WEAPONS ELECTRICAL ENGINEERING BRANCH

1870 - Electrical firing of guns introduced in ironclad ships including HMVS CERBERUS.

Although the Weapons Electrical Engineering Branch is one of the newest by title in the Navy, the history of this trade training stream goes back to 1870 in the Royal Navy, for in those embryonic days of electricity in the Navy, great and dramatic advances were being made in the fields of naval technology. This was at the time of the passing of the great wooden walled Men-of-War and the birth of the ironclad ships.

The history of the Weapons Electrical Engineering Branch from its inception as the Torpedo Branch of the Royal Navy has always been one of turbulence and expansion with the need to keep up with rapid and sophisticated advances in electrical and electronic technical changes.

To lead up to the present day state of the weapons electrical engineering training stream in HMAS NIRIMBA today, it is necessary for clarity to go back over 100 years. Even in the 1960's and 1970's there was turbulence in the organisation of the branch.

In 1871, the first ironclad ship of any Australian Colonial Navy arrived in Victoria to take up service in the Victorian Naval Forces. This was HMVS CERBERUS, whose name has dramatic links with the Royal Australian Navy of today. HMAS CERBERUS Westernport, Victoria, proudly bears the name of the sister training establishment to HMAS NIRIMBA in technical training - being the ninth CERBERUS in the British Empire and the fourth in Australian Naval activities.

In 1870, Director firing of guns (electrical) was introduced into ironclad ships including HMVS CERBERUS. At the same time non-contact mines known as electrical torpedos, operated by the Royal Engineers were introduced into service. This was the time of the birth of the Weapons Electrical Engineering Branch as we know it today.

Electrical and Torpedo training for Australian sailors began in 1881 at the Williamstown Naval Depot, the main shore facility for the Victorian Naval Forces. The Williamstown Naval Depot was also known as the Williamstown Torpedo Depot, for the Victorian Naval Forces was heavily oriented to torpedoes and Torpedo Boats. There was quite a sizealble Torpedo Flotilla in the Victorian Naval Forces. In 1901 the rating of Electrician was established. In 1912 Electricians became Electrical Artificers.

A brief glance at the history of the Weapons Electrical Engineering Branch of the Navy is given at the end of this segment of the History of HMAS NIRIMBA but we will first concentrate on the story of the branch in Australia leading up to the present day weapons electrical engineering training in HMAS NIRIMBA.

The first buildings of the Torpedo School at HMAS CERBERUS were constructed in 1916-1917 and on 1st September 1920, when CERBERUS officially opened, training began in the Torpedo School, Flinders Naval Depot, as CERBERUS was then known. In those days, the Torpedo Branch was responsible, in addition to Whitehead Torpedo maintenance, for general electrical maintenance except for wireless telegraphy equipment which was maintained by the Telegraphists of the Wireless Telegraphy Branch. The Torpedo School was designed to cater for training in torpedo, depth charge, mine warfare and electrics. Tradesmen were then being

entered from civilian life either as partially trained electricians, electrical fitters, etc, or qualified tradesmen to be Artificers of the Torpedo Branch whilst adult entry recruits began their naval careers as Ordinary Seamen Torpedomen. This situation remained extant until after World. War II and the Torpedoman of those days was looked upon somewhat in awe and reverence because he was thought to be some sort of brilliant person - as his trade embraced the magic word 'electricity'.

The Torpedoman's little green canvas work bag was a status symbol for the Torpedomen of the RAN and marked him as someone of high station in the lower deck.

During the 1939-45 War, the quantity and complexity of electrical equipment in the Navy increased enormously and the introduction of the new tecbnique of radar required men of specialised training which had not been provided by either the Torpedo or Communications Branches. Furthermore, the pressure of signal traffic, particularly in Shore Wireless Stations had increased to such an extent that the Telegraphists had not the time to operate and maintain their equipments. To overcome these problems, university graduates in science and engineering were commissioned as Royal Australian Naval Volunteer Reserve Officers in the Radar category and selected sailors, also from the Reserve Forces were trained as Radio Mechanics at civilian technical colleges, RAN STATION 264 (later HMAS WATSON) and at the Signals School, HMAS CERBERUS. Present day communications and systems technicians of the Weapons Electrical Engineering Branch will now begin to see their origins emerging.

With the coming of peace, most of the Reserves returned to civilian life and it became distressingly apparent that the Australian Fleet (then the Squadron) would be left with a wide range of complex equipment and few maintainers. To add to an already unsatisfactory situation, responsibility for different equipment was spread through different branches and control of the maintainers was similarly split. Various remedies were proposed, but after observation 0f the Royal Navy, which had been in a similar predicament, it was decided by the Australian Navy to weld the responsibilities for all electrical maintenance into one technical branch.

