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COST REPORTING BY MULTIPLE BREAKDOWN STRUCTURES SIMULTANEOUSLY

Mike Milinusic, P.Eng., M.B.A.

"The whole world spoke the same language, using the same words.
… Let us then go down and there confuse their language,
so that one will not understand what another says." Genesis 11:1 & 7

In the United Nations General Assembly simultaneous translation during all sessions enables the delegates to hear the speakers in their chosen languages. Today cost reporting has reached the complexity where "translators" are needed. A number of years ago a project manager informed me, "The client does not understand the cost report and wants it presented using his company's coding system." Having said this, he handed me a thick "compendium" of the client's coding system to decipher, interpret, and to use for reporting each month. This task proved to be tedious, time consuming, and excruciating. Not only did the coding need to be "translated", but where we needed piping reported simply by area, the client required the piping divided into specific systems. That left me "to split hairs" by rearranging bulk fittings purchase orders into compressed air, gas, heating, etc. How I wished for a simultaneous translator of codes!

To meet each organization's needs the accountants, the taxmen, the government agencies, the entrepreneurs, the consultants, and the cost engineers have contributed to the confusing array of cost codes and breakdown structures and left us with a serious translation task. **Today**, this dilemma, this complex, confusing time-consuming irritation - borne of the necessity for the owner, the engineer, and the contractor, each stakeholder, to view projects and products from different perspectives - does have a solution. Now reporting simultaneously by multiple breakdowns and coding structures is not only possible, it is essential for all projects. Simultaneous, multiple-breakdown structures cost reporting allows communication between the stakeholders to be enhanced and homogenized. This type of reporting results in saved time and money not only because it eliminates the heretofore frustrating coding manipulation exercises, but because it provides an improved and more "revealing" tool for cost reporting.

To understand the "how to" reach this simultaneous solution, we will first examine the coding and breakdown structures, then we will demonstrate how these are used for the simultaneous multiple reporting. During the process , you will view various reports and discover how this previously tedious and costly reporting is no longer a chore but rather provides you with additional instant and useful project analysis data. So instead of complicating the project work, this reporting has many benefits for any project.

SECTION I: CODING AND BREAKDOWN STRUCTURES

The legacy of the existing coding and breakdown structures has evolved because each organization needs to analyze their data from a variety of perspectives.

Coding is essential.

Each stakeholder has its own unique coding structures. This allows each to collect and sort the data for estimating, cost control, cost accounting, scheduling, progress evaluation, and data feedback. Their coding

structures enable the organizations to create an overall coherent and interconnecting set of building blocks of all the components and thus define the scope of work to be performed. This set of building blocks, depending on the size of the organization, is broken down into manageable constituents. Some examples of breakdown constituents include: Work Breakdown Structure, Code of Account, Cost Breakdown Structure, Organization Breakdown Structure, and Resources Breakdown Structure.

Reporting requirements differ.

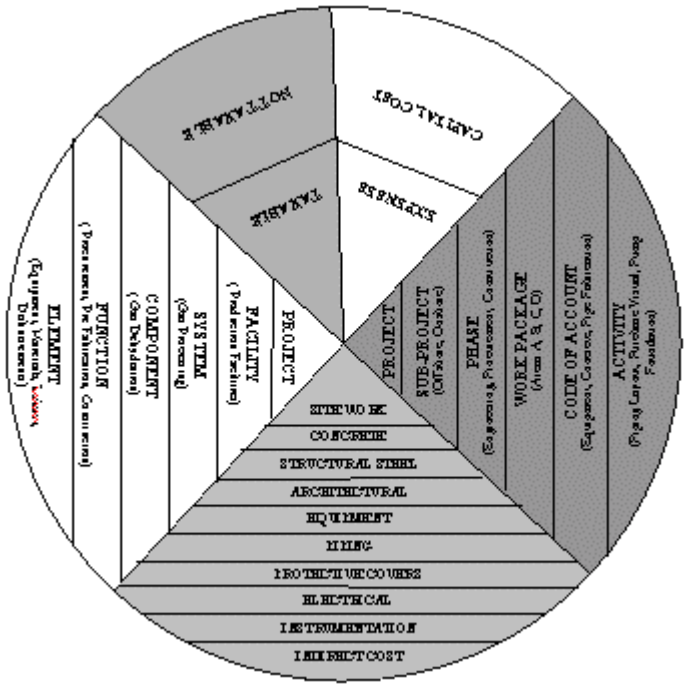
While a simple code of accounts is sufficient for reporting in some organizations, others require massive and complex coding and breakdown structures to control and analyze the data. In fact, today many of the larger organizations require multi-million dollar software systems to handle the data, generate the reports, and help them effectively interpret the project information.

Because each organization has developed its own unique coding structure one finds that even the multi-nationals with their sophisticated structures are not using the same terminology. Consequently, the problem of communication between different organizations joined by a common project continues to be a costly issue.

