ROADS Service

A History of Roads Service 1973 - 2005









An Agency within the Department for Regional Development
www.drdni.gov.uk

Foreword

In late 2003 the Northern Ireland Branch of the County Surveyors' Society proposed that Roads Service should commission a printed document describing the creation of the organisation and the first 30 years of its history. In addition, consideration was to be given to the establishment of a physical archive of important documents and other material.

This proposal was accepted in late 2004 and this document is the result of the efforts of the authors which have included consultation and discussion with many members of staff, both past and present. We were asked to prepare a history that was formal rather than anecdotal.

It was acknowledged that there would be some overlap with other publications and in particular the Institution of Highways and Transportation Silver Jubilee document of 1989, the Roads Service Jubilee Reflections of 1998, and the Northern Ireland Motorway Achievement of 2002.

We considered it important to set the formation of the organisation in the context of the proposals to reshape local government which were developed between 1966 and 1970. There are of course proposals stemming from the recent Review of Public Administration which may have far reaching implications for the Roads Service as we have known it over the last 33 years.

In a publication such as this, it is not possible to record all organisational changes or capture references to all functions the organisation carried out. However we hope that readers will find something of interest in the document.

Finally, this document would not have been possible without the generous assistance of many people, the names of whom we have acknowledged in Appendix E.

Grahame Fraser
Victor Crawford
Douglas Maxwell.

July 2006

Contents

1. Background Before 1973

As an introduction to the history of Roads Service it is helpful to look back briefly at some of the key developments and changes in the administrative arrangements for the provision and maintenance of roads over the years, which brought us to the position that existed in October 1973.

County Borough, County, Urban, and Rural District Councils

1834: County Surveyors in Ireland were appointed by the Lord Lieutenants and were responsible to the County Grand Juries.

1898: The Local Government (Ireland) Act set up County Councils and Rural District Councils (RDCs). In general the cost of road works in rural areas was borne by the RDCs but the Act provided for half the cost of structural alterations on designated "main" roads to be borne by the County Councils.

1909: Lloyd George's budget set up the Road Fund to help local authorities fund road improvements. A Roads Board was established. It distributed the grants from the Road Fund until a Ministry of Transport was established in 1919.

The Roads Act of 1920 provided for a road classification system which facilitated the payment of different rates of grant for different classes of road.

1921: The Northern Ireland Government was set up and a separate Northern Ireland Road Fund was established.

1923: The Local Government (Roads) Act (NI) made the Counties responsible for Class I and Class II and Rural District Councils responsible for all unclassified roads. All roads in towns became the responsibility of County Borough, Borough or Urban District Councils.

The Northern Ireland government set up a Roads Branch in the Ministry of Home Affairs. It was responsible for roads legislation, payment of grants to the local authorities for road improvements and maintenance, and the approval of senior appointments in the County Surveyors' departments. It also paid a portion of the salary of the County Surveyor.

1928: The Roads Improvement Act (NI) gave road authorities the power to acquire land compulsorily.

1937: The Roads Act (NI) enabled the Government itself to construct new roads.

1948: The Roads Act (NI) introduced changes to roads administration. Some of the more important minor roads became a county responsibility as Class III roads, and the Government assumed full financial responsibility for 346 miles of main arterial or 'trunk' roads. Agency arrangements were made with local authorities for reconstruction and maintenance on the trunk roads. This act also gave the Government powers to construct motorways.

1963: The Special Roads Act (NI) gave powers for the operation of motorways.

Grants/Funding

All expenditure on trunk roads and motorways was met from monies voted by Parliament and the Roads Branch of the Ministry of Home Affairs administered this expenditure.

Engineering and administrative staff in the Roads Branch of the Ministry were responsible for the motorway programme. Assistance in delivering this programme was provided from other government departments as well as County Councils.

Local road authorities were paid an agency fee of 6% for administration, maintenance and minor improvement work on trunk roads. An agency fee of 4% was paid for the preparation and execution of major works where the work was done by contract and 5% if the work was done by direct labour.

In 1956 the Government paid grants from the Road Fund of 90% and 75% respectively for the reconstruction of Class I and Class II roads. The grant for Class III roads was 40% and for unclassified it was 25%

In 1967 the Government paid grants of 61.1% of the cost of all construction and maintenance work on local authority roads. When the government's General Exchequer Contribution was taken into account the notional charge on the ratepayers was 18.4%.

Sydenham Bypass - concrete delivery truck

The Ministry of Development

In the 1960s, road development, particularly motorway construction, was buoyant. Dr John Oliver in his book 'Working at Stormont' when referring to this period said 'the excellent roads of Ulster today are a tribute to the single minded energy and self assurance of the Roads Branch of the Ministry and the County Surveyors'.

In July 1964 the Ministry of Development was created. It brought together a wide range of physical services; planning, roads, transport, airports, housing, sewerage, nature conservation, amenity lands, new towns and local government.

In the mid 1960s the senior staff in the Roads Division of the Ministry of Development were:
Maurice K Harris (Assistant Secretary), Bill J Forster and Jim W Logan (Senior Principals), G Fred Chambers (Chief Highway Engineer) with Superintending Engineers George W H Allen and T Jackson McCormick.
Leslie Clements was responsible for structures and W Bailie Russell dealt with motorway planning.

Proposals to Reshape Local Government 1966-69

At this time there was much discussion in political circles of the reform of local government as it was considered that the local authority system was antiquated, had outlived its usefulness and was struggling to cope. It was felt there were too many authorities, many were too small, many were very poor, and the two- tier system of county and district councils was wasteful and confusing.

In Dec 1967 a white paper of preliminary suggestions was published. The aim was to create a simplified, single tier, strong local government system with a full range of powers including housing.

In July 1969 a second paper Cmd 530 'Further Proposals for the Reshaping of Local Government' was published. This proposed a system of 17 Unitary Authorities with no role foreseen for the County Councils. It aimed to deliver a healthy, efficient and responsive local government system.

The 1969 proposals

The 17 unitary areas proposed were:
City of Belfast as it was
Newtownabbey-Hydepark-Ballyclare-Carrickfergus
Larne-Ballycastle
Antrim-Ballymena
Lisburn-Finaghy
Coleraine-Ballymoney-Limavady-Magherafelt
Londonderry
Strabane-Castlederg
Omagh
Dungannon-Clogher-Cookstown
Enniskillen
Craigavon
Armagh-Tandragee

Newry-Warrenpoint
Newtownards-Donaghadee-Downpatrick-Kilkeel
Bangor-Holywood
Banbridge-Hillsborough-Dromore-Castlereagh

The planning, construction and maintenance of roads of regional importance i.e. motorways, all-purpose trunk roads and some Class I roads would be the responsibility of the Ministry. Area Councils would carry out maintenance as agents of the Ministry. The planning and construction of regional routes could be undertaken by agent authorities or by a road construction unit under the Ministry. The remaining classified and all unclassified roads were to be the direct responsibility of Area Councils.

There was much discussion of the proposals. There was concern at the breaking up of the County Surveyors' staff and whether putting them in a larger number of smaller units would be less efficient. There was generally little enthusiasm among roads engineers for the proposals.

Political Intervention

However, with the rise of the civil rights campaign and the beginning of "the troubles", political events were to change the strategy for local government reorganisation.

In consultation with James Callaghan, the Home Secretary, a crucial decision was taken by ministers in October 1969 to transfer responsibility for housing from the local councils and the Housing Trust and give it to a new statutory body, the NI Housing Executive.

This action, whatever its merits, made it impossible to proceed to create a new local government system with a full range of functions.
A new reshaping was required.

The Review of Local Government

In December 1969 Brian Faulkner, as the Minister for Development in James Chichester-Clark's cabinet, appointed a Review Body under industrialist Patrick Macrory as chairman. His task was' The Reshaping of Local Government'.

Other members of the review body were JC Baird, WJ Blease, Michael G Bready, TD Lorimer and EMR O'Driscoll. The secretary was John A Oliver.
There were also 3 assessors from the 3 bodies representing the local authorities in Northern Ireland.

The Review Body reported to Brian Faulkner on 29 May 1970. It proposed that Stormont (itself an elected authority) be responsible for the regional services and that district services should be the responsibility of not more than 26 District or Borough Councils. There was to be no role for County Councils.

The Case for one Road Authority

The decision in October 1969 to put the control of public housing in a new statutory body covering the whole province (the NI Housing Executive) pointed to a conclusion of the reshaping of local government quite opposite to that put forward in the July 1969 proposals for 17 unitary authorities with a full range of functions.
It was considered that as housing, roads, water, sewerage and the other main environmental services were inter-dependent they should each be administered centrally.

Reasons stated at various times for roads to be managed centrally included:

(a) Northern Ireland is smaller than Yorkshire,

(b) roads are largely financed from central funds,

(c) the present division of responsibilities between government departments and local councils causes delay and duplication,

(d) A large number of very small Councils led to difficulties in recruiting professional and technical staff and to the fragmentation of technical skills,

(e) the perceived failure of local government to attract sufficient numbers of elected representatives of the right calibre,

(f) the existence of Stormont, the regional parliament of Northern Ireland.

At the time of these proposals there were 69 road authorities in Northern Ireland – the Ministry of Development, 2 Development Commissions (Craigavon and Londonderry), 66 Councils:-, 6 County Councils, 2 County Borough Councils, 8 Borough Councils, 24 Urban District Councils and 26 Rural District Councils.

Macrory recognised the inefficiencies in this structure and recommended planning, roads, traffic management, water, and sewerage be vested in

the Ministry of Development and be organised on a functional basis.

Macrory Report 1970

Macrory's proposals can be summarised:

1 Two levels of executive responsibility:
(a) the elected regional Government responsible to NI Parliament working through Ministries.
(b) up to 26 elected District Councils working as local authorities responsible to their electorates.
2 Ministries responsible for regional services. District Councils responsible for local services.
3 Ministries to decentralise to provincial towns the day by day management of regional services under flexible arrangements as appropriate to the service.
4 District councils responsible for district functions in 5 categories
(a) executive functions conferred by law
(b) agency functions delegated by Ministries
(c) representative role on area boards & other agencies
(d) consultative role as consumer councils
(e) ceremonial
5 Rate to be struck in two parts – regional & district
6 Community groups for small localities where desired.

The recommended 26 Borough or District Councils were:

Antrim, Armagh, Ballycastle, Ballymena, Ballymoney, Banbridge, Bangor, Belfast, Carrickfergus, Castlereagh, Coleraine, Cookstown, Craigavon, Downpatrick, Dungannon, Enniskillen, Larne, Limavady, Lisburn, Londonderry, Magherafelt, Newry, Newtownabbey, Newtownards, Omagh, Strabane

Delivery of Regional Services

Macrory said that the following services which are at present provided wholly or partly by local authorities should also be treated as regional.

Education, public libraries, personal health welfare and child care, planning, roads and traffic management, water, major sewerage schemes, food composition standards and labelling, tourism, electoral arrangements, motor taxation, criminal injuries compensation, major harbours, gas, electricity, public road passenger transport, fire.

The Services should be clearly vested in the appropriate Ministries e.g. "Planning, roads, traffic management, water, main sewerage systems in the Ministry of Development.

Ministers would be answerable to the Northern Ireland Parliament for the effective provision and performance of regional services. They could not divest themselves of this.

Ministries might employ professional/technical staff for the management of regional services.

Ministries could determine the degree of decentralisation and / or delegation depending on the service.

Ministries might conclude that district councils would be suitable agents providing they are willing and have the competence.

Management arrangements should be capable of being altered if necessary without upsetting the historic structure of power.

Cutting the ribbon on the Belfast – Enniskillen road at Maguires Bridge.
The road was opened by the then Transport Minister

2. Conception and Birth Pangs

While the Macrory Report of May 1970 set out the broad principles of the way forward, much further work was needed to develop the single roads organisation which eventually came into being on 1st October 1973.

Development of Outline Organisational Structure for Roads

Regional services were to be delivered by Ministries who were left to work out the details. After consultation with the Deputy Secretary, John F Irvine, Harris (until September 1970), Chambers and McCormick of Roads Branch in the Ministry of Development produced preliminary proposals for the future delivery of regional services covering all road and traffic matters including services such as street lighting and car parking.

An outline structure was proposed consisting of:

A Headquarters Unit to deal with general policy and finance, legislation (primary and subordinate), the rural motorway programme (which was then just past its peak period of expenditure), forward planning of motorways and other main roads, and the design of major structures. There would be a Chief Executive, an Assistant Secretary, a Chief Engineer and appropriate senior administrative and professional and technical staff.

Divisional Offices (4, 5 or 6) based on the existing County Surveyor's offices plus a large office in Belfast. Each divisional area would consist of 3, 4, 5 or 6 whole District Council areas. Each Divisional Office should have a Chief Engineer, a deputy and four or more senior engineers to run the functional aspects of the work such as traffic, forward planning, design, construction, private streets, structures etc.

This work formed the basis for discussions at a senior level in the Ministry of Development under the chairmanship of Dr. Oliver.

The Minister of Development, Brian Faulkner, presented the Macrory Report to the Northern Ireland Parliament on 25th June 1970. A two-day debate followed on 28th and 29th October. During November and December intensive discussions took place in the Ministry of Development. On 16th December 1970 the proposals for Roads, Planning, and Water and Sewerage were finalised at a large meeting of senior staff, again under the chairmanship of Dr. Oliver. These proposals formed the basis of a statement in the House of Commons on 17th December by the Prime Minister of Northern Ireland, Major J Chichester-Clark.

Following the Prime Minister's statement, Mr Brian Faulkner opened a two-day debate on 20th and 21st January 1971. In his statement he used "Road Works" as his example of how future services could be delivered.

In March 1971 James Chichester-Clark resigned. Brian Faulkner became Prime Minister and Roy Bradford became Minister of Development

At a Ministry of Development meeting on 5th April, it was agreed that the Roads organisation should adopt the same 6 divisional areas as the Planning Department. The Water organisation based its divisional areas on catchments. It was further agreed that roads matters would not be delegated to District Councils in the form of agency agreements, but that consultation with them was a necessity.

Throughout 1971 discussions and consultations took place with a wide range of interested groups including the then County Surveyors (T A N Prescott, J M Buchanan, C A Craig, W N Brady, H K Scott and S C Neely).

The outline structure was agreed in January 1972, when it was confirmed that all design would transfer from Fermanagh County Council to the new Division based in Omagh and that the new Ballymoney and Ballycastle District Council areas would form part of Coleraine Division.

Appointment of the Chief Executive

Early in 1972 the Ministry of Development started the recruitment process for the future heads of the Planning, Water and Roads organisations and other senior staff.

Interviews for the post of Chief Executive Designate of the Roads Executive were held on 2nd February 1972. The candidates were H T Bergin (Chief Engineer, Craigavon Development Commission), the County Surveyors of the two premier counties – C A

Craig of Down and T A N Prescott of Antrim – and G F Chambers of the Ministry of Development.

On 11th February 1972 it was announced that Noel Prescott had been appointed with effect from 1st April 1972

Appointment of Divisional Executives

Interviews for Divisional Executive posts were held between 16th March and 23rd March 1972. The successful candidates were announced on 19th April. They were:

Belfast
T A Warnock, Deputy County Surveyor Londonderry
F Regan (Deputy), Deputy City Surveyor, Belfast Corporation
E W Boland (Deputy) Superintending Engineer, Ministry of Development

Ballymena
J C Forth Deputy County Surveyor, Antrim

Coleraine
H K Scott County Surveyor, Londonderry

Craigavon
J M Buchanan County Surveyor, Armagh

Downpatrick
J D Kirk County Surveyor, Down

Omagh
S C Neely * County Surveyor, Tyrone

* On 10th November 1972, Charles Neely was killed in a car accident. On 5th January 1973 Ambrey Fitzsimmons of Newtownabbey Council was chosen to replace him.

On 28th April1973 the first meeting of the Roads Divisional Executives Designate was addressed by Dr Oliver and Messrs Irvine, Prescott and Chambers.

Detailed Structures – Working Parties (WPREs)

Following the creation of the outline structure, it was agreed to set up a number of working groups to deal with each aspect of reorganisation in more detail, under an overall Steering Group chaired by John F Irvine

They started work on 12th May 1972, when there were meetings of WPRE1, Organisation, chaired by Noel Prescott and WPRE3, Land Acquisition, chaired by Jackson McCormick. Other working parties included Finance chaired by Bill Forster, Maintenance chaired by Jack Buchanan and WPRE8, Traffic Management, chaired by Brian Palmer of the Ministry of Home Affairs. These working parties produced guidelines for use by the new organisation.

The work of the various Working Parties continued through 1972 and 1973. The last meeting of WPRE1 Organisation was on 7th September and the last meeting of the Steering Group was on 28th September 1973.

Staff Appointment Process

Interviews were held during 1972 for both Senior and Main Grade Engineers, with the last interviews being held on 18th December. Staff were (with a few later exceptions) allocated to the new structure in Divisions and Headquarters by 2nd January 1973.

Staff Concerns

During the period following the adoption of the Macrory Report until October 1973, there were many concerns expressed by members of staff relating to where they might have to work, what work they would be assigned, and what their conditions of employment (mainly pay, retirement age and pension rights) would be.

These concerns led to local authority staff forming an organisation called the Association of County Highway Engineers (ACHE) to negotiate on their behalf and to protect their interests leading up to October 1973. The uncertainty prompted some staff to leave and seek work outside Northern Ireland, but the majority stayed and moved to their allocated posts to form the new single-tier roads authority.

The assimilation of staff from the more extensive local authority pay scales to Civil Service pay scales took a considerable period of time. Branches of the Civil Service Professional Officers Association (CSPOA) were formed in the new divisions and were very active in helping individual members reach agreement with central Personnel Department.

Changing Political Background

“The Troubles” continued throughout this period with Internment being introduced in 1971. On the morning of 24th March 1972 Edward Heath announced that Brian Faulkner’s cabinet had resigned, the Stormont

Parliament would be prorogued and a Secretary of State for Northern Ireland would be appointed.

The main legislation necessary for the setting up of the new structures – the Local Government Act (Northern Ireland) 1972 – had gone through all the necessary parliamentary procedures by 23rd March 1972 – just one day before the dissolution of the parliament. The new Secretary of State, William Whitelaw, and the Minister of State, Lord Windlesham, continued the process, which had been set in train by Brian Faulkner and Roy Bradford.

Postponement from April 1973 to October 1973

The target date for the completion of the whole reshaping exercise was 1st April 1973. However, it became apparent that this was over ambitious. It was decided to postpone the implementation of the new structures until October 1973, with the elections to the new District Councils held in May.

Transfer of Functions

Statutory Rule and Order No. 278, 1973, made on 20th August 1973 under Section133 of the Local Government Act (Northern Ireland) 1972, provided for the transfer of all functions in relation to Roads and Traffic to the Ministry of Development on 1st October 1973.

Shortly thereafter, the roads and traffic functions of the Ministry of Development were transferred to the Department of the Environment. At that time the principal enactments relating to roads and road traffic were the Roads Act (NI) 1948, the Private Streets Act (NI) 1964, the Down County Council (Strangford Lough Ferry) Act (NI) 1967, the Road Traffic Act (NI) 1970 and the Local Government Act (NI) 1972.

3. The Roads Executive 1st October 1973

When staff took up their new posts, by far the largest group had been employed in local government and their entry into a new centralised Civil Service was a major cultural change. This was particularly so for those who remained in a network of existing local offices and many were reluctant to accept the new regime The former local government staff had much to learn about the bureaucratic workings of the Civil Service, such as the processing of travel claims, the requisition of office equipment and furniture, staff salary structure etc. The Civil Service had even more to learn about managing a large industrial workforce that was employed on minor works and maintenance schemes. New systems had to be introduced to meet the needs of an organisation of almost 1000 professional and technical staff, 500 general service grade staff and 3500 industrial staff. While there was some confusion in the initial days and months, there was a general willingness to make the new organisation work. Most importantly, improvement and maintenance works to the roads system continued as normal throughout the changeover period.

The Directorate and Divisional Executives

The Roads Directorate, Noel Prescott (Chief Executive), Fred Chambers (Chief Engineer) and Dan Barry (Assistant Secretary), together with their headquarters staff, were based in the Stormont Estate.

The six Divisional Executives were located in County Hall, Ballymena; Hydebank, Belfast; County Hall, Coleraine; Bachelors Walk, Craigavon; English Street, Downpatrick and County Hall, Omagh.

Finance

The changeover to the new organisation coincided with the 'Yom Kippur War' in the Middle East, which had serious effects on oil supplies, leading to a downturn in the economy. On the 17th October 1973 the sheiks put up the price of oil by 70% and started to reduce output by 5% per month. Preparations were put in place for the introduction of fuel rationing and there was a significant reduction in traffic volumes. This economic crisis led the U.K. government to introduce substantial reductions in public expenditure. As a consequence there were very severe cuts in the funds available for roads in Northern Ireland. The Road Fund had been abolished in March 1973, so there was no longer any hypothecation of funds for road works.

Noel Prescott

Fred Chambers

Dan Barry

4. Developments from 1st January 1974

The Power Sharing Executive

On 1st January 1974 the new Assembly at Stormont came into being. Statutory Rule and Order No. 504 1973 dated 29th December 1973 transferred the roads functions of the Ministry of Development to the new Department of the Environment for Northern Ireland. Roy Bradford became the Minister responsible for the Department of the Environment.

However, the Assembly was short lived and was brought down by the Ulster Workers Strike, which lasted from 14th to 28th May 1974. Direct Rule was re-introduced with Merlyn Rees as Secretary of State for Northern Ireland and Roland Moyle as Minister responsible for the Department of the Environment.

Change of Name

To avoid confusion with the political Executive, the Roads Executive became the Roads Service and Noel Prescott's title became 'Director of the Roads Service'.
The Divisional Executives became 'Divisional Roads Managers'.

Organisational Structure

The Roads Service Directorate consisting of the Director, the Chief Engineer and the Assistant Secretary was in effect the executive board of the organisation and was responsible for all key corporate decisions. There were two Superintending Engineers George Allen and Leslie Clements who were responsible to the Chief Engineer in Headquarters. The 6 Divisional Roads Managers were responsible to the Director but were largely autonomous in their local areas in terms of developing and delivering the programme. The Belfast DRM's post was created at Chief Engineer grade, and he had two deputies at the same grade as the other DRMs. The DRMs were required to formally consult with local councils in their areas at least twice per year. This consultation commitment was not enshrined in the Transfer of Functions Orders of 1973 but was as a result of a commitment given by Brian Faulkner, the Minister of Development. A commitment to consult with councils at least once per year was later written in to the Roads (NI) Order 1980.

The Divisional Headquarters were mostly established in existing buildings where the former County Surveyor had been based except for the Belfast Division which was established in a new prefabricated building at Hydebank which had initial planning consent for 5 years.

The Divisional boundaries were contiguous with District Council boundaries and with the boundaries of Planning Service. The council boundaries were as recommended by Macrory but some of the councils chose new names. The 26 city or District Councils were:

Antrim, Ards, Armagh, Ballymena, Ballymoney, Banbridge, Belfast, Carrickfergus, Castlereagh, Coleraine, Cookstown, Craigavon, Down, Dungannon, Fermanagh, Larne, Limavady, Lisburn, Londonderry, Magherafelt, Moyle, Newry, Newtownabbey, North Down, Omagh and Strabane

Each District Council area had at least one Section Office that was the main point of local contact with Roads Service for councillors and the general public. Some council areas had two or even three Section Offices initially. These were: Armagh (North and South), Belfast (North and South),Dungannon (Clogher and Dungannon), Fermanagh (Fermanagh North, Fermanagh South, and Belmore), Newry and Mourne (Newry East and West), and Omagh (Omagh and Drumnakilly).

Roads Service inherited a huge estate of depots, garages, yards, and stores from the former local authorities including a quarry, a tram depot, ferry vessels, a blacksmith's shop and a plant nursery.

The model divisional structure had 4 Principal Professional and Technology Officers (PPTOs) and a Divisional Finance Officer under the Divisional Manager.These PPTOs had responsibilities for: Forward Planning (including street lighting), Works, Maintenance, and Structures / Computers. However there were variations to suit local circumstances particularly in Coleraine, Omagh and Belfast.

Under the PPTOs there were a number of PTO1s (later re-titled as Senior Professional and Technology Officers)

Roads Service Divisions and Offices 1973

Directorate / DRMs Meetings

Roads Service was a very large organisation with offices throughout Northern Ireland and there was regular contact between Divisions, and with Headquarters, at all levels in the organisation.

The Directorate held regular, usually monthly, meetings at which the strategic decisions were taken. Other senior headquarters staff would attend by invitation to give presentations on specific functional areas of the business.

The main formal link between the Directorate and the DRMs was through the quarterly Directorate / DRMs meetings. This meeting was normally preceded by a meeting of the DRMs' Society at which issues of common interest in Divisions were discussed prior to the meeting with the Directorate.

Prior to the formation of Roads Service in 1973, the then County Surveyors were members of the County Surveyors' Society, which was a UK wide organisation. After 1973, the County Surveyors' Society took the view that the Northern Ireland members were no longer eligible for membership because they were now employed by central government rather than by local authorities. The need for an alternative forum to discuss matters of mutual interest led to the formation of the DRMs' Society.

Roads Service Management Group

The Roads Service Management Group (RSMG) meetings were introduced in 1994 by Walter Martin to replace the quarterly meetings of the DRMs with HQ senior management. These monthly meetings were introduced at a time of extensive market testing of maintenance activities as it was considered that there would be benefit in the Directorate having regular and frequent face to face discussions with those actually responsible for delivering the service on the ground. The RSMG meetings were chaired by the Director and attended by all staff at Superintending / DRM grade and above. These meetings enabled the DRMs to have a greater input into the decision making process.

The RSMG continued as the main management meeting through the transition to Agency status in 1996 at which time the composition of the Directorate changed to: Chief Executive, Technical Director, Director of Operations, Director of Corporate Services, and Director of Finance

Heads of Business Units Group

Following the restructuring in 1999 to 4 client divisions, the Transportation Unit, Roads Service Consultancy (RSC) and Roads Service Direct (RSD), the RSMG was replaced by the Heads of Business Units Group (HOBUG) which met quarterly. It was considered that this better reflected the ethos of separate business units in the new structure.

Each Director held his own business unit meetings such as the Network and Customer Services Board where the Director of Operations met monthly with the DRMs.

Progress Meetings

Progress Meetings began early in the life of Roads Service. They were set up to monitor progress on a divisional basis in the delivery of capital projects. The meetings were held four times a year between Roads Service HQ senior management and Divisional senior management. They were held in each Divisional Headquarters.

The Director chaired the meeting and was supported by the Chief Engineer, the Assistant Secretary, Superintending Engineers and the Senior Engineers responsible for scheme programming and lands.

The Divisional Roads Manager, the Senior Engineers, the Divisional Finance Officer, and the Lands Officer represented the Division.

In 1985 the frequency was changed to 3 formal meetings per year, with the summer meeting being given over to the Director alone visiting the Division to look at works on the ground.

As the major works programme reduced over time, the meeting concentrated more on maintenance and financial monitoring.

To ensure the Progress Meeting went smoothly, and did not last more than half a day, a Pre-Progress Meeting was held about 2 weeks in advance. Their aim was to prepare an agenda for the Progress Meeting and to research any contentious issues to avoid them monopolising the main meeting.

The Progress Meetings continued in this form until the formation of the Agency following which the Director of Operations continued to meet with the 4 Client Divisions.

Roads Service Committees

The Working Parties (WPREs) that were established during the formative period were transformed into Roads Service Committees (RSCs). These were advisory technical committees with responsibilities for each main functional area; maintenance, works, forward planning and traffic, and street lighting. Each Division and HQ was represented on all committees, usually at PPTO level. They reviewed and developed Roads Service technical policy and procedures and made recommendations for change. The committees played an important part in seeking to achieve consistency of practice and procedures across all Divisions of Roads Service.

Following a review of the committee structure, Standing Technical Advisory Groups (STAGS) replaced the RSCs. These were modelled to better reflect the client/contractor split. However in 2001, following concerns about their effectiveness, the STAGs were stood down for a period.

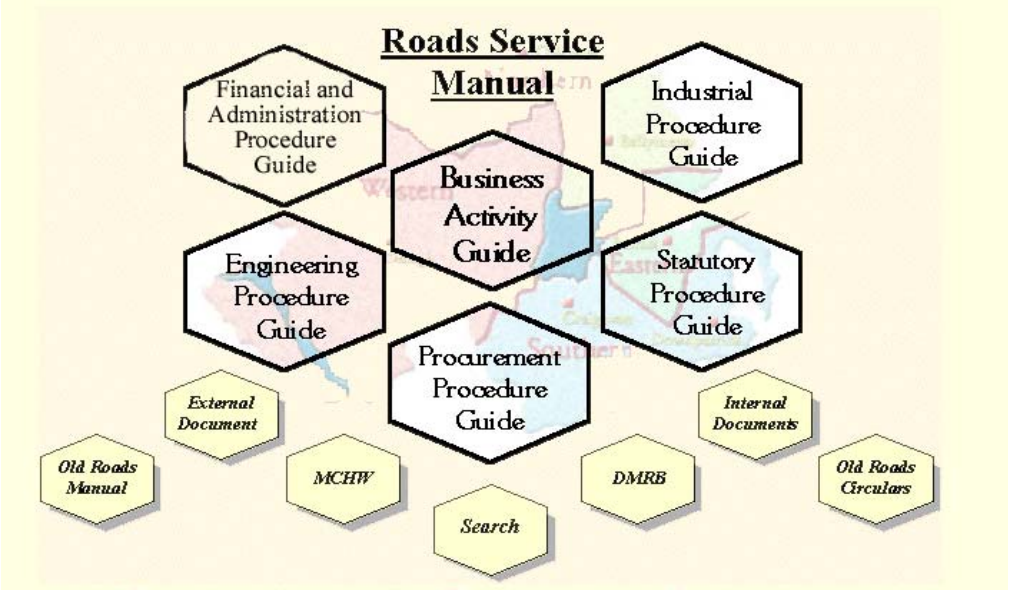
The current committee arrangements, which were introduced in 2002, are:

- Network Maintenance Committee
- Network Planning Committee
- Network Development Committee

Roads Service Manual

Seeking to ensure uniformity of approach across the Divisions Roads Service published a manual that contained guidance on administrative and engineering procedures for staff. This consisted of circulars and directives conveying Roads Service policy. At first the information was general but as time passed, Roads Service Committees (RSCs) considered and made more detailed recommendations on new input to the Manual. Unfortunately the effort required to keep the manual up to date was greater than the resources available. Some chapters of the Manual received more attention than others but it could never have been said to be complete.

In 1999 it was decided to produce a new Roads Service Manual based on best practice in similar organisations. The aim was to have a set of all policy and procedure guides for all staff in one document.



The Manual core consists of 5 Roads Service Policy and Procedure Guides. They cover Finance and Administration, Engineering, Procurement, Procedures for Industrial staff, and Statutory Procedures. They are cross-referenced to the old Roads Manual, various external documents, the Design Manual for Roads and Bridges (DMRB) and the Manual of Contract documents for Highway Works (MCHW) etc. It is in electronic format, managed by RSHQ and updated monthly.

Organisational Change

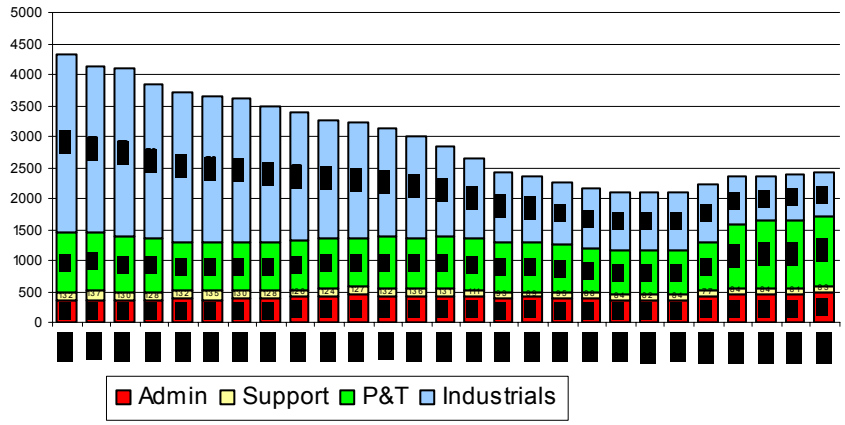
Roads Service was and still is unique among road authorities in the UK in the range and scope of its responsibilities and activities. The structure reflects the three distinct roles being undertaken – a central government department, a local authority and the direct provider of services.

The organisational structure devised in 1971/72 proved to be soundly based and remained relatively unchanged for the first 20 years or so. The only significant change in this period being the formation of the Transport Management Group in 1991.

The Conservative government came to power in 1979 and began to seek reductions in public spending across the UK. This led to pressure to cut staff numbers in Roads Service as programme resources gradually reduced and the government introduced the concept of Departmental Running Costs (DRC) as a crude tool to control the size of the Civil Service. In the early 1980s a team from Management Manpower Review Division of the Department of Finance and Personnel led by Bill Gazzard carried out a broad-brush study of Roads Service staffing levels. This exercise proposed widespread reductions but left Roads Service management with the problem of how to implement staff cuts while retaining a viable organisation.

Technical staff reductions were achieved by redeployment to Water Service following the attendance of Roads Service staff at SIFT board interviews to determine their suitability.

Roads Service Manpower Figures



Despite the professional and technical staff redeployment there was a view often expressed, particularly by the trades unions representing industrial staff, that the staff cuts to reduce DRC were mostly borne by the industrial workforce, which was seen as the soft under belly of the organisation.

In 1980 a new section was set up in Roads Service Headquarters under Bob Roulston and Joe Drew to carry out work studies in all areas of industrial activity, and devise and introduce productivity schemes in all Divisions.

The reduction in numbers was achieved without any compulsory redundancies and was compensated by a significant improvement in productivity of the industrial workforce such that in 1992 about 1500 staff delivered the same output as 3500 had delivered in 1973.

By 1994/95 the staff complement was 2,724 of which 1345 were industrial employees. The number of industrial staff had fallen from about 3,500 in 1973.

Market Testing

The Conservative Party manifesto prior to the 1979 general election particularly targeted local direct labour schemes as examples of inefficiency, and when they were elected to government they implemented policies that brought increasing pressure on direct service providers in the public sector to demonstrate that they were achieving value for money. In Northern Ireland a special Market Testing Unit was established within the Central Purchasing Unit of Department of Finance and Personnel to promote programmes of Market Testing within Departments of the Northern Ireland Civil Service.

This Market Testing initiative was the Civil Service version of Compulsory Competitive Tendering (CCT) that was applied to Local Authorities, through legislation introduced by the Conservative government. Following consideration of whether or not an in-house activity needed to be continued, market testing involved business planning, to identify efficiency measures, and the calculation of in-house costs. In parallel with this, a separate team produced a service specification and contract documents. The final part of the process involved a formal tender competition with private sector competitors, and the award of the “contract” to the organisation that offered the best value for money for the government.

As Roads Service had a large Direct Labour Organisation that carried out many activities which could be undertaken by private sector providers, it came under great pressure to deliver an ambitious market-testing programme. The programme that was agreed in the late 1980s required Roads Service to complete a larger programme of Market Testing than any other part of the NICS.

The formal programme of market testing took place over a 4-year period, in the early 1990s. The functional activities to be market tested were agreed in negotiations involving Eddie Galway, Roads Service’s Assistant Secretary, and John Whitlaw, the Department of the Environment’s Under-Secretary with responsibility for Roads Service. The activities selected for testing included surface dressing, Castlenavan Quarry, grass cutting and verge maintenance, bridge inspections, gully emptying, laboratories, car park operations, winter service, and the Strangford Lough ferry service.

These activities were selected as they were managed and carried out in a manner that allowed in-house costs to be readily calculated and efficiency measures to be implemented independently. The main players involved in this work were Billy Walker (HQ Highway and Bridge Maintenance Section) and Ivan Coffey (HQ Finance). Assistance was provided by management consultants from a Coopers and Lybrand team, led by Bob McCullough.

The outcome was that in-house teams won work to the value of £5M (92%) through market tests carried out in this period. While most of the work was subjected to formal tendering, this step was avoided in some cases, due to the clear cost or operational advantages of retaining the work in-house. The initial 4-year testing programme caused considerable stress and upheaval and it was to the credit of the many staff involved that the organisation emerged largely unscathed, but with increased self-confidence, after that period. There were, however, government plans to expose much larger parts of the NI Civil Service to the rigours of market testing in the coming years.

At this time the client and internal contracting staff were integrated and this made for difficulties in de-

termining clarity of roles and identifying the costs required for market testing. This was one of a number of catalysts to introduce a major organisational change and separate the client and contractor role. This was regarded as a pre-requisite to the market testing of the core maintenance activities.

One outcome was the setting up of Direct Service Organisations (DSOs) in 1994. These were divisionally based and under the control of the DRM. This separation of the client and contractor duties brought about a significant change in the role of the Section Engineer and, in the early days, introduced tension in that part of the organisation.

In order to be able to compete successfully against the private sector, the DSO had to adopt a commercial ethos which was foreign to both the staff and the Trade Union Side (TUS) who represented them in negotiations over changes to the productivity bonus scheme. It was a great frustration to the managers of the DSO that they were constrained from adopting a wholly commercial approach as the new organisation was still subject to the Departmental Running Costs (DRC) regime and was prevented from tendering for work in the private sector.

Prior Options Study 1994

On 18 January 1994, the Minister of State, Sir John Wheeler, announced in the House of Commons that, in considering the scope for further “Next Steps“ agencies, Prior Options Studies would be undertaken for a number of business areas under the control of Northern Ireland Departments .One of the areas to be subjected to such a study was the Roads Service of The Department of the Environment for Northern Ireland.

The study was completed by October 1994 and reported on number of options for the future of the organisation.

The Abolition Option

It was concluded that the abolition of functions undertaken by Roads Service was not a realistic option. The Province and its community would be unable to operate effectively without a reliable and efficient road system. For that reason alone, the statutory duties and responsibilities of the public road authority must continue to be discharged and therefore the cessation of functions was considered to be impractical.

The Privatisation Option

The report concluded that in the context of the scale of activity in Northern Ireland the opportunities for involving the private sector in the designing, building, financing and the operation of specific road projects was extremely limited. The prospect of creating a revenue stream (e.g. from tolls) that would provide private funds for reinvestment and thus lead to privatising all or part of the network was considered to be very remote, at least in the short term.

Two revenue streams were identified - car parking with receipts of about £3M per year and the Strangford Lough ferry service which yielded about £0.5M.Both were considered for privatisation.

The study concluded that it was important, for traffic and transport policy reasons, that the Department remained in a position to influence the scale, location and pricing of car parking and therefore contracting out those car parks still managed by Roads Service was considered to be a more effective goal.

Against the background of the local political reaction when the ferry operation was market tested previously and the fact that privatisation would only be achievable through the payment of a subsidy for an indefinite period, contracting out the day to day operation was considered to be a more realistic option.

The Contracting Out Option

While market testing provided the assurance that value for money is obtained in the delivery of public sector services, it was identified that there was a risk in in-house teams entering into contractual commitments against an unstable DRC background. Alternatively, the new problem was that more extensive market testing coupled with continuing cuts in DRC allocations, could result in work being lost piecemeal to the private sector, with experienced staff teams being dispersed.

Externalisation or strategic contracting out had been adopted by a number of local road authorities in England and this was seen as the preferred means of delivering many of the Department’s road functions subject to it representing good value for money.

The study identified that the externalisation option would be undeliverable unless there was a clear

and positive resolution on 2 key issues within the control of the Department of Finance and Personnel. These were that programme funds would have to be substituted for DRC provision to the extent of about £40M per year, and that firm assurances about future funding in the medium term would need to be in place.
Equally the cooperation of the staff would be critical to the successful implementation of an externalisation proposal.

Outcome

The prior options study proposed that:

- The Department should retain in its core a small Roads Division responsible for policy, legislation, resources, etc.
- A Roads Service Next Steps Agency to be created by April 1996 with a few hundred staff to manage the Department's statutory responsibilities for roads. The new agency would become a purchaser rather than a provider of services.
- Upwards of 2000 jobs to transfer to the private sector over a period of 3 years.
- A small Ministerial Advisory Board to be created to advise on the strategic direction of the agency and its performance

Initially the Department accepted this plan. The proposal to contract work out through externalisation did not, however, find favour either with staff, trade union officials, or local politicians. As a result the Minister concluded that, on balance, the provider activities of Roads Service should be exposed to competition through market testing rather than strategically contracted out. The externalisation plans were, as a result, converted to an extensive market testing programme of an equivalent value and over a similar timescale.

Agency Status

It was against this background that on 1 April 1996 Malcolm Moss, Minister of the Environment, launched Roads Service as an Executive Agency within the Department.

The existing organisational structure was retained to allow time for the many other changes associated with agency status to settle down. The Agency was, however, committed to a root and branch review of the entire organisational and regional structure.

A Ministerial Advisory Board was put in place and Nigel Nott and Mike Callery former County Surveyors of Hertfordshire and Lancashire respectively were appointed as independent external advisors.

Organisational Review

In September 1996 the management consultants Deloitte and Touche were commissioned to undertake a study to recommend the structure best suited to Roads Service needs and to advise on contract packaging for both the consultant and contractor provider functions.

Restructuring Proposals

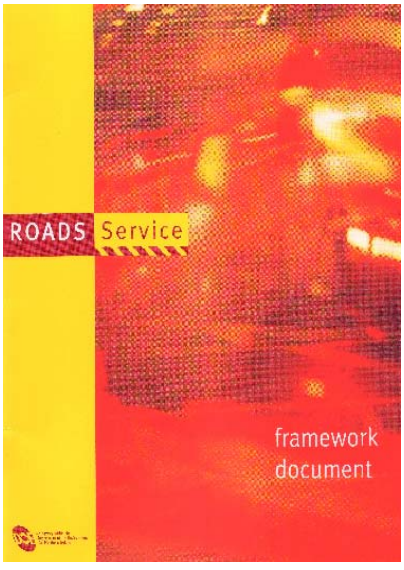
Having consulted widely with other road authorities and organisations the consultants developed and proposed a best practice model for the structure of Roads Service based on the separation of the purchaser (or client) and the provider roles (the consultant, the contractor and some of the business support functions).

The recommended revised organisational structure was to consist of;

A Directorate composed of a Chief Executive with 3 Directors one of whom was to be responsible for business services, one for engineering policy, and one for network and customer services;

4 Client Divisions based around a reduced number of 24 Section Offices;

A single Consultant Provider with a clear focus on engineering activities;



A Direct Service Organisation that was centrally managed but with staff based locally as appropriate.

This structure was broadly accepted as an appropriate model except that, after much debate, it was decided to retain 4 Directors with the Director of Finance and Director of Corporate Services as separate posts.

Implementation of the New Organisational Structure

The Directorate was aware of the outcome of the Delotte and Touche study by the Spring of 1997. However the General Election of May 1997 resulted in the election of a Labour government and by early June it announced that it was pressing ahead with its manifesto commitment to replace Compulsory Competitive Tendering with a new duty for public authorities to ensure "Best Value" for the public.

This change in policy presented an opportunity for Roads Service to seek to move from the commitment to significant market testing to achieving efficiency gains through embracing the principles of best value and using techniques such as benchmarking and business process re-engineering. The Minister, Lord Dubs, agreed to this approach and consultations began with staff in August 1997. It was recognised that it would be a huge task to successfully implement the change process required to bring in the new structure while maintaining an appropriate level of service delivery but this challenge was accepted.

It was realised at an early stage that good communication with staff was vital to a successful implementation strategy and a Communications Task Team was established to meet regularly with staff in Divisional offices to keep them up to date, answer questions and act as a conduit for feedback to the Directorate.

Throughout 1997 there were many informal discussions with the Northern Ireland Public Service Alliance (NIPSA) about the implications of the proposed organisational review. The formal consultation on the proposals contained in the consultant's report commenced in August 1997.

NIPSA expressed considerable reservations about the proposals. These ranged from challenging the principle as to whether the proposals actually delivered Best Value in line with the new government's priorities, through concern about the boundaries between the duties of client and consultant staff, to staffing numbers in particular section offices.

While the restructuring proposals were never "accepted" by NIPSA the discussions always took place in an appropriate and business-like manner. This led to a position where, by the end of 1997, a Central Change Management Team led by a project manager was in place, and the Heads of Business Units appointed on a "Designate" basis with a view to the new structure becoming fully operational by 1 April 1999.

An early task was to establish the assignment criteria for Grade 7 level staff and to agree the Grade 7 structure and nominate staff to posts. The development of the detailed staff assignment procedures was recognised as being critical to a successful implementation process. The key criteria as to whether staff were assigned to the client, consultant or direct labour structures was the percentage time spent in these roles in their existing duties.

The boundary changes and the split into separate business units had a big impact on some staff, for example in the former Downpatrick Division which lost much of its client function and became the new headquarters of the Consultancy. The grades and location of staff did have some influence on the final structure in an attempt to mitigate the distances staff had to travel, for example some financial functions were transferred to Downpatrick and the structures section of the new Consultancy was centred in Ballymena. The process of assigning staff to the posts in the new organisation that was developed and implemented proved to be fit for purpose and resulted in only a handful of appeals against the decisions.

Chief Executive Billy McCoubrey was due to retire in mid 1999 and it was agreed that a Chief Executive Designate would be appointed who would act as the Director of Implementation of the change process in the interim period.

