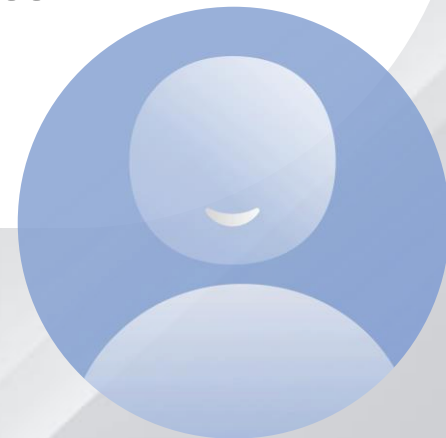


# Project Monitoring

## Lecture 7

PMG 333

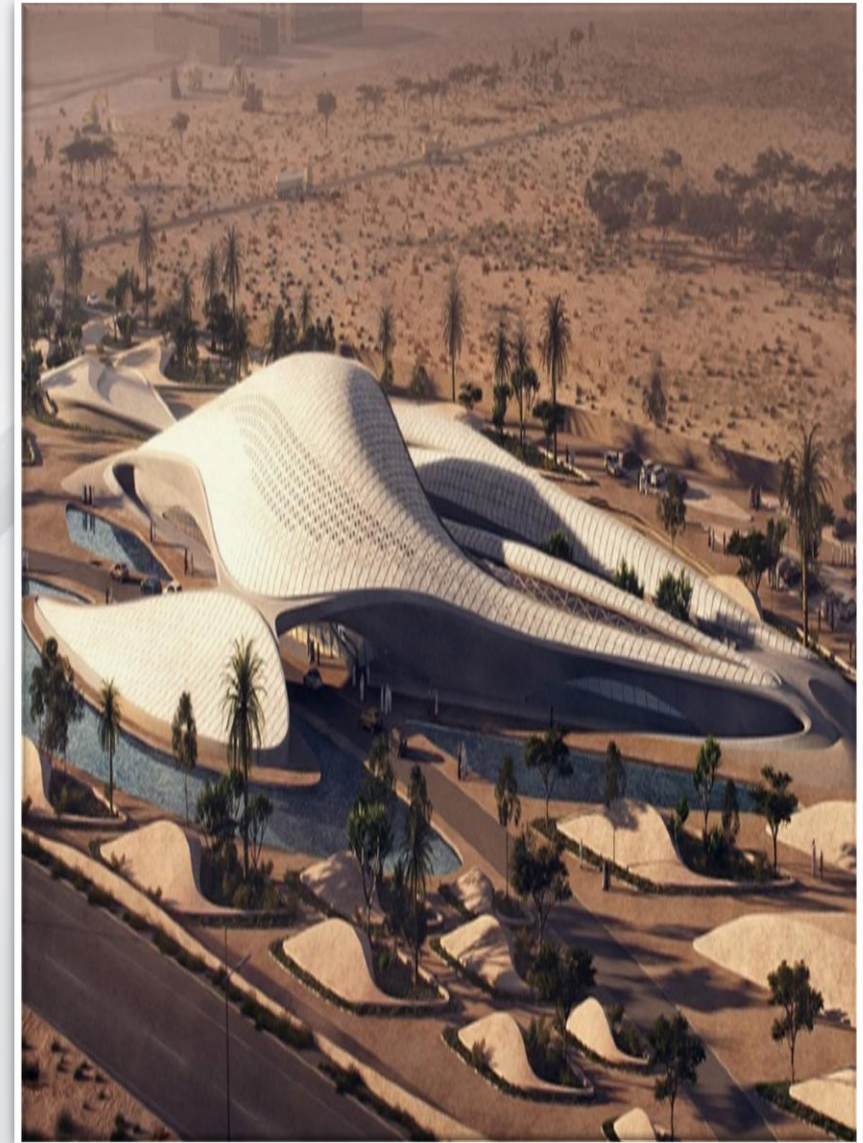
## Reducing Project Duration



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## Learning objectives

1. Understand the different reasons for crashing a project.
2. Identify the different options for crashing an activity when resources are not constrained.
3. Identify the different options for crashing an activity when resources are constrained.
4. Determine the optimum cost-time point in a project network.
5. Understand the risks associated with compressing or crashing a project.
6. Identify different options for reducing the costs of a project.