To complicate this further, various groups within each organization focus in on only certain specific aspects of the coding/breakdown structures of that organization. A corporation's financial controller is interested in segregating expenses from capital cost items. Their accountant is interested in tax related items and needs to identify the capital cost items to be depreciated over time. The engineer is neither focusing on expenses or taxes, but on the functions of the items. The construction manager is primarily interested in the construction packages, then in the sub-categories/disciplines within these packages. Each therefore needs the items coded specifically for their own needs.

Figure 1 illustrates the multifaceted nature of breakdown structures as reflected by specific needs within an organization.

Figure 1



Typically, and in the chosen example, the EPC engineer/contractor has the challenging task of attempting to satisfy all its clients' – owners and contractors – reporting requirements while keeping the EPC's own system intact/uncompromised.

Coding System Specifications suggested:

In order to understand how the existing coding systems can be utilized, their formation needs some brief examination. This will allow the unique coding systems to be shortened while they will retain the significant figures so these can be used to report to each stakeholder in their own way.

The model chosen is that of an EPC contractor reporting cost to a multinational client. This model enables a discussion of coding systems within a comprehensive sample of a pipeline distribution system. CostTrack , a desktop, integrated project management software will be used as the vehicle. To clarify the use of terms and show how simply the adjustments to maintain the unique coding/breakdown reporting can be accomplished, the model takes us through the following steps:

- **Project Code**: Before assigning specific digits to a project number one must consider the expense and capital nature of the project. One may also take into consideration the various levels of divisions and sub-divisions; the subsidiaries; the geographic locations; the facility; the systems; and, the components. Further one may consider phase breakdowns such as front-end, engineering, procurement, construction, and commissioning. These phases are traditionally associated with "approvals" normally identified with an AFE (approval for expenditure) number. One project might have multiple AFEs. Because of the differing levels of project complexity, a multinational client would not use the same project identifier number as the EPC contractor. Consequently, there will be separate identifiers for each in the sample project. This example assigns **XEPC-02** as the **Project Number**. This is the second full EPC project for the year 2000 for client X. To identify the client project number, a separate code, labeled **Client Code 1,** has been assigned. Here AFEs have been used and you will find that **AFE-980Z-1 & 2** represent some of the above-mentioned aspects of the client's financial reporting system.

- **Area Code or Work Breakdown Structure:** As this represents a well-delimited geographic and/or process portion of the work, the client and the EPC contractor generally agree to use the same Area Code – usually the one selected by the owner/client. The areas may be subdivided into sub-areas as might happen in the case of a pipeline crossing several states where the area code is composed of the main line and the laterals and compressor stations serve as unique area identifiers. In the pipeline distribution system example, areas AL01, 2, &3 represent the Alberta main line, the Alberta laterals, and the Alberta compressor station respectively.

- **Discipline Code or Organization Work Breakdown Structure:** Both the client and the EPC contractor generally agree to use the EPC contractor's code of discipline here as this simply makes more sense since the disciplines are the areas of main interest to the EPC contractor. Typically, disciplines are Engineering, Procurement and Construction. These are frequently subdivided as: Process; Geotechnical; Environmental; Civil; Structural; Mechanical; Piping; Protective Covers; Electrical; Instrumentation for Engineering and Purchasing; Inspection and Expediting for Procurement; Site Preparation; Piling; Concrete; Structural; Architectural; Equipment; Piping; Insulation and Fireproofing; and finally, Electrical and Instrumentation for Construction. All of these discipline codes may be either the direct cost type or the indirect cost type – e.g. expenses, overhead costs.

- **Cost Type or Resources Breakdown Structure:** This coding structure is created uniquely for each project and it serves as the common denominator to supplement and complement the area and discipline codes. If the area code has been restricted to process or geographic

location, the Cost Type will assume other attributes – generally those tied to resources, such as contract and sub-contract packages, fabrication, and assembly and/or pre-assembly. If we have restricted disciplines or cost code categories (such as specific material resources sorted and/or defined differently than in the discipline or item codes) then Cost Type is a particularly useful supplementary code giving the project another dimension and perspective for comparison. In the pipeline example, the following cost types have been identified for simplicity: engineering contingency as single categories; material by facility; and, construction by specific packages or contracts.

- **Item Code or Cost Breakdown Structure or Code of Account:** Organized to form and define the total scope, the item code is the smallest element of the deliverables oriented grouping of the project building blocks. The Item Code**,** as the project's DNA**,** can be assigned, within the digits defining it, identity attributes previously mentioned in the breakdown structures. For example, the first digit of the item code could be the same as the first digit of the discipline code, etc. This apparent redundancy is helpful in organizing and manipulating these building blocks for the other project management functions such as planning.

