

TECHNICAL AND FINANCIAL PROJECT MANAGEMENT TOOL

L. Symons

ST Division – Civil Engineering Group (ST/CE)
CERN, Geneva, Switzerland

Abstract

In order to control the technical and financial aspects of the civil engineering contribution to the LHC project, an autonomous data management tool has been put in place to integrate drawings, schedules and budget control. To assemble this very heterogeneous data in its support, contents, and naming, a uniform Product Breakdown Structure (PBS) has been introduced between the different files. For updating reasons, the technical menu has a direct access to the CERN Drawings Directory (CDD). The budget menu compares, for each structure, the initial estimates with the actualized ones, the latter compared permanently with the paid invoices. The total amount of the civil engineering cost is available online.

1. INTRODUCTION

In order to control electronically the technical and financial aspects of the civil engineering contribution (226 different works, estimated cost: 350 MCHF) to the LHC project, an autonomous data management tool has been put in place to integrate drawings, schedules and budget control.

2. CIVIL ENGINEERING DATA MANAGEMENT APPROACH

2.1 General data identification

As the input data is very heterogeneous in its origin (architects, experts, consultants, contractors, etc.) and in its contents (reports, drawings, schedules, invoices, etc.) a Product Breakdown Structure (PBS) has been introduced. The PBS is a unique number acting as a common link through the files.

2.2 Product Breakdown Structure (PBS)

The main tasks in creating the PBS are:

- to define the PBS to the required level of detail,
- to establish a system to manage the project changes and adjustments.

The civil engineering product identification is made on the conceptual design of each specific structure, document or service.

Codification examples:

- BP10.U01 stands for PX14 in Package 1,
- BP50.R05 stands for the "Geotechnical Interpretative Report" in Package 2.

2.3 Data management implementation

The basic idea was to create a very user-friendly, server-based, data-handling system accessible from MAC and PC. The general layout is shown in Fig. 1.

After logging in the system (e.g. Windows 95, Start, Applications, FileMaker Pro 3.0, Hosts, GénieCivil.FP3) the geographical LHC screen appears giving direct access to the eight LHC points (P1, P2, ..., P8) or the two injection tunnels (TI2, TI8).

2.3.1 Technical Menu

The technical menu, accessible without password, is composed of:

- the descriptive register of structures (per LHC point or for the entire project),
- the descriptive form per structure (giving individual information, e.g. crane details),
- the drawing register of structures (lists all drawings, 1850 presently, with their phase and status),
- the drawing form per structure (lists all the approved drawings related to the structure - Fig. 2),
- the schedule register of structures (lists all schedules).

The drawings are opened with an appropriate HPGL viewer. The schedules are opened with Microsoft Project.

2.3.2 Budget Menu

The budget menu is only accessible with a password. The provisional management is permanently confronted against the invoice reality. The principle is based on a cost comparison, per structure, through the following five columns:

"Initial Estimate" - "Variation" - "Actual Estimate (1)" - "Payment (2)" - "Ratio 2/1"

The ratio column, with its red or green associated lights, acts as a proven error detector.

This analysis principle is applied for the three packages (+TI8) on the following main files:

- the consulting consortia (Fig. 3),
- the other design parties,
- the works consortia,
- the advanced works.

As special features can be mentioned the direct access for each file, per structure line, to the invoices (invoice number, order reference, amount per budget code, date). For the works files, also per structure line, a direct access exists to the Bill of Quantities.

For the different files exist on-line summary tables giving grand totals:

e.g. Package 1 - Consultants. Display of totals per phase, per machine/experiment budget codes, etc.

The overall grand total regroups the totals per package in each discipline (consultants, contractors, etc.).

3. CONCLUSION

The Technical and Financial Project Management (TFPM) tool of the Civil Engineering Group allows, during the LHC project civil engineering design and construction phase, a day-to-day overview on the drawings, schedules and especially the cost performance. The system will also remain, after the end of the works, an accurate tool to retrieve as-built drawings against each structure. This feature is considered to be fundamental as today's designers will not be tomorrow's users.

