Supervision & Testing on Electrical System

8 May 2015

Principal Engineer Cheong Weng Yip

Development & Construction Productivity Department

Building Quality Group

Housing & Development Board

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Supervision

- Conduct periodically
- Observant and vigilant during site visit
- More attention to new and poor contractor
- Feedback to Design Team for improvement

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Common Defects

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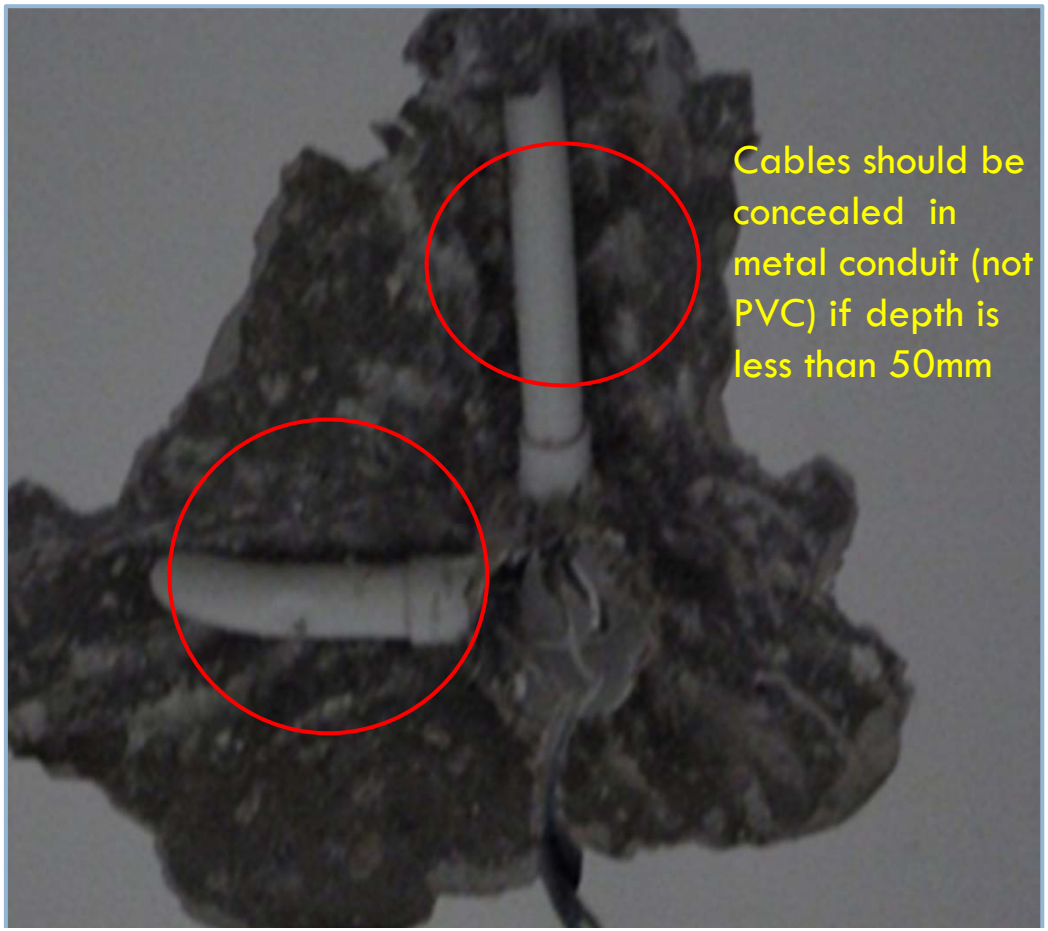
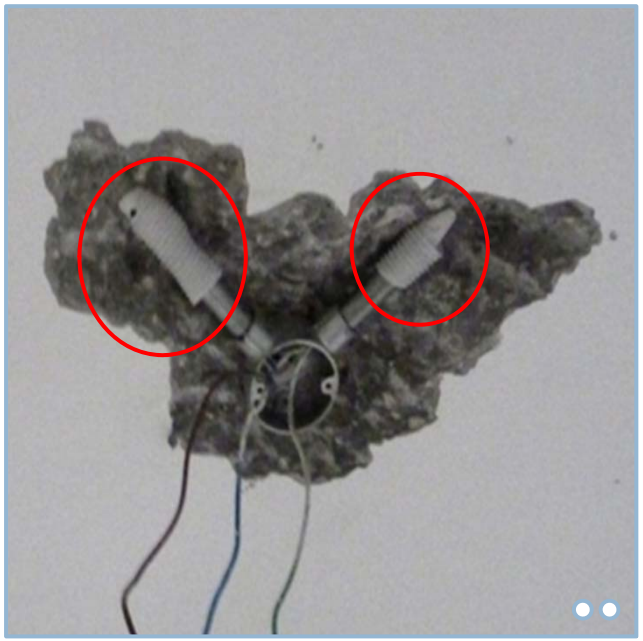
Improper Installation/Poor Workmanship







Cables not in concealed metal conduit installed at less than 50mm depth from surface. Non-compliance with CP 5 requirement.

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Improper Installation/Poor Workmanship



Electrical accessories within restricted zone of hob. Non-compliance with SPSL's requirement.

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Improper Installation/Poor Workmanship







Openings not Patched up. Water could seep in resulted to low electrical insulation

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Improper Installation/Poor Workmanship



Sign of water seepage





Sign of water stain



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Improper Installation/Poor Workmanship



Installation Subject to Weather. Water could seep in resulted to low electrical insulation



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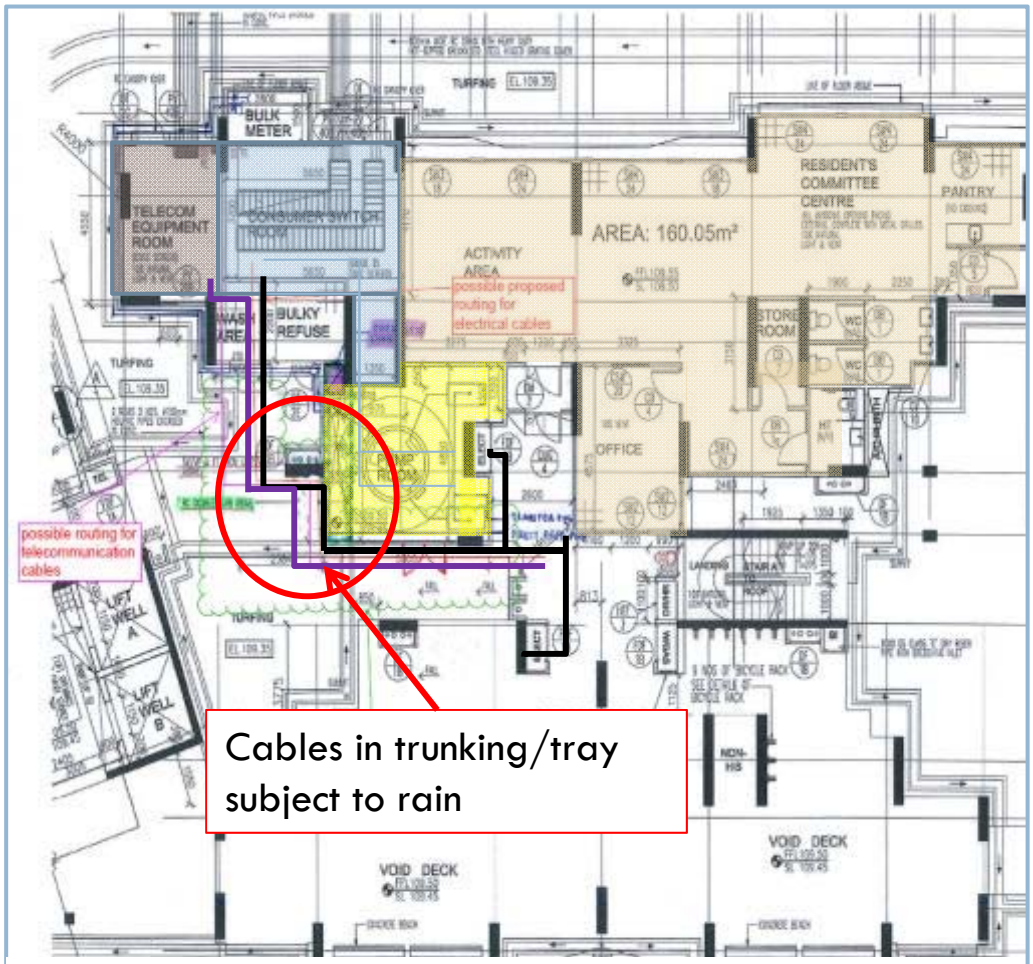
Improper Installation/Poor Workmanship



