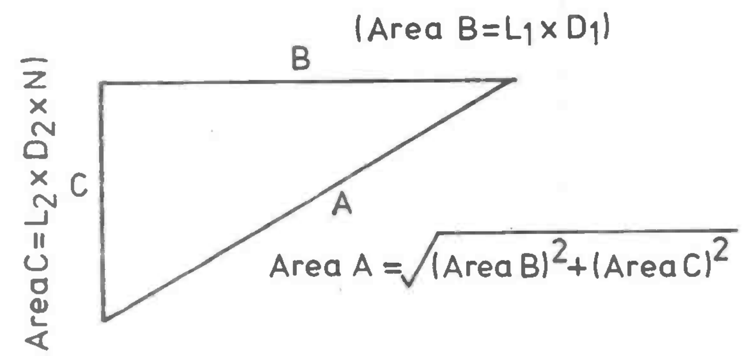


FIG.2. Wind diagram

if the aerial is made of round tube or rods, they present a much better aerodynamic shape to the airflow (see **Fig. 3**) and so any resulting wind pressures would be less than that on the equivalent flat plate. An allowance is made for this by multiplying the maximum area A by a factor of 0.6. Having got the maximum effective area of the aerial, corrected by 0.6 if round tube is used, the wind pressure or 'windage' is obtained by multiplying by the wind pressure relative to a given wind speed.

Wind pressure

There are a number of variables to be taken into account when considering wind pressure in relation to its speed, but so as not to confuse the issue we have simplified matters by using values applicable to aerials at a height of 15m above ground, situated in open country with scattered wind breaks. These values of wind speed have been derived on a statistical basis from continuous records for the whole of the UK and are given as being the estimated gust speeds that are likely to be exceeded, on average, only once in 50 years in open country and 15m above ground. These values are given in a British Standards Code of Practice, CP3 Chapter V: Part 2 1972 and some of these are reproduced below in simplified form:

Vertical aerials

With aerials that are mounted vertically as in **Fig. 4**, the maximum surface area appears when the aerial is viewed from the side. Therefore, the maximum windforce will occur when the wind is at right angles to the side of the aerial. The effective area can be worked out as follows: multiply the area of the longest element, (including any traps) by the total number of elements. Add the area of the supporting boom.
Effective area =

$$AE = (L_2 \times D_2 \times N) + (L_1 \times D_1)$$

As with the horizontal aerials, if the elements and boom are made of round tube, then the result must be corrected by multiplying by a factor of 0.6.

Extensions and rotators

Like the aerial, the rotator and any extension tube (see **Fig. 6**) will also offer some wind resistance that has to be taken into account. The total area and wind pressure can be worked out in the same way as for aerials made of round tube. If, however, the rotator has a rectangular profile then find the greatest area, and consider it as a flat surface. When dealing with rotators and extension tubes (see **Fig. 6**) two factors have to be considered:

1. The sideways load due to the wind load of the aerial.
2. The sideways load due to the wind load of the extension tube itself.

These two loads cause a bending load to be applied to the rotator and mast top as well as the extension tube. The bending load on the rotator is found by multiplying the windage of the aerial at point A by its distance (B2) above the bottom of the extension tube. Working in units of pounds (weight!) and inches, the load is given in lb.in. The wind load of the extension mast is found by multiplying its height H above the rotator by its diameter D. Because it is generally of round tube, the answer is

Wind Speed (Miles/Hour)	50	60	70	80	90	100	110	120
Dynamic Pressure (lb/ft²)	6.4	9.2	12.5	16.4	20.7	25.6	31.0	36.9

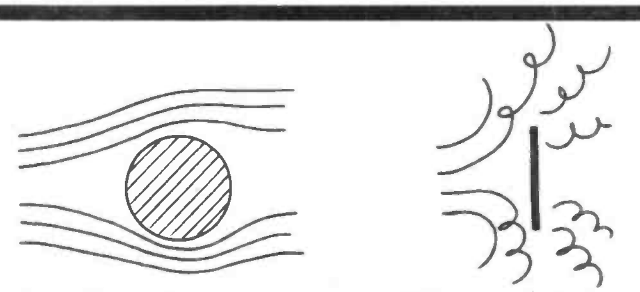
CORRECTION – APRIL

In the April issue of this magazine we carried an error in the previous part of this series 'A Plain Man's Guide to Masts and Towers - Pt 3' which has caused much annoyance to all concerned.

We stated that the name 'Versatower' was attributed Western Electronics Ltd. This is not so. This well known brand-name belongs to Strumech, a company which has been making Versatowers and other forms of aerial masts for the last 15 years.

The error originated in the editorial offices of this magazine and was in no part due to the author of this otherwise excellent series, Alan Barraclough G3UDO. Profuse apologies and red faces.

Frank Ogden G4JST
Editor, Ham Radio Today



Smooth air flow over round surfaces = less resistance

Disturbed turbulent air flow over flat surfaces = more resistance

FIG. 3.