

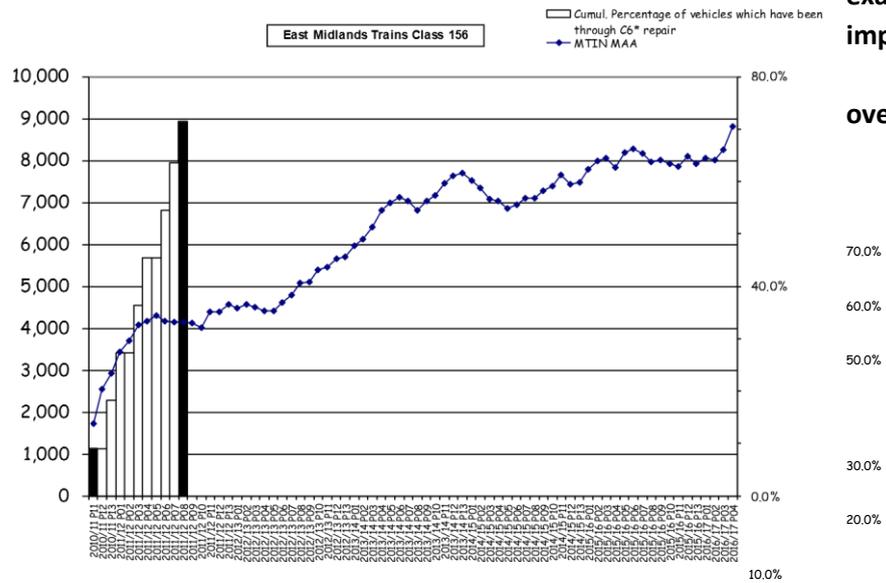
16 Overhaul Management

This chapter focuses on the overhaul of rolling stock and / or their components¹.

The industry has recognised a risk that vehicles re-entering service post-overhaul can suffer from a reduction in reliability.

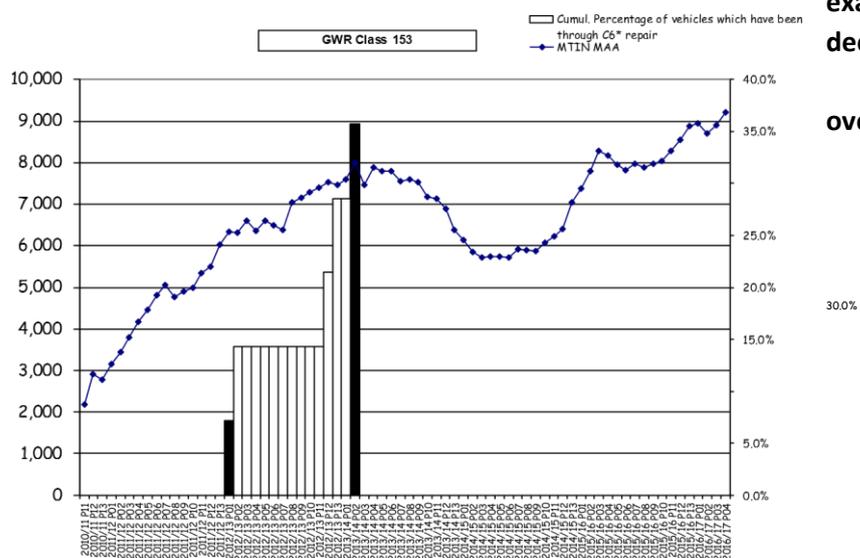
Analysis shows that reliability for fleets coming out of overhaul can vary widely, with there being no overall correlation between pre- and post-overhaul reliability.

Graph 1: An example of a fleet with reliability immediately post-overhaul.



example of improving reliability post-overhaul.

Graph 2: An example of a fleet with reliability immediately post-overhaul.



example of declining reliability post-overhaul.

¹ E.g. doors, bogies, gearboxes, engines etc.

