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Pressler Forensics, Inc.

# Forensic Files

## *Piping Failures: Causes and Cures*

**Corrosion -** Corrosion is the deterioration of a material due to interaction with it's environment. The corrosion of metals is a natural process. Most metals are not thermodynamically stable in their metallic form; they want to corrode and revert to the more stable forms that are formally found in ores, such as oxides. Corrosion is of primary concern in engineering and design. Corrosion occurs in every metal and though it cannot be eliminated, it can be controlled.

**Erosion** - A strictly mechanical form of corrosion that is caused by friction. This can be mechanical corrosion, such as that of sandy water flowing around a bend in a pipe, which acts just like sand paper.

**Galvanic Corrosion -** An extremely common problem for areas where brass or copper is joined to steel. Under certain conditions, it may also exist at steel to steel contact points - where new pipe meets old, and where different ground potential exists.

**Stray Current -** Stray current corrosion results from sources outside the influence of the pipe and it's environment. To cause stray current on a pipeline, the current must flow onto the pipe at one location and then flow off the pipe at another location. Where the stray current leaves the affected pipe, corrosion will occur. Stray current corrosion exposure can be very localized within the piping network. Because of the variable magnitude of the stray current, corrosion loss can be far greater than any of the other corrosion mechanisms acting on the pipe.

**Diffusion -** In solids, diffusion is the spontaneous intermingling of the particles of two or more substances. The combined solid is usually weakend by this interaction.

**Brittle Fracture -** Brittle fracture is a rapid run of cracks through a stressed material. The cracks usually travel so fast that you can't tell when the material is about to break. In other words, there is very little plastic deformation before failure occurs. In most cases, this is the worst type of fracture because you can't repair visible damage in a part or structure before it breaks.

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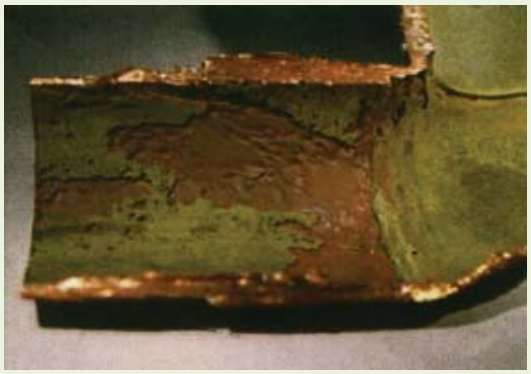

**Pitting Corrosion -** Pitting corrosion is localized corrosion that occurs at microscopic defects on a metal surface. The pits are often found underneath surface deposits caused by corrosion product accumulation.

**Localized Corrosion -** A good example showing particulate deposits settling along the inside of the pipe, which will produce deep deposit pitting.

**Galvanic Corrosion -** An extremely common problem . A combination of water penetration and galvanic activity causing pipe deterioration.