Engineering Project Management: Scope, Time and Cost Management

We'll learn to crate a project scope statement, identify ways to control the scope of the project, decompose the work and develop work packages, create a work breakdown structure, develop a critical path schedule, review types of cost estimates and identify whether they are top down or bottom up and much more.

What are your goals for this course? What skills do you hope to gain? How will you use these skills in your personal and professional life?
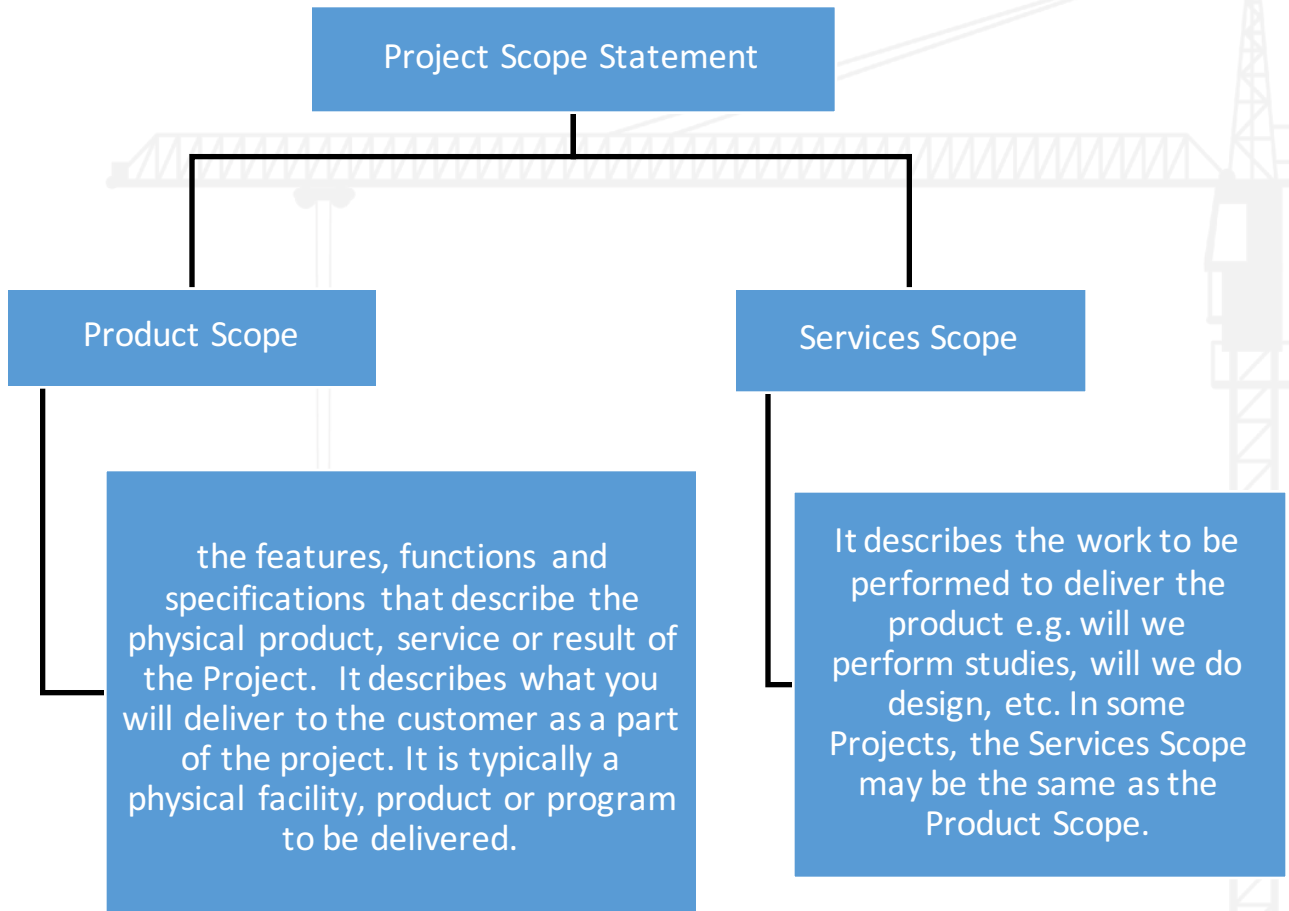
Module 1 and Intro

