AACE International Recommended Practice No. 20R-98

PROJECT CODE OF ACCOUNTS

TCM Framework: 7.1 – Project Scope and Execution Strategy Development,
7.2 – Schedule Planning and Development, 7.3 – Cost Estimating and Budgeting

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January 27, 2003

INTRODUCTION

This guideline establishes the basic principles of codes of accounts (COA) for projects in any industry. It examines key characteristics including usage, content, structure and format and describes benefits of establishing standard COAs. Topics such as activity-based costing and work breakdown structures as they relate to COAs are addressed. The issues of properly defining a WBS and how it should be structured are outside the scope of this guideline. COAs are applicable to all phases of the asset life cycle, however, this guideline specifically addresses the project execution phases of asset design development through to start of normal operation.

A project code of accounts is a coded index of project cost, resource and activity categories. A complete COA includes definitions of the content of each account code and is methodically structured to facilitate finding, sorting, compiling, summarizing, defining and otherwise managing information the code is linked to. The information is used to support total cost management practices such as cost estimating, cost accounting, cost reporting, cost control, planning and scheduling. Other names used for COAs are coding matrices, coding structures, charge accounts, asset or material classification accounts, value categories, cost elements, work breakdown structures, resource breakdown structures and activity breakdown structures.

PURPOSE

The purpose of this guideline is to establish a common understanding of the principles and characteristics of project COAs so communication is improved among stakeholders across all industries. It should be used to help cost management practitioners create or modify a COA to maximize its value. This guideline also provides the conceptual foundation for other recommended practices and standards that address project COA applications in specific industries.

Common understanding is important because all projects are the product of team endeavors in which the timely and accurate flow of project cost, resource, progress, and other information is essential to project success. Industry experience has shown that a large amount of time and resources are wasted in the effort to reconcile disparate project records, and project failures are often traced to poor communication. The practice of benchmarking project costs at a meaningful level of detail is a daunting task in some industries because of the lack of cost coding commonality.

GUIDELINE METHODOLOGY AND BACKGROUND

This guideline was developed using a practical rather than a theoretical approach. Actual COAs were gathered and dissected to identify core COA principles and attributes as they exist in the area of project cost management today. The detailed contents of the owner and contractor company COAs gathered are confidential. Some of the sample COAs have been published as “standards.” They are described in Appendix A. The COA from the organization referred to as “benchmarking” is a format that 14 international process industry owner companies had agreed to use for the purposes of cost and resource benchmarking at the time the document was provided.

There are almost as many different codes of accounts as there are companies executing projects. For this guideline, 28 actual COAs were collected and analyzed as summarized in Table 1. Despite differences, there is sufficient consistency of COA principles and attributes among industries to provide confidence that the COAs collected are an adequate sample.

Industries	Number	Organizations	Number
Environmental	2	Owners	7
Utility	1	Contractors	11
Oil & gas extraction	1	Standards - professional	6
Offshore oil & gas	2	Standards - owners	1
Process - oil & gas	13	Benchmarking	1
Process - general	2	Government	1
Process - chemical	1	Estimating software	1
Process - pulp & paper	2		
Mining	2		
Transportation - pipeline	1		
Construction - buildings	1		
	28		28

Table 1 – Number of COAs Examined by Industry and Source

After identifying the attributes and characteristics of each COA, the content characteristics were listed in tables that categorize them by their prevalence of use. Breakdowns of most common content characteristics are shown in tables 6 and 7 later in the guideline. Content characteristics were categorized or ranked by prevalence of use as shown in table 2.

Prevalence Group	Percent Occurrence in the Sample COAs
Primary	Equal to or greater than 75 percent
Secondary	50 to 74 percent
Tertiary	25 to 49 percent
Other	Less than 25 percent

Table 2 – COA Content Characteristics Ranking Categories

While this approach is not necessarily forward-looking, it is practical, and the core COA principles identified are expected to have lasting value. This and related guidelines will serve as a documented basis for AACE's cooperation with other industry COA initiatives particularly those of vendors and users of computer-aided engineering and design, enterprise and project planning systems, and accounting systems as they attempt to further integrate their products.

