What is a Project?

- A project is “a unique attempt to produce a set of deliverables within clearly specified time, cost and quality constraints”.

Projects are different from standard business operational activities as they:

- Are unique in nature. They do not involve repetitive processes. Every project undertaken is different from the last, whereas operational activities often involve undertaking repetitive (identical) processes.
- Have a defined timescale. Projects have a clearly specified start and end date within which the deliverables must be produced to meet a specified customer requirement.

- Have an approved budget. Projects are allocated a level of financial expenditure within which the deliverables must be produced to meet a specified customer requirement.
- Have limited resources. At the start of a project an agreed amount of labor, equipment and materials is allocated to the project.
- Involve an element of risk. Projects entail a level of uncertainty and therefore carry business risk.
- Achieve beneficial change. The purpose of a project, typically, is to improve an organization through the implementation of business change.

What is Project Management?

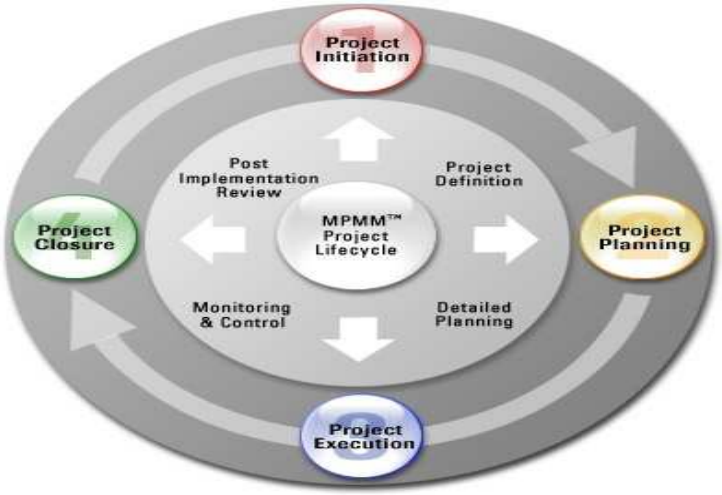
- "Project Management is the skills, tools and management processes required to undertake a project successfully".

Project Management consist of:

- A set of skills. Specialist knowledge, skills and experience are required to reduce the level of risk within a project and thereby enhance its likelihood of success
- A suite of tools. Various types of tools are used by project managers to improve their chances of success. Examples include document templates, registers, planning software, modeling software, audit checklists and review forms

- A series of processes. Various management techniques and processes are required to monitor and control time, cost, quality and scope on projects. Examples include time management, cost management, quality management, change management, risk management and issue management.

Project Lifecycle



Project Initiation

- The Initiation Phase is the first phase in the project.
- In this phase a business problem (or opportunity) is identified and a business case which provides various solution options is defined.
- A feasibility study is then conducted to investigate the likelihood of each solution option addressing the business problem and a final recommended solution is put forward.
- Once the recommended solution is approved, a project is initiated to deliver the approved solution.

Project Planning

- Once the scope of the project has been defined in the Project Charter, the project enters the detailed planning phase. This involves the creation of a:
- Project Plan (outlining the activities, tasks, dependencies and timeframes)
- Resource Plan (listing the labor, equipment and materials required)
- Financial Plan (identifying the labor, equipment and materials costs)
- Quality Plan (providing quality targets, assurance and control measures)
- Risk Plan (highlighting potential risks and actions taken to mitigate them)
- Acceptance Plan (listing the criteria to be met to gain customer acceptance)
- Communications Plan (listing the information needed to inform stakeholders)
- Procurement Plan (identifying products to be sourced from external suppliers).
- At this point the project has been planned in detail and is ready to be executed.

Project Execution

- This phase involves the execution of each activity and task listed in the Project Plan.
- While the activities and tasks are being executed, a series of management processes are undertaken to monitor and control the deliverables being output by the project.
- This includes the identification of changes, risks and issues, the review of deliverable quality and the measurement of each deliverable being produced against the acceptance criteria.
- Once all of the deliverables have been produced and the customer has accepted the final solution, the project is ready for closure.

Project Closure

- Project Closure involves releasing the final deliverables to the customer, handing over project documentation, terminating supplier contracts, releasing project resources and communicating the closure of the project to all stakeholders.
- The last remaining step is to undertake a Post Implementation Review to quantify the overall success of the project and list any lessons learnt for future projects.
- The following sections provide a more detailed description of each phase and list document templates which provide the Project Manager with guidance on how to complete each phase successfully.

Risk

Any event which is likely to adversely affect the ability of the project to achieve the defined objectives

Risk Management

The process by which risks to the project (e.g. to the scope, deliverables, timescales or resources) are formally identified, quantified and managed during the project. The process entails completing a number of actions to reduce the likelihood of occurrence and the severity of impact of each risk

Purpose of Project

- We have cement project, power project, refinery projects etc. while projects is common to all of them, the plants are not. In each case the project is for the plant but as soon as the product is ready, the project is suppose to be completed.
- In a business setting , whether in public and private sectors, an organization must grow for the sales of survival. The organization therefore is continuously on the lookout for good business idea which may require for growth either in existing lines of business or diversified area.

- But the idea should be technically feasible, economically variable, politically suitable and socially acceptable.
- Generally purpose of any project is for earning profits by fulfilling needs of various sections of the people.
- Purpose of project may be specified depending on structure.
- Project can be starting of a new ventures, diversification of the products of existing company, reduction of overall cost of product, replacement or modification in the materials used for making any product, reduction in manufacturing time and modification of the external feature of a product.

- Project selection is a process to assess each project idea and select the project with the highest priority.
- Project evaluation refers to the systematic collection, analysis and use of information to answer questions about a project. It involves the analysis of costs, outcome or impact, implementation as well as the need for the project.

Project selection

- Project Selection is a process to assess each project idea and select the project with the highest priority. Projects are still just suggestions at this stage, so the selection is often made based on only brief descriptions of the project. As some projects will only be ideas, one may need to write a brief description of each project before conducting the selection process.

Project Evaluation

- Evaluation is a process which:

- supports a project, by measuring the extent to which the objectives are met,
- identifies achievements,
- identifies areas for improvement,
- encourages decisions to be taken, including changes to objectives and the project methodology.

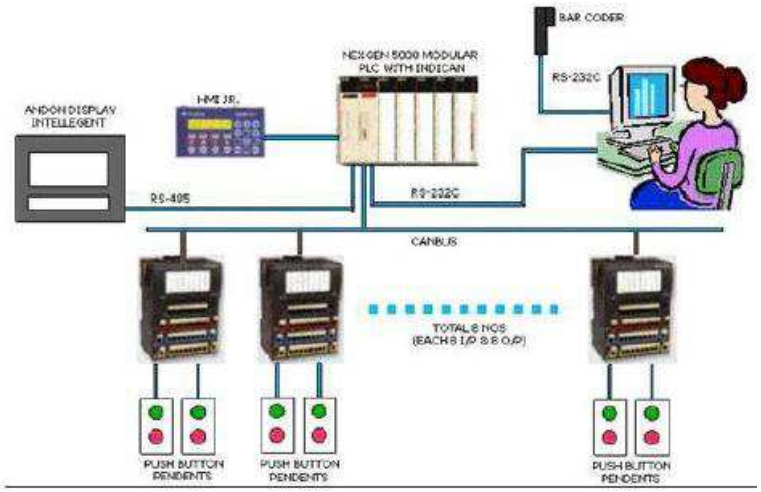
- Project evaluation involves several steps, related to the stages of the project:
- Discussing and defining the aims
- The collection of data following the objectives of the project and the subject of the evaluation
- The analysis and the interpretation of this data leading to informed conclusions
- Amendments of the project in the light of the evidence acquired.

Steps in Evaluation

1. Understand what your project is trying to achieve
2. Develop an evaluation plan
3. Select the potential participants
4. Collect data / information
5. Analyse and interpret the data / information
6. Report on and use your findings

Human Machine Interaction

- Man – Machine interface is an imaginary plane across which information is exchanged between the operator and machine.
- Information is conveyed from the machine to the man by the display elements of the interface, and from the man to machine by the control element of the interface.



- The machine is fast, accurate, powerful, and inflexible; the man is slow, subject to error, relatively weak, and yet highly versatile.
- The nature of these properties explains why the man / machine combination is so useful but only if these two fundamentally different units can be efficiently linked together.
- The higher the speed of the equipment, the more crucial it is to conform to the basic principles of interface design.

Human Engineering Consideration in Product Design

- Ergonomics or human factors engineering is the science of fitting tasks to man. The word ergonomics is a Greek words “Ergon means work” and “nomos means natural laws”.
- Ergonomics and human factor engineering are synonymous and cover a very wide field, including the human operator and his working environment.

- The areas of study cover under HFE are one group comprising Anatomy, Physiology and Psychology, and the other group consisting of engineering sciences such as Physics, Mathematics, Materials science and Design.

