TECHNICAL AND FINANCIAL PROJECT MANAGEMENT TOOL

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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.

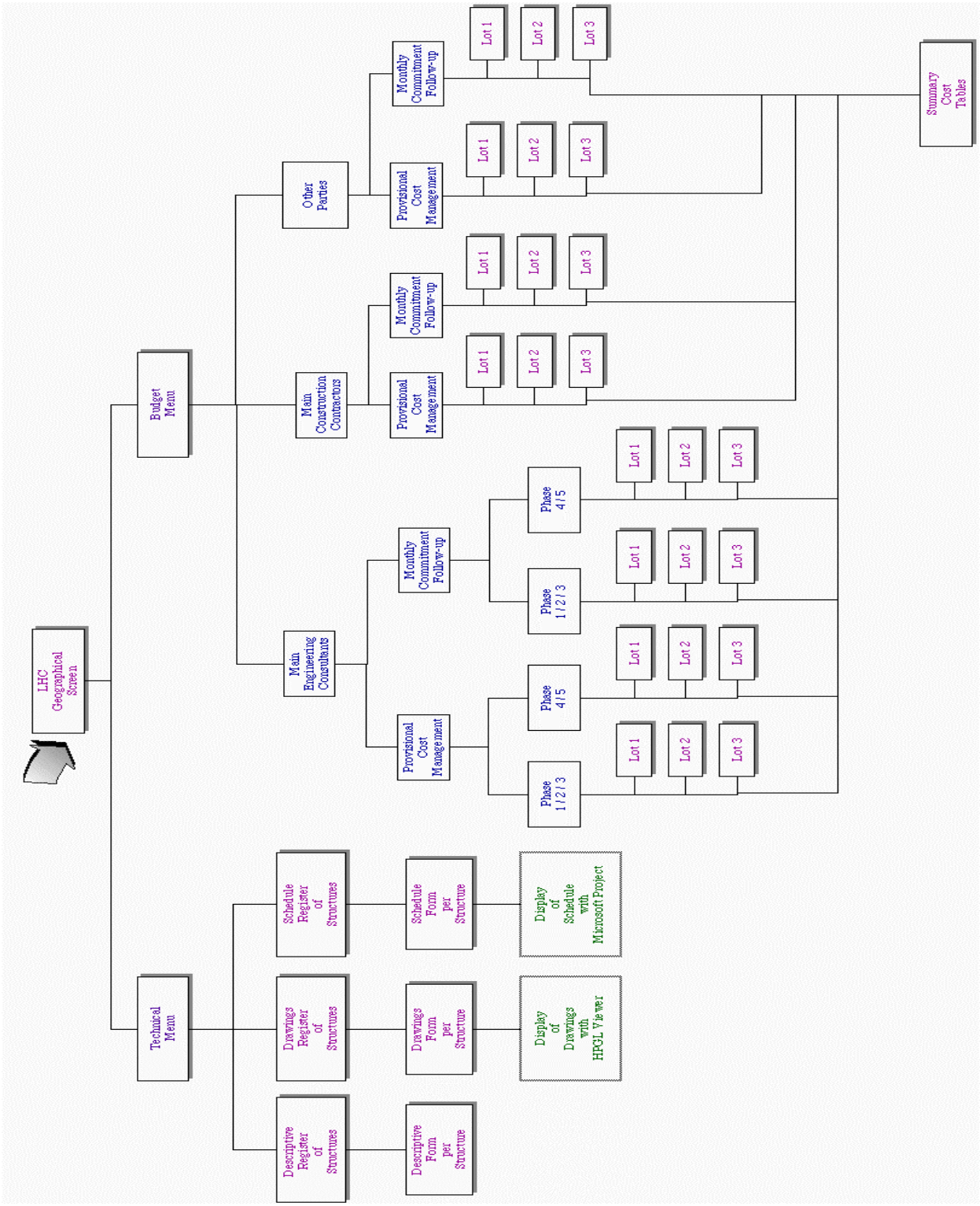


Fig. 1 General layout Technical and Financial Project Management Tool.