Cable Routing expose to weather



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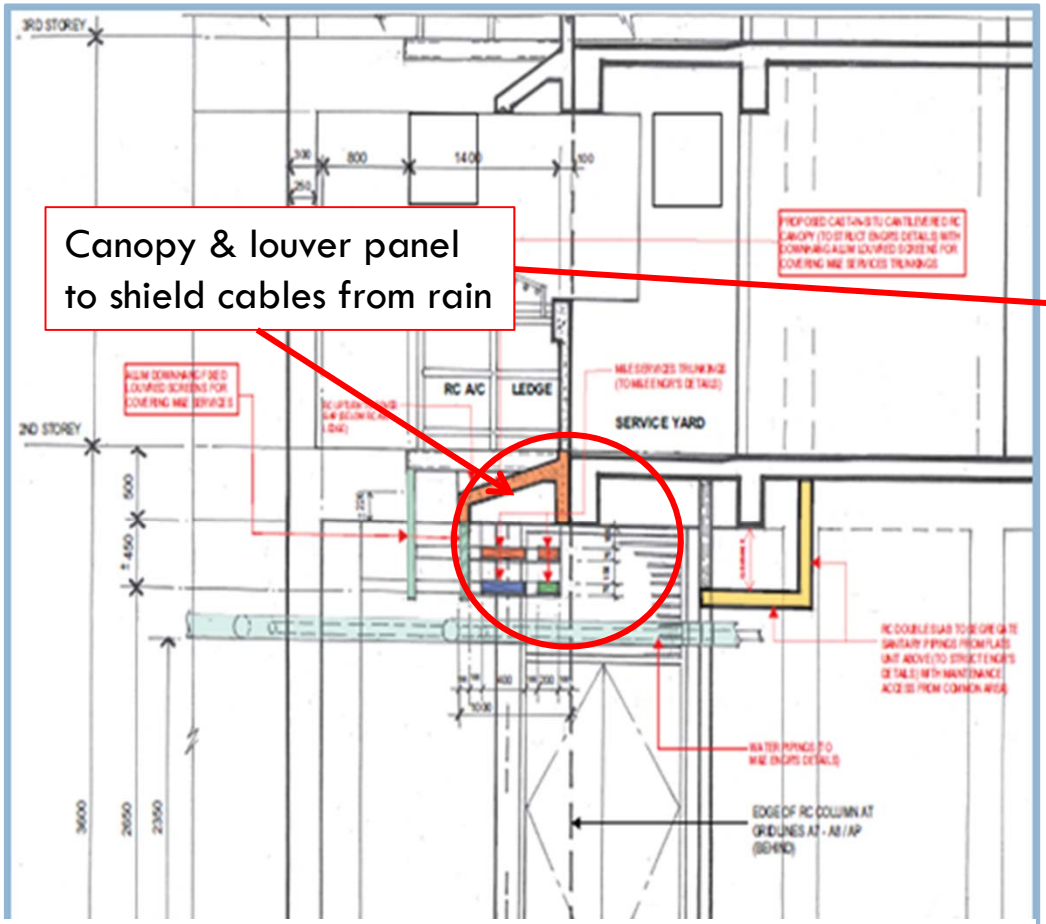
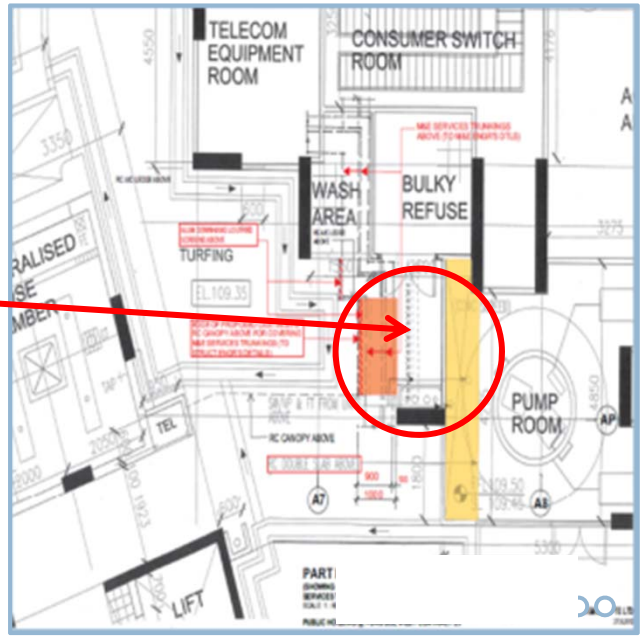
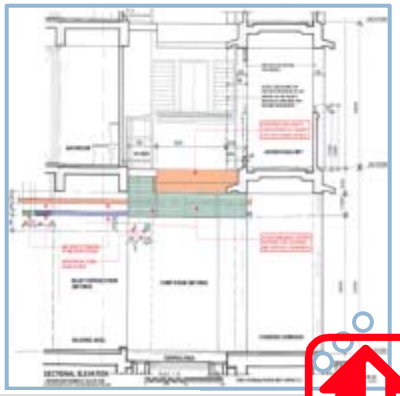
Detailing (Canopy) Provided to Shield Cables from rain







Canopy provided to shield cables in trunking/tray from rain

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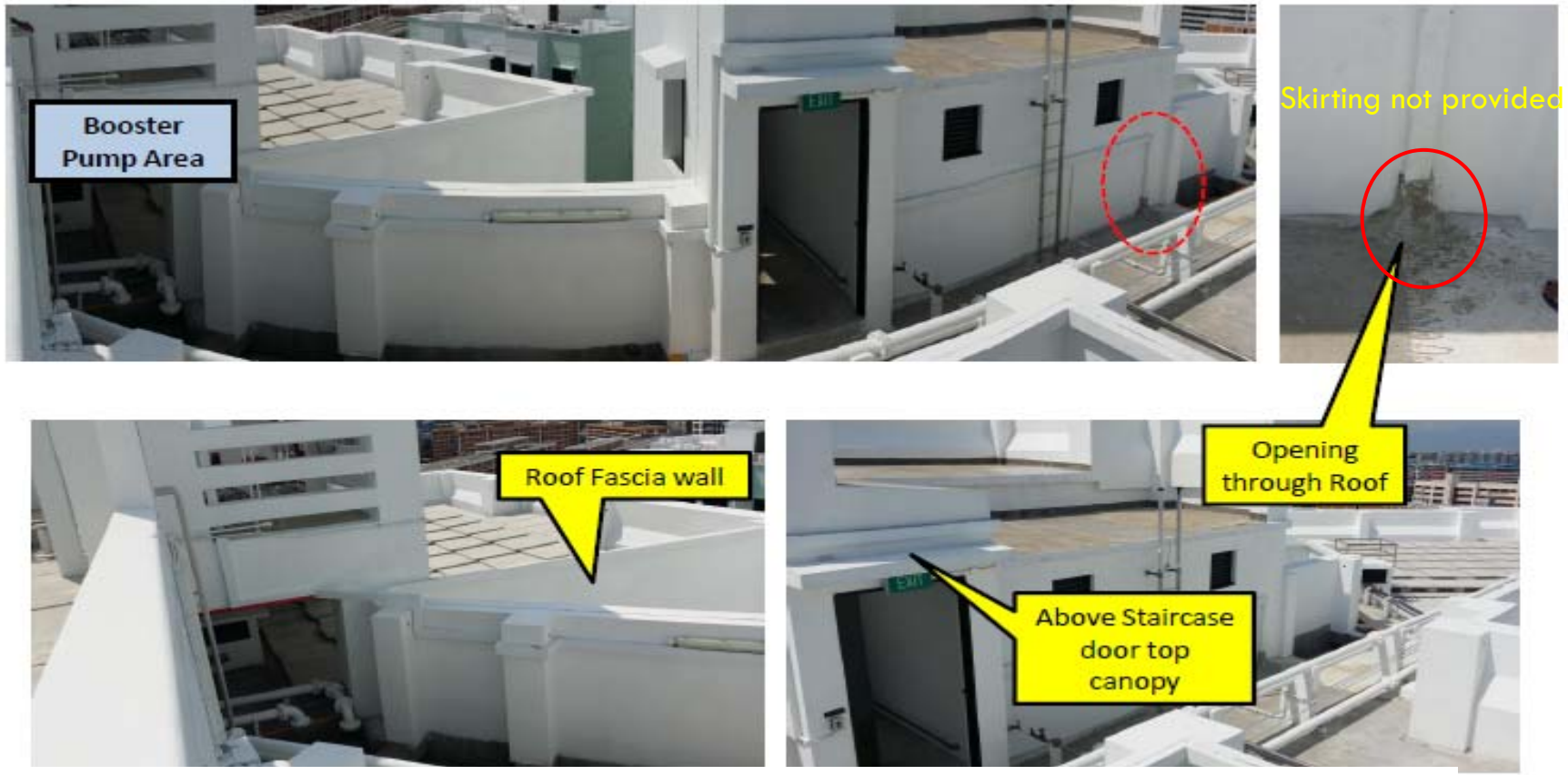
Improper Installation/Poor Workmanship



Installation to weather. Water could seep in resulted to low electrical insulation

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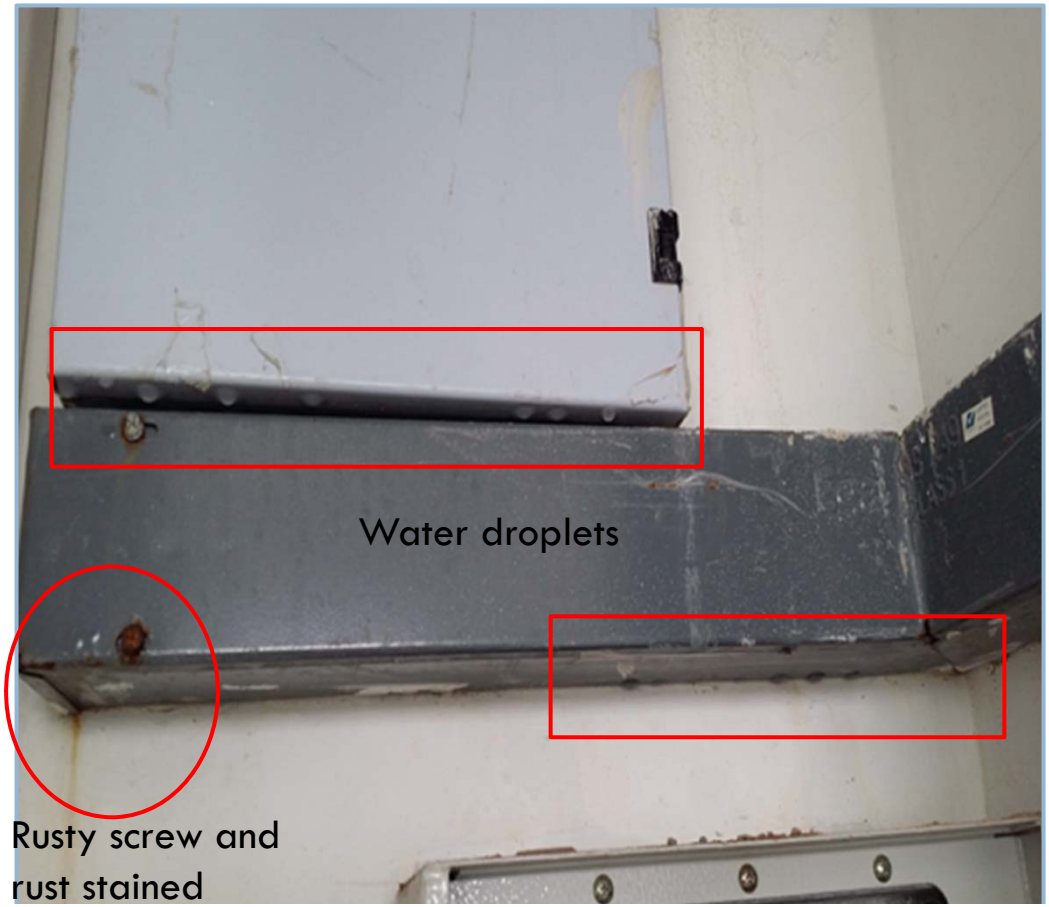
Improper Installation/Poor Workmanship







Nuisance tripping of electrical installation due to water seepages

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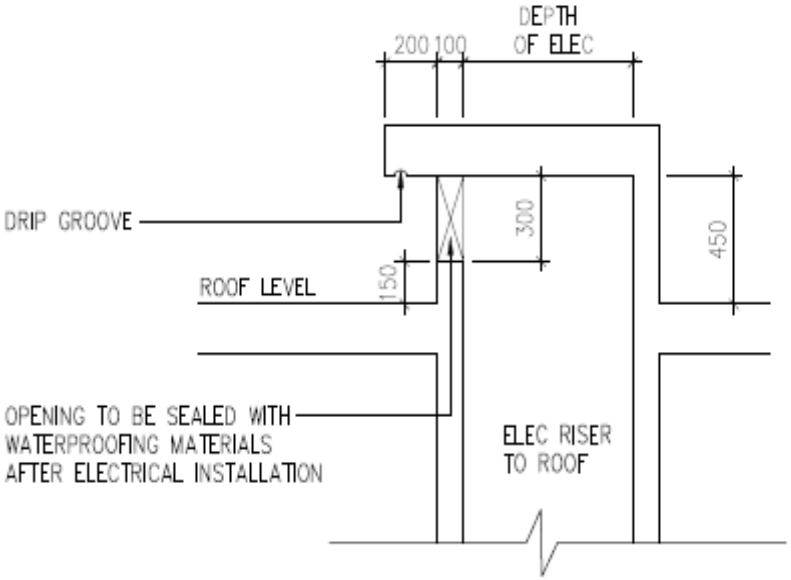
Electrical Mains to Roof