## Outlines

1. Rationale for Reducing Project Duration
2. Options for Accelerating Project Completion
3. Project Cost–Duration Graph
4. Constructing a Project Cost–Duration Graph
5. Practical Considerations
6. What If Cost, Not Time, Is the Issue?

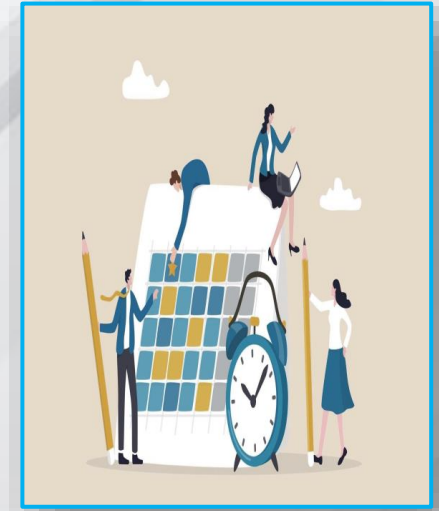
## 7.1 Rationale for Reducing Project Duration

- There are many good reasons for attempting to reduce the duration of a project.
- One of the more important reasons today is time to market.
- Intense global competition and rapid technological advances have made speed a competitive advantage. To succeed, companies have to spot new opportunities, launch project teams, and bring new products or services to the marketplace in a flash.
- Perhaps in no industry does speed matter as much as in the electronics industry.



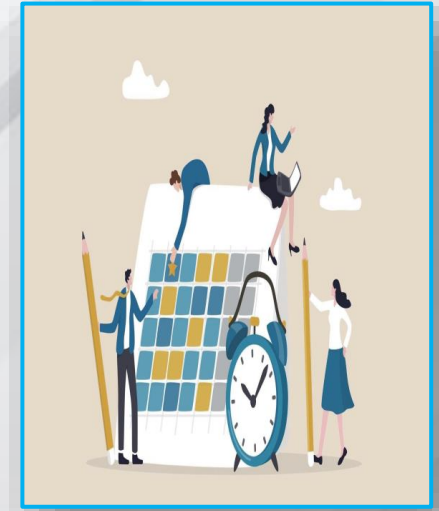
## 7.1 Rationale for Reducing Project Duration – Cont.

- For example, a rule of thumb for moderate- to high-technology firms is that a six-month delay in bringing a product to market can result in a loss of market share of about 35 percent.
- In these cases, high-technology firms typically assume that the time savings and avoidance of lost profits are worth any additional costs to reduce time without any formal analysis.



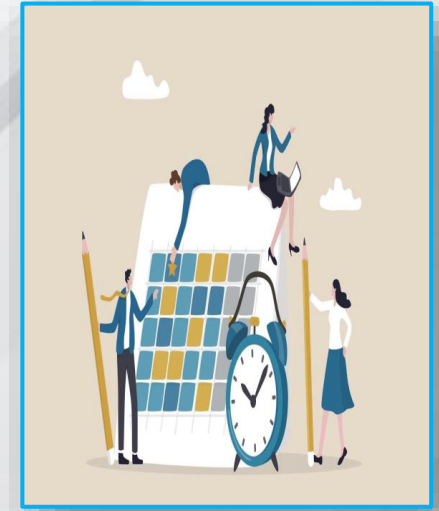
## 7.1 Rationale for Reducing Project Duration – Cont.

- Business survival depends not only on rapid innovation but also on adaptability.
- Global recession and energy crises have stunned the business world, and those companies that survive will be those that can quickly adapt to new challenges.
- This requires speedy project management! For example, the fate of the U.S. auto industry depends in part on how quickly they shift their efforts to develop fuel-efficient, alternative forms of transportation.



## 7.1 Rationale for Reducing Project Duration – Cont.

- Another common reason for reducing project time occurs when unforeseen delays—for example, adverse weather, design flaws, and equipment breakdown—cause substantial delays midway in the project.
- Getting back on schedule usually requires compressing the time on some of the remaining critical activities.
- The additional costs of getting back on schedule need to be compared with the consequences of being late.
- This is especially true when time is a top priority.



## 7.1 Rationale for Reducing Project Duration – Cont.

- Incentive contracts can make reduction of project time rewarding—usually for both the project contractor and owner.
- For example, a contractor finished a bridge across a lake 18 months early and received more than \$6 million for the early completion.
- The availability of the bridge to the surrounding community 18 months early to reduce traffic gridlock made the incentive cost to the community seem small to users.
- In another example, in a continuous improvement arrangement, the joint effort of the owner and contractor resulted in early completion of a river lock and a 50/50 split of the savings to the owner and contractor.

## 7.1 Rationale for Reducing Project Duration – Cont.

- “Imposed deadlines” is another reason for accelerating project completion.
- For example, a politician makes a public statement that a new law building will be available in two years.
- Or the president of a software company remarks in a speech that new advanced software will be available in one year.

## 7.2 Options When Resources Are Not Constrained

- **Adding Resources**
- Identify the different options for crashing an activity when resources are not constrained.
- The most common method for shortening project time is to assign additional staff and equipment to activities.
- There are limits, however, as to how much speed can be gained by adding staff.

## 7.2 Options When Resources Are Not Constrained

- Doubling the size of the workforce will not necessarily reduce completion time by half.
- The relationship would be correct only when tasks can be partitioned so minimal communication is needed between workers, as in harvesting a crop by hand or repaving a highway.
- Most projects are not set up that way; additional

## 7.2 Options for Accelerating Project Completion

- workers increase the communication requirements to coordinate their efforts.
- For example, doubling a team by adding two workers requires six times as much pairwise intercommunication than is required in the original two-person team.
- Not only is more time needed to coordinate and manage a larger team; there is the additional delay of training the new people and getting them up to speed on the project.

## 7.2 Options for Accelerating Project Completion

### Outsourcing Project Work

- A common method for shortening the project time is to subcontract an activity.
- The subcontractor may have access to superior technology or expertise that will accelerate the completion of the activity.
- For example, contracting for a backhoe can accomplish in two hours what it can take a team of laborers two days to do.

## 7.2 Options for Accelerating Project Completion

- Likewise, by hiring a consulting firm that specializes in ADSI programming, a firm may be able to cut in half the time it would take for less experienced, internal programmers to do the work.
- Subcontracting also frees up resources that can be assigned to a critical activity and will ideally result in a shorter project duration.

## Scheduling Overtime

- The easiest way to add more labor to a project is not to add more people, but to schedule overtime.
- If a team works 50 hours a week instead of 40, it might accomplish 20 percent more.
- By scheduling overtime you avoid the additional costs of coordination and communication encountered when new people are added.

## Scheduling Overtime – Cont.

- If people involved are salaried workers, there may be no real additional cost for the extra work.
- Another advantage is that there are fewer distractions when people work outside normal hours.

## Overtime Advantages:

- First, hourly workers are typically paid time and a half for overtime and double time for weekends and holidays.
- Sustained overtime work by salaried employees may incur intangible costs such as divorce, burnout, and turnover.
- The latter is a key organizational concern when there is a shortage of workers.

## Overtime Advantages – Cont.

- Further more, it is an oversimplification to assume that, over an extended period of time, a person is as productive during his or her eleventh hour at work as during his or her third hour of work.
- There are natural limits to what is humanly possible, and extended overtime may actually lead to an overall decline in productivity when fatigue sets in (DeMarco, 2002).

## Overtime Advantages – Cont.

- Overtime and working longer hours is the preferred choice for accelerating project completion, especially when the project team is salaried.
- The key is to use overtime judiciously.
- Remember a project is a marathon not a sprint! You do not want to run out of energy before the finish line

## Establish a Core Project Team

- One of the advantages of creating a dedicated core team to complete a project is speed.
- Assigning professionals full time to a project avoids the hidden cost of multitasking in which people are forced to juggle the demands of multiple projects.
- Professionals are allowed to devote their undivided attention to a specific project.

## Establish a Core Project Team – Cont.

- This singular focus creates a shared goal that can bind a diverse set of professionals into a highly cohesive team capable of accelerating project completion.
- Factors that contribute to the emergence of high-performing project teams will be discussed later.

## Do It Twice – Fast and Correctly

- If you are in a hurry, try building a “quick and dirty” short-term solution, then go back and do it the right way.
- For example, pontoon bridges are used as temporary solutions to damaged bridges in combat.

## Do It Twice – Fast and Correctly – Cont.

- In business, software companies are notorious for releasing version 1.0 of products that are not completely finished and tested.
- Subsequent versions 1.1 . . . x correct bugs and add intended functionality to the product.
- The additional costs of doing it twice are often more than compensated for by the benefits of satisfying the deadline.

## 7.3 Options When Resource Are Constrained:

- A project manager has fewer options for accelerating project completion when additional resources are either not available or the budget is severely constrained.
- This is especially true once the schedule has been established.
- Below are some of these options, which are also available when resources are not constrained.

## Improve the Efficiency of the Project team:

- The project team may be able to improve productivity by implementing more efficient ways to do their work.
- This can be achieved by improving the planning and organization of the project or eliminating barriers to productivity such as excessive bureaucratic interference and red tape

## Fast – Tracking:

- Sometimes it is possible to rearrange the logic of the project network so that critical activities are done in parallel (concurrently) rather than sequentially.
- This alternative is commonly referred to as fast tracking and is a good one if the project situation is right.
- When this alternative is given serious attention, it is amazing to observe how creative project team members can be in finding ways to restructure sequential activities in parallel.

## Fast – Tracking – Cont.

- Sometimes, one of the most common methods for restructuring activities is to change a finish-to-start relationship to a start-to-start relationship.
- For example, instead of waiting for the final design to be approved, manufacturing engineers can begin building the production line as soon as key specifications have been established.
- Changing activities from sequential to parallel is not without risk.
- Late design changes can produce wasted effort and rework.
- Fast tracking requires close coordination among those responsible for the activities affected and confidence in the work that has been completed.

## Critical-Chain:

- Critical-chain project management (CCPM) is designed to accelerate project completion.
- It would be difficult to apply CCPM midstream in a project. CCPM requires considerable training and a shift in habits and perspectives that takes time to adopt.
- Although there have been reports of immediate gains, especially in terms of completion times, a long-term management commitment is probably necessary to reap full benefits.

## Reducing Project Scope:

- Probably the most common response for meeting unattainable deadlines is to reduce or scale back the scope of the project.
- This invariably leads to a reduction in the functionality of the project.
- For example, the new car will average only 25 mpg instead of 30, or the software product will have fewer features than originally planned.

## Reducing Project Scope – Cont.

- While scaling back the scope of the project can lead to big savings in both time and money, it may come at a cost of reducing the value of the project.
- If the car gets lower gas mileage, will it stand up to competitive models? Will customers still want the software minus the features?

## Reducing Project Scope – Cont.

- The key to reducing a project scope without reducing value is to reassess the true specifications of the project.
- Often requirements are added under best-case, blue-sky scenarios and represent desirables, but not essentials.
- Here it is important to talk to the customer and/or project sponsors and explain the situation—you can get it your way but not until February.

## Reducing Project Scope – Cont.

- This may force them to accept an extension or to add money to expedite the project.
- If not, then a healthy discussion of what the essential requirements are and what items can be compromised in order to meet the deadline needs to take place.
- More intense reexamination of requirements may actually improve the value of the project by getting it done more quickly and for a lower cost.

## Reducing Project Scope – Cont.

- Calculating the savings of reduced project scope begins with the work breakdown structure.
- Reducing functionality means certain tasks, deliverables, or requirements can be reduced or even eliminated.
- These tasks need to be found and the schedule adjusted.
- Focus should be on changes in activities on the critical path.

## What If Cost, Not Time, Is the Issue?

- In today's fast-paced world, there appears to be a greater emphasis on getting things done quickly.
- Still, organizations are always looking for ways to get things done cheaply.
- This is especially true for fixed-bid projects, where profit margin is derived from the difference between the bid and actual cost of the project.
- Every dollar saved is a dollar in your pocket. Sometimes, in order to secure a contract, bids are tight, which puts added pressure on cost containment.
- In other cases, there are financial incentives tied to cost containment

## What If Cost, Not Time, Is the Issue? – Cont.

- Even in situations where cost is transferred to customers there is pressure to reduce cost.
- Cost overruns make for unhappy customers and can damage future business opportunities.
- Budgets can be fixed or cut, and when contingency funds are exhausted, then cost overruns have to be made up with remaining activities.

## What If Cost, Not Time, Is the Issue? – Cont.

- As discussed earlier, shortening project duration may come at the expense of over time, adding additional personnel, and using more expensive equipment and/or materials.
- Conversely, sometimes cost savings can be generated by extending the duration of a project.
- This may allow for a smaller workforce, less-skilled (expensive) labor, and even cheaper equipment and materials to be used.
- Below are some of the more commonly used options for cutting costs.

## Reduce Project Scope

- Just as scaling back the scope of the project can gain time, delivering less than what was originally planned also produces significant savings.
- Again, calculating the savings of a reduced project scope begins with the work breakdown structure.
- However, since time is not the issue, you do not need to focus on critical activities.
- For example, on over-budget movie projects it is not uncommon to replace location shots with stock footage to cut costs.

## Have Owner Take on More Responsibility

- One way of reducing project costs is identifying tasks that customers can do themselves.
- Homeowners frequently use this method to reduce costs on home improvement projects.
- For example, to reduce the cost of a bathroom remodel, a homeowner may agree to paint the room instead of paying the contractor to do it.
- On IS projects, a customer may agree to take on some of the responsibility for testing equipment or providing in-house training.

## Have Owner Take on More Responsibility – Cont.

- Naturally, this arrangement is best negotiated before the project begins.
- Customers are less receptive to this idea if you suddenly spring it on them.
- An advantage of this method is that, while costs are lowered, the original scope is retained.
- Clearly this option is limited to areas in which the customer has expertise and the capability to pick up the tasks.

## Outsourcing Project Activities or Even the Entire Project

- When estimates exceed budget, it not only makes sense to re-examine the scope but also search for cheaper ways to complete the project.
- Perhaps instead of relying on internal resources, it would be more cost effective to outsource segments or even the entire project, opening up work to external price competition.

## Outsourcing Project Activities or Even the Entire Project – Cont.

- Specialized subcontractors often enjoy unique advantages, such as material discounts for large quantities, as well as equipment that not only gets the work done more quickly but also less expensively.
- They may have lower overhead and labor costs.
- For example, to reduce costs of software projects, many American firms outsource work to firms overseas where the salary of a software engineer is one-third that of an American software engineer.
- However, outsourcing means you have less control over the project and will need to have clearly definable deliverables.

## Brainstorming Cost Savings Options

- Just as project team members can be a rich source of ideas for accelerating project activities, they can offer tangible ways for reducing project costs.
- For example, one project manager reported that his team was able to come up with over \$75,000 worth of cost saving suggestions without jeopardizing the scope of the project.
- Project managers should not underestimate the value of simply asking if there is a cheaper, better way.



Thank You