



PG Level course for Monsoon Semester 2016
Faculty of Design
CEPT University Ahmedabad 38009 INDIA

FORWARD

This course was meant for Masters level Design students at Faculty of Design (and open to masters' students of other faculties), CEPT University. The first intent was to make it as Entrepreneurship for Designers. Design graduates were expected to professionally operate in the role of Designers, Producers or Services providers. For this purpose, it was decided to include Design creation, Management of design organizations, Design processes, Standards and specifications, ISO management systems, Risk management, Human resources, Basics of finance, etc. The course was to be offered in two lectures per week over a semester of 16 weeks. It could have many other modules, but it was not possible to include it now. The course lectures are published here ([Main Index](#)), and check for [links to Blog version with images](#) provided next to [main index](#)

- Gautam Shah

DESIGN IMPLEMENTATION PROCESSES

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01 ORGANIZATIONS

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0101 An Organization

An **organization** is an amalgam or aggregation of *human and material resources combined as a distinct and integrated entity or an operative system*. **Organizations are setup** to achieve certain objectives more effectively and economically, than individuals acting by themselves. An **organization** is generally a formalized entity or an ongoing effort that is adaptive to many different purposes. Whereas an **enterprise** mean a one time effort, or set of individualized activities.

0102 Organization formed for-

Organizations are formed for:

- 1 **Producing** physical things like goods and commodities,
- 2 **Executing, Managing and Servicing** various types of systems, projects and setups
- 3 **Designing and Distinguishing** the means, procedures and objectives.

0103 Purpose of Organization

An **Organization** is an **on going effort**, based on an approach that is *adaptive to many different purposes*, whereas an **Enterprise** is a **prime effort**, and may remain as **one time effort**, or an **individualized activity**. Organizations are established for:

- 1 **Designing and Distinguishing** the means, procedures and objectives, e.g. architectural, interior design, legal, marriage counselling, project consultancy.
- 2 **Managing and Servicing** various systems, projects and setups, e.g.

security, insurance, internet, surgical, healthcare, etc.

3 Producing and Executing physical things like goods, structures and commodities, e.g. manufacturing units, contracting, assembly, etc.

0104 Types of Organizations

Organizations serve different purposes. **Business organizations** are commercial activities, for earning a profit. **Governmental organizations** are primarily for administration, and formed through legal process and with specific policies. **Non Governmental Organizations** (NGOs), are government aided or not, but abide by certain rules, and for specific aims.

0105 Types of Business Organizations: Proprietorship

A **single person business** (with or without employees) is called **proprietorship**. The proprietor gains directly in proportion to the efforts put in. It is a *natural and ideal proposition for business activity, with flexibility of operations, including firm formation and dissolution*, but has few drawbacks. One gets no relief in crisis (sickness, accident), or any time for vacation. **Clients** get a *highly satisfying personalized service*. **Proprietary firms** are not *capable of carrying out complex jobs, handling time-intensive (fast) jobs, or multi location sites*. One may need legal registrations, for income tax, service tax, and other production and sales-based taxes.

0106 Types of Business Organizations: Partnership

Partnership organizations comes into being, with **two or more partners**. Partnership can be of **maximum 20 persons**, But if more than 11 participants, can also form a setup, legally called a **cooperative**. *Prime blues of single person practice become less severe in a practice with partners*. Partnerships can be casually launched through, an understanding between all participants. For legal reasons (income tax and

sales tax registration, opening a bank account, etc.) a **formal partnership deed** (Memorandum of Understanding -MoU) must be executed, and registered with appropriate authorities.

Partners, each must have individualistic, and yet compatible competence. Professionals with identical competence in a partnership face the problems of '*cross or overlapping interests*'.

0107 Types of Business Organizations: Nature of Partnerships

Partnerships are not always **equal or simple**. Partnerships have many areas like, *resource (assets, goodwill, prestige) input, capital investment, liabilities, goodwill, gain (profit) share, physical labour and expertise input, etc. that have differing values*. A formal partnership deed is necessary to clearly state all the factors. Formally constituted partnerships can be **altered or dissolved** only through another **deed** (MoU) which may or may not recognise the earlier deed, but replace it. Partners bear full and unlimited liability, and all have to share the consequences of an action by a partner.

Partners always face a problem, how to share the liabilities. Partners with monetary resource are often interested in only a safe income for their investment, without other responsibilities. A **joint stock company** is a business form where these problems are solved.

0108 Types of Business Organizations: Joint Stock Company

A **joint stock company** (public or private limited company) endows very **limited liability** on its initiators or shareholders. Such organizations have an elaborate and costly process of formation, and are closely regulated by the government. In both types of joint stock companies, **control of management** remains with the largest shareholder/s. Companies act defines a joint company as an **artificial or virtual person**. The virtual person manifests as a **common seal**, to be used by a designated officer

of the company. There are **Two forms of Joint stock companies**.

0109 Private Limited Company

A **Private Limited companies** can be formed by at least two individuals with minimum paid-up capital of Rupees 1 lakh. As per the Companies Act, 1956 the total membership of these companies cannot exceed 50. The shares allotted to it's members are not freely transferable between them. These companies are not allowed to raise money from the public through open invitation.

0110 Public Limited Company

A **Public limited company** requires a minimum of seven initiating members, but without any restriction on maximum number of members. It must have minimum paid-up capital of Rs 5 lakhs. The shares allotted to the members are freely transferable. These companies can raise funds from general public through open invitations by selling its shares or accepting fixed deposits.

0111 Types of Business Organizations: Co-operatives

A cooperative is formed under a state law for cooperative societies. It is an amalgamation of 10 or more participants, who contribute the capital, and have **equal voting rights**. Profit of the cooperative society can be distributed to members in a limited amount, and the rest is ploughed back in asset creation. Cooperative model is for participating entrepreneurship to come together and help themselves. *A cooperative set-up is too impersonal for a field like design, but may work for self help production setup.* It may be registered by filing application with the bye-laws for its operations. The advantage for Design production Cooperative are that there are certain Tax exemption for manufacturing, sales and benign processes for supplying to Government departments.

0112 Types of Business Organizations: Multi nationals

A **multinational corporation** is a worldwide enterprise, where design, production and servicing occur through business entities, owned operating in different national territories and economic regimes. It is in the form of **conglomerate operating as a transnational company** or often as or as a stateless entity. There always territorial moral and legal constraints.

0113 Consortiums

A consortium is an **association of two or more individuals, companies, organizations or governments** (or any combination of these entities) with the objective of participating in a common activity or pooling their resources for achieving a common goal. *An example of a consortium approach is World Bank participating with Banks and National Governments to finance and initiate a local government (municipal) project.*

Consortium is a Latin word, meaning "partnership", "association" or "society" and derives from consors 'partner', itself from con- 'together' and sors 'fate', meaning owner of means or comrade.

0114 Coopetition

Coopetition is a word combined from cooperation and competition. When companies that are nominally competitors collaborate to handle an extraordinary project. This could be to *share the risk, advantageously use the capacity and gain expertise, profit and prestige.*

0115 Conglomerates

A conglomerate is formed of number of diverse business organizations dealing in products or services, often across many countries owned or

managed by one corporate group. Conglomerates are formed to diversify from geographical, seasonal or product range. Conglomerate are formed with ready-running organizations rather than planning 'green-field' units.

0116 Joint Venture

A **joint venture**, is formed to take **advantage of local conditions**. It occurs between **diverse partners** such as *investors and managerial agencies, production and marketing companies, technical know-how providers and producers*. Compared to a conglomerate the business entity is created by shared ownership, management, returns and risks.

02 ESSENTIALS of ORGANIZATIONS

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0201 Essentials of Business Organizations

Business organizations are constituted within a **legal and taxation framework** of the nation. This allows enforcement of *work standards, labour regulations, registration and dispute redressal (arbitration)*.

Business organizations, when wish to **operate in other nations** as branch, appoint franchise, or secure assignments, some **degree of local Government consent and registration** are required. These requirements become all the more difficult when partners, conveners or stack-holders are of **persons or business entities** of different nationalities. **Business conveners, organizers, investors, other beneficiaries and non-beneficiary participants**, all need to understand that formation, registration, declaration, redressal mechanisms for disputes (arbitration etc.), reach of jurisprudence, etc. are nation bound.

0202 Activities of Organizations

Organizations can have **one dominant activity** and many other subordinate ones. Externally an organization may seem to function with only one activity, but its internal working may consist of all the activities.

0203 Start-ups or Enterprises

Designers more often than not, venture out as **start-up or an enterprise**. A start-up can offer a **design, product, process or service** with a very **small capital and associated risks**. Design being substantially an intellectual process, its implementation faces fewer problems of *funding, poor marketing and bad business strategies*. Start ups are launched at comparatively **younger age**, when the *risk taking and course correction capacities are high*. **Spirit of entrepreneurship** can be seen in not only in **business ventures** but also in **social service sectors**.

0204 Entrepreneurship

The **exploitation of entrepreneurial opportunities** may include *actions such as developing a business plan, hiring the human resources, acquiring financial and material resources, providing leadership, and being responsible for the venture's success or failure*. Entrepreneurship implies *qualities of leadership, initiative, and innovation in new venture design. team-building, leadership, and management abilities*.

0205 Stewardship

Stewardship is an ethical concept that concerns with **safety and security of others, their belongings and rights**. Design stewardship becomes effective through **planning and management of resources**. It supports sustainable development of **durable, reusable and recyclable products** by way of conceptualization, formation and disposal. It is a responsibility to nurture all **activities, institutions, organizations or governments** in a better shape for the next generation.

Stewardship was originally made up of tasks that took care of members of household, guests, their interests and properties.

0206 Trusteeship

Trusteeship is a socio-economic philosophy by Mahatma Gandhi. It is based on the idea that one has *right to retain wealth just enough for immediate personal needs*. Rest of the wealth belongs to the community and must be used for the welfare of the community as a trustee or manager. In the larger context the concept is very similar to **stewardship**.

03 DESIGN ORGANIZATIONS

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0301 Design Vocation

A designer professes a **rare skill** with **sincerity and reliability**, and so is appreciated by the society. Such an attitude is **individual** and **professional**. Professionals earn their livelihood through **creativity and productivity**. The **professionalism** is set by: *Person own-self, Professionals themselves (professing similar skills) as a group, Society or by an Authority or Government through law.*

0302 Design Practices

Pure design practices offer design solutions, as **advise** with or without documents, and as a result require **smaller setup with a very low capital outlay (investment)**. One can operate even without an office, often with a mobile phone and off a briefcase or a laptop.

Design Plus practices offer **Design and other 'services'** such as *prototype making, design surveys and assessments, marketing, facilitating purchase-supply-installation of systems, billing and supervision.* The capital outlay is higher due to the interim investments and higher engagement of human resource.

Design Plus Build practices require **production facilities at home, on-site, owned or hired**. The Home production facility requires high investment, space, manpower and carriage of large overhead expenses. **On-site facilities** save rents, but are temporary, small in scale without heavy equipment **Owned or rented production setup** as a workshop need large inventory of raw materials and tools. It poses problems of logistics of *transporting and installing components on site.*

0303 Other Design Organizational Engagements

A designers can operate alone as a **free lancer** without being bothered with the nitty-gritty of an organization. One can get a restricted attachment

as an **associate designer**. The **restricted attachment** can be for a *project-based responsibilities with or without liabilities, as a solution provider or as specific field-consultant*. At a production level one can offer staff or workers on '**body-shopping**' basis or equipment capacities as **jobbers**.

0304 Scale of Design Organizations

Design organizations have **inherent size limitations**. Design organizations remain **creative** only if the chief or the partners **intensively participate in the process of design**. Where work is delegated to large number of subordinates, the conveners would compulsorily remain busy in managing them rather than overseeing a design creation. Some relief can be had by appointing *senior persons capable of operating independently*, as **design associates**, and by hiring **managers** to handle various categories of **non design work**. all these associates and managers, however, will ultimately report to the partners, off taking their design time. *Design organizations, therefore must remain of a reasonable size.*

0305 Methods of optimizing the scale of Design Organization

One way to optimize the size of a design organization is to **specialize or create a core competence**. Instead of handling too many *projects at a lower (economic) fee, it is better to handle fewer projects with high fees*, and deliver excellent professional results. Many organizations to remain within a manageable size by passing on part of their work to outside agencies. These outsiders could be **subsidiary organizations, consultants**, or individuals like **free lancers**. Job components (tasks) that are independent in character are usually handed over to such agencies.

0306 Layered structure of Simple Design Organizations

Simple organizations have **single layer structure**, wherein the

designer-owner assigns and supervises the work. Such **single layer organization** work best with 8 to 10 people. Beyond these size there are two ways for an organization to grow: Job captains or people with specialized skills are assigned tasks, or Key personnel are recognized as leaders, and assigned whole jobs. Such **two layered design organizations** can have for 4 to 6 leaders or key persons, and 12 to 16 other personnel.

0307 Layered structure of Complex Design Organizations

Complex organizations have a **multi layered structure**. In such organizations, the masters or the partners each can handle 6 to 8 person reporting to them. Each of these reporting member can again attend to another 6 to 8 persons. With each layer, the masters or the partners get distanced from the key staff members, ultimately losing their control on *creative and personalized aspects of design*. The master or the owner may become an administrator when tries to handle too many persons. Organizations with more than **3 tiers become non homogenous**.

0308 Small Size Design Organizations

Small design organization are single person practices. These may have closely linked (in-house or on-site) production facility. The organizational setup is revamped for new projects, and older staff is fired (rather than being retrained) for fresh talent.

0309 Medium Size Design Organizations

Medium size Design organizations have several *designers of the same branch or from compatible fields* as partners. The organization may additionally retain seniors and experts as associates. In medium organizations partners and associates all share a common pool of design and non design subordinates. In such organizations, characteristically, *the hierarchies are formal*. Subordinates though serve everyone on demand

within the organization, are looked after for other matters (appointments, leave, salaries, promotions etc.) by a formally appointed manager or a designated partner. Such setup work efficiently when limited to 16 to 20 employees. Beyond this size one or many of the partners will have to attend more of management work than design duties.

0310 Large Size Design Organizations

Large Size Design Organizations are never formed a fresh. Small organizations with **prestige, goodwill, professionalism and expertise** *mature* into a large setup, but over a period of time. The **original team of convening or founding partners** is not disturbed. Such a setup with more than 4 partners can have communication problems. Contracted Design associates, if more than 4 to 6 persons, cause problems of their frequent appointments and discharge.

0311 Large Size Design Organizations -inequalities

Some of the partners will seem to be **contributing more** towards, one or more of the following factors: *developing new businesses, initializing new designs (ideas, concepts), negotiations, contracting, hiring, execution related matters like site supervision, detailing the jobs (technical input, specification writing), fees collection, client relations, coordination with external experts, presentations, public relations, employee matters, or office resources management (purchase)*. Such specific contributions may not be perceived equal to their share in the partnership. This is the major cause why partnership concerns reform or break apart.

0312 Corporate Design Organizations

Corporate Design organizations protect the founders from unwanted liabilities. Large design organizations, handle large projects, often at different locations. A parent firm can create a **subsidiary organization** (proprietary, partnership or franchise) to handle such projects. Subsidiary

organization, *utilizes the resources, facilities, goodwill, reputation, taxation registration, design, production, marketing, servicing, man power, etc. of the parent organization.*

04 PROJECTS

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0401 Emergence of Projects

Projects emerge out of **circumstances**, aided by all kinds of **debate and analysis, policy decisions**, as unique ways of addressing social, political, business and organizational issues, within increasingly complex environments. *'A project is a goal oriented organizational tool for getting from A to B, -a, distinct one from other more traditional, routine and bureaucratic means.'* Projects need to be managed well, to achieve the set goals, in a **specific time frame** and within the limited **geo-spatial spread**. In project management *what is unfamiliar and non routine*, invariably requires all kinds of **learning, adaptation and problem solving**.

0402 Nature of Projects

A **project could be** *'an idea or concept taking shape in mind or being readied for an outward expression', a strategy to actualize an idea, to recollect a happening, estimates the scale of an event, reproduce an experience or a search for a match or fit*. Projects usually have a dual personality, **technical**, and **procedural**. Some projects are predominantly technical or procedural, but not exclusively one or the other. **Architecture** is an example of the former, **marketing or the training** would be an example of the later. Designers deal with many different types of Projects. Projects are conditioned by the available *technology, and by legal, social and such obligations*.

0403 Critical Projects

A project is accomplished as an output of: *a physical object, representation of thoughts and concepts, or non physical matter like problem solving, satisfaction, enjoyment, etc*. A project is considered as *weak as its most inferior section*. A project, however, achieves a *strength equivalent to the average strengths of all its sections*. **Project management** systems entail *recognition of time and extent dependent*

*features, and strategies for handling them. As a **planning and forecasting tool**, projects are *hypothetically intensified to discover their weak sections.**

0404 Dependencies of Projects

Projects are so scope and time dependent. Any increase or decrease in size affects the functionality of it. A time dependent project when delayed impacts the benefits or losses out of it. With early or accelerated execution, extensive benefits could be derived, or with slower implementation hazards and risks can be controlled. Projects with **acute time and size dependency** occur when *conditions are abnormal and survival of an individual or the entire race is threatened, such as during war, a natural calamity, a catastrophe, etc.* Best or most successful projects emerge in **crisis like acute conditions.**

0405 Project management

Project management is unique in character and distinct from other more traditional, routine and bureaucratic means. Project management achieves the objectives within the **Defined scope, Time, and Costs**. The fourth parameter of project management is the **Quality of the delivery**. The advance planning of the effort and required resources assures the nature of the outcome. Projects involve **men, money, materials, machines**. Projects generate gains, return, advantage, learning, fees, commissions, charges, or compensation.

0406 Project Documentation

Projects need definitions like objectives and deliverables, which are essential mechanisms to reinforce teams' expectations, align sponsors, clients and other stakeholders. **Documentation process** may get obliterated, where *owners, conveners, planners, designers, vendors, executioners, supervisors and operators* converge due to in-distinctive

roles.

0407 Types of Project Documents

Some of the documents created by parties involved with a project are:

1 Project Charter, Project Profile Report, Business case, Feasibility Study, Scope Statement, Terms of reference, Project Management Plan, Project Initiation Document

2 Work Breakdown Structure, Assignments, Task lists, Schedules,

3 Accommodation of Alterations, Change Control Plan,

4 Communications Plan, Reportage system, notifications,

5 Risk Register, Risk probabilities, Risk extent, Risk Management Plan (avoidance, mitigation, factors of safety, margins), Risk compensations

6 Governance Model, Administrative strategies

7 Resource Management Plan

8 Project Schedules, Targets

9 Responsibility and Authority structure

0408 Project Planning

Projects have **FOUR distinct phases**. These phases are handled by different agencies, and yet rarely **distinctly delineated in extent, or defined on time scale**.

Planning

Design

Construction /Execution

Operations

0409 Planning Phase

Project conception and definitions for necessity and feasibility occur here. To contemplate designs or other details are not required. Routine projects naturally have very concise planning phase, whereas unconventional projects have intensive planning and often concurrent with the design phase. Project and its operant organization are often intimately linked, and both are set forth simultaneously by the same agency. In other circumstances a project is perhaps required to rejuvenate an existing organization, or conversely association of new organization reestablishes the project.

0410 Planning Phase Modalities

One of the most crucial decisions taken at this stage is *whether or not, to pursue the project*. To make such a decision, many questions must be answered by the administrators, politicians, and professionals of other fields. **Design professionals** unless proficient in branches like finance and management are not involved.

Is the project needed?

What will the project cost?

What will the benefit of the project be?

How big (comparative scale) will it be?

What impact will it have on the environment?

Who will pay for the project?

What alternatives are available?

What are the quantitative and qualitative advantages and

disadvantages of the alternatives?

0411 Design Phase

The **design phase** follows the **planning phase**. Sometimes, the design phase has already been initiated with the planning phase, as for case studies. Planning stage is hardly visible wherever designers are the conceivers or visualizers of the project. The **complex design work** has two stages, the **macro** and **micro design**. The decisions at the macro stage relate to holistic concept, theme, form, etc. At the micro stage sections are detailed, specified and assigned to relevant teams or external consultants.

0412 Construction or Execution Phase

This follows the design process, and some preliminary work like preparation of prototypes, master batching, mock-ups, pilot project, sample production, etc. may have already started with the design work. The circumstances change during the time gap between the Planning and Execution phase, and all projects see are modified in varying proportions. Other external factors like, climate, political and economics become affective when actual work is being executed.

0413 Operations Phase

Projects have operations phase either as an obvious **supplement**, or as a very **indistinct activity**. Operations phase starts during the project execution phase itself, as and when large components and system become ready. In case of turn key projects, the builder may operate some of these systems for trials and use.

0414 Operations Phase for Projects of various types

At simplest level a project is **delivered to a client** (assigning, real-user,

or the agent), who than may operate it or hire required help. In cases, where the **client is also the project convener and builder** the operations phase may form an integral part of the Planning, Design, or Execution phases. Such projects have an **indistinct operations phase**. **Large and complex projects**, however, are completed, tested for trial run and formally submitted or handed over to assigned operators. These types of projects have a very **obvious operations phase**, because planners, designers and executioners are able to transfer a part of their responsibilities (and so liabilities) to professional operators.

0415 Operations and Feedback systems

A **feed back or reportage system** is required as part of the operations phase. It helps in optimization new projects. Feed back system is difficult to organize for projects that are rare, unique, or holistic, but easier for routine projects. **Where clients or conveners, are also the project operators**, they are able to utilize the feedback very efficiently. However in projects that pass through designers, to contractors to operators, the feedback is very difficult to monitor or reliable.

05 JOBS or ASSIGNMENT HANDLING

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0509 Activities for Efficiency and Productivity of the organization

0501 Project in a Design Organization

A project is a comprehensive work module, offered by a client. A project is accepted, if analogous to the policy goals of the organization. In **Design organizations** a project requires distinctive *human skills*. In **Manufacturing organizations** there is a heavy dependence on tools, equipment and plants, so the projects are identified for their efficient use. **Service organizations** are governed by time as key element, so thrive on projects that are time intensive. Projects are divided into smaller units or **jobs** that are mainly based on routine efforts. Jobs also arrive from internal users like departments.

0502 Job or Assignments in a Design Organization

A **Project** is first dealt by a single person, a core group of partner experts or by the entire team of owners. The project may then be handed over to a team leader for further definition. A **Job** is a **trade, skill or schedule specific work module**. It allows individualised attention and effective use of the available resources. Its efficiency of execution or operation can be examined and upgraded independently of other jobs. Jobs are handled on **continuous** as well as **batch bases**.

0503 Job or Assignment Handling

Organizations that repeatedly handle very large and complex assignments develop specific departments. Such specific job handling capacities are **universal** across that class of organizations. So **spare capacities** are offered to others, and **excess work** is outsourced. Jobs of routine nature are handled productively within the organization, but novel needs are better outsourced.

0504 Elements of Jobs in Design Organizations

Design organizations operate with jobs, which have SIX basic elements:

1 **Person/ s** who assign the tasks, determine roles, perform the tasks, oversee or supervise the task performers.

2 A job consists of **Non physical things** like, concepts, ideas, themes, and **physical things** like parts, objects, raw materials.

3 A job requires Information or data as **external inputs** from clients, **internal inputs** from organization's own search, archived data, evaluations, judgments, employees' knowhow, site reports, feedback, by manipulation of various inputs.

0505 Elements of Jobs in Design Organizations (contd.)

4 A job is based on **ancillary facilities** like Tools, plants, equipments, space, location facilities, methodology, formulations, processes, schedules, acquisition and disposal systems.

5 A job needs **Services** like conveyance, transport logistics, communication, storage, data management, welfare, resources management, public relations, goodwill.

6 Jobs are dependent on **Time** as Schedules of delivery, servicing, rate of operation, rate of returns.

0506 Other activities of the organizations

Prime activity of any organization is to **earn a gain**, but simultaneously many **Conventional activities** also occur within the organization.

0507 Activities for the Sustenance of the organization

1 Sustenance of the organization as a functional entity.

- Determination and Evaluation of aims, policies, goals.
- Planning and deployment of financial resources
- Planning and Acquisition of other facilities
- Procurement and Upkeep of assets

- Personnel Management.

0508 Peripheral Activities of the organization

2 Peripheral activities that add to the advantages for the organization.

- Public relations
- Client relations
- Other relations such as the contractors, suppliers, co-professionals, associates, consultants, free lancers, etc.
- Facilitating the execution of assignments like raw material procurement, materials handling, erection, execution, manufacturing processes, testing.
- Tasks' evaluations like quality controls, testing, certification.
- Marketing of goods, services, billing, money collection.
- Servicing like post execution or delivery, servicing, maintenance, guarantees.

0509 Activities for Efficiency and Productivity of the organization

3 Efficiency and productivity of the organization.

- Determination and definition of procedures
- Standardization of inputs, outputs and procedures
- Information collection, Inquisitions, investigations and surveys,
- Installation and management of information storage, manipulation and retrieval devices
- Publications and dissemination of organization's output (data, concepts, ideas) material.

06 DELIVERABLES from DESIGN ORGANIZATIONS

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0601 Deliverables from Design Organization

A Design organization **delivers a product, formulates a concept or renders a service**. Commercially these **Deliverables** take the form of *products, projects, reports, plan of actions, advisory, solution, job, assignment, order, commission*, etc. Organizations prefer activities, which provide a **Direct gain**, followed by those accruing some **Indirect advantage**, and all other work must be avoided.