SECTION II: USING THE SIMULTANEOUS MULTIPLE REPORTING STRUCTURE

To illustrate how to provide the simultaneous multiple breakdown structure reports and to show how these breakdown structure reports provide immense advantages in project management and cost control, the example uses a commercially available program, CostTrack , as the vehicle to serve as the cost code translator and reporter. This vehicle has been chosen because of its convenience, ease of use, speedy accurate results, and because it is a reliable, affordable software package.

The only difficult part of getting the project rolling is this first step where a project (here the sample pipeline project) is initiated by preparing the multi-coded budget according to the following procedure:

- **Coding Input Procedure:** Display the initial estimate in a spreadsheet format. Because most estimates contain more detail than is required in cost reports, consolidate the items according to the project's execution methodology. Then assign the code of account to each item. Next, assign the owner's equivalent code of account to each of the items. In some instances, the owner may require different breakdowns and you may have to expand the code of account in the EPC system to accommodate these owner requirements. In this example, the concrete foundations code, seen in Table 1, had to be expanded into process and utility to accommodate the taxable nature of utility versus the non-taxable nature of process foundations. Once these entries have been completed, continue through the process by entering the discipline code, the type codes, the area codes, the client code 1, and the project number.

The completed spreadsheet is then directly imported into CostTrack . Everything required for multiple coding breakdown structure reports is now set. Advantages begin immediately as now the estimate can be recast by the breakdown structures displayed in the program menu. (Figure 2) Recasting often reveals anomalies and omissions. And, of course, the estimate can now be printed and summarized by any chosen breakdown structure.

Table 1: Representation of Input for the Pipeline Example

Job	area	disc	item	type	sern	clnt1	clnt2	dscr	unit	qty	bdgt
XEPC-02	AL03	01	01221	S05	2	AFE-980Z02	C-400-BF	foundation buildings	m3	110	81,400
XEPC-02	AL03	01	01510	S05	6	AFE-980Z02	C-400-BU	building erection	m2	300	45,000
XEPC-02	AL03	02	02430	S06	1	AFE-980Z02	C-400-EC	compressor station elec/instr. contract	ls	1	188,000
XEPC-02	AL03	01	01221	S05	1	AFE-980Z02	C-400-EF	foundation equipment	m3	55	52,250
XEPC-02	AL03	02	02430	S05	3	AFE-980Z02	C-400-ME	compressor eraction	t	56	15,680
XEPC-02	AL01	03	03170	S02	2	AFE-980Z01	C-400-PE	pipeline creek crossing # 2	ea	1	6,500
XEPC-02	AL01	03	03170	S02	1	AFE-980Z01	C-400-PE	pipeline creek crossing # 1	ea	1	6,000
XEPC-02	AL01	03	03170	S01	1	AFE-980Z01	C-400-PE	pipeline installation	m	10000	450,000
XEPC-02	AL03	03	03170	S05	4	AFE-980Z02	C-400-PE	piping installation	ft	4000	216,000
