

# Integrated Corrosion Engineering

## Corrosion Risk Management



**ICE DRAGON**  
CORROSION<sub>INC.</sub>

**At ICE we combine our deep technical knowledge on corrosion with a best practice risk management process to ensure physical asset resilience is optimised over service life.**

### ICE FLOW FRAMEWORK

Based on industry best practices and standard risk methods ICE has developed a framework for long-term management of asset degradation risks for our clients. Since 2016 this approach has been successfully applied across whole sites as well as single assets.

#### CORE ELEMENTS

- Corrosion risk assessment and prioritized management is at the core of the framework, which also puts emphasis on high quality, quantitative data collection.
- Integrating corrosion management into the organisation is key to sustainable success.
- The program is linked to key business objectives and informs budget, resource and risk planning.

[icedragoncorrosion.com](http://icedragoncorrosion.com)

Contact: Zoe Coull

[zoe@icedragoncorrosion.com](mailto:zoe@icedragoncorrosion.com)

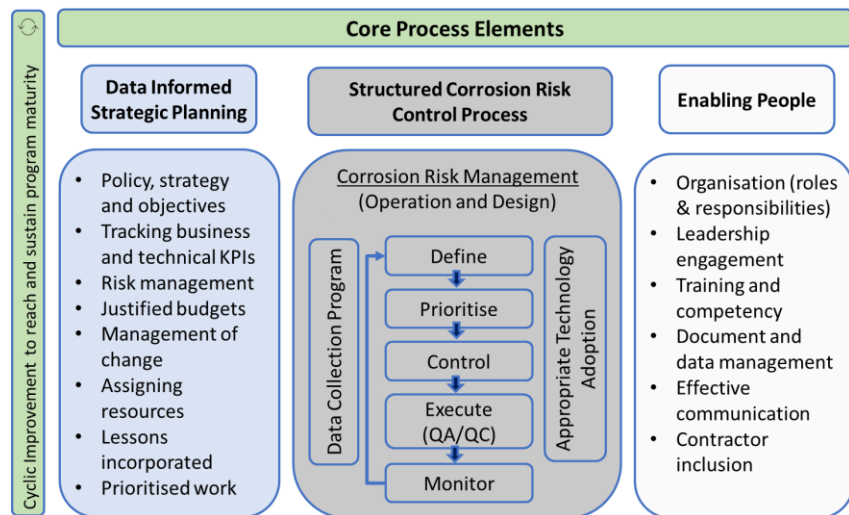
647-525-1602

### THE START OF CORROSION RISK MANAGEMENT

One of the first formal corrosion risk management plans was created by the US Marines in 2002 for their mobile ground equipment. Once implemented created other benefits; within 4 years it had reduced maintenance budget by 15% (\$85M), decreased depot repairs by 22% and field repairs by 46% (improving safety and efficiency of their teams).

### THE EVOLUTION...

In 2016 NACE released its Impact Report, which included a comprehensive review of both the global cost of corrosion but also the results of a multi-industry survey. They collated the best practices around Corrosion Risk Management from over 200 organisations



### PROJECT EXAMPLES

- Gold mine, Dominican Republic: CMP set up to deal with significant site-wide corrosion from acidic ore and bacterial attack.
- Gold mine, Canada: CMP in progress to deal with impact of highly saline process water.
- Potash mine design, Canada: derisking of the design for corrosion and the inclusion of CMP best practices into the operational readiness program.

*The ICE Dragon Corrosion team is a pleasure to work with. They bring subject matter expertise and experience that is very hard to find. The ICE team has consistently gone above and beyond the 'call of duty' to deliver projects on time. I strongly recommend their consulting services.*

*Amit Akulah, Senior Principal – Asset Management, Hatch-Bantrel JV, 2020*

Call us to discuss your corrosion issues!

# Case Study: Corrosion Risk Management



**ICE DRAGON**  
CORROSION INC.

**PROJECT:** gold mine, saline process water / groundwater, remote location

**CORROSION CHALLENGE:** most physical assets exposed to salt water, corrosion rapid

**ICE IMPACT IN OPERATION:** Development of ICE Flow processes for single assets and plant-wide – see examples of actions below!

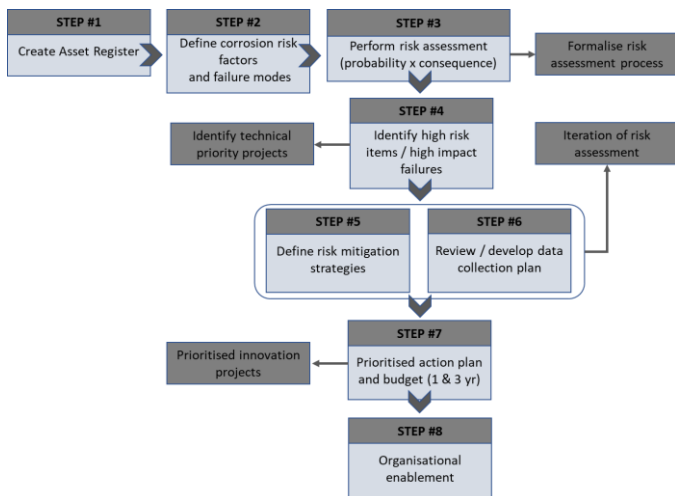
## WORK PRIORITISATION

Developed a data-informed risk assessment method to prioritise work and set accurate budgets – detailed 1 yr plans, higher level 3 yr plans.

## CORE OF PROGRAM: RISK MANAGEMENT

Created structured risk assessment processes for different assets e.g. structural steel, underground rock bolts, concrete, tanks, piping etc. Data collection programs inform decisions.

## CORROSION RISK PROCESS:

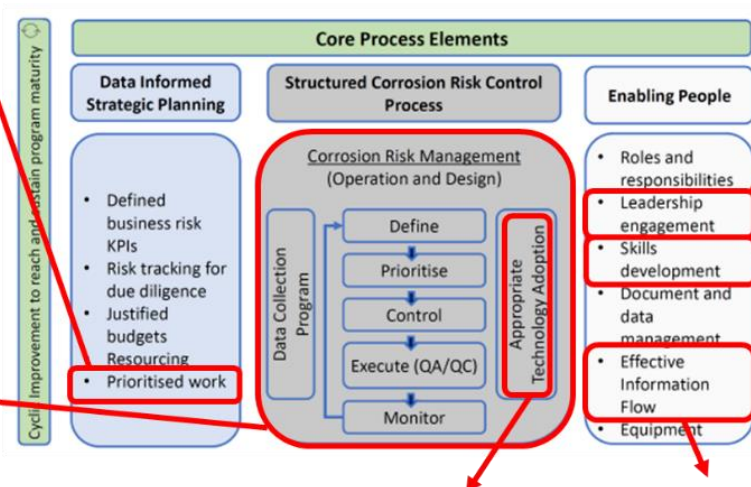


## LEADERSHIP ENGAGEMENT

90% of top Corrosion Risk Management plans have accountability at top management level. Leadership accountability through monthly steering committee and KPI reporting

## TRAINING

Developing site-wide training for learning lessons / increasing awareness of risks and roles / responsibilities



## TECHNOLOGY ADOPTION

Piloting self-healing coating to increase the recoat window for structural steel by +50%

## COMMUNICATION

Site-wide communication plan being developed to ensure all stakeholders have the information they need to control corrosion risk: from RACI charts, toolbox talks for contractors, wording in RFPs etc.