Colin James was appointed and took up post and subsequently succeeded to the post of Chief Executive in August 1999.

Malcolm McKibbin took up post as Chief Executive on 24 June 2002.

5. Network Maintenance

5.1 Staff Structure

In 1973 a Senior Engineer was appointed in each Division, with responsibility for Maintenance and Minor Improvements. Omagh Division was the exception in that two were appointed to cover its larger area; one based in County Hall, Omagh covered Strabane, Omagh and Cookstown District Council areas and the other in Castle Barracks, Enniskillen covered Fermanagh and Dungannon District Council areas. While each Senior Engineer had a main grade engineer to assist him, the bulk of their staff was based in local Section Offices under Section Engineers. For the most part, Section Office boundaries and District Council boundaries were contiguous.

In the late 70's and early 80's Central Services Principal Engineer posts were created in Craigavon, Ballymena, Downpatrick and Belfast Divisions, in most cases by the suppression of the original Structures and Computers posts. These new posts were designed to reduce the workload of the Maintenance Principals. However, they were not introduced in Omagh or Coleraine as these two Divisions opted to keep their original structures i.e. two maintenance Principals in Omagh and a Principal post in Londonderry While there was some variation in the duties assigned to each post, they included –

Maintenance Depots
Vehicles and Plant Maintenance and Purchase
Winter Maintenance
Salt Barns
M.A.R.C.H. Survey
Inventory Survey
Laboratories
Work Study/Productivity
Street Lighting
Contracts and Budget Control

While there was some re-assignment of duties in 1994 with the creation of the Divisional DSO's, it was not until 1999 that the Central Services posts were done away with as most of their duties were transferred to the new Roads Direct or Consultancy organisations. A single Maintenance Principal post was then established in each of the four new Client Divisions.

5.2 Funding

The Northern Ireland road network consists of about 24,900 km of public roads together with some 9,000 km of footways and 5,800 bridges. The maintenance of these assets, which have a replacement value of around £20 Billion, has been one of Roads Service's highest priorities since the organisation was formed, but there have always been tensions between competing areas of spend both within Roads Service and in the wider public expenditure arena.

In the face of declining maintenance funds, a strategy of maximising spend on structural maintenance activities such as resurfacing and surface dressing while minimising spend on routine maintenance activities such as grass cutting, gully emptying etc consistent with safety standards, was adopted

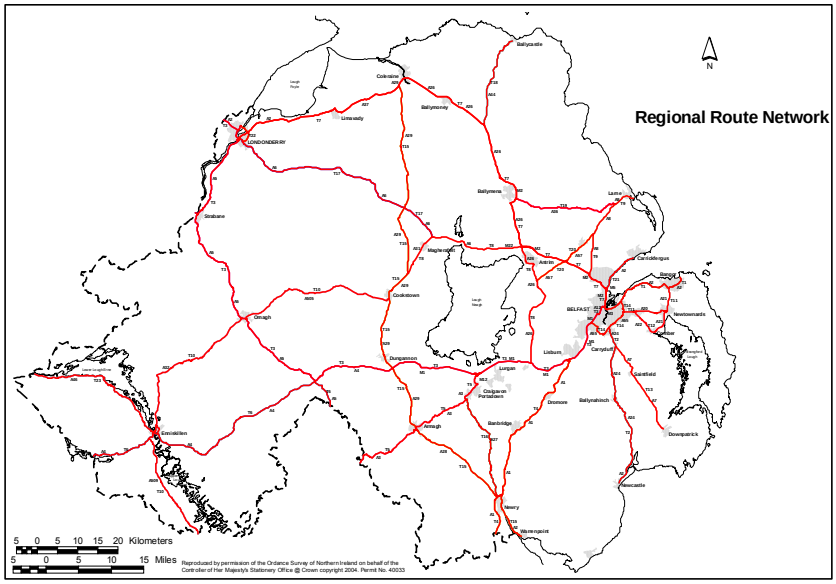
Snaith Reports

In the early 1980s disquiet was being increasingly expressed both within and outside Roads Service that the level of service provided by the road network had suffered due to either insufficient funding, less than efficient use of the available resources or a combination of these factors. These concerns were addressed by 3 major reports by Professor Martin Snaith of the University of Birmingham in 1986,1989,and 1994 and in a report by the Northern Ireland Audit Office in 1992.

Of these, the 1986 report was the most far reaching. It looked in detail at maintenance planning, management and overall working practices and produced a number of recommendations that sought both to increase maintenance to an appropriate level and to ensure its efficient utilisation. The objective was to improve the standard of roads by enhancing the structural maintenance budget and increasing the mileage of roads actually treated

The outcomes of the 1986 report included:

A network of economically important routes of some 1150 km was established and designated as the Regional Route Network (RRN). Special arrangements were introduced for the approval, financing and monitoring of RRN schemes.



The MARCH intervention levels were adjusted to give priority to the RRN.
The structural maintenance allocation system was modified to take more account of MARCH and road machine data.
The special needs of Omagh Division continued to be considered.
The recommendation to adopt a positive road abandonment policy was deemed not to be a practical proposition since the view was taken that the roads in question provide an important service to small and scattered populations.
Greater use was made of road machines such as SCRIM, Deflectograph, Bump Integrator and High Speed Road Monitor to provide statistical information on, and trends of, road condition.

During this period comprehensive documented cases were made in the course of each annual Public Expenditure Survey Round in an effort to secure an appropriate level of funding for the structural maintenance function but, with the exception of 1988 when increased funding was obtained, the success in securing additional funding was minimal.

The subsequent 1989 report had a similar goal and sought to advise Roads Service on appropriate budget levels and the making, where necessary, of operational reforms. The funding and efficiency themes were also strongly reflected in the Audit Office Report

The outcomes of the 1989 report included:

A declaration that the establishment of a Pavement Management System (PMS) was a Roads Service objective and that the organisation was contributing to the development of UKPMS and taking an active role in the technical design and implementation.

A recommendation to introduce a maintenance condition survey that would permit monitoring of the network. This led to the first Northern Ireland Road Condition Survey Report being published in September 1992.

Roads Service had decided not to proceed with an integrated computerisation system on the lines originally envisaged. This required a new information system, Roads Maintenance (Client) System to be developed to allow for appropriate databases to be set up for the storage of condition data and for appropriate reports to be produced.

Continued support for Omagh Division's programme to reflect its greater need.

The 1992 Northern Ireland Audit Office Report was critical of the level of funding allocated by the Department for structural road maintenance and pointed out that, with increasing numbers and weights of vehicles, the then level of funding would hasten the rate of deterioration in the condition of the road network which was already giving cause for concern.

The Audit Office highlighted the absence of criteria similar to those used for the appraisal of capital schemes when planning expenditure on maintenance. They considered that this made it difficult to be certain that cost effective decisions had been made when allocating funds to capital rather than maintenance.

The Department responded that it was aware that maintenance expenditure was proportionately higher in England and Wales and that in Northern Ireland road maintenance was funded at the best possible level consistent with the resources available and the competing demands of other programmes.

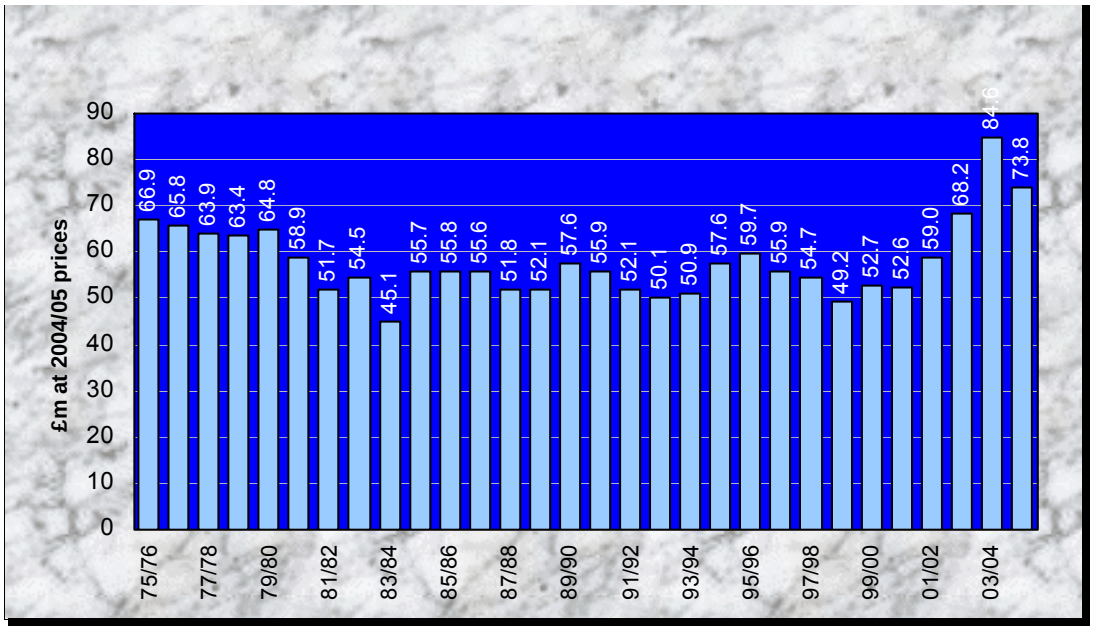
By the early 1990s the link between inadequate structural maintenance funding and the decline in network condition was beginning to be reluctantly accepted at the centre of the Department of the Environment and bids were submitted for additional funds at various spending reviews and almost every monitoring round from 1992. However it has to be recognised that many other departmental programmes including water, sewerage and public transport were also under resourced at this time.

The 1994 Snaith review recognised that simply measuring network condition was not a good basis for establishing a funding strategy, because by the time deterioration was detected it was often too late to contribute to medium to long term financial planning. Accordingly this review proposed a more rational way of determining the optimum level of investment for structural maintenance of the Northern Ireland network, which was put at £75m per year at that time.

The Road to Everywhere

Roads Service took every opportunity to press the case for additional structural maintenance funding and a key document in this respect was a study undertaken in 1998 as part of the DOE (NI)'s Policy Evaluation Programme. The purpose of this evaluation was to consider the effectiveness and overall impact of the policy of structural road maintenance and to determine if the associated programmes were adequately funded and effectively focussed.

The output of this work, which was led by David Orr and Roddy Crilly, was a report entitled "The Road to Everywhere" that captured the essence of the argument backed up by benchmarked spending data from Great Britain and the Republic of Ireland. This Policy Evaluation developed and updated Snaith's 1994 review to produce a good practice Structural Maintenance Funding Plan. The Plan, which was independently verified, recognised that road and footway surfaces do not last forever and have limited life spans, the values of which are generally widely accepted by pavement engineers. At or around the end of these life spans, periodic major maintenance is required in the form of resurfacing or surface dressing.



Structural Maintenance Spend

By applying these good practice frequencies to the known area of roads and footways, and using then current unit costs for remedial treatments, the Structural Maintenance Funding Plan was derived. The original Plan based on 1998 prices showed that over £80m a year needed to be invested on structural maintenance. If anything, this was an under estimate, as it was based on the longest possible life span of the surfacing. This became a reference document for future bidding rounds and was drawn heavily on by the Audit Office when they carried out their next review of the structural maintenance of roads in 2000.This funding plan has since been regularly updated to track the movement of inflation and construction prices.

Allocations

Over the years the roads maintenance budget was allocated across the Roads Service Divisions on the basis of need, using a range of weighted indicators tailored to each maintenance activity (i.e., resurfacing of motorways and trunk roads, resurfacing of non-trunk roads, carriageway patching, surface dressing, winter service, etc.). Over time these indicators have been refined to ensure, as far as possible, an equitable allocation of funding.

Historically just over half the amount recommended by the funding plan was made available, with an average allocation of just over £47m per year on structural maintenance in the 5 years preceding the Regional Transportation Strategy 2002-2012 (RTS) to which Roads Service made a major contribution. The RTS recognised the importance of maintaining the network and proposed an additional £250m for structural maintenance over the 10 year period of the strategy.
Whilst the structural maintenance budget has increased compared to historical allocations it has not yet reached the level recommended in the RTS and that required to meet with Good Practice Guidelines.

5.3 Condition Assessment

The Highway Inventory Survey

From the early years of the organisation it was recognised that an objective means of assessing the condition of roads was a pre-requisite of having an effective pavement management system. Roads Service monitored the condition of the public road network using a variety of machine and visual surveys, similar to ones used by many road authorities in Great Britain, in order to measure its strength, surface condition, skidding resistance and riding quality.

In order to effectively deliver its duty to maintain its own surfaces and equipment and to ensure that others owning plant/equipment on the highway maintain it properly - Roads Service needed to know what existed and where it exists.

Initially such Information was held by individuals in many different and inconsistent formats throughout the organisation. It was difficult to access and incomplete. To remedy this, the Highway Inventory Contract was commissioned in 1988 and was the largest contract of its type in UK at that time. It was let at a contract price of £1.12m and covered the entire network. The contract was carried out by Howard Humphreys & Partners assisted by their NI partner 'Civil Engineering Surveys'.

The objective of the contract was to capture data and transfer to a computer database that would allow full access through many computer terminals linked to a mainframe.

This was a key part of the (at that time proposed) Integrated Computerisation project which would link inventory data with many other functions. e g would allow computerised work planning, job cards, work completed records. It was envisaged there would be 10 to 12 million bits of data on the system.

The system was delivered but did not become fully operative (with the demise if the Integrated Computerisation project) until incorporated in the Road Maintenance Client System in 1992.

A review of the inventory items was carried out in 2002 and the number reduced from 70 to around 30. The associated item attributes were also revised.

MARCH

From the late 1970's until April 2002 Roads Service used MARCH (Maintenance Assessment Rating and Costing for Highways) to assess the surface condition of all roads except motorways. This was a computer-based system, which relied on trained inspectors gathering information on the surface condition of roads by means of a detailed visual survey.

Each year 50 per cent of all A and B class roads and a 10 per cent random sample of all other roads were surveyed. The data collected was fed into a computer model the output of which indicated the treatment required and gave a priority rating. This made it possible to direct resources to the areas of greatest need. The disadvantage of MARCH was that it only assessed surface condition and not the underlying strength of a road. Treatments like surface dressing, which Roads Service continues to use extensively, tended to obscure indications of deep-seated deterioration. In addition, it was not used to assess concrete roads, which make up approximately two per cent of the network. MARCH, therefore, undervalued the total maintenance need.

MARCH as a survey instrument was fairly slow, with a daily route capacity of 2-6km. and was replaced in 2002 by the Coarse Visual Inspection (CVI) and Detailed Visual Inspection (DVI) systems.

SCRIM

Since the mid 1970s Roads Service has used SCRIM (Sideways-Force Coefficient Routine Investigation Machine) which provides a continuous measurement of the wet skidding resistance (slipperiness) of the near-side wheeltrack at a speed of 50km/hour.This testing is carried out between May and September when research shows that surface friction is at its lowest. Each year it is used to test 100 per cent of the motorway and 33% of trunk road network together with additional A class roads.. This helps identify sections of the network that require maintenance intervention.

Deflectograph

Deflectograph

In the mid 1970's a joint research programme into pavement management and condition assessment was established with Queen's University, Belfast and one outcome of this was the commissioning of the first UK-built deflectograph to enable measurement of the underlying strength of road pavements

The Deflectograph is an automated lorry-mounted system that measures the underlying strength of the road pavement. The machine measures surface deflections at 4m intervals in both wheel paths under the action of the standard axle load of the rear wheels. The equipment can monitor 12 – 20 lane kilometres per day producing about 3,000 – 5000 individual measurements in each wheel path.

The amount it deflects determines the need for structural repairs and gives an indication of the remaining life of the road. Operating speed is, however, restricted to 2.5km/hour. Testing is normally carried out on main roads, with approximately one third of the motorway, trunk and non-trunk A class road network covered each year.

UKPMS

From the early days Roads Service was at the forefront in supporting the development of the United Kingdom Pavement Management System (UKPMS) and Derek McCandless chaired the Implementation Group for many years. UKPMS aimed to provide a consistent and unified basis for the storage of data arising from all condition assessment surveys and permit comparisons to be made on treatment types as well as in the allocation of funding for structural maintenance.

UKPMS, in addition to being able to accommodate data provided from machine-based surveys, incorporates the two visual condition surveys – CVI and DVI.

High Speed Road Monitor

From 1991 until April 2002 Roads Service used High Speed Road Monitors (HRM) as part of its condition survey armoury. This consists of a number of laser sensors mounted on a purpose built vehicle which measure the riding quality of a road, the extent of wheel track rutting and road alignment. HRM surveys, provided a rapid overview of road condi-

tion, operating at normal traffic speed. They were not intended to replace existing slower routine surveys, but enable more effective use to be made of them by targeting surveys on those lengths of road in need of attention. Like MARCH this type of survey was made redundant following the introduction of CVI/DVI.

Coarse Visual Inspection (CVI)

All class B, C and Unclassified roads are now monitored using Coarse Visual Inspection (CVI) Surveys in accordance with (UKPMS), which is carried out on all roads apart from motorways, trunk roads and non trunk A Class roads. CVI surveys are carried out from a slow moving vehicle and are used to monitor the overall surface condition of the non-trunk road network as well as to target further Detailed Visual Inspections. It is a cyclical programme which covers all of the B and C class roads (7,600 km) in 2 years and all of the unclassified roads (15,000 km) over a 4-year period.
By the end of 2005 Roads Service had completed year 4 of the CVI survey programme. In general terms, the observed output from the CVI identifies lengths of road where the surface condition is deteriorating and exceeds certain pre-determined thresholds. Processing the measurements through a UKPMS software application (used by highway authorities for the management of their road networks) a national Best Value Performance Indicator (BVPI) can be calculated for the network. The BVPI is defined as the percentage of the local road network where structural maintenance should be considered.

Detailed Visual Inspections

The Detailed Visual Inspection or DVI is a more comprehensive survey, with defects identified by a larger number of more detailed classifications eg. severe local settlement and subsidence or whole carriageway major chip loss. The DVI is a walked survey covering up to 6km per day that provides much more detailed information than the CVI, and is typically targeted at lengths already identified as defective and potentially in need of treatment.

It is still considered too early to establish local trends and it is expected that more surveys will be required in order to make meaningful comparisons. However, in support of a better maintained network, Roads Service has been able to increase the percentage length of roads that have received treatment to 64% of that recommended in National Best Practice Guidelines (base year for comparison was 2002 at 50%).

TRACS & SCANNER

A traffic speed condition survey (TRACS) has recently been developed which incorporates the latest video and laser technology used to monitor conditions such as pavement cracking and which provides faster, more consistent and accurate data economically. One of the key advantages of this vehicle is that it can travel at normal road traffic speed, collecting road surface information, which can then be examined later to identify areas in most need of repair. TRACS type surveys are now recommended for use on all principal roads in England and pilot surveys have commenced on a sample of trunk roads and non trunk A class roads in Northern Ireland to examine the usefulness of this technique. A new machine called SCANNER is currently being developed which incorporates all the TRACS technology but which can be applied to other roads that make up the bulk of the network in Northern Ireland.

Estimating the Backlog – Local Roads

The structural maintenance backlog is worked out for all roads in Northern Ireland on the basis of Northern Ireland Audit Office recommendations whereas authorities in Great Britain are still seeking to derive an agreed methodology for the calculation of backlog

In the 1980s & 1990's the only survey in Northern Ireland covering local roads was the MARCH system. However, this survey was limited in that it only covered a random 10% each year of the non-trunk network.

In 2002/2003 the more efficient Coarse Visual Inspection survey (CVI) element of UKPMS was introduced. This enables the calculation of the measured backlog on B, C & U Class roads, using data derived for the purpose of producing national Best Value Performance Indicators (BVPI).

The BVPI is made up of 3 condition indicators: Structural, Wearing Course, and Edge Deterioration The Condition Indices are based on the UKPMS CVI output and the current set of UKPMS rules and parameters.

The backlog is calculated by applying to these adjusted lengths a unit treatment rate per km. The results from the 2004-05 valuation showed a measured backlog of more than £303M for local roads.

5.4 Operations

Routine Maintenance

In 1973 the work horse of road maintenance squads was the tractor. Complete with 'bee – hive' hut mounted on the trailer, this combination was used to transport both men and materials. In general, small rural areas each had their 'lengthsman' who worked out of a small local depot and looked after about 10 miles of road on their own. He trimmed the verges by spade, cut grass by scythe and hook, manually cleared drainage outlets in the road edge and carried out general maintenance work in the area. The road authority has an historic right to discharge existing outlets into adjoining field drains and sheughs. Permission is required to establish new outlets.

With the passage of time the increased use of lorries and vans meant that men and materials could be moved more quickly and efficiently. Small crewcabs and larger lorries gradually replaced tractors and vans as general maintenance vehicles. Working practices changed and the 'lengthsman' disappeared. Men worked in squads from a central depot and carried out activities appropriate to the season over larger areas. Six man squads were common and as productivity increased the teams reduced to two man squads. Improvements in plant meant that fewer men could do much more work.

In grasscutting Roads Service tended to cut all grass areas adjoining public roads. Hedges were also faced in many areas. Initially tractors with mounted belt driven mowers were used. Subsequently flail mowers and flatbed mowers were used with improved output and quality of cut. In 1987 Road Maintenance Guidelines established the frequency and extent of grasscutting. In urban areas Roads Service often has local agreements with the Councils who maintain the urban grassed areas to a higher amenity standard. Privately funded planting and maintenance of roundabouts, verges and carparks is encouraged in exchange for controlled advertising on the site.

Structural Maintenance

The running surface of roads is predominantly bitmac or asphalt and deteriorates under traffic use and weather.

In 1973 bitmac, or tarmac as it used to be known as, was the primary road surfacing material and was machine laid. Pot holes could be easily repaired. At first 'tar darning' was used. This consisted of the manual pouring of hot tar into the defective area and subsequent addition of stone until the defect was eliminated. Then crude 'cow pat' patches were applied. This was replaced by 'cut out' patches using bitmac from hot boxes or deferred set macadam. In 2000 techniques included the Jet Velocity Patcher which sprays stone and emulsified bitumen under pressure into the defect. Bitmac remains the most frequently used surfacing material on the more lightly trafficked and rural roads.

In 1973 asphalt on the other hand was much more expensive. It was used principally in city/town centres. Trinidad Lake Asphalt Company dominated the market. Repairs were not so easily carried out. The suppliers provided special lorries called 'freighters' to deliver hot asphalt in small quantities to sites. There has been a considerable increase in the use of hot rolled asphalts especially in urban areas and on major routes. Asphalt has proven to be very du-

rable on heavily trafficked routes and in particular where heavy turning movements are prevalent. The asphalt boom was assisted by the move away from the use of naturally occurring Trinidad Lake Asphalt and its substitution with softer bitumens and suitable limestone or cement fillers.

The price gap between bitmac and asphalt has narrowed over the years. Repairing asphalt is easier. A Heat Patcher can fuse the patch material with its surroundings. The good practice frequency for resurfacing bitmac is 15 years and for asphalt is 20 years.

More recent developments include the use of a thin bitmac surfacing layer using modified binder. For asphalt there is increasing use of stone mastic asphalt (SMA). This has a higher stone content and uses an enhanced binder.

Surface dressing, which is more of an art than a science, is the most common maintenance treatment for lightly trafficked and rural roads. It prolongs the life of bitmac surfacing by applying dry stone chippings on top of a film of bitumen adhesive. The adhesive used originally was coal tar from the gasworks. However this bubbled up in hot weather and was followed by the use of oil based bitumen. Safety was a significant factor as it had to be applied at high temperatures and ground and weather conditions were critical. Bitumen emulsions were developed and marketed and this water based material could be applied at much lower temperatures and in more variable weather conditions. The good practice frequency for surface dressing is 7 years but this has rarely been achieved Asphalt surfaces have been successfully surface dressed using a 'premium' binder. This has been done successfully on major routes including the M1 to restore skid resistance.

Service Delivery

In 1973 Roads Service had a large direct labour organisation and carried out most maintenance operations in house. Exceptions were resurfacing and large scale patching. Annual 'Measured Term' contracts were let for a range of functions usually on a section area basis. Annual contracts existed with some farmers for local grass and hedge cutting and for snow clearance in an emergency.

Omagh and Downpatrick Divisions had a history of carrying out their own surface dressing and this carries on in Western and Southern Divisions.
Roads Service have maintained good working relationships with farmers and local contractors. This has been to the advantage of all parties and ensures flexibility to deal with any eventuality.

With the large reduction in the number of direct labour staff over the years contracts now cover larger areas of a Division. They can be for 3 – 5 year terms and are awarded on a quality / price basis (typical 20/80). Recently Environmental Maintenance Contracts covering grass cutting, weed spraying and gully emptying have been awarded on this basis. These contracts reduce the workload in preparing contract documents and are more economic. However the removal of local involvement can be a disadvantage.

Surface Dressing

5.5 Winter Service

Legislative framework

There has never been any statutory requirement for Roads Service or its predecessors to undertake preventative measures in anticipation of snow and ice.

Prior to local government reorganisation in 1973, byelaws made in some local council areas under Section 54 of the Public Health (Ireland) Act 1878 required occupiers of premises to remove snow from adjoining footways and pavements. Other byelaws made under the same section but by other local councils required persons who have removed snow or ice to avoid any undue accumulation in any channel or carriageway or upon any paved crossing.

Section 23 of the Roads Act (Northern Ireland) 1948 provided that anything done by a road authority for the removal of any obstruction caused to traffic by the accumulation of snow on any road shall be deemed to have been done in the course of the maintenance of the road.

The Roads (Northern Ireland) Order 1980 contained, in Article 9, a duty for the Department of the Environment for Northern Ireland to remove from a road an obstruction that has been accumulated through a fall of snow. However, although the Department was committing a substantial amount of finance to the gritting of roads the Order contained no powers in relation to that activity. As a result, it was decided to take discretionary powers enabling the Department to take such steps as it considered reasonable and practicable to prevent snow or ice interfering with the safe passage of persons and vehicles using the road. This power can be found in Article 9 of the Roads (Northern Ireland) Order 1993. Under Article 10 of the Order, there is a statutory duty to clear obstructions from the highway, including snow.

Pre 1973

Local councils were responsible for salting roads in winter prior to 1973. In the main, their equipment consisted of demountable salt spreaders, trail gritters and tail -board gritters. As traffic increased a large number of ex-army R series 4 X 4 chasses were purchased to use for front-line salt spreaders.

Gradually salt spreaders became more technologically advanced, with on-board data logging and monitoring equipment. Modern spreaders are speed related and have electronic feedback control systems incorporated. Information is downloaded into data capture devices and then into local personal

computers. Typical data contains information such as, rate of spread of salt, speed of vehicle and spread - width settings.

Plant

Historically about 70% of the winter service fleet of about 140 gritting vehicles was made up of dedicated vehicles which stood idle during the summer and the de-mountable vehicles were not easily adapted for other use. The age profile of the gritter fleet was unsatisfactory but not as bad as the specialist snow blowers, some of which had been purchased in the 1960s!

A detailed assessment of the winter service fleet was carried out in 1990 which established complements for fixed and interchangeable vehicles and it was accepted that all new lorries purchased should be capable of easy adaptation. A progressive replacement programme was adopted and an average of 14 vehicles was purchased every year for 10 years between 1992 and 2001.This brought the average age down to less than 5 years. Since 2001 the organisation has continued to add to its winter service capability with the purchase of 4 new snow blowers and additional tractor mounted snow cutters between 2003 and 2005.

The Review of 1991

Between 1973 and 1991, Road Service's winter service policy and road salting schedule developed on a mostly informal basis, mainly by drawing on the knowledge of divisional engineers and in response to local political pressures.

In July 1991, Roads Service set up a Standing Working Group (SWG) to review winter service policy and procedures and to develop objective criteria for the salting of roads which would:

- introduce consistency of decision-making and parity of treatment throughout Northern Ireland; and
- maximise the benefit by targeting roads which carried the heavier traffic flows.

The review was a fundamental examination of all aspects of winter service from first principles. The topics examined included criteria for inclusion of roads in the salting schedule, decision making, route optimisation, communications, and plant. With much debate during the progress of the review, and the distillation of many conflicting views, it took almost 4 years to take a final decision. Implementation eventually took place in October 1996.

As part of the review, consultants were appointed in 1995 to develop and implement route optimisation and as a result of this exercise the number of routes was reduced from 129 to116. Also at this time it was decided to proceed with thermal mapping of all roads on the salting schedule to assist decision making during marginal conditions.

Review Outcome

.The most significant outcome of the review was the establishment of criteria that were to be applied to determine which roads within Northern Ireland would be salted. This would form the basis for the development of a revised salted road network

Cost Benefit Analysis techniques were used to measure the benefits of salting roads in terms of reducing traffic delays and accidents against the associated costs. The objective was to determine the break-even point where the total benefit per kilometre in terms of traffic flow and accident reduction was the same as the cost of treatment per kilometre.The overall break-even indicative figure was in the region of 1,500 vehicles per day.

This determined the maximum amount of traffic volume which could be captured on salted routes within the available budget. The road network was divided into categories depending on traffic volumes and the cost of treating each category was calculated.

It was concluded that there would be a dramatic increase in cost if roads carrying fewer than 1,000 vehicles- per day were treated.

The criteria developed using these methodologies were to:

- salt all through-routes carrying 1,500 or more vehicles per day; and

- salt other routes carrying more than 1,000 vehicles per day, at the discretion of the Divisional Roads Manager, if there is difficult terrain and no alternative salted route.

Prior to the introduction of the new criteria, the salted road network totalled 7,141 kilometres (28.7 per cent of the total road network). After the review it comprised 6,780 kilometres (27.2 per cent of the total network). This was not a simple reduction of 1.5% across the board. Some areas had routes removed, others had routes added.

The revised salted network was marginally smaller than before in terms of kilometres salted. However, the cost benefit analysis demonstrated that the revised network captured 80 per cent of traffic volume in terms of vehicle kilometres travelled, for an annual cost of approximately £5 million. The cost benefit analysis also demonstrated that, in order to cater for 90 per cent of traffic volume, annual expenditure would have to double. The annual cost of treating the entire road network at that time was estimated at over £20 million.

As far as could be ascertained at the time, no other road authority in the UK had sought to determine their salted network using quantitative methods or had published their criteria. The Roads Service methodology attracted considerable interest and was published in one of only two papers by UK authors presented to the Xth PIARC International Road Congress in Lulea, Sweden in 1998.

The Review of 2001

Following the severe snow conditions experienced in late December 2001 and which was followed by some media criticism, the Minister for Regional Development, Gregory Campbell, instructed Roads Service to review its procedures in relation to snow clearing and also its overall winter service policy.

This was a fundamental review reporting to a steering group which was headed by Mike Moore, Director of Environmental Services of North Yorkshire County Council.

The Minister subsequently made a statement to the Northern Ireland Assembly in July 2001 that broadly endorsed Roads Service's winter service policies and practices but accepted that there were some improvements that could be made. These included:

- Improved readiness in mounting snow blades
- Salted road links to small settlements of more than 100 dwellings
- Buses in service (including school buses) receiving special consideration, e.g. a 40 seat bus is counted as 40 vehicles
- Earlier morning route completion times to accommodate actual travel patterns

- Improvements to external communications and the provision of real time information

Weather Forecasting

Up to 1987 the Meteorological Office faxed general weather warning information to Roads Service Duty Controllers using codes Alpha, Bravo or Charlie to indicate lack of frost, frosty conditions or snow respectively.

From 1987 specific area weather forecasts were faxed to Duty Controllers, initially based on dummy weather stations, with actual forecasts being phased in as weather stations were commissioned. This system has since been significantly enhanced with the introduction of Winter Service laptop computers and Thermal Mapping. It is now possible to receive predicted road temperature graphs and information on road conditions to help Duty Engineers make decisions, More recently, a new web-based Winter Service database was developed resulting in faster communication times for input and collation of data, as well as issue of information. In particular, a report on overnight salting activities is relayed electronically to the broadcast media to ensure the latest news on road conditions is available to motorists across Northern Ireland.

In Northern Ireland, winter nights are often marginal with road temperatures hovering around zero degrees; this makes the decision whether or not to salt roads extremely difficult. Before the onset of the 1998-99 winter, a £600,000 project for thermal mapping and route optimisation was completed. Thermal mapping allows duty engineers to make salting decisions based on the best possible information. 20 automatic weather stations now gather information on road surface temperatures and weather conditions. The information is relayed to Meteorological Office staff who use the data to provide duty engineers with specific forecasts for all of Northern Ireland. Thermal mapping provides predicted minimum road surface temperatures at all points on our salting network, so that the routes most in need of treatment can be identified and target only the coldest routes on marginal nights. Duty engineers receive this information via computer link, along with updates in the weather forecast, which takes account of changing weather conditions such as forecast rain or snow.

5.6 Laboratories

Prior to 1973 most of the larger Road Authorities operated Material Testing Laboratories, including temporary site laboratories on major road schemes. Following reorganisation, existing sites, staff and equipment were used to establish a single laboratory for each Division, located at:

Belfast	-	Corporation Street
Ballymena	-	Ballykeel
Coleraine	-	County Hall
Craigavon	-	Ballynahone
Downpatrick	-	Castlenavan
Omagh	-	Silverhill

Staffing levels in each laboratory were similar, with a PTO III in charge of each with two laboratory technicians and a number of industrials. Summer students were often attached to the laboratory, as were trainee technicians, who usually spent part of their training period in a laboratory.

A wide range of both laboratory and site tests for blacktop, concrete and soils were carried out. The number of laboratories was reduced to four in the mid 1990's with the closure of Coleraine and Castlenavan sites – work was redistributed between the remaining labs.

In 1999 the responsibility for laboratories passed over to the new Roads Service Consultancy (RSC). A RSC Best Value Review took place in April 2004. This included material testing and laboratories. It recommended one laboratory to replace the existing four, and setting up of a Materials Engineering and Assessment Section (MEAS). This new centralised section was to be responsible for laboratory tests and site testing but would also be responsible for Traffic Surveys, Highway Inventory (HI) and Coarse Visual Inspections (CVI).

A later report of December 2004 into the Best Value Review recommended that the laboratories at both Ballykeel and Armagh should be retained but that those at Silverhill and Corporation Street should be closed. The report also pressed for the early establishment of MEAS and the appointment of the SPTO to lead it. However, an interim structure was proposed with the CVI / HI and Traffic functions still based under RSC SPTO's in each of the four Divisions.

Blacktop

Over the years the testing of bitumen mixes has remained the most important aspect of the work of the laboratories. From 1973, most testing was against mixes specified in BS1621 for Bitmac and BS594 for asphalt. The standard specification has been amended over the years, with BS4987 introduced for Bitmac in 1988. However, a number of "own mixes" were specified by Divisions in the early years and, more recently, "design mixes" for special sites or large schemes have been specified.
The tests were carried out in compliance with BS 598, which included a choice of testing methods to remove the bitumen for the rest of the mix. The "roller bottle" method was most widely used, but Silverhill lab used the "sieving extractor" method for a period into the 1980's. From 2003, a new BS598 Part 102 was used.

Following research into the quality and durability of laid blacktop surfacings, a major initiative was launched to improve the situation. In 1980 compliance rates for both Bitmac and asphalt were below 50%.

All contractors test results were collated at Headquarters and lists prepared at regular intervals to show the rates of compliance being achieved. If unsatisfactory, warnings were issued, following, if necessary, by removal from the approved lists. Uniform, accurate and repeatable test results were an essential part of this initiative.

Laboratories, which had operated largely independently up to that stage, came under detailed examination into all aspects of their testing methods to improve consistency. Test samples were sent to each laboratory to compare results.

Sampling methods were improved with training. A sampling target rate of 1 per 100 tons laid was recommended (increased to 1 per 30 tons for contractors under warning). The use of biscuit tins and other containers was discontinued, replaced by suitably sized boxes provided by the Department. Samples were to be taken by the contractor and not Roads Service staff. Each sample was divided into three, one for the contractor, one for Roads Service and one for retesting in disputed cases.

The manufacture of bituminous mixes at new mixing plants had to be approved. Lab staff carried out the necessary inspections and were involved in testing a range of trial mixes. Contractors were expected to have their own testing laboratories.

In 1987 each laboratory was provided with a computer to work out and record all test results. This led to further uniformity of test results and easier transmission of results to Headquarters for compliance monitoring. By 1988 compliance rates had risen to over 80%. Compliance rates in the 1990's were generally about 90% for bitmac and 95% for asphalt.

With the use of methylene chloride and other chemicals in the laboratories, health and safety issues had to be addressed. Gas masks were worn by the technicians and proper fume cupboards with good extraction were then provided. Staff wore special tags to monitor their exposure over time. Checks by independent inspectors also took place. Their reports compared the recorded levels against acceptable safety levels.

In addition to laboratory tests, staff also carried out a variety of tests on the road and at construction sites-
Rolling straight edge tests were carried out on new running surfaces.
Texture depth was measured using the sand patch method.
Skid resistance was measured by the pendulum
Small-bore coring machines were used to check the depth of newly laid surfacings, including reinstatement work by Utilities.
Compaction was measured by coring.
Nuclear Density meters were provided to each laboratory. Their main purpose was to facilitate quick tests on the compaction of newly laid materials.

In 1989 the Belfast laboratory was the first to achieve accreditation under the National Measurement Accreditation Service (NAMAS). In 1990, Dr. Gordon Stevenson, the Chief Engineer, directed that all laboratories should become accredited for blacktop. This was achieved by 1994. Annual inspections are carried out each year to confirm continued accreditation. In 2000, NAMAS was replaced by the United Kingdom Accreditation Service (UKAS).

Aggregates

Aggregate testing was carried out each year particu-

larly in connection with the surface dressing programme. Stock piles were sampled and tested under BS63 Part2 1971, amended over the years until replaced by BS812 Testing of Aggregates 1990. This standard was divided into a number of parts, including tests for flakiness index, crushing stone value, 10% fines, polished stone value (PSV) and abrasion value. PSV tests were only carried out at Ballykeel and at Castlenavan.

Spray-Bar Tests

Surface-dressing tankers had to have valid test certificates before working on the road. Contractors and Roads Service tankers were tested to ensure that a known volume of binder was applied evenly to the road surface. Tests were carried out at Armagh, Ballykeel and Castlenavan.

Concrete

Each laboratory was able to carryout crushing tests on sample cubes. Seven and twenty-eight day results were produced. Twenty-eight day cubes were stored in large water baths and maintained at a constant temperature range before testing.

Most tests were carried out for other public bodies and the private sector. In-house tests were mostly in connection with bridge works. After debts were incurred from smaller private construction companies, some laboratories adopted a policy of only testing for public bodies with payment in advance. Over time, laboratories have stopped concrete testing; Belfast in 2003. Armagh is now the only lab still accredited for testing concrete.

Soils

In 1973 drilling rigs were taken over from the former roads authorities in a number of locations. They were attached to the laboratories and continued to operate. A Dando 150 machine was attached to Silverhill, a Pilcon rig at Ballynahone and at least two drill rigs were located at Coleraine.

They carried out exploration at future road and bridge sites. Core samples were taken and borehole logs produced after soil classification tests were carried out in the laboratory and standard penetration tests during the drilling. In addition, cores were taken for testing in the laboratory triaxial testing machines.

The labs carried out California Bearing Ratio (CBR) laboratory tests. Staff were also involved in carrying out site CBR tests with portable equipment mounted on the back of a lorry or Land Rover.

Demands for drilling and soil testing remained steady over the first decade, but slowly reduced as projected improvement works were scaled down. Increasing use was made of Works Service who operated drill rigs and a testing laboratory based at Hydebank. As work picked up in the late 90's, Roads Service relied more on the private sector.

5.7 Road Openings by Utilities

Background

Utilities providing services to the public have a legal right to lay their services in the public road. This has caused problems for Highway Authorities throughout the United Kingdom. Disruption to traffic during the works and poor reinstatement were the main concerns. Increasing activity highlighted the need for co-ordination of works and the keeping of accurate records of the location of the underground apparatus.

As early as 1925 in GB, a joint negotiating committee consisting of highway authorities and utilities was set up to agree a standard clause for the insertion into future special enactments promoted by the utilities. Unfortunately, after a protracted period of deliberations, an agreement could not be reached and the committee was dissolved.

In GB the Public Utilities Street Works Act 1950 was introduced to regulate the situation. However, legislation was not introduced in Northern Ireland.

Certificate System

Northern Ireland Local Roads Authorities had introduced systems that were taken over by Roads Service in 1973 commonly known as certificates 1, 2 and 3. The systems involved making local voluntary agreements with each utility and with Roads Service issuing a series of certificates at key stages.

Certificate 1: issued following receipt of an acceptable detailed proposal from a utility
Certificate 2: issued after a joint inspection of an acceptable permanent reinstatement

Certificate 3: issued when Roads Service accepted responsibility for future maintenance after a period of maintenance by the utility.

While these systems were better than none, they were not satisfactory from the point of view of either the Roads Service or the Utilities. The travelling public were particularly unhappy with the quality of the temporary reinstatements and the length of time they were allowed to remain.

Over time different local agreements were made to try and improve the quality of the reinstatements and to reduce disruption to the public.

Horne Report

In GB in 1983, a committee chaired by Professor Michael Horne was set up to review all aspects of the 1950 Act. The Committee's report in 1985 recommended that utilities should become responsible for their excavations and reinstatements in the roads and that a street works register should be established.

The legislative response to these recommendations was contained in Parts III (England and Wales) and IV (Scotland) of the New Roads and Street Works Act 1991(NRSWA). The Act established a legislative framework only leaving the detailed application to Codes of Practice and Regulations.

Northern Ireland Roads Authority and Utilities Committee (NIRAUC)

In 1987 a sub committee of the Road Maintenance Committee was set up to produce a new agreed Reinstatement Standard to be used as a basis for agreements with the utilities. This sub committee, under the chairmanship of Sean Price, reached general agreement with all the utilities except for Water Service, who had objected to a requirement for them to 'police' their own small maintenance openings. A draft document was produced in March 1988. This formed the basis of a series of local agreements between Divisions and the utilities in 1989.

In 1990 NIRAUC was established under the chairmanship of George Leckey; its first task was to negotiate a new reinstatement document with all the existing utilities

By 1993 the committee had made a voluntary agreement- "Control of Openings and Reinstatement of Roads". This enabled formal new agreements to be made between the Department of the Environment and each of the main utilities – NIE, BT, Water Service, Mercury Telecommunications. They were signed by the Permanent Secretary of the Department, John Murray, on 23 April 1993 and applied to all Roads Service Divisions.

Streetworks

On 13 February 1995 the Constitution for NIRAUC was established. Early in 1995 the Divisional Roads Authority and Utilities Committees (DRAUC) were also established in each Roads Service Division. Their constitution was signed on 21 April 1995.

In addition, on 23 February 1995 the Street Works Advisory Group (SWAG) met to commence the preparation of the Codes of Practice associated with the proposed new legislation which would replace the voluntary agreements.

Street Works (Northern Ireland) Order 1995

On 13 December 1995 the order was made and it mirrored the street works elements of the GB Act (NRSWA).

SWAG produced the following 6 Codes of Practice:

- Measures Necessary where Apparatus is affected by Major Works (Diversionary Works): the code and regulations came into operation on 1 June 1995. 2nd Edition of the code came into operation on 1 May 2005.
- Specification for the Reinstatement of Openings in Roads: the code and regulations came into operation on 1 February 1999. 2nd Edition is being processed.
- Code of Practice for Inspections: came into operation on 1 February 2001 and the inspection Fees Regulations were made 19 November 2001 and came into operation 1 January 2002. 2nd Edition came into operation on 1 Sept. 2003.
- Code of Practice for the Co-ordination of Street Works and Works for Road Purposes and Related Matters: made May 2001 and came into operation on 18 March 2002. 2nd Edition came into operation 31 January 2005.
- Safety at Street Works and Road Works: made 8 November 2001 and brought into action 1 February 2002. This code of Practice applies to the whole of the U.K.
- Code of Practice for Recording of Underground Apparatus in Streets: issued on 1 October 2004.

Northern Ireland Street Works Register and Notification System (NISRANS)

With the increase in street works activity in the early 1990s, Roads Service started to develop its own computerised system of handling street works notices known as the Road Opening Management System (ROMIS). However, with the introduction of the Street Works (NI) Order 1995, there was a requirement for a street works register that would permit notices to be transmitted electronically between the utilities and Roads Service. As a result, the ROMIS project was terminated in 1995.

NISRANS was developed in conjunction with a consortium of Scottish Local Authorities who developed software called Susiephone. The software was further developed by a private-sector company called Moleseye, under a Government Direct form of contract. Moleseye worked with Roads Service and the utilities to develop the software to run a successful pilot scheme for one year. A 5-year contract, with the possibility of a 2-year extension, was signed with Moleseye on 31 May 2002.

Traffic Management Act 2004

This Act applied to England and Wales. As Roads Service was the sole roads authority in Northern Ireland only part of the act was relevant. It was agreed by the Minister in May 2005 that the street works elements of the 2004 Act should be introduced into Northern Ireland by a Street Works (Amendment) (Northern Ireland) Order.

The main elements of the proposed policy are the introduction of:

- Permit schemes
- Direction-making powers
- Requirement to keep records
- Financial Penalties – a Fixed Penalty Noticing system
- Lane rental

Policy consultation documents were issued to interested parties on 30 June 2005 and it is currently envisaged that the order would be made by the end of 2006.

6. Section Offices

Divisions and Offices 1973

The Early Years

Initially, there were 33 Section Offices, mostly located within their own section area and these offices were the main point of contact for members of the public and local politicians.