XEPC-02	AL03	03	03160	MS	1	AFE-980Z02	C-400-PP	pipe prefabrication	t	30	57,750
XEPC-02	AL03	01	01190	S04	2	AFE-980Z02	C-400-SW	piling for compressor	ea	50	17,500
XEPC-02	AL03	15	01500	S04	1	AFE-980Z02	C-400-SW	site clearing/road building	lot	1	8,000
XEPC-02	AL01	13	13400	E	2	AFE-980Z01	E-500-EC	engineering pipeline	hrs	500	35,000
XEPC-02	AL02	13	13400	E	1	AFE-980Z01	E-500-EC	engineering lateral	hrs	55	3,850
XEPC-02	AL01	13	13400	E	3	AFE-980Z01	E-500-SC	pipeline survey	km	10	35,000
XEPC-02	AL03	13	13431	E	1	AFE-980Z02	E-5CE-EC	civil engineering	hrs	200	16,000
XEPC-02	AL03	13	13463	E	1	AFE-980Z02	E-5D0-EC	cad drafting electrical	hrs	900	50,400
XEPC-02	AL03	13	13462	E	1	AFE-980Z02	E-5D0-EC	cad drafting mechanical	hrs	1200	69,600
XEPC-02	AL03	13	13461	E	1	AFE-980Z02	E-5D0-EC	cad drafting civil	hrs	450	24,750
XEPC-02	AL03	13	13433	E	1	AFE-980Z02	E-5EE-EC	electrical engineering	hrs	500	43,000
XEPC-02	AL03	13	13432	E	1	AFE-980Z02	E-5ME-EC	mechanical engineering	hrs	500	40,000
XEPC-02	AL03	13	13434	E	1	AFE-980Z02	E-5PE-EC	process engineering	hrs	100	9,000
XEPC-02	AL03	13	13700	E	1	AFE-980Z02	E-5XX-EC	expenses	hrs	3850	38,500
XEPC-02	AL01	14	14900	C	1	AFE-980Z01	I-000-99	contingency pipeline	lot	1	80,000
XEPC-02	AL02	14	14900	C	2	AFE-980Z01	I-000-99	contingency lateral	lot	1	5,000
XEPC-02	AL03	14	14900	C	1	AFE-980Z02	I-000-99	contingency station	lot	1	270,000
XEPC-02	AL03	02	02430	MS	1	AFE-980Z02	M-200-CC	compressor	ea	1	1,700,000
XEPC-02	AL01	03	03110	MP	1	AFE-980Z01	P-500-PB	pipe 10"	m	10000	300,000
XEPC-02	AL02	03	03100	S03	1	AFE-980Z01	C-400 PE	lateral subcontract construction material	m	2000	40,000
XEPC-02	AL02	03	03100	ML	1	AFE-980Z01	P-500-PB	lateral piping material (bulk)	m	2000	28,000
XEPC-02	AL03	03	03110	MS	1	AFE-980Z02	P-500-PB	pipe 10"	m	460	14,000
XEPC-02	AL03	03	03110	MS	2	AFE-980Z02	P-500-PB	pipe 6"	m	1500	24,000
XEPC-02	AL03	03	03120	MS	3	AFE-980Z02	P-500-PB	pipe 4"	m	1200	11,000
XEPC-02	AL01	03	03116	MP	1	AFE-980Z01	P-500-PC	pipe coating	m	10000	120,000
XEPC-02	AL03	03	03120	MS	1	AFE-980Z02	p-500-PF	fittings	ea	20	12,000
XEPC-02	AL01	03	03120	MP	1	AFE-980Z01	P-500-PF	fittings	lot	1	25,000
XEPC-02	AL01	06	06310	MP	1	AFE-980Z01	P-500-PV	control valves	ea	2	11,000
XEPC-02	AL01	03	03143	MP	1	AFE-980Z01	P-500-PV	NSP 8" 600# check valve	ea	2	8,000
XEPC-02	AL03	03	03145	MS	1	AFE-980Z02	P-500-PV	valves 6" ball	ea	4	19,600
XEPC-02	AL03	01	01333	MS	1	AFE-980Z02	S-130-SS	piperack steel	t	14	42,000
XEPC-02	AL03	01	01337	MS	2	AFE-980Z02	S-130-SS	misc steel	t	3	13,800
XEPC-02	AL03	01	01511	MS	1	AFE-980Z02	S-200-CB	supply prefab compressor building	m2	300	108,000
XEPC-02	AL03	01	01512	MS	2	AFE-980Z02	S-200-UB	supply prefab utility building	m2	100	30,000
XEPC-02	AL03	09	09130	MS	1	AFE-980Z02	S-600-CE	communication equipment	lot	1	19,000
XEPC-02	AL03	05	05320	MS	1	AFE-980Z02	S-600-SW	switchgear	lot	1	45,000
XEPC-02	AL03	15	02870	MS	1	AFE-980Z02	S-900-CC	operating spares	lot	1	34,000
											4,468,580