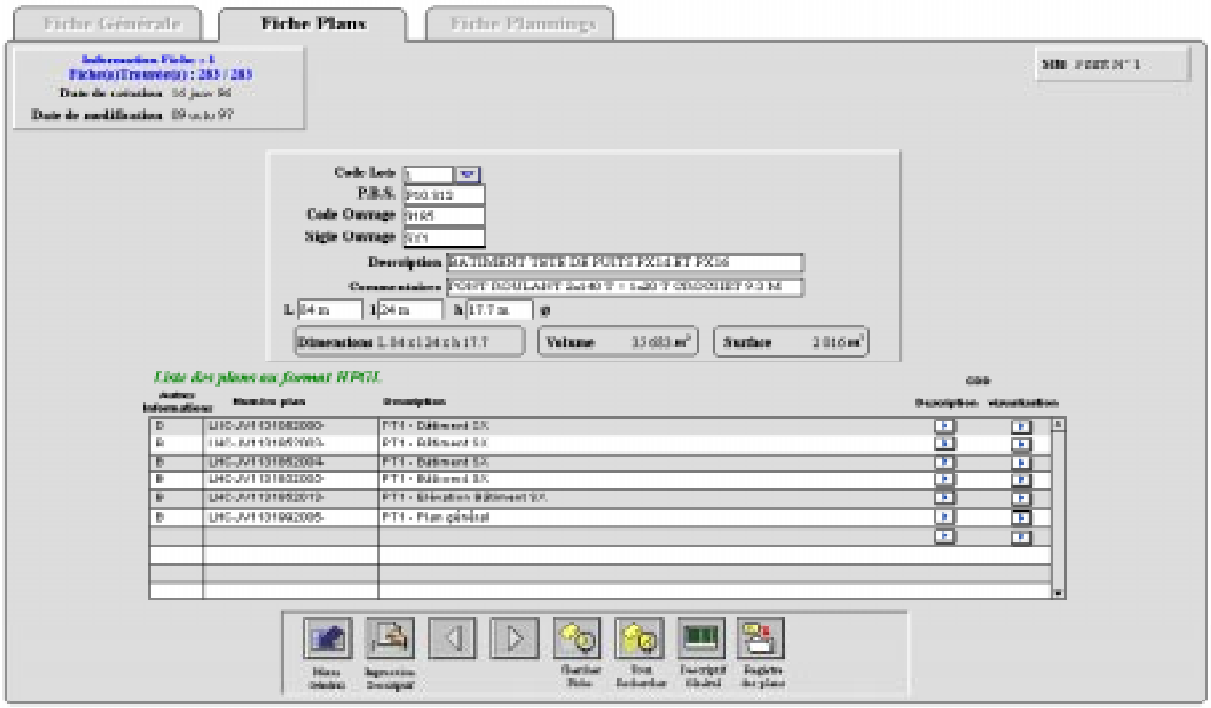
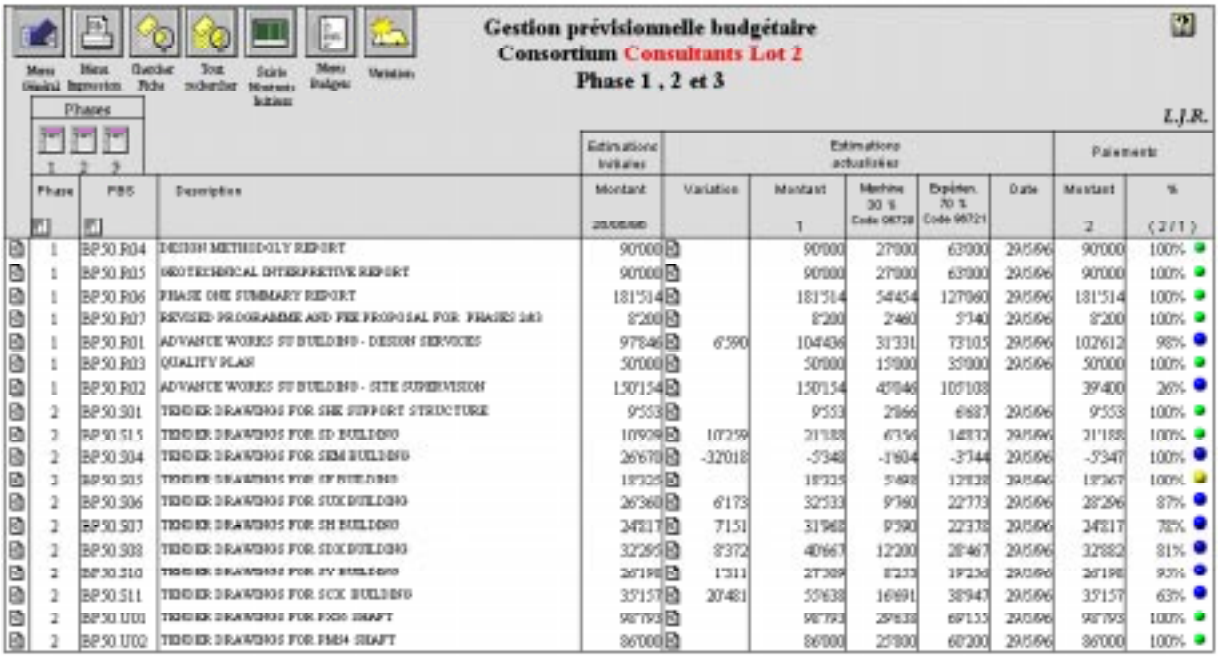