Section Engineers were supported by Highway Supervisors. They identified the works needed in their areas and arranged for it to be carried out by the industrial workforce. Resurfacing work and the larger Minor Improvement schemes were set to contract prepared by the Section. Most Highway Supervisors had been promoted from the Industrial workforce but, in some areas, younger technicians had been recruited to fill posts by the former roads authorities.

The industrial staff, including gangers and foremen, were mainly based in small yards and depots dispersed throughout the section, where plant and materials were also stored. However, there were still some men based at home, where their lorries or tractors and emergency equipment were kept. Others walked or cycled to work in their local area. The industrial workforce included some tradesmen - carpenters, stonemasons and “handymen” - who erected fences, laid kerbs and built structures such as retaining walls, culverts and some small bridges. Work tended to be seasonal with grass-cutting and surface dressing in summer and drainage and minor improvement schemes (including URIC) in winter.

Each Section Office also had administrative support. The Section Clerk played an important role as all industrial wages, plant returns and materials invoices were processed by the Section. Each Section kept its own records of both capital and maintenance expenditure .

The first significant changes in Section Offices followed the end of URIC work in 1978, together with the adoption of uniform Civil Service systems for the payment of wages and invoices and the new codes for the management of Industrial staff. New pay grades for Professional and Technical staff were introduced – PTOI, PTOII, PTOIII and PTOIV replacing the former Main Grade etc.

As time progressed there was a greater need for more technical input into both Minor Works and Maintenance operations. Deputy Section Engineer PTOII posts and some PTOIII posts were introduced to assist the Section Engineer and the PTO IV (Highway Supervisors). Over time more technicians were recruited or trained up to ONC or HND levels and appointed to the PTO IV or PTO III grades.

Changes in the 80s

Lack of resources for maintenance and the rising number of Public Liability (PL) claims were two of the main factors that caused changes to be made in Section Offices as Roads Service strove to be-

come more effective and efficient. While many of the changes were driven from the centre, Section Office staff were very much involved in their formulation and were largely responsible for their implementation.

Guidelines and standards were produced and reviewed for all aspects of maintenance work. The aim was to try to divert funds to structural maintenance by reducing the resources spent on routine maintenance.

Manual Work Planning was introduced and later computerised and updated with the introduction of PSION hand-held data capture devices in 1985. This included new systems for cyclical inspection and repair to help counter PL claims. More rigorous methods of investigating and reporting on claims were also introduced.

Trained work-study officers produced preferred methods of working for all aspects of work, including manning levels. Productivity incentive bonuses were introduced for all industrial staff including foremen.

As a result of these and other changes, Section staff became more specialised. Highway Supervisors and Foremen split into two main groups i.e. Management and Works. Works staff continued to control the direct labour work on the ground, while Management identified and recorded the work required, supervised contracts and carried out other duties including giving evidence in court.

In 1986, further changes to grades were introduced across the Civil Service. Senior Engineers became Principal Professional and Technical Officers (PPTO's); Section Engineers (PTOI's) became Senior Professional and Technical Officers (SPTO's); the PTOIV and PTOIII scales were amalgamated into a new single PTO scale. The latter caused difficulties for some of the remaining non-technical PTO IV's as they did not have academic qualifications and some were not considered suitable to cover the full range of duties expected of the new grade. However, the use of "personal to holder" salary arrangements and age retirements eventually solved this problem.

The industrial numbers attached to sections initially decreased as more Minor Works and other maintenance operations were let to contract. Better work planning, improvements in plant (particularly the introduction of crew-cabs), incentive bonus schemes and work-study led to more efficient use of resources, reduced over-manning and increased productivity. This allowed for further reduction in numbers (generally by natural wastage) while maintaining output. As numbers stabilised the workforce increasingly concentrated on the repair of surface defects on both carriageways and footways.

The Section Clerks (AO grade) were usually assisted by an Administrative Assistant (AA). They managed the Section Office on a day to day basis, manning the telephone and acting as the first point of contact with the public, noting complaints and directing them to the appropriate officers. While the actual processing of wages, material invoices and the preparation of management information became more centralised, the return of wage sheets, bonus sheets etc continued, as did the issue of road permits and the receipt of deposits.

Section Office Reviews

In 1988 the Management and Manpower Review Division (MMRD) carried out a review of Roads Service activities. Their report, Part 2 - Section Offices, was released in 1989. The survey work concentrated on a sample of 13 Section Offices and gathered considerable detail of what was taking place at individual, section and functional levels.

The main recommendations of the report were that there should be greater use of the TG1 grade for contract supervision, investigation of PL claims and to monitor unapproved road openings in Belfast, and that Roads Service should adopt three models for Section Office staffing structures to reflect the differing work loads particularly at Section Engineer (SPTO level).

Model A was to apply to only 4 sections – Belfast North, Belfast South, Lisburn and Londonderry.

The SPTO was to be supported by a Management HPTO and a Works HPTO. They in turn were to be supported by 7 PTO's and 2 TG1's on the Management side and 2 PTO/TG1's plus the industrial workforce on the Works side.

Model B was to apply to 12 sections – Antrim, Ards, Armagh North, Ballymena, Castlereagh, Coleraine,

Craigavon, Down, Magherafelt, Newry and Mourne East, Newtownabbey and North Down.
In this case an SPTO was shown but he was supported by only 1 HPTO. 3 PTO's were suggested for Management and only 1 PTO/TG1 for Works plus the industrial workforce.

Model C was to apply to the remaining 17 sections – Armagh South, Ballymoney, Banbridge, Belmore, Carrickfergus, Castlederg, Clogher, Cookstown, Drumnakilly, Dungannon, Enniskillen, Larne, Limavady, Moyle, Newry and Mourne West, Omagh, Strabane.

In this case the model showed an HPTO in charge of the day-to-day running of the section with access to an SPTO. As for Model B, they still showed 3 PTO's for Management and one for Works.

In all these cases additional TG1 and administrative staff were considered necessary but specific numbers were not indicated.

The report also recommended that a more fundamental review of section offices should take place after the outcome of the expected market testing exercises and the implementation of the Integrated Computer System. However, the recommendation to adopt the three section models was not implemented as it was overtaken by subsequent events.

The proposed Integrated Computer System was halted in 1990 but the need to have an appropriate structure to carry out market-testing effectively, resulted in the proposal to remove the Direct Labour workforce from sections and create a new Direct Service Organisation (DSO) in each Division. A Road Maintenance Client Reorganisation Project was established to review the effect this would have on the existing 33 Section Offices and to recommend what the new client structure should be.

Work continued on the project during 1993. It was considered that population, expenditure, PL claims and section mileage (with suitable weighting for urban and main routes) would provide a reasonable measure for a Section's workload.

The proposal was to reduce the number of Section Offices from 33 to 27.

Ballymena Division
Larne and Carrickfergus combined as East Antrim Section.

Coleraine Division
Moyle combined in a larger Ballymoney Section.

Craigavon Division
Armagh N and S combined in a single Armagh Section. Newry and Mourne E & W combined in a single Newry and Mourne Section.

Omagh Division
Clogher and Dungannon combined in a larger Dungannon Section Omagh, Drumnakilly and part of Castlederg combined and divided into Omagh East and Omagh West, while Strabane and most of Castlederg formed a new larger Strabane Section.

Belfast and Downpatrick Divisions
No Change

The new DSO's were established in August 1994 and during 1995 the new Section Offices were created. While Larne and Carrickfergus were combined in July 1995, with the Section Office based in Larne, the name East Antrim was not adopted.

While most Industrial staff transferred to the DSO's, the remaining Management Foremen were still Industrials and it was not until 2003 that they were regraded as Professional and Technical staff on the TG2 grade.

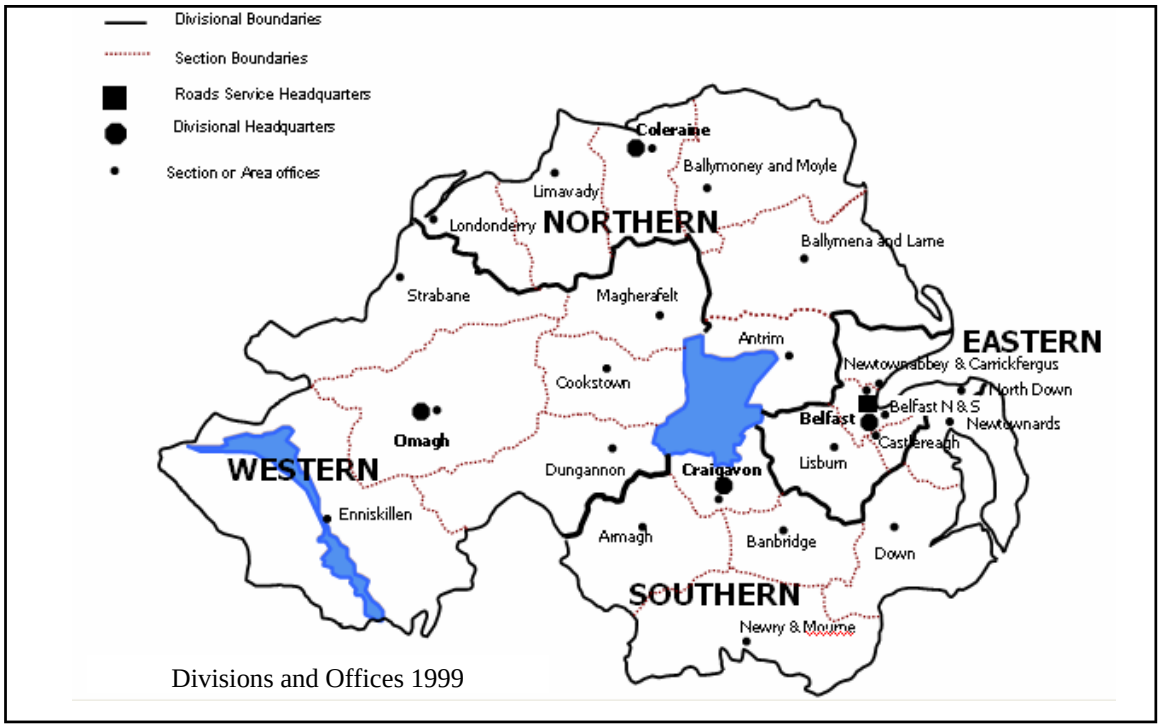
The Change to 4 Divisions

The next major change occurred in 1999 when 4 new Client Divisions were established in conjunction with the creation of Roads Direct and a new internal Consultancy organisation. The latter became responsible for preparation and supervision of works contracts of different types, including resurfacing, further reducing the workload of Section Offices. New staffing structures were introduced to reflect this change in workload.

At this time Section Offices were further reduced in number from 27 to 24.

Larne/Carrickfergus Section was split into its former parts –
Carrickfergus Council area became part of a new expanded Newtownabbey Section while Larne Council area became part of Ballymena Section.

Fermanagh East and West were combined into a single Fermanagh Section



Divisions and Offices 1999

Omagh East and West were combined into a single Omagh Section.

In 2003 a further review of Section Offices took place under the direction of the Network Services Board. Its purpose was to review the role and workload of Section Offices. Stage 1 of the report was complete in December 2003. It covered the range of work carried out by each of the 24 Section Offices, the staff resource deployed and included consideration of various issues and initiatives that had potential to affect working practices.

Stage 2 of the report (final draft) was completed in June 2005. While the report clearly stated that it was not a formal staff inspection/job evaluation exercise, it did benchmark the performance and workload of each section office. A chart and table showing the theoretical staff requirements compared to actual staff levels was produced for Section Offices.

The report also suggested that a small number of Section Offices might be combined (no more than one per division) but that this would clearly be dependent on the outcome of the proposed Review of Public Administration.

The Changing Role of the Section Engineer

In 1973 the Section Engineer had a very wide range of responsibilities and was given considerable independence and discretion as to what took place in his section. He managed allocated budgets, decided what maintenance and Minor Works were required and how the work was to be carried out, whether by Direct Labour or Contract. He directed and managed the Industrial workforce and prepared, awarded and supervised contracts. He also acted as the main interface with the public and with elected representatives for the area.

While these main roles continued until 1994, his work was increasingly influenced by new codes/ standards and initiatives from Divisional and Roads HQ. He had to manage the implementation of these major changes while maintaining a day-to-day service to the public. Budget allocations became more targeted. Inevitably there was some loss of independence and discretion.

With the major changes of 1994 and 1999, the Section Engineer's role became much more focused (in some cases in a larger geographical area). He decided what funding and programmes of work were needed and monitored his expenditure each year. He had to liaise with Roads Direct and the Consultancy on a regular basis to review progress and agree targets for the completion of works.

The Section Engineer was still responsible for many of Roads Service obligations under the Roads Order and continued to act as Roads Service local representative interfacing with an increasing number of pressure groups – Development Associations, Community groups, Tenants' Associations etc.

In June 2005 a paper entitled Network Ownership and Management was presented to the Roads Ser-

vice Board. The role of the Section Engineer as "Network Owner" was clearly set out in addition to his responsibilities for maintaining the network in his area. The report indicated that he will:

- be the owner of the network in his area, taking an overview interest in all that Roads Service is doing or should be doing, and the work of others such as utilities;
- be aware of all significant work that is being planned or under way;
- be alert to significant incidents or chronic problems across the range of Roads Service activities and feed these through to the relevant branch for appropriate action and forwarding reports of incidents that they become aware of in accordance with Roads Service's Incident Reporting Procedures;
- be the eyes and ears of Roads Service, advising the Divisional Roads Manager who is the ultimate Network Owner;
- act as a first point of contact for the general public and public representatives and promote good relationships with the local District Council.

7 Direct Labour Organisation (DLO)

Over the years the numbers of industrial staff declined significantly. There were about 3,500 involved in Operation and Maintenance (O&M) in 1973, including those taken on for Urban & Rural Improvement Campaign (URIC) programmes. This , compares with less than 1000 in 2006. Throughout the 1980s and 1990s output per man rose and workforce numbers fell while overall more work was achieved.

URIC

The URIC programmes, which ceased in 1978, were employment relief schemes. Government funding was made available to take people off the unemployment register and employ them as labourers on road improvement schemes. All labour was managed by Roads Service staff and this programme provided both a much needed boost to the quality of the road network in rural areas and to local economies.

DLO management

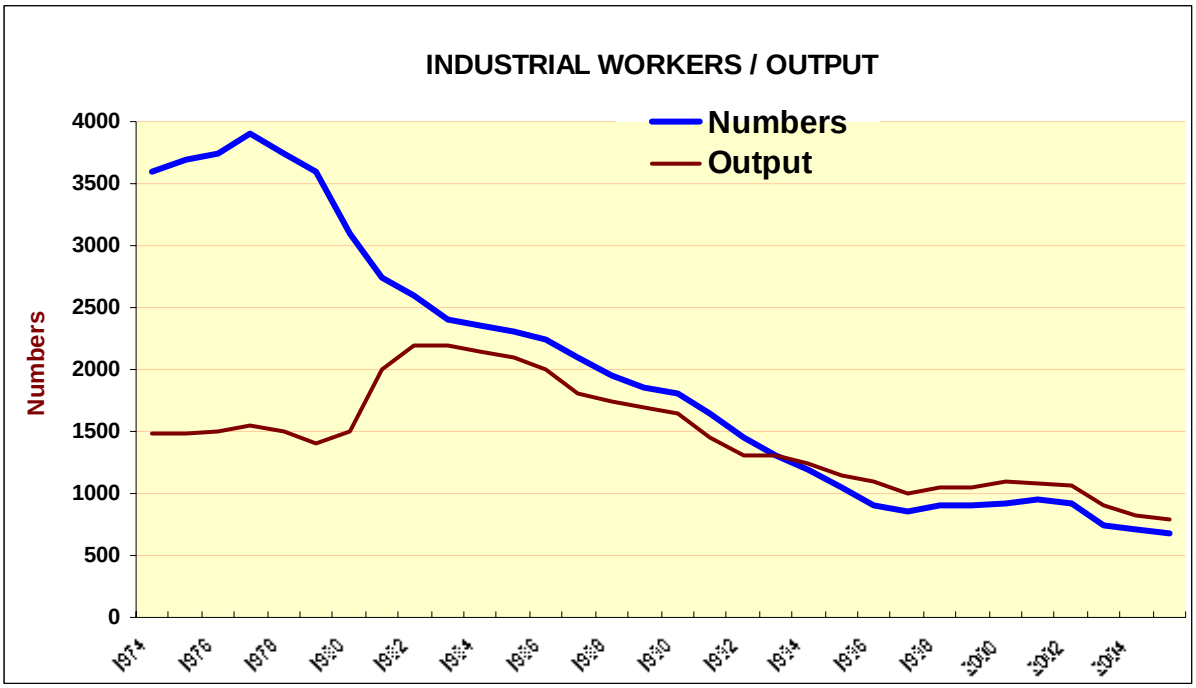
In the 1970s each Section Office in Roads Service employed its own industrial staff to carry out it's work. These staff worked out of Section Office depots where vehicles, plant and materials were housed.
In the late 1980s Roads Service came under great pressure to deliver an ambitious programme of market testing of the core maintenance activities. At this time the client and internal contracting staff were integrated and this made for difficulties in determining clarity of roles and identifying the costs required for market testing. This was one of a number of catalysts to introduce a major organisational change and separate the client and contractor role. This was regarded as a pre-requisite to the market testing of the core maintenance activities.

The outcome of this was that ,in 1994, the internal contactor staff were formed into Direct Service Organisations (DSOs). These were based in Divisions and under the control of the DRM.

The re-organisation of 1999 centralised the management of industrial staff in a new division named Roads Service Direct (RSD). This was based in Ballymena with Joe Drew as the new Grade 6 manager. However the industrial staff continued to be based in local depots.

Productivity

As a precursor to the introduction of productivity schemes for the DLO, Work Study officers were used to establish preferred methods and optimum



manning levels for all the key activities. They looked at what needed done and how best to do it.

This introduction of productivity arrangements for industrial staff met with initial management resistance due to their reluctance to accept that man-management skills needed to be improved and that non-industrial staff would have to undertake additional work to make the new system work. Both industrial and non-industrial trades union were opposed to it.

In 1981 the first Productivity Scheme was introduced. A Roads Productivity Implementation Group (RPIG) was set up to approve proposals, policies, method studies and work measurement and to oversee the scheme introduction. This committee was chaired at DRM level and consisted of both Roads Service staff and representatives of the Departmental Industrial Personnel Branch. RPIG was eventually stood down in the late 1980s.

The concept was a bonus incentive scheme where extra output would be paid for by a bonus. Operatives were expected to achieve a minimum amount of productive work, on average 10 Planning Units (PUs) per hour, before bonus was paid. Each PU earned in excess of 10 then attracted a bonus payment. Work could be executed outside normal hours, eg a Saturday, but in these situations no basic pay or overtime was paid but all PUs earned attracted bonus payment.

While Work Study was sometimes criticised for failing to capitalise as much as it should have on possible efficiencies, nevertheless a genuine output based scheme was developed. If there was no measured output, no bonus was earned. Roads Service has resisted pressure over the years to consolidate bonus into normal pay.

Trades Union

Historically trade union negotiations were held at local level and normally the few problems that arose were able to be resolved at this level. The Joint Industrial Council (JIC) was established and was chaired by Personnel Branch of the Department. This forum brought together the main industrial unions and management. The unions represented were Transport & General (T&G); Amalgamated Electrical Engineering Union (AEEU); and General Municipal & Boilermakers Union (GMBU). There were problems in trying to rationalise methods and pay rates across Roads Service. If all three unions did not agree there was no mechanism to take matters forward. This resulted in a number of cases being referred to industrial tribunals. RSD was hampered to a large extent by the Roads Service restriction on the use of sub-contractors and was unable to exert leverage on the trades union.

Training Centre

In 1978 a Roads Workman Training Unit was set up in County Hall Ballymena. It was subsequently renamed Roadman Training Branch and it provided the in-house training of industrial staff skills. It con-

Roads Service Training Centre

centrated on training in Health & Safety and the core roadman skills of bitmac patching, kerbing, flagging and plant operation.

In 1979 Roads Service introduced a roadman training bus at a cost of £34,000 which was the first of its kind in the United Kingdom. This mobile training unit brought the training to the site. It was a 16 seat bus equipped with blackout blinds, air conditioning and projection equipment. It provided an effective training medium for over 15 years.

In 1981 the Roadman Training Centre was established at Caulside, near Antrim. The training centre developed a quality assurance role, allowing training effectiveness to be determined while independently auditing quality performance and adherence to safe working practices.

With the introduction of computerised systems the interface between industrial and non-industrial training became less well defined. The training centre was renamed the Roads Service Training Centre (RSTC) with the aim of providing suitable training for Roads Service industrial and non-industrial staff and others to develop skills and competencies essential to meet Roads Service business objectives. This wider commitment was demonstrated by a significant investment in a new purpose built training centre at Caulside in 1997.

Depots and Stores

In 1973 Roads Service had a network of stores across each Division to hold equipment, materials and vehicle parts for the effective execution of O & M activities by the DLO. These stores were in Section Office depots where there were also vehicle storage and workshop facilities. Depots were the responsibility of the relevant Section Engineer but all vehicles, workshops and stores were the responsibility of the Divisional Plant Engineer. Some low value equipment and materials were kept in small supervisors' yards which were located convenient to work areas.

Concerns about accountability issues led to the 1982 Rayner Report which was critical of the large number of stores and supervisors yards The outcome of this report led to a review of stockholdings versus needs and the closing of many supervisors' yards. Common tendering for fleet maintenance parts was also introduced at this time.

The stores function transferred to RSD on Roads Service reorganisation in 1999. An internal review carried out by RSD in 2001 resulted in further streamlining of the stores operation, with the reduction to a single store in each of the 4 operational areas. Supervisors' yards were confirmed as the most appropriate method of storing bulky frequently used materials.

Ballykeel Depot

Vehicles and Plant

Historically Roads Service had a great deal of under used plant, much of it in poor condition spread throughout all Divisions. Much of it was retained on a “just in case” basis or for the cannibalisation of parts.

In 1985 the Northern Ireland Audit Office (NIAO) reported on the management of vehicles and mobile plant and criticised the limited use of Plant Utilisation Reports (PURS).

A second NIAO report on the management of vehicles and mobile plant, published in 1989, was critical of Roads Service and Water Service for each having repair workshops in the same towns. It considered that more should be done to rationalise capacity. The Permanent Secretary, John Murray, had to appear in person at the Public Accounts Committee (PAC) in Westminster to respond to the NIAO criticisms.

In 1991, MMM Consultants were appointed by DoE to recommend a way forward for vehicle and plant management. Their report recommended the formation of a Transport Management Group (TMG) in both Roads Service and Water Service.

Transport Management Group

In 1992 the Roads Service Transport Management Group (TMG) was set up under Michael Parkinson at PPTO grade. The group was initially located in Roads Service Headquarters and moved to Marlborough House, Craigavon in 1995. Two new Transport Manager posts replaced the 6 Divisional Plant Engineers

This new group drove rationalisation and simplification of PURs and many plant groups were deleted from the information gathering process. A computerised fleet management system (TRANMAN) was procured and internal charging procedures were put in place.

The outcome of the MMM report led to a rationalisation of workshops in 1993 with closures in Dungannon, Larne, Ballycastle, Newry, Lisburn and Bangor. Roads Service then had 7 workshops and Water Service had 4 workshops spread across Northern Ireland. Each service did maintenance for the other where appropriate. Displaced staff were offered redeployment and a common charging rate for fitters was introduced across Roads Service and Water Service.

Fleet rationalisation continued until 1995. Many old and seldom used vehicles were auctioned off to reduce operating costs. Roughly half of the annual capital procurement budget went into replacing the road winter salting fleet. Parts holdings were also greatly reduced.

By 1994 The TRANMAN system held a lot of detailed plant information which was used
to produce monthly depreciation reports and about 10,000 invoices annually to Water Service. At this time Siva, the Management Accountant in Roads Service, provided much helpful advice on financial reporting. Internal Client/Contractor arrangements operated between divisions and TMG. A full cost recovery regime operated, as with Water Service rechargeable work.

In the 1999 reorganisation the TMG functions transferred to RSD and fleet management. was placed under the control of RSD’s Business Manager.Since 2000, increased investment has produced a significant improvement in fleet condition and age profile. Workshop facilities have been improved to meet more stringent vehicle testing regimes.

With the likely constitution of Water Service as a GoCo (a government company) the issues around one workshop servicing both vehicle fleets in each location have again been raised. The reversion to separate water and roads workshops is a real possibility - what goes around comes around!. .

Castlenavan Quarry

In 1973, Roads Service took ownership of Castlenavan Quarry, located on the A 24 near Seaford,which was, uniquely, the only operational quarry in public ownership in Northern Ireland The Quarry Manager at that time was Billy McCoubrey who later became Chief Executive of Roads Service.

Just prior to reorganisation there was a major capital investment in quarry plant involving crushing, screening and mixing plants which enabled the quarry to produce blacktop and dry stone materials of high quality, especially as the mechanical properties of the stone were very good.

In 1973 there was in excess of 100 industrial staff employed in the quarry carrying out various road work activities including surface dressing, a year-round resurfacing programme across the whole of Downpatrick Division, and major road reconstruction work such as the A21 between Ballygowan and Comber at Maxwell Court. The quarry was producing in excess of 30,000 tonnes of material and was operating all the year round.

During the early years of Roads Service, Castlenavan played a leading role in various research projects such as Friction Course Bitmac. Work also took place in partnership with Industrial Science Laboratories into high skid resistance aggregates such as calcined bauxite which is the main constituent of Shellgrip.

In addition to the quarry, Downpatrick Division's Materials Testing Station (Laboratory) was located at Castlenavan. The main vehicle and plant workshops for Downpatrick Division were also located there. As well as looking after the vehicles and plant in the division, they also carried out servicing, repairs and refits to Strangford Ferry boats and to the quarry plant.

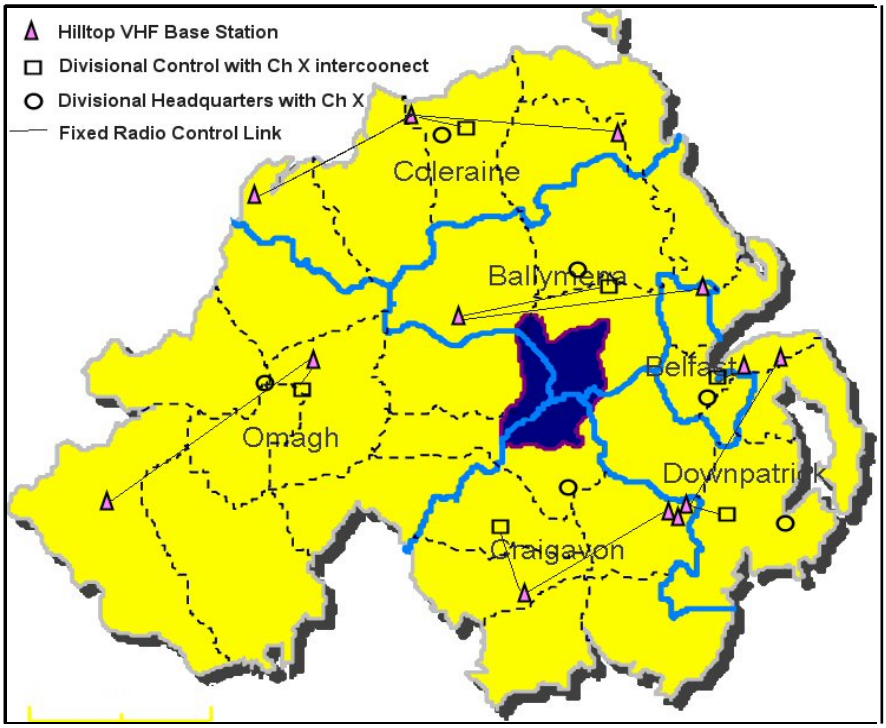
The quarry played an invaluable role as a constraint and regulator on the quarry industry and contracting prices over the years in Northern Ireland. However there was increasing pressure from the Quarry Owners' Association to close or sell the quarry because it considered that the quarry prices were being subsidised to the disadvantage of their members In the early 1990s the quarry plant needed significant investment for refurbishment and the quarry operation could not demonstrate a profit. The quarry was not permitted to compete for work in the open market, even in another part of government, eg Forest Service. Local residents complained about the effect of blasting at the quarry and the environmental lobby was becoming stronger.

By the mid 1990s Castlenavan Quarry had closed and was sold to a local quarry company, CE Stevenson who used the stone mainly for making concrete blocks.

Radiotelephone System

Considerable pioneering and development work on the Radiotelephone Systems, (R/T), was carried out by Down County Council (DCC) in the mid to late 1960s. It was recognised that as well as in emergency situations such a system would enable better planning and control of industrial manpower particularly as they became more mobile.

In 1973 there were some 55 mobiles and fixed office



Radiotelephone Network

sets in use within DCC (including the first 10 sets used for the M1 Motorway Maintenance, operated by DCC on behalf of the then Ministry of Development). There were around 15 sets in use within Antrim County Council and a further 11 sets in Belfast Corporation which transferred to the Roads Executive on 1 September 1973.

Roads Service wanted the benefits of mobile radiotelephony to be extended to all the new roads Divisions across Northern Ireland. A R/T Communications Officers Group, under the Chairmanship of Leslie Young initially, was established to plan, design, implement and operate this strategy.

This was done by the provision of a further 11 hilltop sites in addition to Slieve Croob which had been a hilltop site since 1967. Work was completed in 1978. All equipment, outside the contract maintenance period, was serviced and maintained by Radio Workshops (later termed Telecommunications Branch).

An overlay channel, based on Slieve Croob with point to point linkage to the main Divisional Controls, Divisional Headquarters and Roads Service Headquarters was established under the aegis of Channel X. This provided an emergency channel which could be used by Roads Service to provide basic communications between HQ and Divisional HQs and by linking channels at the Divisional Control could be extended to mobile to HQ coverage. This was to cover the potential situation of disruption to landlines.

Channel X was subsequently recognised as a Government Emergency Channel though not supported centrally by any special funding. Thankfully it never needed to be used in this mode.

Both the original and replacement Northern Ireland wide systems have proven to be resilient and reliable in operation even in the most extreme weather conditions and have recouped the capital investments many times over in the greater efficiency and effectiveness of the Roads Service personnel, vehicles, materials and equipment involved.

By 1990 the complement of R/T equipment was a total of 1,318 vehicle mounted mobiles, 144 hand portables and 58 fixed office installations.

At present Winter Service is the only area where R/T is still used comprehensively and consistently. Over the past 10 years mobile phones have gradually replaced R/T for the majority of day to day communications within the DLO. Men have their own mobiles and prefer to use them as they give greater privacy on calls and the fact that they are in the pocket. This makes them immediately available rather than fixed in the vehicle cab. Mobile phones are provided for men on call for Winter Service and emergency rotas.

8 Public Liability Claims

Background

The Public Liability for Neglect Act NI was introduced in 1966 and from then on there was a gradual increase in claims from the public. The rising number of claims was not helped by the comparative lack of resources at that time and the implementation of the Roads Order (1980) also had a very profound effect. A much greater number of cases was taken against Roads Service over the next 10 years by claimants, many of whom were in receipt of legal aid. In the main these were claims for alleged personal injury from pedestrians rather than claims for vehicle damage. The claims hot spots tended to be concentrated in the main centres of population in both town centres and housing estates. There were many contributory factors including damage caused to roads, footways and lighting arising from civil unrest, a growing claims culture, and the difficulties encountered by Roads Service through having an under resourced regime of inspections and repair records which made it difficult to refute some claims.

Public Accounts Committee

In 1986 Roads Service was severely criticised by the Westminster Public Accounts Committee for its management of a situation where, within a 12 month period, over 6000 claims had been made and the total compensation, including legal fees, amounted to over £6 million. Typical press comments of the day contained articles the gist of which was that the streets in Northern Ireland were 'paved in gold'.

The main PAC complaint was the lack of a co-ordinated and consistent approach to claims-handling and investigation. At that time each of the then 6 Roads Divisions operated its own in-house system for processing claims. Divisions consulted the Crown Solicitor but on their advice a large proportion of claims were settled out of court. There was major concern expressed that the projection of the then current trends indicated that the number of claims were likely to increase to 11000 per year by 1992 with compensation and costs possibly reaching £12 million. This would be an increasing direct charge on public funds because the Department carried its own insurance. Compensation payments came out of maintenance funds and were distorting the maintenance programme.

It was identified that urgent action was needed to resolve this issue but in the prevailing tight financial situation it was stated very clearly that no extra manpower or finance would be available for any new systems. In effect Roads Service had to adopt a completely new approach in the way maintenance works were planned and executed. This would be judged on the basis of the number of claims received and the associated costs.

New Inspection and Repair Standards

A Task Group chaired by Bob Roulston was established. This group's report which identified the problems and recommended appropriate measures, formed the terms of future action. Roads Service then embarked on the speedy development of a new inspection and repair regime which, despite initial difficulties, proved to be a major success. This new approach led to the drawing up of the first province wide standards for the inspection of roads and the repair of various categories of road defects. Generally claims took up to two years to be processed in the courts so a 2 to 3 year period was needed to see if any major improvement in the claims statistics would be achieved by the new approach.

The New Road Maintenance Standards were introduced on 27 August 1987 and, for the first time, the frequency of routine inspections for Public Liability, Work Planning and Safety purposes was defined and implemented across the organisation. Apart from motorways which were to be inspected on a daily (except Sundays!) basis, the frequency ranged from 4 weeks to 8 weeks for the various categories of all-purpose roads and footways.

The new process was initiated using a paper system. Defect details were recorded by inspectors in a duplicate book from which job cards were prepared for repair squads. Checks were carried out to ensure that the repairs had been carried out properly and the records were filed by street names to enable retrieval in the event of a claim.

While this paper system worked well it became clear that it would lend itself to computer application and this change was gradually implemented. Inspection details were recorded on Data Capture Devices (DCDs) and the Work Planning System enabled job

cards to be printed in priority order and issued to squads. Computerised storage of work done was quite simple and retrieval of records in the event of a court case was made much easier. A major in-house training programme was carried out.

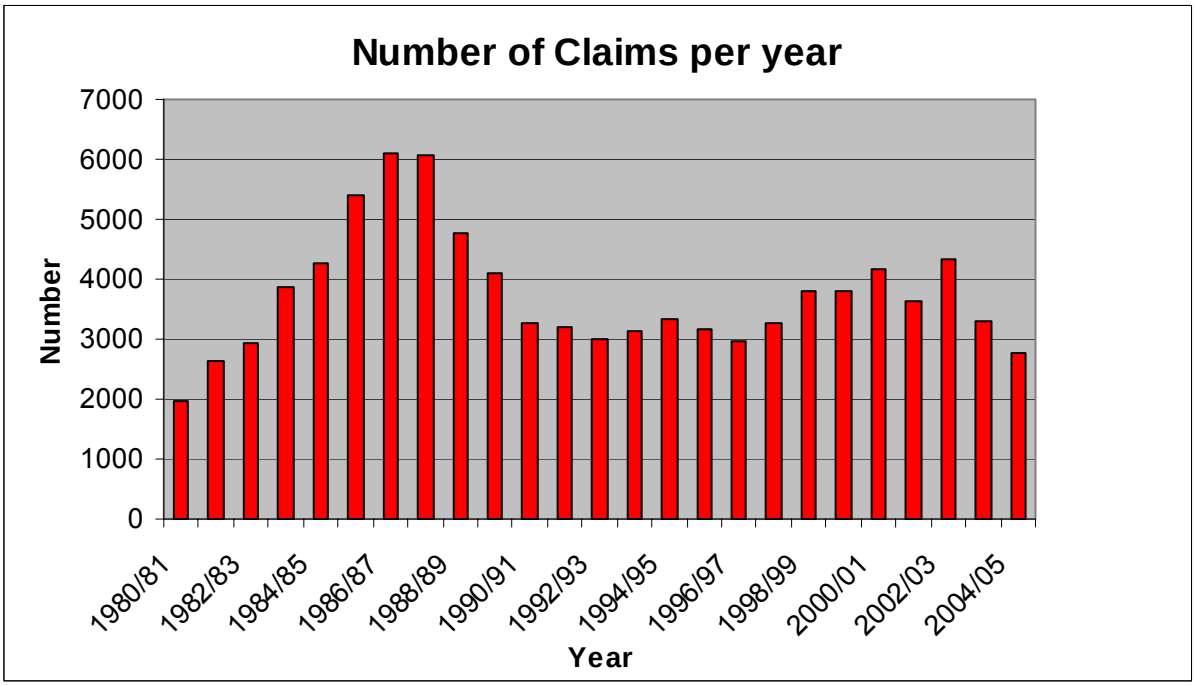
As a very high proportion of the claims received involved pedestrians, the establishment of a defensible 'trip height' was of major importance. The height established was greater than 20mm. This dimension was contained in Codes of Practice on highway maintenance in Great Britain and was considered to be equally applicable in Northern Ireland because the highway authorities' legal responsibilities were the same although they were contained in separate legislation. Defects well in excess of these standards eg 50mm or greater had to be repaired within three working days of discovery or the site was to be designated by the erection of warning equipment. All other defects had to be repaired before the date of the next inspection. At this early stage no standards were published for rural roads but common sense rules for the repairs to defects like potholes were used to progress the scheme.

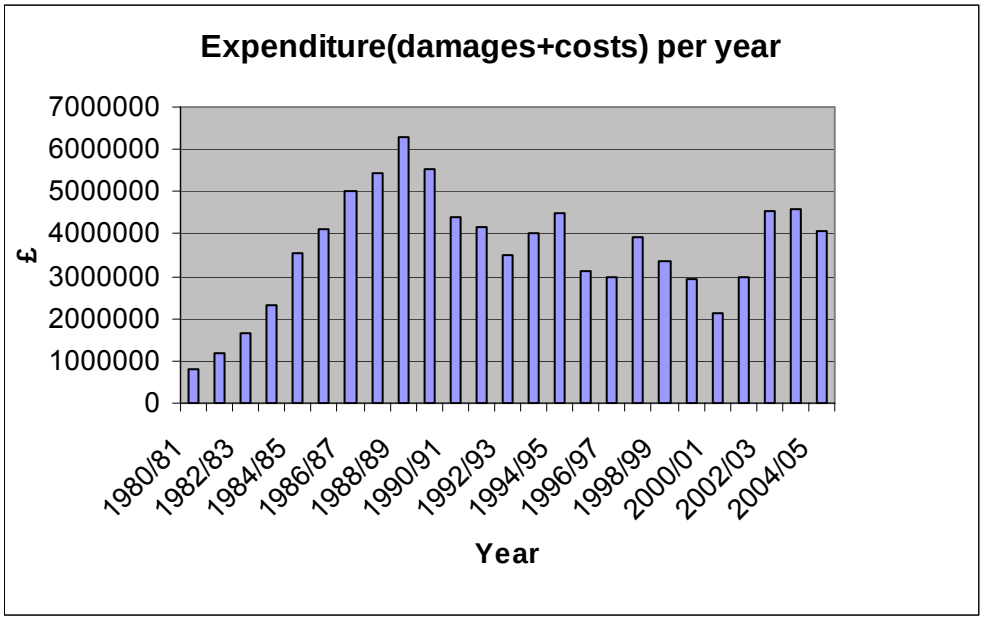
Central Claims Unit

Along with the new systems of inspection and repairs came a much more robust defence of Roads Service standards and procedures. This defence process was greatly enhanced by the establishment, in 1989, of a Central Claims Unit (CCU) headed by a qualified solicitor. The unit brought appropriate legal and administrative knowledge to the whole process of claims handling. Relevant staff were trained in the role of the witness in liability cases and the unit made a major contribution to the valid claim that 'Roads Service had the best inspection and repair system in the British Isles!' Overall there was an excellent partnership between the Roads Service staff and that in the Central Claims Unit. This ensured that the best possible case was made on behalf of Roads Service.

The computerised records made it easier to effectively investigate the background to any claim and to refute many fraudulent claims which reduced in number as claimants became aware of the amount of information available to Roads Service to enable it to mount a robust challenge. Another exercise carried out using the more sophisticated information was to identify the number of claims attributed to Roads Service. This indicated that Roads Service was only liable on 22% of claims received with the others being referred to other bodies such as the Northern Ireland Housing Executive and utilities such as BT and Water Service.

The CCU continues to provide dedicated proactive and reactive legal support to Roads Service. It is headed by a Solicitor and has 12 dedicated claims teams working to the Head of Unit. The role of CCU also extends to claims handling for Water Service





Statistics

The charts show the alarming increase in claims activity from 1969 claims in 1980/81 to the crisis peak of 6,093 in 1986/87 with peak compensation expenditure of £6.29 million in 1988/89.
They also indicate that the new process was a major success. The claim figures for 1992 were less than 50% of the 1986 figures which had prompted the PAC inquiry and were less than one third of the projected figure for 1992. The cost figures also showed substantial reductions with the £6 million costs being reduced to less than half that figure by 1995/96.
The number of claims received in 2004-05 was at its lowest level since 1986.

It should be noted that expenditure costs continue to fluctuate even with a lower number of claims. Over time court awards have increased and legal fees including legal aid continue to rise.

Road Maintenance Guidelines

Standards of inspection and repair were kept under review and were amended in the light of experience on the ground and in the courts.

As part of the ongoing process Roads Service issued new Guidelines for Road Maintenance in 1992. This was a much more comprehensive document which was largely based on the GB Department of Transport Code of Practice for Routine Maintenance and the GB Local Authority Association Code of Good Practice for Highway Maintenance. It included maintenance frequencies for traffic management and other equipment as well as routine cyclical activities. Further revisions of this document were issued in 1995 and 1997.

As part of a series of Policy and Procedures Guides a new document "Road Maintenance Standards", was issued in June 2000. This included revised inspection and repair standards for the whole road network. This new document contained information on the concept of a hierarchy of roads for the allocation of resources, the surveys and inspections required to identify work to be carried out and the standards to be used when maintaining the network.

9 Traffic Management

What is it?

A 1960s definition of the function of traffic engineering was:" *to fit the roads to the traffic* by planning and design, and the traffic to the roads by regulation and control."

The 2006 Roads Service leaflet defines the aim of traffic management:: "*to help road users* move safely and efficiently, by making best use of existing road space."

The evolution of the function over the last 40 years or so, and particularly in the last 20 years, can be detected from the different nuances of these 2 definitions. Over not much more than the lifespan of Roads Service traffic management has moved from implementing techniques to improve vehicle throughput and evolved into a tool to reflect a different set of priorities and re-distribute space from vehicles to people.

Resources

Prior to the setting up of Roads Service in 1973, the staff resources allocated to traffic management in the then existing road authorities were limited and even in Belfast, a traffic section was only established in the City Surveyor's department in 1970.However, because of the system of grant approval in place at that time, there was close liaison with the Ministry of Development and the Ministry of Home Affairs in the implementation of traffic schemes.

In most of the new Divisions the staff resources were much the same as had existed prior to 1973.However in Belfast the traffic management team from Belfast Corporation together with staff from Holywood Urban District Council and other road authorities came together to become the Traffic Management Section, Belfast Division, based at Hydebank. There were 10 people in the Section and Belfast was the only Division with a Principal post solely allocated to traffic duties. Other Divisions had small teams headed by a PTO1 and some controlled industrial staff to carry out signing and lining duties.

In all Divisions there was frequent liaison with representatives of the traffic police. This was an extremely important and sensitive issue because the police had to be "on-side" before Roads Headquarters would process the necessary subordinate legislation to bring in new regulations whether for short lengths of waiting restrictions or more complex traffic management schemes. This on occasion gave rise to some disquiet in Divisions because of the inference that the traffic police had a veto on change. This brought about tensions in the relationship with the police but these were invariably well managed by both parties.

This was largely the age of providing for vehicular traffic. The introduction of one way schemes, right turn overlaps at traffic signals; mini and small roundabouts; local widening; and more complex schemes, such as that introduced in Belfast's Shaftesbury Square, all played their part in seeking to ensure that the ever increasing number of vehicles did not result in increasing congestion and queues.

Census Point Location	1973	2004	%Change
A1 Newry to Border	4,107	20,250	393
M2 Greencastle to Sandyknowes	11,006	63,760	479
A26 North of Ballymena	7,608	19,220	152
A6 Dungiven to Londonderry	4,176	13,850	231
M! at Lough Road Craigavon	11,602	32,740	182

Change in Traffic Volumes 1973 – 2004

The Increasing Problem

In 1973 there were about 380,000 vehicles registered in Northern Ireland. By 2004 this had risen to 883,261- an increase of 132%

Traffic volumes too have increased dramatically over the same time period. Traffic volumes at a few sample sites is shown in the table. There is a wide variation in the percentage change in volumes between different locations. Reasons for this include where volume figures in the early years were depressed because of “the troubles”, and differences in the pattern of development in different areas of the Province.

The monitoring and collection of traffic data is now a key element in the effective management of the road network, the allocation of funding and the future development. To this end Roads Service now has 270 automatic traffic counting sites located on both the main and minor road network throughout the Province and publishes a comprehensive annual Traffic and Travel Information Report

Every day in 2004 there was an average of more than 54,000,000 vehicle kilometres of travel on the roads of Northern Ireland.

Collision Remedial Schemes

In 1980 the Institution of Highways and Transportation produced Guidelines for Accident Reduction Schemes This gave advice on identifying and treating sites and using engineering measures to improve safety. In recent years the terminology has changed to Collision Remedial Schemes which is considered to better reflect that there is usually some human culpability in these incidents.

