Technical Meeting — 7 March 2018

Sean Langman, Managing Director, Belinda Tayler, General Manager Defence and Commercial, and Tim Sullivan, Engineering Manager, gave a presentation on *A New Lease of Life for Sydney's Iconic Floating Dock* to a joint meeting with the IMarEST attended by 60 on 7 March in the Harricks Auditorium at Engineers Australia, Chatswood. This was the second-highest attendance of the 103 technical presentations held at the Enginers Australia Chatswood venue, and second only to Sean's presentation on *The Quest for Speed Under Sail* back in March 2014!

Introduction

Sean began the presentation with an introduction to Noakes, which was established in 1979 as a rigging company. Today the wholly Australian-owned and -operated company encompasses two NSW boat and shipyards in North Sydney and Nelson Bay, as well as the Tasmanian sister yard at The Kermandie on the Port Huon River co-owned by Sean and his business partner, Christopher Stannard. From dinghies to tall ships, survey lifts and antifouling to major refits to osmosis repairs and complete paint jobs, Noakes has the experience, facilities and highly skilled professionals to deal with maintenance and repairs on almost any vessel. Noakes offers a comprehensive maintenance and repair service as well as offering boat owners the option of self-organised jobs using external contractors and thirdly, do-it-yourself onsite at any Noakes yard. The reason for the success and expansion of the company is simple; Noakes is committed to providing the best advice and workmanship to its clientele.

Noakes' yard at Berry's Bay
(Iage courtesy Noakes Group)

Noakes

Sean said that he began his working life as a rigger, and then went into business in 1979 as a rigging company. He bought into the Noakes boatyard in Berry's Bay in 1981 with John Noakes, and built the business until it now operates the leading marine maintenance and repair facilities in NSW. They have been in business as a small-to-medium enterprise for nearly 40 years, a trusted contractor to Defence for over 30 years, and now seem to be the only Australian-owned Defence contractor. They are now a Key Divisional Supplier for the Department of Defence.

Noakes has three key markets: defence, commercial and recreational. In view of their defence commitments, they have had to change their recreational structure to suit defence. 75% of their work is recreational and commercial, and 25% defence, but they make 90% of their profit on defence work! The group now includes the ownership and operation of the fleet of five Rosman ferries.

Current Expertise and Capability

All sites operate travelifts for vessel removal from the water, and North Sydney has an additional 150 t slipway capacity. They have a 30 year history of vessel operation and maintenance in NSW. They have efficient technical evaluation of vessel operational and compliance issues, with a hands-on management approach tempered with documented processes. They are highly skilled in timber vessel repair, GRP, aluminium and steel replacement.

They have an ISO Quality Management System of which they are justly proud, and are in the process of ISO Environmental Certification. They operate cross-site CMMS (Computer Maintenance Management System)

MEXS, and this is also utilised on larger vessel maintenance projects. They have a dedicated staff of naval architects, engineers, riggers, shipwrights, and other trades. They have a formal project management and reporting system. All sites are secure with controlled access, and they are a Key Divisional Supplier to the Department of Defence.
Recreational and commercial repair contracts include ferries, yachts and power boats.
Defence contracts include the sail training ship (STS) *Young Endeavour*, the LHD landing craft storage, the SMB (survey motor boat) maintenance for the prime contractor, and the Red Viper [*the 20 m Australian Commando Unit Special Forces vessel designed for the Department of Defence (Army)*—Ed.] A point of difference in their defence contracting is that they do the paperwork in accordance with OQE 9objective quality evidence) standards, and do the work themselves. The intention is to build the infrastructure so that they can do all the work themselves. They are a small bottom-feeder in the defence contracting area, and this is dangerous territory!

Future Vision
The vision for Noakes is for the continued growth of the company, which is currently 10% annually. This can be achieved by increased involvement with smaller naval asset maintenance, Government-department maintenance tenders, entering into the tug and barge repair sector, and targetting larger vessels. They have the self-belief to create something different and special.
However, there are several barriers to maintaining the current growth rate: the current slipway capacity is limited and there is no scope at the site for an increase, and the environmental compliance of the slipway is problematic.

