

USACE Asset Management Program

*Managing the Army Corps of Engineers'
Civil Works Infrastructure Assets for the
Nation's Well-Being*

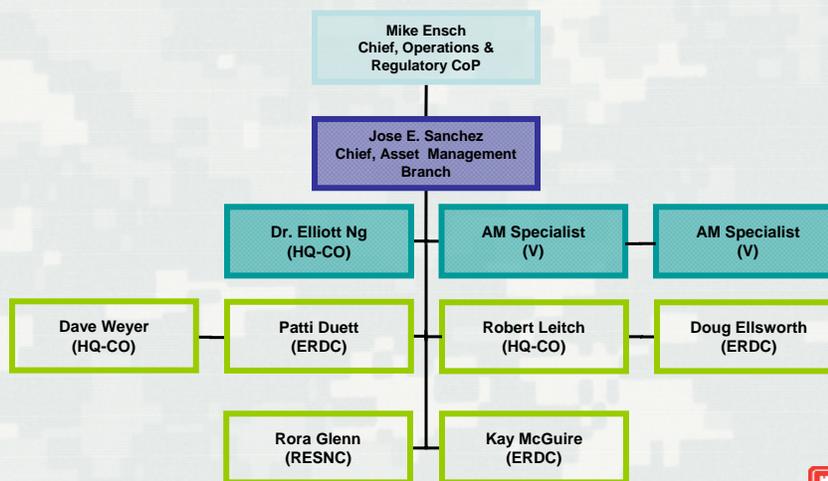
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Chief, Asset Management
28 July 2009



US Army Corps of Engineers
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Asset Management Organization Chart



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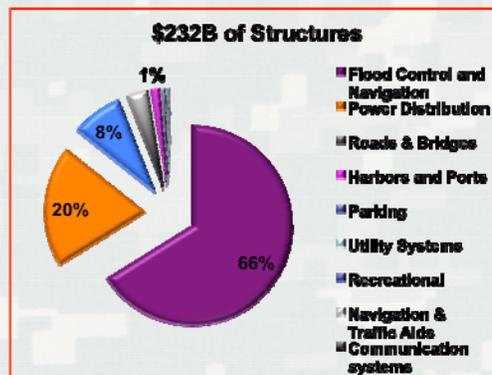
Asset Management

- Asset: “an item of value owned”
 - ▶ Federal Real Property Council: Constructed Asset (Dams, Locks, Hydropower Plants, Recreation Areas)
 - ▶ For now, Infrastructure Asset and Constructed Asset will be used interchangeably
- Management: “to handle or direct with a degree of skill”
 - ▶ Smart investments that are risk-informed
 - ▶ Life-cycle, i.e., from planning to disposal



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USACE Infrastructure Assets



Buildings & Structures: ~\$238 Billion
USACE among top 4 federal agencies in total value of assets



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Drivers - Requirements

- External
 - ▶ Water Resources Development Act (WRDA)
 - ▶ Public Law 101-576, the Chief Financial Officers Act of 1990 and Amended by Public Law 103-256, the Federal Financial Management Act of 1994
 - ▶ Executive Order 13327, Federal Real Property Asset Management (2004)
 - ▶ Inland Waterways Users Board (IWUB)
- Internal
 - ▶ USACE Campaign Plan - Goal 3 (Objective 3c)



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Drivers - Financial

- External
 - ▶ Civil Works infrastructure plays a vital role in US economy
 - ▶ Growing competition for funds within US Government
- Internal
 - ▶ Aging infrastructure
 - ▶ Limited resources
 - ▶ Growing competition for funds within Corps' expanding missions
 - ▶ Ability to convey a clear business case for investing in water resource infrastructure
 - To augment
 - To maintain



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Asset Management Program

- Mission: *Managing the life-cycle of infrastructure assets with innovative and adaptive strategies to ensure those assets continue to provide value to the Nation and meet expected levels of service while mitigating risk*
- Simply stated:
 - ▶ Inventory (what you own)
 - ▶ Condition (what is the condition of what you own)
 - ▶ Investment Strategy (driven by risk-informed decision-making)