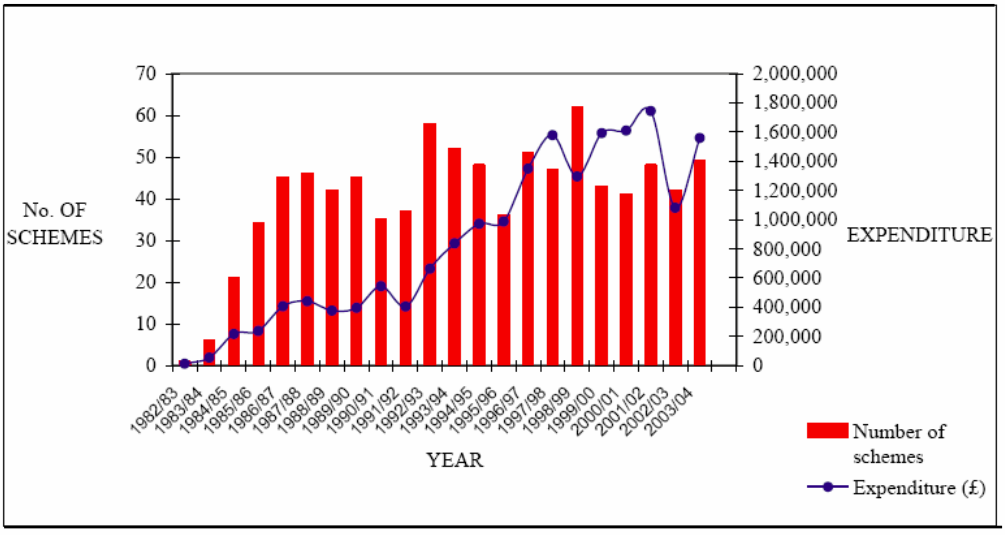
Barbara Sabey, Head of Road Safety at the Transport Research Laboratory was the speaker at an IHT meeting in Belfast in 1981. During her visit she met to discuss the topic with interested Roads Service staff including Tom Warnock, then Divisional Manager in Belfast Division. This turned out to be the catalyst for Roads Service to make accident reduction a priority and subsequently a number of staff attended the Royal Society for the Prevention of Accidents courses and spent some time in Hertfordshire County Council under the tutelage of Dick Rainbird.

Liz Head in Belfast Division, and George Wright in Ballymena Division were appointed as the first Accident Reduction Engineers in 1982 and the first scheme was implemented at a cost of £14,000,

This programme has been, and continues to be, a major success. Since 1982 almost 900 schemes have been undertaken across Northern Ireland at a total cost of £18.5M. A comparison of 3 years before and 3 years after scheme implementation indicates that about 3,400 collisions have been prevented. This represents not only a major saving in pain and suffering but a major financial saving to the community at large.

At first the intervention level above which sites were considered for schemes was 8 or more collisions in 3 years for urban areas of Belfast and 4 or more collisions in 3 years elsewhere. Following a policy review, this criterion was changed from April 2004 to 4 or more collisions in all locations.

Expenditure on Collision Remedial Schemes from 1982/83 – 2003/04



nitially accident data had to be transcribed from the police T1 reports on to overlays on Ordnance Survey base maps and all subsequent analysis was manually carried out. Data on all reported collisions that have occurred since 1989 is now held electronically and this computer system now facilitates the identification and analyses of clusters as well as providing a history of collision statistics.

Pedestrians

Pedestrian/vehicle conflicts and the vulnerability of the pedestrian has always been a major concern. In particular, the demand for pedestrian crossings has been, and remains, unceasing. Many lay-people consider controlled crossings to be a panacea for pedestrian safety. The issue is so important that provisions for pedestrians have not been limited by finance but by the difficulties encountered on the justification and siting of appropriate provision.

Many pedestrian facilities have been provided over the years and perhaps are now taken for granted. They include pelican crossings, zebra crossings, pedestrian islands, tactile paving and pedestrian phases at traffic signals

In the mid l970s the need to improve the town and city centre environment was recognised by the introduction of pedestrian priority in approximately 20 streets in Belfast city centre beginning with the Cornmarket-Ann Street area in 1973. The benefits of such schemes had been shown by the security control zones that had been introduced in the city, but even so, the formalisation of pedestrian priority, by providing street furniture and landscaping, was opposed by many traders. Subsequently pedestrian zones were introduced in a number of other cities and towns including Londonderry, Coleraine, Lisburn and Newry.

Traffic Calming

In 1975 the Transport and Road Research Laboratory conducted a controlled 12 month experiment on a road in Cowley, Oxford which was used as a shortcut by non residential traffic, to assess the effect of constructing road humps to reduce vehicle speeds.

However long before 1975 the army had constructed road humps at many locations in Northern Ireland adjacent to police and army locations. Many of these were on main roads and the geometry of the humps was significantly more severe than those tested in the TRRL experiment. The army and their Civil Representatives subsequently came under great pressure from local communities to construct more humps for safety reasons where there was no security benefit. Some of these were conceded in an attempt to win the “hearts and minds” of local communities. It took many years after the security situation became more relaxed before these humps could be removed and in some cases the geometry was amended and they became “official” schemes.

The official traffic calming programme commenced with 2 small schemes between 1990 and 1992.The first of these was at Carlisle Park in Ballynahinch. A significant head of steam was building up from residents' groups and local politicians for the implementation of traffic calming schemes and it became clear that "traffic calming" meant different things to different people. To some it meant cheap and nasty road humps and to others it meant relatively expensive paving schemes based on the Dutch model of Woonerfs.

The first 2 schemes involving more than road humps were constructed in the "Holyland" district in Belfast and in Castlewellan in 1993-94.

Car Parking - Off Street

In 1973, outside of Belfast, there were few off street car parks and even fewer which were close to town centres. Most of the car parks under council control transferred to Roads Service. All day parkers occupied the most convenient spaces from early morning both on-street and in off-street car parks. Shoppers were mostly catered for by limited waiting (one hour in any 2 hours during the working day) on the street. In some towns this waiting restriction alternated from one side of the street to the other on different days of the week.

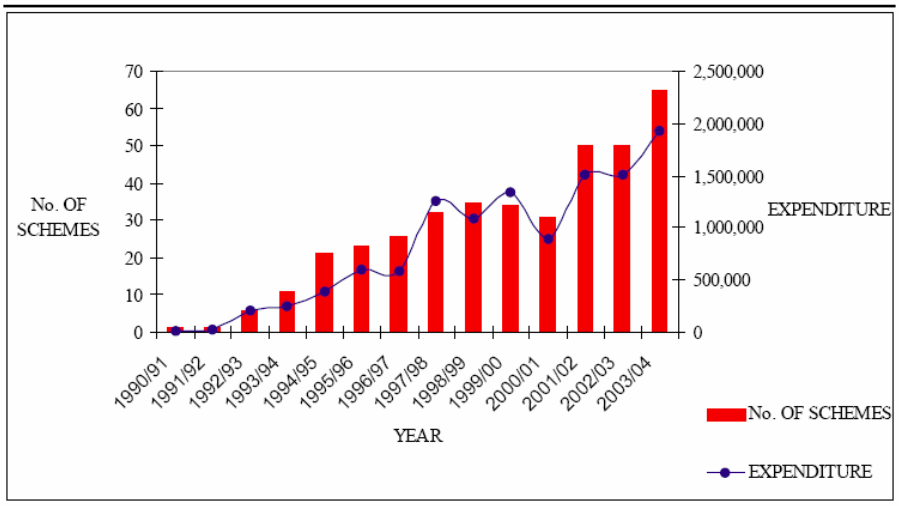
It became generally accepted that the urban street network in expanding towns did not have the capacity to accommodate the increasing numbers of pedestrians and vehicles, as well as parked cars. This resulted in an extensive car parking programme in the 1970's and 1980's including the first multi-storey car park outside Belfast at the Tower Centre in Ballymena. There are now about 320 car parks outside Belfast with approximately 28,000 spaces. As these car parks were provided, waiting restrictions were introduced to relieve the streets of on-street parking.

It then became necessary to manage the off- street spaces in a way which maximised the turnover of the more convenient spaces. Charging was introduced in the most popular car parks to discourage long term parking in these spaces. The first charging structures introduced usually had a short period free of charge with increasing charges for the longer stay users. With the later introduction of a target of full cost recovery for our car parks, together with the effect of inflation, the initial free period has now disappeared and hourly charges have increased. The method of collecting this charge has also changed over the years with barrier systems and Pay and Display both having periods of dominance. Pay on foot systems are now the preferred option at some sites.

In Belfast, Roads Service inherited 14 car parks from Belfast Corporation, including a mechanically operated multi-storey located within the core of Clarendon House in Franklin Street, although this site was closed on security grounds.

During the 1980s there was considerable investment by Roads Service in off-street car parks in Belfast. Whilst the Corporation had 14 car parks, including a multi-storey in Franklin Street, by the end of the 1980s this had increased to 32 sites with 3,500 spaces. Many of these sites purchased were

Expenditure on Traffic Calming Schemes.



on an opportunity basis where premises had been destroyed through terrorist action. However over the succeeding years Roads Service had to accede to sustained pressure from other departments to release some of their prime city centre sites as part of site assembly for new developments.

There was also major development in this area by the private sector, especially in multi-storey car parks. The first, Hi-park, opened in December 1985 and has since been followed by 6 others, providing a total of 4,600 spaces.

Town and city centre car park charging policy is an acknowledged tool in seeking to influence overall transport policy through restricting the opportunities for all cheap all-day parking. Roads Service fought a losing battle in Belfast for many years against the transfer of sites to the private sector for development in which the parking provision would inevitably be all-day contract parking. In 1986 Roads Service controlled about 80% of the off-street spaces in Belfast and in 2004 this had reduced to about 20%. Currently ,in 2006, there are planning applications submitted for almost 4,500 spaces in proposed multi-storey sites.

Throughout Northern Ireland, Roads Service is now responsible for 367 off-street car parks with 31,240 spaces and 1 multi–storey with 840 spaces.

Car Parking-On-Street

Just prior to the setting up of Roads Service, unattended parking was banned on the streets of Belfast -one of the casualties of this being the parking meter scheme which had been introduced in 1966

This was the position until November 1987 when on-street parking, controlled by Pay and Display, was reintroduced in 415 spaces in an area south of the City Hall. This decision had its critics, mainly on security grounds, but it proved to be very popular and was extended in 1991 to a total of 1300 spaces. On-street parking has played an important role in providing accessible short term parking in the city centre, particularly in areas which are not well served by car parks.

In provincial towns on-street parking continues to be free of charge and controlled by limited waiting restrictions

A great source of frustration to traffic management staff over many years has been the lack of enforcement of on-street parking and waiting restrictions by the police or traffic wardens. As a result, illegal parking was and continues to be widespread across many parts of Northern Ireland. This affects the free flow of traffic, contributes to increased congestion and creates potential hazards to road users.

Even in the Belfast City Centre Pay and Display scheme where Roads Service pays for enforcement by wardens, an NIAO report in 2000 was critical of the management and effectiveness of the enforcement arrangements. This report suggested that the decriminalisation of parking enforcement, as was in

place in many English authorities, could provide a viable alternative.

The PSNI subsequently confirmed that its policing priorities were such that it could not continue to devote resources to the enforcement of parking offences. Consequently, following a public consultation exercise, the Department for Regional Development took powers to enable the transfer of responsibility for parking enforcement to the Roads Service.

These powers are contained in The Traffic Management (Northern Ireland) Order 2005 made at Privy Council on 19 July 2005. Work is in hand to implement an operational scheme. This includes drafting of subordinate legislation and development of a contract to engage a specialist private enforcement company to carry out on and off street enforcement and to manage off street car parks. It is planned to award a contract in summer 2006.

When DPE is introduced, enforcement of waiting restrictions and on-street and off-street parking regulations will be undertaken by Traffic Attendants employed for that purpose. It is intended that the scheme will be operational in late 2006.

Traffic Control

In 1973 there were less than 200 traffic signal controlled junctions and pedestrian crossings in Northern Ireland. By 2005 this number had expanded to 830. Originally most signal controllers were electromechanical and some, like that at Belfast's Castle Junction, had been installed before the war. While a level of co- ordination between adjacent junctions had been achieved using hard-wired systems, it could take up to two weeks' work with a soldering iron to change a plan. Traffic signals were therefore not good at responding to changing traffic patterns and in this respect were regarded by many as inferior to free flow one-way street systems involving merging, weaving, and diverging .All of this changed in the late 1970s with the introduction of microprocessor controllers which gave a much greater level of flexibility.

Urban Traffic Control (UTC)

Even with the added sophistication of microprocessors, the 'intelligence' of traffic signal control systems was in the equipment on the street. This limited the extent to which signals could be linked. In 1980 Belfast became one of the first cities in the UK to overcome these problems by having an Urban Traffic Control system. This used private BT lines to link traffic signals to a central computer in the new Traffic Control Centre in Prince's Street. The computer stored and processed data to ensure that the signals operated efficiently and to control traffic throughout the central area, rather than at each individual junction.

Initially 12 CCTV cameras covering critical junctions in Belfast enabled the staff to quickly adapt the UTC system to deal with new situations and incidents. The pictures also enabled UTC staff to provide travel information to the media -a service now significantly enhanced with the BBC Traffic and Travel correspondent having a desk in the new Traffic Information and Control Centre (TICC) in Airport Road.

Remote Monitoring of Traffic Signals

The UTC system allowed signal faults to be identified at the UTC Centre. A fault at one set of signals in a busy network not only reduces its efficiency but can quickly spread and seriously affect other junctions.

The considerable benefits of remote monitoring were extended by including 100 sets of signals outside the UTC system; indeed, many of them were not in Belfast. These systems are now commonplace but in 1985 the Belfast system was the first installed by Plessey in the UK.

The New UTC Centre

Between July 1993 and the opening of the new Lagan Bridge 18 months later, Roads Service commissioned an integrated traffic control system to deal with the interfaces between the new motorway junctions and the urban network. It included an upgraded UTC system, new motorway control facilities and a driver information system using electronic and rotating prism variable message signs. CCTV coverage was expanded to 19 cameras in the urban area and 3 on the M2/M3 motorways.

A new Control Centre was built at Airport Road to house these systems. There, staff manages the 350 traffic signals and pelican crossings currently operating in Belfast and remotely monitor signals in 3

other Divisions of Roads Service.

The technology behind computerised UTC systems has developed and expanded into Intelligent Transport Sytems (ITS). In Northern Ireland the urban (UTC) and inter-urban traffic control systems have been integrated and include a driver information system of variable message signs. Traffic flow is now monitored by a network of CCTV cameras on both the urban and inter-urban networks.

Initially, deployment of ITS generally centred on Belfast and its environs, this being the most heavily trafficked part of the road network. Motorway control has now been extended to other parts of the network and a satellite of the Belfast UTC system has been established in Craigavon with a remote network connection to Downpatrick. This has enabled the application of UTC to Newry and Craigavon.

Travel Information

The dissemination of travel information has made tremendous strides in recent years. Roads Service now offers:

Dynamic travel information and real time CCTV pictures on the internet (www.trafficwatchni.com)

Traffic and travel information broadcast live from TICC

Provision of on-trip information to drivers via a network of variable message signs

BusTrak- the provision of real time information for passengers at bus stops.

European Projects

Since the mid 1990s, Roads Service has recognised the advantages to be gained by a relatively small road authority keeping abreast of developments in traffic control technology, not just in the UK but also throughout Europe, by collaborating in a number of projects

In 1995, Roads Service's first experience of a European project on traffic control was in a project called TABASCO (Telematics Applications in Bavaria, Scotland and Others.

In recent times, Roads Service has partnered the National Roads Authority in the Republic of Ireland in a project called INSTANT which considers the provision of traffic and travel information on the Belfast to Dublin corridor.

STREETWISE is a Euro Regional project involving the 5 national roads authorities of the UK and RoI. This project involves the investigation of traffic control and travel information facilities on the Trans European Network.

10. Transportation

Introduction

Nearly 45 years ago, the Buchanan Report highlighted the potential dangers facing Britain from increasing car ownership and the unrestricted use of the car. The report also identified a number of key policies including road pricing, parking controls and the provision of more attractive public transport.

In 1966 the Belfast Transportation Study was carried out as part of the Belfast Urban Area Plan. While the consultants considered the potential role of road pricing, parking controls, residents parking, rapid transit systems, busways, bus lanes etc. they recommended that all the funds available in the plan period should be invested in road improvements. In 1969 the Belfast Urban Area Plan and Transportation Plan were published showing major road proposals including an Urban Motorway Ring road connected to four radial motorways M1, M2, M3 and M4.

In the same period Development Commissions were set up to plan the expansion of "growth towns" and to accommodate the expanding overflow from the Belfast Urban area as the "Matthew Stop Line" came into effect. A new linear City of Craigavon was planned with proposals for extensive new road systems including two Urban Motorways.

These optimistic plans were based on the sustained population and economic growth of the 1960's. However, the projected growth did not take place due to the effects of the international recession and a nationwide decrease in population growth, coupled with civil disturbance in Northern Ireland. As a result the new Roads Service had to reassess all the plans and projects that it inherited from the previous road authorities in 1973.

Belfast

The question of transportation has always been very important for Belfast, because of its scale. In 1974 consultants were again appointed to reappraise the Belfast Urban Area Transportation Strategy even though the plan had only recently been adopted following a Public Inquiry in 1972. A second Public Inquiry in 1977 led to the adoption in 1978 of a revised strategy based on a broad balance in allocation of resources between public transport and new roads and carparks. The review also included a considerable scaling down in both the number and standard of road improvement proposals in the 1969 plan. However, it did enable the revised link between the M1 and M2 known as West Link to be constructed in stages between 1979 and 1983.

A further reassessment of the Strategy for Belfast was undertaken in the mid 1980s in conjunction with the preparation of the new Belfast Urban Area Plan 2001 which was due to replace the 1969 Plan. This new plan continued the 1978 strategy in that additional road capacity was planned to provide freedom of movement for vehicles and parking was still to be provided to meet demand.

Well before the end of the plan period it became clear that old 'predict and provide' policy could not be sustained from either a financial or environmental point of view. However, the Cross Harbour Road and Rail Bridges survived the re-assessment and were constructed between 1991 and 1995 thus linking the Bangor rail line to the rest of the rail network, and the Sydenham By-Pass to the M2 via the new M3 bridge.

Craigavon and Other Areas

Prior to 1973 most areas had Area Plans which included Transportation Proposals (mostly road schemes). These were based on similar thinking to 1969 Belfast Plan.

The second report on the Craigavon New City Plan, dated March 1967, expected the population of the new city to reach 100,000 by 1981 and 150-180,000 by 2000. The actual population of the urban area in 2001 was 56,568. The plan was based on the assumption that the motor car would be the dominant mode of travel and that high private car usage could be catered for by building an extensive linear road network. A separate pedestrian/cycling network was proposed to reduce conflict with motor vehicles.

While an extensive network of roads, footpaths and cycle tracks was provided in the 1970's, it fell well short of the original New City Plan. Planning Service produced a revised working plan for the area in 1985. This reduced the extent of the proposed area for development and the associated road network.

Most of the other first generation post '73 DOE Area Plans and their replacements in 1980's reduced the extent of proposed road schemes. This reflected a more realistic view of the likely level of funding. While there was an increasing awareness that new roads could have detrimental effects on the environment, there was little change in the overall policy direction of Transportation in the 70's and 80's.

European and United Kingdom Policy Direction

There was a growing awareness over a number of years that rising traffic levels would eventually become unsustainable. The UK National Road Traffic Forecasts in 1989 predicted that traffic levels would grow to between 83% and 142% of the 1989 levels by 2025. This led to a greater understanding of the need to manage this increase. In 1990 the relationship between land use and travel demands was highlighted in a White Paper "This Common Inheritance". A Policy Guidance Circular on Transport (PPG13) was issued in 1994. Its aim was to use land-use policies to reduce the reliance on the private car by reducing the growth in the length and number of motorised journeys and by encouraging more environmentally friendly means of travel.

A year earlier, in 1993, an EC White Paper was published on the future development of a common transport policy. The paper advocated a sustainable mobility policy that required action to reduce congestion caused by the use of private cars. It indicated the need to promote the use of environmentally friendly public transport and at the same time to dissuade the use of the private car. In 1995 the Secretary of State for Transport, Dr Brian Mawhinney, launched a national debate on transport policy by issuing a document for discussion called "Transport: The Way Forward".

The Northern Ireland Response

A major shift in Transportation Policy direction took place when Malcolm Moss, the Minister for the Environment in Northern Ireland, issued a statement on 17 January 1995 outlining seven key principles, which would be used in determining future transportation policy here. These were:

- the need to minimise, where possible, the effects of transport on the environment
- a recognition that it is no longer acceptable to seek to meet the full demands of future traffic growth simply by building roads, particularly in urban areas
- an improved public transport system which will include better co-ordination of bus and rail services
- fuller integration of land use and transport planning
- a more integrated approach to transport planning and funding
- the maintenance of good strategic transport connections both within Northern Ireland and between Northern Ireland and the rest of Europe
- a realistic assessment of what is achievable, in both the short and medium-term, having regard to the availability of future financial resources and changing public attitudes.

The message was underlined by the parallel announcement that the controversial road proposal adjacent to Belvoir Forest in Belfast was to be abandoned.

In October 1995 a more detailed statement was published "Transportation in Northern Ireland: The Way Forward".

The Statement:
- highlighted the transport issues which needed to be addressed
- identified the choices that needed to be made
- explained what the Department proposed to do in the short term
- sought to encourage debate and comments on the matters raised.

Its aim was to:
- reduce where possible the need to travel
- encourage the use of alternatives to the private car
- provide an efficient, safe and accessible transportation system which offered better choice and mobility for all its users.

Transportation Unit

Roads Service Transportation Unit was set up in 1995 under Denis O'Hagan and was initially based in Clarence Court. Its purpose was to assist in the development of the Department's policies in line

with the new strategic thinking. It was also responsible for liaising with and co-ordinating the activities of all parties with an interest in transportation. Its initial tasks were to collate the comments on the Way Forward Statement, arrange for further consultation and to co-ordinate and report on progress on a wide range of commitments made by the Department.

Over the years there was a continuing debate as to whether Roads Service was the appropriate home for the Transportation Unit or whether it should be seen as being more independent and reside in the core department. It has, however, remained in Roads Service since its formation on foot of the view that this placed it in the best position to influence both policies and scheme delivery.

Moving Forward

In 1997 the Labour Party's election manifesto contained a commitment to safeguard the environment and develop an integrated transport policy to fight congestion and pollution. That same year, following their election to government, a major consultation exercise on future transport policy was carried out. This was followed by the publication of a White Paper "A New Deal for Transport: Better for Everyone" in July 1998 which set out the Government's approach to transport policy throughout the United Kingdom. The aim of the policy was to achieve integration of transport policy at national, regional and local level

- within and between different types of transport
- with the environment
- with land use planning
- with policies for education, health and wealth creation.

In November 1998 Lord Dubs (Minister for the Environment) published "Northern Ireland Transport policy statement: Moving Forward". It outlined the strategy for implementing the objectives of the White Paper in a way that would reflect the particular circumstances in Northern Ireland. It committed the Department to produce a Regional Transport Plan. The first formal plan was to cover the 5-year period 2001 –2006. It also included a detailed Interim Regional Transport Plan to cover the period from 1998.

In June 2001 a Regional Transport Programme 2001-02 was published setting out the agreed transport initiatives and measures to be implemented during that financial year. It also included details of the large number of measures that had been implemented between April 1997 and March 2001.

The Regional Transportation Strategy (RTS)

In December 1998 the DOE (NI) published the Draft Regional Strategic Framework for Northern Ireland – "Shaping our Future". After extensive consultation, the Regional Development Strategy (RDS) was published in September 2001 setting out the spatial development framework up to 2025 for Northern Ireland and including a vision for future transportation - "to have a modern, sustainable, safe transportation system which benefits society, the economy and environment and which contributes to social inclusion and everyone's quality of life".

In July 2002 Peter Robinson (Minister for Regional Development) published the "daughter document" - The Regional Transportation Strategy for Northern Ireland 2002 –2012. This followed nearly two years of work and extensive consultation. In January 2001 a consultation paper had been issued, meetings held with stakeholders, and a major working conference held in September 2001 to consider options. The final consultation was the publication for comment of a Draft RTS and associated Equality Impact Assessment – launched by the Minister in a debate in the Northern Ireland Assembly in February 2002.

The strategy identified strategic transportation investment priorities and considered potential funding sources and the affordability of planned initiatives over the 10 year plan period. It assumed a total investment of £3500M, of which £1370M was additional to the then current levels of transportation spend.

This proposed investment was broken down into four areas and under different modes and included all aspects of Road Service work including Maintenance and Road Network Management costs.

Delivery of the RTS was to be progressed through three Transport Plans:

- Belfast Metropolitan Transport Plan

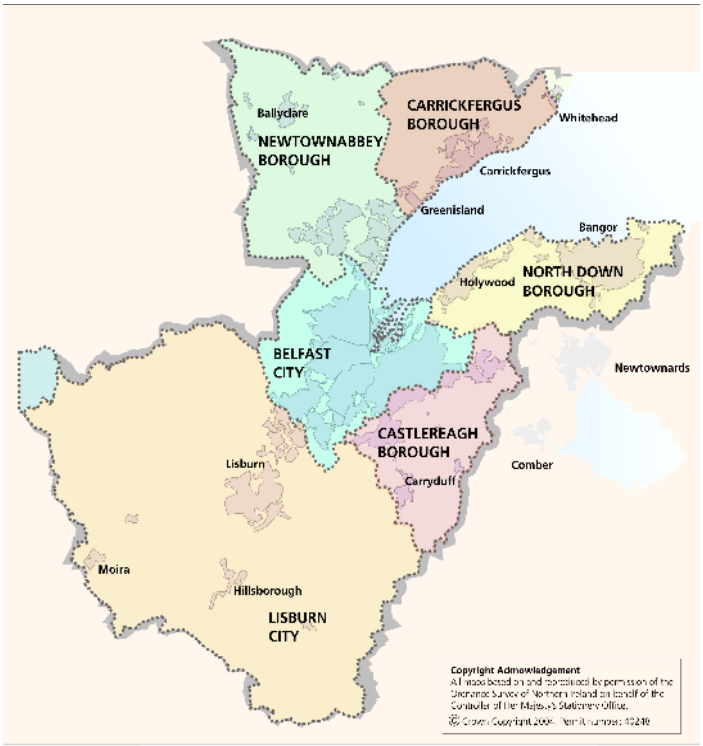
- Regional Strategic Transport Network Plan
- Sub-Regional Transport Plan

A series of targets was set for 2012. These were to be regularly assessed and additional targets set as part of the plan-making process.

In the interim period until these plans were finalised, the Department would continue to produce Annual Regional Transport Programmes. Three programmes were produced for 2002-03, 2003-04 and 2004-05; each also included a review of progress in the previous year.

Belfast Metropolitan Transport Plan (BMTP)

When Roads Service was restructured in 1999 the new Eastern Division boundary was intended to include the main urban areas that made up the greater Belfast area. While there was a case for including Newtownards and excluding the rural areas to the west and south of Lisburn, it was decided that the new Division should be contiguous with six existing Council boundaries - the city of Belfast and the Boroughs of Carrickfergus, Castlereagh, Lisburn, Newtownabbey and North Down. This area was subsequently used to define the boundary of Belfast Metropolitan Area (BMA), which is the subject area for both the Belfast Metropolitan Area Plan (BMAP) and the BMTP.



Belfast Metropolitan Area

Work on the BMTP began with the setting up of a team in Eastern Division and the appointment of consultants in April 2001. Close liaison and joint working arrangements with the BMAP team ensured the plans were mutually supportive and developed in parallel. The original ten-year time frame for the plan was extended to fifteen to tie in with the BMAP.

Early strategic guidance was obtained from the team developing the RTS. The strategy itself set the strategic framework for BMTP, including expenditure guidelines. Further guidance was given from the team developing the Accessible Transport Strategy (ATS). There was extensive consultation with Reference, Key Stakeholder and Focus groups and with District Councils. This led on to a Working Conference in February 2003 to consider both the Emerging Plan 2015 and the 2025 Strategy which had also been developed as a longer term vision.

In November 2004 John Spellar (Minister for Regional Development) published the Belfast Metropolitan Transport Plan 2015. The draft BMAP was also published at this time.

The BMTP identified and costed each measure proposed for completion by 2015, set in a strategic framework up to 2025. The total projected spend over the fifteen-year plan period was £1913m, with £897m to be spent by 2008-09. these costs were broadly in line with the projected funding shown in the RTS.

The Plan was broken down into four main headings – Walking and Cycling, Public Transport, Highway Network, and Management. Proposals were shown by Council Area with maps for each of the main built-up areas including Belfast City Centre. Metropolitan Transport Corridors were identified – 6 radials and 2 orbitals.

The Plan identified improvement works under each of the first three headings, with a strong emphasis on measures to make walking, cycling and the use of bus and rail more attractive.

The Management section set out a Parking Policy framework for Central Belfast by reducing the availability of long-stay parking. City centre core and fringe parking zones were identified. A range of measures to manage on-street, off-street, private non-residential and residential parking were proposed for these zones. Future parking standards

for new developments in these zones were identified. Outside Belfast City Centre, better control, enforcement and management of parking was proposed for Bangor, Carrickfergus and Lisburn and at key nodes on the main transport corridors.

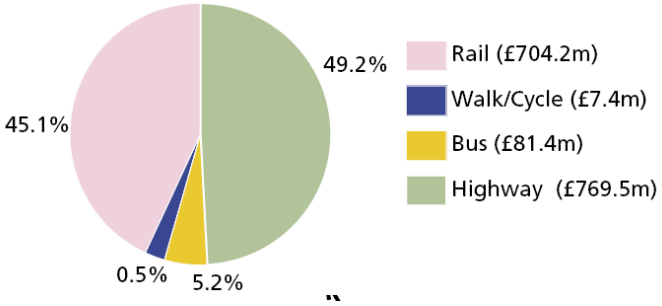
Regional Strategic Transport Network Plan

Development of this Plan was led by a team in Network Development Branch in Roads Service HQ with input from Divisions. The Project Team included representative from Translink, Ports and Public Transport Division, Regional Planning and Transportation Division.

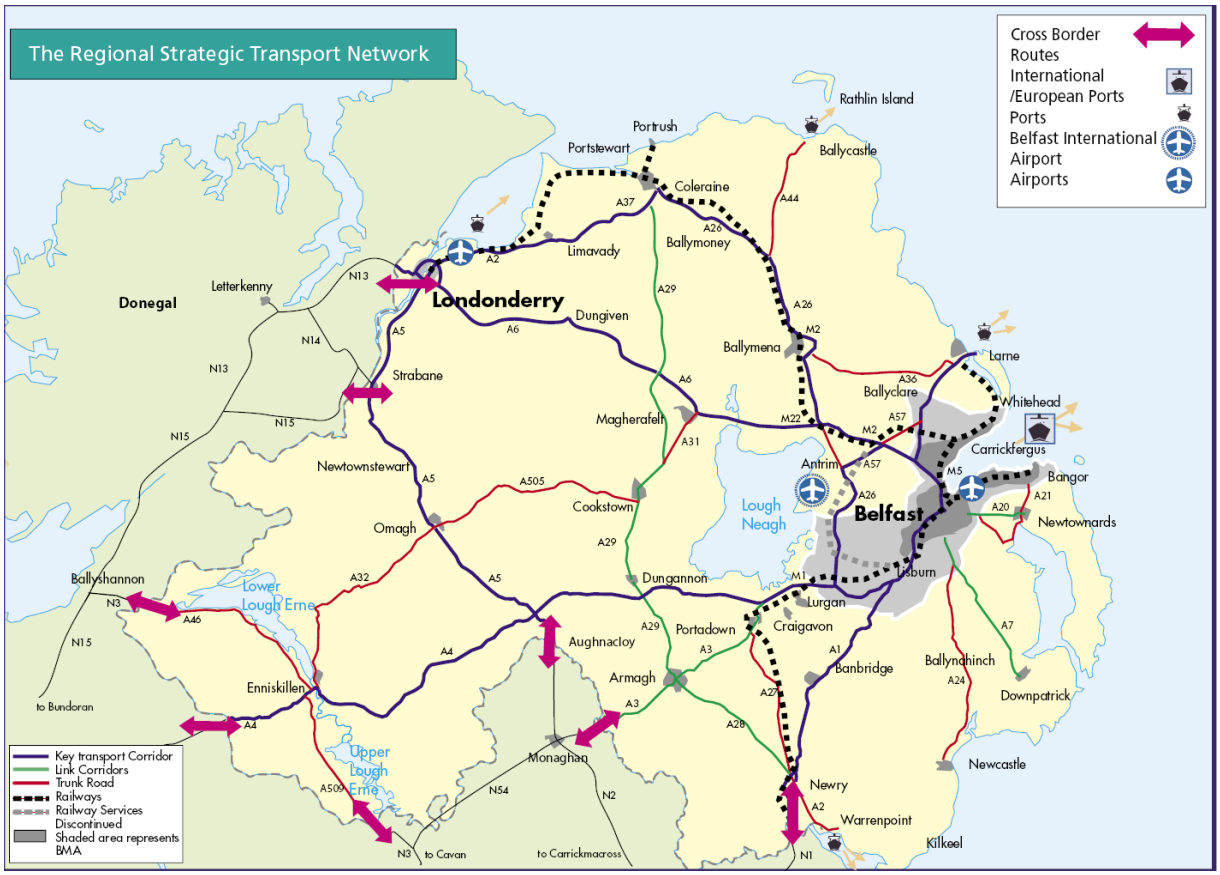
The Network comprises the complete rail network, five Key Transport Corridors (KTCs), four Link corridors, the Belfast Metropolitan Transport Corridors and the remainder of the trunk road network.

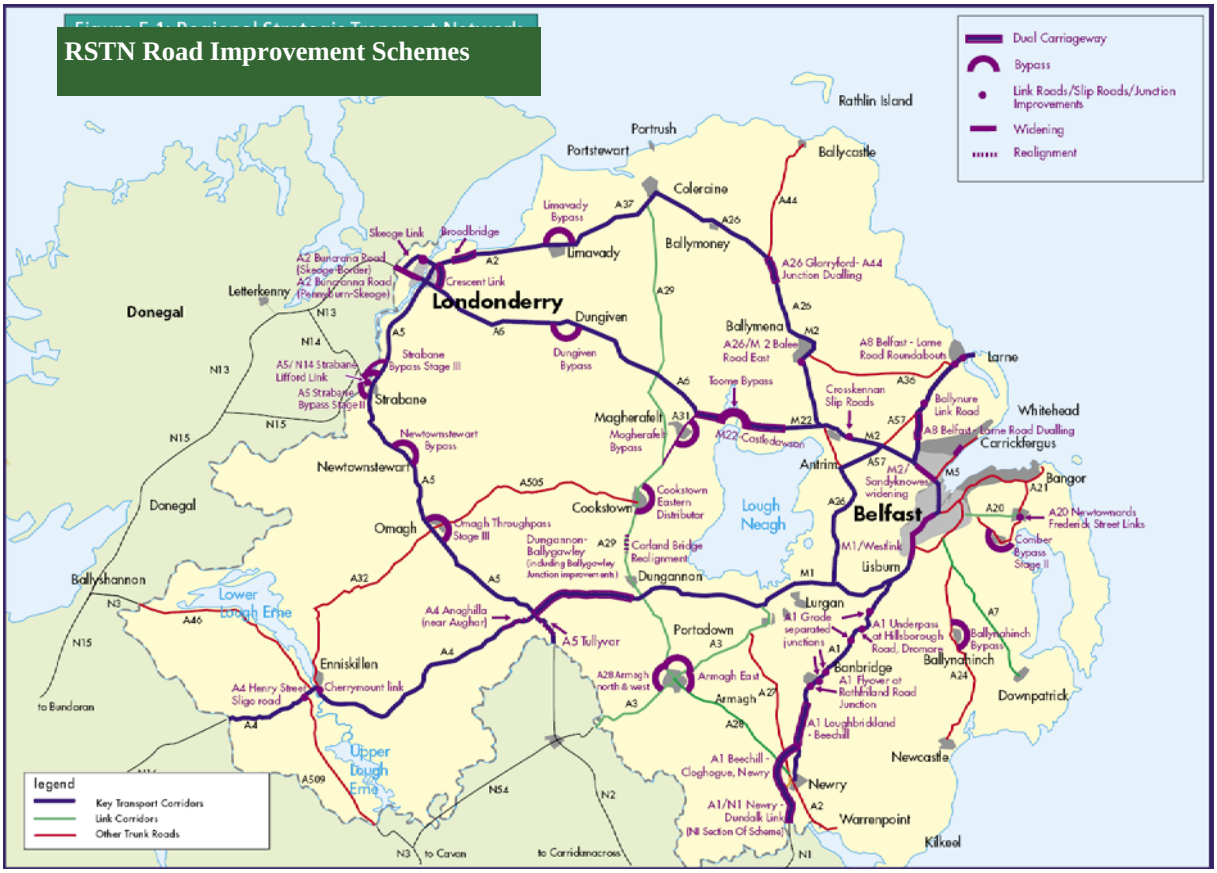
All District Councils were consulted and they helped identify additional Strategic Road Improvements (SRIs) that should be appraised for possible inclusion in the Plan. A working conference was held in September 2003 to consider the emerging plan.In 2005 John Spellar (Minister for Regional Development) published the Regional Strategic Transport Network Transport Plan 2015 (RSTN TP). The Plan used the framework established by the RDS and RTS. Proposed expenditure levels were compatible with those in the RTS but were extended to 2015, in a similar way to the BMTP.

The plan sets out proposed measures to a total value of £1,567.6m over the plan period under Walking and Cycling, Bus, Rail and Highways. In line with RTS these projections included maintenance and management costs for the road and rail networks.



The proposed Strategic Road Improvements (SRIs) were listed by corridor with estimated costs and suggested time frames. In addition, a considerable number of improvement schemes were proposed on single carriageway sections of the network ,to give overtaking opportunities. The proposed investment in Highway Measures was almost £770M.





Sub-Regional Transport Plan

Development of this final plan was led by a team from Roads Service Transportation Unit. Work started in 2004 with the first consultancy commission being awarded that summer. The draft plan was launched for consultation at the end of March 2006.

Transportation Measures

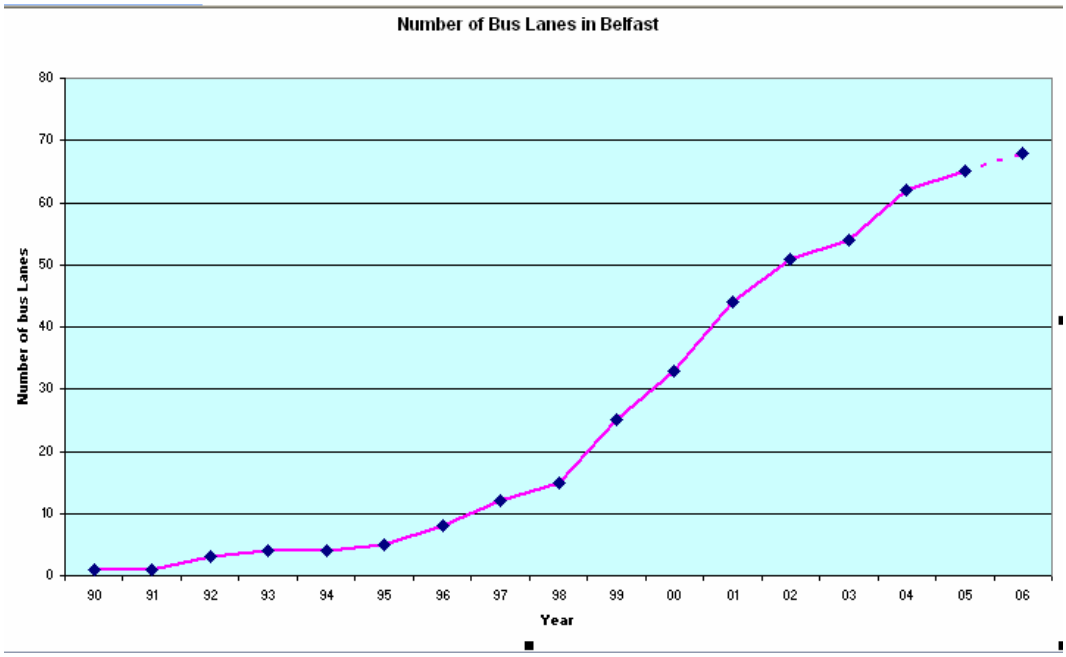
Roads Service has been responsible for implementing many of the measures and initiatives proposed in the different programmes and plans that have been made as a result of ongoing changes in Policy and Strategy for Transportation in Northern Ireland. Most of the measures were aimed at reducing the use of the private car by making other means of travel more attractive. They have been carried out by Roads Service Divisions and Transportation Unit working closely with other bodies, in particular Translink.

Enhanced Facilities for Buses

Roads Service provides the highway and roadside facilities for buses. The provision of bus lanes to improve bus journey times has been one of the main features, particularly in Belfast.

The first bus lane was introduced in Belfast in 1973. This was a contra flow bus lane in York Street, introduced as part of the York Street- Corporation Street one-way scheme. The main purpose was to keep both inbound and outbound bus routes close to Gallaher's cigarette factory for the benefit of the employees. Later there was a short length of bus –only street introduced in Queen's Square as part of the Custom House Square scheme.

"With flow" bus lanes trials were first carried out on the Ormeau Road in 1991. The first bus lane became operative on 15 October 1992, starting at the Ormeau Bridge towards the city centre. The second



bus lane was provided at Nelson Street/Dock Street in October 1992. Progress picked up in 1995, but there were still only 12 bus lanes in place at the start of 1998.

In 1999 a part time bus lane was opened on the M1 Motorway hard shoulder from Stockmans Lane junction to the end of the motorway at Donegall Road. This was, the first such scheme, controlled by variable message signs to be introduced on a motorway in the U.K. This was later extended along West Link with a dedicated access to the Europa Bus Centre.

With the creation of a dedicated Bus Section in Eastern Division and the provision of aditional funding, progress was speeded up. By 2005 there were 65 bus lanes totalling almost 30km in length.

Bus priority at traffic signals was first introduced at the Upper Newtownards Road in 1993 and has since been introduced at other junctions using a bus priority version of the adaptive traffic control system, SCOOT.

In most cases bus lanes were provided by reassigning existing road space, but additional widening took place at a number of sites, e.g. Saintfield Road/ Newton Park, East Bridge Street and Albertbridge Road.

Across Northern Ireland, bus gates, coloured surfaced bus bays, bus boarders and new bus shelters were provided. Red coloured surfacing was universally adopted to demarcate bus lanes.

A pilot Quality Bus Corridor (QBC) was introduced on the Saintfield Road/Ormeau Road in Belfast in May 2000. Roads Service provided 2.4 km of bus lanes, 80 new high quality bus shelters and other bus stop facilities. Translink provided better passenger information and an improved service using new buses branded with the “GO” logo. An initial usage survey carried out by Translink indicated increased usage and some modal shift.However, although additional routes on Falls Road and Newtownards Road were planned,Translink found it difficult to provide the resources to provide an appropriate level of service.

In August 2003, John Spellar (Minister for Regional Development) officially launched the first use of Real Time Passenger Information at bus stops on two routes in Belfast. Ten displays were installed on the Centrelink Service and twelve on the City Express service from Newtownabbey. There are now over 100 displays mainly on the Metro bus service routes in Belfast.

Bus Shelters

Over the years since 1973 Bus Shelters of varying standards have been erected in both rural and urban locations. Many in the rural areas were made and erected by Enterprise Ulster for Local District Councils as part of a training programme for the unemployed. In urban areas Environmental Develop-

ment Schemes often included the provision of bus shelters. In a number of Council areas, Adshel provided shelters on the understanding that they could use the shelter for advertising.

In 1999 Transportation Unit set up a small team including Eastern Division, to negotiate a new bus shelter contract for the whole of Northern Ireland. After much consultation, 25 out of the 26 Councils agreed to participate in the scheme.In January 2001 a 15-year contract was awarded to Adshel to provide 1700 shelters, By the end of 2005 over 900 shelters had been provided.