- Electrical Mains to Booster Pump and Hose Reel Pump system on roof



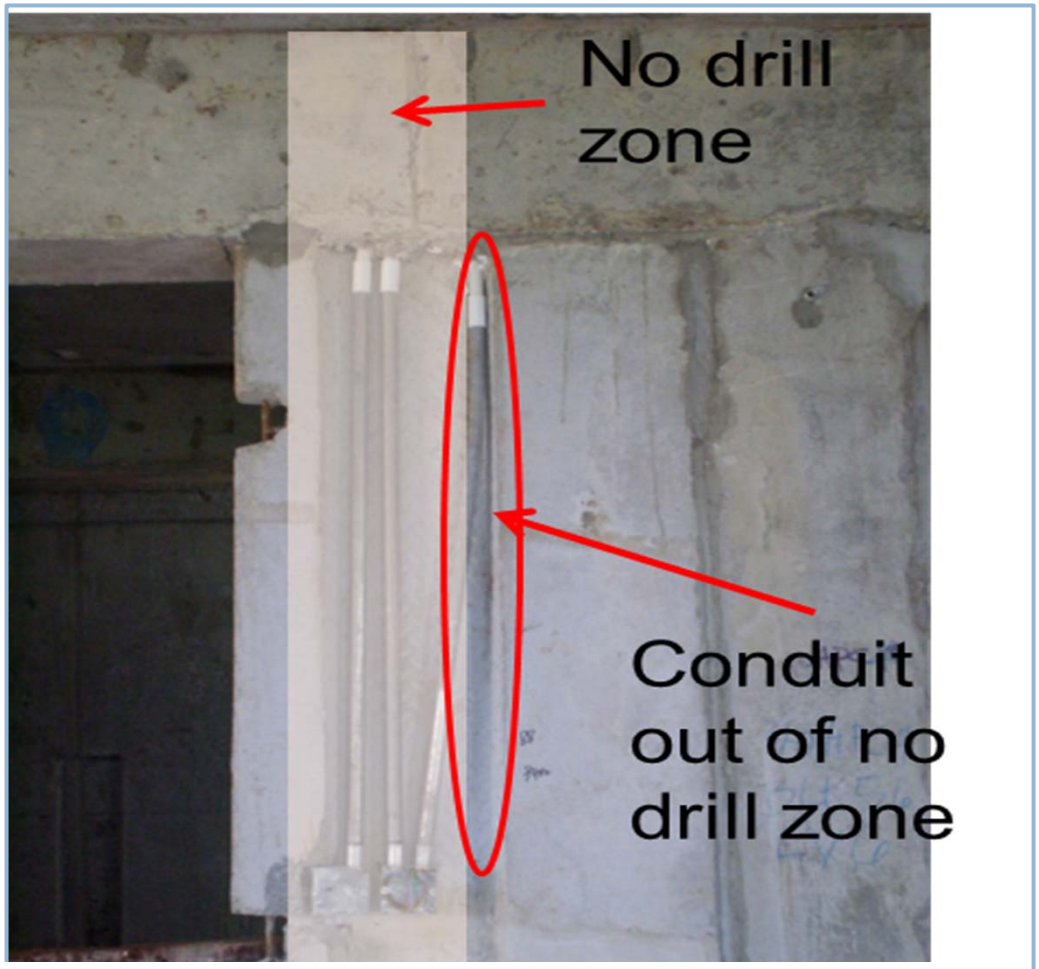
TYPICAL DETAIL OF DOG HOUSE FOR ELECTRICAL CABLES ON ROOF

Lift E&I and TMS Closet

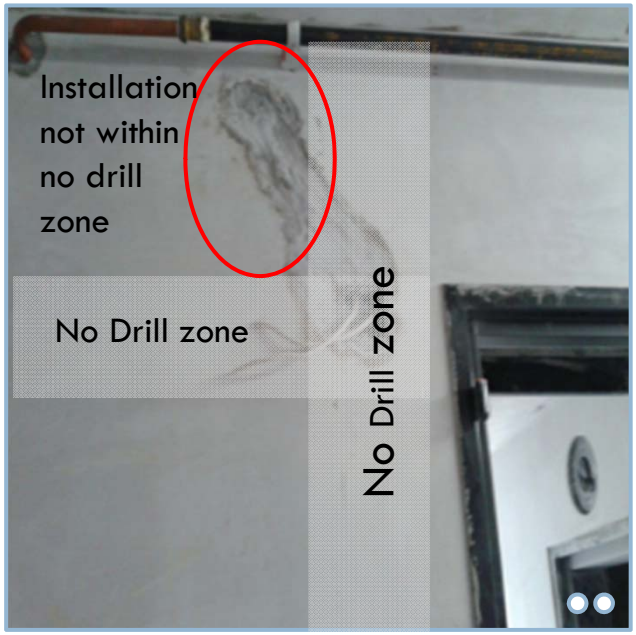
- Limitation of shelter space above E&I closet
- E&I and TMS closet on the top most storey
- E&I closet on top most storey and TMS closet on 2nd top most storey



Improper Installation/Poor Workmanship



Installation not within No Drill Zone



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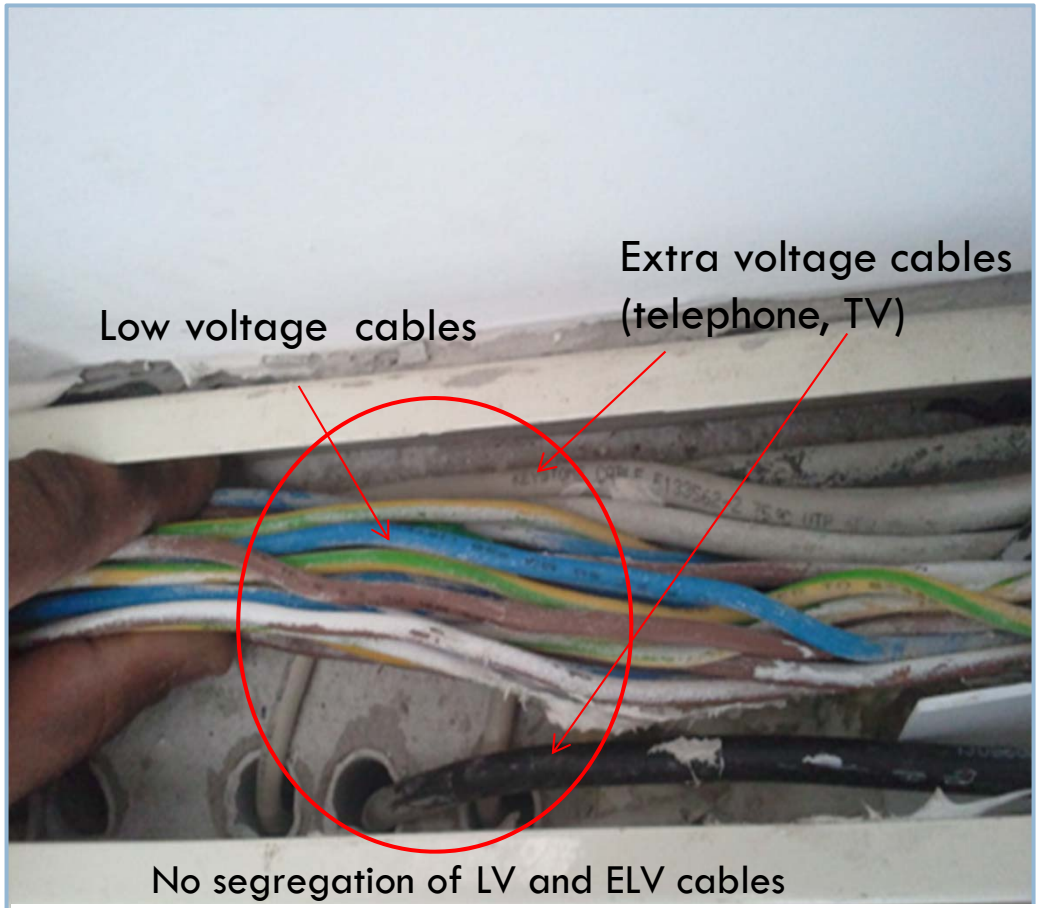
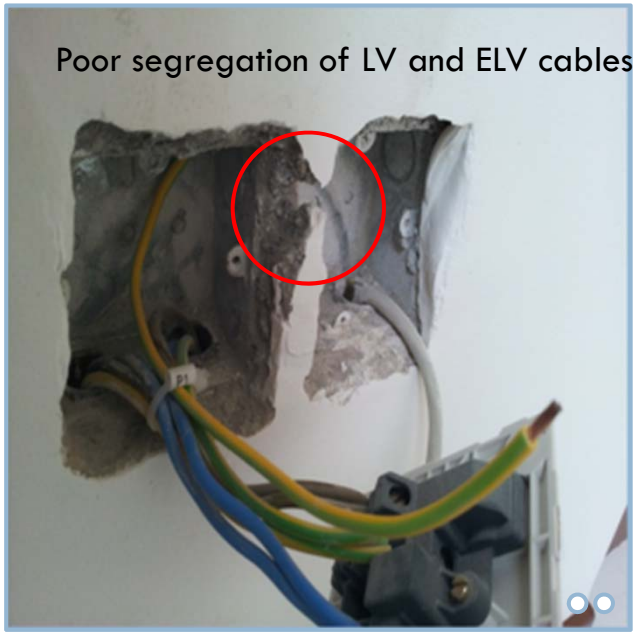
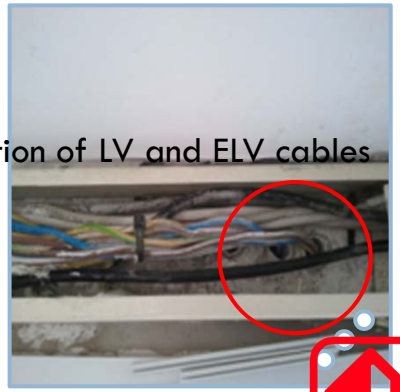


No segregation / poor segregation of LV and ELV cables. Non-compliance with SPSL's requirement







