Network Rail
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Network Rail Safety Bulletin

Inspection and Work with signalling power supply systems containing equipment above nominal system voltage of 175 Volts

For the attention of all staff and contractors working with signalling power supply systems

This safety bulletin reminds staff how to identify and control the electrical safety risk on signalling power supply systems operating at or above nominal voltage of 175 V This includes Location Cases, Supply Terminal Pillars and Functional Supply Points (FSP), herein all referred to as FSPs.

The relevant electrical safety and lifesaving rules are:-

Work should be carried out with the supply dead, unless it is unreasonable to work dead, and it is reasonable to work live.

Never assume the equipment is safe, always test before touch

Never undertake an activity unless you have been trained, assessed as competent and have the right equipment

Working on live equipment is only permitted if

- It is considered that work with the system remaining live is reasonable, appropriate protective methods (which may include the use of insulated tools, insulated gloves with gauntlets or insulating mats) must be used in accordance with your training.
- During any work with live equipment, the risk of electrical injury must be continuously considered. If that risk can not be addressed, work must cease, and you must inform your supervisor.
- To work on live equipment, staff shall be deemed, by their employer, as being competent to carry out live working and have the necessary experience. Staff shall also be accompanied by one or more person.

Any work in a FSP case shall be considered as working live if:

- The signalling power system has a first earth fault present. (ie Insulation resistance (IR) is below 20 kΩ or unknown) or
- There are exposed 650 V conductors or
- The case / metal parts have not been tested as below 60 V or
- The work involves accessing the 650 V equipment

Action required by all persons wishing to access a Functional Supply Point:

All staff should avoid making contact with equipment housings that could contain equipment operating at a voltage greater than 175 V.

1. Before opening the FSP, *test before touch* for any voltage between the case and any nearby metalwork, for example hand rail, barrier, OLE support or similar, within the touching distance of 2 metres[1] from the case. If a voltage of 60 V or greater is measured, it should be considered to have a first earth fault, and hence the equipment shall be assumed live.

2. Open the case and check for any exposed live conductors within it, and avoid contact with any found. If any terminals greater than 175 V are exposed or inadequately shrouded, then the equipment should be assumed live.

3. Repeat *test before touch f*or any voltage between all metal covers within the case, the FSP case and any nearby metalwork within the touching distance of 2 metres[1] from the case. If a voltage of 60V or greater is measured, it should be considered to have a first earth fault and hence the equipment shall be assumed live.

4. When steps 1, 2 and 3 have been completed then visual inspection work or work on the signalling equipment can continue in accordance with existing controls.

5. On the completion of work repeat step 3 before securing the case.

6. If any touch voltage exceeds 60 V, securely affix a yellow and black warning tape around the FSP case several times and warning sign (yellow triangle as per first page of this Safety Bulletin), and report a first earth fault at the FSP to Route Fault Control.

General Points

- A voltmeter with fully insulated leads in according to HSE Guidance Note GS38 “Electrical Test Equipment for use by Electricians” should be used to measure touch voltages.

- Insulated equipment must be in accordance with
  - BS EN 60900 for insulated tools
  - BS EN 60903 for insulated gloves with gauntlets, which must be Class 0 (Network Rail part number FBC90VSE)
  - BS 61111 for insulated matting which must be Class 0

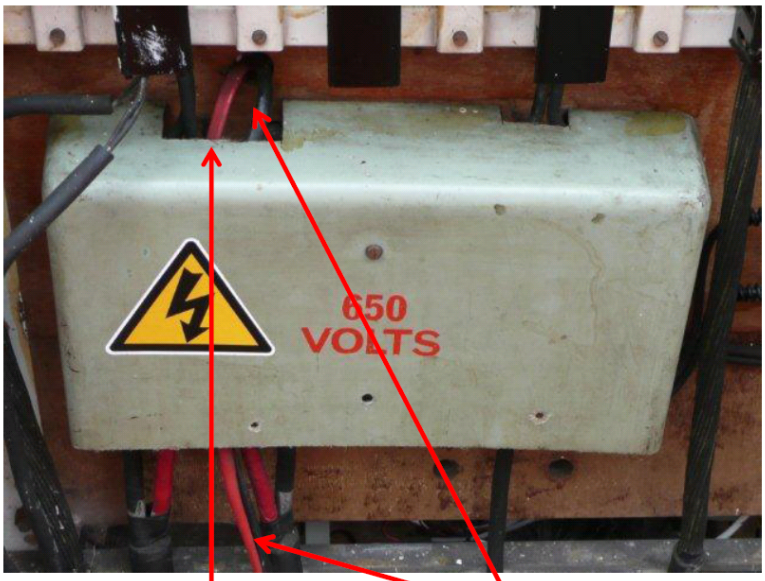
- Equipment inside a FSP should be protected from rain when the doors are opened.

- You must never leave a FSP with the doors open and unattended. At the end of the work you must check that the electrical equipment is protected from the environment, for example by closing and securing the doors.

Further guidance can be found in

- Network Rail Technical Instruction TI 164 - 650/400 V IT Signalling Power Supplies
- NR/L2/10064 - General Instructions to Staff Working on S&T Equipment, Modules E022 and X002.
- NR/GN/ELP/27318 - Insulation Monitoring of 650 V Earth - Free (IT System) Power Cables
- NR/L2/ELP/27238 - Maintenance specification for fixed plant equipment
- NR/L3/RCS0216/DP10 – Working on low voltage equipment
- NR/L3/ELP/27241 “Fixed Plant Work instructions”
- TNC8785 and Management plan
- Route based TNCs

Example of inadequate shrouding of live conductors



Protective guarding has been cut away and “hair-moon” cables in use

Footnote[1]

If two times one meter test leads are not available, then these should be ordered as soon as possible. In the meantime, existing test leads should be used and surfaces outside the reach of existing test leads should not be touched.

For further advice, contact Robert Wilson, Principal Engineer,
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