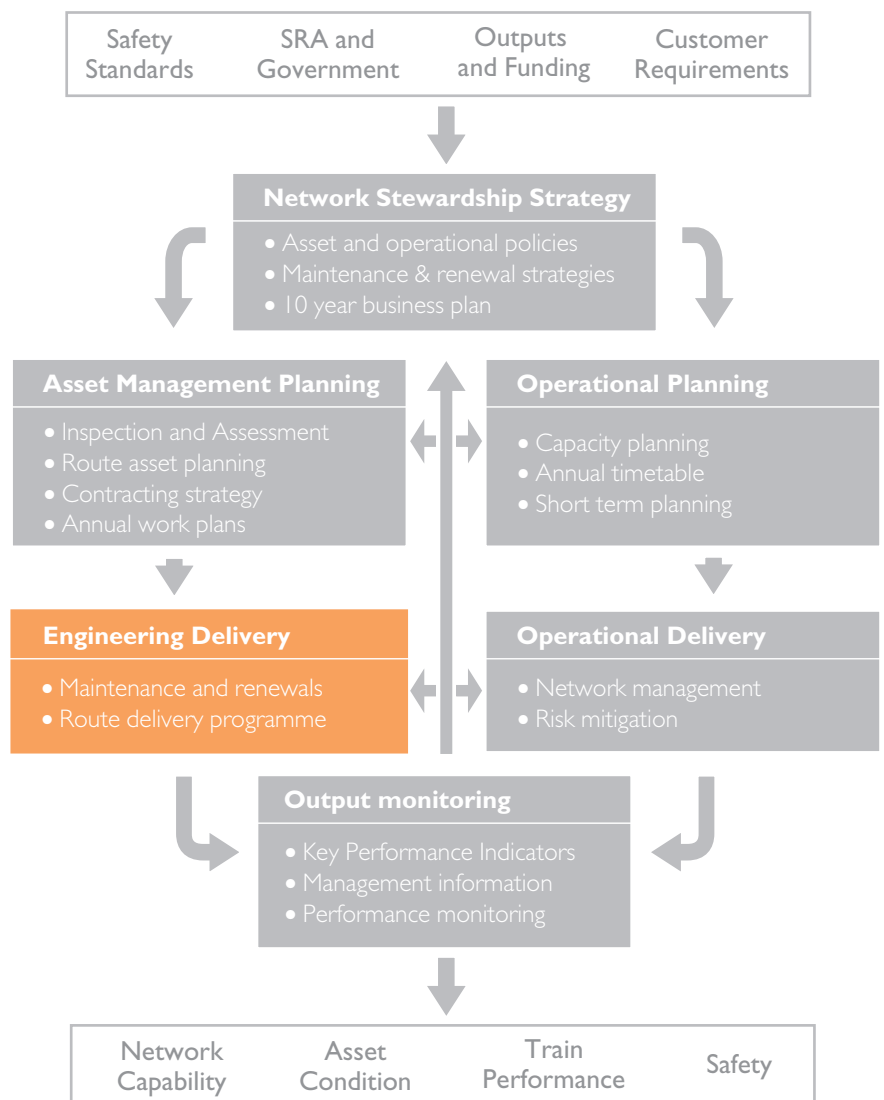


Section 5

Engineering Delivery

The delivery of the work contained within the Annual Work Plans is covered by the scope of the Engineering Delivery process. This section explains how we develop a resourced programme for the identified maintenance, renewal and enhancement activities and how we ensure the delivery of this work safely and economically.



