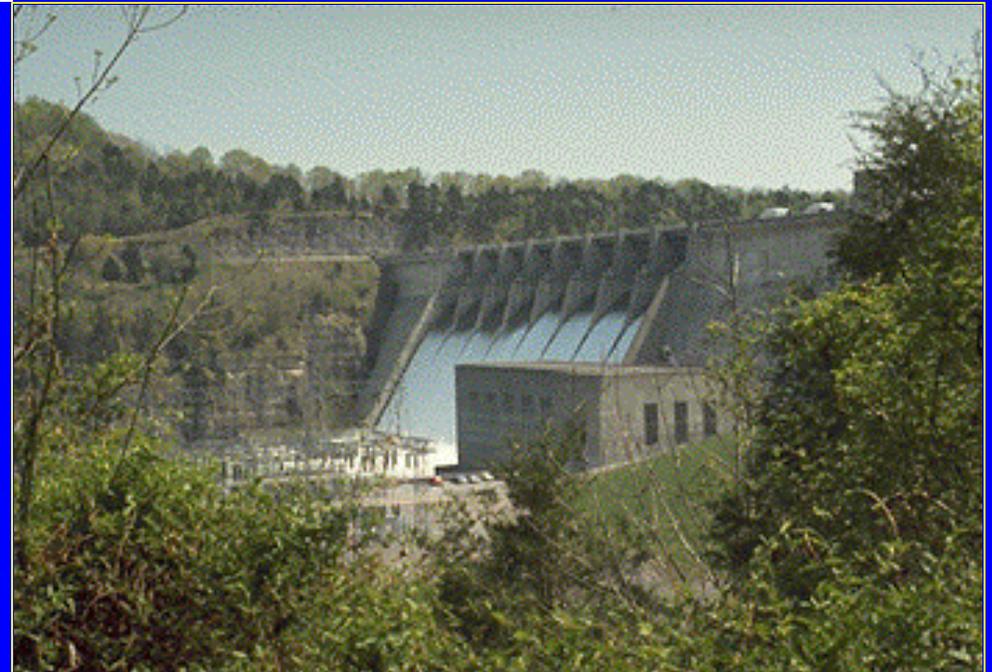




Committee Report: Group 1

NAVIGATION SYSTEMS & HYDROPOWER

**Infrastructure
Workshop
13-15 March 2001**



Issues Addressed

- **Will current R&D provide necessary products to the field?**
- **Does current R&D address changing USACE missions?**
- **How will new program recommendations fit into current programs?**
- **Need for new program within R&D needs?**
- **FY2003 R&D needs.**

IDENTIFIED FY02 R&D NEEDS

6 Field Operating Capabilities

32 Issues

Future Operating Capabilities We Need

- A. Technology to allow design and construction of durable navigation structures, cheaper and faster.**
- B. Tools to reduce O&M costs on existing structures.**
- C. Capture corporate knowledge to maintain expertise (clearing house, tech assistance, tech transfer).**
- D. Extend life of existing structures.**
- E. Better stewards of environment.**
- F. Increase project output from existing projects.**

Technology to allow design and construction of durable navigation structures, cheaper and faster

- **Energy absorbing techniques to reduce barge impact loads** *[1,5,1]**
- **Design guidance for float-in construction (tremie conc thermal study, concrete, air bladders, sealing methods for underwater construction)** *[4,3,0]*
- **Composite piles (durability, design parameters, skin friction issues, can't rehab?)** *[2,3,2]*
- **Extend RCC applications** *[4,3,0]*
- **Revitalize CASE, GCASE** *[4,2,1]*

**Ranked: [High, Medium, Low]*

Technology to allow design and construction of durable navigation structures, cheaper and faster (cont'd)

- **Plastic piling to replace timber structural elements (connections, installation) [1,1,5]**
- **Design of large caissons (computer program, CASE) [3,3,1]**
- **Economical infill for precast modules (locally available sand/gravel) [2,4,1]**
- **Underwater inspection/repair (high-resolution sonar, etc) [2,4,1]**

Tools to reduce O&M costs on existing structures

- **Improve repair materials and methods for aging structures** *[4,3,0]*
- **Investigate Emerging technology for reduced routine maintenance costs** *[4,3,0]*
- **Specific guidelines for repair of Hyd Steel Structures (list of “don’ts”)** *[1,4,2]*
- **Workable models and strategies leading to success to gain Construction General (CG) dollars for repair of deteriorating concrete (Policy issue, Preliminary study screening process)** *[4,2,1]*
- **Long-term durability studies concrete, coatings, lubricants (666 issues, new testing procedures)** *[6,1,0]*

Tools to reduce O&M costs on existing structures (cont'd)

- **Plastic piling to replace timber structural elements (connections, installation) [1,1,5] REPEAT!**
- **Uplift during rehab (ability to measure and calculate); also include in new construction [1,3,3]**
- **Tainter gate anchors post-tensioning and trunnion friction (NDT evaluation of stress state) [6,1,0]**
- **Leakage through structure (EOP) [0,3,4]**
- **Tools to predict equipment failure (justification to rehab) [3,3,1]**
- **Corrosion of steel water piping (replacement materials, exposed and embedded). Evaluate new technology (Insitu Form) [2,4,1]**

Tools to reduce O&M costs on existing structures (cont'd)

- **Mitigate ice problems on hydraulic steel structures [4,2,1]**
- **Instrumentation for real-time monitoring of performance of structures and cathodic protection systems [5,2,0]**

*Capture corporate knowledge to maintain expertise
(clearing house) (policy, tech assistance, tech transfer)*

- **Metals (compatibility of different, data base, publication search capabilities such as <http://libweb.wes.army.mil>) [0,6,1]**
- **Steel structures (welding, corrosion, connections, coating, cathodic protection) [4,3,0]**
- **Guidance for welding on hydraulic steel structures (case studies) [2,4,1]**

Extend life of existing structures

- **Lock extensions – innovative ideas [1,5,1]**
- **Energy absorbing techniques to reduce barge impact loads [1,5,1]**
- **Methods to reduce rate of deterioration of concrete and steel structures to delay of major rehab) [3,4,0]**
- **Innovative alternatives to replace existing pilings or other foundation elements during rehab (plastic, etc) [1,2,4]**
- **Quick Evaluation of closure gates on local protection projects (corrosion, impact damage → condition index) [1,4,2]**

Better stewards of environment

- **Durability and non-polluting capability of coatings, lubricants**
[6,1,0]
- **Plastic piling to replace timber structural elements**
(connections, installation) *[1,1,5]*
- **Environmental solutions (fish passage, lead-based paints, water quality issues)** *[2,3,2]*

Increase project output

- **Methodology/policy on shaft stresses (6000 psi....new criteria?)** *[4,3,0]*
- **Accurate (within 5%), low cost means to measure flowrates out of large structures** *[2,3,2]*
- **Plant optimization; required power vs. water available (most efficient use of water)** *[2,3,2]*

Recommended Programs for 02 and Beyond

- **Innovative Design and Construction for Civil Works Infrastructure**
- **Maintaining and Extending the Life of Existing Infrastructure**
- **Earthquake Engineering (follow-on)**
- **Dam Safety Risk Analysis**