

ADVANCEMENTS

Preserving capital spares: a strategy for concrete-coated pipelines

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Subsea oil and gas pipelines are frequently constructed by joining concrete-coated segments together. During construction, concrete-coated pipe may sit for six months to several years before installation. Capital spares are often ordered at the same time as the initial pipes but with a designed preservation life measured in decades of idle time. To ensure that these capital spares do not deteriorate prematurely, Cortec® shares several technologies and tips for preserving concrete-coated pipes from corrosion.

Challenges of protecting concrete-coated spares

Subsea pipe spares are often stored near the coast due to material handling difficulties. An incredibly long storage period and an aggressive environment combine to pose a frequently overlooked risk for long-term integrity. Although the concrete coating will initially protect the outside of each steel pipe segment, the concrete will absorb moisture, chlorides, and carbon dioxide over time, eventually leading to corrosion. Extreme temperature swings and sporadic inspection intervals can exacerbate the problem. To complicate matters, the concrete coating makes it difficult to access and treat the OD (outer diameter) of the steel pipe.

Migrating corrosion inhibitors to the rescue

Migrating Corrosion Inhibitor™ (MCI®) Technology is typically used to protect reinforcing metals embedded in concrete because of its ability to travel through concrete pores to reach the surface of the underlying metal. The same mechanism makes MCI® suitable for protecting the metal pipe OD of concrete-coated pipe. Migrating Corrosion Inhibitors applied to the outside of the concrete pipe can gradually migrate as much as several inches into the concrete to form a protective anticorrosive molecular layer on the steel OD.

When to preserve capital spares

Preservation of spare concrete-coated pipes should be done as soon as possible. Any delay gives moisture and chlorides a chance to start attacking the concrete and steel. Although preservation can be done later, additional rust removal and cleaning may be needed by then. In worst case scenarios, preservation may be neglected so long that corrosion compromises the integrity of pipe segments and new ones must be purchased, defeating the purpose of capital spares.

Protecting the outer diameter

If integrity is confirmed and surfaces are clean, the concrete surface may be treated with MCI®-2020. This topical solution has the highest concentration of Migrating Corrosion Inhibitors compared to other surface applied corrosion inhibitors (SACIs) on the market. For further protection, a water repellent can be added to hinder the entrance of additional moisture and chlorides while trapping the MCI® inside. Alternatively, MCI®-2018, which contains MCI® in a 100% silane water repellent, can be used alone or (for maximum protection) in conjunction with MCI®-2020. Both MCI®-2020 and MCI®-2018 are certified to meet ANSI/NSF Standard 61 for use in drinking water system components, making them attractive for those laying pipeline in environmentally protected waters where dangerous leachates are a concern for sea life.

Pipe ends and inner diameter

Often, several inches on each end of a subsea pipe are not coated with concrete. Here, MCI® CorShield® can be applied to protect the exposed metal. This water-based removable coating provides excellent protection in unsheltered outdoor environments and cures to a soft non-tacky film that eventually hardens. If the capital spares need to be installed, the coating can be removed with an alkaline cleaner, if desired.

The inner diameter (ID) of the pipeline segment should also be protected by fogging it with CorroLogic® Fogging Fluid VpCI®-339. This chemistry is similar to MCI® and migrates through void spaces to form a molecular protective layer that remains as long as the void stays closed. To meet this requirement and keep debris out, workers should cap the ends of each pipe segment with a material such as MilCorr® VpCI® Shrink Film, a heavy-duty plastic that also contains corrosion inhibitors. Once this is done, the spares can be left alone and checked once or twice a year.

Keep your capital spares on-call

Even though the need to install concrete-coated pipe spares may be unpredictable, these capital spares should remain on-call for emergency or routine replacement. Proper preservation helps oil and gas companies do so, keeping pipeline segments ready to use on short notice. ■



