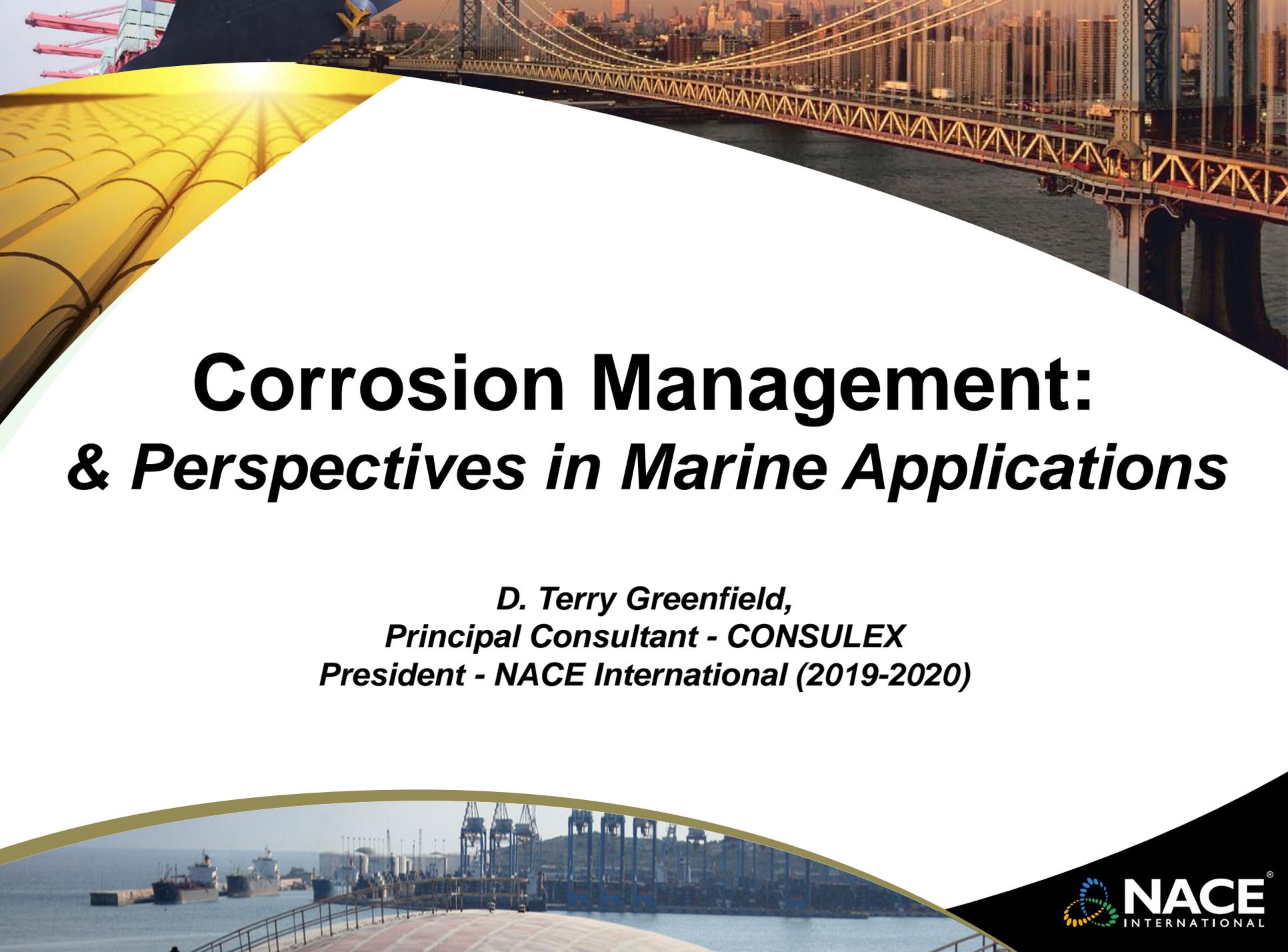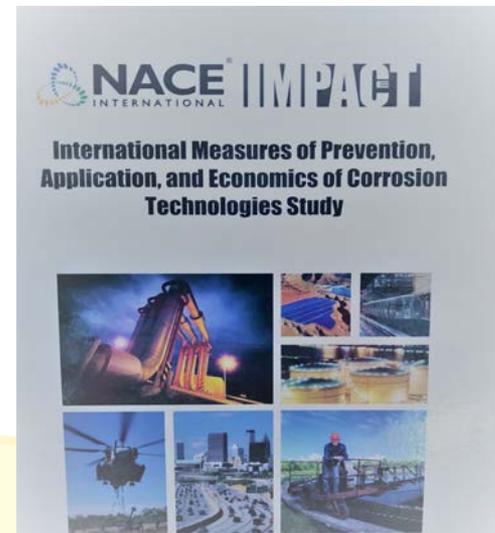# NACE Maritime

