



# Anodes

Datawell - Oceanographic Instruments

## Steel strips in the sacrificial anodes of a Directional Waverider

Concerning steel strips in the sacrificial anodes.

Plain steel is Ferro-magnetic, i.e. it generates a magnetic field which disturbs the earth magnetic field used to transform the buoy motion to the Heave/North/West axis system.

A small piece of iron below the buoy disturbs the earth magnetic field in the compass with typically a single degree ( $1^\circ$ ). For most applications this  $1^\circ$  deviation in the direction of the waves is acceptable. However, this static error is not the only effect of the Ferro magnetic disturbance. When the steel induced field at the compass changes dynamically during the measurements, the axis transformation of the motion to North/West motion is affected. In this way a plain circle motion appears as a combination of motions in various directions. The horizontal motion at one frequency is

transferred to other frequencies. So dynamically the steel strip does not introduce a small disturbance, but complete artefacts in the direction measurements. In his book, "Waves in Ocean Engineering", M.J. Tucker speaks of "compass noise" when discussing this and related topics (Sections 4.2.3 and 7.4.3).

The impact of a strip of steel in practical applications is not easily specified, since it depends on (1) the magnitude of the magnetic field at the compass due to the steel, (2) the changes in the position of the steel, and (3) the motion of the buoy itself.

It is for this reason that Datawell uses stainless steel strips for the sacrificial anodes.

