Design and Management process

A sight to improve management in Kurdistan

Kurdistan Engineering Union

Rawezhkar Assessment Programmme

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PREAMBLE

This paper is produced to gain the consultant (Rawezhkar) status for the Kurdistan Engineering Union.

The paper split mainly into four sections, the first looks at the three key elements behind any development (Developer, Engineer and the project). The second looks at the type of Construction projects and contracts. The third looks at the management of the design process and the fourth is about managing a project by introducing a system management.

INTRODUCTION

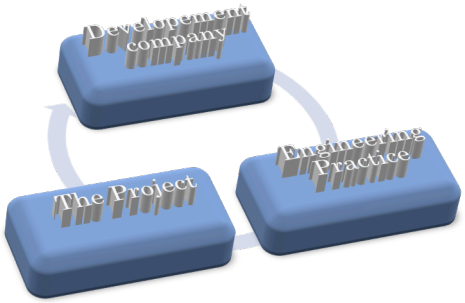
The Kurdistan region of Iraq lives today its golden age in terms of security and development. The security brought the wealth and the wealth brought investment. The Construction industry is leading this mass development in the region. The prediction for this growth to continue over the next decade, but for this growth to bring its fruits for the region and makes it competitive with its neighbors, a new redirection needs to take place.

In particular, in the Design, Engineering and Construction Industry, there is a need for new system, legislations and direction. The Author, from his work in the region in the past few months diagnosed chronic failure on the management side of the industry. In Britain they say all Engineers are good and are of the same quality, but it is frequently said this designer, company or project is better, more profitable or of higher quality than the other. And what makes the difference between A and B companies is their management system.

This essay introduce international management theories and simplified it to make first step to improve the overall industry standards.

THE ENGINEER, THE DEVELOPER & THE PROJECT

The author in this paper looks at the management of the main three elements involved in any development, these three elements are the Engineering practice (including Architect), The development company and finally the Project.



The Engineering Practice

An Engineering practice may include single or multi disciplines, depending on type of practice. The practice maybe specialized in designing single element of the design such as Architectural design or Fire System design or offer one stop shop where the client approach the practice to provide multi service.

Type of engineering practice around the glob varies from country to another, recently Kurdistan parliament introduce legislation for type of engineering companies operating in Kurdistan, the list includes two types only, despite it has been an encouraging step forward but frankly the legislation focused only on the functionality and type of projects it can run and dismissed other important elements such as the liability. Therefore, and as this legislation is too fresh to be amended the author will not go into details of type of engineering practice internationally recognized, instead the author will only list them.

Types of Practice in the UK

- Sole Principle
- Partnership
- Unlimited liability
- Limited liability
- Public company
- Limited partnership
- Limited liability partnership
- Co-operative
- Group practice
- Developer/architect/contractor

Type of Practice in Kurdistan

- Design Practice
- Consultancy Practice

The Developer/ Development Company

The Development companies in Kurdistan largely very poorly managed, this is frequently leads to misunderstanding between them and the Engineer, Architect, Contractors and other suppliers. The lack of legislation on the companies law lead to big confusion and big misunderstanding of what the development company represent or function. In general companies assign varies distinction to their business but in reality it is meaningless. Example; companies may call itself group but in fact it doesn't represent varies companies connected by board. Similarly in the structure of these companies (if exist) has not been put in methodological way, in stead many titles doesn't represent the function of the role and vice versa.

Currently in Kurdistan two type of development are widely recognized. Development using the Investment law and Private development. On the developer side there is also three type of developers; first are the developers where all the design and construction work done in house, the second, where part of the work done in house and the other outsourced. The third is where the Developer acquired the design and construction services from outside. The author view the third type is the most successful way. The first two types carries enormous risk with the lack of management system and the poor regulation.

The Project

A Project is a temporary organization that is created for the purpose of delivering one or more business products according to an agreed business case.

A successful project is the fruit of the collaboration between the consultant and the developer. It is important that the consultant constantly advice the developer to achieve his objective in terms of cost, time and quality. There are mainly three types of projects running in the Kurdistan region, these are Public projects, Investment projects and private projects.

TYPE OF CONSTRUCTION PROJECTS AND CONTRACTS

There are many types of Construction projects depends on the procurement systems used.

The procurement system should be the most appropriate in the light of the criteria signaled to the architect/ Engineer by the client during and after the briefing stage. In choosing procurement path, the key criteria are the client's priorities in respect of:

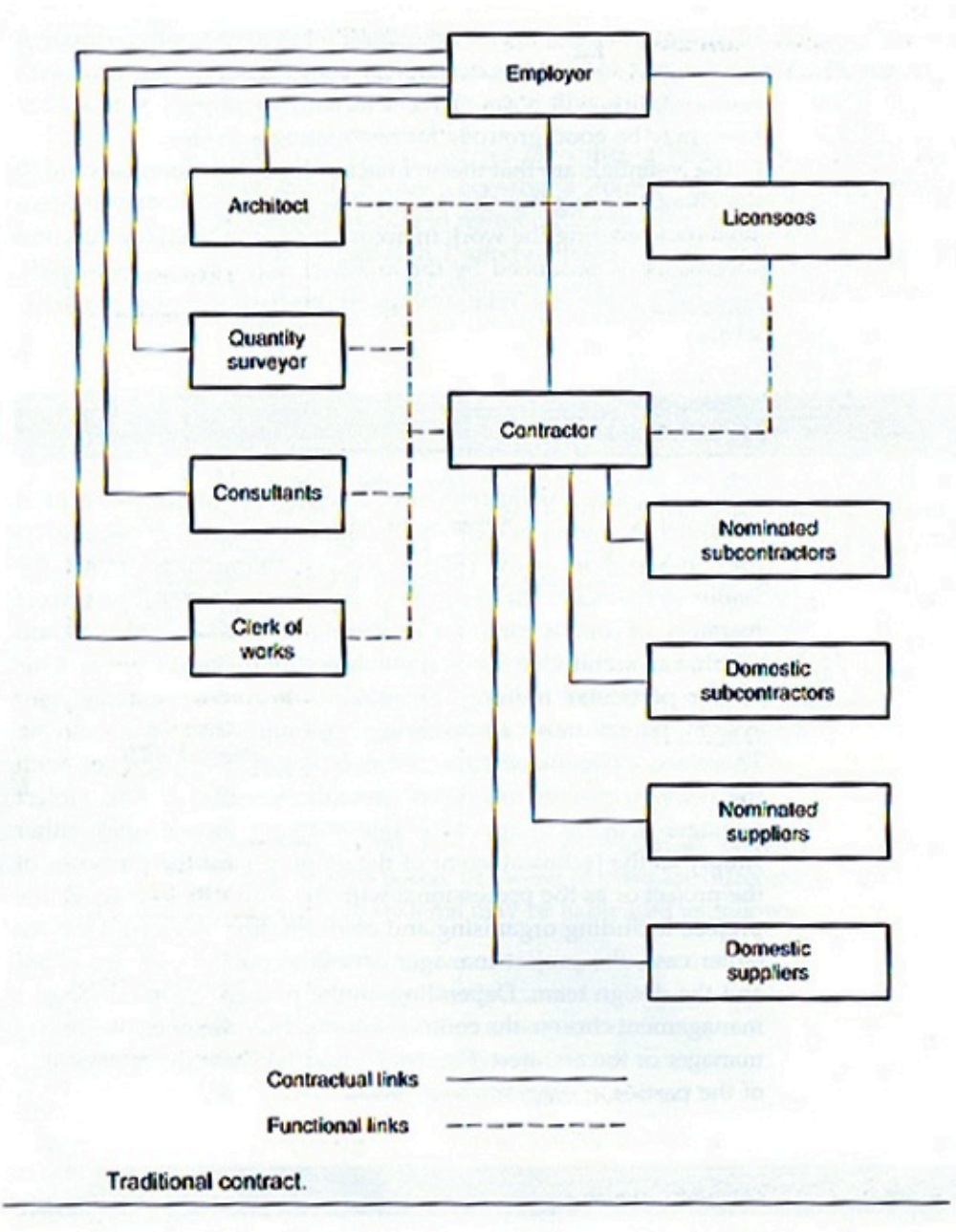
- Time: economy and certainty
- Cost: economy and certainty
- Control: apportionment of risk
- Quality: in design and construction
- Size/ value: small/ medium/ large
- Complexity: complex/ simple

There are many different procurement systems as there are pebbles on the beach, but some of them are different only in detail.

The principle systems mat be expressed as follows:

Traditional

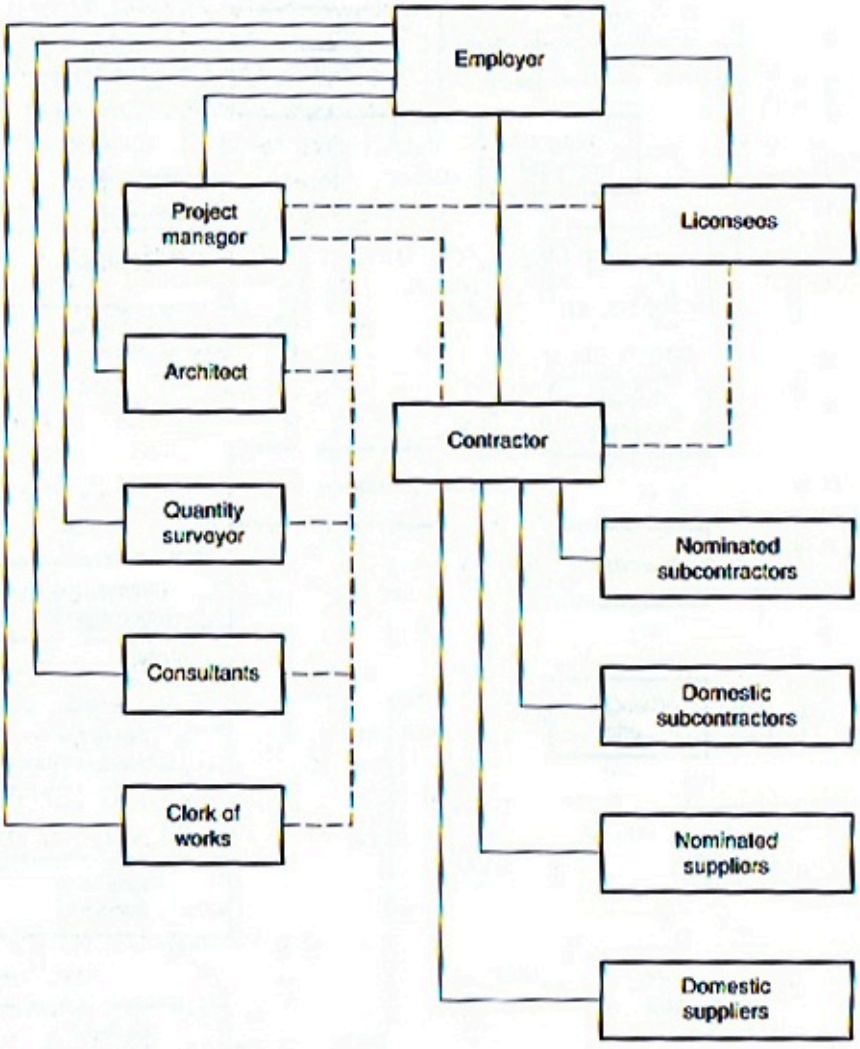
Very broadly, the traditional system is where the client commissions an Architect to take a brief, produce designs and construction information, invite tenders and administer the project during the construction period and settle the final account. If the building is other than small or straightforward, the architect/ engineer will advise the client to appoint other consultants to deal with particular items, such as quantities, cost estimating, structural calculations and heating/ cooling design. The contractor who has no design responsibilities will normally selected by competitive tender or maybe there may be good grounds for negotiating a tender. The essentials are the architect is an independent advisor to the client carrying out the design. The contractor is only responsible for executing the work in accordance with the drawings and specifications produced by architect and other professionals.