# Corrosion Management:
## & *Perspectives in Marine Applications*

**D. Terry Greenfield,**
**Principal Consultant - CONSULEX**
**President - NACE International (2019-2020)**

# IMPACT Study Launched October 2014

The IMPACT study:

- Updates the global cost of corrosion
- Assesses corrosion management practices
- Corrosion management templates
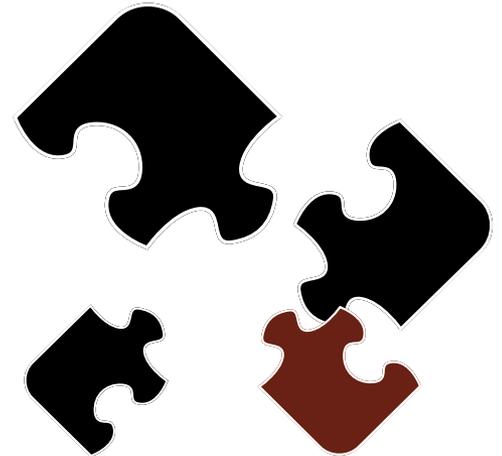- Financial tools
- Benchmarking

# Most Critical Findings of IMPACT Study

- A change in how decisions are made is required
- Continue investment in technology for corrosion control
- Corrosion Management System Framework
- <span style="color:red">Justify corrosion control actions by business impact</span>

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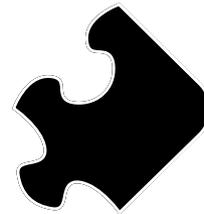# Corrosion Control Programs

*Do you have one? Which one?*

- Asset Integrity Management System (AIMS)
- Integrity Management System
- Corrosion Control Program
- Corrosion Control System
- Corrosion Engineering
- Corrosion Management
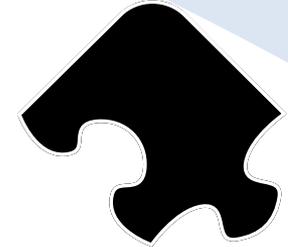


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# Corrosion Engineering

- *"Combating corrosion through proper materials selection, environmental control, and design"*

*An Introduction to Asset Corrosion Management in the Oil & Gas Industry*

*by Dr. Ali Morshed*

# Corrosion Management

- A Synonym for Corrosion Engineering?

- Corrosion control through corrosion engineering?

- *Definition: "The process of reviewing the existing Integrity Management measures, regular monitoring of their performances, and assessment of their effectiveness post-commissioning."*

  *An Introduction to Asset Corrosion Management in the Oil & Gas Industry*

  *by Dr. Ali Morshed*

# Corrosion Management

- Should include Corrosion Engineering and Corrosion control efforts comprised of policies, processes and procedures that address corrosion across the complete lifecycle of the asset, from design to decommissioning.

- A Corrosion Management Program must include an accepted philosphy within the organization and ingrained into the that corporate culture.

  *An Introduction to Asset Corrosion Management in the Oil & Gas Industry*
  *by Dr. Ali Morshed*

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# Corrosion Control Program

- Corrosion Control Program Benefits
  - Satisfy regulatory requirements
  - Ensure safe operation of assets
  - An effective Corrosion Control Program requires a relatively small investment compared to the potential return on that investment
- Sustainability

# Corrosion Management

- Asset Integrity Management
- Overarching and encompassing all aspects of corrosion control including the use of coatings
- Methods can be widely varied
- Corrosion Engineering vs. Corrosion Management
- NACE International IMPACT Study and IMPACT Plus Tool
- Sustainability

# Current Industry Mindset?



# *Corrosion is a cost of doing business*

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# Corrosion Management
### *…Identify Corrosion as a RISK*

- ISM Safety Management Code doesn't Identify Corrosion as a RISK
- Autonomous & Smart shipping may place a greater need on Corrosion Engineering and Management systems

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# Corrosion Management
### *…Identify Corrosion as a RISK*

- Cybersecurity being identified as a RISK and work there may serve as a model in having Corrosion identified as a RISK as well

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# Corrosion Management
### *…Identify Corrosion as a RISK*

- Smart Ports – Today's ports experience a high reactivity model to Corrosion issues

- Need for Education
- Financial Modeling

# Corrosion Management

- Program Elements[1]
  - Identification of Corrosion Threats
  - Life-Cycle Cost Analysis
  - Corrosion Control Strategies
  - Corrosion Monitoring and Inspection
  - Program Performance Review and Management

- Corrosion Prevention Systems
  - Protective Coatings
  - Materials Selection
  - Cathodic Protection

1- MATERIALS PERFORMANCE MAGAZINE
**Essential Elements of a Successful Corrosion Management Program**
By *Ben DuBose* on 6/30/2016 – a summary of S. Ghalsasi, B. Fultz, R. Colwell, "Primary Constituents of a Successful Corrosion Management Program," NACE Corrosion Risk Management Conference, paper no. RISK16-8734 (Houston, TX: NACE International, 2016).

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**And it's Role in the Asset Integrity Management of a Corrosion Control Program**

# Management System Domains

- Policy
- Accountability
- Communication
- Stakeholder Integration
- Resources
- CM Practice Integration
- Performance Measures
- Organization
- Culture & Knowledge Mgmt
- Continuous Improvement

**POL — POLICY**
Policies, associated strategies, and objectives to address business needs (including regulatory, legal, environmental, and societal)

**STA — STAKEHOLDER INTEGRATION**
Alignment to stakeholder needs, performance monitoring, and compliance

**ORG — ORGANIZATION**
Structure, interaction model and internal/external engagement (vendors/suppliers)

**ACT — ACCOUNTABILITY**
Roles, responsibilities, and resource allocation

**RES — RESOURCES**
Competencies, training and development, and formalization of job and work requirements

**CKM — CULTURE & KNOWLEDGE MGT.**
Knowledge capture and transfer, lessons learned, content management, sharing culture

**COM — COMMUNICATION**
Awareness, knowledge management, and lessons learned

**CMP — CM PRACTICE INTEGRATION**
Integration into work processes, alignment to quality and other disciplines, and incident tracking/resolution

**IMP — CONTINUOUS IMPROVEMENT**
Improvement identification, prioritization, selection, and change management

**PER — PERFORMANCE MEASURES**
Quantifiable indication, such as Key Performance Indicators (KPIs) to assess and to measure how well an organization or individual is achieving desired goals

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# Process Classification Framework

**PCF creates a common language by outlining all of the processes practiced, categorizing them, and aligning them according to a hierarchical numbering system.**

- Tool to support benchmarking, manage content, and perform other important performance management activities

- Used to overcome challenges in organizational alignment, governance, and implementation

- Designed as a framework and global standard to be customized for use in any organization

- Represents major processes and sub-processes, not functions

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# The VALUE Proposition…

- Integrated platform for corrosion management professionals who desire to move their company to higher levels of performance

- A common language and structure needed to ensure communication throughout all levels of an organization

- Easy way for organizations to identify gaps in processes that could lead to the reduced lifecycle of assets

- The CMMM creates a roadmap of strategies, investments and best practices that lead to higher performance