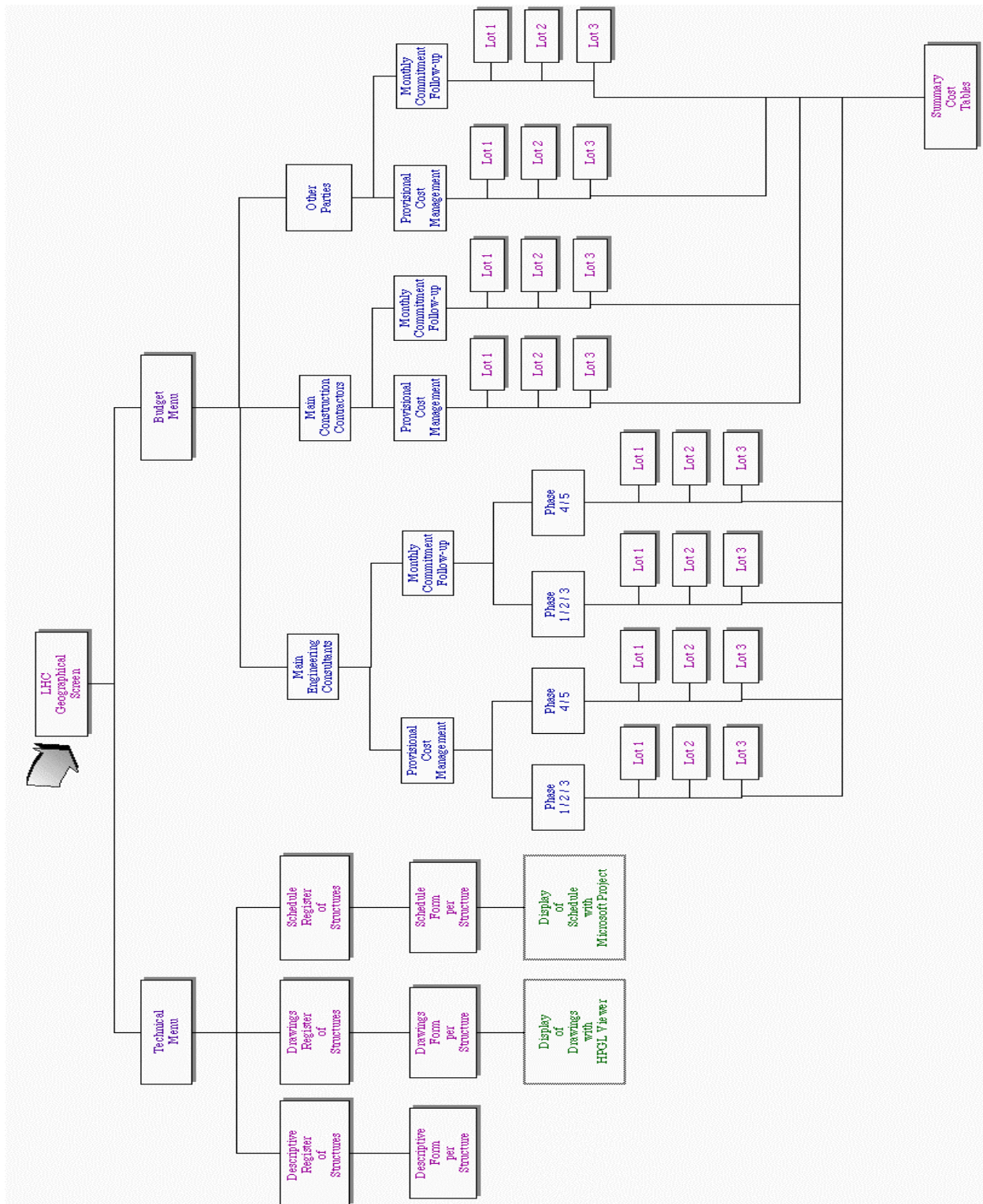


Fig. 1 General layout Technical and Financial Project Management Tool.

