Chemical and Materials Information Management for Sustainable Engineering and Design

Army Corrosion Summit 2010
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Session C – RDT&E
# Chemical and Materials Information Management for Sustainable Engineering and Design

## Abstract

2010 U.S. Army Corrosion Summit, Huntsville, AL, 9-11 Feb
Life of Material Data

Includes both material property and process data
Acquisition Life Cycle

User Needs & Technology Opportunities

Concept Refinement
- Concept Decision

Technology Development

System Development & Demonstration
- Design Readiness Review

Production & Deployment
- FRP Decision Review

Operations & Support

Traditional Materials Information Input

Materials Information Needed

Technology Driven. Warfighter Focused.
Impact of materials and process information on product lifecycle

85% of life cycle costs and environmental impact is built into products during design.

Project Funding Trends by Commitment and Expenditure of Lifecycle Cost (LCC)

Chemical & Materials Dilemma

Technology Development
- Cycle times 7-30 Years
- Developed independent of application
- Empirical developments
- Modeling
- Multi-scale issues

Engineering Design
- Cycle times 3-5 Years
- Requires confidence in materials system
- Risk Averse
- Modeling enables rapid developments in design

Use of New Materials & Processes only Occurs With Mitigation of Risk
Technology Dilemma – Differing, Sometimes Conflicting Perspectives/Values

The Soldier
- Capabilities
- Availability
- Utility

Program Managers
- Min Risk
- Cost
- Engineering

Laboratory
- High Risk
- Innovation
- Technology

Army Materials Summit 2006
Dr. Steve McKnight
Business Transformation

- Standardize … to significantly enhance the ability to process and share information throughout DoD and the military services.
- Eliminate stovepipes from solution design and deployment.

Commentary: New focus on business operations across DoD
By DAVID FISHER February 08, 2009
Efficient Enterprise Access

EFFICIENT ENTERPRISE-WIDE ACCESS

External reference data

CONSOLIDATE DATA

NASA MAPTIS
Army MSAT

Proprietary data
ARL Materials Vision

OBJECTIVES

• Identify, mature and transition advanced materials solutions
• Develop capabilities to enable the Army to rapidly exploit breakthroughs
• Accelerate the insertion of advanced materials
Get the Data
Challenge: Information Flow
Manage the Data

**Capture**

**Corporate materials database**

- Process test data
- Create approved design data
- Statistical process control
- ...

**Maintain**

- Capture & maintain context
- Change management
- Security / access control...

**Technology Driven. Warfighter Focused.**
Distribute the Data

- Ease of access
  - Web browser

- Scalable & robust

- Secure & controlled

- Fit users’ workflows
  - Plug-in, API

- Desktop integration
  - Data to/from Excel
Use the Materials Information

Example materials decision support tools

Enterprise Materials Optimizer

REACH
Regulatory compliance tools

Eco Audit

Materials selection

GRANTA MATERIAL INTELLIGENCE

TECHNOLOGY DRIVEN. WARFIGHTER FOCUSED.
DoD-NASA Partnership

- MAPTIS - Materials & Process Technical Information System
- MAPTIS is a NASA-wide materials database established for the purpose of recording and disseminating material information
- MAPTIS distributes in-house & commercial databases
- Housed and administered by NASA
Looking Forward

- Single source – integrate with existing data sources
- Track materials to components through acquisition cycle
- Investigate restricted materials use
- Target implementation strategies
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