



Project Management Institute

Practice Standard for *Work Breakdown Structures*

Project Management Institute

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Work Breakdown
Structures**

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Project Management Institute
Newtown Square, Pennsylvania USA

Library of Congress Cataloging-in-Publication Data

Project Management Institute practice standard for work breakdown structures

p. cm.

Includes bibliographical references and index.

ISBN 1-880410-81-8

1. Project management. I. Project Management Institute. II. Title: Practice standard for work breakdown structures.

HD69.P75P76168 2001

658.4'04—dc21

2001048475

ISBN: 1-880410-81-8

Published by: Project Management Institute, Inc.

Four Campus Boulevard

Newtown Square, Pennsylvania 19073-3299 USA

Phone: 610-356-4600 or Visit our website: www.pmi.org

E-mail: pmihq@pmi.org

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Foreword

On behalf of the Project Management Institute (PMI®) Board of Directors, I am pleased to present PMI's first practice standard, the *Project Management Institute Practice Standard for Work Breakdown Structures*.

The *Project Management Institute Practice Standard for Work Breakdown Structures* is an important step in PMI's continuing commitment to define the body of knowledge supporting the project management profession, and to develop standards for its application. The dedicated volunteers who worked on PMI's Ethics, Standards, and Accreditation (ESA) Project first distilled the Project Management Body of Knowledge (PMBOK®) in 1983. Building on that work, PMI published the *PMBOK® Standards* in 1987.

The publication of *A Guide to the Project Management Body of Knowledge (PMBOK® Guide)* – 1996 Edition continued the evolution. Today the *PMBOK® Guide* – 2000 Edition is an *American National Standard* and the *de facto* global standard for project management.

It has been PMI's intent for many years to supplement the information in the *PMBOK® Guide* by providing both industry-specific extensions and practice standards that guide the practice of the profession through more in-depth information on the listed inputs, tools and techniques, and outputs. The *Project Management Institute Practice Standard for Work Breakdown Structures* is the first such practice standard. It provides guidance in the initial generation, subsequent development, and application of the Work Breakdown Structure.

Finally, I would like to thank the project team, led by Kim Colenso, who worked so diligently to bring this standard to fruition. Dedicated and competent volunteers have always been the backbone of PMI's success, and this publication is yet another example.

Hugh Woodward

Hugh Woodward, PMP
Chair – PMI Board of Directors

Preface

This *Project Management Institute Practice Standard for Work Breakdown Structures* provides guidance in the initial generation, subsequent development, and application of the Work Breakdown Structure (WBS). The target audience for this standard includes project managers, project team members, contract personnel, and others who participate or have an interest in any aspect of the management of projects. In using this *Practice Standard*, it must be recognized that as projects vary, so may the resulting WBSs. There are, however, certain universal principles that this *Practice Standard* addresses.

The *Project Management Institute Practice Standard for Work Breakdown Structures* is consistent with the current release of *A Guide to the Project Management Body of Knowledge (PMBOK® Guide)* – 2000 Edition. The *Practice Standard* also includes information derived from accepted project management industry sources. The Project Management Institute Standards Program will periodically update the *Project Management Institute Practice Standard for Work Breakdown Structures* as part of the planned evolution of the standards documents. Your comments are both requested and welcome.

The *Project Management Institute Practice Standard for Work Breakdown Structures* is organized as follows:

Introduction	Introduces the WBS concept.
What Is a WBS?	Defines the WBS and its characteristics.
Why Use a WBS?	Defines the benefits derived from using a WBS.
How to Create a WBS?	Documents the steps required for building a WBS and presents guidelines for determining if the WBS is sufficient for subsequent planning and control.
Appendix A–D	Provides background information on the Project Management Institute Standards Program and the <i>Project Management Institute Practice Standard for Work Breakdown Structures</i> project.
Appendix E–O	Provides documented industry examples to aid the reader in further understanding, creating, and using WBSs. Each appendix represents an approach tailored to a specific purpose, application, or industry. Examples are in different stages of completion and represent the evolutionary development of a WBS. None of the examples should be taken as the only <i>right</i> WBS for that type of project.
References	Offers literary support for the information contained in the <i>Project Management Institute Practice Standard for Work Breakdown Structures</i> .
Glossary	Provides clarification of key terms that exist in the project management profession, including those that have subtle or variable meanings depending on the organization and industry.