The Floating Dry Dock
Belinda took over the presentation here, and said that a possible solution to Noakes' problem was the floating dry dock (FDD). The dock was constructed by Morts Dock and Engineering Co. in Sydney in 1942 and has been in Sydney Harbour servicing naval vessels at Garden Island ever since. It was purchased by Thales as part of the sale of the fixed and floating asserts of Australian Defence Industries, and saw service until it was decommissioned by Thales in 2011 and went to live in "rotten row" in Athol Bight.
Principal particulars of the FDD are

Length OA	64.00 m (original; 60.00 m now)
Breadth moulded	19.81 m
Depth Pontoon	2.75 m
Wing walls	7.77 m
Overall	10.52 m
Useable Breadth	14.0 m between wing walls
Docking draught	8.5 m
Working draught	2.5 m
Docked vessel draught	5.7 m
Designed lift capacity	1000 t

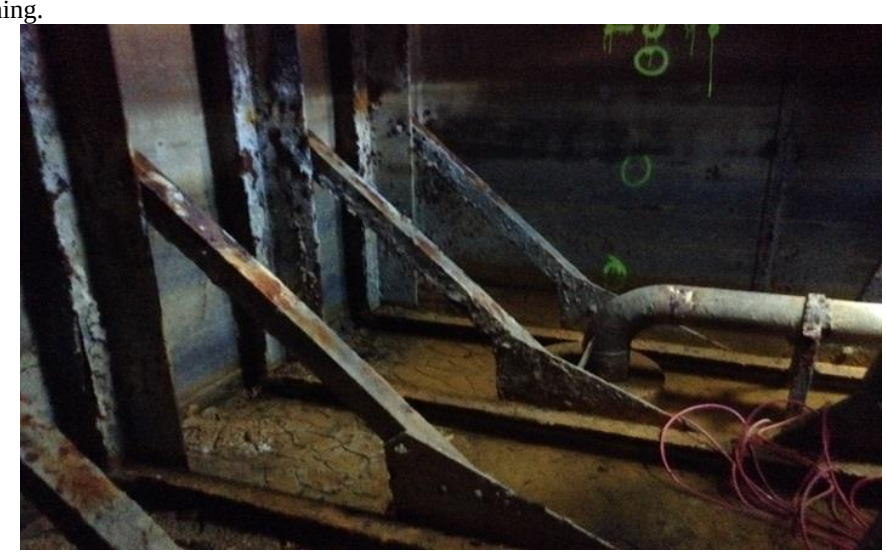

Floating dry dock for sale
(Photo courtesy Noakes Group)

When it was put up for sale, Sean saw an opportunity that no-one else could see, and purchased the dock in December 2014. The dock then spent a year moored in Berry's Bay, much to the displeasure of the local residents, while plans and arrangements were being made for its refit. In January 2016 the FDD was towed to Yamba to begin a $4 million four-year refit at Harwood Marine. Much of the early work was done in the water while the slipway at Harwood was being repaired to take the dock.
The dock was originally built to Department of Navy requirements and not to any classification society rules. The vessel now requires AMSA survey as it is now considered commercial. However, the National Standard for Commercial Vessels has no requirements for FDDs, and the US NAVSEA requirements were considered applicable for the compliance required in order to perform Defence work. Noakes therefore engaged Shearforce Maritime Services to back-engineer the structure and confirm load and stability capabilities.

Pre-refit Condition
Due to the age of vessel, a large proportion of the pontoon and wing-wall structure is of riveted construction. The steel condition internally was generally good due to the quality of the steel and the remaining original coating system. However, the pontoon deck was covered in a matrix of doubler plates due to the poor condition of the deck.

Doubler plates on the pontoon deck
(Photo courtesy Noakes Group)

There were many old and redundant systems and machinery, such as steam power and six separate engines for power generation. The walkways and the pontoon-deck extensions were completely corroded. Numerous deckhouses and workshops had been installed on the safety deck, adding significantly to the windage and raising the centre of gravity. Internal tank paint was in poor condition due to lack of maintenance since decommissioning.



Poor condition of internal tank paint
(Photo courtesy Noakes Group)

Pre-refit Concept
Prior to starting work, the following were the concepts which guided the refurbishment:

- The dock to be made into mobile platform to be supported with shore-supplied services.
- Excess mass to be removed, including redundant equipment and structure, to maximise lift capacity and stability.
- The side-shore system to be rebuilt and vessel-handling winches to be refurbished.
- The reliability of the ballast system and its control to be ensured.
- Full environmental compliance was required — this meant that all water had to be retained on the pontoon deck.
- Ladders and handrails compliant with today's OH&S regulations to be fitted.
- Structure to be repaired as required and tanks and external hull fully painted.

The Refit

During the refit:

- The pontoon deck plate and supporting structure were totally renewed.
- The six generators and associated systems were removed and replaced with stand-alone units.
- All tanks were hydro-blasted and repainted.
- All ballast piping was replaced.
- All hull-side and internal valves were rebuilt.
- All old deckhouses were removed and one new aluminium control room was fitted.
- All access covers were removed and replaced.
- The firemain and vents were replaced.
- All side shores were replaced, including housings, and the drive motors were refurbished.
- New bollards were fitted.
- Deck winches were refurbished.
- Full non-destructive testing of structure was carried out.
- Wing-wall, deep-tank and hull plating was replaced as required.
- All doubler plates were removed.
- A tank-level monitoring and alarm system was installed.
- There was a complete external abrasive blast and re-paint.
- New lighting was installed throughout.
- New ladders and safety rails were fitted to current standards.
- New sponson were fitted for berthing.
- New anodes were fitted throughout.
- New metric draft marks were welded to the hull plating.
- A new environmental system was installed.

