

To conduct road tunnel in-situ inspection checks for defects on concrete walls behind claddings

Prepared By:

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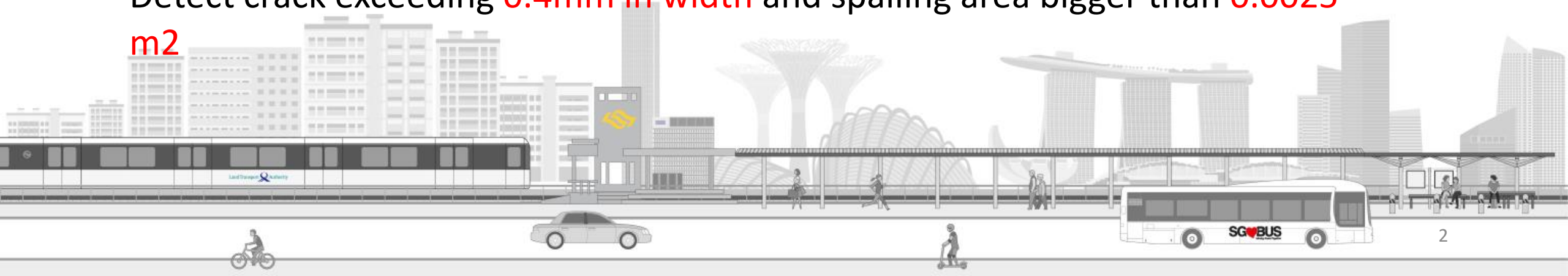


To conduct road tunnel in-situ inspection checks for defects (crack, spalling) on bare concrete walls behind cladding

Background: To pick up defects on the concrete walls in our road tunnels such as crack and spalling, our inspection contractors have to remove and reinstall the wall claddings. This removal and reinstalling work require about 4 workers and a total inspection time of about 20mins for each cladding unit.

Requirements:

- Reduce manpower required to at most **2 workers**
- Reduce time required for inspection per cladding unit to **10mins**
- Detect crack exceeding **0.4mm in width** and spalling area bigger than **0.0025 m²**