Making it Easier to Walk

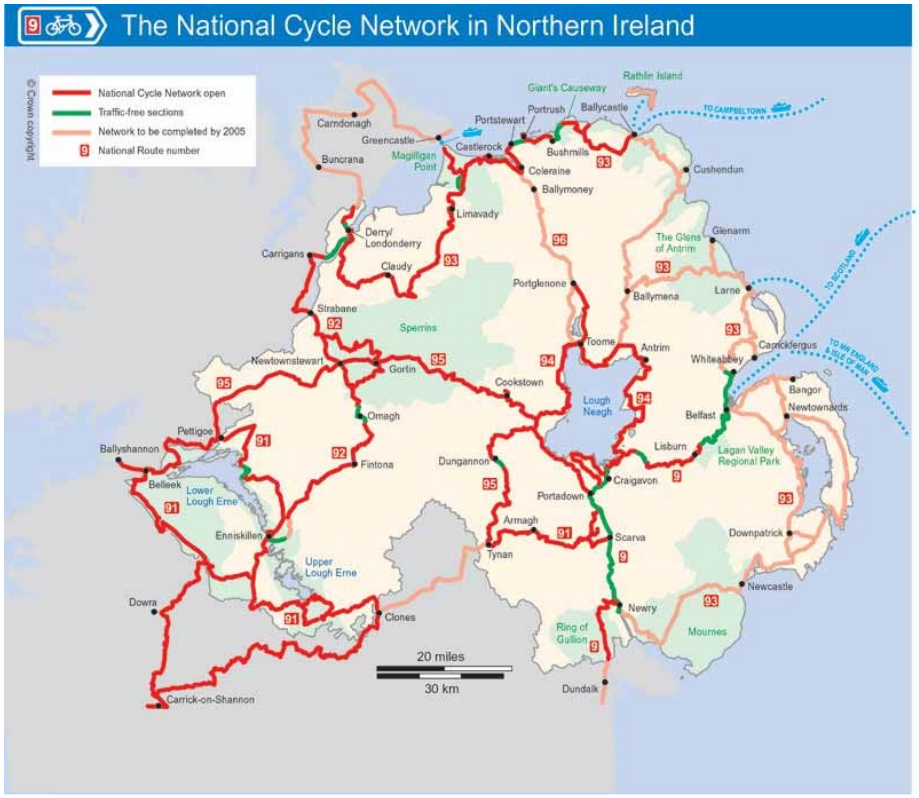
Providing and maintaining footways in a safe condition and reducing conflict with vehicular traffic were the main thrust of Roads Service work for pedestrians over the first 20 years. The convenience of pedestrians was not the first concern as vehicular traffic generally took precedence. Footbridges and underpasses were provided but many were not convenient and were underused. The location of guardrails and the widening of roads often made crossing more difficult for pedestrians.

However, there was a major change in attitude during the 1990's when it was recognised that walking was an important mode of travel that could help reduce over-dependence on the motor car.

Measures have been implemented to make walking more attractive, while continuing to provide and maintain an extensive footway network. New convenient foot-bridges have been provided such as the Waterside Millenium foot and cycle bridge crossing the River Bann in Coleraine, opened in 2001. Alternatively an under- used footbridge in West Belfast was replaced by a more convenient at-grade crossing. Underpasses were made less intimidating by improved lighting and the painting of murals, while others have been abandoned and replaced with at-grade crossings, e.g. Oxford Street in Belfast. Across Northen Ireland many new convenient crossing points were provided by providing build-outs, pedestrian refuge islands, zebra and pelican crossings.

The provision of the first Quality Walking Corridor was commenced in 2000 on the route between Queen's University and Belfast City Centre. This was completed in 2002 and further schemes were carried out in Coleraine, Omagh and Dungannon.

Transportation Unit played a major role in a number of initiatives to promote walking. In April 2000 a Walking Forum was launched. It was made up of over 50 members for a wide range of interests, including representative from the unit and Roads Service Divisions. A draft Walking Strategy was published in March 2002 and in December 2003



Denis O'Hagan (Chair of the Walking Forum) published "Walking Northern Ireland – An Action Plan".

The plan was wide ranging. It outlined activities which would assist in the delivery of measures aimed at "making it easier to walk" contained in the RTS. It included two targets to increase the number of short walking journeys (less than 2 miles) by 20% by 2012 and to increase the average distance walked per person per year by 10% over the same period. In addition it outlined actions aimed at the Health, Leisure and Tourism aspects of walking and at raising public awareness.

Making it Easier to Cycle

In 1973 cyclists used the existing road system and there were very few dedicated cycle lanes. In Belfast, the only dedicated lanes had been provided along the Sydenham By-pass in 1959. In Craigavon pedestrian/cycle ways were provided and segregated from other traffic routes. With the rapid growth of vehicular traffic, cycling on roads was seen by many as a dangerous activity.

However, attitudes to cycling changed in the 1990's as more people recognised the contribution that cycling could make as a flexible, inexpensive, healthy and environmentally-friendly way for people to travel. In 1996 the "National Cycling Strategy" was published with a target to double the number of cycle tracks in the UK by 2002.

In Northern Ireland, Roads Service played a major role in developing and implementing initiatives to improve cycling. In 1998 the Northern Ireland Cycling forum was established. It brought together the major organisations with an interest in cycling and included members from Transportation Unit and Divisions. It worked on delivering a cycling strategy and in June 2000 Peter Robinson (Minister of Regional Development) published the "Northern Ireland Cycling Strategy".The strategy aimed to promote increased cycle use by improving conditions for cyclists to encourage more journeys to work as well as recreation and tourism. It included a target to double the number of cycle trips between 2000 and 2005 and to quadruple them by 2015.

Roads Service, with a number of other agencies, was involved in the earlier production of the "Cycling Strategy for Derry" in 1998.

Sustrans, the cycling charity, played a major role in kick-starting the provision of new cycle ways. They planned the Millenium Project to provide that part of the National Cycle Network (NCN) in Northern Ireland. Work began in 1996 and by the end of 2000, 840km had been completed at a cost of £14.5m. In addition, two coast to coast cycle routes between Belfast and Ballyshannon (368km) and from Ballycastle to Ballyshannon(298km) were completed by 2000.

Most of the work was carried out by Roads Service but local councils, other government departments and the private sector and community groups all played a part.

As part of the celebrations to mark the completion of 10,000 miles of the NCN in the UK, the "Lagan and Lough Cycle Way" was declared the UK's best Urban NCN route 2005. The 21-mile long route runs from Jordanstown loughshore through the centre of Belfast to the Union Locks in Lisburn. An innovative scheme to carry the route under Governor Bridge by constructing a U-shaped reinforced concrete box located below the level of the adjacent River Lagan was opened in 2001.

Cycling Officers had been appointed in each of the six divisions from an early date but it was not until the mid 1990's, when new appointments were made, that they really started to make an impact,and, as funds for projects became available they started to give an increasing amount of their time to cycling duties. By 2000 there were 3 part-time officers in Northern Division, 2 in Southern Division and 1 in Western Division. A full-time officer had been appointed in Eastern Division in 1999.

In addition to their rural work and the NCN, they developed further facilities for cyclists by providing additional cycle lanes and networks in urban areas.

In most cases existing road space was reassigned for cycle use, but separate cycle tracks were also built. Over some lengths, cyclists share footways with pedestrians. They are also permitted to use bus lanes. Green coloured surfacings have been adopted in Northern Ireland to highlight cycle lanes i.e. where they cross existing road junctions etc.

Opportunities were taken to provide cycling facilities when new works or maintenance operations were

carried out. Cycling lanes were provided along most of the Outer Ring Road in Belfast in conjunction with major resurfacing programme.

In Eastern Division there was only one cycle lane until the late 1990's. In June 1999 a pilot cycle route was opened between the University of Ulster at Jordanstown and Whiteabbey village and on to Hazelbank Park. By 2004 there were over 120 kilometres of cycle facilities in the Belfast Metropolitan Area.

In 1999, Roads Service introduced a cycle usage survey based on 33 locations in Northern Ireland. The survey information has been monitored each year. Overall by 2004 an increase of only 14% was recorded compared to the base year. However the 9 counters in Belfast City Council Area showed a 45% increase.

11. Network Development

Introduction

There had been a period of extensive improvement to Northern Ireland's rural road network which reached its peak in the mid 1960's. The Ministry of Development financed, forward planned and programmed major road improvements to the motorway and trunk road systems. Most detailed design and construction of the trunk road system (and some motorways) was carried out by local authorities, but the extent and choice of schemes was greatly influenced by the level of funds available from the Ministry.

Improvement works continued under the new structure in 1973. Roads Service Headquarters was responsible for prioritising and allocating finance to the different capital programmes, major works, minor works, bridges, car parks, street lighting. The extent of the programmes was based on the funding levels available as programmes were rolled over each year. Major Works schemes were prioritised into 5 year and 5 to 15 year programmes.

Forward Planning Sections were established in each of the six new Divisions. Their main responsibilities were the identification and preliminary design of road schemes to the Direction Order (DO) stage (i.e. the selection of the vertical and horizontal line to a suitable scale, generally 1/2500); providing input to the Major Works programmes and liaison with Planning Service regarding roads input to Area Plans, including statutory line protection for proposed new roads. In addition, new car park sites were identified in towns and villages.

Maintenance and Minor Improvement (M & MI) sections were responsible for the selection and design of minor improvements. Minor improvement programmes were prepared for each Council area on an annual basis following the allocations from Headquarters. Construction was by both direct labour and contract. Unemployment Relief Schemes, under the Urban and Rural Improvement Campaign (URIC) were also used to improve the road network, until they were phased out in 1978/79.

Works Sections normally had responsibility for detailed design, preparation of the Vesting Order (VO), contract preparation and letting, and supervision to completion on site for all major road and bridge schemes. The structure in Belfast Division was different in that there were 2 Principal Engineers, with John Fogarty responsible for design and Sean MacAleenan for construction.

Forward Planning

An early task for the new Forward Planning Sections was to review and assess the numerous road improvement proposals that were still in existence; many from the 1960s. It became clear that future funding levels would not support their construction and "line protection" in planning terms could no longer be justified. In addition, new road capacity standards were introduced in 1974. These indicated that new higher traffic predictions were needed to justify the construction of dual carriageways and that single carriageways were deemed capable of carrying higher volumes of traffic than heretofore.

Appraisals

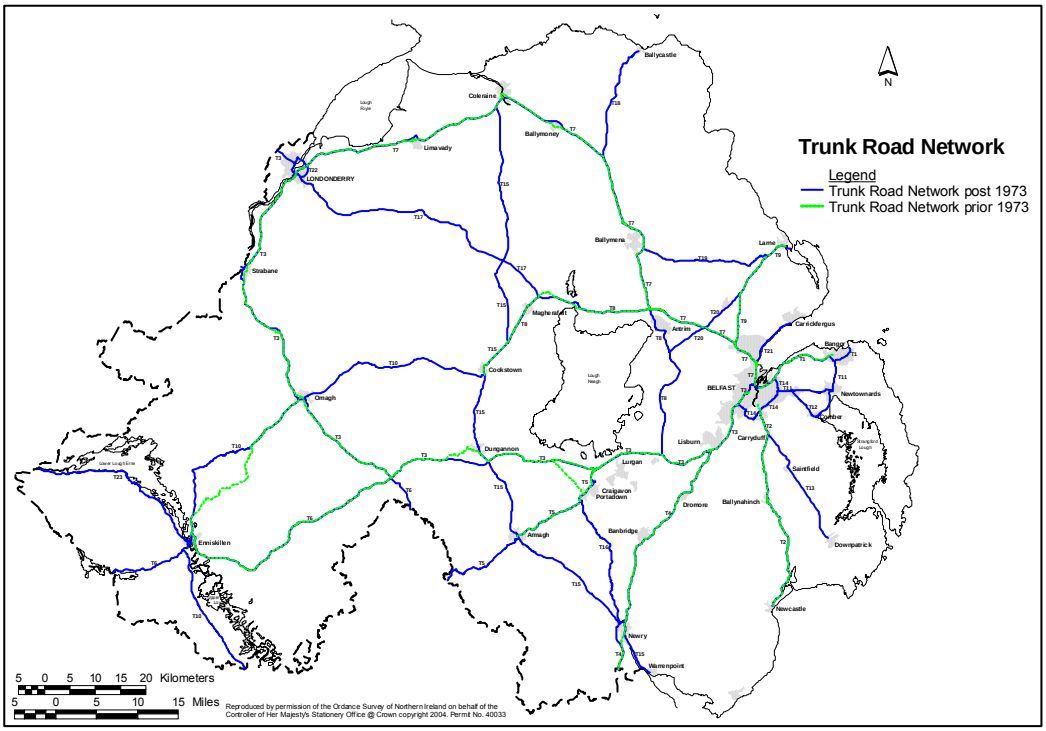
Appraisals were initially made using Cost Benefit Analysis (COBA). In effect, this method was mainly used to help rank schemes in the Major Works programme. As funding reduced, some schemes were removed from the programme even though their cost/benefit ratios were positive.

The 1998 Moving Forward – Northern Ireland Transport Policy Statement stated that all new road building proposals would be appraised under five key criteria. These were set out in the Department of the Environment Transport and the Regions (DETR) publication "The New Approach to Appraisal"; -

- Integration
- Safety
- Economy
- Environmental impact
- Accessibility

In March 2000 DETR published "Guidance on the Methodology for Multi-Modal Studies (GOMMMS). This approach was developed so that all alternative transportation modes or options could be considered.

In March 2001 DETR produced a bridging document "Applying the Multi-Modal New Approach to Appraisal to Highway Schemes". This document provided the link between the detailed advice on appraisal methods set out in the Design Manual for Roads and Bridges (DMRB) and GOMMMS.



Networks

While roads in Northern Ireland were classified as A. B, C and Unclassified it has always been the intention to concentrate improvement schemes on what were considered to be the most important routes. The original trunk road network (T1—T9) was created in 1949. By 1973 there were eleven designated Trunk roads with the addition of T10 in 1959 and T11 in 1968. There was little change to this network except for the re-routing of T10 between Enniskillen and Omagh via Irvinestown in the early 80's. In 1998 a major review took place and routes T12 and T13 were added.

In 2001, as part of the Regional Development Strategy (RDS), the concept of Key Transportation Corridors (KTC) was introduced. These corridors were then used by the Regional Transportation Strategy team in considerations leading to the Regional Strategic Transportation Network (RSTN) in 2002.

In addition to the Northern Ireland road networks, the European Community designated a Trans-European Network (TEN) to act as the main transportation corridors linking the different member states and funds were directed towards its improvement. In Northern Ireland 4 of the 5 KTCs were included.

Statutory Processes

Trunk Road schemes required the making of DOs to establish their line and level and VOs to acquire the necessary land.

Between 1973 and 1993 joint DO and VO enquiries were often held concurrently under a single inspector. However, the new Roads (N.I.) Order 1993 required the holding of separate inquiries. This caused administrative difficulties and delay in progressing schemes.

In 1984 Planning Service and Roads Service agreed that most new road schemes should be put through the normal planning procedures even though they were Crown Development and did not require formal planning approval. However, it was also agreed that Trunk Road schemes requiring a DO would not be subject to the same planning processes, as public consultation and the right to object were already available under the DO procedures.

In 1985 the process was further complicated when a European Commission (EC) Directive was issued requiring the assessment of the environmental effects of new developments. Environmental Impact Statements (EIS) were to be produced and made available to the public in connection with any new major developments (including roads). Planning Service indicated when such requirements were needed as part of their Development Control procedures. The Roads Order 1993 gave powers to carry

out Environmental Impact Assessments in connection with new road proposals. In 1997 a further EC Directive was issued, followed in 1999 by the Planning (Environmental Impact Assessment) Regulations (Northern Ireland).

A Draft Roads (Amendment) (N.I.) Order 2004 was prepared to amend the Roads (N.I.) Order 1993 and became operative in 2005. It permitted, as far as practicable, the three main statutory processes (Environmental Impact Assessments, Direction or Designation Orders and Vesting Orders) to be considered together at a single Public Inquiry.

Area Plans

Area Plans were produced by Planning Service for all areas of Northern Ireland from 1973 onwards. Roads Service staff worked closely with Planning staff in the process from draft to final published plan. In many cases, objections to road lines and policy were major issues. Roads Service staff played a vital role in the proceedings when Public Inquiries were held. Road lines indicated on Statutory Plans were given "line protection" and could not be easily altered or abandoned until the next plan review.

Capital Works Programmes

Since 1973 road and bridge schemes were categorised as major or minor works depending on their estimated cost. Originally works costing £100,000 or more were categorised as major works and this limit remained until the late 1980s when it was raised to £250,000. In 2000 it was further raised to £500,000 and in April 2004 it was set at £1million.Minor works tend to be works of local importance whereas major works are works with strategic importance and benefit.

The 5 year Major Works programme showed the cost and suggested start date for each scheme. This programme was invariably optimistic with the actual start date being dependent on the completion of the statutory processes including the acquisition of the necessary land, and the availability of funding.

The contents of the Major Works Programmes were the subject of consultation and political debate in many Councils and with Ministers. Roads Service provided as much objective assessment as possible to help in the selection of schemes. The Minister agreed and announced the final programme.

The constraints on capital expenditure meant that some major works such as the Omagh Throughpass and Strabane By-Pass were built in stages. This arrangement was politically expedient and enabled more schemes to be announced and commenced within the same amount of funding. It allowed the costs to be spread over several years, but there was a price to pay in terms of effective procurement.

In 2000 the then Minister for Regional Development, Peter Robinson, directed that the rolling 5 year and 5 to 15 year programmes be replaced with:

- The Constructiom Programme which contains those schemes which had completed the statutory processes and for which funding had been confirmed.

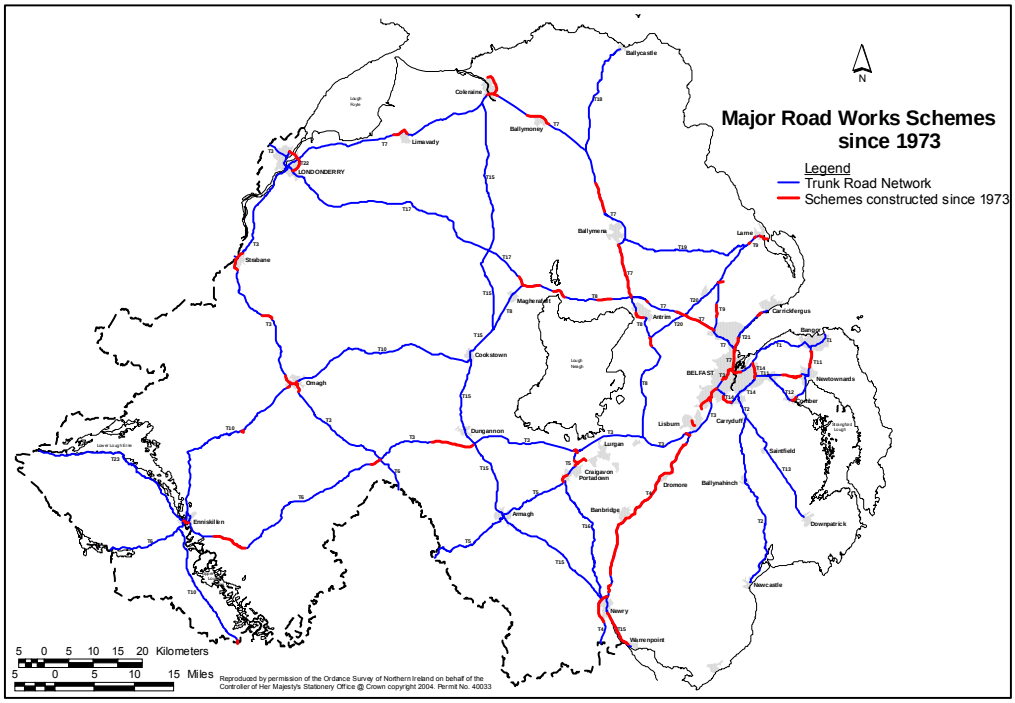
- The Preparation Pool which allows high priority schemes to be taken through the statutory procedures, including acquisition of land, in advance of funding being confirmed.

- The Forward Planning Schedule which identifies desirable schemes which could be started within the next 10 years or so subject to satisfactory economic and other appraisals, availability of finance and satisfactory progression through the statutory processes..

More recently a further category, the Long-term Planning Schedule, has been added. This will contain schemes that are not expected to start within the next 10 years but are considered to be of strategic benefit in the longer term.

A schedule of the individual schemes is included in the Appendices.

Minor Works programmes were produced by the Divisions for each Council area on an annual basis following the allocation from Roads Headquarters Councils were consulted in the autumn with suggested programmes of work for the next financial year based on the expected allocation. Allocations were made to Divisions early in the calendar year. Final programmes were presented to Councils as soon as possible after the 1st April. Considerable debate took place over the content of these programmes with individual councillors pressing for schemes in their own local areas.



Schedule of schemes included in Appendix

While some Councils considered the merits of competing schemes and advised Roads Service of their priorities, other Councils avoided the hard decisions of prioritisation and left the programme up to Roads Service.

In the 1980s and 1990s funding for all capital works was very tight and the ceiling on minor works had not kept pace with inflation. This led to the situation where some larger schemes, which were considered important by local Councils but had no strategic importance, were constructed through the Minor Works programme in stages over two or more years. An example of such a scheme was the widening and realignment of the B178 Carryduff to Hillsborough road. Whilst such arrangements may have appeased local politicians they could not be considered to be part of an effective procurement policy.

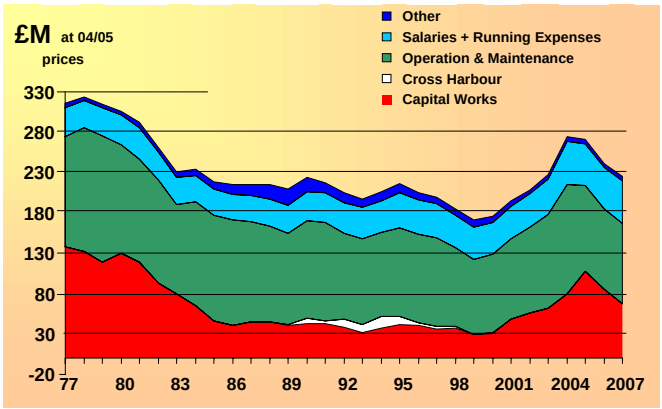
Funding

The funding levels for Capital Works were in the region of £100M per year in the 70's and 80's. A major reduction took place over the next five years when funding was cut by two thirds to £35M by 1985. The total capital funding available remained at approx. this level until 1998 though there was a slight increase in 94/95 to £40M when the expenditure on the Cross Harbour project was at its height.

In 1998 the Chancellor of the Exchequer, Gordon Brown, paid a flying visit to Northern Ireland to announce a £315m package of public expenditure, including £87m for a major programme to upgrade the Strategic Roads Network (to be spent over a three-year period). The package was to be part-funded by the sale of Government assets including the Belfast Harbour Estate. The road improvements included M1/Westlink, Newtownstewart By-Pass, Strabane By-Pass, A26 Dualling and the A8 Larne Road.

The overall capital provision was divided each year between Major Works, Minor Works, Street Lighting and a number of other smaller programmes. As overall programme funds were extremely limited in the 1980's and early 1990's, capital provision was restricted to enable as much funding as possible to go to structural maintenance .At this time funding for new car parks was stopped.

However, a modest programme of Major Works was maintained and the Minor Works allocations were kept at a low level enabling a regular programme of



Roads Service Expenditure

works to be carried out in each District Council area.

In 1982 a special allocation was started to fund a programme of Accident Remedial Schemes and by 2001/02 it was almost £1.8m.

Following the setting up of Transportation Unit in 1985, allocations were made to kick-start the provision of measures to improve walking, cycling and public transport. This funding was allocated to Divisions for these specific programmes through the Transportation Unit.

Following the publication of the RTS in 2002, Minor Works and other programmes were combined in a Local Traffic and Safety (LTS) Measures Programme with allocations given to each Division.

European Regional Development Fund (ERDF)

When the United Kingdom joined the European Union in 1973 it became eligible for several different funding programmes. However, as Northern Ireland was part of the UK which was a net contributor to the EU budget, public expenditure cover was required for the full cost of projects before any funds could be drawn down. This concept proved very difficult to explain to District Councils whose members cast their envious eyes across the border and saw the different funding regime in place there.

In recent years Network Development Branch in HQ has managed the funding process for the programmes relevant to Roads Service working closely with the Department of Finance and Personnel (DFP), UK Department for Transport (DfT), Department of Transport Dublin (DoT) and other DRD divisions.

In the 10 years up to 2004, £75M of EU funding was recovered.

The four main EU Programmes in 2004 were:

1. Building Sustainable Prosperity (BSP) Programme –£13.6M was drawn down against the A5 Newtownstewart By-pass and the A2 Limavady By-pass for 2003/4.
2. Peace II Programme –£11.5M was drawn down against A5 Strabane By-pass and A6 Toome By-pass.
3. Interreg IIIA Community Initiative
4. The Trans European Network (TENs) programme – Main interest in Priority Project Number 13 'Ireland – UK – Benelux'. Sub projects in 2004 related to
    a. Northern Ireland Transportation Infrastructure Project 2000
    b. A1 Loughbrickland to Beech Hill
    c. A1/N1 Newry to Dundalk Link Road
    d. A1 Beech Hill to Cloughoge

Works Design

Roads Service carried out most scheme designs in house for the first decade. For specialist large schemes such as Foyle Bridge, or at times of heavy workload, private sector consulting engineers were engaged. As design work was scaled down in the 1980s due to budget constraints, design staff resources were reduced likewise with consultants covering any capacity shortfall. In house design resources became spread increasingly thinly over the six Divisions and RSHQ.

The restructuring of 1999 saw the creation of a Roads Service in house design consultancy arm (RSC) which became responsible for a large portion of design work. This new organisation drew design staff from the then 6 Divisions and was able to set up specialist teams based in 4 locations. RSC now engages an external consultant on a partnering basis to assist where specialist expertise is required and also to cater for capacity shortfalls.

Surveys

Before detailed design commenced various surveys needed to be carried out to establish the physical and geological conditions and current traffic conditions. These were necessary so that the impact and

behaviour of the completed scheme could be predicted and subsequently measured.

Geodetic

In1973 topographical surveys for road schemes were carried out using theodolite and level, chain and tape. For some larger schemes aerial photography was used where appropriate. These photographs were then calibrated and co-ordinated to enable meaningful plans with contours to be produced.

By 1985, with major advances in technology, the introduction of electronic distance measuring devices (distomats) revolutionised surveying. Aerial photographs could also be converted into digital maps by the suppliers. These could then be transmitted electronically to the end user.
By 1990 the Ordnance Survey for Northern Ireland (OSNI) had developed 'off the peg' digital mapping which was available electronically to designers using computer aided design (AutoCAD). These advances enabled designers to carry out terrain modelling in AutoCAD and use global positioning systems (GPS) to verify their plans.

Geotechnical

In the early years geotechnical surveys of future road and bridge sites were carried out in-house using drilling rigs taken over in 1973 from the former road authorities. These were managed by the divisional laboratories, where most samples were tested. It was not unusual for rigs to work outside their divisional area as workload demanded.

Demand for drilling and soil testing remained steady over the first decade, but slowly reduced as the programme of works was scaled down. The in-house drilling capability reduced and increasing use was made of Works Service of the Department of Finance and Personnel who operated drilling rigs and a testing laboratory based at Hydebank. As the new construction programme picked up in the late 1990's, Roads Service relied more on the private sector for geotechnical surveys.

Traffic Surveys

Roads Service engaged in a wide variety of traffic surveys over the years as good information on traffic and trends is an essential requirement in all aspects of highway engineering particularly the scheme design.

A8 Belfast / Larne

A wide variety of surveys are carried out including traffic volumes, accidents, classification, speed, turning movements, parking, pedestrians, and trip origin and destination

As well as ad hoc and scheme-specific surveys, regular monitoring surveys were carried out across the Northern Ireland road network. These included:

- until 1984, manual counts (biennial census) at over 100 sites and currently continuous automatic traffic counts at over 200 sites, providing information (and their comparison with previous years) on traffic flows, traffic growth, vehicle classification and vehicle kilometres of travel;
- since 1996, annual journey time surveys on five of the main strategic routes; and
- since 1999, Travel Survey, providing information on how and why people use different forms of transport to meet their travel needs.

Traffic Modelling

Predictions of the likely traffic situation, or demand for travel, up to 25 years into the future, provides the basis for developing transport plans, and the economic evaluation and the assessment of environmental impacts of transport proposals.

Increasing travel demands and associated problems have generated many traffic studies in Northern Ireland, and as early as 1938 consultants were commissioned to report "on the cross river traffic problem in Belfast" and to examine "traffic that flows parallel to the river in so far as it affects the cross river

traffic". In the years since, engineers and planners have continued to count and classify traffic, and analyse its interaction taking account of existing and proposed infrastructure. However, while the principles of modelling in terms of generation, attraction and assignment have not changed, the advance in mathematical techniques and the development and availability of computers have provided the capability of examining areas in greater detail.

Through the 1970s, 80s and 90s, as technology improved and traffic continued to increase, the models used became more detailed, multi-modal and covered larger areas. Now in the 21st century, the modelling systems in the Roads Service armoury range from small simulation models, which predict local traffic impacts of development proposals and analyse junction performance through to multi-modal transport models, and can cover large transport networks. Transport models are used to forecast the overall demand for travel and provide information on vehicle and passenger flows and travel costs necessary for operational, environmental, economic and financial appraisals. Real time micro-simulation models, which provide a visual representation of transport schemes, have also been developed and applied in Northern Ireland.

At the upper end of the modelling hierarchy is the Northern Ireland Strategic Transportation Model. It is an area-wide multi-modal model, which commenced development in 1996, and represents all the strategic transportation movements across NI. This model was used to examine the transport options to inform the development of the Regional Transportation Strategy for Northern Ireland 2002-2012, published in 2002.

Local area and town models form the next tier of the modelling hierarchy. Roads Service has developed a number of these models, including models for Belfast, Londonderry, Enniskillen, Dungannon, Armagh, Newry and Lurgan, which have been used to examine local issues – traffic routeing through the towns, scheme proposals etc.

The largest and most complex of these models is the Belfast Transportation Model, which is a multi-modal model of the Belfast Metropolitan Area. Its development, which first commenced in the early 1980s, has been associated with major transport reviews, including the Belfast Transportation Strategy Review that commenced in 1985. More recently the model has played an important role in the development of the Belfast Metropolitan Transport Plan, published in 2004, which sets out transport proposals within the Belfast area up to 2015.

Standards and Specifications

Between 1973 and 1990 Roads Service used the Specification for Road and Bridge Works issued by the Ministry of Transport, the Scottish Development Department and the Welsh Office. A version known as the "orange book" was used up to 1976 and from 1976 this changed to the "blue book".

For design purposes Roads Service used, with amendment in some cases, a series of standards issued by the Ministry of Transport which covered a wide range of topics. These standards tended to be issued on an ad hoc basis, and included issues such as 'Roads in Urban Areas', 'Highway Link Design', loading for structures, and reinforced and prestressed concrete design.

In early 1990s, prompted by a European Union directive to pass all technical specifications to Europe for scrutiny and approval, the Department of Transport, the Scottish Office Industry Department, the Welsh Office and the Department of the Environment for Northern Ireland (the Overseeing Departments) got together to establish a common approach. The Design Manual for Roads and Bridges (DMRB) and the Manual of Contract Documents for Highway Works (MCHW) were developed as a set of common standards and specifications. They were largely based on the Department of Transport documentation, which traditionally had been adopted by Roads Service in whole or in part.

In the intervening years the Overseeing Departments have gone through various identity changes and in 2006 are known as the Highways Agency, the Scottish Executive, the Welsh Assembly Government and the Department for Regional Development, Northern Ireland. They are now known as the Overseeing Organisations.

The manuals are jointly owned by the 4 Overseeing Organisations with the Highways Agency (HA) taking the management lead in any amending/ updating. Technical Project Boards representing the Overseeing Organisations are set up by the HA to consider and agree any changes. The DMRB consists of 15 volumes and the MCHW has 6 vol-

City Airport Exit Tunnel

umes. They were put on the Roads Service Intranet and are updated electronically.

Safety Audit

The first written Roads Service policy on safety audit was introduced in March 1993. This required a safety audit of all major works schemes and of minor works schemes over £100k.

Road Safety Audit (RSA) is a systematic process for checking the safety of new road proposals, based on sound safety principles, and looks at proposals from the road users' perspective. Audits provide an independent view of proposed road and traffic schemes. RSA is not a technical or structural safety check or an assessment of the merits of a proposed scheme.

The aims of RSA are to:

- Ensure that highway schemes operate as safely as practicable
- Minimise the number and severity of collisions
- Consider the safety of all, but especially vulnerable road users, and
- Improve the awareness of safe design practices among road engineering staff.

In 1994 Roads Service adopted the first DMRB standard on Safety Audit (HD19/94). Four stage or two stage audits were carried out depending on the scale of the scheme by experienced engineers independent of the design team.

Roads Service carried out a review on safety audits particularly the applicability of the latest DMRB standard (HD19/03) introduced in November 2003. This Standard applies to all schemes on all roads in Northern Ireland where the capital improvement value is greater than £250k. For all schemes, with a capital improvement value of less than £250k, the Project Sponsor has to consider whether it is necessary for a Safety Audit to be applied or not.

Procurement

The Procurement Steering Group chaired by the Director of Engineering and including representative business heads was set up in 1999 to give direction and advice on all procurement issues, both goods and services. At that time changes in procurement practices were being driven nationally by the Latham and Egan reports.

Forms of Contract

For works procurement, Roads Service generally used the Institution of Civil Engineers (ICE) 5th Edition Conditions of Contract and to a lesser extent made some use of the ICE Minor Works form.

From 2000 Roads Service increasingly used the New Engineering Contract (NEC) suite of contracts and in particular the Engineering and Construction Contract (ECC). Although the contracting industry and Roads Service had a good working relationship

over the years with very few significant contractual claims, it was decided to go to the NEC as it was considered more suitable for delivery of the Achieving Excellence objectives, which included the adoption of a partnering ethos.

All Major works except Public Private Partnerships (PPP) use the ECC condition of contract.

Within the ECC there are 6 main options covering priced, target priced, cost reimbursable and management contracts. Reflecting the ethos of the ECC two of these contain 'pain and gain' mechanisms with the objective of delivering value for money. Contracts are now awarded on the basis of quality and price.

Design and Build (D&B) contracts are currently being used for all schemes valued above £5million. Below this figure D&B tendering costs tend not to be economical. However there have been some exceptions such as the Tillysburn Junction / City Airport Exit tunnel where the value was less than £5M but the advantages of a contractor's design for the tunnel was identified. The Limavady and Toome By-Passes were the first D&B contracts to use the ECC and adopted option C with amendment.

Since 2002 Maintenance and Minor Improvements term contracts use the ICE Term Version Contract 1st Edition for works orders up to a value of £250,000. Previously the ICE 5th Edition Conditions of Contract had been used for this type of work. For projects with a value greater than £250.000, individual contracts are awarded with increasing use being made of the ECC.

Private Finance Initiative (PFI)

In February 1996 consultants Deloitte and Touche produced for Roads Service a report titled 'Introducing Private Finance'. Three schemes were proposed as the first foray by Roads Service into PFI.

The largest scheme was for the widening of the M1/ Westlink from Blacks Road to Divis Street including grade separation at the Broadway and Grosvenor Road roundabouts. The scheme was to include the operation and maintenance of the main motorway network for a 30-year period. Significant effort was put into the scheme including the appointment of engineering, legal and financial advisors. In 1998 the new Labour Government set up a Treasury Taskforce to examine all current PFI proposals. Following a visit to Belfast they recommended that this scheme should be suspended as the likely cost of transferring the risks associated with the statutory processes to a private consortium would be unlikely to give value for money.

The second scheme was to replace the ageing Strangford ferry but this proposal collapsed at an advanced stage of negotiation when the preferred bidder unexpectedly withdrew in February 1999.The ferry was subsequently replaced through a conventional contract in 2001.

The third scheme was to renew the cabling and motorway emergency telephones on the M1 and M2 motorways (excluding the M2 Foreshore and the M3), with associated telematics. In 1997 it was decided not to proceed under PFI due to concern whether there was sufficient risk transfer to take the project 'off balance sheet'. Because of the critical condition of the obsolete motorway telephone system and the difficulties in keeping it operational, Roads Service went forward on this project via conventional procurement in February 1999.

At this time Roads Service was keeping very close contact with the Highways Agency (HA) in England as they had delivered a number of Design Build Finance and Operate (DBFO) schemes which were considered to be value for money. These contracts had very large construction and maintenance elements with a long operation period of up to 30 years, and a payment mechanism to incentivise the performance of the concessionaire.

The Labour government which came into power in 1997 replaced PFI with the Public Private Partnership (PPP) concept.

A new Central PPP Unit was established in Roads Service in 2004, and in the light of the prevailing funding situation, the M1 - Westlink DBFO proposal was re-visited. A contract for almost £100 million of capital expenditure in widening and grade separation at key junctions on parts of M1, Westlink and M2 was awarded in 2005 to the consortium of Grahams, Farrans and Bilfinger Berger. The concessionaire will also maintain 60km of the motorway and trunk road network for up to 30 years.

Roads Service has used the Highways Agency Conditions of Contract, with the assistance of specialist advisors, for DBFO contracts.

12. Bridges

Introduction

The present road network is a major asset to the economic well being of Northern Ireland. Included in the network are some 5,800 bridges -some large, some small -but all vitally important. Since the formation of Roads Service the continued maintenance and upgrading of the bridge stock has been a top priority. Roads Service has always set out to achieve high quality structures by being technically sound, ready to innovate and showing an appreciation of high aesthetic values.

To reflect this priority in 1973 each Division of Roads Service had a PPTO-led Bridges Section responsible for all aspects of bridge design, inspection and maintenance. There was also a separate PPTO-led Works Section. By the mid 1980s pressure on staffing levels led to the Bridges and Works posts being combined except for Belfast Division. Since reorganization in 1999 Roads Service Consultancy is responsible for Works and Structures.

Many milestones have been passed during these years and technical developments introduced.

Bridge Beams

In 1973 the main source of bridge beams was the PCDG (Pre-stressed Concrete Development Group) inverted T-beam (see Figure 12.1) which covered a range of spans from 7m to 15m. They were an economic solution for these modest spans as they were able to exploit the advantages associated with the repetitive use of formwork and pretensioning facilities.

The introduction of the M-beam about this time extended the range of spans available for precast units. They covered the range of spans from l5m to 29m and, as a high proportion of highway bridge decks were within this category, it was a popular choice. This type of beam offered a good solution to most problems, especially the railway/river or busy road crossing where interference with existing traffic had to be kept to the absolute minimum.

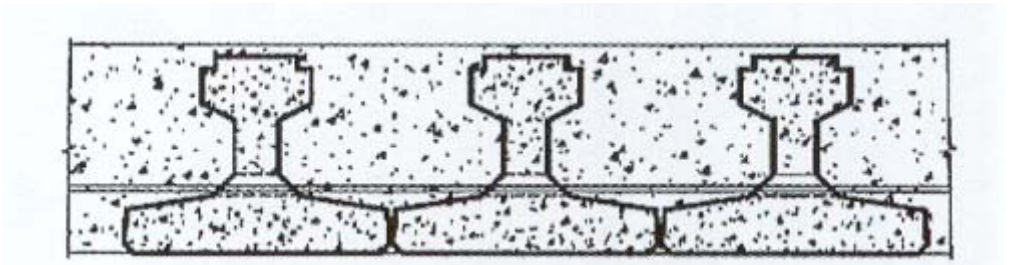


Fig 12.1 PCDG Standard inverted T- Beams

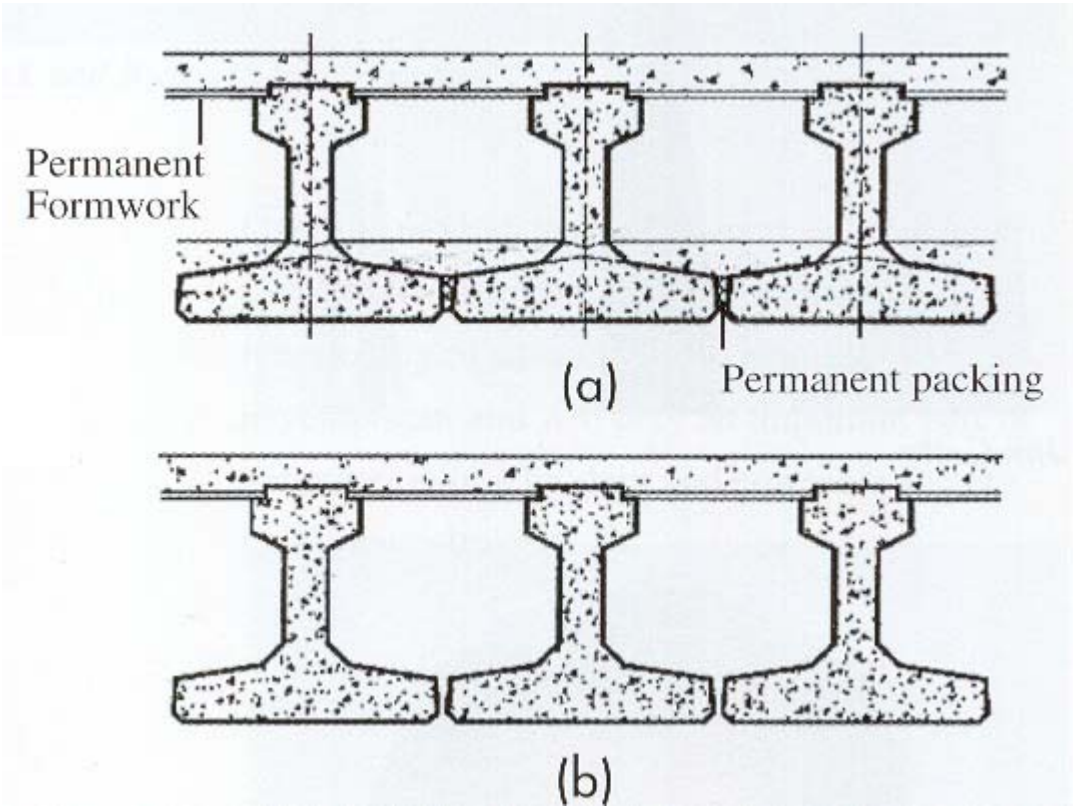


Fig 12.2
(a) Pseudo – box
(b) T- Beam

The standard M-beam was designed as a precast pretensioned unit for use in composite voided slab (pseudo-box) and contiguous inverted T-beam and slab construction. Both forms of construction are shown in Figure 12.2. The top slab was standardised at 160mm. The first Roads Service M-beam bridge deck was constructed in 1973 over the railway line at Ballymacoss, Lisburn.

Development of the M- Beam Bridge Deck

In October 1977 a Roads Service review of future requirements for bridges over the next 7 years indicated that they could be constructed using M-beams. This resulted in a research and development project being initiated in conjunction with Queens University. The objective of this work was to develop the full economic potential of this form of construction. The early designs used a grillage analogy to establish the load distribution of both forms of deck.

An important starting point for the project was to establish the load distribution characteristics of both T-beam and pseudo-box construction to ensure that all future designs proceeded on the basis of sound experimental data.

At that time three bridges on the Banbridge By-Pass and Granville Bridge on the Dungannon By-Pass were being constructed and, as two were T-beam and two pseudo-box, they were ideal for full scale load tests. Two 6-wheeled lorries loaded to about 30 tonnes each were used to load the deck and gauges measured the strain on the soffit of each beam. These experimental results were then compared with the theoretical transverse distribution of longitudinal beam soffit stresses from the grillage analysis. This showed excellent correlation for the T-beam decks although, for the pseudo-box decks, the grillage analysis showed a consistent over estimation of beam stress. A more rational method was therefore developed and incorporated into charts to simplify the design.

M-beams were intended to be used side by side at approx 1m centres with only a nominal gap between the bottom flanges. However, to improve the economics of the system it was proposed to use the beams at spacings up to 2m. Unfortunately, the top slab then had to span a greater distance between the beams and this introduced problems relating to its design. In order to establish the ultimate capacity of the slab and investigate the level of reinforcing steel required a one-third scale model was constructed. The prototype was Clinghan's Bridge (near Dromore) which was used for serviceability tests.

The results of these tests confirmed that, due to compressive membrane action, there was a very high reserve of strength in the slab at its ultimate limit state and, to meet serviceability requirements, steel reinforcement of onlv 0.6% instead of the usual 1.5% was required. The combination of spaced beams and reduced reinforcement resulted in significant savings in the cost of the M-beam deck.

To complete the development of the M-beam deck, continuity was introduced to improve the long-term durability. Trinamadan Bridge near Gortin was the first bridge to be constructed using all the innovations developed during this project.

The Y - Beam

In 1991 the Y-beam was introduced. This represented the latest thinking in precast pretensioned bridge beams (see Figure 12.3). It had a narrower bottom flange, which provided better access for inspection, and the deeper bottom flange allowed more prestressing tendons to be used.

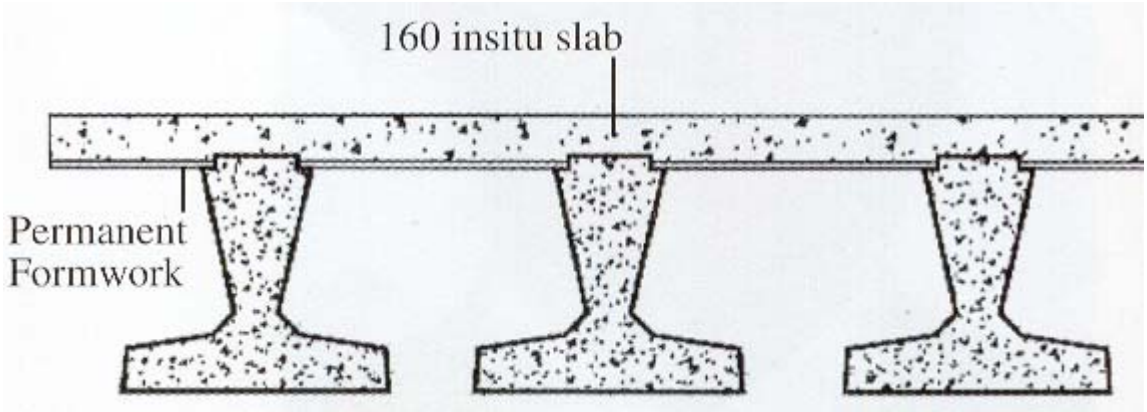


Fig 12.3 Standard Y-Beam

The first Y -beams were used in 1993 to re-deck the Faughan River Bridge at Campsie near Londonderry. The innovative developments for the M-beam deck also applied to the Y-beam form of construction and were incorporated into the standard designs.

