

## Case Study – Rail investigation (training)

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### Introduction and disclaimer

You are about to undertake the investigation training course, CS04 (Investigation Skills for Practitioners). This is a two day course and throughout day 2 this case study will be used extensively to allow you to place your learned skills from both days into practical use. Prior to joining the course it is advisable that you complete this introductory exercise to allow you to gain most from the case study.

Note: It must be stressed that although incidents very similar to this have happened and some of the photographs and examples you will see are from actual incidents, this case study is **entirely fictional** and has been developed to ensure that learning points can be explored. It in no way represents a real situation.

### Company overview

The company in question is an outsourced maintenance provider to a rail transport organisation, operating the maintenance under a train service agreement (TSA).

The rail transport organisation is a UK train operating company (TOC) that has a mixture of long distance and London serving urban traffic. As such the mix of rolling stock is similar to most UK TOCs. Although the company has a long distance and an urban fleet, these are managed as two separate business units. The incident happened on one of the long distance trains and so this overview focuses on that Department.

The long distance outsourced maintenance provider has several rail maintenance depots across the UK, with the busiest depot being near London; the other depots are smaller but carry out similar work. The work carried out at each location is running rail maintenance, so level 1 to level 4 maintenance. The maintenance itself is managed uncontrolled mainly on a daily regime buy a central planning team.

The organisation is well funded and has a capable and competent management structure and certainly on face value has a good overall process and procedural approach. The organisation holds ECM regulatory approval. Although there have been previous incidents there is nothing to suggest there are cultural issues to be addressed.

### Incident summary

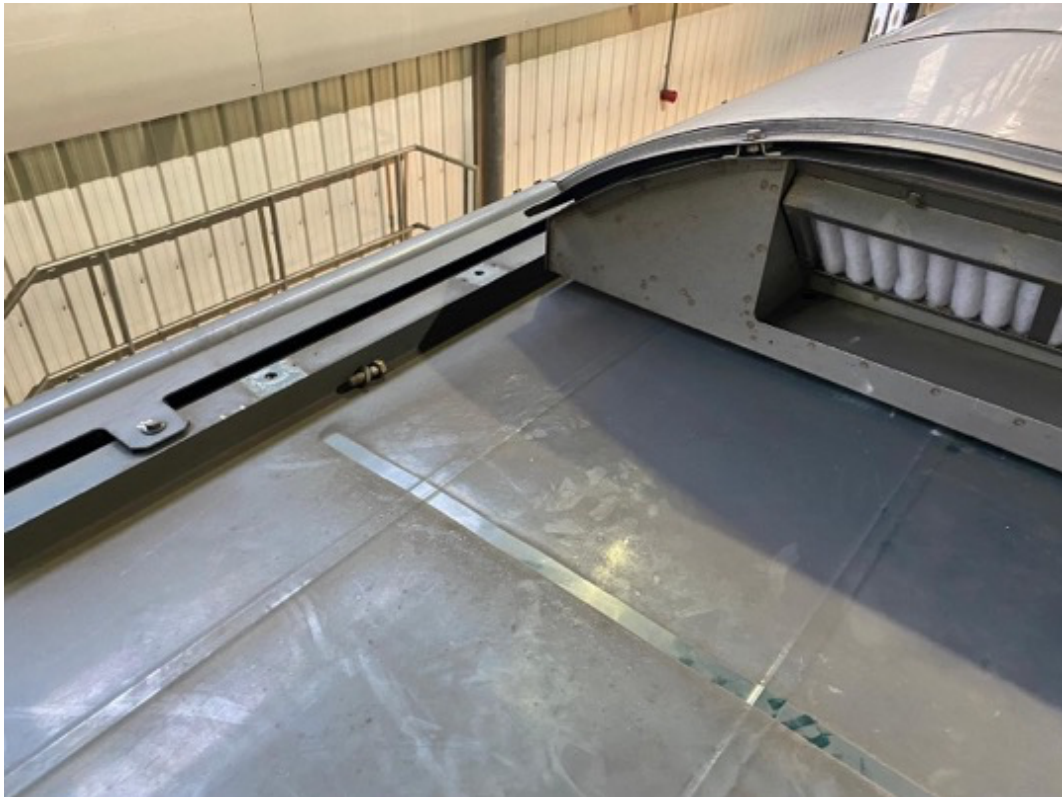
On the 14th of February train 822321 was scheduled on a 500 day exam not the London train maintenance centre. The 14th of February was a Saturday, and it was very common for the slightly larger exams to be undertaken over the weekend due more Labour capacity available. An experienced maintenance technician Was assigned as person A on the 500 day exam block cards, and one of the tasks was to change the filter for the HVAC unit which is located on the roof of the train.

When the technician arrived at the location he noted there was a space well the panel should have been fitted, and noted for attaching bolts we're lying loose in the roof area where the panel should have been. Initially he assumed somebody had already removed the panel and so continued with the filter change, it was only when he went to refit the panel that the panel could not be located, and the duty shift manager (DSM) was informed.

The photograph below was taken shortly after the DSM was informed. An initial search for the panel was instigated, but with discussions with all on shift it became clear the train had arrived with the panel

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not fitted. It was noted that's the brake resistor pack on the same coach had suffered some impact damage. Given the size of the panel and the possibility of it detaching during service the DSM started an initial investigation sequence.



### Initial assessment

As train 822321 was not due in service until 08:30 Monday morning it was possible to carry out a reasonable initial assessment.

Saturday 14<sup>th</sup> February

09:32 Panel discovered not fitted, reported to DSM at 10:15

10:35 The TMC manager and the duty Engineering Manager were called on the phone. The TMC Manager lived close and so, suggested he come in.

11:00 Maintenance records were checked, and it was discovered the last time this panel was likely to have been removed was some six weeks earlier when the 450 hour exam was completed at the country TMC.

11:25 A search of the country TMC did not discover the panel, it was therefore assumed it had detached during service.

11:50 TMC manager arrived on site and took charge of the investigation and recovery.

12:00 Given the length of time from when the panel is likely to have detached from the train, the DSM felt Network Rail need not be informed. The TMC manager overturned that decision and NR were informed at 12:05

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- 12:15 The TMC manager and the DSM performed a visual inspection of the area and considered there was only minimal damage to the brake resistor pack of the same coach. The train was considered suitable to return to service post maintenance and a robbery was initiated from train 822413, a long-term stopped train.
- 14:50 The Network Rail duty safety manager informed the TMC manager that they had deemed this a level three incident using the PRM methodology. The NR procedures require them to inform the ORR, which they had done prior to this call.
- 15:12 The duty engineering manager called the TMC Manager to inform them of a scope of works that was required prior to release of the train; this required NDT of the upper attaching rack. This prevented the train returning to service on Monday, but the activity was completed, and the train released to service on Wednesday 18<sup>th</sup> February.

### Initial cause identification

As the attaching bolts were found lying loose in the roof area it seemed a reasonable assumption that the immediate cause of the event was the panel not having been properly refitted following its 450 hour examination six weeks earlier in the country TMC.

### Full investigation decision

The company executive met on Monday morning and given the ORR were involved already a full investigation was called for. This was to be led by the TMC manager of the country TMC, and comprised a small team of technical expertise.

The only full time member of the investigation team was a co-opted safety manager who performed some oversight duties. All other members of the investigation team perform the investigation in between their normal daily duties. The investigation started on Monday and revealed the following.

### Incident investigation

There are three main 'players' in this incident, and during the second day of the course you shall have a chance to interview each in your investigation teams. They are:

- ❖ **Dave Myers** – he is a Maintenance Technician with 3 months experience, good attitude on the surface and certainly show promise for the future. Dave was 'person A' during the 450 exam on the day in question and was therefore tasked to remove the panel, clean the filter and replace the panel.
- ❖ **Kevin Doorbar** – is Dave's Team Leader and has many years of railway experience. He has been working this train type for four years now. Promoted to TL six months ago, of good character, although it has been noted by the TMC Manager that Kevin has had a couple of 'run-ins' with his DSM.
- ❖ **Trevor Miller** – Is the DSM for the shift. Trevor's background is mostly military, having moved into rail in the last two years, and was promoted to TL and then to DSM some four months ago. The role of the DSM is to oversee the efficient and safe production on the day, as such, Trevor feels very responsible for what has happened.

### Timeline

822321 was scheduled for a 450 day exam on 1<sup>st</sup> January.

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- 07:00 Shift start - It was a fairly relaxed start to the shift, with this shift having just returned to work following three rest days. Dave Kevin and Trevor were all gently easing themselves into the work pattern looking at the list of work schedule whilst also discussing respective Christmas and new year periods.
- 07:10 Kevin held a shift start brief , a fairly standard briefing, after which he assigned work to various people. Dave Myers was assigned to be person a on the 450 day exam. Two other maintenance technicians would take the roles of Person B and Person C. This left a vacant position Person D, which Kevin said he would cover with the help of Dave. The three maintenance technicians left the briefing and went together tools and materials from stores.
- 07:15 Trevor mentioned to Kevin that they were down on numbers this shift due to three people being on leave and two people phoning in sick earlier. They mentioned but they had a brief discussion and discussed the workload and recognised but even without the sickness the list of work was almost unachievable. They both noted that the 450 day exam would need to be the priority workstream to give themselves any chance of making service availability tomorrow morning. Following this discussion Kevin then started working the 450 day exam along with the rest of his team.
- 09:25 At break time Kevin caught up with his three maintenance technicians and they had a brief discussion regarding progress. Dave reported that he had pretty much finished the roof work with just had a few final items to undertake. The other two technicians had not managed to get on so well and Person B asked Dave if he could help him after break as he had a two man job to undertake, Dave agreed.
- 10:00 Dave and Person B went into the passenger saloon and completed the toilet tests that required two people; this they finished at 12:15 – meaning Dave did not get back to his zone until after lunch.
- 12:35 During lunch Trevor mentioned that there is a train in the yard that needed a one day exam next Kevin who he could put on it. Kevin and Trevor had a pointed discussion during which time Kevin pointed out that he didn't even have enough time to complete the 450 day exam never mind undertaking more work. Kevin asked this additional work to be loaded on to night shift, but Trevor indicated that rain was needed at 1900 hours before the night shift came on shift.
- 13:15 Instead of disturbing his maintenance technicians, Kevin felt it best that he undertook the one day exam out in the yard. This is not a task he is used to doing and as such it took him a little over 2 1/2 hours. During this time the maintenance technicians we're working largely unsupervised as Trevor had issues to deal with in the office.
- 13:15 At the same time as Kevin went to the yard, Dave went to finish the roof element of the 450 day exam that he was originally tasked with, leaving the panel loose so that Kevin could perform the final inspection. There were a couple of tasks Dave had not done before and with Kevin being in the yard he asked one of the other maintenance technicians for help on a couple of occasions. Dave finished the roof work at 15:30.
- 15:45 Kevin returned from the yard and gathered his team for a quick situation report to establish relevant progress. After having done this Kevin then assigned various ad hoc jobs to different

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people to make sure the exam got completed before end of shift. Kevin then have to spend roughly 1 1/2 hours updating the asset management system.

16:00 Dave received a call from his wife saying she was very worried about one of their children as he was running a very high temperature. Dave mentioned this to Kevin and Kevin asked what status Dave's work had got to. Dave replied that the roof work was finished apart from a final panel inspection and the work he had been helping with was nearing completion. Given this Kevin decided the compassionate thing to do would be to allow Dave to finish his shift early a make up the time later in the week.

16:15 Dave's car departed site

18:30 Kevin was completing the final certification of the train when he remembered but Dave had asked him to have a look at the filter and then the panel would need refitting. Kevin was extremely pushed for time now but still quickly run up the gantry and went down towards the HVAC unit. When he was walking towards it he noticed that the access panel was already fitted and was slightly annoyed that he hadn't had the chance to inspect the filter fitment. However, as he was pushed for time he assumed that Dave had fitted the panel to try and help Kevin out. Kevin noted that the access panel was fitted properly and so signed the task off.

18:54 822321 was signed serviceable by Kevin

19:25 Kevin finally left the site, some 25 minutes after his shift ended.

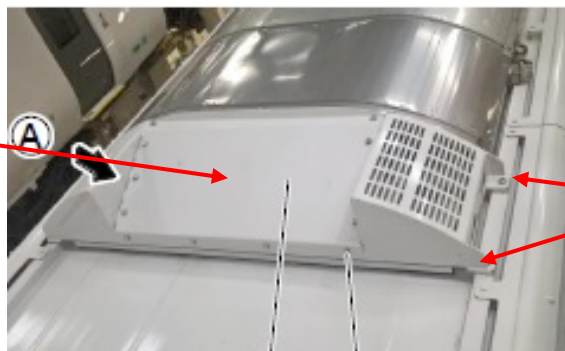
### Factual information

As the investigation was some six weeks after the adverse event there was no perishable evidence to collect.

**Competence management.** The competence management system was reviewed for both Dave and Kevin and in both cases show they were competent. Although the competence assessment didn't cover the specific panel it did cover panel removal and refit and Dave was signed competent four months previously.

**VMI.** The VMI was accessed on the system during the investigation and it revealed that the access panel with twelve attaching bolts should be removed to gain access to change the HVAC filter. See picture below. Note: only four bolts were found on the roof in London, and it is four bolts that hold on the larger panel – that houses the access panel.

Access panel –  
12 bolts



4 bolts hold on the  
housing (that has  
access panel on it)

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**CIF process.** The company uses this process to update technical and other information. It was noted there is a backlog of 152 outstanding CIFs. Two of which we are relating to ambiguity around this very panel.

**Tooling and Materials.** The tooling and materials logs we reviewed and revealed on the 1st of January that Dave had withdrawn from stores the correct materials and several tools. The torque wrench listed in the VMI as being required when refitting the 12 bolts of the access panel was not shown as issued to anybody on the 1st of January. Several speedy guns were however issued, a speedy gun is an electric powered screwdriver used for rapidly removing screws and bolts but should not be used for refitting them.

**Load v capacity.** In the timeline it was indicated the workload was tight suggesting there was challenges with the load and capacity for the shift. Reviewing the list of work was demonstrated the shift would have required seven fully competent people to deliver the work requested.

**Work schedules.** The block card system for the 450 day inspection it was reviewed and although indicating some efficiency challenges there was nothing substantially wrong with this system. It was noted that it required paperwork to be generated rather than electronic signatures. The block card for the particular task on this panel was reviewed and it revealed that Kevin signed that particular block.

**Team structure.** The normal shift has Kevin as the team leader with six fully qualified maintenance technicians. The shift was depleted on the 1st of January due leave and last minute sickness.

**Site layout.** This was investigated and it was discovered that it takes 15 minutes approximately to walk from the panel location to stores and back.

**CCTV.** This was checked from the 1st of January to the 14th of February and although train 822321 came into both the London and the country TMC there was no removal of this panel detected. This further reinforced the fact it must have been removed during the 450 day inspection on 1<sup>st</sup> January.

**Panel removal process.** The panel removal process checked, and this showed that prior to a panel removal an open entry must be made in the asset management system. Although technically there was no open entry in the asset management system for this panel, the block card approach that was being adopted at the present time did have open entries for the removal and refit of this panel.

**TL workload.** Although a full study of the team leader workload was not performed the preliminary factual evidence tends to indicate that the team leader workload is exceptionally high. It was unclear whether this was due to the short Manning on this particular shift or if this is a normal situation.

**Fleet check.** At the present time no fleet check has been called.

**Audits.** The DSM is routinely test with performing in process checks on the tasks being undertaken in the TMC. The panel removal process last had an in process check completed in the summer of last year. There have been no audits by the quality Department or other people since then.

**Targets and culture.** The specific targets of the DSM and team leader are not relevant to this investigation as they are more around team management. The overall culture in the TMC is very much one of service tomorrow, meaning that if service is made tomorrow this is classed as a success. the

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TMC management commented the quality and safety are higher than service tomorrow however when questioning people on the shop floor a different perspective was given.

**OTMR and HFMT.** Neither were interrogated as the information was not relevant.

### Exercise

During day 2 of your training course we shall be using this case study extensively looking at the factual information collected thus far I'm probing what further factual information you would want if this was a real investigation.

Additionally, during day 2 you will get your chance to practise investigative enhanced cognitive interviewing techniques as you can interview Dave, Kevin, and Trevor. You will do this in small investigative groups that you will be split into during day one of the course.

For now please read through the case study noting it is entirely fictional even though it is based on an event that actually happened and if you were involved in the investigation disregard anything you found during that investigation as this has been structured in such a way to allow you to establish some key learning points associated with investigative techniques rather than getting to a solution.

**Make notes** on where you think you need more information and then the areas where the initial factual evidence that has been collected you might want to probe deeper.