

NACE International Standards & DoD Corrosion Prevention/Control Effort

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NACE International

- Presentation Outline
- NACE Overview
- NACE Standards
 - Standards Development
- Cost of Corrosion
- DoD Corrosion Effort
- DoD Specification, Standards, and Qualification Process Working Integrated Product Team

NACE International

History

- Founded in 1943
- Began with the Oil & Gas Industry

Since 1943 NACE has:

- Produced over 100 standards
- Developed numerous training and certification programs
- Grown to over 15,000 members worldwide

NACE MISSION

To protect people, assets, and the environment from the effects of corrosion.

NACE International

- Industry Represented
 - Oil & Gas (production, distribution, storage, refining & processing)
 - Infrastructure
 - Pipeline & Underground Storage
 - Waste Management
 - Power & Utilities
 - Government

NACE International

- Over 15,000 Professionals from 91 countries
- Individual Members Representing:
 - Engineers
 - Inspectors
 - Scientists
 - Researchers
 - Educators
 - Students
 - Technicians
 - Manager
 - Supervisor

NACE Resources

- NACE Standards
- Education Programs
- Professional Recognition
- Coating Inspector Training
- Cathodic Protection Certification
- Annual Conference
- NACE Periodicals

NACE Certification & Training

Education Programs

- NACE offers education courses for members and non-members worldwide. General Education Courses include:
 - Basic Corrosion
 - Corrosion in Oil & Gas Production
 - Protective Coatings & Linings
 - Designing for Corrosion Control
 - Microbiologically Influenced Corrosion

NACE Certification & Training

Areas of Certification

- Corrosion Specialist
- Corrosion Specialist, P
- Corrosion Specialist. G
- Specialty Area Certification
 - Coating Inspector Certification**
 - Cathodic Protection Specialist**
 - Chemicals Treatment Specialist
 - Materials Selection/Design Specialist
 - Protective Coatings Specialist
- Senior Corrosion Technologist
- Corrosion Technologist
- Corrosion Technician
- Internal Corrosion Technologies

NACE Certification & Training

Coating Inspector Program

- It was developed to meet worldwide industry needs for a recognized standard for coating inspectors training and for improved coating applications inspection.
- More than 3,600 people worldwide are recognized at different levels of coating inspector training.

NACE Certification & Training

- NACE CP is the leading training & certification tool for industry
- CP is a 4 level hands-on Program
 - Level 1 – Tester
 - Level 2 – Technician
 - Level 3 – Technologist
 - Level 4 – Specialist

NACE Conferences

Annual Conference

- 6,000 corrosion professionals from 56 countries and more than 350 exhibiting companies attend the NACE annual conference. Each year there are approx.
- 35-40 technical symposia, and approx. 400 technical papers presented. In addition to the annual conference NACE produces many other regional conferences during the course of the year.

NACE Publications

NACE Periodicals

- *Materials Performance* – A monthly journal of practical corrosion control applications and case histories for solving corrosion-related problems affecting all industries.
- *Corrosion* – The Journal of Science & Engineering
 - A monthly technical research journal devoted to critically evaluating the causes and effects of corrosion processes, and the protection of materials in corrosive environments

NACE Standards

- NACE International's Technical Coordinating Committee (TCC) oversees more than 350 technical committees that research, study, and recommend state-of-the-art corrosion technology to industry and government. NACE International's committees produce consensus industry standards in the form
 - Test Methods
 - Recommended Practices
 - Material Requirements
- NACE standards are used worldwide.

Corrosion

- Corrosion is an asset preservation matter, and not just a maintenance issue.

NACE Standards Development Procedures

NACE ANSI-Accredited Standards Developer

- Procedures Approved by American National Standards Institute (ANSI)
- ANSI is U.S. member of International Organization for Standardization (ISO)
- In ISO, one country, one vote

ANSI Procedures

- NACE submits standards to ANSI for approval
- ANSI solicits public comments
- NACE must address any comments, and must prove that proper process was followed

Technical Committee Organization

Specific Technology Groups (STGs)

- 30 STGs on topics from aviation to oil and gas pipelines form voting groups
- STGs have 80 to 300 members
- Nonmembers may also vote on standards by contacting NACE Headquarters

NACE Standards Development

- Task Groups
 - Write documents, e.g., standards, reports
 - Reports cannot make recommendations
 - Formed when need for standard identified

NACE International – Review

Forum for technology

- Symposia, Seminars
- Administer Tri-Services Conference 2005 Orlando, FL

Internationally Recognized Technical Standards

- Consensus technology
- ANSI

approved

- Periodicals and Books
 - Corrosion Journal
 - Materials Performance
 - DoD eNewsletter (Sept 2005)
- Education & Certification
 - Tech. through Engineer
- Public Affairs
 - Government Relations
 - Public Awareness
 - Corporate outreach

\$276 Billion

The United States Cost of Corrosion Study



NACE[®]
INTERNATIONAL
THE CORROSION SOCIETY



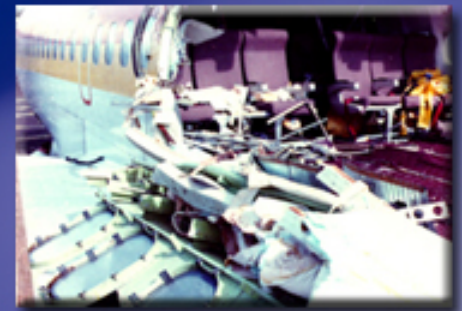






Hawaii (1988) : Aloha Airlines Boeing 737

- At 25,000 ft., lost part of front fuselage
- Stewardess sucked out of jet
- Pilot miraculously lands jet in Maui
- CAUSE: CORROSION
- Over 2,500 commercial planes now flying beyond their designed lifespan



Washington, DC (November, 1999)

US Army Apache Helicopters Grounded

- Faulty part in tail rotor assembly results in helicopter crash
- **CAUSE: STRESS CORROSION FRACTURE**
- All helicopters grounded until parts replaced



Cost of Corrosion – Industry Sector Analysis

26 Sectors in 5 Categories

- Infrastructure
- Utilities
- Transportation
- Production & Manufacturing
- Government

COC - Non-Technical Preventive Strategies

- Increase awareness of the large corrosion costs and potential savings
- Change the misconception that nothing can be done about corrosion
- Change policies, regulations, standards, and management practices to increase corrosion savings
- Improve education and training of staff

COC - Technical Preventive Strategies

- Advance design practices for better corrosion management
- Advance life prediction and performance assessment methods
- Advance corrosion technology through research, development, and implementation

Cost of Corrosion – Summary of Sector Analyses

Infrastructure	B\$	22.6
Utilities	B\$	47.9
Transportation	B\$	29.7
Production & Manufacturing	B\$	17.6
Government	B\$	20.1
TOTAL	B\$	137.9



Defense	B\$	20.0
Nuclear Waste Storage	B\$	0.1
TOTAL	B\$	20.1

- The U.S. Congress recently approved \$27.1M for the Department of Defense Corrosion Effort in FY2005
- NACE is working with the U.S. Department of Defense to develop and implement a comprehensive corrosion mitigation program

NACE & the Department of Defense

Congressional Direction

Public Law 107-314 Sec: 1067. Prevention and mitigation of corrosion of military infrastructure and equipment requires that:

DoD designate a responsible official or organization

DoD develop a long-term corrosion strategy to include

- **Expansion of emphasis on corrosion prevention & mitigation**
- **Uniform application of requirements and criteria for the testing and certification of new corrosion prevention technologies within common materiel, infrastructure, or operational groupings**
- **Implementation of programs to collect and share information on corrosion within the DoD**
- **Establishment of a coordinated R&D program with transition plans**

Department of Defense

- DoD creates the Directorate of Corrosion Policy & Oversight
- A key element of this effort is to provide adequate training and certification for service personnel
- DoD works with NACE to develop a series of corrosion training & certification programs

DoD & NACE

- DoD contacted NACE in January 2003 for assistance in addressing this issue
- NACE is working to provide a number of resources for DoD
 - Corrosion 101 Course (the first of three courses)
 - E-newsletter
 - Facilities training and certification
 - Tri-Services Corrosion Conference (Orlando, FL. November 2005)
 - Standards

DoD Spec & Standards WIPT

- The Working Integrated Product Team has been reviewing all military standards and comparing to industry
- Working with NACE to begin to address the corrosion related standards
- Looking to use industry standards where applicable and develop or refine current military specific standards

DoD Spec & Standards WIPT

- NACE has a STG that is working with the military to begin strengthening the needed standards
- DoD has asked NACE to coordinate with other technical societies that develop corrosion related standards to ensure that they have the most accurate standards

DoD Spec & Standards WIPT

Questions?