A super Y- beam, which could span up to 36m, was subsequently developed. This was used on the A26 Kellswater Bridge to carry the northbound traffic of the new dual carriageway between Antrim and Ballymena. Each beam was 1.7m deep, 34.3m long and weighed 50 tonnes.

Standards and Codes

In 1973 the Department of Transport introduced new Bridges Engineering standards BE 1/73 (reinforced concrete), BE 2/73 (prestressed concrete) and BE 5/73 (highway loading). These standards reflected some aspects of the first Limit State Code (CP110) Which was issued in 1972 for the design of building structures.

Technical Approval Scheme

The Technical Approval Scheme for the design and checking of highway structures was introduced in 1974. The scheme provided a formalised certification procedure for the design and checking of all classes of highway structures, bridges, retaining walls, culverts, sign gantries and bases etc. It provides for approval in principle of the form, layout and appearance of the structure before commencement of design. It also provides for the certification (by designer and independent checker) that the design has been undertaken and translated into drawings for construction in accordance with the standards and codes stated in the approval in principle.

Inspection and Assessment

In 1973 Roads Service inherited a stock of 6,400 bridges consisting of 64% masonry structures, 23% concrete structures with the remainder of steel or composite construction. Bridges have since been classified as road structures greater than 2m span. Smaller structures are being progressively removed from the bridge register. Currently there are 5,807 bridges recorded.

Roads Service was represented on the committees which drew up the then Department of Transport 'Bridge Inspection Guide (1983)' and their standard on the 'Assessment of Highway Bridges and Structures (1984)'

Roads Service was a co-signatory to the UK Design Manual for Roads and Bridges (DMRB). Standard BD 63/94 required an inspection regime for bridges so that defects could be highlighted and repaired before the safety and integrity of the structure was impaired. General Inspections were carried out every 2 years with more detailed Principal Inspections every 6 years. All Principal Inspections on motorways, A Class roads and those bridges causing concern remain at 6 years. All other Principal Inspections are now done every 10 years.

General Inspections were normally carried out by TG1 Bridge Inspectors. Principal Inspections were categorised with masonry arches being done by Technician staff, the very large complex structures by external consultants, and the remainder by graduate engineers.

EEC Directive 85/3 had a dramatic effect on the UK bridge stock. This Directive introduced the requirement that from I January 1999, 40 tonne Construction and Use vehicles would be permitted to use roads throughout the UK.

A Bridge Assessment programme commenced in the mid 1980s. Assessments were carried out to determine the load carrying capacity of bridges.These included older structures not known to have been designed to any modern loading standard and those more recent bridges where the design may be inadequate as a result of changes in design criteria. In addition long span bridges greater than 50 metres were also subject to assessment. These assessments necessitated a number of bridges being strengthened and in some cases replaced, eg Ballymacarrett Flyover in Belfast and Swann's bridge over the river Roe near Limavady.
In 1996 all post-tensioned bridges were subject to a special assessment programme due to serious concerns regarding corrosion of the prestressing tendons. Whilst no serious problems were found, these bridges required to be closely monitored.

Various inspection aids have been acquired over the years. Roads Service has an under bridge inspection machine called a Topper Unit, boats for river bridge inspections and Foyle Bridge has a permanent inspection gantry attached to its underside.

Bridge Records

In 1973 Roads Service inherited a card and photograph record system for bridges that allowed scant facility for recording inspection reports. In the early 80s the first computer programme for records and inspection was written in-house for the then 'state of the art' Hewlett Packard desktops

In 1990 a new computerised bridge management system was acquired from the Scottish Office. Roads Service added a bridge inspection module called BRIGS that was supplied by Dunsmore Data, the initial provider of the Scottish bridge management system. Inspection data was recorded on-site using a hand held data capture device. The information was then transferred to the main database electronically. By the mid-1990s users of the bridge management system were becoming increasingly frustrated with a system that was proving to be unfriendly and slow to use.

In 1998 a young Roads Service engineer, Colin Hutchinson, based in Coleraine, developed a Microsoft Access based Bridge Management System (RSBMS). Having the in-house expertise and resource meant the system was tailored to meet the needs and capabilities of the users and was readily adopted by them. It rapidly became the primary source of bridge information throughout Roads Service.

Major Bridges Constructed since 1973

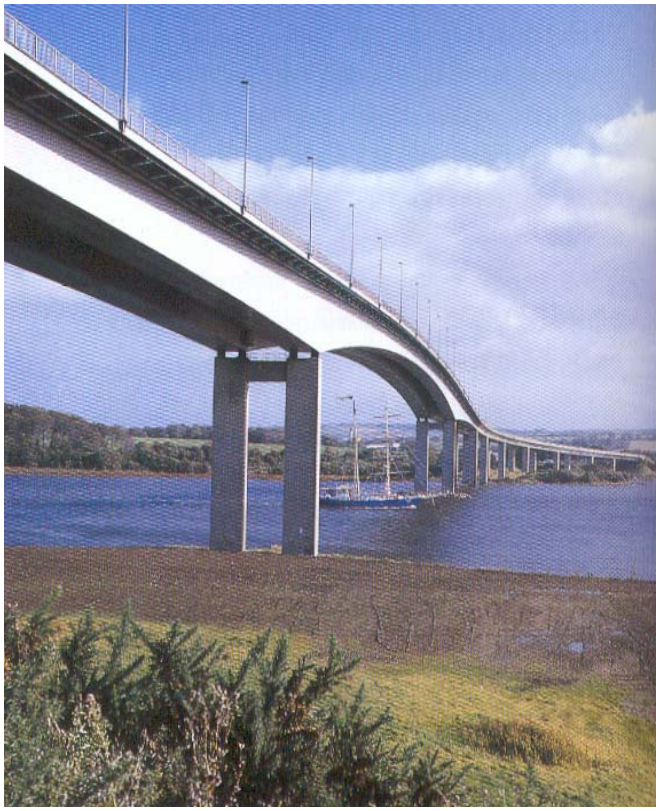
Sandleford Bridge at Coleraine carries the ring road over the River Bann south of the town. It is a high level bridge consisting of five spans, two of 42.3m and three of 49.5m with a composite construction of plate girder steel beams and reinforced concrete deck. The consultants for the bridge were W S Atkins and Partners and the contractors were Farrans Ltd. The bridge as built was an alternative design by the contractor Redpath Dorman Long. It was opened in 1975.

New Shaws Bridge, Belfast, crosses the River Lagan beside the Old Shaws Bridge. Part of the design brief was that the new bridge should not detract visually from the old bridge. The bridge is a prestressed portal beam and slab construction with a main span of 58m. Designed in-house, it was built by Public Works Ltd, and was opened in 1977.

Agivey Bridge over the River Bann near Ballymoney was a new deck on the original piers and replaced an old wrought iron truss bridge. The bridge was designed by Roads Service in conjunction with Somerset & Walsh and British Steel, and was the first major bridge to use hollow rolled steel sections in the steel trusses of 25.6m, 24.5m and 12.5m. It was built by John Graham Dromore Ltd, and opened in April 1981.

Castle Bridge, Enniskillen, duplicates the old west bridge and forms the second leg of a one way traffic system. Designed in-house and built by Farrans Ltd, it is a reinforced concrete splay legged portal with a main span of 32m. It was opened in June 1982.

Foyle Bridge, Londonderry, is the largest bridge built in Northern Ireland with main steel spans of 144m, 234m and 144m and seven approach spans in reinforced concrete of about 50m. The bridge was designed by Freeman *Fox* and built by a joint venture of Redpath Dorman Long and John Graham Ltd



Foyle Bridge

Mourne River Bridge carries the Strabane through-pass over the Mourne River north of the town. Designed in-house, it has a three span of 22.6m, 26.3m and 22.6m continuous M8 beam and slab deck with reinforced concrete piers and abutments, was built by Woodvale Construction Ltd and was opened in November 1992.

Swanns Bridge crosses the River Roe about 6 km down river from Limavady. It replaced an old 5 span reinforced concrete structure built about 1934. The new bridge was built alongside the original which was then demolished. It has 3 spans of 15m, 22m and 15m ,and is constructed of continuous Y-beams with a 160 mm composite deck. It was designed in-house, constructed by John Graham (Dromore) Ltd. and opened in 1994.

Lagan Bridge in Belfast carries the M3 motorway over the River Lagan some 200 metres downstream of the Queen Elizabeth II bridge. It is a high level bridge with three spans of 54m, 83m, and 54m and approximately 600m of approach viaduct linking the MI/Westlink and M2 corridors, north and west, with the Sydenham by-pass east of the city. It is match cast post-tensioned glued segmental construction (first time used in Ireland) with reinforced concrete columns, piers and abutments. The bridge was designed by Acer Consultants Ltd and built by a joint venture of John Graham (Dromore) Ltd and Farrans Construction Ltd. It was opened in January 1995.

River Roe Bridge which carries the A2 Limavady Bypass over the River Roe to the west of the town was provided by a design and build contract. It is a single span structure with a 46m skew span. It is on sleeved steel piled foundations with a composite steel beam/ concrete deck. The steel beams are of weathering steel. It was designed by Scott Wilson (Scotland) Ltd and built by John Graham (Dromore) Ltd. It was opened in September 2003.

Toome Bridge which carries the A6 Toome Bypass over the Lower Bann about 1km north of the town is a single span Bowstring Girder or tied arch design with vertical hangers. The bow girders are of steel box section with plate girder ties at road level and transverse steel beams. The deck is of composite concrete/steel construction. The span is 95.8m. Weathering steel was used with visible faces painted. This landmark bridge was designed by Bullen Consultants Ltd and the contractor was FP McCann. It was opened in 2004

Newtownstewart Bridge, the larger of the two bridges on the A5 Newtownstewart Bypass over the Strule River. It is a three span structure with a heavy skew and is 120m in total length. It is curved in plan.The bridge deck is a composite construction of weathering steel plate girders with an insitu concrete slab. It was provided by a design and build contract and was designed by Parkman Ltd. Whitemountain Quarries Ltd was the contractor and the bypass was opened in 2001.

Tillysburn Replacement Bridge on the A2 Sydenham Bypass was provided by a design and build contract with Tony Gee & Partners as designers. This project was carried out to replace the former road over railway bridge which had failed its assess-

Lagan Bridge

ment and includes a 100m long underpass linking the City Airport to the A2 citybound. The railway structure has a significant skew and was designed as a right structure with a span of 10.8m. It is 115m wide. It was constructed of precast concrete portal segments with a notional pin at foundation level. The portal segments were connected by an insitu concrete stitch. The vehicular underpass from the City Airport is an insitu reinforced concrete box structure. Sydenham Bypass and railway traffic was maintained throughout the construction. Farrans Ltd was the contractor and the scheme was opened in February 2003.

Toome Bridge

13 Street Lighting

Background

In the 1960s street lighting was the responsibility of the Belfast and Londonderry Corporations and the urban and rural district councils. Each of the cities had electricity departments that installed and maintained street lighting while most other local authorities used the Electricity Board of Northern Ireland (EBNI) as their agents for this work.

During this period the Ministry of Development was responsible for the design and installation of lighting on new major roads such as the Sydenham By-Pass, and grant aided the provision of lighting on principal traffic routes throughout Northern Ireland.

Development Commissions

When the Development Commissions were established in Craigavon in 1965 and Londonderry in 1967, responsibility for road lighting in their areas transferred to these bodies. In Londonderry, the Commission exercised a supervisory role with the design and maintenance work being carried out as before by the electricity department in the city and by the EBNI in rural areas. In Craigavon, however, the Commission established a new street lighting section headed by Bernard Jones a lighting engineer from Great Britain. This organisation assumed responsibility for all aspects of road lighting provision and maintenance, including laying private underground cables.

Roads Service

The road lighting function became the responsibility of Roads Service when it was established in 1973 although, initially, there was very few electrically qualified staff, and they were mainly in Craigavon Division. Members of staff, who had formerly been responsible for street lighting in the Belfast Corporation Electricity Department, were seconded by EBNI to Belfast Division to manage the street lighting function. The work on the ground in this area continued to be carried out by EBNI staff. The seconded staff continued to enjoy the terms and conditions of service of their former employer including a “rest day”!

Early Days

Joe Forth, the Divisional Executive in Ballymena Division, chaired the Working Party that had responsibility for street lighting, and under his leadership Bernard Jones was given the responsibility of establishing street lighting sections in all Divisions using Craigavon as the model. There was a gradual reduction in the role of the Northern Ireland Electricity Service (NIES), which was the successor to the EBNI.

The initial policy document was published under the signature of Joe Forth on 21st November 1973 and this outlined how street lighting should be organised and administered in the future. Lighting was considered to fall into two general categories; traffic route lighting and police lighting. The standards for the former were to be determined by a headquarters unit and would be dependent on road classification and traffic volumes.

The document also indicated that the street lighting staff would be responsible to the Section Engineer, how requests for additional lighting should be dealt with, and how, in the longer term, the arrangement would change from the electricity authority carrying out the work to the work being carried out by Roads Service direct labour staff.

Initially relatively junior staff from a variety of backgrounds delivered the street lighting function and it was not until 1975 that agreement was reached to recruit suitably qualified street lighting staff. Recruitment took place early in 1976.

The first dedicated street lighting course, aimed at the new recruits, took place over 11 days between October and December 1976, at Bachelors Walk Craigavon. 16 staff attended, from PTO I- PTO IV, of whom 9 were new recruits to the service. The course was opened by the then Director, Noel Prescott, who articulated the objectives for the new street lighting staff in the organisation:

- To improve the existing service to the public
- To install systems that will meet the functions outlined above.
- To keep costs as low as possible
- To keep abreast of new developments
- To co-operate with other disciplines within Roads Service.
- To get uniformity in the level of provision in the various Divisions.

The Troubles

In the first few years of Roads Service's existence there was massive damage caused to the street lighting stock through terrorism and civil disruption, especially in Belfast, Londonderry and Newry. The resources available from NIES to restore and maintain lighting to an acceptable level were totally inadequate and the situation was often further confused by the uncertainty of the security forces as to whether or not they wanted the lighting restored in some sensitive areas.

This culminated in the intervention of the Secretary of State and in February 1975 an appeal from the Northern Ireland Office to the Director of Roads Service to give extra resources to the restoration of street lighting to be funded under Operation Spruce Up.

Following the retirement of Bernard Jones, the Principal Engineer post was located in Belfast Division in 1980 and filled by Bob Hutchinson, on promotion from Downpatrick Division.

Policy Development

The original policy was that published in November 1973 and referred to earlier. Between 1976 and 1978, the street lighting committee developed a draft policy intended for adoption as Chapter 14 of the Roads Manual. This was never formally adopted but was considered de facto policy until the mid 1990s. The draft Chapter 14 was later revised by the Street Lighting Working Group and formally adopted in 1994.

A policy evaluation on the provision of new lighting was carried out in 1999 and this concluded that there was a high level of customer satisfaction. The policy for provision in rural areas was reviewed in 1999 and resulted in minimal change In May 2001, under an amendment to the Private Streets Construction Regulations, responsibility for the provision of lighting in new developments passed to the developer.

Columns and Lanterns

At the formation of Roads Service in 1973, outside of Belfast, Londonderry and Craigavon, street lights were mounted mainly on NIES wooden poles that

carried the overhead supplies, or on concrete columns. In Belfast city centre and radial routes, many lanterns were mounted on steel traction poles that originally carried the catenaries supporting the trolley bus cables. All equipment was connected directly to the mains supply except for that in the Craigavon area.

Since 1973 approximately 50% of the capital lighting budget has been used for upgrading but there are still a substantial number of concrete columns to be replaced. Generally it is expected that a lighting scheme should last for 25 to 30 years, but in common with much of the rest of the UK, there are columns still on site which are more than 40 years old. Substantial investment has been targeted towards replacing columns of greatest age and poorest structural condition and in 2004-05 £8.5M was spent installing new street lighting systems and replacing those that had reached the end of their useful life.

The lamp population has expanded by about 2.5 % per year to reach about 254,000 units in 2005. Photoelectric cells for lighting control were introduced in 1980 and low-pressure sodium became accepted as a cost effective light source from the early 1980s.

Maintenance Regime

Group replacement of street lighting lamps was carried out in the former Belfast Division from the early 1980s until the mid-1990s. Under this planned maintenance regime, lamps were replaced after 2 or 3 years, depending on the type, in order to minimise random failures. This system worked well throughout that period, enabling street lighting to be effectively maintained.

Advances in design and manufacture brought increased lamp reliability, and in the mid 1990s, group lamp replacement was no longer considered to be generally cost effective. However, on roads such as the urban motorways, Westlink and some dual carriageways with special access restrictions, group lamp replacement is still used, in order to minimise disruption to traffic during street lighting maintenance.

Festive Lighting

District Councils, Town Committees or affiliated groups, often request use of street furniture from time to time for the support of, and electrical supply to, festive decorations to be installed for a limited duration. In the early years there were a number of relatively informal arrangements in place that were carried over from the former local authorities.

Festive lighting installations could range from a single Christmas tree to elaborate strings of catenary lighting. Increasing concerns about the health and safety implications both from a structural and electrical point of view led to a more formalised approval procedure being introduced. This resulted in the development and publication of a Code of Practice for the erection and operation of festive decorations.

A licence may be granted to allow street furniture to be used for this purpose under Article 74 of The Roads (Northern Ireland) Order 1993 subject to the detailed provisions of the Code of Practice and where the requirements for electrical, mechanical or structural safety have been met and appropriate indemnity insurance is in place.

Energy

The street lighting energy bill has always been substantial and increased from £5.0M in 1985 to £7.9M in 2005. The energy market in Great Britain was opened up to competition in the 1990s. The British lighting authorities were able tender their energy requirements from different suppliers in the energy market, but Roads Service was effectively tied to NIES as the sole supplier in Northern Ireland. Nevertheless, over the years, a number of discussions took place with the office of the electricity regulator seeking to mitigate the effect of being tied to a monopoly supplier.

Service Delivery

Over the past 30 or so years there have been dramatic changes and developments in this function in terms of how the service was provided. Until about 1989 the use of in-house labour was the norm in all areas except Belfast but by 2005 only Southern Division and, to a lesser extent Western Division, had any significant in-house industrial staff resource.

A computerised inventory and management system was introduced in Belfast in 1985,and extended to all other areas in the early 1990s.

Organisational Change

The structure implemented at the time of changing to 4 client divisions in 1999 proved not to be optimum and a further tuning of the client / consultant split was implemented in July 2001.

This resulted in each Division having a client team headed by an SPTO, and a dedicated lighting design team, also headed by an SPTO, established in the Roads Service Consultancy. This unit, the competency of which is recognised throughout the UK, also provides engineering support in specialist areas such as fault location, inspection and testing, and audit.

14 Strangford Lough Ferry Service

Early Ferries

One of Roads Service's most unusual acquisitions at the time of its formation in 1973 was the Strangford Lough ferry service which, until that time, had been operated by Down County Council.

A ferry service has been provided across Strangford Lough for almost four centuries and this crossing was served by the first steam ferry in Ireland in June 1836 when the "Lady of the Lake" took up service between Strangford and Portaferry. This was thirty-six years before Belfast could boast a steam ferry on the River Lagan.

In early 1946 two flat-bottomed landing craft, fitted with twin engines and capable of accommodating about 36 passengers and two motor cars were brought into service. Sadly this arrangement ended with the capsizing of one of the boats and the loss of one life. A privately owned passenger service was operated by the McDonald family of Strangford until 1967 when it was taken over by Down County Council.

The County Council started the roll-on roll-off vehicle ferry service in September 1969. The first superintendent was George McDonald, a man who had spent his whole life on the ferries between Strangford and Portaferry. New slipways were constructed in both Strangford and Portaferry harbours and a purpose-built ferry, the MV Strangford, was constructed in the Verholme Dockyard in Cork. The ferry was 33 metres long and certified to carry 263 passengers and 21 cars. A second-hand passenger-only vessel, Jacqueline, was also acquired for use when the MV Strangford was out of service.

In 1973 the responsibility for this ferry service passed to the Downpatrick Division of Roads Service. However this was a seamless transfer of service as the majority of personnel transferred from Down County Council. The service and its reliability were, from the beginning, local political hot potatoes. The service had come to be relied on, particularly by those people living on the Ards peninsula, for travel to school or to work and the movement of goods. When the vehicle service was not available whether because of breakdown or when the vessel was being re-fitted, the phone lines to English Street in Downpatrick would be "red hot".

This was not unexpected as the distance between Strangford and Portaferry by road is approximately 75 kilometres and takes about an hour and a half by car. By contrast, the ferry route is approximately 0.6 nautical miles with a typical crossing time of about 8 minutes and a service is provided for approximately 16 hours each day, 364 days per year.

New Vessels

It became recognised that another vessel, capable of carrying vehicles, was needed to provide a reasonable level of service when the MV Strangford was undergoing its annual re-fit, which could take several weeks, and to supplement the service at peak tourist times such as Easter. The MV Cleddau King was purchased from Dyfed County Council where it had been used on the Pembroke Harbour ferry service. This vessel was extensively modified by Harland and Wolff, renamed MV Portaferry, and entered service in 1975. However, one drawback to this vessel was that because of the vehicles occupying space on either side of a centrally positioned wheelhouse, it could only carry vehicles not exceeding 8 tonnes in weight.

1975 also saw the completion of a new terminal building and ebbing dock in Strangford .The ebbing dock enabled maintenance to the underside of the vessels to be undertaken at low tide without time-consuming and expensive visits to dry dock in Belfast.

In 1988 the existing passenger vessel, MV Jacqueline, was replaced by the MV Isle O' Valla which was able to carry 43 passengers under cover and was brought into use on rare occasions when neither of the vehicle ferries are serviceable.

By the mid 1990s it was clear that the ageing MV Portaferry needed be replaced by a larger vessel to give increased carrying capacity and to allow the MV Strangford to serve as the standby.

In 1998, in line with the policy of the day, efforts were made to seek a private sector partner to provide a new vessel and take over the running of the service under a Private Finance Initiative (PFI) concession agreement. The negotiations were at a very advanced stage when, in February 1999, the pre-

ferred bidder pulled out and the PFI project foundered.

A decision was subsequently taken to procure a new vessel through conventional public sector funding and Portaferry II came in to service in December 2001. This vessel, with an increased capacity of 28 cars, was built by McTay Marine of Birkenhead at a cost of £2.7M.

The commitment to construct a new vessel rekindled the interest of the private sector with an offer to run the service as a Public Private Partnership (PPP) and a new PPP procurement process started in November 2001.This was subsequently suspended to allow:

- A reasonable settling down period following the introduction of the new vessel
- The introduction of a new driver information system at key locations on the approach road network. (Six remotely controlled electronic signs came into operation in January 2004).
- Completion of a review of the proposed service enhancements requested by a local pressure group.

Review of Options

In 2004 the Roads Service Board commissioned up a further review of the ferry service. This followed on foot of a "Best Value" review of the Roads Service Consultancy, which operated the service on behalf of Southern Division. The review team was asked to consider:

- the procurement options and whether or not the case for a PPP type contract was still viable taking account of the Minister's stated view that a full-blown PPP/PFI type contract was not appropriate;
- the potential for other forms of procurement including management type contracts for the future delivery of the service;
- the potential for the transfer of the service either within the Department for Regional Development or to another public body;
- the option of maintaining the status quo.

The final report of the Review Team was presented to the Board in August 2005. This recommended that the Department proceed to prepare documentation to contract out the operational management of the SLFS to a private sector marine based organisation. The status quo was not seen as appropriate as an enhanced management staff structure would have been required to continue to operate the service in an efficient manner.

Recent developments include a Waste Management Plan for Strangford Harbour; refurbishment of the terminal building to provide conformity with disability legislation and the sale of multi-journey tick books through the Internet. Indeed the Internet sales arrangement was a "first" for a Government Department in Northern Ireland.

The variable message signs make use of the Internet and mobile phone technology for communications but technical issues related to communications reliability became apparent after some months of operation. However the supplier took a pro-active approach to their resolution and they have proved to be a valuable asset in providing reliable driver information in adverse weather conditions that impact on the normal sailing schedule.

In 2005 a business case was prepared for a replacement for the MV Strangford. It is planned that the standby passenger-only vessel, the Isle O'Valla, is to be auctioned off in 2006.

15. Development Control

In 1973 Senior Engineer (now PPTO) Forward Planning posts were created in each new Division. Their role included Development Control (DC). Separate teams were established under a Main Grade (now SPTO) to process applications ranging from individual access to major new developments requiring new streets. Staff had to work closely with the new Planning Service and agree their respective roles under the then existing legislation and guidelines.

Accesses

Initially Roads Service Senior Staff were authorised to grant approval for all access as under the Roads Order. Each development approval map had to be stamped and signed by both Roads and Planning. With the introduction of the Planning (N.I.) Order 1978, approval of accesses passed to Planning Service and only consents for new or altered field access onto unclassified roads remained with Roads Service.

In 1983 the Department of the Environment for Northern Ireland (DOE) published "Access Standards" for guidance and use in relation to applications under the Roads (Northern Ireland) Order 1980 and the Planning (Northern Ireland) Orders 1972 and 1978. It defined a hierarchy of roads: main, secondary and other routes, to be used when establishing visibility standards and layouts for different types of access.

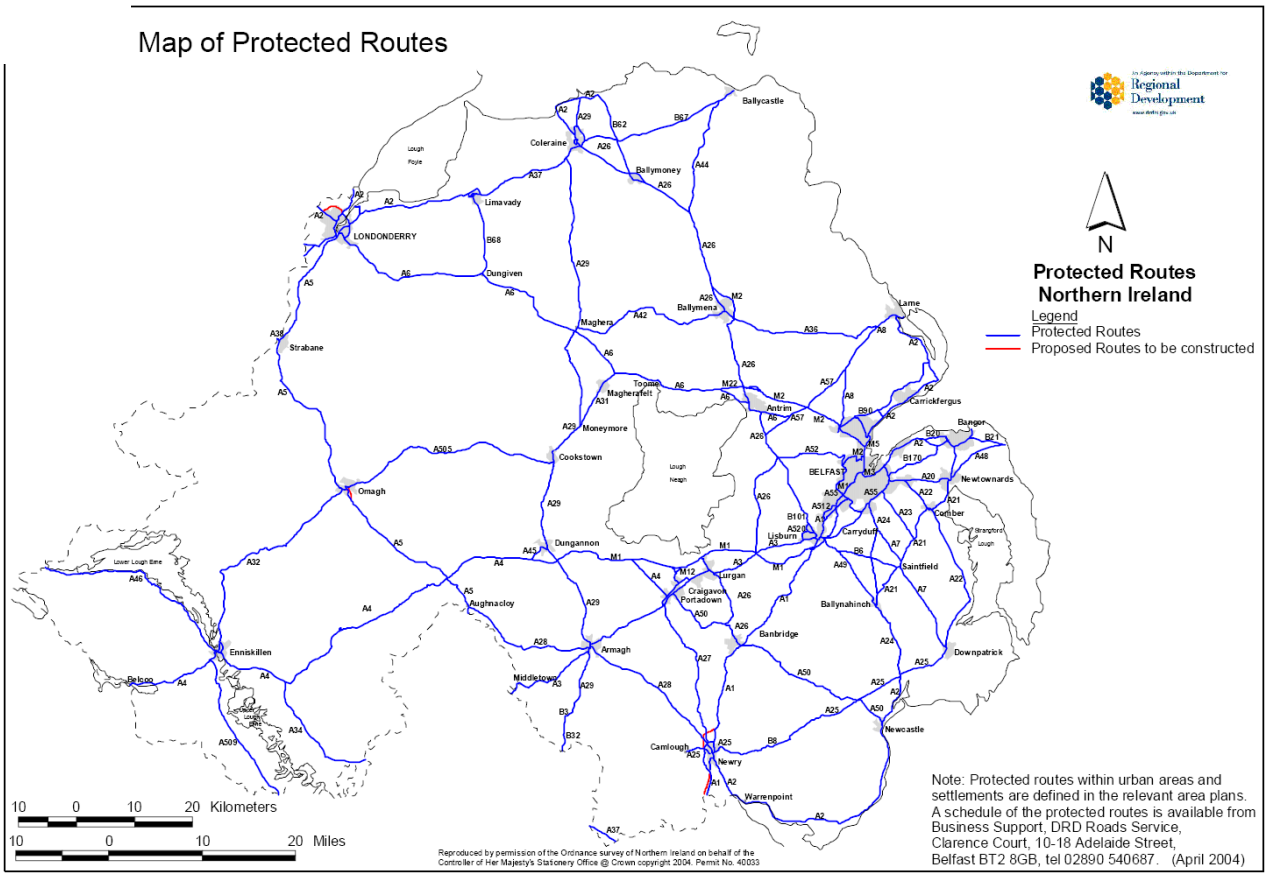
There were two tables setting out the Visibility Standards:

- Table 1 set out the sight line standards to be achieved for traffic using the proposed new junction depending on the type of access (major/minor/single/paired) and the classification and speed of traffic on the route.

- Table 2 set out the forward sight distance for traffic using the existing road at the location of the new entrance. This again related to the speed of traffic and the classification of the route.

In addition, it included a map showing a "Network of Main Routes for Protection" dated 1981. New accesses to this network were not to be permitted, except in exceptional circumstances, in order to maintain a high standard of safety and convenience for traffic using these important routes.

The Planning (N.I.) Order 1991 required the Department of the Environment Planning Service to formu-



late and co-ordinate policy for the planning and development of land. In 1993 "A Planning Strategy for Rural Northern Ireland" was published by Robert Atkins (Minister for the D.O.E.) setting out the overall strategy including the protected routes policy. However, a series of more detailed Planning Policy Statements (PPSs) were subsequently issued to replace it. The first, PPS 3 "Development Control: Roads Considerations" was published in 1996.

In August 1999 a Development Control Advice Note 15 (DCAN 15) (2nd Edition) "Vehicular Access Standards" was published by the D.O.E. setting out the normal requirements for vehicular accesses and superseded the 1983 "Access Standards". DCAN 15 was issued in March 1999. It again gave guidance on different types of access layouts and included new advice on the provision of right-turning lanes and tapers and the use of the earlier roads hierarchy was abandoned. Visibility standards were defined by the use of two new tables which were more detailed than the 1983 versions and took better cognisance of the variables of access type, predicted traffic volumes, and traffic speeds when establishing the required visibility standards.

In February 2005 a revised PPS3 "Access, Movement and Parking" was published by the D.O.E Planning Service, following the publication of a draft in December 2002. It included an up-dated map showing the Protected Routes Network. This had changed little over the years but included the A46 in County Fermanagh, which was added when the trunk road network had been reviewed.

Residential Developments

Prior to 1973, the Private Streets Act 1964, the 1965 "Layout of New Streets" design guide and the 1966 Private Street (Construction) Regulations were used by Local Authorities to approve and adopt new residential developments and they continued to be used in the early years of Roads Service.

The Private Streets Act included provision for the upgrading and adoption of existing sub-standard streets. Many such streets had been dealt with by the former Roads Authorities but some were adopted following reorganisation.

In the early years most of the larger housing developments were carried out by the Northern Ireland Housing Executive (NIHE) and activity by the private sector was relatively small. District Development Officers had been appointed by the DOE in each District Council Area to co-ordinate the work of the different agencies set up in 1973. The progress of NIHE programmes was always the main topic for discussion. Roads staff worked closely with Planning and NIHE staff to determine, approve, supervise, inspect and adopt the new estates.

In 1979, Noel. Prescott (Director of Roads) and John. Davidson (Director of Planning) jointly published Layout of Housing Roads, Design Aid. This was based on a new approach that had been adopted in Cheshire County Council and was a major change in approach to residential housing. A new extended hierarchy of roads was introduced. Type 3 roads – local distributors, Type 4 – main vehicular routes within the development, Type 5 – shared use pedestrian/vehicle cul-de-sacs.

Type 5A Developments had open-plan front gardens incorporating service strips, a ramp at the entrance to the cul-de-sac, contrasting road surfacings and an amorphous turning area.

It took time for the new Design Aid to be understood and implemented by both Roads and Planning staff and Developers. Some private developers saw it as a way of saving costs, for example by using surfaced dressed bitmac on shared roadways and the expected high quality landscaping was not always provided. Some of the best early schemes were carried out by N.I.H.E.

The adoption and use of service strips on shared surface roads became a problem. Some developers sold this strip to the new house owner as part of their site and some householders then built walls and fences or planted trees and hedges on the strip. This caused problems when these roads came to be offered for adoption

Private Streets Order (N.I.) 1980

In 1980 a new Private Streets (N.I.) Order was introduced.
Part I defined Street Works and included enforcement powers.
Part II dealt with the layout and construction and the need for streets to be determined. It also contained the power to make construction regulations.
Part III defined how streets were to be adopted as public roads.

In 1981 the D.O.E. published "Layout of New

Streets in Traditional Residential Developments" which dealt with two broad categories of road; housing distributors and access roads. It gave detailed guidance on the design of both types of road and included parking requirements, drainage and standards for private drives joining access roads.

Layout of Housing Roads, Design Guide

In 1988 Richard Needham (Minister of the Department of the Environment) published "Layout of Housing Roads, Design Guide" which brought together and superceded the guidance given in 1979 and 1981 and included some extracts from a Surrey County Council guide.

It set out standards for the dimensions and layout of residential roads with the objective to help create safe and attractive places for people to live. A complete Urban Roads Hierarchy was introduced with additional sub-divisions of both Type 4 and Type 5 roads from that in the 1979 Design Aid.

The concept of Target Maximum Mean Speed Limits was also introduced to achieve a reasonable degree of safety on each category of road. Different types of speed control measures were suggested including speed control bends, islands and regulating curves.

A separate section was given to "Service Strips on Shared Surface Roads" to highlight the need for special attention to ensure that they were integrated into the overall landscape design. As in the 1979 Design Aid, it again set out a recommended wording for a covenant to be inserted into the conveyance between the Developer and Purchasers. In addition, it also suggested that appropriate conditions be applied to planning approvals to remove any permitted development rights to build fences and walls which might otherwise apply under the Planning (General Development) Order N.I. 1973.

In 1992 a Private Streets (Amendment) NI Order was introduced. It contained a number of new provisions including

- The granting of licences to developers to carry out works on the public road
- Powers to stop-up roads
- The introduction of fees for the inspection of works
- Further powers to address service strip violations
- Requirements for developers to provide street lighting

In 1994 the Private Streets (Construction) Regulations were finally introduced under powers given in the 1980 Private Streets Order. A contributing factor to this long delay was the difficulty in reaching agreement with the construction industry. The regulations contained much more detail than the old 1966 regulations and replaced drafts which had been used by Roads Service to advise developers regarding construction standards, specification of materials etc.

Creating Places

In May 2000 "Creating Places: Achieving Quality in Residential Developments: Incorporating Guidance on Layout and Access" was published by Hugh McKay (Chief Executive of the Planning Service) and Colin James (Chief Executive of the Roads Service). Known as the "Blue Book" it was informed by publications from Great Britain and other European countries. Two of the main sources were the 1992 Design Bulletin 32 and the Guide of 1998 published by Department of the Environment, Transport and the Regions. PPS 7 Quality Residential Environments gave policy backing, though it was not formally published until June 2001.

Part 1 dealt with the overall design and how it would fit into the environment. Developers were advised to produce a Design Concept Statement or a Concept Master Plan for discussion at an early stage.

Part 2 set out the main elements of the design including movement patterns for all modes of transport i.e. routes for pedestrians, cyclists, buses, cars and service vehicles. Low flow, permeable layouts were recommended to help reduce traffic flows and

speeds (to 20mph). Suggested layouts were shown including back-up measures to reduce speed e.g. humps and chicanes. Parking requirements were also given.

Part 3 set out the detailed design requirements, including carriageway widths, junction spacing, surfacings and visibility requirements.

In 2001 the Private Streets (Construction) (Amendment) Regulations NI were published. The main amendment was the introduction of a section on street lighting standards to be provided by developers. In May 2001 developers became responsible for street lighting provision in all new developments. This brought street lighting into line with other services such as water, sewerage, storm drainage etc. which had always been provided by developers.

The time taken to reach the final adoption stage for private streets was always a problem and unacceptable backlogs developed from time to time. Developers often carried out their developments in stages leaving the roadworks to the end of their programme. This led to complaints from the new residents of the uncompleted estates. If persuasion did not work, Roads Service activated their enforcement powers and in some cases carried out the works to complete the private streets using the money from bonds lodged at the approval stage. In a number of cases developers went bankrupt and Roads Service had to take responsibility for completing the necessary roadworks.

A major initiative to speed up the adoption process in NIHE developments was introduced in 1987.This was a self-certification scheme which reduced the cost to the public purse by minimising the amount of supervision and inspections carried out by Roads Service staff.

Major Developments

In the early years of Roads Service there were few big developments taking place. Most were carried out by public bodies such as the NIHE and Department of Commerce. Roads Service generally carried out any subsequent road improvements needed, e.g. the provision of new footways to provide links from new NIHE estates to the existing footway network. In a few cases new roads were built to service new developments e.g. a road to service a cement factory near Cookstown.

However, with the increase in the number and scale of new proposals, developers became responsible for mitigation measures to reduce the impact on the surrounding environment and road network. There was a surge in the number of applications for major new retail outlet stores across NI in the late 80's and the 1990's.

Initially developers contributed to the costs of improvements needed on the adjacent public road network. This was achieved by the use of Article 40 agreements under the Planning Order. Developer contributions were treated as a material consideration in determining applications. Agreements had to be signed before planning approval was granted.

Developer contributions

One of the earliest contributions of this type was made to fund the widening of the Donegal Road, Belfast in the vicinity of the Park Centre development in the 1980's. In the early 1990's the Forestside development contributed to the costs of carrying out the extensive roadworks at the Outer-Ring Road/Saintfield Road junction. In Portadown the High Street Mall developers contributed to road improvements and the provision of traffic signals at the junction to their site. While contributions of this type were made towards the costs of improvements in all Divisions, there was difficulty in assessing the impact of the new developments and the value of an appropriate contribution.

The 1992 Private Streets (Amendment) (NI) Order enabled developers to carry out road works on the public road under licence, while the Roads (NI) Order 1993 enabled them to carry out road improvements divorced from the immediate site. This legislation reduced the need for Roads Service staff to evaluate developer contributions and to arrange for the necessary works to be carried out. However, there remained the need to evaluate the traffic impacts of proposed developments and what mitigating measures were needed to overcome them.

Traffic Impact Assessments

In 1994 "Guidelines for Traffic Impact Assessment" was published by the Institution of Highways and Transportation (IHT). This set out methods to quantify the effects of the projected generated traffic on that existing on the surrounding road network and

Sprucefield

where mitigating measures were needed. Traffic Impact Assessments (TIAs) became a requirement for all major development applications and formed the basis of negotiations with developers as to what mitigating measures were required.

In 1999 “Guidelines for Planning of Public Transport in Developments” was published by the IHT. It was used in conjunction with the earlier guidelines to facilitate the needs of public transport.

In March 2001 “Transport Assessment: Traffic Impact Assessment Guidelines” was published by Roads Service –DRD, based largely on the earlier IHT publications. In February 2005 a draft consultation document entitled “Transport Assessment – Guidelines for Development Proposals in Northern Ireland” was released jointly by DRD Roads Service/DOE Planning Service.

Transport Assessments (TAs) and TIAs were carried out by the developers’ agents but Roads Service DC staff were involved at an early stage in the process when scoping studies were discussed. Since the establishment of RSC, Divisions have also used the Traffic Consultancy staff in Downpatrick to help evaluate assessments submitted by major developers.

One of the largest series of roadworks carried out by a developer was at Sprucefield near Lisburn. In addition to new roads and new junctions on the A1 a new junction was provided on the M1 Motorway.

Developers were generally required to provide other mitigating measures in addition to road improvements. In the case of the Millennium Odyssey project, in addition to road improvements on the Sydenham Road, to improve access by Public Transport, funding was provided for a bus service to the site and car-parking advisory signs were erected on the public road network linked to the availability of parking on site.

Planning Service had the option of using Article 31 of the Planning Order to process major planning applications. These were generally applications that would have a major impact and were often related to unzoned land or land zoned for other purposes in Area Plans. In many cases these applications resulted in a major commitment by Roads Service staff to prepare and give evidence at public inquiries

Council Consultations

In 1973 the new local councils had the right to be consulted on planning applications lodged with the new Planning Service. As they were no longer the decision-makers, most councillors adopted a position of supporting and arguing the case for the approval of individual applications. Initially both Roads and Planning staff attended monthly planning meetings of the Councils to consider development applications and deferrals to site meetings were soon established as a regular part of the process.

With the increasing number of applications and the changes in legislation regarding the granting of accesses on public roads, it was agreed within the DOE that there was no need for Roads DC staff to attend all such meetings. Planning staff would advise Roads when they needed back-up on roads matters. As a result, Roads Service attendance at Council planning meetings was greatly reduced. However, the reduction in attendance at site meetings was more difficult to bring about as poor sightlines were often one of the main obstacles in granting planning applications for sites. In these cases councillors often insisted that the "Roads man" should attend.

Property Certificates

In 1973 the new District Development Officers became responsible for the administration of the Property Certificate consultation process for the different branches of the then Ministry of Development. Roads Service staff had to answer five questions:

- Are the streets adopted?
- If not adopted are they bonded?
- Is the property to be affected by future roadworks?
- Are there proposals to acquire any land?
- Is the property affected by a Planning Blight Notice/Counternotice?

With the phasing out of the Development Offices, Planning Service took direct control of the process on behalf of the DOE. The time taken to process certificates was lengthy with the paperwork passing between different functional sections within Roads Service.

Following a consultants report it was decided to introduce a new centralised computer system to speed up the process. In October 2002 Ballymena and Belfast were the first areas to connect up to the new system based in Enniskillen. By January 2003 all areas were included. Monthly reports were produced for each area to show if the target of 94% returns within 10 days was met. The majority of certificates were processed within 5 days.

Guidance for Development Control Staff

As time progressed, staff have had to deal with increasing numbers of more complex legislation, design guidelines, advice notes etc. Access standards, for example, changed over the years and it was possible to interpret the standards in different ways. More junior staff were encouraged to take a firm line at the early stage, while more senior staff often relaxed the final recommendations to Planning Service.

The Forward Planning Committee recognised the need to provide clear guidance to staff and set up a DC Working Group under the chairmanship of a PPTO with representatives from each Division. The Group discussed problem applications and helped to maintain a common approach across Roads Service and some progress was made towards the creation of a guidance manual. However, staff had little time for this task as the number of planning applications continued to rise by approx. 10% per year and by 2005, 25,000 applications were being processed. When John Magowan (PPTO) Eastern Division retired in August 2004 he was appointed to complete the work on the manual.

This was achieved in August 2005 when "Development Control Manual (Version 1)" was made available. This very detailed document was for the use of Roads DC staff and brought together all aspects of their work with background and advice as to how they should proceed. Information was produced on all legal and technical matters that impinged on the work of DC. It also included information and guidance on the Performance Agreements between Roads and Planning Services as set out in their Service Level Agreements.

16 Information Technology

Introduction

Roads Service has been to the fore in using information technology from its inception in 1973 to the present day. There have been several key successes along the way - as well as the occasional failure. Each has contributed positively to the development of the organisation and extensive use is made of Information Systems in carrying out statutory obligations.

The Early Years 1973-1980

In the early years computing facilities were very limited. The only applications available at that time were those which ran on the mainframe computer in Computer Services Branch of the then Department of Finance. Available applications were principally technical in nature and included highway alignment design (BIPS), structural analysis (GRIDS) and Column and Beam design (COLDES and PREBEM).

Running these applications was much more complicated than with present day computers. Initially, a series of coded data sheets were completed by hand, with more complex problems requiring as many as 30 sheets, each with forty lines of data. These sheets were sent to punch-card operators who transcribed each line of data to a single punched card. This was then put through a card reader to create a print-out of the card set for verification by the user. Typically, up to 5% of the cards contained errors and would need to be re-punched before submission to the mainframe. Batches of cards were submitted to the operations centre in the afternoon and were scheduled to be run that same evening and, assuming that the data was correct and the cards had not been rearranged, then the user could expect a fairly heavy print-out the following morning. Often a job had to be submitted several times over a few days before a successful outcome was achieved.

The Advent of the Personal Computer

The late 1970s and early 1980s saw the introduction of the personal computer into Roads Service.The first was the Hewlett Packard 9830 which had only a single line display instead of the present day VDU. There was one computer per Division initially. They came with their own operating system which was hidden from the user and they only ran programs which were written in BASIC (Beginners All purpose Symbolic Instruction Code). All of the software was written in-house by a small number of interested individuals and consisted mainly of technical applications written to solve specific problems. Other more general applications were written to allow simple word processing and the preparation of Bills of Quantities for major works contracts. The major limitation with these early personal computers was their limited memory capacity and disc storage space and the lack of any commercially available software.

1982 saw the development of one of the largest and most complex systems used by Roads Service during the 1980s - the productivity system. It was written to support the introduction of a new productivity bonus system for industrial staff. It consisted of a suite of approximately forty interrelated programs which were written in BASIC and ran on a series of Comart computers sited in each of the six Divisional Headquarters. Each computer supported up to five terminals which were essential to cope with the large amounts of keyboard time necessary to operate the system.

