Department of Defence

Senate Economics References Committee – Inquiry into the future of Australia's Naval Shipbuilding Industry – 21 July 2014

Question on Notice No. 1 - Auditor-General's report

Senator Xenophon asked on, 21 July 2014, Hansard page 22:

Senator XENOPHON: I understand your frustration about being the fall guys and bearing the brunt of criticism when you say that there are a number of other factors if a project is over time or over budget. Do you broadly accept the recommendations and the criticisms of the Australian National Audit Office and the Auditor-General in the ANAO's report on the AWD program?

Mr King: Broadly, but there were a number of matters on which I disagreed and I have reasons for that. I am happy to work through those with you.

Senator XENOPHON: I am worried about time constraints so would you mind providing details about what part of the Auditor-General's report you disagree with—for instance, in relation to it being the first time Navantia had exported one of its ship designs for construction by an international shipyard, where the Auditor-General's report says:

A better understanding of these risks is likely to have led Defence and the Industry Participants to proceed more cautiously in accepting the detailed design and moving into production …

Mr King: Yes, I can, but can I just say something now. This is the fascinating position that we are finding. There was a design that had been built 4½ times at the time that I thought we had given it all the thought we could give it reasonably in order to embark on the project. But we are sitting here today saying that possibly for a ship of 20,000 tonnes—we are going to build three of them—that has never been built offshore before, suddenly, magically, this time we can transfer all that design work or even some of that design work to Australia and there will not be a problem. There will be a serious problem.

Response:

The Auditor General's report suggests that the Defence Materiel Organisation (DMO) did not make sufficient allowance for factors such as importing a surface-ship design and the inexperience of domestic shipyards. Defence did consider these issues throughout Phases 1 and 2 of the Air Warfare Destroyer (AWD) project and made sizeable investments in the shipbuilding industry, including payments of around $80 million to ASC, to cost the existing F100 and evolved designs, and comparing these to contemporary projects of similar scale and scope in Australia and overseas. The estimated schedule for the shipbuilding element submitted by ASC in its tender for the AWD exceeded all other known contemporary international examples, including even the original design and build of the Fl00. The DMO was assisted in its

evaluation of ASC's offer by independent Australian and international specialist companies.

Defence questions the emphasis in the ANAO report on the impact of design change. Defence considers the amount of design change was not excessive for a design of the complexity of the AWD, nor was the level of design change unpredicted at Government approval. Furthermore, ASC had studied each of the proposed changes and included the cost and schedule impact in its offer. The real issue around these changes was in the immaturity of the processes to manage the design change challenge with the designer and the block subcontractors. Defence accepts this is a major concern which must be addressed as a core performance requirement of an effective and efficient shipbuilding industry.

The report suggests Defence did not adequately monitor shipyard performance. Since the commencement of production, Defence has engaged First Marine International, a highly regarded consultant to the international marine industry, to conduct annual benchmark assessments on shipbuilding performance in the AWD project. Defence has made these reports available to each of the shipyards on an annual basis to assist them with identifying key areas for improvement.

Department of Defence

Senate Economics Reference Committee – Inquiry into the future of Australia's Naval Shipbuilding Industry - 21 July 2014

Question on Notice- No. 2 - Deferment of Supply Ship Replacement Program

Senator Edwards asked on 21 July 2014, Hansard page 25:

Senator EDWARDS: From 2009-10 to 2016-17, $16 billion was cut or deferred from the defence budget, including $9.2 billion from the Defence Capability Plan. Since 2009, has the deferment of this program been because of the cuts that were made to that program?
Mr King: I am not certain. No doubt cuts defer programs, but in tracing that I would have to refer it to the Capability Development Group about how that impacted that project.

Response:

No.

Department of Defence

Senate Economics Reference Committee – Inquiry into the future of Australia's Naval Shipbuilding Industry - 21 July 2014

Question on Notice No. 3 - Evaluations of alternative options

Senator Carr asked on 21 July 2014, Hansard page 27:

Senator KIM CARR: We will obviously need to get you back, Mr King, because this inquiry will go further than this matter. You indicated that the DMO recommendation was based on consideration of capability—we have discussed that—and time. In that process you indicated that you had considered a second-hand purchase and/or a lease. Can you give the committee any advice, copies of reports, on the evaluations of those two options? You may have to take that on notice.
Mr King: Senator, just to be clear, I said that Defence had considered—
Senator KIM CARR: Are you able to provide us with advice—
Mr King: I will certainly take that on notice.

Response:

Defence rarely undertakes industry solicitation prior to Government First Pass approval of Defence Capability Plan projects. Therefore, all assessment of capability options and other options is conducted through open market research.

Defence open market research of available options for the purchase of second-hand Auxiliary Oiler Replenishment (AOR) and/or equivalent ships was unsuccessful, with no suitable vessels evident on the world market.

Defence engagement, primarily through navy-to-navy contacts, with allies for the prospect of leasing an in-service foreign navy AOR was also unsuccessful, with no suitable leasing options identified.

Department of Defence

Senate Economics Reference Committee – Inquiry into the future of Australia's Naval Shipbuilding Industry - 21 July 2014

Question on Notice No. 4 - Shipbuilding budget

Senator Edwards asked on 21 July 2014, Hansard page 28:

Senator EDWARDS: That is the element that we are talking about here today, isn't it, the shipbuilding component?
Mr King: That is right. An AOR is mostly shipbuilding. So the shipbuilding aspect is over budget. Just for the record, though, the project is under budget at the moment, but that gives no comfort to anybody that there is an element that is over budget.
Senator EDWARDS: And time wise?
Mr King: About two years at the moment.
Senator EDWARDS: Two years over time?
Mr King: Late. It varies. It is a bit different for each ship.
Senator EDWARDS: What percentage is the $360 million of the total shipbuilding budget?
Mr King: It would be of the order of 15 per cent? Or 7½ per cent?
Senator EDWARDS: Sorry; 7½ per cent?
Mr King: Sorry; we can get that for you.

Response:

The approved AWD project budget is $7.2 billion (all figures are 2007 base date). Of this, the Alliance budget is $4.3 billion, 60 per cent of the project budget. The Shipbuilding budget of the Alliance is $2.5 billion.

Recent assessment shows the Air Warfare Destroyer Alliance is estimated to be about $360 million over the Target Cost Estimate for the program, most of which is in shipbuilding. This Variance at Completion is 5 per cent of the project budget, 8.3 per cent of the Alliance budget, 14.4 per cent of the shipbuilding budget.

With the 'pain share' / 'gain share' arrangements in the AWD Alliance Based Target Incentive Agreement (ABTIA), Defence will pay half of the cost over-run, currently $180 million, and the industry participants will meet the other half through fee reduction.

Further increase in the target cost overrun in shipbuilding is probable.

Department of Defence

Senate Economics Reference Committee – Inquiry into the future of Australia's Naval Shipbuilding Industry - 21 July 2014

Question on Notice No. 5 - History of exclusive Tenders

The Committee provided in writing:

Please provide the history of exclusive tenders of this size throughout the shipbuilding program.

Response:

DMO and predecessor organisations have undertaken shipbuilding procurements in accordance with the Commonwealth procurement policy framework applicable at the relevant time. Currently, this framework is provided by the Commonwealth Procurement Rules (previously known as the Commonwealth Procurement Guidelines).

