DoD Corrosion Prevention and Control

Dynamic Strategies for Corrosion Prevention & Control

Army Corrosion Summit 2010

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Overview of Strategies

- Take positive **action to prevent and control** corrosion
- Establish and implement effective corrosion **management**
- Pursue comprehensive corrosion **education and training**
- Perform ground-breaking corrosion **research and development**
- Develop a nation-wide **anti-corrosion culture**

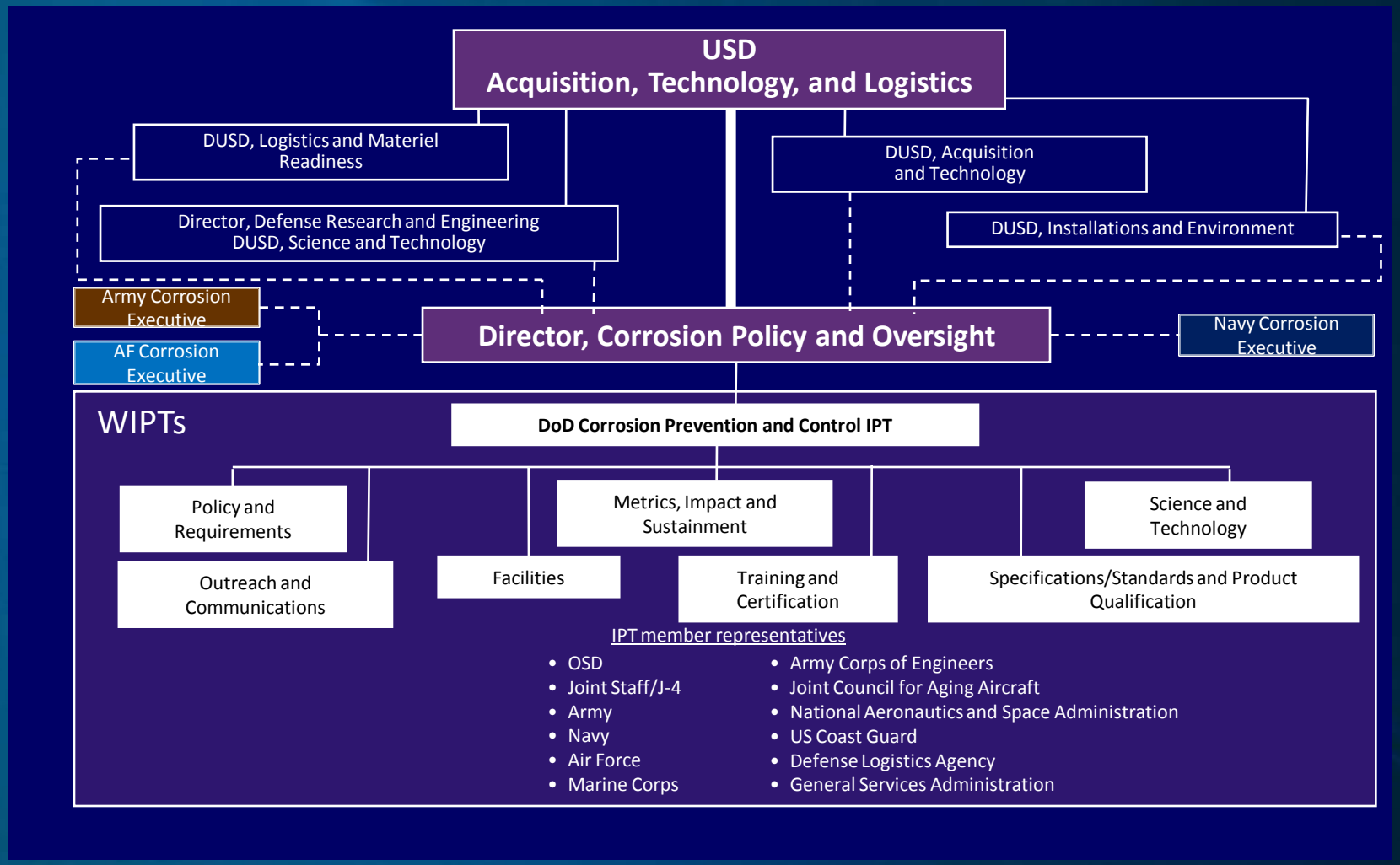
Positive Actions

- Prevent corrosion from happening
  - High percent of corrosion expense is downstream maintenance
  - Select corrosion-resistant materials
  - Design products to prevent or resist corrosion
  - Use production methods that don't induce corrosion
- Predict if and when corrosion will occur
  - Sense the onset and growth rate of corrosion
  - Forecast impact of impending corrosion
  - Develop and apply early mitigation strategies
- Detect and treat actual corrosion
  - Implement effective processes to detect corrosion
  - Select effective, long-lasting coatings and other treatments
  - Tailor corrosion repair or replacement to conditions & expectations

Effective Corrosion Management

- Increase management **recognition of impact of corrosion** on performance, safety & readiness
- Acquisition managers need to know
  - Vulnerability of systems to corrosion
  - Effects of corrosion on performance, readiness and safety
  - Trade-offs to reduce/eliminate vulnerability
  - Life cycle costs of alternatives
  - Criteria for effective decision-making
- Operational managers need to know
  - All the above
  - How to establish corrosion requirements
  - How to select corrosion resistant systems

DoD Corrosion Organization



Corrosion Education and Training

- National Academies study
  - Assessed undergraduate corrosion education in engineering programs
  - Corrosion engineers only educated at the graduate level
  - Varied curricula and concentrations
- Corrosion engineering education
  - Critical mass of true corrosion engineers and scientists needed
  - Corrosion Engineering Degree at University of Akron
- Corrosion training expanded
  - NACE, SSPC and other technical societies are vital training resources
  - New corrosion training videos in use or development
  - Defense Acquisition University training managers and acquisition officials

Groundbreaking R & D

- New, ground-breaking technology solutions are needed
