

SOME ENGINEERING BRANCH CAREER FACTORS

by

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Historical

Up to about 1938 the main task of the Engineering Branch was to drive the Fleet through the water, *i.e.*, to provide, operate and maintain the propelling machinery of the Fleet. It is true up to 1919 it had been responsible for hydraulic gun machinery and that certain Engineer Officers continued to be employed in other ways, *e.g.*, Torpedo Engineer Officers and "Gun-mounters", but these ways were as backwaters compared to the main stream.

Like most real backwaters, they were interesting and instructive but often didn't lead anywhere, and this sometimes had undesirable effects.

About 1938, the task of the Engineering Branch underwent a series of changes—changes which were subsequently made more abrupt by the pressing needs of new forms of war.

Firstly, the R.N. took over from the R.A.F. the responsibility for the majority of the training and maintenance of the Fleet Air Arm, as it was then called, and secondly, an Admiralty Committee under the chairmanship of Admiral Sir Sydney Bailey decided that something must be done to relieve the Gunnery Officers of the Fleet of some of their technical functions.

The latter was necessary partly because of the increasing complexity of modern weapons, and partly to enable the Gunnery Officers to spend more of their time and energies on the correct use of their weapons (tactics) and on the training of the officers and men who would manipulate them in battle.

It will be appreciated, too, that naval aviation is a fighting machine with small sharp "teeth", but a very large administrative "tail". This "tail" is predominantly technical in one way or another.

Thus twelve years ago changes took place which were to change radically the task of the Engineering Branch, and make the demand for Aeronautical and Ordnance Engineers combined exceed that for Marine Engineers.

It was obviously undesirable and grossly unfair to allow A/E and O/E to become backwaters, and it was therefore necessary to change the whole structure of the Engineering Branch. The time had obviously come, too, to see whether or not the initial training required revision.

The New Structure

For the reasons outlined above, pockets and backwaters had to be avoided. Every officer, no matter what his specialization, must be given a fair chance of rising to the highest post, and his career must be so ordered that, if and when he gets there, he is capable of appreciating all sides of the complex human, technical and administrative problems with which he will have to deal. This catholic experience should also be good for the Service and the individual as it should safeguard the latter against narrowness or atrophy.

There is a vast variety of billets to be filled by Engineer Officers in each specialization, namely, posts connected with research, development, design, production, inspection, spares provisioning, administrative staff work, opera-

[E] BRANCH. CAREER CHART

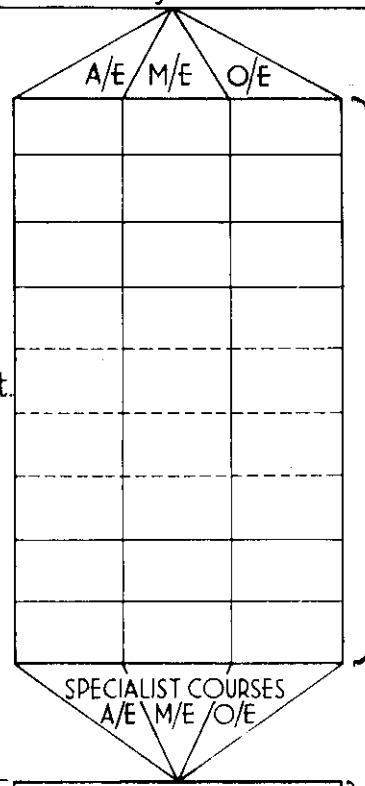
The Engineer – in – Chief
of the Fleet

Administrative Staffs of Senior Officers.
Technical Administration in Admiralty and M.O.S.
or their Establishments.
Command of Technical Training Establishments.
Administration of Technical Personnel.
Oversight of Production and Finance.
Management in Dockyards.

SENIOR
ENGINEER
OFFICERS
[6 to 10
years]

TECHNICAL FUNCTIONS

1. Research & Development.
2. Design for Production.
3. Production, Inspection & Finance.
4. Installation, Tests & Trials.
5. Supply of Spares & Plant.
6. Administrative Staff Work. (A & Q).
7. Repair & Heavy Maintenance.
8. Technical Training
9. Operation & Light Maintenance



SPECIALIST
NAVAL ENGINEER
OFFICERS
[15 to 20 years]

From 12 to 16 Months
approximately.

	OBTAINING CERTIFICATE OF COMPETENCY AT SEA	8 to 12 months.
NAVAL ENGINEER OFFICERS	BASIC B.Sc. DEGREE COURSE IN MECHANICAL SCIENCES. (N.B. Upper Yardmen (E) & ex-University Entrants enter here).	2 years.
	GUNROOM TIME IN FLEET [only 50% Engineering.]	8 months.
NAVAL OFFICERS	TRAINING CRUISER [COMMON SEA TRAINING.]	8 months.
OFFICERS	R.N. COLLEGE DARTMOUTH [COMMON TRAINING.]	4 months for Special Entry, 2 years for 16 year old Dartmouth Entries.

tion, maintenance and repair of machinery, and the training of the officers and men who will use it (see diagram opposite).

