



PROJECT MANAGEMENT

- 1) Basic Fundamentals of Project Management
- 2) Project Management Processes
- 3) Statement of Work
- 4) Work Breakdown Structure,
- 5) Project Scheduling Techniques
- 6) People and Leadership
- 7) OHS and Risks



1) Basic Fundamentals of Project Management

Management Definition:

The process of achieving objectives efficiently and effectively through organising resources and implementing action plans

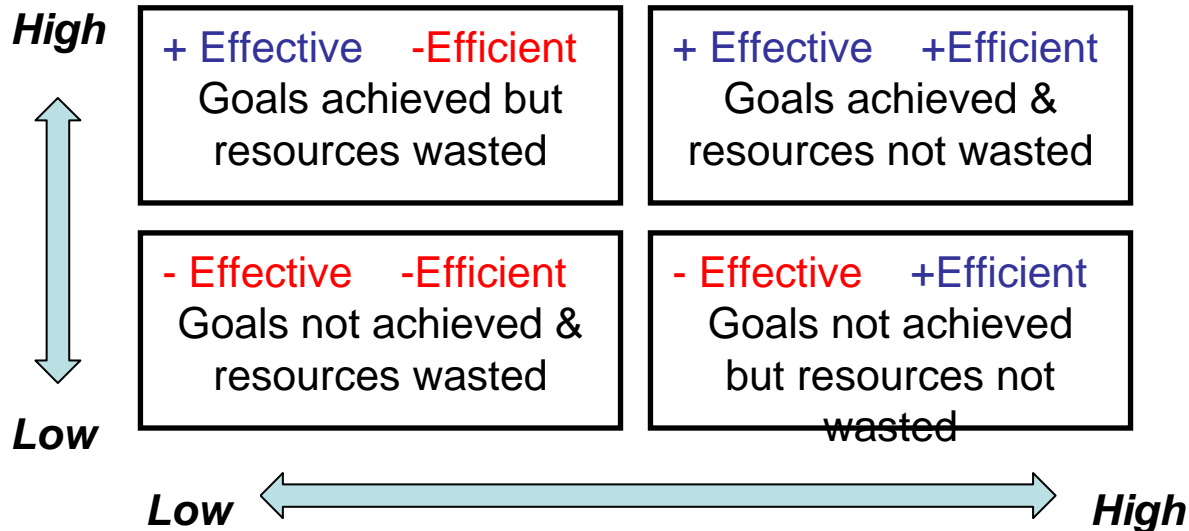
Resources:

Human; Financial (money); Physical (materials, plants, etc); and Information

Management work involves a complex and dynamic combination of science (systematic techniques) and art (experience, intuition and common sense). Managerial work is directly related to the personal instinct, individual personality and motivation.



Management Concepts





Project Management: is ‘the application of knowledge, skills, tools, and techniques to project activities in order to meet or exceed stakeholder needs and expectations from a project’.

Project managers must not only strive to meet specific scope, time, cost, and quality goals of projects, they must also facilitate the entire process to meet the needs and expectations of the people involved in or affected by project activities.

Advantages of Project Management

- Better control of financial, physical, and human resources
- Improved customer relations
- Shorter development times
- Lower costs
- Higher quality and increased reliability
- Higher profit margins
- Improved productivity
- Better internal coordination
- Higher worker morale.



Knowledge areas

There are nine knowledge areas that describe the key competencies that project managers must develop.

The four core knowledge areas (leading to specific project objectives) of project management include project scope, time, cost, and quality management.

- Project **scope management** involves defining and managing all the work required to successfully complete the project.
- Project **time management** includes estimating how long it will take to complete the work, developing an acceptable project schedule, and ensuring timely completion of the project.
- Project **cost management** consists of preparing and managing the budget for the project.
- Project **quality management** ensures that the project will satisfy the stated or implied needs for which it was undertaken.

The four facilitating knowledge areas (means through which the project objectives are achieved) of project management are human resources, communication, risk and procurement management.

- Project **human resource management** is concerned with making effective use of the people involved with the project.
- Project **communication management** involves generating, collecting, disseminating and storing project information.
- Project **risk management** includes identifying, analysing, and responding to risks related to the project.
- Project **procurement management** involves acquiring or procuring goods and services that are needed for a project from outside the performing organisation.

Finally, project **integration management** is an over-arching function that affects and is affected by all of the other knowledge areas.



History of project management

Did project management begin with the building of the Egyptian pyramids or with the Great Wall of China, or earlier than these when leaders organized village cropping for the first time. Much later, the military was behind the development of several project management techniques. In 1917, Henry Gantt developed the famous Gantt chart. Later this tool provided a standard format for planning and reviewing all the work that needed to be done on early military projects.

PERT (Program Evaluation and Review Technique) charts were first used in 1958 for the US Navy Polaris missile submarine project. These charts help in the modeling of the relationships among project tasks. By the 1970s, software was used to manage large projects.



Stakeholders

Stakeholders are the people involved in or affected by project activities

- the project sponsor
- project team
- support staff
- customers
- users
- suppliers, and
- even opponents of the project.

Project Charter: The document that authorises the release of organisational resources to the project. It assigns the project manager.