  - Fundamental aspects of corrosion science and engineering not fully understood
  - Hard to reliably predict susceptibility and course of corrosion in materials
  - Advances are needed in fundamental research and basic understanding of corrosion
- Six universities collaborating in pilot program to address an array of basic and applied research needs such as
  - Environmental effects on coating formulations
  - Inhibitor-binder synergy
  - Corrosion resistance characteristics of Mg-rich primer
  - Environmental effects on corrosion
  - Accelerated lab test data relation to field data
- International university collaborations also underway

Nation-wide Anti-Corrosion Culture

- Corrosion not accepted as inevitable
  - Recognized as insidious and pervasive
  - Can be prevented or treated
  - Can be detected
  - Can be predicted
  - Can be managed
- Integrated state and national programs
  - Preserve and maintain infrastructure
  - Support corrosion research and development
  - Broad education and training
  - Design for corrosion prevention
- Significant outreach programs underway
  - Technical societies
  - Videos, games and podcasts

Results to Date

- DoD Corrosion Program has been autocatalytic
  - Produces self-reproducing emergent results
  - Depends on sound, new, dynamic strategies
  - Success achieved through prior implemented strategies
- Recognition by GAO and Congress for
  - Institutionalized and documented modern corrosion management policies and methods
  - Validating the extremely high annual DoD cost of corrosion of over $22 billion
  - Certifying savings of over $6.37 billion on 169 R&D projects during six years, with a 50 to 1 ROI
  - Army projects show $2.7 billion savings on 72 projects, by investing $32 M with DoD's $29 M for a 48 to 1 ROI

Conclusion - What We Want to Accomplish

- Emphasize **corrosion prevention**
- Increase DoD management **recognition of impact of corrosion** on performance, safety & readiness
  - **Focus on high-cost causes** of corrosion
  - **Slash** the DoD **cost of corrosion** by increasing investment in high-payoff, high impact projects
- Create a **critical mass of true corrosion engineers** and scientists
- Generate **new, effective technological solutions**
- Develop a **national anti-corrosion culture**
  - Implement expanded outreach programs
  - Facilitate added **cooperative** inter-service, inter-agency and international corrosion **programs**