Chapter 2

What Is a Work Breakdown Structure?

2.1 COMMON USAGE OF TERMS

The following commonly used words have generally accepted meanings:

- Work** Sustained physical or mental effort to overcome obstacles and achieve an objective or result; a specific *activity*, duty, function, or assignment often being a part or phase of some larger undertaking; something produced or accomplished by effort, exertion, or exercise of skill.
- Breakdown** To divide into parts or categories; to separate into simpler substances; to undergo decomposition.
- Structure** Something arranged in a definite pattern of organization.

These definitions imply that a Work Breakdown Structure (WBS) has the following characteristics:

- It is representative of work as an activity, and this work has a tangible result.
- It is arranged in a hierarchical structure.
- It has an objective or tangible result, which is referred to as a deliverable.

A WBS, as defined in the *PMBOK® Guide – 2000 Edition*, is:

A deliverable-oriented grouping of project elements that organizes and defines the total work scope of the project. Each descending level represents an increasingly detailed definition of the project work (Project Management Institute 2000).

2.2 CONCEPT

2.2.1 Overview

The *WBS elements* assist the project *stakeholders* in developing a clear vision of an end product of the project and of the overall process by which it will be created. The WBS divides the project scope into hierarchal, manageable, definable packages of work that balance the control needs of management with an appropriate and effective level of project data. The various levels of the WBS aid in focusing communication with stakeholders and clearly identifying accountability to the level of detail required for managing and controlling the project.

The upper levels of the WBS typically reflect the major deliverable work areas of the project or phases in the project's life cycle. These levels also provide logical summary points for assessing performance accomplishments, as well as measuring cost and schedule performance. The content of the upper levels varies depending upon the type of project and the industry in which it resides. Therefore, to avoid confusion and rework, it is often prudent to consider defining the labels for the different levels of the WBS prior to its construction. The lower WBS elements provide appropriate focus for scope, cost, and schedule development.

Whenever work is structured, easily identifiable, and clearly within the capabilities of individuals, project stakeholders can confidently expect the objectives associated with that work can—and will—be achieved.

Appendix D

Guidelines for a Project Management Institute Practice Standard

- Each practice standard provides guidelines on the mechanics (e.g., nuts and bolts, basics, fundamentals, step-by-step usage guide, how it operates, how to do it) of some significant process (input, tool, technique, or output) that is relevant to a project manager.
- A practice standard does not necessarily mirror the life-cycle phases of many projects. But, an individual practice standard may be applicable to the completion of one or more phases within a project.
- A practice standard does not necessarily mirror the knowledge areas within *A Guide to the Project Management Body of Knowledge (PMBOK® Guide)*, although an individual practice standard will provide sufficient detail and background for one or more of the inputs, tools and techniques, and/or outputs. Therefore, practice standards are not required to use the name of any knowledge area.
- Each practice standard should include information on *what* the significant process is and does, *why* it is significant, *how* to perform it, *when* it should be performed and, if necessary for further clarification, *who* should perform it.
- Each practice standard should include information that is accepted and applicable for most projects most of the time within the project management community. Processes that are generally restricted or applicable to one industry, country, or companion profession (i.e., an application area) may be included as an appendix for informational purpose, rather than part of the practice standard. With strong support and evidence, an application area-specific process may be considered as an *extension* practice standard, in the same manner as extensions to the *PMBOK® Guide* are considered.
- Each practice standard will benefit from the inclusion of examples and templates. It is best when an example or template includes a discussion of its strengths and weaknesses. A background description may be necessary to put this discussion in the appropriate context. The examples should be aligned with the relevant information in the standard or its appendix and placed in proximity to that information.

- All practice standards will be written in the same general style and format.
- Each practice standard project will assess the need to align with or reference other practice standards.
- Each practice standard will be consistent with the *PMBOK® Guide*.
- Each practice standard is intended to be more prescriptive than the *PMBOK® Guide*.