Learning Objectives

- Define a project scope based on stakeholder needs

- Develop a scope management plan based on the approved project scope

- Identify the key requirements and deliverables needed to be collected and analyzed to complete the plan

- Review a scope validation process

- Develop a scope control plan

- Develop a scope change management plan

- Recall: In the first course "initiating and planning" of this specialization we have achieved following objectives. We have:
    - Learned what it means to be a project manager
    - Leaned about project organizations
    - Developed the project carter and discussed the steps to get the project approved
    - Identified the project stakeholders and prepared a stakeholder register
    - Learned the steps to develop a communication plan and the overall project management plan
    - Started our change management plan

- In this module the next step is to prepare the project scope statement both for the product and the services.

Do you remember what you learned in the first course on "Initiating and Planning"? Recall your understanding for all the objectives specified here:

Module I

Project Scope Management

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                   ┌─────────────────────────────┐
                   │  Project Scope Statement     │
                   └─────────────────────────────┘
             ┌────────────────┴────────────────┐
   ┌──────────────────┐              ┌──────────────────┐
   │  Product Scope   │              │  Services Scope  │
   └──────────────────┘              └──────────────────┘
```

Product Scope

the features, functions and specifications that describe the physical product, service or result of the Project. It describes what you will deliver to the customer as a part of the project. It is typically a physical facility, product or program to be delivered.

Services Scope

It describes the work to be performed to deliver the product e.g. will we perform studies, will we do design, etc. In some Projects, the Services Scope may be the same as the Product Scope.