Figure 2: X Menu Selection

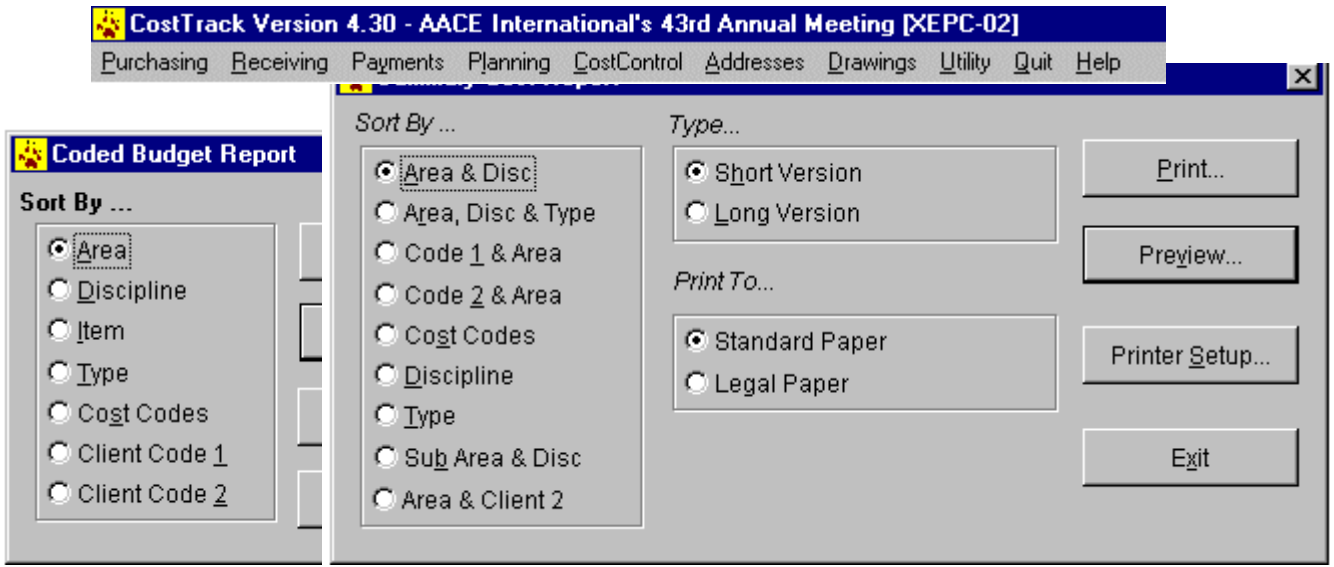


Table 2: Coded Budget Report by Cost Type (extract)

Job	Area	Disc	Item	Type	Seq no	Clnt1	Clnt2	Description	Unit	Qty	Budget (Amt)	Hours
XEP0-22	AL01	14	14000	C	1.00	AFE-950Z01	E-50C-CL	contingency pipelines	lot	1.00	85,000	0
XEP0-22	AL02	14	14000	C	2.00	AFE-950Z01	E-50C-SC	contingency steel	lot	1.00	5,000	0
XEP0-22	AL03	14	14000	C	1.00	AFE-950Z02	E-50C-SE	contingency electrical	LS	1.00	275,000	0
								SubTotal : CONTINGENCY			**365,000**	**0.0**
XEP0-22	AL01	13	13400	E	2.00	AFE-950Z01	E-50C-EC	engineering civil/site	hrs	700.00	35,000	0
XEP0-22	AL01	13	13400	E	3.00	AFE-950Z01	E-50C-SC	pipeline survey	crs	10.00	35,000	0
XEP0-22	AL02	13	13400	E	1.00	AFE-950Z01	E-50C-EC	engineering steel	hrs	55.00	3,850	0
XEP0-22	AL03	13	13431	E	1.00	AFE-950Z02	E-5CE-EC	civil engineering	hrs	400.00	12,000	0
XEP0-22	AL01	13	13402	E	1.00	AFE-950Z02	E-5ME-EC	mechanical engineering	hrs	700.00	47,000	0
XEP0-22	AL03	13	13433	E	1.00	AFE-950Z02	E-5EE-EC	electrical engineering	hrs	500.00	42,000	0
XEP0-22	AL03	13	13439	E	1.00	AFE-950Z02	E-5PE-EC	process engineering	hrs	100.00	8,000	0
XEP0-22	AL03	13	13461	E	1.00	AFE-950Z02	E-5CD-EC	cad drafting civil	hrs	450.00	21,750	0
XEP0-22	AL03	13	13462	E	2.00	AFE-950Z02	E-5CD-EL	cad drafting mechanical	hrs	1,400.00	85,800	0
XEP0-22	AL01	13	13403	E	1.00	AFE-950Z02	E-5CD-CE	cad drafting electrical	hrs	700.00	37,400	0
XEP0-22	AL03	13	13700	E	1.00	AFE-950Z02	E-5XX-EC	excel sec	hrs	3550.00	38,500	0
								SubTotal : ENGINEERING			**365,100**	**0.0**
XEP0-22	AL02	07	07100	M	1.00	AFE-950Z01	C-400-PT	lateral piping material	m	2700.00	28,000	0
								SubTotal : MATERIAL LATERALS			**28,000**	**0.0**
XEP0-22	AL01	08	08110	M/P	1.00	AFE-950Z01	P-50C-PB	pipe 10"	m	10,000.00	80,000	0
XEP0-22	AL01	07	07110	M/P	1.00	AFE-950Z01	P-50C-PC	pipe coating	m	10000.00	120,000	0
XEP0-22	AL01	08	08120	M/P	1.00	AFE-950Z01	P-50C-PF	fittings	LS	1.00	25,000	0
XEP0-22	AL01	08	08143	M/P	1.00	AFE-950Z01	P-50C-PV	NPS 8" 600# check valve	ea	3.00	5,000	0
XEP0-22	AL01	08	08310	M/P	1.00	AFE-950Z01	P-50L-PV	control valves	ea	4.00	11,000	0
								SubTotal : MATERIAL PIPELINE			**464,000**	**0.0**

For example, simply automatically sorting the data as in Table 2 allows for a visual inspection to assure that all cost-type items have been accounted for. For area ALO2, a contingency might have been missed and this would show up as a zero figure appearing in the budget column.

