

APPG FOR
SHIPBUILDING AND SHIP REPAIR

THE MARITIME SKILLS BASE WITHIN UK SOVEREIGN
DEFENCE CAPABILITY



JUNE 2021



The Rt Hon. Kevan Jones MP
North Durham

Former Defence Minister and
Member of the Intelligence
and Security Committee



The Rt Hon. Mark Francois MP
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Former Defence Minister and
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Luke Pollard MP
Plymouth, Sutton and Devonport

HMNB Devonport, the
largest naval base in Western
Europe, lies within
constituency



Simon Fell MP
Barrow and Furness

BAE Systems Submarines, the
construction centre for the
Astute-class submarine, lies
within constituency



Carol Monaghan MP
Glasgow North West

SNP Armed Forces Spokesperson and
Member of House of Commons
Science and Technology Committee



Chris Stephens MP
Glasgow South West

Govan Shipyard, the construction
centre for the Type 26 Frigate, lies
within constituency



Gavin Robinson MP
Belfast East

The historic dockyard of
Harland & Wolff lies within
constituency

Chair's Foreword



"In the longer-term, the challenge will be for the government to finally curtail the 'boom and bust' model, and put in measures to ensure the skills necessary to maintain sovereign defence capability in the maritime sector remain resident"

Since the publication of the APPG's report into the National Shipbuilding Strategy (NSS) in May 2019, we have seen positive steps taken by the government in relation to the shipbuilding sector.

These include the publication of a Defence and Security Industrial Strategy, the commitment to publish a 30-year orderbook for the Royal Navy, and its recognition that competition by default has failed our shipyards.

However, we remain concerned that any proposed increase in shipbuilding construction – periods of relative 'feast' – will be inevitably followed by a period of 'famine' should the government fail to coordinate effectively with industry and provide a steady drumbeat of sustainable work. Once this period of relative increase is over, we must not see a repeat of the gate closures we observed at Ferguson Marine, Harland & Wolff and Appledore in the rundown of the carrier programme.

The Government must instead introduce support measures for the UK's maritime skills base and ensure throughput of work for UK shipyards, supply chains and the maritime skills base.

This short report will focus on this final point – the UK's maritime skills base – and examine why it is important to the UK, assess its current condition, and look at alternative measures being taken by the United States, Canada and Australia to increase domestic resilience in this crucial area.

In what is likely to be a period of transition in the Government's posture towards the maritime sector, hopefully one where competition by default is replaced by a more nuanced understanding of shipyards and supply chains, it remains an area of concern just how little consideration has been afforded to how prepared the skills base is to facilitate any proposed changes.

Already short in a number of important areas, this challenge in the immediacy will be centred on the UK's decision to construct two complex warship designs simultaneously; an undertaking avoided by peer nations for a number of reasons, not least the strain exacted on the skills base. In the longer term, the challenge will be for the government to finally curtail the 'boom and bust' model and put in measures to guarantee the skills necessary to maintain sovereign defence capability in the maritime sector remain resident over time.

More widely, the UK Government must accept its responsibility as the prime contractor for the generation of UK defence capability in the maritime sector. No major shipbuilder in the world exists outside state ownership or without major government subsidy.

This report will seek to focus the role government can play in ensuring essential skills and personnel remain onshore and, by doing so, ensure that the Royal Navy receives its equipment from a leading-edge supply chain and support structure.

The Maritime Skills Base

Why is it important?

Beyond the specific maritime context, most commentators accept that the competencies of the defence-industrial worker are important to standing ideas around national security and international obligations. Put simply, critical skills relating to defence capability reside with the folk in overalls on the factory floor as well as with those in military uniforms.

However, the government does not collect data on the number of personnel leaving the defence industry despite its clear and obvious concurrency with national security and, whilst other areas of the defence skills base have been studied in granular detail (particularly Taylor and Louth's 2014 study into the effects of the early retirement of Harrier and the cancellation of the Hawker Siddeley Nimrod on the aerospace skills base), no detailed study has been conducted of the maritime skills base in the United Kingdom since 2008.