Fig. 2 Example of different drawings applicable to one structure (SX building – Package 1).



	Phase	PBS	Description	Estimations initiales Montant	Variation	Estimations actualisées Montant 1	Machine 30 %	Expérien. 70 %	Date	Paiements Montant 2	% (2/1)
	1	BP50.R04	DESIGN METHODOLY REPORT	90'000		90'000	27'000	63'000	29/06/96	90'000	100%
	1	BP50.R05	GEOTECHNICAL INTERPRETIVE REPORT	90'000		90'000	27'000	63'000	29/06/96	90'000	100%
	1	BP50.R06	PHASE ONE SUMMARY REPORT	181'514		181'514	54'454	127'060	29/06/96	181'514	100%
	1	BP50.R07	REVISED PROGRAMME AND FEE PROPOSAL FOR PHASES 2&3	8'200		8'200	2'460	5'740	29/06/96	8'200	100%
	1	BP50.R01	ADVANCE WORKS SU BUILDING - DESIGN SERVICES	97'846	6'590	104'436	31'331	73'105	29/06/96	102'612	98%
	1	BP50.R03	QUALITY PLAN	50'000		50'000	15'000	35'000	29/06/96	50'000	100%
	1	BP50.R02	ADVANCE WORKS SU BUILDING - SITE SUPERVISION	150'154		150'154	45'046	105'108		39'400	26%
	2	BP50.S01	TENDER DRAWINGS FOR SHE SUPPORT STRUCTURE	9'553		9'553	2'866	6'687	29/06/96	9'553	100%
	2	BP50.S15	TENDER DRAWINGS FOR SD BUILDING	10'909	10'259	21'188	6'356	14'832	29/06/96	21'188	100%
	2	BP50.S04	TENDER DRAWINGS FOR SEM BUILDING	26'670	-32018	-5'348	-1'604	-3'744	29/06/96	-5'347	100%
	2	BP50.S05	TENDER DRAWINGS FOR SF BUILDING	18'305		18'305	5'492	12'813	29/06/96	18'367	100%
	2	BP50.S06	TENDER DRAWINGS FOR SUD BUILDING	26'360	6'173	32'533	9'760	22'773	29/06/96	28'296	87%
	2	BP50.S07	TENDER DRAWINGS FOR SH BUILDING	24'817	7'151	31'968	9'590	22'378	29/06/96	24'817	78%
	2	BP50.S08	TENDER DRAWINGS FOR SUX BUILDING	32'295	8'372	40'667	12'200	28'467	29/06/96	32'882	81%
	2	BP50.S10	TENDER DRAWINGS FOR SY BUILDING	26'198	1'311	27'509	8'253	19'256	29/06/96	26'198	95%
	2	BP50.S11	TENDER DRAWINGS FOR SCK BUILDING	35'157	20'481	55'638	16'691	38'947	29/06/96	35'157	63%
	2	BP50.U01	TENDER DRAWINGS FOR PCH SHAFT	95'793		95'793	28'638	66'155	29/06/96	95'793	100%
	2	BP50.U02	TENDER DRAWINGS FOR PMH SHAFT	86'000		86'000	25'800	60'200	29/06/96	86'000	100%

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