BASIC PRINCIPLES OF CODES OF ACCOUNTS

The survey of industry COA practices identified some basic, common sense principles. The principles are listed below (the underlined words are key COA attributes that will be discussed further in the guideline).

1. COAs serve many users and usages, but should have one master.
Project managers, estimators, schedulers, accountants, buyers, and other stakeholders all have strong and sometimes conflicting requirements for a project COA. The basic structure of a COA should be managed in a way that prioritizes and addresses user and customer needs, considers long-term and external consequences, and considers intra and inter-company standardization. A cross-functional team is best at managing a COA. Arbitrary changes by individual users should not be permitted although flexibility can be a planned aspect of a system.

2. Project information content is limitless, but COA formats are always constrained.
Every COA has constraints from a human comprehension standpoint or from limited data field capacity or criteria in information management systems. Constraints require compromises that favor using a team-managed COA approach. The COA team needs to include members with thorough knowledge of information management.

3. A COA is a communication tool requiring structure and a dictionary like a language.
COAs are by nature intended to reduce confusion. Random elements (arbitrary alpha-numeric, lack of hierarchy, etc.), words or acronyms weighted with connotations, unclear use of symbols, and other such practices increase confusion. Structure and format increases usability and providing definitions of all elements in a reference dictionary or similar document improves clarity.

4. Standardization is always better in the long term.
You can depend on change in your project organization and systems. When change occurs, the value of having a standard COA (with planned flexibility) will shine. Here are some typical outcomes from not having a standard COA.

- What used to be in-house work is now being turned over to a contractor. The contractor or vendor cannot make sense of or map your organization's COA to their accounts. Team meetings are consumed by arguments about report content.
- A contractor's COA needs to be mapped to the owners COA to meet owner corporate reporting requirements and there is no way to accomplish it without reviewing every code definition of both companies to determine how they correlate.
- You are going to do a project just like one completed years ago, but you cannot make any sense out of the COA that was used on that past project; you miss some important cost items.
- You're expected to benchmark your company performance with peer companies, but you can't participate in benchmarking groups in a meaningful way because you can't share data in a standard format.
- You've been merged into or must cooperate with another group and need to roll-up your costs/projects with theirs, but it will take months to convert them to a similar basis.

ATTRIBUTES OF CODES OF ACCOUNTS

The principles above consider four attributes of a code of accounts. These attributes are:

- usage;
- content;
- structure and format; and
- standardization.

When evaluating, creating, or modifying a COA, these attributes should be considered within the context of your project system circumstances and requirements.

Usage of Codes of Accounts

There are many uses of a project codes of accounts. Some of these are:

- classifying estimate items, budgets, and expenditures for cost control and capitalization;
- facilitating estimating and analysis of project cost data;
- summarizing cost data;
- assigning responsibility for budgets;
- complying with accounting, taxation, and regulatory requirements;
- providing a means to relate work scope to costs and schedule;
- integrating between accounting, cost reporting, cost and schedule control;
- categorizing performance and productivity measurement and analysis;
- simplifying cost and schedule forecasting; and
- facilitating audits and reporting accuracy.

Table 3 shows how these uses often vary for major processes or phases of a typical project.

Planning	Execution	Reporting	Close-out
Scope breakdown	Timekeeping	Costs	Historical estimating data
Estimating	Purchasing	Progress	Valuation by asset class
Budgeting	Contracting	Productivity	Tax classes
Planning	General expenses	Forecasting	Post audits
Scheduling	Audits	Regulatory	Claims
		Special	Benchmarking

Table 3 – Uses of Codes of Accounts in Project Processes and Phases

When creating a COA, these uses must be considered and prioritized. Those responsible for these activities and uses should be involved in COA development and evaluations.

Content of Accounts

A COA in and of itself contains little information. The account is just a tag attached to a packet of information. The content of the information packet must be evaluated as to how it can serve the various uses that have been identified. A COA whose account content is optimized for one use may not serve another. For example, cost control usage may favor a COA whose account content reflects the costs of tasks by various organizations (i.e., piping by contractor A). Capital accounting may desire account content that reflects the asset item. To serve both cost control and capital accounting uses, an account for piping by asset and by contractor could be created, but it would greatly complicate cost control reporting. It may be beyond the capability of the contractor to track piping work on each individual asset. In that case, it may be better not to directly combine the uses in one COA.