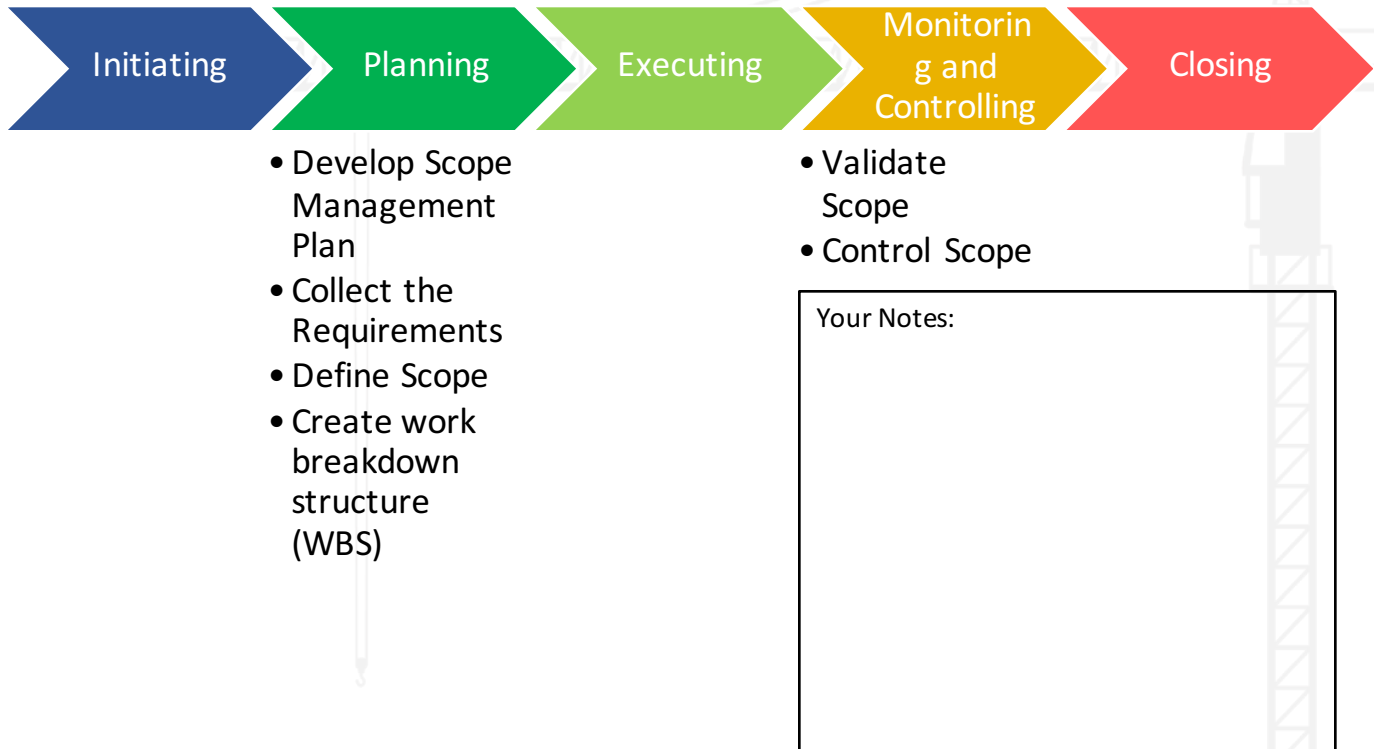
- Project Scope Statement is one of the important parts of Project Scope Management

Your Notes:

Module I

Project Scope Management – Part 1

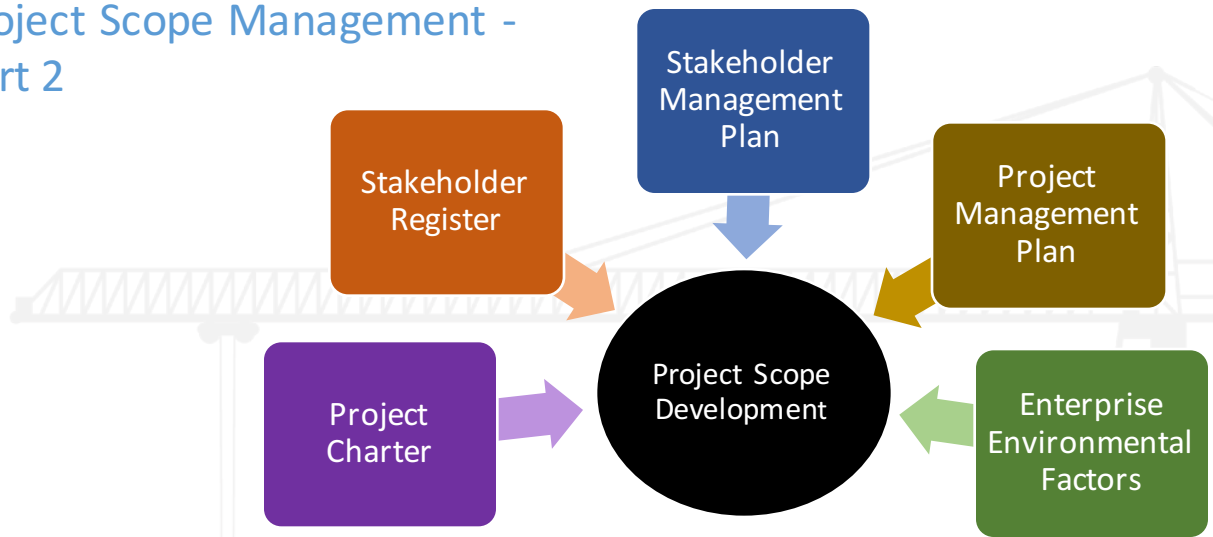The Project Scope Management Processes

Initiating	Planning	Executing	Monitoring and Controlling	Closing

- Develop Scope Management Plan
- Collect the Requirements
- Define Scope
- Create work breakdown structure (WBS)

- Validate Scope
- Control Scope

Your Notes:

Project Scope Development Sequence

Plan Scope Management (Planning how we will develop the scope)	**Collect Requirements**	**Define Scope** (Preparing the actual project scope statement to define a scope and obtain agreement)

Module 1

Project Scope Management - Part 2

Project Scope Development inputs:

1) **Project Charter**:
   - ❑ The formal authorization for the project that provides the context and background for the project.
   - ❑ At high level it contains the scope description and list of the project requirements along with the acceptance criteria.
   - ❑ It is the starting point for our project scope statement.

2) **Stakeholder Register**:
   - ❑ Documents key players who can provide input on the requirements.
   - ❑ These are the people we would want to reach out to when we prepare the project scope statement.

3) **Stakeholder Management Plan**:
   - ❑ Documents how we are going to engage the Stakeholders

4) **Project Management Plan**:
   - ❑ Includes prepared and approved sections of the plan that are used to help define the scope

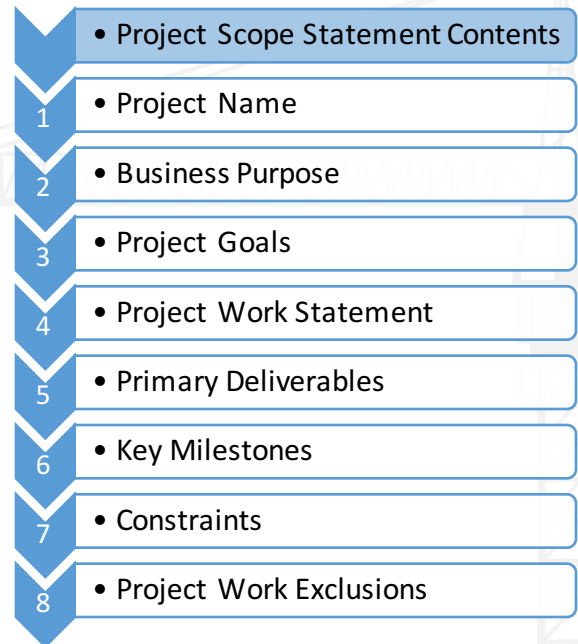5) **Enterprise Environmental Factors**:
   - ❑ Includes company culture and strategy, plus information on general market conditions and other key elements.

Your Notes:

Module I

Project Scope Management – Part 2 *Continued*

- The Project Scope Statement is the end product of our Project Scope Development process.

- The Project Scope Statement includes many of the same elements that are included in the Project Charter (that you learned about in the last course "Planning and Initiating").
  - The difference is the level of detail.

