5. Train Preparation

Train Preparation (TP) activities are primarily undertaken for three reasons: Safety, Reliability and Cleanliness. This chapter places emphasis on the Plan, Do, Review approach for train readiness for services.

5. Train Preparation

In many cases, TP is more appropriately performed by drivers. In essence, the message is that each train type and each location dictate who is best placed to carry out TP.

There is a lot of evidence that TP activities are frequently duplicated by maintenance staff and the train preparer. Two examples are featured below. It is good practice to identify duplication and eliminate it as far as possible.

Example: In relation to Thameslink Units, GTR undertake a berth check - a pre-driver checks to pre-empt any start time failures. Activities are undertaken for reliability reasons as opposed to meeting a safety requirement.

Example: Two extremes of TP duplication were reported by London Midland

On one fleet, fuel point exams were enhanced to protect the depot from conductors finding faults. On this fleet, 3 checks are undertaken:

- Check 1: Maintenance staff undertake a daily exam.
- Check 2: The shunters undertake the conductor prep.
- Check 3: Depot driver undertakes driver prep.

It was reported that these checks were additionally implemented on Class 323 units, with the introduction of Check 1 improving the reported reliability performance by 25%.

Conversely, on another fleet, the manufacturer's maintenance staff undertake train preparation and hand over a piece of paper to the driver to confirm that the train is in a fully fit state. The train driver then simply takes the train into service.

N**.B.:** items marked **[KTR]** are to be considered for inclusion in a future version of the Key Train Requirements (KTRs) to improve the train preparation process (both in terms of time and ease). The latest edition of the KTRs can be accessed here

5.1 Plan

Planning for train preparation is equally critical to the preparation itself. The following points focus on good practice when considering train preparation, arrangements and examples of current industry practice.

Consideration should be given to the reasoning behind train preparation post-maintenance. It should not be used as a catch-all to identify maintenance or cleaning process deficiencies.

The frequency of train preparation should be kept to a minimum. Good practice would be for it to be valid for at least 24 hours. In some instances, units are stabled for extended periods of time, during which two preparations are undertaken. Consideration should be given to whether the TP periodicity can be extended to make better use of staff resources.

Example: East Midlands Trains' (EMT) Meridian fleets are prepared by Bombardier as per their Train Supply Agreement. This preparation does not expire, therefore once prepared, a train can be left as long as necessary and taken into service without a second preparation.

Conversely, EMT's 15x units (maintained in-house but on the same depot) need to be prepared every 2 hours. This is justified as protecting the depot from start time failures as a result of drivers arriving late to report defective cab heat, since the unit has cooled down since the original TP

was undertaken.

Example: Virgin Trains West Coast's (VTWC) Class 390 fleet has a TP validity of 24 hours.

Example: When meeting to discuss this good practice, members noted that some fleets require physical attention every 24 hours otherwise they shut down. The example cited was a LIM reset on Electrostar Units. This functionality was not considered appropriate **[KTR]**.

On the other hand, some TOCs have instigated depot TP activities to address an epidemic of start time failures reported by traincrew. This reduced failures to two in 18 months.

The introduction of new rolling stock has been an initiator of change for TOCs in relation to TP and is a good opportunity for TOCs to review TP processes and create a blank slate.

Where trains are frequently prepared on depot, consideration should be given to access to the depot becoming restricted/impossible. Where this occurs, contingency plans should ensure early identification of faults and minimise any potential reduction in reliability.

Example: In normal operation, the VTWC Class 390 fleet returns to a depot every day. In 2015, the West Coast Main Line was severed by a damaged viaduct. This resulted in a noticeable number of outstanding defects arising across the fleet; a symptom of difficulty accessing the fleet.

Preparation can be further complicated at outstations such as Nottingham station where it is not possible to walk around the exterior of the train. A different TP regime therefore does not involve the underframe of the unit. Consideration should be given to where units are prepared to ensure that they are not consistently prepared at locations with no access below the solebar.

Example: Bombardier report that it is not possible to walk around the Class 378 units whilst in their stabling points, therefore below-solebar TP activity it not undertaken at these locations.

5.2 Do

Good practice is considered to be preparation of the train by maintenance staff (since they are best able to affect a repair) and provided fit for service to the driver who, upon receipt of formal documentation, takes the train into service. It is accepted that this arrangement is not possible at all locations.

At Gatwick Express (Stewarts Lane), the depot staff produce paper TP certificates that are left in the cabs. GX fitters are also depot drivers for optimisation of resources.

At GTR's Hornsey depot, their depot staff (including the shunters) undertake TP. At their outstations, the traincrew undertake TP.

Where possible, the train management system of modern stock could avoid the need for a piece of paper to demonstrate TP validity, thus reducing the need for the physical transport of documentation to the vehicles and any potential loss/damage. **[KTR]**.

Similarly, where possible, the TMS should be used to monitor the status of systems on the train which require preparation, particularly at locations such as outstations.

Example: Govia Thameslink Railway Class 455 units are on exam more often than the more recent Electrostar units. Therefore, as the Electrostars are more frequently prepared at outstations, the Train Management System Intelligent Display Unit is used by fitting staff during TP.

Example: SWR's Siemens Northam Depot is not big enough to accommodate their entire fleet so they use remote diagnostics to identify faults, details of which are then used to inform the activities of a "man in a van" repairer.

Where units frequently run through Automatic Vehicle Inspection Systems (AVIS), the case could be made for a reduction in TP activities. These systems are able to report on the state of various external systems (i.e. brake disc and pad presence and thickness, fire bottle level, whether side skirts are left open, etc.) and can minimise TP if the unit is run via this system on a regular basis. It is important to note when the inspection is done, i.e. on the way into or out of the depot.

Where possible, train preparation should be uniform across depots. At the time of writing, different depots undertake different TP activities. There is a disparity not just between TOCs but also between depots within TOCs. A significant barrier to this is Industrial Relations (IR), whereby a major change to TP would be difficult to achieve without the support of staff. This issue primarily occurs between staff grades within TOCs.

When considering future trains, it is worth investing time and effort thinking about how the system will work and streamlining the TP process, i.e. can the TMS report system status (healthy/faulty)? Can physical checks be removed from the TP inspection? **[KTR]**

Self-tests should be as reliable as possible, to prevent spurious fault messages upon start-up, which can result in a conflict with diagnostics.

On Siemens Desiro units, the TMS features different pages of information that are presented to the user on the TMS display. It is crucial to ensure that the level of information presented to the driver in relation to faults is sufficient for them to provide a value-added action to rectify the fault. But there is such a thing as too much information.

Faults can be classified as major or minor. Major faults are those that the driver is aware of and can undertake a timely response to once the fault has been reported, e.g. a fault in relation to the safety of train. Minor faults are those that do not require the immediate attention of the driver and can be addressed at a later stage.

There is a danger that additions to TP activities over the years have been to ensure that drivers cannot fail trains in order to protect fleet reliability performance reporting.

Example: East Midlands Trains has a wide variety of TP staff just within their Etches Park Depot:

- 22X fleet – manufacturer prep (Bombardier)
- 15x – depot driver prep
- HST – depot staff prepare power cars; shunters prepare trailer car interiors

There is little or no requirement for depots or TP to test horns, head, tail and marker lights. This functionality is tested by drivers routinely when vehicles are in service. Members believe that there will be little chance that these components will fail between service and re-preparation.

Point of interest: When comparing the railway to the automotive industry, upon completion of a car service, it is not typical for the customer to walk around the car undertaking an inspection. It should be noted, however, that aircraft pilots still perform a walk around of their aircraft prior to

flight.

Where systems display an analogue dial featuring any potential dubiety, it should be obvious whether the reading is a clear pass or fail.

Example: Class 15x fire systems feature a dial reading “red, green, red”, i.e. low pressure, medium pressure, high pressure. What it does not tell, however, is that high pressure is not considered a problem when compared to low pressure. Train preparers may, upon seeing a needle in the red zone, fail the train without knowing this. **[KTR]**

Good practice when preparing coupled multiple units is keeping units in their consist rather than separate to prepare individually. Splitting units introduces risk and therefore should not be necessary.

Example: Some TOCs reported that units running in multiple are split upon train preparation to check the functionality of the couplers. This is the only reason for splitting the units and was deemed to be unnecessary and introducing undue risk.

Whilst it may be considered by some to be a belt-and-braces approach to TP every cab in a train consist, it does represent good practice since it prevents defects subsequently being identified by traincrew.

5.3 Review

The causes of TP failures should be analysed. This will help to understand the systemic issues and, via a pareto-based approach, begin to tackle the most frequently recurring failures. This analysis can be broken down further to look at the failures which occur on depot compared to those which occur at outstations.

Any incidents which have occurred as a result of improper train preparation should be reviewed but caution nonetheless exercised as if new checks are initiated as a result of every incident, TP becomes ungainly and unwieldy.

TP activities should be routinely reviewed (ideally on an annual basis) to ensure that they are relevant and of benefit to the process.