Department of Defence

Senate Economics Reference Committee – Inquiry into the future of Australia's Naval Shipbuilding Industry - 21 July 2014

Question on Notice No. 6 - Unsolicited Proposals

The Committee provided in writing:

In relation to the evidence given by Mr King that 'the unsolicited proposals…came back with a 40 per cent increased cost and delayed delivery for a hybrid build alone' (see Hansard, p. 25), please provide further information as to the basis of this assertion. (See also Hansard, pp. 38–39.)

Response:

Given the sensitivity of currently undertaking a market solicitation process following the Government announcement of First Pass approval for SEA1654 Phase 3, as well as the commercial-in-confidence nature of the unsolicited proposals, Defence offers to brief the Committee in camera on any further information it may require on this matter.

Department of Defence

Senate Economics Reference Committee – Inquiry into the future of Australia's Naval Shipbuilding Industry - 21 July 2014

Question on Notice No. 7 - Australian Industry Participation

The Committee provided in writing:

To what extent will the tender include Australian industry participation? In particular, will the tender specify matters such as a part build or fit out in Australia?

Response:

The SEA1654 Phase 3 replacement Auxiliary Oiler Replenishment (AOR) ships will be constructed offshore, with an opportunity for modest Australian industry involvement during the acquisition phase.

During the acquisition phase, there is potential for Australian industry to become involved as sub-contractors for activities such as:

- design and installation of the Command, Control, Computers, Communications and Intelligence,
- combat system (preference is an Australian developed SAAB 9LV)
- specialist Integrated Logistic Support Services, and
- to develop and provide Royal Australian Navy specific support products.

Further, the sustainment of the AOR, through the award of an In-Service Support Contract, provides significant long-term opportunity for Australian industry over the life of the ships.

In line with Government policy for contracts over $20 million, the contractor will be required to deliver and implement an Australian Industry Capability plan.

Department of Defence

Senate Economics Reference Committee – Inquiry into the future of Australia's Naval Shipbuilding Industry - 21 July 2014

Question on Notice No. 8 - AMWU Submission

The Committee provided in writing:

In its submission, the AMWU suggested that the best solution would be 'to build the main hull of the first ship in the parent shipyard, and install the superstructure and complete the fit out in Australia.' It explained that this hybrid build approach was similar to that for the LHDs. It noted: *Then, because there is not the same urgency to replace the Sirius, the second ship would be built in Australia…allows work to commence just as quickly on the first replacement, and delivers shipbuilding work later when activity on the destroyers comes to an end and before the build-up of construction work on frigates and submarines. (Submission 4, p. [5])*
Could options such as a hybrid build be considered as viable or preferred options?

Response:

Defence considered a number of proposed build options. Information both from unsolicited proposals and from the existing Landing Helicopter Dock (LHD) hybrid build was used when considering the cost and schedule implications of conducting a proposed hybrid build for SEA1654 Phase 3.

The AMWU proposal includes the hybrid build for the first ship and full Australian construction of the second ship. The production drawings for any ship design are specific to the yard in which the ship is being built. A hybrid build would require either significant re-engineering of production methods, to allow for the much smaller facilities and reduced crane-lifting capacities currently available in Australian yards, or a significant investment in Australian shipbuilding facilities and capabilities, including new block-building halls, paint and blast facilities and new cranes.

This would mean that production would be unable to commence in Australia for at least four years for the hybrid build and around six to seven years for a full Australian build, based on information from the Australian LHD and the Canadian Joint Support Ship projects.

Either option would have a significant cost premium.

The Auxiliary Oiler Replenishment is unlikely to fit the time frame to bridge the gap between LHD/AWD and the proposed Future Frigate project.

Department of Defence

Senate Economics Reference Committee – Inquiry into the future of Australia's Naval Shipbuilding Industry - 21 July 2014

Question on Notice No. 9 - Air Warfare Destroyer Program

The Committee provided in writing:

Do the latest delays to the Air Warfare Destroyer program indicate that Australian shipyards are under pressure to meet current demands?

Response:

There is limited capacity at present but this will free up as the Landing Helicopter Dock and Air Warfare Destroyer projects complete. However, the Auxiliary Oiler Replenishment (AOR) is unlikely to fit the time frame to bridge the gap between those projects and the proposed Future Frigate project.

Any hybrid build of the AOR would require either significant re-engineering of production methods, to allow for the much smaller facilities and reduced crane-lifting capacities currently available in Australian yards, or a significant investment in Australian shipbuilding facilities and capabilities, including new block-building halls, paint and blast facilities and new cranes.

Apart from the significant cost premium, it would mean that production would be unable to commence in Australia for at least four years for the hybrid build and around six to seven years for a full Australian build, based on information from previous projects conducted within Australia and abroad.

Department of Defence

Senate Economics Reference Committee – Inquiry into the future of Australia's Naval Shipbuilding Industry - 21 July 2014

Question on Notice No. 10 - Air Warfare Destroyer and Landing Helicopter Docks

The Committee provided in writing:

Given the work still to be done on the Air Warfare Destroyers and the Landing Helicopter Docks (LHDs) in Australia, what capacity is there for local shipyards to meet extra demands?

Response:

Currently there is little capacity to meet extra demand; however as existing projects ramp down, industry capacity will free up.

Air Warfare Destroyer work in Melbourne and Newcastle is expected to be completed by the end of 2015, while ship construction and integration work at ASC will be completed by ship delivery scheduled for early 2019, although some further delays may arise.

BAE is also delivering two Landing Helicopter Dock ships to the Royal Australian Navy. The first ship is currently undergoing contractor sea trials and the second ship is expected to be delivered to the Navy in mid 2015.

Department of Defence

Senate Economics Reference Committee – Inquiry into the future of Australia's Naval Shipbuilding Industry - 21 July 2014

Question on Notice No. 11 - Local build for the two supply ships and new infrastructure

The Committee provided in writing:

Would a local build for the two Supply ships require new infrastructure? If so, is there any estimate of the costs involved?

Response:

Yes, to achieve a reasonable level of productivity, a local build of the two supply ships would require significant infrastructure investment, including not just the update of the shiplift at the Techport facility in Adelaide but also the update of cranes and buildings to allow for the construction of the significantly larger block that would be required to build a replenishment ship.

None of the unsolicited proposals received by Government have proposed a total local build for the two supply ships. However, they did propose a hybrid build with a partial build within Australia. A 2010 assessment undertaken by a leading internationally recognised consultancy within Royal Haskoning DHV, First Marine International, of objective shipbuilding productivity and facilities stated the ASC single shipyard as:

“Current capacity is zero as a suitable build position is not available. Potential capacity is zero as a suitable build position cannot be developed without significant capital investment".

Defence has not at this stage undertaken an in-depth analysis of the costs involved.

Department of Defence

Senate Economics Reference Committee – Inquiry into the future of Australia's Naval Shipbuilding Industry - 21 July 2014

Question on Notice No. 12 - Stock take of Shipbuilding facilities in Australia

The Committee provided in writing:

To DMO's knowledge, when was the latest audit or stocktake of shipbuilding facilities in Australia undertaken? What did it show?

Response:

In 2012, the Commonwealth asked the international benchmarking organisation, First Marine International (FMI), to undertake an assessment of the capacity and capability of the four major naval shipyards in Australia, ASC in Adelaide, Austal in Fremantle, BAE Systems in Melbourne and Forgacs in Newcastle. This was done for the Future Submarine Industry Skills Plan, published in May 2013.

The FMI assessment showed that the four major Australian shipyards have the capacity to build the submarines, surface combatants and patrol boats, although investment would be required to develop launch facilities for the large supply ships. It also showed that the shipyard workforce generally has the range of skills to build the ships required for the surface fleet, although there are a number of skills groups that would need to grow.

Department of Defence

Senate Economics Reference Committee – Inquiry into the future of Australia's Naval Shipbuilding Industry - 21 July 2014

Question on Notice No. 13 - BAE Systems and unsolicited proposal

The Committee provided in writing:

BAE systems informed the committee that it had submitted an unsolicited proposal to Government in September 2012 setting out a hybrid build program, with part of the ship built overseas and part of the ship built in Australia—a model similar to the LHD Program.

(a) How did Defence go about considering this proposal? Was this option explored any further with BAE Systems?

(b) BAE Systems noted that if the ships were produced based on its proposed hybrid approach, there would be no major capital investment required: that the investments made for the LHD and AWD would be sufficient. (Submission 9, p. 2.) Does this assessment marry with Defence's?

(c) BAE Systems informed the committee that it has achieved significant improvements in productivity through its work on the LHD project and building blocks for the AWD program, noting that the Williamstown shipyard was currently at 76 manhours per Compensated Gross Ton. Does DMO have concerns about BAE maintaining and improving its productivity?

Response:

(a) The unsolicited proposal from BAE Systems in September 2012, along with all other unsolicited proposals to Defence, was reviewed by the project. The premium for the BAE Systems hybrid build was so significant that it did not justify putting Australian industry to significant cost in responding to a tender, when there was no real prospect of success.

(b) Noting that BAE's proposal for a hybrid build did not detail which components would be built in Australia, this is difficult to assess. Assuming, similar to the LHD, only the superstructure were to be constructed in Australia, following re-engineering for production, it is likely that no major capital investment at Williamstown would be required.

(c) While there were some initial production issues in 2010 related to dimensional control at the Williamstown shipyard, BAE addressed the problems by bringing in shipbuilding experts from the US and the UK. First Marine International benchmarking data have shown that BAE has improved in terms of block productivity since that time.

DMO has no concerns about BAE's current level of block productivity and, as a commercial shipbuilding company, BAE undoubtedly is looking to improve its performance. Past events show that BAE has the means, ability and willingness to react to any decrease in productivity.

Department of Defence

Senate Economics Reference Committee – Inquiry into the future of Australia's Naval Shipbuilding Industry - 21 July 2014

Question on Notice No. 14 - Navantia's and DSME's history in building naval replenshipment ships

The Committee provided in writing:

What is Navantia's and DSME's history and experience in building naval replenishment ships?

Response:

The experience and performance history of the potential suppliers was considered by Defence and assessed as each having demonstrated experience and a strong history in delivering ships on time and on budget.

DSME is one of the most prolific shipbuilders in the world, having the highest of reputations for tanker construction, of which an Auxiliary Oiler Replenishment (AOR) ship is a derivative, and is currently in contract with both the United Kingdom Ministry of Defence for the Royal Navy's MARS (Military Afloat Reach and Sustainability) Tanker and the Norwegian Defense Logistics Organization for Norway's new Logistics Support Vessel.

Navantia is a proven shipbuilder with experience with AOR design and construction, including Cantabria in 2008, which deployed to Australia and operated very successfully with the Royal Australian Navy (RAN) during 2013, as well as building the RAN's two new Landing Helicopter Dock ships.

Department of Defence

Senate Economics Reference Committee – Inquiry into the future of Australia's Naval Shipbuilding Industry - 21 July 2014

Question on Notice No. 15 - Comparison between Australian shipbuilders with oversee shipbuilders

The Committee provided in writing:

When it comes to productivity, to what extent do, or how do, Australian shipbuilders compare on cost and schedule with overseas shipbuilders (Spain and South Korea) in producing ships such as the proposed supply ships?

Response:

There is no recent data on Australian shipbuilders constructing replenishment ships similar to those proposed by the Government.

Based on unsolicited proposals however, the cost premium of a hybrid build, with 40 per cent of the work performed in Australia, would be in the range of 40 per cent and above. A wholly Australian build is estimated at a 60 per cent cost premium.

Overseas construction of two replenishment ships, either in Spain or South Korea, would take just over three years, while the hybrid build would be closer to five years. A wholly Australian build is estimated to take at least six years.

The last replenishment ship wholly built in Australia was HMAS *Success*. The contract for its construction was signed in October 1979, at a cost of $68.4 million (November 1978 prices) with ship delivery scheduled for July 1983. HMAS Success was finally commissioned in April 1986. The total project cost was estimated at $197.41 million. This represents a schedule slip of about 75 per cent, and a budget slip of almost three times the contracted amount.

While it is said that Korean shipyards can build ships at about 20 man-hours per compensated gross tonnage, it should be noted that this is for commercial tankers.

Department of Defence

Senate Economics Reference Committee – Inquiry into the future of Australia's Naval Shipbuilding Industry - 21 July 2014

Question on Notice No. 16 - Productivity of Australia's naval shipbuilding industry and international standard

The Committee provided in writing:

The Defence Teaming Centre noted that, based on the Winter review, 'the Minister has criticised the productivity of Australia's naval ship building industry quoting an international standard of 60 hours per tonne, a 'generous' aspirational allowance of 80 hours per tonne for the AWD program and a current level of productivity of 150 hours per tonne within the industry. (Submission 10, p. 3.)

(a) What is the basis for the international standard of 60 hours per tonne?
(b) Is it the standard of a foreign shipyard producing low complexity vessels on a regular basis? Or, does the statistic relate to a mature shipyard producing indigenous designed complex warships like the AWD on a continuous build basis? Or, is it the expectation of a new shipyard building a short run of three offshore designed, complex, first of class, warships like the Air Warfare Destroyer?
(c) What is the basis for the Government's aspirational allowance of 80 hours per tonne for Australia's naval ship building industry?
(d) Is this the expectation of a mature shipyard building an indigenous designed complex, first of class, warships like the Air Warfare Destroyer after the first three ships are completed?
(e) How can the Government expect a standard of 80 hours per tonne from a new shipyard building a short run of three offshore designed, complex, first of class, warships like the Air Warfare Destroyer when the ship yard is yet to complete the first ship?
(f) What is the basis for the Minister for Defence's often quoted 'current' standard of 150 hours per tonne?
(g) When was the measurement taken, and what was the methodology used?
(h) Is the 150 hours per tonne an average of the four shipyards building modules for the Air Warfare Destroyers (Spain, Adelaide, Melbourne and Newcastle)? If so what are the productivity levels for each shipyard?
(i) How much of the 'current' standard of 150 hours per tonne is attributable to the reworks and remediation required due to deficient design drawings and redesign work?
(j) What is the reason for there being a requirement for the significant reworks and remediation work?

Response:

(a) and (b) First Marine International (FMI) has provided specialist consultancy services to the marine industry since 1991. Its clients include the UK, the US and other government departments and agencies, national and international maritime organisations as well as shipbuilders and ship repairers.