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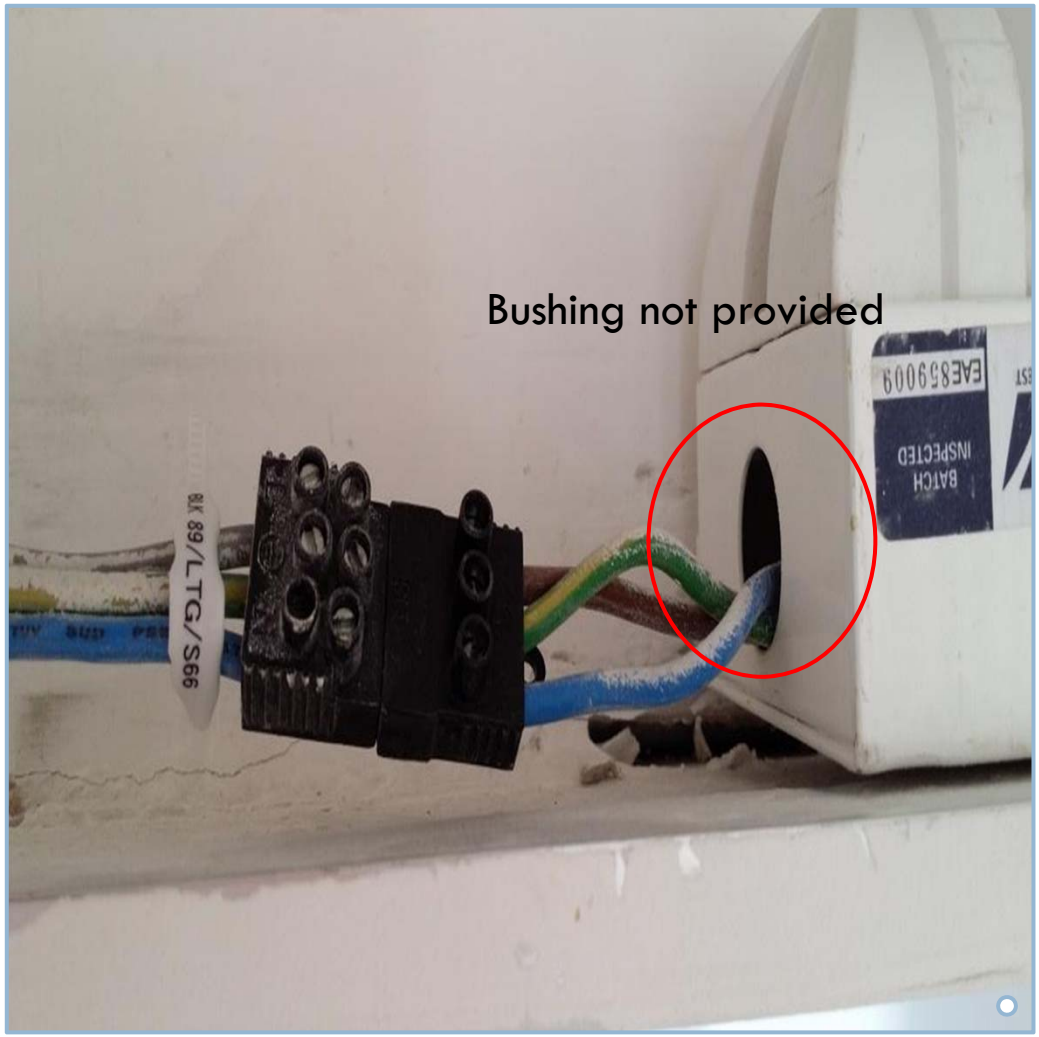

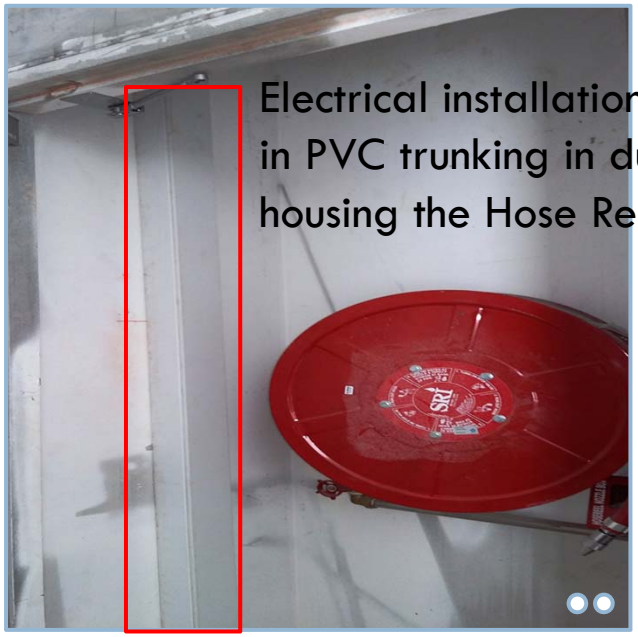

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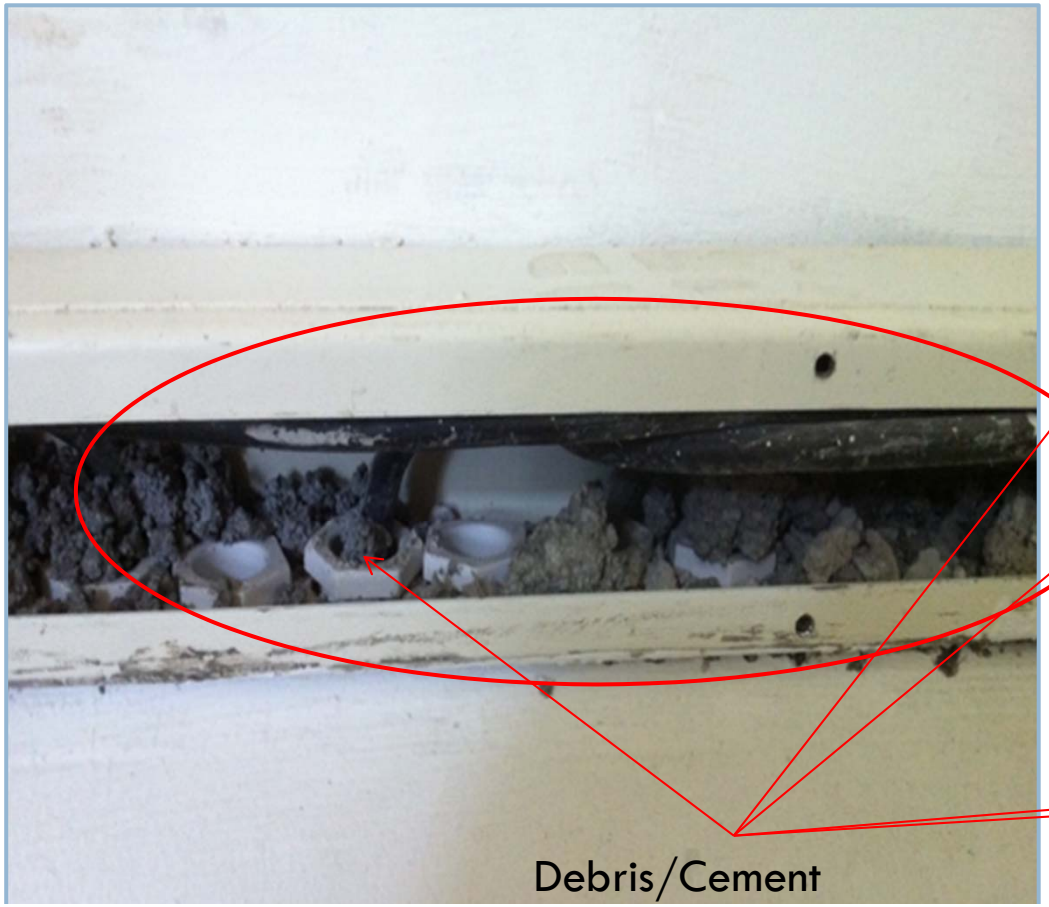

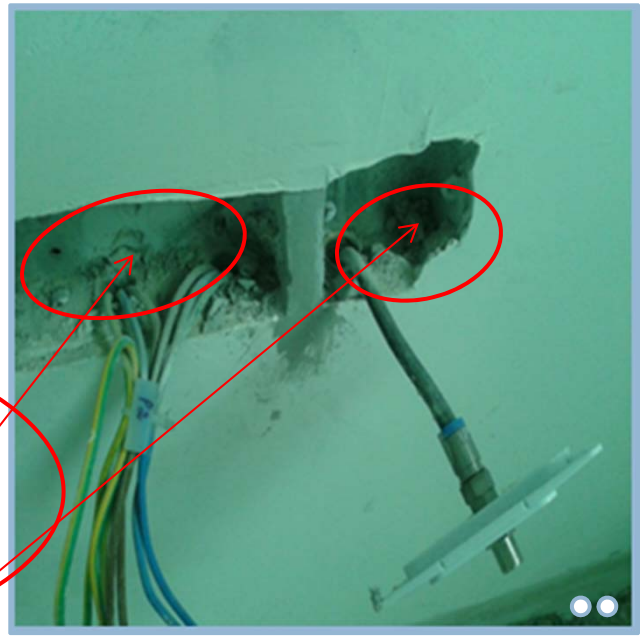



Cement stained/Debris not removed may caused choke to PVC pipes

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Improper Installation/Poor Workmanship