For those who attribute the competencies of the defence-industrial worker to national security obligations, this is an area requiring further analysis.



CURRENT SHORTAGES

It has been understood that, for a number of years, the UK has had persistent skills shortages across the engineering sectors. Mechanical engineers, electrical engineers, electronics engineers, design and development engineers, production and process engineers, and engineering technicians have all been listed on the Home Office's Shortage Occupation List since 2011.

More widely, 69 per cent of engineers believe that there is a skills shortage in engineering, with a quarter of those saying this was most prevalent at the skilled trades level where 45 per cent of personnel are over the age of 45. In the maritime sector, shortages are particularly pronounced for naval architects, electrical engineers (especially power engineers), systems engineers, and mechanical engineers.

Maritime recruitment specialists have reported that fluctuating requirements have made it a challenge to recruit enough candidates with the right skills and outlined that the maritime sector is particularly affected by engineering shortages. Demand for experience in these fields can be particularly acute; it takes 6-8 years for technical skills of this nature to reach 90 per cent of the optimum level of productivity.

Welders too make the Shortage Occupation List, with many yards having to recruit foreign nationals to ensure high-quality workmanship. The shortage of welders nationwide represents an 'extraordinary shortage' according to a Chief Government Advisor.

Beyond the yards themselves, the Royal Navy has suffered skills shortages in similar specialisms; one NAO report outlined a current shortage of 9% in skilled nuclear trades and specialisms, including nuclear marine engineers; a deficiency likely to be accentuated as demand for these skills in the civilian economy increases in the future.

Contemporary shipbuilding will continue to place heavy demands on experience in highly technical specialisms, varied across engineering and design, which are often at a premium in the general population. Increased demand for personnel skilled in artificial intelligence, big data, software design, the exploitation of data, disruptive technologies, coupled with the greening of the current workforce will exacerbate the premium placed upon certain skills related to the maritime sector in the coming decades.

Of course, difficulties also lie in projecting which skills will be necessary for the future. The UK must have the resident capabilities to cope with changes to technological dynamics. This includes areas such as UK-owned and accessed intellectual property, system design, integration and sustainment, complex engineering capabilities, operational testing and evaluation, infrastructure, workforce and technical skills.

As Louth and Taylor state, one curious element of the common understandings of defence competencies is an assumption that the skills in a given defence-industrial base 'somehow self-regulate through the hidden hand of the market.' As a consequence, British policymakers take comfort 'perhaps erroneously, in the narrative that defence-industrial competencies remain alive and available to state decision-makers – essentially frozen into some form of perpetual equilibrium of assured supply.'

Studies by RUSI and RAND have undermined this assumption and, given the absence of study into the maritime skills base specifically, this has become an area of longstanding concern for this APPG.

In many historical cases and through many governments, shipyards and skills have been allowed to atrophy at the conclusion of contracts, under the misguided assumption that the gates can be reopened and the skills base reformed after periods of famine. Time and time again, this has proven to be a false option which the government has nonetheless taken despite the immense difficulties in reforming a skills base prone to exodus at the conclusion of contracts, the huge regenerative outlay for industry in restarting programmes, and the delays to handing over crucial equipment to the Royal Navy.

CASE STUDY: ASTUTE-CLASS SUBMARINE PROGRAMME

The case study of the Astute-class submarine programme is perhaps the most notorious case of a UK Government's failure to reabsorb its skills base at the conclusion of a defence programme.

Whilst initiated in January 1986 as a replacement for both Swiftsure-class and Trafalgar-class, the Astute programme would initially suffer delays through reduced defence expenditure at the end of the Cold War. This led to a substantial gap in designing and building nuclear submarines in the UK, with both the private sector and the MOD greatly underestimating the ultimate impact on program cost and schedule risk.

Although the MOD's final invitation to tender was made in July 1994, by the time comprehensive design had been completed by GEC-Marconi, the workforce at the Barrow shipyard had fallen from around 13,000 to 3,000 with key skills in design and engineering being lost predominantly through retirement or movement into other sectors.

Due to the lengthening of the gap between the end of Trafalgar and the start of Astute, junior-level managers could not benefit from the experience of previous programmes. As outlined by RAND's 2011 study, 'the movement of key people from the submarine sector to retirement or other career fields, resulted in a lack of experienced managers and technicians at the prime contractor.'

The problems faced by Astute led to a situation in which submarine design and build skills atrophied in the United Kingdom. The MOD had neither anticipated the impact of the gap nor factored into the cost and schedule estimates the need to rebuild industrial base capability. The results are felt today with every single Astute boat to date being overbudget and delayed.

The gap between Trafalgar and Astute outline that the technical community and the industrial base that designs, builds, and maintains the fleet must be sustained so that they can provide the required capabilities when needed. This is especially true in the submarine community, where many skills are unique and cannot be supported by surface-ship programs.



SOVEREIGN DEFENCE CAPABILITY

In order to secure freedom of action and operational advantage for its Royal Navy, the UK must be able to design, develop, manufacture, maintain, operate, upgrade and dispose of its maritime equipment.

All these tenets of sovereign defence capability have people at their heart. They are all activities which remain heavily reliant on access to a wide array of skills and competencies – some relatively easy to acquire and maintain or transfer from civil industry, but others requiring decades of investment, planning and hands-on experience to build up the requisite levels of deep subject matter expertise.

Fluctuations in the market are to be found in any sector but, for grey shipbuilding, the MOD is a unique customer that commands a monopsony over producers and the employment of yards depend on their investment. The MOD must therefore take a hands-on approach to nurture resilience within this skills base and ensure that the UK has a pool of experienced individuals capable of leading these programmes effectively.

The government has expressed a willingness to address the wider issue of boom and bust in shipbuilding and pursue greater levels of intervention and planning; the publication of the Defence Industrial and Security Strategy and the 30-year orderbook demonstrate this.

However, very little focus has been applied by the MOD towards the maritime skills base and greater levels of assessment must be applied. This is not a challenge solely for industry. As the single-buyer, controller of the market and protector of sovereign defence capability, it is the MOD's role to ensure the sustainability of the UK's maritime skills base.

THE ALTERNATIVE

In recognition of current shortages and studies undertaken by RUSI and RAND into the defence industrial sector, this APPG has consistently called for the Government to place a far greater emphasis on the sustainment of contracts to allow industry to recruit and retain specialist maritime skills.

We, therefore, welcome the Government's decision to publish a series of policy papers outlining measures to improve the situation. In particular, the Government's acknowledgement that a sustainable shipbuilding pipeline approach is crucial to allowing UK industry to develop a highly skilled workforce.

The UK Government is not alone in this analysis and is comparably slow to react. The United States, Australia and Canada have all published landmark documents in the past five years attesting to their concerns around the 'boom and bust' profile of shipbuilding.



As well as its \$21bn Shipyard Optimisation Programme, the United States' recent action signals its desire to distance itself from 'boom and bust.'

In the Office of the Chief of Naval Operations Report to Congress on the Annual Long-Range Plan for Construction of Naval Vessels, the US notes that boom and bust 'severely degrades the ability to plan the long-term or respond in the near-term', as well as 'devastating workforce experience and efficiency.' In the past, this has 'contributed to significantly longer timelines to build ships with attendant significant cost growth.' It further notes that even 'boom' periods resulted in large-scale block obsolescence, meaning that vessels reach the end of their service lives simultaneously.



The Canadian National Shipbuilding Strategy (2019) has similarly committed to the end of boom and bust and stated that delays in hiring necessary management and attracting engineering expertise delayed recent projects by two years.

The strategy aims to put forward a 'long-term shipbuilding plan rather than operating on a project-by-project basis.' This approach will allow the government and the shipyards to invest in the marine sector, build and maintain expertise, and create and sustain employment, as well as mitigating the risk of potential layoffs and fluctuations in production between builds.



Australia's Naval Shipbuilding Plan (2017) outlines a similar prognosis. The plan accepts the limitations of the market in the context of shipbuilding, and commits itself to 'ending the boom-bust cycle that has afflicted the Australian naval shipbuilding and sustainment industry.'

It further accepts that leaving programmes to source their own workforces and training requirements could 'result in shortages of specialist labour, and delays to shipbuilding schedules and delivery of planned naval capability.'

The United States, Australia and Canada have all, therefore, recognised the need for far greater clarity from government in order to create resilience throughout the skills base.

From the overarching orderbook, to investment in shipyard optimisation, to strategic registers for specific skills and projects, all three governments have signalled a willingness to undertake greater involvement in their domestic skills base. Put simply, they have placed maritime skills at the centre of their sovereign defence capability.

RECOMMENDATIONS

ASSESSMENT

As an independent coastal state, the UK must possess the resident technical capability to design, test and assure that maritime equipment is operationally ready for service. To achieve this, the UK must have an appropriately skilled UK-based workforce and the infrastructure to maintain, sustain, repair, upgrade and upkeep defence capability in the maritime sector, now and into the future.

Any analysis undertaken by the Department should be centred on achieving these tenets of sovereign defence capability in the maritime sector.

Whilst Maritime 2050 promised to regularly ‘review [...] skills needs will allow the UK to capitalise on its skilled workforce’, the MOD’s understanding of its maritime skills base is minimal. In the National Shipbuilding Strategy 2017, the MOD stated that ‘having the sovereign skills to design, build, repair, and supply certain equipment and systems and integrate naval ships (and security-sensitive equipment in all naval ships) is a key factor in the successful delivery of naval capability.’ However, they stopped short of outlining any specific plan to nurture this base in the context of grey shipbuilding and, more alarmingly, stated that ‘the number of apprenticeships and graduates in the shipbuilding industry and supply chain is primarily a matter for the companies concerned’ and that ‘industry will determine what skills are needed to deliver programmes, and tune their workforce accordingly.’

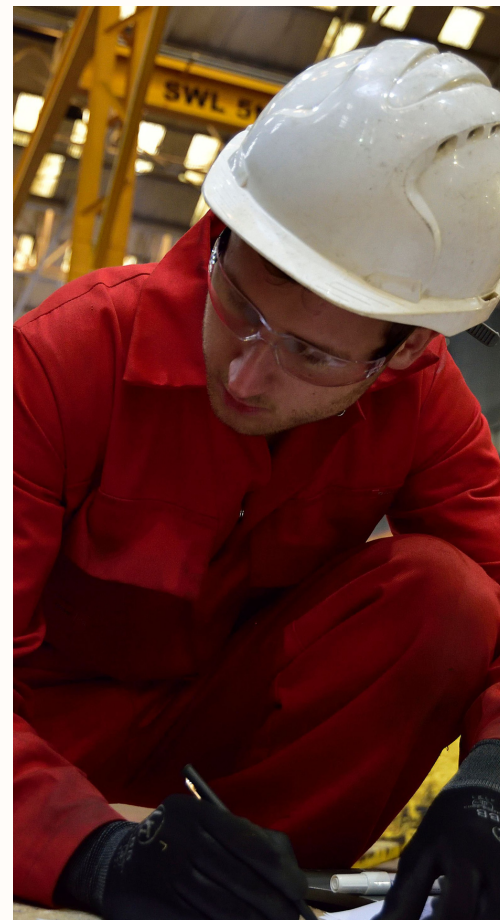
We must accept that leaving workforce development solely to industry could result in multiple approaches to workforce skilling, with little or no coordination at the national level.

As previously outlined, most peer nations have now accepted that this market-led model has failed, and that the concurrency between our maritime skills base and national security necessitates the hand of government in order to ensure sovereign defence capability is maintained between programmes.