In FMI's terminology 'core productivity' is the best productivity that a shipyard can achieve, taking account of the shipbuilding facilities, and processes and practices adopted by the shipbuilder (FMI "best practice rating"), and adjustments for the complexity of the ship being built.

An international comparison by FMI of shipyards producing surface combatants shows productivity ranging between 30 to 110 man-hours per Compensated Gross Tonnage.

Compensated Gross Tonnage (CGT) is a formula developed by FMI to compare the amount of work required to construct different vessels. There are two major variables; the first being a ship's gross tonnage (GT) figure which is a measure of the ship's internal volume. It is not the same as a ship's displacement or dead weight. The second is the 'CGT coefficient' that represents the complexity of the vessel design and allows a comparison to be made across different types of vessels. For example, a tanker, while large, is a relatively simple design and so will have a much lower CGT coefficient compared to a modern complex warship. Multiplying the GT by the CGT coefficient produces a figure for Compensated Gross Tonnage and it is this figure that allows a comparison of the relative amount of work required to build different vessels. Finally, this is multiplied by a customer factor which corrects the base CGT coefficient for the additional effort required by naval shipbuilders over and above that which would be usual in a normal commercial contract. In the main, the difference is in the proportion of white-collar staffing required.

Since 2010, FMI has been tasked by the Commonwealth to provide an assessment of the objective shipbuilding productivity of the Air Warfare Destroyer (AWD) project.

In reviewing the facilities and process of the three shipyards and the complexity of the ship, FMI has assessed the core productivity benchmark to be about 60 man-hours per Compensated Gross Tonnage.

(c) First-of-class performance drop-off, or lead ship factor, is the difference between the actual productivity being achieved on vessels early in the series and core productivity. Substantial improvements can be seen between the first two vessels as a shipyard progresses down the learning curve through 'ship learning', which is refining the design information and gaining experience with constructing the design, and 'shipyard learning' which is improving process.

Shipbuilding productivity improves with every ship that is built in a series. Generally referred to as the learning curve, this is a basic manufacturing principle. The same efficiency gain is not made between every ship in a series; typically the same percentage reduction is achieved as output doubles. So the gain from hull one to two in a series is about the same as the gain made from hull two to four, then four to eight, and so on. In warship construction, learning curves of eight to ten per cent are typical, but it can be higher for inexperienced shipyards and there are other first-of-class effects that lower productivity for the first ship in a series

Given the circumstances of the AWD build, it was FMI's assessment that the AWD would achieve core productivity of 80 to 85 man-hours per CGT for Ship 03.

(d) The 80 to 85 man-hours per CGT represents the expected productivity for the third AWD being built in the three Australian shipyards, as determined by FMI.

(e) The standard of 80 to 85 man-hours per CGT represents FMI's professional opinion of a realistic productivity target for Ship 03.

(f) Since 2010, FMI has been tasked by the Commonwealth to provide a yearly assessment of the objective shipbuilding productivity of the AWD project.

The 2013 report by FMI indicates that, based on the latest Estimate at Completion, the level of productivity for Ship 01 is 149 man-hours per CGT. To allow for marginal errors, this has been broadly interpreted as 150 man-hours per CGT.

(g) FMI conducted its most recent assessment of AWD shipbuilding productivity in late November/early December 2013 with data supplied by the Australian shipyards.

The information required by FMI, covering a basket of measures of up to 25 performance indicators, was compiled by the shipyards in advance of the visit and refined during the meetings and through discussions post-visit in the UK. Work-in-progress was observed at each shipyard and meetings were held to discuss additional topics including targeted measures to improve productivity.

(h) The figure of 150 man-hours per CGT is an average figure for Ship 01 for the Australian shipyards involved in the AWD project. It does not include the work done by Navantia in Spain.

The productivity level in individual shipyards is a commercial-in-confidence matter and cannot be released publicly. Defence offers to brief the Committee in camera on any further information it may require on this matter.

(i) No specific assessment has been made of the amount that design change has affected shipyard productivity. However, FMI has asserted that the level of change seen in the AWD Project is no more significant than would be expected for a ship of this size and complexity.

(j) While there have been issues with the quality of the design packages supplied by Navantia, out of sequence work, productivity and budget estimating errors, production defects and rework have each contributed more to the rework and remediation required on the project.

This points to issues in the production planning and scheduling, change management, the quality control and assurance processes in the shipyards being the cause of most of the required rework and remediation.

Department of Defence

Senate Economics Reference Committee – Inquiry into the future of Australia's Naval Shipbuilding Industry - 21 July 2014

Question on Notice No. 17 - Australian industry sustainment

The Committee provided in writing:

What weight does Australian industry sustainment, including workflows, have in decisions regarding naval ships being built overseas?

Response:

Although there is some crossover between shipbuilding and ship sustainment and repair, it is not necessary to have built the ship to sustain it. In fact, ships are generally sustained by different companies and at different sites. More important to ship sustainment is access to ship design experience and the required technical data.

Department of Defence

Senate Economics Reference Committee – Inquiry into the future of Australia's Naval Shipbuilding Industry - 21 July 2014

Question on Notice No. 18 - ACIL Allen Report to the Australian Industry Group

The Committee provided in writing:

The ACIL Allen report to the Australian Industry Group, Economic Value to Australia, noted the potential $2.3 billion contribution from naval shipbuilding and through life support to the economy as well as other significant economic benefits technology transfer, transfer of expertise, and improved practices in areas such as quality assurance, business planning, sub contracting and dealing with Defence. The report also highlighted the 'hidden but real, financial costs that are likely to arise if a decision is taken to source ships from overseas or between different approaches to Australian design, build and sustainment'.

(a) What are the most significant hidden costs in sourcing naval ships from overseas?

(b) Could not some of the identified problems such as technology and expertise transfer and maintaining core skills be addressed by arrangements with the producers that would require Australian input?

Response:

Defence assesses that there are very few hidden costs. History shows that ordering products from existing production lines facilitates projects coming in on time and budget.

Department of Defence

Senate Economics Reference Committee – Inquiry into the future of Australia's Naval Shipbuilding Industry - 21 July 2014

Question on Notice No. 19 - Adelaide Ship Construction International and Social Fabrication

The Committee provided in writing:

Mr Simon Kennedy, Adelaide Ship Construction International and Social Fabrication, wrote of the positive returns on investment should the ships be built in Australia:

E*very dollar spent on a ship or submarine within Australia goes further than the initial transaction. Australian primes engage Australian manufacturers who engage Australian subcontractors. The training and development required to build the ships and submarines not only contributes to our local economy, but also our local knowledge and skills base. If the Navy's auxiliary supply ships are built overseas, the flow-on effects of each dollar spent will not be felt in Australia. We would be investing billions of dollars in an overseas economy, in overseas communities, instead of our own. It would be detrimental to Australia's knowledge and skills base and akin to shooting ourselves in the foot.* (Submission 8, p. 2.).

What is DMO's response to Mr Kennedy's statement?

Response:

The economic impact of purchasing an item of defence capital equipment, from domestic or overseas sources, can only be determined case by case and may vary from project to project.

When assessing the economic impact of a project, three issues should be kept in mind. These issues are not mentioned in Mr Kennedy's submission, which suggests that his approach may overstate the actual economic benefits accruing to Australia if a decision was made to build the Navy's auxiliary supply ships in-country.

The first issue is that all Defence capital equipment projects must ultimately be paid for by Government by raising taxes or reductions in other areas across the public sector to maintain a balanced budget. Consequently, defence capital equipment can only be purchased at the cost of displacing or 'crowding out' other areas of activity elsewhere in the economy. This applies irrespective of whether the equipment is produced domestically or sourced from overseas.

The second is that many of the resources already used within Australia for the production of defence capital equipment, or earmarked for potential use, can eventually be deployed in other parts of the economy; possibly in more productive applications. If Australia is required to pay a substantial price premium to ensure that an item of defence capital equipment is produced in-country, it suggests that more productive uses for these resources are available over the longer term.

Consequently, a price premium is normally only justified for the domestic build of equipment if the equipment has an especially high military-strategic value to the Australian Defence Force and overseas supply is impractical. The construction of an auxiliary supply ship in Australia does not satisfy either of these criteria. Moreover, any payment of a price premium will erode the purchasing power of the Defence budget and require that Defence reduces its expenditure on other military capabilities. A premium therefore has a direct opportunity cost.

The third issue is that, although investing in the domestic build of an auxiliary supply ship will generate so-called multiplier or flow-on effects and may create so-called spill-overs by contributing to broader workforce skilling, it is not clear whether these effects are any higher than if the investment in the build had been re-directed and used for other purposes. That is, it is not clear that the multipliers or spill-overs associated with building the ship are any greater than those associated with other types of economic activity.

In regard to the skills base, DMO agrees that a continuous build program is the way forward, but believes also that frigates are a better program opportunity than the construction of two Auxiliary Oiler Replenishment ships.

Department of Defence

Senate Economics Reference Committee – Inquiry into the future of Australia's Naval Shipbuilding Industry - 21 July 2014

Question on Notice No. 20 - HMAS Success and HMAS Sirius

The Committee provided in writing:

What has been the extent and nature of Defence's consultation with Australia's naval shipbuilding industry since the announcement of the intention to replace HMAS Success and HMAS Sirius?

Response:

In accordance with Defence policy for building Australian Industry Capability, consultation with the Australian naval shipbuilding industry is always ongoing.

Department of Defence

Senate Economics Reference Committee – Inquiry into the future of Australia's Naval Shipbuilding Industry - 21 July 2014

Question on Notice No. 21 - Scoping studies by Defence

The Committee provided in writing:

Could you inform the committee about the findings of scoping studies by Defence to establish the availability in the marketplace of the type of ship required by Defence, the options for a domestic build, the whole-of-life costs for those options and the opportunities for innovation including domestic innovation?

Response:

As advised for Question on Notice No. 3, Defence does not engage industry prior to Government approval (First Pass) of Defence Capability Plan projects.

In the absence of permitted industry solicitation, Defence established the availability in the marketplace of the required type of Auxiliary Oiler Replenishment (AOR) ship, based on undertaking open market research, unsolicited proposals, other recent approaches to market including the exchange of information from similar Canadian and New Zealand projects, and reports into Australian shipbuilding available capacity.

Notwithstanding the limitations of this research, the level of information available on the various ship options in the marketplace was widely available through open source information and sufficiently detailed to enable Defence to obtain information on available options to meet the capability requirement.

Options for domestic build centred on domestic companies offering existing overseas designs and the unsolicited proposal received have indicated increased cost and schedule, as this approach would require Australian industry to initiate lengthy detailed design and engineering design phases of the project to tailor an overseas design for construction in an Australian shipyard.

Whole-of-life costs cannot be reasonably established until a design is selected and Defence is permitted to engage the designer to establish these costs.

Opportunities for innovation are quite limited for SEA1654 Phase 3. AOR ships do not have a multitude of complex systems where opportunities for innovation may be possible; they offer a fairly straightforward capability where innovation, such as in machinery control and monitoring, is already incorporated into the design. Australian industry has not offered a domestic ship design; therefore, domestic innovation opportunities would likely only result from Australian industry undertaking construction of an overseas design.

The Royal Institution of Naval Architects noted in its submission to the committee "The Division understands that no Australian shipbuilder is currently equipped to either design or build these vessels without drawing on foreign design and/or shipbuilding resources. Although it is possible for Australian industry to complete fit-out of such vessels, given the integration of fit-out with construction in modern shipyards, it would seem likely to be inordinately expensive and time consuming to develop a domestic capability for building just two vessels of this size and type compared with what might be available off the shelf from existing shipbuilders in Spain or South Korea or elsewhere".

Department of Defence

Senate Economics Reference Committee – Inquiry into the future of Australia's Naval Shipbuilding Industry - 21 July 2014

Question on Notice No. 22 - Requests for information to obtain estimates cost, capability and schedule for the project

The Committee provided in writing:

Did Defence issue requests for information to obtain estimated cost, capability and schedule information for this project? Could you provide details?

Response:

Defence developed estimated cost, capability and schedule information for SEA1654 Phase 3 based on undertaking open market research, unsolicited proposals, other recent approaches to market including the exchange of information from similar Canadian and New Zealand projects, and reports into Australian shipbuilding available capacity.

Department of Defence

Senate Economics Reference Committee – Inquiry into the future of Australia's Naval Shipbuilding Industry - 21 July 2014

Question on Notice No. 23 - DSTO and technical risk assessment

The Committee provided in writing:

For this project did the Defence Science and Technology Organisation do a Technical Risk Assessment? Could you provide details?

Response:

Yes. However, the information contained in the assessment is classified and no further details can be provided.

Department of Defence

Senate Economics References Committee – Inquiry into the future of Australia's Naval Shipbuilding Industry – 21 July 2014

Question on Notice No. 24 - Rating of the construction of the two supply ships

The Committee provided in writing:

How does Defence rate the construction of the two supply ships on a scale from proven off the shelf to highly developmental?

Response:

The two Auxiliary Oiler Replenishment (AOR) ships will be based on existing designs with minimal modifications to meet Royal Australian Navy (RAN) requirements, environmental obligations and statutory requirements.

Therefore, Defence would best describe the construction of the two supply ships as low risk. As described in the answer to Question 8, regarding the AMWU submission, the significant re-engineering effort required to adapt the ship design's production strategies (ie block sizes) to suit the existing capabilities of Australian shipyards would increase risk of build.

Department of Defence

Senate Economics Reference Committee – Inquiry into the future of Australia's Naval Shipbuilding Industry – 21 July 2014

Question on Notice No. 25 - Will the ships need to be customised to suit Australian service conditions

The Committee provided in writing:

Will the two ships need to be customised to suit Australian service conditions and the needs of the RAN? If so, could you give some indication of the likely modifications and whether risk assessments have been done on the requirements for such modifications? Could you provide details?

Response:

The two Auxiliary Oiler Replenishment (AOR) ships will be based on existing designs with minimal modifications to meet Royal Australian Navy (RAN) requirements, environmental obligations and statutory requirements, and to accommodate Australian combat and communications systems.

Defence will be undertaking a Risk Reduction and Design Study with each of the suppliers to ascertain what, if any, design changes might be required to suit Australian requirements. The intention is that design changes will only be pursued for compliance with Australian safety and certification requirements where they differ from the supplier's design baseline. Likely modifications might include those required for environmental and Work Health and Safety Act compliance.

Department of Defence

Senate Economics Reference Committee – Inquiry into the future of Australia's Naval Shipbuilding Industry – 21 July 2014

Question on Notice No. 26 - Interoperability

The Committee provided in writing:

Do you anticipate that there could be difficulties created with interoperability because of the ships being built overseas?

Response:

No. The primary interoperability considerations are the compatibility of the replenishment equipment (ie the ability of the new ship to replenish existing and future warships) and the ability of the new ships to integrate with Royal Australian Navy (RAN) and Allied ships on exercises and operations.

Replenishment equipment is governed by NATO standards, which Australia uses, that will stipulate requirements for the new Auxiliary Oiler Replenishment ships.

Defence requirements for the type and capability of communications and combat system equipment will ensure interoperability with RAN and Allied ships.

Department of Defence

Senate Economics Reference Committee – Inquiry into the future of Australia's Naval Shipbuilding Industry - 21 July 2014

Question on Notice No. 27 - Construction of AWDs in Australia

The Committee provided in writing:

Did Defence's experiences with the construction of the AWDs in Australia (delays and budget overrun) influence the decision to have the replenishment ships built offshore? If so, please provide details.

Response:

Defence made its recommendations based on the schedule and cost premiums indicated by the research undertaken against similar ship construction projects (ie supply ships/Landing Helicopter Docks) and the unsolicited proposals.

Department of Defence

Senate Economics References Committee – Inquiry into the future of Australia's Naval Shipbuilding Industry – 21 July 2014

Question on Notice No. 28 - Timeframe from first pass and concluding of contract to build ships

Senator Canavan provided in writing:

How long would it typically take between first pass and concluding of contract to build ships like the naval supply ships?

Response:

The construction of new naval supply ships is not a common or typical acquisition undertaken by Defence. The last supply ship constructed by the Royal Australian Navy was HMAS *Success* that was commissioned in 1986. More recent experience with the in-country construction of a European military-off-the-shelf design – with two supply ships for Canada – suggests it would take around six years from the award of initial design study contracts to the award of a build contract.

Department of Defence

Senate Economics Reference Committee – Inquiry into the future of Australia's Naval Shipbuilding Industry - 21 July 2014

Question on Notice No. 29 - Funding for replacement of naval supply ships been deferred

Senator Canavan provided in writing:

Has funding for replacement of the naval supply ships been deferred at any point since 2007? If so, please provide details.

Response:

No, it has not.

Department of Defence

Senate Economics References Committee – Inquiry into the future of Australia's Naval Shipbuilding Industry – 21 July 2014

Question on Notice No. 30 - Request for material and clarification on the future frigates

The Committee provided in writing :

The chair requested that DMO table the illustrations that were being used during the hearing (p. 27) and Mr King agreed to do so but in a form that the committee could use. The committee may wish to use the illustrations in its report so the committee requests, if possible, could DMO make them available in electronic form suitable for inserting in a committee report. Also to ensure that the committee makes the best use of the illustrations, would it be possible for DMO to include a short paragraph to accompany each illustration highlighting the key points to be drawn from each one. When using one of the diagrams, Mr King drew attention to the future frigates being able to pick up where the AWDs finished. He said: …should the government decide to build the future frigates based on the air warfare destroyer hull, incorporating an Australian-made radar, which would be an absolutely fantastic radar—it is one of the world's best for value for money, no excuses—then we potentially end up starting that program at this sort of learning efficiency here because we are using exactly the same modules, by and large—there will be some changes to some of the superstructure (p. 23). Could you provide the committee with as much information as you can on the likelihood that the future frigates would be built in Australia?

Response:

The illustrations requested are attached and summarised below.

BAC Cantabria blocks built by Navantia in Cadiz, Spain.

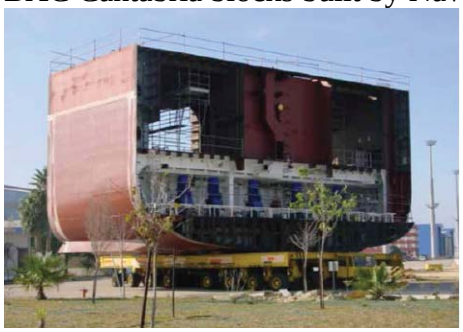


Figure A - Typical block under construction in Spain ~462 tonnes.

Figure B - Aft superstructure block under construction in Spain. Australian construction of this block required it to be constructed and lifted as four separate blocks due to manufacturing and lifting capacity restrictions.

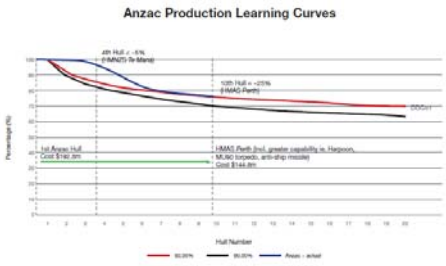


Figure C - Anzac Class Learning Curve productivity levels

The graph illustrates productivity improvement through continuing work on the same design. Experience with the Anzac Class program shows that a short series of ships, like the two Auxiliary Oiler Replenishment ships, is not long enough to develop improvements in shipyard learning. An experienced naval shipyard with constant throughput of work would normally expect a learning curve of 90-94 per cent between first and second ship. It is important to note that, because of the peaks and troughs associated with naval shipbuilding in Australia, the Anzac Class program did not achieve a corresponding learning curve effect until the fifth ship.

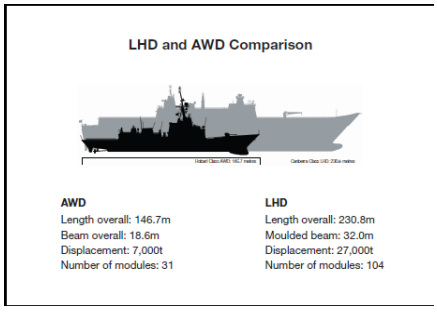


Figure D - LHD and AWD Comparison chart

Illustrates ship dimensions and block quantities.

FMI use Compensated Gross Tonnage (CGT) as an indicator of the effort required to build a ship, as it takes account of the size, complexity and the customer oversight required in building vessels of different types. While the Air Warfare Destroyer (AWD) is about one quarter of the displacement of the Landing Helicopter Dock (LHD), the AWD is a much more complex vessel, given the levels of equipment installed on the ship. The CGT values for both ships, however, are similar.

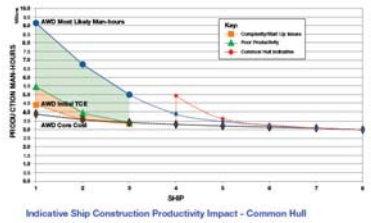
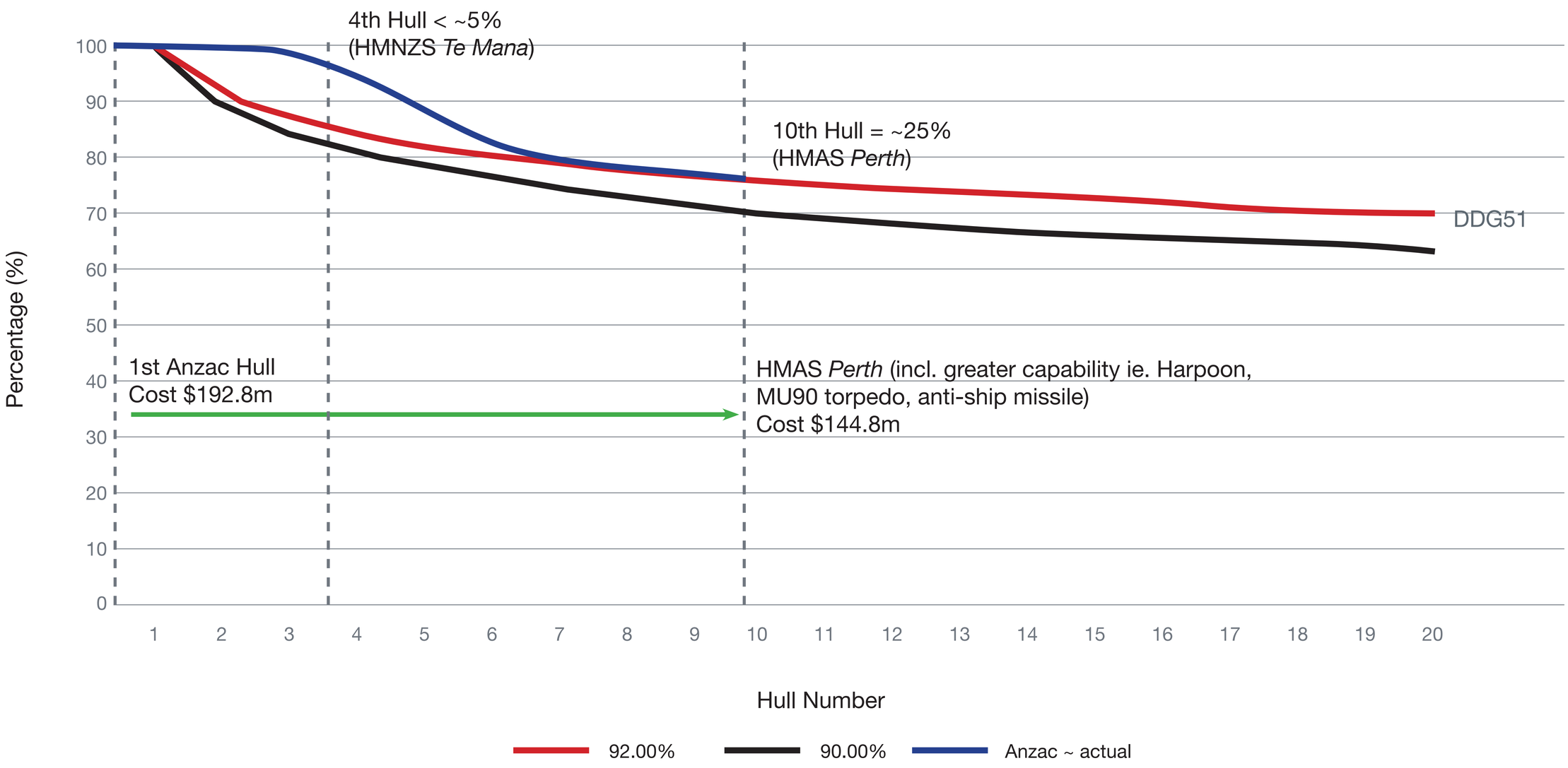


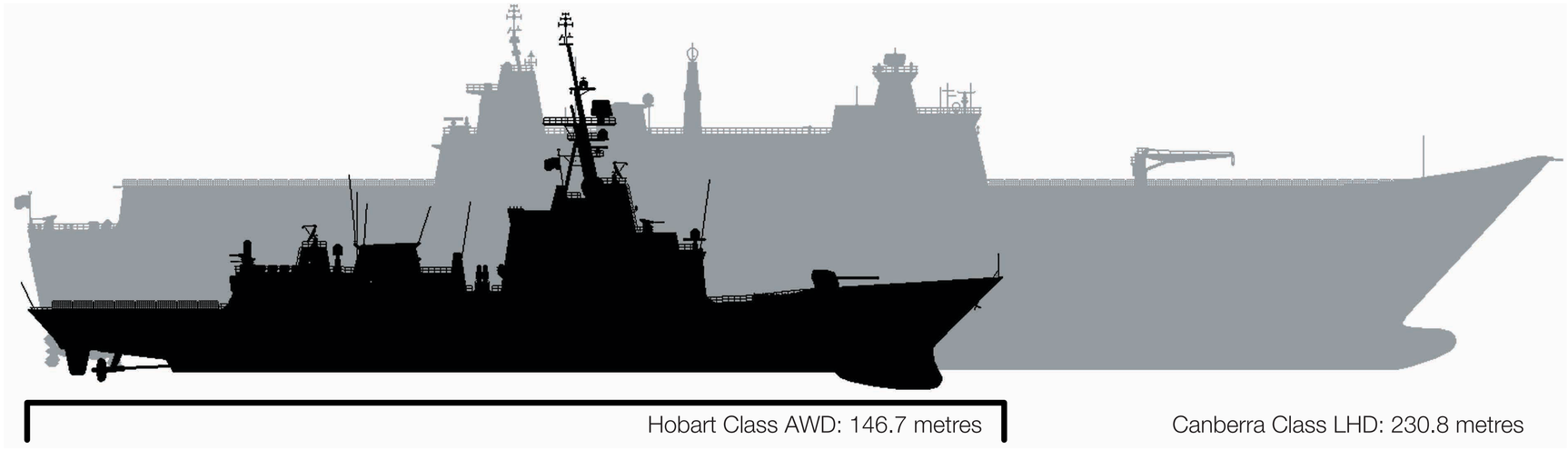
Figure E - Indicative Ship Construction Productivity Impact – Common Hull

To retain the option of building these warships in Australia, the Government has approved a limited feasibility study into using the AWD hull for the Future Frigates. This work will focus on continued production of the current AWD hull, suitably adapted and using capabilities from Australian companies CEA Technologies Australia and SAAB Combat Systems.

Anzac Production Learning Curves



LHD and AWD Comparison



AWD

Length overall: 146.7m

Beam overall: 18.6m

Displacement: 7,000t

Number of modules: 31

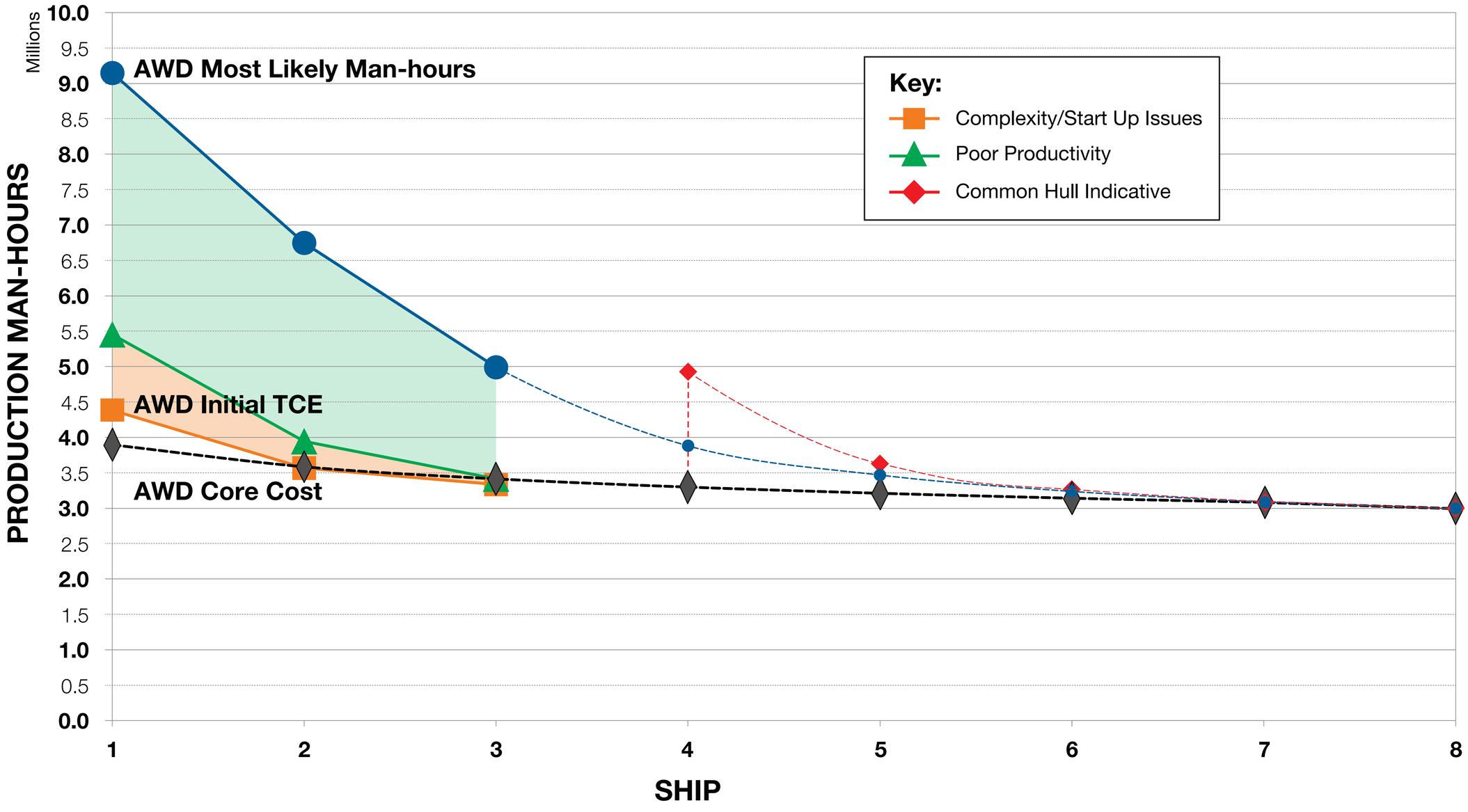
LHD

Length overall: 230.8m

Moulded beam: 32.0m

Displacement: 27,000t

Number of modules: 104



Indicative Ship Construction Productivity Impact - Common Hull

Department of Defence

Senate Economics References Committee – Inquiry into the future of Australia's Naval Shipbuilding Industry – 21 July 2014

Question on Notice No. 31 - Defence's preferred design for the supply ships

Senator Dastyari asked on 31 July 2014, Hansard page 34:

Mr Thompson advised not to assume that 'the European shipyards do not face similar start-up costs. It has been a long time since the Spanish built the Cantabria, which was commissioned in 2010. The Korean ship is a new design. Steel for the first ship the UK was only cut last month on 27 June' (Also refer to p. 36 of Hansard). Could you inform the committee about the number of ships that have been built and delivered based on Defence's preferred design for the supply ships from Navantia of Spain and Daewoo Shipbuilding and Marine Engineering?

Response:

Navantia is a leading naval shipbuilder that, in recent years, has undertaken the construction of naval vessels for a number of different navies, including those of Spain, Australia, Norway, India and Venezuela. The Cantabria class design is a development of the earlier Auxiliary Oiler Replenishment (AOR) Patino commissioned in 1995, and was built using the same shipyard processes as the Spanish and Australian Landing Helicopter Dock (LHD) ships.

Navantia has previously constructed one of the Cantabria class ship and one Patino class. The Spanish shipyards have long established suitable facilities and construction techniques, with shipyard familiarity extending established processes across other recent successful construction projects. The Spanish shipyards would use the same design teams, common building procedures and standards, and build strategy for potential Royal Australian Navy (RAN) AOR ships as undertaken for Cantabria and other recent programs.

There would be no requirement to re-engineer the block size or other aspects of the design as would be required to undertake construction by local Australian industry (noting it has been independently recognised that such re-engineering effort negates any learning curve and productivity-related benefit).

Daewoo Shipbuilding and Marine Engineering (DSME) is recognised as one of the world's best shipyards with 148 commercial and naval vessels currently on order worth a combined $US 44 billion. DSME has built over 1,000 commercial and naval vessels, including more than 330 commercial tankers, to which the potential AOR Aegir 18A design is a variant.

The DSME shipyard averages 50 ships delivered per year, and is currently in contract with the UK Ministry of Defence for four Military Afloat Reach and Sustainability tankers and Norway for a single Logistics Support Vessel, both of which are variants of the potential SEA1654 Phase 3 design. The Korean shipyard would use the same design teams and build strategy for potential RAN AOR ships as undertaken by DSME for the construction of the UK and Norwegian Aegir designs.

Department of Defence

Senate Economics References Committee – Inquiry into the future of Australia's Naval Shipbuilding Industry – 21 July 2014

Question on Notice – No. 32 - History of exclusive tenders

Senator Carr asked on, 31 July 2014, Hansard page 38:

Senator KIM CARR: …Chair, can I ask: is it possible that the committee could ask the DMO for the history of exclusive tenders of this size throughout the shipbuilding program? …
CHAIR: Sure. I am sure they could take it on notice

Response:

DMO and predecessor organisations have undertaken shipbuilding procurements in accordance with the Commonwealth procurement policy framework applicable at the relevant time. Currently, this framework is provided by the Commonwealth Procurement Rules (previously known as the Commonwealth Procurement Guidelines).

Department of Defence

Senate Economics References Committee – Inquiry into the future of Australia's Naval Shipbuilding Industry – 21 July 2014

Question on Notice No. 33 - BAE Systems unsolicted proposal

Senator Xenophon asked on, 31 July 2014, Hansard page 39:

Senator XENOPHON: Chair, further to Senator Carr's request, which I fully concur with, and in relation to the assertions made by Mr King about the BAE systems being 40 per cent more expensive to build a hybrid—the unsolicited proposal—if we could get some further information from the DMO as to the basis of those assertions, do you think it would be relevant?
CHAIR: Yes.
Senator KIM CARR: That is on top of the request to get the hearing—the actual proceedings.
Senator XENOPHON: Yes.
CHAIR: I do not know if anyone here is aware—I am obviously not—of whether BAE has made their unsolicited proposal a public document?
Senator XENOPHON: Well, if it is not a public document, we could get it in camera.

Response:

Due to the sensitivity of currently undertaking a market solicitation process following the Government announcement of First Pass approval for SEA1654 Phase 3, and the commercial-in-confidence nature of the unsolicited proposals, Defence offers to brief the Committee in camera on any further information it may require on this statement.