Skills of Engineers

versus

Skills of managerial work

- Technical tasks with Mathematical precision
- Application of proven scientific theories
- Uses reproducible data and experiments
- Technical expertise helps solve technical problems
- Satisfaction is through the physical creation and the work

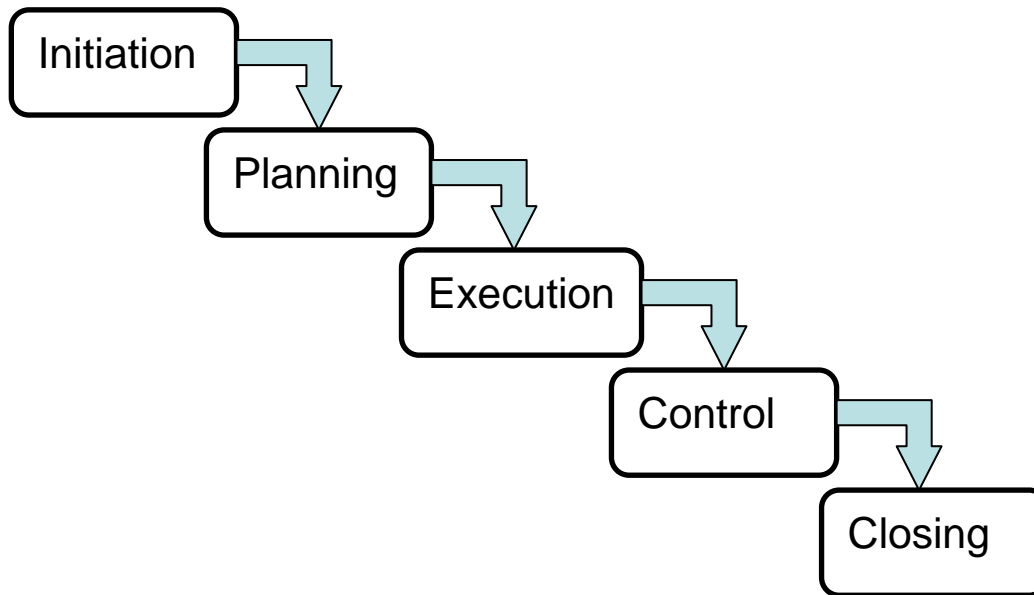
- Focuses on goals using resources wisely
- Decisions based on intuition and common sense
- Interpersonal skills are the basis to solve socio-technical problems
- Managers rely on their resources to get things done
- Satisfaction is from achievements of teams that they supervise (+outcomes)