0602 Deliverables for Whom?

Design organizations **deliver an entity to a client, who is external and compensates** for it. Design organizations serve an entity to an **internal person, department, or an external agency**, which was deliberately (planned) created, but for which no definite compensation may be available. Design organizations allow **entities to proliferate within the organization** (including the sites or at clients' places) which when properly monitored and exploited improve the efficiency of the organization, its image in the market and core-competence in the field. Such entities could be in the form of *products, procedures, styles, judgements, confirmation, rejections, or assurance that every thing operates at desired or predefined level*.

0603 Deliverables and Evaluation of Gains

Organizations audit their work periodically, to see if an activity is providing a **gain or advantage, or is neutral**. Organizations have a formal or informal setup to continuously evolve their **domain of actions**. Where for any reason this cannot be carried out impartially, *external experts, advisors, evaluators, or auditors are called in*. The **evaluation** results in *recognition of deliverables, categories, types of clients or beneficiaries (paying now, rendering an indirect advantage, non paying, or neutral)*.

0604 Deliverables, Evaluation and Reorganization

Clients are **forced or encouraged** to move to other categories with **assurance of linked advantages** (e.g. legal ownership, guarantees or warranties) and **satisfaction** (service and operational support). An audit of activities identifies departments with high public exposure (that offer too many freebies). These are reorganized by moving them to the **internal zones or as separate entities**. Client definition helps the organization to identify internal departments, their interdependency and external bearings.

0605 Deliverables, Evaluation and Reorganization (contd.)

Departments, when realize the true value, decide whether to source their needs from within the organization, or out-source them on the basis of a cost-benefit ratio. **Internal users of organizations**, show an irresponsible tendency to in-source their demands. An **internal audit** can help tag such transactions. This ultimately helps in determination and recovery of the realistic costs. In design organizations technical talents like draftspersons, model makers, site supervisors, messengers, etc. form a common pool, which is sourced by different project teams, but at a cost to be accounted for. In manufacturing units the use of a plant, equipment, tool and human resources are accounted into the component or project.

0606 Examples of Reorganization of Deliverables

Designers charge **payable-extra** fees for drawing documents, site visits and other consultants' costs, and not include in the basic design fee. Doctors charge consulting and surgical fees, but charges for an operation theatre and medicines are **payable-extra**. Manufacturers often charge extra for delivery, site installation, test-run and the warrantee. These all are attempts to classify the costs as the compulsorily payable and negotiable. A professional may provide a free counselling to a friend, but charges for the services rendered and goods delivered. TV and car manufacturers provide a costless guarantee or extended warrantee for their products to achieve brand faithfulness. Doctors and other estate

developers etc. often provide free advice, ideas, consultancy etc. to know a client, but soon enough, the client becomes a recipient of charged product or service.

0607 Examples of Reorganization of Deliverables (contd.)

Production organizations do not offer direct deliveries, but prefer independent sales agencies. Professionals offer their services through project consultants or such intermediaries. There are many architects and interior designers who work on exclusive basis with builders, estate developers, etc. Service agencies may not take individual jobs but prefer to work for clients as retained agents.

0608 Types of Clients for Designers

The **client** for a designer may be a person, business or governmental organizations or a group of users or beneficiaries. A client can have an assignment which is **first time endeavour** with a possibility of continuing as a **venture**, or a sure-footed **enterprise**. A client has Four types of advantages: **Estate (space), Money (or other investable things), Idea, or Experience.**

0609 Who is a Client?

A **client** is one who needs services of an **expert** to solve a specific problem. A client, may or may not be aware of someone else's extraordinary proficiency, and so assign someone to search the 'expert'. In few instances, it is the expert who makes the 'client' realize 'what the problem is and how it can be solved'? Clients would like to deal with a person, who is *competent* and but *shows a predictable and socially acceptable behaviour*. Clients realize that to secure services of an expert one must pay out **compensation or a consideration**.

0610 Clients' Disabilities

Clients' disabilities are on several counts.

- 1 Entities are not always simple, easily selectable, readily available or producible.
- 2 Do not have a personal capacity to judge the appropriateness of decisions.
- 3 Are not fully aware of the needs, problems. Clients are not aware of the type and degree of skills required.
- 4 Clients are not either resourceful or incapacitated for taking decisions and actions by any extraneous cause.

0611 How-why do Clients retain or hire Designers?

Sometimes, a client, who wishes to hire services of a professional, has no competence of checking the suitability of a professional for a particular job. Therefore, he may hire an intermediary capable of finding and appointing a suitable professional for the job. The job of an **intermediary agent** in this case is like that of any other competent and socially acceptable person, the **professional**.

Professionals are hired by clients, who may themselves be professionals of different skills, both *ultimately serving a real client*. Primarily, there is the classic relationship of a *client to a professional* and secondarily the relationship is **professional (now a client) to professional/s**.

0612 Types of Clients : Individuals

At simplest level the client is representing own-self, or perhaps the family. A **professional** is generally in a position to define the identity of an **individual client**. Such a client is *very real and visible in personality and is interactive*, i.e. one can get certain amount of feedback during the job.

0613 Types of Clients : Specific Group of Persons

A **specific group of persons**, *who have formed the group on their own initiative or have become members of a suitable existing group*. Clients representing a specific group are partnership firms, private or limited companies, corporations, societies, associations, and in many instances government departments and semi-government organizations. When there is a **specific group** as a client, its leader or the representative behaves like a *real and visible client*. It is not very difficult for a professional to generalize and determine the characteristics of a specific group client.

0614 Types of Clients : General or Non-specific Group of People

General or non-specific groups of people are **stakeholders or beneficiaries**, classified per some norms and supposedly represented by public organisations or the government. *These are set of people who may not be aware, of their being a party to a group*. Person/s who represent such generalised or non-specific group, functions as a client with or without their mandate. For such groups, the real user is invisible and sometimes unreal, and direct design feedback is unavailable. The designer may need to overwork to identify the 'client'.

0615 Other ways of categorising Clients

Assigning Client is **person assigning the job** (eg. government official) but not likely to use the entity created or derive any benefit. Often an active citizen may generate a debate in the society for an issue and ultimately provide sufficient leadership input, so as to become defacto conceiver and executioner of the project. In complex projects, there may not be a single or identifiable personality acting the role of a client. **Non clients or multi clients** have little interest in the project, except marketability and adequate financial return. **Marketing or other specialists as clients** form a design brief.

0616 Dealing with different types of Clients

Clients are easy to deal, if they are **real, singular, grouped and well organized**. They are not very difficult to handle even when are **invisible or generalized**, but are **well defined**. Design process moves very fast and efficiently, when **clients' feedback** is certain and predictable. Design out-put for organised and well-defined clients, are likely to be very relevant, and survives or operates better. Variety of problems can occur with clients. In case of an **individual as a client**, only personal whims can cause a problem. In case of a **specific** client representing a *formal or informally constituted group*, the relations and position vis a vis, the group may not remain constant. With **group clients** or committees all decisions and actions are necessarily formal, and so there are inherent delays, but job commitment is not a major problem.

07 DEALING WITH A CLIENT

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0701 Contacting a Client

Clients and Designers seek each other in many different ways. A client can go about it *without any inhibitions*, whereas a designer can go about it with *certain restrictions*, depending on the *type traditions and ethics* followed by the profession. Client and Designer are primarily introduced to each other by **intermediaries like friends and relatives**. Secondly a client may seek a designer through **direct contact**, on seeing or experiencing the work as a **real entity, sketch or a publication** of it.

0702 Designer Contacting a Client

A **designer** on realizing a person's potential as a client may seek the person **directly or through a mutual acquaintance or friend**. When a person is a potential client, in the **official capacity** than an official appointment with the clear declaration of intent is necessary.

When a **client** is not *aware of a competent designer*, or **not allowed, or not authorized** (e.g. a government official) to deal with any designer, on a person to person basis, an appropriate process for selection is required. The **process of selection** can be restrictive through invitations offered to, *designers with defined level of competence, members of a recognized body, persons of certain location, age, sex, nationality, or religion*. For very complex design jobs, selection of a designer is done through **pre assessment or a limited competition**.

0703 Clientele

Cultivation of social contact is the most common method for a designer to come into contact with a potential client. Other means of **Personal approaches** include, *specific letters, generalized bulletins, telephonic calls and face to face meetings*. The impression created through a meeting or telephonic call may not be of desired type and long lasting.

Letters are very objective, longer lasting, but have to be brief to be effective.

0704 Biodata or Resumé

Biodata or Resumé is an ever lasting and effective medium of exposure. These are created to secure a design assignment not for employment. So it must not contain anything beyond **professional competence and achievements** relevant for that exposure. *Concealment or non emphasis of data in such documents is intentional, and generally not unethical, though could be malafide.*

0705 Ethics

In dealing with clients, what kinds of **behaviour, actions or attitude** are considered as **unethical, malafide or bad**, *varies from country to country, region to region, profession to profession, and time to time.* In professions where rules regarding behaviour have not been formalized it may vary even from a **professional to professional**. Members of the society usually *know where and how to find a designer in traditional fields* but for **newer branches of design skills, intermediaries** bridge the contact.

0706 Contact between a Client and a Designer

Rapport between a client and designer develops slowly, or is launched formally. **Fresh designers** are eager to secure the job, whereas **established designers** may wish to *know the client more or understand the design brief well.* Clients on the other hand are often shrewd enough to have a *free taste of thing* to come before formalizing the relationship. Designers need to know, if they **take on a project** *what will be their gain,* versus, if they **do not take the project** *would there be a loss, other than the usual non availability of a gain.*

0707 Formal Consent

For a designer requisition of a **formal consent** from a client, for a job, is a very difficult exercise. A designer begins a job, *by investing in labour, stationary and intellectual skills*, and a formal commitment *binds a designer to deliver the expected services*. Whereas, a client awaits with uncertainty whether *the designer will at all deliver the services, of required quality and in time*. When a **designer fails to deliver**, *wastes clients time and effort* (both non calculable entities). And if the **client refuses to appreciate** a designer's, *all the labour, stationary and intellectual skills* (only some of it calculable) are wasted.

0708 Formal Commitment

Ideally best and binding commitment sets in with a **contract** as per the law of the land. Contract, however, is a very formal **expression of intent**. It is too much to expect a client and a designer to formalize their relationship with a contract, when they hardly know each other, or have not formulated the project. In the absence of a contract, if both the parties are willing the relationship can be nurtured. At a little later stage, any of the parties may refuse to acknowledge the relationship between them. In such a situation a designer will lose all that was invested in *understanding, preliminary working, planning of the project, including some patent ideas*. On the other hand, a client will never recover the time wasted in searching, identifying the project, and the designer.

0709 Circumstantial evidences of Commitment

It is very natural that clients and designer are extremely careful *about things they say and do*. For a designer, (who is operating in the absence of a very formal commitment) it is necessary to create a **proof** that, a client did commit the job, or at least was aware that the designer is working for the job. The circumstantial evidences of such nature are not generally tenable in court of law, unless corroborated by other circumstantial or real evidences.

0710 Circumstantial evidences of Professional Relationships

Circumstantial evidences are proofs that *establish the time, location, context, contents, pre and post effects of a happening or an event*. It is not full evidence, because it may be lacking in one or many of these factors. Circumstantial evidences are of many types, such as:

Records and minutes of meetings with the client -location, time, context, witnesses, etc., Records of correspondence, messaging, and telephone talks with the client, Replies from the client for the queries, Changes, doodles and notes etc. made on drawings by the client during meetings, Original plans, sketches, writings, data, etc. as supplied by the client, Keys, permissions to visit the site.

0711 Retainer Amount

One of the **best commitments** next only to a **legal contract** is payment of a **Retainer Amount**. *A retainer fee, however small, signifies establishment of a relationship, between a client and a designer (retainer amount or fee should not be confused with retention money)*. Ideally a quantum of a retainer amount should be *large enough* to cover not only the *labour, stationary and skill, but the **cost of patent ideas** (original or exclusive)* required to generate a schematic design (or such other stage when fees again become due). The **cost of patent or unique idea** is collected at first go, because a unique idea or a concept once exposed to an outsider like a client loses its originality and so the value. A **formalized relationship** has built in compensation procedures, so in case of a failure no one feels hurt. However, when an **informal relationship** fails, it creates the worst of situations.

0712 Mandatory data or Prime information for Design

Work of a designer begins with the **mandatory data / prime information** provided by the client. As soon as a potential client is identified, a

designer postulates own data requirements. For these first the client's capacity to furnish or collect is checked. In exceptional cases, where the client is invisible (a social group) very little data is likely to be available. Where a **client is incapable of providing the data**, it is up to the designer to get the same collected, but with clients' **consent and cost**.

0713 Ownership and Rights for Data

A designer cannot object to a **client's right to procure the data** from other professionals or sources. A designer has no right to use the data collected for and paid by the client, for any other client or purpose. *Nominally the person who pays, receives the output, and has the first and exclusive right to it.* The party that pays for data, also acquires the inherent **risks and liabilities**. Whenever a client provides a crucial data like sizes, technical requirements, permissions etc. the **transfer of information** should be **formal and well recorded**. Data contributions from independent professionals are favoured, because these *provide greater clarity, a counter check, division of responsibilities and dilution of risks.*

0714 Role of Designers with Government and Corporates

Small or improperly organized clients require designer who can handle the job even through its operations phase. They generally leave everything in the hands of the designer. **Government and large corporate organizations** have the necessary expertise to divide the routine type of job into tasks that can be assigned to different professionals. Such organizations themselves coordinate all the output from different professionals and take their own decisions and actions. Here the role of a designer is very clearly defined and so is the risks and liabilities. Designers working under a master or assigning professional have no problem regarding *data collection, accuracy, liabilities or transfer, since everything is well organized.*

0715 Design Assignments

A client realizes the **potential for a project** when the **assets** such as **land, building, money,** and **personal qualities** like **knowledge, expertise, experience,** becomes known. In case of **physical assets** the **financial adviser** provides clues how to explore the situation suggests the ways and agency who can shape it. **Personal qualities** motivate a person **to pursue an activity,** but will still need an agency to formulate the project. **Financial advisers and project consultants** are the largest referring agencies for **designers.** Next lot of **design assignments** arrive from **designers of other branches of design.**

08 SPECIFICATIONS

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0801 Specifications

Specifications help to **recollect or reenact** a happening. Specification formation is also a process of **improvisation and rationalization**. Specifications are likened to a **cookery recipe**, a set of instructions for materials and methods to *generate a product or initiate an action*. A specification is the *'best possible definition or explanation at a given time, for a given situation'*, a continuously **evolving experience**, where familiarity reveals greater details.

0802 From Description to Specification

Specification at a very basic level could be a **description** listing the physical qualities such as *size, weight, shape, colour, feel*, etc. of a thing. These also cover changes profiled in 'time', in the thing itself and the surroundings. One needs to define **the process for occurrence**. When a description consists of both, the **physical characteristics and the processes**, sequenced in time, it becomes a **Specification**.

0803 Negative Specifications

When goods and materials are comparatively new and their effects are not fully known, **ignorance and fear dominate**. Negative specifications, therefore mention, **undesirable aspects that must be avoided**. Negative specifications relate to things that are *harmful, unpredictable and debilitating for life*. All specifications initially tend to be **Negative**, but gradually become **Affirmative**. Negative specification may, however, remain *'independent statements with insufficient corroboration'*. Negative specifications are **eliminating**, and so allow a vast degree of openness. Results or creations, through negative specifications may prove to be **unexpected and even detrimental**. Gradually, with realization of all causes and effects, the initial **Negative Specifications** become elaborate and affirmative statement or **Positive Specifications**.

0804 Affirmative or Positive Specifications

When things are familiar and their effects are well documented, **affirmative Specifications** come into being. A specification becomes affirmative on being corroborated through detailing of all sub aspects or parts. Affirmative specifications gain their clarity through **cross references** or **dependency on similar other specifications**. Affirmative specifications are very **rigid, complete and positive**, so allow little variations, alterations or improvisations. For these reasons these do not seem very innovative, however, results are better guaranteed. Negative specifications are too thin, whereas the affirmative specifications are too elaborate and technically complex. A reliable and secure way out of such a dilemma is to look for a **Comparative Condition somewhere**, and relate to it.

0805 Comparative Specifications

Comparative Specifications are **dependent specifications**. Here an item is imitated or referenced because it offers an assurance. People, who are technically incompetent to define a problem or its context, tend to seek a known product. An original thing may be perfect in its own, but the same in a different context or environment may **precipitate unseen problems**. It is very difficult to search for a root cause of a fault, or a deficiency through such specifications. Comparative specifications are usually **non-innovative or creative**.

0806 Forms of Specifications • Messages or Documents

- **Oral instructions or messages** are the simplest way of conveying details. These are **ordered or delivered in chronological order**, or at least have some **cause-effect arrangement**, and so seem **action-oriented**.

- **Written or recorded documents** are substantial means of conveying the specifications. Documents are complex and bulky as these also include **methods for access, reference, and interpretation**.

0807 Forms of Specifications • Traditional Specifications

- **Traditional Specifications** define **constituents and production processes**. Primary way of specifying a thing is through the **measures, sensorial aspects and physical qualities**. Time definitions like, **rate and quantum of change** are required. Items flourishing for their **Performance** (output-input, yield rate, productivity, etc.) require **checks and evaluation processes** and **operational assurances** through **guarantees and warranties**.

0808 Forms of Specifications • Specifications of Technical Nature

- **Specifications of Technical Nature** depend on **drawings and flow charts** (scaled representations and surrogates using symbols, metaphors, etc.). Drawings show size, shape, scale and such other physical details, but require a **written backup** to show the **sensorial aspects** like *weight, speed, odour, warmth, etc.* Drawings are sometimes backed with **scaled models** (art cartoons, mockups, dummies, samples, pilots, etc.), or **full-size replicas**.

0809 Specifications Formats ■ Brand-name Specifications

- **Brand-name Specifications** are restrictive, and limit the bidding to a single product. The only competition will be between various suppliers of the same product.

- **Brand-name or its Equivalent Specifications** cite one or more brand-names, model identity or other details to identify **certain category of products**. The vendor is asked to show that offered product is indeed

identical. *The procuring agency reserves the right to determine equivalency.* Brand-name or its equivalents have perhaps a legitimate ground, but very limited place in public purchases.

0810 Specifications Formats ■ Lists of Qualified or eligible products

■ **Lists of Qualified or eligible products** are maintained and periodically updated *by Government's agencies, for purchase of commonly used items by various departments.* A vendor quotes + or - over the quoted price. In India, **DGS&D** (Directorate General of Supplies & Disposals) creates such lists. The term *goods* used in this manual apply to *articles, materials, commodities, livestock, furniture, fixtures, raw material, spares, instruments, machinery, equipment, plants* but excluding books, publications, periodicals, etc.

0811 Specifications Formats ■ Design Specifications

■ **Design Specifications** also called **Item Specifications**. This is a traditional scheme of creating an item, or **prescription** of *what an entity should be in its completed form.* Here the manufacturer or supplier is emphatically told **what and how to produce or deliver**, leaving no chance for **technologically or economically a superior item.**

0812 Specifications Formats ■ Performance Specifications

■ **Performance Specifications** are the expectations **how an entity should function or what performance it offers.** The specifier communicate the requirements as to, ***What will be an acceptable product, and How the adequacy of the product will be judged.*** The vendor gets substantial freedom in offering the most appropriate technology. There is a tendency to demand performance requirements that are very high in comparison to actual projections, which leads to cost escalation. Problems arise when **test methods** for judging adequacy of a product could require a *'Destructive Testing'* or a *'Laboratory or*

Plant-based facility'. Full activation or critical testing of an atomic reactor may not be feasible, or a long term performance of material cannot be checked in any setup.

0813 Specifications Formats ■ Operational Specifications

■ **Operational specifications** relate to the **functioning of the item**. Operational specifications are not performance specifications, but details about **mitigating risks arising out of operation of a system**.

0814 Dependent and Independent Specifications

◆ **Dependent and independent specifications** have a **web of dependancies**. These specifications are variously linked to use of parts, components, tasks, materials, equipments, costs and operational charges, and so once included, any alterations need to be carefully monitored. Such specifications cannot be changed without any consequent repercussions. Though, **rationalization of a sub-aspect** helps in *rationalization of the larger object or job*, yet restraint is necessary.

0815 Specifications for Open-ended and Closed-ended Products

◆ Some creators wish to protect their creations from marauders, so intentionally design **an inaccessible or closed system**. Such **closed ended products** or '**close ended architecture**' lose the favour when equivalent **open-ended objects** are available.

◆ Products in public (domain) have specifications that are '**open-ended Architecture**', and always preferred by the users. Such products allow greater degree of customization.

◆ Specification writers such as designers, aspire to conceive parts and tasks which are independent, or at least have a **designed or controlled interdependency**. Plug in micro chips of modern electronics and other

add-on systems are examples of such **purposive design**.

0816 Design Specifications

◆ **Design Specifications** are aimed at creating or procuring a product or assembling them to form an **invoice-able item**. These are substantially whole, and similarly identified in Estimate schedules. So often variants of design specifications also appear as **brief description** on drawings and estimate schedules, each contradicting the other.

0817 Performance Specifications

◆ **Performance Specifications** are holistic, and so, ideally should not include a separate or single item of work. Design if any relates to the *exterior* (such as fitment, size and shape parameters, etc.) rather than its *interior* (its constituents, method of working, etc.). But these set of specifications are **distinctly stratified**. 3 & 4 state **Requirements and Verification** and so most important ones.

0818 Strata of Performance Specifications

- 1 This Level offers the scope and background information of the project. No requirements are stated here, and even if implied, are not binding.
- 2 This lists all the documents that form the set.
- 3 **Performance requirements** are stated here, *and these are binding*.
- 4 **Testing and Verification** requirements are stated here matching to the performance requirements.
- 5 This lists all peripheral aspects of work, such as handling, packaging, shipping, delivery, precautions, etc.
- 6 This section contains information (such as method of submission, bid evaluation, etc.) and other data.

0819 Statements of Work (SOW)

Statements of Work (SOW) are unique to each acquisition or proposition document. It documents details of the work to be performed. It consists of first three tiers (see previous para) only. A Specifier (Designer) must prepare on own, or alternatively can seek it from the bidders. There are three types of SOW - **Function based, Performance based, and a combination of the two**. Selecting the type of SOW depends on how User wants to govern **Specific Contract Requirements**.

0820 Citing Specifications and Standards

By citing published **Specifications and Standards** one can make a specification document *very compact, extremely reliable, and automatically updating*. On the wrong side, **citing an incompatible or a cancelled version** is unprofessional. When a Specification or Standard is cited, *one may actually be citing a lengthy and voluminous chain of documents, many sections of which may not be relevant or impossible to understand*. Some of the cited documents could be obsolete or cancelled.

0821 Strategies for Creating Performance Specifications

It is very difficult to conceive a **fresh set of exclusive performance specifications**. But one can gradually and consciously reformat the **traditional specifications** with inclusion of **performance parameters** for standard parts and components. Many **resources are available to form performance specifications** such as, *Government departments and large corporate groups which prepare **indexed descriptions of commercial items** for frequently or routinely required products, Performance oriented descriptions as available in public domain purchase bids, Trade associations, commercial organizations, or technical societies often develop **coordinated standard specifications**, for the warranted performance of items produced by their members, Government Departments design and publishes **Model Specifications** for use by their*

*own sub departments and agencies. Specifications of well-organised departments like defence, telecommunications, etc. can be used for further **understanding of the methodology** and Market analysis as available in technical journals can show the ranges of performance that are currently possible.*

09 HISTORY OF SPECIFICATIONS

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0901 Measures as First Standards

Measures were the **first standards** to emerge. The first measures were based on **body sizes or capacities** but had many **racial and regional variations**. These local variations were ironed out through barter trading. But, for trade with far-off regions, the same process proved to be very difficult, as intermediaries like, brokers, caravan masters and shippers were making large profits through **Conversion of Measures**. The *inconsistencies of the measure conversions* were partly solved with **monetary pricing** system. Trading blocks had to concur to a common set of **Nominal measurements**.

0902 Early Measures and French Revolution

Early measure systems such as weights, lengths, volumes, though natural were **mutually incompatible**, as each had a different scale of sub fractioning. The problem multiplied when equated with equally **varied units and sub fractions** of monetary units. This was sought to be solved during the **French Revolution**. During the **French Revolution (1870)** the National Assembly of France asked **French Academy of Sciences** to formulate a **Scientific and Rational Measure System**. Such a system was expected to be: Neutral and universal, Replicable anytime and anywhere, Have decimal multiples, Follow common prefixes and Practical and simple to use. The rationale for such a system forced many countries of Europe to think on similar strategies.

0903 Measures and Industrial Age

Industrial Revolution period saw **faster means of transport and better communication systems**. *It fostered trade between far off regions and different political domains*. The producer and the consumer were very distanced. British, Spanish, French and Dutch empires established **trading outposts and their colonies**, to control the international trade.

These **colonial nations** maintained their own measurement system. Yet for inter-empire trade there was an acute need for a *common, logical, definable, replicable and comparable system of measurements*. As nations became free of colonial controls (such as USA) the International trade needed a ***fair measurement policy***.

0904 Metre Convention or Convention du Mètre

Metric System was rational but had **too many sub fractions**, each of the nations, regions, and trade groups favoured **different sub fractions**, creating confusion. First International effort to develop a **worldwide policy for weights and measures** was made during May 1875. Some 17 countries signed a **Metre Convention or Convention du Mètre**, an international treaty to create a '*permanent mechanism to recommend and adopt further refinements in the metric system*'. This was directed towards defining what constitutes a **Standard Measure Units**, and means to replicate it in **great accuracy anywhere and anytime**.

Signatories of the Treaty, were: USA, Germany, Hungary, Belgium, Brazil, Argentina, Denmark, Spain, France, Italy, Peru, Portugal, Russia, Sweden, Norway, Switzerland, Turkey, Venezuela.

0905 Confèence gènvrale des poids et mesures CGPM

After the **Convention du Mètre** in France in 1875 a **Confèence gènvrale des poids et mesures CGPM** (General Conference on weights and measures) was organised in 1889. **Eight CGPM**, at rough intervals of four years, were held till 1933, followed by an inactive period due to world war II. These meetings gradually evolved a worldwide policy on the advice of scientists and metrologists (*Metrology is science of measurements*). **Bureau international des poids et mesures (BIPM)**, is a permanent laboratory and world centre of scientific metrology, for establishment of the **basic standards and scales of the principal physical quantities and maintenance of the international prototype standards**.

0906 Formation of ISO (Organisation internationale de normalisation)

Soon after WW II, hectic reconstruction activities began everywhere in the world, but major impediments to this were the differing **National Standards**. To allow free flow of raw materials, equipments and technology a platform of **common Standards and Specifications** was required. In 1946, delegates from 25 countries met in London to create a new organization, to facilitate the **international coordination and unification of industrial standards**. The new organization, **Organisation internationale de normalisation, ISO**, officially began operations on 23 February 1947, in Geneva, Switzerland. The word ISO was selected to represent the organization in all languages, because it is derived from the Greek *isos*, meaning *equal*.

0907 Systeme International d'Unites (SI units)

9th CGPM in 1948, meeting after 15 years gap due to WW II formally adopted a recommendation for **writing and printing of measure unit symbols and numbers**. The name **Systeme International d'Unites** (International System of Units), with the international abbreviation **SI**, was adopted for this **New Metric System**. In 1960, the CGPM revised and simplified the measure system. **Seven Base Units**, such as: **meter** (Length), **kilogram** (Mass), **second** (Time), **ampere** (Electric current), **kelvin** (Temperature), **mole** (Substance), and **candela** (Luminous intensity), were established.

0908 SI Measurements

As a **designer**, we are concerned with formulating or creating new entities, and also using ready parts and components. For both the purposes, we need to specify the **Measures**. *ISO has formulated rules for Writing and Specifying Measures in drawings, documents, specifications and other forms of communication*. This is done to avoid any ambiguities

in interpretation of information.

0909 Writing and Specifying Measures-I

These are rules per ISO, and also better methods of writing measurements on **Design Related Drawings**. These apply to manual drawings and also CAD representations.

◆ All decimal numbers must be **preceded by a zero**, if no other digit exists. e.g. 0.121 (and not as .121)

◆ **No thousand or hundred markers** are to be used, e.g. 1000 (and not 1,000), but where large number of digits are involved, a blank or space (equal to 1 digit or not less than ½ digit in width) may be used as a separator, in place of a marker. However, where **only four digits are used** no space as a separator need be provided. e.g. 100 000, 10 000 or 1000 (but not 1 00 000 or 1 000).

◆ For **Length units** recognized measures are **km / m / mm** which may if required must be in **small letters**. For example **architectural plans** have nearly all measures in mm, so the **mention of mm should be avoided**. However, in the same drawing if **weight or volume or such other measures** are to be indicated, then identifiers for such units may be indicated.

◆ Architectural drawings nominally have **dimensions of maximum 5 digits** (for mm) unless a detail requires indicating a fraction of a millimetre, signifying measures up to 99999 mm or 99.999 mts (-but unit identifiers are not to be used). Plans larger then 99mts sizes are considered of Map Category.

0910 Writing and Specifying Measures-II

◆ Full names of units even when these are named after a person, are

written in small letters: ampere, volts etc., with the exception W for watt and J for Joule.

◆ For liquid measure (Litre) however It may be written as Lt (to differentiate between l and l).

◆ Plurals of measures need not be used. (kms, mts, kgs).

◆ Point or Full stop for abbreviation may not be used, for example as in m.g. or ml.

◆ Where cubic or square measures are to be shown: 3m³ = will mean three cubic metres and not 3³ i.e. 3 x 3 x 3 = 27cmt.

◆ Where traditionally only one unit is accepted, and if there are no chances of ambiguity, the measure nomenclature (mm, km, gm etc.) may not be mentioned (e.g. cloth width = 1.200). If in one sheet of drawing (or a document) only one scale and one mode of measure are used, the nomenclature may be mentioned as a general instruction for the drawing.

◆ Where drawings or details are likely to be graphically reduced or enlarged in processing / copying, a graphical scale preferably showing 100 mm bar may be shown. If 100 mm size is not suitable due to micro reduction or macro enlargement, suitable multiples of 100 mm for upwards scaling and 10x fractions of 100 mm for downwards scaling maybe used.

0911 Measurements on Drawings-I

When both mt & mm are used on drawings, it will be less confusing if the dimension is always written to three places of decimals, i.e. 3.450. No unit symbol need be shown unless a lesser number of decimal places are used; i.e. 3.450 or 3.45 m and under some circumstances 3.5 m, are all correct. Of the options, 3450 and 3.450 both are preferred. Where no

ambiguity can arise, symbols may be discarded, according to following rules:

0912 Measurements on Drawings-II

- Whole numbers indicate mm
- Decimated fractions to three palaces of decimals indicate m (and also by implication, mm)
- All other dimensions must be followed by the unit symbol.
- Where dimensions refer to different types of measures (lengths, weights, temperature etc.), preferably all units should be indicated or all units other than the major one should be indicated.
- Main dimensions and the tolerance (fitments, limits, margins etc.) etc. should be in the same unit system.
- Where main dimensions are accompanied by + or - range, both should be in the same unit.

0913 Need for a Coordinated Measure System

Consistency of dimensions allows use of standard tools, equipments, plants and technologies. The dimensional consistency can rationalize the conversion processes, storage, handling, and waste management. '*Raw materials or Finished product's are transient terms for goods. A finished product is a raw material for some other process.* Raw materials procured in a linear, square, volumetric, weight or liquid measures get processed into a *different 'measure' entity.* And so for products transiting from **one measure phase to another**, a **persistent dimensioning system** is very advantageous.

0914 ISO Modular Preferences

The SI recognized that widely spaced (1000 factored) measurements were either too large or small and not amenable to **unit formation** for processes like *planning, design, production, transportation, fabrication or*

execution, etc. ISO (International Standards Organization) as a result devised a *practical modular system of dimensions* known as **ISO Modular Preferences**. Most National Standards (including Indian Standards) are enforcing the same. It accommodates **traditional modular systems**, such as foot-Inch and earlier versions of the metric systems. This was done for wider acceptance and to achieve a gradual changeover.

0915 ISO's Four Preferences for Modular Coordination

First Preference 300 mm = 12"

Second Preference 100 mm = 4"

Third Preference 50 mm = 2"

Fourth Preference 25 mm = 1"

■ **First Preference** is favoured by the building materials' industry. Plywoods and other wood products are available in modules of 300 such as 600, 900, 1200, 1800, 2400 etc. Large buildings are designed with 300 as the modular measure. But, for smaller spaces such as Bedrooms, toilets, second preference of 100 is used as a module.

■ **Second Preference** is considered to be the most appropriate one for **Building components and Planning**. Glazed Tiles are available in multiples of 100 mm, with sizes like 100 x 200, 200 x 200, 200 x 300 etc., and also in sizes such as 150 x 150, 150 x 200 etc. as a carry over from the old system. Fabrics have widths of 600, 900, 1000, 1200, 1800 etc. For Windows or Doors width x height are measured in 100 mm increments.

■ **Third and Fourth Preferences** are not to be used for basic object sizes of more than 300, unless there are strong economic or functional reasons for doing differently.

0916 Implications of Modular Coordination of Dimensions-I

There are many products where **smaller modulation or variations** are desirable such as **Garments and Shoes**. ISO Modular Preferences, also do not consider variations in **naturally available materials**. Furniture, fittings and fixtures designed with **ergonomic profile or serving anthropometric, inconsistencies** have no specific accommodation in this system. **ISO is a modular system** to form a **grid or matrix for macro planning** and in that sense takes a superior position. Components and parts are expected to fit in the system and as a result, work-sizes of **components and assemblies** should be determined by taking account of **space for joint and allowance for tolerances**.

The ISO Modular Coordination of Dimensions, is **unnatural** and does not **relate to human body**. It creates an '**order that lacks beauty**'. ISO Modular system has **predictable progression-digression**, *unlike many mathematical orders and systems like Corbusier's Modulor system*.

0917 Implications of Modular Coordination of Dimensions-II

ISO Modular Preferences, as a **universally agreed system** of preferred measures, disciplines design, procurement, production, conveyance, handling, storage, distribution, usage, wastage and reuse or recycling of materials. The system provides a level ground to compare standards of various countries, and evolve world standards (ISO) for various products, services and work or operational procedures. It has made the **writing of specification lucid and logical**. It simplifies taxation procedures, costing, estimating, and valuation. It also rationalizes deployment of human and energy resources. It has made quality control procedures very objective.

0918 Implications of Modular Coordination of Dimensions-III

An **Abstract Dimension Modulating System** like ISO stifles the creative instincts but has universal acceptance. The **Dimensioning system** defies all *localized traditions, cultural variations, anthropometric*

distinctions, racial biases and geographical peculiarities.

10 STANDARDS

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1001 Standards

Standards emerge from **empathy or as a strategic understanding between two or more persons**. *Standards are commonly accepted specifications for making, maintaining, using and disposing objects, and mechanics of creation, handling, operations and management.* Formation of standards' is the raison d'être for being a member of **clan or society**. **Governments** gain **political power and patronage** by administering standards. **Regional blocks and International communities** achieve efficiency by preventing conflict and duplication of effort through standards. Standards, very effectively and economically *raise the levels of quality, safety, reliability, efficiency and commutability.*

1002 Why Standards

Standards emerge at many different levels. At **basic level** these are very **widely acceptable strategies**. But at **higher level**, a person, an organization or a government department must strive for **greater universal participation**. Such an active role in the society occurs as a quest for quality for all aspects of being. The **quest for quality** is reflected through: *desire to excel, readiness for improvisation, steadfastness to good practices, transparency in dealings, persistence for consistency, wider application.*

1003 Personal Standards

Standards at a very primary level are compiled **by a Person**, as a 'collection of bests', 'most favoured or representative items' or 'my suggestion'. Since these are carefully picked out items, represent a **Quality Conscience of the Author**, and so, are **personal standards**. Personal Standards are valued for the *author's mastery over the subject, rather, than the absolute quality of the included material*. Personal standards combined with personal norms of enforcement are often tyrannical. Specifications that establish personal standards describe

entities' physical characteristics, but rarely provide the ways and means (processes) of achieving or even testing it. Typical examples of personal standards are: *Time saver standards for architecture and interior design, Furniture or item catalogues, Special issues of periodicals, etc.*

1004 Standards as a Strategic Understanding

Standards can be a **strategic understanding**, among the **competitors or associates** to manage a situation such as: *reduce the rivalry, rationalise the methods of production, reduce the costs, enhance the image of the product, form a cartel to ward off the nonmembers etc.* Such standards also emerge without any distinct effort, as *'followers of the same path'*, empathetically sustain similar actions. A **work-culture or faith comradery** develops among the practitioners.

1005 Standards of Clan or Cast

Members of clan or cast can have a **tacit or formal understanding** for acting in unison. Such understandings are of usually negative dictates and are very restrictive. These understandings or standards sustain the livelihood by *protecting the exclusive or patent knowhow, and by regulating the competition among the members.* The standards are **more of the norms for behavioural and less of technological specifications.** Clans and casts flourish by acting in consonance with the Rulers or Government. Which, inturn enhances their governance by politically acknowledging such practices. Over a period of time the **divergent policies and directives** of the clans get rationalised as the **Code of Conduct.** Such Codes relate to *personal behaviour, formation and conduct of commercial activities, use of resources including the environment, safety measures, risks management, manufacturing, handling and disposing of the materials, and trade practices relating to weights, measures, economic transactions, employment, etc.*

1006 Virtual standards

Some major Consumers, Government departments like defence, because of their vast scales of operations, are **prolific creators of specifications**, and their needs become **virtual standards**. These agencies can afford to operate testing facilities for the purchases, and have enough supervision expertise for rationalizing the work procedures. In India, Railways and Public works departments are some of the agencies that dominate the realm of commercial activities. Whatever is consumed by them become the commercially the most viable item.

1007 National standards

Specifications have strong indigenous origin, as materials and human skills, both have **strong local character and advantage**. The **Bureau of Indian Standards (BIS)** in India, and National Standards agencies in many countries of the world, operate as a **Standards Formulating, Licensing, and Enforcing-agency**. Some governments like USA, though, act only as a **Facilitating agency**, encouraging the trade organizations and technical associations to take the lead in not only **developing standards, but for enforcement**. Governments during the later part of 20th C. found it easier to frame laws that are parallel to standards. In many small countries, standards for very urgent and acute requirements are prepared, as integral part of the legislation. **'Formulation of Standards' and Legislation** is often considered to be the same.

1008 International Standards -I

National standards are very indigenous, designed to serve the national interests. The **national protectionist interests** are served by **restrictive or negative specifications**. National standards cover only the **exigent needs of the nation**, so do not serve the interests of **regional economic activities**. When materials and human resources are transected across nations, a need for a wider application of specifications makes Nations come together to create a **Charter of Regional or International**

Conduct.

1009 International Standards -II

A world level Organization was needed to coordinate the standards' activities of many Nations and Commercial Organizations. **International Standards Organization** (ISO -1947), International Electrotechnical Commission (IEC -1906) in 1906 and the International Federation of the National Standardizing Associations (ISA -1926-1942), are some such International agencies. International Standards have no **Legislative Support or Enforcement** backing of a Government. International Standards work on **Voluntary Corroboration**. Such standards flourish on the realization that *greater advantages are earned by following it, rather than not being part of it*. Success of International Standards depends on the **Rational Confirmation and Wider Acceptance**.

1010 Levels of Relevance

Standards are expected to achieve intended results, by **voluntary concurrence, obligation, or through enforcement**. Standards are very powerful means *to cause a change or even maintain status quo*. The nature of **Application of Standards** takes many different forms with varying levels of **credibility**. **Acceptance of standards** if voluntary ensues a social respect or some form of elite status. The enforcement also may occur with social boycott, penalty or punishment.

1011 Purposes Standards serve

Compulsory and Legal like laws, regulations,

Obligatory and Quasi Legal like directives, policies,

Obnoxious or Evil like decrees, mandates,

Necessities like compulsions, obligations,

Traditional and Esteemed like customs, traditions, taboos,

Provisions like commitments, acceptance.

1012 Process of Standardization

Standardization is a process of identifying **common features** amongst various **Versions of Specifications** (personal, clan, trade, etc.) and assimilating them into a **common and rational form**. A standard emerges from *equalization of divergent views, beliefs or concepts, as a consensus with intentions of efficiency and commercial advantage*. 'A Standard is that level of performance or accomplishment which has been selected as an Ideal to which actions or objects may be equated'.

Standardization allows for clear communication between **User and Suppliers**, at a relatively low cost and with efficiency. Standards allow for *interchangeable parts, replaceable systems and inter polarity of systems* by encouraging concepts like: '**Open-Ended-Architecture**', '**Modulated Plug-in Systems**', '**Networking**', '**Shareware**', '**Systems thinking**'.

1013 Forms of Standards

Standards for industry may be **Qualitative Parameters for constituent raw materials**, which can provide a reasonable output. It could be **Capabilities of machines and other equipments**, which combined with specific human skills help efficient handling of tasks. Standards also specify **Tactics and Strategies** of securing assured results. It could be devices, instruments and methodologies to verify the performance. Standards could also include **mechanisms** to connect, operate, maintain and replace systems. Standards invariably incorporate Time management through *scheduling, sequencing, acceleration, retardation, etc.*

Standards that are applied in an Industrial setting include **Engineering Standards**, such as *properties of materials, fits and tolerances*,

terminology, and drafting practices. **Product Standards** describe attributes and ingredients of manufactured items as embodied in drawings, formulas, material lists, descriptions, or models.

1014 Updating of Standards

Specifications continuously evolve and so do the Standards. Standards cannot remain purposeful for very long, unless *continuously improvised, and their domain enlarged*. Some Commercial Standards, as for example, in the **fields of Information Technology, Communication protocols and Data Processing** are replaced by **emergent technologies** even before being implemented. **ISO** (International Standards Organization) and **BIS** (Bureau of Indian Standards) revise their standards, optimally **every five years**, but often more frequently. Improvisation, updates the specifications included as standards, and enlarges the domain by including many more facets of human activities.

11 LIABILITIES

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1101 Liabilities :

In any venture risks of under-performance, non-performance exists. These are due to mis-match with the expectations, circumstances and inadequate foresight and care during planning, execution and operations of projects. The liabilities in ventures manifest, at many different levels:

1102 Designers' Liabilities:

Project conceiver, planner or designer, are all liable for the inadequacies of conception resulting in poor definition of *performance requirements*, for having inadequate processes of verification for the offerings of the contractor or vendor and for establishment of operations mechanisms that is ineffective and lacks coordination. Designer's take-on liabilities of sub-consultants, by agreeing to work with under-qualified experts.

1103 Contractor or Vendor's Liabilities:

Contractors' or Vendors' liabilities are more defined and so always restricted, in spite of *all-inclusive clauses* that may have been integrated in the *terms of contract*. The liabilities of the contractor generally relate to *correcting the defects or complete replacement*. The liabilities may also include *making good the loss of profit and loss of opportunity* during the *period of inadequate working*. In some conditions it may include the *cost of misuse of materials, site facilities and loss of life and damage to other properties*.

1104 Operations' Liabilities:

Liabilities arise from the operations of the project or system. Designers and Contractors usually preempt such situations with appropriate provisions in the contractual relationship with the client. Operations specifications, in recognition of such situations provide for setting up of appropriate **Risk Management Systems**. A risk management system

recognises the role of regular maintenance. Guarantees and warranties help in diluting the level of apparent risks and thereby reduce the Cost of Risk-Management (insurance premium).

1105 Circumstantial Liabilities:

Circumstantial liabilities are mainly from **external conditions** like, *disasters, calamities, political situations, changes in law, rules, perceptions, trends, fashions, etc.* Some of these are natural and involve designers for inadequate perception and provisions. But other external liabilities depend on political, economic and social changes, and so many not attach a designer.

1106 Liabilities for designers:

Liabilities for designers arise from what they professionally deliver. These include specifications, observations and supervision of a job. The specifications include 1 Drawings, Graphical representations, 2 Literary or oral explanations, 3 Models, samples, surrogate representations 4 Formal or tacit acceptance of happenings related to design.

1107 Quality of Expression in Specification Writing:

Writing Specifications is the most important way of **facilitating a product or service**. Specifications writing is an *extended activity of contracting*, so here too all the **contract fundamentals** are strictly followed. As per the natural law '*a contract has to be enforceable, and whatever is specified must be doable*'. Specifications cover all *valid and essential requirements of the job*. A major danger in writing specifications is to **include unnecessary information**. So *choosing, what to exclude is as important, as choosing what to include*. Specifiers (Designers) must *eliminate any requirement that adds no value to the Product or Service being acquired*. The Specifier (Designer) must state clear conditions in a complete language, and yet remain brief.

1108 Defects in Specifications and Liabilities:

Very few specifications are totally free from defects. As a fundamental principle of law, a specifier (Designer) is responsible for the consequences of the specifications. Designers usually put in a **disclaimer** (in the contract with their client) for *errors found in their work*. The Insurance companies that cover the designers for **Professional Liability** (Professional Indemnity Insurance) insist upon it.

Most of the specification writers (Designers) incorrectly presume that their *text of specifications* is read and interpreted by **comrade technocrats** only, with whom they share **similar experience and mind-set**. During a dispute specifications are, however, more attended by **non technocrats** like the *administrators, lawyers, jurors and judges*. A contractor interprets the specifications, as long as the **interpretation is commercially reasonable** (an earning proposition).

***The Notion of Deconstructionism:** A French philosopher, Jacques Derrida originated the Notions of Deconstructionism. It is a whim of finding alternate interpretations of text. He contended that the meaning of a text is dependent on the context in which it is interpreted. All writings in some degree can be interpreted differently from what was intended. Deconstructionism doctrines, from Jacques Derrida and his colleague Michel Foucault, were a rage in many universities during the 1980's. A quotation from Thoreau, 'The mass of men lead lives of quiet desperation' was attacked by a feminist deconstructionist in words like: '..... real intention was to say that most women lead lives of noisy elation.' Here the writer's unintentional gender-specific wording was interpreted differently.*

1109 Faulty Specifications and a Contractor's Attitude:

A contractor works with **sheer sense of profit**, and so deals with **faulty**

specifications in any one of these ways:

- 1 A contractor charges by *doing the prescribed work according to the personal interpretation.*
- 2 *demand extra for undoing what was done*
- 3 *charge for redoing the job according to the corrected interpretation.*

Alternatively

- 1 a Contractor may refuse to execute the work causing delay, or
- 2 *take a legal recourse on the grounds of impossibility of performance or commercial impracticability.*

1110 Specifications and Enforcement:

A neat contract is one where things are **delivered for consideration**, but strictly in a **one-way transaction**. However, contracts are very complex. Certain jobs require clients *to provide information, materials, equipments, facilities or services to the contractor* (as per the terms of a contract or job specifications), and **an obligation is incurred**. Even if such things are offered with or without a **return consideration**, the contracting parties get tied up in the **Reverse Transaction**. A client, failing to deliver as promised, takes the blame for missed schedules and cost overruns. Specifications causing such *Reverse Transactions* are prone to **enforcement difficulties**.

1111 Accuracy and completeness of Contract Specifications:

A Contract is in force the moment it is signed, or dated to be effective. Once a contract comes into force, *any thing has been left-out, or not properly defined, can be only corrected* through a **Negotiated**

Supplementary Agreement. A Contract and Specifications must not leave out any aspect, *as something to be agreed or determined later on* (e.g. a clause like: *plastic paint of x quality, but colour shade to be approved later*).

In design offices specification-writing is a **last moment compilation**, and as a result it is common to see specifications of *items that do not exist, or have been eliminated from the project*. Specifications of only **intended items and required quantities** of work should be provided to the contractor. Otherwise, the bids will reflect the necessity of being prepared to handle **Intended items and Quantified work**.

1112 Holistic Products and Site Assembled Systems:

Job assignments for Structures, Architecture, Interior Design, etc. consist of both, Holistic Products and Site Assembled Systems. It is often easier to handle **Holistic Products**, fully or substantially through **Performance Specifications**. However, **Site Assembled Systems** inevitably have some form of **Design Specifications**.

1113 Specifications and Fair Trade Practices:

Avoid specifying a particular product, agency, tool, equipment, or a patent process. Favouring one, to the exclusion of others would mean **Unfair Trade Practice**. It is a good business sense to encourage competition to achieve better prices and quality. Competition also provides optional and reliable sources of supply. Mentioning a particular product, provides an unintentional warranty of its suitability for the purpose. It is better to confine Specifications to Requirement Statements.

1114 Property Disposal:

When Writing **Statements of Work**, the Contractor must be told *How to dispose of residual materials, garbage, sewage, emissions, etc*. Such

Disposal Procedures have to follow the local regulations, often at cost. The liabilities arising out of compliance and the cost operations need to be specified. If the residual materials are to be handed back to the client, then handling and storage must be specified. If disposal of such items is likely generate an income, *who takes the money* must be mentioned. The Tax liabilities of expenditure, income generated, or sales done for disposal, also requires clarification.

1115 Valid Claims:

A Designer and Client realize shortcomings of the work being executed, and request **alterations or corrections**. Such changes are not executed unless formally requested. The cost of such **constructive changes** is to be paid by the client and is considered a **Valid Claim**. Contractors also make mistakes. A contract specifies modalities for notifying mistakes and what is considered to be improper communication of information or reportage by the contractor. Contracts also list modalities for corrective action and settlement of costs.

1116 Language:

Contract language must be simple and for that reason sentences should be short. Long sentences do not provide any sensible meaning. Throughout the document for the sake consistency and even at the cost of creating dull and a simplistic writeup, use the same words, phrases (rather than exploiting a thesaurus). Use **category numbering** system and avoid **inter-document referencing** such as '*see xxx page, ref to yyy sub item, see above-below*', etc. Avoid **acronyms**, If must, use the commercially known **abbreviations**, and provide a reference index with expanded meanings. Avoid ambiguous words, or phrases that reflect more than one meaning. Refrain from phrase constructions that due to their sequence of placement, context or grammatical relationship could be interpreted differently. **Conflicting Requirements** often result from using *totality words* (such as: all, always, never, every, and, none, etc.) in

statements, when something else in another sentence makes an exception to the totality.

1117 Writing style :

in **Passive Voice** is always superior. The object of an action gets precedence and thereby the required special attention. In specifications the emphasis must rest on the product being described. It also removes the mention of the actor. Government servants favour passive voice because it does not require the mention of the actor, and thus avoid the responsibility. Avoid using **gender nominating words** like *he, she, his, her, him, man, men, woman, women, etc.*

1118 Grammatical Errors:

There are three levels of grammatical errors. At primary level such errors do not affect the meaning being conveyed. (X ate less apples than Y vs. X ate fewer apples than Y). At next level the grammatical mistake renders the sentence totally meaningless. Such errors can be corrected through meticulous proofreading. But the most dangerous **grammatical blunders** are those that alter the intended meaning of the expression, to something different. These get passed over by most literary proofreaders and software like word processors' grammar checks. Such mistakes can only be checked by an expert **Specification Writer**, or a **Seasoned Contractor**. The last levels of errors are most exploited by a lawyer in case of a dispute.

12 BUREAU of INDIAN STANDARDS (BIS)

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12 BUREAU of INDIAN STANDARDS (BIS) *Design Implementation Processes*

1201 Indian Standards

1202 BIS Standards Policy

1203 Bureau of Indian Standards (BIS) Operations-I

1204 Bureau of Indian Standards (BIS) Operations-II

1205 Bureau of Indian Standards (BIS) Operations-III

1201 Indian Standards

National Standards formation, in India began soon after the independence in 1947, as **Indian Standards Institution (ISI)**. It started a **product certification scheme** in 1955. This was recast by Indian parliament in 1986 as **Bureau of Indian Standards (BIS)** and has since then taken over the functions of Indian Standards Institution.

1202 BIS Standards Policy

BIS endeavours for improved adoption of Indian Standards by **industry, large scale purchasing organizations, statutory bodies and universities**. It lays emphasis on **company standardization and association level standardization**. It tries for effective implementation of standards through **Sectoral Committees**, such as those dealing with steel, food, textiles, information technology, automotive and power. **State Level Committees on Standardization and Quality Systems** also help for better implementation of Indian Standards. BIS also helps for use of Indian **Standards in legislation definitions**. BIS interacts with private sector undertakings for basing public purchases on Standards and Standardized Marked Products. BIS also tries for use of Standards in educational system.

1203 Bureau of Indian Standards (BIS) Operations-I

Formulating Indian Standards for Product Specifications, Methods of tests, Codes of practices, Guidelines, Terminologies, Glossaries, Basic standards.

1204 Bureaus of Indian Standards (BIS) Operations-II

Activities of BIS Product Certification (ISI mark) are **Voluntary, Mandatory (+135 products), or Compulsory** in nature, but based on **ISO**

Guide 26 and 28 for initial *testing, quality assessment, and sampling in the factories and in the open market*. Under separate arrangements with statutory agencies, some products are placed under **Special Certification Schemes** of lot or batch-based inspection, but carried out by BIS inspecting officers. For all other products, manufacturers are permitted to **Self Certify the Products**. The BIS product certification is also for other countries. National and State Governmental agencies are allowed to make enforcement through legislation. Besides the **ISI mark**, BIS also grants **ECO mark** for **Environment Friendly Products**.

1205 Bureau of Indian Standards (BIS) Operations-III

The **coordination with ISO** (International Standards Organization) occurs in following manner: BIS provides technical advice on formation and revision of ISO Standards, Participates in various discussions on Standards related activities, Revises own existing standards to match the format and content style of standards by ISO, Provides equivalent ISO identity numbers to its own standards (many BIS standards carry dual numbered standards, i.e. BIS & ISO), Conducts **Product Certification programmes** as per the Guide lines of ISO, Acts as the dissemination agency for various types of **Quality Management Systems**.

13 INTERNATIONAL STANDARDS ORGANIZATION (ISO)

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1301 Beginning of ISO

In 1946, delegates from 25 countries met in London and decided to create an **International Standards Organization**, for coordinating and unifying industrial standards. The new organization, ISO, officially began operations on 23 February 1947, in Geneva, Switzerland. ISO is not an abbreviation (of International Standards Organization), but a word, derived from the Greek **isos**, meaning **equal**. Whatever is the language, the accepted short form of the organization's name is ISO.

1302 ISO and International Cooperation

ISO is a **voluntary, democratic and non governmental organization** for international cooperation. It is now a **Network of National Standards' Institutes** of 162 countries of the world. It is formed on the basis of one member per country. Some of the participants, delegated by their governments, are the most representative body for Standardization effort in their country. ISO is a non governmental organization and so **cannot regulate or legislate**. It has **no legal authority to enforce** its standards. It **evolves standards by consensus**. *Every participating member, irrespective of strength of its political prestige or size of its economy, can influence the formation of standards.* Some Standards, through bilateral and multi lateral agreements, have become an inevitable **International Trading Requirement** and important criteria for **aid, loans, grants, etc.**

1303 ISO Work

ISO began its work with *specifications for writing and coordinating measures*. Subsequently ISO began to evolve **International Standards for Products, Services, Processes**, etc. These were derived as a consensus based on many **national standards**. The standards are upgraded and redefined every five years, and sometimes more frequently. Yet, to serve the user better, many individuals and organizations **outperform the standards**.

ISO standards are developed by **Technical Groups or Committees** (+3000) that comprise *experts* (+50000), *from industrial, technical and business sectors that follow these standards*. In addition, these committees also include *representatives of government agencies, testing laboratories, consumer associations, non-governmental organizations and academic circles*. The ISO has published more than 15000 **International Standards**.

1304 Formation of Standards at ISO

When a Government, Industry or Business identifies a need for standard, the requirements are conveyed through one of the ISO's National members, one of the three **General Policy Development Committees**. (Such as: **CASCO** -for conformity assessment, **COPOLCO** -for consumer policy, or **DEVCO** -for developing country matters). The new proposal, if accepted, is assigned to a technical committee of experts and others with relevant knowledge, such as *representatives of government agencies, consumer organizations, academia and testing laboratories*. The technical committees form a **Draft Agreement**, which is circulated as a **Draft International Standard (DIS)** to all ISO's members, for comments and voting. The feedback generates **Final Draft International Standard (FDIS)**, which on approval is published as the **International Standard (IS)**.

The process of approval a time-consuming action so ISO allows intermediate stage publications before a full consensus: 1 **Publicly Available Specification (PAS)**, 2 **Technical Specifications (TS)**, 3 **Technical Report (TR)**, 4 **International Workshop Agreement (IWA)**.

1305 Other Activities of ISO

ISO also helps for an **International Consensus on Terminology** to make the *transfer of technology, declarations, negotiations and*

communications. ISO formulates requirements for **Conformity Assessments** to assess materials, products, systems and services for the Level of Compliance to relevant standards before these can be put on markets. ISO offers agreements on **Standard Test Procedures** for evaluation of products. ISO does not carry out the conformity assessment, but has developed **systems and norms** as to how Conformity Assessing Organizations operate.

1306 ISO, Governments and Consumers

ISO has emerged as coordinating and consensus making organization among divergent national or regional standards to ease out the **technical barriers to international trade**. Similarly ISO helps Governments in health, safety and environment related issues. ISO standards affect the consumers for air, water, food, and soil quality, emissions of gases and radiation through assurance of quality, safety, reliability, wide choice, and worldwide compatibility of technologies.

14 ISO 9000 and OTHER MANAGEMENT STANDARDS

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14 ISO 9000 and OTHER MANAGEMENT STANDARDS *Design Implementation Processes*

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1401 Concepts of Consistent and All-inclusive care

In all human endeavours, each **citizen** (or a being) is considered a **stakeholder**. So one has to be **conscious and conscientious** of all our actions. It was accepted that for a **consistent and all-inclusive care**, an **attitude at personal level**, and a **culture at organizational level** is necessary. It is very necessary to **institutionalize** the individual attitudes and organizational culture for *'good management' with support of right policies, procedures, records, technologies, resources, and structures.*

1402 Assuring the Processes and the System of an Organization

To achieve a **Quality System of consistency**, a **Quality Conscience** is required. In this direction ISO created a series of **Quality Management Standards (QMS)**, designated as **ISO 9000 series**. The Quality Management Systems created by ISO were not meant to certify the products or services, but to **assure the processes and the system of an organization**. ISO 9000 series provisions, how *one conducts own work* rather than the *quality of the end product*, because if the process is rational, it will naturally affect the end product. ISO 9000 series was to ensure that products not only meet just the **customers' requirements** but *also satisfy all 'stakeholders' expectations'*.

1403 Origins of Quality Management Standards

QMS or Quality Management Standards have their origin in the **Product Liability Directives of European Community (EC)** of July 1985, also known as the **single market directives**, which state that manufacturers exporting to the EC and, eventually, to the **European Free Trade Association**, would need to have a **well documented and implemented Quality Assurance System** for certain regulated products.

ISO realized the need to improve quality of products and services.

1404 Needs for Quality Management

The needs for Quality Management were factored like:

- to bring in transparency in the structure and working of organization associated with products and services.
- to use only standard products and follow standard service processes, and insist for such a conscience from all partners or participants.
- to provide assurance to customers, users and stack holders through a universal process
- to meet mandatory requirements for business with governments and for international transactions.

1405 ISO 9000 series Quality Management System Standards

ISO 9000 series of Quality Management System (QMS) Standards are among the most widely known standards. It is a generic title for a Quality Management family consisting of **Standards, Guidelines, other supporting standards on terminology and auditing tools**. The standards can be applied to **manufacturing, service or administrative organizations in any sector**. ISO itself does not certify quality of any product or service, or register a quality management compliant organization. ISO has recognized **certification bodies** that check and certify an organization's conformity for QMS. ISO, therefore maintains no official database of ISO 9000 certificate holders.

1406 Some famous International Registrars for QMS

ABS Quality Evaluations. Inc.

American Association for Laboratory Accreditation

AT & T Quality Registrar

British Standards Institution (BSI) Quality Assurance

Bureau Veritas Quality International (BVQI) #

Canadian General Standards Board

Det Norske Veritas Industry (DNV) # etc.

Of these # BVQI and # DNV are operative auditors in India.

1407 Preparing for ISO 9000

An organization desiring to follow ISO 9000 system must carry out certain reforms within the organization before calling in a **recognized auditor for validation process**. The prime requirement is to frame the **goals of the organization**. Many times this are **informal ideologies** with the top level of a management team. This must therefore be **formally documented and every single participant** in the organization is made aware of it.

1408 Goals or Policy of Organization

The goals or the policy of the organization will cover:

- Nature of business being conducted
- Future changes as envisaged in business model
- Define clear roles and responsibilities for policy determination, implementation, preview and reporting
- Define **external 'clients'** who sustain the organization in return for the benefit gained or **beneficiaries of the offerings** of the organization for whom the entity functions
- Let each department define the **internal 'clients'** for products and services (such as intra-department demands)
- Define products, services and other inputs required to serve **external and internal clients or designated beneficiaries**. (Including validation

of the providers, quality parameters for the offerings, compliance with 'accepted' standards and Governmental requirements)

- Define processes that occur within each of the departments and necessary conditions for them to flourish (including human resources, health & safety requirements, environmental concerns)
- Define likely scale of affectations to 'third parties' (non user beings) due to the endeavour
- Form and place where these data (as listed above) will be available, frequency of revision, and process of accepting feedback on it.

1409 Structured Perception of the Organization

These exercises help define various processes operative in the organization and the nature of dependency amongst it. The organization is seen here as a large complex system consisting of several sub systems few of which are fairly independent, but most others are interpolating subsystems. The **structured perception of the organization** helps in developing a sharper quality control regime.

On completion of the ground work (as listed above) a request is made to any of the recognized registrar to specific requirements to be ISO compliance worthy. The requirements are defined in various standards of the series. One may also remain in compliance without being registered by an accredited Auditor, but cannot have the benefit of declaring itself to be an ISO 9000 accredited organization.

1410 ISO 14000 Environmental Management Systems Standards

ISO 14000 is a **generic management standard**, similar to the **ISO 9000**. Main thrust for the development of this series was the Environment summit held at Rio in 1992. Its focus is a **systematic approach for defining objectives and targets for environmental concerns and**

compliance with applicable legislative and other regulatory requirements.

It does not specify levels of environmental performance, and so not designed to be specific to any particular set of activities. It helps organizations evolve EMS (Environmental Management System) to minimize harmful effects on the environment caused by commercial and other activities, and continually improve the environmental performance.

1411 Working of ISO 14000 Processes

ISO 14000 series of standards have **two distinct facets for reporting** on Environmental Performance. **Internal objectives** are issues within the processes and activities and so substantially in control of the organization. The internal objectives are intended to assure all immediate stack holders including employees that the organization is an environmentally responsible entity. **External objectives** are larger issues between the organization and universe. The external objectives provide assurance on environmental issues, to external stakeholders such as customers, the community and regulatory agencies. It also provides for a system for inclusion of suppliers' declaration of their conformity to **ISO 14000**.

1412 Benefits and Implications of ISO 14000 EMS

The EMS facilitates compliance with environmental regulations, supports the organization's claims about own environmental policies, plans and actions. A **certification of EMS conformity** by an independent certification body furthers the work on QMS (ISO 9000). ISO 14001 compliance can improve the Environmental Management, and enable easy access to a growing '**Green-Market**'.

ISO 14000 *Improves operational efficiency, Cost savings, Energy conservation, Rational use of raw materials and other resource, Better recycling processes, Reduced waste generation and disposal costs,*

Pollution prevention, Reduces environmental liability and risks, Improves community goodwill and societal images, compliance with legislative and regulatory requirements, Improved Industry Government relations, and provides Competitive advantage for 'Green' products.

The EMS offers a range of approaches for **Environmental Labels and Declarations**, including *self declared environmental claims*, **Eco-labels** (seals of approval), and Quantified Environmental Information about Products and Services. ISO has developed more than 350 Environment related International Standards.

1413 Other Management Standards

In the last two decades ISO has concerned itself with **Management Standards** for **Quality, Safety, Security, Environment, Food, Health**, etc. These standards refer to what an organization must do to manage its processes or activities.

ISO Management standards are broadly of two classes. **Generic Standards** mean that these can be applied to any organization such as business enterprise, public project, administration or government department, whatever the product or service may be. Other Management Standards are **Sector specific Standards**.

1414 Select List of Other Management Standards

Some Management Standards have been formed and published for implementation, whereas a large number of them are in formative process and will appear soon. *The standards are listed in order of their number, which does not reflect their order of formation or year of publication.*

ISO 18000 OHSMS Standard on Occupational Health & Safety Management Systems,

ISO 20000 IT Service Management,

ISO 22000 Food safety Standards,

ISO 24000 Security and Continuity Management Standards,

ISO 26000 Social Responsibility,

ISO 27000 Information Security,

ISO 31000 Risk Management Standard,

ISO 50000 series is for Energy Management Standards,

ISO 55000 Asset Management Standard.

1415 Certifiable Standards and Requirement Standards

ISO Management standards can also be categorized as **Certifiable Standards** and **Requirement Standards**. An organization may get a **conformity Certification** by a recognized agency after an audit process as specified in series of standards. ISO 9000, ISO 14000, ISO 18000 and ISO 22000 are **management standards that allow certification**.

There are several other Management Standards that have **no certification process, and so-called Requirement Standards**. The *Requirements standards*, only provide guidance for implementing a management system (such as ISO 26000 and ISO 31000).

15 QUALITY for DESIGNERS

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15 QUALITY for DESIGNERS *Design Implementation Processes*

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1510 Strategies for Client Management in Design-VI

1511 Post Delivery of a Project

1501 Designers and Quality

A designer, as a professional, strives to assure that projects are completed **planned level of inputs** and provide **intended benefits**. Quality represents the fundamental economics of the **input-output equation**. The emphasis is upon *maximizing the achievements, value addition and minimizing process effort, resource wastage*.

1502 Pursuing Quality in Design

Quality in Design results from *'what the product is'* and *'what the users do with it'*. It results from Three-way interaction between:

- 1 The nature of the project, product or service, as perceived **by the originator**, i.e. the thing in its own entirety.
- 2 The **user's original needs and altered expectations**, as a result of interaction with a completed project or product.
- 3 The **operations or functioning of a project**, product or service, as reflected in live experience training, servicing, parts availability, ease of replacement, warranties etc.

1503 Judgements for Quality

There are several **Primary issues**, against which **quality judgements** are made, like: *comfort level, variety, novelty, prestige, economy, size, ergonomics, anthropometrical possibilities, other or secondary uses, etc.* The **Secondary issues** include *social, cultural, psychological, political and other relevancies*.

Designers are **quality conscious** on two counts: their **own conscience** and the **public compliance**. Designers are **conscious** that *'certain personal quality notions'* must be achieved, and *'certain other public*

requirements' must be complied. *But consciousness does not translate as conscience, and conscience does not make for compliance.*

1504 Types of Design Clients and their Involvement

Designers deal with many types of clients, **knowledgeable, curious, domineering, modest and ignorant ones**. But, two distinct classes of clients profoundly affect the design process. **One**, where the clients are corporate or organizational entities, with factual and detached interest in design, and **Two**, 'personal-clients' who are inquisitive, participatory and subjectively involved.

1505 Strategies for Client Management in Design-I

During the design phase 'personal or individual clients' (like a family), a design is a rare event, but initiates **multi faceted dreams**. The ever evolving dreams consist of unconnected images, friends' suggestions and other impressionistic situations like media, magazines or real life examples. For a designer the problem occurs in **perceiving a holistic image** out of it, or in offering and convincing the client about a novel offering that is far more exciting. Most clients do not understand the formal language of drawings or graphical representations. During discussions they **grab familiar words or terms** and hang on to it. So designers have to be **very careful how and what they express**.

1506 Strategies for Client Management in Design-II

Prepare a **project brief** for determining and stating formally, all requirements, such as: *user and other 'clients' needs and demands, technical requirements, statutory obligations, prevailing standards, current styles, available technologies, etc.* Where the **client is not a user**, and a **product specifier is a marketing team**, both of thee may not offer much for **design requirements**, so it is left to the designer **to formulate the design brief**. The user-client may not understand such briefs, at least

initially, so remain non-committal, or in good faith allow initially allow the designer to proceed.

1507 Strategies for Client Management in Design-III

As a **Design** gets under-way, and design presentations, in colour, 3D format, reality models, or in virtual animations, the clients 'truly' react to the Design. At this stage, clients **due to their subjective involvement**, become **extra perceptive** to some aspects of Design. A designer should see this as the **inevitable**, and be prepared for the accommodation. All re-calibrated designs face **a barrage of new demands**, requiring substantial to a complete rethink over the design.

1508 Strategies for Client Management in Design-IV

A worrying aspect of **Design Delivery** is **over or premature commitments**. Both of these create liabilities of promised delivery. Right from meeting for concept design presentation to an execution stage, a designer may **over explain a detail** orally or in other presentations. Certain details must remain '**open ended**', allowing scope for improvisations. A **premature statement or commitment** before all aspects like technical or economics feasibility have been checked, can become embracing. For example, between 'a red floor' and 'bright coloured floor finish', the commitments are very different. Individual clients are very **fast learners**, and designers must expect them to be **super designers**, by the time execution starts. With their **fast learning capacity to suggest changes enlarge many-fold**, and designers should take this enhanced ability as the **readiness to dabble in complex issues of design**.

1509 Strategies for Client Management in Design-V

As the project materialises, the clients begin to have **first life size or**

realistic experience of the designed entity. Designers must 'engage' their clients by adequately answering the queries, offering convincing explanations. Clients **derive satisfaction during the project execution phase**, *when queries about economic and technical nature are answered with convincing explanations with comparisons amongst various options.*

1510 Strategies for Client Management in Design-VI

A project, as it is delivered to an actual occupying-user (who could be a new person, different from the assigning-executing client) the designed entity is revalued. The new person, is less bothered about how a design was evolved, but concerned about the advantage accruing out of it. This could be based on sum effects of many factors like *cultural roots, aspirations, economic status, etc.*

1511 Post Delivery of a Project

For Design professionals stakes are very high in seeing that clients derive satisfaction both, during the **design and execution phases** of the project. In few instances, the **design and execution phase converge**, so it becomes all the more necessary *to keep in touch with the clients*. This can be reinforced through *casual visits to the project, or inquiries of well being*. For a designer interaction with the client begins through the **design process and delivery of a final product**, but persists as an **everlasting relationship**. *A satisfying design process helps in most appropriate product delivery. And an appropriate product backed by constant concern creates a long-lasting relationship bringing in new projects and clients.*

16 QUALITY CONSCIENCE

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16 QUALITY CONSCIENCE *Design Implementation Processes*

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1608 Conscience for Excellence

1609 Documenting matters related to Quality

1610 Transparency and Compliance for Quality

1611 Fee-back and Feed-forward systems for Quality control

1601 Context for Quality

Quality is as much an issue for the **conscientious designer**, as much as for the **project initiators, project users, project operators** and the **society**. *It relates to how a project, product or service is carried out or employed, how the external conditions support the usage and how it is perceived ?*

1602 Quality as per ISO 8402

*'The **concept of quality** is the totality of features and characteristics of a project, product or service that bear on its ability to satisfy, **stated or implied needs**'. Quality is both a **perception and a value judgment**, concerning human satisfaction; the **basis for both is ever changing**. The **characteristics of a project, product or service**, by themselves, **cannot determine the measure of quality**. A project, product and services when satisfactory in every respect, can fail, if the **external use conditions** are drastically altered during its execution.*

1603 Conscience for Quality

Conscience is the inherent ability of every human being to **perceive what is right and wrong**. With this conscientiousness, we *control, monitor, evaluate and conduct* all endeavours. Some consider that **the innate sense of judgement** *needs to grow, develop, and further formatted*. It must though become a **continuing passion of refinement** (meticulousness).

A project, product and service, if conscientious executed **inspires the designer to do better next time**. Designers project their professionalism through their **attitude and deliverables**, both of which **converge as pursuit for quality**. An **enhancement of satisfaction** is the key element of **quality conscience**. The **conscience for quality** has THREE facets,

a **Personal need, Governmental requirement and Social obligation.** In the **First case**, it just too *subjective and changeable*. In the **Second instance**, it is often *compulsory, restrictive and punitive*. In the **Last case**, there are many *stakeholders*.

1604 Developing Quality Meticulousness

To achieve **quality meticulousness**, a **Designer** must offer deliverables that:

- a meet a well defined need, use or purpose,
- b satisfy user-customers' expectations,
- c comply with applicable standards and specifications,
- d comply with statutory requirements
- e involve all stack holders and meet all social obligations,
- f are made available at competitive prices,
- g are provided at a cost which will yield a benefit or profit to the user-customers.

1605 Defining: Consciousness

Confusion between **Conscience and Consciousness** arises, because of the same Latin root (Latin word *conscius*, meaning **with** and to **know**).

Consciousness is an *adjective*, for *being aware and responsive to one's environment*, but not being judgmental in terms of good-bad, wrong-right, etc. Consciousness is being **aware of all processes and parameters** where conscience is checked.

1606 Defining: Conscience

Conscience is a *noun* which can have many different meanings, but it is the *inherent ability of every human being to perceive what is right and*

what is wrong. It is considered as a **quality of one's character and conduct**, *reflected by the adherence to moral principles and consideration of fairness and justice.*

With conscientiousness, one can control, monitor, evaluate and conduct all endeavours. Conscience is a **social facet of the morality**, as it is shaped by the person and the society. *A quality conscience requires no outside assessor.* In commercial fields, conscience is seen in products and services that demonstrate the **integrity and social responsibility.**

1607 Defining: Compliance

Compliance is the **act or process of complying to public desire, demands, ideology, traditions or legal, regimen.** This is done by *coercion or sense of responsibility.* This requires **extra ordinary effort, compromises and investments**, and so it often detested or challenged. Some Governments (like USA) avoid interference whereas some International agencies have no power to legislate so depend of **self-regulation** that is akin to conscience.

1608 Conscience for Excellence

The Conscience as a refinement can be seen in the **excellence enhancement and emergence of human relationship**, at both, **personal and professional levels.** It is measured at professional level, *as the original expectations (requirements) versus the product formation, service deliverance or adequacy of counselling.* For this, It is imperative to **formally state the expected use of the system and define ways how its adequacy will be checked.**

1609 Documenting matters related to Quality

For **developing quality meticulousness**, it is very necessary that all

matters relating to **quality control** are well documented. A **well-documented brief** serves as a **benchmark** for assessing the level of the quality being achieved. Wherever **Quality control documents that are formal, transparent and accessible, to all stack holders** (clients, users, public and competitors), the projects, products and services have greater **quality assurance**.

1610 Transparency and Compliance for Quality

Quality **Conscience and Consciousness** are both personal pursuits, yet together cannot offer the **Quality at Societal level**. The pursuits for quality, even if *individual in nature and ever evolving* must be **transparent**. To involve all stakeholders, a designer must **declare and continually update the policies relating to quality** through **open access, public domain documents**.

1611 Fee-back and Feed-forward systems for Quality control

For ages **quality control** has been a matter of learning and improvising the process and materials. The learning was a **feed-back** from the users, as available through selling and using the produce or services. **Feed-back** is interpreted as *adjusting future actions on the basis of past experience or performance*. It is a **post event report** on things that have already occurred and past remains unchangeable. Post industrial age many **real time work systems** were realized. These were used concurrently with the system eventualities to make '**course corrections**'. But these did not allow strategic planning. So **Feed-forward** as a future directed system was realized. It is like **preventive maintenance or preventive actions** to avoid mishaps or cash flow planning for contingences.

17 CONSUMERISM

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17 CONSUMERISM *Design Implementation Processes*

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1704 How to deal with Stakeholders

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1706 Consumer Rights in India

1707 Monopolies and Restrictive trade practices regulations (in India)

1708 Ralph Nader movement in USA for consumers

1701 Stakeholders

A stakeholder is a person, group or organization, having an **interest, concerns or grievances** for the **objectives, policies, plans of actions or effort**. These persons are inside or outside the organization, but show a characteristic *proximity, intimacy, knowledgeability*, and have degree of physical affectations and urgency.

1702 Stakeholders Interests

Stakeholders' interests are positive or negative but may show contradicting interests. Secondary stakeholders are sometimes indirectly affected, more distanced and may not acutely represent the urgency. **Internal stakeholders**, at organizational level are like *staff, suppliers, consultants, financiers, investors, etc.* The **stakeholders' interests** could be *economics, social, work conditions, safety and security, environmental concerns, public resources* and enforcement of Government and other obligatory regulations. At **other level the stakeholders** could have political interest, propagation of ideology, support or negation of specific materials, processes or technologies.

1703 Managing Stakeholders

Stakeholders represent **bridges of social connections**, which if properly cultivated help *public acceptance of designers' works*. The acceptances include new clients, approvals, grants, loans. The social bridges can act as buffers, to tide over the shortfall, on **quality expectations, delivery schedules, budget over-runs and professional competition**. Stakeholders increase the **business credibility of the organization**, and **personal social reliability**.

1704 How to deal with Stakeholders

It is easier to deal with stakeholders as a group than in isolation.

Recognize stakeholders for their **geographic and class of affectation**. The real affectations could be *economic, social, safety, encroachment or compromise of rights and opportunities for participation in the process*. A stakeholder or the group may want **public exposure, a media story or political gratification**. Stakeholders are **societal influencers** and demand certain respect, and this can be offered through participation or engagements. Both of these can be achieved by **keeping them informed** in design conception, planning, decision making, implementation, and evaluation processes.

1705 Consumerism

It is a concept that relates to **consumers' rights**, about *protection and information for products and services regarding practices such materials, processes of production, testing, certification, packaging, claims in advertising, efficacy of guarantees*. It ensures social justice through **fair economic practices**. The term 'Consumerism' (since 1915) can also include **consumerists' movement, consumer activism or consumer protection**.

1706 Consumer Rights in India

Consumer rights are now being reformatted as laws and obligatory practices (specifications and standards). One of the most important legal framework covering individuals and organizations, is the **Consumer Protection Act, 1986**. These laws provide right to know, demand and get effective application of consumer rights. Any individual who purchases products or services for his personal use and not for manufacturing or resale is called a consumer. It includes the *right to be protected from all kind of hazardous goods and services*. The *right to free choice and be informed about quality of all goods and services*. The rights to participate in the issues of consumer interests. The right to seek redressal. The department of Consumer Affairs is the nodal organization to protect the consumer rights, redress the consumers' grievances and promote the

standards governing goods and services provided in India. A hierarchy of consumer courts have been established to handle such cases.

1707 Monopolies and Restrictive trade practices regulations (in India)

The **MRTP act** (passed in 1969) became effective from June 1970. Its major aim was consumer protection by preventing concentration of economic power, and provides for control of monopolies. It has been now improvised as **Competition Act, 2002**. It restricts monopolistic and restrictive and unfair trade practices. It addresses, to matters of cartel forming for production, sales, distribution, pricing, limiting new technologies, elimination of potential competitors for goods and services.

1708 Ralph Nader movement in USA for consumers

Ralph Nader (1934) is an **American consumerism activist**. His concern included consumer protection, humanitarianism, environmentalism, and democratic government. Nader (1965) published a book '*Unsafe at Any Speed*' on safety performance of US automobiles. He criticized auto industry for putting style and power over safety while questioning Government's attitude on regulations. In 1967, Nader also initiated a campaign for federal standards on slaughterhouses. Ralph Nader (1960-1970) mobilized college students to form Public Interest Research Groups (PIRG), for aiding in his investigations in public policy and effective government regulation. This resulted in reports on baby food, insecticides, mercury poisoning and coal-mine safety.

18 HUMAN RESOURCES

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1801 Personnel in an Organization

Personnel are the most important asset for any organization. Organizations hire people with required *education, skill, experience, inclination and personality trait*. Personnel as **Human resource** are not only *immensely manipulable, but up-gradable to seemingly infinite levels of efficiency*. And so organizations **recognize, support and even reformat these qualities** through *formal training and by providing opportunistic exposures*.

1802 Employment

Employee and Employer enter into a **contractual relationship** wherein *compensation is offered for the type of services to be rendered*. At a very basic level the *performance of an employee relates to the profitability of the organization*. This is more so in Design organizations where human resources are very important assets, unlike in manufacturing units where productivity of machines and raw material costs have greater significance.

1803 Process of Employment

Employment is a process of **mutual choice** or selection: **Employer** chooses the employee to engage, and the **Employee** selects the employer to work with. *The extent of choice and the power to make it, are rarely equal*. All democratic Governments' laws, however have a basic tenet that employer and employee have equal choice. In reality, however, *inequalities occur due to **discriminations** of sex, race, region of origin, age, language, social status, etc*. Some of the *discriminations though scientifically supportable are not tenable in normal law*. Our constitution, overrides, provides, dictates or recognizes '**reservations in employment**' for specified classes of people, to eliminate and correct certain historical effects.

1804 Selection for Employment

Hiring an employee is both a process of **Selection and Elimination**. The process is so subtly carried out that often applicants do not become aware of it. The Selection is based on

1 **Objective requirements** (intellectual) Skill, experience, training, work related abilities.

2 **Subjective requirements** Personality traits, initiative, speed of reaction, temperament, memory, power of reasoning.

3 **Physical requirements** Age, height, muscle power, health history, abnormality of body limbs and sense-abilities

4 **Other requirements** Past record, references, readiness to accept the terms of employment.

1805 Performance of an Employee

The employment is an evolving process, where the employer and employee both try to prove themselves worthy of their roles. These **performance appraisals** must not only occur at regular intervals, but sometimes as a surprise too. Once a person is employed, the management body of the organization continuously monitors the **performance**. **Performance of an employee** is a product of many factors such as *individual ability, personality traits, input effort, sincerity, perception of the role, motivating factors*, etc. Yet, performance can be conditioned as the *enhanced capacity to deal with more complex or new problems, share of responsibility, greater authority*, etc.

1806 Perception of Performance

An **Employer sees performance** as a tool *for future efficiency to be gained at a specific cost*, whereas the **Employee perceives performance** as *immediate compensation, personal fulfilment, future*

promotion and skill gain. An employee can be motivated with additional advantage, comfort, increased learning, or even enhanced motivation. The **original conditions of employing a person** such as *the technological relevance, equipments, nature of projects, economics of resources deployment, personal efficiencies, work-culture,* **change with passage of time.**

1807 Job Discharge or Termination

Job discharge or termination, has two facets: *ONE the employee wishes to cease working with the employer, or TWO the employer desires to terminate the employee.*

Employee's perception could be: *insufficient motivation, unsatisfactory compensation, lack of promotion, any other personal (psychological or physical) reasons, or better prospects elsewhere.*

Employer's perception could be: *inability to reset with the changed circumstances, lethargy of advancing age, technological irrelevance of the skill, lack of experience, unviable pay-structure, lack of scope for promotion, unacceptable social behaviour, or resistance to relocate at a new location.*

1808 Employee's Options for Job change

Employee's options are two fold: **Change of employer or renegotiation of terms of employment.** In the later case, **age of the employee** is an important criteria. A person comparatively young in age must move around seeking various jobs to experience the *mechanics of employment.* A person not so young, will have to *select between reduced appreciation of the role and security of reasonable compensation, or enhanced appreciation and uncertain compensation.*

1809 Employer's Options for Employee's Discharge or Termination

When an employer wishes to remove an employee, there are many **legal hurdles**, *some are convertible into monetary terms*. Instead of wasting efforts to surmount such hurdles, employers try *to assign different roles, retrain, relocate, assign different tasks, provide punishments, curtail other advantages*, to their employees. When, an employee leaves, the organization loses an **asset**, *accumulated mass of knowledge and experience, personalized contacts, a person with proven mode of communication, secrets, patent procedures and formulas etc.* Organizations are nominally unwilling to let a **reasonably seasoned employee** quit.

1810 Hire, Fire and Retrain the Personnel

Small organizations, Whenever circumstances (projects on hand) change, **prefer to fire an employee and hire new talent**. Larger organizations have greater **capacity to recast the role of employee**, so would retrain the employee with different exposures.

1811 Realities of Re-employment

For a person who seeks a fresh position, it is time to take advantage of the real and abstract gains of the past, such as *experience, personal contacts, specialized knowledge etc.* These can now be converted into materialistic things. Such a plan, however, is related to the **age of the employee**. **Re-employment chances** begin to taper off beyond a certain level of age,. An **aged person**, though well experienced, has **reduced learning capability, reduced reorientation faculties, less motivation, less migration capacity and willingness for re-establishment**. An aged person may have out-dated knowledge base. An organization looking for consolidation of their business may promote a person **from within their cadre**, rather than hire someone, *who will takes time to attune to their work-style*.

1812 Employed Designers under the age of 30

Designers under 30 years of age have many **positive operants** in their favour, like: *Fresh technological background, some experience, highest mobility or capacity to settle at any geographical location, capacity to work under most difficult conditions, and highest learning abilities.* These qualities are very appreciated by all employers, and so desire to hire people either as a **complete fresher** or with less than 30 years of age (i.e. with 5/6 years of experience).

1813 Employed Designers in the age segment of 30-35

Ideal age for **job change** is less than 32 years, and designers in the age segment of 30-35 should *have changed the job, or do so as early as possible.* Alternatively *renegotiate the terms of employment* and move to higher position like **partnership or associateship**. This is also perfect age to start **own design venture**. At these age a person is *ready to relocate, take a challenging position, is highly motivated and has reasonably good knowledge base.*

1814 Designers in the age segment of 35-40

This is an age segment, when a designer is mature with *sufficient work experience, personal contacts, and specialized knowledge,* but also begin to have **Negative operants** like: *reduced learning capability, lesser reorientation faculties, less motivation, less migration and reestablishment willingness.* It is the last opportunity for seeking change in employment.

1815 Designers in the age segment of 40-45

In this age segment chances of re-employment taper off drastically. Only way a designer can hope to **shift the position** is by joining another organization as *partner, senior associate or a free-lancer.* Such opportunities, though are very few, and would *demand persons with outstanding competence and capacity to contribute.*

19 LEADERSHIP

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1901 Meaning of Leadership

'Leadership is the ability of an individual to influence, motivate, and enable others to contribute toward the effectiveness and success of the organizations of which they are members,' a person in a **position or office of authority**, such as a **President or a Chairperson**. The convener of the Design Organization is normally the **prime leader** of the unit.

1902 Authorities to conduct an Organization

An organization is launched, when its convener has one or several authorities, such as:

- **Formal authority** to lead an organization is acquired by the *capacity to reimburse or compensate people* who work for the organization.
- **Technical authority** derives from *superior knowledge, expertise, skill, experience*, etc.
- **Personal authority** is a function of **Personality attributes** such as: *age, sex, race, bearing, determination, will power, appearance, charisma, height, weight*, etc.

1903 Lack of Authorities to conduct the Organization

Conveners of the organization, who **lack any of these authorities**, try to make it up by other means. **Formal authority** can be procured by *having a financier partner or associate, or an official appointment*. **Technical authority** can be secured by *hiring technically qualified associates or employees*. **Personal authority** can be modified by having *an indirect or remote mode of management*.

1904 Quality of Leadership

Qualities of Leadership vary according to the **nature of work** in the organization, but nominally it is the **quality of leadership that defines the work style of the organization**. To achieve the first object, organizations separate out the *domain of leadership for the functioning of the organization* from the *domain of leadership required to handle a project*. The second aspect requires the *leader to be as versatile as the project demands*.

1905 Nature of Leadership

Organizations that handle *highly variable situations or non-repeating projects* need a very **Radical leader**. On the other hand organizations with *routine projects* will function well under a **Methodical leader**. An **Autocratic leader** overrides the situational differences and imposes a preconceived style. The autocratic leader expects complete obedience. Such a leadership works well for *projects that are critical in time, resources and extent*. A **Democratic leader** would rather mould the situation, so that it can be handled within the ambience of the personal (leadership) qualities. A democratic leader offers full support, status and due recognition to employees. Democratic leaders are ideal for *projects involving large user base*. A **Bohemian leader** develops a *style to suit the situation on hand*, and are very useful in *tackling continuously variable situations*. A **Custodial leader** has extra ordinary economic and political resources to make employees subservient, but the resulting performance is barely adequate.

1906 Authority and Responsibility in Organizations

Leadership in organization is recognised in terms of **Authority and Responsibility**. **Authority** refers to the *right or prerogative of requiring action over others, or simply a right to command*, whereas, **Responsibility** means being *prepared for the consequences of application of authority*. A leader passes on a *part of the authority* to selected subordinates, and makes them *responsible for their actions*. By

sharing the responsibility a leader strengthens the ultimate authority.

A leader establishes a rational link between the authority and responsibility. Leaders create a **logical, transparent and well-balanced structure of authority and responsibility**, within their organization, through selective participation of subordinates. A relationship between authority and responsibility motivates other subordinates to belong to the process.

1907 Employees' Perception of Responsibilities

Members of the organization take on responsibilities with different concepts, *as an assignment, as a perceived duty, as something to reimburse the favours or compensations, as a share of power or prestige, or even as a compulsion*. The responsibilities unless accompanied by adequate handout or **recognition of the authority**, causes unpredictable responses.

1908 Dispensation of Authority and Responsibility

A complex organization will have many layers of **people with assigned or presumed authority**. In mid size and large organizations owners or conveners do not get involved in dispensation of authority and responsibilities. To manage these dispassionately, a **coordinator or manager** is required. A coordinator's job is to dispense the *authorities and responsibilities* in a **formal and ceremonial manner**. A coordinator or the manager usually has the **power to hire, fire or favour** any subordinate. *'Managers are people who do things right, but leaders are people who do the right thing'*- Warren Bennis, 'On Becoming Leader'.

1909 Work Culture

Each organization has its own distinctive **work culture**. The work culture is a **historical formation**. Work culture in an organization emerges from

the revered formal and informal systems of the past. It is a *combination of the collective history, the continuum of leadership, residual effects of events and crises, and the physical spread of the organization in the society*. This results in *traditions, routines, taboos, pride, prejudices, etc.* that permeate in the organization. The cultural setting of the organization impacts the behaviour of its members.

1910 Work Climate

The **work climate** results from the recent working of the organization. A climate reflects the quality of current leadership. An organizational climate is **based on the values, attributes, skills, and actions, and priorities of the leader**. It is seen as the **empathy** an organization creates in its members, clients and collaborators. An individual or a short term leader cannot easily create or change the work culture, because it very deeply rooted. Work culture influences the characteristics of the Work climate by its effect on the actions and thought processes of the leader. A leader can hope to mould the **work culture** by improvisation of the **work climate**.

1911 Specialization or Core Competence of the Organizations

Organizations come into being with specific aims. *All organizations intend to specialize in tasks that are analogous to their aims*. But **specialization** is acquired through **repetition of opportunities**. Specialization leads to an **economy in the operations**. It also upgrades the organization's *capacity to deal with larger or complex tasks*. Specialization, is perceived as an *innovative activity*, that causes enough synergies, *to make the organization behave like self correcting or continuously adjusting biological entity*.

Creativity is not in **specialization** (capacity to excel in limited fields) nor in **generalization** (capacity to handle many different situations) in any field. **Specialization** means being consistently proficient in sustaining the technical superiority, whereas **Generalization** means being efficient or

productive, but not at the cost of quality.

1912 Creativity in Organizations-I

Design Organizations *thrive on new ideas, concepts, innovations, etc.* A **creative environment** comes about by many factors. There should be *teamwork spirit, willingness to help each other, commitment and dedication to assigned tasks, trust with fellow workers.* **Personnel should have access to** appropriate resources, including facilities, equipment, information, funds, and people. If work is challenging or tasks are intriguing than there is an attraction to handle it. Staff members should have some control on tasks they carry out and freedom in deciding how to accomplish a task. A **manager or leader** who sets clear goals and is able to communicate well with subordinates, encourages creativity. **Existence of defined and surprise rewards** encourages creative efforts. A collaborative atmosphere sets in, when the *staff shares the vision and goals of the organization.*

1913 Creativity in Organizations-II

In any well knit organization, **creativity** comes about, through **several layers of activities**, carried out by individuals with many different talents and personality traits. *'It operates like a relay race, but the participants have no idea who will take over, at which level and when'.* Often the racers have no idea, whether they were running forward or backward, i.e. towards or away from the finish line or goal.

1914 Creativity in Organizations-III

Organizations become and remain creative when **roles that personnel are required to play**, are very definite. Where there is a **knowledgeable and visible structure**, one knows who is going to take over at what time and at which level. A **creative idea or concept** will be *accommodated, supported and carried through, if necessary, by even changing the goals*

of the organization. The leaders of such organization are sensitive, and have a ready **mechanism to improvise the goals** of their organization **on a continuing basis.**

1915 Creativity fails to spread

Creativity fails to spread in an organization because there is:

- 1 Fear of ridicule.
- 2 Fear of theft of idea (loss of authorship or patent)
- 3 Lack of time
- 4 Lack of competence to further the idea
- 5 Lack of power and resources to further the idea
- 6 Lack of buyers / takers of different ideas
- 7 Lack of compensation

In organizations, where *obnoxious quality control checks, evaluations, secret reportage, etc. abound*, personnel come under pressure and become sterile. **Promotions other than on qualitative criteria, allocation of resources other than on needs based assessments, recognition of wrong members, delayed or inadequate compensation, etc.** are some other factors that vitiate the working of an organization.

A good leader makes the personnel realize that **real measure of creativity is in the gains or advantage an organization gets.** This is a difficult proposition, as it requires a very *high degree of transparency in accounting and auditing processes.* Everyone must clearly realize what *an effort will cost, and how much benefit the organization will get out of it.* Creativity is both a **personal and group pursuit.** A **personal innovation** must have confirmation of the larger group, and the **group's achievement** must remain impersonal.

1916 Categories of personnel in Organizations

Personnel of the organization can be classified into three broad categories.

- 1 **Chores** that require little *innovativeness*, and which can as well be assigned to machines, are handled by **workers**.
- 2 **Assignments** that require some degree of thought are carried out by **technicians**.
- 3 **Tasks** that require creativity are handled by **experts or professionals**.

These three categories constitute a layered arrangement. There are no specific models as to which category of staff, numerically must form the dominant layer. Organizations involved in **Professional** work have the *third category as the dominant layer*. **Production organizations** have the *first category as the dominant layer*. Whereas **Service organizations** such as concerned with testing, evaluation, data management, administration, etc., have the *second category as the dominant layer*.

1917 Assigning Jobs

Organizations define tasks into various **skill and resources-based specialities** to assign these to **individuals as distinct roles**. The leader of the organization or chief of a project continually **shifts a job from one to another person**, to achieve optimum results. The organization becomes **innovative and creative through such shifting of personnel**. Jobs are assigned *to remove the tedium of repetitions, to provide new exposures, infuse new thoughts, improvise work methods, and utilize different resources (plant, equipments, tools, talents)*. Jobs are presented as an **opportunity, challenge, and incentive** to a person or a team.

1918 Personality traits

An organization is formed by people of many **different talents and personality traits** that are reflected in their **attitude and conduct**. These traits are not exclusive categories, and under appropriate conditions a person also takes on other characteristics.

Dream-weavers are prolific generators of ideas and new concepts, but *lack the skill to detail* them. The dream-weavers are mercurial and often have a fear of failure. A dream weaver must be an extrovert otherwise never gets acknowledged.

Technocrats have a talent of **visualizing structured entities**. For them an entity is conceivable, if it is structured and so practicable. Technocrats are fastidious, uncompromising, and hardheaded. A technocrat though may get entwined while detailing the parts, and lose the grasp of the holistic scheme.

Exponents enjoy advocating ideas or schemes, without bothering either its **authorship or practicability**. They feel that the public attention received through the advocacy is the measure of their skill and success.

Patrons are not necessarily resourceful people, but are ready to support any new activity that takes them **away from their routine chores**, provides a novel experience, and keeps them busy. A person may become a sponsor by virtue of the position and powers to allocate resources. Such people are motivated by strategic gains through various sponsorships.

Arrangers or fixers are expert manipulators, and keenly look for a chance to jump into any difficult situation to manage it. As a risk taker they collect lots of benefits, and very fast.

Conservatives are by personality, very over careful. Conservatism is due to *a struggle less life or due to old age lethargy*. They detest change, but

if instrumental of causing even minor innovation, take a great pride.

20 DATA, INFORMATION and KNOWLEDGE

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2001 Data

Data is raw collection of facts. Data is categorized into sets by the **class of its contents**, such as the character, text, words, numbers, images, etc., and by the **inter-connections of the substance**. These two are the factors that colour the data, which otherwise is neat collection of facts. Data must be further *organized, structured, interpreted, and presented* to be meaningful as information. Same data can be had by many people or agencies, but the way it is used it begins to be **proprietary information**. Data gains context during processing. Raw data is useless, and has no value except the *cost of identification, collection and storage*. Data once collected is preserved, as the same data may offer new vision or information in future.

2002 Data Processing :

In nominal usage, **data** refers to facts, posed to our receptive faculties or sense organs. Data is perceived, when it is *within the limited perceptive (sensory) capabilities, and if has some relevance to our needs*. Data perception is affected by the *mental and physical state*. Our mind (and other organs) processes the data into **Information**. **Data processing** refers to acts like *gathering, manipulating and transmitting for specific objectives*.

2003 Data to Information

Data is *open knowledge*, but when *perceived in some context or for a probable purpose*, it becomes **information**. Information, on the contrary is a **personalized property**. *One person's information becomes another person's data*. To work efficiently, and within the personal biological capacity, one retains only *relevant sections of data*.

Data can be processed *manually, mechanically and electronically*. And

with each processing the data gets structured differently providing new insights. A machine (mechanical, electronics) processes data according to set parameters, so is more **objective** than any manual processing.

2004 Electronic or digital systems

Electronic or digital systems have better receptors and larger storage capacities (and improving day by day). Such systems, like their biological counterparts, invariably include *barriers or filters to select only relevant things*. A computer during the receiving and recording phase converts relevant things into a *storable representation or a surrogate form*.

The information stored in the mind or thins out with time, so must be either **communicated or recorded**. Recoding is *formatting information over a medium*. **In-forming** implies that a **form** is impressed onto -a **medium**. The formatted (recorded) expression on a medium is less likely to get lost with time. Recorded and communicated material is already processed, but as we **re-communicate** it, it gets further processed. During each process of *expression, perception, recording or retrieving, information corruption occurs*.

2005 Methods and modes of 'formatting'

Methods and modes of '**formatting**' the information are like: *writing, printing, transmitting, receiving, storing, retrieving, etc.* However, formatting '*conditions*' the data, and often '*corrupting*' it. The **forming mediums** are **physical**, such as: *paper, magnetic tape, etc.* and **formatting tools** are: *languages, images, graphics, metaphors, etc.*

The information **expression and formation** (on a medium), both are acts of **communication**. The originator, though, has less control on how the expression will be perceived or recorded (in-formed). The Information originator *accessing own records at some other time-space level cannot*

revert to the original physical and mental state, and so re-experience or reestablish the original. The communicated information manifests slightly differently, yet it is a '**knowledge transmission process**'. For communication to occur the **originator** and the **accessing user** both must follow **common modalities**.

2006 Documents and Information Technology

Documents are 'lots of related knowledge', which when referred to, provide the intended information. Once information is perceived from data set, it is placed or linked to a **document**. In other words like other storable units it is modulated according to *what it is to contain, and stacked (stored) according to how it is placed, referred and retrieved.*

Traditional documents are like: *letters, reports drawings, specifications, procedures, instructions, records, purchase orders, invoices, process control charts, graphs, pictures, etc.* Such documents' *'pages', chapters or sections* are placed together to maintain order of placement. Sub units of documents also carry a **positional identifier** like *page, chapter or section number*. Documents are stored in their *order of arrival, category, size, nature (paper, books, tapes, etc.), author etc.* **Traditional documents** as **sequential data storage system** are also created in the form of index cards, punched data cards, magnetic tapes, etc. A **digital document** stores information in pre-sized lots of bytes and bits which may offer random access, such as with floppy disks, CDs, HDs, etc. A file allocation table FAT as a **dynamic index system** manages the access to it.

2007 Files

Files are the most common units of information transfer. Filed information has: *a title, a description of contents and the mass of content. Additionally it occupies a space, so size, and the birth context (date/ time/*

location/ other circumstances of origin). Beyond these primary endowments, a file may be given *different attachments* (links and references). A file carries many identifiers such as:

- time (of origin)
- size (of storage, transmission time & effort)
- author, contributors
- content (index, key words, summary)
- place of origin
- place of destination, identity recipient
- authority to create, read, write, alter and delete the contents of a file
- affiliations, linked documents, preceding and following documents
- references
- embedded codes
- signs, symbols
- language
- style
- mode of communication
- limits and conditions of relevance

2008 Simple versus Complex Files

It is through such identities that a file begins to be relevant or worthy of access. A **simple file** is nominally static, because its data entities are allocated *specific physical space*. A **complex file** may contain *variable size space allocations*. There are often filters that decide which of the data entities are to be allocated a *free or variable space*.

2009 Static versus Dynamic Files

Data entities in a file remain permanent or are changeable. The conditions that cause a data to remain permanent or be variable could be external or internal. The **internal conditioners** are inseparable parts of information files. In a *static file*, the *structure* remains unaltered even while data entities are changed. The meaning deriving out of that file however, may change. Static files are easy to process, but are incapable of

providing qualitative information. Static files usually contain data that is *mathematical or substantially logical*. In **dynamic files** the structure of a file gets altered along with the nature of data entities. Dynamic files are complex to process.

2010 Hard copy vs Soft copy :

Substantial quantity of information is generated as **hard** copy, i.e. written or printed. It is possible to copy these type of documents in parts or whole, through processes like *carbon copying, scanning, lithography, screen printing, transfer printing, photo and Xerox copying*. Some of these processes require specific media. Few processes are capable of enlarging or reducing the scale (micro films). *But contents cannot be edited, revised or manipulated*. A **digital data file** is often called a **soft copy** because its contents can be manipulated with much ease. It can also be linked as a whole or by its parts, to other files or their parts. It can be analysed, dissected, reassembled, rearranged or restructured. Through such manipulations even ordinary looking data takes on different forms, and new meanings can be established.