The role of HF in product and equipment design assumes importance in three respect

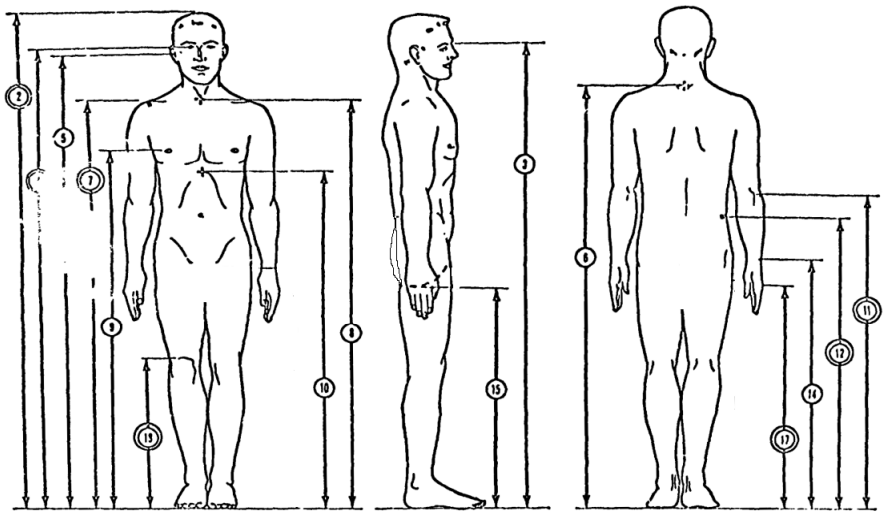
- Man, as occupant of space, i.e. to operate a machine, the human operator should have adequate space, as dictated by human body dimensions or anthropometry.
- Man, as reader of display from the machine, i.e. based on the display data, man processes the data and takes action.
- Man, as one who takes action through operating controls which form a part of the machine.

Thus, man acts as applicator of force and controls the machine.

Man as occupant of space: Anthropometry

- The starting point of the design of work spaces must be the dimensions of the people who are going to operate within given spaces. Thus, one of the primary responsibilities of ergonomics is to provide data about body size. Such study, which is part of the domain of the anatomist is called Anthropometry.

- Anthropometry data are often expressed in the form of 5th, 50th and 95th percentiles.
- A dimension quoted at 5th percentile level means that 5% of the population considered are estimated to be smaller than this.
- Correspondingly, only 5% of the population is larger than the 95th percentile.
- The range from 5th to 95th percentile covers 90% of the population.



WEIGHT

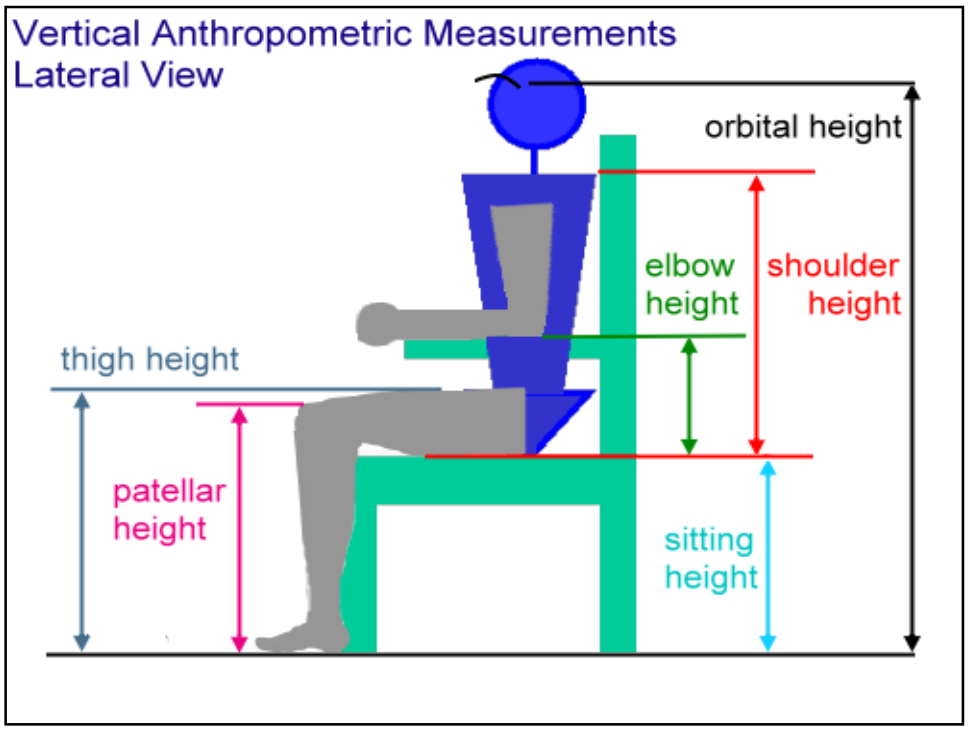
1. Weight (Now Shown)

2. Stature
3. Nasal Root Height
4. Eye Height (Internal Canthus Height)
5. Tragion Height

BODY LENGTHS

6. Cervical Height
7. Shoulder Height (Acromial Height)
8. Suprasternale Height
9. Nipple Height
10. Substernale Height
11. Elbow Height
12. Waist Height
14. Wrist Height
15. Crotch Height (Inseam)
17. Knuckle Height
18. Kneecap Height