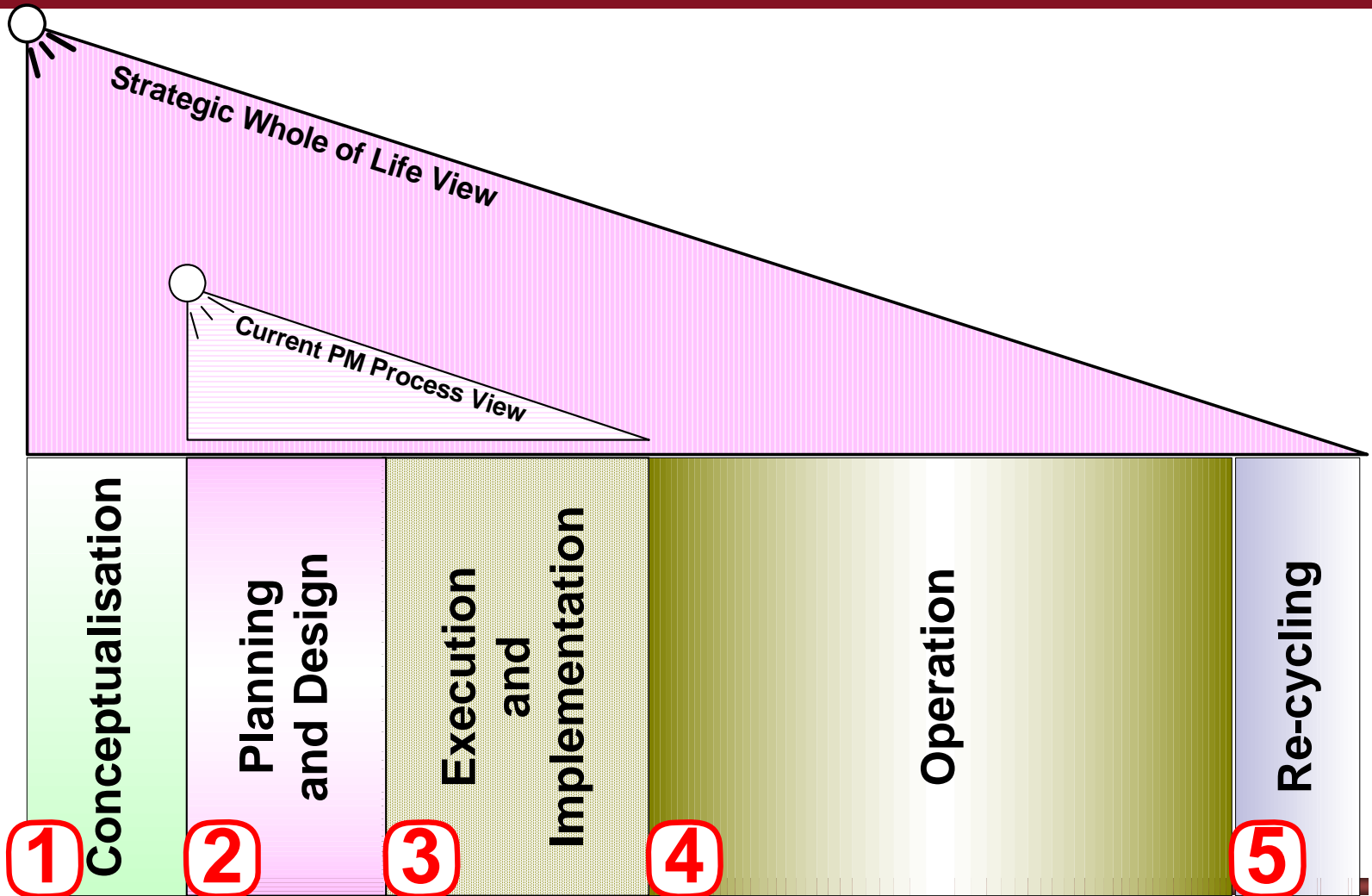


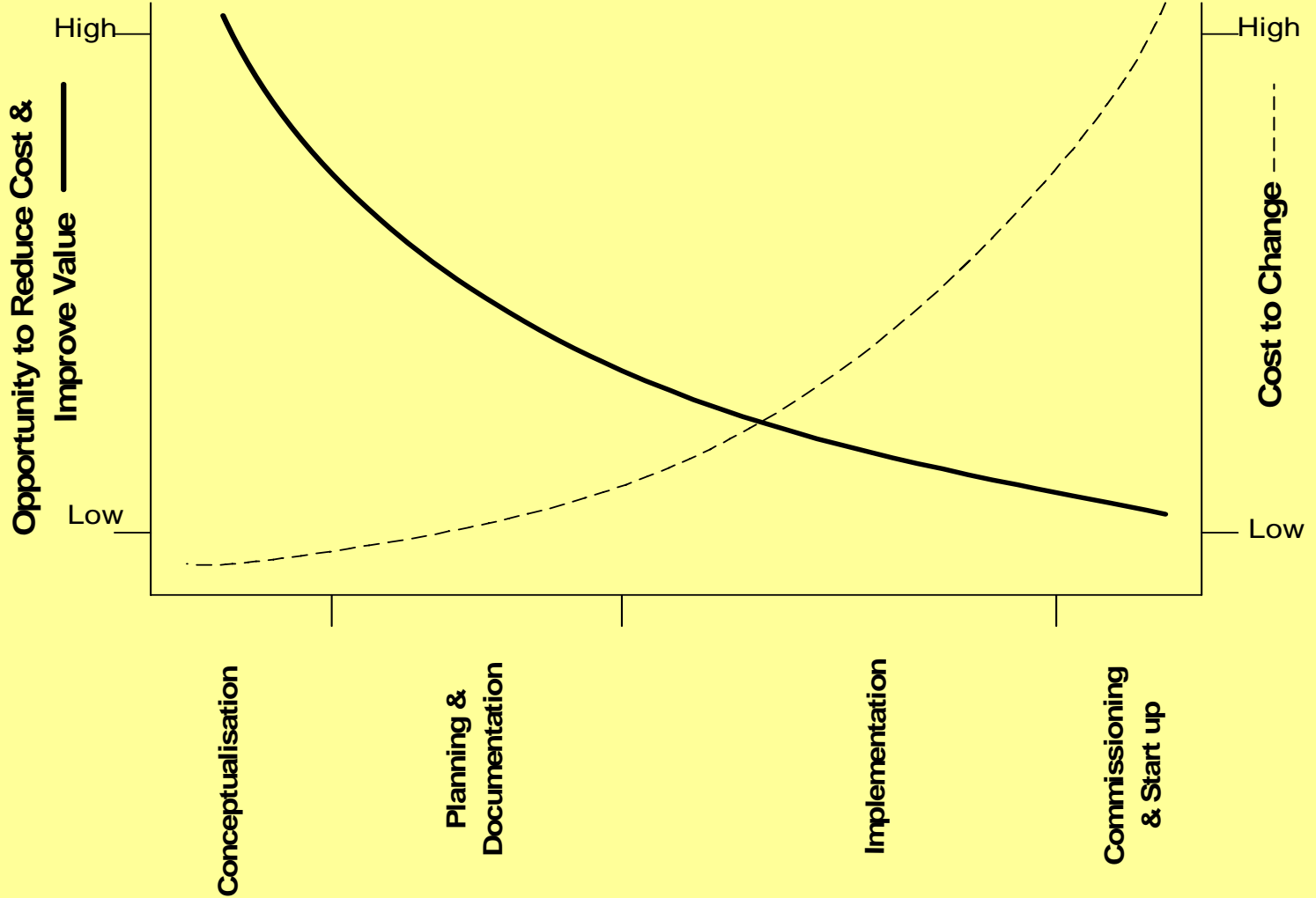
2) Project Management Processes

The Process is a series of actions directed toward a particular result.

There are five project management process groups:









1. Initiate activities: actions to commit to beginning or ending projects and project phases: defining the business need for the project; sponsoring the project; and defining the role of project manager.

