

HF AND MF TRANSMITTING

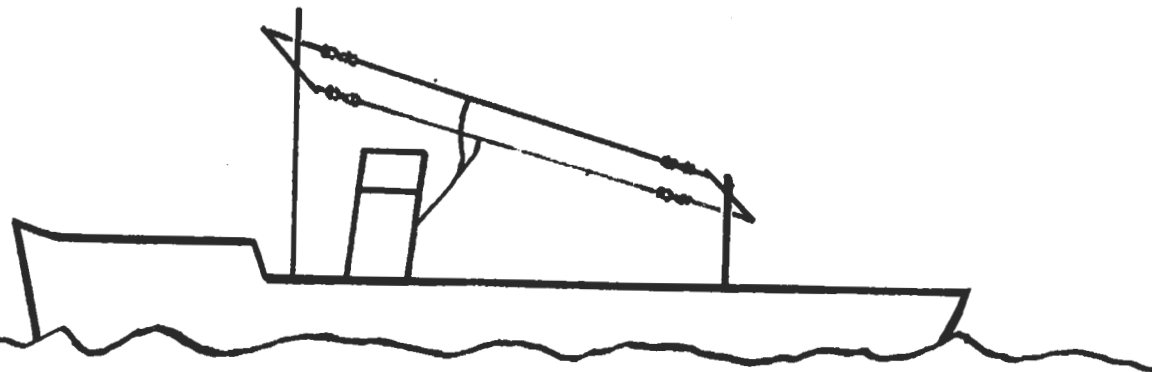
(a) Feed from the transmitter to the aerial is normally by means of trunks - a central conductor in a circular, square or "D" shaped earthed trunk.

(i)	H F Low Power	4"
(ii)	H F Medium Power	8"
(iii)	H F High Power	12"
(iv)	M F Low Power	8"
(v)	M F Medium Power	12"
(vi)	M F High Power	18"

Trunks are used because they eliminate the need for complicated matching units at the aerial, which coaxial feeders would entail. Trunk systems, however, require bulky high-voltage insulators.

(b) M F Aerials

A main roof is normally used for M F. If this is not available, the longest wire aerial should be used.

(c) H F Aerial - Wire

A single wire aerial is normally used for H F, and, where possible, should be vertical and not less than 50 ft. and, if possible, 70 ft. long, well clear of ships structure etc.

- (i) Attempts to cut H F transmitter aerials to definite frequencies usually pays no dividends.
- (ii) The great disadvantage of a single wire aerial is its large length/diameter ratio, which gives a peaky response curve, and the difficulty of adequately supporting it clear of ships structures etc.

(d) A W C

For aircraft carriers. It can be raised or lowered by hand and is 35 ft. long. Maximum power 400 watts, optimum frequency is 7 mcs and efficiency falls off sharply below 1.5 mcs due to mis-matching.

1.

(c) A W E

As for AWC except that there is no raising or lowering. For all ships other than aircraft carriers. It can be mounted on top of an 8" trunk or on the funnel with a wire feeder to the trunk. It should not be at more than 10 degrees from the vertical, or less than 15 feet from any other vertical aerial, or 8 feet from a horizontal aerial.

(f) A W L

Identical with AWC, but with hydraulic raising and lowering mechanism.

(g) A W G (Portable)

Originally designed for use with type 612 transportable, but has been modified for ships use as outfit AWH. They are transmitting whips (up to 40 watts) but can be used for reception. AWG consists of nine 4 ft. tubes with a special base unit. AWH consists of six 4 ft. tubes which fit on trunk outfit TK. This trunk outfit is normally used with a wire aerial except in an emergency or in coastal forces craft where AWH is fitted.

(h) Advantages of Whip Aerials

- (i) They are very robust.
- (ii) Many sites are possible.
- (iii) Their behaviour is known and can be estimated in the transmitter design.

H F AND H F RECEIVING AERIALSFeed

From the aerial to the receiver is normally by coaxial cable. If the feeder is very long, a transformer is fitted between the aerial and the feeder to avoid severe mis-matching.

Wire Aerials

These should have a height of not less than 35 feet and should be clear of funnels etc. They should also be not less than 100 feet from the main transmitting aerials (if possible) and not less than 4 feet from one another.

Deck Insulators

Provide for the connection of the feeder to the aerial and are of three types:-

(i) Group O A

Has 2 transformers and 2 links with 3 positions:-

Position 1 - Aerial to feeder via a transformer (15 - 1500 kcs)

Position 2 - Aerial to feeder via a transformer (100 - 10,000 kcs).

Position 3 - Aerial to feeder direct (above 10 mcs).

These links should be set up for the station organisation. A gas gap arrester is fitted and the whole is packed with grease (a nipple is fitted for topping up).

(ii) Group O B

As for O A but no transformers are fitted.

(iii) Group O C

A smaller edition of group O B.

Whip Aerials(i) A W A

This is fitted in a large number of ships and has a remotely controlled matching unit at its base. It is best on the HF and upper MF bands although its range is 100 kcs to 25 mcs. The aerial is 30 ft. long. The remote control unit is fitted in the B W O or Main Office and requires 230v 50 c/s AC (it should also have an emergency supply from DWB/E).

(ii) The varnished base insulator should never be painted (once painted it must be renewed).

3. RECEIVER AERIAL EXCHANGES

- (a) (i) As there can never be enough aerials for all receivers, plug and socket exchanges are used for connecting receivers to the aerials. Normally filters and gas gap arrestors are fitted in the aerial leads to the exchange.

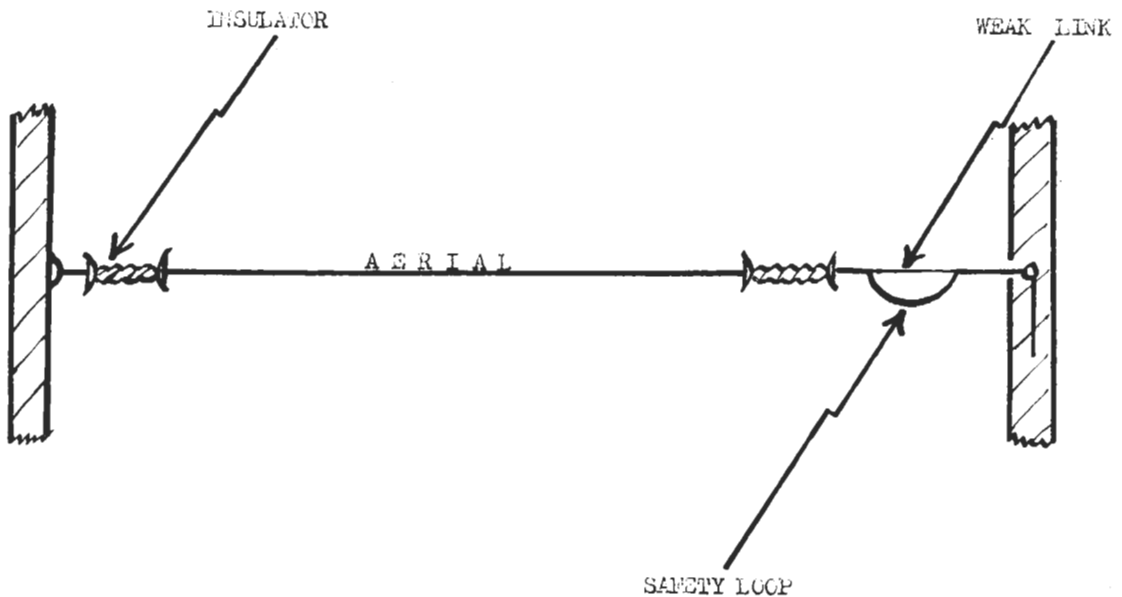
Note 1. Transmitter aerials can be used for reception.
(i.e. reciprocity)

Note 2. The filters are normally anti-WA Radar.

SHIP AERIALS

NOTES ON H F AND M F AERIALS

- (a) Insulators and wires should be kept clean.
- (b) Dock Insulator and Trunk connections should be polished, screwed up securely and greased.
- (c) Insulation checks are very important.
- (d) Safety loops should be fitted in Main roof aerials in case of "whip" of ship in action, and particularly in aircraft carriers where main transmitting aerials are on hinged masts.



- (e) When HF D F is fitted, no aerials should be within 15 feet of the D F loops. When taking bearings the main roof and other transmitting aerials should be earthed whenever possible.

(f) Emergency Aerials

Lengths of Patt. 611 rubber-covered wire with one end bared and one end tailed with a line, stowed forward and aft, should be used first. Then proper jury aerials should be rigged from ready use store of insulators, wire, halyard and blocks etc.

(g) War Aerials

Each ship should have a "Battle" aerial (three strands of aerial wire, plaited up, with heavy insulators and halyards) for use in action, in lieu of a Main Roof. Two War receiving aerials of rubber-covered Patt. 611 wire run permanently to parts of the superstructure which will not whip should also be rigged.

5. U / VHF AERIALS

(a) A good masthead site is absolutely vital for freedom from screening. The intelligent use of aerials is important (e.g. A destroyer on the screen uses her after TBS etc.) Aerials are normally $\frac{1}{2}$ wave dipoles with coaxial feeders.

(b) APH, ARU, AJA

Half-wave, centre-fed dipole, 22" in length for the 100 - 156 mcs band, (87 M and 86 M) Yardarm fitting.

(i) A R U Aircraft Carriers

(ii) A J A Coastal Forces

(iii) A P H Other ships

(iv) The balancer presents a short circuit to DC hence the aerial must be disconnected for insulation tests.

(c) A P U

Half-wave, centre-fed dipole, 39" in length for the 60 - 80 mcs band. Yardarm fitting for types TBS and QD.