Another major development undertaken in the early to mid-1980's was the Work Planning System. The need for this system arose from the high costs incurred in meeting public liability claims arising from damage to vehicles caused by potholes and pedestrians tripping on uneven flags. The system allowed for the entry of defects captured during routine inspections of the entire road and footway network. These defects were prioritised and sorted by type and job cards were issued to the industrial workforce to effect repairs.This system ran on Apricot 286 personal computers located within each of the section offices. It was written with a package called Sensible Solutions, one of the earliest database programming languages available. It also consisted of approximately forty interrelated programs.

Initially, the inspection records were captured on paper and keyed into the system. In 1985, Psion Organiser hand-held computers were introduced for the Highway inspectors. This significantly streamlined the process by allowing direct uploading of

data captured on site. The system paid for itself many times over since it allowed Roads Service to challenge and indeed win many public liability cases in court.

The Integrated Computer System

In 1987 Roads Service initiated a large computer project to put in place systems to cope with the anticipated computer needs for a ten-year period. The main elements of the system were Schedule of Public Roads, Highway Inventory, Work Planning/Productivity, Fleet Management, Bridge Records, Street Lighting, Private Streets, Stores & Purchasing, Payroll, Works Design, Management Accounting, Creditors Payments and Receipts and Debtors.

Considerable effort was expended in developing the logical design for respective elements of the system. Major renovations were carried out to the ground floor at Marlborough House and an IBM mainframe computer was installed together with a communications network extending to all Roads Service locations. Unfortunately, in 1990 a dispute arose with the contractor over the content of the logical design and this eventually led to termination of the contract.

Of all of the functions included in the contract, only the Works Design requirements were met successfully by providing graphical workstations running a drafting application supplied by McDonnell Douglas.

The Information Systems Strategy

The ultimate failure of the Integrated Computer System project left Roads Service in urgent need for information systems to enable it to carry out our various activities.

In 1991, Don Barnard Associates were appointed to complete the first Information Systems Strategy. The study concluded that there was no merit in retaining the mainframe computer and its associated infrastructure and instead, a series of UNIX based systems should be put in place to support the applications identified along with a new communications network.

The systems which were identified in the strategy as high priority were Schedule of Public Roads, Highway Inventory, Work Planning/ Productivity, Fleet Management, Bridge Records, Street Lighting, Works Design and Accounting. The computer section, which already existed in Headquarters, was expanded to cope with the increased workload anticipated in taking forward projects to put these systems in place.

A number of feasibility studies were carried out to determine the best way forward for Accounting, Fleet Management, Schedule of Public Roads, Highway Inventory and Work Planning together with an Infrastructure project aimed at providing a data communications network capable of supporting these systems in a distributed province-wide network. These feasibility studies were carried forward into full studies followed by procurement exercises which led to the award of a number of contracts:-

- In October 1992 British Telecom was awarded the contract to install the data communications network which extended from Headquarters through each Divisional HQ and on to all other Roads Service locations;

- In May 1993, a contract was awarded to RMS Tranman Ltd. for the supply of a Fleet Management System. This system enabled the Transport Management Group to co-ordinate the hire and maintenance of all plant and vehicles from their various centres and workshops throughout Northern Ireland;

- In May 1994, the Northern Ireland Civil Service common accounting contract was extended to take on board Roads Service's requirements in respect of the provision of a General Ledger and Accounts Payable Module;

- In April 1994, a contract was awarded to ICL for the provision of an integrated Road Maintenance System. This system incorporated all of the functionality identified in the Schedule of Public Roads, Highway Inventory and Work Planning areas and the system continues to be operated from all Divisional HQ's and Section Offices; and

- In June 1994, a contract was awarded to ICL

for the provision of a system to record and report on the incidence of Road Traffic Accidents. This system enables the monitoring of trends in the incidence of accidents and assists in targeting expenditure on low cost accident prevention schemes and traffic calming measures.

All these systems are now in full operation throughout Roads Service and they represent a capital investment of some £2.5 million with annual running costs of approximately £800,000. In the same time period, many other smaller developments were undertaken including street lighting management, orange badge administration and private streets administration.

The 1991 strategy also identified an urgent need to get basic computing facilities to as many staff as resources would allow and this need was addressed by setting up a small system application process. Staff were able to submit applications to Headquarters for new or improved computer facilities to run small desktop applications. This small systems process has been the primary facilitator in achieving the level of computer use which is evident today. The number of Personal Computers (PCs) in use has increased since their introduction in the early 1980's to the current level of over 1800 units.(see bar chart

Within the office environment each member of staff now possesses a high specification, state-of-the-art computer replaced within a rolling 4-year refresh programme. The current minimum PC specification within the complement is a Pentium 4, 2.0 GHz processor with 256 Mb RAM and 40 Gb hard disc. All PCs have sleek TFT monitors of 17 inch minimum size instead of the bulky older style CRT screens.

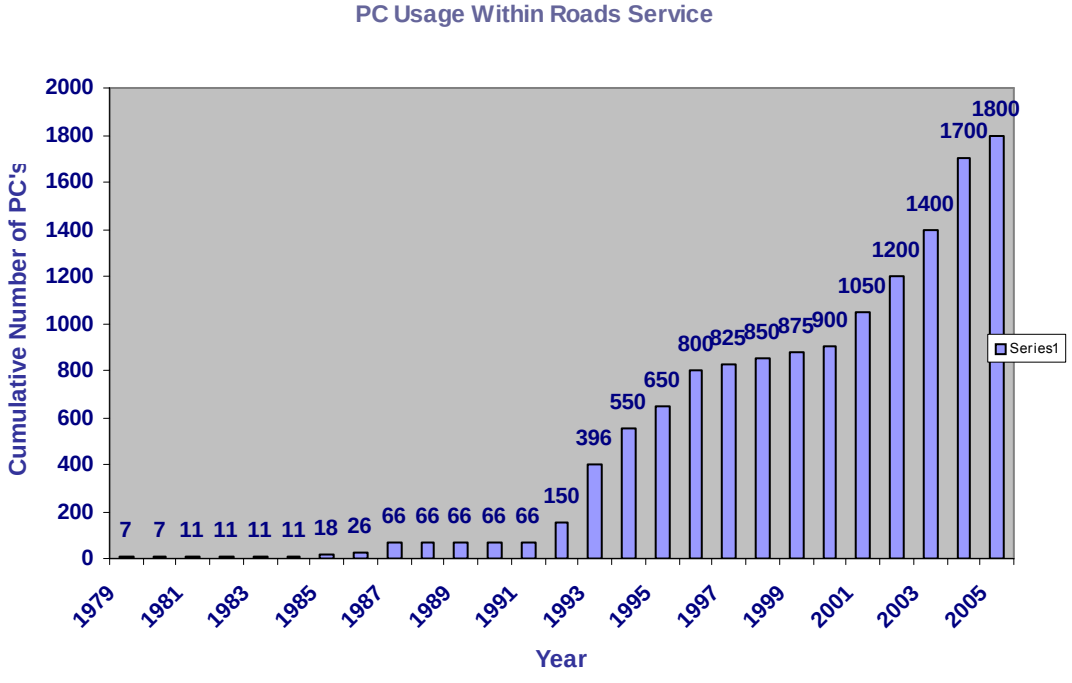
Office Automation

In March 1995, Digital Equipment Company was awarded a contract for the supply and installation of a Departmental Office Automation system. All non-industrial staff (approx 1700 in 62 locations across Roads Service) now have such facilities. This system has delivered several major benefits such as-

- Every office-based member of staff has efficient fast communication via the E-Mail facility. Using Microsoft Outlook, correspondence between staff is now routinely carried out in this fashion;

- Greater flexibility as staff are provided with the Microsoft Office range of products;

- A corporate electronic diary based on MS Outlook is also used for scheduling meet-



ings; and

- An easy to use file management system.

Of course all these computers need to be linked together. To facilitate this Roads Service utilises a share of the Public Services Network (PSN) which, depending on conflicting traffic, can provide impressive networking speeds in excess of 10 Mbits. The availability of such high speed links has also realised significant savings by networking systems whenever possible.

A Printer Project established, on a section-by-section basis, printing requirements based on a shared network printer solution as opposed to the standard one printer per PC solution. Savings of over £150,000 per annum resulted from a reduction in printer numbers coupled with reduction in maintenance needs and use of consumables.

Network licences have realised significant savings. For example, rather than have 250 stand alone AutoCad licences approximately 70 concurrent networked licences can meet the need at a much lower cost.

Internet and Intranet

Undoubtedly one of the most exciting developments in recent years in the field of information technology has been the internet. This technology has developed to such an extent that it has now gone far beyond the initial concept of publishing static information.

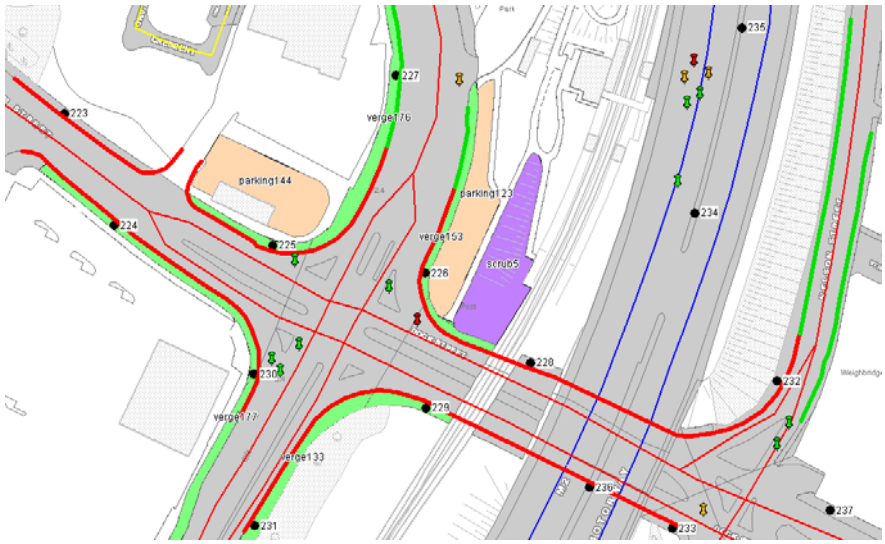
Roads Service has its own internet web site
www.RoadsNI.gov.uk

This site provides facilities to:

- View real-time traffic information;
- Monitor dynamic roadworks information;
- Report defects on the road network;
- Provide approved contractors with contract information;
- Give customers access to consultation documents; and
  provide customers with downloadable forms

Roads Service have limited full internet access to all staff. Those with a demonstrable need for access to a particular site can be 'enabled'. On successful application they are allowed access via RoadsNet – the Roads Service Intranet site. This platform allows staff to access a vast array of information on their own PC from many sources. Each Business Unit within Roads Service has developed their own Intranet site where they publish articles, etc. relating to their own specialist area within the Agency.

Secure Remote Access is made available to staff who have a need to access their NT accounts via their laptop from remote locations such as their homes or hotel rooms.



GIS—Dock Street / Nelson Street Belfast

Geographical Information Systems

It has long been recognised that Geographical Information Systems (GIS) could provide the key to more effective use of information by Roads Service, by allowing data from a variety of sources and systems to be brought together on the basis of common spatial references (point on the ground!)

While GIS functionality has been offered within some Roads Service systems for several years many key systems are both disparate and not spatially enabled. The development of a GIS Scoping Study and associated GIS Project Strategy has laid the foundations for the development of a more integrated approach to GIS within the Agency. Hitherto standalone systems will be able to exchange and compare data represented on a digital-mapping platform.

RoadsMap

One of the most significant recent developments has been the commissioning of a new Corporate GIS and Mapping Facility – RoadsMap. For some time there existed an ad hoc approach to the procurement of Ordnance Survey NI digital mapping resulting in inflated costs due to duplication.

Information Systems Support Services (ISSS), Roads Service's own IT section, arranged for the provision of a central mapping facility, RoadsMap, via the Agency's Intranet. This allowed over 1700 staff access to raster and vector mapping.
Since its initial introduction in 2004 the system has grown immensely with the introduction of various user defined layers of additional data such as NIE Plant, Phoenix Natural Gas Pipes and Water Service Plant.

Roads Service have also added static layers of information from many of its existing systems such as, Bridge Management Systems (including record photographs), Parking Restrictions, Traffic Accidents, Street Lighting etc.

17 Corporate Services

Background

Following agentisation in 1996 the broad range of administrative and corporate functions, excluding finance, were brought together in the Corporate Services Directorate under Jim Carlisle. The main functional responsibilities included business planning and improvement, the development and implementation of appropriate human resources policies, the secretariat, lands acquisition, and subordinate legislation.

The responsibilities for human resource management were devolved to the new agency and this brought a major challenge to move forward on key issues such as training and development and business improvement.

European Foundation for Quality Management

Initially when the Corporate Services Directorate promoted tools such as the European Foundation for Quality Management (EFQM) Excellence Model to identify areas where business could be improved, they met with resistance and scepticism from some of the traditionalists in what was a technically based organisation. Recognition that quality was a key strategic issue took some time to percolate through the organisation, even at senior level. Nevertheless the nettle was grasped and self-assessments were carried out and action plans produced almost every year from 1997 until 2004. This resulted in steadily improving scores.

In 2001 Roads Service attained a Bronze Award in their first submission to the NI Quality Awards and subsequently achieved a Silver Award in the 2002 NI Quality Awards.

A major effort was undertaken in 2004 to improve the performance score and a team of 14 staff from different functional activities across the Agency was assembled to draft the submission. The team benefited from input from Heads of Business Units, the Roads Service Board and a consultant from the Business Improvement Service. The team were given awareness training on the Excellence Model and advised on how a submission should be put together. Following the submission, a panel of external assessors visited the organisation for 3 days and spoke with over 90 staff through interviews and focus groups.

This resulted in the organisation successfully attaining a Gold Award in the Northern Ireland Quality Awards with a score of 416. Only two other public sector organisations received higher recognition than Roads Service.

Investors In People (IIP)

IIP is a national standard which seeks to encourage organisations to train and develop their employees through a planned approach, in order to meet organisational objectives.

As part of a Civil Service wide initiative, and following initial preparation work and a staff survey, Roads Service registered its formal commitment to achieving IIP recognition, in December 1997. In preparation for a formal external assessment, Roads Service undertook a further staff attitude survey in 1998 that led to initiatives on communications, induction, training and evaluation.

An initial external assessment was undertaken in June 1999 and 12 out of the 23 indicators were met. Following a further assessment in December 1999 the remaining indicators were achieved and formal recognition was gained on 22 December 1999.

To carry on the momentum of IIP, a focus group was formed, chaired by the Director of Corporate Services and incorporating Training Liaison Officers and IIP advisors. This group provided a central role within the Agency in terms of embedding the culture of IIP and embracing the changes of the IIP Standard.

Roads Service has continued to use diagnostic assessment by external assessors and has successfully achieved two post recognition reviews in 2002 and 2005.

Communications

Roads Service has always been a de-centralised organisation with staff located in many locations throughout Northern Ireland. In the early years the importance of good comprehensive internal communication throughout all levels of the organisation was not as high on the management agenda as it is today. In 1996 this was formally recognised with the

decision that existing communication mechanisms should be supplemented by the introduction of an 'in-house' newsletter and the appointment of an Editor.

In the same year, staff views on written and oral communications were sought through IIP questionnaires and staff were critical of how Roads Service communicated. Communication had become a critical issue because a report on the proposed restructuring of the organisation had been circulated to staff and the trade union for consultation. Given the climate at that time, it was recognised that in times of rapid and fundamental change it was necessary to keep staff fully and properly advised of all significant developments. Communications Task Teams were appointed to give regular reports on the progress of the organisational review through the team briefing process.

In 1997 uniformity was established in all Divisions regarding the application of team briefing for all staff including industrial staff, and regular reports on the Organisational Review were issued via the team briefing process & Communication Task Teams to keep staff in Divisions informed. In the same year the Communications Manager was appointed with an initial remit to establish an 'in-house' magazine.

The Internet and Intranet sites were initially established in 1999 and following substantial redesign the Internet site was launched by the Minister, Angela Smith at the Balmoral Show in 2003. The website (www.roadsni.gov.uk) has since been developed into a comprehensive database giving access to a wide range of information from application forms, corporate documents and council reports to up to the minute traffic information and roadworks reports.

In 2000 focus group exercises were undertaken to hear the views of staff. These were structured around the Corporate and Business Plan values and commitments and to support the cultural and organisational change that was currently underway through re-organisation. An Internal Communications Strategy and Action Plan were produced as a result.

In 2003 a report reviewing the implementation of the Internal Communications Strategy was produced. The purpose was to review the effectiveness and to reflect the Agency's ongoing commitment to improve and develop internal communications. A further series of focus groups discussed the impact of the strategy and identified areas for improvement.

One of the key actions to be addressed within the Corporate Risk Register in 2004 referred to ineffective communications. A firm of consultants, Weber Shandwick, was subsequently commissioned to complete a communications audit. This was to lead to yet another indicative Communications Strategy.

Roads Service Secretariat

The Secretariat had its origins in Private Office Queries Section which, together with Subordinate Legislation Branch, formed Roads HQ Administration, based in Commonwealth House in the 1980s. This structure remained intact when Roads Service moved to Clarence Court in 1993. Later, in 1996, as workloads increased on the Ministerial front a dedicated Secretariat was formed under a Grade 7.

The Secretariat is responsible for providing administrative backup to the Chief Executive and for preparing draft advice, replies and background notes on his behalf for the Secretary of State, Departmental Minister, and Permanent Secretary. This includes drafting answers to written and oral Parliamentary Questions. The Secretariat works in close conjunction with the Minister's Private Office and Roads Service Divisional and Headquarters staff. The Secretariat also provides a secretarial service to the Roads Service Board.

Under Direct Rule, the Secretariat dealt with up to 1000 items of correspondence each year. However, when working to a Devolved Administration, the overall statistics increased by almost 50%. Typically there was 25% uplift in the number of items of correspondence received by Roads Service during devolution. In addition to this, on a monthly basis, answers to Oral Questions had to be prepared for the Minister to answer in the Assembly and this increased the workload by almost 25%.

Legislation

At the time of reorganisation the Roads General and Planning Branch of the Roads Division of the Ministry of Development, based in Parliament Buildings at Stormont, provided the roads-related primary legislation service.

It was considered that that there was no need for a

permanent primary legislation team dedicated to roads issues. The practice has been to create a team as needs demand for the review and consolidation of roads-related legislation. Demand is usually led by the enactment of legislation in Great Britain and, just as any review of legislation is finite, so too is the lifetime of the Branch.

A Roads Service Primary Legislation Branch was created in 1979. It comprised one Principal Officer (or Grade 7) two Deputy Principals (DP) and one Staff Officer (Administration Trainee) who were responsible for progressing 3 consolidation orders, namely the Roads (NI) Order 1980, the Private Streets (NI) Order 1980 and Road Traffic (NI) Order 1981. Following the introduction of these Orders the branch was disbanded in 1981, its work complete.

Some ten years later, taking account of anticipated events in GB including the publication of the North Report, Horne Report and the Road Traffic Law Report, a further Primary Legislation Branch was established. This was ultimately comprised of one Grade 7 post and two DPs who undertook a review of the 1980 Roads Order and considered the impact of new legislation being introduced in GB. As a result, various roads provisions corresponding to those of the New Roads and Street Works Act 1991 were introduced in the Roads (NI) Order 1993, while provisions relating to street works were introduced some two years later in the Street Works (NI) Order 1995. The Road Traffic (Amendment) (NI) Order was also produced in 1995.

In 1996 , under the terms of the new Agency Framework Document, the Department of the Environment was responsible for the provision of support services to the Agency in accordance with service level agreements. Consequently, provision of primary legislation services became the responsibility of the Department and the personnel comprising the Roads Service Primary Legislation Unit were absorbed back into the Department. The making of the Road Traffic Regulation (NI) Order 1997 brought to an end that period of review of roads primary legislation and the staff concerned ultimately became responsible for other duties within the Department.

In 2004 Roads Service established a further primary legislation team comprising a Grade 7 and a DP. Initially this was to take forward work aimed at introducing legislation to decriminalise parking enforcement in Northern Ireland. However, taking into account amendments that had taken place in different aspects of roads legislation in GB over some ten years, it was decided to increase the number of staff by one and to further review and consolidate Northern Ireland legislation. This resulted in a programme of work being identified to update the Street Works (NI) Order 1995, Roads (NI) Order 1993, Road Traffic Regulation (NI) Order 1997, Road Traffic (NI) Order 1995, Private Streets (NI) Order 1980 and the Road Races (NI) Order 1986.

Just as the existence of previous primary legislation teams has been finite, the lifespan of that team will, in all probability, be no different.

18 Health and Safety

Background

Roads Service, being an employer of large numbers of industrial and non-industrial staff, has significant Health and Safety responsibilities. These responsibilities became a statutory duty under the 1978 Health and Safety at Work (NI) Order that followed similar legislation in GB four years earlier.

Staffing

The initial Health and Safety structure in Roads Service was formed in 1977 by the appointment of a Senior Safety Advisory Officer (SSAO) with part time Safety Advisory Officers (SAO) in each Division.

The SSAO post was at PTO I (now SPTO) grade and the SAOs were appointed initially at PTO III grade. Extensive training followed and SAOs were required to obtain the National Examination Board in Occupational safety and Health (NEBOSH) diploma. The initial appointees were:-

SSAO
Brian Boreland (he initially also doubled as SAO Belfast)

SAOs
Tom Russell (Downpatrick)
Philip Devlin (Ballymena - replaced by John Turner in a few weeks)
Terry Fulton (Coleraine)
John McKinney (Omagh)
Michael Murray (Craigavon)

In 1988 the SAO posts were upgraded to HPTO grade reflecting the increasing importance of their role.

The SAOs were under Divisional control for accommodation and workload but received professional advice from the SSAO now based in Headquarters. In 1997 there was an internal review of H & S in Roads Service. To strengthen and refocus its commitment to H&S Roads Service decided that each Divisional SAO must spend at least 50% of their time on H & S matters, assisting managers to identify hazards, assess risks and put appropriate controls in place.

In 1999, following the re-organisation of Roads Service into 4 Divisions and 2 Provider Units, the function of the SAO was reviewed. The outcome was to have SAOs at HPTO grade for the whole of Roads Service. Both were assigned to RSD and attached to the Roadman Training Centre. Professional advice continued to be provided by the SSAO at RSHQ.

The SAOs provided technical advice across the whole of Roads Service but the bulk of their work was in RSD. The SSAO took on a wider Engineering Policy role, becoming involved in environmental and maintenance aspects of Roads Service activities. This set-up remains.

Legislation

Some of the legislation that increased the profile of Health and Safety and to which Roads Service was required to react was:

1978**:** Health and Safety at Work (NI) Order.

1990**:** COSHH (Control of Substances Hazardous to Health) Regulations.

1993**:** Management of Health and Safety at Work Regulations, which shifted the focus on how H & S was managed.

1995**:** CDM (Construction Design and Management) Regulations, which focused on how to design things so that they could be built, used and maintained safely. It covered the management of construction projects from concept to demolition.

Procedures

Initially the means of promulgating and controlling H&S advice was through chapter 21 of the Roads Manual. This took the form of Hazard Warning Notes and various Safety Circulars. However, following the outcome of a continuous improvement project in 1997, a new Safety Management System was introduced. This marked a change in approach from being prescriptive and driven by the SAO to being more flexible and driven by the DRM. It was further emphasised that H&S was the responsibility of line management and the SAO had a purely advisory role.

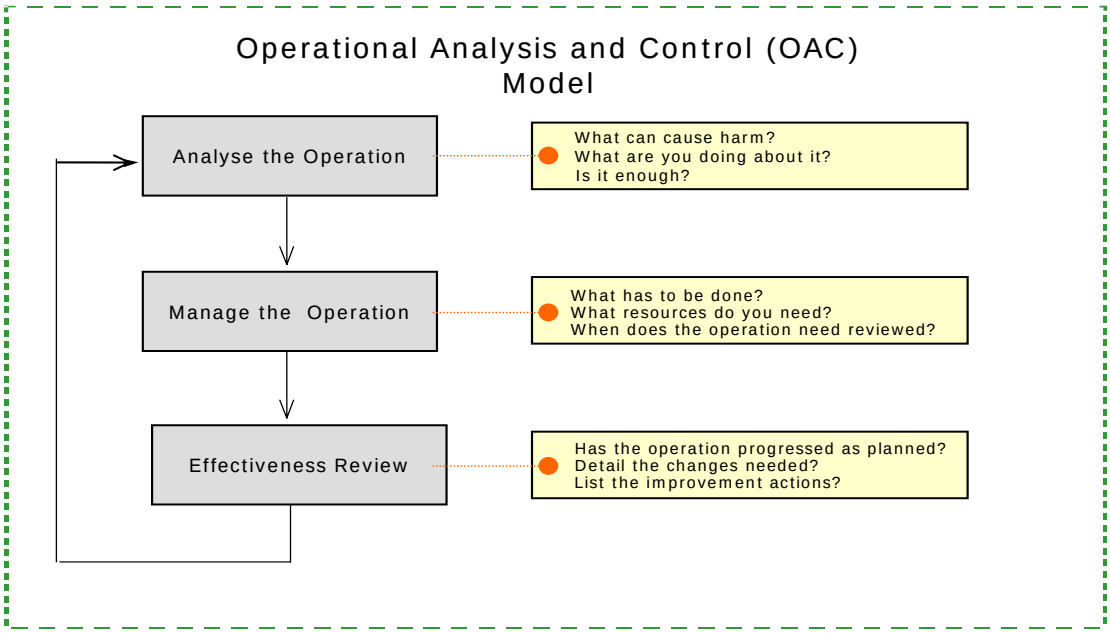


Fig 18.1 Roads Service's Safety Management System. 1997 onwards

In 1998 a separate Roads Service Safety Manual was introduced. It brought in a new approach of Operational Analysis and Control (Fig 18.1). This best practice model did away with the old style Risk Assessment. The aim was to ensure that work operations were carried out in strict accordance with all relevant 'safe working' procedures and that people, plant, and property were protected from harm prior to, during and after the work regardless of the hazards faced. The efficacy of the process is regularly examined through a robust accident investigation procedure, annual audits and quarterly reporting to the Roads Service Board. In addition, senior management inspections and controls assurance checks are a regular feature of routine management.

This unique approach was recognised nationally and received the Institution of Occupational Safety & Health (IOSH) / Zurich Municipal award in 1998. A further award was received in 2001 from the National Irish Safety Organisation for the effectiveness of our Safety Management Systems.

Since the Safety Manual was essentially a desktop management document a pocket version was issued to all staff. Since 2002 the Safety Manual is only available in Intranet form.

The approach to Risk Assessment is reviewed at 5-year intervals. As a result of the 2003 review Operational Safety Controls are now being introduced. These short documents are akin to the former Hazard Warning Notes, focussing on the hazards and controls for particular work activities, such as bituminous patching operations, pipelaying and drainage work. Operational safety controls link directly to the Pocket Safety Book, form the backbone of H&S competence training, and fit with the Controls Assurance Process, introduced in 2002.

A H&S sub-committee of Roads Service Whitley was established for Roads Service to deal with overall staffing concerns on H&S matters. A Director and the SSAO represented management. With the integration of H&S into normal management activities H&S issues are now considered within the Service Whitley.

Training

Roads Service has a health and safety induction programme for all of its industrial workforce, focused on the type of work it expects them to be engaged in, and which is augmented by a comprehensive competence development plan for each worker, targeted to their specific areas of work. This programme of training and development is firmly linked to the operational safety controls. Where there are appropriate accreditations, such as City & Guilds, Roads Service uses them. Roads Service also requires that the contractors it employs are competent and consequently contractors must provide evidence that their training is linked to their risk assessment outcomes for the work that they are tendering to carry out on Roads Service's behalf. As with its internal arrangements Roads Service also expects that contractors have competence development plans. This approach fits with the Government backed Buildsafe-NI initiative to 'eliminate deaths and substantially reduce injuries through improvements in the application and management of H & S within the construction industry'.

Roads Service's designers and site staff are

also engaged in programmes of health and safety competence development, which include safety in design, CDM training program for planning supervisors and on-site safety training. Every level of P&T staff from the Chief Executive down receives construction safety training if they are intending to or are expected to be on a construction site.

Accident Reporting System

Roads Service views an accident as a control failure for which a remedy is expected. Staff are encouraged to report non-conformances, accidents, incidents and unsafe conditions to their line manager, where it is expected that the appropriate corrective action be taken. In recent years there has been a drive towards local managers taking control of accident investigations, looking for underlying causes, possible corrective action and the means for the Agency to learn from the event. Since the Buildsafe-NI initiative is about eliminating fatalities and substantially reducing major injuries, Roads Service is working with the contracting fraternity to develop a standardised process for the whole of the road construction industry to learn from accidents.

Roads Service's accident statistics have been dropping steadily over the years since the introduction of its various health and safety improvement initiatives (see Fig 18.2).

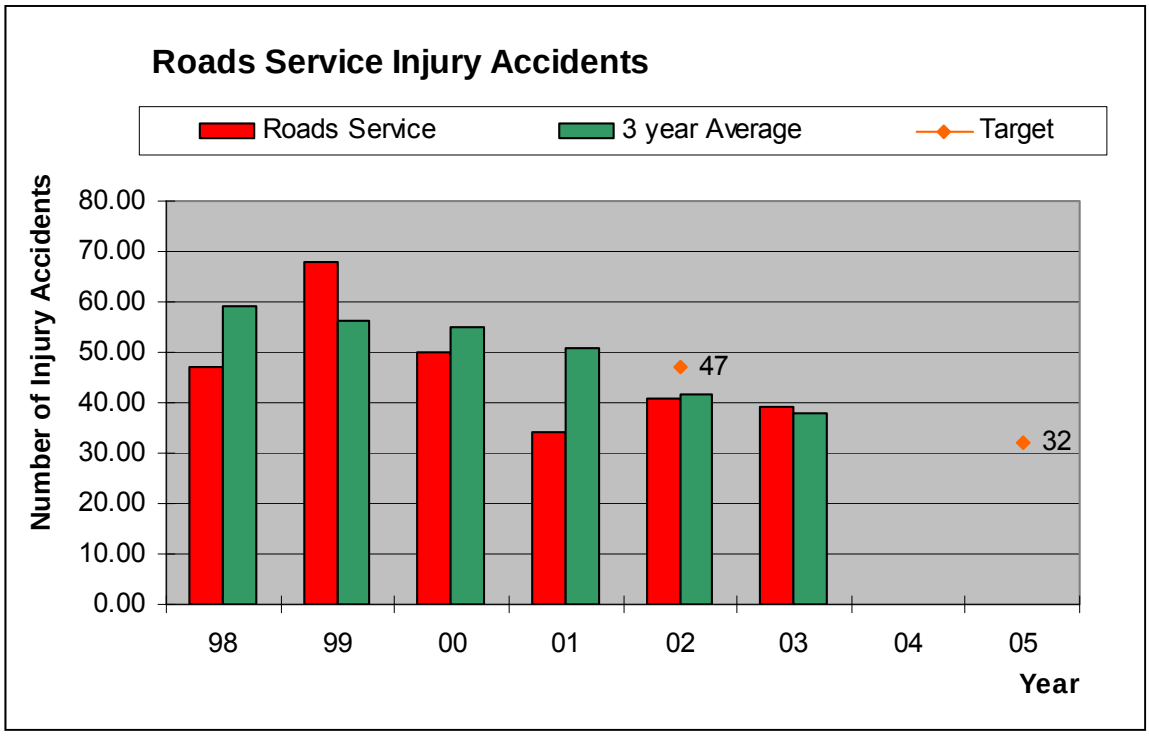


Figure 18.2

19 Roads and the Environment

Introduction

In the 1960's inter urban roads were built to achieve the best vertical and horizontal alignments with the aim of improving journey times. An elevated urban motorway ring road was proposed for Belfast in the 1969 Belfast Urban Area Plan. Environmental treatment was often an afterthought applied following the completion of schemes by planting trees and shrubs on the side slopes of cuttings. Neatness and tidiness were the order of the day with extensive grass areas to be maintained and cut to a high standard.

However, the detrimental effects of roads and traffic on the environment became more clearly understood and appreciated as time progressed. Initially concerns related to the more obvious effects such as the severance of farms and the demolition of dwelling houses but the wider local effects due to visual intrusion, noise and air pollution soon became more apparent particularly with the increasing levels of traffic and congestion.

Visual intrusion was one of the first effects to be addressed. The aim was to try and fit the new road into the existing landscape by selecting more flowing alignments, smoothing the cut/fill lines and planting suitable trees at appropriate locations to tie in with existing. Landscape architects were employed to assist roads design engineers.

In the 1970's there was considerable opposition to the building of new roads, not just from those directly affected but also by groups who were concerned with wider environment issues.

In global terms, the need for a more sustainable approach to overall development was highlighted at Kyoto in 1997. Climate change, due to global warming caused mainly by carbon dioxide emissions, was generally recognised as a problem that needed to be addressed. Emissions from motor vehicles were seen as a major contributor to this problem.

Pollution

By 1973 there was a growing awareness of the need to consider the environmental impacts of all aspects of roads and traffic.

The Land Acquisition and Compensation (NI) Order 1973 Part II Compensation for Depreciation caused by the use of Public Works came into existence in late 1973, just after Roads Service came into existence in October 1973. The order recognised the detrimental effects of roads and entitled landowners to compensation for depreciation in the value of their interests caused by the physical factors (noise, vibration, smell, fumes, smoke, artificial lighting and the discharge onto lands of any solid or liquid substance) emanating from new or altered roads.

Noise pollution became more of a problem with the rapid increase in traffic levels on main rural and urban roads. New systems were developed for measuring noise and for predicting what noise levels would result when new roads were built. A measure of sound pressure level ("A" weighting) in decibels dB(A) was adopted. Each Division was provided with sound-measuring equipment. Design staff were trained in methods to predict likely noise levels at properties near new road schemes. Pre-works and post-works noise levels were calculated to help assess claims. If considered excessive, barriers could be provided as part of the road scheme to reduce noise to more acceptable levels.

In 1995 the Noise Insulation Regulations (NI) came into effect to enable residents subjected to increased traffic noise at or above 68dB(A) through the use of new roads to benefit from a reduction of noise level inside their home. It empowered Roads Service to provide noise insulation or to offer a grant. The operative date was 1995 but schemes completed on or after 6 Dec 1992 could also be considered. The implementation of the regulations was largely the responsibility of Lands staff in the Divisions. While considerable work was needed to check all possible eligible properties, few surveys resulted in works being carried out.

The use of different types of quiet road surfacing could greatly reduce noise levels – some by as much as 3dB(A), equivalent to halving the volume of traffic. In the late 1990's new types of surfacings were laid, initially to reduce spray, but their open texture also reduced noise levels e.g. M5 Foreshore motorway. In more recent times quiet road surfacing was selected for the By Passes of Limavady and Toome.

A target has been set in England as part of a 10-

year plan to resurface 60% of the motorway and A road network with quiet road surfacings by the end of the plan period in 2011. While no targets have been set for Northern Ireland, Environmental Impact Statements for major new projects, are used to identify the need for such treatments.

Air pollution became recognised as a problem with increasing traffic levels and congestion in urban areas. At first the appearance and smell of black diesel fumes from lorries raised concerns. However, with time, the existence and harmful effects of a wide range of emissions from both diesel and petrol engines became more clearly understood.

Major advances in the control of emissions have been made with improved engine design and the use of catalytic converters. The harmful effects of lead in petrol were recognised in the mid 70's and lead-free petrol appeared on some forecourts. However, it was not until major tax changes were introduced in March 1987, making lead-free petrol appreciably cheaper, that sales started to rise. Within two years, sales rose to 20% of the market and. in January 2000, leaded petrol was withdrawn from sale. The harmful effects of sulphur in diesel fuel were also reduced with the introduction of low-sulphur diesel in 1999. However, much still needs to be done to improve local air quality by reducing the main pollutants, nitrogen dioxide (NO2) and particulates (PM10), and to reduce the dangers of global warming resulting from CO2 emissions.

In 1995 the Environment Act came into force in England requiring local authorities to review and assess local air quality. While not applying to Northern Ireland, most local councils took action. In 1997 the United Kingdom National Air Quality Strategy (NAQS) was published and applied to N.I. Following a review, it was reissued in 2000.

Nitrogen dioxide (NO2) was seen as a key traffic pollutant and has been monitored at different locations including kerbside by District Councils. Roads Service installed some measuring equipment in Belfast in 2000. In 2001/2 the monitoring network was expanded and included more extensive measurement of PM10s.In the same year Environment and Heritage Service published the findings of a preliminary study to identify road links that were likely to exceed the target levels for NO2 set out in the NAQS.

In 2002 the Environment (NI) Order was introduced giving local councils the task of managing local air quality. An Air Quality Partnership for Greater Belfast was established to provide a comprehensive review of air quality against NAQS objectives and European Union limit values. In 2003 detailed District Council Review and Assessment reports were appraised, and in 2004 Action Plans for Air Quality Management Areas were introduced.

Water pollution of streams etc near busy roads has also become a problem in some areas. The drainage of new roads and their discharge points are designed to minimise such problems with the use of holding ponds and filter reed-beds.

Increasingly, awareness of the needs of different flora and fauna and how they can be affected by new and existing roads has resulted in the adoption of approved systems of work. In 1989, for example, Roads Service published Guidance Notes relating to Bats and Dippers in Bridges.

Roads Service Environmental Handbook

In 1993 the County Surveyors' Society published a Code of Practice for Environment Matters. At the same time Roads Service had set up a joint working group with Environment and Heritage Service under the Director of Roads Service, Walter Martin. The aim was to pull together the wide range of environmental issued faced by Roads Service. In conjunction with Dinah Browne (consultant) a draft handbook for staff was produced in 1995. However, the final version was not issued to staff until 1998.

The handbook was aimed at Roads Service staff with a role in designing or managing roads and verges. It helped to identify the impact of roads on the natural and built environments and advised on how to minimise or control the effects. It advised on the planting of trees, the treatment of road boundaries as well as on matters relating to the protection of wildlife and the built heritage.The handbook was a good basis for appropriate environmental practice for all work.

Environmental Design

For major road schemes the RS Environmental Handbook is supplemented by the Design Manual for Roads and Bridges (DMRB) Volumes 10 and 11 on environmental design and assessment respectively.

Volume 10 firstly sets out the environmental objectives in the context of environmental design and management and then gives design standards for new roads and for improving existing roads. It addresses nature conservation, biodiversity, archaeology and the creation of environmental barriers.

Volume 11 of DMRB sets out the general principles of environmental assessment of the impact of road schemes, the techniques to be applied and how to present and report the results. The key output is the environmental statement document.

As a result of measures incorporated into the Newtownstewart Bypass project the scheme received one of the first CEEQUAL (Civil Engineering Environmental Quality Assessment) awards ever to be presented in the UK.

IHT Guidelines for Environmental Management of Highways

Roads Service was a sponsor of the guidelines and was invited to write Chapter 3 on Environmental Management Systems. Environmental management was not a new phenomenon but applying a systematic approach to it was.

The aim of these guidelines issued in 2001 by the Institution of Highways and Transportation was to describe best practice in managing and maintaining highways in such a way as to minimise potentially harmful environmental impacts and maximise environmental gains. Roads Service had a major input. Chapter 3 covers the creation of an environmental management framework, the building of an environmental management system, and the preparation of an environmental management model.

These guidelines were intended for use mainly by planners, architects, highway engineers, traffic engineers and maintenance engineers. It is unlikely any organisation could claim to conduct its business without harm or impact on the environment therefore it is important to manage the situation to mitigate negative impacts. It had an international circulation.

Roadside Trees

Roads Service became responsible for large numbers of trees in urban and rural areas in 1973. Belfast City Council Parks Department continued to maintain the street trees in their area, acting as agents for Roads Service. This partnership has proved very successful over the years. The Council now provides an arboricultural advice service to Eastern Division and some section offices, including Newtownards and Ballymena.

During the 1970's considerable street tree planting took place, funded in the main by Belfast Development Office (a part of D.O.E.) A computerised data base was introduced by Belfast City Council to record the details of each tree and for planning any necessary maintenance. New and replacement tree planting was carried out each year, with particular care taken in the selection of suitable species. In 1993 there were 9,000 trees on the database, and by 2006 there were over 13000.
Street trees were also planted in other towns and cities, often in conjunction with more general environmental improvement schemes.

Forest of Belfast

In 1992 the "Forest of Belfast" project was launched. Roads Service was one of the central government agencies that are in partnership with other non-departmental bodies, local government and voluntary sector organisations. The Minister for the Economy and Environment, Robert Atkins, published a booklet called "Belfast Street Trees" in support of the project. In 2000 the National Urban Forestry Unit published a case study (No.18) featuring the Forest of Belfast project.

In 1998 a joint initiative with Belfast City Council was launched with the aim of creating a "Celebrity Tree Trail" in the central area of Belfast. The first trees were planted by the comedians Cannon and Ball and May McFetridge opposite the Grand Opera House in Great Victoria Street. To date over 30 trees have been planted, each marked with a brass plaque.

In rural areas, many trees and hedgerows were planted in conjunction with new major and minor road improvement schemes, e.g. 150,000 trees were planted as part of the Toome By-pass project. Overall, in the 1990's approximately one million trees were planted by Roads Service.

Cyprus Avenue - Belfast

The Frosses

The pine trees at the Frosses on the A26 between Ballymena and Ballymoney have been an ongoing problem for Roads Service in that many of the trees became dangerous and had to be removed. However, their importance in supporting the road foundation was recognised and replacement planting has taken place over the years, leading to a major planting in 2001, when 800 trees grown from local seed, were planted by school children under the watchful eye of Prof. David Bellamy.

In all,1730 trees were planted at this site between 1978 and 2001 and during this period some 90 trees were removed. As the original trees are now 166 years old, it is not surprising that their number continues to fall. In 2004 a further 11 had to be removed, leaving less than 100 of the original mature pines planted by the Charles Lanyon - the eminent engineer and architect.

In 2004 a conference “Good Practice, Good Trees” was held at Belfast Castle jointly sponsored by Roads Service and Belfast City Council.

Recycling/Waste Management

Only recently has recycling played a significant part in road construction in Northern Ireland to date. There have been two main UK government initiatives – the Land Fill Tax in October 1996 and the Aggregates Tax in April 2002.

The Land Fill Tax was a tax on dumping waste material. In Roads Service new road schemes were designed to try and balance cut and fill and to mini-

The Frosses

mise any surplus. The tax of £2 per ton for inactive waste had minimal effect.

The Aggregates Tax was aimed at protecting the environment by discouraging the general use of virgin aggregates in their raw state. The aim was also to encourage recycling. After much lobbying, particularly by the Quarry Products Association, Northern Ireland was given an 80% discount on this UK tax of £1.60 per tonne because of the disproportionate impact it would have had on the local quarry industry due to the effect of the proximity of the land frontier with the Republic of Ireland. The relief given covered aggregates in processed products and virgin aggregates in their raw state extracted and used in Northern Ireland. The effect of the £0.32 per tonne tax has not been significant on Roads Service.

The Specification for Highway Works allows for recycling of materials both for use as fill and in the production of blacktop up to a maximum of 10% in surface courses and 50% in other layers. Although china clay asphalt base and slate macadam base are permitted by the Specification, neither of these materials are available in Northern Ireland and the cost of transporting them would be totally prohibitive. Further materials are under investigation for use and as these gain entry to the Specification, Roads Service should have more opportunity to use recycled materials.

There is an abundance of good quality and relatively inexpensive stone in Northern Ireland and this has been a major factor in the reluctance of local contractors to recycle materials due to the costs involved in haulage and processing. The scale of contracts do not often justify the costs of setting up processing plants on site and it is rarely viable to incur the transport costs if the materials are returned to the contractors quarry plant for processing.

On a limited scale some contractors do transport road planings back to their plant and use these in production of blacktop for private use where the specification (i.e. 10% max recycled content) is less stringent. There has been some use of road planings as Type 3 substitute in footway construction. Some contractors recycle hardcore materials to produce aggregates that meet the requirements of the Specification for Highway Works and sell the produced materials locally. RSD has experimented with the use of a portable crusher on all hard material to produce material similar to Type 3 for use as side fill, general fill etc. When the Ballymacarret Flyover (road over rail) at the city end of the Sydenham bypass was demolished in 2000 as part of the Eastern Approaches scheme, the concrete was crushed and used for road formation.

While the option to recycle is available in Roads Service contracts, it has proven to be difficult to encourage contractors to recycle material unless they are convinced that they can achieve cost savings by doing so. To make recycling of any material mandatory in a contract would almost certainly produce an increase in cost. In 2003 in Northern Ireland it was estimated the level of recycled material was about 10% of the material available.

20. "The Troubles"

From the start of the troubles in 1969 the then road authorities had to adapt and react to the changing security situation following riots, car bombs, shootings and high-jackings. Throughout this difficult period Roads Service staff continued to work in all areas providing essential services to the public despite intimidation and threats to both staff and Roads Service contractors. The local knowledge, understanding and agreement of staff living in these areas was essential in reaching decisions as to the best course of action in each case.

Many members of staff and their families were either directly or indirectly affected by incidents that caused death and serious injuries. Property was also damaged. A large car bomb on the Mountjoy Road in Omagh severely damaged County Hall, the Works Design drawing office taking the main force of the blast. Roads Service plant was both hijacked and damaged from time to time, for example. crew-cab lorries were burnt in Bangor, but the overall damage was very small for such a large and vulnerable fleet.