Table 3: Coded Budget Report by Discipline (extract)

Job	Area	Disc	Item	Type	Seq no	Clnt1	Clnt2	Description	Unit	Qty	Budget (Amt)	Hours
XEP0-22	AL03	01	01190	S01	2.00	AFE-950Z02	C-400-SW	piling for compressor	ea	50.00	17,500	0
XEP0-22	AL03	01	01221	S05	1.00	AFE-950Z02	C-400-EF	foundation equipment	m3	65.00	54,250	0
XEP0-22	AL01	01	01221	S05	2.00	AFE-950Z01	C-400-BF	foundation buildings	m3	150.00	81,400	0
XEP0-22	AL03	01	01393	M/S	1.00	AFE-950Z02	S-15C-SS	pipe rack steel	t	14.00	42,000	0
XEP0-22	AL03	01	01387	M/S	2.00	AFE-950Z02	S-15C-SS	misc steel	t	3.00	13,800	0
XEP0-22	AL03	01	01610	S05	6.00	AFE-950Z02	C-400-BU	building erection	m2	50.00	45,000	0
XEP0-22	AL01	01	01511	M/S	1.00	AFE-950Z01	S-20C-CD	supply prefab compressor bld	m2	700.00	105,000	0
XEP0-22	AL03	01	01512	M/S	2.00	AFE-950Z02	S-20C-UB	supply prefab utility build	m2	100.00	30,000	0
								SubTotal : CIVIL/STRUCTURAL			**388,950**	**0.0**
XEP0-22	AL01	02	02430	M/S	1.00	AFE-950Z01	M-20C-CC	compressor	ea	1.00	1,700,000	0
XEP0-22	AL03	02	02430	S05	3.00	AFE-950Z02	C-400-ME	compressor erection	t	55.00	15,680	0
XEP0-22	AL03	02	02430	S06	1.00	AFE-950Z02	C-400-EC	compressor station electric	ls	1.00	185,000	0
								SubTotal : EQUIPMEN			**1,900,680**	**0.0**

Looking at the estimate from another perspective, Table 3, shows that while the EPC contractor has the same code for the foundations, the client has these separated into equipment foundation and building foundation. Obviously this provides a software solution to the communication dilemma between the stakeholders – everyone can view immediately the data they specifically require in their own "language".

- **Cost Reports:** To provide and demonstrate, with this example, some of the cost control capabilities and to specifically demonstrate the multiple report capabilities made possible by the original entry of the multiple cost coding structures, some budget changes have been made and a budget shift has been included. Additionally, some commitments and payments have been processed. The advantages and results of having simultaneous multi-coding breakdown structures in the following simply and quickly available reports become quite

obvious when one examines the samples. The chosen reports are either common to all or specific to each stakeholder.

Sample Reports

1. Report by Cost Type or Resources Breakdown Structure

This report, using the "developed" Cost Type, becomes one of the most useful as it is designed to contain the essential and common elements needed by the owner, the engineer and the contractor. Facilitating communication, it enables each to "talk from the same piece of paper". Easy to set up, this report removes the confusion created by coding differences.

Table 4: Summary Cost Report by Cost Type

		BUDGET				COST			FORECAST		VARIANCE
Code		Original (A)	Transfers (B)	Scope Changes (C)	Current Target (D=A+B+C)	To Date Committed (G)	To Date Incurred (H)	To Date Approved (I)	To Complete (J)	Final Estimated Cost (K)	Forecast vs. Budget Variance (M=K-D)
C	CONTINGENCY	355,000	0	0	355,000	0	0	0	355,000	355,000	0
E	ENGINEERING	365,100	0	0	365,100	0	0	0	365,100	365,100	0
ML	MATERIAL LATERALS	28,000	15,000	0	43,000	44,512	44,512	44,512	-16,512	28,000	-15,000
MP	MATERIAL PIPELINE	464,000	-15,000	0	449,000	419,440	419,440	419,440	44,560	464,000	15,000
MS	MATERIAL STATIONS	2,130,150	0	0	2,130,150	1,701,300	850,650	850,650	428,850	2,130,150	0
S01	PIPELINE CONSTRUCTION PKG # 1	450,000	0	0	450,000	0	0	0	450,000	450,000	0
S02	PIPELINE CREEK CROSSING PKG # 1	12,500	0	10,000	22,500	26,750	26,750	26,750	-14,250	12,500	-10,000
S03	PIPELINE LATERALS PKG # 1	40,000	0	0	40,000	0	0	0	40,000	40,000	0
S04	COMPRESSOR CONSTRUCT. PKG # 1	25,500	0	0	25,500	0	0	0	25,500	25,500	0
S05	COMPRESSOR CONSTRUCT. PKG # 2	410,330	0	0	410,330	0	0	0	410,330	410,330	0
S08	COMPRESSOR CONSTRUCT. PKG # 3	188,000	0	0	188,000	0	0	0	188,000	188,000	0
Grand Total		4,468,580	0	10,000	4,478,580	2,192,002	1,341,352	1,341,352	2,276,578	4,468,580	-10,000
		% 100.00			% 100.22	% 49.05	% 30.01	% 30.01	% 50.94	% 100.00	% -0.22
						Less Holdback Amount		164,352			
						Net Amount Paid		1,177,000			

Table 4 shows both the budget shift in the material account and the change in the creek crossing account.

