b.Impressed current cathodic protection method

In this method, an impressed current is applied in the opposite direction of the corrosion current to nullify it and the corroding metal is converted from anode to cathode. This can be done by connecting negative terminal of the battery to the object to be protected and positive terminal of the battery is connected to an inert anode. Inert anode used for this purpose is graphite or platinized titanium. The anode is buried in a back fill (containing a mixture of gypsum, coke, breeze and sodium sulphate). The back fill provides good electrical contact to anode **(Fig. 1.7)**. The current from the battery is impressed on the metallic structure to be protected which acts as the cathode. So, this is called as impressed current cathodic protection method. Important applications of impressed current cathodic protection are structures like tanks, pipelines, transmission line towers, underground water pipe lines, oil pipe lines, cables, etc., are protected from corrosion.

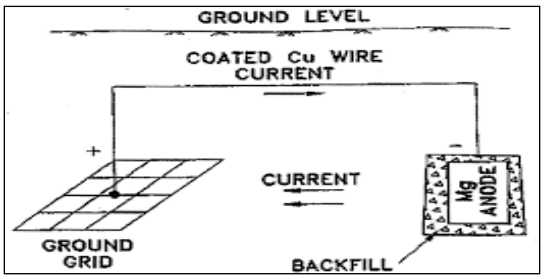

Fig. 1.7 Impressed current cathodic protection method

Advantages of impressed current protection method

1. Larger driving voltage.
2. Larger flexibility control.
3. It is applicable to large objects.
4. Uncoated parts can also be protected.

Limitations of impressed current protection method

1. Maintenance and installation cost are very high.

1.10. Differences between sacrificial anodic protection and impressed current cathodic protection method

S.No.	sacrificial anodic protection method	impressed current cathodic protection

		method
1.	There is no need for external power supply.	It essentially requires external power supply.
2.	The replacement of anode must be done periodically.	Anode is highly stable. No necessity for replacement of anode.
3.	Investment is low.	Investment is very high.
4.	This is most economical method, when short-term protection is required.	This method is well suited for large structures and long-term operations.
5.	Soil and microbial corrosion are not taken into account.	Soil and microbial corrosion are taken into account.
6.	It is suitable when the current requirement and resistivity of the electrolytes are relatively low.	This method can be practiced even if the current requirement and the resistivity of the electrolyte are high.