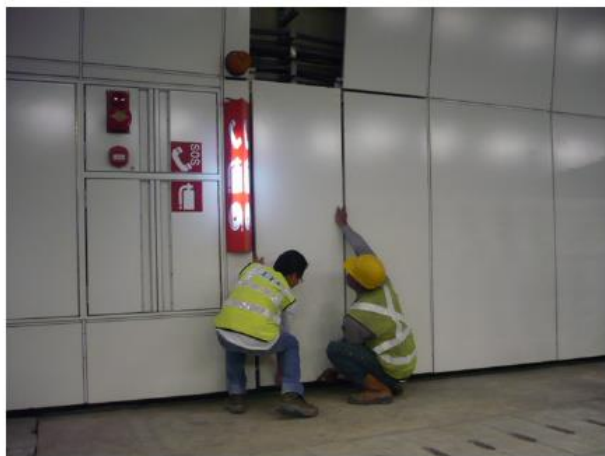
Steps to remove cladding



1. Take out the screw on the tension plate lower cladding



2. Pull out the tension plate for lower cladding



3. Lift up the lower cladding panel



4. Unscrew and remove the tension plate for the top cladding



Steps to remove cladding



5. Lift up the top cladding



6. Cladding after taking off



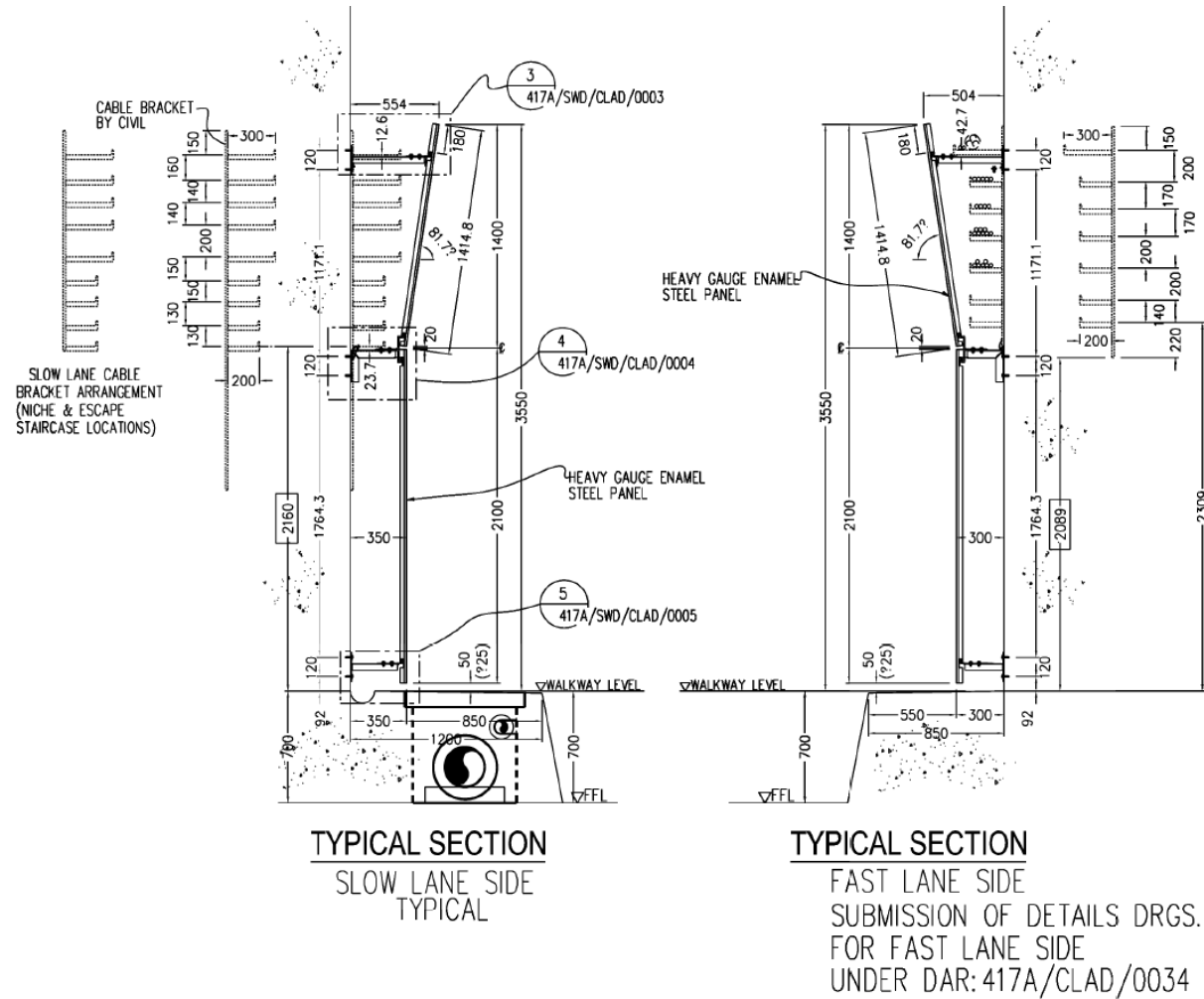
Showing the brackets to hold the cladding. Width approx. 300mm

