6. Delivering the Service

How engineering, operational, planning and retail functions work together to deliver the service is vital to day-to-day reliability and to on-going reliability improvement. Sometimes these relationships span actual contractual boundaries, but whatever the organisational structure, the functions must still all pull together to deliver the service.

Three areas where there are often the greatest challenges, and the greatest scope for reliability improvements, in terms of numbers of incidents and the operational impact (e.g. minutes lost) of each incident are:

1. Coordination of depot planning and train planning
2. Communications processes around faults and failures
3. Measures of fleet performance and how they are used to improve performance

For each area, we have shared experience and thinking about:

- hard issues, like should there be contracts or internal contract-type relationships (e.g. interface rules set out in requirements documents); and
- soft issues, like culture (i.e. creating a culture of engineers and operators working together to optimise their combined overall delivery).

Most people involved in running a railway set out to try to do the right thing: we need to recognise each person's expertise and enhance each person's understanding of the bigger picture to enable them to contribute to better overall decision-making. As with every other area in ReFocus, we need to make the most of on-going experience, using effective feedback loops based on sound analysis of individual incidents and trends to develop and disseminate our overall learning.

In some circumstances, it will be right to do one thing, in others the reverse. For example, if a train develops a fault at a remote location in a low traffic density on a regional railway, it is probably best for the driver to telephone a nominated depot maintenance person for advice, aiming to enable the train to proceed, possibly in a controlled degraded mode. If however the same train develops the same fault on the approach to a busy station at a peak time, it is probably best to declare the train an operational failure and clear the line.

In summary, to optimise the reliability of any railway the people involved need to select the most appropriate approach in each set of circumstances. Setting out some clear plans around hard issues is an essential step to consistently delivering reliability, as is having a culture of people who work together for the best overall service delivery (e.g. departing from these plans in a controlled mutually agreed way when that is the best thing to do). This Section is not called "operator interfaces", because it's about developing and making use of an effective combined culture focused on service delivery.

6.1 **Coordination of depot planning and train planning** (timetable and resources)

TOCs should have a resilient, joined-up plan, to reliably deliver the service. There is a risk that a narrow approach to train planning does not take full account of either operational resourcing constraints (e.g. where on-train staff book-on and off) or diagramming for maintenance requirements (e.g. where facilities, fitters and cleaners are and the time they need to do their work). Some train operators

resolve this by colocating depot planning and train planning teams; others have an engineering planner who sits on the train planning group.

Train planners need to understand Depot Capacity (see 5.2), and the consistently deliverable Availability of all the fleets (see 4.5). This is a good example of hard and soft issue management: we need some hard plans which are owned by each area of expertise (e.g. the depot plan, the train plan, the drivers' rostering plan). However, everyone needs to remember that we all exist to deliver a service, so these plans must be flexible, which means the soft side – talking to each other, not just making assumptions. There are many examples of train planners who genuinely thought they were being helpful by changing the train plan to increase the number of trains returning to a particular depot at night. However, the impact of this can be to make a depot logistically unworkable.

Train planners and depot planners should meet to discuss every timetable change, and ideally more regularly e.g. to review experience, to discuss the frequent diagram changes necessary to accommodate track engineering possessions – and to maintain relationships.

Example: GWR has documented Rules of the Depot which set out minimum requirements e.g. for how long how many trains are required in the depot in order to maintain them effectively. The programme of delivery of units to the depot at Bristol, to feed the relatively short, single road fuelling shed has been carefully worked out. Delivery against this plan is closely monitored, with feedback on a daily basis. Shortage of one driver for instance, leading to coupling together too many units for an empty move to the depot can cause havoc to the operation, and impinge heavily on time available for maintenance.

Example: GWR, ran a series of Diagramming workshops, involving engineers, diagrammers, operators and driver managers enabled all to understand the fuelling, cleaning and maintenance requirements of the different fleets of DMUs, along with operating constraints and the length of time units could be made available at depots for maintenance. The joint aim to optimise maintenance downtimes and ondepot slots resulted in a good working train plan.

Example: ATW Production Manager emails out a daily Report direct to the Operations Director and Head of Drivers, as well as Control and the engineers. This uses traffic lights to highlight how the previous day actually worked, comparing against plan: no. of units to depot before 1800, 2200 and 0001; no. of A and B exams; no. of drivers provided; depot staffing levels. Any shortfalls highlighted in red are discussed and reviewed by the directors, daily if necessary.

Best practice TOCs evaluate the costs and risks associated with changes to service requirements (e.g. changing the timetable, changing the vehicle diagrams), as well as benefits. Engineers should be clear about what is optimal in their area, and also about setting out any costs and risks associated with a proposed change.

For example, TOCs should do a risk assessment on any proposed timetable change in terms of their ability to ***reliably deliver the service*** (e.g. Is the proposed rolling stock utilisation plan robust? Are turnaround times sufficient? Does the TOC really want to suffer the likely increase in unreliability from having another terminal station stabling point?). Risk assessments should also include issues like ability to ***deliver service quality*** (e.g. turnaround times required for adequate cleaning, diagramming to enable adequate toilet maintenance).

Example: SWT minimise coupling and uncoupling of units. This means that they run more 8-car sets throughout the day instead of 4-cars, which increases fleet mileage and hence the mileage-dependent maintenance requirement. However, the benefit is reduced risk of failures with huge operational impacts.

Example: C2C's costs and benefits work out differently, so they cannot eliminate coupling from their service pattern. This means they have taken another approach. They effectively justify an insurance position of having a station fitter at Shoeburyness who can reduce the risk of service impact e.g. by supporting operational staff undertaking coupling and uncoupling, and dealing with emergent technical issues as they arise.

The plan is not just about setting the timetable and letting it run, **feedback loops** are crucial here too. A good way to develop a more robust train plan is to monitor how the service degrades during the operational day. Traditional measures of availability of trains for traffic tend to centre upon a certain time of day (e.g. was the 6am stop position met?), but more frequent measures may be useful to identify risks to service performance, as well as actual service degradation. Then, effort (and resources) can be directed where they will have most effect (e.g. where to put a stand-by set or a terminal station fitter).

6.2 Communications processes around faults and failures

Best practice for delivering the service is to go beyond the safety baseline required in a standard contingency plan. TOCs need a cut and run policy - how long (and indeed whether) to support the driver in fault finding and resolution will vary in different operational circumstances. What is important is that the driver knows what approach to take on each occasion – it is usually best for the driver to contact control as soon as possible, to confirm the approach to be taken.

Example: FCC (now GTR) had prior agreement between depot/control/operators on how to react to various common faults e.g. leave in service, swap out before bottleneck (e.g. central tunnel section). A specific problem on Meridian doors was managed through an instruction "if in doubt, lock it out", much reducing service delays.

Even if train reliability is "poor", in the life of any particular driver, train faults will actually be rare events. Hence the driver may need support to work through something which maintenance staff might regard as a common fault, easily mitigated.

Drivers may also be in a state of anxiety, such that moral support would be very helpful to them in dealing with incidents where they are on their own in the cab and under pressure.

Example: SWT has "Phone a Friend" (a dedicated helpline for defect reporting and support) which covers mandatory reporting (e.g. RT3185s) and quality issues (e.g. graffiti or blocked toilets). Southeastern specifically train drivers in fault reporting at driver training school, using simulators for drivers to practice fault rectification.

Example: A small handbook has been jointly developed for drivers, by engineering and operations staff working together at C2C. It is to be carried by drivers as part of their essential kit, with the threat of disciplinary action if they don't have it. The booklet is sub divided, with colour coding of the page edges, into traction faults, door faults, brake faults etc to ease quick identification. It is updated in the light of experience – a recent change is to amend 'report as soon as possible' to 'report at terminal station', to save having to stop to report a fault.

Example: On some TOCs, the driver phones the maintenance control centre where the controller works through a computer-based fault chart. This chart ensures a consistent approach to on-train fault finding, and means that depot maintenance staff subsequently knows what was done, making their work easier.

Timely and useful feedback from operational staff to the maintainer (e.g. what happened, what they tried to do to fix it) is notoriously difficult to get. This means that subsequent root cause identification is less efficient than it might be and there is a greater risk of repeat failures. Feedback can be enhanced by closing the loop – some TOCs write to Drivers, thanking them for their report, explaining what was found and maybe suggesting a useful mitigation for them if it should occur again – or letting them know that a permanent technical fix will be developed. This positive feedback encourages more and better quality reporting.

Example: Service feedback can also be obtained automatically without having to wait for drivers reports. Electronic condition monitoring systems (e.g. MITRAC on Bombardier's modern fleets) enable simultaneous fault information to be transmitted to depots so they can plan in advance the priorities and resources (e.g. expertise and materials) for maintenance that night.

Example: Use condition monitoring systems and communications links between trains and depots to report directly the condition of the equipment. This data can form an invaluable independent source of evidence with which to interpret drivers' reports. It is possible using such systems to "dial up" the train in real time to investigate and respond to specific reports.

It is vital that the different functions understand each other's expertise and issues. The fitter needs to know what it feels like to be at the front of a broken train with hundreds of people wanting to get home sitting behind you; the driver needs to understand that it's very hard to find (let alone fix) a fault when the person who saw it hasn't taken the effort to describe what happened adequately. Some ways of enhancing understanding and empathy have been described above in the processes for dealing with specific failures, remembering that communications need to be two-way to be effective – drivers fill in fault reports and get feedback on what was found.

Some more good practices are:

- newsletter for drivers – helps drivers understand. Focus on topics that are known to be of interest to drivers e.g. from defect reports, driver managers or after attending drivers briefings
- engineering slot in their drivers' Safety Update Briefing - enables some face to face two-way discussion of current issues and future developments
- Driver Forums - engineering staff attending driver messrooms, for pre-arranged question and answer sessions, with answers and advice on common faults which are then published (maybe in the newsletter)

Example: At EMT there is an Ops Manager who, as an ex-driver, works as the 'interface' between drivers and engineering staff. He attends reliability meetings, and includes relevant extracts in the magazine which is produced for Ops staff. This also includes information on significant incidents, what was found, and what was done about them. There are other 'keeping drivers in the loop'

items, such as 'watch out for such and such a unit, it has a new design of cab window – please look and tell us what you think'. He facilitates regular driver surgeries between drivers and fleet staff, and e-mails direct to Engineering with arising driver issues, helping to greatly speed up the process of resolution and feedback.

Example: An EMT 'coupling' video has been made, using EMT liveried trains, (and staff with local accents!), to remind all of the standard procedure to be used during coupling and uncoupling sets – 'The Happy Coupler'. It was also identified how important it is to ensure every regular couple and uncouple is shown in drivers diagram to be done, to avoid last minute problems.

6.3 **Measures of fleet performance** (and how they are used to improve performance)

Sometimes productive time and energy is tied up by different functions within an operator or across a contractual boundary undertaking independent data analysis – and worse still these analyses sometimes get different results and discussing these differences absorbs yet more energy.

You should agree a joint dataset, then focus on reducing the likelihood of failures occurring, plus reducing the impact of each failure. With sound analysis, your effort is more likely to be directed to the areas which will potentially deliver the greatest service reliability improvement per pound spent.

Example: VTEC reduce the likelihood of failures occurring (projects include increasing battery life in case the static converter fails, visual indication of transformer gas detection rather than a power shutdown, improved sander nozzles to prevent spurious dragging brakes reports). They also work to reduce the impact of delays e.g. upping the speed limit of the Class 67 thunderbird light engine running to a failed train from 75 to 100mph.

The ability to produce an agreed dataset is very much to do with the soft issues of building trust, relationships and understanding between different areas of expertise.

Examples: C2C produce common data which is summarised on a one-page document called "Service Affecting Incidents". This is discussed at performance meetings where actions to drive up reliability are agreed and reviewed. Key to the success of this process is that the actions which different parties are taking are transparent – Operations know that Fleet is developing a long term fix for fault z, so meanwhile they are keen to help mitigate its effect by working round it using procedure y.

Once the dataset and root causes are agreed, different players can feel more comfortable about working together to minimise the impact of any fault. There are often short term operational mitigations which can be very effective in improving reliability whilst a long term engineering fix is developed and implemented.

Example: A new fleet had interlock problems with the exterior bodyside doors for cab access when changing ends. Whilst an engineering solution was being developed and implemented, the drivers agreed to use the saloon doors to access the cab, so that the risk of cab exterior door interlock failure was reduced. This more holistic approach delivered a more reliable service even before the technical improvement could be rolled out.

It is also of course important to capture faults that don't yet have an effect on the service but reduce the operational flexibility.

Example: C2C measure degraded mode operations where one cab has to be buried inside a train (e.g. because of failed windscreen wipers or inoperative TPWS). They want to understand the nature and level of their operational inflexibility for splitting and turning trains round, because that affects the total resilience of their service delivery. C2C measure trends in these areas even where no delay is experienced in service, because it is a measure of a reduction in their capacity to mitigate any other event which occurs.

More is better: There are other examples of expanding the definition of faults in order to capture more issues which should be resolved so they can be addressed before they have an impact on service delivery. Many operators treat a problem which causes a step up internally as seriously as if it had caused a cancellation. In other words, they acknowledge they are making use of the resilience they have built into their diagramming, and make the most of the learning experience. This attitude is also important in prioritising customer issues other than simply getting there on time e.g. cleanliness, functional toilets etc, as mentioned above. Soft issues are critical here in creating a culture where people accept that different functions are contributing to the whole.

Fewer is better too: At the other end of the scale, some TOCs have mechanisms which focus on the worst few incidents in each period e.g. those which cause the most delay minutes, or all incidents above a certain threshold of delay minutes. A full cross-functional review of the failure is carried out which identifies real root cause(s) and more effective long term mitigations. This review also often elicits other opportunities for improvement. Actions are typically fed into cross-functional groups and progress monitored by the Performance Manager.

Train service performance has been improved by:

- Focussing people on what is most important to themselves and their internal customers
- Creating indices by which progress can be monitored
- Providing more structure and formality around previously casual arrangements
- Improving cross-functional understanding and organisational learning
- Providing useful quantitative data to assist business cases which address root causes, improve resilience and make mitigations more effective

In summary, TOCs should have a holistic, structured assessment of the measures needed to target improvements. This then needs to be analysed robustly, checking for statistical significance of variations and identifying common cause issues, where concentrating effort on the root cause can eliminate several different failures.