

## Technology Transfer Plan Water Resources Infrastructure

### I. Dam Safety Focus Area

#### i. Portfolio Decision Support System Work Unit

- JUN 09 Field Initial Portal for data/document storage (in use now)
- SEP 09 Field Enterprise Database to support risk engine (DAMRAE) with Check OUT/IN process
- SEP 10 Field Initial version of Suite of management modules for decision support based on Enterprise Database
- SEP 10 Final Portal for data/document storage and management decision support

All of these products will be tested initially by the Risk and Reliability DX in LRD then by the teams in the field performing the Dam Risk Assessments. These people are the final users for the document storage/retrieval and Check OUT/IN portal. Documentation is included in the Online Portal and training will be conducted for the Teams. Decision support modules are developed with input from the Risk & Reliability DX and the HQ Dam Safety Policy & Procedures Team. These people will test the initial version after training /demo is conducted.

#### ii. Simplified Probabilistic Models for Concrete Dam Failure Work Unit

FY09:

- Nov. 2008 Technical Report ERDC/ITL TR-08-3 by Ebeling, Fong, Chase and Arredondo "Fragility Analysis of a Concrete Gravity Dam and Its System Response Curve Computed by the Analytical Program GDLAD\_Sloping\_Base"
- Feb 2009 Technical Report ERDC/ITL TR-09-2 by Ebeling, Fong, Yule, Chase and Kala "Permanent Seismically Induce Displacement of Rock-Founded Structures Computed by the Newmark Program"
- PC-based software GDLAD\_Sloping\_Base distributed through the CASE web site and will also be provided via the RADS portal and will be located on a Corps server with access controlled by the Risk and Reliability DX.
- PC-based software Newmark distributed through the CASE web site and will also be provided via the RADS portal and will be located on a Corps server with access controlled by the Risk and Reliability DX.
- The four PC-based software products developed or in development will be discussed by Dr. Maureen Corcoran at the Corps Infrastructure Conference in Cleveland, OH, July 2009.

FY10:

- If sufficient funding is provided in FY10, an ERDC Technical report will be completed and published discussing "Fragility Analysis of a Concrete Gravity Dam Founded in Rock and Its System Response Curve Computed by the Analytical Program GDLAD\_Foundation"
- When completed, the PC-based software GDLAD\_Foundation will be distributed through the CASE web site and will also be provided via the RADS portal and will be located on a Corps server with access controlled by the Risk and Reliability DX.

#### iii. Unlined Spillway Erosion Work Unit

- Unlined Spillway Erosion toolbox in beta version and being test by Corps of Engineer Portfolio Risk Assessment (PRA) team. The toolbox is available upon request to PRA team.
- The computer program, SITES Spillway Erosion Analysis with Latin Hypercube simulation (SSEA+LHS), is in beta version, and will be available for use after the beta testing through ERDC GSL web page end of FY09.

#### iv. Breaching Mechanisms of Embankment Dams Work Unit

There will be no technology transfer this FY, funding was greatly reduced in this work unit

- v. **Estimating Probability of Extreme Floods Work Unit**
- Draft EC is being written to detail the recommended method
  - PMF exceedance and frequency curve extrapolation methods will be incorporated into the HEC-SSP software. HEC-SSP is freely available from the HEC website.
  - In the future, methods will be taught in the flow-frequency analysis PROSPECT training at HEC
  - Methods presented or scheduled to be presented at:
    - ASCE-EWRI Conference, May 2009 in Kansas City
    - USACE Infrastructure Conference, July 2009 in Cleveland
    - Dam Safety Conference, September 2009 in Hollywood, FL
    - ERDC R&D Conference, November 2009 in Memphis

## II. Levee Safety Focus Area

- i. **Effects of Vegetation on Levees Work Unit**
- FY09
- Established contacts with local, state, and Corps districts by conducting site visits in Oregon, Washington, Louisiana, Texas (planned July 2009), California, and New Mexico
  - Established Science Team with the state of California and their stakeholders to collaborate research efforts and report research results
  - Developed fact sheet (posted on public website link below)  
(<http://operations.usace.army.mil/research.cfm?CoP=flood>)
  - Conducted Woody Vegetation Workshop in Vicksburg, MS, to communicate research and preliminary model testing
  - Prepared extensive literature review on publications on the effects of woody vegetation and related topics (available in draft on CD)
- FY10
- Conduct second Woody Vegetation Workshop in Vicksburg, MS, (proposed Nov 09) to discuss preliminary results
  - Develop a white paper on Review of International Guidance of Woody Vegetation on Levees
  - Prepare technical notes of field sites (includes background information and data gathering methods)
- ii. **Levee Failure Mechanisms Work Unit**
- FY10:
- ERDC Technical report will be completed discussing “Soil-Structure Interaction and the Development of Flaws at I-Walls During Flood Loadings”
  - Support District development effort using R&D findings generated during this study for the new HQ Guidance Document (ETL) on Flood Walls.
  - Release of new software program, Corps\_I-Wall, for performing deterministic and probabilistic analysis of levee stability with embedded structures.
- iii. **Infrastructure Risk & Reliability Work Unit**
- Coordinated workshop with HR Wallingford engineers to discuss system reliability using fragility curves
  - Develop white paper with HR Wallingford engineers on assessing the reliability of geo-structures