On 27th July 1947, the Torpedo Branch was renamed the Electrical Branch. In those days the officers of the Electrical Branch comprised an exotic collection of former Torpedo Officers, Torpedo Gunners, Commissioned and Warrant Electricians (Electrical and Radar), Commissioned Telegraphists and ex-Royal Australian Naval Volunteer Reserve Radar and Anti-Submarine Warfare Officers, who had been given permanent General List commissions on the basis of their wartime experience and university qualifications. Torpedo Officers who were not transferred to the Electrical Branch were converted to the newly formed Torpedo Anti-Submarine Branch - with no direct maintenance responsibility.

After a shaky start and with a series of cross training programmes, differences between backgrounds were eliminated over a short period and the branch became integrated and efficient.

For 15 years, the Electrical Branch survived without major turbulence in its structure and during this time the training of Electrical Artificers and Ordnance Artificers began at HMAS NIRIMBA in 1956. The story of the Ordnance Artificer (commonly called 'Oily' because of his preoccupation with the hydraulics side of weapons systems) is another story of turbulence in category structure and is detailed in another segment of this history. (See Chapter 5.)

The first Electrical Artificer Apprentices, ten in number, were entered into HMAS NIRIMBA in July 1956 and of these entrants, all graduated four years later. Between the years 1956 to 1962,

when the Naval Board decided to change the structure of the Electrical Branch once again, a total of 138 Electrical Artificer Apprentices entered HMAS NIRIMBA and of these, 122 graduated.

The first class of Electrical Artificer Apprentices entered at HMAS NIRIMBA in 1956 was made up of:

> Electrical Artificer Apprentices: R M Moule, K R Lloyd, E H Barrie, T W Richards, M J Howe, D T Groves, B J Jacobs, R A Salter, D J Luck and B C Clark.

The first officer in charge of the Electrical School was Lieutenant Commander Jack Axford RAN. The senior civilian instructor in the school at the time was Mr A Robinson.

Instruction began in building 259 on the eastern side of the Establishment adjacent to the Richmond railway line and training aids consisting of handed down equipments from World War II ships comprised the demonstration gear in the early days of the Electrical School. Flowing from the paucity of sophisticated training aids came a penchant of conscientious instructors to obtain on the 'old boy' basis, equipment and training aids which had been surveyed and written off by other establishments and ships.

Electrical Artificers for the Fleet Air Arm were streamed from the Electrical Branch and these trainees underwent a series of cross training courses to equip them for the skills needed to maintain aircraft communications and weapons systems.

In 1962, the most dramatic change to the Electrical Branch occurred in the Royal Australian Navy. This was when the Electrical Branch became the Weapons Electrical Engineering Branch. Following the lead of the Royal Navy, a rating structure review team analysed the personnel and training policies of the Royal Australian Navy and submitted their report in 1962. This was called the RATSTRUC Report. The conclusions of that team differed in detail from the development of the Royal Navy and the philosophies of the personnel and training policies of the two navies began to separate.

There was in retrospect, little alteration to the rating structure in the tradesman field and this comprised mainly title changes in most instances. Separation of trade streams into more specialised segments and a shortening of the naval apprentice training course from four to three and one half years comprised the main themes.

Prior to 1962, the electrical oriented apprentices were entered as Electrical or Ordnance Artificer Apprentices. Following the RATSTRUC Report and the change of the Electrical Branch to the Weapons Electrical Engineering Branch, the Apprenticeship Commission of New South Wales formalised recognition of the new trade stream categories of naval electrical apprentices as follows:

Naval	***Civilian***
Systems Artificer Power	Electrical Fitter Power
Systems Artificer Communications	Electrical Fitter Communications
Systems Artificer Weapons	Electrical Fitter Electronics
Systems Artificer Air Weapons	Electrical Fitter Electronics
Systems Artificer Air Communications	Electrical Fitter Electronics

At that time added emphasis was placed on technical subjects as diagnostic rather than craft skill became higher priority requirement for the maintainers of the Fleet. In HMAS NIRIMBA serious inadequacies in the equipments needed to support and advance further technical training and competence in the rapidly expanding electrical and electronics fields led to the Systems Artificer categories of HMAS NIRIMBA being sent to the Gore Hill (Sydney) Technical College and the Granville Technical College between January 1965 and June 1969. A considerable number of those lads attending the technical colleges obtained Certificates of Engineering.

