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HTRW CX

# CostRisk

## U.S. Army Corps of Engineers

## Tri-Services Cost Engineering Workshop and Conference

### Virginia Beach, VA

### 04 June 2003



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## U.S. Army Corps of Engineers HTRW Cost Engineering Omaha, Nebraska



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## What is the Background?

- **Risk Analysis method for cost estimates advocated by HQUSACE in early 1990's**
- **Cost Engineering Regulation (ER) 1110-1-1300 (1993) – Use Risk Analysis on estimates where quantities / scope is not well defined**
- **CorpsRisk - During the mid 1990's, the Corps developed the design spec for CorpsRisk for use with MCACES**



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## What is the Background?

- **HAZRISK (1994-2000) software was for HTRW only - used linear regression methods (driven by a database of historical cost data)**
- **CostRisk is an Inter-Agency effort (Army, DOE, AF, Navy) Version 1.3 completed Oct 2001**



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## What is the Purpose?

- **To understand causes of risk in a cost estimate**
- **To assist in analyzing the sources of variability in cost estimates and to determine their potential effect on the cost of a project**
- **To establish estimate by level of confidence**
- **To determine an appropriate estimate needed to provide a certain amount of confidence level and thus, reducing risk of budgetary estimate over-run**



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## What is the Purpose?

- **To be applicable to HTRW, Military, and Civil Works Estimates**
- **To be independent of a historical database that requires maintenance**
- **To be primarily used for early stage budget estimates, such as parametric**



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## What software is utilized?

- **With cost estimating software**
  - **RACER (HTRW Clean Up - Parametric)**
  - **PACES (Military Const - Parametric)**
  - **Stand Alone estimates (HTRW, Mil, Civ Works)**
    - **Manually Created in CostRisk based on MCACES or other**
    - **MS Excel**
      - **Electronically Imported**
- **With risk analysis software using Monte Carlo methods (driven by team input, not by a database)**
  - **Crystal Ball**



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## What is the process?

- **User specifies three sets of parameters:**
  - **Best Case - Absolute best outcome, 1 in 100**
  - **Expected Case - Normally the original estimate values - the most likely values**
  - **Worst Case - Absolute worst outcome, 1 in 100**
- **Create 3 different estimates in RACER, PACES or Stand Alone in CostRisk**



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## What is the process?

- **Use CostRisk “Summarization” feature for RACER or PACES estimates**
  - **Pareto’s Law**
  - **Focus on 20% of Assemblies that contain 80% of the cost**
  - **Allows Cost Engineer to pay attention to important uncertainties**
- **Set “Std Deviation” for RACER or PACES pricing**
- **Import to CostRisk from RACER or PACES**
- **Perform Crystal Ball Analysis in CostRisk**



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## What is the Output?

- **CostRisk Contingency Report**
  - Shows Table of several Anticipated Construction Costs, each with its associated Contingency percentage, and Level of Confidence (Not to Overrun) percentages.
  - Allows decision making for budgeting project costs.



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## Training Workshop

- **July 30-31, 2002 – 16 Hours @ Earth Tech office**  
– Earth Tech - Englewood, CO
  
- **Proposed Date of ??? for next training workshop - need funding**



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## Engineering Change Proposals (ECP's)

- **02-001 Stand Alone: Add ability to edit UOM**
- **02-002 Markups: Add ability to include subcontractor markups**
- **02-004 Add Export / Import functionality**
- **02-006 Stand Alone: Add a “User Description” column**



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## Engineering Change Proposals (ECP's)

- **02-007 Stand Alone: Add ability to Enter Negative Numbers**
- **02-009 Status Window: Add progress bar**
- **Funding Needed**



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## CostRisk HTRW Example - Using RACER

- **Walker AFB – Roswell, NM**
- **FUDS Project**
- **Mercury Contaminated Soil in Housing Area**
- **Primary Uncertainties:**
  - **Excavation Quantity**
  - **Disposal Location**



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## CostRisk Civil Works Example – Using Stand Alone

- **Green River**
- **Project to clear snags from channel**
- **Based on MCACES estimate**
- **Primary Uncertainties:**
  - **Number of snags by Size (Quantity)**
  - **Location (Distance to Disposal)**