The good practice identified in this chapter aims to address the issues which cause fleets to have a postoverhaul reduction in reliability and to help RoSCos, TOCs, maintainers and Overhaulers ensure that overhauls optimise fleet reliability when re-entering service.

This chapter is structured on a generic high level overhaul process (figure 1), with good practice identified at each stage. Each overhaul will have its own complexities², so the guidance should be followed with consideration taken for the specific fleet overhaul in question.

Figure 1: The High Level Overhaul Process



16.1 Need for Overhaul Identified from Horizon Plan

The publishing of horizon plans is good practice particularly if they are reviewed periodically and updated to incorporate recent developments. It enables the industry to form a more complete view of overhaul plans and timescales nationally. Conflicts for resources can be identified quickly and efforts can be made to smooth out demand. It also provides the supply chain with information they can use to secure investment for future bids.

Example: Porterbrook openly publishes a six year overhaul plan on its website. This gives visibility of work which will become available for tender in the future and gives suppliers the ability to plan future bids.

16.2 Define Specification

The purpose of defining the overhaul specification is to provide clarity to all involved parties of what is expected to be achieved from the overhaul process. If done well it reduces the likelihood of:

- ✦ unacceptable performance delivery during the overhaul,
- ✦ undesirable reliability post overhaul,

² E.G. C4 exams are historically more predictable than C6 exams; frequently a minefield presenting numerous potential additional challenges.

- ✦ additional / unforeseen costs to the overhaul,
- ✦ delays / late delivery; and
- ✦ poor quality delivery all of which can bring reputational damage to the industry and have a negative impact on passengers.

This section will be split into four sub-sections in order to provide clarity around the good practice recommendations:

- ✦ Timescales for creating and agreeing the overhaul specification,
- ✦ Method for creating and agreeing the overhaul specification, ✦ Content to be included in the overhaul specification; and ✦ Clarity over the intended outcome of the overhaul.

16.2.1 Overhaul Specification Timescales

The amount of time required to create an overhaul specification will vary from project to project. Factors which will influence the time required include:

- ✦ The complexity of the overhaul,
- ✦ The number and experience of stakeholders involved,
- ✦ The size of the initial scope; and
- ✦ Lessons to be learnt from previous overhauls.

It is critical that the overhaul specification is suitably developed prior to contract award in order to avoid late notice contract variations which can result in additional costs and delays being incurred.

16.2.2 Overhaul Specification Method

By employing a truly collaborative approach³ to developing an overhaul specification, it should create an environment where all parties are properly bought-in to the overhaul process and its outcomes. RoSCos and TOCs should aim to learn from previous overhauls to ensure specifications are created in appropriate timeframes. This includes considering removing tasks which no longer add value⁴.

It is recommended that the overhaul specification should be jointly developed by the Overhaulers, OEMs, RoSCo(s) and TOCs / maintainers. By taking a tri-party approach to creating the overhaul specification it starts the process on a collaborative bought-in footing. A horizon plan can help Overhaulers create a case for investment in this process but framework agreements are also a good solution.

