REPORT 1030*

USE OF DIRECTIONAL ANTENNAS IN THE MF BAND ALLOCATED TO THE MARITIME MOBILE SERVICE TO IMPROVE SPECTRUM EFFICIENCY

(Question 38/8)

(1986)

1. Technical aspects

In the maritime mobile service it may become necessary to employ directional antennas in the MF band, e.g. to improve frequency use or as a more efficient means of solving decoupling problems between adjacent antennas and solving interference problems between adjacent service areas.

In the MF band, self-radiating masts with vertical polarization are commonly used as transmitting antennas. The required directivity of the radiated power can be achieved very cost-effectively by using the guys as director and reflector elements. This method can be applied to power levels of up to approximately 10 kW. The base feed impedance can, if necessary, be increased either by the provision of a fixed or adjustable top loading capacity (see Figs. 1 and 2).

* The Director, CCIR, is requested to bring this Report to the attention of the International Maritime Organization (IMO).

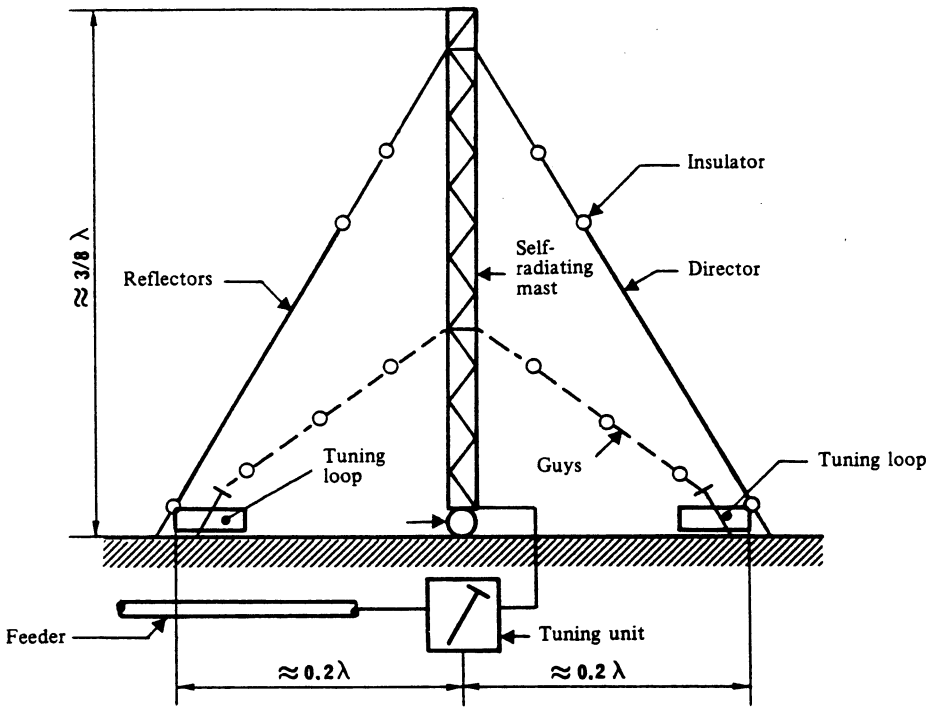

FIGURE 1 – *Directional antenna using guys as director and reflector elements*

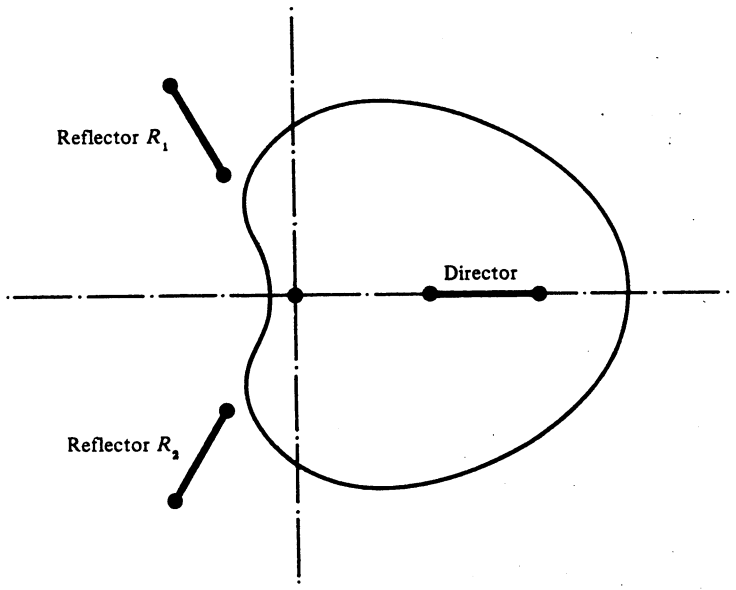

FIGURE 2 – *Horizontal radiation pattern*

As a result of tests performed in the Federal Republic of Germany with laboratory models, the following technical data are expected, depending on the dimensions of the antenna:

Gain:	approx. 3-5 dB
Front-to-back ratio:	> 10 dB
Half-power beamwidth:	90-180°

Fig. 2 shows the horizontal radiation pattern.

2. Further studies

It is intended to install and test antenna systems of this type for the 2 MHz band at one of the coast stations in the Federal Republic of Germany. These tests will also reveal the vertical radiation pattern.

The possibility of extending this concept to short antennas for use around 500 kHz should be investigated.

REPORT 1031*

WIRE ANTENNAS FOR USE ON BOARD SHIPS

(Question 41/8)

(1986)

1. Introduction

1.1 The International Convention for the Safety of Life at Sea (SOLAS) in force prior to 1 February 1992 requires that all passenger and cargo ships of 1600 tons gross tonnage and upwards must carry both a main and reserve transmitter, operating in the frequency band 405-535 kHz, a main and reserve receiver and a main and reserve antenna. The convention indicates that for acceptable communication a field strength of at least 50 μV/m is required. With this field strength at the remote station, the main transmitter is required to have a normal minimum range of 150 nautical miles, and the reserve transmitter, 100 nautical miles.

1.2 The objectives and requirements of SOLAS are clearly stated, but it is the interpretation of these requirements into engineered hardware where problems arise.

2. Antenna efficiency measurements

2.1 The 500 kHz distress frequency offers considerable propagation advantages which enhance the range of communications, but disadvantages in terms of providing suitable antenna elements. The wavelength is 600 m and it is difficult to design a compact, yet efficient antenna. The problem is aggravated by the current trends in ship design.

2.2 When the SOLAS Convention was originally drafted, most merchant ships had well-defined masts near the bows and the stern, between which a T or L shaped wire antenna could readily be erected. Experience with these antennas over many years indicated that they had a consistent performance which enabled the range of a particular installation to be calculated by a simple formula.

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