

CHAPTER 5

COST CODES AND THE WORK BREAKDOWN STRUCTURE

1. INTRODUCTION

This chapter will discuss the purpose of the work breakdown structure (WBS) and code of account (COA) cost code system, show the purpose and fundamental structure of both the WBS and the cost code system, and explain the interface between the two systems. For further information, see DOE Order 4700.1, PROJECT MANAGEMENT SYSTEM.

2. DEFINITIONS

A. Work Breakdown Structure

A WBS is the result of project/program planning that establishes the physical work packages or elements and the activities within those packages that completely define a project. It organizes the physical work packages into levels that can be developed into a summary. Figure 5-1 shows a typical WBS.

B. Code of Accounts

A COA is a logical breakdown of a project into controllable elements for the purpose of cost control and reporting. The breakdown is a numbered structure, organized in a logical manner. Chapters 16 and 17 contain example COAs for construction and Environmental Restoration and Waste Management projects.

3. PURPOSE OF SYSTEMS

The WBS and COA systems provide a consistent organization throughout the life of the project. The Department does not require a specific WBS or COA for use in cost estimating. It is envisioned that each Field Office or Program Officer will specifically delineate a WBS and COA for each office or program. These would be used in developing cost estimates throughout the project's life.

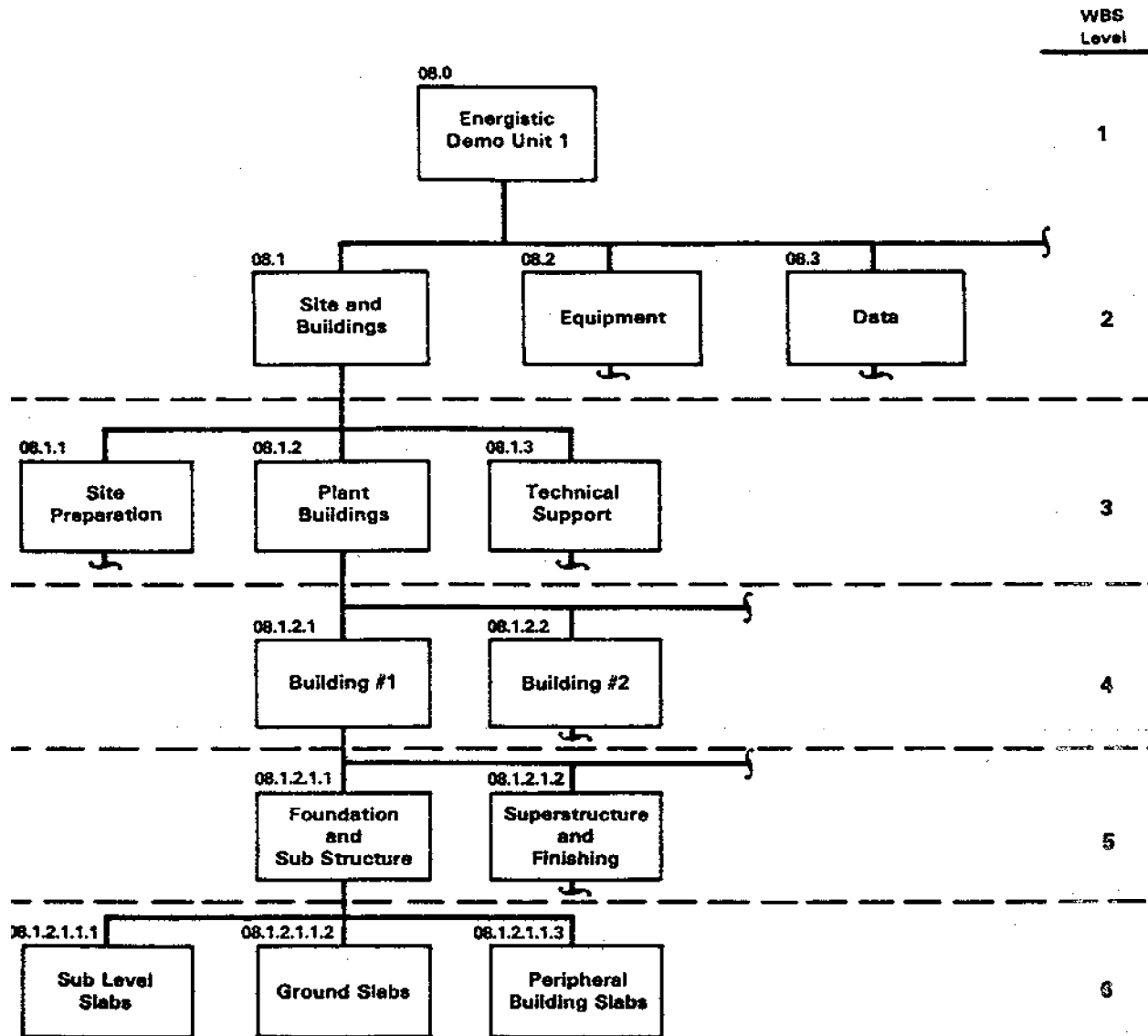


Figure 5-1. Typical Work Breakdown Structure

A. Work Breakdown Structure

A WBS shows the relationship of all elements of a project. This provides a sound basis for cost and schedule control.

During that period of a project's life from its inception to a completed project, a number of diverse financial activities must take place. These activities include cost estimating, budgeting, accounting, reporting, controlling and auditing. A WBS establishes a common frame of reference for relating job tasks to each other and relating project costs at the summary level of detail.

Since the WBS divides the package into work packages, it can also be used to interrelate the schedule and costs. The work packages or their activities can be used as the schedule's activities. This enables resource loading of a schedule, resource budgeting against time, and the development of a variety of cost budgets plotted against time.

B. Code of Accounts

A cost code system or COA is established early in a project and is used for its duration. An organized, numbered structure for a project is developed. This standardization is used in the development, collection, organization, and reporting of project data.

The COA organizes data at a detail level that is developed into higher summary levels. As the detail of a project increases, more detail levels can be developed.

The COA is used during the estimate stage to organize the costs. As a project progresses, the same COA is used, but the elements of data are updated. By comparing the changes in the elements of the COA, variances and trends can be identified. Using the same COA once construction work begins will provide consistency between the estimate and actual cost data for cost control purposes.

A project cost code manual must be provided for each line item construction project. If the cost code system has not been developed prior to the CDR, it must be issued as a part of the CDR. All subsequent estimates must then be made in accordance with the cost code system.

4. INTERFACE OF SYSTEMS

Even though the numeric systems established for the WBS and COA differ, they are both based on a structure that increases in detail as the levels increase. A correlation exists between the WBS and COA levels. This relationship is inherent since there are costs

associated with the execution of each work package or element of the WBS. This correlation is shown in Figure 5-2.

Incorporating the cost codes into the WBS will provide:

- a framework for basic uniformity in estimating and accounting for the costs of construction work;
- a means for detecting omission and duplication of items in budget estimates;
- a basis for comparing the cost of similar work in different projects or at different locations;
- a record of actual costs incurred on completed projects in a form that will be useful in the preparation of estimates for other projects; and
- a means of establishing the cost of property record units for continuing property accounting records.

5. THE WORK BREAKDOWN STRUCTURE

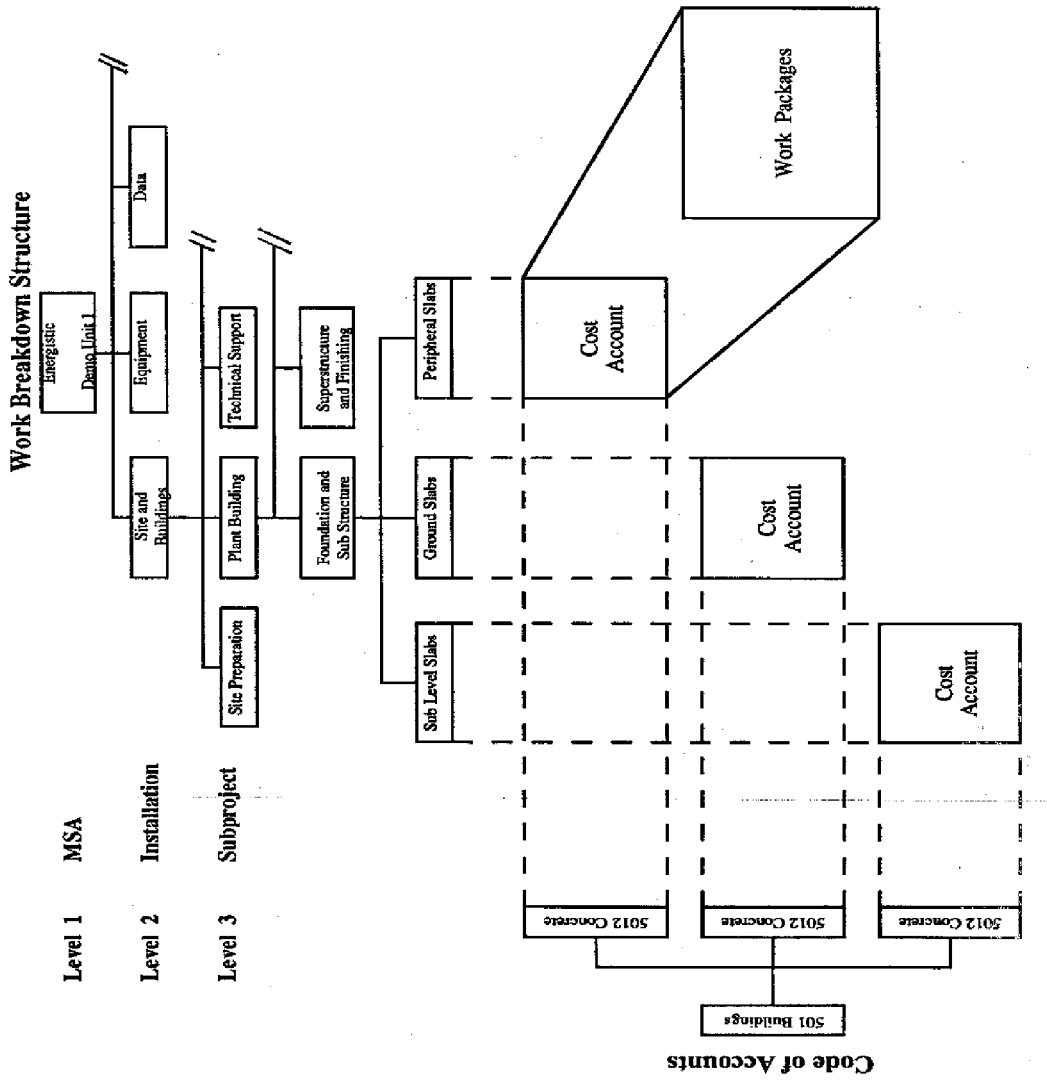
A. Fundamental Structure of a Work Breakdown Structure

A WBS is a numerical, graphic representation that completely defines a project by relating elements of work in that project to each other and to the end product. The WBS is comprised of discrete work packages, called elements, that describe a specific item of either hardware, service, or data. Descending levels of the WBS provide elements of greater and greater detail. The number of levels of a WBS depends on the size and complexity of the project. The DOE WBS Guide presents a structure that may be used as a guideline when developing the project/program WBS.

Examples of the first three levels of a WBS are as follows.

1. Level 1 contains only the project end objective. The product at this level shall be identifiable directly to elements of the DOE Budget and Reporting Classification Structure.
2. Level 2 contains the major product segments or subsections of the end objective. Major segments are often defined by location or by the purpose served.
3. Level 3 contains definable components, subsystems or subsets, of the Level 2 major segments.

Figure 5-2 Work Breakdown Structure Extended to Cost Account and Work Package Levels Indicating Cross Walk to Code of Accounts



B. Preparing a Work Breakdown Structure

The initial WBS prepared for a project is the project summary work breakdown structure (PSWBS). Normally, the PSWBS contains the top three levels only. Lower-level elements may be included when necessary to clearly communicate all project requirements.

