MCG Health & Safety Strategy

Lessons Learned Data Collection Form

Project Location:

Brief description of Incident

Electrical Live Testing - Risk Management

Background

This note follows an incident investigation where an electrical engineer placed a short circuit across live busbars causing an electrical explosion. The incident investigation noted that live testing was carried out in live busbar chambers on a regular basis.

Access to live busbars chambers while carrying out testing is likely to result in persons coming into contact with exposed live conductors. Any person coming into contact with live electrical conductors energised at 415 volt between phases is likely to suffer a fatal electrical shock. It is also possible that a short circuit of the conductors could lead to an electrical explosion or fire resulting in fatal burn injuries. This is in direct contravention of Regulation 14 of the Electricity at Work Regulations 1989.

In general access to panels or busbar chambers that are not rated to IP2X should not be permitted until a suitable and sufficient risk assessment and any live working need should be risk assessed at earliest opportunity in the management of a project.

Methods should interrogate the requirement to work live and ensure that all other avenues have been explored.

The Issues

1. Ongoing Electrical Work

In accordance with BS7671, the following tests are required to be conducted live:-

- Earth fault loop impedance
- Prospective fault current
- Functional testing of residual current operated devices (the test to be independent of any test facility incorporated in the device)
- Functional testing of switch gear and control gear assemblies drives controls and interlocks.

In each work package the view of the responsible person shall be sought (as part of normal ongoing project overview processes) to ensure a formal review is undertaken with the aim of minimising risk from testing, by reducing personnel exposure.

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2. Testing and Bus bar Contact

Live testing of LV electrical panels for prospective short circuit current and earth loop impedance has traditionally been a standard action, and is an accepted industry practice.

Test connections are often typically made in a live busbar chamber, and this is a standard approach / practice for a test of this type.

HSE's view is that this level of risk has never been acceptable. Regulation 14 of the electricity at work regulations makes it clear that live testing can only be carried out when all steps have been taken to prevent injury.

It is critical that all principal contractors and electrical subcontractors are aware of these dangers and carry out an audit of the fixed equipment they have on site as a matter of urgency. Where concerns are raised they should in the first case be raised with the manufacturer. A safe system of work must then be developed in line with the Electricity at Work Regulations 1989 reg. 14 and HSG 85 Electricity at Work Safe Working Practices. This can readily be achieved by modification to panel design (see actions following), and create a step change in risk reduction.

Lesson Learned:

PANEL ACCESS FEATURES & RISK REDUCTION:

Minimisation of the 'potential for contact' has led to a review of panel design to avoid both inadvertent contact if panels are accessed, and the need for panel access.

As a result of discussions with the HSE, selected panel manufacturers are working cooperatively to assess the situation, and panel design in particular, and to provide a safe working solution under HSE guidance, which can be implemented across the industry.

The proposed working solutions to reduce risk of personnel potential contact are at this stage:-

1. Provide clear plastic insulated barriers within panels in front of busbars, to reduce contact risk after opening.
2. Provide panel test points, obviating the need for panel access.

We are now working to achieve these changes as described above after taking manufacturers advice.