- The Project Scope Statement should be a fairly detailed statement about the product scope and the services scope.
  - It will include all the requirements, specification details for the products of our project.
  - While the Project Charter is typically 1-2 pages, the Project Scope Statement can be quite extensive.

- For larger projects it is generally best practice to divide Project Scope Statement into several sections, one section for each function of the project.
  - Each section will contain the similar table of contents and then there is an overall summary plan prepared by the project manager that ties them all together and summarizes the results.

- It is also good to include project acceptance criteria as a part of the project scope statement.
  - These criteria let us know when we have met the requirements and the deliverables are complete.
  - It is important to define these upfront as they are key elements of project scope statement.

	• Project Scope Statement Contents
1	• Project Name
2	• Business Purpose
3	• Project Goals
4	• Project Work Statement
5	• Primary Deliverables
6	• Key Milestones
7	• Constraints
8	• Project Work Exclusions

Who should develop the Project Scope statement? (Choose the correct option)
1) The project team
2) Managers
3) Stakeholders

Why?

Module I

Project Scope Development Sequence

Plan Scope Management

(Planning how we will develop the scope)

Collect Requirements

Define Scope

(Preparing the actual project scope statement to define a scope and obtain agreement)

1st step in Project Scope Development sequence is - **Plan Scope Management!**

Prepare a Scope Management Plan that addresses:

- Process for collecting the requirements
- Process for developing, reviewing and approving a Scope Statement
- How the WBS will be developed (Subject for next week)
- Approval of Project deliverables
- Process to approve and manage changes to the Project Scope

Your Notes:

Module I

Requirements Development

Project Scope Development Sequence

Plan Scope Management (Planning how we will develop the scope)	Collect Requirements	Define Scope (Preparing the actual project scope statement to define a scope and obtain agreement)

2nd step in Project Scope Development sequence is – **Collect requirements!**

Sources of information might include:

- Project Charter
- Bid documents
- Product specifications
- Stakeholders
- Focus Groups
- Facilitated Work Shops
- Questionnaires and Surveys
- Prototypes
- Benchmarks

Important: Keep track of source of each requirement that you collect.

Types of requirements

- Business or mission requirements
- User requirements
- Functional requirements
- Stakeholders requirements
- Quality requirements
- Project requirements

Module I

Requirements Development *Continued*

Reviewing the requirements

A key element of successful project execution is making sure that all of the requirements are well understood by all.

To assure this is true, we should review the requirements to make sure:

- All the conflicting requirements are reconciled.
- Each requirement has a single meaning
- Ambiguous words are removed and replaced
- There are no unbounded lists such as etc. or TBD
- All key-words are defined in a dictionary

Reviewing the requirements

As you Collect Requirements, also develop a Requirements Traceability Matrix. The Traceability Matrix allows us to:
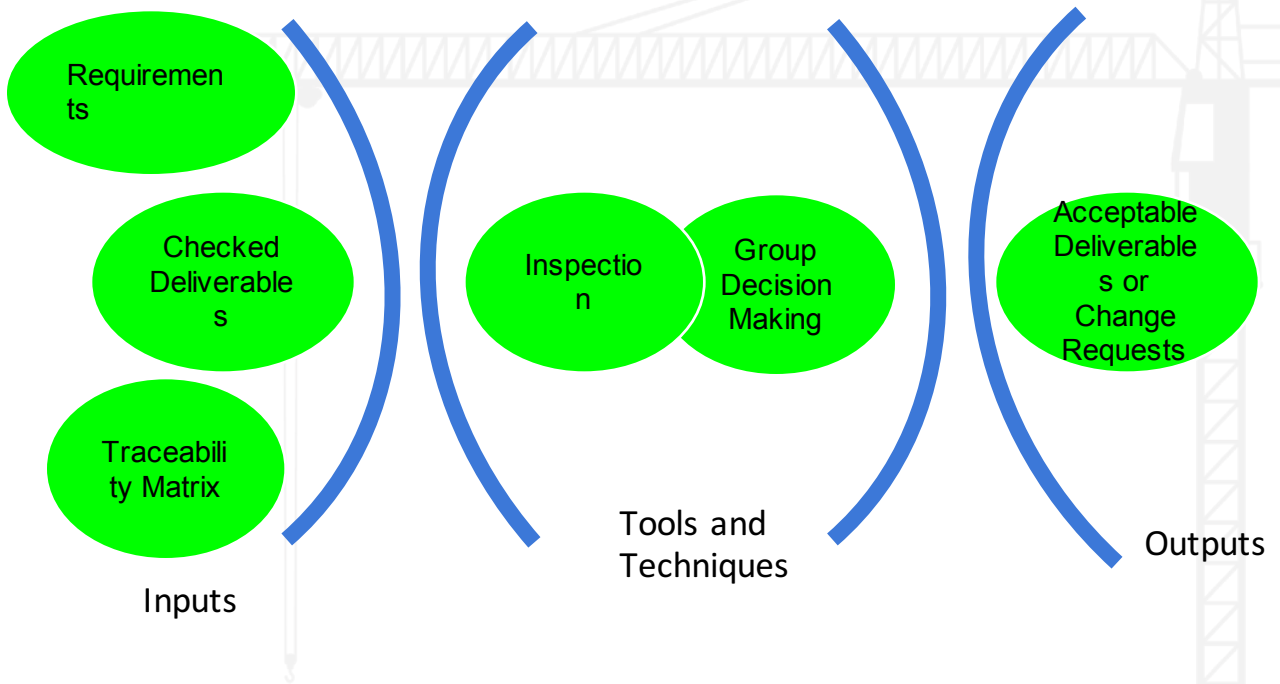
- Track Requirements from their source to how they will be
- Links each Requirement to a business value
- Ensures that each Requirement is included in the project

Requirements Traceability Matrix								
Project Name								
Project Description								
Requirement ID	Requirement Description	Business needs, goals, objectives satisfied	Project Objectives	Source	How will Project address?	Reference Document	Acceptance Criteria	Status

Module 1

Scope Validation: It is a confirmation by the customers and other identified stakeholders that the deliverables from the project meet their needs.

Inputs
- Requirements
- Checked Deliverables
- Traceability Matrix

Tools and Techniques
- Inspection
- Group Decision Making

Outputs
- Acceptable Deliverables or Change Requests

Your notes:

Why is the requirements traceability matrix useful?

Module I

Scope Control Process

Scope Control Process

The Scope Control Process is an established work process to identify, evaluate, control and approve changes on a project.

Uncontrolled project scope changes will:

- Cause undocumented delay
- Increase cost without approval
- Damage morale and productivity
- Spoil relationships

A good Scope Control Process:

- is documented and approved process
- Contains layers of authority

  Level 1: Project approval

  Level 2: Change control board approval

  Level 3: Executive approval
- Adapted to organization and project needs
- Based on validated scope
- Accepted process to modify the baseline
- Outlines roles and responsibilities

Your Notes:

Module 1

Scope Control Process *Continued*

Key attributes of a good change process:

- Change requests must be in writing
- Benefits of the change must be documented
- Roles and responsibilities must be appointed and documented
- Approval process must be documented
- Decision authorities must be appointed and agreed
- Approved changes must be incorporated into the plan
- Scope changes must be communicated
- A set of standardized tools should be used

Any good change process includes a listing of the key roles in the process and who fills those roles.

Key role includes:

- Originator: Person or persons requesting the change
- Coordinator: Person who records the change in the change log and shepherds it through the process
- Assessment body: Project team that evaluates the change and makes the recommendation.
- Decision makers: Authority to approve the change.
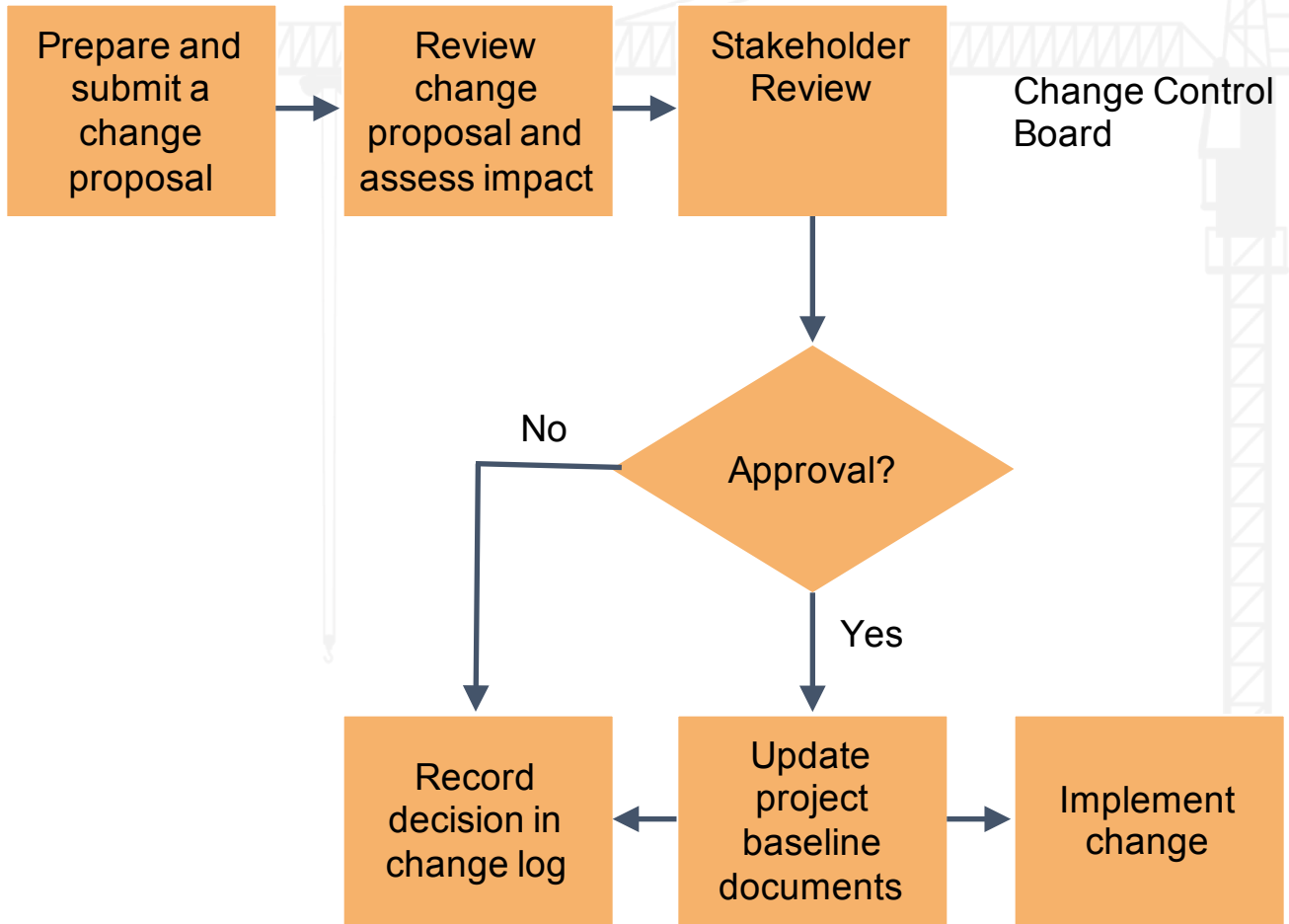- Implementers: Team members acting on a change.

Your Notes:

Module I

Scope Change Process

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┌─────────────┐     ┌─────────────┐     ┌─────────────┐
│ Prepare and │     │   Review    │     │ Stakeholder │      Change Control
│  submit a   │ ──► │   change    │ ──► │   Review    │      Board
│   change    │     │ proposal and│     │             │
│  proposal   │     │assess impact│     │             │
└─────────────┘     └─────────────┘     └─────────────┘
                                               │
                                               ▼
                           No            ◇─────────────◇
                        ◄────────────────│             │
                        │                │  Approval?  │
                        │                │             │
                        │                ◇─────────────◇
                        │                       │
                        │                      Yes
                        ▼                       ▼
                 ┌─────────────┐     ┌─────────────┐     ┌─────────────┐
                 │   Record    │ ◄── │   Update    │ ──► │  Implement  │
                 │ decision in │     │   project   │     │   change    │
                 │ change log  │     │  baseline   │     │             │
                 │             │     │  documents  │     │             │
                 └─────────────┘     └─────────────┘     └─────────────┘
```

Your Notes:

How can you implement the Scope Change Process?

Module 1

Scope Control Process *Continued*

Change Log:

- Ecah proposed change should be recorded in the change log
- The change log is a key document containing:
  - ID
  - Origination date
  - Originator
  - Description
  - Assessment (Cost, Schedule, Quality impacts)
  - Disposition
  - Approvals and approval dates
- The change log should be published in the monthly report

Your Notes:

Module 1 Conclusion

Modules objectives:

- ❑ Define a project scope based on stakeholder needs
- ❑ Develop a scope management plan based on the approved project scope
- ❑ Identify the key requirements and deliverables needed to be collected and analyzed to complete the plan
- ❑ Review a scope validation process
- ❑ Develop a scope control plan
- ❑ Develop a scope change management plan

Module Assignments:

- ❑ Peer Review: Project Scope Statement
- ❑ Discussion: Kaz and Tom weekly conclusion
- ❑ Quiz: End of Module 1 Quiz

Summarize this Module and jot down how you will personally use this material: