Cathodic protection methods

Corrosion control can be done by cathodic protection (Modifying the metal) methods. The principle involved in the cathodic protection is to force the metal to behave like a cathode. Hence, there is no anodic on the metals corrosion does not occur. There are two types of cathodic protection:

i) Sacrificial anodic protection (or) galvanic protection method.

ii) Impressed current cathodic protection method.

a.Sacrificial anodic (or) Galvanic Protection method

In this method **(Fig.1.6)**, the metallic structure to be protected is made cathode by connected it with more active metal (anodic metal) so that, all the corrosion will concentrate only on the active metal. The more active metal itself gets corroded slowly while the metallic structure (cathode) is protected. Hence, this process is known as sacrificial anodic protection. The anode used for this purpose is called sacrificial anode. Aluminium, zinc, magnesium and their alloys are used as sacrificial anodes. The completely corroded sacrificial anode is replaced by a fresh one. This method is used to protect the buried pipelines, underground cables, marine structures, water tanks, domestic water boilers, etc.

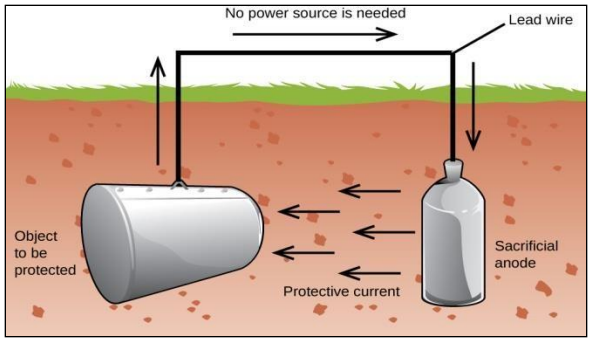

Fig. 1.6 Sacrificial anodic protection method

Advantages of sacrificial anodic protection method

1) External power supply is not necessary.

2) It can be used in remote area.

3) Low installation cost.

4) Minimum maintenance cost.

Limitations of sacrificial anodic protection method

1) Limited driving potential and current output.
2) Frequent replacement of sacrificial anode.
3) Soil resistivity limitations.
4) It is not suitable for larger size object because of mutual interference.

Applications

1. This method is used for the protection of ships and boats. Sheets of Mg or Zn are hung around the hull of the ship which will acts as an anode compared to Fe (ship / boat made of Fe). Hence, corrosion concentrates on Zn or Mg, since they are sacrificed in the process of saving iron.
2. Protection of underground pipelines cables from soil corrosion.
3. Insertion of Mg sheets into domestic water boilers to prevent the rust.