Most printed documents are **opaque**. It is very difficult to *superimpose or merge* two or more such documents. Digital documents, on the other hand can be treated as *set of layers or even three dimensional matrices*. Digital documents can be treated as transparent and miscible. AutoCAD creates files as transparent layers. Digital files could be made interactive (such as with spreadsheets), i.e. a change in one file can be made pervasive in all other linked files.

2011 Information Resources of Organizations :

Data arrives in organizations, at periodic intervals or on a continuous basis, but it arrives in parts, that will:

- probably form a whole,
- automatically create a structure with definite boundaries (close ended)
- form an ever growing matrix (open ended).

2012 Strategic and Tactical information :

Organizations **receive and generate** lot of data, which have two sets of relevance. Information with distant use is **strategic**, and will be used for planning and forecasting. Strategic information is more general than any tactical information. Information with immediate use is **tactical**, and is used for decision making and problem solving. Operational uses of information are very occasion or situation specific.

Information has **five qualities**:

- Brevity (specific to the context),
- Accuracy (of the right context or sensible),
- Timeliness or up to date,
- Purposiveness (capable of causing desired actions),
- Rarity (original, novel).

2013 Internal versus External Resources of Information :

Prime **Internal Information Resources, IIR** for organizations are: **experience and knowledge** that comes with *owners, employees, consultants, etc.*, and data generated from the **routine activities**. The **External Information Resources, EIR** are: **input and feedback** from *consultants, suppliers, contractors and clients*. These are **media-based** such as *books, periodicals, internet, CDs, tapes, etc.* External information once procured by the organization, if properly stored can be a great internal asset.

2014 Internal Information :

Internal information is *personal, departmental or organizational*. **Internal information** resources are nearly free, require only processing at a negligible cost, but are ignored. Organizations thrive and proliferate on the **quality and quantity of data** within their reach. Organizations by continuously processing their data generate synergies that in turn sharpen their data processing capacity.

2015 External Information :

External information is *inter-organizational, fraternity level, society, community, national, or of a universal domain*. External information is acquired for a payment of compensation in proportion to its **quality, quantity and acuteness of need**. Organizations, as a result, end up paying a stiff price for sourcing **external information**.

2016 Cost of information :

Information as a commodity can have an ordinary cost, if it is *universally available and not urgently needed*. However, information of *rare or proprietary nature and that requiring immediate access* can have a high price. Information is also available without any obligations in many *free domains*. Cost of information is also formed by absolute factors like the *cost of acquisition, processing, storing, retrieval and transmission*.

2017 Emerging Forms of Business Organizations

Information systems and emerging forms of business organizations: Information systems affect the *structure of organizations and design of the workplaces*. Information networked organizations are more dynamic because the workers communicate amongst themselves, and with other firms. These provide for greater coordination and collaboration in projects'

handling. These strategies have also '*led many organizations to concentrate on their core competencies and to out-source other parts of work to specialized companies*'. '*The capacity to communicate information efficiently within an organization has also led to the deployment of flatter organizational structures with fewer hierarchical layers*'.

Information systems built around portable computers, mobile telecommunications, and group-wares have enabled employees to work virtually anywhere. '*Work is the thing you do, not the place you go to*'. Employees who work in virtual workplaces outside their company's premises are known as **Tele-commuters**.

2018 Networked and Clustered Organizations

Two forms of **virtual organizations** have emerged: **network organizations** and **cluster organizations**. A **network organization** of individuals or geographically widely dispersed small companies working with *internet and wide area networks*, can join seamlessly through specific protocols to present a multi disciplinary appearance of a large organization. The subsets operating in all time zones seem to be operating 24 x 7. In a **cluster organization**, the principal work units are permanent, complimented by multiplicity of service providers or temporary teams of individuals. A job or project begins to percolate within the cluster and different sub units begin to react to it, providing their inputs. A solution begins to emerge from apparently fuzzy and often unrelated ideas or concepts. Team members, are connected by *intranets and groupware*.

2019 Knowledge :

Knowledge is acquisition involving complex cognitive processes, such as **perception, communication, and reasoning**. Knowledge is a *familiarity, awareness or understanding of someone or something, such as facts, information, descriptions, or skills*. These are acquired through experience

or education by *perceiving, discovering, or learning*. Knowledge can be **implicit** (as with practical skill or expertise), or **explicit** (as with the theoretical understanding of a subject).

Knowledge is learning from *experience, observation and perception*. The learning from information resources is an ever evolving process. Observation and perception are subjective, but information resources offer verifiable opportunity. The information resources offer simultaneously several points of views, strategies and solutions.

'Data is abundant, but mostly redundant. Information exists in data, if one is inclined to derive knowledge out of it. But for wisdom one may not need any knowledge'.

2020 Application of Artificial Neural Networks :

Most of the traditional processes, including computer programmes are linear or sequential. Execution occurs in a step by step process and sometimes with circular commands that use iteration. A neural network processes information collectively, in parallel mode. it changes its internal structure based on the information flowing through it. It is a complex but adaptive system.

Artificial neural networks are applied to *speech recognition, image analysis and adaptive control*, to construct software design tools and autonomous robots. Most of the currently employed artificial neural networks for artificial intelligence are based on *statistical estimation, optimisation and control theory*. **Application areas for Artificial Neural Networks** also include system identification and control (vehicle control, process control), game-playing and decision making (backgammon, chess, racing), pattern recognition (radar systems, face identification, object recognition and more), sequence recognition (gesture, speech, handwritten text recognition), medical diagnosis, financial applications,

data mining, visualisation and e-mail spam filtering.

Artificial neural networks are applied to following categories of tasks:

- 1 Function approximation, or regression analysis, including time series prediction and modelling;
- 2 Classification including pattern and sequence recognition, novelty detection and sequential decision making;
- 3 Data processing, including filtering, clustering, blind signal separation and compression.

2021 Fuzzy Logic :

Fuzzy logic is an organized and mathematical **method of handling inherently imprecise concepts**. It is specifically designed to deal with imprecision of facts (fuzzy logic statements). For example, the *concept of coldness* cannot be expressed through an equation, because it is not quantity like the temperature is. There is no precise cutoff between *cold and not so cold*. Whether a person is inside or outside the house is imprecise if one stands on the threshold. Is the person slightly inside or outside the house? While quantifying such partial states (xx % inside and yy % outside) yields a **fuzzy set membership**.

Fuzzy logic is derived from fuzzy set theory dealing with *reasoning that is approximate* rather than *precisely deduced from classical predicate logic*. Fuzzy truth represents *membership in vaguely defined sets and not randomness like the likelihood of some event or condition*. Probability deals with chances of that happening. So **fuzzy logic** is different in character from **probability**, and is not a replacement for it. Fuzzy logic and Probability refer to different kinds of uncertainty.

2022 Fuzzy Logic based Error Correction Systems :

Fuzzy logic is used in **high-performance error correction systems** to

improve information reception (such as over a limited bandwidth communication link affected by data-corrupting noise). Fuzzy logic can be used to control *household appliances such as washing machines (which sense load size and detergent concentration and adjust their wash cycles accordingly), refrigerators, rice cookers, cameras focussing, digital image processing (such as edge detection), elevators, Fuzzy logic is used for video game artificial intelligence, language filters on message boards and for filtering out offensive text in chat messages, remote sensing, etc.*

21 DESIGN PROCESSES

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2101 Design Handling

A design occurs as a concept, idea or theme. Designs are processed further into experimental prototype, model or pilot. Other designs turn into products or systems. Designs become strategies for operational management or services. But there are many ways a **Design is handled**. The obvious conditions like: *Nature of output, Presentation tools and methods, Scale of detail, Nascent effort or routine application, Human and other resources available, Technologies involved, etc.* govern the Design formation. But most important one that *affects the **quality of output*** is the **Technic of Design** or the **Design Process**. Following FOUR processes are discussed here:

- 1 Holistic approach
- 2 Component approach
- 3 Redesign or Re-engineering
- 4 Concurrent engineering or Simultaneous design

2102 Holistic Approach

Design effort that conceives a **complete and self-contained system** is called a **Holistic Approach** (whole to the part). These are *conceived as a whole without much thought for the details*. It entails *germination of an intuition* as a complete system. Such creations are akin to a **work of art**, often not functional, and **not necessarily reproducible**. Such **impulsive concepts**, however, may be detailed later on to become **component systems**.

2103 Relevance and Purpose of Holistic Approach

Holistic approach is *useful in areas where sufficient information is unavailable or there is a distinct disinclination to search for the detail*. Holistic approach follows when **inspiration rather than logic** causes a

design. A **holistic concept and its execution** if, are distanced in time, some **recall** is required **forcing documentation**, and the holistic approach may not remain as wholesome.

2104 The term Holism

- *The whole is more than the sum of its parts* -Aristotle.
- The term **holism** was introduced by the South African statesman Jan Smuts in his 1926 book, *Holism and Evolution*. Smuts defined holism as *the tendency in nature to form wholes that are greater than the sum of the parts through creative evolution*.
- **Holism** (from **holos**, (Greek) = all, entire, total) is the idea that all the properties of a given system (biological, chemical, social, economic, mental, linguistic, etc.) cannot be determined or explained by the sum of its component parts alone. Instead, the system as a whole determines in an important way how the parts behave. **Reductionism** is sometimes seen as the opposite of **holism**.
- In science reductionism is seen as a complex system that can be explained by reduction to its fundamental parts. Chemistry is reducible to physics, and biology is reducible to chemistry and physics, similarly psychology and sociology are reducible to biology, etc. Some other consider holism and reductionism to be complementary viewpoints to offer a proper account of a given system.

2105 Component Approach

Component approach is one of the oldest methods used for designing entities. A complex entity is perceived, as if composed of several sub systems each of which is already substantially viable. The components **breed from the familiar conditions**, and so are **universal and relevant**.

Here one is required to **solve the inter-subsystem relationships**, and while doing so, *upgrade the original subsystems, or possibly select a new subsystem*. **Component approach** (parts to the whole) provides systems that are **reliable, but usually traditional**. Where situations demand a radically different or a novel solution, **parts to the whole or component design approach** are often inadequate.

2106 Relevance of Component Approach

The component approach requires one to have a complete overview of the system, and be able to recognise the **value of the component in the whole**. This is rather simplified by recognising the ***time and space relevance of the subsystems***. The components residing within a well-conceived system are not much affected from conditions beyond their boundaries, so can be dealt easily. Component approach creates systems with some **regimentation where subsystems have predictable dependency**, and yet are replaceable. Component approach systems are fairly matured.

2107 Purposes of Component Approach

The component approach requires one to have a complete overview of the functions the parts and the objects are to serve. Where situations demand a radically different or a novel solution, parts to the whole design approach are often inadequate. Components approach systems are fairly fail-safe because individual segments, parts, or components are continuously and concurrently being evolved. Modern day automobiles, computers are examples of this. For ages large number of buildings are being created through Components Approach. **'Monuments' and highly stylized architectural works** intentionally and intensively negate the component approach for the sake of **Holistic image**.

2108 Redesign or Re-engineering

A product is born through **improvisations**, and rarely through sudden **eureka discovery**. During the last few centuries, a series of products has been 'improvised' upon the existing ones. Many of these products were very successful in the market, and to remain ahead of competitors had to be **continuously upgraded**. *One needs to be aware of how others are innovating with radical technologies, styles, additional functional provisions, compactness, energy efficiencies, superior handling, ease of repair and servicing.* And one has to absorb these, and deliver it fast.

2109 Redesign or Re-engineering Approach

Manufacturers need to design new products and launch them before their competitors do. **Redesign or Re-engineering** is used for product development like **automobiles**, **'white goods'**, **office equipments**, etc. For this markets are **continuously surveyed** to find out the features that make certain **products leaders in the market**. An attempt is made to **absorb and improvise such features**. As one is working with a successful subsystem, the chances of its failure are less. Redesign generates a product in its **new Avatar**.

2110 Background for Redesign or Re-engineering

Most products, however claimed to be original, are only **improved versions** of some existing thing or a **Redesign**. This is a well accepted **design process for products' development**. It has perhaps, a little less relevance in design processes of **unique or first ever systems**, such as Civil structures and Architectural entities. Japan perfected the process and achieved distinctive **product design solutions** in early 1960s. Sony music system **Walkman** has evolved from such efforts. At that point of time taped music systems were very bulky and weighed very heavy (these were often called Ghetto or Beachfront blaster). A new Walkman delivered the sound directly to the ears, through earplugs as speakers.

2111 Redesign Ideology

Redesign addresses to deficiencies of *aging technologies, fast changing tastes and varying operative conditions of products*. It gives very specific clues which new features are accepted and which are the emergent technologies. It also allows **faster incorporation of new technologies** as new subsystems being offered by inventors and innovators are sought. New products are launched with **minimum changes to existing tools and plant**. Workers only need to upgrade their skills, and new employees or new training schedules are not required. The improvised product has slight familiarity with the existing range, and as a result comfort of acceptance is high.

2112 Redesign Practices

Redesign practitioners operate with notions that:

- A whole system is divisible into subsystems, each of which can be improvised.
- These subsystems can be improved in-house, but technologically better solutions are being developed by others, so identify them and collaborate to resource such emergent solutions.
- It is more efficient to redesign or re-engineer a known system, then go into basic research to discover a new entity.
- A product of redesign process has fewer chances of failure, because one is improvising upon a working system.
- Transfer or absorption of new Technologies is very fast.

2113 Working of Redesign Processes

Redesign processes **require lots of field surveys** for identification of a **market leader product**. The field data is often so enormous and with **minor or rare variants** that may require **statistical processing**. Very

often feedback from consumers is **subjective in nature**. There is a distinct danger for the *design leader/ team to get entangled in the data collection and interpretation work at the cost of essential design clarity and creativity*. Redesigned products have to be very careful about **infringing intellectual property rights**. It is also extremely **difficult to secure patents, copyrights, etc. for such products**.

2114 Concurrent Engineering or Simultaneous Designing-I

Concurrent Engineering or Simultaneous Designing, are sometimes referred to as **Integrated Product Development IPD**. It allows several teams to work simultaneously. It brings together **multi-disciplinary teams** working in diverse locations, taking advantage of *local talent or resources, the daytime zones and climatic conditions*. The teams could be a *departmental, outsourced facility or free lancing entities*.

2115 Concurrent Engineering or Simultaneous Designing-II

Concurrent engineering or Simultaneous designing has some bearing on **component approach for design**. The implications here relate to **an entire project** and not just **a product**. Till recently, products or subsystems were handled as separate tasks, each often managed sequentially. Here the tasks are recognized and designed by different agencies. These agencies are **not offered any specific design assignment**, but become aware of it through **shared Net resources**. They offer their own design suggestions. Earlier in **sequential design approach** whenever major changes were proposed, everything had to be reset, forcing **rethink and rework**. It increased the 'development time' of a project.

2116 Working of Simultaneous Designing

The simultaneous approach needs **live or virtual linkage** channels for

very fast communication. Concepts, ideas, designs, specifications and alternatives are exchanged instantly, and *shared with the project leader, teams handling specific tasks, and often all stack holders*. Sharing may also be through a **public domain** like internet world wide web allowing anyone to *pass an opinion or make a business offer*. Concurrent engineering offers gains such as *reduced product development time and cost, reduced design rework, and improved communications*.

2117 Examples of Simultaneous Designing

For example, a significant design change in structural design of a bridge span will affect design of many other sub systems. It could mean change of loads on the columns, foundation structures, scaffolding requirements etc. Each of these would have new design parameters, but with electronic drafting tools and instant communication means, all design changes can be apparent to all the concerned agencies, immediately.

2118 Notions for Simultaneous Designing-I

Concurrent Engineering or Simultaneous Designing works with following notions:

- A system can be perceived as consisting of several independent, and inter-dependent subsystems. The nature of the dependency is defined so that the subsystems can be dealt by the **same team** (sequentially) or by **different teams** (simultaneously -in parallel mode).
- Association of **different teams** allows *superior technological input*. **Different teams working in parallel mode** offer *faster a throughput*. **Teams located in different time zones** though do not fully operate in parallel mode, offer *advantage of local technologies and 24x7 day-light working hours*.

2118 Notions for Simultaneous Designing-II

- **Virtual parallel processing of projects** occur in many different ways. Database, spreadsheet, CAD drawings and other documents can be altered by many different users, with each version or layer identified separately and a possibility of assimilating (merging) it selectively.
- Current age high speed virtual communication (broad band internet, video conferencing) allow changes to be proposed, confirmed and accommodated **in real time mode**.
- The **evolution of design becomes participatory**. It does not remain restricted to **hired or appointed experts**, but becomes a **public domain affair with inventors, innovators and other free lancers** offering novel ideas. Such offers are usually on a **try it - like it - buy it** basis, i.e. without any consultancy charges or purchase-payment obligations.

2119 Conditions for Concurrent Engineering

Concurrent Engineering or Simultaneous Designing works best when resource constraints are very acute. It helps in **completion of projects in the shortest possible time** and maximises the profit or advantage. It *matches tasks to available human resources, machines capacities*. Organization dabbling in **off the track jobs cannot suddenly recruit new employees, upgrade the competence of staff or resort to over-time payments for the extra work, efficiently use the concurrent engineering. Concurrent Engineering or Simultaneous designing is one of the best methods to **infuse new technologies**, adjust to erratic finance flows and cope up with external factors like a climate, political conditions, etc. These methods allow use of human and other physical resources however, **remote** they may be.**

2120 Design Processes for Lay person and a Designer

The **design processes** for a **creative lay person and a designer** are very different. A creative lay person simply goes on creating (assembling, modifying) things without being aware *why certain things manifest in a certain manner*. For a creative person the **end is important and means irrelevant**. A **Designer**, on the other hand, *tries to discover the logic behind it*. Selection of an element may be **initially intuitive**, but there is always a **later effort to justify the actions intellectually**. A designer **justifies all actions like selection, rejection, inclusion or composition of various elements**. In doing so the designer refines the **intellectual prowess** by equipping with an experience that is:

- definable
- repeatable or recreate-able as a whole or in selective parts
- recordable -its perceptive aspects
- transferable to another person
- increase or decrease its intensity (time scale) and diffuse or intensify its concentration (space scale).

2121 Relevance of Design Documents

For a designer, **knowing means to achieve a specific end** are very important. **Proper record keeping** of all **design processes** helps here. It is very difficult to **register dreams, intuitions or inspirations**. One needs to recall them in a **different time and space context**. All intuitions or inspirations, however, absurd, have some physical context of origin. Designers unlike a lay crafts-person or artist, are trained and disciplined, to record their design related thought processes. *Thought processes thin out or obliterate completely with passage of time, so must be recorded as early as possible.*

2122 Importance of Documenting Design Process

The prowess of documenting all aspect of design helps a designer to

handle **extensive or more complex intuitions or inspirations**. **Personal and impulsively formed systems** tend to be Holistic, with few or no recognisable sub systems. On the other hand, **planned systems**, whether personal or evolved through multilateral effort, and over a longer period of maturation, consist of many sub sets.

2123 Closed Ended Systems

Close-ended systems are intentionally holistic. Such systems become irrelevant as soon as an **open-ended system** is available. Closed systems are **improvise-able only by the author or inventor**, whose capacity to **update it continuously is finite**. Closed-ended systems are planned to protect the **intellectual rights of the innovators**. As such systems cannot be dissected for inspection or repair, the form **compact and rigid**. **Proprietary computer software** may be used by a licensee, but its code remains restricted. Stand-alone or as a part of a larger entity have shorter relevance. Closed ended system need **nodes of connectivity or gateways** to be useful. Such gateways may or may not allow access to proprietary entities. In the world of **mutual dependency**, it becomes difficult to survive.

2124 Open-ended Systems

Open-ended systems evolve from **multilateral effort or multi trial endeavours**. Where large number of people are involved in design and execution, and where these processes are likely to take place at different time and locations, the system **automatically becomes open ended**. The subsystems to be replaceable are conceived as substantially independent systems, by their vendors. Open-ended systems have on certain **discipline or 'design-architecture'**, formed through common measurements, materials and procedures. To allow these, open-ended systems have a **skeleton type frame structure** (infrastructure). Open-ended systems have built-in reserves or **additional safe capacities**,

often wasteful, but such reserves make systems more persistent. Open-ended systems allow replacements, improvisations and up-gradations of their subsystems and components.

22 DECISION MAKING and PROBLEM SOLVING

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22 DECISION MAKING and PROBLEM SOLVING *Design Implementation Processes*

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2201 Decision Making for Projects

Project management involves **Decision Making**. Decisions are taken on factors that are essentially *part of the project itself*, and also on various presumptions, which may or *may not become part of the project*. In the first case the decisions are made on **factors that are internal**, through a *process of selection, confirmation, elimination, etc.* While in the later case, the decisions are made from **external factors**, where, not only the relevance, but the entire range of their effects needs to be forecast.

2202 When Decisions are taken?

Decisions are primarily taken *when an action is required or when further decisions are due*. Decisions are taken at: **conscious level (intellectual) and subconscious level (intuitive)**. **Decision making** helps a designer with an analytical base to affirm a belief (intuitive or 'gut-feeling'), and select a course of action from several **nearly equal alternative possibilities**.

2203 How Decisions are taken?

Decisions are taken through:

Analysis: Dissecting a whole into parts so to understand it better.

Synthesis: Combining several things to form a whole to see if it is pertinent.

Holism: Conceptualizing the whole thing.

2204 Quality of Decision

The **Quality of Decision** is governed by the decision makers' state such as: *physiological fitness, mental alertness, personality traits (daring, fear), information, training, experiences, opportunities, time, resources (human, equipment, finance, circumstances), etc.* A decision is a subjective process

that offers the best course for a given situation,

2205 Efficiency of a decision

Efficiency of a decision is judged, on what it accomplishes. A reasonable decision always takes one closer to the goal, however, slightly. Decisions do not have **mathematical sharpness or uniqueness**. There is never a perfect decision. There usually are many different ways of achieving the same goal. A decision is the best course for a given situation, and the context within which it occurs are important clues of the process. Decision makers are fully aware of the process, and invariably have the capacity to **improvise or correct** the situation as **decisions actualize**. The **course corrections** are required because original conditions change by the time **actualization** occurs.

2206 Decision makers ask questions like:

- Is the objective defined ?
- Is sufficient information available ?
- How many options are available ?
- Have these options been evaluated ?
- Are all risks identified and provided for ?
- Does this decision feel right, now that actions are being taken on it ?

2207 Decision making comprises of:

1 Forecasting the most opportunity moment and the most obvious conditions, for **consequences to occur or even not to occur**.

2 Determination of **probabilities of occurrence** or follow up actions.

Decision making and consequences thereof (actions or further

decisions) are often so interlaced that it is not possible to view them separately.

2208 Problem Solving

Decision making involves some degree of problem solving. Alternatively it can be said that *problem solving itself is a decision making process*. In decision making some **intuitive and alogical processes** are operative, but **problem solving** occurs in a more **realistic situation**. Problem solving can be defined as *an exercise of observing situations, vis a vis change causing elements*.

2209 Solving a Problem

For solving a problem, it is necessary to, sever **all the connections and dependencies**, and deals with it as **a unique entity or separate event**. Problem solving leads to a solution or a course of action which may require solving new problems. Problem solving includes steps like: Defining the problem, searching and evaluating the alternatives and Implementing the solution. Problem solving is finding when products or processes may fail, and preparing for a preventive action.

'Each problem that I solved became a rule, which served afterwards to solve other problems' -**Rene Descartes**

2210 Types of Problems > Mysteries

A mystery is an **unexplained deviation** from **what is expected**. It is necessary to *understand as to what is a deviation* (size, scale, measure, range etc.) and *what forms a standard* condition. A deviation is not necessarily a bad or foul thing, it may be an advantage or even a gain. Efforts should be directed in finding out, **what has caused the deviation**. **Mysterious problems** get tackled as soon as the deviation causing

elements are identified.

2211 Types of Problems > Assignments

These are enforced exercises, or problems handed out as part of **work or duty**. An assignment is like a contract, *where in goals or tasks must be properly defined, resources allocated, and delivery standards identified.*

Assignments deal with **known things**, but involve **application of skill and management techniques**. It may lack a creative effort but productivity and sincerity are important factors.

2212 Types of Problems > Difficulties

A **difficulty occurs for two reasons**, either, we do not know, how to manage a situation, or feel we lack the resources. **Difficulties are subjective or objective**. In the **first** case, *the person has the capacity, but is unable to accomplish a task*. In the **second** case, the person may not have the *talent, know how, motivation, resources* etc. Difficulties, if subjective require human resources, whereas objective ones need other physical inputs.

2213 Types of Problems > Opportunities

Opportunities need to be perceived in the **context of 'time'** and as early as possible. There is a period of its manifestation, obsolescence or being irrelevant. Evaluation in terms of the potential benefit or loss leads to solution of a problem. Opportunities self presumed where a person or group perceives a condition as the problem, or situational offerings, where a larger environment (social, political, academic) seems worthy of a reassessment.

2214 Types of Problems > Puzzles

A Puzzle is a situation where one knows a correct solution exists, but sufficient efforts have not been made to discover it. Puzzles are of **THREE types**: *soluble, currently insoluble and ever insoluble*. **Soluble puzzles** can be tackled with current knowledge. **Currently insoluble puzzles** will be hopefully solved, when adequate resources and information are available. Puzzles, however, remain **insoluble**, when certain important sections are irretrievably lost. Puzzles have such inbuilt solution that in real sense, there is no need to solve any thing, but *locate the solution and identify the ways to reach it*. Puzzles are solved as soon as the **end itself or the means to the end are in sight**.

2215 Types of Problems > Dilemmas

Dilemmas offer *two or more choices*, each of which seems equally fitting. Dilemmas remain in-force only for a particular time **span, situation or value judgment**. When a dilemmatic situation is probed further, one of the solutions is likely to be *just slightly more superior or less inferior*. Dilemmas if handled *by a different person, attended at another time, or dealt in another situation*, may not be a problem at all.

2216 Problem Solving Strategies

Thesis, reports, and fictions have a **strategic issue** to be studied and postulated. The handling of the strategic issue reflects the methodologies of problem solving. Authors and fictional characters like Sherlock Homes, Agatha Christie, Perry Mason etc. raise and solve problems.

Some problems are *stated at the start, the story discovers 'how the issue occurred', and only in the last chapter or page one finds 'Who caused the problem and How?'*

In another scenario, *one is first told 'How and, Who causes the problem', but one finds in last chapters, 'Why the happening was circumstantially*

caused?

In still another setup, *one is shown the event and the circumstances, Which caused it. Here one is led to believe some false truth, or several conflicting possibilities. The author wants you to get involved in the process of investigations.* The truth (at least in fiction) always is a surprise.

2217 Forecasting

Since the outcome of a decision is always in future, it needs to be forecast. For a better decision, one needs to forecast the *inherent risks and consequences* of all the *competing alternatives*. Forecasting involves *determining the chances, frequency and intensity of occurrence or non occurrence of an action*. Forecasting is required, because at the decision making location and moment:

1. sufficient data is not available,
2. some problem solving exercises are incomplete,
3. resources are not available,
4. time is insufficient,
5. there is a lack of experience or competence.

Most often a decision is valued on **what it achieves, and how efficiently**. However, when the quality of outcome or approximation to a goal with all the possible range of actions is nearly the same, one needs to bring in a *value judgment*.

2218 Probability

Forecast-able situations are *inherently probable*. A human being cannot perceive a situation that is not probable. However, probabilities are either **deterministic or in-deterministic**.

- **Deterministic probability:** *A hill station is likely to be a cool place,*

*because all our experiences have taught us that height and coolness of a place are correlated. **Determinable probabilities** have fewer operative factors, so chances of probability are much focussed.*

■ **Indeterminable probability:** An oil well may spud oil, which however, may or may not occur. And, the oil, if it occurs may not have a commercially viable quantum. Such situations pose many uncertain factors.

23 SYSTEMS THINKING

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2314 Closed-ended Systems

2301 Systems

When things come together to represent a working whole, it is for two reasons: 1 as a **realism**, where things coexist on a location (space) or are concurrent for an occasion (time); 2 as an **abstract web** of *inter-connectivity or inter-dependency of things*. **Eberhardt Rechtin**, defines a system as: *“a collection of elements which, interrelated and working together, create useful results which no part of the elements can create separately”*. In both the cases things **interpolate to manifest a system**. The interpolation could be due to proximity, some commonality or complete suffusion.

2302 Simple and Complex systems

Simple systems are holistic and so balanced or with thermodynamic equilibrium due to little interference from external environment. Compared to this complex systems, affected by many external energies are continuously varying. Complex systems often seem boundless, nested and are effusive. Simple systems have definitive edges, and are like small *buildings, newspaper or a computer programme*. Complex systems have diffused boundaries due to convergence of other systems. Complex systems are *such as our own body, city administration or internet*. Nature's systems are very extensively spread reaching to infinity, and include *atmosphere, planetary or food chains*.

2303 Systems' Edges

Systems, be they real, virtual or hypothetical, are all defined by their edge conditions. The **edges, when are break-less**, create a **holistic or closed ended entity**. But with **nodes** or the **breaches** an open-ended system comes into being (a node= *nodus* -Latin = knot is either a connection, point of joint, a redistribution point, an end or terminal point). A hypothetical or abstract one is completely suffused and so is omnipresent.

2304 Designed and Natural Systems

In a **designed** (intentional) **system** nearly all sub units have a **purpose of their in being with the others**. In designed systems the sub units are *selected, prepared, modified, manufactured*, for being together in a particular format. In a **complex system** only a few sub units are relevant to other units. Here some sub units occasionally and due to their position remain latent. Natural systems are usually large and complex. Here the sub units do not reveal themselves, unless their order is probed.

'A complex system is one that by design or function or both is difficult to understand and verify' (Weng, Bhalla and Iyengar).

2305 Familiar Systems of Buildings, Furniture, etc.

Systems in buildings occur both as *holistic and components systems*. Buildings show convergence of many different systems such as *environmental, structural, openings, barricading, etc.* **Furniture systems** emerge due to *frequent resetting of arrangement and reassignment of functions*. Furniture systems are apparent on count of *modularity, utility, typology, styling etc.*

2306 Building as a system

Traditional building systems are simpler because the components are **individually dealt, drawn, built and serviced**. This makes it easier to deal with them in **different time, space and by different agencies**. Buildings have to operate in a larger context, and so **nodes, boundaries, edges, connectivity, modularity**, are inevitable. Buildings with *very large footprints and strong community concerns* have this imprint. But buildings conceived for the sake of **systematization** are strongly disciplined bound and often sited anywhere, irrespective of climate, orientation, location or terrain.

2307 Architectural Systems

*'Good architecture may be viewed as a 'partitioning scheme,' or algorithms, which partitions all of the system's present and foreseeable requirements into a workable set of cleanly bounded subsystems with nothing left over. It is a partitioning scheme which is **exclusive, inclusive, and exhaustive**. A major purpose of the partitioning is to arrange the elements in the sub systems so that there is a minimum of interdependencies needed among them'.*

*'The **need for complexity in building system** occurs due the **pursuit of the unusual**. To conceive a system that is complex yet fully integrated requires multi-disciplinary approach. For complex building external experts arrive to offer solutions but without comprehension of the totality'.*

2308 Systems approach in building Design

*'**Modular design, or 'modularity in design'**, is a design approach that subdivides a system into smaller parts called modules or skids, which can be independently created and then used in different systems. A modular system can be characterized by functional partitioning into discrete scalable, reusable modules, rigorous use of well-defined modular interfaces, and making use of industry standards for interfaces'.*

***Biomimicry** is one such order that is subsumed in buildings. Complex systems often exhibit **hysteresis**, a phenomenon in which the reaction of the system to changes is dependent upon its past reactions to change. (Hysteresis = history affects the value of an internal state). This sort of **memory retention or recollection** (such as of previous exposure to magnetism is the working principle in audio tape and hard disk devices or recovery from complicated*

deformations in the state of substances) is just one facet of system behaviour. It is sought to be seen as simplistic and stand-alone hysteresis.

2309 Systems Thinking

Systems thinking concept began to emerge post 1920s. It began from realization that small catalytic events occurring in different time and space, cause significant change in complex system. Often identification of such scarce events helps to acknowledge existence and scale of the larger domain. Systems thinking recognize circular causation or iteration, where a variable is both the cause and the effect of another. It accepts the non-linear and organic interrelationships between things.

2310 Systems Engineering

Systems Engineering is an interdisciplinary approach and means to enable the realization of integrated or holistic systems. It starts very early, usually precedes the planning or concept design stage. It combines the contribution of all technologies, circumstances and human expertise. At another level it considers the business and its various needs like finance, logistics and marketing into one larger perspective.

2311 Systems thinking in Design

Designers see the space design as bubbles or doodles of **function modules**, each recognised **with nonmaterial barriers, and of proportional extent**. This is a mental process and manual expression, of the intents. It needs conversion to a scaled layout, and workshop or site details. To carry on the original essence of design through dimensioning, material definitions, styling, etc. and more importantly for confirmation by all stack holders is a difficult endeavour. Only clarity that comes through is delineation of **space delimiting barriers and space servicing**

elements. The elements that form these two categories are mutually not exclusive, so a **cohesive system without gaps, overlaps or repetition must occur.**

2312 Types of Systems

Systems have different connotations depending on who considers it such as people concerned with *buildings, architects, interior designers, structural engineers, builders, promoters and occupants.* To compound the problem, many different ideologies from other fields are being implicated here. Some of these include: *Components and Systems approach, Holistic or Unified approach, Prefabrication and Modular coordination, Dimensional coordination, Dimensional preferences, System building, Industrialised building, etc.*

Openness translates into a synergy for collaborative working. Open systems have mass and energy transition across the edges, such as water pond, building or earth's atmosphere. Closed systems are like the balloon, little transfer for mass, exchange energy across the border. A system is called an **isolated or insulated system** when it is not dependent on exchange of **mass or energy.** Some take the classification further, a **self-sufficient system** is one, which subsists on its **own enthalpy.**

2313 Open-ended Systems

In **open-ended systems,** components designed or manufactured by different vendors are used. The success of such a system depends on the adaptation of measures, standards for materials and codes for procedures. Open-ended systems are wasteful because of the **built in reserves or additional capacities.** The built in capacities in the open-ended systems do facilitate future replacements, improvisations and up-gradations. Open-ended systems generally result from *mature and multi trial endeavours.* Where large number of people are involved in design and

execution and where these processes are likely to take place in different time spans, the system automatically becomes open ended. Open-ended systems are also called '*open architecture entities*'.

2314 Closed-ended Systems

In a **closed ended system** the components are not interchangeable or replaceable. Components designed for a particular situation are neither usable nor adoptable in another situation. Closed systems are very wholesome or compact compared with open systems. Later usually have a skeleton type frames structures (infrastructure) and are loosely held. Closed systems are rigid and not easily improvisable, whereas open systems allow up-gradation. Closed ended system being compact, have no redundancy. Closed ended system become totally useless with even minor changes in their environment or working. Close ended systems generally result from first ever (prime) or unique creative effort. Spontaneous and one man creation tends to be closed system, unless a conscious effort is made to make it an open system. Closed-ended systems are also called '*proprietary systems*'.

24 RISK MANAGEMENT

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2401 Risks and Human Endeavours

A great deal is expected from every human endeavour, be it **entities, events or organizations**, all set up with **expense of resources, effort and time**.

Human endeavours, when *fail to take off, perform adequately, or satisfy its stack-holders, pose risk*.

2402 Endeavours fail on two counts

Human endeavours do not work for the **conceived functions** or the **original functions do not remain relevant**.

- For the first case, the fault may be that it was not adequately conceived or the functions were not properly defined.
- In the second case, between the planning and operations phase the circumstances change and it is not feasible to recast the programme.

2403 What is a Risk?

Risk is any set of such conditions that adversely affect a human endeavour. One can **avoid, manage or accommodate**, *risks to a limited extent*, but beyond these, the effects of risks have to be **compensated, replaced or transformed** in such a way, that there is a *sense of equilibrium*. One may not be able to **reestablish the lost entity, reenact the missed event or resurrect the dead organization, but one may, indemnify against such losses**.

2404 Defining Risks

'Risk is any factor that affects an activity or object that denotes a likely

negative impact from some present process or future event'. Contrary to this some believe risks often have an advantage, like a lottery that may provide unusually large gain for a very small loss. Risk if negative is valued against the scale of loss and frequency of occurrence.

2405 Types of Risks-I

Purchasing a lottery ticket is a risky investment with a high chance of no return and a small chance of a very high return. But since the amount lost is small and the gain very large, lots of people go for it. In contrast investing money in a company involves a large investment, so we take care to find out the identity of the company. A government bond though provides a small interest is considered less risky. In finance the greater the risk, higher is the potential return.

2406 Types of Risks-II

Risks in personal health are reduced by preventive actions, like avoiding illness causing situations. Secondary prevention can come by early diagnosis and perhaps preventive regimen and treatment. Third level of action is directed in terminating negative effects of an already established disease by restoring function and reducing disease-related complications.

2407 Categories of Risks

Risks are broadly categorized as:

Natural and Circumstantial

- **Natural Risks:** These originate from **outside the system** due to the context or changes in the environment. This could be perceived as an advantage in a system which can be isolated with a barrier. Some **interactive systems** must flourish with the environment have to '*manage*'

the environment.

- **Circumstantial failures:** These are accidental, i.e. unpredictable in **scale** (size) and **time of occurrence**. The circumstances, within which an endeavour takes place is **continuously variable and unpredictable**, so is perceived as a natural failure.

2408 Intentional and Man-made risks

- **Intentional Risks:** These are due to avoidable or malicious acts. Avoidable acts include adventurism, neglect, destructive tendencies etc.

- **Man-made failures:** These occur due to faults in *conception, observance or operations* of the system. These can be **set right** by *foresight, flexibility of approach (such as adopting 'open system or open-ended architecture')*, *provisions of additional capacities, and by including escape or safety procedures.*

2409 Man-Made Failures

Some of the **man-made failures** occur, because:

1. System is not designed or adequately equipped (technically) to serve *the nominally expected functions.*

2. System is required *to serve functions for which it is not designed* and there no processes to regulate the overuse, misuse or under or non-use.

3. System has a **rigid design, structure or setup regimen** which prevents corrections or improvisations.

4. System is so **liberal** (loosely or irregularly structured) that a coordinated

emergency action plan cannot be enforced.

2410 What is a Risk Management System?

When endeavours fail to perform then a fresh effort is required. Risk management deals with such eventualities. It determines the chances of an occurrence, de-intensify the affectations, and create means to mitigate the losses.

Risk management is a process of

- 1 **Identifying** the risks
- 2 **Assessing** (scale of affectation)
- 3 **Prioritizing** (sequencing of risks in terms of their severity of consequences and chances of occurrence)
- 4 **Mitigating** the risks (by way of monitoring and controlling the probability and by way of absorption and diversion of consequences).

2411 Types of Risks Determinable Risks

- **Determinable Risks** are predictable and suitable risk avoidance measures can take care of it. Certain factors trigger such risks, so observance and reportage mechanisms for such conditions can help avoid it.

2412 Types of Risks Indeterminable Risks

- **Indeterminable Risks** have very low probability, or the twin aspects such as *scale of affectation and pattern of occurrence* are indeterminable. The damage and suffering cannot be predicted. Its mitigation is left to the concerned age and society.

2413 Types of Risks Probable Risks

● **Probable Risks** are predictable but within **limits of probability**. Here the trigger factors are not easily definable. Historical experiences show us what could be the **scale of affectation and pattern of occurrence**. Affectation can be **spatially isolated and temporally limited**, by design of the joints, connections, and by spacing and distancing. The occurrence schedules may be matched with a timed action, or even planned dormancy. Additional capacities (factor of safety, safe margins), are provided for such contingencies.

2414 RISK Management Standard ISO 31000

Risk management processes are applied to project management, security, engineering, industrial processes, financial portfolios, actuarial assessments, and public health and safety. Risk Management has been recognised as a **generic standard** under series **ISO 31000**.

- ISO 31000:2009 -Principles and Guidelines on Implementation
- ISO/IEC 31010:2009 -Risk Management -Risk Assessment Techniques
- ISO Guide 73:2009 -Risk Management -Vocabulary

2415 Managing the Risks

One can **avoid, manage or accommodate** risks to a limited extent. Beyond these, the effects of risks have to be **compensated, replaced or transformed** in such a way, that there is a **sense of equilibrium**. One may not be able *‘to reestablish the lost entity, reenact the missed event, or resurrect the dead system’*, but one may **indemnify** against such losses.

Indemnity: (*origin = Latin indemnitas, from indemnis 'unhurt, free from*

loss') 1 security or protection against a loss, hurt, damage or other financial burden. 2 security against or exemption from legal penalties, liabilities or responsibility for one's actions. 3 a sum of money paid as compensation, especially by a country defeated in war.

2416 Strategies for Managing the Risks

Dorfman 1997 prescribes four way **strategies for managing the risks**:

Tolerate (retain),

Treat (mitigate),

Terminate (eliminate),

Transfer (buy insurance, hedge).

Ideal use of these strategies may not be possible as some of them may involve tradeoffs that are not acceptable to the organization or person making the risk management decisions. Another source (US Department of Defence) calls this **ACAT**, for

Accept,

Control,

Avoid,

Transfer.

2417 Risk Avoidance

Risk avoidance is just one important aspect of risk management. It means '*controlling all detrimental activities*'. But all risks cannot be avoided and thereby managed. Some risks are **delayed, hastened, diverted, or even embraced**. Avoiding risks also means losing out a very high gain potential situation. Many take a '*calculated plunge*' for a **small or rare risk**.

2418 Risks in Business

It is perceived that taking on a client (a new project) translates into larger profit in business. That is not always so, because the bother of dealing with an unusual or odd client could actually mean less or no profit for the organization. Similarly taking on a prestigious assignment is a challenge, but the outlay on handling could be far more in comparison to a nominal project and uncertain gains. Another example would be procuring a non standard product or system (without a full guarantee and warranties) for an acute need.

2419 Risk Reduction

- **Risk Reduction**, involves strategies to reduce the **severity of the loss**. In buildings this includes fire escapes, controlled use of combustible materials, installation of sprinklers with fire detectors, etc. The cost of such **risk reduction systems** is checked in terms of what it can save or prevent.

2420 Risk Retention

- **Risk Retention**, means the person or the party bears the loss resulting out of an event. This is a viable strategy for small risks where the *cost of insuring and getting compensation* would be greater, like in minor illness or injuries. All risks that are not avoided or transferred are presumed to be bourn or retained by the person or party.

2421 Risk Transfer

- **Risk Transfer** to another party by **contract or by hedging** (as in betting). Insurance is one type of risk transfer that uses contracts. **Risks are transferred** to another party, schedule to other time, shifted to different / separate location. The **pace of transfer** is often hastened or

slowed, and the affectations are concentrated or spread. Risk of injury due to local impact (and so intensive) are spread to a wider area by means such as a helmet, a car air-bag, knee pad, a seat belt, etc. Impact buffers and such stopper mechanisms absorb the impact or divert it.

2422 Risk Synergy Systems

Risk Synergy systems exist in some **biological systems, pliant compositions and pseudo intelligent entities** (e.g. some equipment with fuzzy logic and neural networking). These have capacity to **self regulate or selves organize** to accommodate the **conditions of change**. Such systems are inherently restricted or finite in capacity. Their **risk sensing and accommodative functionality** are available so long as required energy and other input are available. Designers strive to emulate such systems by integrating **the risk handling features** (such as: gas and fire detectors, auto sprinklers, auto open-shut opening systems, burglar alarms, earth quake and heavy wind load absorbers, etc.), into their creations.

2423 Strategies for Handling Risks

Risks are managed in three ways:

- Perceive the likely **scale of affectation**,
- Determine the **chances of occurrence**,
 - **Prioritize** risks as per their scale and nature affectation
- Develop strategies
 - to **control the effects**,
 - to **recover** the earlier condition, as close as possible
 - to **compensate** the losses to people and organizations.
 - to **replace** a high risk situation with low level risk (less severity of affectation or predictable occurrence).

2424 Prioritization in Risk Management

A process of **prioritization** has many facets. **Saving lives** is given a higher priority than **salvaging goods and equipments**. Evacuation of human beings gets greater priority than **saving a structure**. But many countries feel *sacrificing a human life may be unavoidable then surrender to a terrorist hostage situation*. Risks with **greater probability, higher monetary loss** (of replacement), are handled first.

2425 Cost aspects of Risks

Risk management include equating the **cost of controlling the risk** versus the **cost of compensating the losses**. It also includes the **evaluating the cost of recovery** against **the expense for compensation**. Justifying the **cost of being prepared** over a long duration for an event that has low probability.

2426 Economics of Risk

Risks result into losses, delays, setbacks and deaths (humans, flora-fauna and diffusion or termination of the systems). Ideally, the *expenditure on risk management must be minimized*, while *maximizing the risk-safe zones and periods* (MTF = *meantime between failures*). Yet, sometimes **risks are indulged into, or ignored** in view of the benefits (often called a gamble or calculated risks).

2427 Commercial Risks

In the commercial world risks are of two types: **Inherent risks** are part of any business operation, and affect the *profits or opportunities* negatively. **Incidental risks** are natural, and *not always part of, or due to the business activity*.

2428 Intrinsic and Extrinsic Risks in Projects

Projects are work entities to accomplish certain goals, with a *set start, process of run or operation and end or termination of the endeavour*. Any condition that does not allow these objectives being achieved, is a risk. The risk could be intrinsic or extrinsic. The **intrinsic risks** could be handled through *good design, management, and modalities of accommodation*. The **origins of extrinsic risks**, are beyond the organization, so *their nature, schedule, frequency of occurrence and scale of affectation* must be **identified**.

2429 Risks in Projects

Risks in projects are **identified** by *enacting various scenarios* (combination of various possibilities occurring together). The scenario, if risky is further probed to **assess its potential severity and extent of loss**. These **two quantities** are simple to measure, and then set as the **value of the damaged component**. The probability of occurrence, however, is difficult or impossible to assess as an event, mainly **due to lack of its history**.

2430 History of Risk or Rate of Occurrence

The fundamental difficulty in risk assessment is determining the rate of occurrence, since in many instances the statistical information is unavailable. Furthermore, evaluating the severity of the consequences (impact) is often quite difficult for **immaterial assets** (with emotional value). Asset valuation is another question that needs to be addressed. Thus, **best educated opinions and available statistics** are the primary sources of consideration.

2431 Cumulative effect of Risk Measures

Provisions for various risks tend to have a cumulative effect. For example

a **building foundation** is designed to carry the load of the building, with additional provisions for an earth quake, hurricanes, temporary loadings, etc., but not all of these are likely to occur simultaneously. Similarly we provide extra for individual considerations: *loads calculations, strength of cement concrete and steel bars*. These, if not properly attuned, these can **add up to substantial over spending**. All provisions for risks need a careful working for the individual, as well as cumulative effect.

2432 Design Projects and Risks

Design Projects fail to satisfy a client, or are commercial losers for a variety of reasons like, *shift in taste, changes in market demands, arrival of new technologies, prices, etc.* Many of these factors begin to be affective when projects' execution is long drawn or delayed. **Finishing of projects on schedule**, eases many such problems. Projects become risky due to **poor definition of the project requirements**, and *lack of complete understanding and acceptance of the project profile report by the client*. Interior Design projects often **fail due to ironclad specifications**, which *may not allow correction or improvisation during execution*. The risks on this count can be taken care of, for example by keeping 'open certain windows' for later formulation or decision. *These are often done by hiring other agencies for work that is likely to occur in different time and space.*

A **Designer** must be extremely careful of *individual warrantee and guarantee that when read as a combination often cancels out each other*. Complex Interior Design projects formed of several systems (offered by equally varied vendors), have **conflicting provisions**.

2433 Insurance

Insurance is a **risk management investment**. By paying a small sum, the **premium**, risks are **conditionally insured**. The **compensation** is invariably for providing an **equivalent product** or **commercial value** (at

the time of loss or more commonly the depreciated value of the original or cost of replacement) in monetary terms. Insurance is an **indemnity** against loss. It is a way of contracting out of a risk. A person, company, an organization, or government, pay a small amount -premium, to protect own self from a potential large loss. In case of risk insurance, however, only risks that are **stated distinctly** in the contract are included for premium compensation, all other risks (including unknown and indeterminable ones) are presumed to be bourn by the party (insurer).

2434 Other losses of Risks

Emotional and such other associated considerations (nose of an actress) are often insured, but by determining a fixed value for it, before a contract is made. **Value for the loss of life**, is an example of similar nature. **Loss of opportunity** such as earning, business, etc. due to sickness, injury, strikes, riots, war, etc. can also be insured. **Loss due to certain happenings** like flood, riot, calamity, malicious damage by any person, devaluation of currency, sudden drop or rise in prices, defaulted business services, blames, lawsuit expenses, fines, compensation payments, etc. can be provisioned through insurance.

2435 Distribution of Risks by Insurance company

A typical insurance company working on life insurance has a large clientele consisting of people of various age, vocation, etc. Of these only few will die, in a year, for which compensation is paid. The premium rates are based on *historical data, such life expectancy, rate of natural deaths and caused by accident, etc.* An **actuary** is an expert who compiles and analysis' statistics in order to calculate insurance risks and premiums.

2436 Reinsurance by Insurance Companies

An insurance company can be in a problem zone, if in one locality many

people were to die simultaneously. In such an eventuality, the sudden demand for compensation can be very difficult to meet. To provide for such an eventuality, the insurance company **reinsures** itself with another company that perhaps has no such *liability* in the same geographic region. This **reinsurance** strategy **spreads the risks**, over time and space.

2436 Geographical affectations of Collective Risks

The insurance company operates on the premise that not all risks **happen simultaneously and to all the insurers**. Insurance companies plan their business in such a way that in comparison to their premium income the amount to be paid out for compensation is less, resulting in meeting the administrative expenses of business and a reasonable profit.

Often for a very large risk like insurance for nuclear power plant or a space craft, the insurance company or some other commercial entity acts as an **underwriter**. It may not on its own insure any risk personally, but as a professional body with very strict rules of conduct, manages everything about insurance and takes the first liability. It then, **divides and transfers the risk**, to several insurance companies by sharing the earned premium.

2437 Classes and Kinds of Insurance-I

Basic classes of Insurance are **Fire, Accident, Life, Marine**. Other ways of defining the Insurance:

- **Imperative:** These are risks, which would imperil the organization's existence, such as the destruction of assets (fire, flood, etc.), or circumstances that would seriously impair its ability to operate effectively (such as a machinery breakdown, loss of vehicles and the like).
- **Statutory:** These consist of insurance covers that are required by

law, such as employers' liability for its employees, and third-party accident in connection with motor vehicles, etc.

2438 Classes and Kinds of Insurance-II

- **Contractual:** Construction and similar contracts require the contractors to take out insurance to cover such risks as public liability and fire.
- **Advisable:** These include risks that could be costly or embarrassing: examples are burglary, export credit and accident to key personnel.
- **Other:** There are many minor risks that organizations consider it worthwhile to insure against, plate glass insurance for retail stores being an example.

25 WARRANTIES and GUARANTEES

25 GUARANTEES AND WARRANTIES

Design Implementation Processes

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2501 Warranties and Guarantees

The words are often used in lieu of the other, because both are promises that manufacturers or sellers make to customers. Each is a promise, but, offers different legal rights. A guarantee has no actual 'legal' transport, whereas a warranty does. Guarantee, are **commitments**, and Warranty is the **assurance** made to buyers by the producers. In the case of a product guarantee is a promise that *it will work as they claim it will*. A warranty is a promise (or guarantee) that *they will fix it if it breaks within a certain period of time*. A warranty is usually a written guarantee for a product that makes the producer responsible for repairing or replace a defective product or its parts.

2502 Warranty :

A **warranty** is in its simplest form a simple contract. Some warranties run with the product, so that a consumer who is distanced (by wholesaler, distributors, dealers) from the manufacturer also gets it. A warranty may be express or implied. **Express warranty** is explicitly provided (written) with indication of the jurisdiction. **Implied warranties are unwritten promises** that arise from the nature of the transaction, and the inherent understanding by the buyer. Here the goods are expected to be *merchantable* that is to conform to ordinary expectations of the buyer. **Limited warranties** are time limited, whereas **performance warranties** have set parameters (like kilometres). Warranties often exclude abusive usage, malicious destruction, acts of God or nature, and parts or other inputs that wear out (rubber plastic goods) and replenishment (tires, lubrication, fuel, coolants). Warrantees are often limited to the first consumer (buyer) and original location of delivery.

2503 Mechanisms of Assurance :

Warranties and Guarantees are mechanisms of assurance. When one

procures a consumer item, **some degree of assurance in expressed and implied form** is automatically available. Entities that are formed of several components are assured by the assembler. Complex structures like buildings, however, come-up through works of several assemblers, and lack comprehensive assurance.

2504 Comprehensive or Compounded Assurance :

Concepts turn into *Designs + Specifications + Contracts*, and ultimately into a *deliverable entity*. If the deliverable entity is deficient, than everyone concerned for its conception, design and production, is held responsible. But in reality this is very difficult, as there are many *persons, agencies, materials, technologies etc.* involved in the process, with very indistinct and overlapping roles. Often, the extent of **individual responsibilities** and **mode for verification** of their compliance, are not properly defined. In some instances' delivery occurs as compounding of many entities, where the *individual share of responsibilities need not match with the physical scale of contribution*. Compounded entities do not automatically offer a **comprehensive assurance**. Here all **individual assurances** must be assimilated into a **comprehensive assurance** which then must be **transmitted** to the owner or operator of the project.

2505 Creating - Providing own Guarantees :

Dynamic Users employ raw materials (materials, parts, components) in forms and conditions beyond the **original manufacturers' provisions**. Guarantees provided by the original manufacturer for the **few definite end-uses** are rarely of any help for dynamic users. Even where materials are employed in the manner prescribed by the original manufacturer, the output process could make it impossible to *relate a particular inadequacy to a certain material or procedure*. People who assemble complex entities cannot hope to dilute their responsibilities even by involving people like suppliers of materials, etc., **System creators must evolve their own**

guarantees.

2506 Comprehensive Guarantees :

In some jobs several vendors come together to a site, and create a System. Designers are not equipped to check or test run the system, or in such instances the system is not **completely verifiable**. Often there is no **Master Agency** to assure that the system so assembled will function according to the parameters set by Designers.

Owners however, need a comprehensive guarantee to assign the operations and maintenance to agencies concerned with working of the whole entity, such as Insurance companies, Safety (fire, security) Engineers, System Operators, etc.

2507 Processes required for Comprehensive Guarantee :

Specifications for Turn-key Jobs invariably include ways and means for assimilating and interpolating individual guarantees into a composite form for the individual part buyers or users. Specifications are also provided for appointment of third party agencies to manage the guarantees and warranties for the life cycle of the entity. Such additional mechanisms provide an **uninterrupted cover** for all the **resultant liabilities** and an **operandi for the management of risks** thereof.

Lloyds Register of shipping: Lloyds is one such organization that began in 1760 in London, It provides standards for construction and maintenance of merchant ships, and provides necessary technical help. Shipping agents, governments, bankers, insurance cos all depend on the certification provided by Lloyds.

2508 Contingent liabilities :

These are commitments that may give rise to a cost as a result of a future event. They often result from indemnities, guarantees, warranties and certain liability caps in contracts. Contingent liabilities are generally used to allocate risk between parties to an arrangement. The Commonwealth's policy is that risk should be managed by the party best placed to manage it.

2509 Liability Account

A **liability account** that reports the estimated amount that a company will have to spend to repair or replace a product during its warranty period. The liability amount is recorded at the time of the sale. (It is also the time when the expense is reported.) The liability will be reduced by the actual expenditures to repair or replace the product. Warranty Payable or Warranty Liability is considered to be a contingent liability that is both probable and capable of being estimated.

26 FINANCE

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2601 Design professional and Finance :

A designer needs to involve own-self where financial viability of a project is discussed. For this designer is expected to have some understanding of **basic finance terms**. Some of the documents like *project reports, estimates, schedules, invoices, etc.*, generated by the designer must meet the requirements of **an accounts department of clients**. Some terms of finance are explained here.

2602 Capital :

Capital is any amount that is spent for creation of wealth in a business. It includes all possible *material, nonmaterial, and human inputs*. There are two forms of capital. **Money**, is a fluid and intangible form capital that is used as **investment**. The other capital is in the form of **physical things** such as: *buildings, machinery and equipment* employed for production of other goods and services, talent and experience, i.e. **wealth**.

2603 Capital Creation :

Capital is created through, *personal savings, borrowed from some source with attached obligations, or one that can be availed of by selling, renting, transferring in any other manner, whole or part of any tangible or non tangible property*. Capital can be in *cash, rights (ownership, tenancy, membership, citizenship, patent, copyright), abstract things (prestige, goodwill, expertise, knowledge, skill, information), etc.*

Capital or the advantage out of it, are primarily used in **creation of assets** like **fixed assets**. Other uses include investment for the purchase of inputs, rents, etc. till an output is readied: **working capital**. The income earned by capital is **profit**.

2604 Types of Capital :

Capital comes as **debts or borrowings**, and must be repaid intermittently or in future, as **Interest**. Capital also comes as **participatory investments** in the form as **equity** which may not involve a direct obligation to repay the funds, but requires compensation in the form of a **dividend**.

- **Fixed capital** is usually defined as that which does not change its form in the course of the process of production, such as *land, buildings, and machines*.

- **Circulating or Working capital** consists of *goods in process and operating expenses, raw materials, and stocks of finished goods waiting to be sold*.

2605 Return on Investments: Interest and Dividend

Investment is any sum that is not used by a person in buying assets but allowed to be used by others for the same purpose. The other party provides some return for the sum allowed to be used for such a purpose. Generally investments are arranged with a **fixed rate of interest**, but sometimes these are linked to *rate of inflation, risk perception, period of borrowing, etc.*, often called a **floating rate of interest**. Compared to these when a lender **agrees to share the profit and / or loss** (but may not participate in matters of other party's affairs or business), called a **dividend**. The dividend is dependent on the share of profit being generated from the investment, so it is uncertain and risky, but provides greater advantage.

2606 Assets

It is a resource with economic value that an individual, corporation or country owns or controls with the expectation that it will provide future benefit. An **asset** is a physical or non-tangible entity with some value of sale, purchase or even possession. Normally we procure entities, with

*some value now or in future. To 'own' here include rights of exclusive possession (traditional ownership), rights of utilization (lease or rent), and other rights (visitation, guardianship). Assets are capital: 'It is any entity formed out of capital, and any entity that can be converted back as capital'. In account books, such **assets are accounted as capital**. Projects on completion become physical assets for the clients. Assets, in economics are stocks of resources that are used for production of goods and services. In classical economics there are three factors of production: *Assets, Labour and Land*.*

2607 Design Practice and relevance of Value and Cost

Design practice includes dealing with *works of art, artefacts, craft pieces, and many other precious things*. It involves *identifying objects, judging their **true worth**, acquiring, producing and sometimes even disposing off such articles*. When a designer helps in handling such precious entities, the benefits accruing to the client are several times more than the cost of creation or acquisition. It is very important for a design professional to be able **to differentiate between the cost and value**.

2608 Cost

Cost is the amount of price (money or something else) paid to buy, or produce a thing. **Cost of buying** includes the **cost of production** and **cost of delivering** the thing to the location of use. It also includes any **costs of financing the purchase**. Cost of production is little more complex, as it is composed of elements such as: *cost of materials, labour, and a proportion of the costs for the capital investment required to produce the good or service*. Certain **costs like rent** (for plant, equipment, buildings etc.) remain consistent, no matter how much one produces, and are commonly referred to as the **overheads or fixed costs**. The **variable costs** are inputs like materials and wages, these vary according to how much is produced.

*When the product is unique or first ever, two categories costs are recognized: **Primarily labour and materials' costs** are considered, whereas average overhead cost, predetermined for some production volume are added. However if the product is reasonably known, the overhead costs are actual and exact.*

2609 Costing

Costing (cost finding) is a tool to derive the *cost of a product, providing a service, performing a function, or operating a department*. Some of these are historical facts or **historic costs** -*How much did it cost?* -while others are predictive or **budgetary costs** -*What will it cost?* Cost has relevance primarily to the person, who *wishes to acquire or dispose off the item*. But often a person to assess the '*value of an object*' wishes to determine its worth through the costing. **Cost of a product** is the total expenditure (cost of raw materials, labour, rent for plants, and producers' profit etc.) incurred to produce or procure an item, or its exact replica. Costing can be conducted through two routes: **Cost analysis and Rate analysis**. Cost analysis and Rate analysis have very thin differentiation, and so some consider them to be the same.

2610 Cost Analysis

Cost analysis takes into consideration all *factors that form an item or service*. Cost analysis is more effective, for whole items, that is when an item is *at a design or conceptual stage*, and its parts have not yet been perceived. Yet it requires fairly clear perception of the system. *Unless external conditions change, a product of cost analysis is specific, fairly stable, and may not need frequent revisions.*

2611 Data Input for Costing

1. **Cost of materials**, including cost of royalties, taxes, mining, procuring,

producing and all those expenses required to convert the materials into a utilizable raw material.

2. **Cost of materials and other inputs** required to effect a service.
3. **Cost of labour** required to modify the materials, assimilate into a product, to transport, store and protect it, market it and in some cases trial run it.
4. **Cost of labour for services** such as performing, supervising and providing required assurances for the service.
5. **Post production costs** are amounts paid to launch a finished product or services in the society, such as: **royalties, cess, taxes** etc.
6. **Cost of rents or hire charges** for plants, tools, equipments to manufacture, erect, install, testing, test operating, transportation, etc.
7. **Expenditure for risks and responsibilities** associated with the product generation, installation, operation and maintenance, and conduction of the service.
8. **Cost of investments** on resources that are tied up, till about a utilizable product delivered or service is rendered and paid for.
9. Cost of other overheads such as cost incurred for managing the setup for procurement, production, testing and marketing.

2612 Categories of Costs

- **obligatory costs** : royalties, cess, taxes.
- **handling costs** : transportation, shifting, stacking, primary processing,

storage.

- **costs of losses or shortfalls** : rejections, leakage, wastage, breakage, theft, evaporation.
- **energy costs** : manufacturing, processing, storage (temperature, moisture control).
- **replacement costs** : rents & lease charges, depreciation for plants, tools, equipments, containers.
- **risk management costs** : insurance charges, security charges, indemnity charges.
- **assurance costs** : providing guarantees, warranties, trial runs, maintenance services.
- **quality control costs** : adherence to standardization, quality control certification, testing, supervision.
- **return on capital invested** : Interest, dividend, profits.

2613 Rate Analysis

Rate analysis is comprehensive application of various costs (arrived through cost analysis). Unlike cost analysis, the rate analysis takes into consideration *the optimum costs of production or supply (economics of volume, batch sizes, packing unit), wastage, residues, etc.* External conditions affect a **rate**, extensively and often unpredictably. Costings made through rate analysis need to be continuously improvised.

2614 Application of Rate Analysis

Items that have not been well detailed, or vaguely or partially conceived, various cost *parameters like cost per unit of length, area, volume, or unit of the entity derived from the known situations, are applied*. Often cost of a known thing is considered a **typical rate** and applied to nearly similar things, with accommodation of the variations, as plus or a minus factor. Costing done through rate analysis provides a generalised picture. Rate analysis is preferred for task-based items (assignments that have universal identity).

2615 Value

Designers often help their clients to acquire or dispose off entities in their completely prepared form. When the transaction originates at producer's end, it is *little above the cost*, at a **price**. Price, reflects the value a producer attaches to the entity. Later transactions may not in any manner relate to entity's cost.

*For a thing to have a value, it must be **transferable**. A latent value becomes potent when it is perceived that someone needs the entity in some time and space, for a **utilitarian or hypothetical purpose**. A demand for a perishable commodity, if does not occur within its life span, is irrelevant. Similarly demand for something in a far off place cannot be satisfied, due to transportation hazards and handling problems. Air has a lot of utility but is not scarce. Rotten eggs may be scarce, but hardly have any utility. Friendship is very useful and scarce, but is not transferable or marketable.*

Historic cost of creating a painting may be few drops of colour, a canvas and artists' few moments. But once the fact is accomplished, the painting gains a very high value due to its extraordinarily high relevance to the society. Relevance of a product in terms of its utility is (more) likely to degenerate over a period of time, but its value may appreciate or depreciate depending on its

relevance to the owner or the society.

2616 Price and Value

Prices are effected in money. *Prices go up or down depending on the fall or rise in the (universal) value of the money.* Any change in money (monetary value) affects the prices of all things across the board. **Value** of a thing, however, is specific. There cannot be a *general fall or rise* in value of all things. **Value of a thing goes up**, when we can acquire or aspire for more or superior things in exchange. **Value of a thing goes down**, when we can acquire or hope for less or inferior things in exchange. Value is relative, referred in terms of something else.

Value of a thing, cannot be always measured in money. **Value has many different connotations**, typically, it has relevance in terms of, *emotions, remembrances, associations, ageing, maturity, heritage, rarity, ecological, environmental, social, etc.*

2617 Valuation

Valuation, in functional sense, is done to determine *what one would gain by acquiring, or forgo by disposing the item*, but not necessarily doing so. Value of a product means an addition or deduction to **wealth**, Cost at the moment of transfer may or may not reflect the value of an item, but it helps in a better judgement of the value.

A rare painting or an antique may *have an indeterminable cost, but will have a probable value.* Value could be several times more or less than the actual cost of the item. **Value is considered to be the true worth of an item, more lasting, but not necessarily reliable.** Cost and price are very realistic and reliable, but not always representative of the true worth of the item. Both, perhaps, are required to gain a full insight of the situation.

2618 Monetary versus Non-Monetary Valuations

Valuations are of two types: Monetary and Non-Monetary. **Monetary valuations** are not very different from **costing exercises**. Value of a thing, cannot be always measured in money. Though here *utility, desirability, scarcity, availability and marketability etc.* of an item are assessed in monetary terms rather than market equivalent costs of such items.

Valuations of non-monetary type are made to check adherence to *values, customs, traditions, ethos, rules regulations, laws, etc.* Greater adherence to these issues results into higher value realization for the product. Often negative or repulsive aspects of an entity, such as *Hitler's memorabilia, black magic tools, due to their rarity, invite a connoisseur's favour.* Non-monetary valuations have a relevance only to people who are concerned with it in some way. Non-monetary valuations based on one aspect or few concerns are not very useful, desirable, or even reliable. Non-monetary valuations based on too many aspects are not comparable, so must be scaled into some economic or monetary component. These makes, a valuation very complicated process.

2619 Costing versus Valuation

Costing is a logical (mathematical) process, and any technically proficient person can carry it out. Costing process must always remain justifiable, and requires many exact inputs, including latest market costs etc. **Valuations**, however, involve many hypothetical judgments, are very subjective, and so may not seem rational. It is the **experience of the valuer** that imparts some degree of objectivity and also reliability to the valuation. Valuation on the other hand is a subjective judgment, and no explanations may be asked for.

Costing helps a designer in planning, budgeting and auditing the expenditures. Valuation is used to confirm or justify expenditures, indicate

non monetary savings, and to convince a client for quandary options.

2620 Design Practice and Cost Determination Methods

Designers choose entities, increase or decrease their usage by predicting the costs. Designers develop their **own cost determination methods**, *appropriate for the jobs they handle, and for types of items specified in their projects*. Input data like market rates for materials, parts, components, labour etc. are continuously updated or sought as and when estimates are to be prepared. Updating feedback is also available through the historic estimates conducted on completion of a project.

In design offices **predictive cost analysis is made through Rate analysis**. Average prices of all commonly used materials, operations, etc. are collected routinely, reformatted and stored. These are presumed as standard rates, and form the basis for the cost analysis. To simplify the process of cost analysis, number of items and their individual rates or prices are reduced by approximation (through definition of a factor for variation) in quantity and quality.

2621 Routine jobs and jobs with substantial intellectual effort

Routine jobs have a determinable **cost** (and by adding a customary margin of profit, etc. one can derive the price). However, jobs with **substantial intellectual effort** accomplish more than the **cost of implementation**. So, dilemmas occur, **should one charge a professional fee on the total cost of the job, or value accruing out of the job?** Authors of creative efforts must know how to **value their accomplishments**, and thereby demand a **fair compensation** for it. Designers need to know both the **cost and value** of their professional services.

2622 Cost versus Value for Designers

The **understanding of Cost versus Value** of an entity helps a designer at TWO distinct levels:

1 Determination of Fees: Cost-based and Value-based

2 Helping a client for the value-assessment of their possessions.

2623 Cost-based Fees

Design practice follows age-old traditions of Architectural practice. Jobs are generally executed by appointed contractors or selected vendors. These third party (away from the Architect and the Client) business entities present an invoice, which reflects the **nearly true cost of the job**. Architects base their fees on this foundation after adding certain percentage amount to account for miscellaneous expenses, (such as on power, water, etc.). Substantial part of Designer's work follows a similar path.

2624 Value-based Fees

Value-based Fees are charged for jobs like *renovation, extension, addition, conservation*, etc. that make substantial change to the existing environment, upgrading the commercial value, or advantages deriving out of it. A unique concept that costs very little to implement, provides a *substantial benefit to the client*. Should **one charge a fee on the cost of a job or on the value of the completed job?** Here determining an appropriate **cost base for fees** is very difficult.

2625 Value Assessment of Possessions

On some sites there are pre-existing structures which are to be only reformed or reused. The design cost of continuing or protecting such structures is difficult to compute, and so must be **value-based**. Cost of

works or supplies by third party vendors and contractors are accountable, but **items supplied by the Clients** from the existing stock are difficult to document. **Cost of Retained Structures, Antiques, Curios**, used in a project are often indeterminable, instead their values, if available need to be used. On sites where several Professionals operate simultaneously, exclusive authorship to a creation is disputable, so cost of a patent idea is disputable.

2626 Cost Plus Fees

Fees for very complex jobs, or jobs that are unique, and without any precedents are very difficult to predefine. *A Client wishes to see the job properly done, and the Professional wants a guaranteed, but a fair amount of income.* Such jobs are executed on **Cost Plus Basis**.

The office work of the professional and the site work of the project, both are executed in a very **transparent setup**. All the expenses at the **Professional's Office** (salaries, stationary, conveyance, rents, service charges for equipments, etc.) and at the **Project Site** (on raw materials (stationary), wages, and salaries, rents for equipments, conveyance, postal and telecommunication charges, taxes, etc.) are well **monitored, documented and audited**. The Professional is then allowed a **percentage over the Audited Costs**.

2627 Investments and Expenditures

Design jobs create **assets** through substantial **investments**, or are maintained at their optimum operational conditions through **expenditure**. Designers need to be aware if their decisions relate to '**investment**' or '**expenditures**' in accounting terms. Nominally **assets** are large physical entities with some life of utility, whereas small things, services, repairs, maintenance activities do not create assets and so are accounted as

expenditures.

2628 Depreciation

Assets once created lose their value, gradually over a period of time even while, *being used, not used at-all, under-used, or over-used*. Assets, also lose their value *suddenly on sale or through accidents*. The sudden reduction in the value of an asset is easy to note but the **gradual diminution** is often not perceptible, and is difficult to account for. The value degradation could be for **external or contextual reasons** like changed relevance. The value decline for intrinsic causes could be due to the **reduced utility of the asset**.

2629 Dilution of Value

Normally **dilution of value** in an asset can be ultimately adjusted when a less useful object is sold off (at discounted value) or disposed off (at zero or debris value). However in accounting procedures such losses are *discounted on a year to year basis*. Normally the income earning capacity falls due to increasing inefficiency arising from physical deterioration. Some assets like adornments go out of fashion very fast whereas electronics see **technological obsolescence**.

The gradual dilution of value of an item occurs for many reasons:

- Physical deterioration of the item affecting the possible benefit accruing out of it.
- Availability of a similar product at a lower price (obsolescence).
- Fall in value due to changed relevance.

2630 Appreciation of Value

Assets appreciate in value. An upgraded or reconditioned item can once again achieve higher yields. Some items with associated values are considered rare, and become a treasure with high value. The value of a land is due to the location but more due to the circumstantial surroundings.

2631 Methods of calculating the Depreciation

These methods or formulas are found in excel or other spreadsheets like programmes. There are many such methods but some basic-simple ones are provided here.

- **Straight line method:** The rate of depreciation is constant for the entire working life of the capital assets. This is based on three aspects, 1 assets' cost, 2 the salvage or the book value of the asset at the end of assets' useful life and 3 the period of useful life of the asset.

- **Sum of the years depreciation, to be calculated:** This is based on four aspects, 1 assets' cost, 2 salvage or the book value of the asset at the end of assets' useful life, 3 the period of useful life of the asset, 4 period for which depreciation is to be calculated.

- **Double declining balance method:** This method recognizes the substantial consumption of some assets' service potential in early years. This is based on four aspects 1 assets' cost, 1 period of useful life of the asset 2 salvage or the book value of the asset at the end of assets' useful life, 3 period of useful life of the asset, 4 period for which depreciation is to be calculated.

2632 Design Professionals and Money

Design professionals deal with money, *to conduct own commercial organization* (professional practice), and sometimes *to help a client to implement a project*. The second case like situations are rare (but

occasionally do happen with small clients). Here a designer gets a free hand, to spend *someone else's money*. In a professional practice, however, it is the management of these sums that provide great comfort to the client, but causes discomfort to the tax authorities.

2633 Managing Client's Expenditures for the Project :

Designers can get involved in spending money for and of the client, knowingly and inadvertently. For managing project expenditures some precautions are necessary:

- 1 The ideal condition is one where the designer approves bills of expenditure and certifies the payment, client then arranges the payment.
- 2 Next option is to operate a **joint signatory bank account**. This must be *operated in the name of client with client as the main operator*, and the designer as the *authorized signatory*. Alternatively a **single operator bank account**, in the name of a client, but operated by the designer as the power of attorney signatory.
- 3 In case 2, a designer must avoid *granting payments to own-self* such as for professional fees or other chargeable amounts.
- 4 Client's money (in any form) meant for the *execution of a project* must **never be deposited** in a designer's personal account or design company's account, even for a short duration transfer.
- 5 For case 2 (as above) All other transactions must be through cheques drawn to party receiving the payment, and no *third party or bearer cheques*. No *self-cheques* for cash withdrawal be made.
- 6 All payments to *designer own-self, design company or their employees* must be made with clients' own signature on the cheque.
- 7 When a bank account as per 2 above, for project expenditure is operated, it is meant for expenditure on the project such as *payments for labour, services, materials, other consultant's fees*,

etc., but may not include payments for site rent and taxes. For the later, a separate clause must be added to the authorization deed.

- 8 The power of attorney or authorization must be for specific period (if necessary with provision for periodic renewal), but not with non-specific mention such as *‘till a project is completed’*.
- 9 Avoid payments from such accounts that are like investment (including shares, bank deposits or bonds), or speculative spending.
- 10 All payments (by client or by designer as an authorized signatory) must be over *invoices or vouchers made in the name of the client*. Avoid accepting any *invoices made in the name of the designer or designer’s company*. Write cheques only in the name of the (suppliers, vendors, contractors, etc.) party who generates the invoice (to *avoid third party payments*).

2634 Project Expenditure by Small and Large Clients

There are some basic differences how small and large clients (and corporates) manage their **project expenditure**.

- **Small clients** have the budgeted amount almost ready for investment, as if the entire sum is to be spent immediately, and in one lot. Projects, however small, consist of items that occur in phases, and so do the payments for them. If a designer takes care to prepare, a **schedule of expenditure**, in addition to the **nominal schedule of estimates**, a client can be advised on *‘When and What sums will be required’*. By properly **scheduling the purchases of independent systems** to later part of the project one can delay the investments. Such delayed purchases also help in taking full advantage of **guarantee and warrantee provisions**, and also delay the expenses on risk management costs like insurance. Date of purchase also affects **the amount of depreciation** (a purchase made during the last few months before the year ends, qualifies for full year’s depreciation).

- **Large and Corporate Clients** provision money for expenditure as a strategy. They may arrange money for a project from different internal account heads, and also from outside sources like financial institutions. Outside borrowing have to be planned and sanctioned (committed), even before the project is launched. A service charge of 1 to 3 % is levied on the sums sanctioned (but not actually borrowed) as loan (in addition to the interest on the amounts as and when actually borrowed). For this reason loan sanctions, and consequently heavier borrowing are differed as much as possible. *Stand alone or complete systems like ACs, elevators, etc.* are procured, as late as feasible, but sometimes a little earlier to take advantage of *depreciation accounting* during a financial year. Such clients usually need not only **an estimate** but also a very detailed **schedule for payments**.