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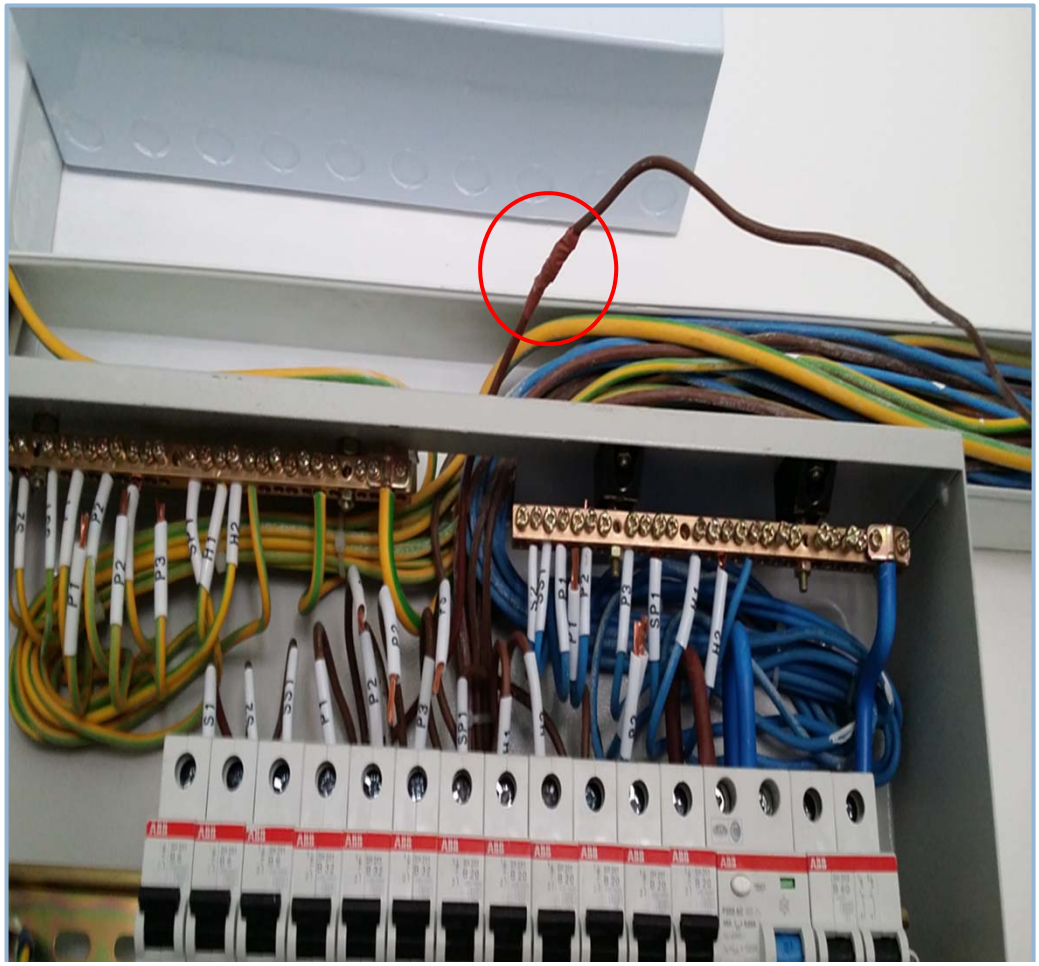
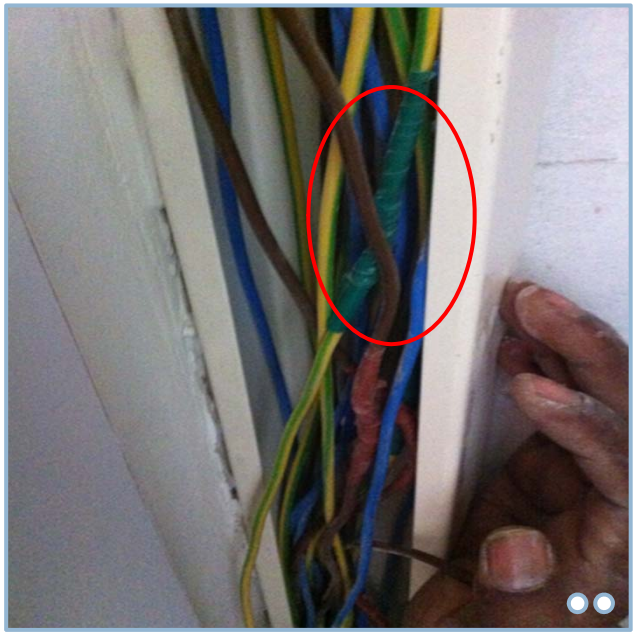
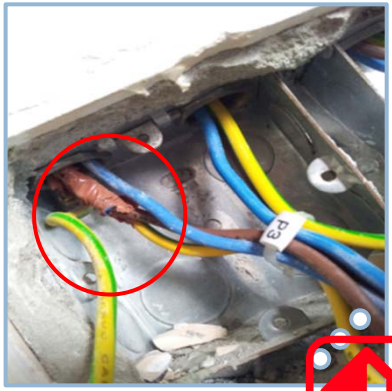
Improper Installation/Poor Workmanship



Cable Joint not allowed





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Improper Installation/Poor Workmanship



Provision for mounting of electrical meter > 1.8m. Non-compliance with SPSL requirement



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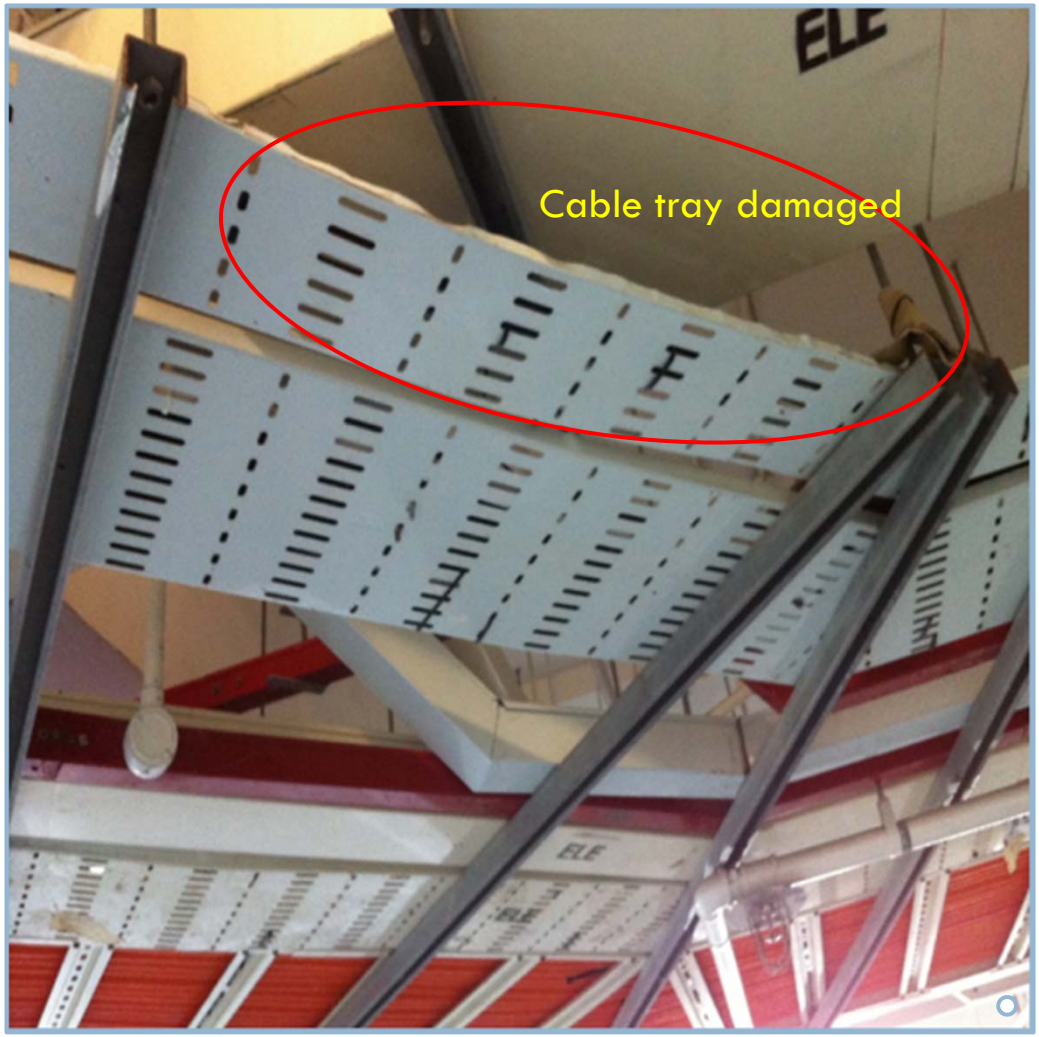





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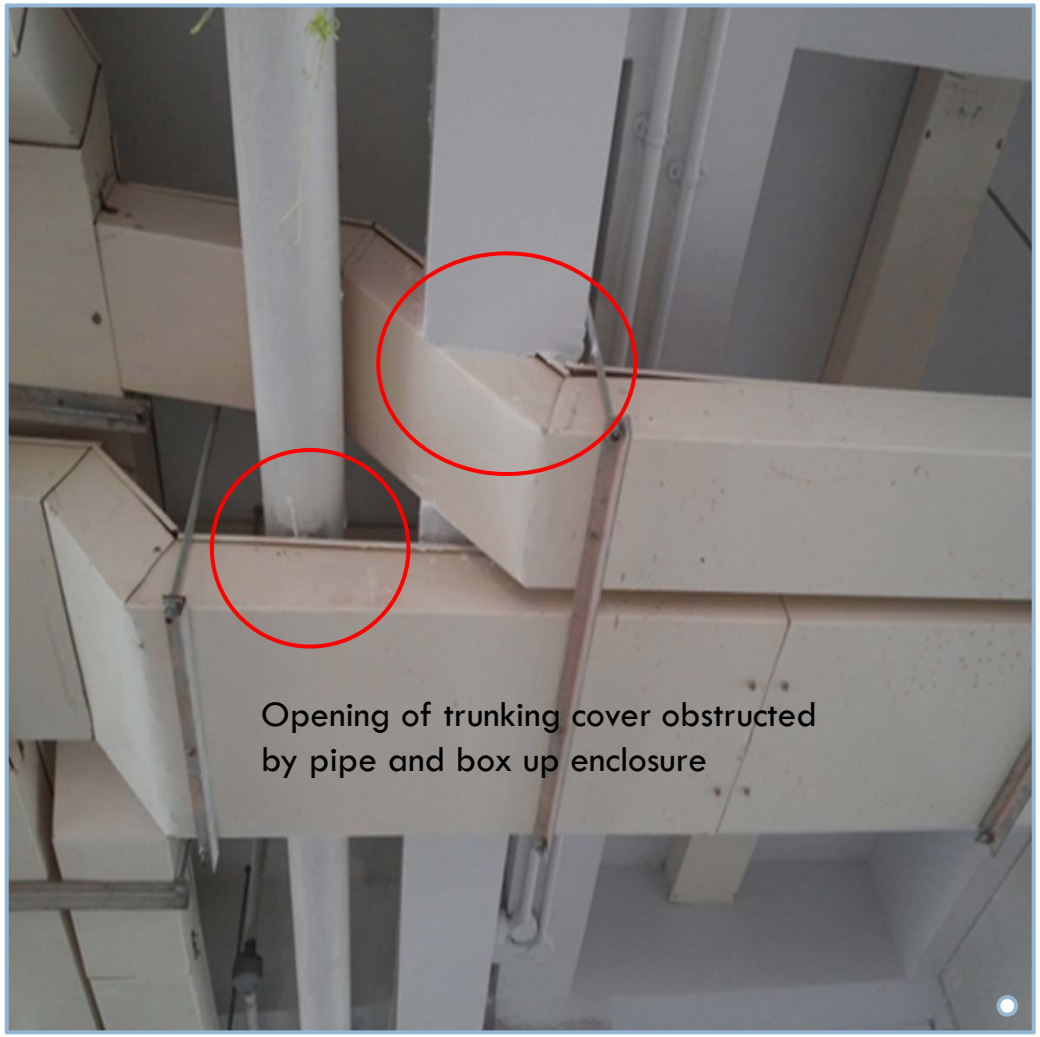
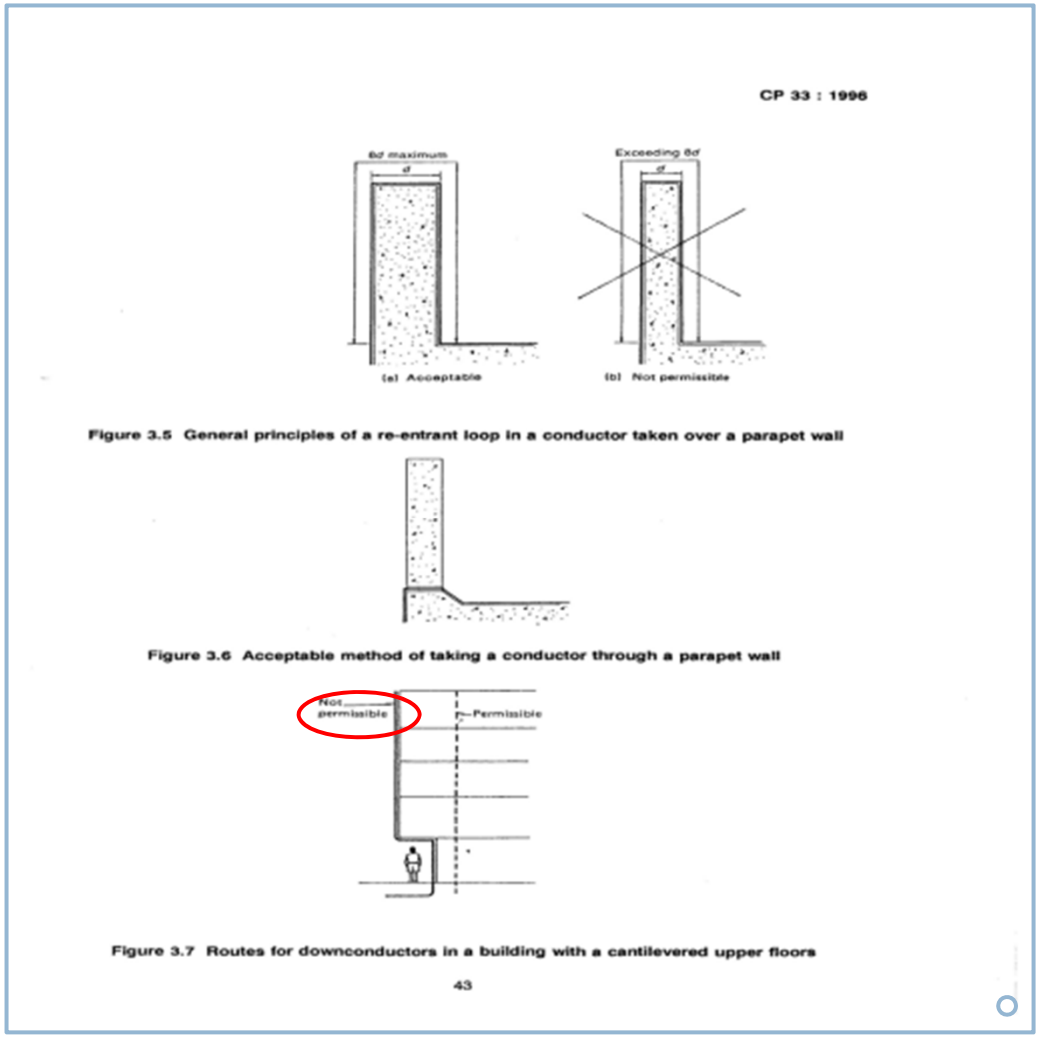




