

*DoD Corrosion
Prevention and Control
Program Policy Overview and Status*

**Corrosion Policy and
Oversight**

**Daniel J. Dunmire
Department of Defense
Special Assistant for Corrosion Policy and Oversight**

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Cost of Corrosion

Year 2002 Transportation Department study revealed:

- World-wide cost increasing
- USA direct cost now exceeds \$276 billion annually
- 3% of US Gross National Product (GNP)
- Indirect cost even higher

COUNTRY	TOTAL ANNUAL CORROSION COST	PERCENT OF GNP	YEAR
U.S.A.	\$5.5 billion	2.1	1949
India	\$320 million	–	1960
Finland	\$54 million	–	1965
W. Germany	\$6 billion	3.0	1967
UK	£1.365 billion	3.5	1970
Japan	\$9.2 billion	1.8	1974
U.S.A.	\$70 billion	4.2	1975
Australia	\$2 billion	1.5	1982
Kuwait	\$1 billion	5.2	1987
U.S.A.	\$276 billion	3.1	2002

Koch, G. H., Brongers, M. P. H., Thompson, N. G., Virmani, Y. P. and Payer, J. H., *Corrosion Cost and Preventive Strategies in the United States*, FHWA-RD-01-156, Federal Highway Administration, U.S. Department of Transportation, Washington D.C., 773 pp., March 2002.



Congressional Response

Members of Congress

- Reviewed Transportation Department study
- Noted severe, pervasive corrosion during 2002 Pacific Rim tour
- Subsequently enacted corrosion control legislation because –

DOD Cost of Corrosion

- Estimated at **\$10B to \$20B**, and as high as **\$40B per year**
- Where most dollars go toward
 - Detection and assessment of corrosion
 - Treatment to prevent or retard added effects
 - Repair of damaged equipment or facilities



The Law

**Public Law 107-314 Sec: 1067 [portions codified in 10 U.S.C. 2228]:
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**

Strategy to include policy guidance & assessment of funding and personnel resources required



DoD Response to Congressional Mandate

- Response to the law
 - Developed organization
 - Developed strategy
 - Reported to Congress
- Assembled corrosion forum
 - Organized overarching corrosion program IPT
 - Established WIPTs (focus groups)
- Developed and published a strategic plan
- Interacted with the Government Accountability Office (GAO)

