Value Methodology Applied to Levee Repairs

Missouri River Basin
2011 Flood Repairs
What is Value Methodology?

- A systematic process used by a multidisciplinary team to improve the value of a project through the analysis of its functions

\[ V = \frac{F}{\$} \]

- **V** = Value
- **F** = Function
- **\$** = Cost
When May Value Methodology Be Applied?

- Concept development
  - Analysis of multiple alternatives

- Design
  - Refine selected alternative
  - Quality improvements – design suggestions

- Acquisition / Construction
  - Acquisition method
  - Constructability / Sequencing
  - Minimize impacts on operating project
OMB / USACE Requirements

OMB Circular A-131
- Requires VE application on all federal projects/programs over $1,000,000 total project cost

PL 99-662 (WRDA 1986)
- Requires VE during design of all water resource projects with cost over $10,000,000

USACE ER 11-1-321, Change 1 Value Engineering
- “The VE program applies to all procurement acquisitions that are Federally funded, managed, and/or executed by the Corps of Engineers including … Support for Others (SFO) … and any other Federal funded programs with a total project cost of $1 million or more regardless of the number of phases/contracts to accomplish the project.”
Objectives for VE in Planning

- Identify possible additional alternatives
- Enhance existing alternative options
- Screen/evaluate alternatives
Importance of VE Job Plan

Standard 6-phase Job Plan with emphasis on project Planning Phase
Importance of VE Job Plan

TYPICAL DESIGN F.A.S.T. DIAGRAM TEMPLATE

BUILDING STRONG®
Importance of VE Job Plan

CREATIVITY STARTS HERE

PLANNING F.A.S.T. DIAGRAM TEMPLATE

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Importance of VE Job Plan

SAMPLE DESIGN F.A.S.T. DIAGRAM FOR PROPOSED LEVEE PROJECT
Importance of VE Job Plan

SAMPLE PLANNING F.A.S.T. DIAGRAM WITH ADDED ALTERNATIVES

BUILDING STRONG®
Importance of VE Job Plan

### Importance of VE Job Plan

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<tr>
<th>TIME</th>
<th>PLANNING</th>
<th>INITIAL DESIGN</th>
<th>FINAL DESIGN</th>
<th>CONSTRUCTION</th>
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<td>COST TO MAKE CHANGE</td>
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<td>NET POTENTIAL COST SAVINGS/AVOIDANCE</td>
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<td>MAX. POTENTIAL GROSS SAVINGS/AVOIDANCE</td>
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**POTENTIAL FOR VE COST SAVINGS/AVOIDANCE**

Would change to detention/diversions be considered in Final Design Phase?
NWO VE Approach with Levee Repairs

- **NWO Levee Systems:**
  - *Upper Missouri River basin*
  - 8 states – 91 levee systems – 612 miles

- **USACE spending priorities**
  - $581M: $319M (leves) & $262M (dams) – FY12
  - $105M: FY11 flood fighting activities
  - $45M: FY11 funds transfer to kickstart levee repair and dam inspection

- **NWO Levee Rehab Projects**
  - 19 approved Project information Reports (PIRs)

- **Conduct VE studies early in design phase**
  - Larger projects - VE conducted by AE teams (6 studies; projects @ $11.8M - $117M)
  - Smaller projects – district VE Officer integrated with PDT (9 studies; projects @ $1.2M - $14.8M)
General VE Recommendations  
Missouri River Levee Repairs

- **Location of Repair Material**
  - Adjacent depositional material
  - Sponsor identifies nearby borrow locations to reduce haul distance

- **Alternative methods of managing exit gradient at landside toe**
  - Vinyl sheet pile
    - Note: Vinyl sheet pile was not adaptable for these levees.
Site-Specific VE Recommendations
Missouri River Levee Repairs

- Do not replace seepage berms (placed during the flood fight) – leave as is
- Eliminate stone layer on stability berms and plant grass
- Use graded rock instead of scoria rock for road repair
Design & Contracting Suggestions

- Incorporate smart phone MICA into surveillance, operations, and GIS levee management

Contracting
  - Beyond breaches and major scours, consider design-bid-build (instead of MATOC) to support local construction industry and potentially lower cost
  - Firm fixed-price bids/pricing schedule with absolute priorities as basic items; additional priorities as options
  - Specialty contractor for turf

Design
  - Prefabricated manholes for gatewells to speed construction
Missouri River Levee Repairs

Middle L-575 - Pre Repair

Upper L-550 - Pre Repair

Middle L-575 - Post Repair

Upper L-550 - Post Repair