Obstructed access

Improper Installation/Poor Workmanship



CP 33 : 1996

Figure 3.5 General principles of a re-entrant loop in a conductor taken over a parapet wall

Figure 3.6 Acceptable method of taking a conductor through a parapet wall

Figure 3.7 Routes for downconductors in a building with a cantilevered upper floors

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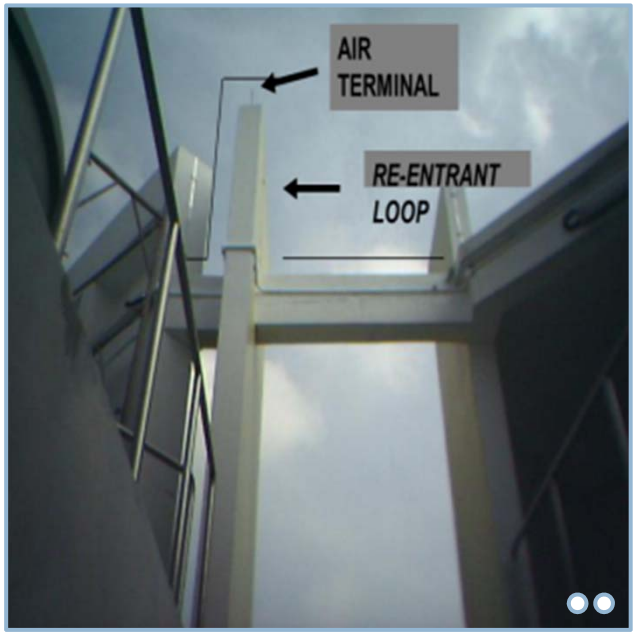
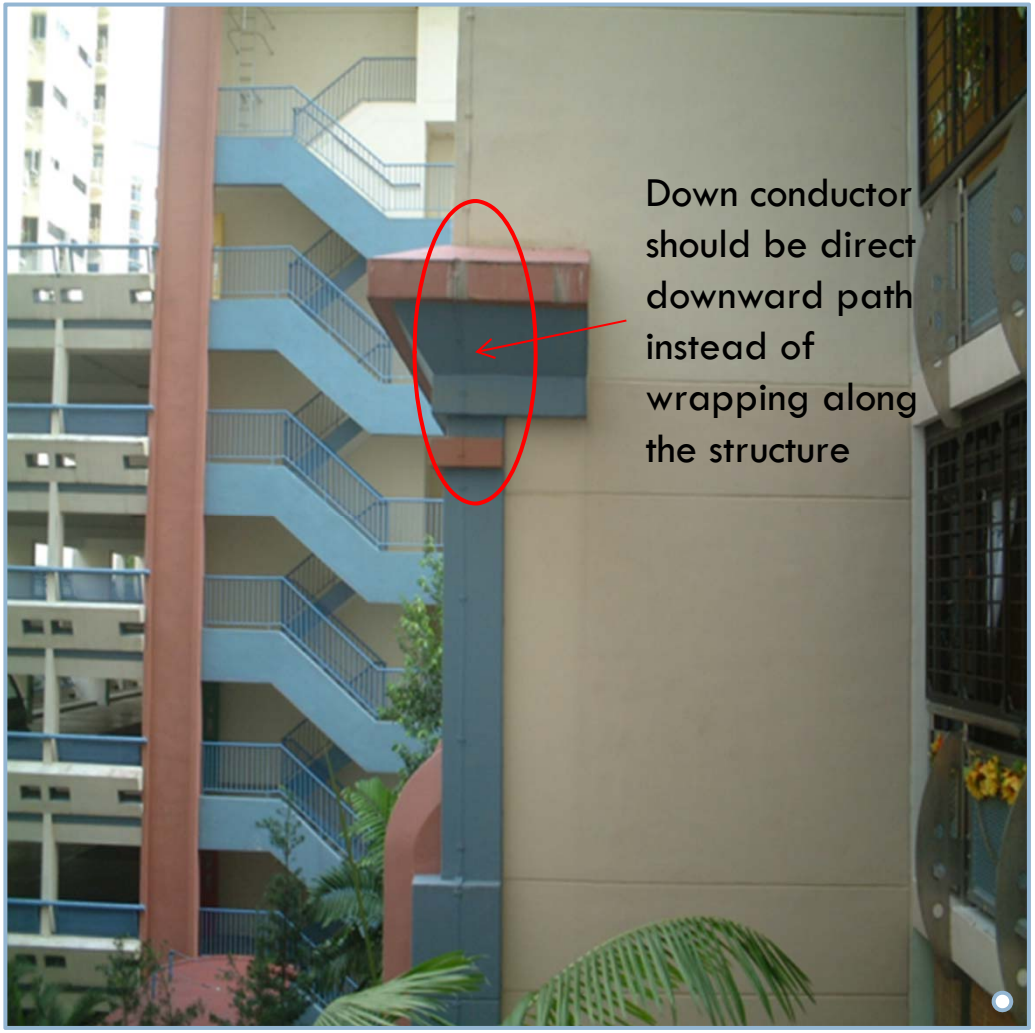




Routing for down conductor in a building with a cantilevered upper floors

Improper Installation/Poor Workmanship







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Improper Installation/Poor Workmanship



Insecure installation





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Improper Installation/Poor Workmanship



Insecure installation





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Possible Activities which may affect Insulation Resistance of Electrical Installation

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Possible Activities

- Water Tightness Test
- Ingress of Rain Water
- General Washing inside Unit and Common Area
- Rectification Work on Wall & Floor Tiles

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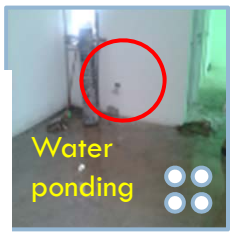
Water Tightness Test



Windows are not close when water tightness test is carried out. Unprotected electrical Installation subject to water splashing







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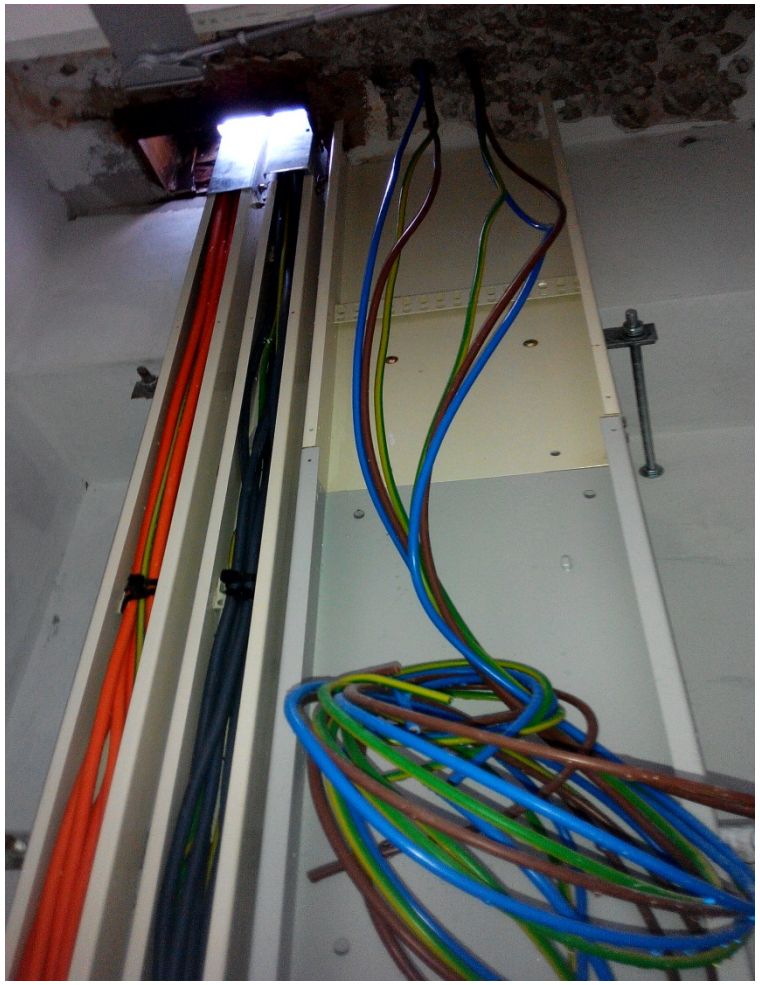
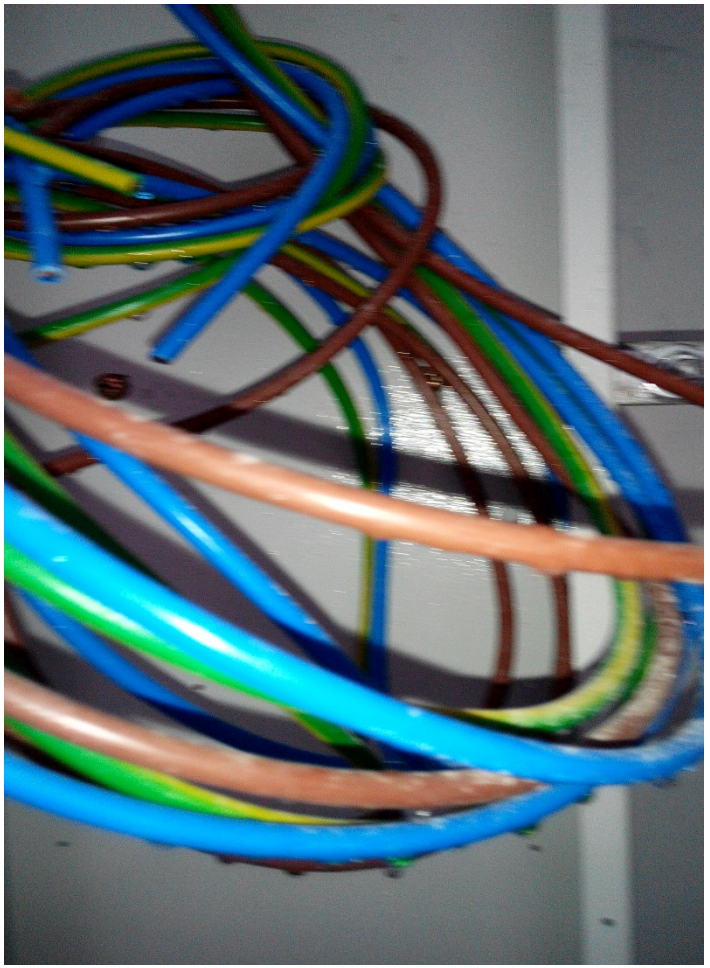
Ingress of Rain Water