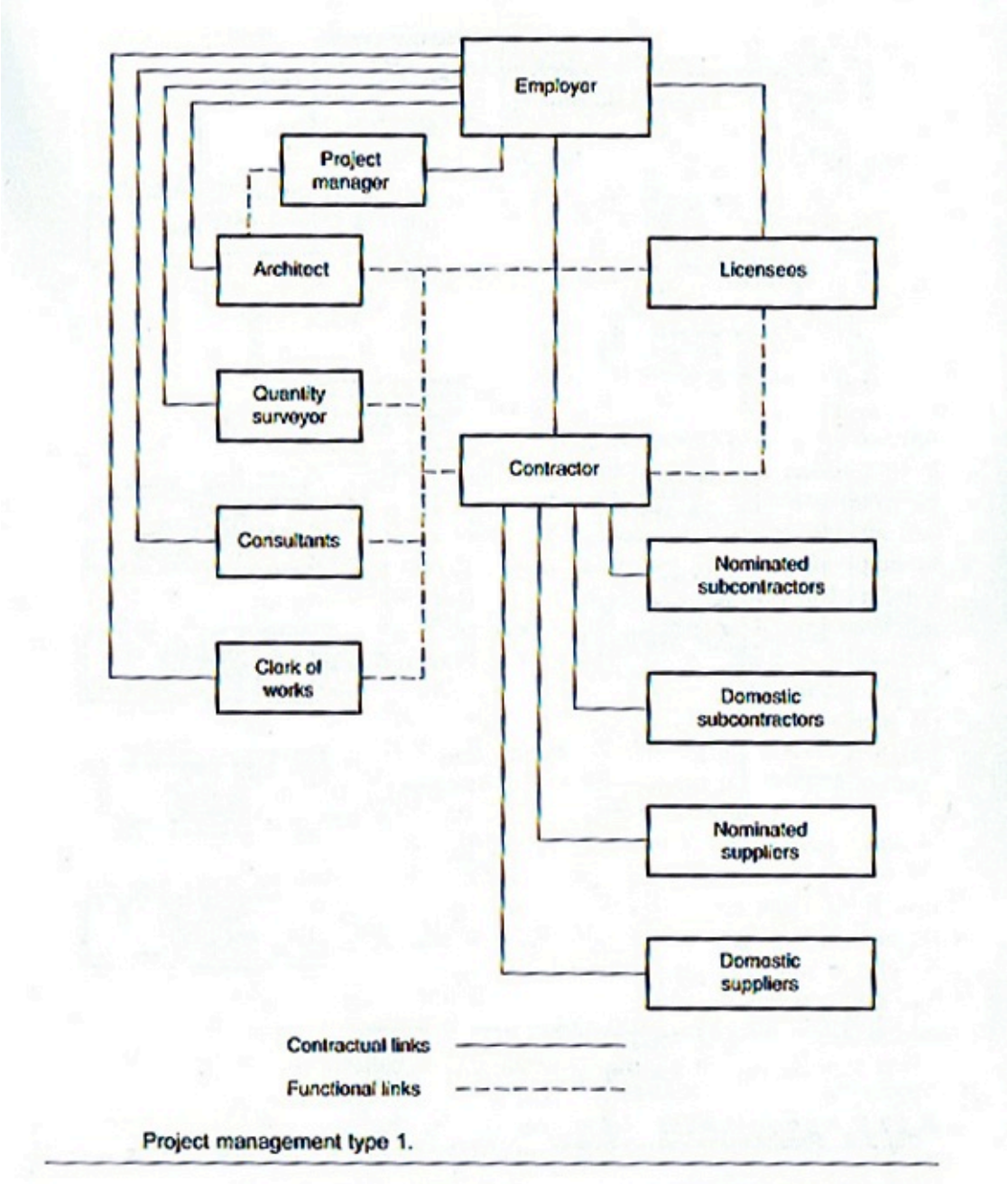
Traditional contract.

Project management

This method has much in common with the traditional system. However, the architect is not the leader of the team, the project manager is the leader. Essentially , the project management system places most emphasis on planning and management. Therefore, a person, whether architect, engineer or surveyor with relevant project management skills is required. The project manager is likely to appear in one of two principle roles: either siply as technical agent of the employer for the purposes of the project or as the professional with authority to manage the project, including organizing and co-ordinating all consultants. In either case, the project manager acts as a link between the client and the design team.



Project management type 2.



Project management type 1.

Design and Build

Design and build is a system which has grown in popularity and which appear in various guises. It places the responsibility for both design and construction in the hands of the contractor. There are variations in the name and there are subtle differences in the meaning.

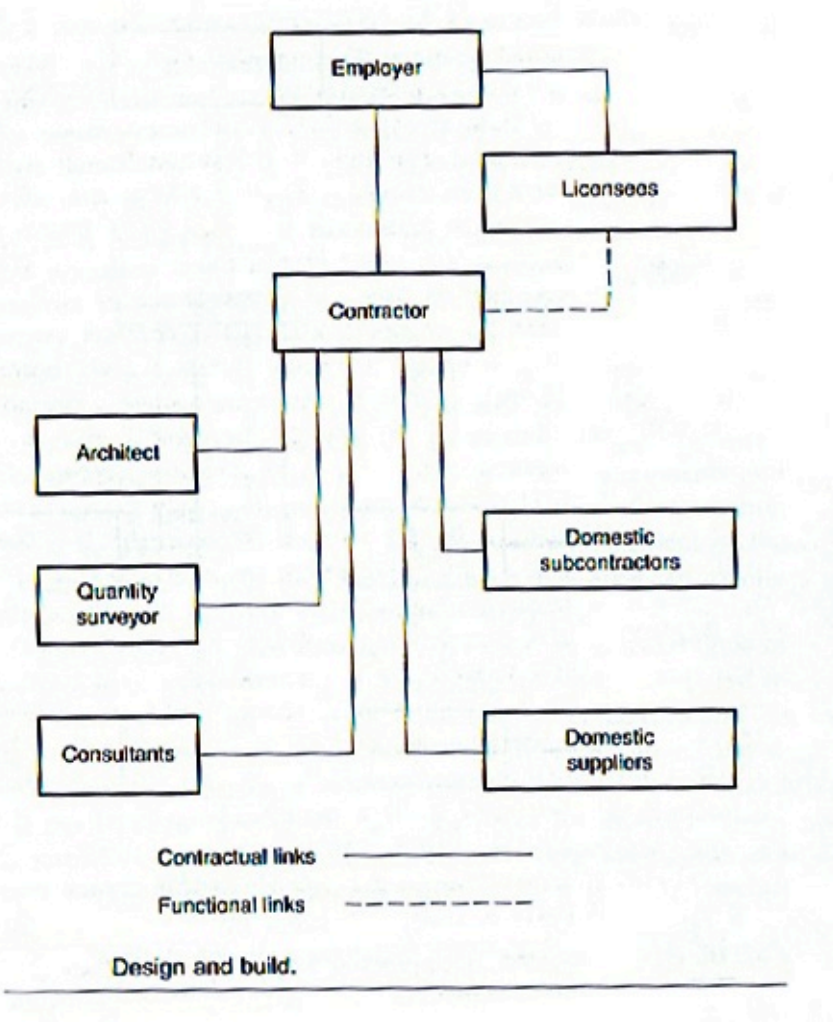
Design and build, for example, refers to the basic system where a contractor carries out the two functions.

Design and Construct includes design and build and other types of construction such as purely engineering works.

Develop and Construct often describes a situation where a contractor takes a partially completed design and develops it into fully detailed design.

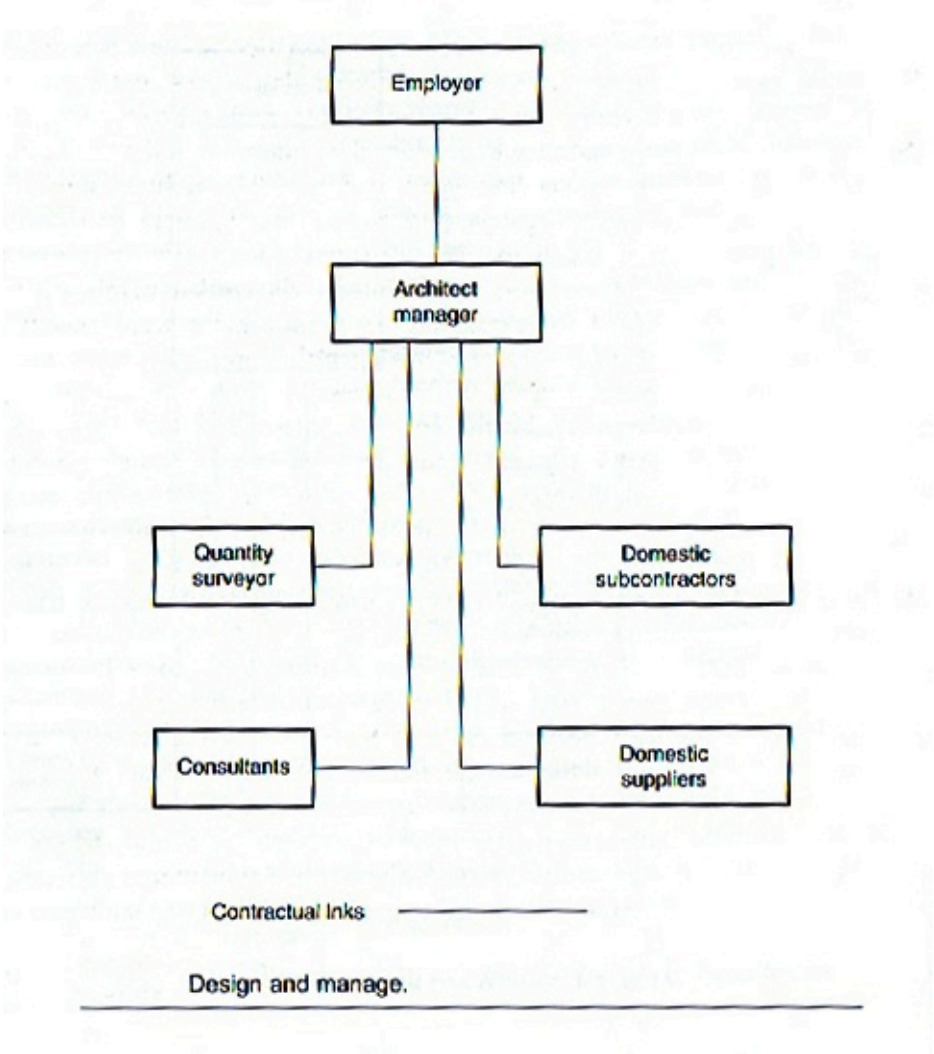
Package deal suggest that the contractor is responsible for providing everything in one package and it is particularly apt when referring to an industrial building.

Turnkey contracting is a system in which the contractor really is responsible for everything, including furniture and pictures on the walls id required. The idea is that the employer simply turns the key and begins using the building – hence the name.



Design and Manage

This is a system where a single point of responsibility rests with a professional who maybe an architect, engineer or surveyor. Beside being responsible for the design of the project, the professional also manages the project in the sense of managing other professionals and also the construction process in the form of, probably, a number of sub-contractors and suppliers.

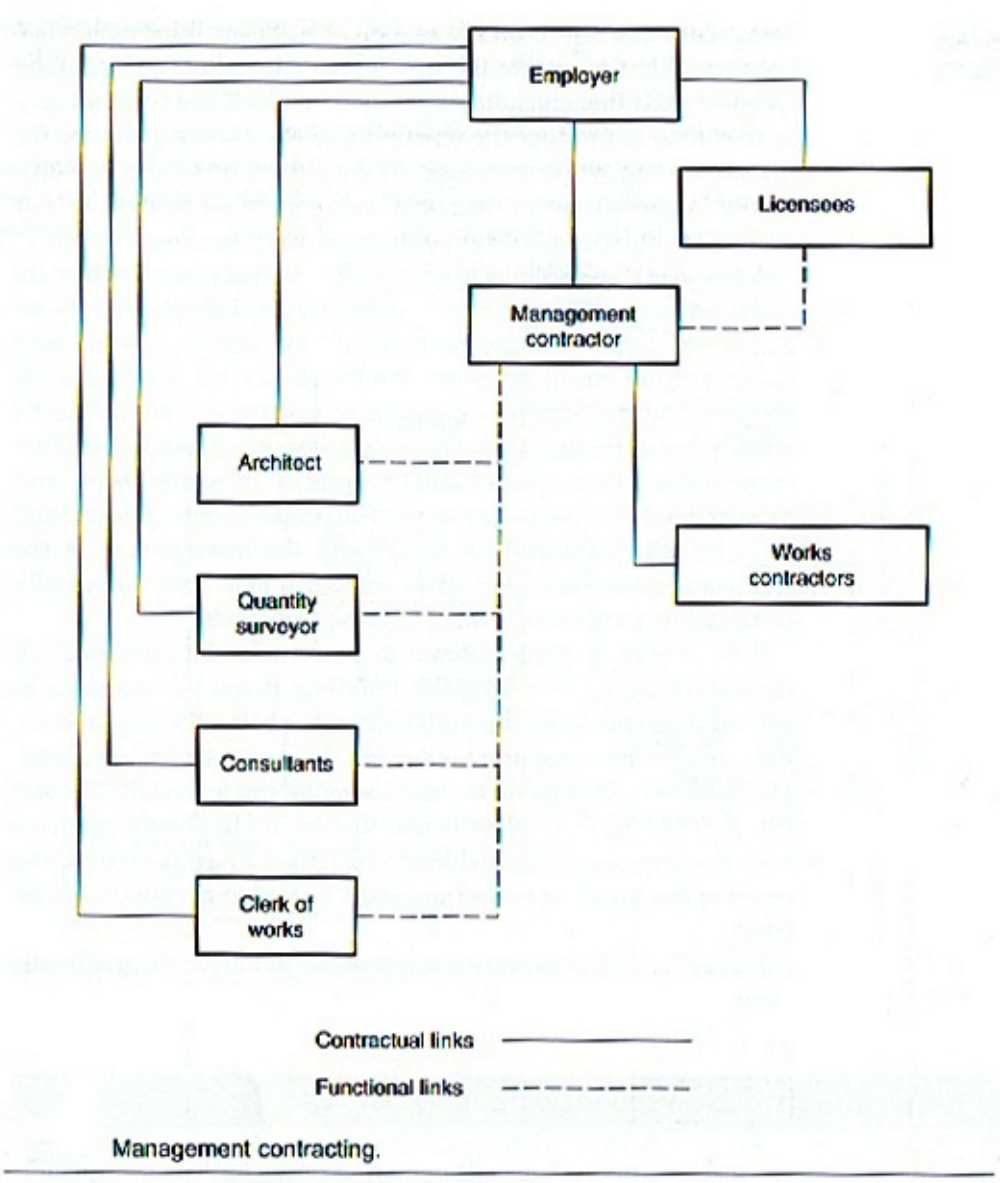


Management contracting

Management contracting seems to be waning in popularity as design and build increases its stake in the construction market.