The first step is to assess the current condition of the maritime skills base. Whilst currently independent, the Maritime Skills Commission (MSC) could be a suitable body to undertake such an overarching analysis. This analysis must involve a lengthy collaboration with industry and the MOD, in order to accurately identify areas of shortage, how these shortages may interact with the governments 30-year orderbook, and how changes to technological dynamics may impact the future skills base.

This would also require that the commission be offered greater guidance and input from the MOD as to the importance of maritime skills within the UK’s sovereign defence capability. Originally a DfT led commission, it is crucial that other Government departments integrate themselves effectively in the MSC, particularly DfE and BEIS, as well as the Maritime Enterprise Working Group.

As an early measure, the MOD should consider pushing for greater representation within the MSC in recognition of the Second Sea Lord being the sole representative of the Royal Navy on the commission.



GROWTH & COORDINATION

The government must also take this opportunity to anticipate the required skills over this period, identify workforce growth strategies, and assist industry in meeting projected demands in a collaborative way.

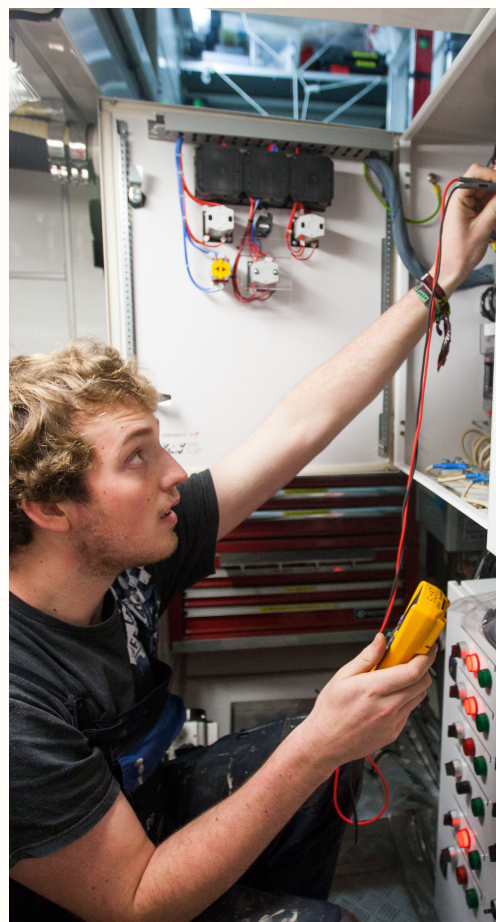
In its Naval Shipbuilding Plan, the Australian government has used the orderbook to project exactly when certain specialisms will peak in order to allow the skills base to be forecast appropriately. Published in 2017, the plan projected that, this year, shipyards will experience higher demand for outfitting specialists such as electricians, carpenters and pipe welders, and for higher numbers of highly experienced supervisors and middle managers. Australia further anticipated that, this year, its shipyards will experience a demand increase for 'structural skills', most notably fabricators and welders. Planning and certainty have meant that industry was given five years to work towards increasing these skills by a factor of four by 2021. Next year, workforce demand will shift to South Australia to meet the start of the future frigate and future submarine projects. Again, industry has been aware of this geographic shift for five years. This measure of planning applied in the UK would prevent skills shortages such as those suffered in the run-up to Astute.

To assist in this planning, the APPG supports proposals to establish a Naval Shipbuilding College to organise vocational pathways for specific projects, organise bridging projects should they be necessary, arrange placements for apprenticeships and graduates, and ensure there is throughput of qualified personnel. This college would also coordinate a Strategic Workforce Register to establish a database of individuals with interest, skills and capabilities relevant to naval shipbuilding, sustainment, and supply chain industries.

Finally, the Government must do more to support cross-sector, collaborative research and innovation. Maritime Research & Innovation UK is currently far too reliant on industry to guide and fund research; the UK Government has only invested £6mn in it since its inception. Boosting investment in this area will not just support the UK's sovereign defence capability; it will stimulate spinoff into other engineering sectors. The support offered by foreign governments allows their companies to place themselves more competitively for export. In a globalised maritime market with high barriers for entry, UK companies must be able to fairly compete.

