CASE STUDY 5 – OVERHEAD POWER LINE FAULT

Organization context: The electricity transmission industry is responsible for the efficient bulk movement of electrical energy from power generating companies across large distances to regional substations where the electrical energy is distributed to local residents and businesses.

Describe the event: During the routine inspection of an overhead line (OHL) using an infrared camera, a hot joint (a defective section of the OHL which has started to overheat) was identified in a section of the line that crossed a busy motorway.

The linesman immediately reported the fault to his manager who escalated the issue up to the maintenance planning team and the transmission system operator to take the circuit out of service, which would eliminate the risk of the hot joint failing, and plan the repair of the affected OHL joint. Given the high risk if left unresolved, the maintenance planning team and the system operator worked to identify the safest way to isolate the affected circuit whilst maintaining the security of supply of the transmission network. Other active maintenance activities that required sections of the transmission network to be out of service were recalled.

This enabled the system operator to safely isolate the affected circuit without putting the entire transmission network at risk. The maintenance team was deployed to repair the defect.

Explain the consequence: The temperature of a hot joint could rise by over 100^{o}C above the ambient temperature of the OHL location. If left unresolved, the hot joint could fail with the worst-case scenario being that the OHL cable will fall off the tower and onto the ground. In this situation, the ground was a busy motorway which would have put lives in danger.

What were the root causes: The variation in power to maintain the efficient movement of electrical energy across the transmission network, and the exposure of the OHL to changing environmental/ weather conditions, mean that over time, the OHL will start to wear. For this reason, regular inspections are required to identify the onset of failure before the actual failure does occur.

What can be learned from this case study (good and bad): This case study highlights the benefits of taking a proactive approach to identify faults which can be resolved before they become failures and potential incidents. It also highlights the benefits of effective coordination between different parties to resolve a fault and/or incident.