# Developing a Scope of Work for an Engineering Project

An Online Continuing Education Course for Engineers

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# Developing a Scope of Work for an Engineering Project

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## Course Contents

# 1 Overview of Scope of Work

A project scope is all the products, services, and deliverables required to complete the project. The scope should be written out as a scope statement and agreed upon prior to starting the project. A scope statement defines the project's boundaries, tasks, deliverables, and milestones.

When well prepared, a scope statement acts as a clear roadmap that ensures a shared understanding of what will and will not be performed in the project, which helps prevent misunderstandings and "scope creep." For engineering projects, it is essential to have an accurate and detailed scope statement to confidently commit to schedule, budget, and quality goals.

The "scope statement" is also called a written scope of work or statement of work. The project sponsor should agree upon the scope statement before starting the project. The scope statement can be utilized to create a work breakdown structure (WBS), WBS dictionary, budget, schedule, project management plan (or work plan), and other project management documents.

The combination of the scope statement, work breakdown structure (WBS), and WBS dictionary is often considered the "scope baseline."

Scope baseline = Scope statement + WBS + WBS Dictionary

The scope statement is usually specifically agreed upon in writing by the project sponsor (or is part of an agreed contract). At the same time, the WBS and WBS dictionary are created afterwards and are not considered binding. For a contracted project, in the event of a dispute, only the agreed scope statement is considered legally binding and hence a liability.

Note that the term "product scope" means the features and functions that characterize a product, service, or result. This is synonymous with product requirements and design criteria.

Source: commons.wikimedia.org/wiki/File:Fountain_pen_writing_(literacy).jpg, Dungdm93, CC-BY-SA-4.0

# 2 Preparing to Write a Scope Statement

The project scope does not simply present itself. It must be thought through and carefully written out, usually by the project manager (PM) in conjunction with design team members such as the design manager. For an engineering project, it is essential to involve key engineering staff to help ensure the scope includes the design work needed to produce the deliverables.

Before starting to write a scope of work, one should gather and review existing information, such as the following documents, if available:

- Project definition

- Business case
- Charter
- Roadmap
- Request for proposal
- Business development notes and documents

The end goals, also called the “exit criteria,” should be clear prior to attempting to write out the scope statement. The questions in Figure 1 are also helpful to consider.

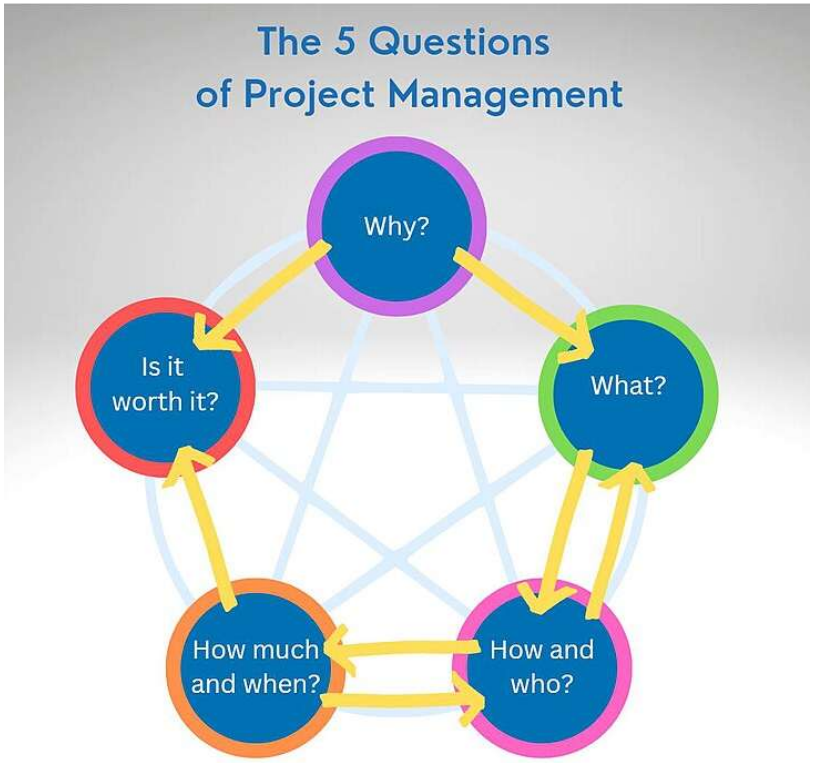


*Figure 1: Questions to ask when planning a new project.*
*Source: commons.wikimedia.org/wiki/File:The_5_Questions_of_Project_Management.jpg, Leanpm, CC-BY-SA-4.0*

## 3 Steps to Write a Scope Statement

The following steps can be followed to write a project-specific Scope Statement:

1. Understand Project Objectives and Goals
   - Understand the "why" of the project.
   - Engage with the project sponsor, champion, client, and/or stakeholders to understand the business need and expected outcomes.