Initiating processes takes place during each phase of a project. For example, project managers and teams should re-examine the business need for the project during every phase of the project life cycle to determine if the project is worth continuing. Initiating processes are even required to end a project. Someone must initiate activities to ensure that all the work will be completed, that the customer will accept the work, that the project team will document lessons learned on the project, and that all project resources will be reassigned.

Tasks undertaken during the **Initiating processes** :

- The organisation recognises that a new project exists.
- This recognition is accomplished by completing a stakeholder analysis, requirements document and feasibility study.
- Reports are made to outline the potential supporters and opponents of a project, and to define of the project, and the high level goals, scope, deliverables, deadlines and resources of the project.

The main outcomes of the initiating processes at the beginning phase of a project are the creation of a project charter and selection of a project manager.



2. Planning activities, ie, devising and maintaining a workable scheme to accomplish the business need that the project was undertaken to address.

Project plans should be prepared to define each knowledge area as it relates to the project at that point in time. For example, plans must be developed to define the scope of the project, to define the schedule as to when various project activities should be done and who will do them, to estimate costs, to decide what resources will need to be procured, and so on.

To account for changing conditions on the project and in the organisation, plans are often revised during each phase of the project life cycle.

Tasks undertaken during the **Planning process**:

This is completion of a work breakdown structure, project schedule, and project budget.

It is vital in IT projects because it takes a huge amount of effort to change a system once it has been implemented.



3. Executing activities, ie, coordinating people and other resources to carry out the project plans and produce the products or deliverables of the project or phase.

Examples of executing processes include developing the project team, providing leadership, verifying project scope, assuring project quality, disseminating information, procuring necessary resources, and delivering the actual work.

Tasks undertaken during the **Executing processes** :

- Taking the actions necessary to ensure that the work described in the planning activities will be completed.
- The main outcome is the delivery of the actual work of the project. For example, if an information technology project involves providing new hardware, software and training, the executing processes would include leading the project team and other stakeholders to purchase the hardware, develop and test the software, and deliver and participate in the training. This process group should overlap with all of the other process groups and will take the most resources to accomplish.



4. Controlling activities

- ensure that project objectives are met,
- measure progress against plans and take corrective action when necessary, and
- performance and status reviews.

If changes are necessary, someone must identify, analyse, incorporate and manage those changes.

Tasks undertaken during the **Controlling** :

- Measuring progress towards the project objectives
- Monitoring deviation from the plan, and
- Taking corrective action to match progress with the plan.

The ideal outcome of controlling is to complete a project by delivering the agreed on project scope within time, cost, and quality constraints. If changes to project objectives or plans are required, controlling processes ensure that they are made in an efficient and effective manner to meet stakeholder needs and expectations.



5. Closing activities, ie, formalising acceptance of the project or phase and bringing it to an orderly end. The administrative activities involved are archiving project files, documenting lessons learned, and receiving formal acceptance of work delivered as part of the project or phase).

Tasks undertaken during the **Closing processes** :

- Formal acceptance of the work.
- Creation of closing documents such as a project audit and lessons-learned report.

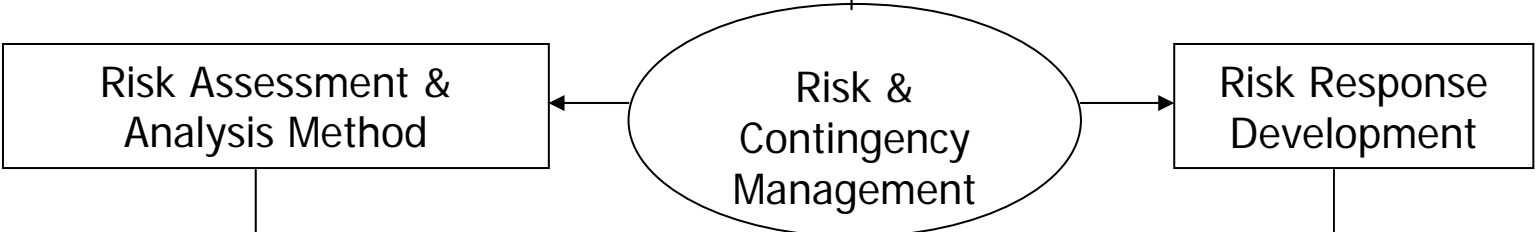
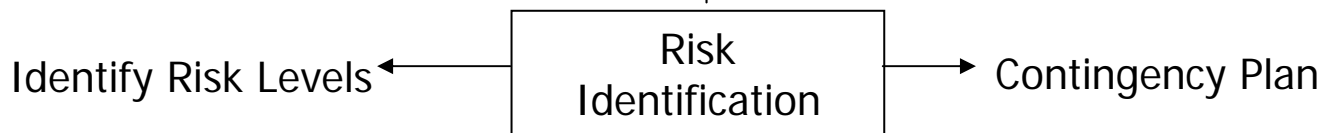
You can map the main activities of each project management process group into the nine project management knowledge areas as shown in the following Table.

Note that the majority of project management activities occur as a function of the planning process group. Since each project is unique, project teams are always trying to do something that has not been done before. To succeed at doing new activities, project teams must do a fair amount of planning.



Risk & Contingency Management

Major Risk Items Identified



Risk & Contingencies Table

Qualitative Risk Analysis

- Strategy 1 - Risk Minimization
- Strategy 2 - Risk Transfer
- Strategy 3 - Risk Acceptance
- Mitigation Actions



3) Statement Of Work (SOW)

Definition: A narrative description of products, services, or results to be supplied.

- Better Description leads to better vendor service
- Procurement items are detailed in the SOW
- SOW is often seen with a Request for Proposal (RFP)
- RFP does not give details on specific items
- SOW is a document that can be used to control the costs and to give vendors as much information a possible about the type of items you want to purchase for your product

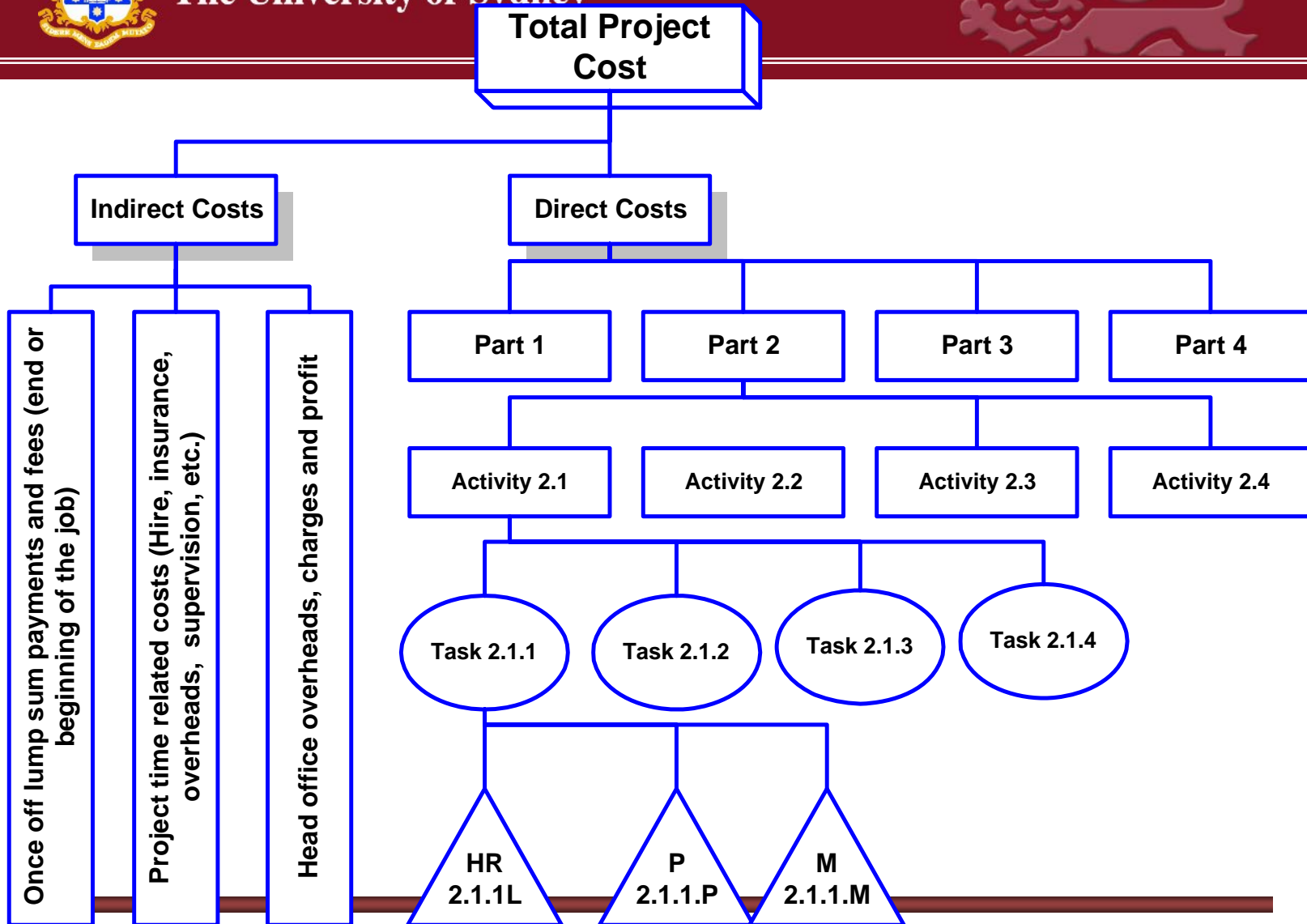


4) Work Breakdown Structure (WBS)

Definition: The WBS is an example of a hierarchical chart. It shows relationships of the various tasks and people in a top-down, graphic format. The WBS looks like a family tree and is common in organisational control.

The WBS is written by the team and comes after the Scope Statement. It decomposes the scope statement into tasks that form the basis for all the work on the project and breaks them into smaller tasks so that the project manager can control and manage the project.

The WBS is developed by using yellow sticky notes on a board to make sure everyone has a chance to participate. It can also be developed on a white board in a team meeting and left for 2 or 3 days for the team to edit or add ideas.





The OBS (Organisation Breakdown Structure) shows departments or units of the organisation and is not organised along the line of deliverables.

The RBS (Resource Breakdown Structure) breaks down the project by resource types, so that the PM can see quickly which resources can be grouped together. For example, quality testers may be listed together, although they may be used at different times during the project for different areas of quality testing. The RBS may include materials, communication technologies and other types of resources needed to complete the project.



5) Project Scheduling Techniques

The schedule is the basis for managing time on a project. It depicts the sequence and timing of the project tasks and activities that need to be performed to complete the project and achieve the project objectives.



The Key roles of the project schedule are to:

- Enable cash and resource requirements to be forecast for different periods so that priorities can be assigned between project activities.*
- Facilitate the allocation and coordination of resources, and ensure that resources are available when required.*
- Enable progress to be assessed.*
- Identify project milestones (key events)*
- Enable the achievement of a predetermined project completion date*
- Provide supporting documentation for dispute resolutions*



CRITICAL PATH METHOD (CPM)

After a network diagram has been drawn to represent a project, critical path computations can be performed to analyse the network and obtain the following information:

- The minimum time in which the project can be completed***
- the earliest time that each project activity can start***
- the latest time by which each activity must be completed, if the project is to be completed in minimum time***
- activities that are critical to the project being completed on schedule***
- the maximum allowable delay for a non critical activity before the project is delayed***
- the effect of a delay or disruption in one activity on the whole project***



PROGRAM EVALUATION REVIEW TECHNIQUE (PERT)

The CPM assumes that activity durations have deterministic value. However, it is never certain what the actual activity durations will be. The PERT considers this inherent uncertainty by assuming activity durations have a range that follows a statistical distribution called the beta distribution.

For each activity, a pessimistic duration, an optimistic duration, and a most likely (or normal) duration is determined.



6) People and Leadership

Management Versus Leadership

Leadership and management are two different concepts

Leadership is just one of the many assets a successful manager must possess. The goal of a manager is to maximise the output of the organisation through administrative implementation.

This can be achieved by organisation , planning , staffing , directing , and controlling .

Leadership is just one important component of the directing function.

A manager cannot just be a leader, he also needs formal authority to be effective.

"For any quality initiative to take hold, senior management must be involved and act as a role model. This involvement cannot be delegated."



In some circumstances, leadership is not required. For example, self motivated groups may not require a single leader and may find leaders dominating. The fact that a leader is not always required proves that leadership is just an asset and is not essential.

Managers think incrementally, whilst leaders think radically. *"Managers do things right, while leaders do the right thing."* This means that managers do things by the book and follow company policy, while leaders follow their own intuition, which may in turn be of more benefit to the company. A leader is more emotional than a manager . *"Men are governed by their emotions rather than their intelligence"* .

This quotation illustrates why teams choose to follow leaders.

"Leaders stand out by being different. They question assumption and are suspicious of tradition. They seek out the truth and make decisions based on fact, not prejudice. They have a preference for innovation."



7) OHS and Risks

Construction Management of Site Safety

- Construction sites are difficult places to make safe.
- Construction Management is about minimising risks and accidents.



Construction Management of Safety

- Refer Halpin & Woodhead Second Edition, Chapter 16 pp 284-304.
- There is a need for a safe site and safe site practices on every construction job for:
 - Humanitarian reasons
 - Legal reasons
 - Cost reasons



Economic Costs Associated with Accidents on site

- Accidents are covered by worker's Compensation or Public Liability Insurance policies.
- Uninsured Costs include:-transportation; investigations; reports; insurance gap; rental on damaged equipment; new worker training; production downtime; time delays;



Other Economic Costs attributable to Accidents

- Other accident costs to the site include:
 - Lower worker productivity and morale.
 - Loss of worker skill.
 - Unfavourable public relations and press.
 - Increased conflict with Work Cover and Unions



N.S.W. Occupational Health and Safety Act, 2000

- Aims of the Act:

1. Promote safety in the workplace
2. Allow employers and employees to participate in workplace safety.
3. Provide a legislative framework for increasing workplace safety over time.



Where does the OH&S Act Apply ?

- Applies to all work places in NSW
- Applies to the Crown



Duties of Employers

- Part 2, Div. 1, Sec. 8 of the Act stipulates that an employer has many duties:
 1. Employers “must ensure the health and safety and welfare at work of all the employees” as well as ensuring safe work places for apprentices and others who are not employed



Duties of Employers

2. Ensure that the work premises as well as access to it is safe for employees.
3. Ensuring that equipment and materials used at work are safe if properly used.
4. Ensuring that the employees have adequate training to perform work safely.
5. Providing adequate facilities at work for the employees.
6. Notification of Work Cover in case of accidents.



Duties of Employees

- » “Employee” - defined by common law and includes anyone who works under a contract of employment or apprenticeship.

1. Employees must take “reasonable care, while at work, take reasonable care for the health and safety of people who are at the employee’s place of work”.



Duties of Employees

2. Employees, while at work are directed by the Act to:”co-operate with his or her employer...to enable compliance with any requirement under the Act...that is imposed in the interests of health and safety”.
3. Employees must not disrupt the workplace by creating risks or “safety fears”.
- Penalties are currently \$4,950 for a repeat offence and \$3,300 for



Penalties for Offences

- Offences for breaches of the Act are currently at the following maxima:
 1. Corporation-previous offender \$825k
 2. Corporation-first offence \$550k
 3. Individual-previous offender \$82.5/2 yrs
 4. Individual-first offence \$55k



O.H.&S. Committees

- O H & S committees may be formed to:
 - Review safety
 - Investigate risks
 - Resolve



Unlawful Dismissal

- The NSW O.H.&S. Act, 2000 stipulates that an employer cannot dismiss an employee because he:
 - Makes a complaint about safety.
 - Is a member of an O.H.&S. Committee.
- Generally the onus of proof in unfair dismissal cases lies with the defendant.



Work Cover Authority

- Work Cover must be notified prior to commencing any work on site.
- Work Cover have training programs and certification courses for such things as driving hoists, fork lifts and others.
- Work Cover have inspectors that visit sites and all carry an identification card-
Section 47 of the Act.



Powers of Work Cover Inspectors

- Inspectors may enter any premises they wish and without prior notice.
- Entry must occur at a “reasonable time”
- Inspectors have powers to inspect, test, search and photograph on site.
- Inspectors may take samples.
- Require site personnel to answer questions
- View documents.



Rights of entry of Union Reps

- The Act also gives powers of entry to Union representatives who are authorised under the Industrial Relations Act, 1996.
- Union representatives may “for the purpose of investigating any suspected breach of the O.H.&S. legislation, enter any premises ...where members...or persons eligible to be members...work”.



Unions' Powers On Site

- Entry may be without notice.
- Inspections may only take place if "the person proposing to exercise the power is in possession of an authority issued by the Industrial Registrar under Part 7 of Chapter 5 of the Industrial Relations Act, 1996".
- Entry must be at a reasonable working hour when work is being carried out on a site.
- Powers to investigate breaches of O.H.&S. include searches, inspections and photographs.
- ~~Powers to inspect documents that relate to safety .~~



Types of Work Cover Notices

- Division 1-Investigation Notices
- Division 2-Improvement Notices.
- Division 3-Prohibition Notices



Management of Occupational Health and Safety:

An in-depth investigation into the
application of current practices and
policies in the NSW Construction Industry

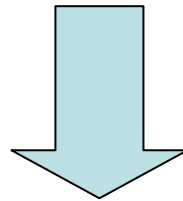


OHS refers to the legislation,
policies, procedures and activities
that aim to protect the health, safety
and welfare of people at work

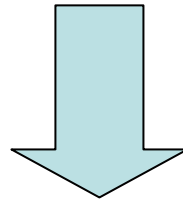


New South Wales OHS Framework

NSW OHS Legislation



Company application



WorkCover NSW



OHS and the Construction Industry

Between 1994 and 2000, 50 building and construction workers were killed at work each year.

Building and construction workers are more than twice as likely to be killed at work than all other industries in Australia.

Research Aim

To improve safety within the NSW construction industry by initiating change that will strengthen the safety culture and develop a best practice safety framework.



Research Investigation

- Problem identification
- Case study
- Recommendations

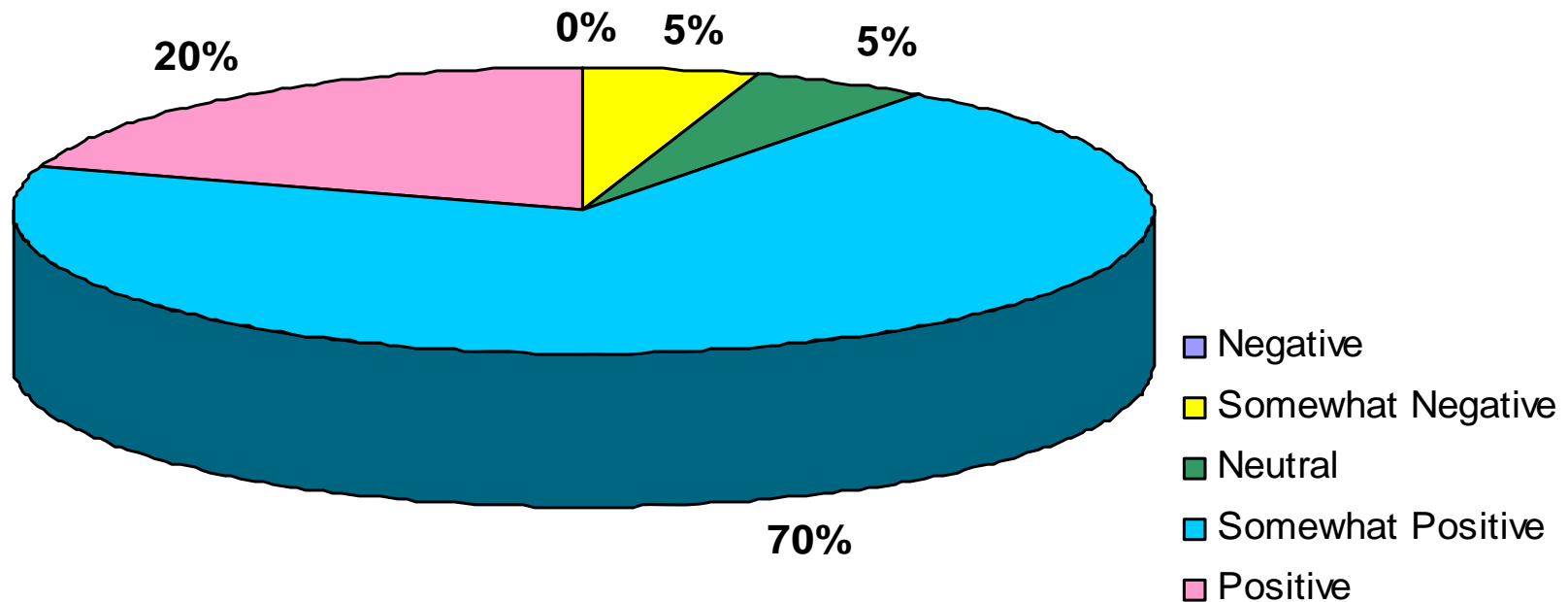
Eight Identified Problems

1. Drugs and alcohol
2. Duty of Care
3. The consultation process
4. National OHS legislation
5. Documented safe work procedures v
Actual safe work practices
6. OHS and the design phase
7. Budget and schedule: Effects on
safety
8. The negative performance
measurement approach to OHS
management



Drugs and Alcohol – Results

How effective do you think the introduction of drugs and alcohol legislation into the Act would be?





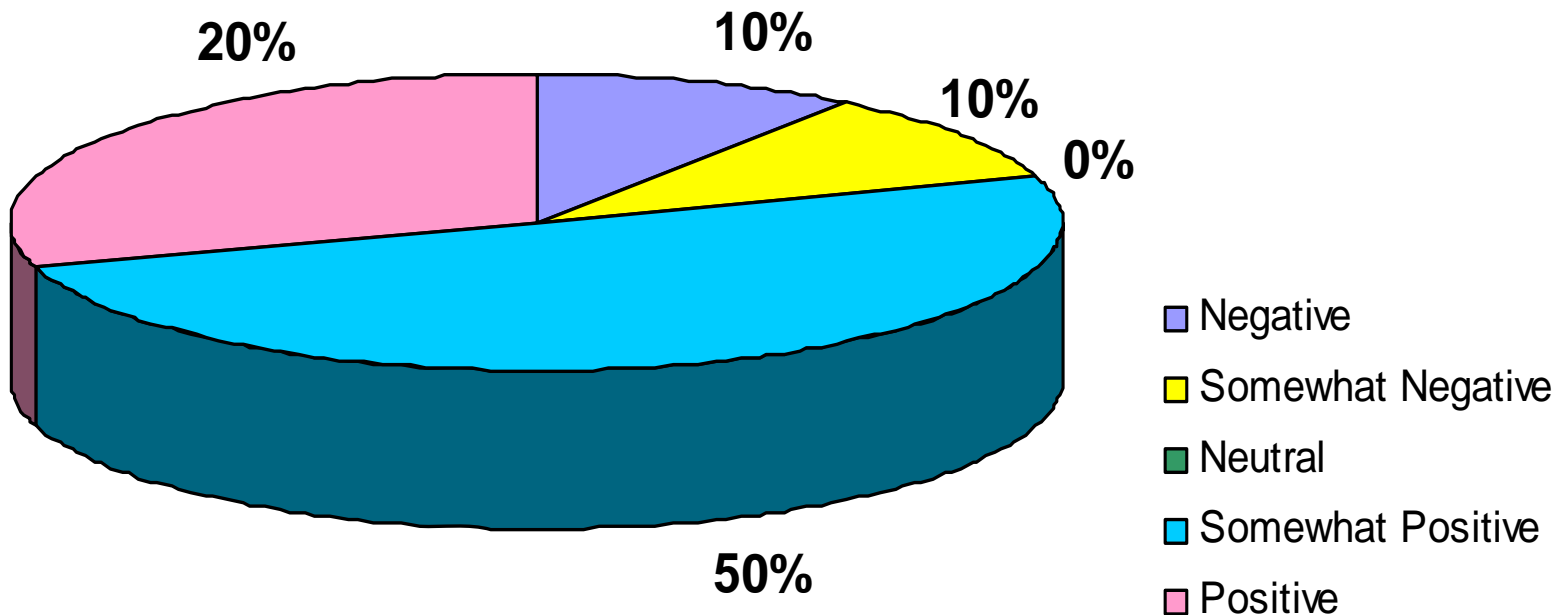
Drugs and Alcohol - Recommendations

- a) Introduction of OHS legislation.
- b) The production of a set of regulations and guidelines to assist management



The Consultation Process - Results

How effective do you think the creation of a guide to consultation for the construction industry would be?





The Consultation Process - Recommendations

- a) An independent third party be introduced and involved in the OHS consultation process
- b) Introduction of specific clauses into the OHS Legislation in regards to the powers of OHS representatives or committees.
- c) The development of a comprehensive guide to the OHS consultation process within the construction



Conclusion

There is a clear indication for the need to reassess current approaches towards OHS management in the construction industry.

For these recommendations to succeed, there must be a change in the construction industry's safety culture.

The successful management of occupational health and safety across the construction industry will ensure a safer workplace for all



Risks

Generic Risk Management Approach

- Flow chart shows the generic approach
- Risk management is a continuous process
- Risk analysis is only a step in the process
- Risks should ideally be eliminated through re-planning and new strategies/alliances
- If not possible then reduced
- If not possible then transferred or distributed
- If not possible then accepted
- If not possible then project abandoned.

Refer to the word Document : Report on Project Risk Management –
Professional Practice in Engineering Management ENGG5204