Account content characteristics can be classified into six major categories as shown in table 4 below.

Accounting	Geographical	Physical	Resource	Activity	Timing
cost type	location	**product**	organization	WBS	budget year
project #	country	facility	company	work type	fiscal year
cost group	state/province	cost group	department	activity	quarter
billing code	city/town	system	cost center	activity type	shutdown/non-shutdown phase
asset class	plant	**unit**	trade	discipline	
capital/expense	**area**	project type	**discipline**	commodity	
contract #	site	**commodity**	**cost type**	process step	
change #	office	process	material	phase	
	cost center	component	contractor	sub-phase	
			service		

Table 4 – General Classes of Content Characteristics

Some of the characteristics listed in table 4 are defined below in the order of prevalence of use.

Discipline and Commodity

A discipline is a type of work, craft, profession, or trade. Each discipline will employ a somewhat unique set of skills and knowledge and will tend to work with different types of materials (i.e., commodities) and resources. Discipline and organizational breakdowns are often similar, but organization is a more artificial construct defined by reporting responsibilities rather than skill sets. In construction activities, the skill set and materials being installed are related, therefore discipline and commodity accounts tend to be synonymous (e.g., piping, electrical, and so on). Other names for the discipline characteristic are major account, prime account, and class. This characteristic is important to project control because grouping like skills and commodities together facilitates productivity and progress analysis. Also, these groupings are good for benchmarking because discipline level practices tend to be generally applicable to all projects, while asset-type accounts tend to be project specific. A summation of costs in a discipline account will include all costs and resources associated with that discipline, including labor and material.

Although this characteristic was the most common found in the COA sample, not all industries used this characteristic because it was considered to be part of the activity/work type characteristic.

Cost Type
Cost type generally refers to the type of resources such as labor, material (i.e., equipment and bulk materials), or subcontract (i.e., a combination of labor and material). This account type also may be used for organizational and accounting breakdowns. In organizational usage it may segregate owner costs from contractor costs and may further identify contract type (subcontract, service, turnkey supply and install, design, labor, and so on). In accounting usage it may segregate rental and lease costs from purchases. Also, asset owners need to separate capital costs from expense costs (e.g., demolition and software development are often expensed) because they affect depreciation, taxation, and ultimately profitability.

Product or Deliverable
Deliverables are the physical product or a key milestone that results from the execution of work activities. It may be the final product at the completion of a project or an intermediate product such as a requirement document. A software program and a chemical process unit are examples of products resulting from a project. Usually, the product account rolls-up all the costs (i.e., all disciplines and cost types) that were invested in that product. Asset accounts also reflect product-oriented characteristics, but asset accounts are generally reserved for classifying products by useful life for depreciation purposes (asset accounting is usually a financial allocation that occurs after the asset is created or installed).

Area and Unit
These are two separate characteristics, but they are routinely used in combination. Area refers to a geographical location with a defined boundary and is most often a term used in the process industries. Units are a characteristic used in the process industries. A unit is a set of process equipment and ancillary commodities that together perform a defined process step (a unit also may be considered a product). There are generally several units within an area.

Cost Group
A cost group represents a summary categorization used for general cost reporting. A cost group may be a combination of the cost type and direct/indirect characteristics (e.g., direct material, direct labor, and so on). Another cost grouping is field versus home office costs. . Table 5 shows how different organization types tend to group or summarize costs at a high level.