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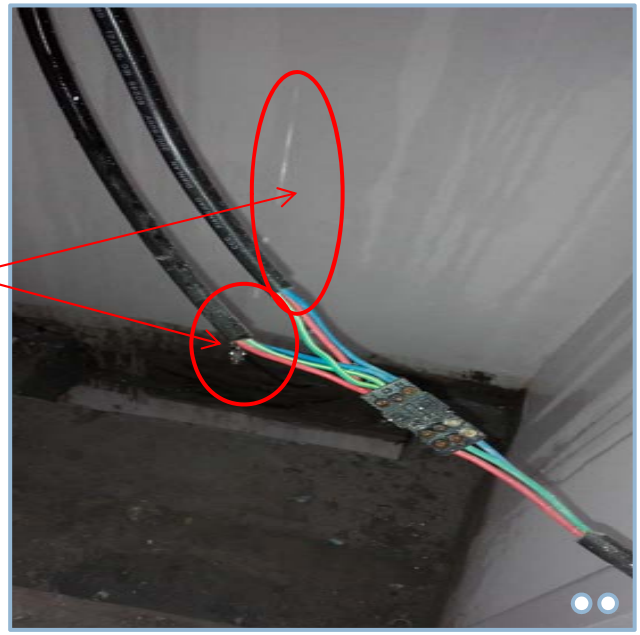
Ingress of Rain Water





Water stain mark on wall



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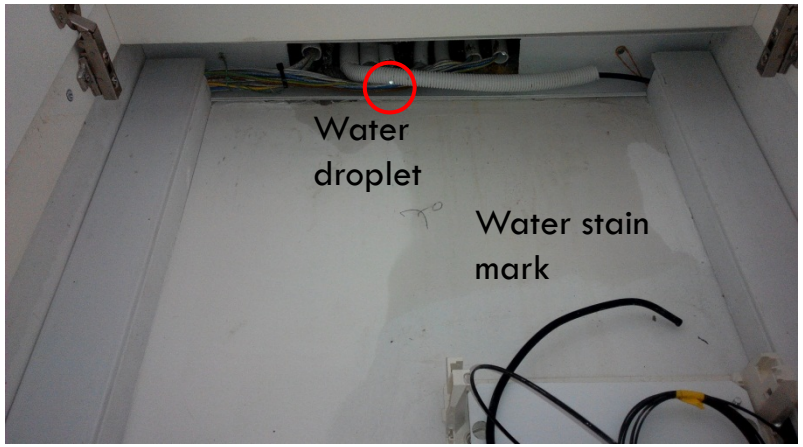
Ingress of Water in Service Closet





- Caused by
  - Water pipe leak coming from upper sty leaked through riser slab and made its way into the service closet

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Ingress of Water





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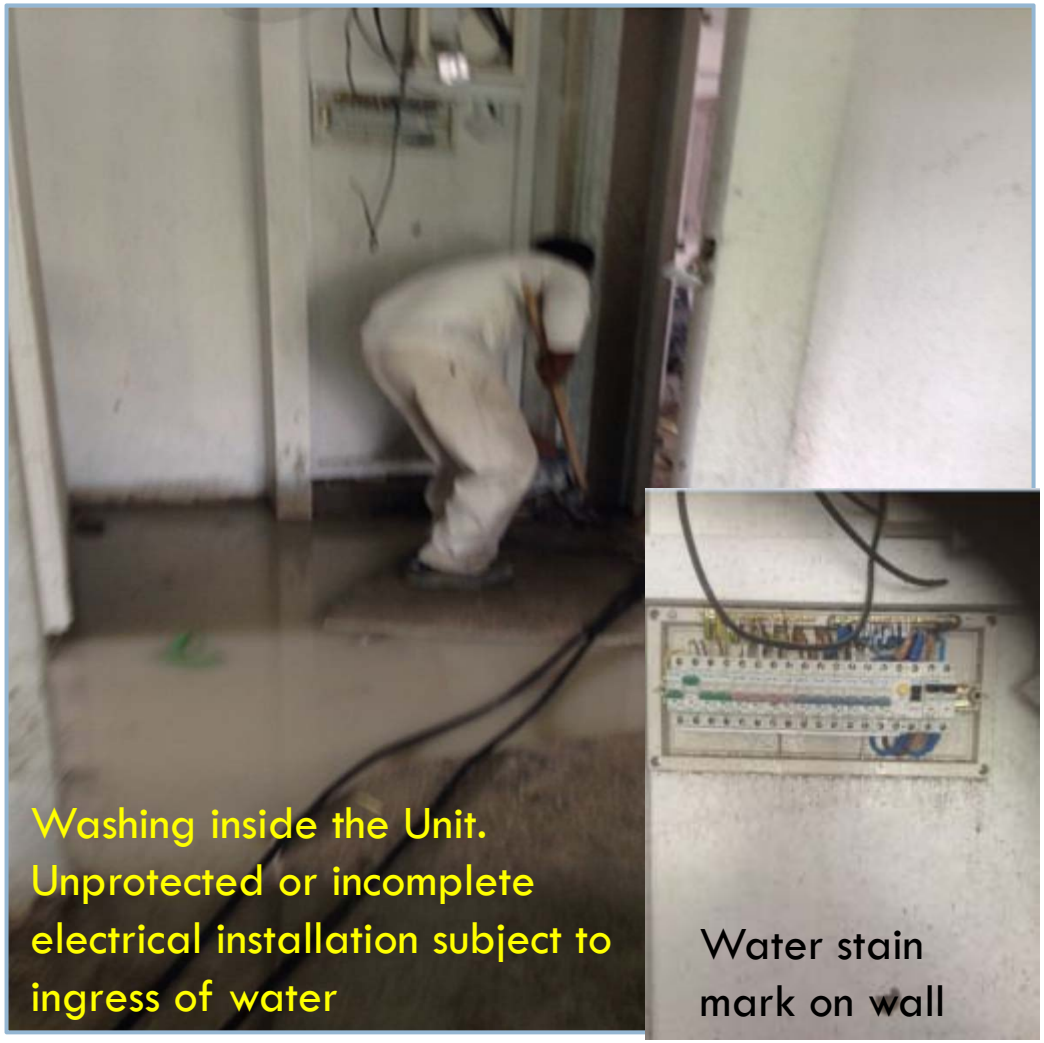
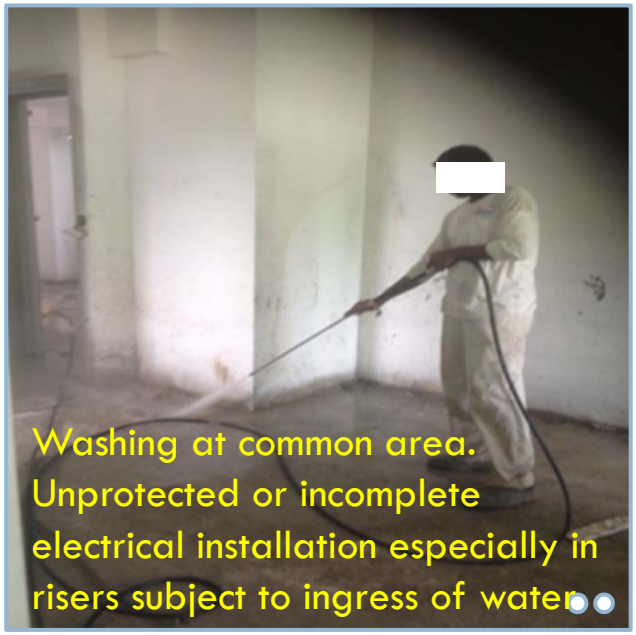
General Washing



Washing inside the Unit. Unprotected or incomplete electrical installation subject to ingress of water

Water stain mark on wall



Washing at common area. Unprotected or incomplete electrical installation especially in risers subject to ingress of water





Water Droplets

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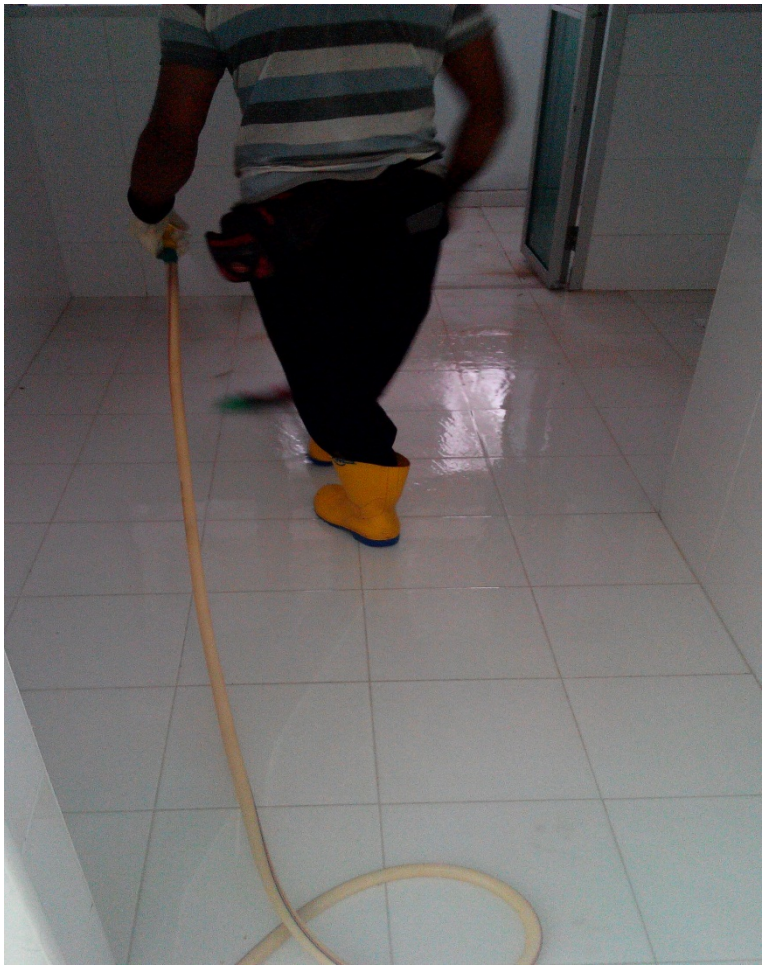
General Washing





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Burnt Installation



- Caused by
  - Electrical riser accidentally splashed over with water by worker



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Tiles Rectification Work

How it happened ?