Likewise, this APPG notes that the Maritime Enterprise Working Group remains non-permanent and has only received £20,000 from the public purse. In order to facilitate a sustainable research model, the UK should consider making MEWG permanent and establishing regular grants for MarRI-UK to place its research on a tenable footing and encourage greater investment from industry.

We support Maritime UK's proposals for a government investment of £1bn to spur the industry transition to net-zero and create more than 74,000 jobs through enhanced capital allowances, faster planning processes and tax credits for research and development.



CONCLUSION

Of singular concern is the conflict that remains in the Government's strategy. The Government states in its most recent document that it recognises the need for 'flexibility in acquisition strategies' in order 'to deliver and grow the onshore skills.' Most in industry do not wish for government to have more flexibility on procurement strategies; it wishes for government to provide greater certainty through sustainable investment.

More widely, decisionmakers must take a long-term view and understand how a specific program nurtures and feeds into the overall strategic plan.

Compared to our allies, the United Kingdom has been late to recognise these dynamics and reassess the 'competition by default' model. Australia, Canada and the United States have all taken steps to consolidate their maritime skills base through working with industry to project the needs of the next decades. The UK is yet to fully do so, and the MOD's recent assertions in its Defence and Industrial Strategy will alert many to the inadequacy of a case by case procurement policy for supporting sustainable skills growth.

The Government's promise of 'a more flexible and nuanced' strategy must not allow the MOD to approach each contract on a case by case basis, based upon interpretive criteria. Such carte blanche would only serve to increase insecurity within the sector and thus undermine the skills base further.

If the UK is to emerge as a 'medium power' with special characteristics and acknowledge the importance of specialising in areas of national comparative advantage, it should be clear that one of these advantages, as a historic seapower and independent coastal state, must be a resilient maritime skills base and the ability to surge at times of acute national need.

The MOD must accept the role it has to play in this. UK yards are dependent upon state contracts; the MOD is a unique customer that commands a monopsony over producers and the employment of many yards depend on their investment. The MOD must therefore show a requisite willingness to collaborate with the other areas of government currently charged with supporting the maritime skills base, currently BEIS and DfT, and lead both the evaluation and sustainable growth of these skills.

What is required is not only investment but deeper coordination across government and a willingness to present a sustainable model. At present, whilst money invested in shipbuilding is to be welcomed, it runs the risk of inducing a peak period which will inevitably be followed by yard closures, redundancies, skills leak, and the weakening of sovereign defence capability within the maritime sector.

RECOMMENDATIONS

01

The MOD must recognise that no major shipbuilder in the world exists outside state ownership or without major government subsidy.

02

The MOD must accept that as the single-buyer, controller of the market and protector of sovereign defence capability, it is the MOD's role to ensure the sustainability of the UK's maritime skills base.

03

Direct the Maritime Skills Commission to conduct an overarching study into the maritime skills base to accurately identify areas of shortage, how these shortages may interact with the 30-year orderbook, and how changes to technological dynamics may impact the future skills base.

04

Establish a Naval Shipbuilding College to organise vocational pathways for specific projects, organise bridging projects should they be necessary, arrange placements for apprenticeships and graduates, and ensure there is throughput of qualified personnel.

05

Coordinate a Strategic Workforce Register to establish a database of individuals with interest, skills and capabilities relevant to naval shipbuilding, sustainment, and supply chain industries.

06

Invest £1bn to spur the industry transition to net-zero and create more than 74,000 jobs through enhanced capital allowances, faster planning processes and tax credits for research and development.

07

The MOD must push for greater representation on the Maritime Skills Commission, in recognition that the Second Sea Lord is the sole representative from the Ministry of Defence.

08

To facilitate a sustainable research model, the government should consider making MEWG permanent and establishing regular grants for MarRI-UK to place its research on a tenable footing and encourage greater investment from industry.