Generic Group Name	By Owners	By Contractors	By Standards and Others
Direct costs	Capital directs	Directs	Directs
Indirect costs	Capital indirects	Field indirects Home office	Field indirects Project management & administration Engineering
Expense costs	Expense	(Included in details)	(Included in details)
Suspense costs	Suspense	(Rarely used)	(Rarely used)
Other costs	(Rarely used)	Other costs	Other costs

Table 5 – Typical Cost Groups Used by Organization Types

Direct and Indirect Cost
Direct costs are those which are readily or directly attributable to or become an identifiable part of the final product (e.g., piping labor and material). Indirect costs are all costs that cannot be readily attributed to a part of the final product (e.g., costs for managing the project). Indirect costs are sometimes called prorates or distributives because they often are allocated to direct cost categories to determine the total costs of a product or asset class. Indirect costs are occasionally called overheads, but overheads are generally considered a subtype of indirect costs. This characteristic is often combined with cost type to form a cost group (e.g., direct materials, indirect labor, and so on). Owners and contractors commonly account for indirects differently. For instance, a contractor may account for employee salary as a direct

cost and benefits as an indirect cost, but the owner is only billed for total labor cost (i.e., all-in rate including contractor direct and indirect labor items), which the owner considers a direct cost.

Geographical Location
This covers any geographical characteristic such as country, region, state, province, plant, area, or unit. It may also include geological characteristics such as fields or reservoir pools in the oil and gas industry or stratagraphic layers in mining.

Work Process/Activity/Phase Characteristics
This represents the process steps or activities required to execute the work scope (e.g., review drawing, write code, drill well, erect pipe, install door, and so on). Work classification structure (WCS), standard activity breakdown (SAB), discipline, and activity type are other common names used. Phases are stages of project development over time and represent summarized work process steps and activities. Tracking costs against phases can provide a high-level view of expenditure profiles and related cost performance. This characteristic is a basic part of activity-based costing (ABC).

Organization
Organization is primarily a responsibility characteristic. It is often combined with cost type to achieve a hybrid cost type and eliminate extra coding requirements. Responsibility, company, department, trade, discipline, internal/external are examples of organizational characteristics. Organization tends to be more company and project specific than the discipline characteristic. Owner versus contractor is an organizational breakdown.

Timing
Budget approval year, fiscal year, and quarters are examples of timing characteristics. Budget approval year can be part of the coding structure, but this is typically associated with the highest level on the project and not required to be a part of detail coding. The availability of project funding drives the start timing of projects, and some projects are driven by cash flows to the extent that scope and schedule are adjusted to accommodate cash constraints throughout the life of the project.

In the process industries, facility outages, turnarounds, and shutdowns are done to perform a large volume of maintenance work in a short period of time with the goal of minimizing production downtime. Outages often involve both maintenance and capital investment scope of work. It is desirable to integrate the planning and execution of maintenance and capital work as one project while capturing costs for the different types of work.

Note on Owners Versus Contractor COA Usage
The primary use of COAs by owner companies is for allocation of costs for financial budgeting and asset accounting. Many owners contract out their detailed execution work as well as much of their front-end planning. Therefore, they perceive less immediate need for activity-based accounts as used for project control during execution. In many cases, owners do not have a COA that allows effective project control of their own internal activities such as front-end engineering. Discipline and activity-based cost data are critical for owners to understand their own long-term project cost performance and develop their own conceptual cost estimating, benchmarking, and contract bid evaluation capabilities.

Owners have a need to categorize costs into capital or expense categories. Capital costs are further categorized into asset classes for taxation, capital cost allowance, and fixed asset accounting depreciation. Owners also tend to have suspense accounts which act as temporary holding places for costs that are to be cleared-out before closing the project. Examples of suspense accounts, are contractor hold-back, project material stock, and back-charge collection. Contractors have suspense accounts but they are handled by separate detail accounts rather than a cost type or group.

Summary of Content of Account Characteristics
Table 6 categorizes account content characteristics by usage priority for each major type of organization that provided reference code of accounts. Table 7 is an overall categorization regardless of organization type.

Type of Organization	Primary Characteristics	Secondary Characteristics	Tertiary Characteristics
Owners	Commodity Product Cost Center	Cost Type Area/Unit Cost Group Project Number WBS Activity	Internal/External Asset Class System
Contractors	Commodity Cost Type Cost Group Area/Unit	Project Number WBS Activity	System Billing status Phase
Standards	Commodity Cost Type Product	Cost Center Area/Unit Trade	Project Number System WBS Phase Cost Group Activity

Table 6 – Characteristic Ranking by Organization Type

Type of Organization	Primary Characteristics	Secondary Characteristics	Tertiary Characteristics
All	Discipline/commodity Cost type Deliverable/product	Area/unit Cost group Work type/activity Direct/indirect Geographical Organization Project number WBS	Cost center System Project type Trade Billing status Asset class Phase

Table 7 - Characteristic Ranking for All Organization Types Combined

Structure and Formats of Code of Accounts
Structure and format issues that should be considered when evaluating, creating, or modifying a COA include:

- relative cost of major project components;
- type of industry;
- type of organization (e.g., owner, contractor, service, professional, standards, etc.);
- type of project (e.g., research and development, design/build, software, maintenance, reorganization, etc.);
- data processing capability and design (e.g., integration with systems for accounting/purchasing/payroll, estimating, etc.);
- reporting requirements (e.g., project control/management, contractual, financial/tax, regulatory, historical, etc.); and
- use of related structures/methods (e.g., WBS, OBS, ABC, etc.).

Coding Formats
A cost code usually contains a series or set of cost code elements. COAs for projects should include a key to the overall coding format that explains how the various code parts fit into the structure. Figure 1 illustrates a typical method used to illustrate this in COA documents.

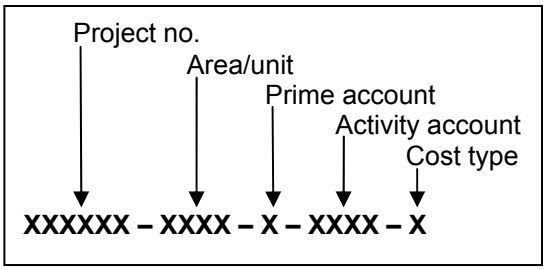

Figure 1 - Example of a Coding Format Definition Key

Alpha or Numeric Characters or Alpha-numeric
In the COA samples evaluated for this guideline, there are about the same number of COAs with combined alpha-numeric codes as there are with pure numeric codes. Detail accounts tend to be numeric. Numeric codes are constraining because each character can only represent ten breakdown categories (9 if zero is not used). More than ten breakdowns requires the use of letters (i.e., alphas) or alpha-numeric combinations. Using only letters allows 26 categories (English alphabet) in a single character field. A combination of both numbers and letters would yield 36 categories. One drawback of using alpha-numeric codes but is potential confusion because of the visual similarity of some characters. (letter I vs number 1 or letter O vs number 0). Refer to Table 8 for the number of combinations per digit used. Alpha-numeric can reduce data processing and storage costs because increasing the number of fields or code categories increases database size. "Intelligence" is commonly designed into the coding to facilitate understanding learning and accuracy. For instance, ENG may stand for engineering, L for labor, and so on.

# of Digits	Numbers only	Letters Only	Alpha-numeric
1	10	26	36
2	100	676	1296
3	1000	17576	46656

Table 8 – Number of combinations available by type of character

Scope of Each Code (dictionary descriptions)
Each cost code item requires a clear definition of what is included and what is excluded regardless of whether the COA uses “intelligence” within the code identifiers or not. Three or four-word descriptions or definitions will only suffice on the simplest of projects. For example, having a concrete account for foundations without specifying whether concrete piping, cast-in-place pipe racks, concrete paving or concrete piling are included or excluded.

Coding Structures and Hierarchies
Over 80 percent of the project COAs sampled have some form of a hierarchical coding scheme to facilitate summarization or drill-down, depending on the level of focus required. The benefits of this are:

- scaleable to any size of project - use only what is necessary;
- breaks costs down into manageable parts;
- allows efficient summarization or drill-down into details;
- aids in determining the most effective level of detail to be used;
- maintains a minimum level of consistency regardless of level of detail used;
- reduces costs of training through a structured approach; and
- reduces the amount of data collation required by information systems.

Typical project COAs are designed so the costs can be summarized by commodity (from 5 to 15 categories), by cost type (from 3 to 10 categories), or major deliverable (varies by project). Some COAs have no summarization capability while others show 30 categories or more on the highest level of summarization. The highest level of summarization below total project level should easily fit on one page so recipients do not have to search for summary information. Large contractor coding formats tend to have between 10 and 15 primary categories for direct costs and about the same for indirects.

