

Corrosion considerations for underwater vibration monitoring

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Underwater monitoring solutions

Many customers install our sensors on submerged equipment such as pumps and platform support structures. In these applications in addition to the normal vibration requirements, consideration must be given to the very real problem of galvanic corrosion. Galvanic corrosion can occur any time two dissimilar metals are brought into contact and immersed in an electrolyte such as seawater.

The Wilcoxon 746 sensor is the best option for monitoring the vibration in submerged applications in either seawater or fresh water. The 746 uses a titanium case and polyurethane integral cable for submersion to pressures up to 650 psi (45 bar).

Titanium casing resists corrosion

Titanium-cased units are less likely to pit and corrode in most circumstances because of titanium's ability to easily polarize in seawater. However, the structure (pump) may still suffer from galvanic corrosion. It is important to note that galvanic corrosion is a complicated process and the installation engineer needs to fully understand the metallurgy of the pump, the coating on the pump, the type of mounting technique used for the sensor (stud, glue, mounting pad) as well as the chemical makeup of the seawater.

One method that is commonly used to protect against corrosion is to introduce a third metal into the chemistry. Oftentimes, zinc coatings are introduced as a means of protecting steel in a marine atmosphere. Because zinc more easily gives up electrons when compared against other metals in a seawater solution it will corrode first protecting the base metal. A second method of mitigating corrosion is to electrically isolate the sensor housing and the surrounding area from the electrolyte (seawater). This can be accomplished by applying a coating of epoxy or synthetic paint over the sensor and surrounding area after installation of the sensor, but before submersion. A possible synthetic paint would be one made out of a fluoropolymer elastomer such as Viton®. A third solution would be to electrically isolate the sensor from the mounting structure. In this case plastic or ceramic washers between the accelerometer and mounting location could be used but their effect on the frequency response of the sensor should be considered.