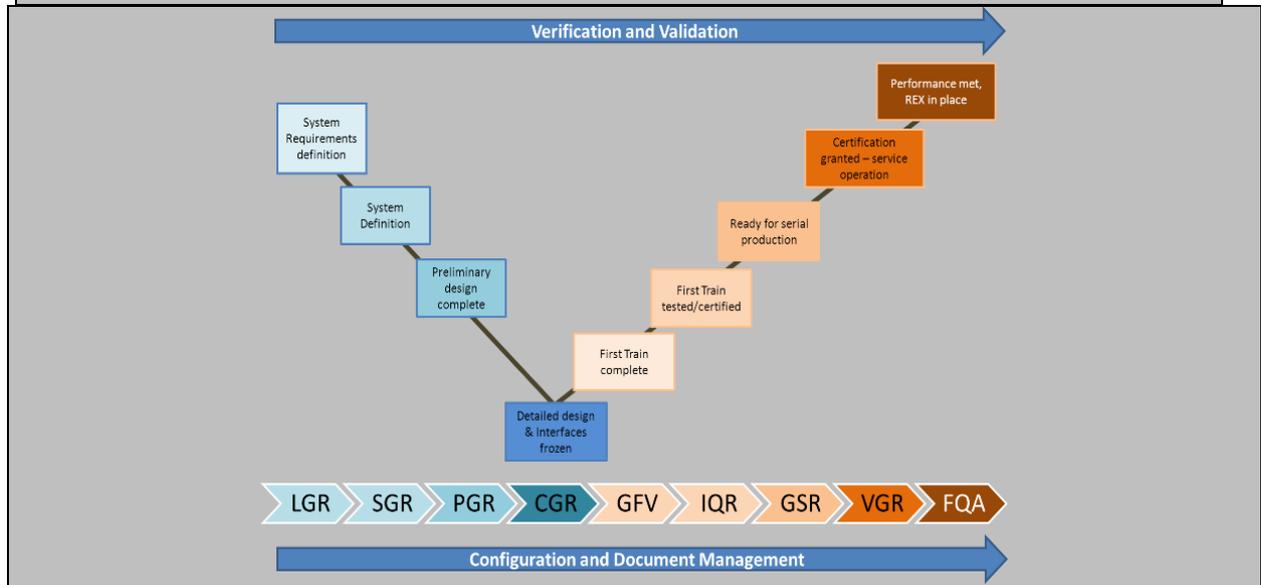
The tri party approach to overhaul specification may also need to be extended to include other parties, particularly where a fleet is common to other TOCs and RoSCos . ACOP1006 provides a framework for multi-party Engineering Change and where possible fleets should be standardised unless there is a valid business case to do something different e.g. duty cycles.

Design for Quality is a good framework to develop the overhaul specification.

³ BS11000 is a collaboration standard.

⁴ Subject to an appropriate risk assessment.

Example: Alstom uses a V model to plan their overhaul design and delivery. This Development for Quality (DfQ) process is used to verify project maturity and re-evaluate risks at pre-determined stages of a project. The process is a series of formal, checklist based reviews, emphasising the importance of the project team understanding the significance of identifying and making transparent any potential risks before moving between each stage of the project. The DfQ model is illustrated as follows:



The overhaul specification should be jointly owned and periodically reviewed by the engineering teams within both RoSCos and TOCs/maintainers during the operation of the fleets to capture lessons learned and good practice. All changes in condition should be noted and captured for the next overhaul. Moreover, good practice which is captured during overhaul should be shared by RoSCos. For example, updates to drawings or Engineering Change (EC) process details should be incorporated into future specifications for overhaul.

16.2.3 Overhaul Specification Content

Expected train condition should be set out in the overhaul specification. If there are any significant differences in asset condition, it can lead to delays for work to begin while it is agreed how these differences will be accommodated. Therefore, condition assessment prior to overhaul is essential in specifying the overhaul regime. It must occur during or prior to tendering and again just prior to the actual overhaul, to get an up-to-date position on asset condition. As a minimum, it may require a survey and audit of at least one or more vehicles.

It is good practice to involve TOC operations staff to ensure that opportunities to make improvements to the train from the users' perspective are taken into account.

A risk based approach should be taken when planning for corrosion. Technology such as endoscopes are cheap and can be used to inspect hard to reach areas of the body and underframe.

Former British Rail overhaul specifications may assume a level of competence which does not reflect modern maintenance practices and so additional instructions or changes to the overhaul specification may be required.

A good specification should consider how testing will be performed and what test equipment needs to be developed. This should include pre-testing of relevant systems by the overhauler in advance of component removal / overhaul. Testing should be done on the train at a system level and prove functionality. Testing should involve components that were not directly overhauled but which form part of systems with components which were overhauled. Any issues identified in testing should be analysed for the root cause and used to review the overhaul specification with an intention to eradicate or minimise the occurrence of the issue. Consideration should be made as to which components may / will be disturbed during the testing process and what might need to be removed. Best practice would be to test all disturbed components (pre and post overhaul) to ensure functionality is retained. The specification should require that data captured during overhaul and testing be captured in a manner whereby it can be manipulated and processed. For example, spreadsheets and tables programmes such as word or excel are easier to analyse and manipulate than paperwork, scans of paperwork or PDFs.

