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AERIAL ARRAYS AT HORSEA.

PRELIMINARY DESCRIPTION.

SERIAL NO.

H.M. Signal School,
R.N. Barracks,
Portsmouth.
25th February, 1932.

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PRELIMINARY DESCRIPTION.

GENERAL. The four aerial arrays for W/T communication with the Far East will be erected across the eastern end of the Island. Three are directed to Seletar; two, for Summer and Winter day waves, are tuned to 17810 kc/s and 13570 kc/s respectively, and one, for night working, to 7720 kc/s. The fourth array is directed to Stonecutters and tuned to 9060 kc/s for night working. Switching arrangements are provided whereby the direction of the beam from each array can be reversed in direction, or alternatively the array radiate a beam in both directions simultaneously. They will be energised from Type 26 transmitters. Fig. 1 shows the situation of the arrays on Horsea Island and the run of the feeder systems from the transmitting building to them.

DESCRIPTION OF ARRAYS. The array curtains, reversible transmitting and reflecting, are suspended from triatics slung between the cantilevers on five self-supporting steel towers each of which is designed to withstand the turning moment developed by a horizontal pull of 1600-lbs at the ends of the cantilever. Figs. 2, 3, 4 and 5 show the arrays in half section front elevation. The transmitting and reflecting curtains are identical so that each can take up the functions of the other when the beam is reversed.

The 17810 kc/s array is built up of two curtains spaced a quarter wavelength apart (13-ft.9-ins.), and each curtain containing six bays four tiers high, that is, each bay has four sets of doublets, each doublet arm being a half wavelength long (27-ft.6-ins.) and the four sets being spaced vertically apart by a half wavelength (27-ft.6-ins.).

Pattern 1082A - 7/22 aerial wire will be used for the dipoles and 1-inch steel wire rope for the triatics. The dipole arms are cross connected as shown on the drawings so that the radiation from the connecting feeders is suppressed and the array arms fed with current in the correct phase relationships.

Pyrex 12-inch insulators are used at the separation points of all dipole arms, and Pyrex 7-1/2 inch insulators at all other points. It is proposed to break up the catenary triatic into 3/4 wavelength sections (41-ft.3-ins.) and to insulate the sections with Pattern 999 rigging insulators.

The branch feeder lines from corresponding bays in the 2 curtains will be brought to switch junction boxes mounted on 13-ft. posts placed in line with the towers. The incoming

feeder.....

feeder lines are connected to the blades of the change-over switches, which are chain and pulley operated from the ground, thus enabling power to be switched on to either curtain, the other acting as a reflector. A certain amount of experimental work will be necessary in adjusting the length of these connecting lines to obtain the desired results.

The above description applies in general to the other arrays.

The 13570 kc/s aerial system consists of two curtains spaced 18-ft. 4-ins. apart and each curtain containing four bays three tiers high. The length of each arm of the doublets and the vertical distance between tiers is 36-ft.2-ins. The distance between insulators on the catenary triatics is 54-ft.4-ins.

The 9060 kc/s aerial system consists of two curtains spaced 27-ft.2-ins. apart and each curtain containing three bays two tiers high. The length of each arm of the doublets and the vertical distance between the tiers is 54-ft.6-ins. The distance between insulators on the catenary triatics is 81-ft.9-ins.

The 7720 kc/s aerial system consists of two curtains spaced 32-ft. apart and each curtain containing two bays two tiers high. The length of each arm of the doublets and the vertical distance between tiers is 64-ft. The distance between insulators on the catenary triatics is 96-ft.

The parallel wire feeder systems from the transmitting station are run with No.6 S.C.G. copper wire carried on Pattern 4669A - 4-inch porcelain pillar insulators which are supported at a height of 13-ft. on cross arms on 26-ft. telegraph poles spaced approximately 70-ft. apart. The lines are spaced 6-inches apart and are rotated or staggered, as in the G.P.O. telegraph system, to reduce mutual coupling between the different pairs.

NOTE.

This specification is subject to revision as regards exact length of aerial doublets and any method of suppression found necessary at the aerial branch feeders. The method of switching over the feeder lines to the different transmitters has not yet been worked out in full detail.

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Fig 1

DESCRIPTION OF ARRAYS. The array curtains, reversible transmitting and reflecting, are suspended from triatics slung between the cantilevers on five self-supporting steel towers each of which is designed to withstand the turning moment developed by a horizontal pull of 1600-lbs at the ends of the cantilever. Drawings Nos. X2/14, X2/15, X2/17, X2/19, show the arrays in half section front elevation. The transmitting and reflecting curtains are identical so that each can take up the functions of the other when the beam is reversed.

Figs 2, 3, 4

The 17810 kc/s array is built up of two curtains spaced a quarter wavelength apart (13-ft.9-ins.), and each curtain containing six bays four tiers high, that is, each bay has four sets of doublets, each doublet arm being a half wavelength long (27-ft.6-ins.) and the four sets being spaced vertically apart by a half wavelength (27-ft.6-ins.).

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Pyrex 12-inch insulators are used at the separation points of all dipole arms, and Pyrex 7-1/2 inch insulators at all other points. It is proposed to break up the catenary triatic into 3/4 wavelength sections (41-ft.3-ins.) and to insulate the sections with Pattern 999 rigging insulators.

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The above description applies in general to the other arrays.

The 13570 kc/s aerial system consists of two curtains spaced 18-ft.4-ins. apart and each curtain containing four bays three tiers high. The length of each arm of the doublets and the vertical distance between tiers is 36-ft.2-ins. The distance between insulators on the catenary triatics is 54-ft.4-ins.

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The parallel wire feeder systems from the transmitting station are run with No. 6 S.G.G. copper wire carried on Pattern 4.669D .4 inch porcelain pillar insulators which are supported on cross arms on 26..-ft. telegraph poles spaced approx. 70.-ft apart. The lines are spaced .6.. inches apart and are rotated or staggered, as in the G.P.O. telegraph system, to reduce mutual coupling between the different pairs.

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