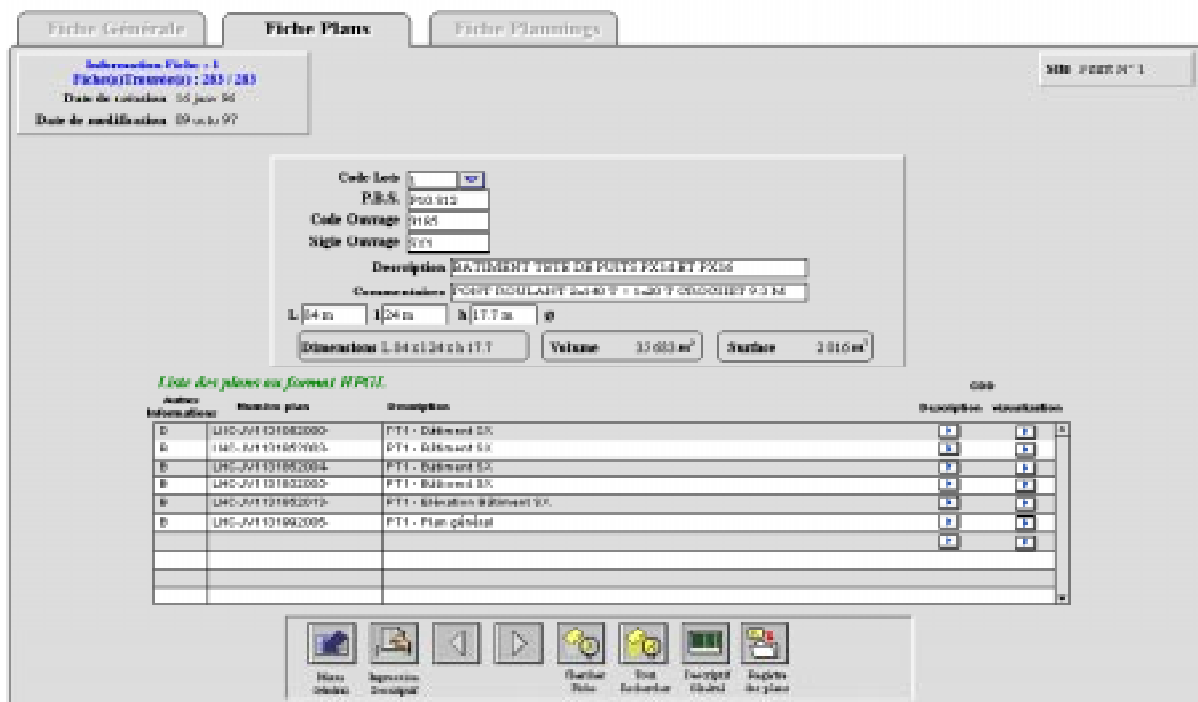


Fig. 2 Example of different drawings applicable to one structure (SX building – Package 1).

Gestion prévisionnelle budgétaire
Consortium Consultants Lot 2
Phase 1, 2 et 3

L.J.R.

Phase	PBS	Description	Estimations initiales		Estimations actualisées			Paiements		
			Montant	Variation	Montant	Méthode 30 % Code 08728	Epaves 70 % Code 08721	Date	Montant	%
1	BP 50 F04	DESIGN METHOD-ONLY REPORT	90000		90000	27000	63000	29/06/04	90000	100%
1	BP 50 F05	OROTECNICAL INTERPRETIVE REPORT	90000		90000	27000	63000	29/06/04	90000	100%
1	BP 50 F06	PHASE ONE SUMMARY REPORT	181514		181514	54454	127060	29/06/04	181514	100%
1	BP 50 F07	REVISED PROGRAMME AND P&E PROPOSAL FOR PHASE 2&3	8200		8200	2460	5740	29/06/04	8200	100%
1	BP 50 F01	ADVANCE WORKS FOR BUILDING - DESIGN SERVICES	97846	6390	104236	31331	73105	29/06/04	102612	98%
1	BP 50 F03	QUALITY PLAN	50000		50000	15000	35000	29/06/04	50000	100%
1	BP 50 F02	ADVANCE WORKS FOR BUILDING - SITE SUPERVISION	130154		130154	45946	100108		39400	26%
2	BP 50 S01	TENDER DRAWINGS FOR SHE SUPPORT STRUCTURE	9553		9553	2866	6687	29/06/04	9553	100%
3	BP 50 S15	TENDER DRAWINGS FOR ED BUILDING	10909	10759	21668	6756	14912	29/06/04	21668	100%
2	BP 50 S04	TENDER DRAWINGS FOR SEM BUILDING	26670	-32018	-548	-1804	-3744	29/06/04	-5347	100%
3	BP 50 S05	TENDER DRAWINGS FOR SH BUILDING	18705		18705	5488	13218	29/06/04	18705	100%
2	BP 50 S06	TENDER DRAWINGS FOR SOX BUILDING	26360	6173	32533	9760	22773	29/06/04	28296	87%
2	BP 50 S07	TENDER DRAWINGS FOR SH BUILDING	24317	7151	31468	9390	22078	29/06/04	24317	78%
2	BP 50 S08	TENDER DRAWINGS FOR SOX BUILDING	32295	9372	41667	12300	29467	29/06/04	32882	81%
2	BP 50 S10	TENDER DRAWINGS FOR SV BUILDING	26190	1311	27501	8233	19268	29/06/04	26190	93%
2	BP 50 S11	TENDER DRAWINGS FOR SOX BUILDING	35157	20481	55638	16891	38947	29/06/04	35157	63%
2	BP 50 U01	TENDER DRAWINGS FOR FOX DRAFT	98793		98793	29633	69153	29/06/04	98793	100%
2	BP 50 U02	TENDER DRAWINGS FOR FISH DRAFT	86000		86000	27000	60200	29/06/04	86000	100%

Fig. 3 Example of financial analysis principle (Consultants - Package 2)