The contractor is selected at an early stage. Although not normally responsible for carrying out any of the construction work, the contractor simply has a management function for which a fee is paid. The construction work is divided into a number of packages with the contractor's advice and tenders for these individual packages are invited as appropriate to suite the programme

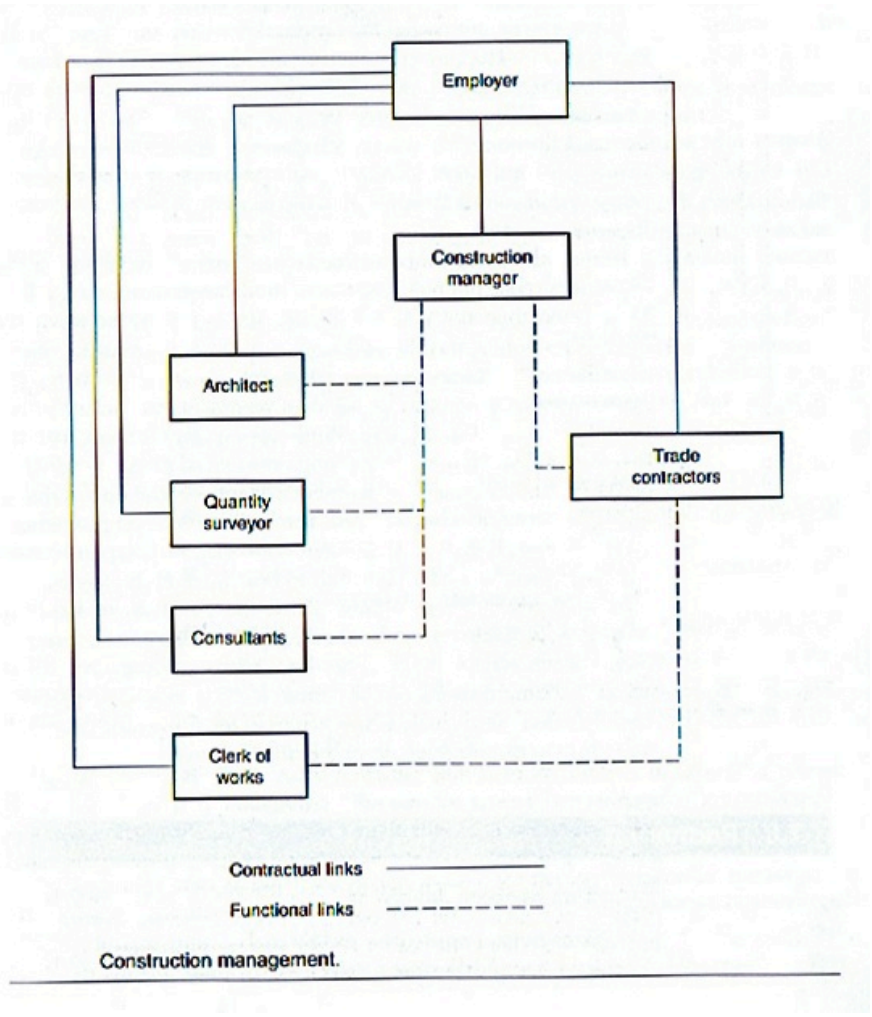
This is a system most often referred to as '***fast track'*** the idea being that works begins on site as soon as sufficient information has been produced to enable the first works contractor to start. The engineers are then involved in constant race against time to produce the reminder of the drawings in time for the succeeding work packages.



Management contracting.

Construction management

This system calls upon the contractor to act simply in a management capacity for which a fee is paid. The design team is often appointed directly by the employer, but in some instances the contractor may appoint. In such cases, the system has some of the flavor of project management. The key difference between this system and management contracting is that the individual works contractors (they are usually termed *'trade contractors'* under this system) are in contract with the employer.



Construction management.

PFI contracts

The Private Finance Initiative (PFI) is not a procurement system, because any of the systems above can be used with PFI. It is becoming clear, however, that procurement routes based on some form of design and build, certainly contractor led, are becoming the standard. The idea was that the private sector should be involved in providing and operating various assets which might otherwise never have been started. This system envisaged the eventual return of the project to the public sector. The return to the private sector was to be achieved during the intervening period.

Partnering

Partnering has been defined as:

A management approach used by two or more organizations to achieve specific business objectives by examining the effectiveness of each participant resources. The approach is based on mutual objectives, an agreed method of problem resolution and an active search for continuous measurable improvement

THE DESIGN PROCESS

Design Process and its integration with the project is vital for successful project delivery, the author chooses RIBA (Royal Institute of British Architects) design stages over its counterparts as it pays lots of emphasis on process that produce high quality, these stages are flexible and can be combined in many cases to reduce time and cost. The benefit of stages and its requirement is detailed later in managing a project process; here we look at the stages purely from design prospective. Later we look at how to manage a project profitably using the OGC stages process and how this process can fit with the other process.

RIBA stages are divided to 11 stages; these stages are identified mainly for charging and other purposes. Each stage has its activities but it is not always easy to pinpoint activities within a particular stage, because the whole process is continuous and some activities can be recommended in several stages.

RIBA recommends the following stages to execute a project:

Stage A: Appraisal (Inception)

At this stage the identification of client's needs and objectives is developed, business case and possible constraints on development put in place. Preparation of feasibility studies and assessment of options to enable the client to decide whether to proceed, it is the Engineer's responsibility to advice on how to proceed and on the need for any specialist work.

Stage B: Strategic briefing

Development of initial statement of requirements into the Developed Brief by or on behalf of the client confirming key requirements and constraints. Identification of procurement method, procedures, organizational structure and range of consultants and others to be engaged for the project

Stage C: Outline proposals

Implementation of Developed Brief and preparation of additional data.

Preparation of concept design including outline proposals for structural and building services systems, outline specifications and preliminary cost plan. Review of procurement route

Stage D: Scheme design

Development of concept design to include structural and building services systems, updated outline specifications and cost plan.

Completion of final Brief. Also the application for detailed planning permission take place at the end of this stage.

Stage E: Technical design

Preparation of technical design(s) and specifications, sufficient to co-ordinate components and elements of the project and information for statutory standards.

Stage F: Production Information

Preparation of detailed information for construction. Application for statutory approvals.

Preparation of further information for construction required under the building contract. Review of information provided by specialists

Stage G: Tender documentation

Preparation and/or collation of tender documentation in sufficient detail to enable a tender or tenders to be obtained for the project.

Stage H: Tender action

Identification and evaluation of potential contractors and/or specialists for the project. Obtaining and appraising tenders; submission of recommendations to the client.

Stage J: Mobilization

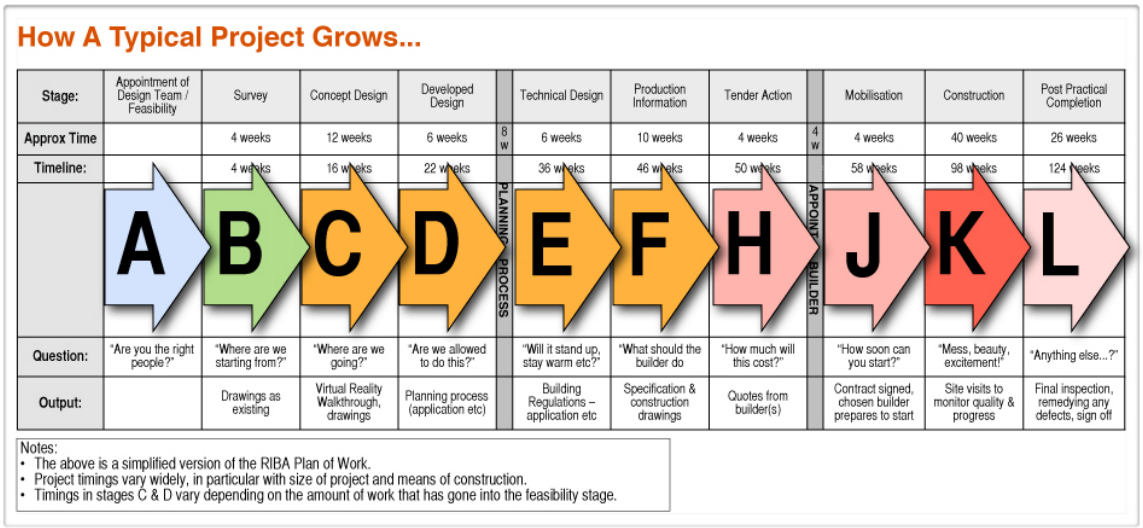
Letting the building contract, appointing the contractor. Issuing of information to the contractor. Arranging site hand over to the contractor

Stage K: Construction to Practical completion

Administration of the building contract to Practical Completion
Provision to the contractor of further Information as and when reasonably required. Review of information provided by contractors and specialists

Stage L: Post practical completion

Administration of the building contract after Practical Completion and making final inspections. Assisting building user during initial occupation period Review of project performance in use.



MANAGING A PROJECT

There are number of characteristics of project work that distinguish it from business as usual:

- **Change** projects are the means by which we introduce change
- **Temporary** projects are temporary in nature
- **Cross Functional** Projects involve a team of people with different skills working together (on temporary base) to introduce change that will impact others outside the team.
- **Unique** every project is unique.
- **Uncertainty** Every Projects has threats and opportunities over and above that those typically encountered in the course of business as usual.

Why have a project management method?

Project management is the planning, delegating, monitoring and control of all aspects of the project, and the motivation of those involved, to achieve the project objectives within the expected performance targets for time, cost, quality, scope, benefits and risks.

What is it we wish to control?

There are six variables involved in any project, and therefore six aspects of project performance to be managed

- Cost
- Timescales
- Quality
- Scope
- Risk
- Benefits

There are varies methods to manage a project, looking at the current construction industry in Kurdistan and the way it is progressed, the author recommends the 777 method (known as PRINCE2 method) which is developed by the OGC (The Office of Government Commerce in the UK). This method is used widely in the UK and many commonwealth countries.

The method is based on 7 Principles, 7 Themes and 7 Processes.

Principles

Principles are characterized as:

- Universal in that they apply for every project
- Self-validating in that they have been proven in practice over many years
- Empowering because they give practitioners of the method added confidence and ability to influence and shape how the project will be managed

The 7 Principles can be summarized as:

- Continued business justification
- Learn from experience
- Defined roles and responsibilities
- Manage by stages
- Manage by exception
- Focus on products
- Tailor to suite project environment

1. Continued Business Justification:

A requirement for a project is that

- There is justifiable reason to start a project
- The justification of the project should remain valid throughout the project
- The justification is documented and approved

  If, for whatever reason the project can no longer be justified, the project should be stopped

2. Learn from Experience:

Project teams learn from previous experience: lesson are sought, recorded and acted upon throughout the life of the project.

Learning from experience permeates the method

- When starting a project
- As the project progresses
- As the project closes

  It is the responsibility of everyone involved with the project to **seek** lessons learned rather than waiting for someone else to provide them.

3. Defined Roles and Responsibilities

A project has a defined and agreed roles and responsibilities within an organization structure that engages the business, user and the supplier stakeholder interests.

To be successful, projects must have an explicit project management team structure consisting of defined and agreed roles and responsibilities for the people involved in the project and means of effective communication between them.

All the projects have the following primary stakeholders:

- **Business Sponsors** who endorse the objectives and ensure the business investment provide value for money
- **Users** who, after the project is completed, will use the products to enable them to gain the intended benefit
- **Suppliers** who provide resources and expertise required for the project

4. Manage by Stages

A project is planned, monitored and controlled on stage-by-stage basis.
A successful project requires a minimum of two management stages: One initiation stage and one or more further management stages.
At the end of each stage, the project's status should be assessed, the business case and plans reviewed to ensure that the project remains viable, and a decision made as to whether to proceed.
Planning can only be done to a level of detail that is manageable and foreseeable.

5. Manage by Exception

A project has defined tolerances for each project objective to establish limits of delegated authority.
It is important to enable appropriate governance by defining distinct responsibilities for **directing**, **managing** and **delivering** the project and clearly defining accountability at each level.
Delegating authority from one management level to the next by setting tolerances against six objectives for the respective level of the plan; these are:

- Time
- Cost
- Quality
- Scope
- Risk
- Benefit

6. Focus on Product

Project focuses on the definition and delivery of products, in particular their quality requirement.
A successful project is output-oriented not activity-oriented.

7. Tailor to suit the project environment

To manage a project successfully, it is important to use a method that is tailored to suit project environment, size, complexity, importance, capability and risk.

Themes

Themes describe aspects of project management that must be addressed continually.

The Seven themes are:

- Business Case (Why we have the project)
- Organization (Who will do the project)
- Quality (What are we expecting at the end)
- Plans (How? How much? And When?)
- Risk (What if?)
- Change (What's the impact)
- Progress (Where are we now? Where are we going? Should we carry on?)

A Project Management Processes (discussed in the next chapter) address the chronological flow of the project –which actions relating to different themes mixed together.

1. Business Case

The purpose of the Business Case theme is to establish mechanisms to judge whether the project is (and remains) desirable, viable and achievable as a means to support decision-making in its (continued) investment.

The business justification is the reason for the project. Without it no project should start. If business justification is valid at the start of the project but disappears once it is underway, the project should be stopped or changed.

The business case is based on whether the project is **desirable** (the cost/benefit/risk balance), **viable** (the project can deliver the products) and **achievable** (the products can provide the benefits)

The business case is not static. It should not be used only to gain initial funding for a project, but should be actively maintained throughout the life of the project and be continually updated with current information on costs, risk and benefits.