2. Report by Discipline or Resources Breakdown

The Discipline Report (Table 5) is the most useful tool for the EPC contractor and the cost engineer because this is "how it is most practical" to report costs for project control purposes. For the cost engineer, looking at this report expanded to the Detailed Discipline Report (single element level, not shown here) provides the basic tool for forecasting.

Notice the effect of the budget shift in piping, from lateral to main line, is not observable here since the shift occurred within the same discipline. However, this shift does show up on the more Detailed Discipline Report. In Table 5 the piping is shown as only one summary line instead of the two lines seen in Table 4, Summary Cost Report by Cost Type.

Table 5: Summary Cost Report by Discipline

COST CODE/DESCRIPTION		BUDGET				COST			FORECAST		VARIANCE
Disc	Description	Original (A)	Transfers (B)	Scope Changes (C)	Current Target (D=A+B+C)	To Date Committed (G)	To Date Incurred (H)	To Date Approved (I)	To Complete (J)	Final Estimated Cost (K)	Forecast vs. Budget Variance (M=K-D)
01	CIVIL/STRUCTURAL	389,950	0	0	389,950	96,300	48,150	48,150	293,650	389,950	0
02	EQUIPMENT	1,903,680	0	0	1,903,680	1,505,000	802,500	802,500	298,680	1,903,680	0
03	PIPING	1,337,850	0	10,000	1,347,850	480,702	480,702	480,702	847,148	1,337,850	-10,000
05	ELECTRICAL	46,000	0	0	46,000	0	0	0	46,000	46,000	0
06	INSTRUMENTATION	11,000	0	0	11,000	0	0	0	11,000	11,000	0
09	COMMUNICATION	19,000	0	0	19,000	0	0	0	19,000	19,000	0
13	HOME OFFICE	365,100	0	0	365,100	0	0	0	365,100	365,100	0
14	CONTINGENCY	355,000	0	0	355,000	0	0	0	355,000	355,000	0
15	CLIENT COST	42,000	0	0	42,000	0	0	0	42,000	42,000	0
	Grand Total	4,468,580	0	10,000	4,478,580	2,192,002	1,341,352	1,341,352	2,276,578	4,468,580	-10,000
		%100.00			%100.22	% 49.05	% 30.01	% 30.01	% 50.94	%100.00	% -0.22
						Less Holdback Amount		164,352			
						Net Amount Paid		1,177,000			

3. Report by Client Code 1 or Client Project/Sub-Project Number

This report (Table 6) summarizes the investment by the owner and is used mainly to satisfy the financial corporate reporting. It gives no clue regarding how to predict or forecast cost on this particular job. However, this report provides the owner with the essential data which can serve as a cost element in a much larger corporate universe comprising several hundreds of projects.

Table 6: Summary Cost Report by Client Code 1

COST CODE/DESCRIPTION		BUDGET				COST			FORECAST		VARIANCE
Area	Client Code 1	Original (A)	Transfers (B)	Scope Changes (C)	Current Target (D=A+B+C)	To Date Committed (G)	To Date Incurred (I)	To Date Approved (J)	To Complete (L)	Final Estimated Cost (K)	Forecast vs. Budget Variance (K-D)
AL01	Sub Total: ALBERTA MAINLINE	1,076,500	-15,000	10,000	1,071,500	446,100	446,100	446,100	677,864	1,124,064	52,564
AL02	Sub Total: ALBERTA LATERALS	76,850	15,000	0	91,850	14,512	14,512	0	78,850	93,362	1,512
AFE-880	PIPELINE SYSTEM	1,153,350	0	10,000	1,163,350	460,612	460,612	446,100	756,714	1,217,426	54,076
AL03	Sub Total: ALBERTA COMPRESSOR STATION	3,315,230	0	0	3,315,230	1,727,300	850,650	850,650	1,518,930	3,250,230	-65,000
AFE 880	COMPRESSOR STATION	3,315,230	0	0	3,315,230	1,727,300	850,650	850,650	1,518,930	3,250,230	-65,000
Grand Total		4,468,580	0	10,000	4,478,580	2,187,912	1,311,262	1,296,750	2,275,644	4,467,656	-10,924
		%100.00			%100.22	%48.85	%29.27	%28.95	%50.82	%99.77	%-0.24
				Less Holdback Amount		118,850					
				Net Amount Paid		2,068,062					

In this report, the cost is summarized by Area and by AFE or Client Code 1.

Note that the totals on Tables 4, 5 & 6 are the same.

4. Detailed Cost Report by Code of Account

Given the detailed cost report extracts from Area AL01, Alberta mainline, for both the owner and the engineer (Tables 7 & 8), it is obvious that these reports are both similar and different. They both cover the same details and have the same totals and figures, but each is slightly different in the descriptions and the manner in which the breakdowns are sorted. Each is ideally suited to their respective designated users – but require no effort or extra time to produce in this format since the software tool manipulates all the data.

