A STUDY OF STRIP TRANSMISSION LINES

by

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Chapter 1

Introduction

1. The aims of the report

The last two decades have seen the large scale introduction of various forms of the strip transmission line, both shielded and unshielded, in an attempt to simplify the construction of microwave components. The high cost, bulk and ever-increasing complexity of equipment fabricated with standard waveguides has stimulated interest in several alternative types of transmission lines. Counterparts of most coaxial or waveguide components, such as hybrid junctions, directional couplers, etc., can be realized in planar form, and this has suggested the possibility of fabricating quite complicated component assemblies which would, moreover, have the advantage of relatively small bulk and weight.

Various forms of shielded strip transmission lines have been devised and discussed in the literature. Fig. 1 shows some configurations. Some have inner conductors consisting of a single strip or a solid inner bar, and with or without a filling of solid dielectric, Fig. 1a and 1c. Others have an inner conductor made up of a dielectric card with a thin conducting strip on one or both sides (with the dielectric occasionally not extending beyond the edges of the strips), and air spaced from the ground planes, Fig. 1b and 1d. In some applications, striplines are made of two microstrip lines (a microstrip line is made of a single strip and a ground plane on opposite

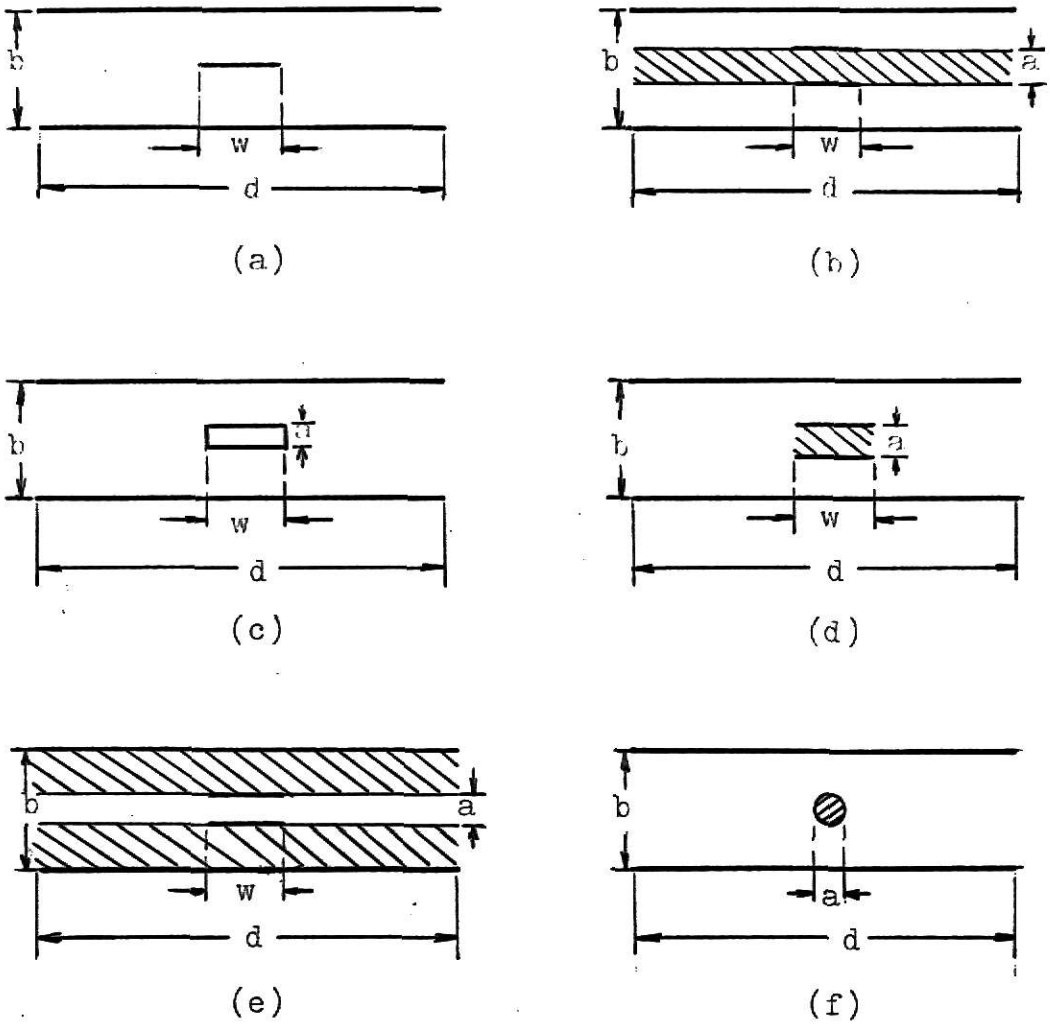

Fig. 1. Various forms of shielded strip line

(a) single strip; (b) double strip, dielectric supported; (c) solid inner bar; (d) double strip, partial dielectric supported; (e) two microstrip lines with the strips face to face; (f) circular inner rod.