Glossary

- Activity:** An element of work performed during the course of a project. An activity normally has an expected duration, an expected cost, and expected resource requirements. Activities can be subdivided into tasks.
- Customer:** The individual or group that has requested, that is the recipient, or who is paying for the deliverable(s). This could be an internal department, someone in management, an external organization, and so on.
- Decomposition:** Decomposition involves subdividing the major project deliverables into smaller, more manageable components until the deliverables are defined in sufficient detail to support future project activities (planning, executing, controlling, and closing).
- Deliverable:** Any measurable, tangible, verifiable outcome, result, or item that must be produced to complete a project or part of a project. Often used more narrowly in reference to an external deliverable, which is a deliverable that is subject to approval by the project sponsor or customer.
- Organizational Breakdown Structure (OBS):** A depiction of the project organization arranged so as to relate work packages to organizational units.
- Phase:** See Project Phase.
- Project Phase:** A collection of logically related project activities, usually culminating in the completion of a major deliverable.
- Responsibility Assignment Matrix (RAM):** A structure that relates the project organization structure to the Work Breakdown Structure to help ensure that each element of the project's scope of work is assigned to a responsible individual.
- Risk Event:** A discrete occurrence that may affect the project for better or worse.
- Scope:** The sum of the products and services to be provided as a project.
- Scope Change:** Any change to the project scope. A scope change almost always requires an adjustment to the project cost or schedule.
- Stakeholder:** Individuals and organizations that are actively involved in the project, or whose interests may be positively or negatively affected as a result of project execution or project completion. They may also exert influence over the project and its results.
- Statement of Work (SOW):** A narrative description of products or services to be supplied under contract.
- Task:** A generic term for work that is not included in the Work Breakdown Structure, but potentially could be a further decomposition of work by the individuals responsible for that work. Also, lowest level of effort on a project.
- Work Breakdown Structure (WBS):** A deliverable-oriented grouping of project elements that organizes and defines the total scope of the project. Each descending level represents an increasingly detailed definition of the project work.

Work Breakdown Structure (WBS) Dictionary: A document that describes each Work Breakdown Structure element, including scope, deliverable(s), specification, schedule, resource requirements, and so on.

Work Breakdown Structure (WBS) Element: An entry in the Work Breakdown Structure that can be at any level.

Work Package: A deliverable at the lowest level of the Work Breakdown Structure, when that deliverable may be assigned to another project manager to plan and execute. This may be accomplished through the use of a subproject where the work package may be further decomposed into activities.

Upgrade Your Project Management Knowledge with First-Class Publications from PMI

New Books

A Guide to the Project Management Body of Knowledge (PMBOK® Guide) – 2000 Edition

PMI's *PMBOK® Guide* has become the essential sourcebook for the project management profession and its de facto global standard, with over 700,000 copies in circulation worldwide. This new edition incorporates numerous recommendations and changes to the 1996 edition, including: progressive elaboration is given more emphasis; the role of the project office is acknowledged; the treatment of earned value is expanded in three chapters; the linkage between organizational strategy and project management is strengthened throughout; and the chapter on risk management has been rewritten with six processes instead of four. Newly added processes, tools, and techniques are aligned with the five project management processes and nine knowledge areas. For example, reserve time, variance analysis, and activity attributes are added to Chapter 6 (Project Time Management); estimating publications and earned value measurement are added to Chapter 7 (Project Cost Management); and project reports, project presentations, and project closure are added to Chapter 10 (Project Communications Management). This is one publication you'll want to have for quick reference both at work and at home.

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PMI Project Management Salary Survey – 2000 Edition

This 2000 Edition updates information first published in 1996 and expands coverage to over forty industry affiliations in nearly fifty countries in seven major geographic regions around the world. Its purpose is to establish normative compensation and benefits data for the project management profession on a global basis. The study provides salary, bonus/overtime, and deferred compensation information for specific job titles/positions within the project management profession. It also contains normative data for a comprehensive list of benefits and an array of other relevant parameters. *The PMI Project Management Salary Survey – 2000 Edition* is a vital new research tool for managers and HR professionals looking to retain or recruit employees, current members of the profession or those interested in joining it, researchers, and academics.

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Michael Singer Dobson

Dobson, project management expert, popular seminar leader, and personality theorist, understands "promotion grief." He counsels those who prefer logical relationships to people skills and shows technical professionals how to successfully make the transition into management. This is a witty, supportive management primer for any "techie" invited to hop on the first rung of the corporate ladder. It includes self-assessment exercises; a skillful translation of general management theory and practice into tools, techniques, and systems that technical professionals will understand and accept; helpful "how to do it" sidebars; and action plans. It's also an insightful guide for those who manage technical professionals.

"The exercises and case studies featured here, along with the hands-on advice, hammer home fundamental principles. An intriguing complement to more traditional IT management guides, this is suitable for all libraries." —*Library Journal*

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Boris Hornjak

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Quentin W. Fleming and Joel M. Koppelman

Now a classic treatment of the subject, this second edition updates this straightforward presentation of earned value as a useful method to measure actual project performance against planned costs and schedules throughout a project's life cycle. The authors describe the earned value concept in a simple manner so that it can be applied to any project, of any size, and in any industry. *Earned Value Project Management, Second Edition* may be the best-written, most easily understood project management book on the market today. Project managers will welcome this fresh translation of jargon into ordinary English. The authors have mastered a unique "early-warning" signal of impending cost problems in time for the project manager to react.

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trainers, administrators, practitioners, and individuals interested in pursuing PMP certification.

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Francis M. Webster Jr.

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Neil Love and Joan Brant-Love

This to-the-point and quick reading for today’s busy executives and managers is a one-of-a-kind source that describes the unique and challenging support that executives and managers must provide to be effective sponsors of project teams. *The Project Sponsor Guide* is intended for executives and middle managers who will be, or are, sponsors of a project, particularly cross-functional projects. It is also helpful reading for facilitators and project leaders.

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Francis T. Hartman

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Neal Whitten

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H. David Shuster

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Michael S. Dobson

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Al DeLucia and Jackie DeLucia

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ISBN: 1-880410-01-X (paperback)

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ISBN: 1-880410-82-6, Facilitator's Manual Set (3-ring binder)
ISBN: 1-880410-80-X, Participants' Manual Set, (paperback)

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Book Ordering Information

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Mail: PMI Publications Fulfillment Center,

PO Box 1020, Sewickley, Pennsylvania 15143-1020 USA

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From the world's largest professional association for project management—
*The global practice standard to help you prepare useful and high quality
 Work Breakdown Structures (WBSs).*

It has been the intent of the Project Management Institute (PMI®) for many years to supplement the information in the *PMBOK® Guide* by providing both industry-specific extensions, and practice standards that guide the practice of the profession through more in-depth information on the inputs, tools and techniques, and outputs. This first PMI practice standard does in fact live up to that intent by complementing and elaborating on the information contained in PMI's *de facto* global standard for the profession, *A Guide to the Project Management Body of Knowledge (PMBOK® Guide)* – 2000 Edition. This new PMI standard provides guidance and universal principles for the initial generation, subsequent development, and application of the Work Breakdown Structure.

Successful project management uses planning techniques to define the project objectives in sufficient detail to support effective management of the project. The Work Breakdown Structure provides the foundation for defining work as it relates to project objectives and establishes the structure for managing the work to its completion. Each descending level of a WBS represents an increasingly detailed definition of the project work.

This new PMI standard provides an introduction to the WBS concept, defines the WBS and its characteristics, discusses the benefits of using a WBS, and demonstrates how to build a WBS and determine if it is sufficient for subsequent planning and control.

A unique feature of this new handbook is the inclusion of 11 industry-specific WBS examples.

Constituting over half of the book, these examples aid the reader in further understanding, creating, and using WBSs in the following industries or applications:

- Oil, Gas, and Petrochemical (OGP)
- Environmental Management
- Process Improvement
- Pharmaceutical
- Process Plant Construction
- Service Industry Outsourcing
- Web Design
- Telecom
- Refinery Turnaround
- Government Design-Bid-Build
- Software Implementation

Examples are in different stages of completion and represent the evolutionary development of a WBS. None of the examples should be taken as the only *right* WBS for that type of project.

This is the first-of-its-kind *Practice Standard* from the world's largest professional association for project management. It will enable project managers, project team leaders, contract personnel, and others interested in managing any aspect of a project to prepare a useful and high quality Work Breakdown Structure.



Project Management Institute
 Four Campus Boulevard
 Newtown Square, PA 19073-3299 USA

PMI Practice Standard for Work Breakdown Structures

ISBN: 1-880410-81-8

US \$25.95