Outputs, outcomes and benefits

To be understand business case theme it is essential to understand the following:

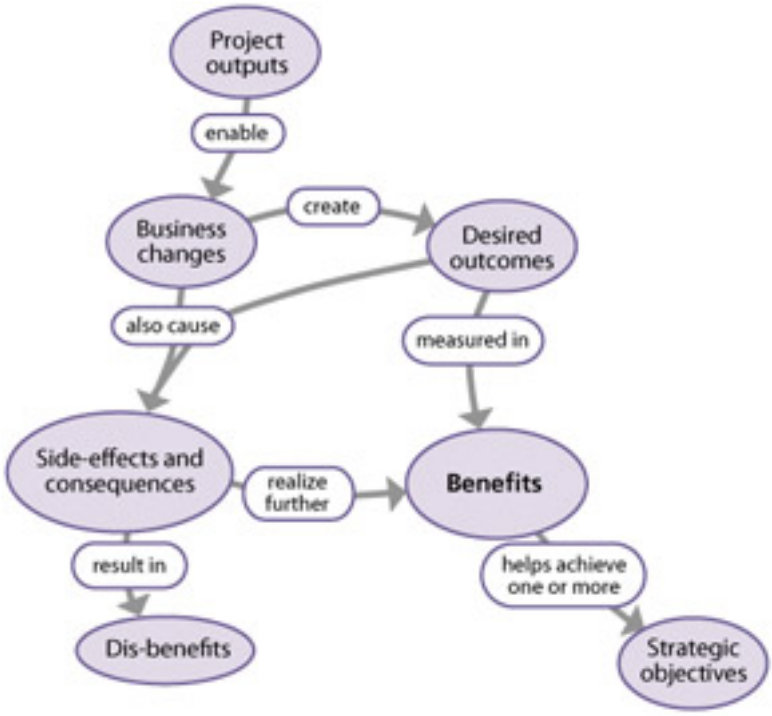
- A project **output** is any of the project's specialist products (whether tangible or intangible)
- An **outcome** is the result of the change derived from using the project outputs
- A **benefit** is the measurable improvement resulting from an outcome that is perceived as advantage by one or more stakeholders.

Example of output, outcome and benefit

Output: Building a new Cargo airport extension in Sulaymaniah airport

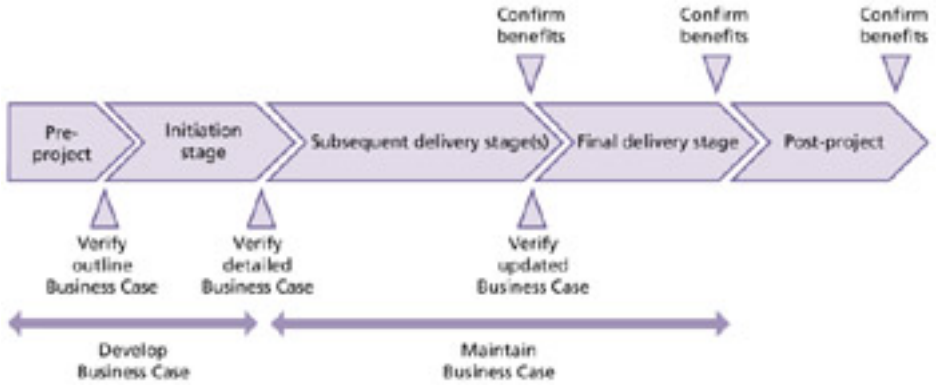
Outcome: able to host cargo plane in the airport

Benefit: increase airport revenue from cargo landing and fuel sales.



Relationship between outputs, outcomes and benefits

The Business Case is developed at the beginning of the project and maintained throughout the life of the project being formally verified by the Project Board at each key decision point, such as end stage assessments, and confirmed throughout the period that the benefits accrue.



The development path of the Business Case

The Business Case drives all decision making by ensuring that the project remains justified and that the business objectives and benefits being sought can be realized.

2. Organization

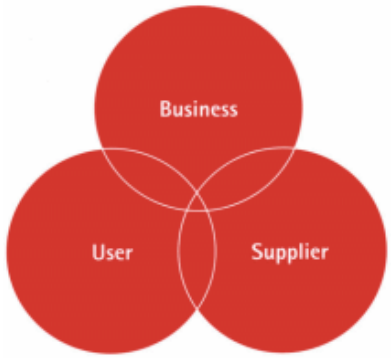
The purpose of the Organization theme is to define and establish the project structure of the accountability and responsibilities (the who?)

In organization the author recommends Customer/ Supplier environment.

All projects must have a defined organizational structure to unite varies parties in the common aims of the project and to enable effective project governance and decision-making.

A successful project management team should:

- Have business, user and supplier stakeholder representation
- Ensure appropriate governance by defining responsibilities for directing, managing and delivering the project and clearly defining the accountability at each level
- Have reviews of the project roles throughout the project to ensure that they continue to be effective
- Have an effective strategy to manage communication flows to and from stakeholders.



The three project interests

The Executive (representing the business viewpoint) and the Senior User (representing theUser view point) roles can often be combined.

The project management structure has four levels, three of which represent the project management team and the fourth which sits outside of the project.

Tolerance is set at each level against which the project can be controlled.

- **Corporate or programme management**
  Sits outside the project but sets the overall requirements and tolerance levels for the project. The three levels of management within the project (responsible for directing,

managing and delivering) will manage and implement within these tolerances and escalate any forecast breaches of project tolerance

- **Directing (Project board)**
  Has overall control at a project level, as long as forecasts remain within project tolerance, and will allocate tolerances for each management stage to the Project Manager. The Project Board has the ability to review progress and decide whether to continue, change or stop the project. During execution of the Project Plan, if any forecasts indicate that the project is likely to exceed the agreed project tolerances, then the deviation should be referred to corporate or programme management by the Project Board in order to get a decision on corrective action.
- **Managing (Project Manager)**
  Has day-to-day control for a management stage within the tolerance limits laid down by the Project Board. During execution of a Stage Plan, if any forecasts indicate that the stage is likely to exceed the agreed stage tolerances, then the deviation should be referred to the Project Board by the Project Manager in order to get a decision on corrective action.
- **Delivering (Team Manager)**
  Has control for a Work Package, but only within the Work Package tolerances agreed with the Project Manager. During execution of the Work Package, if any forecasts indicate that it is likely that the agreed tolerances will be exceeded, then the deviation should be referred to the Project Manager by the Team Manager in order to get a decision on corrective action

3. Quality

The purpose of the Quality theme is to define and implement the means by which the project will create and verify products that are fit for purpose.
The management team must ensure that the product

- Meet business expectation
- Enable the desired benefits to be achieved subsequently

Quality is generally defined as the totality of features and inherent or assigned characteristics of a product, person, process, service and/ or system that bear on its ability to show that it meets expectations or satisfies stated needs, requirements or specification.

Quality Management and quality management system
Quality management is defined as the coordinated activities to direct and control an organization with regard to quality. A quality management system is the complete set of quality standards, procedures and responsibilities for a site or organization.

Quality Planning
To control anything, including quality, there must be a plan. Quality planning is about defining the products required of the project, with their respective quality criteria, quality methods (including effort required for quality control and product acceptance) and the quality responsibilities of those involved.

Quality Control
Quality control focuses on the operational techniques and activities used by those involved in the project to:

- Fulfill the requirements for quality (for example, by quality inspections or testing)
- Identify ways of eliminating causes of unsatisfactory performance (for example, by introducing process improvements as a result of lessons learned).

Quality Assurance
Quality assurance provide a check that the project's direction and management are adequate for the nature of the project and that it complies with relevant corporate or programme management standards and policies.

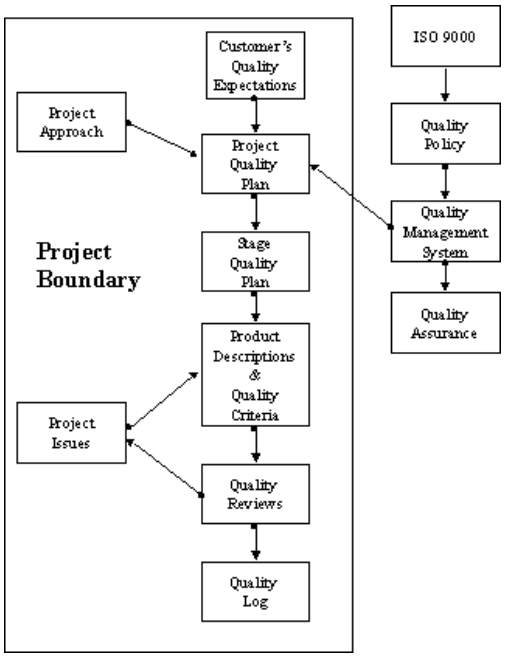
Generally when we approach project quality we aim to **plan** for the expected quality and then make sure that the quality under **control** during project lifecycle.

Quality plan should include the following

- The customer's quality expectation
- Acceptance Criteria
- The Project Product Description
- The Quality Management Strategy
- Product Descriptions

Quality Control compromises:

- Carrying out quality methods
- Maintaining quality and approval methods
- Gaining acceptance



4. Plans

The purpose of the Plans theme is to facilitate communication and control by defining the means of delivering the products (the where and how, by whom, and estimating the when and how much).

Planning provides all personnel involved in the project with information on:

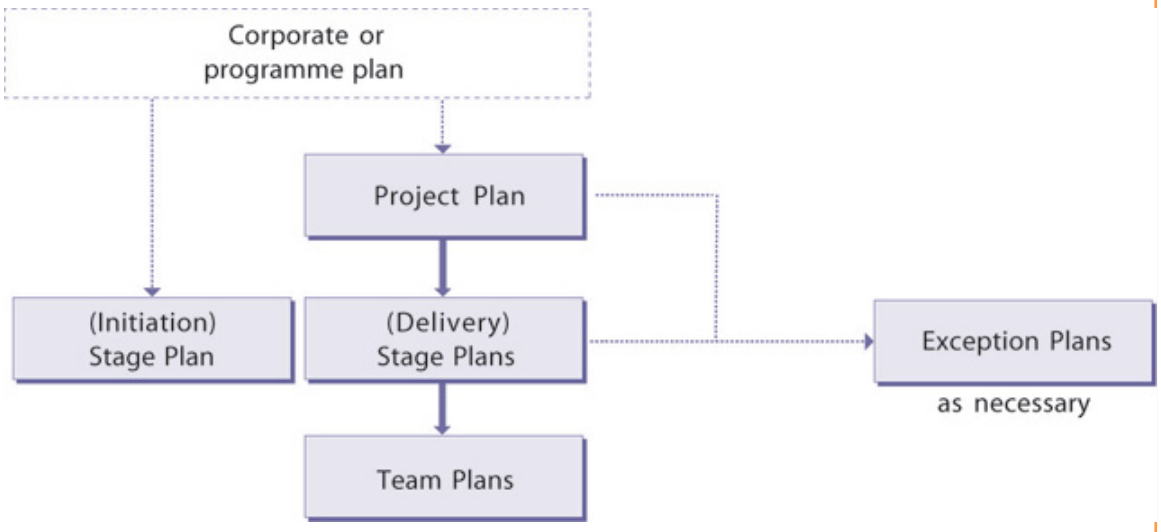
- What is required
- How it will be achieved and by whom, using what specialist equipment and resources
- When events will happen
- Whether the targets (for time, cost, quality, scope, risk and benefits) are achievable.

  A plan is a document describing how, when and by whom a specific target or set of targets is to be achieved. These targets will include the project's products, timescale, costs, quality and benefits.

  Plans are the backbone of the management information system required for any project. It is important plans are kept in line with the business case at all times. A plan requires the approval and commitment of he relavent levels of the project management team.

  Planning is the act or process of making and maintaining plan.

  It is recommended to have three levels of plan to reflect the needs of different levels of management involved in the project, stage and team.



Planning Levels

The development and maintenance of credible plans provides a baseline against which progress can be measured. They enable planning information to be

disseminated to stakeholders in order to secure any commitments which support the plan.

The very act of planning helps the project management team to think ahead to 'mentally rehearse the project'. It is such rehearsal that enables omissions, duplication, threats and opportunities to be identified and managed.

Project Plan
The Project Plan provides a statement of how and when a project's time, cost, scope and quality performance targets are to be achieved, by showing the major products, activities and resources required for the project.

- Provides the Business Case with planned project costs and timescales, and identifies the major control points, such as management stages and milestones
- Is used by the Project Board as a baseline against which to monitor project progress stage by stage
- Should align with the corporate or programme management's plan.

Stage Plans
Stage Plan is required for each management stage. The Stage Plan is similar to the Project Plan in content, but each element will be broken down to the level of detail required to be an adequate basis for day-to-day control by the Project Manager.

Each Stage Plan for the next management stage is produced near the end of the current management stage.

This approach allows the Stage Plan to:

- Be produced close to the time when the planned events will take place
- Exist for a much shorter duration than the Project Plan (thus overcoming the planning horizon issue)
- Be produced with the knowledge of the performance of earlier management stages.

Team Plan
A Team Plan is produced by a Team Manager to facilitate the execution of one or more Work Packages. Team Plans are optional; their need and number will be determined by the size and complexity of the project and the number of resources involved.

Exception Plans
An Exception Plan is a plan prepared for the appropriate management level to show the actions required to recover from the effect of a tolerance deviation. If approved, the Exception Plan will replace the plan that is in exception and it will become the new baselined Project Plan or current Stage Plan, as appropriate.

The philosophy behind producing plans, is that the products required are identified first, and only then the activities, dependencies and resources required to deliver those products identified. This is known as **Product-based planning** and is used in the Project Plan, Stage Plan and optionally, in the Team Plan. The figure below illustrate the steps required in producing a plan.

The approach to plans

The benefits of product-based planning include:

- Clearly and consistently identifying and documenting the plan's products and the interdependencies between them. This reduces the risk of important scope aspects being neglected or overlooked
- Removing any ambiguity over expectations
- Involving users in specifying the product requirements, thus increasing buy-in and reducing approval disputes
- Improving communication: the product breakdown structure and product flow diagram provide simple and powerful means of sharing and discussing options for the scope and approach to be adopted for the project
- Clarifying the scope boundary: defining products that are in and out of the scope for the plan and providing a foundation for change control, thus avoiding uncontrolled change or 'scope creep'
- Identifying products that are external to the plan's scope but are necessary for it to proceed, and allocating them to other projects or organizations
- Preparing the way for the production of Work Packages for suppliers
- Gaining a clear agreement on production, review and approval responsibilities

For the purpose of producing this report, the author omitted the details of producing a plan, instead the key steps are mentioned below:

- Write the project product description (ex: airport description)
- Create the product breakdown structure (consider use members of design and construction team)
- Write the product description (all products should be described to avoid misunderstanding; ex: structure design, Architectural design or if the project in construction stage: Escalator type, type of flooring, materials…etc.
- Create product flow diagram
- Identify activities and dependencies
- Prepare Estimates (how much time and resources required to carry out a piece of work).
- Prepare the Schedule (Presentation format may be different depends on size of project and client request, ex: Gantt charts, Critical path diagram, spreadsheets and product checklist)
- Analyze the risks

5. Risk

The purpose of the Risk theme is to identify, assess and control uncertainty and, as a result, improve the ability of the project to succeed.

It is unfortunately that this important element is not considered the engineering industry here in Kurdistan, the result of this is delays, extra costs and poor quality and in many cases the relationship between Client and Engineer terminate for not considering the unforeseen events.

What is a Risk?
A risk is an uncertain event or set of events that, should it occur, will have an effect on the achievement of objectives.
Risks can be Treat or opportunity.

What is Risk Management?
The term risk management refers to the systematic application of procedures to the tasks of identifying and assessing risks, and then planning and implementing risk responses. This provides a disciplined environment for proactive decision making.
For risk management to be effective, risks need to be **Identified**, **Assessed** and **Controlled**.

Management of risk is based on a number of risk management principles, of which the following are appropriate within a project context:

- Understand the project's context
- Involve stakeholders
- Establish clear project objectives
- Develop the project risk management approach
- Report on risks regularly
- Define clear roles and responsibilities
- Establish a support structure and a supportive culture for risk management
- Monitor for early warning indicators
- Establish a review cycle and look for continual improvement.

Risk Management Strategy

A key decision that needs to be recorded within the Risk Management Strategy is the Project Board's attitude towards risk taking, which in turn dictates the amount of risk that it considers acceptable. This information is captured in the form of risk tolerances, which represent the levels of exposure that, when exceeded, will trigger an Exception Report to bring the situation to the attention of the Project Board

Risk Register

The purpose of the Risk Register is to capture and maintain information on all of the identified threats and opportunities relating to the project. Each risk on the Risk Register is allocated a unique identifier as well as details such as:

- Who raised the risk
- When it was raised
- The category of risk
- The description of the risk (cause, risk event, effect)
- Probability, impact and expected value
- Proximity
- Risk response category
- Risk response actions
- Risk status
- Risk owner
- Risk actionee

Risk Management Procedure

Five steps are recommended for risk management

- Identify (context and risks)
- Assess (i.e. Estimate and Evaluate)
- Plan
- Implement
- Communicate

There are many techniques used for risk identification, estimation and evaluation before a plan and implementation put in place.

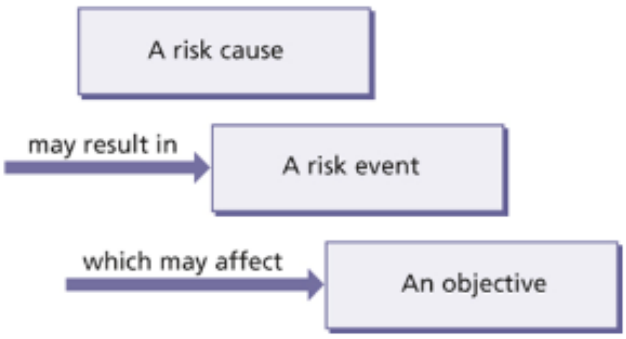
Some of the Risk Identification techniques are:

- Review lessons
- Risk checklists
- Risk prompt list

- Brainstorming
- Risk breakdown structure

To identify a risk it is important to consider the following aspects of each risk:

- Risk cause
- Risk event
- Risk effect



Some of the Risk estimation techniques are:

- Probability trees
- Expected value
- Pareto analysis
- Probability impact grid

And for Risk evaluation some of the key techniques used are

- Risk Model (for example the Monte Carlo analysis)
- Expected monetary value

The primary goal of the '**Plan**' step is to prepare specific management responses to the threats and opportunities identified, ideally to remove or reduce the threats and to maximize the opportunities. Attention to the Plan step ensures as far as possible that the project is not taken by surprise if a risk materializes.

Risk ID	Likelihood (%)	Impact (£)	Expected value (£)
1	60	20,000	12,000
2	30	13,000	3,900
3	10	4,000	400
4	5	10,000	500
Expected monetary value			16,800

Threat responses	Opportunity responses
Avoid	Exploit
Reduce (probability and/or impact) Fallback (reduces impact only) Transfer (reduces impact only, and often only the financial impact)	Enhance
Share	
Accept	Reject

Typical threats and opportunities responses

The final step is the **'communicate'** step to ensure that information related to the threats and opportunities faced by the project is communicated both within the project and externally

6. Change

The purpose of the Change theme is to identify, assess and control any potential and approved changes to the baseline

Change is inevitable during the life of a project, and every project needs a systematic approach to the identification, assessment and control of issues that may result in change.

Issue and change control is a continual activity, performed throughout the life of the project.

The aim of issue and change control procedures is not to prevent changes; it is to ensure that every change is agreed by the relevant authority before it takes place.

Issues and Change Control

Issue and change control procedures ensure that all issues and changes which may affect the project's agreed baselines are identified, assessed and either approved, rejected or deferred.

Configuration Management

Configuration management is the technical and administrative activity concerned with the creation, maintenance and controlled change of configuration throughout the life of a product (or item).

Issues

The term 'issue' used to cover any relevant event that has happened, was not planned, and requires management action. It can be a concern, query, request for change, suggestion or off-specification raised during a project. Project issues can be about anything to do with the project.

Issues may be raised at any time during the project, by anyone with an interest in the project or its outcome.

Summary of types of Issues

Types of issue	Definition	Example
Request for Change	A proposal for a change to a baseline	The Client requested to add 10 floors to a tower to become 55 floor high
Off-specification	Something that should be provided by the project, but currently is not (or is forecast not to be) provided. This might be a missing product or a product not meeting its specification	Advise from the engineer that the design foundation can only carry up to 50 floors high and that the requested 55 floor building can not be delivered.
Problem/ concern	Any other issue that the Project Manager needs to resolve or escalate	The team manager advises the Project manager that Structural

		engineer was off-sick and therefore the delivery date for the work package will slip by a week

The Approach to Change

The project's controls for issues, changes and configuration management will be defined and established by the Initiating a Project process and then reviewed and (if necessary) updated towards the end of each management stage by the Managing a Stage Boundary process. The following management products are used to establish and maintain the project's controls for issues, changes and configuration management:

- **Configuration Management Strategy:** effective issue and change control is only possible if it is supported by a configuration management system that facilitates impact assessments (relationships between products) and maintains product baselines (the basis from which the entity will change)
- **Configuration Item Records:** The purpose of the Configuration Item Records is to provide a set of records that describe information such as the status, version and variant of each configuration item and any details of important relationships between the items.
- **Product Status Accounts:** The purpose of the Product Status Account is to provide information about the state of the products within defined limits. The limits can vary.
- **Daily Log:** A daily Log is used to record problems/concerns that can be handled by the Project Manager informally. Issues initially captured on the Daily Log may later be transferred to the Issue Register if, after examining them, it is decided they need to be treated more formally.
- **Issue Register:** The purpose of the Issue Register is to capture and maintain information on all of the issues that are being managed formally. The Issue Register should be monitored by the Project Manager on a regular basis
- **Issue Reports:** An Issue Report is a report containing the description, impact assessment and recommendations for a request for change, off-specification or a problem/concern. It is only created for those issues that need to be handled formally.

Issue and Change Control Procedure

The diagram below explains clearly the issue and change control procedure and how it is escalated.


Project Board/Change Authority
Request for advice
Request for advice/
Exception Report
Capture
• Determine issue type
• Determine severity/ priority
• Log Register
Examine
• Assess impact on project objectives/ Business Case and project risk profile
• Check severity/ priority
Propose
• Identify options
• Evaluate options
• Recommend options
Decide
• Escalate if beyond delegated authority
• Approve, reject or defer recommended option
Implement
• Take corrective action
• Update records and plans
Daily Log or
Issue Register/Issue Report

7. Progress

The purpose of the Progress theme is to establish mechanisms to monitor and compare actual achievements against those planned; provide a forecast for the project objectives and the project's continued viability; and control any unacceptable deviations.

What is Progress?

Progress is the measure of the achievement of the objectives of a plan. It can be monitored at Work Package, stage and project level.

What are Progress Control?

Progress controls ensure that for each level of the project management team the next level of management can:

- Monitor progress
- Compare level of achievement with plan
- Review plans and options against future situations
- Detect problems and identify risks
- Initiate corrective action
- Authorize further work

Exceptions and tolerances

An exception is a situation where it can be forecast that there will be a deviation beyond the agreed tolerance levels.

Tolerances are the permissible deviation above and below a plan's target for time and cost without escalating the deviation to the next level of management. There may also be tolerance levels for quality, scope, benefit and risk.

Tolerance areas	Project level tolerances	Stage level tolerances	Work Package level tolerances	Product level tolerances
Time +/- amounts of time on target completion dates	Project Plan	Stage Plan	Work Package	NA
Cost +/- amounts of planned budget	Project Plan	Stage Plan	Work Package	NA
Scope Permitted variation of the scope of a project solution, e.g. MoSCoW prioritization of requirements (Must have, Should have, Could have, Won't have for now).	Project Plan (note 1)	Stage Plan (note 1)	Work Package (note 1)	NA
Risk Limit on the aggregated value of threats (e.g. expected monetary value to remain less than 10% of the plan's budget); and Limit on any individual threat (e.g. any threat to operational service)	Risk Management Strategy	Stage Plan (note 2)	Work Package (note 2)	NA
Quality Defining quality targets in terms of ranges, e.g. a product that weighs 300g +/- 10g	Project Product Description	NA (note 3)	NA (note 3)	Product Description
Benefits Defining target benefits in terms of ranges, e.g. to achieve minimum cost savings of 5% per branch, with an average of 7% across all branches	Business Case	NA	NA	NA
Note 1 – the scope of a plan is defined by the set of products to be delivered. Scope tolerance (if used) should be in the form of a note on or reference to the product breakdown structure for the plan. Scope tolerance at the stage or Work Package level is of particular use if applying a time-bound iterative development method such as Agile.				
Note 2 – more specific stage level risk tolerances may be set by the Project Board when authorizing a stage or by the Project Manager when commissioning Work Packages, especially from external suppliers.				
Note 3 – quality tolerances are not summarily defined at the stage or Work Package level but are defined per Product Description within the scope of the plan.				

The approach to Progress

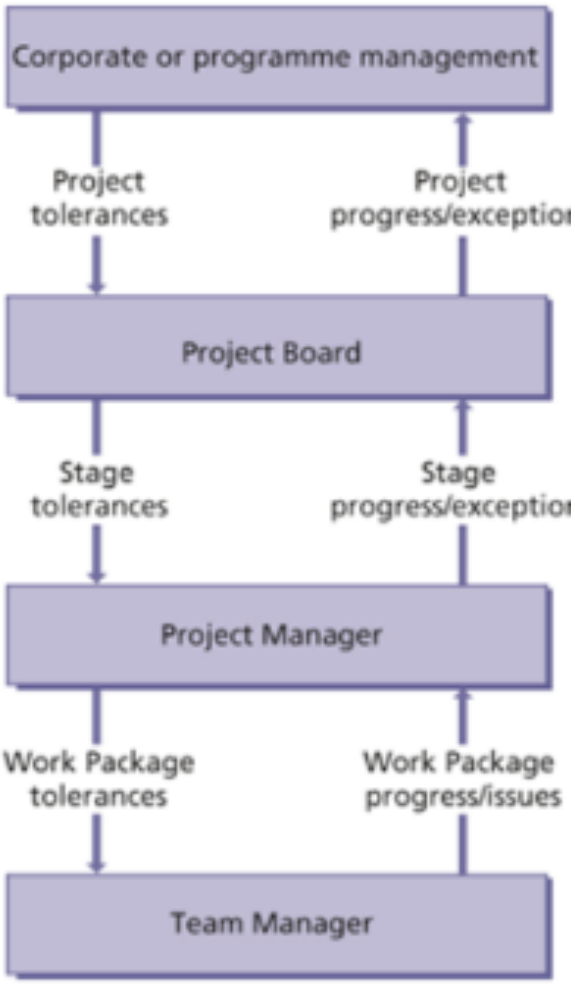
Progress control involves measuring actual progress against the performance targets of time, cost, quality, scope, benefits and risk, and then using this information to make decisions (such as whether to approve a stage or Work Package, whether to escalate deviations, whether to prematurely close the project etc.) and to take actions as required.

Progress Control is provided through:

- Delegating authority from one level of management to the level below it
- Dividing the project into management stages and authorizing the project one stage at a time
- Time-driven and event-driven progress-reporting and reviews
- Raising exceptions

Delegating Authority

The principle of management by exception uses six types of tolerance against which a project can be controlled. The allocation of tolerances follows the four levels of the project management team as outlined in the diagram and described below:



Use of Management Stages for control

Management stages are partitions of the project with management decision points. A management stage is a collection of activities and products whose delivery is managed as a unit. As such, this stage is a subset of the project and is the element of work that the Project Manager is managing on behalf of the Project Board at any one time.

Management stages:

- Provide review and decision points, giving the Project Board the opportunity to assess the project viability at regular intervals, rather than let it run on in an uncontrolled manner
- Give the ability to ensure that key decisions are made prior to the detailed work needed to implement them
- Allow clarification of what the impact will be of an identified external influence, such as the corporate budget round or the finalization of legislation
- Facilitate the management by exception principle by delegating authority to the Project Manager on a stage-by-stage basis.

Number of Stages

The use of management stages in a project is mandatory, but the number of stages is flexible and depends on the scale and risk of the project. Every project consists of at least two management stages. The initiation stage is mandatory as it ensures that there is a firm basis for the project, which is understood by all parties. There should also be at least one other management stage to cover the remainder of the project. For larger projects, additional management stages may be needed to enable the project management team to have an optimal level of planning and control.

Defining management stages is fundamentally a process of balancing:

- How far ahead in the project it is sensible to plan
- Where the key decision points need to be on the project
- The amount of risk within a project
- Too many short management stages (increasing the project management overhead) versus too few lengthy ones (reducing the level of control)
- How confident the Project Board and Project Manager are in proceeding

The number of management stages required will be dictated by the nature of the project and its duration. For short-duration projects (where the project can be completed within the planning horizon, for example), the introduction of multiple management stages could result in unnecessary ‘overheads’ and additional costs.

Events driven and time driven control

There are two types of progress control throughout the life of the project

Event-driven controls

Take place when a specific event occurs. This could be, for example, the end of a stage, the completion of the Project Initiation Documentation or the creation of an Exception Report. It could also include organizational events that might affect the project, such as the end of the financial year.

Time-driven controls

Take place at predefined periodic intervals. This could be, for example, producing monthly Highlight Reports for the Project Board or weekly Checkpoint Reports showing the progress of a Work Package.

Monitoring and reporting requires a time-based approach, whereas control (decision making) is an event-based activity.

Baselines for progress control

It is only possible to control at the level of resolution in the plans, i.e. if you want to have Checkpoint Reports weekly, you need to know (in the Stage Plan) what you expect to achieve week by week.

The following management products assist the Project Manager in establishing baselines for progress control:

Project Plan

This will include the project-level performance targets and tolerances. Any threat to the project-level tolerances needs to be escalated to the Project Board, which will seek advice from corporate or programme management for corrective action.

Stage Plans

These form the basis of the day-to-day control of the stage. They should contain details of the activities to be conducted during a management stage, their timescales, and the resources needed to carry them out.

Reviewing Progress

As part of Controlling a Stage, the Project Manager will regularly review the progress of work through Checkpoint Reports and maintain a set of project registers and logs. The Project Manager will use this information to update the Stage Plan with actual progress achieved. The frequency of checkpoint reporting required may change according to the needs of individual Work Packages.

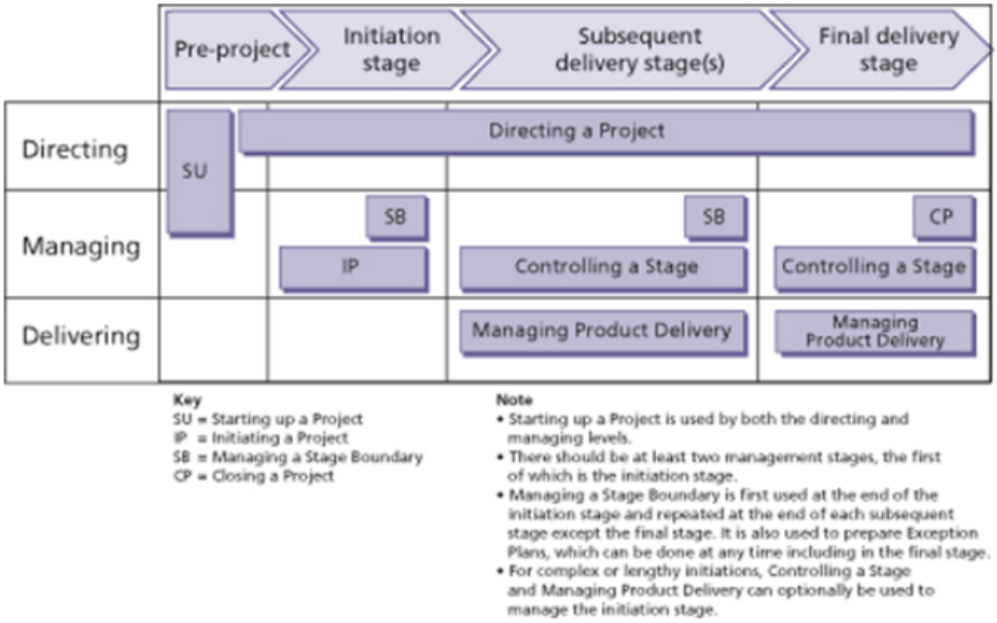
It is also useful to look at trends to get a view of the overall 'health' of the stage. For example, the stage may seem to be progressing well in terms of the products being completed against the schedule. However, the Issue Register may reveal an increasing number of issues which are not being resolved and which may be a cause for concern. Similarly, a high number of outstanding items against a product in the Quality Register may show design issues with that product.

INTRODUCTION TO PROCESS

A process is a structured set of activities designed to accomplish a specific objective. It takes one or more defined inputs and turns them into defined outputs.

There are seven processes which provide the set of activities required to direct, manage and deliver a project successfully.

The diagram shows how each process is used throughout a project's life



Pre project

In the beginning, someone has an idea or a need. This may result from new business objectives, responding to competitive pressures, changes in legislation, or a recommendation in a report or an audit. The trigger for the project could be almost anything. This trigger is called a project mandate. The project mandate is provided by the commissioning organization (corporate or programme management) and can vary in form from a verbal instruction to a well-defined and justified project definition.

Prior to the activity to fully scope the project, it is important to verify that the project is worthwhile and viable. Such activities are covered by the process Starting up a Project (see later section), which culminates in the production of a Project Brief and a Stage Plan for project initiation.

Initiation Stage

Once there is a decision to go ahead with the project, it needs to be planned in detail. Funding needs to be obtained and controls should be defined to ensure that the project proceeds in accordance with the wishes of those people paying for the project and those who will make use of what the project delivers

Subsequent delivery stage(s)

The Project Board delegates day-to-day control to the Project Manager on a stage-by-stage basis. The Project Manager needs to assign work to be done, ensure that the outputs of such work (products) meet relevant specifications, and gain suitable approval where appropriate. The Project Manager also needs to ensure that progress is in line with the approved plan and that the forecasts for the project's performance targets are within agreed tolerances. The Project Manager ensures that a set of project records (Daily Log, Lessons Log, Issue Register, Risk Register, Quality Register and Configuration Item Records) are maintained to assist with progress control. The Project Manager informs the Project Board of progress through regular Highlight Reports. The activities to control each stage are covered by the Controlling a Stage process (see later section).

In the Managing Product Delivery process (see later section), the Team Manager(s) or team members execute assigned Work Packages (that will deliver one or more products) and keep the Project Manager appraised of progress via Checkpoint Reports.

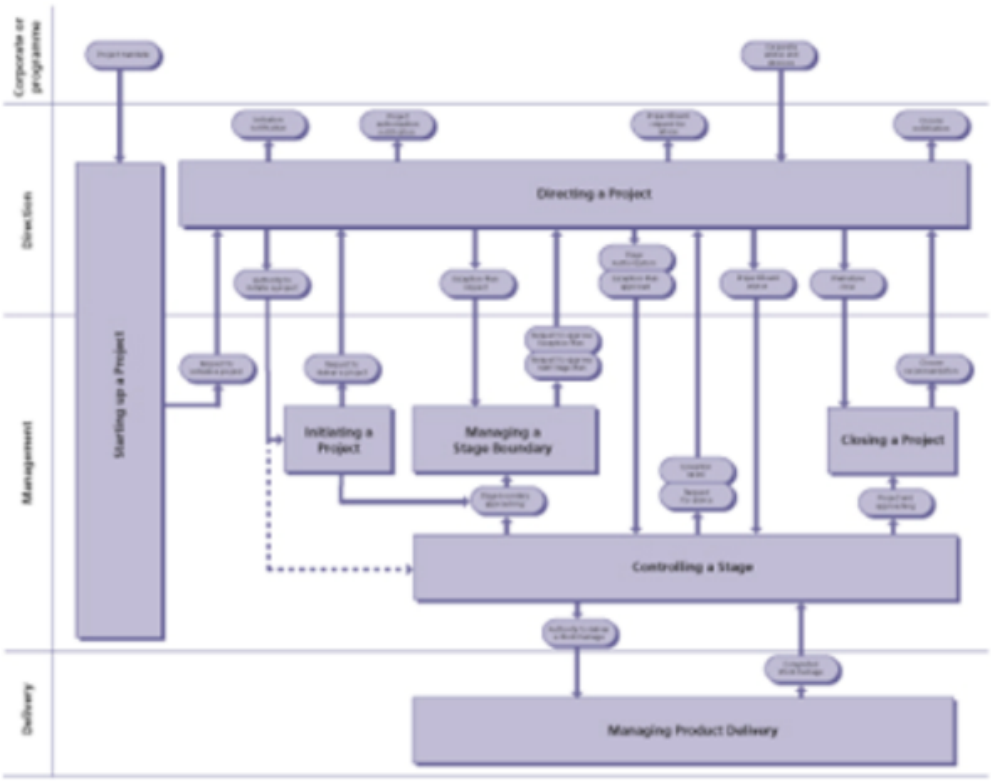
Towards the end of each management stage, the Project Manager requests permission to proceed to the next stage by reporting how the stage performed, providing an update to the Business Case and planning the next management stage in detail. The Project Manager provides the information needed by the Project Board in order for it to assess the continuing viability of the project and to make a decision to authorize the next management stage. The activities to manage each stage boundary are covered in the Managing a Stage Boundary process (see later section).

Final delivery stage

As project is a temporary undertaking, during the final stage (once the Project Manager has gained approval for all of the project's products) it is time to decommission the project. The Project Board needs to be satisfied that the recipients of the project's products are in a position to own and use them on an ongoing basis.

Process Model

The process model is shown in the diagram. The processes are aligned to the management levels of corporate or programme, directing, managing and delivering. The triggers between each process are shown



Notes:

Note 1: at the end of the initiation stage, the Initiating a Project process is used to request Project Board approval to initiate the project (with the submission of the Project Initiation Documentation) and in parallel the Managing a Stage Boundary process is used to request Project Board approval of the Stage Plan for the second management stage.

Note 2: the closure activities are planned and approved as part of the stage approval for the final stage; therefore the Closing a Project process takes place in the final stage.

1. Starting Up a Project

Purpose

The purpose of the Starting up a Project process is to ensure that the prerequisites for Initiating a Project are in place by answering the question: do we have a viable and worthwhile project?

Nothing should be done until certain base information needed to make rational decisions about the commissioning of the project is defined, key roles and responsibilities are resourced and allocated, and a foundation for detailed planning is available.

The purpose of the Starting up a Project process is as much about preventing poorly conceived projects from ever being initiated as it is about approving the initiation of viable projects. As such, Starting up a Project is a lighter process compared to the more detailed and thorough Initiating a Project process. The aim is to do the minimum necessary in order to decide whether it is worthwhile to even initiate the project.

Objective

The objective of the Starting up a Project process is to ensure that:

- There is a business justification for initiating the project (documented in an outline Business Case)
- All the necessary authorities exist for initiating the project
- Sufficient information is available to define and confirm the scope of the project (in the form of a Project Brief)
- The various ways the project can be delivered are evaluated and a project approach selected
- Individuals are appointed who will undertake the work required in project initiation and/or will take significant project management roles in the project
- The work required for project initiation is planned (documented in a Stage Plan)
- Time is not wasted initiating a project based on unsound assumptions regarding the project's scope, timescales, acceptance criteria and constraints.

Context

Projects can be identified in a variety of ways and thus have a wide variation in the information available at the time of start-up. This is called the trigger for the project the project mandate, which is provided by the responsible authority which is commissioning the project - typically the corporate or programme management organization. The term project mandate applies to whatever information is used to trigger the project, be it a feasibility study or the receipt of a 'request for proposal' in a supplier environment. The project mandate should provide the terms of reference for the project and should contain sufficient information to identify at least the prospective Executive of the Project Board.

Overview of Starting up a Project

Activities

The activities within the Starting up a Project process are likely to be shared between corporate or programme management, the Executive and the Project Manager.

The activities are to:

- Appoint the Executive and the Project Manager
  To get anything done in the project, a decision maker with appropriate authority is needed - the Executive - who represents the interests of the business stakeholder(s). The appointment of the Executive is a prerequisite to ensuring that the project is justified.
  The appointment of a Project Manager allows for the project to be managed on a day-to-day basis on behalf of the Executive.

- Capture previous lessons
  A number of lessons may have been learned by other projects, corporate or programme management, and external organizations about weaknesses or strengths of the processes, procedures, techniques and tools used, when they were used, how they were used, and by whom.

- Design and appoint the project management team
  The project needs the right people in place, with the authority, responsibility and knowledge to make decisions in a timely manner. The project management team needs to reflect the interests of all parties who will be involved, including business, user and supplier interests.
- Prepare the outline Business Case

When setting up, and particularly while running the project, it is all too easy to concentrate on what is being done and how it is to be done, while ignoring why it needs to be done. The Business Case states why the work is worth doing and, as such, is a crucial element of the project.

- Select the project approach and assemble the Project Brief
  Before any planning of the project can be done, decisions must be made regarding how the work of the project is going to be approached. For example, will the solution be developed in-house or contracted to third parties? Will the solution be a modification to an existing product or built from scratch? Will the solution be based on a commercial off-the-shelf product (often referred to as COTS) or something that is custom-designed?
- Plan the initiation stage
  Initiating a Project takes time and consumes resources. The work should be planned and approved like any other project work. This also ensures that initiation is not aimless and unstructured.

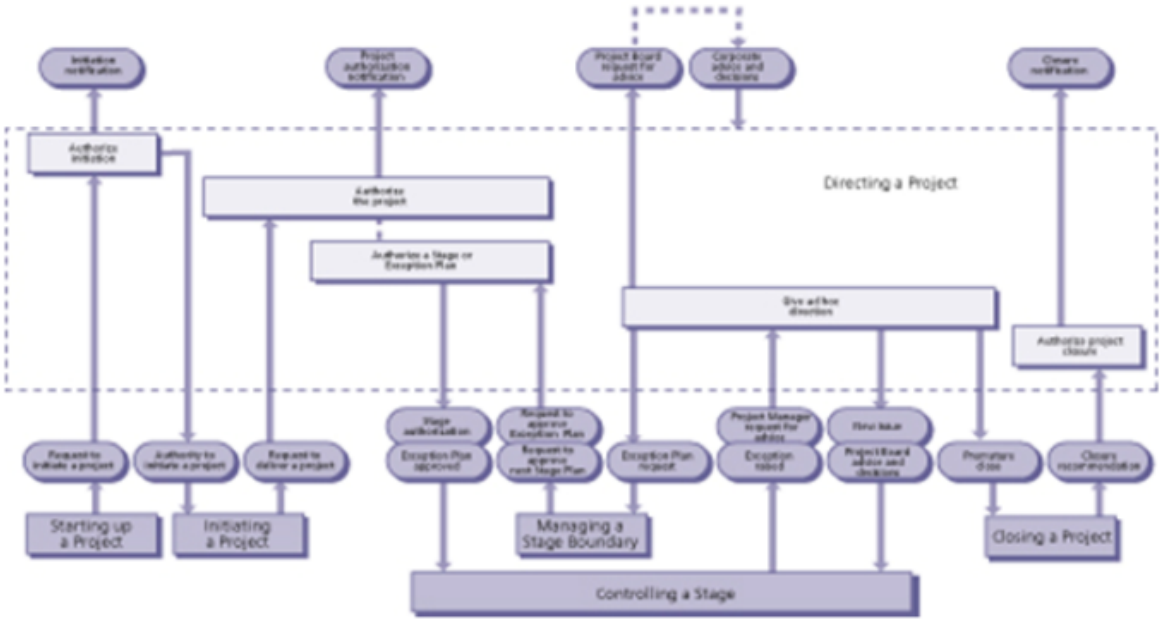
2. Directing a project

The purpose of the Directing a Project process is to enable the Project Board to be accountable for the project's success by making key decisions and exercising overall control while delegating day-to-day management of the project to the Project Manager.

Objective

The objective of the Directing a Project process is to ensure that:

- There is authority to initiate the project
- There is authority to deliver the project's products
- Management direction and control are provided throughout the project's life, and that the project remains viable
- Corporate or programme management has an interface to the project
- There is authority to close the project
- Plans for realizing the post-project benefits are managed and reviewed



Overview of Directing a Project

Context

The Directing a Project process starts on completion of the Starting up a Project process and is triggered by the request to initiate a project.

Activities

The activities within the Directing a Project process are Project-Board-oriented and are to:

- Authorize initiation
  Projects take time and cost money to initiate, so the activities for initiation should be planned, monitored and controlled. The Project Board activity to authorize initiation ensures that such investment is worthwhile.
- Authorize the project
  This activity will be triggered by a request from the Project Manager for authorization to deliver the project, and should be performed in parallel with authorizing a Stage or Exception Plan (see the section covering 'Authorize a Stage or Exception Plan').
- Authorize a Stage or Exception Plan
  It is important that a stage starts only when the Project Board says it should. The Project Board authorizes a management stage by reviewing the performance of the current stage and approving the Stage Plan for the next stage. Approval of Stage Plans occurs at the end of every management stage except the last one
- Give ad hoc direction
  Project Board members may offer informal guidance or respond to requests for advice at any time during a project.
  Ad hoc direction may be given collectively or by individual Project Board members
- Authorize project closure.
  The controlled close of a project is as important as the controlled start. There must be a point when the objectives set out in the original and current versions of the Project Initiation Documentation and Project Plan are assessed in order to understand:
    - *Whether the objectives have been achieved*
    - *How the project has deviated from its initial basis*
    - *That the project has nothing more to contribute*

3. Initiating a Project

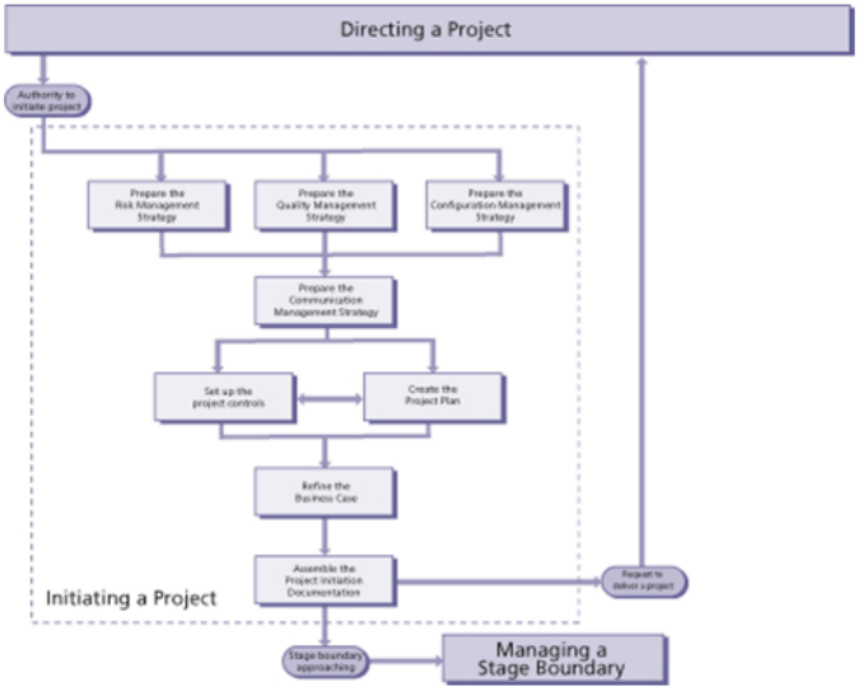
The purpose of the Initiating a Project process is to establish solid foundations for the project, enabling the organization to understand the work that needs to be done to deliver the project's products before committing to a significant spend.

Objective

The objective of the Initiating a Project process is to ensure that there is a common understanding of:

- The reasons for doing the project, the benefits expected and the associated risks
- The scope of what is to be done and the products to be delivered
- How and when the project's products will be delivered and at what cost
- Who is to be involved in the project decision making
- How the quality required will be achieved
- How baselines will be established and controlled
- How risks, issues and changes will be identified, assessed and controlled
- How progress will be monitored and controlled
- Who needs information, in what format, and at what time
- How the corporate (or programme's) project management method will be tailored to suit the project

Initiating a Project is aimed at laying down the foundations in order to achieve a successful project.



Overview of Initiating a Project

Activities

The activities within the Initiating a Project process are Project-Manager-oriented and are to:

- Prepare the Risk Management Strategy
  The Risk Management Strategy describes the goals of applying risk management, the procedure that will be adopted, the roles and responsibilities, the risk tolerances, the timing of risk management activities, the tools and techniques that will be used, and the reporting requirements.
- Prepare the Configuration Management Strategy
  Configuration management is essential for the project to maintain control over its management and specialist products.
- Prepare the Quality Management Strategy
  A key success factor of any project is that it delivers what the user expects and finds acceptable.
- Prepare the Communication Management Strategy
  The Communication Management Strategy addresses both internal and external communications. It should contain details of how the project management team will send information to, and receive information from, the wider organization(s) involved with, or affected by, the project. In particular, where the project is part of a programme, details should be given on how information is to be fed to the programme.
- Set up the project controls
  The level of control required by the Project Board after initiation needs to be agreed and the mechanism for such controls needs to be established - as does the level of control required by the Project Manager of the work to be undertaken by Team Managers.
- Create the Project Plan
  Before committing to major expenditure on the project, the timescale and resource requirements must be established. This information is held in the Project Plan and is needed so that the Business Case can be refined and the Project Board can control the project.
- Refine the Business Case
  The outline Business Case produced during Starting up a Project needs to be updated to reflect the estimated time and costs, as determined by the Project Plan, and the aggregated risks from the updated Risk Register
- Assemble the Project Initiation Documentation
  There needs to be a focal point at which all information relating to the 'what, why, who, how, where, when, and how much' of the project is:
    - *Gathered for agreement by the key stakeholders*
    - *Available for guidance and information for those involved in the project.*

4. Controlling a Stage

The purpose of the Controlling a Stage process is to assign work to be done, monitor such work, deal with issues, report progress to the Project Board, and take corrective actions to ensure that the stage remains within tolerance.

Objective

The objective of the Controlling a Stage process is to ensure that:

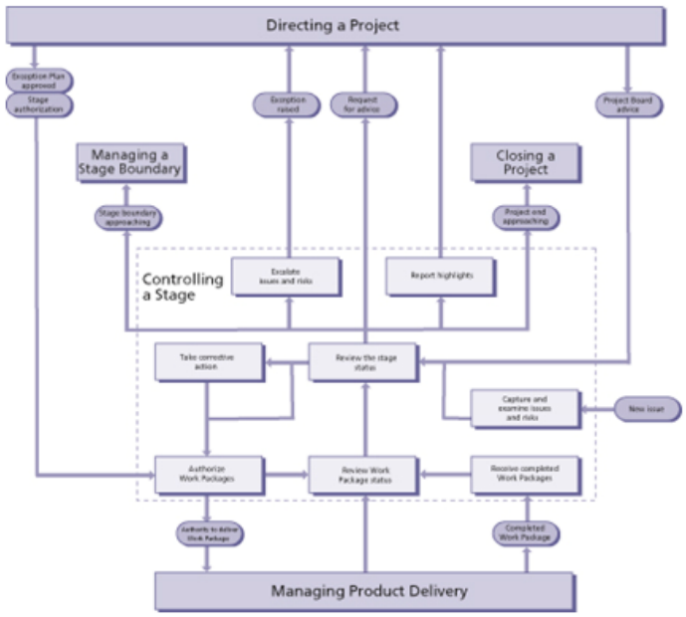
- Attention is focused on delivery of the stage's products. Any movement away from the direction and products agreed at the start of the stage is monitored to avoid uncontrolled change ('scope creep') and loss of focus
- Risks and issues are kept under control
- The Business Case is kept under review
- The agreed products for the stage are delivered to stated quality standards, within cost, effort and time agreed, and ultimately in support of the achievement of the defined benefits
- The project management team is focused on delivery within the tolerances laid down.

Context

The Controlling a Stage process describes the work of the Project Manager in handling the day-to-day management of the stage.

Towards the end of each stage, except the final one, the activities within the Managing a Stage Boundary process will occur.

Work Packages are used to define and control the work to be done, and also to set tolerances for the Team Manager(s).



Activities

Controlling a Stage activities are Project-Manager-oriented and comprise:

- Work Packages:
  - Authorize a Work Package
    It would be chaotic to have the people who are working on the project starting activities whenever they think fit.
    It is therefore important that work only commences and continues with the consent of the Project Manager. The vehicle for this is the production, execution and delivery of a Work Package.
  - Review Work Package status
    This activity provides the means for a regular assessment of the status of the Work Package(s).
  - Receive completed Work Packages
    Where work has been allocated to individuals or teams, there should be a matching confirmation that the work has been completed and approved.
- Monitoring and reporting:
  - Review the stage status
    If the project is not checked on a timely basis, there is a danger that it will get out of control. There needs to be a balance between planning ahead and reacting to events.
  - Report highlights
    The Project Manager must provide the Project Board with summary information about the status of the stage and project and distribute other information to stakeholders at a frequency documented in the Communication Management Strategy (as defined by the Project Board)
- Issues:
  - Capture and examine issues and risks
    In the course of managing the project, various issues will occur and risks may be identified.
  - Escalate issues and risks
    A stage should not exceed the tolerances agreed with the Project Board. The Project Manager can only take corrective action or maintain the status quo as long as the stage (or project) is forecast to be completed within the tolerances set by the Project Board. This activity applies where any corrective action within the Project Manager's control would not save the stage (or project) from going beyond the tolerances agreed. This applies to all types of issue and risk (or aggregation of them) that cannot be resolved within the tolerances set by the Project Board.
  - Take corrective action
    Changes and adjustments to the project need to be made in a considered and rational way, even when they appear to be easily manageable and within tolerances.