The DIGIAC Trainer is currently used to teach trainees in digital electronics.
Mr Barry Moloney is shown instructing AETP Hooper.

From late 1969 the supply of up to date electrical and electronics training equipment began to arrive in NIRIMBA, modem teaching laboratories were constructed and 'in-house' instructional competence increased. HMAS NIRIMBA was from that time able to run similar courses to the technical colleges on board.

The history of the Weapons Electrical Engineering Branch has always been one of rapid expansion and review in order that the branch's training could keep pace with the ever changing technological scene. Inevitably, in the late l960's another committee was set up to inquire into training and techniques in the technical branches. Misgivings were being voiced on the objectivity of naval technical training and at the same time suggestions were being heard in naval circles that overtraining and inappropriate training of naval apprentices were extant.

In 1969, the NIRIMBA Report, which resulted from an investigation specifically set up to inquire into apprentice training, raised more problems on navy wide training difficulties than it solved. A more comprehensive investigation was carried out in 1970 by the Sailor Structure Committee (SAILSTRUC) and this report raised some rather radical suggestions for the personnel and training policies of the Royal Australian Navy. Although the vast majority of the SAILSTRUC decisions were implemented, there were some teething problems and it is only now that the Weapons Electrical Engineering Branch has settled down to a static routine of training. In the beginning of the SAILSTRUC implementation programme, the major changes were that the period of apprentice training at HMAS NIRIMBA was reduced to approximately two years and the new entries were recruited on a status somewhat equivalent to the adult entry recruit at HMAS CERBERUS. From that time onwards, the naval apprentice was required to compete with his general service adult entry counterpart for promotion. Graduating apprentices from the time of introduction of the SAILSTRUC scheme now aspire to the rank of Able Seaman instead of the former rank of Artificer.

Confusing though it may seem to the layman or the former Torpedoman of the old navy, the former rank structure of the Weapons Electrical Engineering Branch apprentices may be seen in the following comparative table:

Former	***Current***
Systems Artificer Power	Able Seaman Electrical Technical Power
Systems Artificer Communications	Able Seaman Electronics Technical Communications
Systems Artificer Weapons	Able Seaman Electrical Technical Weapons
	Able Seaman Electronics Technical Systems

The Weapons Electrical Engineering Section of the Air Technical Branch is also separated into three categories of Air Technical Weapons Electrical, Communications and Weapons Ordnance.

I shall not attempt to spell that philosophy out to readers.

The personnel of the Electrical Branch have been known colloquially in the Navy since World War II as 'Greenies' which was derived from the green distinguishing cloth formally worn between the gold sleeve lace by Electrical Branch officers. This practice went out of the Navy in 1957, but the name continues. Some sailors of the Electrical Branch were subjected to yet another shock to the system in 1972 when the Power category sailor of the Weapons Electrical Engineering Branch was relegated to the Marine Engineering Branch in a category called Marine Technical Power Electrics as mentioned in Chapter 3.

Since 1976, adult trainees of the phase scheme in the Weapons Electrical Engineering Branch have trained at HMAS NIRIMBA.

The first technical branch member of the Women's Royal Australian Naval Service to train at HMAS NIRIMBA, Senior WRAN ETC Neilson, graduated from HMAS NIRIMBA in 1980 after completing Phase 2 training. Since that time a further fourteen WRANS have commenced training at HMAS NIRIMBA.

Members of the Women's Royal Australian Naval Service of the Electrical Technical categories commenced technical training in HMAS NIRIMBA in 1979. WRANS who followed Senior WRAN Neilson in NIRIMBA were WRAN Radio Operator Wheeler, Senior WRAN ETC King, Senior WRAN ETC Phillips, Senior WRAN Walsh, Leading WRAN Read, and WRANS Hunter, Kirk, Edwards, Schelling, Stennett, Diamond, Mitchell, McKinnon and Sayers.

Three of the Commanding Officers of HMAS NIRIMBA have been officers of the Weapons Electrical Engineering Branch. These are:

Captain J R McMurray RAN, 1962-65, (Died in 1983).
Captain E J Morrison RAN, 1966-68.
Captain D R O S Fox AM, RAN, 1980-82.

Of the above, two were former sailors of the Electrical Branch and one was formerly a member of the Torpedo Branch.

