Endeavour Energy

Technical Bulletin

TB 0316A Controlling Excavation and Penetration Risks When Retrofitting Holec MD4 Switchgear

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Purpose

To identify potential risks and establish minimum construction requirements for retrofitting Holec MD4 switchgear on concrete slab plinths, excluding culvert type padmounts.

Background

Retrofitting of Holec MD4 switchgear works on concrete slab padmount plinths involves the following civil and structural works in SDI182 - Retrofit of Holec MD4 Switchgear padmounts:

- Excavation to expose cables in close proximity to the concrete plinths; and
- Saw cutting of plinths to create a penetration for the cables.

These works may pose risks to the structural stability of the padmount substations and fatal risk to personnel.

Risks

1. Excavation adjacent to the padmount may compromise the integrity of the concrete footing, potentially causing structural instability and resulting in displacement or tilting of the padmount substation if support piers are absent.
2. Saw cutting of the concrete plinth, subsequent excavation and installation of the 300 – 400kg Safelink switchgear on top, may compromise the structural integrity of the plinth, creating a risk of collapse and potential crushing hazards for personnel within the excavation.

Actions

Minimum plinth requirement for retrofitting works

- Retrofitting must not be undertaken on padmount substation plinths with a thickness of less than 170mm.
- Retrofitting must not be undertaken on plinths with a width of less than 1160mm.

Where these minimum dimensions cannot be met, a full substation replacement is required.

Excavation

- Review and evaluate any site specific safety hazards associated with the plinth location, including factors such as adjacent embankments, vegetation, retaining walls or other nearby structures.
- Where possible, verify the presence of piers beneath the plinth using appropriate non-destructive digging (NDD) techniques or other approved manual excavation methods.
- If a pier is confirmed as supporting the plinth, excavation may extend to maximum depth of 900mm from ground level and temporary props will not be required.
- If a supporting pier beneath the plinth cannot be confirmed, the plinth must

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be temporarily braced as shown in Fig.1 before any excavation under the new slab or saw cutting is performed. Props must be grounded using steel plates for stability.

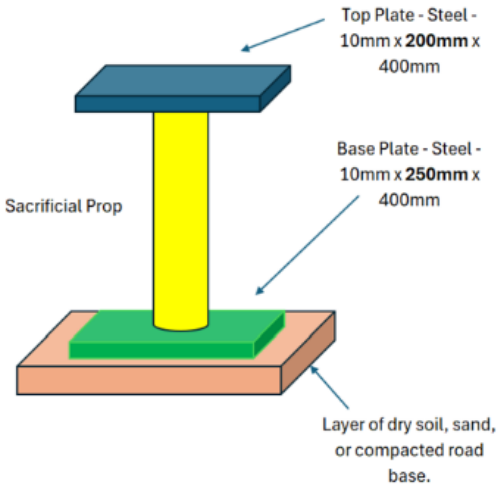

Fig. 1 Sacrificial prop

- If piers are identified as the excavation progressed, the props may be removed.
- Where excavation depth along the length of padmount exceeds 900mm, please contact Civil Design section for further advice.
- Monitor ground conditions throughout the excavation activities in compliance with GSY1015 Fatal Risk-Excavation and Penetration.

Penetration

- Fabricate slab-cutting templates to ensure uniformity and accuracy of all penetrations.
- Pre drill 100mm diameter core hole at the corners of the penetration to prevent overcutting. Refer to Fig. 2.

Fig. 2 Core hole drilling

- Saw cutting penetrations must only be performed on plinths with a depth > 170mm, maintaining a minimum concrete width of 250mm on either side of the penetration. Refer to Fig. 3.

Fig. 3 Dimensions

- Monitor slab cutting operations for any signs of cracking. If a crack is detected, immediately stop work and consult the Civil Design section for further guidance.

Post Holec replacement backfilling

- If reinforcement is present in the plinth, remove temporary props (if used) in sections and backfill to the

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base of the plinth with approved free-draining sand.

- If no reinforcement is present, do not remove the temporary props; backfill the plinth using free-draining sand.
- Sand must be placed and compacted in layers not exceeding 200mm.

Implementation

The contents of this Technical Bulletin must be implemented immediately.

Impacted Standards

- SDI 182 – Retrofit of Holec MD4 switchgear in size 5 and 10 padmounts with ABB Safelink switchgear.

Contacts

For further information contact:

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