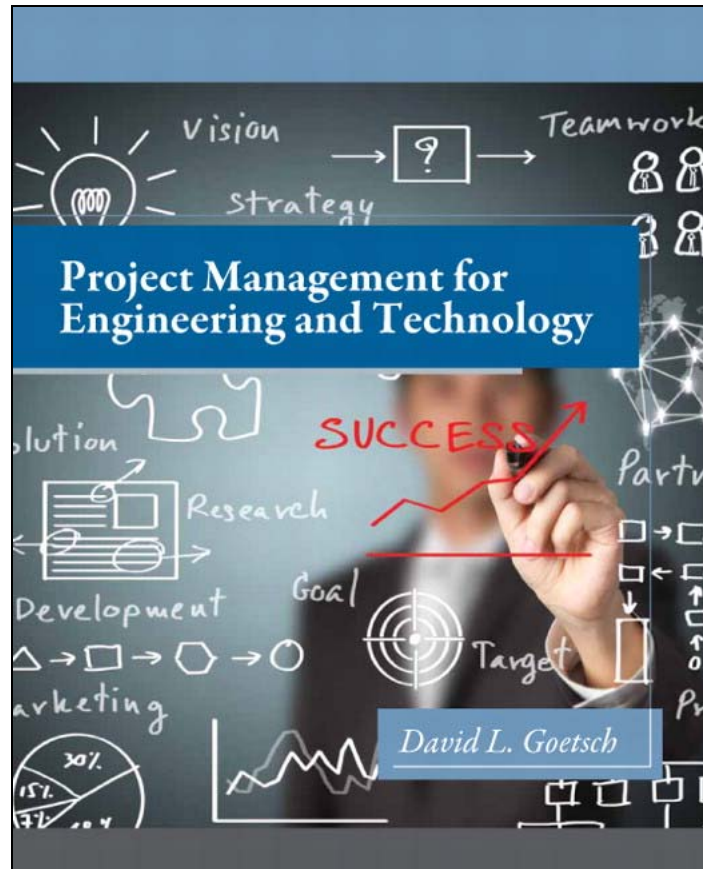


Project Management for Engineering and Technology



Overview of Project Management

Overview

- A project is a fully-coordinated group of interdependent tasks that are completed by people using resources and processes.
- Projects have definite starting and ending dates as well as success criteria.

Overview

- Project managers are needed in engineering and technology firms for the same reason conductors are needed in orchestras.
- Projects consist of tasks that must be planned, scheduled, budgeted, staffed, and coordinated.

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Overview

- Projects that are properly managed are completed on time, within budget, and according to specifications.
- There are four interrelated and interdependent components of any project:
 - scope
 - schedule
 - resources
 - leadership

Overview

- The project scope summarizes everything members of the project team need to know to fully understand the project.
- A project's scope includes a project overview, deliverables, features and functions, acceptance criteria, restrictions/constraints, and uncertainties.

Overview

- The schedule for a project includes the beginning and ending times and duration for all project tasks.
- Project resources include any and all assets needed to complete the project on time, within budget, and according to specifications.

Overview

- Internal project are initiated by engineering and technology firms for the purpose of enhancing the firm's competitiveness.
- External projects are initiated by customers that need a project and/or service.

Overview

- Projects have five distinct phases:
 - Initiation
 - Planning
 - Execution
 - Monitoring/control
 - Closeout

Figure 1.2 Phases and elements of the project management process.

Process Groups	KNOWLEDGE AREAS								
	Integration	Scope	Time Management	Cost Management	Quality Management	HR Management	Communication Management	Risk Management	Procurement Management
Initiating	Project charter (Contract, drawings, and specifications)	–	–	–	–	–	Identify stakeholders	–	–
Planning	Project management plan	- Scope development - Work breakdown structure development	- Estimate time and duration of activities - Develop schedule	- Estimate costs - Establish budget	Plan quality	Develop HR plan	Develop communication plan	- Identify and analyze risks - Plan risk management	Develop procurement plan
Executing	Project execution	–	–	–	Assure quality	Establish build/lead project	Communicate with all stakeholders regularly	–	Procure needed resources
Monitoring/Controlling	- Monitor, track progress, control - Adjust as changes occur	Control scope	Control schedule	Control costs	Control quality	Monitor team performance	Report on progress and performance	Monitor and control risks	Manage the procurement process
Closing	Close	–	–	–	–	–	–	–	Close procurements

Overview

- People skills needed by project managers include:
 - Teambuilding
 - Leadership
 - Motivation
 - Communication

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Overview

- People skills needed by project managers include:
 - Time management
 - Change management
 - Dealing with diversity
 - Leading times in times of adversity

Roles and Responsibilities of Project Managers

Roles and Responsibilities

- Project managers perform both process and people functions. Both types of functions are necessary for effective project management.

Roles and Responsibilities

- Process functions fall into the following groups:
 - initiating
 - planning
 - executing
 - monitoring and controlling, and
 - closing out projects

Roles and Responsibilities

- People functions include:
 - leadership
 - teambuilding
 - motivation
 - communication
 - time management
 - change management
 - diversity management
 - adversity management

Figure 2.1 Project managers provide the leadership in carrying out these process functions.

PROCESS FUNCTIONS OF PROJECT MANAGERS

1. Project initiation

- Develop project charter
- Identify stakeholders

2. Project planning

- Develop the project schedule
- Develop the cost estimate/budget
- Develop the quality, human resource, communication, and risk management plans

3. Project execution

- Direct and manage project work
- Assure quality
- Conduct procurements

4. Project monitoring/control

- Control changes
- Control the scope, schedule, costs, quality, performance, and risk

5. Project closeout

- Close procurements
- Close all other project activities

Figure 2.5 People functions are half of a project manager's job.

CHECKLIST OF THE PROJECT MANAGER'S PEOPLE FUNCTIONS	
☒	Leadership
☒	Teambuilding
☒	Conflict management
☒	Motivation
☒	Communication
☒	Time management
☒	Change management
☒	Diversity management
☒	Adversity management

Roles and Responsibilities

- Effective project managers have the following characteristics:
 - advanced process skills
 - advanced people skills
 - intellectual curiosity
 - commitment
 - vision
 - insight
 - people orientation
 - character

Roles and Responsibilities

- Effective project managers do the following:
 1. focus on solutions
 2. practice decisive and participatory management
 3. focus on the customer
 4. focus on win-win outcomes
 5. lead by example
 6. elicit the best from all stakeholders

(From Duncan Brodie of ProjectSmart)

Roles and Responsibilities

- Project managers may work in organizations that have a functional, matrix, or project-oriented structure.
 - In functional organizations (Hierarchical or line structure), project managers typically do not have line authority over members of project teams.

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Roles and Responsibilities

- Project managers may work in organizations that have a functional, matrix, or project-oriented structure.
 - In matrix organizations each department (e.g. engineering, manufacturing, etc.) is considered a pool from which project team members are drawn as needed.
 - Project managers do not have line authority over team members in matrix organizations.

Roles and Responsibilities

- In organizations with a project structure all work revolves around projects. In this type of organization, project managers have line authority over their team members.

Roles and Responsibilities

- Various project management certifications are available from the Project Management Institute.
- For information about certification requirements and levels go to www.pmi.org

Project Initiation

Project Initiation

- The outcomes of the project initiation phase of a project are:
 - project description, feasibility analysis report, concept document, project charter with scope, stakeholder register, and the project kickoff meeting.
- The project description summarizes what the project involves, who the project is for, and why the project is important.

Project Initiation

- The feasibility analysis should answer these questions:
 - Is the firm already operating at capacity?
 - Does the project fall within the firm's core competencies?
 - Is the potential return on investment sufficient?
 - Is the customer financially able to meet its contractual obligations?

Project Initiation

- The project concept document should contain the following:
 - overview of the project, purpose statement, goals and objectives, selected approach and strategies for implementing it, success factors, financial information and resource requirements, schedule information, and risk information.

Project Initiation

- The project charter is more detailed than the project concept document. It should contain:
 - general information, project overview, assumptions, scope, milestones, deliverables, authority/responsibility, organization, roles, disaster recovery, resources, funding, and signatures.

Project Initiation

- The project stakeholder register is a directory of all individuals who have a stake in the project. It contains complete contact information on all stakeholders.

Project Initiation

- The project kickoff meeting should cover the following agenda items as a minimum:
 - welcome, introductions, distribution and discussion of the project charter, discussion of the stakeholder register, discussion of next steps, and questions/concerns from team members.

Figure 3.8 Project managers should develop a comprehensive agenda for the kickoff meeting.

Agenda KICKOFF MEETING: XYZ PROJECT Date: September 27, 9:00 AM, 3rd Floor Conference Room Project Manager: Mark Wheland AGENDA ITEMS 1. Welcome by Mark Wheland 2. Introductions of team members 3. Distribution and discussion of the project charter: a. Project overview b. Assumptions c. Project scope with milestones and deliverables d. Authority and responsibility e. Project organization f. Roles and responsibilities g. Disaster recovery h. Resources and funding 4. Stakeholder register a. Known stakeholders b. Hidden stakeholders 5. Next steps 6. Around the room a. Questions b. Concerns
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Project Planning: The Schedule

Develop the Management Plan and Schedule

- Effective scheduling can result in benefits in the critical areas of time, cost, and quality. Consequently, project managers must be good schedulers.

Develop the Management Plan and Schedule

- The scheduling process consists of the following steps:
 1. clarify the project's goal
 2. develop the work breakdown structure (WBS)
 3. put the WBS activities in sequence
 4. compute and chart the durations of all WBS activities

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Develop the Management Plan and Schedule

- The scheduling process consists of the following steps:
 5. develop the network diagram and determine the critical path
 6. update the schedule as needed
 7. monitor the schedule throughout the project

Figure 4.6 WBS for producing a motorcycle with time allocations and numbering.

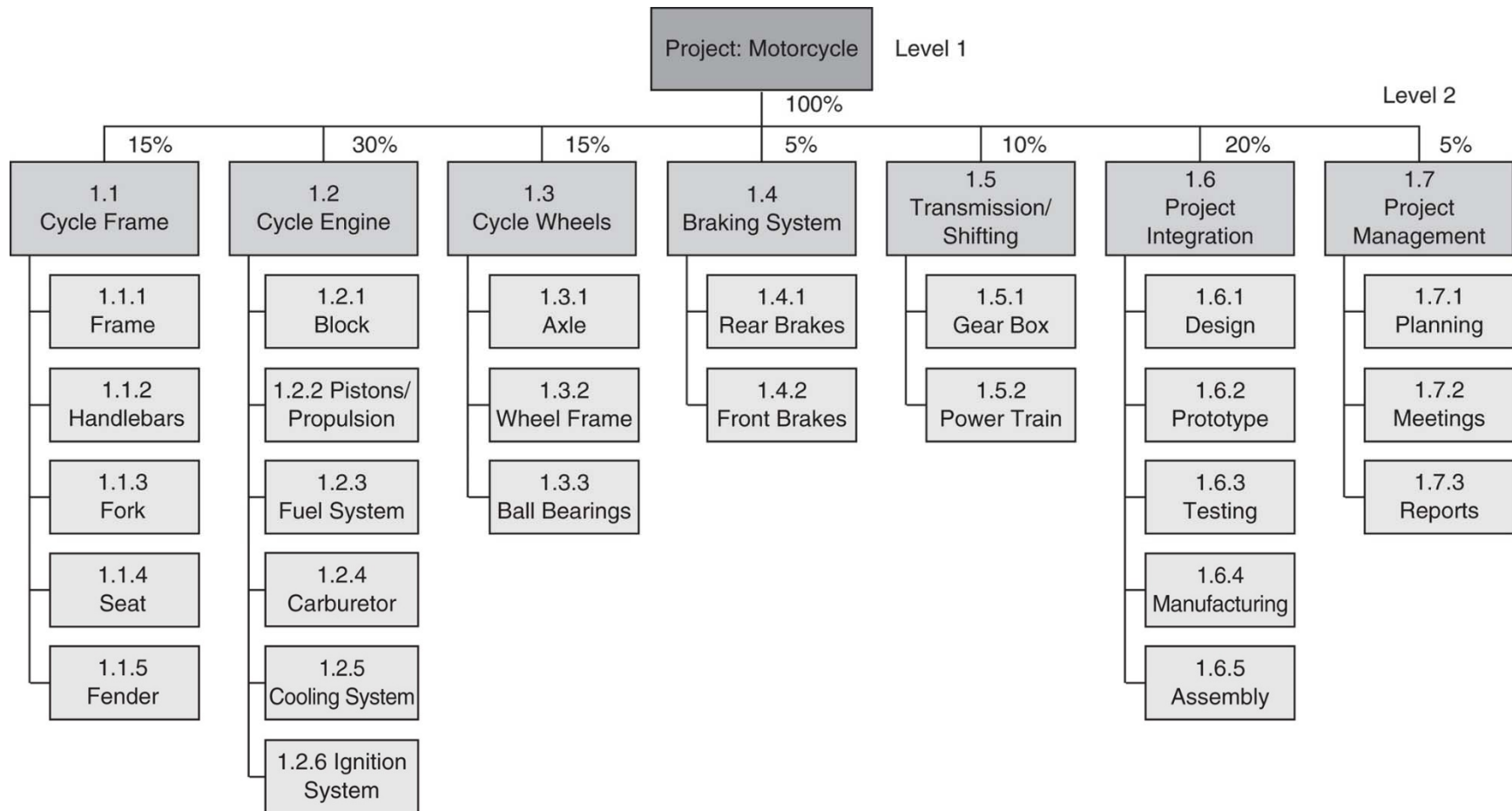


Figure 4.9 Sample Gantt chart schedule.

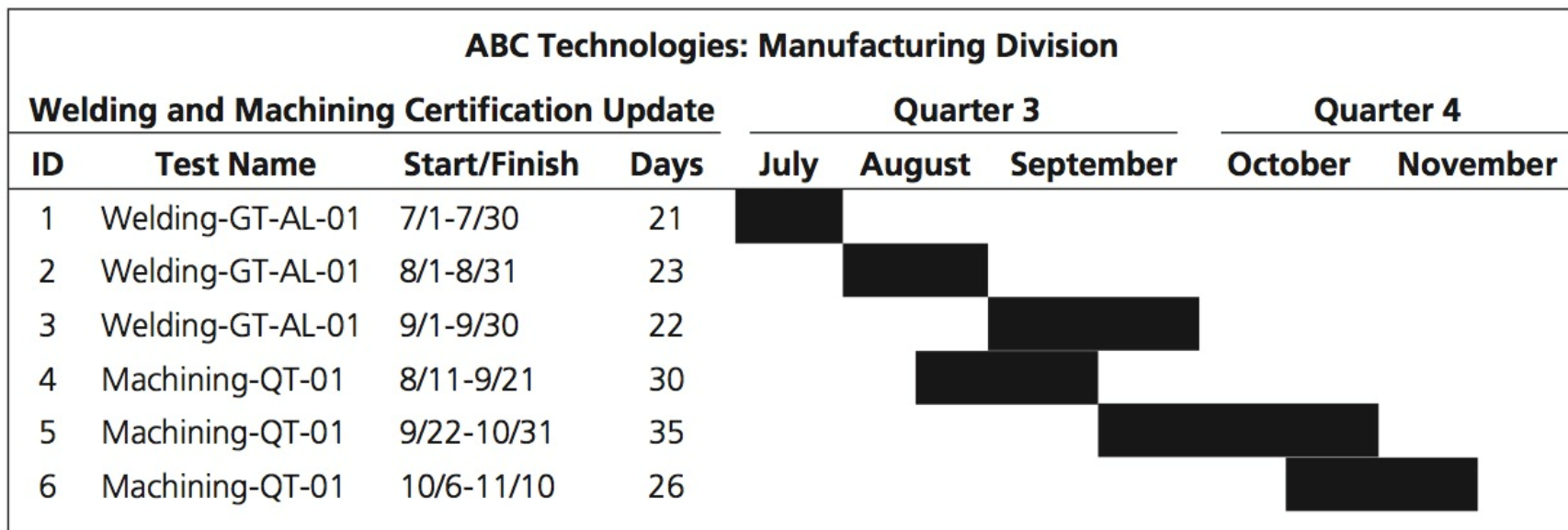


Figure 4.10 CPM network diagram.

