

THE POWER TOOL

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POWER Tool – Planning, Optimization, Waste Estimating and Resourcing tool, a hand-held field estimating unit and relational database software tool for optimizing disassembly and final waste form of contaminated systems and equipment.

THE PROBLEM

The U.S. Department of Energy must deactivate and dismantle dozens of major facilities that are highly contaminated as a result of past weapons production activities. Each facility dismantlement will cost hundreds of millions of dollars and will generate large amounts of waste. Decisions on approach and sequencing for dismantling these facilities will be a major factor in the ultimate cost. There is an urgent need for a tool to help the technical staff of these facilities estimate the work needed and waste generated, perform case comparisons, and develop an optimized plan that can save tens of millions of dollars for each major facility.

THE SOLUTION

Task Structure and Sequencing

A task structure and sequencing was developed to systematically estimate and plan the decontamination, dismantlement and waste disposal for contaminated systems. The structure lends itself to consideration of alternative methods that optimize between important attributes including; labor cost, waste disposal, and schedule. Different cases can be estimated to explore the effect of alternate work approaches, and the best tradeoff selected as the baseline for the project.

Database Tool, Field Estimating Unit

The POWER Tool software is used for field estimating on a small hand-held PC about the size of a videocassette and weighing less than 2 pounds. An adapter and neck strap has been designed to allow the unit to hang comfortably around the estimator's neck when not in use. The unit contains a high-resolution color screen, a keyboard and pointing device for data entry. A high-capacity lithium-ion battery allows field operation for 3 to 4 hours before a battery change is required. Data is recorded on a flash-RAM card in the PCMCIA card slot in



Fig. 1 Hand held PC

the field unit, and the flash-RAM card is removed and inserted into a base station in the office for upload into the master database. In the event of contamination of the field unit, the unit is also capable of infrared or ethernet data transfer.

User Interface

After project facility/system/equipment information has been entered in the office, project field and engineering staff make estimates of field work effort, calendar days, and waste generation by category for each subset of equipment for each subtask in the work task structure.

The project field staff and engineers use a field estimating screen containing navigation buttons and pull-down menus to navigate among the hardware subsets and work subtasks, and enter estimates. The use of library data for each subtask allows the estimator to work at the subtask level, with the software accounting for the details of manpower and labor costs. On-screen feedback of manpower per subtask based on the estimator's input and the library data is provided, and the estimator has the option of using an exception routine to adjust library data where necessary.

Hours calculated from estimated work units x library data for each work unit.									
HucOp hr	RCT hr	CR hr	El hr	IT hr	PipF hr	Milw hr	Rig hr	Carp hr	Supr hr
96.0	96.0	160.0	0.0	0.0	0.0	0.0	0.0	0.0	52.8

Fig. 2 Field Estimating Screen

A command button opens a second screen allowing entry of estimates for waste generation. Waste is estimated by container type for accuracy and ease of use by the field estimator; the software converts from container to cubic footage, and calculates cost.

Relational Database

The POWER Tool software has been developed in the Microsoft® Access 97 relational database environment. This allows the flexibility and power of a relational database for data management, screen features, data processing and reporting. The software is also capable of exporting the records on equipment subsets, including schedule days, manpower loading and waste generation loading to a critical-path-scheduling program for detailed project scheduling. Several standard reports have been developed, and custom reports can be easily adapted in the Access environment. The standard task and subtask structure and labor and waste categories in the software can be adapted for site and project needs, and labor rates, waste costs and subtask labor can be modified in the software tables.

Development Status

The POWER Tool software has been developed through an alpha phase including testing of the task structure on equipment subsets at the Rocky Flats 771/774 Facility in hard copy and spreadsheet form. The Access database version has been developed and alpha-tested on test equipment subsets at Hanford. Initial library data on work effort for subtasks has been estimated based on FASTER Services experience, and supplemented by estimates made at Rocky Flats. Rocky Flats 771/774 equipment subset estimates are being entered to test the data processing and reporting features. The software and field-estimating unit are being tested on equipment subsets at Hanford facilities and are ready for beta-test deployment at other sites and facilities.