Throughout the 1970s and 1980s riots and civil disturbances occurred at frequent intervals. Paving flagstones were broken up and used as "ammunition", burning barricades damaged the road surface and street lights were often "shot out". Roads Service staff helped clear up the resulting debris and repaired the damage, often in very difficult circumstances. The security services advised when it was safe to do so and when to re-open any blocked roads. However, there were occasions when staff found themselves in the middle of dangerous riot situations and had to withdraw.

Car-bombs caused major damage to life and property in towns and cities. In the immediate aftermath of such large explosions, Roads Service staff were called out to help clear up the resulting debris from collapsed and damaged buildings. Signs and barriers had to be erected, road drainage and other services had to be repaired before the large craters could be filled in and the road reinstated.

Control Zones

To counteract the threat of car bombs, Control Zones were created in town and city centres with limited access and unattended car parking prohibited. Such schemes were introduced under emergency powers legislation, usually at very short notice, and Roads Service had to react quickly to sign alternative routes and introduce alterations to existing parking and traffic management arrangements. A limited number of gated entry points were a feature of most schemes with the gates closed by security forces at night. In Belfast the gates were initially manned by military personnel and then by a new Civilian Search Unit.

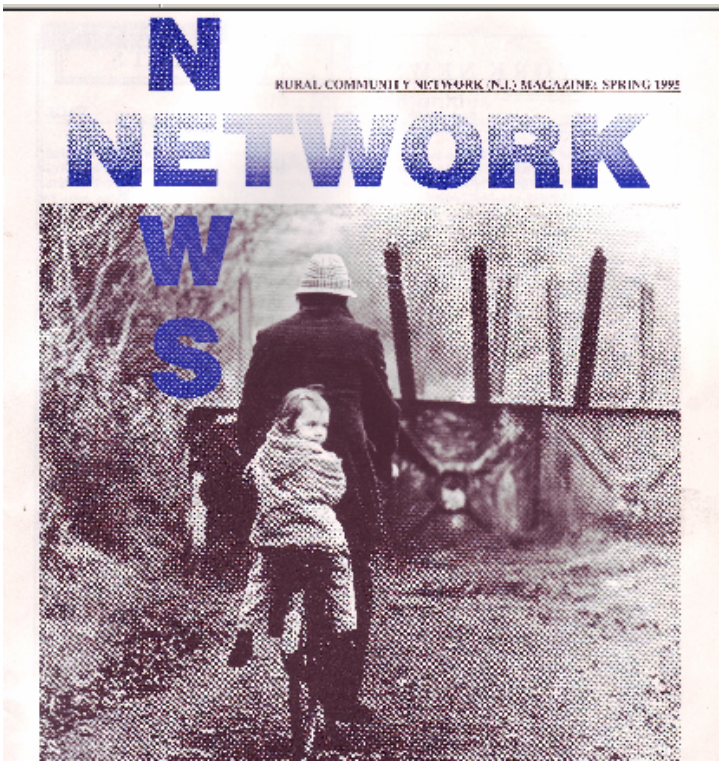
Many of the schemes introduced for security reasons created what were, in effect, pedestrian priority areas. This prompted the early implementation of formal pedestrianisation schemes initially under roads legislation and subsequently under planning legislation.

As the security situation improved, acces was permitted for longer hours and some gated areas were removed. In 1995 the Control Zone in central Belfast was removed. While the traffic restrictions in many of the streets in the central area were covered by planning legislation, some of the important main streets were not. Roads Service proposed new legislation under the Department's Planning (Northern Ireland) Order 1991 for Donegall Place, Castle Place and parts of Royal Avenue, Castle Street and High Street. However, it was not possible to reconcile the conflicting demands of the different users of the city centre, particularly Orange Badge holders, and a Public Inquiry was held in February 1999. Temporary orders had to be used from 1995 until a permanent order was finally made in May 2001.

Throughout the Province many police and army sites were protected by high walls and fences and associated look-out posts. Roads in the vicinity were often realigned or closed and large road bumps were laid on the road surface.

Cross Border Roads

To control traffic movements in the vicinity of the border between Northern Ireland and the Republic of Ireland, many cross border roads were closed. These closures were effected under powers conferred by sections of the Northern Ireland (Emergency Provisions) Act 1978. In addition, army control posts were established at strategic locations throughout the border area and at the main crossing points.



The road closures were often achieved by blowing up small culverts and bridges or by digging up and removing a section of roadway. Large concrete and metal spikes, known as "dragon's teeth" and Braithwaite type barriers made up of large metal tanks filled with concrete were also used to restrict and close roads. These closures also adversely affected legitimate local travel and in many cases local people constructed both new sections of road to by-pass the closure and also, in a number of cases, improvised bridge structures, only for these to be removed in turn. Eventually to ease the situation somewhat, a number of temporary footbridges were erected by the authorities.

At control posts, additional alternative loop roads were often built. Identifying and maintaining the actual public road at these sites was very difficult. Roads Service staff had to work closely with the Civil Representatives to arrange for funding and access.

With general improvement in the security situation and the declaration by the IRA of a cease-fire in 1994, the Secretary of State announced in late October that year that all cross-border roads would be reopened. This followed the rescinding of orders made to close border crossing points.

At the request of the Northern Ireland Office, an intensive programme of work to reopen all roads was organised by Roads Service and coordinated with the authorities in the Republic of Ireland. Indeed, one crossing point on the Fermanagh/Leitrim border was reopened on the day of the Secretary of State's announcement.

Priorities were quickly established and work started on the first group of roads in November 1994. An overall programme of works was agreed with progress initially monitored on a monthly basis. Three Roads Service Divisions – Coleraine, Craigavon and Omagh – were involved with five County Councils from the Republic – Cavan, Donegal, Leitrim, Monaghan and Louth. A large number of local contractors were employed in this major exercise, with up to 32 sites active at one time.

Omagh Division was tasked with programming and coordinating the overall project and reporting on progress. By June 1995 all roads not requiring bridge replacements had been reopened. Quarterly progress reports were produced for the remaining bridge sites. This programme was substantially completed by March 1996, though work at three sites was delayed on the advice of the Northern Ireland Office following the breakdown of the ceasefire in that year. Two of these minor bridge crossings near Caledon have still to be reinstated. In all 102 crossings were reopened at a cost of £10m.

The reconstruction of Aghalane Bridge on the N3/A509 took longer as the bridge was relocated as part of a major road realignment scheme in County Cavan. An advance contract to form a rock-filled embankment on the Fermanagh side was started in May 1997 and the main bridge contract was completed in March 1999. The first beam of the bridge was placed by Senator George Mitchell of USA, who named it the Peace Bridge.

21 Outward Face

External Contacts

For Roads Service to function efficiently and effectively it has been necessary to establish and maintain good working relations with other agencies and services with which it interfaces. In this it has succeeded. There is mention elsewhere of the extensive consultation with Planning Service on development control matters and with Water Service on joint procurement and maintenance of vehicles and plant as well as the thorny issue of road openings. At the higher level joint meetings of the Roads Service Directorate with each of Planning Service and Water Service Directorates have been held quarterly to consider policy issues and matters of common interest.

Over the years Roads Service has maintained contact with the Department of the Environment of the Republic of Ireland (RoI) and the National Roads Agency (NRA) in Dublin and shared knowledge and expertise on highway design, procurement and construction. The expenditure on roads in RoI in recent years has been much greater than expenditure in Northern Ireland although this has not always been the case Roads Service's input to methods, specifications and procedural issues has always been welcomed and respected. Cross border projects require close cooperation. The replacement of Aghalane bridge linking County Fermanagh with County Cavan in 1998 was a case in point.

Good road connections between Belfast and Dublin are essential for commerce and economic development and the improvement of the A1/N1 Newry to Dundalk cross- border road link in particular has been the subject of much joint discussion since the early 1980s. Politics and funding have been major factors. This cross-border project is being managed on behalf of both jurisdictions by Roads Service and is scheduled for completion by summer 2007. This is a tribute to the liaison between Southern Division and Louth County Council, as well as members of Roads Service Directorate and the NRA Directorate in Dublin.

Learned Associations

Since 1973 Roads Service has played an important role not only in maintaining and improving the road network but also in promoting civil engineering and Northern Ireland. Roads Service has, over the years ,provided leadership both locally and nationally to various professional engineering institutions and associations.

The Institution of Civil Engineers

The Institution of Civil Engineers (ICE) is the longest established professional institution for civil engineers and until recently was the only body with a royal charter giving it power to confer nationally recognised professional qualifications on its members who they deem to have achieved an appropriate level of professional competence. Roads Service engineering staff have served as Chairmen of the Northern Ireland Association of ICE as follows:

Tom Warnock	1982/83
David Stewart	1992/93
David Orr	2004/05

David Orr is presently a national Vice- President of ICE and will succeed to the position of national President for the period 2007 to 2008 He will be only the fourth president of the 141 elected to date to have been born in Northern Ireland and only the second to be working here at the time. It is a singular honour for Roads Service.

The Institution of Highways and Transportation

The Institution of Highways and Transportation (IHT) has been well supported as a professional institution by Roads Service engineering staff who have played a leading role in its forty year history. The Northern Ireland Branch of IHT has had seventeen Chairmen from Roads Service over the years:

Herbie Walsh	1972/73
Tom Warnock	1973/74
Ronnie Ross	1974/75
Gordon Mc Mullan	1975/76
Jack Buchanan	1976/77
George Allen	1978/79
Joe Forth	1979/80
Gerry McCusker	1981/82
Walter Martin	1984/85
Billy McCoubrey	1985/86
Tom Bill	1988/89
Bert Bailie	1989/90
Victor Crawford	1992/93
Bernie Frayne	1995/96
Denis O'Hagan	1998/99
Grahame Fraser	2001/02
Geoff Allister	2004/05

Billy McCoubrey, former Chief Executive of Roads Service, brought honour to Roads Service when he was elected national President of IHT for the period 1998/1999. Only one Northern Ireland person had been President prior to this. That was Major Harold K Scott who was President in 1970/71 when he was County Surveyor of Londonderry County Council. Harold is a legendary figure and retired as DRM of Coleraine Division in 1979.

The Institution of Structural Engineers

The Institution of Structural Engineers (I Struct E) is probably the most specialised of the engineering institutions. The Northern Ireland Branch of I Struct E has had the following Chairmen from Roads Service:

Noel Prescott	1978/80
David McIlwaine	1986/88
Jim Kirkpatrick	1995/96

County Surveyors ' Society

Roads Service senior engineering staff – DRM grade and above – have been members of the UK County Surveyors Society (CSS) since mid 1980s. They have played an active role and served on various national committees as well as forming a Northern Ireland Branch of CSS. Their views, leadership and achievements are recognised and respected in CSS.

Geoff Allister was the first member of Roads Service to succeed to the post of national President of CSS in 2005. This was a major honour for Roads Service.

The Wider Picture

Roads Service is a highly respected roads organisation in the UK context. It has a level of achievement and expertise much admired within UK and Western Europe. Staff have been called upon to serve on committees of various interest groups where they have played an active role. They have been invited to make presentations to conferences worldwide etc. They have all been good ambassadors for Northern Ireland.

PIARC

Roads Service is a member of the British National Committee (BNC) of the Permanent International Association of Roads Congresses (PIARC). The latter is the foremost body in the dissemination of knowledge and experience in road engineering on the world stage. Every four years a major international Roads Congress is held somewhere in the world. PIARC has recently been renamed the World Road Association (WRA).

Billy McCoubrey was elected Chairman of the British National Committee of PIARC for the period from 2000 to 2004. He was involved in the organisation of the 2004 PIARC World Congress in South Africa.

22 The Future

The report of the Review of Public Administration (RPA) for Northern Ireland published in 2005 has proposed that responsibility for local roads should pass to seven new Council Authorities to be in place by 2009. The future shape of Roads Service is therefore uncertain. An appropriate organisation will however still be required to manage, maintain and improve the strategic road network.

It is a matter of great regret that an integrated organisation which is widely respected across the UK and further afield is to be disaggregated.

Appendices

Appendix A - Directors and Chief Executives

Noel Prescott 1973—1983

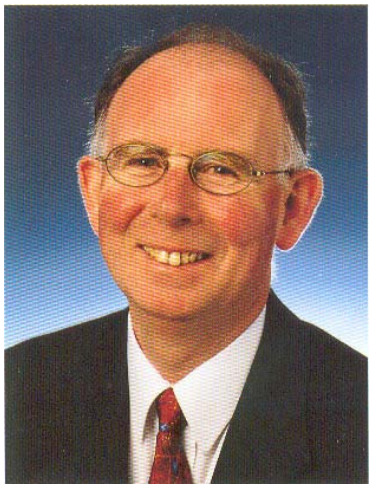
Jackson McCormick 1983 – 1984

Tom Warnock 1984 - 1985

Ian Joiner 1985 –1990

Walter Martin 1990 – 1995

Billy McCoubrey 1995 - 1999



Colin James 1999 – 2002

Malcolm Mc Kibbin 2002 -

Appendix B - Major Works completed since 1973

Trunk Routes

(Routes T1-9 created 1949, T10 created 1959, T11 created 1968 but revised 1998, T12-23 created 1998)

	Scheme	Con-structed	Direction Order No	
T1	M3 Lagan Br	1995	1990 No 318	
T2				
T3	Belfast Urban Motorway/Westlink (Donegall Rd/Whitla St)	1981	1969 No 323	
	Belfast Urban Motorway (Clifton St)	1982	1969 No 323	
	Belfast Urban Motorway (Divis St)	1983	1969 No 323	
	Dungannon By-Pass	1980	1977 No 32	Dungannon By-Pass
	Dunmurry By-Pass (Blacks Rd on/off slips)	1988	1987 No 10	
	Omagh Distributor	1990	1987 No 199	Omagh Through-Pass
	Omagh Through-Pass (Stage 2A)	1995	1987 No 199	Omagh Through-Pass
	Omagh Through-Pass (Stage 2B)	1996	1987 No 199	Omagh Through-Pass
	Strabane By-Pass	1992	1988 No 195	Strabane By-Pass
	M1 Lagan Bridge strengthening	2001		
	M1 Bann River Bridge strengthening	2002		
	Newtownstewart By-Pass	2002	2000 No 400	Newtownstewart By-Pass
	M1 Blacks Rd Bridge strengthening	2004		
	M1 Blacks Rd - Stockmans Lane	2004		Blacks Rd / Stockmans Lane
	M1 Kingsway Bridge strengthening	2004		
	Strabane By-Pass	2003	2001 No 14	Strabane By-Pass
	Omagh Through-Pass	2006	2002 No 330	Omagh Through-Pass
T4	Hillsborough By-Pass	1974	1969 No 344	Hillsborough By-Pass
	McKee's Dam	1973	1970 No 257	Hillsborough / Dromore
	Dromore By-Pass	1973	1970 No 257	Dromore By-Pass
	Ballymacormick	1973	1971 No 135	Hillsborough / Dromore
	Edenordinary	1977	1972 No 143	Dromore / Banbridge
	Banbridge By-Pass	1979	1972 No 312	Banbridge By-Pass
	Banbridge By-Pass (dual)	1989	1972 No 312	Banbridge By-Pass
	Loughbrickland By-Pass	1978	1976 No 172	Loughbrickland
	Tinker Hill	1984	1981 No 356	Loughbrickland / Newry
	Newry By-Pass (Belfast Rd / Armagh Rd)	1988		Newry By-Pass
	Sprucefield (off slip)		1988 No 140	Lisburn / Hillsborough
	Mullan's Corner (Balleny/Lisnaward, Dromore)	1992	1989 No 378	Dromore / Banbridge
	Newry By-Pass	1995	1990 No 443	Newry By-Pass
	Sprucefield Interchange (A101)	2004	2003 No 116	Lisburn / Hillsborough

	Loughbrickland to Beech Hill (Greenan to Corgary)	2006	2003	No 116	Loughbrickland / Newry
	Rathfriland Rd, Banbridge	2004	2002	No 166	Banbridge By-Pass
	Hillsborough Rd, Dromore (Ballymacormick)	2005	2003	No 322	Dromore By-Pass
T5	Craigavon Urban Motorway	1973	1973	No 176	Carn r'about
	Craigavon Urban Motorway (Kernan Loop/Northway)	1973			(Kernan Loop/ Northway)
	Craigavon Urban Motorway (Northway/Armagh Rd)	1974	1973	No 304	(Northway/Armagh Rd)
	M1 - M12 Link Roads (Ballynery/ Ballynacor)	1992	1991	No 75	M1 - M12 Link Roads
T6	Annaghilla	1980	1968	No 77	(Augher) / Ballygawley
	Lisbellaw - Maguiresbridge By-Pass	1973	1968	No 212	Lisbellaw / Maguires-bridge
	New West Bridge, Enniskillen	1982			
	Enniskillen Through-Pass	1986			Enniskillen Through-Pass
	New East Bridge, Enniskillen	1991			
T7	M2 (Sandyknowes - Duncrue St) (1971 No 91)	1973	1968	No 266	Greencastle / Duncrue St
	Crankill	1972			Ballymoney / Bally-mema
	Coleraine (Sandelford)	1974	1976	No 96	Coleraine
	M2 (Parkgate - Sandyknowes) (1971 No 91)	1975	1965	No 233	Parkgate / San-dyknowes
	Ballymoney By-Pass	1977	1977	No 64	Ballymoney By-Pass
	M2 (Dock St)	1982	1983	No 2	Dock St
	M2 (Crosskennan Junction) (Stage 1)	1993	1979	No 250	Crosskennan Junction
	Ballymena - Antrim (Stage 1)	1989	1986	No 272	Ballymena / Antrim
	Ballymena - Antrim (Stage 2)	1997	1986	No 272	Ballymena / Antrim
	Ballymena - Antrim (Stage 3)	2003	1986	No 272	Ballymena / Antrim
	Coleraine - Ballymoney (Lodge)		1999	No 23	Coleraine / Ballymoney
	Limavady By-Pass	2001	1994	No 318	Limavady By-Pass
T8	M22 (Randalstown)	1973	1969	No 12	Randalstown
	Castledawson By-Pass	1992	1989	No 375	Castledawson By-Pass
	Antrim Through-Pass (Dublin Rd)	1979			Antrim Through-Pass
	Antrim Through-Pass	1981			Antrim Through-Pass
	Killead By-Pass	1994			Antrim / Nutts Corner
	Toome By-Pass	2004	2000	No 403	Toome By-Pass
T9	Larne Harbour	1977	1972	No 112	Larne Harbour
	Doagh Rd / Coleman's Corner	2004	2001	No 333	Doagh Rd / Cole-man's Corner
	Millbrook and Antiville	2004	2001	No 334	Millbrook and Antiville r'abouts
	Ballynure	2005	2001	No 335	Ballynure
	Larne Harbour (extension)	1977	2004	No 490	Larne Harbour

T10	Culmore (Omagh)	1974	1973 No 24	Omagh / Dromore
	Dromore Inner Link	2003	1996 No 43	Dromore
	New Aghalane Bridge	1999	1997 No 250	Derrylin / Belturbet
T11	Conlig By-Pass	1975		Newtownards / Bangor
	Bangor Rd, Newtownards	1980		Newtownards / Bangor
	Quarry Corner	1978		Dundonald / Newtownards
T12	Comber By-Pass (Stage 2)	2003		Comber By-Pass
T13				
T14	Outer Ring West, Belfast	1973		Belvoir / Milltown
	Shaws Bridge, Belfast	1977		
	Outer Ring East, Belfast (Stage 1)	1981		Hawthornden Way
	Outer Ring East, Belfast (Stage 2)	1984		Parkway Way
T15	Newry - Warrenpoint	1974		Newry / Warrenpoint
T16				
T17	Castledawson By-Pass	1992		Castledawson By-Pass
T18				
T19				
T20				
T21	Belfast Rd, Carrickfergus	1986		Belfast Rd, Carrickfergus
	M5 (Greencastle - Rushpark)	1980		Greencastle / Rushpark
T22	Crescent Link, Londonderry	1977		
	Foyle Bridge, Londonderry	1984		
T23				
	Others			
	Lisburn Through-Pass	1987		Lisburn Through-Pass
	Dunmurry By-Pass (Stage 2A)	1988		Dunmurry By-Pass
	Lisburn Through-Pass (Governor's Rd)	1989		Lisburn Through-Pass
	Dunmurry By-Pass (Stage 2C)	1991		Dunmurry By-Pass
	Dunmurry By-Pass (Stage 2D)	1992		Dunmurry By-Pass
	Coleraine By-Pass	1976		Coleraine By-Pass
	Craigavon Urban Motorway (Northway/Central Way)	1973		(Northway/Central Way)

Appendix C - Home Secretaries, Secretaries of State and Ministers

Home Secretaries & Northern Ireland Ministers 1968 - 1973

	Home Secretary/ Secretary of State	NI Prime Minister/ Chief Executive	Home Affairs	Finance	Develop-ment	Health& Social Services	Commerce	Agriculture	Education	New Depart-ments
1968	Callaghan	T.O'Neill	Craig	Kirk	Fitz-simmons	Morgan	Faulkner	Chichester-Clark	Long	
			December			*January*			Fitz-simmons	Community
			Long		Neill	Porter				Relations
1969		*May*	*March*		Long				P.O'Neill	
		Chichester-Clark	Porter							*October*
1970	*June*		*August*	Kirk	Faulkner	Fitz-simmons	Bradford	P.O'Neill	Long	Simpson
			Chichester-Clark & Taylor							
1971		*March*								
	Maudling	Faulkner	Faulkner& Taylor	Kirk	Bradford	Fitz-Simmons	Bailie	West	Long	Bleakley
										September
Direct Rule	*March*									McIvor
1972	Secretary of State Whitelaw		Lord Win-dlesham	Howell	Lord Win-dlesham	Channon	Howell	Howell	Channon	Lord Win-dlesham
						November				
			June						Van Staubenzee	
1973					Howell	Van Staubenzee		Mills	Lord Belstead	Van Straubenzee
	December			*January*						
1974										

January	PYM	Chief Ex	Finance	Housing,	Environ-ment	Health&	Manpower	Commerce	Agriculture	Education	Community	Planning	Legal&Law
1974	*March*	Faulkner		Planning,		Social	Services				Relations	& Co-	Reform
Executive		Deputy		Local Govt		Services						ordination	
		Fitt	Kirk	Currie	Bradford	Devlin	R.Cooper	Hume	Morrell	McIvor	I.Cooper	McGrady	Napier
May 1974 Direct Rule Resumed	Rees		Concannon		Moyle	Lord Donald-son	Orme	Orme	Lord Donald-son	Moyle	Moyle		
1975										Education			
										Lord Donaldson			
			April	Environment									
1976			Rees	Concannon		Con-cannon	Moyle	Moyle	Dunn	Carter			
	September												
	Mason		Dunn	Carter		Lord Melchett	Concannon			Lord Melchett			
1977													
1978			Pendry						Pendry				
	May												
1979	Atkins		Rossi	Goodhart		Alison	Rossi	Shaw	Shaw	Lord Elton			
1980													
1981	September												
	Prior		LrdGowrie	Mitchell		J.Patten	Butler	Butler	Butler	Scott			

Ministers Responsible for Roads Service 1973 - 2006

1973	*October*
	David Howell
January **1974** **Executive**	**Roy Bradford**
May **1974** **Direct Rule resumed**	**Roland Moyle**
1975	
1976	*April* **John Concannon**
	September
1977	**Ray Carter**
1978	
	May
1979	**Philip Goodhart**
1980	
1981	*September*
	David Mitchell
1982	
	June
1983	**Chris Patton**
1984	
1985	*September*
	Richard Needham
1986	
1987	
1988	
	July
1989	**Peter Bottomly**

	July
1990	**Richard Needham**
1991	
	April
1992	**Robert Atkins**
1993	
	January
1994	**Tim Smith** *October*
1995	**Malcolm Moss**
1996	
	May
1997	**Lord Dubbs**
1998	
1999	
December **1999** **Devolution established**	**Peter Robinson**
February **2000** **Devolution suspended**	**Adam Ingram**
May **2000** **Devolution restored**	**Peter Robinson** *July* **Gregory Campbell**
2001	*October*
2002	**Peter Robinson** *October*
Devolution suspended	**Angela Smith**
2003	*June*
2004	**John Spellar**
2005	*May* **Shaun Woodward**
2006	*May* **David Cairns**

Appendix D - Senior Staff

Roads Service Headquarters (1973+)

Director of Roads Service/ Chief Executive	Superintending Engineer/(G6)	PPTO	PO
Noel Prescott	Bailie Russell	Corden Stevenson	Ronnie Ross
Jackson McCormick	Bill Foster	Harold Caters	Brian Watters
Tom Warnock	George Allen	Ronnie Ross	Howard Campbell
Ian Joiner	Leslie Clements	David McIlwaine	Jim Logan
Walter Martin	Corden Stevenson	David Stewart	Jim McCormick
Billy McCoubrey	Harold Caters	Daryl Cooke	Bill Moffett
Colin James	Jim Logan	Charlie McClean	Robert Martin
Malcolm McKibbin	Howard Campbell	Eric Stewart	Ivan Coffey
	Sinclair Duncan	Brian Watters	Gordon Hattrick
	George Lyster	Leslie Young	Alan McArthur
	Bob Roulston	Victor Crawford	John Angus
	Eric Stewart	Gerry McCusker	Jean McKay
	Bill Moffett	Thompson Moore	Sam Williams
	George Leckey	Joe Drew	John Wallace
	Billy Walker	Billy McCoubrey	David Walker
	Dennis O'Hagan	Bob Trimble	Maurice Galbraith
Grade 5	John Angus	Jack Cargo	Roy Sherman
	Peter McWilliams	Derek German	Terry Deehan
Fred Chambers	Andrew Murray	Derick McCandless	Pip Crook
Dan Barry	Barry Jordan	Malcolm McKibbin	Colin McWhirter
George Allen		Harvey Hamilton	Michaela Glass
Jackson McCormick		Ronnie Wilson	Michele Woods
Joe Cowan		Peter Morrison	John Price
Fred Miller		David Orr	
Corden Stevenson		Derek Hamilton	
Billy McCoubrey		Peter Mc Williams	
Eddie Galway		Leslie White	
Victor Crawford		Roddy Crilly	
Grahame Fraser		Reynold Nicholson	
Jim Carlisle		Alan Houston	
Jim Aiken		Philip Hamilton	
John McNeill			
Geoff Allister			
David Orr			

Transportation Unit (1995+)

Head of Unit	PPTO	PO
Denis O'Hagan	Bert Bailie	Aileen Gault
Andrew Murray	Peter Morrison	Michael Rickard
	Stephen Wood	Brian Moreland
	John Irvine	Simon Richardson
	Ronnie Wilson	
	Bernie Frayne	

Ballymena Division (1973 - 1999)

DRM	Principal Engineer	
Joe Forth	Brian Shields	Campbell Young
Harold Caters	Billy McAlpine	Tom Bill
Robert Kernohan	David McCausland	Bert Bailie
Sean Price	Tom Trouton	Billy McIlrath
	Robert Kernohan	Ronnie Wilson
	Thompson Moore	Sam Browne
	Gerry McCusker	Arthur Johnston
	George Leckey	

Roads Service Direct (1999+)

HoBU	Principal Engineer
Joe Drew	Arthur Johnston
Ken Hutton	Desmond Moore
	Ken Hutton
	Roger Morgan
	Colin Brown

Belfast Division (1973 -1999)

DRM/G5	Deputy DRM	Principal Engineer/PO	
Tom Warnock	Francis Regan	Grahame Fraser	Billy McIlrath
Ian Joiner	Eric Boland	Sam Orr	John Dempsey
Walter Martin	John Fogarty	Dick Leach	Tony McGurk
Grahame Fraser	Tom Trouton	Sean MacAleenan	Tom McCourt
Robert Martin	Hill Brown	John Fogarty	Derek Hamilton
Douglas Maxwell	Tom Bill	Terry Campbell	Bernie Frayne
		Ian Joiner	Bert Bailie
		Hill Brown	Leslie Patterson
		Bob Moore	Jim Getty
		Bob Hutchinson	John Magown
		Harry Madill	Andrew Murray
		Dick McCurry	Ivan Coffey
		Derek German	David Finlay
		Sam Hawthorne	Sean Price
		Denis O'Hagan	

Eastern Division (1999+)

DRM	Deputy DRM	Principal Engineer/PO	
Douglas Maxwell	Tom McCourt	Derek Hamilton	Norman Chambers
Sean Price		John Magown	Roy Spiers
Joe Drew		Andrew Murray	Brian Maxwell
Andrew Murray		Bernie Frayne	Graeme Beckett
		Leslie Patterson	Colin Brown
		Stephen Pollock	

Coleraine Division (1973 - 1999)

DRM	Principal Engineer	
Harold Scott	Pat Cullen	John McCurdy
Walter Martin	Victor Watson	Jim Kirkpatrick
Victor Crawford	Gordon McMullan	Joe Alcorn
Joe Drew	George Leckey	Garth Bresland
	Bob McNeill	Jim Beattie
	Garth Giffin	Ken Hutton
	Tom Bill	

Northern Division (1999+)

DRM	Principal Engineer
David Orr	Peter Hadden
Andrew Murray	Billy McIlrath
Jim Beattie	Jim Beattie
	Deirdre Mackle
	Uel Wilson
	Graham Brown

Craigavon Division (1973 - 1999)

DRM	Principal Engineer	
Jack Buchanan	Walter Martin	Jim Wilson
Ian Joiner	Tom Harrison	Bob Trimble
Billy McCoubrey	Herbie Walsh	Denis McCready
Douglas Maxwell	Sam Craig	Moti Shah
Malcolm McKibbin	Bob Roulston	Tom Atkinson
	Bernard Jones	Derek Hamilton
	Gerry Berryman	Bob Cairns
	Daryl Cook	David Orr
	Harry Madill	John White

Southern Division (1999+)

DRM	Principal Engineer
Sean Price	
John White	Tom Atkinson
	John White
	Bertie Ellison
	Kevin Monaghan
	Angela Coffey
	Leslie McCullough

Downpatrick Division (1973 – 1999)

DRM	Principal Engineer	
Joe Kirk	Billy McCoubrey	John Humphreys
Grahame Fraser	Brian Coulter	Joe Drew
David Stewart	Alan Caldwell	John Magowan
Derick McCandless	Tom Trouton	Roy Lewis
	Wally Easom	Leslie White
	Thompson Moore	Desmond Moore
	Bertie Sherwood	

Roads Service Consultancy (1999+)

HoBU	Principal Engineer	
Derick McCandless	John Humphreys	Leslie McCullough
Bob Cairns	Tom McCourt	Bob Cairns
	Jim Kirkpatrick	Graeme Beckett
	Jim Getty	John McRobert
	Michael Parkinson	Carol Sheldon
	Dawson Wray	Bernie Frayne
	Sam Browne	

Omagh Division (1973 - 1999)

DRM	Principal Engineer	
Ambrey Fitzsimmons	Bill Kelso	Geoff Allister
Charlie McClean	Jim McCleery	Jim Beattie
David Stewart	Walter Brady	Tony McGurk
Denis McCready	John McCurdy	Peter Hadden
Geoff Allister	Ian Harvey	Malcolm McKibbin
	Derick McCandless	Sam Webb
	Douglas Maxwell	Pat Doherty
	Mick McGuckin	Norman Black

Western Division (1999+)

DRM	Principal Engineer
Geoff Allister	Pat Doherty
Pat Doherty	Sam Webb
	Norman Black
	Leslie McCullough
	Kevin Monaghan
	Connor Loughrey
	Richard Hamilton
	Arnold Hamilton

Omagh Division (1973 - 1999)

DRM	Principal Engineer	
Ambrey Fitzsimmons	Bill Kelso	Geoff Allister
Charlie McClean	Jim McCleery	Jim Beattie
David Stewart	Walter Brady	Tony McGurk
Denis McCready	John McCurdy	Peter Hadden
Geoff Allister	Ian Harvey	Malcolm McKibbin
	Derick McCandless	Sam Webb
	Douglas Maxwell	Pat Doherty
	Mick McGuckin	Norman Black

Western Division (1999+)

DRM	Principal Engineer
Geoff Allister	Pat Doherty
Pat Doherty	Sam Webb
	Norman Black
	Leslie McCullough
	Kevin Monaghan
	Connor Loughrey
	Richard Hamilton
	Arnold Hamilton

Appendix E - Acknowledgements

Chapter 1 of this book draws heavily on material researched and prepared by Mr T Jackson McCormick, a former Director of Roads Service. A more comprehensive description of the administrative and political backdrop between 1966 and 1973, which impacted on the setting up of Roads Service, can be found in *The setting Up of DOE(NI) Roads Service 1966 – 1973 by T Jackson McCormick.* This document is available from Roads Service Headquarters.

The authors acknowledge the assistance received from the undernoted and apologise for any omissions in this list.

Geoff Allister
Gerry Anketell
Harry Armstrong
Tom Atkinson
Bert Bailie
Jim Beattie
Gordon Best (QPA-NI)
John Boyd
Colin Brown
Sam Browne
Jim Campbell
Jack Cargo
Jim Carlisle
Norman Chambers
Joe Cochrane
Angela Coffey
Michael Cooney
Annette Coyle
Roddy Crilly
Pip Crook
Robin Cuddy
Stephanie Curran
Michael Davison
Pat Doherty
Joe Drew
David Dynes
Alan Flavell
Bernie Frayne
Terry Fulton
Jim Getty
Roy Gordon
Derek Hamilton
Harvey Hamilton
Richard Hamilton
Alan Houston
John Humphreys
Ken Hutton
John Irvine
Arthur Johnston
Charlie Johnston
John Kee
William Kerr
Jim Kirkpatrick
George Leckey
Eric Lindsay
Nigel Lucas (CEF)
Alan Mahaffey (BCC)
Walter Martin
Brian Maxwell
Ciaran McAleenan
Tony McAllister
Jackson McCormick
Billy McCoubrey
Denis McCready
Jimmy McCullough
Leslie McCullough
Malcolm McKibbin
Eamonn McMahon
Barry McMillen
Willie Miller
John McRoberts
Roger Morgan
Stephen Murphy
Andrew Murray
Raymond Neill
Reynold Nicholson
Denis O'Hagan
David Orr
Michael Parkinson
Michael Pollard
Stephen Pollock
Gilbert Richardson
Henry Robinson
Philip Robinson
Richard Robinson
Attracta Rooney
Bob Roulston
Jack Shaw
Desmond Smart
Roy Spiers
Corden Stevenson
David Stewart
Jackie Strain
Graham Thomas
Paul Thompson
Sam Webb
John White
Leslie White
Ronnie Wilson
Stephen Wood

Appendix F - Important Reference Documents

1 Background before 1973

The Local Government (Ireland) Act 1898
The Roads Act 1920
The Local Government (Roads) Act (Northern Ireland) 1923
The Roads Improvement Act (Northern Ireland) 1928
The Roads Act (Northern Ireland) 1937
The Roads Act (Northern Ireland) 1948
The Special Roads Act (Northern Ireland) 1963
Working at Stormont - Dr J A Oliver (1978)
White Paper Cmnd 517 Statement of Aims 1967
White Paper Cmnd 530 Further Proposals for the Reshaping of Local Government 1969
Cmnd 546 Review Body on Local Government in Northern Ireland Report 1970
The Setting Up of the DOE (NI) Roads Service 1966-1973 - T J McCormick (2005)

2 Conception and Birth Pangs

The Road Traffic Act 1970
The Local Government Act (Northern Ireland) 1972
Statutory Rule and Order No 278, 1973 Transfer of Functions

4 Developments from 1st January 1974

Statutory Rule and Order No 504 1973
Prior Options Study (1994)
Agency Framework Document (1996)
Organisational Review of Roads Service - Deloitte and Touche (1997)
Roads Service Top Structure Review (2001)
1964 – 1989 25 Years On - Institution of Highways and Transportation
Jubilee Reflections - Roads Service (1998)
The Northern Ireland Motorway Achievement (2002)

5 Network Maintenance

5.2 Funding

Review of Structural Maintenance in Northern Ireland - MS Snaith (1986)
A Further Review of Structural Maintenance Procedures for DOE (NI) - MS Snaith (1989)
Structural Maintenance of Roads - Northern Ireland Audit Office (1992)
A Review of Structural Maintenance Needs in Northern Ireland - MS Snaith (1993)
Northern Ireland Road Condition Survey Report 1992
The Road to Everywhere DM Orr and R Crilly (1994)

5.4 Winter Service

The Roads (Northern Ireland) Order 1980
The Roads (Northern Ireland) Order 1993
Winter Gritting Policy in Northern Ireland - GP Fraser and J Drew. Proceedings of the Xth PIARC International Road Congress, Lulea, Sweden (1998)
Improving Winter Driving Conditions - Northern Ireland Audit Office (1999)
Winter Service Review - Report and Appendices (July 2001)

5.6 Laboratories

Roads Service Consultancy Best Value Review (2004)
Best Value Review - Report on Establishment of a Materials Engineering and Assessment Centre of Expertise (2004)

5.7 Road Openings

Horne Report (1983)
New Roads and Street Works Act (1991)
Reinstatement Standards for Water Service Works – letter WGG Martin (March 1988)
Control of Openings and Reinstatement of Roads - NIE (Oct. 1998)
Reinstatement Agreements - DOE with NIE, BT, Water Executive, and
Mercury Communications (April 1993)
Constitutions for NIRAUC and DRAUC (1995)
Street Works (NI) Order 1995
Street Works (Reinstatement) Regulations (NI) 1998
NIRAUC – Specification for the Reinstatement of Openings in Roads (Nov 1998)
Road Openings by Utilities - Northern Ireland Audit Office (2001)
A History of Street Works – Paper, John Shaw (July 2005)
Traffic Management Act 2004

6. Section Offices

Review of the Department of the Environment Roads Service Stage 2, Section Offices - MMRD (Sept 1989)
Roads Service Committees paper (April 1990)
Minute from WGG Martin on proposed staff charts following MMRD Reviews (Jan 1992)
DSO Project – Organisational Framework (1993)
Roads Maintenance Client Reorganisation – Staffing Levels paper (May 1993)
Review of the Role and Workload of Section Offices Stage 1 Report (Dec 2003)
Review of the Role and Workload of Section Offices Stage 2 Report (June 2005)
Network Ownership and Management- paper for Roads Service Board (June 2005)

7 Direct Labour Organisation

The Setting Up of Direct Service Organisations - Report (1994).
Rayner Report on Stores in Roads Service (1982)
RSD Review of Stores (2001)
Report on Management of Vehicles and Mobile Plant - Northern Ireland Audit Office (1985)
Report on Management of Vehicles and Mobile Plant - Northern Ireland Audit Office (1989)
Report on Vehicle and Plant Management - MMM Consultants (1991)

8 Public Liability

Public Accounts Committee Report on Claims Handling and Investigation (1986)
Road Maintenance Standards (1987)
Road Maintenance Guidelines (1992)
Road Maintenance Guidelines (1995)
Road Maintenance Guidelines (1997)
Road Maintenance Standards (2000)

9 Traffic Management

Guidelines for Accident Reduction Schemes - Institution of Highways and Transportation (1980)
Design and Use of Roundabouts in Ireland - D O'Hagan and B Frayne - An Foras Forbartha Teoranta (1987)
The implementation of Integrated Traffic Control and Informatics in Belfast – GP Fraser and RB Maxwell Institution of Electrical Engineers (1994)
Travel Survey for Northern Ireland 2002-2004
The Traffic Management (Northern Ireland) Order 2005
Telematics Applications in Bavaria Scotland and Others (TABASCO)
€uroprice Newsletter (2001)
Intelligent Transport Systems in Northern Ireland 2003–2012- Roads Service
Road Safety Engineering Report 2004
Traffic and Travel Information 2004

10 Transportation

Belfast Transportation Study (1966)
Belfast Urban Area Plan (1969)
Second Report on Craigavon New City Plan (March 1967)
UK National Road Traffic Forecasts (1989)
This Common Inheritance White Paper (1990)
Transport: the Way Forward (1995)
Transportation in Northern Ireland – The Way Forward (1995)
A New Deal for Transport: Better for Everyone (July 1998)
Moving Forward – Northern Ireland Transport Policy Statement (1998)
Regional Transport Programmes - 2001/2002 (2001)
2002/2003 (2002)
2003/2004 (2003)
2004/2005 (2004)
Regional Strategic Framework for Northern Ireland – Shaping our Future (Dec 1998)
Regional Development Strategy (Sept 2001)
Regional Transportation Strategy for Northern Ireland 2002 – 2012 (2002)
Belfast Metropolitan Transport Plan 2015 (2004)
Regional Strategic Transport Network Transport Plan 2015 (2005)
Inventory of Bus Lanes – Eastern Division (2006)
Walking Northern Ireland – An Action Plan (Dec 2003)
National Cycling Strategy (1996)
Cycling Strategy for Derry (1998)
Northern Ireland Cycling Strategy (June 2000)
Lagan and Lough Cycle Way – Sustrans pamphlet (2004)
Cycling Moves in Belfast – paper by P Thompson (2004)

11. Network Development

Guidance on the Methodology for Multi-Modal Studies DETR (2000)
Applying the Multi-Modal New Approach to Appraisal to Highway Schemes (2001)
Specification for Roads and Bridge Works
Roads in Urban Areas
Highway Link Design

The Design Manual for Roads and Bridges (DMRB)
The Manual of Contract Documents for Highway Works
Planning (Environmental Impact Assessment) Regulations (Northern Ireland) 1999 Roads (Amendment) (Northern Ireland) Order 2004
DMRB Safety Audit (HD 19/94)
DMRB Safety Audit (HD 19/03)
EU Structural Funds 2000 – 2006 Paper by Philip Robinson (Nov 2005)
Institution of Civil Engineers (ICE) 5th Edition Conditions of Contract
New Engineering Contract (NEC)
Engineering and Construction Contract (ECC)

12 Bridges

M-beam Bridge Decks Analysis and Design - Dr J Kirkpatrick (1979)
Design of M-beam Bridge Deck Slabs - Dr J Kirkpatrick (1986)
British Engineering Standards BE1/73 – Reinforced Concrete (1973)
BE2/73 – Pre-stressed Concrete (1973)
BE5/73 – Highway Loading (1973)
Technical Approval Scheme (TAS) for the design and checking of highway structures (1974)
EEC Directive 85/3 - Alterations in UK permitted vehicle weights (introduced 1999)
Managing Bridge Management by CR Hutchinson, Dr J Kirkpatrick & J Boyd (1998)

15 Development Control

Planning Order (Northern Ireland) 1978
Access Standards - DOE (1983)
Planning (Northern Ireland) Order (1991)
A Planning Strategy for Rural Northern Ireland (1993)
Planning Policy Statement PPS3 - Development Control: Roads Considerations (1996)
DCAN 15 - Vehicular Access Standards (Aug 1999)
Planning Policy Statement 3 – Access, Movement and Parking (Feb 2005)
Private Streets Act 1964
Layout of New Streets Design Guide (1965)
Private Street (Construction) Regulations 1966
Layout of Housing Roads – Design Aid, DOE (1979)
Private Streets Order (Northern Ireland) 1980
Layout of New Streets n Traditional Residential Developments (1981)
Layout of Housing Roads – Design Guide (1988)
Planning (General Development) Order NI 1973
Private Streets (Amendment) (Northern Ireland) Order 1992
Private Streets (Construction) Regulations 1994
Creating Places: Achieving Quality in Residential Developments: Incorporating Guidance on Layout and Access) (May 2000)
Design Bulletin 32- Department of the Environment Transport and the Regions (1998)
Planning Policy Statement PPS7 Quality Residential Environments (June 2001)
Private Streets (Construction) (Amendment) Regulations (Northern Ireland)i (2001)
Guidelines for Traffic Impact Assessment IHT (1994)
Guidelines for Planning for Public Transport in Developments IHT (1999)
Transport Assessment: Traffic Impact Assessment Guidelines DRD (2001)

Development Control Manual (Version 1) (Aug 2005)

16 InformationTechnology

Procurement Documentation for Integrated Computer System (1987)
Don Barnard Associates Report on Information Systems Strategy (1991)

17 Corporate Services

Business Plans, Corporate Plans, and Annual Report and Accounts from 1996-2006

18 Health and Safety

Health and Safety at Work (Northern Ireland) Order 1978
Control of Substances Hazardous to Health (COSH) Regulations 1990
Management of Health and Safety at Work Regulations 1993
Construction Design and Management (CDM) Regulations 1995
Roads Service Safety Manual (1998)
Pocket Version of Roads Service Safety Manual (1999)

19 Roads & Environment

Land Acquisition and Compensation (Northern Ireland) Order 1973
Noise Insulation Regulations (Northern Ireland) 1995
Land Compensation – Your Rights Explained – Insulation Against Traffic Noise ,DOE
Asphalt Now- Issue 17 (Winter 2005/06)
United Kingdom National Air Quality Strategy (NAQS) (1997)
Environment (Northern Ireland) Order 2002
Roads Service Environmental Handbook (1998)
Field Boundaries No 8 , Managing Roadside Hedges - (DANI 1999)
Guidelines for Environmental Management of Highways - Institution of Highways and Transportation (2001)
Belfast Street Trees - DOE
Regeneration of the Frosses Folder (Dec 2001)
Landfill Tax Order 1996
Aggregates Tax Order 2002

20. “The Troubles”

Northern Ireland (Emergency Provisions) Act 1978

21 Outward Face

Review of Public Administration in Northern Ireland (2005)