

Cost Definitions

Table 3.1: WBS Cost Category Definitions & Example Activities

Activity	Detailed Activities	Activity	Detailed Activities
Conceptual Design	Design activities from CD1, authorization for conceptual design, to CD2, just after completion of Conceptual Design Report. System analysis of requirements, interfaces, simulations, modeling, planning, estimating, scheduling, reports, manufacturability, design reviews.	Pre-Assembly & Test area	Design pre-assembly & test area, procure special test equipment, coordinate with builders and crafts, plan and fulfil staffing, develop work methods and procedures, develop training plans. Calculate floor space requirements for use by Conventional Facilities.
Laboratory design & setup	Design laboratory, procure furniture and specialized / standard test equipment, coordinate with builders and crafts, plan and fulfil staffing. Calculate floor space requirements for use by Conventional Facilities. <i>Note special definition of Equipment in Dictionary.</i>	Pre-Assembly & Test	Assemble manufactured components into assemblies, such as rack assemblies, mounting klystrons to modulators, building magnet and structure rafts etc. QC inspection, records, rework records etc. Return finished assemblies to inventory. <i>TSET teams need to coordinate on estimates to define treaty points and avoid overlaps.</i>
R&D	Demonstration of feasibility and development of related pre-production components, equipment, subsystems, systems.	Acquisition	Acquisition activities for the technical systems, subsystems and components such as purchasing or components for in-house manufacturing, during construction (CD3-CD4).
R&D Design	Restricted to large cost items, such as klystrons or the solid state modulator. <i>Note Dictionary definition.</i> Consult with management on this item. Regular test and lab equipment or field test equipment should be listed as M&S against the appropriate activity.	Manufacturing - Production	Place manufacturing contracts, deliver special jigs and testers, install QC procedures, coordinate/track production.
Design	Engineering design activities between CD2, start of preliminary design, to CD3, start of construction. Includes subsystems engineering (requirements analyses, subsystems integration analysis, DFM, reliability, documentation, procurement plans, cost & schedule estimates). Design includes Preliminary Design (Title I EDI&A) and Definitive Design (Title II EDI&A) activities. The former are pre-production prototypes and the latter are finished and fully documented designs. A Definitive Design Review is a prerequisite for CD3.	Inventory & Storage	Design storage areas, coordinate with Conventional Facilities and Crafts, develop inventory system, staff operation.
Design, fabricate & test prototype	Detailed design of prototype hardware, firmware/software, control panels and interface, built-in diagnostics, parts procurement, fabrication, test, design reviews, rework, test reports.	Installation, Integration and Testing	Activities for planning and executing installation, integration and testing of technical systems, subsystems and components, during construction (CD3-CD4).
Design, fab & test pre-prod. prototype	Revise prototype design including Design for Manufacture, reliability engineering, full specifications documentation, test reports, cost estimates.	Installation - Cable Plant	Define cable plant requirements, design cables, coordinate cost estimates with Cable Shop for engineering, fabrication and installation and QC costs for each subsystem. Cables/cable assemblies will be installed by Contract (Davis Bacon Labor) unless pre-assembled on Girders. <i>Cable Shop will be responsible for cost estimate of total Tray requirements.</i>
Sustaining Engineering	Post-CD3 engineering, inspection, construction management, pre-operational maintenance. Covers engineering activities after design and during construction, receipt of materials, supervision of pre-assembly and factory or incoming inspection. This item is called Title III EDI&A.	Installation - Hardware	Develop installation, QC and training plan, contract installation, procure equipment and materials, supervise installation, design review, installation reports. <i>TSET teams need to coordinate on estimates to define treaty points and avoid overlaps.</i>
Manufacturing-Pre-Production	Develop manufacturing plan, quality plan, contracts for pre-production, design & develop jigs and testers, factory tests for pre-production, design reviews, reports.	Installation - Software	Develop installation, QC and training plans for firmware/software installation, hire/train personnel, supervise installation, QC, reports. <i>Controls Department will install global system software but subsystems need to check out using the global system.</i>
Factory design & setup	Design factory, procure special fabrication and test equipment, coordinate with builders and crafts, plan and fulfil staffing, develop work methods and procedures, develop training plans. Calculate floor space requirements for use by Conventional Facilities. <i>Note special Dictionary definition of Equipment.</i>	System Test & Integration	Design & develop system test, QC and manpower/ training plans, procure equipment and materials hire/train personnel, integrate with neighbor systems, test through controls, develop supporting documentation for Operations and Maintenance, perform integrated hardware/software tests of all features possible without beam in the Accelerator.
		System Commissioning	System Commissioning begins when all systems begin turn-on to establish beam in the Accelerator. <i>This is Post -CD-4 work that is not included in the construction budget.</i> Management will consult with TSET groups in filling these estimates at the appropriate time.