- Define SMART objectives (see next section).

2. List Requirements
   - Gather and describe project requirements (often called design criteria), including technical specifications, quality standards, codes, regulatory requirements, and acceptance criteria.
   - There can be a separate section for standards and requirements, or these can be listed within associated tasks.

3. Identify Deliverables
   - List all major deliverables/outputs.
   - The completion of all deliverables should result in the completion of the project.

4. Break Down the Work into Tasks
   - Decompose work into major tasks required to complete the deliverables.
   - Approach options:
     - List deliverables with tasks under each deliverable
     - List major tasks with associated deliverables listed after each task
   - Describe each task, including specific disciplines, level of design completion, estimated number of drawings, types of 3D models, formats, software, quantities, etc.
   - Be specific and detailed to avoid ambiguity. Gain team member input as needed.
   - Keep in mind that the list of tasks will form the basis for the Work Breakdown Structure (WBS), which usually has a further breakdown of internal work packages for each task.
   - Avoid having tasks with no actual deliverables, such as project management or meetings. These can be accounted for under each task (divided up). Although not recommended, often a separate task is made to encompass all overhead-related costs. Such overhead should be carefully monitored to avoid scope creep.

5. Set Realistic Milestones
   - Establish schedule requirements, such as milestones (required completion dates) for tasks and/or deliverables and for overall project completion.
   - If using actual dates, enter the assumed project start date and add a note that it is contingent on a notice to proceed (NTP) or signed agreement.
   - Add notes for any dependencies between tasks.
   - Add notes for assumed external review times, equipment lead times, weather days, and any other external factors that may delay milestones.
   - Be realistic and include buffer times for unexpected delays.

6. Define Resources and Roles (Optional)
   - Outline the significant required resources.
   - List key staff, subcontractors, suppliers, software, etc.
   - Define the roles and responsibilities of the organizations involved that impact the project (client, contractor, consultant, regulatory agencies, etc.).

7. Define Exclusions and Assumptions

- Explicitly state what is not included in the project scope to prevent scope creep and manage expectations.
- List any assumptions made during planning that could impact the project (number of staff and days for site visits, field work, testing services, hardcopy or digital documents, etc.).

8. Outline the Budget and Payment Terms
   - List payment terms (lump sum, time and materials not to exceed, etc.)
   - Include invoicing procedures.
   - Option to provide a breakdown of costs and a clear payment schedule (e.g., down payment, percentages, or dollar amounts upon milestone completions).
   - Option for shared saving if the work is under budget.
   - Option to include penalties or bonuses for late or early work.

9. Establish a Change Management Process
   - Document the procedure for requesting, evaluating, and approving any changes to the agreed-upon scope, timeline, or budget.
   - This formal process ensures that changes are managed and approved.

10. Review, Approve, and Obtain Signatures
    - Review with stakeholders for shared understanding and agreement.
    - Obtain formal, written signatures from those with proper signature authority.
    - Save and distribute the signed agreement/contract/scope statement.

Copying from Previous Projects

Engineering projects involve unique tasks and designs, so the scope statement shouldn't just be copied and pasted from a previous project. Sometimes sections from previous scope statements can be copied, or master templates can be used to create most of the scope statement. But care should be taken to avoid scope gaps. Scope statement author(s) should think through the unique aspects of the project and make sure the scope is appropriately written.

Helpful Questions

Example questions to ask when developing a scope of work:

- What level of detail is needed for the report, drawings, and/or specifications?
- What level of detail is needed for the 3D Model, such as BIM Level of Development (LOD) 100, 200, 300, 350, or 400?
- Should clash detection be done on the 3D Model?
- How many drawings are estimated for each discipline?
- How many specification sections are estimated?
- Should the topographic survey include a boundary survey, easement search, and title search?
- Should the geotechnical report include foundation options or just a single recommendation?
- What level of accuracy is needed for the class estimate?

