Cost Estimating System Documentation

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ABSTRACT

The Purpose of this paper is to provide a simple description of the *dBase III* + based cost estimating system currently in use by the CDG. The intent is to facilitate usage of this system by those not already familiar with its structure. The system was developed originally in the *Artemis* language on an HP1000, but little of the original code remains today. The menus have been completely re-worked so as to include helpful commments along with the choices in the hope that the system would be mostly self-explanatory. Thus, this is not an attempt at extensive documentation but rather a minimal introduction to the system.

Data and Index Files

The data are stored in three main database files. Each line item is tagged with WBS and item numbers, and stored in a file with extension .DAT. Two index files are needed, one for indexing by sort code, and one for indexing by WBS number. The WBS data are kept in a file with the extension .WBS. An index file is needed to sort the WBS data by sortcode. Finally, the craft codes and associated rates are kept in a file with extension .CRF. This data file is indexed by craftcode with an associated index file. Separate estimates are stored under unique names with the file extensions distinguishing the components of each. Thus, for an estimate named "sample", the associated files are:

SAMPLE.DAT	Line item detail database
SAMPLE.TBX	Index for sample.dat by sort code
SAMPLE.TWX	Index for sample.dat by WBS number
SAMPLE.WBS	WBS database
SAMPLE.WBX	Index for sample.wbs by WBS number
SAMPLE.CRF	Craft database
SAMPLE.CRX	Index for sample.crf by craft code

During operation, these files are linked through key fields. These fields are the same ones used in the indexing process, i.e., sort code, WBS number and craft code.

Data File Structure and Field Descriptions

The file structures and field names were derived from those used in the Artemis system from which this dBase system evolved, and, unfortunately, display that heritage. Each field has only three characters - but the attempt was made to keep these as mnemonic as possible.

The line item detail database is the most complex of the three and contains 17 fields:

Structure for database: sample.dat

Field	Field Name	Type	Width	Dec	Description
1	WBS	Character	20		Work Breakdown Structure Number
2	ITM	Numeric	3		Item Number
3	ITD	Character	25		Item Description
4	UNT	Character	6		Unit Measure
5	MQY	Numeric	10	3	Number of Material Units ("Material QuantitY")
6	MUC	Numeric	10	3	Material Cost per Unit
7	MCB	Character	6		Material Cost Estimate Basis
8	LQY	Numeric	10	3	Number of Labor Units ("Labor QuantitY")
9	LUH	Numeric	10	3	Labor Hours per Unit
10	CRF	Character	4		Craft Code
11	EST	Character	15		Estimator's initials (Optional - for reporting if desired)
12	SORT	Character	20		Sort Code
13	CRT	Numeric	5	2	Craft Rate
14	TMC	Numeric	15	3	Sum of Line Item Material Costs ("Tot. Material Cost")
15	TLH	Numeric	15	3	Sum of Line Item Labor Hours ("Tot. Labor Hours")
16	TLC	Numeric	19	6	Sum of Line Item Labor Costs ("Total Labor Costs")
17	MLT	Numeric	19	6	Sum of Total Line Item Costs ("Mat. & Labor Total")

The WBS database contains not only the WBS number and description, but also contains the cost totals and multiplier for that WBS number:

Structure for database: sample.wbs

Field	Field Name	Type	Width	Dec	
1	WBS	Character	20		Work Breakdown Structure Number
2	WDE	Character	45		Work Breakdown Structure Component Description
3	SORT	Character	20		Sort Code
4	LUH	Numeric	10	3	Labor Hours per Unit
5	TLH	Numeric	15	3	Total Labor Hours - Not Used in Current System
6	TLC	Numeric	19	6	Total Labor Cost
7	TMC	Numeric	19	6	Total Material Cost
8	MLT	Numeric	15	3	Total Cost = TLC + TMC
9	TQY	Numeric	5		WBS Quantity multiplier
10	EST	Character	20		Optional Text Field for Reports

The simplest of the three databases is the Craft database. It contains just three fields:

Structure for database: sample.crf

Field	Field Name	Type	Width	Dec	
1	CRF	Character	4		Craft Code
2	CRT	Numeric	8	2	Craft Rate
3	CDE	Character	40		Craft Description

System Programs

The Cost Estimating System consists of 16 dBase program and associated files. Except for the procedure file, ESTPROC.PRG, the program and menu files were written with the aid of the *GENIFER* program generating system. The three report files (*.frm) were written with the standard dBase report generator. The memory file, ESTPNAME.MEM, is storage for the current project name. This allows multiple estimates to be accessed from a common disk directory by assigning different project names to each estimate.

ESTCALC.PRG - Calculations menu, called from main menu
ESTCRINQ.PRG - Craft inquiry module, called from inquiry menu
ESTCRMNT.PRG. - Craft modification/maintenance module, called from maintenance menu
ESTINQ.PRG - Inquiry menu, called from main menu
ESTMENU.PRG - Main menu. Entire system begins with "do estmenu" command from dBase
ESTMNT.PRG - Maintenance/modification menu, called from main menu
ESTPNAME.MEM - Memory file, holds current project name. Maintained by main procedure file
ESTPROC.PRG - Main procedure file - called by many different modules
ESTRDET.FRM - dBase report of line item details, called by report menu
ESTREP.PRG - Report menu, called from main menu
ESTRLEV.FRM - dBase report of "rollup" at requested levels, called from report menu
ESTRSUM.FRM - dBase report of summary rollup, showing quantities, called by report menu
ESTTCINQ.PRG. - Line item data inquiry module, called from inquiry menu
ESTTCMNT.PRG. - Line item data mod/maintenance module, called from maintenance menu
ESTWBINQ.PRG - WBS database inquiry module, called from inquiry menu
ESTWBMNT.PRG - WBS database maintenance module, called from maintenance menu

Menu Outline

Main Menu:

- Name Project:
  - Enter name of project to make current
- Examine:
  - Details
  - WBS
  - Crafts
- Modify:
  - Details
  - WBS
  - Crafts
- Calculate:
  - Sort Codes Update
  - Index Regeneration
  - Calculation ("Roll-up")
- Generate Reports:
  - Roll-up
  - Summary
  - Details