Table 7: Detailed Cost Report by Area and Client Code 2 (extract)

AACE International's 43rd Annual Meeting
Summary Cost Report
By Area & Client 2

Job No. XEPC-02
Data Date: 99.01.30
Print Date: 99.01.31

COST CODE				BUDGET				COST			FORECAST		VARIANCE
Area	Client 2	Item	Client2 Desc	Original (A)	Transfers (B)	Scope Changes (C)	Current Target (D=A+B+C)	To Date Committed (G)	To Date Incurred (H)	To Date Approved (I)	To Complete (J)	Final Estimated Cost (K)	Forecast vs. Budget Variance (N=K-D)
ALB	C 400 F	03170	Piping Contractor	462,500	0	10,000	472,500	26,750	26,750	26,750	456,500	483,250	10,750
ALB	E 500 E	13400	Engineering	35,000	0	0	35,000	0	0	0	35,000	35,000	0
ALB	E 500 S	13400	Survey	35,000	0	0	35,000	0	0	0	35,000	35,000	0
ALB	000 39	14900	Permits	80,000	0	0	80,000	0	0	0	80,000	80,000	0
ALB	F 500 F	03110	Piping Ers	300,000	15,000	0	285,000	272,636	272,636	272,636	27,364	300,000	15,000
ALB	F 500 F	03116	Pipe Coating	120,000	0	0	120,000	146,804	146,804	146,804	0	146,804	26,804
ALB	F 500 F	03120	Fittings	25,000	0	0	25,000	0	0	0	25,000	25,000	0
ALB	F 500 F	03143	Valves	19,000	0	0	19,000	0	0	0	19,000	19,000	0
ALB	ALBERTA MAIN LINE		Subtotal	1,073,500	15,000	10,000	1,071,500	446,190	446,190	446,190	677,864	1,124,054	52,554

Table 8: Detailed Cost Report (extract)

COST CODE			BUDGET				COST			FORECAST		VARIANCE
Area Disc Item Type Ser#			Original (A)	Transfers (B)	Scope Changes (C)	Current Target (D=A+B+C)	To Date Committed (G)	To Date Incurred (H)	To Date Approved (I)	To Complete (J)	Final Estimated Cost (K)	Forecast vs. Budget Variance (N=D-K)
ALB1 13 03110 VF 1.00	pipe 12"		300,000	0	0	300,000	272,636	272,535	272,636	27,364	300,000	0
ALB1 13 03110 VF 1.00	Land Change		0	-15,000	0	-15,000	0	0	0	0	0	15,000
		Cost Totals	300,000	-15,000	0	285,000	272,636	272,535	272,636	27,364	300,000	15,000
ALB1 13 03116 VF 1.00	pipe coating		120,000	0	0	120,000	146,804	146,804	146,804	26,804	120,000	0
		Cost Totals	120,000	0	0	120,000	146,804	146,804	146,804	26,804	120,000	0
ALB1 13 03120 VF 1.00	fittings		25,000	0	0	25,000	0	0	0	25,000	25,000	0
		Cost Totals	25,000	0	0	25,000	0	0	0	25,000	25,000	0
ALB1 13 03143 VF 1.00	NSP 8" 600# check valve		8,000	0	0	8,000	0	0	0	8,000	8,000	0
		Cost Totals	8,000	0	0	8,000	0	0	0	8,000	8,000	0
ALB1 13 03170 801 1.00	pipeline installation		450,000	0	0	450,000	0	0	0	450,000	450,000	0
		Cost Totals	450,000	0	0	450,000	0	0	0	450,000	450,000	0
ALB1 13 03170 802 1.00	pipeline creek crossing # 1		6,000	0	0	6,000	26,750	26,750	26,750	20,750	6,000	0
ALB1 13 03170 902 1.00	Unforseen terrain		0	0	10,000	10,000	0	0	0	0	0	10,000
ALB1 13 03170 802 2.00	pipeline creek crossing # 2		6,500	0	0	6,500	0	0	0	6,500	6,500	0
		Cost Totals	12,500	0	10,000	22,500	26,750	26,750	26,750	44,250	12,500	10,000
		Disc Totals	915,600	-15,000	10,000	910,500	446,190	446,190	446,190	460,310	915,500	5,000

In conclusion it is possible to have cost reporting by multiple breakdown structures simultaneously. With the appropriate initial plan used in coding the initial budget and by using commercially available software, real time simultaneous cost reports by multiple cost breakdown structures can be generated. These reports not only breach the communication gap between owner engineer and contractor, they also satisfy all parties within the organizations. This form of cost reporting is achieved even while it reduces the processing cost and time and improving accuracy.