A balance must be struck between the amount of information desired from the code and the capability of users to understand and efficiently use the code. Extremely complex coding requirements will lead to inaccuracy because users will look for short-cuts it will reduce acceptance from users.

Standardization

Standard or shared COAs facilitate cost management activities such as internal and external benchmarking, estimating, bid or estimate evaluation, and general communication of cost information. For instance, estimate accuracy largely depends on the extent and quality of historical cost data that is available, and quality is largely determined by the clarity and compatibility of past cost coding. Owners often become frustrated because bid submittals by various contractors may look the same at a summary level, but the content of each category can vary widely between contractors.

Standard code of accounts provide many benefits for projects:

- reduced project team confusion: uniform/consistent basis for all project information;
- increased accuracy in actual cost charging and reporting;
- improved ability to integrate and roll-up multiple project cost and schedule information;
- reduced cost from more accurate and quicker asset capitalization and expensing;
- reduced costs of training; it is easier to learn only one coding system rather than several;
- increased efficiency and accuracy in collection and analysis of historical project cost data;
- increased estimate and schedule accuracy due to improved historical data;
- improved project reporting credibility due to clarity and stronger basis;
- improved cost/schedule control due to more accurate trending, forecasting, productivity data, etc.;
- improved auditability of cost and progress; and
- less effort required to develop a COA for each new project.

Despite the many differences in work types and products between industries, the principles, uses, content, and structure of COAs will have many similarities in all industries. A standard code structure could achieve the goal of common understanding of project information and provide a vehicle for integrating project cost information with technical classification systems, document management, and CAE/CAD/CAM formats.

APPENDIX A: EXISTING STANDARDS

Existing standard codes of accounts included in the sample of COAs used to develop this guideline are described below.

The Association of Cost Engineers (UK) has produced a standard code of accounts as recently as 1994 which is intended to cover a variety of industries. The code structure is hierarchical and minimizes the volume of accounts required.

Norwegian petroleum industry operators have developed a coding guideline called the standard cost coding system (SCCS) in concert with the Norwegian Petroleum Directorate (NPD). The SCCS is an extensive three-dimensional model of hierarchical coding structures that covers resources, activity types, and physical components for both offshore and land-based installations. These are known as code of resource (COR), standard activity breakdown (SAB) and project breakdown structure (PBS). The NPD requires all companies operating on the Norwegian continental shelf to report costs prior to or with submission of a development plan and also report actual costs upon completion of each development project. There are specific statutory reporting requirements under the jurisdiction of the NPD. The offshore oil and gas exploration and production industry has the most wide-ranging coding requirements because of its diverse nature. This industry has land-based facilities, process facilities, marine work architectural/buildings, and heavy civil/structural. Due to the potential environmental and safety risks involved, it also tends to be highly regulated.

In Canada, all oil and gas exploration and producing organizations exchange project and operating cost information using the Petroleum Accounting Society of Canada (PASC) standard. Exchanging cost information is required because joint ventures are common practice in this industry. PASC is more of an accounting standard than a project standard so it is not often used for cost management of medium and large EPC projects or exploration/drilling projects.

The US Federal Energy Regulatory Commission (FERC) has specific and extensive reporting requirements that all utilities in the USA must conform to. The focus of these standards is on asset accounting rather than on project control.

Construction Specifications Institute's (CSI) MasterFormat is a widely used standard among the industrial/commercial/buildings/architectural construction and government contracting industries. Consequently, several estimating software packages use this format as well. As the CSI name implies, it is primarily directed at construction contracting, so engineering and other indirect costs are not primary considerations. This standard is not very effective for process industry project control because it does not emphasize equipment, piping and process control which are significant cost accounts in process projects.

UniFormat is another standard (though not used as a reference for this guideline) that is related to MasterFormat. UniFormat combines the accounts into a systems orientation that is particularly useful for conceptual estimating.

APPENDIX B: SUBJECTS RELATED TO PROJECT CODE OF ACCOUNTS

Financial General Ledger or Balance Sheet Accounts

General ledger or balance sheet accounts are used to record, classify, and summarize business financial transactions. The use of general ledger accounts helps to determine the overall financial state of a business. A listing of business ledger and balance sheet accounts is frequently referred to as a chart of accounts. There may be several project account codes that correspond to a single general ledger account. One example is the asset account called "work-in-progress," which captures the value of projects under way (excluding land already purchased which is typically a separate asset account). While large projects may use thousands of accounts for managing the project itself, most of these would be rolled into the owner's work-in-progress asset account of the balance sheet, along with all other projects the owner has under way. After the project is complete, the costs are transferred from the work-in-progress account to other asset accounts that represent the type of asset and are used to determine depreciation expense. The format of accounting chart of accounts differs from a project code of accounts in that project coding tends to be multidimensional because of the requirement to analyze cost information in many different ways.

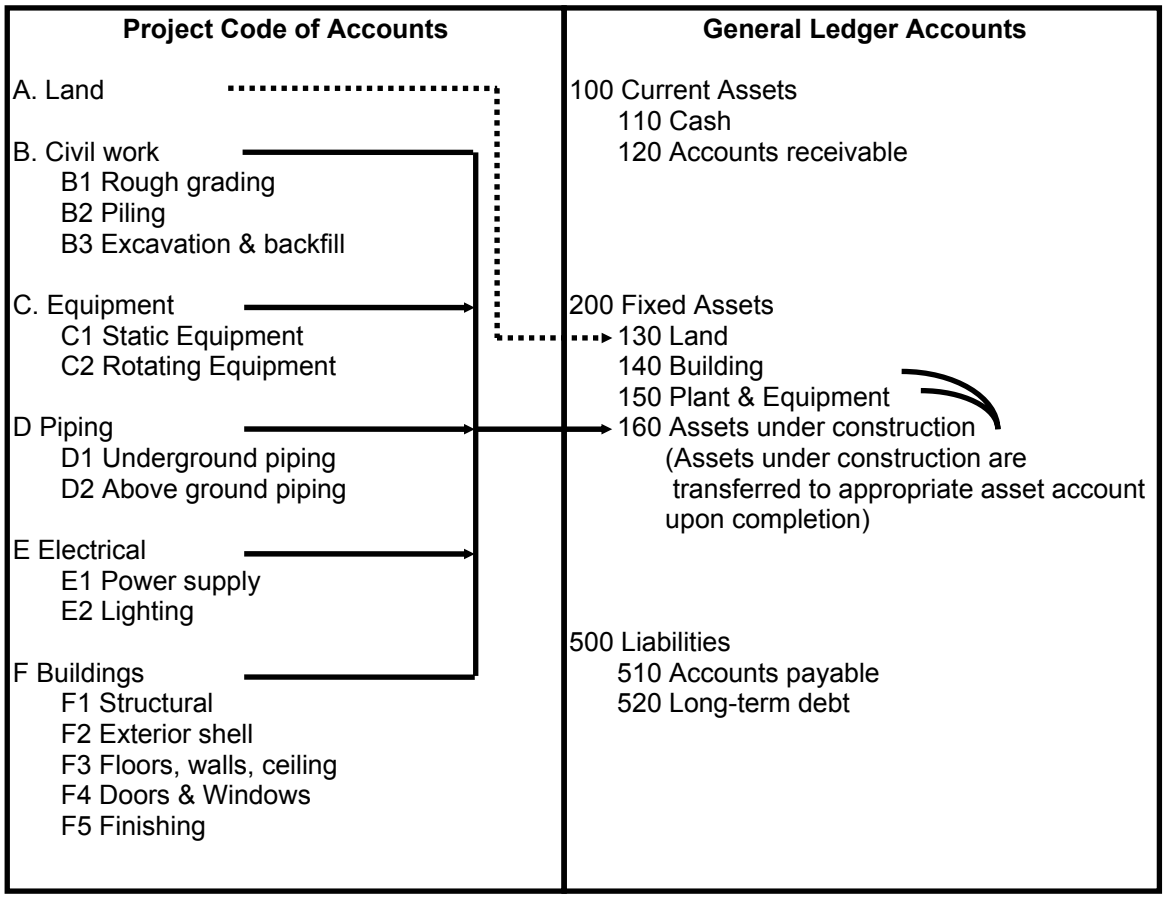

Figure 2 - Relationship Between Project Code of Accounts and General Ledger Accounts