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Asset Management Program Goals

- Support Corps' strategic plan and performance measures
- Institutionalize a system-wide approach in the use and investment of assets
- Establish an integrated Corps-wide asset management process
 - ▶ Standardized process within and across business lines with respect to inventory, condition, and quantification of risk
- Promote efficient and economical outcomes
 - ▶ Drive performance-based budgeting
- Increase accountability of asset management at all levels, i.e., HQ, Division, and District
- Refine process through continuous improvement



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Status of Condition Assessments

- Mature Methodology Implemented
 - ▶ RECBEST
- Mature Methodology Partially Implemented
 - ▶ Dam Portfolio Risk Assessment (sPRA)
 - ▶ Hydropower (HydroAMP)
- Developing Methodology Partially Implemented
 - ▶ **Operational Condition Assessment- Inland Nav and FRM**
 - ▶ Inland Navigation- Major Rehab
- Developing Methodologies
 - ▶ Coastal structures (i.e. risk-informed planning)
 - ▶ Levees and floodwalls



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Operational Condition Assessments (OCA)

- Assess the operational risk of sub-systems and/or components of the infrastructure
- Facilitates and standardizes the prioritization of maintenance packages
- Online tool
 - ▶ viewing of previous reports and photos
 - ▶ upload documents and photos as well as provide comments on each component
 - ▶ results are sent in for QA/QC



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Base Condition Rating Scale (for minimum acceptable service level)

Asset Management – Condition Assessment Standards	
Condition Classification	Definitions
A Adequate	<ul style="list-style-type: none"> - There is a high level of confidence that the feature will perform well under the designed operating conditions. This confidence level is supported by data, studies or observed project characteristics which are judged to meet current engineering or industry standards. - There is a limited probability that the verified degraded conditions will cause an inefficient operation, or degradation or loss of service.
B Probably Adequate	<ul style="list-style-type: none"> - There is a low level of confidence that the feature will perform well under designed operating conditions, and may not specifically meet engineering or industry standards. The feature may require additional investigation or studies to confirm - There is a low probability that the verified degraded conditions will result in inefficient operation, or degradation or loss of service.
C Probably Inadequate	<ul style="list-style-type: none"> - There is a low level of confidence that the feature will not perform well under designed operating conditions, and may not specifically meet engineering or industry standards. The feature may require additional investigation or studies to confirm adequacy. The feature does not meet current engineering or industry standards. - There is a moderate probability that the verified degraded conditions will result in inefficient operation, or degradation or loss of service
D Inadequate	<ul style="list-style-type: none"> - There is a high level of confidence that the feature will not perform well under designed operating conditions. Physical signs of distress and deterioration are present. Analysis indicates that factors of safety are near limit state. The feature deficiencies are serious enough that the feature no longer performs at a satisfactory level of performance or service. - There is a high probability that the verified degraded conditions will result in inefficient operation, or degradation or loss of service.
F Failed	<ul style="list-style-type: none"> - The feature has FAILED - Historically the feature regularly experiences scheduled or unscheduled closures or loss of service for repairs. . . .

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The screenshot shows a Google Earth EC interface with a report overlay. The report is titled "Assessment Results for SOO LOCK AND DAM OVERALL". It contains the following data:

1. Project Risk				
Overall Risk Index	Mission Risk Index	Safety Risk Index	Security Risk Index	Compliance Risk Index
72.66	65.76	75.83	82.80	84.28

Condition	Performance Expectation at Design Condition	Condition Related Probability for Causing a Loss of Service
A-Adequate	High Confidence to Perform	Limited
B-Probably Adequate	Moderate Confidence to Perform	Low
C-Probably Inadequate	Low Confidence to Perform	Moderate
D-Inadequate	No Confidence to Perform	High
F-Failed	Failure has already occurred or is imminent	

Google Earth EC

Search

Places

City, Country

Layers

View: All Layers

imagery

Terrain

Vectors

Swirlp Data

Jacksonville Data

Karna

National Inventory of Dams

SOO LOCK AND DAM OVERLA

Division: 1
District: 1
Waterway: 10
Project Type: Navigation
Assessment date: 05/19/2007

Project Name: AS

Asset Management - Summary of Condition Assessments and Their Effect on Performance Reliability

Dam Structures	Component Order Number	Condition Rating (F Level)	Observations	Replacement Cost per Lump Sum
Air Distribution System				
Feature Rating and Comments				
Air Compressor No. 2, Administration Building	0	Failed	Out of service. Tagged out	
Air Compressor No. 2, Administration Building	0	Failed	Out of service. Tagged out	
Air Compressor, Air Compressor Building	1	Probably Inadequate	To be rebuilt FY08	
Air Compressor, Air Compressor Building	2	Probably Inadequate	To be rebuilt FY08	
Air Compressor, Air Compressor Building	1	Probably Inadequate	To be rebuilt FY08	
Air Compressor, Air Compressor Building	2	Probably Inadequate	To be rebuilt FY08	
Air Compressor, Air Compressor Building	3	Probably Adequate	Rebuild in 2007	
Air Compressor, Air Compressor Building	4	Probably Adequate		
Air Compressor No. 1, Davis Building	0	Probably Adequate	Cooling water supply line too long for pump use. Require pump replacement	
Air Compressor No. 3, MBB Building	0	Probably Adequate	Circa 1945	
Air Distribution Piping, MacArthur Lock	0	Probably Adequate	Probably undersized	
Air Distribution Piping, Fox Lock	0	Probably Adequate	Probably undersized	
Air Distribution Piping, Delta Lock	0	Probably Adequate	Probably undersized	
Air Distribution Piping, Sabin Lock	0	Probably Adequate	Probably undersized	
Air Curtains Bubbler, MacArthur Lock	0	Probably Adequate		
Air Curtains Bubbler, Fox Lock	0	Probably Adequate		
Air Compressor, Air Compressor Building	3	Probably Adequate	Rebuild in 2007	

Side 2 of 2

Risk Management Matrix

Condition		Relative Risk Ranking Matrix				
		Condition Classification				
Consequence Category		F (Failed)	D (Inadequate)	C (Probably Inadequate)	B (Probably Adequate)	A (Adequate)
		I		High Relative Risk	Med-High Relative Risk	Medium Relative Risk
II		High Relative Risk	Med-High Relative Risk	Medium Relative Risk	Low Relative Risk	Minimal Relative Risk
III		High Relative Risk	Med-High Relative Risk	Medium Relative Risk	Low Relative Risk	Minimal Relative Risk
IV		High Relative Risk	Med-High Relative Risk	Medium Relative Risk	Low Relative Risk	Minimal Relative Risk
V		High Relative Risk	Med-High Relative Risk	Medium Relative Risk	Low Relative Risk	Minimal Relative Risk

High Relative Risk
 Med-High Relative Risk
 Medium Relative Risk
 Low Relative Risk
 Minimal Relative Risk



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OCA Schedule

- Inland Navigation structures
 - ▶ Two tier approach
 - Baseline condition assessments (FY2010)
 - ▷ Existing reports
 - ▷ Expert elicitation
 - ▷ Risk index computed (input for 5x5 matrix)
 - ▷ Online tool to compute and collect information
 - Risk assessments (TBD)
 - ▷ Fault tree analysis
 - ▷ Failure curves for all components
 - ▷ Risk and probability of failure computed
- Flood Risk Management structures
 - ▶ Two tier approach
 - Baseline condition assessments (FY2011)
 - Risk assessments (TBD)