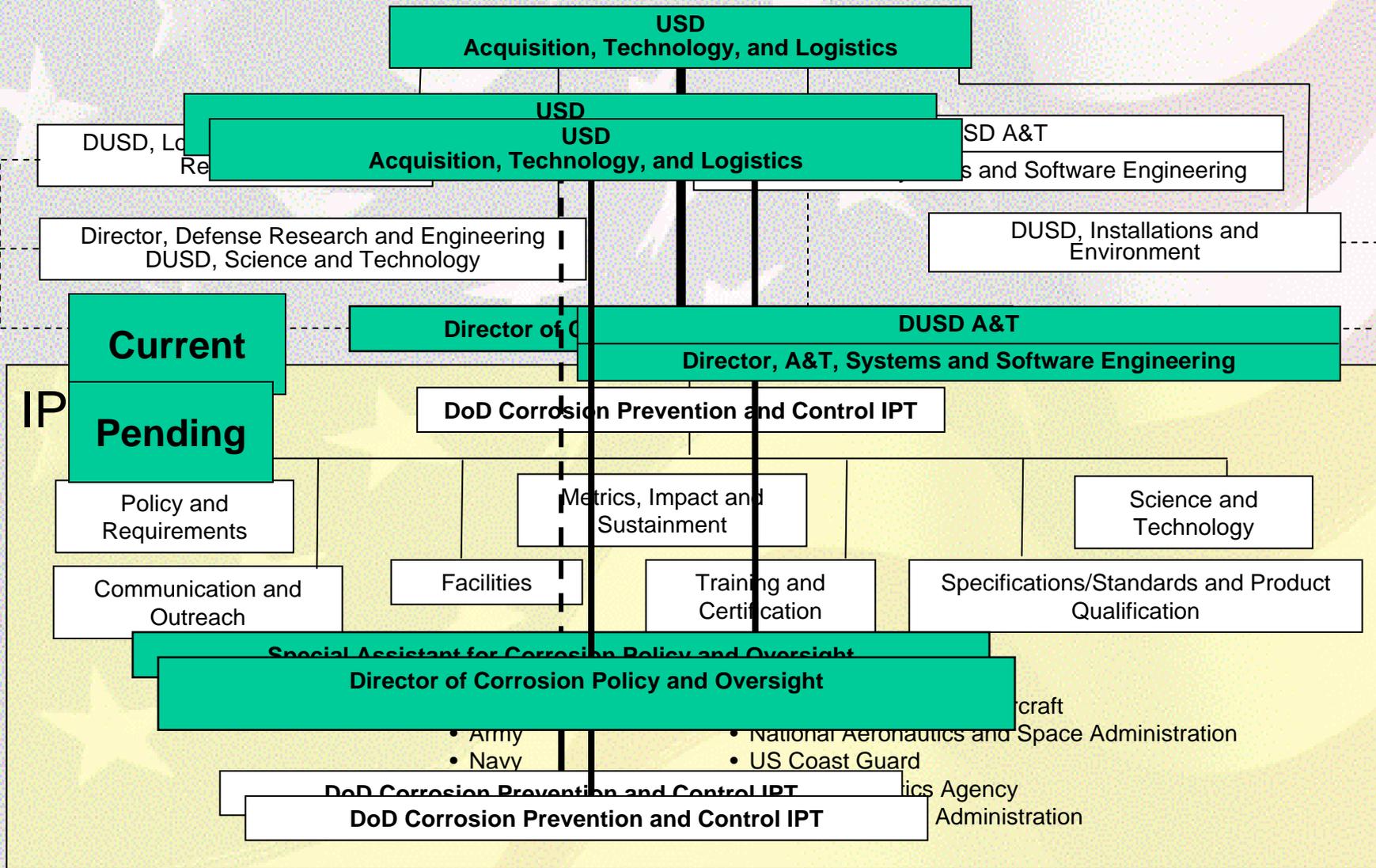


Pending Revision to Law

- Retains the requirements of the basic law
- Makes the following changes
 - Eliminates DoD Corrosion Executive
 - Elevates SA/CPO to Director CPO
 - Assigns Corrosion Executive duties to DCPO
 - DCPO becomes direct report to USD(AT&L)
 - Requires annual financial reporting
 - Codifies ongoing CPO activities



DoD Corrosion Organization



IPT Structure

- Corrosion Prevention and Control IPT (CPCIPT)
 - Provide strategic review and advice
 - Develop and recommend policy guidance
- Working IPTs (WIPTs)
 - Policy and requirements
 - Impact, metrics and sustainment
 - Science and technology
 - Communication and outreach
 - Training and Doctrine
 - Facilities
 - Specifications and standards



Specific Approaches to CPCP Success

- Policy changes – transcend traditional methods
- Strategic plan – develop and implement
- Specifications, standards and qualification processes – update and standardize
- Research projects – submit, select and execute
- Communication and outreach – change culture
- Training and certification – improve competence
- Infrastructure – equal emphasis as equipment
- Strategic partnerships – leverage networks
- Cost of corrosion baseline study – quantify problem



Transcending - Updated Strategies

- **Overarching strategy: transcend traditional control methods, organizations, management and funding approaches**
- **Attack corrosion early** in acquisition or construction
- **Focus** life-cycle corrosion research and development **efforts on four primary areas**
 - Materials and manufacturing processes that **prevent or reduce** the incidence and effects of **corrosion**
 - **Detection** of corrosion in fielded systems and facilities **and prognosis** of the expected growth, potential impact and predicted effects
 - Coatings, treatments and other **applications to prevent, arrest or retard corrosion**
 - **Repair processes** that restore materials to an acceptable level of structural integrity and functionality
- Publish **direction and guidance** regarding corrosion prevention and mitigation **policies and strategies at all DoD and Service levels**



Sharing Problems and Solutions

Industry

DoD

Societies

Corrosion

Agencies

Forum

International

Partnerships



Accomplishment - Four Year Project and Activity Status

- 282 science and technology projects submitted over four year period
- 101 projects selected for funding
- \$110 million spent on projects and activities
 - Services and OSD share project cost: \$86 million
 - Activities funding: \$24 million
- Projected return on investment
 - Life cycle cost avoidance: \$4.46 billion
 - Return On Investment = 53 to 1



Other Recent Accomplishments

- Cost of Corrosion Baseline Study – Spiral 3
- Corrosion Overview Continuous Learning Module at Defense Acquisition University with video CPC
- Planning Guidebook published – Spiral 3
- Congressional Report – 3rd edition
- University Collaboration on Corrosion Education
- Updated specifications and standards and new product qualification process
- Updated Strategic Plan



New Directions

- Education and training
 - Corrosion Engineering Degree at University of Akron
 - Advanced Corrosion Training Video and Continuous Learning Module – including 1 hour training video
 - Initiation of virtual corrosion gaming video
- Outreach and culture change
 - 2007 Tri-Service Corrosion Conference in Denver in December
 - Implement Phase 3 of supplier online product qualification process
 - Premier Outreach and Communication corrosion effort public video
 - Moved CPC Web-site to **www.CorrDefense.gov**
- International Initiatives
 - Australasia, UK, France, Germany cooperative efforts
 - Australasian Conference and World Congress on Corrosion



Lessons Learned

- Recruit top-quality members for IPTs
- Develop sound strategies early in program
- Accelerate cost of corrosion studies
- Identify high-payoff projects to implement
- Establish funding requirements and sources
- Stress communications and outreach
- Take advantage of strategic partnerships
- Maintain good relations with GAO



Transcending the Traditional Organization

DoD Corrosion Prevention and Control (CPC) organization unique in terms of:

- **Composition**
 - DoD Leadership with AT&L organizational support
 - Five services plus NASA, DLA, NACE, industry, academia
 - Equipment and Facilities equally represented
- **Approach**
 - Anything can be done and will be done – “Skunk Works”
 - Total cooperation – continuous coordination – unselfish give and take
 - Sentient task groups with shared experience and information
- **Expectations -**
 - Top-level DoD acceptance of recommendations and buy-in to planned approach
 - Continued high-level visibility and protection from bureaucratic obstacles
- **Results – unparalleled in terms of accomplishments: quantity, quality, rapidity**
- **Loyalty – unprecedented depth toward leadership and co-participants**
- **Dedication – extraordinary efforts to participate, cooperate, contribute and support**
- **Competence**
 - Top level people in terms of position and experience
 - True subject matter experts from all participating organizations
- **Visibility**
 - Access to and support of DoD Corrosion Official
 - Recognition by Congress/DoD organization/Service components
- **Glue – motivation, positive vision, cohesion and clear guidance**



Summary

- Congressional interest very high – recent disasters amplifying interest
- New CPC program structure and directives due soon
- Transcending traditional approaches successful
- Implementing modern strategies produces
 - significant reduction in corrosion incidence and impact
 - better education and understanding
 - cultural changes
 - international interest and cooperation
- Combined efforts of industry, national and international organizations, academia and user community essential to combat corrosion