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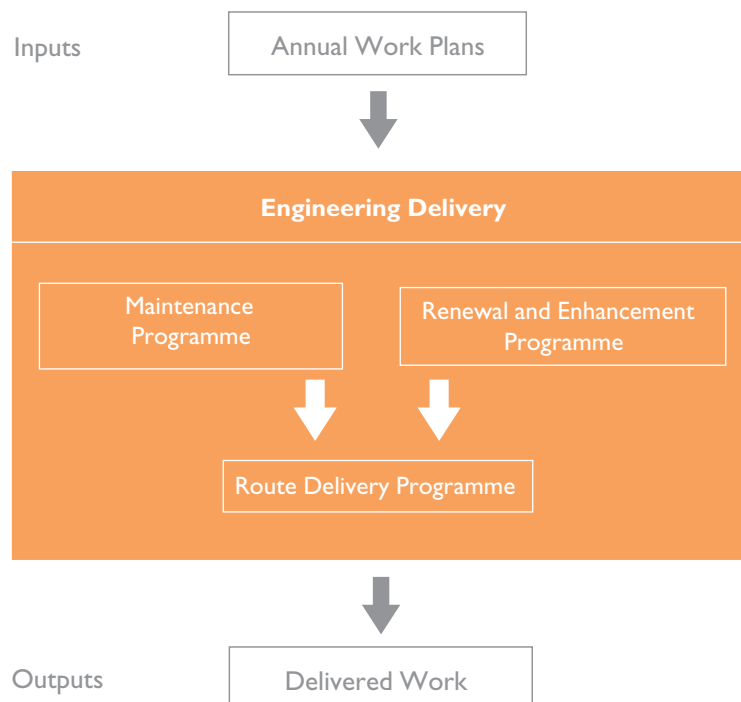
Objective

The Asset Management Planning process provides details of the maintenance, renewal and enhancement work that must be carried on the network over the next three years via the Annual Work Plans. Engineering Delivery is the process that delivers these work items in the most cost effective manner, seeking opportunities to combine work items to optimise delivery efficiencies and possession opportunities.

Approach

Our intended approach is to bring together the proposed maintenance, renewal and enhancement (where appropriate) proposals identified within the Annual Work Plans and develop a robust route delivery programme that provides a suitable balance between potentially conflicting issues, including resource availability, delivery costs and network access, see the figure below.

Figure 5.1 Engineering Delivery



In this chapter we assess weaknesses in the delivery process, identify the long-term components of successful delivery and highlight the key actions we are taking to address the weaknesses.

Existing weaknesses in the delivery process are:

- maintenance volumes are not planned sufficiently far in advance to obtain appropriate resources and access to the network;
- insufficient control over maintenance activity, processes, information, decision making and costs;
- renewals and enhancement delivery programmes are finalised too close to delivery, often with incomplete scope definition;
- lack of coordination of work activities along routes;

- mis-alignment of development and planning life cycles;
- little involvement of customers in our planning; and
- possessions overruns causing delays on the network.

There are four key components that comprise the Engineering Delivery process:

Maintenance Programme. A detailed programme to deliver the identified work must be developed far enough in advance to obtain resources and identify and request restrictions of use. Close cooperation with IMCs is essential to ensure the creation of an optimised programme.

Renewals and Enhancement Programme. In conjunction with a selected contractor we will develop a deliverable programme of work for renewal and enhancement schemes a year before delivery. The early clarity of scope helps to mitigate against late changes to the content of the schemes which compromise delivery efficiencies and the optimised use of network access.

Route Delivery Programme. The key inputs are the individual resourced programmes for maintenance, renewals and enhancement, including its resource requirements. An iterative process will then commence as part of the annual business plan appraisal, seeking to reconcile and balance conflicting demands for resources including possessions and produce a single programme for each route that optimises network access.

Workload Delivery. Engineering Delivery will complete the programme of work as efficiently as possible with minimum unplanned disruption. Continuous year-on-year improvement will be sought through the implementation of improvement programmes.

Although projects and contracts may be programmed to extend over several years, the engineering delivery process for any given programme year must commence no later than about 20 months before the beginning of the timetable period within which delivery will occur.

An agreed and resourced route delivery programme will be constantly refreshed as the level of detail on the plan increases approaching the delivery date. The physical work will be undertaken by contractors, supervised and accepted by ourselves. Where the quality of work or any supplier processes are found to be unacceptable this will be recorded and managed by a Corrective Action Report (CAR) process. Independent monitoring and audit will also be undertaken as appropriate.

Key actions we are taking in the next two years to address the historic weaknesses and begin to deliver our long-term goals are:

- maintenance work volumes will be developed 26 weeks before the start of the relevant financial year;
- completion of phase one of the MIMS project to bring delivery management, data, processes and costs under control;
- definition of future phases of MIMS to cover non-maintenance aspects of delivery;
- implementation of MIMS for Operational Property, Stations and Telecoms;
- embedding of the newly introduced Integrated Planning Units;
- closer specification of acceptance criteria and contract requirements for renewals; and
- direct management of possessions.

Maintenance Programme

The maintenance strategy described previously will allow us to develop an effective maintenance programme far enough in advance to ensure cost effective delivery. Consistent with our seven key outputs we will be responsible for all the material decisions relating to the maintenance programme. New maintenance contracts are currently being developed and the detailed division of responsibilities between our maintenance contractors and ourselves is being finalised.

Estimates of the maintenance work volumes will be developed by us as part of the Annual Work Planning process. This is itself part of a continuous cycle and will provide the starting point for detailed maintenance planning which must be finalised 26 weeks before the start of the fiscal year.

Activities which by their nature are less predictable, such as rapid response and urgent work arising from inspections, will be dealt with as a resource forecast to be compared against the contractually committed resources. Our engineers and planners, working together with the delivery contractor, will develop a resourced programme from the initial estimates.

MIMS Work Management

The MIMS Implementation Programme is a major business change project with the initial phase currently nearing completion. Its purpose is to replace the current disparate legacy systems that are used to manage maintenance work on the network's core infrastructure assets. It will enable us to significantly redefine our relationship with maintenance contractors through the adoption of a single, industry-wide work and asset management system for maintenance work carried out under the infrastructure maintenance contracts. MIMS, is a proprietary asset and work management system used widely in the regulated utilities and transport sectors.

The types of work included within the scope of this phase of MIMS are governed by the core content of these contracts, primarily comprising the infrastructure assets of track, signalling, overhead line and distribution, plant, conductor rail and lineside telephones. In addition to routine maintenance, track renewals performed by the IMC are within the initial scope. The track renewals performed as part of other contracts (typically under a project works contractor arrangement) will be included in future phases of the implementation.

Benefits of MIMS

The implementation of MIMS will result in:

- maintenance delivery across the network being brought under closer control through standardisation of maintenance processes, standard jobs and scheduled maintenance tasks;
- implementation of robust data maintenance processes;
- creation of common business processes and systems for work and data management and supporting organisational roles;
- significant data cleansing to give a level and quality of asset information not currently available;
- facilitation of our involvement in maintenance decision-making processes through access to detailed plans, visibility of job banks and non-compliance reporting at both national and local levels;
- creation of a mandatory audit trail for changes in work prioritisation and planning not achievable with current systems; and
- visibility of compliance for work scheduling and job bank management against our company standards.

The ability to undertake benchmarking of cost and compliance performance across all contract areas will ultimately be used to drive down costs and increase effectiveness.

The project delivers a base platform that is necessary to deliver other key elements of our technical strategy. These include:

- our increased involvement in work definition and maintenance delivery processes;
- delivery of efficiencies in maintenance delivery processes; and
- adoption and implementation of engineering DSTs and methodologies.

Current Implementation Plans

Work started on implementing the current phase of MIMS in 2001, and is currently planned for completion in June 2003. Implementation is now underway across 321 workplaces on the network, and at the end of February 2003 MIMS became the primary work management system (termed system reliant) in 60 locations around the country.

Further Deployment of MIMS Functionality and Scope

We have developed an information management policy of maximising the utilisation of MIMS as a core application that will deliver the greatest benefits of our investment in the system. In this context the future work management projects and programmes can be classified under four main headings:

- further improvement to MIMS;
- making increased use of MIMS functionality;
- extending the scope and principles of work management to other assets, and
- integration projects.

The initial focus will be on consolidating the work carried out under the current MIMS implementation to strengthen end-user acceptance and develop process improvements. Work will commence, in parallel, on defining the requirements for extending the basic philosophies and technologies employed in the management of work on infrastructure maintenance contracts to other asset types and associated contracts.

The work undertaken to date in defining future phases of MIMS has been designed to give a structured development of the system. Of necessity, this work has been provisional in nature and is reliant upon receiving feedback of lessons learnt in implementing and embedding Phase 1. During the first quarter of 2003, a series of workshops were held with key stakeholders to validate and develop the plans for the functionality, content and timescale for each future phase of MIMS, deliver the best benefits for us and our IMCs, and also take into account the requirements of other stakeholders.

Work management functionality (with MIMS as the probable solution) is to be rolled out to other asset types/disciplines and other contract types over the forthcoming two years including Operational Property, Structures and operational/retail Telecoms.

The scope for the extension of the unit cost analysis capabilities within MIMS will also be assessed.

As work progresses on the deployment of the improved processes and technologies associated with gaining full control of asset related data, it is planned that work will be undertaken to extend the integration of these technologies to deliver further efficiencies, and provide an increased level of decision-making capability. Some of the key integration packages currently envisaged are:

- integration of MIMS with maintenance/renewals planning applications;
- integration of MIMS with the possession planning system; and
- integration of hazard data with work management systems.

Scheduled Work Programme

This will be developed using the scheduling features within MIMS to contain all the predictable cyclic maintenance work, by volume approximately 60 to 80% of the annual maintenance activity. By fixing this element of the work it is possible to concentrate efforts on planning and progressively scheduling the more variable balance.

In the longer-term it will be possible to use the output from risk based maintenance analysis and/or remote condition monitoring to refine the maintenance frequencies within the schedule. This would allow a move away from the current fixed periodicities to frequencies that reflect the safety risk and probability of asset failure at that location.

Resourced Programme

Working with the relevant IMCs we will develop an outline resourced programme as part of the Route Delivery Programme for the T-67 deadline sufficient to identify possession requirements. Although it will continue to be necessary to request maintenance possessions at much shorter timescales, it will be important to have a meaningful resourced programme available at T-67 to allow the delivery of economic possession strategies. This will also support the proposed changes to the maintenance contracts by allowing us to agree with our contractors the resources to be provided in the relevant programme year.

We will require a significant increase in the volume of mechanised maintenance, not only to support the achievement of the required asset condition in the most economical way but also to reduce the necessity for track staff to work in Red Zones (when trains are running). The contracting strategy will incentivise the supplier investment in on-track plant necessary to deliver this aim.

The outline portfolio of activities sets the framework within which the programme will be iteratively developed and refined up to the date of delivery. At T-12 the programme will be regarded as final and changes after that point will be by exception.

We will monitor the proportion of Green Zone to Red Zone working and set targets to increase this. The resourced programme will support this objective.

Renewals and Enhancement Programme

Having defined the committed renewals and enhancement workbank it is necessary to develop a deliverable programme in conjunction with the selected contractor. This could be for a single site in the case of a major bridge reconstruction of a large signalling renewal, or for a package of works at different sites as is typical for track renewals.

Key to cost effective delivery is the minimisation of change to the agreed plan. Therefore it is essential that the scope of work is well defined and in sufficient detail to secure key resources, such as track plant and engineering trains. Having developed this resourced renewal programme it can then be considered with the proposed maintenance and enhancements to generate a Route Delivery Programme and allow the required lead times for booking possessions.

To date this programme has often been issued late and the lack of clear scope definition has resulted in significant scope changes prior to delivery. This has constrained the opportunities to deliver the work efficiently and has often resulted in the sub-optimal use of possessions.

Improvements to our Asset Management Planning processes (described in Section 4) and the implementation of the Integrated Planning Unit regime (described later in this section) are targeted with improving this process.

Route Delivery Programme

The Route Delivery Programme will bring together the resourced programmes from maintenance, renewals and enhancements to create a single programme for a route(s) to meet the T-67 deadline. This strategy will be progressively refined and will be the framework within which the required work will be efficiently delivered.

This is an iterative process that will commence as part of the Annual Work Planning appraisal. It will be led by our Programme Management Office and will seek to reconcile and balance conflicting demands for resources including possessions. The individual programme teams will be responsible for programming and ultimately delivering their work within the framework provided by the Programme Management Office.

The key inputs will be the individual resourced programmes for maintenance, renewals and enhancement, including resource requirements.

The Integrated Planning Unit team is responsible for converting renewal workbanks and maintenance plans into deliverable engineering work plans, complete with identifying anticipated outputs. Whilst the primary role of the teams are to ensure that core maintenance and renewal programmes are generated and delivered, they also ensure that delivery of enhancements are efficiently planned and integrated within the overall asset delivery programme. This is particularly important for access planning.

The processes that have been developed offer a consistent planning platform across the network, with improved organisational structures, and with tools to support this planning process. They address the following historic shortcomings in industry practice:

- separate planning of maintenance and renewals and enhancement work;
- lack of clear input from unconstrained volumes based on asset condition;
- the misalignment of Business Planning, Maintenance and Renewals and Project Development cycles;
- the late involvement of customers in planning development; and
- planning processes not supporting successful negotiation of Rules of the Route for engineering access.

Network Access

Improving the way that we plan and manage engineering access is critical to delivering the required activity and achieving reductions in the unit costs of the work we perform on the network. Historically, possessions have been planned in a way that has not always been the most efficient. For example:

- they have been planned to be as short as possible around actual work sites, making it difficult to increase the amount of work to be performed without changing the possession, which adds unnecessary cost. When the possession cannot be changed, it leads to the requirement for additional possessions, which also adds cost;
- the industry has historically planned individual possessions to be as short as possible. For large jobs, this has meant that several possessions have been required to perform the work, rather than one single possession. This leads to extra cost, arising from the duplication of unproductive possession set up and hand back time and additional logistical and management costs; and
- since privatisation, contractors have controlled the possessions needed to deliver the work which they are required to perform. As a result, there has been no incentive for them to allow other contractors to use their booked possessions to undertake other works, resulting in unnecessary additional costs and disruption to the railway as more possessions are taken.

The focus of our work from early 2002 has been to challenge these practices and to find new ways to plan and manage possessions to reduce costs and improve our efficiency and effectiveness. We are addressing these issues as a matter of urgency, building on the work carried out over the last year.

Our aim is to:

- achieve an adequate amount of possessions in which to carry out the necessary engineering work on the network, balanced against the needs of the train operators to run their services;
- reduce planning horizons so that decisions can be taken as close as is practicable to the date of service or task implementation;
- improve forward planning to allow the optimisation of possession plans; and
- improve possession utilisation, reducing costs and the number and length of possessions required.

Improving our planning processes will give increased certainty on proposed works. Significant benefits will be sought through better packaging of works, optimisation of the type of possession for the proposed works (e.g. blockade, overnight), improvements to the management of possessions and the use of high output equipment to improve delivery. Possession optimisation software is being developed to facilitate this.

RIMINI has been introduced to improve planning of work so that it is undertaken in Green Zones, i.e. separated from train movements, wherever reasonably practicable. This promotes a shift from essentially reactive to proactive maintenance and should enable a step change in the quality of maintenance work undertaken.

In parallel with RIMINI we have introduced an Automatic Track Warning System (ATWS). This will provide an automated warning to alert trackside staff of approaching trains more reliably and earlier than can be done by a lookout. As part of an initial programme, we have installed permanent or semi-permanent ATWS on specific parts of the network where maintenance and patrolling frequencies are high, and where there would be particular benefits of enabling a greater degree of safe Red Zone working. In addition to safety benefits of ATWS, and based upon the results of the installation at Leighton Buzzard, the associated increased quality of patrolling, inspection and routine maintenance will have potentially significant performance benefits. The improved track quality will result in a reduction in the number of Temporary Speed Restrictions (TSRs), line closures and associated levels of reactive maintenance activity. Based upon a review of the initial programme, we will assess the success of ATWS with the aim of extending, where appropriate, this approach to the rest of the rail network.

Optimisation of Network Access

The Integrated Planning Units will take an holistic view to the planning of Annual Work Plans. They are charged with identifying and planning possession patterns which will minimise the costs of delivering work on the network. They use innovative tools and techniques to identify optimal possession patterns, and to bundle individual jobs into single possessions, thereby saving on duplicated possession management costs. They are also charged with planning cyclical access at critical locations for maintenance. This allows repeatable maintenance work to be planned effectively, and gives us the confidence that we will be able to secure the appropriate access to deliver the required work. In general our Integrated Planning Units are producing possession patterns that result in fewer, but longer, possessions than has been the case historically. Train operators will want to see disruption minimised, and a recent survey conducted for the Rail Passenger Council suggests that passengers are more positive towards a blockade type strategy rather than an extended disruption to service patterns.

Implementation Programme

From May 2002, the Integrated Planning Support Programme has been implemented as each region established its Integrated Planning Unit. This is due for completion in early April 2003, with the last IPU being established on Southern region. The purpose behind the programme is to:

- provide a detailed understanding to all teams who are involved in plan/programme production of what integrated planning means;
- ensure consistency of the integrated planning process across the company;
- ensure that the process is sustainable;
- provide quality information to prescribed timescales; and
- reduce costs.

The process is supported by the Integrated Planning Manual that has been updated and is due for re-issue during the early part of 2003.

A series of measures have been established to understand the scope, quality and deliverability of the work programmes. These are supported by annual deliverability reviews; the first being held in late November 2002 that, in turn, support the overall Business Planning process. Results will be used to drive further process change in line with our continuous improvement approach to integrated planning.

Deliverability Reviews

Over a number of years a deliverability review process has been developed and refined. These reviews are held with each region and major investment initiative team on a quarterly basis, with the aim of:

- understanding progress against the current year's plan;
- understanding the robustness of the next two year's programme;
- identifying any risks to the deliverability of the investment plans; and
- agreeing actions to be taken to mitigate these deliverability risks.

The reviews are conducted using questionnaires and semi-structured interviews with the respective portfolio investment managers in order to achieve consistency across the regions.

Actions required on key issues are brought to the attention of the Projects & Engineering Director, who decides how these key issues are to be managed.

Workload Delivery

The objective of Engineering Delivery is to complete the programme of work as efficiently as possible with minimum unplanned disruption. Continuous year-on-year improvement will be sought through a series of proposed efficiency initiatives.

We will set the acceptance criteria for maintenance, renewals and enhancements. At the most fundamental level these will take the form of the relevant standards. At a project level these will take the form of specification and contract specific requirements.

During the course of the work we audit the contractor and its systems. Regular external audits of the Contractor's Assurance Case will also be undertaken. In line with our increased emphasis on engineering leadership, this activity will, however, be more focused on day-to-day surveillance and approval of the ongoing works. This will seek to identify and spread best practice and also eliminate bad practice and poor quality work.

Delivery Programme: Process Improvements

A series of initiatives have been instigated, designed to deliver some early benefits and to provide a platform for longer-term process improvements.

Discussions have commenced with our IMCs to enable them to gain an understanding of, and a commitment to, our strategies, seven key outputs and our action plans. A revised maintenance contract is being drafted and stretch targets will be introduced to reduce risk and improve compliance.

An initiative was launched in late 2002 to identify and progress opportunities in the areas of maintenance and renewal that would deliver immediate improvements in performance of the infrastructure, and hence improved public perception.

Five activities have been identified, all of which are being progressed as a matter of urgency and are beginning to deliver tangible benefits.

- Removal of temporary speed restrictions. The provision of resources to supplement regional and IMC teams to accelerate the removal of existing TSRs, improve the management of new TSRs being identified and assist in accelerating existing regional programmes for the removal of TSRs.
- Heavy maintenance on critical junctions. The establishment of dedicated multi-disciplined heavy maintenance gangs to address root cause of failure and/or poor performance at key junctions and bring these up to an acceptable standard.
- Enhanced maintenance of track circuits. Analysis of track circuit performance has shown that 2% of locations account for 25% of track circuit delays. As resourcing constraints limit the opportunity to develop dedicated care teams for these locations, additional root cause analysts are to be recruited to assist in identifying appropriate action.
- Seasonal guides. Whilst the leaf fall season presents us with one of our biggest seasonal challenges it is recognised that considerable benefit can be obtained by developing guides for other times of the year to assist us in dealing with issues such as flooding.
- Focused maintenance within public areas. Improving the environment in and around stations, concentrating on graffiti, litter, effluent, vegetation within structures and weeds on platforms.

These actions will be reviewed to evaluate the benefits, confirm their effectiveness and, where appropriate, ensure the impacts are fully reflected in the Business Plan.

Historically, possessions have been used to conduct heavy maintenance and renewals of infrastructure, with routine inspection and maintenance largely done whilst trains are running. However, the combination of higher speeds and increased traffic on many routes has meant that routine inspection and maintenance whilst trains are running is becoming increasingly difficult. To address this we have been working with the SRA, TOCs, contractors and Railway Safety on three pilot routes to develop strategies whereby as much maintenance as possible is undertaken in scheduled possessions. We will assess the success of this strategy with the aim of extending, where appropriate, this approach to the rest of the rail network.

Managing Network Access

We are progressively taking control of the management of possessions from our contractors. This will allow us to monitor better, and hence control possession start and finish times. Closer adherence to planned start and finish times will allow us to plan with a greater degree of confidence than in the past. We will also be able to reduce the proportion of time in possessions that is unproductive, through the adoption of a single network-wide approach to the management of possessions. Our control of possessions will give us the ability to plan an increase in the number of jobs per possession with confidence, and manage the risks associated with additional associated worksites. As part of this initiative, we are recruiting possession managers in all our regions, and entering into direct contractual arrangements with PICOP (Person in Charge of Possession) suppliers, replacing the existing arrangements whereby PICOPs are sub-contracted to our contractors.

We are also improving the way we are delivering work and improving safety within possessions. For example, we are starting trials to operate tampers as trains, which will eliminate the need to take conventional possession protection when we are conducting tamping work. This will help us improve productive as non-productive time spent on possession protection will no longer be required.

National Logistics Unit

The National Logistics Unit (NLU) provides a supply service to all track maintenance, renewals and upgrade projects. Each year the NLU buys and distributes 2.5 million tonnes of track ballast, 1 million sleepers, 140,000 tonnes of rail and 4,500 major switch and crossing components. It also arranges the removal from site, recycling and disposal of used materials, which are a by-product of railway engineering work. This requires the operation of 16 Local Distribution Centres, a dedicated fleet of 6,000 wagons and 25,000 engineering trains movements per annum.

Current initiatives aimed at improving deliverability efficiency include:

- introducing 8 new long-welded rail delivery trains;
- mobilising for the most intensive ever programme of track engineering work, which commences on the West Coast Main Line in May 2003 and lasts for more than a year. This involves major preparatory works at five supply depots, establishing very large stockpiles of materials and installing high capacity materials handling arrangements; and
- implementing new environmental licensing of all our main supply depots.

Forward volume projections indicate an increasing demand for track materials and works trains. To meet this, the NLU continues to drive more efficient use of existing assets, focusing on increased plant utilisation and better planning of possessions and engineering work. Further investment will be required in all elements of the logistics supply chain. This will include:

- more engineering wagons;
- new and used material handling facilities;
- train marshalling and stabling facilities; and
- key supplier development.