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Success To Date

- OMB buy-in and understanding of the value of Corps' process
- Initial deployment and implementation of the Facility and Equipment Maintenance (FEM) system
- Initial introduction of performance measures in FY10 budget submittals (Nav, FRM, Hydro)
 - ▶ Common Risk Management Matrix (5x5)
- Establishment of AM CoP
 - ▶ Regional Asset Managers
- Demonstrations in 2 MSCs and implementation in 1 MSC of OCA methodology



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The Road Ahead

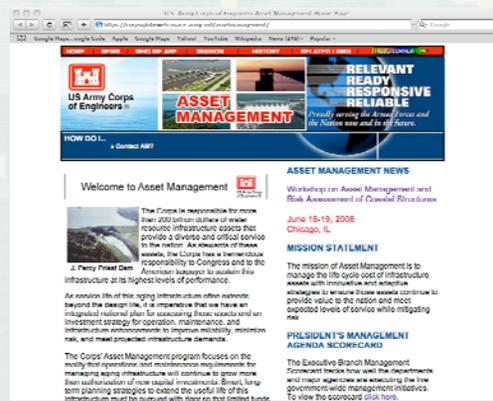
- Operational condition assessment methodology
 - ▶ Finalize Nav OCA tool (4Q09)
 - ▶ Complete CAs for inland Nav structures (4Q10)
- Continue meeting OMB requirements
- Inform Objective 3c (Campaign Plan)
 - ▶ Assessments (risk-informed)
 - ▶ Investment strategies (risk-informed)
- Continue FEM deployment



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Website (public):

<http://corpsglobeweb.usace.army.mil/assetmanagement>



Share Point:

<https://kme.usace.army.mil/CoPs/AMC>

Gateway:

<http://operations.usace.army.mil/asset.cfm>



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Facility and Equipment Maintenance (FEM) System



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FEM

- FEM is a Computerized Maintenance Management System
- Operations and maintenance planning and work management
 - ▶ Spare parts and inventory management
 - ▶ Data repository of/for equipment and O&M standards, practices and accomplishment
 - ▶ Direct support for asset condition assessment
- FEM is based upon the COTS program MAXIMO
- MAXIMO is used extensively in the private sector to manage assets ranging from IT assets to facilities to ships to airlines
- FEM is a Web-Based Enterprise Program
- FEM can provide the “FRAMEWORK” and “CONTROL SYSTEM” for your asset management program.



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FEM Reference Information

- FEM/Maximo website
 - ▶ https://w3.nwp.usace.army.mil/op/fem_maximo/home.asp
- FEM Sharepoint site
 - ▶ <https://kme.usace.army.mil/CoPs/AMC/FEM/default.aspx>
- FEM purchase specified:
 - ▶ 29 August 2007, SUBJECT: Purchase of Preventative Maintenance System software
- FEM Minimum Use Memo:
 - ▶ 1 April 2009, SUBJECT: Optimization of Facilities and Equipment Maintenance (FEM) System Use for Asset Management
- FEM Asset Classification Guidance: 1 April 2009



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USACE Campaign Plan Objective 3c



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OBJECTIVE 3c

Deliver reliable infrastructure using a risk-informed asset management strategy.

End State:

An accurate assessment of the infrastructure at each Civil Works water resource project and within each watershed and/or system which support prioritized recommendations for funding based upon risk, benefits, and mission significance. An accurate real property inventory for all Army controlled real property. Accuracy for both is maintained through quality assurance which includes timely data entry, quarterly data reviews, and timely system upgrades.

Objective 3c Champions: CECW-CO & CEMP-CR

Metrics:

1. Data ready for Audit due by 30 Sep 2009.
2. Complete Facilities and Equipment Management System deployment by 30 Sep 2010.
3. Complete condition assessments for Inland Navigation and Flood Risk Management Structures by 30 Sep 2011.
4. Condition assessments for all business lines by 30 Sep 2012.

Common Actions:

1. Review and update data in REMIS/RFMIS to ensure data accuracy.
2. Establish a risk based asset management system.



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