

# 7 Maintenance of rolling stock and infrastructure

## Rolling stock

7.1. The NIR passenger rolling stock fleet comprises the following:

- (a) 30 diesel electric multiple units (DEMUs) of two types:
  - (i) 21 Class 80, built between 1974 and 1977, mainly in three-car sets but with two in two-car sets. Three of the three-car sets of this class are currently on hire to Irish Rail, but NIR has recently decided to give notice to Irish Rail to terminate this arrangement; and
  - (ii) nine Class 450 (Castle Class), built between 1985 and 1987, all in three-car sets. Of modern British Rail sliding door design, the engines and traction equipment of withdrawn Class 70 units were fitted in order to minimise costs;
- (b) three General Motors diesel locomotives;
- (c) 28 locomotive hauled coaching vehicle (LHCV) of British Rail Mark II design; and
- (d) one prototype rail bus not currently used in passenger service (of late 1970s vintage).

7.2. All nine Class 450 DEMUs are used on suburban services, six on York Road/Larne and the other three on Bangor/Portadown services. Twelve of the 18 available Class 80 DEMUs are also used on suburban services and the rest on InterCity services to Coleraine, Portrush and Londonderry. The locomotives and LHCVs are used on InterCity Cross-Border services.

7.3. Generally the DEMUs operate singly, but at peak periods two units may be joined to provide a six-car train. The three-car units of both types comprise a powered driving car with the engine mounted in the vehicle body (rather than under the floor as in most British Rail Diesel Multiple Units) behind the driving cab. Engine and cab occupy about one-third of the vehicle with the remainder available for passenger use. The centre vehicle is all passenger while the other end vehicle is a driver trailer, mainly passenger, but with a driving cab at the outer end. Thus the unit can be driven from either end.

7.4. Some years ago NIR purchased a single-car rail bus (an early version of the British Rail Pacer type) for use on the Coleraine/Portrush branch. However, it was found to be unsatisfactory since it was too small for morning and evening peak services and, perhaps more seriously, was too light to operate the track circuits used in the signalling system. The vehicle is currently at York Road works awaiting a decision on its fate possibly conversion to an inspection vehicle.

7.5. Given the small size of its fleet, NIR seeks to obtain standard 'off-the-shelf' designs for its passenger rolling stock. However, it has two disadvantages in this regard. First, as with Irish Rail, the NIR track gauge is 5 feet 3 inches compared with the standard of 4 feet 8½ inches which is common to British Rail, most of Europe and North America. At the very least, this requires the fitting of non-standard running gear to vehicles purchased from the major manufacturers. Secondly, much of NIR's passenger fleet is based on standard British Rail designs where the tendency has been towards longer coaches 75 feet is now the standard coach length within British Rail. Because of the

physical constraints at its York Road workshops, NIR has so far been restricted to coaches and power cars up to 65 feet long.

7.6. NIR has no freight vehicles of its own, all such stock being provided by Irish Rail. It does have six Metro Vickers diesel locomotives (acquired second-hand from Irish Rail) which have been used for shunting work and hauling civil engineers' trains. There are also two Hunslett diesel locomotives purchased in 1970. NIR has a fleet of assorted vehicles and equipment for civil engineering use, including three ballast tamping and lining machines, an on-track welding machine, 12 ballast hoppers and various wagons for carrying sleepers and rail. A number of these are well past their best. For example, only three ballast hoppers are in safe working condition. Through a combination of age and accident damage, only one of the three tamping and lining machines was operational for some months in 1990, although a second has now been returned to service after a major overhaul.

7.7. The main repair and overhaul works is located at York Road. It was designed and built over 100 years ago to deal with steam locomotives and individual coaches. For this reason it is less than ideal for handling three-car diesel units. However, its main problem lies in the fact that apart from the six units dedicated to the York Road/Larne services, the rolling stock fleet is based on Belfast Central. The two are little more than one mile apart but the only rail connection is a 50-mile trip via Lisburn, Antrim and Bleach Green. According to NIR, this entails some 25,000 miles a year of empty stock movements. This problem will be resolved on completion of the Cross Harbour Link (see paragraph 6.17). Plant and equipment available at the works appeared no more than adequate.

7.8. Maintenance policy provides for each vehicle/unit to be sent to the works every two years, with a heavy overhaul at four-year intervals and an intermediate overhaul in between. On average, heavy overhauls, which include an external repaint, are intended to take place at 300,000 mile intervals, giving an annual average mileage of 75,000. A heavy overhaul takes six to eight weeks depending on the condition of the unit.

7.9. Given the current size of the DEMU fleet this policy implies a requirement for seven heavy and seven intermediate overhauls a year, a target which has not yet been achieved. The plan for 1990/91 provides for four overhauls of each type. Experience has shown that where mileage between heavy overhauls exceeds 420,000, major failures are likely to occur. Some units are currently at or around the 400,000 mile level. Routine maintenance and minor repairs between works visits are undertaken at the central service depot near Belfast Central Station. There is a small facility near York Road for the six units dedicated to the Larne services. Among other things, routine maintenance includes changing cast iron brake blocks every two weeks. Internal and external cleaning also takes place at these locations together with fuelling. The central service depot is due to be transferred to York Road as part of the work on the Cross Harbour Link.

7.10. Mechanical engineering expenditure for the year to 1 April 1990 was £2 million of which nearly £1.5 million was attributed to Suburban, about £0.5 million to InterCity and a small balance to Freight. Mechanical engineering costs for the four months April to July 1990 showed a net overspend of over £20,000 against budget due to unscheduled work, much of which was attributable to problems with the radiators on Class 450 stock.

## **Infrastructure**

7.11. Maintenance and renewal of the track is undertaken by NIR using its own workforce and equipment. Over the last five years track has been relaid at the rate of between 7 and 10 miles a year using CWR and concrete sleepers. This provides smoother running and lower subsequent

maintenance costs than the traditional jointed track on wooden sleepers. Most of the relay work has been on the BangorPortadown section, although one 12-mile section between Antrim and Ballymena was relaid in preparation for singling this section in September 1990. Because of equipment failures and other reasons, the rate of relaying has fallen short of the target of 10 miles a year in recent years.

7.12. A significant problem in recent years has been the incidence of slurry spots mainly around Antrim, but also on parts of the LisburnBangor route. Slurry spots occur at rail joints where the flexing caused by the passage of trains has pulverised the ballast, broken the sealing layer of ash and cinder under the ballast and allowed water to be drawn out. If untreated, such spots can cause earth movement leading to distortion of the track and possible derailments. Most of the work necessary to resolve this problem has now been completed, either by special treatment of particular spots or as part of track relaying.

7.13. As NIR acknowledges substantial sections of track remain in unsatisfactory conditions. In particular some of the track north of Ballymena, south of Portadown and sections of the Larne and Bangor lines have problems with old wooden sleepers, many of which show signs of severe decay. This results in the imposition of speed restrictions with the consequent adverse effect on train running times. Short of complete relaying, NIR is planning to replace sleepers on the worst affected sections, either totally or on a one-in-three basis depending on local conditions.

7.14. On two parts of the system, the northern end of the Larne line and the Londonderry line near Castlerock, the track runs on a raised causeway very close to the sea. In both places substantial work has been required over the last two years to repair damage caused by storms and flooding.

7.15. Some routine maintenance of buildings and structures and some minor new works are undertaken by NIR's own workforce. However, major works are put out to specialist contractors. A recent example of this has been the repair of the bridge over the River Bann at Portadown, involving complete replacement of the steel superstructure, which was found to be severely corroded, and reinforcement of the pillars and abutments. A survey by consulting engineers in 1984 reported this bridge as in need of further investigation. A subsequent survey by consulting engineers in 1987 found that the bridge was unsafe and recommended the immediate imposition of a 20 mph speed limit pending repairs. In the weeks prior to the renewal work a speed limit of 10 mph was in force.

7.16. NIR has 160 employees engaged in civil engineering work, and revenue expenditure in the year to 1 April 1990 was £2.2 million. In the same year capital expenditure was £3.5 million, including £1.9 million on the track (renewal of track is treated as capital), £1.0 million on building, £0.5 million on bridges and the balance on equipment.

7.17. Since 1985 most of the signalling system has been renewed using modern colour light signals and route-setting panels. This has resulted in a substantial reduction in the number of signal boxes (and signalmen) required and a reduction in maintenance costs. As an example, the York RoadLarne line had six signal cabins before modernisation. The route is now controlled by one setting panel at York Road. From Bangor to Hilden, one mile east of Lisburn, the route is controlled by one panel at Belfast Central.

7.18. The installation of new signalling systems is undertaken by contractors, while NIR staff are responsible for maintenance, except for some very specialist items.

7.19. NIR has a total of 56 public road level crossings, all but seven of which are now converted to automatic operation. Of these 26 have either a half or full barrier, while the other 23 are AOCLs which do not have barriers, road traffic being controlled by flashing lights.

7.20. The Signalling and Electrical Department employs 27 staff and revenue expenditure in the year to 1 April 1990 was £0.4 million. Capital expenditure in the same year was £1.1 million.

## **Conclusions**

7.21. NIR has followed a deliberate policy of keeping the availability of rolling stock tight to discourage slackness in operations. In principle, this has much to commend it and we are loath to propose change. However, we believe that there is insufficient rolling stock available to meet service requirements, maintenance schedules and the unpredictable losses and damage caused by civil disorder. This is leading to higher maintenance costs and could lead to loss of passengers to bus or car. We therefore welcome the recent decision by NIR to give notice to Irish Rail terminating the hire of the three Class 80 DEMUs.

7.22. As far as rolling stock maintenance facilities are concerned, NIR personnel are making the best of a bad job. Working conditions are depressing and the whole set-up is an unfortunate historical legacy.

7.23. The signalling system has been almost totally modernised in the last six years and does not give rise to any significant problems. Apart from the Bann Bridge at Portadown, most structures are in good or reasonable condition albeit Whitehead Station is in urgent need of attention. The need to rebuild the Bann Bridge (at a cost of some £1 million) appears to have resulted from lack of proper maintenance over several decades.

7.24. NIR has already identified that there are serious problems with the track. It shows signs of neglect over a long period and reflects the low level of priority given to expenditure on infrastructure maintenance and the equipment necessary to undertake such work. This has inevitably led to major rebuilds and replacements and if it persists will lead to more. It is not clear whether this problem arises because of real or supposed cash constraints imposed by NITHC and DoE(NI), or by reason of deficiencies in NIR management and control systems.

## **Recommendations**

7.25. We recommend as follows:

- (a) NIR should reassess its rolling stock requirements giving due weight to the importance of scheduled maintenance and contingency factors as well as service requirements. It should then make any necessary adjustments to its capital expenditure plans, in time for incorporation in its next corporate plan.
- (b) The options available (if any) for contracting out maintenance to Irish Rail, British Rail or a private local engineering group should be investigated. At the same time a provisional cost of building and operating new maintenance facilities should be determined. Before the end of 1991 NIR and NITHC should reach a conclusion on the future provision of rolling stock maintenance facilities for the railway.
- (c) NIR should discuss with NITHC the whole problem of infrastructure maintenance, cost and funding before submission of NIR's next corporate plan. NIR should agree with NITHC a work and expenditure programme and regularly monitor the implementation of the programme, reporting quarterly to NITHC.