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The Secretary
Senate Foreign Affairs
Defence and Trade References Committee
Room S1-57
Parliament House
CANBERRA ACT 2600

Dear Sir/Madam

**INQUIRY into MATERIAL ACQUISITION AND MANAGEMENT
in the DEPARTMENT OF DEFENCE**

Enclosed is a paper containing some thoughts concerning Australian Naval Engineering which I believe are relevant to the subject inquiry.

Yours faithfully

D J Truelove

Enclosure: AUSTRALIAN NAVAL ENGINEERING – PAST AND FUTURE

AUSTRALIAN NAVAL ENGINEERING – PAST AND FUTURE

Introduction

The following thoughts pertain to the acquisition/maintenance of ships for the Navy, not equipments for the other services or other activities of DMO, though I believe that they [my thoughts] would have broader application.

These notes represent my views only. Specifically they do not and are not intended to represent the views of any present or past Director(s) of Naval Platform Systems, the Director(s) General of Navy Systems, Commander(s) of Navy Systems Command or any past equivalent offices, most of whom I can be confident will be outraged by them. Nor do they pretend to represent the views of any of my present or past peers, supervisors or subordinates though I suspect many would find themselves privately in substantial agreement, especially the Old Lags who have worked for Navy for many years.

My starting point is to consider the past¹.

Background – the Loss of Engineering Competence.

I was employed by the Dept of the Navy in 1969 as a Cadet Naval Architect, and sometimes willingly/sometimes reluctantly have worked for the RAN in Naval Engineering since². Over the period my work has encompassed design, production, maintenance of RAN ships and boats. Currently I am an Assistant Director in the Directorate of Naval Platform Systems with some indeterminate, undefined responsibility for future Naval projects and no authority to effect whatever that responsibility may be.

In 1969 Naval Engineering Design and Production was vested in 3 substantially civilian organs of the RAN, the Offices of Principal Naval Architect, Principle Marine Engineer and Principle Electrical Engineer, all of whom answered to the 3rd Naval Member, a Rear Admiral and the Chief Naval Engineer. Navy had enjoyed considerable successes in its Engineering in the 1950s and 1960s³, and appeared to be moving confidently to greater successes in the 1970s and beyond.

In 1972 or thereabouts the largely civilian wing of Navy's Professional Engineering was split into Design (then or later called the Design Branch - DGND) and Production

¹ "He who will not study the past is doomed to repeat it" – apologies to Georg Santyana 1898(?)

² With the exception of a couple of years attached to Support Command Australia, the consequence of some DRP fadsurfing quite out of my control and subsequently reversed because of its fundamental illogicality.

³ A good example was the late HMAS MORESBY. This ship was designed by the Navy and the Ship Building Board in cooperation ("Alliance" in newspeak), commissioned into the RAN in 1964 and paid off out of service only a few years ago. Other examples were HMAS STALWART, an *ab initio* design with a propulsion efficiency as high as ever achieved, and HMA ships SWAN and TORRENS, these being extensively redesigned from their RN parent and RAN predecessors

(similarly Production Branch - DGNP). This is always a corrosive division⁴, but was particularly unfortunate in Naval Engineering. “Design” was allowed, mayhap encouraged, to wither⁵ and the “Production” progressively was Navalised by the inclusion of ever more Naval Persons or ex Naval Persons. Most of these could at best should be regarded as Engine Drivers⁶ rather than Engineers. Many were not even that: Seamen slotted into positions because of their alleged competence in “Management”. Effectively these (Naval and ex Naval persons) now dominate the senior levels of Naval Engineering inside and outside DMO.

Other factors also were at work

Over the same period (1969-2002) Navy personnel have developed a remarkably increased reluctance to go to sea⁷, with the numbers of navy people who *could* be located on ships falling from about 40% in 1969 to 30% now⁸ - the corresponding figure for the USN today appears to be about 50%⁹.