- Are supplier or contractor quotes needed?
- Are multiple competitive quotes needed?

Flushing out these questions further develops the scope definition. Also, lead project team members should participate in writing or reviewing the scope statement.

## 4 SMART Objectives

A popular approach to preparing a good scope of work is to follow the SMART technique, which is also used to set goals for individuals and organizations. SMART is an acronym for the following:

- **S**pecific: Clear and detailed
- **M**easurable: Quantifiab
- **Ac**
- **Rel**
- **Tim**

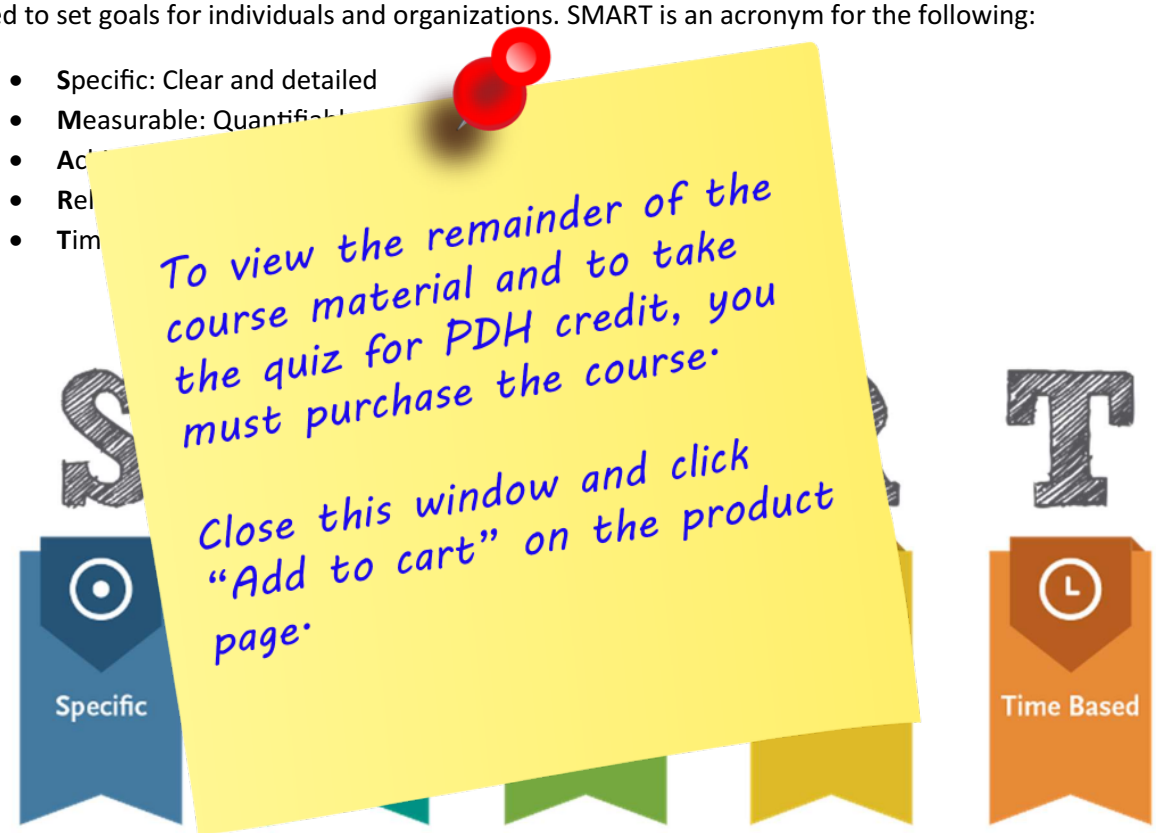


*Figure 2: Illustration of SMART goal setting.*
*Source: commons.wikimedia.org/wiki/File:SMART-goals.png, Dungdm93, CC-BY-SA-4.0*

## 5 Sections of a Scope Statement

The following are typical sections of a scope statement for a design project:

- Background or introduction
- Project description or purpose
- Design criteria (sizes, materials, flow rates, utilities, standards, codes, etc.)
- Tasks with work details, for example: