

## CASE STUDY 1 – TRAIN DERAILMENT

**Organization context:** The organization in focus operates and manages a railway that provides a mixture of passenger and freight train services.

**Describe the event:** A freight train came off the rails, caused considerable damage and the line was eventually reopened 5 days later. A breakdown crane had to be mobilized to recover the train carriages that had derailed.

**Explain the consequence:** Passengers on other trains that were in the vicinity of the incident had to be backed into stations so that they could disembark and revert onto road transport. Passengers on subsequent trains followed diversionary routes on the rail network.

**What were the root causes:** The derailment occurred due to a loss of track integrity: the fixity of the right-hand rail was lost due to progressive failure of the chair screws under the loads from freight trains traversing the curve, leading to the two rails spreading too far apart. The investigation identified that the design of the track was sub-optimal, following replacement 7 years beforehand. The signs of failure were not identified during inspections of the track by maintenance staff, and the location where the derailment occurred had not been subject to mandatory geometry measurements.

### ***What can be learned from this case study (good and bad):***

- **Communication** – The train driver had hit the emergency button so the conversation between the train driver and control operative was relayed over loud-speaker in the control room. This allowed other operatives and those involved in the management of the incident to all hear what was being said firsthand, avoiding any information being changed slightly each time it was relayed to someone else.
- **Training kicks in** – the organization carried out regular practices of train disruptions. The training emphasizes that managing an incident is much more about considering the railway in the future, rather than getting distracted by looking backwards at the causes of the incident. This helped those involved in managing the incident remain focused and effective in containing and recovering from the incident.
- **Information** - A digital replica of the railway was available in the control room that showed where other trains were located, trapped and may be affected. This information supported quick development of plans to divert the trains along alternative routes.
- **Human factors** – The natural instinct of people to go to site had to be curbed, as there was little that could be done immediately on site. Instead, the initial action was to remain calm, to send people home, and prepare a rota so that they could arrive on site when there was work to do and have sufficient cover for the duration of the incident. Overnight, the controllers worked on the temporary service timetable for the coming days until the repair work could be completed.
- **Logistics** - Track replacement materials were available at a hub depot locally minimizing the time taken before repairs could be undertaken.
- **Investigate** – The accident investigation identified recommendations to enhance the organization's procedures for track replacement, mitigation of risk at similar locations, improvements to planning the operation of track measurement trains and evaluating the delivery of key track maintenance activities in the area.