

ROLLING

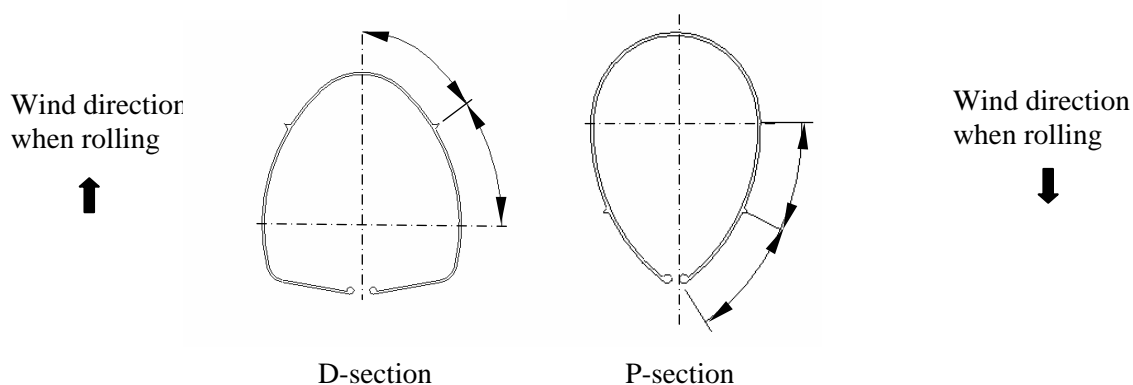
Rolling is the rhythmic heeling to and fro around a longitudinal axis with wind direction approximately longitudinally.

Rolling has occurred with our P sections with wind direction from the bow and with D-sections 137/113 and 160/132 with wind direction from the stern.

1 Actions to minimise rolling

The aerodynamic force which cause the rolling can be eliminated by detaching the air flow around the mast by mounting strips on the upper part of the mast, 30 cm from the masthead and 3-4 m downwards.

Material required: Seldén's aluminium strip (art no. 535-012-01) x 3-4 meter.



2 Theory

Rolling can be classified as "galloping oscillations":

An external force (a gust hitting at an oblique angle of attack or a wave) must initiate the rolling. The mast then moves perpendicular to the wind direction. This movement and the true wind form an "apparent"

wind. For some mast sections this apparent wind creates a force working in the same direction as the mast movement (in the same manner as the driving force generated by a sail). If this rolling force has the same frequency as the natural "pendulum" frequency of the boat, the rolling can increase to a most annoying degree.

The natural pendulum frequency depends on the meta center height of the boat (which in turn depends on displacement, distance between centre of gravity and centre of buoyancy and the initial stability of the hull). A change of displacement, for example, can change the natural pendulum frequency of the boat to such a degree that rolling does not occur.

3 Literature

For further studies of these matters we recommend:

Sachs, Peter: Wind forces in engineering

Rosemeier: Winddruckprobleme bei Bauwerken