



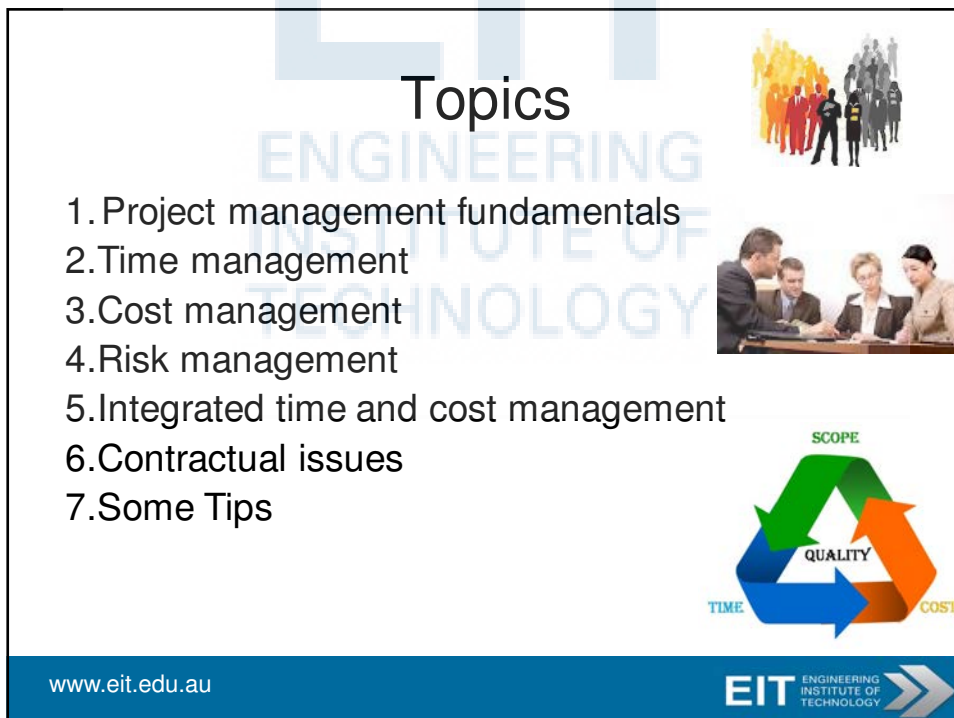
# Essentials of Project Management

by  
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Dean of Engineering

Ably supported by  
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Manager - UK




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## Topics

1. Project management fundamentals
2. Time management
3. Cost management
4. Risk management
5. Integrated time and cost management
6. Contractual issues
7. Some Tips



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## 1.0 PROJECT MGT FUNDAMENTALS

- Basic definitions
- Project management processes
- The project framework
- Project organisation structures
- Project success
- Project planning



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## DEFINITIONS

- **PROJECT**
  - A TEMPORARY ENDEAVOR UNDERTAKEN TO CREATE A UNIQUE PRODUCT OR SERVICE
- **PROGRAMME**
  - A GROUP OF INTERDEPENDENT PROJECTS
- **PROJECT MANAGEMENT :**

**APPLICATION OF:**

- KNOWLEDGE
- SKILLS
- TOOLS
- PROCESSES

} **TO ACHIEVE** {

**OBJECTIVES:**

- TIME
- COST
- FUNCTIONALITY

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## PROJECTS.....

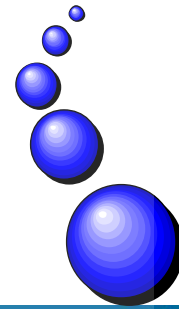
- Planned, executed and controlled
- Constrained by resource limitations
- Performed by people
  
- Note: the difference between projects and operations

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## BASIC PM PROCESSES

- Initiating
  - Taking actions to commence the project/phase
- Planning
  - Identifying objectives and means of achievement
- Executing
  - Co-ordinating resources to implement plan
- Controlling
  - Monitoring and correcting
- Closing
  - Handover and project closure

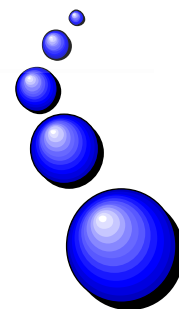


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## SYSTEMS APPROACH

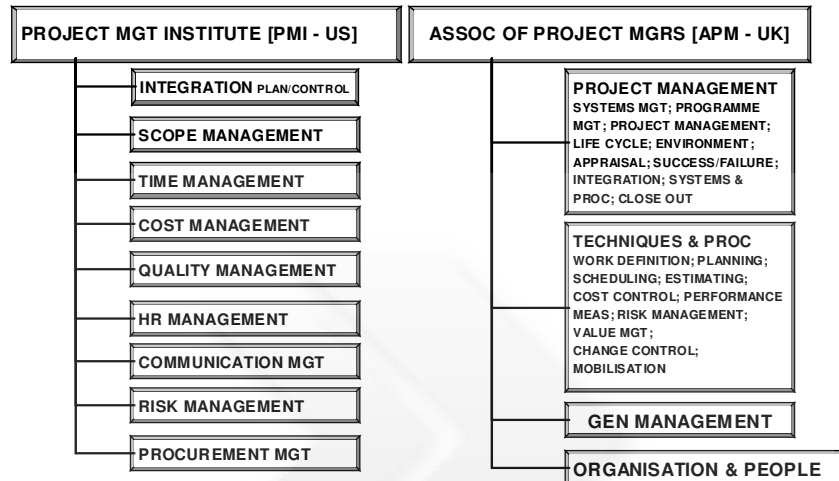
- Environment
- Inputs
- Outputs
- Functions
- Elements and couplings
- State transitions



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# PM BODY OF KNOWLEDGE



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## PMBOK...

Processes described in terms of:

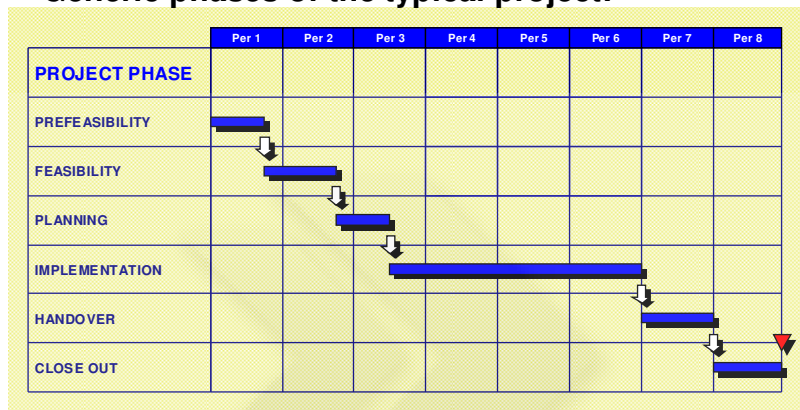
- Inputs (documents, plans, designs)
- Tools & techniques (mechanisms applied to inputs)
- Outputs (documents, products)

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# THE PROJECT LIFECYCLE

Generic phases of the typical project:

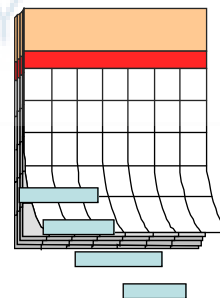


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## 2.0 Time management

- Planning - the project schedule
- Monitoring and reporting
- Comparing actual and achieved progress
- Defining and implementing corrective action

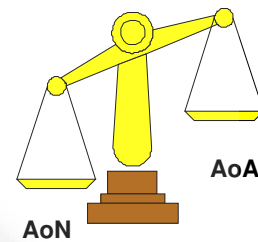


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## Project planning

- CRITICAL PATH METHOD (AoA)
  - Most common pre computers
- PRECEDENCE METHOD (AoN)
  - More flexible and powerful
- Four steps, common to both:
  - work breakdown
  - define logic network
  - apply activity data
  - analyse the network

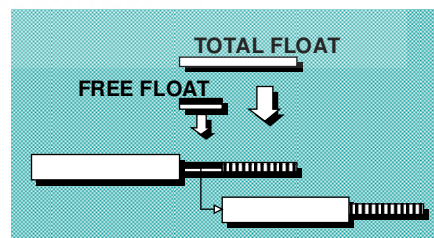


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## Network analysis

- Critical path
  - The path(s) along which activities have no float
- Total float
  - The float available without affecting total project duration – could impact on other activities
- Free float
  - The float available without impact on other activities
- Independent float
  - Worst case – predecessor finishes late, successor starts early

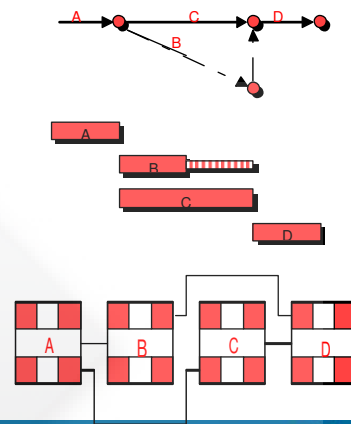


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## Presenting the schedule

- Critical path method
  - Arrow network
  - Gantt chart
- Precedence method
  - Gantt chart
  - Logic network (PERT)

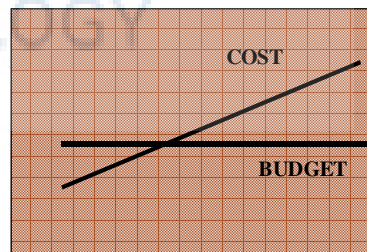


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## 3.0 Cost management

- Estimating
- Budgeting
- Financial control
- Change control
- Cost monitoring
- Value management



***“PROJECT MANAGER SEEKS  
NEW OPPORTUNITIES...”***

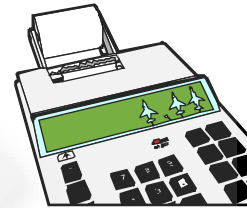
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## Cost estimating 1

- Prepared for
  - feasibility studies
  - cost management
- Estimate basis
  - Inclusions and exclusions clarified
  - Order of accuracy (ROC/PAC/FEC etc)
  - Index
  - Contingency



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## Cost estimating 2

- Estimating methods
  - Resource based
  - Estimating guides
  - Parameter estimates
  - Exponent estimating
- Forecast final cost
  - FFC equals
    - base estimate, plus
    - contingency, plus
    - escalation, plus
    - exchange fluctuations

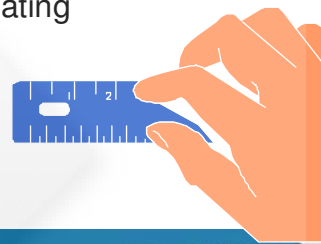


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## Cost estimating 3

- Document procedures
  - Assures uniformity and reliability
  - Procedures should define
    - definition of basis
    - methods to be applied
    - definition of contingency estimating
    - data sources to be used
    - applicable checklists
    - documentation requirements
    - review requirements



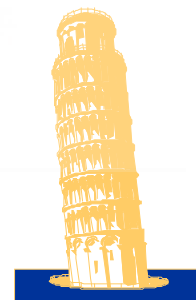
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## 4.0 RISK DEFINED

- The elements of RISK are:
  - The LIKELIHOOD of the event arising
  - The CONSEQUENCES if it does
- RISK is present in ALL projects

CONSEQUENCES	HIGH	RARE CATASTROPHE	COMMON DISASTER
	LOW	UNLIKELY & INSIGNIFICANT	FREQUENT IRRITATION
		LOW	HIGH
		LIKELIHOOD	



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## RISK MGT DEFINED

- The systematic application of policies, procedures and practices, to identify, analyse, assess, treat, and monitor risk
- **ELEMENTS** [AS/NZS 4360:1995]:
  - Establish Context
  - Identify Risks
  - Analyse Risks
  - Assess Risks
  - Develop Risk Treatments
  - Monitor & Review



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## APPLICATION

- Benefits
  - Facilitates rational risk taking
  - Improve basis of financial commitment
  - Improves the planning process
  - Identifies more suitable project processes (e.g. contracting)
  - Good management vs. good luck
- Scope
  - Applicable to all projects
  - A continuous process
  - Most benefits if commenced early

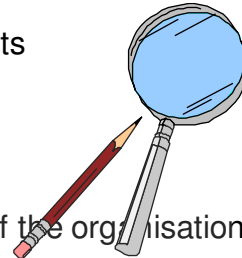


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## ESTABLISH CONTEXT

- Outputs
  - risk management structure (elements within the project)
  - Risk assessment criteria
- Review Context
  - strategic - operating environment of the organisation (financial, political, legal etc)
  - organisational - capabilities, objectives, strategies
  - project - objectives, activities, technologies, environment



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## RISK IDENTIFICATION

- A planned approach required to ensure *all* risks are identified
- STEP 1: identify all events that could affect all elements
- STEP 2: consider all causes & scenarios for each event
- Processes may involve
  - Structured interviews
  - Brainstorming sessions
  - Use of specialist
  - Historical experience



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## RISK ANALYSIS

- Objectives
  - assign level of risk to each event
  - generate data for assessment
  - separate minor & major risks
- Qualitative risk analysis
  - Sort into low/high probability and impact
  - Implement initial responses for significant risks if urgent
- Quantitative risk analysis
  - Sensitivity analysis / Probabilistic analysis / Decision trees / Influence diagrams

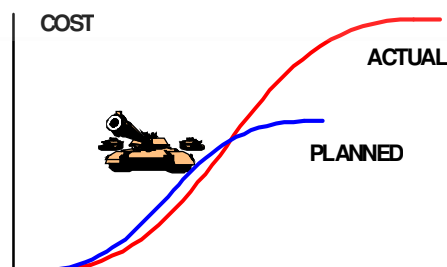


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## 5.0 INTEGRATED TIME & COST

- An earned value analysis approach
- Cost/Schedule Control System Criteria [C/SCSC - US DoD]
- Performance Measurement System [PMS - US DoE]



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## 6.0 LEGAL ISSUES IN PROCUREMENT

- Legal system
- Elements of contracts
- Tendering
- Vitiating factors
- Termination of contracts
- Time for Completion, & EoT
- Remedies for breach of contract
- Liquidated Damages for late completion
- Penalties & Bonuses

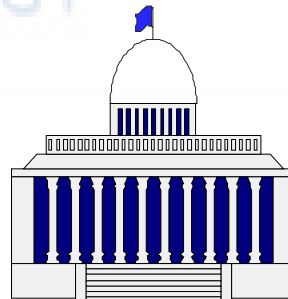


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## THE LEGAL SYSTEM

- Basis of the system
  - Constitutional
  - Local Government
  - Civil law
- Doctrine of Precedence
  - Binding
  - Persuasive
- Natural justice
  - Allegation required to be proved
  - No bias or interest of tribunal
  - Defendant must have the opportunity to contest



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## ELEMENTS OF A CONTRACT

- Intention to be legally bound
- Agreement
  - offer
  - acceptance
- Consideration
- Definite terms
- Legality
- Capacity to contract



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## OFFER

- Must be communicated
  - by words or action
  - the world, a group, one person
- Lapses with time
- Revocable at any time, in general
  - if not, bound by acceptance
  - revoked at time of communication
  - communication need not be direct
- Destroyed by counter offer
- Cf invitation to treat, puffery

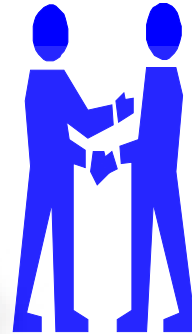


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## ACCEPTANCE

- Must be absolute
- Distinguish from counter offer from enquiry
- Must be communicated
  - words or deeds
- Must comply with specified terms of offer
- Accepted at time of posting

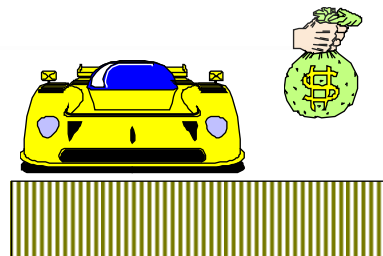


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## CONSIDERATION

- Law recognises bargains not promises
- Consideration need not be equivalent
- Inadequate consideration
  - past consideration
  - existing obligation



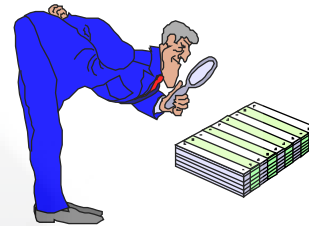
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# TERMS

- The terms of the agreement must be certain,
  - either expressly [unless trivial] or by defined mechanism
- Contract documents will be relied upon to define the terms - essential these be physically compiled
- Note contra proferentum rule
- Terms may be implied
  - in certain cases
- Pre-contract negotiations don't apply



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## 7. Some Additional Tips

- Lay the Groundwork
  - Define success criteria
  - Identify project drivers/constraints and DOF
  - Define when the project is complete (“release”)
  - Negotiate commitments – don't take it lying down



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## 7. Some Additional Tips (Continued)

- Plan the work
  - Write a plan
  - Decompose ALL tasks into inch-pebble granularity
  - Develop planning worksheets for common tasks
  - Plan rework when defects identified
  - Plan time for process improvement
  - Manage Project risks



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## 7. Some Additional Tips (Continued)

- Estimate the Project
  - Estimate based on real effort not calendar time
  - Don't schedule people for more than 80% of their time
  - Build training time in
  - Record how you calculated estimates
  - Use Estimation tools
  - Respect the Learning curve
  - Plan Contingency buffers



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## 7. Some Additional Tips (Continued)

- Track your progress
  - Record actuals and estimates
  - Count tasks when they are 100% complete
  - Track project status transparently



Reference: *Thanks to Software Development*, Nov. '99, and  
Karl E. Wiegand of [www.processimpact.com](http://www.processimpact.com)

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