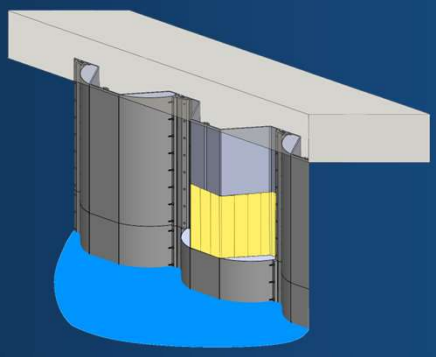
Sheet Pile Wall Protection with Denso SeaShield 2020SP

David Edelman – Edelman Projects Pty Ltd
with
Denso (Australia) Pty Ltd



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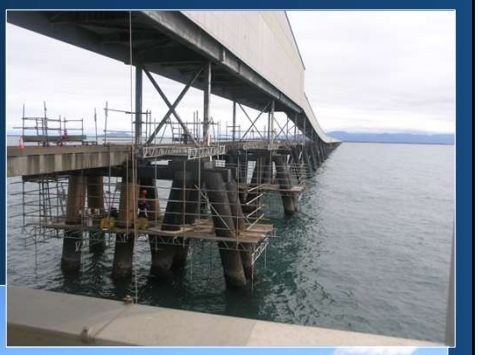
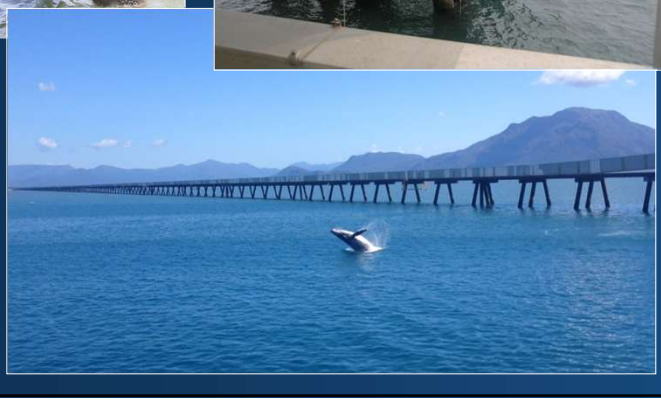
David Edelman

- Infrastructure Project Manager at Port of Townsville Limited (current)
- (previous) Project Engineer at Queensland Sugar Limited
- Managed corrosion protection on the 5.7 km long Lucinda Bulk Sugar Terminal Jettty
- Switched pile protection from blast and paint to petrolatum jacket systems (Denso SeaShield™ 2000FD)
- Published a case study in C&M November 2017 detailing the long term *and* short term cost savings we were able to achieve through use of petrolatum tape systems at Lucinda Bulk Sugar Terminal

Come and talk to me about channel widening and ship to shore cranes





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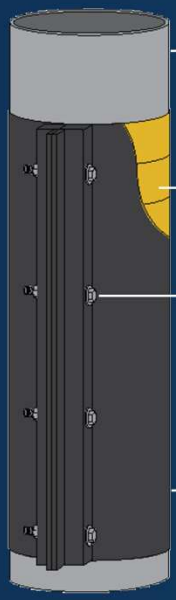
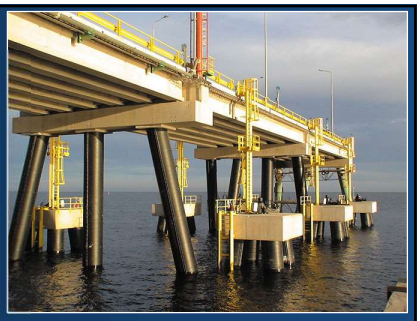
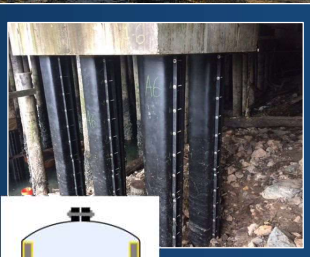
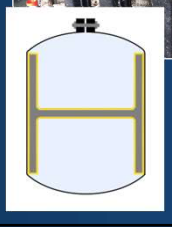
Background: SeaShield™ 2000FD

- Consists of petrolatum primer, tape and tensioned HDPE jacket
- Decades of successful use
- 30yr+ life of the system
- Reduces short term project costs through:
  - No abrasive blasting
  - No encapsulation
  - Simpler access
  - Tolerant to corrosion-pitted surfaces
- Long term asset costs reduced through prevention of corrosion and saving 2-3 blast and paint projects over 30 years
- New projects are increasingly using petrolatum jacket systems to give longest possible maintenance-free life
- Use on H-piles and octagonal piles









H-pile protection using foam profiling blocks

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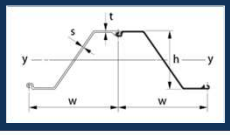
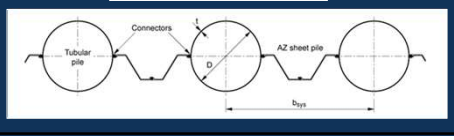
Challenge: Sheet Piles

- Very difficult to get a good paint coating in splash zone – 5yr recoat not uncommon
- Designing with a 'corrosion allowance' is not ideal in temperate and tropical waters
- Can we develop a petrolatum system for sheet pile walls to achieve the same outcomes as 2000FD system?
- You can't wrap a wall (or can you?)
- The challenge is to develop a **cost effective, durable and easy to install** system that provides protection for 25 years+





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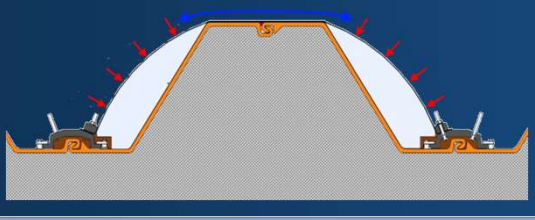
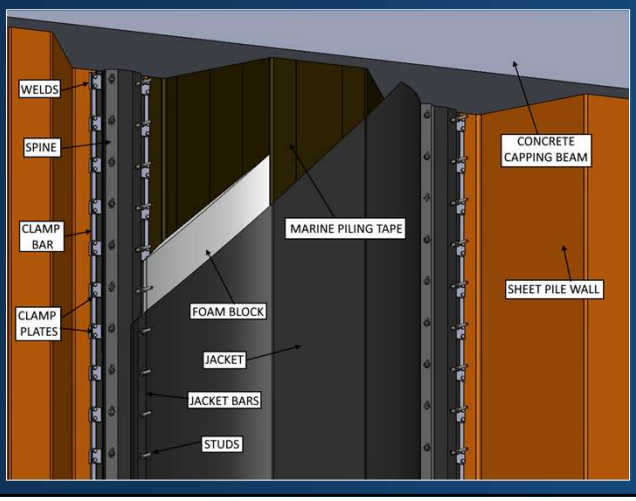
Design of SeaShield 2020SP: Hoop Tension!

- Yes you can wrap a wall (sort of)
- 2020SP uses the same proven core technology of the 2000FD system on H-piles:
  - Marine piling tape
  - Highly tensioned HDPE jackets
  - EPS foam profile blocks to create round profile
- Wall attachment 'spine' is attached to the wall first by welding of clamp bars





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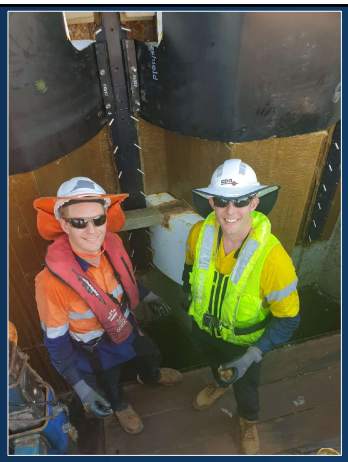
In-Situ Trials

