Electrical networks safety: February and March DINs, SOPs, NEDeRS

This note summarises the key messages from the ENA (Energy Networks Association) Safety briefings. In February and March 2019, there were ten reported incidents and updates on three previous incidents.

I have categorised these under the following headings:

- Manufacturing faults;
- Inadequate maintenance or installation;
- Equipment malfunction;
- SF_6 leak and
- Unknown causes of failure

Manufacturing and design faults

As part of a safe procurement and commissioning system, equipment must be tested thoroughly before installation. The ENA briefing included two reports of faulty ABB manufactured pole-mounted HV transformers that failed due to a manufacturing fault, which resulted in low LV resistance to earth. ABB has investigated and identified the root cause of the defect and changed practice.

Inadequate maintenance or inspection

Maintenance cycles should be based on high quality assessment of asset life. Much maintenance remains time-bound: despite the increasing use of condition monitoring, maintenance is largely still driven by time intervals, more than by real-time knowledge of the condition of assets. Maintenance cycles remain reliant upon regular inspection and effective remedial action.

There were three incidents that point to issues with maintenance.

One related to the physical stability of concrete streetlights, a timely reminder of the importance of correctly assessing non-electrical hazards. There is no suggestion that maintenance was missed but it raises questions about the assessment of mechanical and civil engineering risk.

There were two issues with electrical maintenance and inspections. The first relates to an air break switch operating unexpectedly due to the switch being under such tension that it operated on the slightest contact. This defect had existed since commissioning in 2006, but it had not been identified during inspections.

The second related to a fractured operator arm stop on a tap-changer that failed despite regular maintenance. EHV maintenance engineers have been instructed to inspect before

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operation. Both these incidents remind us that risk assessment and care about operation is still necessary, even if maintenance regimes have been followed scrupulously.

Equipment malfunction

During the resetting of protection settings, a protection relay tripped out as data was being extracted from the system. This unusual response to the connection of a laptop has happened with other examples of this type of equipment and investigations continue.

SF_6 leak

There were five incidents of SF_6 leaks in the incident reports. In one case, the leak has been traced to a failure in the epoxy resin sealing the unit. In the 1990s, SF_6 was seen as a safe and efficient alternative to insulating oil, but as units age leaks and failures have become more common. Given the hazards of SF_6 exposure, further advice is being sought by Prospect.

Unknown causes

In one incident, a pole mounted circuit breaker exploded. It was so badly damaged by the internal explosion that it is impossible to identify why it failed.

The ENA has provided further feedback on the restrictions that have been placed on the operation of fuse switches on a particular type of switchgear that is a significant hazard. Regrettably, there is insufficient background on the root causes to understand the nature of the incident and the ENA is seeking more detailed information.

As ever, this reinforces the importance of checking equipment before use and emphasises the importance of asset management to avoid placing inadequate plant on the system and responding promptly to defects.

Any feedback from company HeSACs on the causes of DINs and SOPs, along with practical changes in operating practice, would be helpful. Most importantly, it is essential that health and safety reps continue to be involved in inspections and Panels of Inquiry so we get better quality data about incidents and avoid the temptation to blame individuals before the root causes of an incident are understood.

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