Some organizations attempt to expand on their accounting general ledger and balance sheet accounts with accounts for project management use or vice versa. Unfortunately, it results in a situation in which neither primary stakeholder has a good solution. Each group finds itself with a number of seemingly irrelevant codes. Contractors have learned that imposing financial account codes onto projects is often a hindrance to meeting project objectives. With the recent arrival of enterprise-wide software programs,

there is potential to improve on the situation because they allow customers to structure each project with its own unique cost reporting requirements while maintaining relationships with financial codes to meet accounting requirements at the same time.

Work Breakdown Structures (WBS)
A WBS can be described as a hierarchical division of work scope into manageable parts that correspond to key deliverables, phases, or milestones. Work breakdown structures can be product-oriented (e.g., bridge section, building foundation, software program, aircraft wing) or process-oriented (e.g., phase, step, activity), organization-oriented (e.g., contractor, department, team), or combined product/process/organizational hierarchies. Some organizations use WBSs only to break work down into manageable parts while others use WBSs as a replacement for COAs. Labels or identifier codes for WBS elements are often called cost codes because it is possible to predefine a dictionary of WBS elements in the same manner that is done for codes of accounts. Conversely, several organizations refer to their code of accounts as a WBS because the project breakdown is incorporated into the cost coding. Many organizations executing projects have some form of both.

When an extensive WBS exists, there is reduced need for a fully detailed code of accounts. For example, if the WBS is broken down by discipline (e.g., civil, electrical), cost codes for discipline become redundant if costs are being charged to the WBS.

Activity-Based Costing/Activity-Based Management (ABC/ABM)
In a manufacturing environment, ABC is akin to the cost accounting concept of process costing or job-order costing. The intent is to understand and reduce or eliminate the cost of individual steps in a process. Overhead costs are allocated to the direct costs of every step in the process to understand the full cost of each step.

In a project environment, ABC is a technique for estimating and cost control of work operations or activities. This requires planning and scope definition to be at the appropriate level of detail to meet criteria for the class of estimate being produced. For example: shutdown planning activity “blind water system” 2 pipefitters for 6 hours (total 12 hrs), plus blind materials, plus a crane with operator for 2 hours. Fully-burdened” rates for labor, materials, and equipment are used to estimate the “full cost” of the activity. Over the last 40 years, organizations such as the US Army Corps of Engineers have built large estimating databases for activity types (i.e.: work-hours per square foot of painting). Project codes of accounts must be designed to accommodate ABC if it is to be used on the project.

REFERENCES/BIBLIOGRAPHY

- *A New look at Work Breakdown Structure.* Robert Youker, PMI Seminar, Oct '90.
- *Accounting: The Basis for Business Decisions.* Meigs, Mosich, Johnson, Blazouske.
- **Applied Cost Engineering - 2nd edition,** Clarke & Lorenzoni.
- *Conducting Technical and Economic Evaluations in the Process and Utility Industries.* AACE Recommended Practices, November 1990.
- **Cost and Optimization Engineering, 2nd edition**, Jelen and Black.
- *Cost Estimate Classification System* - AACE Recommended Practices and Standards, 1997.
- *MasterFormat* - The Construction Specifications Institute, May 1995.
- *North American Industry Classification System (NAICS).*
- **Project and Cost Engineer's Handbook**, 1979, American Association of Cost Engineers.
- **Project Management: A Systems Approach to Planning, Scheduling and Controlling, 3rd edition,** Harold Kerzner.
- *Standard Code of Accounts* - The Association of Cost Engineers (UK), 1994.
- **Standard Cost Coding System** - Statoil, Saga Petroleum, Norsk Hydro, Norwegian Petroleum Directorate, May 1992.

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