Body Lengths, Standing



Man and a chair and a table relationship

A – Height from thighs
B – Depth for knees
C – Height at foot level
D – Depth of foot level
F – Sitting height for input devices
G – Sitting height
H – Viewing depth
E – Foot depth

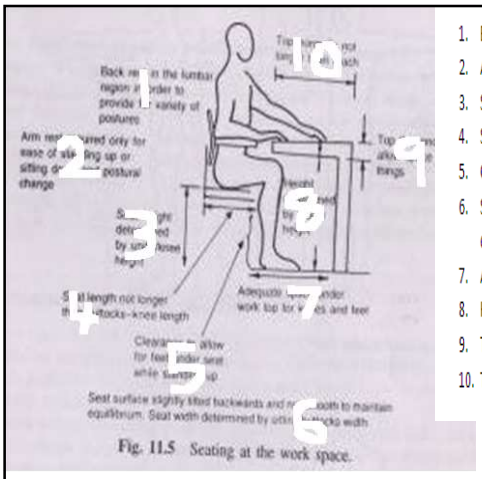


Fig. 11.5 Seating at the work space.

1. Back rest in the lumbar region in order to provide for variety of postures.
2. Arm rest required only for ease of standing up or sitting down and postural change.
3. Seat height determined by under knee height.
4. Seat length not longer than buttocks – knee length.
5. Clearance to allow for feet under seat while standing up.
6. Seat surface slightly tilted backwards and not smooth to maintain equilibrium. Seat width determined by sitting buttocks width.
7. Adequate space under work top for knees and feet.
8. Height determined by elbow height.
9. Top thin enough to allow space for things.
10. Top normally not longer than reach.

The Design of Control

- A control is a device that enables an operator to change the state of a mechanism. It converts the output of an operator into the input of a machine.
- Controls are piece of hardware, they are often regarded as parts of a machine, out for design purposes, they can be more effectively considered as connecting links between the machine and the operator.

List of some controls

- Hand wheel
- Crank
- Thumbwheel
- Knob
- Slider
- Toggle switch
- Joystick
- Roller ball
- Lever
- Foot pedal
- Treadle
- Detent switch
- handle

The Design of Displays

- A display is a part of the environment of the operator that provides him with information relevant to the task he is performing.
- Eg:- Display on a TV Screen, Dial type display with pointer and simple mechanical display (an advertisement card on a visiting card).

Various types of display

1. Pictorial Display: This consists of some level of direct representation of the real situation.

Eg: A spot moving across a map representing position, or a tiny model aircraft.

2. Qualitative Display: This indicates a general situation, rather than a numerical description of it.
3. Quantitative Display: This presents a number denoting the value of some variable in the situation. There are two main types – the moving pointer fixed scale display and the digital display.

Collection of Ideas

- Several sources for collection of ideas – company executives, company sales force, customer suggestions, govt. agencies, research laboratories, patent office, firms going out of business etc.
- One significant creator idea usually opens up field of activities that leads to new ideas. Ideas are generated by detail studying of present and future expected needs.
- Studying the habits and cultural background of various groups of society will also give no. of ideas.

- Studying the basic requirements and additional requirements such as taste for decorative items, comforts, travelling, visiting decorative centers, modern trends in fashion design etc.

Concept Generation Techniques

1. Need Assessment (What does the customer or company want)
2. Scenario Analysis (Futuristic forecasts)
3. Group Creativity (Group innovation)
4. Attribute Analysis (Mechanical approach for obtaining new viewpoints)
5. Relationship Analysis (Force to see new relationships)
6. Lateral Search (Move away from the product)

Concept Evaluation

- Concept evaluation is to refine the set of concepts determine those that should continue in product development process. The decision regarding how many concepts can proceed in the product development process will depend in the resources available.
- Five general approaches can be used to evaluate concept.

The five evaluate concepts are

- Product development charter review
- Concept testing
- Scoring models
- Snake plots
- Financial analysis

ATAR Model

- ATAR stands for awareness, trial, availability and repeat purchase. This approach referred to as a breakdown approach because an aggregate market size number is broken down by the % of awareness in the market due to promotion, % of trial by consumers, percentage of availability in existing distribution channels, and % of consumers who will buy again, multiplied by how much will be bought in a given time period.

ECV

- The specific approach to be discussed calculates the Expected Commercial Value (ECV) of particular product concept, using a decision – tree methodology. This methodology incorporates the probability of technical success and the probability of commercial success to estimate the overall expected commercial worth of a particular product concept.

Cont.

- The formula is as follows:

$$ECV = [(NPV*P_{cs} – C) * P_{ts} – D]$$

- ECV – expected commercial value of product concept, NPV - is the net present value of product, P_{cs} – is the probability of commercial success, C – commercialization costs, P_{ts} – probability of technical success and D – development costs.

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