1. Understanding of the Scope

The first prerequisite to the preparation of the PSWBS is the clear understanding and statement of the project objective by the Project Secretarial Officer (PSO). This can include the delivery of a specific major end item, the erection of a building, or the remediation of a section of land. Once this overall project objective is established, it assists in determination of the supporting project subobjectives. This process of identification and definition of subobjectives assists the PSO in structuring WBS levels and the contributing elements during WBS preparation.

2. Defining the Levels and Elements

Early in project planning, DOE project management should select the summary WBS(s) that will best describe the work of the project in the way it will be executed. WBS elements can be organized by physical area, process, or function. All elements of the WBS should be defined in an accompanying WBS dictionary.

The summary WBS elements should be used as guides as the levels of the WBS are added or changed to reflect the changes and refinements of the scope as the design and project execution are being developed. As levels are added to the WBS, they should be checked across the project to ensure that they remain at the same level of detail. When developing a numbering system, the use of the computerized system should be considered since they may limit the number of digits in the WBS numeric identifier.

3. Use of the Work Breakdown Structure

The PSWBS should be used to identify work for proposed supporting contractors.

Subsequently, the PSWBS elements assigned to contractors are extended by the contractors to derive each contract work breakdown structure (CWBS). Together, the PSWBS and each CWBS constitute the project WBS, which then provides the framework for cost, schedule, and technical planning, and control through the life of the project.

4. Updating the Work Breakdown Structure

The PSO must maintain the WBS. Changes may occur when the work effort can be more accurately defined or if a revised approach (e.g., technically different or more cost effective) is implemented to satisfy or meet the project objective. Also, contractors, while developing their CWBS, may propose to DOE alternative approaches to better accomplish the contract objectives. If the alternatives are accepted by DOE project management, the preliminary PSWBS will be revised accordingly. Thus, when establishing the numeric series for the WBS, it is advisable to leave some blocks of numbers for changes and additions to the scope. This makes the WBS revision process easier.

6. THE COST CODE SYSTEM

Fundamental Structure of a Cost Code System

A direct cost system generally includes three levels of codes. The “first-level” codes, sometimes called “primary levels,” represent the major cost categories. The major components or categories of work for each of the primary levels are listed and assigned a “second-level” or sub-summary code. These “second-level” codes are then broken down by work elements or bills of material and each work element or bill of material (BM) is assigned a “third-level” or fine-detail-level.

The cost estimate will list the labor and material required at the “third-level” code, then all “third-level” codes will be summarized by their respective “second-level” codes. Likewise all “second-level” codes will be summarized by their respective “primary levels.” The “primary levels” will be summarized by each “subproject” or “project” total to obtain the “project” overall cost estimate.

Subproject Designation. Subproject is a term used to divide a project into separately manageable portions of the project. A subproject is generally used to identify each separately capitalizable identity, such as a building. A subproject can also be used to identify a specific geographical area or separate physical features of a project. A matrix should be drawn for each project listing the subprojects designated and indicating all the second-level cost codes for the construction work required by each.

7. INTERFACE BETWEEN ASSET TYPES AND CODE OF ACCOUNTS

When a construction project has been completed, an asset has been created and must be reflected on DOE’s property book. The *Accounting Practices and Procedures Handbook* contains a listing of the asset types used by DOE. In an effort to bridge the gap between a construction account and an asset type, the committee to update the code of accounts decided to use a primary level of accounts coincided with the asset types

used by the Finance and Accounting Offices and thereby reduce the likelihood of introducing errors that could result from translating “as built” costs to asset type categories. Thus, the numbers differ from those used in the older Energy Research and Development Administration (ERDA) manuals and, of course, differ from the Construction Specification Institute Code (CSI). It should be noted that although the numbering is different, the elements of the emerging code of accounts permit both the older ERDA classification system and CSI system to be applied at sublevels of the cost code.