- Worker was not briefed properly on the location of concealed wires before the hacking works.
- Concealed electrical installation damaged (open circuit) in the process of removing the tiles
- Damaged installation was not made known to the electrical sub-contractor
- Open circuit installation buried under new tiles

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Tiles Rectification Work









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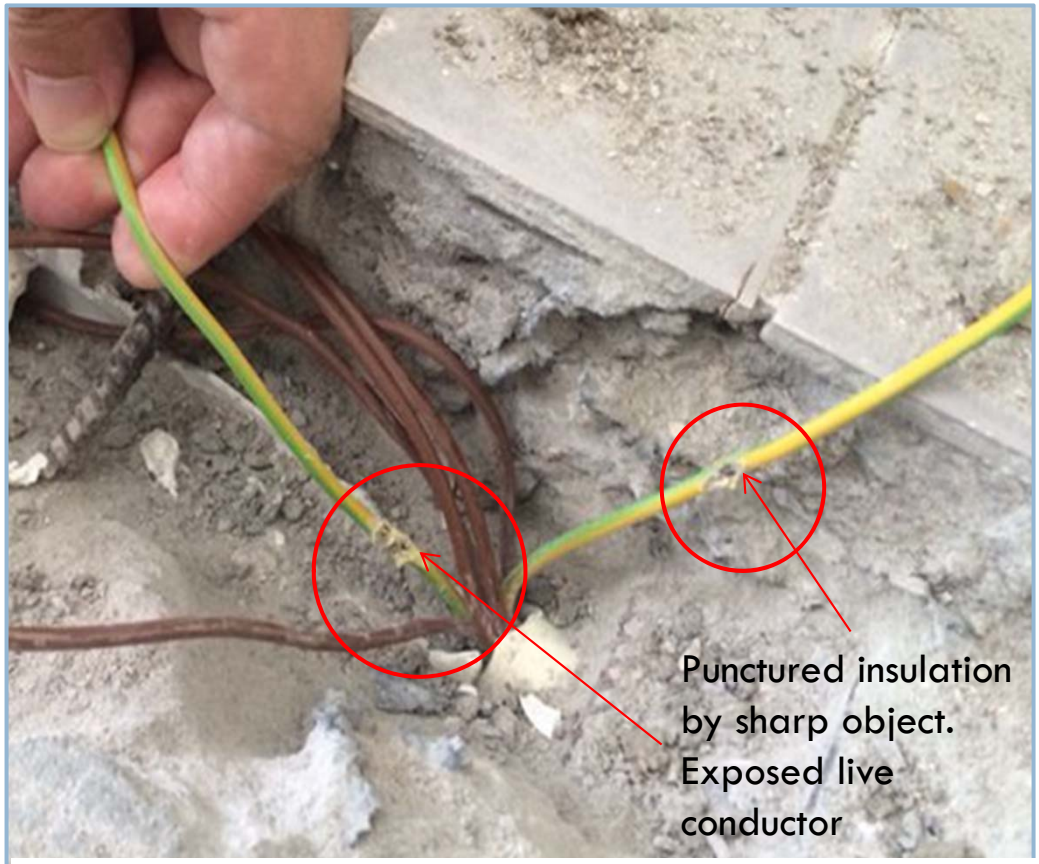
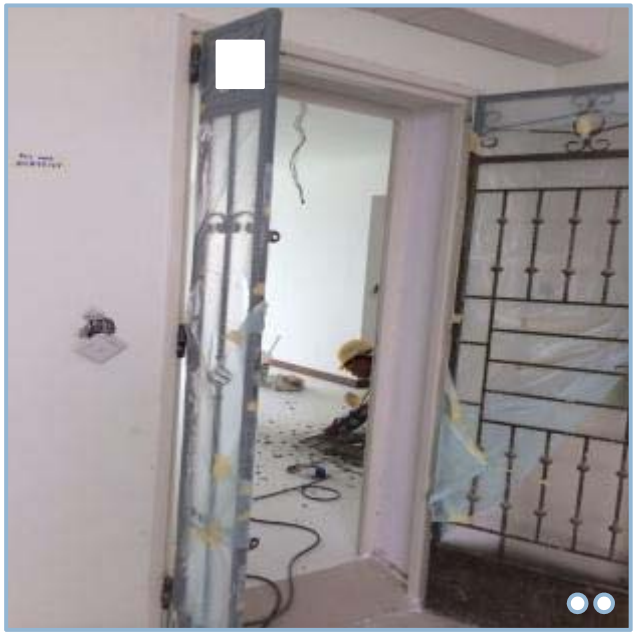
Tiles Rectification Work



Concealed PVC conduct and cable insulation punctured by sharp tool during tiles rectification work





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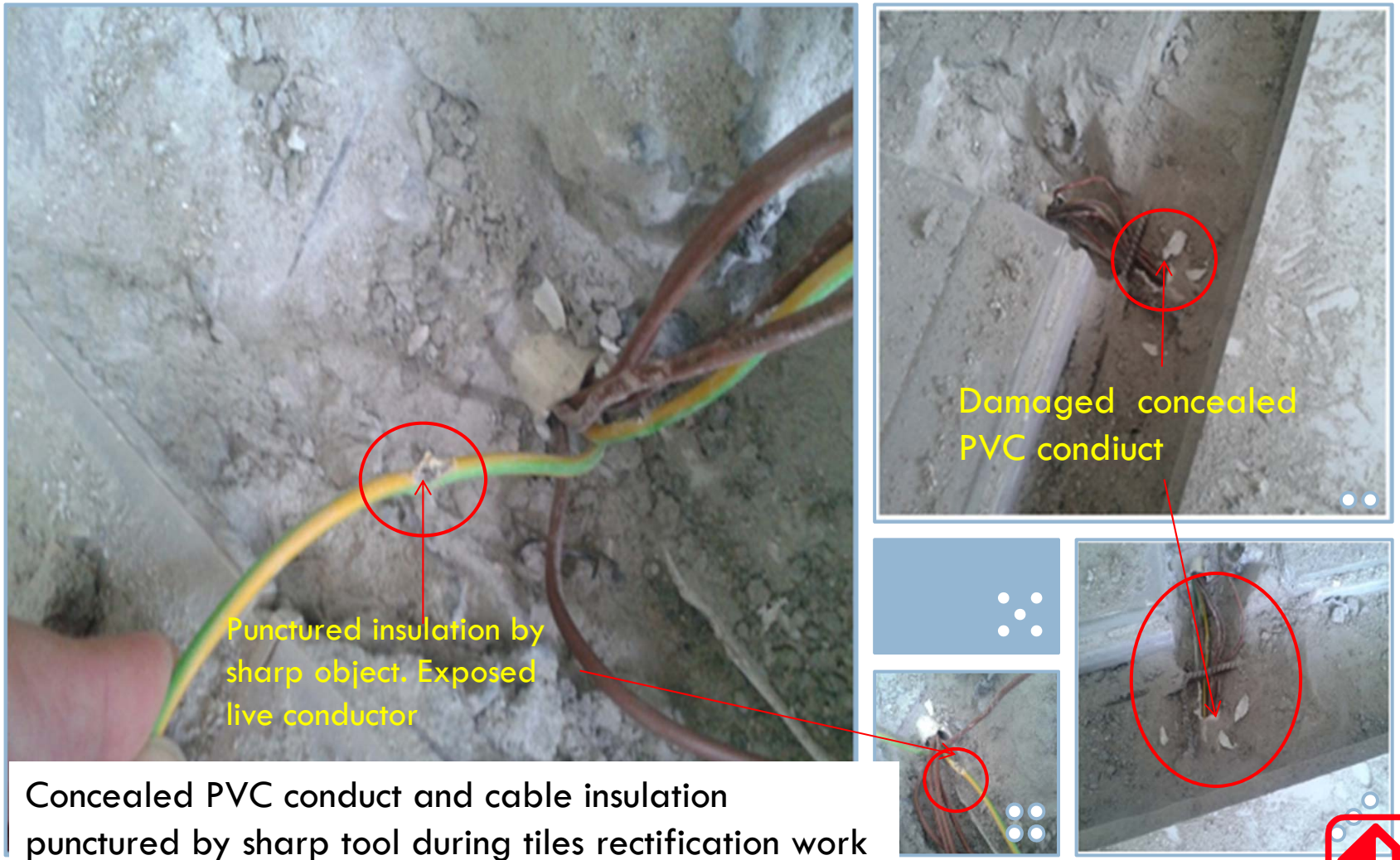
Rectification Work



Concealed PVC conduct and cable insulation punctured by sharp tool during tiles rectification work

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Learning Points (Summarise)

- Raise awareness and brief the Contractor(s)
- Site Supervision Team to monitor site activities
- Carry out visual inspection to ascertain preventive measures are put up
- Step up number of routine inspections on the day of the activity and rainy days
- Method of Statement for hacking work without damaging the concealed wiring for rectification of tiles work
- The electrical contractor to inspect and test the electrical installation before the new tiles are laid.

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Electrical Testing

- Monitor closely on new and poor contractor
- Witness electrical testing carried out
- Installation tested satisfactorily

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Streamline of Application for Unit Test

- Application of Electrical Test
  - Main Switchboard, Unit, Public Lighting and Lightning Protection System
- Streamline of application for Unit test
  - To be implemented before 1 July 15
    - Application of unit test to both LV and ELV system
    - Test date for LV and ELV system within 1 week

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Testing of Telecommunication System

- Testing of RJ 45
  - Sampling test conducted

- Testing of Telecommunication System for Sample Unit
  - Consultant to witness contractor to conduct test
  - Arrange with TM(M&E) to demonstrate the installation comply to COPIF 2013

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LED LIGHT FIXTURE

- Batch Testing is required for from tender 1 Nov 13
- Submit list of projects and LED light fixture supplier

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THANK YOU

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BACKUP SLIDES

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