Over the same period there has been an explosion in the numbers of Naval Officers in the higher ranks, up from 223 to 479. Most noticeable in that of Commodore (a post, *not a rank*, in 1969), up from 4 to 26 (!)¹⁰

Over the same period what remained of Professional (ie., mostly civilian) Naval Engineering declined, being all too often forced into the negative. It was seen as opposed to the fantasies of Senior Naval Persons¹¹ while actually endeavouring to ensure that the engineering was sound, that the ships were safe, that the costs of dreams, themes and schemes were honestly derived etc. In truth its position was hopeless: once enthusiasm outreaches reality the proponents of reality ought fold their tents and creep away, unlamented and unwanted, at least until the next major disaster.

⁴ But unfortunately a very common one. In my opinion a competent Engineer should Design *and* Produce. The purpose of Engineering is the delivery of an artefact, system, service etc. etc. – not a set of drawings or specifications or Learned Papers no matter how elegant [=“pure” Design], for someone else to make work, nor the mindless assembling some one else’s “shake-the-box kit” [=“pure” Production] which seems to approximate the most that we now are prepared to do.

⁵ Although Design is the highest Avatar of Engineering. Any technological body without some design competence ought not be regarded as a serious Engineering organization.

⁶ The term “Engine Driver” is used deliberately and provocatively. There are many uniformed persons in the RAN labelled “Engineers”, and some of them are correctly so named. There are many, many more with a BE from a Proper Establishment who are no more Engineers than I am a welder (for which I have a Certificate from the Canberra TAFE) because they have not really practiced the craft of Engineering (as I have not practiced the craft of welding).

⁷ Some of our most successful Naval Officers have spent very little time at sea. In one case known to me, a Commodore at retirement appears to have served at sea/screw turning for not more than 4 weeks per year in a career of 30+ years (!). Contrast this with a Merchant Mariners career of perhaps 20 *years* at sea/screw turning in 50 years service. Other long serving Navy civilians also have commented privately of the “extraordinarily short” seetime of our senior RAN officers.

⁸ JANES FIGHTING SHIPS 1999-2000 and earlier editions. The number for 1946/47 appear to be about 75%!

⁹ USNI PROCEEDINGS May 2000 – this gives 47% of Officers and 53% of Sailors posted to ships. The RNLN also appears to be able to post 50% of its people to ships. This is particularly interesting as the Netherlands, with a smaller population and smaller economy than Australia, maintains a Navy substantially larger than ours.

¹⁰ 1969 number is from the RAN Navy List Sept 1969.

¹¹ Navy was advised via *at least three* routes that the ANZAC WIP project was infeasible or at least risky years before the Project was cancelled. All of these routes originated in civilian Naval Engineers concerns for what was happening in the 1994-98 timeframe.

So on the one hand, more places ashore were needed for the Reluctant Mariners, while on the other, Navy was denigrating the professionalism of and cultivating a disdain for its civilian Naval Engineers.

As a result the numbers of Senior Experienced Naval Engineers (*not* “Executives”, Engine Drivers/ex Engine Drivers, Seamen/ex Seamen, Pussers/ex Pussers¹², etc. etc.) in production/acquisition/DMO has been declining for 30+ years *although these are the people best able to make competent decisions of technological matters*. This is compounded by the tendency for senior people to be rotated frequently: there is numerous anecdotal and stronger evidence that many successful “executives” owe their career to “moving on” before the problems caused by their decisions/lack of decisions come to fruition. The Navy posting cycle is most unhelpful here.

A consequence of this has been much loss of Engineering appreciation and corporate knowledge - the appreciation/knowledge of how things work, of why they are done or done in a particular way, of what is sensible, of what is risky; the instinct for the scope of the Project/problem etc. which might permit corrective action before the problem manifests itself seriously etc. etc. In short all those things which cannot sensibly be committed to paper or floppy disk but are passed down, discussed and/or experienced which enable a senior person in any field to exercise Professional judgement. What remains of both is incomplete by an amount that we do not know and fragmented between various closed shop offices, both within and without DMO. The ability to *anticipate* problems inevitable in the procurement of complex systems is reduced and worse, is still reducing¹³.

Shadowing the decline in Naval Engineering discussed above has been the demotion of the office of Chief Naval Engineer: a Rear admiral and the 3rd Naval Member in 1969, now its most junior Commodore¹⁴. Once a member of the Naval Board, now not even a member of CNSAC. Given the ever higher technology in military Systems, this seems, at least to this civilian Naval Engineer, absolutely extraordinary.

The loss of the Naval dockyards and their commitment to the RAN is yet another blow awaiting assessment. I suspect that a true assessment of this loss will prove it to have been more grievous than losses in any other area of Naval Engineering, but do not choose to discuss this further at this time¹⁵.

At all levels Australia’s competence in Naval Engineering has declined¹⁶.

¹² Storemen.

¹³ DMO does run “Lessons Learned” workshops to disseminate experience between the divers projects and these are to be encouraged. Unfortunately only a minute amount of knowledge can be transferred in a 2 hour workshop, and often the lessons learned are not really very profound. A revival of Professional engineering should lead to a revival of the Learned societies in various fields, and in their technical meetings of such much more substance could be (and used to be) discussed.

¹⁴ And one had to hire a consultant to determine if the office of Chief Naval Engineer was in any way relevant in the post DRP organization!

¹⁵ I do not believe that Navy has ever acknowledged the contribution of the Naval Dockyards to the RAN – eg., the contribution of HMA Naval Dockyard GARDEN ISLAND in readying the fleet for sea after Cyclone Tracy (1974).

¹⁶ It is contended that the Professional Naval Engineering once done by the Department of the Navy now is contained in Industry: I deny this assertion. There are very competent persons in Industry, many are peers and friends of mine and formerly of Navy, but much is lost. In the 1970s we (Navy &

Towards A New Competence

These are some musings of an embittered and passed over civilian Naval Engineer¹⁷, recruited honestly (I think) to an Engineering organization confidently advancing in 1969 but unfortunately soon thereafter cast into terminal decline.

A Return to the Past?

Firstly, while we can learn from the past, no attempt should be made to reinstate the past. The world moves on: Navy's onetime Design and Production Branches are gone and should not be revived. Restoration of a Naval Production Branch by splitting the Navy element from DMO certainly would be possible but a Design competence *per se* would require 20+ years dedication and consistency of purpose – inconceivable in an era of “continuous relentless change”¹⁸. It is doubly inconceivable because the New Design Branch (under whatever name) would sooner or later have to challenge professionally the amateur nonsenses pertaining to Naval Engineering put about by the (uniformed) Navy, but will ***never be confident enough nor strong enough to prevail***¹⁹. Such challenges contributed to the demise of the past organisation and will result in the demise of any future similar, competent, independent Branch. If a Design competence revives under another aegis, well and good, but else leave it to fond memory. Australia (as already has the RAN) should accept its (technological) colonial status. Like the Naval Dockyards, Design is gone. *Vale* Australian Naval Design.

Central Naval Engineering Organization (CNEA)

To maintain knowledge and to develop Naval Engineering competence, a Central Naval Engineering Agency should be tasked to undertake ***all*** of Navy's Engineering, including ***influencing*** design. It would form an integral part of any Integrated Product Team/Alliance/etc. for Navy Projects by providing personnel as necessary to the team, to the System Program Office, to wherever. The persons so provided would however remain ***responsible to and would return to*** the central body. By such a

Industry) attempted to design a Destroyer of 4600 tonnes: in the 1990s we (Navy & Industry) abandoned the design of a Patrol Vessel of 1200 tonnes and infinitely less sophistication. The successes that Industry has had in the past decade are a consequence of exodus of competent Professional Naval Engineers from the Department, and ***even so the real work has often been done overseas***. This source of Naval Engineering competence and knowledge that Industry has been able to tap now is almost closed.

¹⁷ ie., dinosaur

¹⁸ General Muller, addressing divers persons in the Campbell Park canteen, 1999 or thereabouts. I was present and it was an impressive and, to this Naval Engineer, a most demoralising speech.

¹⁹ Even in its heydays in the late 1960s and with many successes under its belt, Navy did not trust its own designers in the design of a significant warship. The design of the DDL was contracted to Y.ARD (Australia), bypassing Design Branch, but the latter appears to have been blamed ***in perpetuo*** for this failure. Certes in the 1990's Admiral Hudson stated that we “fell on our faces” in this brave Endeavour and implicated the Design Branch in the saying. He offered no encouragement to Australian Naval Engineering, though earlier (1978) he was most helpful to me in inducting Junior Civilian Engineers into Navy's orbit (every one of whom had the good sense to leave!).

mechanism the centre could grow its knowledge and grow the people needed for future work^{20 21}. An additional benefit would be the more efficient allocation of resources: under central control external to specific Projects “Tiger Teams” could be formed quickly and cast at areas or problems most in need.

This central organization should be created by the consolidation of divers Engineering elements in Navy, DMO, DSTO²² and elsewhere. It could be located in Navy, in DMO or in another government organization, or it could be in the form of a trusted company/subsidiary which is independent of the major Defence suppliers. In this latter case the company would have an indefinite contract (Alliance) ***provided it performs satisfactorily***²³. Were the CNEA external to Navy, it would be in a better position to uncritically “deliver what the customer (Navy) wants” rather than concern itself unduly with other matters such as safety, comfort etc..

Unless this CNEA is established, decentralising the day-to-day activity of DMO ***will increase the diaspora of corporate knowledge.***

Long Term Officeholders

System Project Offices should be restructured so that the Directors General and Project Directors are ***long term appointees*** (as much as 10 years for significant projects) ***intended to be succeeded by one of their two deputies***, who themselves will have long tenures. All the Senior Officers should be civilian (perhaps ex Service) with long experience in Naval projects including experience in Industry. Other senior figures in Projects also should have long tenure. Significant Naval projects should include Senior Naval Officers ***in an advisory capacity*** and more junior staff (of any Service) integrated into the running of the Office. Smaller projects should include serving Naval Officers in a dual role so that the end user requirements are not lost as the project evolves.

Decentralization of DMO

²⁰ Notwithstanding this, too much should not be expected of Alliances, Integrated Product Teams and the like because the motives of the parties are completely divergent. Navy wants the ***best*** that money (or at least, budget) can buy but the company wants to supply the ***least*** that it can, its profit being maximised by the maximisation of the difference. This is hardly the stuff of a successful marriage. With long term alliances the dynamics are more complex, but in the end the company is firstly responsible to its usually foreign owners/shareholders.

²¹ Similar contentions probably can be made for other Professions involved in acquisition. The USN (US DOD?) has a central Cost Estimating Office which has centrally owned officers posted all over the US. The estimates from this office, ***not the offerings of the suppliers, including the suppliers tender***, are the ones offered to the USG before approval to proceed is granted.

²² Much of what now is done in DSTO is routine Engineering and as such could be transferred to the new organization.

²³ How this would be assessed is an interesting question: implicit in my suggestion is the final transference of technological competence from the RAN, but as the Navy has for years paid no more than lip service to its need to be an “informed customer”, I suspect that the issue would not prove important in practice: technological troglodytes – rude persons would call the Fishheads [seamen] – will be left to judge Engineering potentials untroubled by reality.

I do not think that the decentralisation of the System Project Offices is especially important in the efficient operation of acquisition and maintenance, so long as:

- a. Operation of the System Program Offices is under the effective control of a competent Central Body²⁴ (ie., DMO);
- b. Engineering staff²⁵ are **centrally owned and return to the Engineering Centre regularly** to build the knowledge of the Engineering Centre²⁶. This implies that the Engineering Centre is independent of DMO's central body, but this independence need not be total. The Engineering Centre could be a part of DMO, and
- c. staff for the Engineering Centre are honestly recruited, with movement to other parts of Australia being a **known and accepted condition of service** (as it is in the Services)^{27, 28}.

That said, I do not in any way approve of the coercion now placed on members of DMO to migrate to places foreign to their desires or expectations. That was not a part of their understanding at the time of their recruitment (ie., "contract"). In this regard the behaviour of DMO (as I understand it) is outrageous.

Other Considerations

In the interests of economy, Service persons should form only a small part of the DMO²⁹.

²⁴ Which does not appear to be the case at the moment. I understand that one SPO is endeavouring to recruit a design house in isolation from the rest of DMO. Recruitment of a design house is not controversial given Navy's abdication from design, however the potential savings from ALL navy design coming from a single Design House might be as high as 5-10% of the total Navy acquisitions for all time. Given the cost of Naval projects, this is a significant amount, and as such ought (IMHO) be worthy of more senior consideration. I suspect that the additional savings in the post delivery life of the ship would be comparable, but have not been able to investigate this yet.

²⁵ And logically the staff of other specialities. The case of the US Cost Estimators has been noted already. Interestingly I understand that in the proposed diaspora of DMO the Finance staff are to be retained in the centre! Beancounters Rule OK!?

²⁶ Implied in this is that promotion should be centrally controlled. Some Navy Project Offices of the past have tended to promote internally, encouraging loyalty to the project; others have promoted from outside the organization, so benefiting from "new blood" but (presumably) at the expense of existing loyalties. There is a dynamic here which would appear to be worth exploiting by a central, competent management.

²⁷ Although some Service persons appear to enjoy extraordinary success in manipulating their postings to remain in particular localities options that do not appear to be open to DMO's civilians at the moment

²⁸ In this context, I expected that I would be so rotated when I joined in 1969. Only later did I become suspicious (cynical?) of the 1970s-80s reality, and declined to be so rotated without written guarantees that I would not be abandoned at some far corner of Australia. Such guarantees were not forthcoming and certes there were plenty who would have consigned me to the far ends of Australia (or indeed the far ends of the Known Universe) if they could have! (And after this there will be even more!!).

²⁹ Reducing the numbers in uniform to some approximation comparable with progressive foreign Navies, such as the USN or RNLN and employing a smaller (yes, I promise that it is possible!) number of civilians to undertake the long term/non seagoing work of the Navy would do more to reduce the cost of the Navy than any changes which might be implemented in DMO. A Uniformed Navy of about 7000 could still have about 50% of its persons posted ashore or on leave at any time. A reduced Navy

A Final Comment

Whether anything or nothing is done to reform DMO, the acquisition of complex systems such as those required for Defence always will be accompanied by some risk of cost overruns and/or failure to achieve performance targets. I believe that these risks can be reduced in Naval Projects if the projects are lead by Senior Experienced Naval Engineers, whom I see as being Civilians (some of whom will be former Service personnel but most long serving Civilian Naval Engineers) with a long term commitment to the success of the Endeavour. Itinerant enthusiasm, an eye for the next post and uncritical/incompetent acceptance of consultants reports are no substitute for sustained hard work.

In any event, nothing can be done quickly, no matter what the “spin doctors” may promise. Given what has been lost, I suspect that at least a decade of consistency is required to develop the CNEA postulated above. Given the small number of Navy Projects existent at any time, foreign input is necessary, either by importing expertise³⁰ or by loaning staff to suitable Engineering or acquisition offices overseas.

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with a reduced senior officer structure of not more than (say) 8 Admirals and 60 Captains (including 4 posted as Commodore (this again being a post and not being a rank, as it is now in the Royal Navy) **could afford an aircraft carrier with no increase to the defence budget** (were this deemed sensible for the defence of Australia). Such a structure is not an impossibility: when the RAN was so structured we could afford an carrier! And had another in reserve!!

³⁰ As we did throughout the 1950s-1990s.