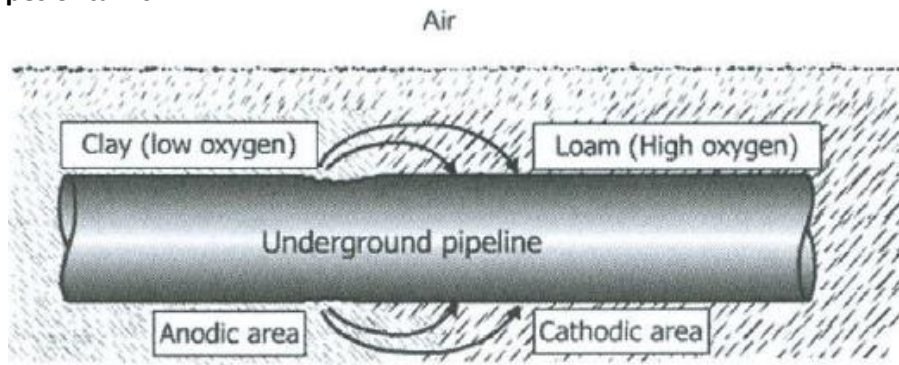


(2) Concentration Cells :

This is similar to galvanic cells except the anode and cathode are of same metals in a heterogeneous electrolyte. A pipe in soil, Concentration cells may be set up by:

- (a) Variation in the amount of oxygen in soils.
- (b) Differences in moisture content of soils.
- (c) Differences in compositions of the soil.

Concentration cells are commonly observed in underground corroding structures, such as buried pipes or tanks.



There are three general types of concentration cell corrosion:

1) Metal Ion Concentration Cells

In the presence of water, a high concentration of metal ions will exist under faying surfaces and a low concentration of metal ions will exist adjacent to the crevice created by the faying surfaces. An electrical potential will exist between the two points. The area of the metal in contact with the low concentration of metal ions will be cathodic and will be protected, and the area of metal in contact with the high metal ion concentration will be anodic and corroded.

2) Oxygen Concentration Cells

A water solution in contact with the metal surface will normally contain dissolved oxygen. An oxygen cell can develop at any point where the oxygen in the air is not allowed to diffuse uniformly into the solution, thereby creating a difference in oxygen concentration between two points. Corrosion will occur at the area of low-oxygen concentration (anode).

3) Active-Passive Cells

Metals that depend on a tightly adhering passive film (usually an oxide) for corrosion protection; e.g., austenitic corrosion-resistant steel, can be corroded by active-passive cells. The corrosive action usually starts as an oxygen concentration cell; e.g., salt deposits on the metal surface in the presence of water containing oxygen can create the oxygen cell. The inequality of dissolved chemicals causes a potential difference, which establishes anode in the more concentrated region and cathode in the less concentrated region.