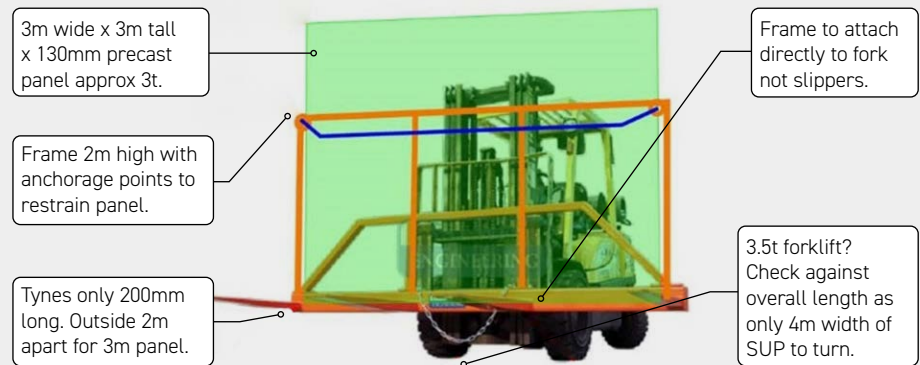


# CUSTOM PRECAST PANEL LIFTING FORKLIFT

Development of a custom plant attachment to allow lifting of precast panels within space constraints.

Metropolitan Roads Program Alliance (MRPA) have worked with East West Engineering to develop a plant attachment combination that allows precast panels to be lifted into place within a restricted space. This innovation provides a solution that safely works within the space constraints of the project whilst still providing adequate stability.



East West Engineering concept design

## The situation

The Clyde Road underbridge required cladding of the shotcrete wall with precast concrete panels. During the early planning phases, the project team assessed the option to install the precast panels, using conventional craneage, to the underside of the bridge before the installation of shared user path (SUP) backspans.

When the precast supplier was unable to deliver the panels during the occupation, the team needed to progress the installation of SUP backspans to ensure the critical path was not impacted. This meant the precast panels could not be installed using the planned crane methodology and would be installed between the SUP backspans while the bridge was operational.

The height of the bridge and the constraints of the SUP limited the size of equipment that could be used. Conventional equipment was either too bulky or too unstable, prompting MRPA to develop a new attachment that could safely lift the 3-ton panels into place without disrupting the existing structure or rail services.

## The solution

MRPA investigated possible solutions and found that a small forklift provided a stable transport option that fit within the space constraints of the SUP and underbridge height. However standard forklift tynes, used to attach items to the forklift, ran the risk of colliding with the underbridge retaining wall.

This prompted MRPA to explore the possibility of fabricating a custom precast installation frame which can attach to a forklift. By developing a wider forklift base with tynes shorter than the precast panels, the precast panels could be successfully lifted into place without disturbing the rest of the structure.

A concept sketch of a custom forklift frame was produced and sent to specialist fabricator, East West Engineering. With similarities to a FFS300L fork spreader; however, it features a direct attachment to the fork (no slipper), with tynes only 200mm long (to avoid protruding into the wall). MRPA undertook temporary works for strapping the panel and updated the risk assessment to enable the attachment to be used on the fork. Calculations for weight and tip over points were completed and certification plates updated.

## Benefits and learnings

This innovation provides a solution that safely works within the project space constraints while still providing adequate stability and has the potential to offer a more compact solution to future projects with similar space constraints.

The manufacture of the 3-ton fork spreader was a once off cost but can now potentially be used at different sites and this innovation could be adopted by other alliances.

Depending on site conditions, where the concrete panels' final position is compared to where a crane can set up will often result in the use of a larger crane to reach the final install position.

With the custom-made frame solution, a smaller crane can be used to load the forklift and can then be driven to the final install location reducing the cost of lifting operations using large cranes.

**Program Office:** Level Crossing Removal Project  
**Work Package:** Clyde Road Level Crossing Removal  
**Principal Contractor:** Fulton Hogan  
**Solution Vendor:** East West Engineering

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