Hooked on Reefs

Toby Roe  
Engineering and Operations Manager
Agenda: Cross-Industry Innovation

- Oil & Gas
- Near Shore
- Reefs
What is an Offshore Artificial Reef?

Any man made structure designed to create a habitat for marine life or effect currents and wave action.
Why Build an OAR?

• Fish habitat
• High quality fishing
• Positive infrastructure
• Replenishment
• Compensation
Engineering Connections – “Reef Style”

What have the wing tip of a Boeing 737, the Pyramids of Giza, UWA and horse hair plaster got to do with artificial reef design?
Key Features of a great reef

• Recruitment vs production
• Crypted spaces to accommodate smaller species
• Tall vertical relief to attract pelagic fish
• Flow modification
• Field layout for Halo effect
The Crypt

We started with a pyramid:

– It was the perfect cave
– Light and shade promotes marine fauna
– Openings sized for bait fish, demersals, divers and pelagic species
Vertical Relief

• Attracts pelagic species
• Reef for any environment
Flow Modification
Field Layout

• Halo effects – circa 50m
• Fishability
• Overall volume = productivity = 800m³
  – We’ve been able to double the volume to 1600m³
Then we had to fab our crazy shape!

Turns out building these from steel reinforced concrete is really hard!
Then we had to fab our crazy shape!

- So we redesigned the reef using fibre reinforcing and reduced the cost of fabrication.
Fabrication - Video
Installation

- Weather sensitive
- Hydraulic tools – faster operations and hands free lifting
- dGPS positioning
Installation - Video
What’s Next...
Application to Coastal
Application to Coastal

Wave attenuation
Application to Oil and Gas

Fibre reinforced concrete

- cheaper fabrication
- design and construction of extremely complex concrete structures previously not possible
- Lifting without steel
- greatly extended design lives (100 years +)
Application to Oil and Gas

Lifting Tools

- used in New Caledonia
- potential for use on recovery of questionable structures
Questions?