Items Needed

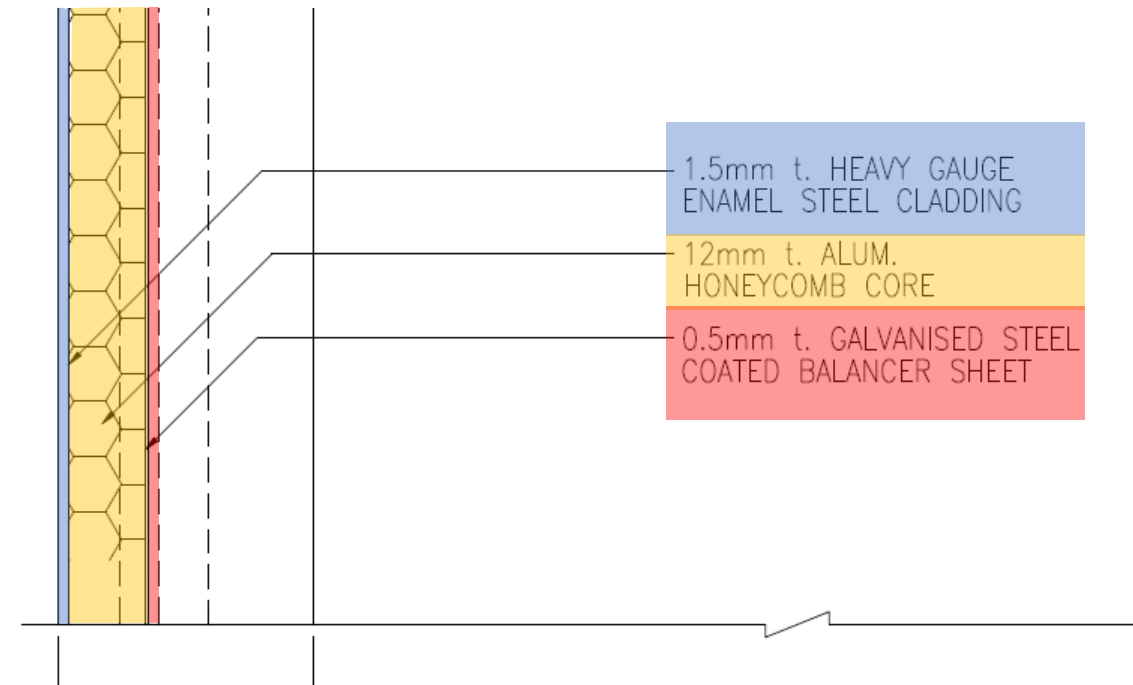
- 1 x TMA
- 50 x cones
- 4 x workers
- 1 x Scaffold Platform
- 1 x Hammer
- 3 x Cordless Screw Driver
- 3 x philip Screw driver
- 3 x spanner



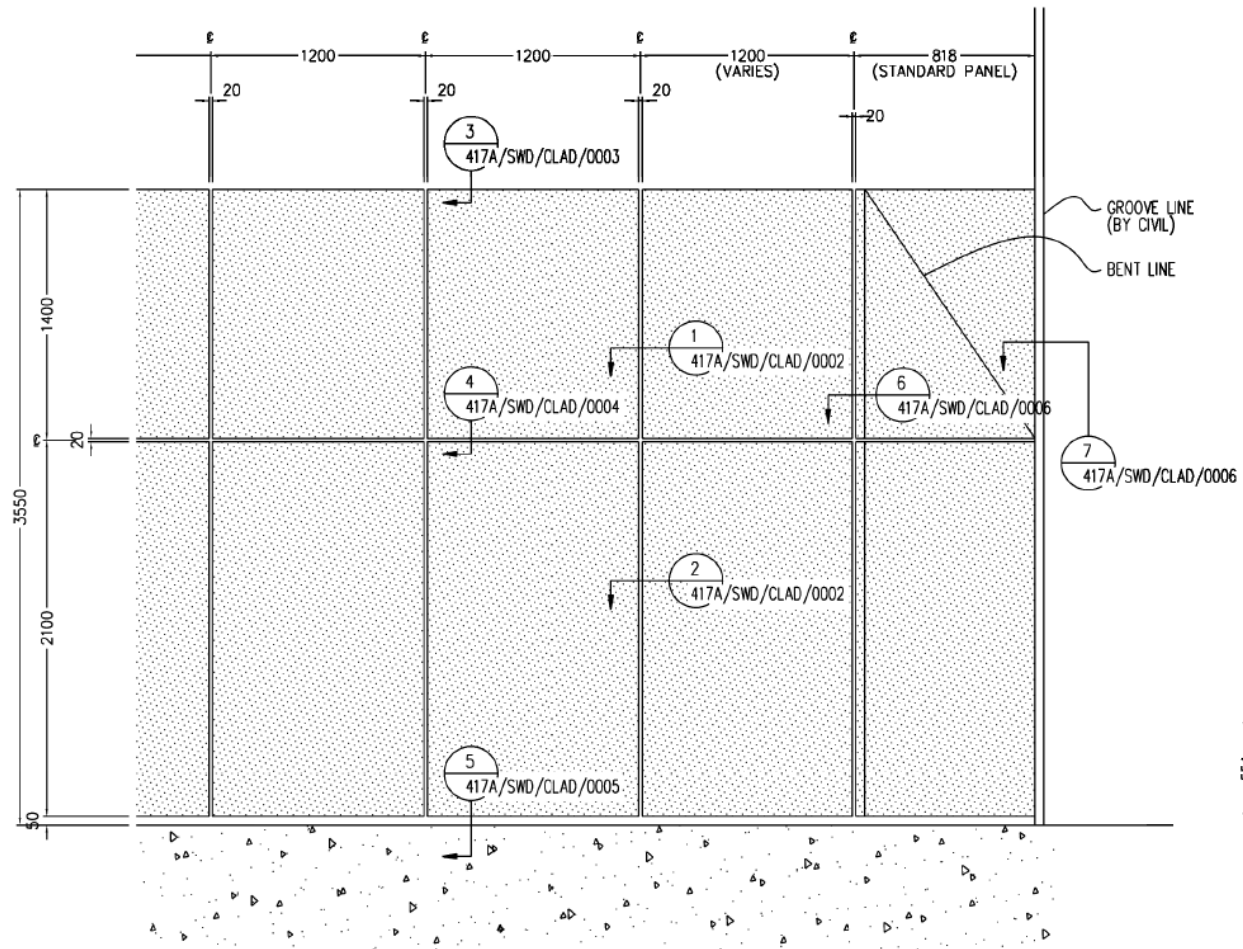
Cladding details



Wall Claddings refer to Vitreous Enamel **14mm thick** wall claddings (1.5mm enamel steel + 12mm aluminium honeycomb + 0.5mm steel coated balancer sheet).

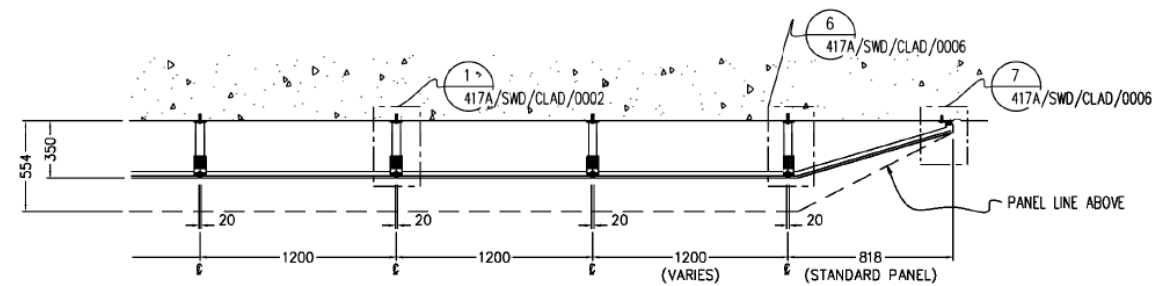


Cladding details



TYPICAL ELEVATION

The Claddings are typically **1.2m wide** and **3.5m high**, with a **350mm gap** between the cladding and the concrete wall.



TYPICAL PLAN
SLOW LANE SIDE



Additional Information

- Timeline: Successful solution needed by **2Q 2021**
- Only KPE and MCE tunnel uses the Vitreous Enamel wall cladding system.
- Length of KPE tunnel = 8.4km
- Length of MCE tunnel = 4km.



Photo for Reference



Wall claddings

Concrete spalling

Surface cracks



Evaluation Criterion	Weightage (%)
1. Technical feasibility of solution	30
2. Innovation	20
3. Economic Feasibility and Commercialization Potential (Include development cost and final product cost)	30
4. Capacity and Expertise to Execute Project	20
Total Score	100



Thank You