New handrails and rebuilt capstan
(Photo courtesy Noakes Group)

New metric draft marks
(Photo courtesy Noakes Group)

Refit Issues

Tim Sullivan took over the presentation here, and said that, during the refit, a number of unexpected issues cropped up and had to be dealt with.

A tri-butyl tin (TBT) antifouling paint system had been used on the underwater hull, and this had to be removed and disposed of as hazardous waste to landfill. This, of course, was expensive.

The end deep tanks were badly corroded due to their previous use as trim tanks, so significant plate and section replacement was required.

Steelwork replacement was, at times, problematic as plates had been joined with doubler strips and corners had been formed with plates lapped on angle bar.

Over 60 doubler plates had been installed on bottom plating, instead of plate replacement localised to affected tanks, leading to breakdown of the coating system.

Full ultrasonic testing of the underwater hull was completed during the refit.

There were non-compliant penetrations between void spaces and through wing walls; i.e. penetrations of piping and wiring through bulkheads which were far from watertight.

There was significant breakdown of plating where temporary attachments had been previously welded, especially on the pontoon deck, safety deck and the wing walls.

Ballast suction dishes were holed and had thin plate in all 12 ballast water tanks; like structure, these were formed by lapping over hull plate.

There was a serious lack of available technical information, so they were basically starting from scratch. They created a new operations manual, SMS, and drawings of all systems, etc. The last recorded inclining experiment was in 1974, so they had to carry out a new inclining experiment and provide completely new stability calculations and a new stability book. There was no record of any previous test and trial results, no pumping plan, no details of allowable deck loadings etc. This last required re-engineering of the existing structure to DNV GL's FDD rules and a check against the NAVSEA requirements.

The pontoon deck replated
(Photo courtesy Noakes Group)

Repaired and repainted internal structure
(Photo courtesy Noakes Group)

New side shores and refurbished drive motors
(Photo courtesy Noakes Group)

Engineering

Belinda took over the presentation again, and said that over 300 t of items (mainly from the upper safety deck) was removed during the refit. This has significantly reduced the KG and potentially increased the lift capacity of the dock, as the lightship draft has been reduced by 0.2m.

The plating on the pontoon deck has been increased from the original ½ in (12.5 mm) plate to 16 mm at the centre line in way of the keel blocks.

A pumping plan program has been developed using tank volumes and allowable loads.

The intact and damaged stability have both been reassessed for compliance with AMSA and Defence requirements.

A towing plan to combine the FDD with Noakes' tug asset *Warren* has been developed.

The FDD has been set up to connect directly to the site services in place at Noakes' North Sydney hardstand.

The FDD at Noakes

Here Sean took over the presentation again.

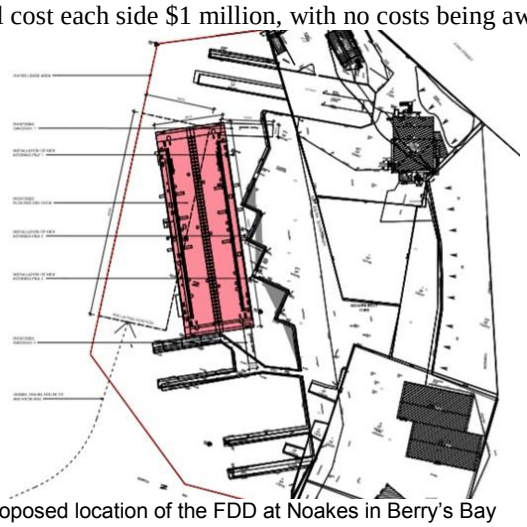
A new 30-year lease has been issued by RMS to cover the additional water lease required. They are currently in the process of negotiating a new Development Application with North Sydney Council. Upgrades will be required to the wharf and piling, and it is expected that these will be completed after DA approval.

However, there have been objections to the DA by local residents, even to the extent of a "Say *No* to Noakes" Facebok page! In order to keep on side with local residents:

- The deckhouses, workshops and machinery have been removed from the safety deck, and a single control room installed, significantly lowering the profile of the dock.

- The dock could be moored east-west, projecting into the bay, but Sean has decided to moor it north-south, parallel to the shore and within the sea-bed lease, so that when there is nothing in the dock, the residents look though it longitudinally and see less of it. This will require the removal of two existing Noakes wharves, but is considered worth it.
- The dock has been made environmentally compliant, and will drop nothing into the harbour.
- There have been lots of maritime leases in Berry's Bay: Woodleys (now closed), Stannards (no closed), and the superyacht marina, so maritime activity is not new to the residents.
- Noakes have held public consultation meetings, and these have been helpful to both sides. The residents are concerned about noise aspects (working hours are limited anyway) and visual, claiming that their view affects their quality of life.

If this ends up in court, then it will cost each side $1 million, with no costs being awarded!



Proposed location of the FDD at Noakes in Berry's Bay
(Diagram courtesy Noakes Group)

Benefits for Sydney Harbour

Noakes sustains 120 jobs at the site in Berry's Bay. The FDD will create 40 new direct jobs and 5 apprentice positions, as well as providing additional indirect jobs through subcontractor support. The FDD will keep Defence and tug maintenance work within NSW. This is a fully Australian-owned company providing a local alternative, reducing downtime and fuel expenditure during docking periods.

For example, docking STS *Young Endeavour* in the Captain Cook graving dock at Thales costs around $350 000; she will be able to be docked in the FDD for much less.

In the longer term, Noakes expects that the refurbishment of the dock will be good for another ten years. They are already talking to a shipbuilder about a replacement!

Conclusion

Sydney's iconic floating dock has been rescued from the breaker's yard and given a new lease of life with a $4 million four-year refit at Harwood Marine in Yamba. The refit has restored the dock to full working condition, lowered the centre of gravity and improved the stability, restored the original lift capacity, made it environmentally compliant, and is set to allow Noakes' projected growth rate to continue.

Questions

Question time was lengthy and elicited some further interesting points.

The cost to refurbish the dock was around one-third of the cost of building a new dock.

RMS has issued a new 30 year lease to cover the additional water lease required. As the expected life of the dock is now around ten years, they are looking to the future and considering a new dock as a replacement for the additional 20 years of the lease.

The vote of thanks was proposed, and the certificates and "thank you" bottles of wine presented, by Adrian Broadbent. The vote was carried with acclamation.

Annual General Meeting — 7 March 2018

The NSW Section held its twentieth AGM on the evening of 7 March, immediately following the March technical presentation in the Harricks Auditorium at Engineers Australia, Chatswood, attended by twelve with Phil Helmore in the chair, standing in for the Chair of the NSW Section, Valerio Corniani.

Valerio, in his Chair's Report (which Phil presented), touched on some of the highlights of 2017, which included eight joint technical meetings with the IMarEST (NSW-ACT Branch), with attendances varying between eight, on a dark and stormy night, and 50 for Steve Quigley's presentation on *Innovations on* Wild Oats XI.

Webcasting of presentations has come to something of a standstill. However, as noted by the President of the Australian Division in his column in the February issue of *The Australian Naval Architect*, the Victorian Section has agreed to conduct a trial recording of a technical meeting, with the recording to be funded by the Division Council, as it will be of most benefit to members outside Victoria. We watch with interest.

SMIX Bash 2017 was successful and was attended by 185, including a number of interstate guests. Many thanks to the organising committee of Nathan Gale (Chair), Adrian Broadbent, Graham Taylor, Craig Boulton, Len Michaels and Alan Taylor, and to the sponsors who supported the event because, without them, the "Bash" could not happen.

Adrian Broadbent presented the Treasurer's Report. The EA venue at Chatswood had, as usual, been our major cost for the year. However, with a close watch on the outgoings, we had managed to operate within our budget and have a grand total of $166*** in the Section account at 31 December 2017. SMIX Bash is funded separately through the SMIX account which currently has a healthy balance, although there are accounts still to be paid, but projections are for a small surplus to balance last year's small loss and enable preliminary arrangements for SMIX Bash 2018.

There is a number of changes to the NSW Committee for 2018. Nate Gale and Sue-Ellen Jahshan have recently resigned from the Committee due to the pressure of other things. John Butler, Noel Riley, Jason Steward and David Wong have accepted positions on the committee. Adrian Broadbent has resumed the position of Nominee to the Australian Division Council after a break of two years. As a result, the committee for 2018 is as follows:

Chair)	Valerio Corniani
SMIX Bash Committee Chair)	
Deputy Chair)	Phil Helmore
TM Program and Website Coord)	
Treasurer)	Adrian Broadbent
AD Council Nominee)	
Secretary	Anne Simpson
Assistant Secretary	Jason Steward
SMIX Bash Committee	John Butler
Auditor	David Wong
Members	Craig Boulton
	Noel Riley
	Alan Taylor
	Rob Tulk

The NSW Section is also represented on the Australian Division Council by Craig Boulton as Treasurer.