- Trials undertaken at
  - Port of Melbourne
  - Mid West Ports (Geraldton)
  - Port of Townsville
- Trial duration of 2 years before inspection
- Performance was evaluated by looking for water ingress to the steel surface rather than corrosion
- Performance was excellent on all trials, showing the system can retain tape against wall and prevent water/oxygen ingress
- Trialled a range of designs of the wall attachment method – with some failures
- Many lessons were learnt and design/process improvements made



Removal and inspection

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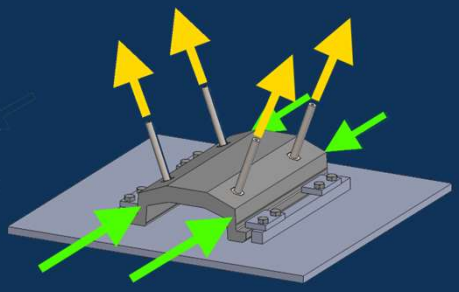
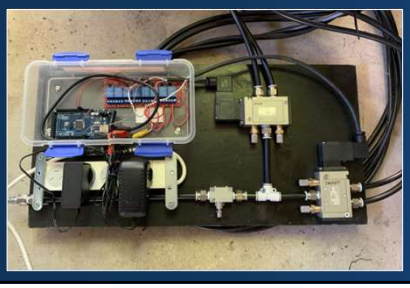
Load testing

- Pneumatic testing apparatus was developed to test attachment method and spine against loads
- Top cylinders apply jacket tension load while lower cylinders push/pull section of spine to simulate thermal expansion/contraction
- Overload testing (220% nominal load) to verify safety factor – with 5000 load cycles
- Thermal expansion cycling – over 50 years of thermal cycles (60,000 cycles)





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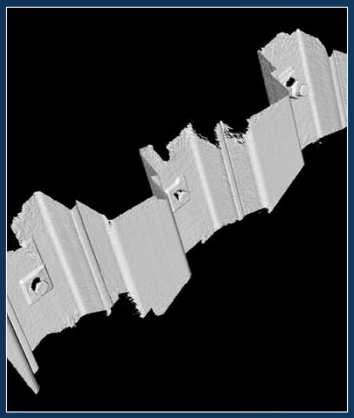
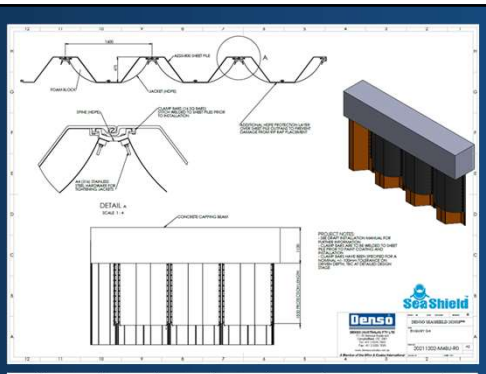
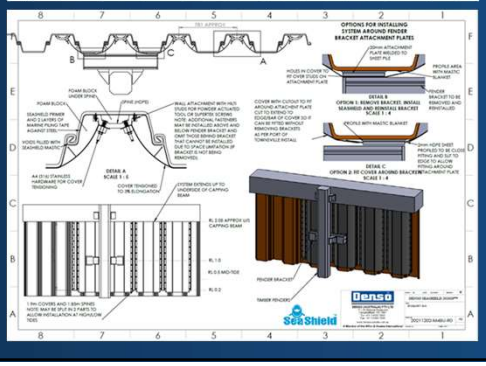
Design process

- General assembly drawing developed prior to order
- Detailed design process for each project with drawings produced
- Designs accommodate tie-backs, fenders, ladders, end regions etc
- Full installation manual and inspection and test plan customised to each project
- 3D scanning can be used to obtain wall geometry in lieu of drawings







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Thank you

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