Note: The balancer presents an open circuit to DC.

(d) A N C & A N Z

A half-wave, centre-fed wide-band dipole of the biconical type for masthead fitting (Types 86M and 87M, 100 - 156 mcs).

(i) ANC is fitted on top of the radar aerial.

(ii) ANZ is fitted on top of the mast in destroyers and frigates.

(iii) This expanded design increases the aerial capacity giving a much wider response curve and enabling the aerial to be used over a wider band of frequencies without loss due to mis-matching

(e) A J D

Similar purpose to ANC/ANZ, but for yardarm fitting.

(f) A N G

Half-wave, centre-fed, wide-band dipole with two pyramids apex to apex for masthead fitting (60 - 80 mcs Type TBS).

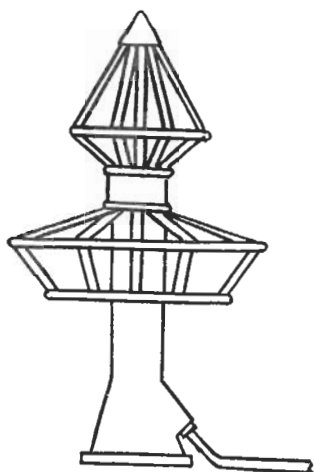
This expanded design increases the aerial capacity and gives a much wider response curve.

5.

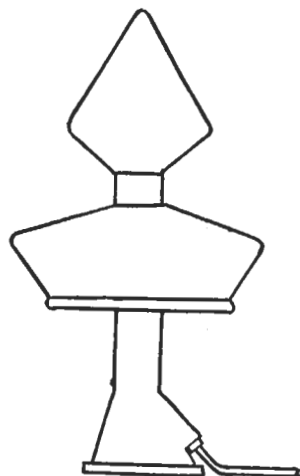
(g) AJC & AJE

Half-wave, centre-fed, wide-band dipoles, shaped as shown for the 200 - 400 mcs band.

A J C



A J E

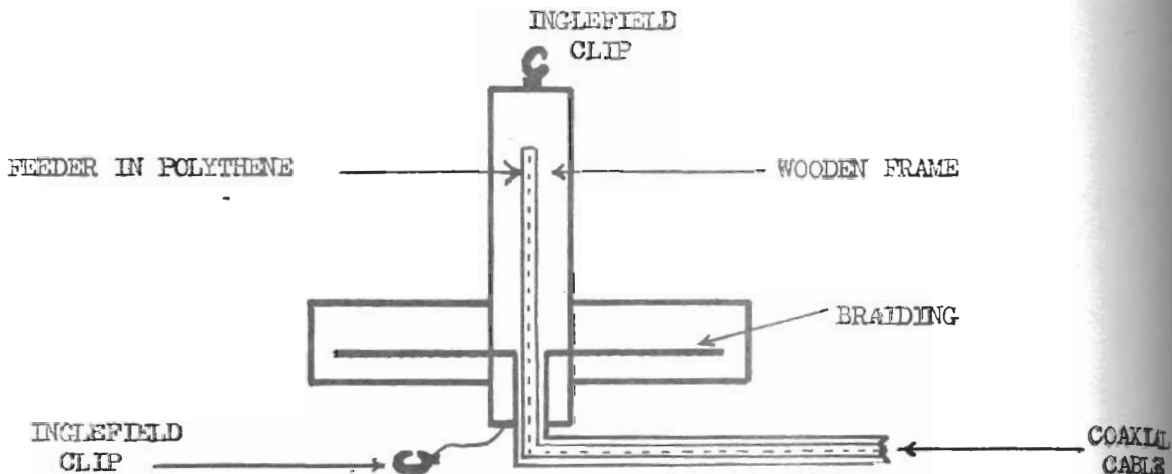


(h) Submarine Aerial

A vertical quarter-wave aerial made up of braided coaxial cable with the braiding material earthed and the whole supported in a groove of a 16 inch wooden spur mounted on the periscope standard.

6. EMERGENCY V H F AERIALS

- (i) (i) A single rubber-covered (patt. 611) wire should be run from the transmitter, or from the centre of the coaxial feeder, to the highest point available.
- (ii) The length of (i) should be adjusted in 6 inch steps for best loading results.
- (iii) The screen on the feeder should be cut back for 20 inches (86M and 87M) or 36 inches (TBS), and the centre conductor bared, and then the braiding split into two horizontal conductors on each side as shown.



- (iv) A temporary aerial of brass or copper rods (20" for types 86M and 87M, 36" for TBS) can be made up and mounted in the form of an inverted "T" (Wooden frame is the best).
- (v) Another temporary aerial used in the Pacific, with it's own emergency feeder, made as shown below, can be kept in the W/T office and hoisted at the yardarm etc when required.
- (vi) All cuts in feeders should be well sealed with rubber tape etc.