Civilian technical instructors of the Electrical School and the Weapons Electrical Engineering School have been:

Mr B Wilson	Mr M Stewart	Mr S Keen
Mr K Guthrie	Mr G Cherrett	Mr J Slade
Mr W Cunningham	Mr R Smith	Mr L Stukatsch
Mr J Bone	Mr J Cameron	Mr D Tadman
Mr L Orloff	Mr K Delroy	Mr E Townsend
Mr E Hughes	Mr G A Whibberley	Mr B Smith
Mr B Croft	Mr A Barry	Mr M Douglas
Mr A Robinson	Mr S Basnett	Mr F Gardiner
Mr G Ross	Mr P Brookes	Mr M Gribble
Mr J Sepetuac	Mr W Collins	Mr J Guides

The senior instructional and administration staff of the Weapons HMAS NIRIMBA at the time of writing consists of:

Lieutenant Commander Stan Coppinger RAN
Lieutenant Commander John James RAN
Lieutenant Commander John Dowdeswell RAN
Lieutenant Commander Imants Ezergalias RAN
Lieutenant Paul Penfold RAN
Lieutenant Brian Flood RAN
Warrant Officer Barry Back

Senior civilian instructional staff:

Mr George Arthur 'Bill' Whibberley
Mr Mick Petery
Mr Graham Cherrett
Mr Ron Smith

LCDR John James

Officers in Charge of the Electrical School and the Weapons Electrical Engineering School in HMAS NIRIMBA since 1956 have been:

Lieutenant Commander J R Axford RAN
Lieutenant Commander A King RAN
Lieutenant Commander Col Stewart RAN
Lieutenant Commander W Crossley RAN (later Commodore)
Lieutenant Commander Arthur Downey RAN
Lieutenant Commander Les Renfrey RAN
Lieutenant Commander J W Haines RAN
Lieutenant Commander N F Saunders RAN
Lieutenant Stan Coppinger RAN
Lieutenant Commander Don Williams RAN
Lieutenant Commander Bill Fisher RAN
Lieutenant Commander Mike Hallen RAN (ex-apprentice)
Lieutenant Commander Stan Coppinger RAN

LCDR Stan Coppinger - OIC WEE School

Mr G A "Bill" Whibberley

1870 ..... Director firing of guns (electrical) introduced into irondad ships (including HMVS CERBERUS). Non contact mines known as electrical torpedoes operated by Royal Engineers were introduced.

1872 ..... HMS VERNON commissioned as a tender to HMS EXCELLENT under the command of Commander J Fisher (later Lord Fisher).

1873 ..... First long torpedo course in HMS VERNON Uni Ford system of electrical gun firing introduced Quarterly and other tests of gun circuits introduced. Continuity test was done by Galvanometer. Admiralty Circular Number 13S of 27th February 1873 stated:
"The electrical firing wires are to be frequently tested by the Gunnery Officer - by sending a trustworthy man to each gun with directions to make the necessary connections and place his hands to take the shock".

1875 ..... Between 1875 and 1880 the dynamo and searchlight appeared. The searchlight was introduced for torpedo work. No electric lighting was yet fitted in ships.

1876 ..... HMS VERNON became an independent command. Professor Alexander Graham Bell brought the telephone to HMS VERNON. The telephone was installed from VERNON to the Captain's house in Foreham. First dynamo installed in HMS VERNON. It was taken off in a dockyard lighter with a red flag. The foreman in charge of delivery informed the Officer of the Watch - "I have brought Mr Dynam's machine".

1881 ..... A full scale lighting system was fitted in HMS INFLEXIBLE. Admiralty approved installation of an electric light shop in HMS ARIADNE. Engineer officers were given one week and Engine Room Artificers four weeks electrical instruction. One Commissioned Officer of the Military Branch, one Gunner and one Torpedo Qfflcer were to be given electrical instruction.

1882 ..... First fatal accident by electrical shock in the Royal Navy - a Stoker was killed in HMS INFLEXIBLE. This ship was the first to have series lighting circuits. Supply at 80 volts. Torpedo Warrant Officers and Torpedo Instructors were to be given electrical instruction. 80 volts became standardised supply for lighting. 'Ampere' appeared - current was formerly measured in 'Webers".

1883 ..... Step by step turret indicators were introduced.

1885 ..... 100 ships were fitted with search lights at this time and 10 with internal lighting.

1886 ..... Order issued that any rating switching a light on or off was to report to the Officer of the Watch so that the voltage of the series parallel system used could be readjusted.

1887 ..... Lead case cable fitted. First remote power control system for lighting and training of searchlights fitted. Electric motors first appeared.

1890 ..... Shutter type masthead flashing light introduced. (Sir Percy Scott.) Floodlit semaphore was formerly used. 'Portsmouth' type 80 volt 400 amp dynamo appeared.

