



Swanson Dock East Berths Remediation and Strengthening

PIANC APAC September 2022
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01 Introduction

Swanson Dock East (SDE) is one of the busiest container terminals in Australia.

Upgrading and rehabilitation was identified by Port of Melbourne (PoM) to extend the life of the existing wharf assets and cater for newer generation container ships.

PoM engaged McConnell Dowell in an Early Contractor Involvement (ECI) process for SDE which lead to successful outcomes for the project.



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Project Information

Item	Comments
Contractor	McConnell Dowell Constructors (Aust) Pty Ltd
Project Name	Swanson Dock East Berths 1 & 2 Subsidence Remediation and Wharf Rehabilitation Project
Client	Port of Melbourne (PoM)
Consultants	Permanent works design - Aecom (engaged by PoM) Temporary Works – McConnell Dowell and WGA
Contract Dates & Duration	<p>ECI Submission: 10 May 2017</p> <p>Berth 1 Contract Award: 8 June 2017 Practical Completion: 22 August 2018 Actual Practical Completion Date 17 July 2018 (30 work-days ahead)</p> <p>Berth 2 Stage 1 Executed Contract Date: 27 August 2018 Date for Practical Completion: 7 June 2019</p> <p>Berth 2 Stage 2 Executed Contract Date: 6 June 2019 Contract Date for Practical Completion: 22 December 2020 Actual Practical Completion Date: 23 November 2020 (25 work-days ahead)</p>

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Swanson Dock East – Collaborative Contracting

Swanson Dock East upgrade was awarded in two stages, each with two distinct phases:

- 1) The Early Contractor Involvement (ECI) phase which included early procurement ; and
- 2) the construction phase under a collaborative, construct only contract, working closely with PoM, and their designer (Aecom).

The ECI phase resulted in

- significant benefits to PoM in planning, cost, logistical, safety and environmental outcomes.
- An improved and refined design prior to issue of the IFC documentation.
- A close working relationship between the stakeholders which flowed into the construction phase.



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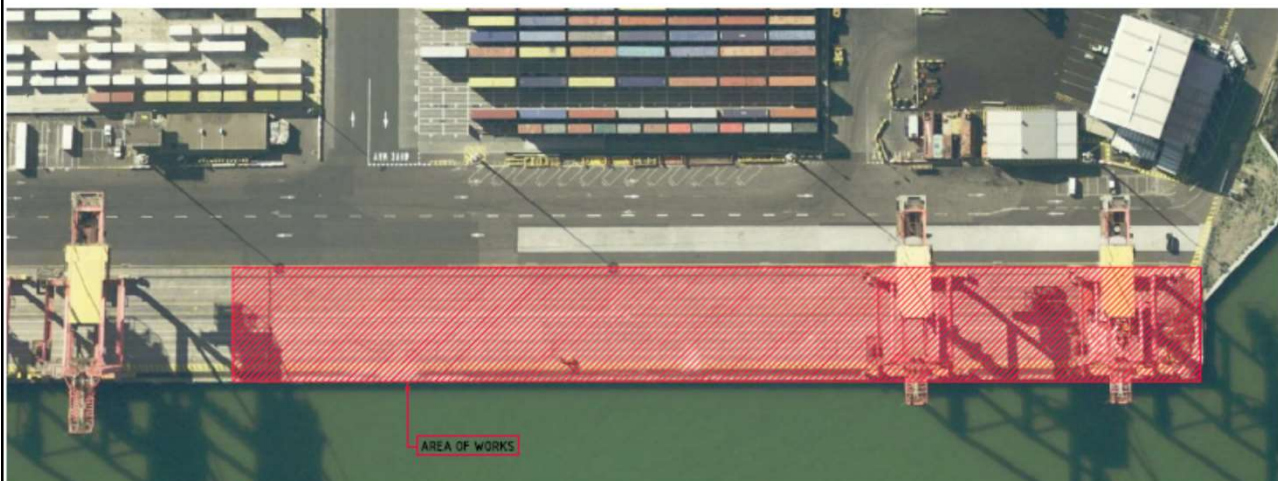
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Berth 1

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Project Scope – Swanson Dock East - Berth 1

- Work Zone Width – Maximum 40 meters
- Work Zone Length – split into 2 zones with only one zone under construction at a time.
- Stage 1: Ch 5 to 90, Stage 2: Ch 90 to 240.



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Key Project Challenges

Complexity of Work

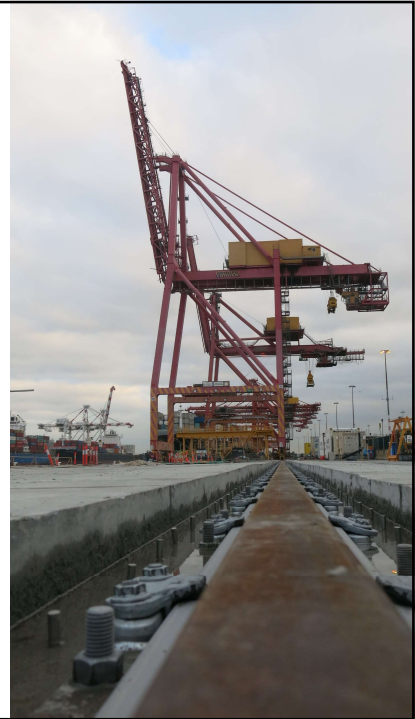
- Provide two berths for the terminal operator at all times
- Works required over the full width of the deck eg. piling at rear of wharf, fender beams
- Spatial restrictions e.g. drop zones for piles
- Multiple mobilisations due to 2 zones – lack of continuity in works

Technical challenges

- Existing deck capacity – loss of support from timber piles at rear of wharf
- Detailed temporary works assessment required to confirm allowable equipment loads and locations.

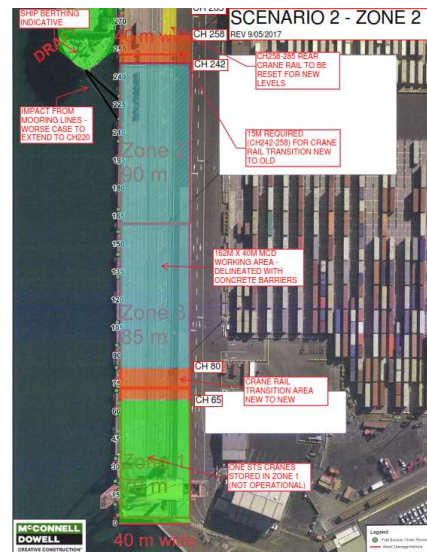
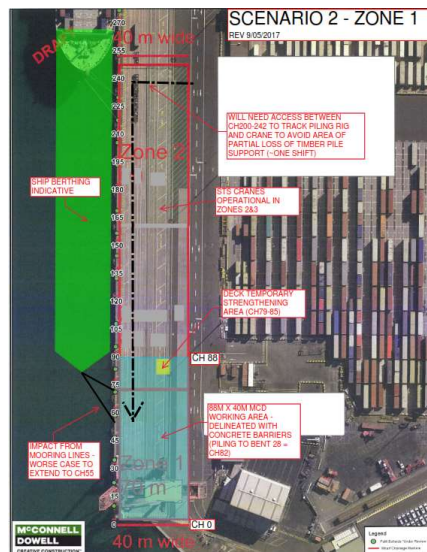
Capacity, resources and logistics

- Working around shipping and in a 24/7 operating container terminal.
- All deliveries to work site through the terminal undertaken under escort



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Berth 1 Staging



Zone 2

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Construction Scope - typical cross section

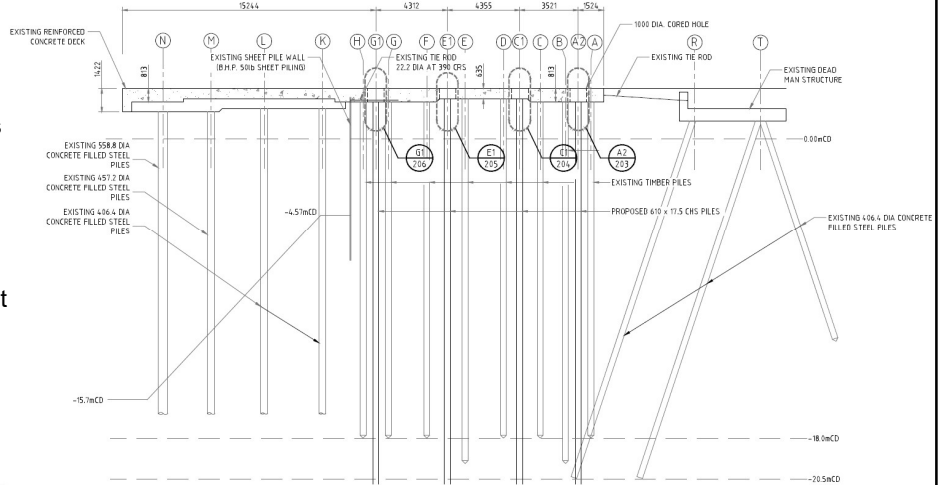


Key Challenges

Grids A-H - cannot load timber pile area while installing new steel piles

Maintain tie rods for wharf stability

Restricted work zones – cannot do works on front of wharf during piling at rear



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Construction Methodology - Piling

- Piling challenges
- Restricted working zone for crane.
- Restricted laydown for piles
- Temporary works frame required to spread loads from Piling leader



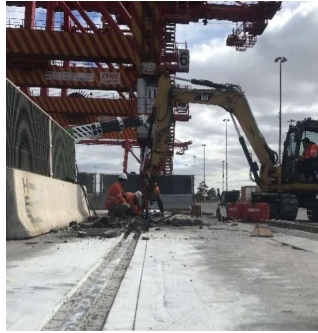
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Construction Methodology – Crane rail Replacement

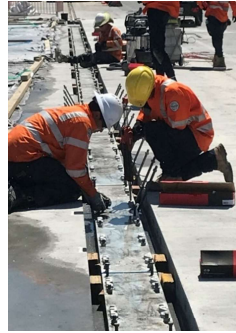


Crane rail replacement

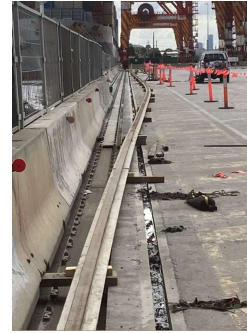
- Done in stages to allow relocation of cranes to the south end of Berth 1
- Required a number of new to old transitions



Removal of old rail system.



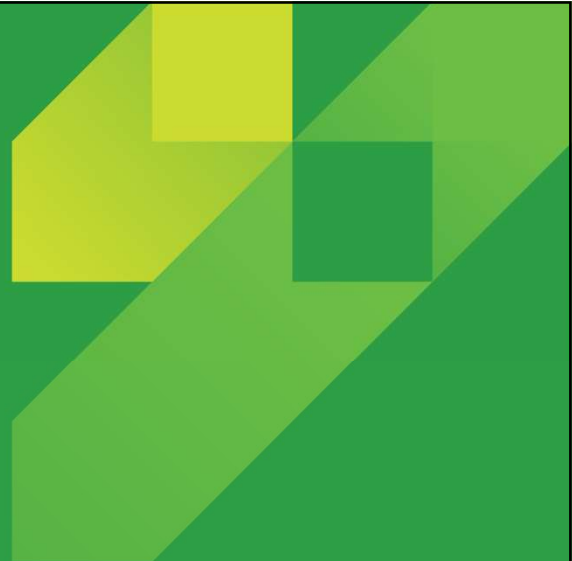
Drilling and installing hold down bolts



Landside rail install.

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03 Fender Access Frame



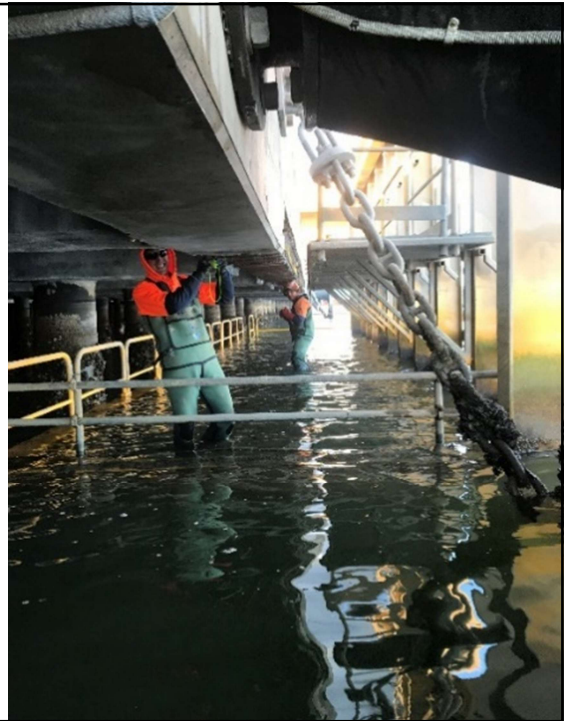
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Fender Beam Rehabilitation

CHALLENGES:

- Interface with ship mooring lines
- Tidal influence – bottom of fender beam is about 500mm above high tide.
- Provide workers with a safe, stable work platform to access all concrete faces.



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Fender Access Frame

The modular design makes installation and removal safe and quick.

The perfect solution for work within this busy port.

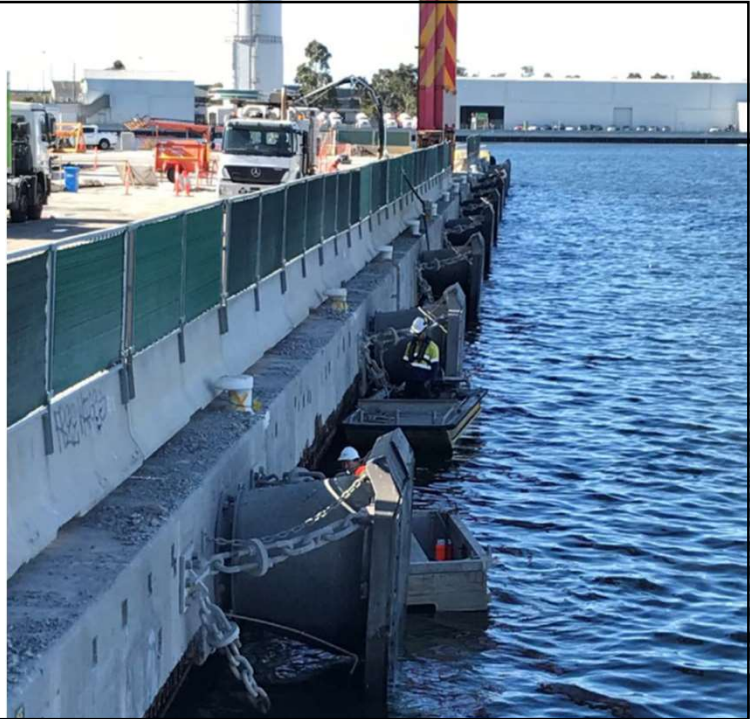


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Fender Access Frame

The "traditional" method of wharf fender rehabilitation.

Uncomfortable, time consuming, higher risk profile.



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Fender Access Frame

- Two frames in use.
- Each measures 16.5m (L) x 6m (W) x 4.5m (H).
- Designed by McConnell Dowell and locally manufactured.



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Fender Access Frame



The final design was the product of extensive consultation between McConnell Dowell's construction specialists, TW designers and, most importantly, our workforce.



Eliminates the need for cantilevered scaffolds, the frames minimise the risk of falling from height and drowning - a known fatality risk in marine projects.

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Fender Access Frame

Hydro demolition mid deck.

Note the clear, unimpeded access for the worker whilst clad in the cumbersome but necessary PPE.



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Swanson Dock Works – SDE Berth 2 and 150t Bollards

Berth 1 and 3 available with some LOA restrictions.

Mooring line encroachment in work areas requires access for line crews & protection for workers.

Pile lifting drop zones interaction with terminal operational areas.

Fender Beam repairs done using fender access frames where possible.

150 tonne bollard upgrades at 4 locations on SDE and SDW around ship movements.

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Key Challenges and Solutions

- Minimise disruption to terminal operations
- Restricted work sites due to surrounding terminal operations
- Load limits of existing wharves imposed major restrictions on construction methods
- Fender rehabilitation via the access frames kept separate from wharf deck rehabilitation
- Subcontractor resource availability & minimize concurrent trades / congestion in one area
- Packaging of works to suit subcontractor’s capacity and capability
- Work sequence developed to cater for terminal operator’s new crane deliveries (late 2019)
- Minimizing plant and equipment mobilizations for high cost trades (eg piling, hydro-demolition).



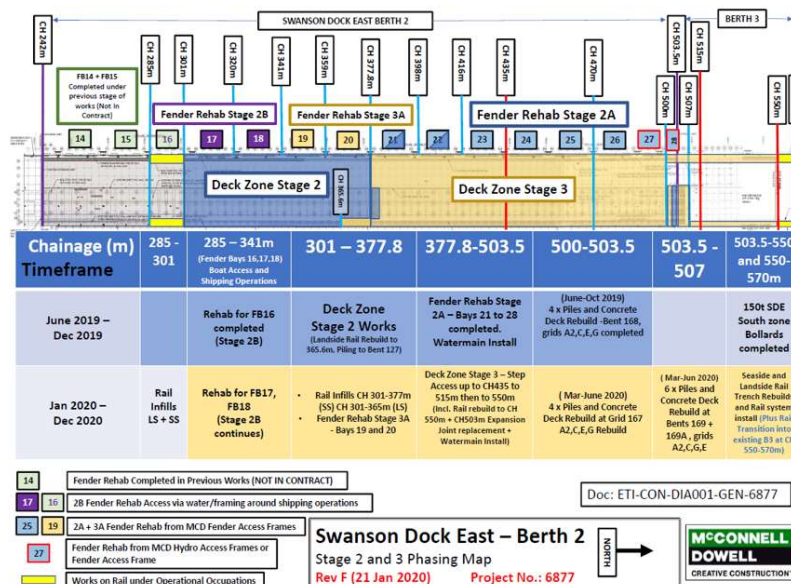
MCD Tender No. AU-VIC-4425- Swanson Dock East Berth 2 Stage 2 Project

BASED ON NBS-NEB-TEM-005-GEN-GRP REV1 18OCT2018

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Project Description - SDE B2 Stage 2/3 Scope

- The scope of works for Stage 2/3 was undertaken in two broad stages to minimise project impacts to shipping operations of the terminal operator and PoM.
- Blue = Works June-Dec 2019,
- Yellow = Works Jan-Dec 2020,
- Purple = Restricted access to bays around shipping.



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05 Conclusions

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Conclusions

- ECI provides major benefits to clients by including the Contactor's planning and constructability advice into the design.
- Detailed planning and sequencing of works in small, tight work zones is key to successful delivery.
- Innovative methods such as the Fender Access Frames are key to achieving productivity and quality work.
- Constant communication and consistency of key team members during the ECI and construction phases leads to great project outcomes.



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