The specification should also consider capturing images prior to and during overhaul so condition can be retrospectively reviewed.

16.2.4 Overhaul Specification Outcomes

It is very important that the TOC, RoSCo and Overhauler have a clear and consistent understanding of the desired outcomes of the overhaul.

Specifiers should focus efforts equally on:

- ✦ improving the reliability of the entire train as appropriate⁵;
- ✦ restoring its condition back to that of a brand new vehicle as appropriate⁶ and;
- ✦ incorporating changes to ensure the vehicle is fit for purpose, easier to operate and maintain. It is important to understand the performance of the fleet with respect to these points prior to and post overhaul and the specification should take into account how this will be measured.

In addition to reliability outcomes, the financial outcomes also need to be considered. There include:

- ✦ the cost of overhaul itself,
- ✦ lifecycle costing; and
- ✦ future maintenance costs (including consideration for equipment / systems which do not currently have a maintenance plan in place but may require one).

16.3 Select Overhauler

The ITT for overhaul should ensure there are suitable service level agreements in place to incentivise the correct behaviours from all parties. This could include penalties to operators who fail to present a unit for overhaul on time and penalties for Overhaulers to fail to return the units back to the customer on time in a suitable condition.

An overhauler is recommended to respond to the procurer's questions by use of a compliance matrix.

⁵ Taking into account the level of overhaul required and a scrutiny of the TOC fleet class reliability.

⁶ This may not be practical for older vehicles which may require a level of accepted tolerance.

Good practice shows that a number of different criteria⁷ should be used to assess the quality of a bid. These can then be compared to the price to establish which bid presents best value for money. Some options to consider are shown below:

✦ **Alignment of business models.**

Do the business values of potential Overhaulers match your business values? If not could this cause problems in the future as and when issues need to be resolved?

✦ **Capability.**

How capable is the potential overhauler of doing the work? Will specialist skills be required? How is the potential overhauler planning to cover them (in-house or sub-contract)? It is important to be confident that a potential overhauler can reliably undertake the work.

✦ **Capacity.**

Can the bidder adequately demonstrate that they can cope with additional work to that which they are already contracted to deliver? While it is important to a supplier to maximise the use of its facility, it is important that this will not impact on deliverability.

✦ **Deliverability.**

How much confidence is there in the potential overhauler's ability to deliver an on time programme? Late delivery can cause operational and therefore reputational damage to TOCs, so it is critical that the overhaul programme is delivered on time. Bidders should submit an overhaul programme for scrutiny which demonstrates how experience will be gained (either through learning from the first unit, having a 'glass case' train or utilising pilot runs as relevant) prior to increasing production.

✦ **Quality and standards.**

How will potential overhaulers guarantee the overhaul will be delivered to an acceptable quality standard?⁸ Will accredited suppliers be used? Is quality process management an embedded part of the operation?

✦ **Cost of overhaul and impact on whole life cost.**

How does the cost of the overhaul impact the whole life cost of maintaining the fleet? It may be tempting to choose the overhauler bidding the lowest price, however it may turn out to be a false economy as it may mask additional costs into other areas. Elements such as warranty being offered and impact on maintenance costs need to be factored in.

✦ **Location of overhauler's facility relative to fleet's base depot.**

Is the potential overhauler close to the fleet's base depot? It can be difficult and expensive to transport fleet around the country so it is important to consider how it will be done and what impact any fluctuations to the overhaul schedule will have on the ability to move fleet.

⁷ These should be requested in the ITT.

⁸ This should be defined in the overhaul specification.

It is also good practice to involve a number of stakeholders in the evaluation of the proposal. When an overhauler is rejected they should be clearly informed of the reason why their bid was unsuccessful and what they would have needed to do to have won the bid.

16.4 Mobilisation

Good practice is for mobilisation⁹ to commence is at least a year in advance of a major overhaul and that the Specification definition is complete. It is critical that this time is kept sacrosanct.

Example: Alstom uses 12 months to plan between H exams and builds on previous experience.

This time is required to:

- ✦ create a robust overhaul plan,
- ✦ ensure there are enough staff with the correct competencies; and
- ✦ ensure that the facility, materials, documentation and tooling are ready.

16.4.1 Creating a Robust Overhaul Plan

Overhauls can be very complicated and have a number of constraints which need to be understood. Not all constraints can be easily removed, so the plan needs to make adequate provision for them. This includes (but is not limited to):

- ✦ learning from previous overhauls,
- ✦ programme risks,
- ✦ interdependencies with other projects,
- ✦ critical path,
- ✦ critical resources,
- ✦ impacts of long lead times,
- ✦ human resourcing,
- ✦ site layout; and
- ✦ the need for specialist work to be undertaken off-site.

The creation of a robust delivery plan is key to the successful delivery of an overhaul programme. Critical chain project management is a useful tool to ensure a plan is deliverable.

Where possible, try to co-locate as many overhaul activities as possible to minimise transportation times. Where necessary, Customers should perform a make versus buy analysis to decide where and why to outsource overhaul activities. This equally applies to their third party suppliers.

Transporting trains to an overhaul location by rail barrier wagons / translators provides a logistical problem as there are only seven pairs located on the GB rail network. Good practice is to avoid the use of these wherever possible.

Example: Southeastern utilises the Rail Operations Group to move their Class 375 units for overhaul to Derby. The need for barrier wagons is negated by using a modified Class 37 locomotive with Dellner couplers.

⁹ i.e. the time between agreeing the contract and receiving the first unit.

Overhaulers will aim to reach the steady throughput rate¹⁰ as early as possible as this will reduce the total time taken to complete the entire overhaul and will minimise the time assets are out of service.

In order to achieve the steady throughput rate as early as possible in the overhaul programme, it is a good idea to do a pilot run¹¹ prior to receiving the first asset from the TOC. It is also a good way of exposing staff to overhaul tasks pre-overhaul which will support their personal development and to allow them to become familiar with the process, tasks and materials.

Example: Wabtec has bought a spare mark 3 coach in order to trial fit new exterior powered sliding doors supplied by Vapor Stone Rail Systems prior to the arrival of coaches from GWR for modification at Wabtec, Doncaster to the latest 'Passengers of Reduced Mobility (PRM)' standard. This is enabling Wabtec to gain confidence in the fit and performance of the doors without using rolling stock required for passenger service.

Where it isn't be possible to do a proper pilot prior to overhaul it is still worth trying to simulate as much activity as possible to identify any issues. Production bottlenecks should be reduced / eliminated so as to ensure maximum throughput and lean techniques can be used to improve throughput. See Section 16.8 Overhaul Appendix for more detail.

Example: Wabtec, Doncaster, have invested in a new paint shop as this stage of overhaul was acting as a bottleneck to production. Their new Class 321 facility has also been built to allow for vehicles to be lifted over each other so as to remove any bottlenecks surrounding movements within the facility.

Example: Alstom's Longsight depot is set up around a "pit-stop" strategy, where all materials are located close by where they will be required on the unit. This is due to the depot overhauling specifically Class 390 units. Wabtec, Doncaster, however, is capable of overhauling a wide variety of rail vehicles and therefore a strong planning process needs to be in place to ensure that, if a similar strategy is to be implemented, plenty of time is assigned for developing where materials will be located.

It is recommended that Overhaulers implement a longer term continuous improvement plan to build on the learning from successive overhauls. Planning to learn for future overhaul programmes is about proactively planning to learn from current work practices.

16.4.2 Human Resourcing & Competency

When planning for an overhaul, the timing of staff recruitment is important, alongside the identification of the skills and competency they are required to have. It is important to set out clear roles and responsibilities for staff. Having a RACI¹² can help to achieve this.

It is good practice to ensure skilled project managers are one of the first additions to any overhaul team.

¹⁰ i.e. the time taken to overhaul most assets.

¹¹ A pilot run is a preliminary study conducted to evaluate feasibility, time and adverse events in an attempt to improve upon the process design prior to commencement of a full-scale programme of works.

¹² A matrix which identifies who is responsible, accountable, consulted and informed for the activities undertaken.

When considering the standard of project managers, a datum should be set around specific qualifications (e.g. APMP). Such managers should experience of the application of lean techniques (see Section 16.8 Overhaul Appendix for examples of lean techniques).

For all staff recruitment, good practice is not to rely on CVs and interviews to assess competence of potential staff (although these things are important) but to also use testing procedures involving genuine examples of overhaul work to score potential candidates' capabilities and identify training and development needs.

KPIs to drive the overhaul business can also be developed based on these competency assessments if they are revisited periodically.

Example: Alstom requires all new contractors joining the overhaul team to undergo a competence assessment to verify that their skills match their CVs. At this time, a record is kept of the skills which each new contractor possesses and uses this to form a framework to match required skills for each task to those available and enables them to report any shortages as a KPI.

BR-built units are usually hand-built and therefore there are tolerance differences between units. Staff should therefore be granted additional pre-series exposure with these units to become familiar with the variances in vehicle manufacture prior to undertaking overhaul.

Training should also be provided on the use of key pieces of overhaul equipment¹³.

Where contracting staff are used, it is good practice to consider providing incentives near the end of the contract to retain the essential skills required until the final unit is completed.

Example: Alstom utilises a tool retention bonus whereby ensuring that no tools are lost. In short, the fewer tools lost, the greater bonus obtained. Tool stores are therefore checked twice daily.

Where the overhauler's workload may fluctuate over time, it is beneficial to try to retain key staff during "down" times, as this will help to ensure consistency and minimising skills loss.

Mobilisation should plan for quality checks throughout the overhaul process from component arrival to final testing and returning the unit. Good practice is to use peer review processes so each team owns responsibility for passing on quality work.

16.4.3 Non-Human Resources: The Facility, Components, Tools & Documentation

The facility should be set up to ensure the overhaul process flow is designed to lean principles (see Section 16.8 Overhaul Appendix) to maximise flow through the facility and to reduce opportunities for process based errors from occurring.

It is important to consider the impact an overhaul could have on small commonly shared component floats as it could negatively affect (other) operators. Therefore, the float of components required for overhaul should be bolstered to ensure that the level is sufficient to cover the overhaul cycle and continue supporting normal operation.

¹³ Some equipment requires training & certification in order to be used.

To ensure that good quality components are procured and used for the overhaul, suppliers should all be approved suppliers within the customer's purchasing system. This applies for RoSCos, TOCs / maintainers¹⁴ and Overhaulers. Approvals should cover change management.

Components used in overhaul should be of a sufficient quality to fulfil their purpose. This should be included in the overhaul specification and that suppliers are made aware of the consequences of quality issues with their materials. Not only should the customer(s) make the overhaul supplier aware, but the supplier should actively engage with the customer(s) to identify quality issues.

Components should have a warranty appropriate to the overhaul specification and where practicable should be for the duration between overhaul cycles (e.g. C4 to C4).

Where obsolescence materialised during the overhaul it should be managed. Further details on this are located in section 12.6.

Each work station should be equipped with tools appropriate for the activity being undertaken. Tools should conform to relevant standards as necessary. Staff should have the correct training to use the tools provided. For smaller hand tools which are liable to be lost / damaged, shadow boards should be used to reduce loss / damage.

It is good practice to ensure that all documentation available to shop floor staff and supervisors (e.g. work instructions, designs, drawings, check lists etc.) fully support the overhaul specification, are up to date, change controlled and easily available to the appropriate people.

