

🔍 The Critical Role of Coating Testing in Corrosion Protection: A Case Study

Corrosion costs the global economy over **\$2.5 trillion annually**—yet a large portion of this is preventable with proper coating strategies and rigorous testing. One often overlooked aspect in asset preservation is **coating testing**, a vital step that determines long-term durability, safety, and cost efficiency.

Why Coating Testing Matters

Protective coatings are the frontline defense against corrosion. But not all coatings perform equally under various environmental conditions. Through **accelerated aging, adhesion, salt spray, and electrochemical impedance spectroscopy (EIS)** tests, engineers can simulate years of wear in weeks and pinpoint the optimal protective solution.

Without proper testing, coatings can fail prematurely—leading to equipment breakdowns, costly repairs, safety hazards, and even catastrophic structural failures.

📌 Case Study: Offshore Platform Pipeline – Gulf of Mexico

Challenge: An oil company faced repeated corrosion issues on a subsea pipeline despite using a high-performance epoxy coating. Maintenance costs were skyrocketing, and inspections revealed premature coating failure within two years of application.

Solution: A full-scale coating testing program was initiated:

- **Salt Spray Test (ASTM B117)**
- **Cathodic Disbondment Test**
- **Pull-off Adhesion Testing**
- **Immersion Testing in Simulated Seawater**

Results showed the original epoxy lacked resistance to chloride-induced underfilm corrosion. A **polyurethane topcoat system** with improved chemical resistance was recommended and validated through a 6-month accelerated test simulating 5 years of exposure.

Outcome: The newly coated pipeline showed **zero failures after 4 years in service**, and maintenance costs dropped by 70%.

Reference

NACE International (now AMPP), "The Cost of Corrosion", 2020.

ASTM International Standards: B117, D4541, G85.

Company Case Files – GulfCorrosionTech Ltd. (2023 internal study, shared with permission).



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