1892 ..... 'Portsmouth' type switchboard fitted in HMS CENTURION. First standard distributing system fitted. (Tree system in CENTURION.)

1895 ..... First illuminated ship overall configuration introduced - HMS SOVEREIGN at Kiel. Bayonet joint lamp holder introduced.

1895 ..... Captain H B Jackson's wireless experiments carried out in HMS DEFIANCE. (Later Admiral Sir Henry Jackson.)

1896 ..... Captain Jackson met Marconi at the War Office for discussions on 'Electric signalling without wires'.

1897 ..... First Electrical Department Complement appeared in the Royal Navy. Torpedo Instructors were allowed to Destroyers for instruction in Electrics as well as in Torpedo maintenance.
Wireless signals were transmitted from HMS DEFIANCE to HMS SCOURGE at 6,000 yards.

1898 ..... Ventilation fans appeared.

1900 ..... 100 volt supply standardised.

1901 ..... Rating of Electrician established. (Similar to Engine Room Artificer.)

1902 ..... Parallel running of dynamos introduced.

1903 ..... Admiralty Electrical Engineering Section set up under the Director of Naval Communications.
Lower Power Board and Generators introduced.
At this time 45 ships had complete fire control systems - using electrical firing and step by step indicators.

1904 ..... HMS WARRIOR attached to HMS VERNON as Wireless Telegraphy School.

1906 ..... 220 Volt Ring Main and Transmitting Magnetic Compass introduced.

1908 ..... Naval Ordnance Inspection Branch introduced. The Army was formerly responsible for the task of ordnance inspection for the Navy. Royal Artillery Officers inspected new guns on behalf of the Inspector of Guns and Steel.

1909 ..... Evershed transmission.

1910 ..... Anschuls Gyro Compass introduced.

1912 ..... Sperry Gyro Compass introduced.
Electricians became Electrical Artificers.

1916 ..... Royal Naval Volunteer Reserve Electrical Engineers entered to assist Torpedo Officers as a wartime measure.

1917 ..... Dreyer Fire Control Table appeared.
The Signals Officer took over communications electrics responsiblity from the Torpedo Officer.

1918 ..... Independent Directorate of Electrical Engineering set up at the Admiralty.

1920 ..... Field-Wastell Committee recommended the introduction of the Electrical Branch.

1921 ..... 'M' motor introduced.
Torpedo School commenced at Flinders Naval Depot (HMAS CERBERUS).

1922 ..... First Electrical Artificer Apprentices in the Royal Navy.
Fuse release switches introduced.
Ordnance Artificer training commenced at Flinders Naval Depot (HMAS CERBERUS). First Officer in Charge, Lieutenant Commander George Prideaux, formerly Armourer's Apprentice in the Victorian Naval Forces at Williamstown Naval Depot 1885.

1926 ..... Anti-Submarine Warfare Officers in the Royal Navy took over anti-submarine eqwpment responsibility from the Torpedo Officer.

1930 ..... Engineering Officers took over high powered engineering equipment in the engine room from the Torpedo Officer.

1934 ..... Magslip introduced.

1939 ..... RNVR and RANVR Electrical Engineer Officers entered.

1944 ..... The Phillips Report recommended the introduction of the three separate branches of Electrical, Ordnance and Anti-Submarine.

1946 ..... Electrical Branch formed in the Royal Navy.

1947 ..... Electrical Branch formed in the Royal Australian Navy. The Torpedo School at HMAS CERBERUS became the Electrical School under the command of Lieutenant Commander G F E Knox RAN.

1956 ..... Electrical Artificer Apprentices entered at HMAS NIRIMBA.

1957 ..... First Captain (L) RAN appointed.

1962 ..... Weapons Electrical Engineering Branch formed from the former Electrical Branch. Tradesmen rank titles changed from Electrical Artificer to Systems Artificer (Power, Weapons and Communications). Ranks of Systems Artficer Air Communications and Weapons introduced. Ordnance Artificer rank changed to Systems Artificer Power or Weapons.

1970 ..... SAILSTRUC system of apprentice entry introduced. Categories now Electronics Technical (Communications, Systems and Weapons) and Air Technical (Communications and Weapons). Power electrics transferred to Marine Engineering Branch under category title of Marine Technical Power Electrics.

1982 ..... Weapons Electrical Engineering Branch now comprises four categories of Electronics Technical (Systems, Power, Weapons and Communications) plus the allied but separate categories of Air Technical (Weapons Electrical Communications and Weapons Ordnance).