16.5 The Overhaul

This stage considers delivery of the plan created during mobilisation to the standard defined in the specification. Each time an Overhauler goes through this process it provides an opportunity to make improvements and to identify improvements for future overhauls using lean techniques.

In order to identify the areas where efficiencies may be made (without negatively impacting on quality) Overhaulers need to ensure they are collecting relevant data.

Example: Knorr-Bremse has a 5 year industrialisation plan to improve the efficiency and quality of overhaul work being undertaken at its Wolverton facility.

In order to provide clarity around the good practice recommendations, this section has been split into four areas:

- ✦ Receiving the train.
- ✦ Working on the train: a lean process.
- ✦ Working on the train: the culture.
- ✦ Evaluating the results.

16.5.1 Receiving the Train

Transportation of the vehicles to and from overhaul facilities is a critical element of the overhaul. It is important that the mobilisation locks this element of planning down early and throughout the

¹⁴ Maintainers are classified as organisations undertaking the day to day maintenance of rolling stock on behalf of a TOC.

overhaul it is managed carefully as alterations can result in repercussions for all other plans including missing vehicle movement slots; often the next available slot is not for another week.

When trains or train components arrive for overhaul, they will be tested to check that their condition meets expectations as part of the acceptance process. A status of conformity should be agreed between the Overhauler and the provider. This extends to parts and materials which should be thoroughly inspected to ensure no faulty goods are accepted. A risk based approach is most appropriate as it is impossible to check all materials and components. Goods inwards should be arriving with a certificate of conformity to confirm the goods are to specification.

If the asset condition is not as described prior to the provider releasing to the Overhauler, the asset provider should give consideration to:

- ✦ starting discussions with the Overhauler about the asset condition at the earliest opportunity in order to minimise delays; or
- ✦ releasing a different asset which meets the specified condition, allowing the provider and overhauler time to agree a plan for the non-conforming asset (without affecting the critical path for overhaul delivery).

16.5.2 Working on the Train: A Lean Process

The overhaul plan will typically allow more time for the first few assets going through the process in order for staff to gain confidence in the process and to identify any issues without creating delays in the overall programme of works. This is a good opportunity to monitor the effectiveness of the process, especially if there wasn't the opportunity to undertake a pilot run. Lean techniques can be employed to identify and correct process problems. See the overhaul appendix for more details.

Example: London Underground treats the first two units to pass through an overhaul programme as 'glass case' examples. The purpose is to trial, fine tune and finalise implementation techniques and processes. It also allows additional time and resource to be allocated to check that assumptions about fleet condition and the overhaul plan are correct and ensures that the plan is achievable for future units.

When confidence in the overhaul tasks is gained, the process can be made more efficient. The Overhauler should analyse all activities which take place (including waiting or down time) and seek to minimise those which do not directly improve the asset as per the overhaul specification.

16.5.3 Working on the Trains: The Culture

It is good practice to utilise the knowledge and experience of staff doing the overhaul when trying to identify and implement process improvements.

It is good practice to ensure that staff perform the same task in the same way. If a member of staff identifies an improvement to the way a task is undertaken, there should be a clear process to implement the change. This will ensure that everyone gets the benefit from any improvements and that learning is standardised and embedded.

It is good practice to ensure that there is accountability at all stages in the overhaul process and that defects / quality issues are identified, recorded in a log and rectified as early as possible, however it is important to do this without creating a blame-culture. Using ad-hoc peer checks (or peer mentoring) to inspect work at each stage in the process can be beneficial to both new and experienced staff. A

“fresh pair of eyes” helps combat the concept of “work blindness”, whereby flaws may not be evident to the worker, whereas a third party can identify any issues more easily.

Example: Wabtec utilises coloured overalls to easily identify the competence levels of staff. Where more senior technicians identify staff who may require assistance/advice, they have a useful visual indicator to understand which skill level they are addressing.

Documentation is vital to record accountability and increase ownership of work. Names signed next to records of work or use of swipe card identity cards will ensure traceability. Sign-offs should be managed so as to not delay the overhaul process or encourage blame to be placed simply because a defect can be traced to an individual. Documentation should be produced in a format which is easily analysed (e.g. .CSV file and not in a free text format).

Ensure Service Affecting Failures (SAFs) are constructively fed back to staff, and include them in the process of eradication from the overhaul process. Consistent bad news can reduce morale, therefore this should be balanced with good news stories.

Example: Alstom provides a plasticised booklet to all staff indicating previous SAFs/mistakes. These provide an “incorrect vs correct” point of view so as to provide a positive message to staff and encourage these issues to not happen again in future.

It is also good practice to sign off all consumables (where appropriate).

Example: Alstom requires all staff to sign off the use of Loctite upon use including which type and the expiry date. This is to combat the use of out-of-life consumables.

Implementing formal handovers at each stage in the overhaul process is beneficial as it provides the opportunity for defects to be identified before more work is done to the asset (thereby reducing the impact of any re-work). Using a formal handover checklist is ideal, as it will help to ensure clarity and consistency in the handover.

16.5.4 Evaluating the Results

When each train gets to the end of the overhaul it will be tested in preparation for return to passenger service. It is good practice to involve the TOC in this process. The following points should be considered:

- ✦ **Quality:** This is the final opportunity the Overhauler has to identify any quality issues and correct them prior to returning the train to passenger service. Taking a systems approach to this final check is critical. If issues are discovered after the train has been returned into service, it is much more difficult and costly to investigate and fix them.
- ✦ **Time:** Is the train being returned on time? If the train is being returned late, it is important to identify the factors which caused the schedule to be missed. The overhauler and TOC need to be realistic about whether these issues can be improved upon for the next train going through overhaul or whether the end to end time for overhauling a train needs to be revised. An honest and evidence based approach needs to be taken when revising the plan for future trains to ensure that it is realistic and achievable.
- ✦ **Documentation:** The Overhauler should provide the TOC with the engineering measures and results for the overhauled train, along with details of any deferred work (as per the overhaul specification). While it is convenient for all parties to provide these results in an electronic format, it is worthwhile both parties reviewing them jointly.

16.6 Contract Review

The contract review provides an opportunity for all parties involved in the overhaul to make a joint and structured assessment of the whole overhaul programme.

The review should look at whether intended outcomes were achieved and if not, which factors caused this. It is important that feedback is balanced and fair. If there were a number of problems during the overhaul, it is important that the review is not overly negative as this will not encourage an open assessment. Overhaulers should supply a number of metrics which can be used to evaluate the success of their programme in terms of quality, time and cost. The review should assess what went well so that good practice can be embedded in future overhauls.

The review should also seek to review the tri-party relationship and assess whether it worked as well as intended or whether it could be improved for the future. It is a good idea for all parties to provide feedback on the contractual incentive / penalty conditions and how this was managed. It is important to ascertain what impact, if any, they had the overhaul outcomes. It may be worthwhile asking an independent party to facilitate this discussion in order that it doesn't seem one-sided or dominated by a particular point of view.

Lastly, the review should seek to review the overhaul specification in order to understand how it might be improved for future overhauls. The results of test results should be fed back into the overhaul specification, providing an enhanced outline of work based on experience from both completed units and initial condition assessments.

16.7 Trains Back in Service

This is the point at which the overhaul programme is effectively over. The post-overhaul review between the RoSCo, TOC / maintainer and Overhauler will have been completed and normal fleet management processes will have resumed for the whole of the affected fleet.

This is a good opportunity for individual stakeholders to do an internal review of the whole overhaul and identify good practice / learning for the future.

TOCs / maintainers can use the opportunity to review their standard fleet maintenance processes and check that they remain fit for purpose for the overhauled fleet.

It is also good practice for TOC performance teams to check whether the overhauled fleet is delivering the projected performance and reliability improvements which have been agreed as part of the performance improvement process.

The data used during overhaul can also be used to shape future maintenance, future fault finding and engineering change.