The Ideas behind the New "Basic" Training

In an era of rapid scientific and technological advances, warships, engines, weapons and aircraft change with breath-taking rapidity, but the fundamentals don't. In fact, *plus ca change, plus c'est la meme chose*.

For this reason, and also because of the variety of billets to be filled, the Engineer Officer must be educated in the fundamentals of the mechanical sciences which underlie all branches of engineering, and not in the nature or functioning of each particular kind of warship, aircraft, engine or weapon.

The nature and functioning of certain aircraft, engines and weapons will, of course, be taught, but only as examples of the application of certain basic engineering principles to fulfil a staff requirement. These educational principles have long been recognized in the professions, and the graduate who has been educated up to "degree standard", whilst initially ignorant of the details of any function or branch of his profession, should be able to attack its problems unaided, assimilate its important features in the shortest possible time, and possibly make some original contributions to it. He does this by applying long-standing scientific principles and using scientific methods to solve current problems. Because of the universal and variegated nature of our task, it is men like this that we must have as Engineer Officers. They must be initially intelligent and adaptable, educated basically, well schooled in one of the three main specializations and then given a catholic experience. All this necessarily takes a long time, and it is therefore necessary to catch them young. This is done by a process of "skimming off the cream" at the ages of sixteen (Dartmouth), eighteen (Special Entry and ex-Artificer Apprentice), twenty-two (University) and twenty-four (Upper Yardmen).

Some Difficulties

The thoughtful reader will have already discerned some difficulties. There are many, of course.

One obvious one is that large numbers of A/Es are required in the rank of Lieutenant and a much smaller proportion in the more senior ranks. Will their chances of promotion be worse?

The answer is "No," because a large percentage of A/E specialists in the rank of Lieutenant-Commander (E) and above will be employed in sea-going and general engineering or administrative appointments. This emphasizes the need for all Engineer Officers to obtain their Certificate of Competency when young. It also means that a candidate for promotion must be not only a capable specialist, but a good administrator capable of stepping without preparation into an unfamiliar background.

The same difficulty presents itself with submarine Engineer Officers, *i.e.*, a large proportion of junior officers is required to man "the boats", but only a very small number of senior technical officers is required.

So far, ex-submariners have proved remarkably adaptable and have experienced no apparent difficulty in stepping into unfamiliar backgrounds as senior officers. It is the existence of spheres like naval aviation and submarines that underline the necessity of avoiding "private navies" and having one large composite branch where surpluses can be absorbed, and whence shortages can be rapidly made good.

Some Statistics

The percentages of specialists at present required in the various ranks are roughly as follows :—

Rank	M/E	O/E	A/E	General Service Sea-going Appointments including S/Ms	General Administrative Appointments
Lieutenant and Lt. Commander	20% to 24%	10% to 14%	32%	26%	8%
Commander	27%	14%	17%	26%	16%
Captain	26%	17%	23%	4%	30%

These percentages will of course vary considerably from time to time, but they serve to demonstrate the trends.

The specialist training is an applied science course in which it is shown how the basic principles underlying all forms of engineering are applied to one of the multitudinous branches of the profession and no engineer officer's education would be complete without it, even if he were going to be a "salt-horse" for the rest of his life, a most unlikely eventuality. This specialist training should produce a healthy surplus of specialists in each rank and specialization. I say "healthy" because it should enable all officers to be given sea-going and general administrative appointments from time to time. The presence of this surplus means that some Lieutenants (E), having just specialized, may be sent to a general service appointment. This is not altogether a bad thing as sea experience of any kind is extremely valuable at this stage.

Dagger Officers

Somewhere between 15% and 25% of each "Year" of Lieutenants (E) will do a Dagger Course, M/E and O/E at the Royal Naval College, Greenwich and A/E at the National College of Aeronautics, Cranfield, Beds.

These post-graduate courses equip their students with the wherewithal to attack with greater ease the more abstruse problems encountered in applied research and design appointments. They are not regarded as a *sine qua non* for the holders of such appointments, but should confer a greater facility.

Interim Measures

Some interim measures will be necessary to deal with the majority of existing Engineer Officers who were trained under the old scheme prior to 1948, e.g. some A/E and O/E Conversion Courses will be necessary to obtain a balance of specialists at each level. If this is not done it might not be possible to carry out the tasks required of the (E) Branch and many of the existing specialists might remain indefinitely in their own specialist line. This would be neither in their own best interest, nor in that of the Service.

Upper Yardmen

Upper Yardmen for the (E) Branch may be drawn from Engine Room Ordnance, Shipwright or Aircraft Artificers, Mechanics or Aircraft Mechanics, according to the regulations issued from time to time.

They will do four months at the Upper Yardmen's College on academic subjects, eight months at the Royal Naval College, Greenwich, on the humanities and a Junior Officers' War Course, one year at the Royal Naval Engineering College on the basic mechanical sciences, and one year at sea obtaining a watchkeeping certificate. They then return to the Royal Naval Engineering College for specialist courses alongside the ex-Cadet entry.