5. Managing Product Delivery

The purpose of the Managing Product Delivery process is to control the link between the Project Manager and the Team Manager(s), by placing formal requirements on accepting, executing and delivering project work.

The role of the Team Manager(s) is to coordinate an area of work that will deliver one or more of the project's products. They can be internal or external to the customer's organization.

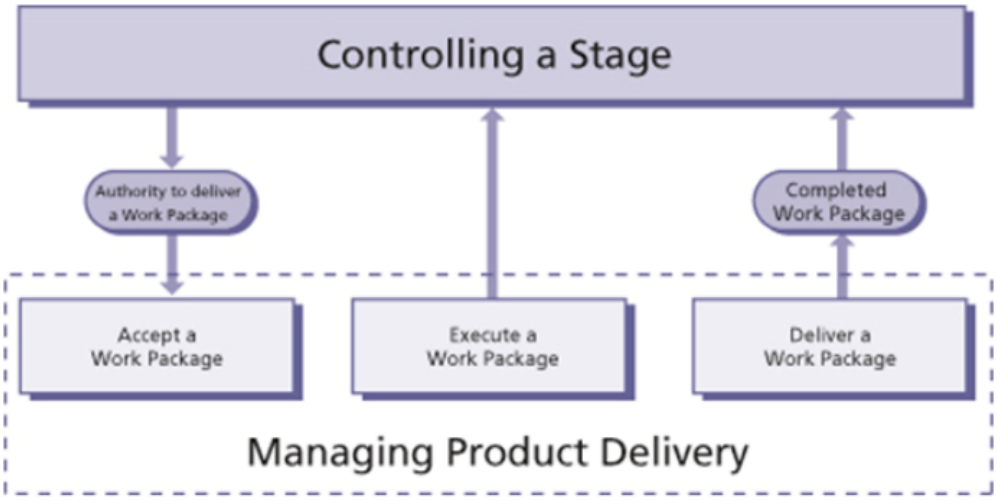
Objective

The objective of the Managing Product Delivery process is to ensure that:

- Work on products allocated to the team is authorized and agreed
- Team Managers, team members and suppliers are clear as to what is to be produced and what is the expected effort, cost or timescales
- The planned products are delivered to expectations and within tolerance
- Accurate progress information is provided to the Project Manager at an agreed frequency to ensure that expectations are managed

Context

Managing Product Delivery views the project from the Team Manager's perspective, while the Controlling a Stage process views it from the Project Manager's perspective.



Activities

The activities within the Managing Product Delivery process are Team-Manager-oriented and are to:

- Accept a Work Package
  The fundamental principle is that before a Work Package is allocated to a team, there should be agreement between the Project Manager and the Team Manager as to what is to be delivered, the reporting requirements, what constraints apply, any procedures to be applied, and whether the requirements of the Work Package are reasonable and can be achieved
- Execute a Work Package
  The work has to be executed and monitored to the requirements defined in the authorized Work Package. While developing the products, the Team Manager should not exceed the Work Package tolerances agreed with the Project Manager.
- Deliver a Work Package
  Just as the Work Package was accepted from the Project Manager, notification of its completion must be returned to the Project Manager

6. Managing a Stage Boundary

The purpose of the Managing a Stage Boundary process is to enable the Project Board to be provided with sufficient information by the Project Manager so that it can review the success of the current stage, approve the next Stage Plan, review the updated Project Plan, and confirm continued business justification and acceptability of the risks. Therefore, the process should be executed at, or close to the end of, each management stage.

Projects do not always go to plan and in response to an Exception Report (if the stage or project is forecast to exceed its tolerances) the Project Board may request that the current stage (and possibly the project) is replanned. The output from replanning is an Exception Plan which is submitted for Project Board approval in the same way that a Stage Plan is submitted for approval.

Objective

The objective of the Managing a Stage Boundary process is to:

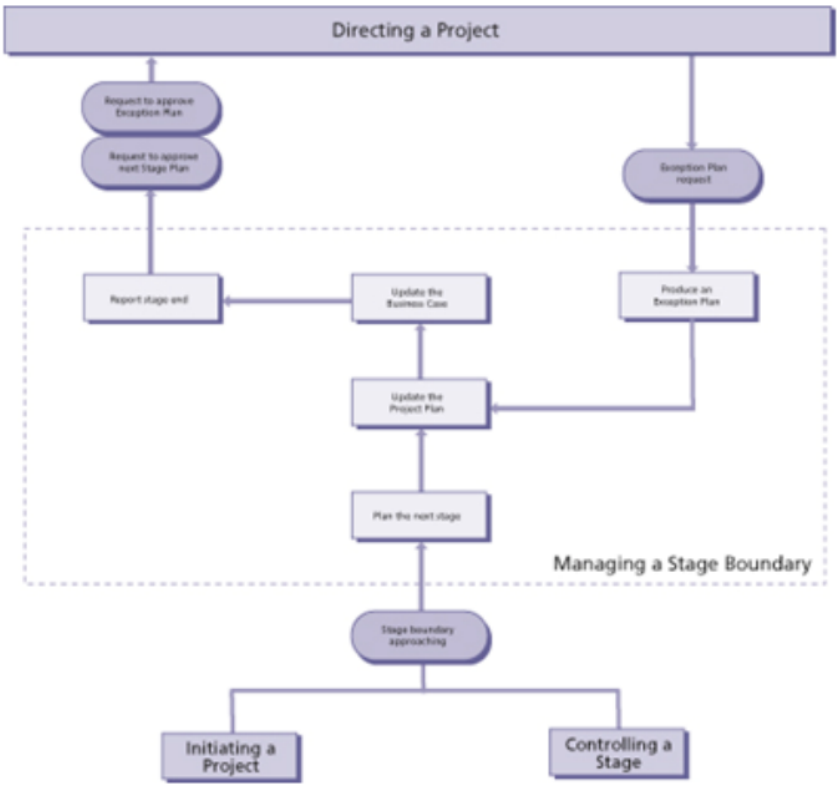
- Assure the Project Board that all products in the Stage Plan for the current stage have been completed and approved
- Prepare the Stage Plan for the next stage
- Review and, if necessary, update the Project Initiation Documentation (in particular the Business Case, Project Plan, project approach, strategies, project management team structure and role descriptions)
- Provide the information needed for the Project Board to assess the continuing viability of the project – including the aggregated risk exposure
- Record any information or lessons that can help later stages of this project and/or other projects
- Request authorization to start the next stage.

For exceptions, the objectives of the Managing a Stage Boundary process are to:

- Prepare an Exception Plan as directed by the Project Board
- Seek approval to replace the Project Plan or Stage Plan for the current stage with the Exception Plan.

Context

A project, whether large or small, needs to ensure that the products it creates will deliver the benefits being sought, either in their own right or as part of a larger programme. The continuing correct focus of the project should be confirmed at the end of each stage. If necessary, the project can be redirected or stopped to avoid wasting time and money.



Activities

The activities within the Managing a Stage Boundary process are Project-Manager-oriented and are to:

- Plan the next stage
  The Stage Plan for the next management stage is produced near the end of the current stage. Closure activities should be planned as part of the Stage Plan for the final stage
- Update the Project Plan
  The Project Plan is updated to incorporate actual progress from the stage that is finishing, and to include forecast duration and costs from the Exception Plan or Stage Plan for the stage about to begin.
- Update the Business Case
  The Project Board is ordinarily only authorized to continue while the project remains viable (that is, the benefits will be realized within the cost, time, quality, scope and risk parameters set out in the currently agreed Business Case)
- Report stage end
  The results of a stage should be reported back to the Project Board so that progress is clearly visible to the project management team.
- Produce an Exception Plan
  If a stage or the project is forecast to deviate beyond its agreed tolerances, it no longer has the approval of the Project Board. Exception Plans are requested by the Project Board in response to an Exception Report.

7. Closing a Project

The purpose of the Closing a Project process is to provide a fixed point at which acceptance for the project product is confirmed, and to recognize that objectives set out in the original Project Initiation Documentation have been achieved (or approved changes to the objectives have been achieved), or that the project has nothing more to contribute.

Objective

The objective of the Closing a Project process is to:

- Verify user acceptance of the project's products
- Ensure that the host site is able to support the products when the project is disbanded
- Review the performance of the project against its baselines
- Assess any benefits that have already been realized, update the forecast of the remaining benefits, and plan for a review of those unrealized benefits
- Ensure that provision has been made to address all open issues and risks, with follow-on action recommendations

Context

A clear end to a project:

- Is always more successful than a slow drift into use as it is a recognition by all concerned that:
    - The original objectives have been met (subject to any approved changes)
    - The current project has run its course
    - Either the operational regime must now take over the products from this project, or the products become inputs into some subsequent project or into some larger programme
    - The project management team can be disbanded
    - Project costs should no longer be incurred
- Provides an opportunity to ensure that all unachieved goals and objectives are identified so that they can be addressed in the future
- Transfers ownership of the products to the customer and terminates the responsibility of the project management team.

Activities

The activities within the Closing a Project process are Project-Manager-oriented and are to:

- Prepare planned closure
  Before closure of the project can be recommended, the Project Manager must ensure that the expected results have all been achieved and delivered.
- Prepare premature closure
  In some situations, the Project Board may have instructed the Project Manager to close the project prematurely. In such circumstances, the Project Manager must ensure that work in progress is not simply abandoned, but that the project salvages anything of value created to date and checks that any gaps left by the cancellation of the project are raised to corporate or programme management.
- Hand over products
  The project's products must be passed to an operational and maintenance environment prior to the project being closed. This may happen as a single release at the end of the project, or the project approach may include phased delivery where products are handed over in a number of releases
- Evaluate the project
  Successful organizations learn from their experiences with projects. When evaluating the project, the objective is to assess how successful or unsuccessful the project has been. It may also be possible to improve the estimation for future projects by analysing the estimates and actual progress metrics for this project.
- Recommend project closure
  Once the Project Manager has confirmed that the project can be closed, a closure recommendation should be raised to the Project Board.

Conclusion

Despite the vast investment and development in the region, the author view of huge amount of waste in resources and wealth in the building and development industry, mainly in Public sector and Investment law projects. The key reason of this is due to the chronic management failure in the industry in general, the lack of system management in the engineering practice and the development companies laid to a projects poor in quality, excessive delays in the delivery, and almost all projects encountered wasting some vast amount of resources could be better placed in developing other projects.

True that competitions will eventually bring standards up including that of the management, but as the failure is quiet vast, therefore it will take very long time before we can see a real improvement should we leave it to competition only, the alternative to that is for the Engineering Union take a leading role using its powerful position to bring standard up in relatively shorter time. Therefore the author recommends the following actions:

- The Union, with agreement with one of the internationally recognized organizations adapts a managerial system and enforces it on any willing company to practice in Kurdistan.
- The Union use it's the position to influence the parliament and other authorities such as Investment Ministry and Local government to make sure projects and investments are only awarded to developers in possession of management system recognized by the industry.
- The Union with help of specialized international organizations, introduce a quality check system (a simplified version of ISO) and make these frequent checks on all the registered Design and consultancy practice in Kurdistan.

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Appendices

Appendix A

The relationship between RIBA design process and OGC management gateway according to the varies contract forms

Amended November 2008

RIBA Outline Plan of Work 2007

The Outline Plan of Work organises the process of managing, and designing building projects and administering building contracts into a number of key Work Stages. The sequence or content of Work Stages may vary or they may overlap to suit the procurement method (see pages 2 and 3).

RIBA Work Stages			Description of key tasks	OGC Gateways
Preparation	A	Appraisal	Identification of client's needs and objectives, business case and possible constraints on development. Preparation of feasibility studies and assessment of options to enable the client to decide whether to proceed.	
	B	Design Brief	Development of initial statement of requirements into the Design Brief by or on behalf of the client confirming key requirements and constraints. Identification of procurement method, procedures, organisational structure and range of consultants and others to be engaged for the project.	**1** Business justification **2** Procurement strategy
Design	C	Concept	Implementation of Design Brief and preparation of additional data. Preparation of Concept Design including outline proposals for structural and building services systems, outline specifications and preliminary cost plan. Review of procurement route.	**3A** Design Brief and Concept Approval
	D	Design Development	Development of concept design to include structural and building services systems, updated outline specifications and cost plan. Completion of Project Brief. *Application for detailed planning permission.*	
	E	Technical Design	Preparation of technical design(s) and specifications, sufficient to co-ordinate components and elements of the project and *information for statutory standards and construction safety.*	**3B** Detailed Design Approval
Pre-Construction	F	Production Information	F1 Preparation of production information in sufficient detail to enable a tender or tenders to be obtained. *Application for statutory approvals.* F2 *Preparation of further information for construction required under the building contract.*	
	G	Tender Documentation	*Preparation and/or collation of tender documentation in sufficient detail to enable a tender or tenders to be obtained for the project.*	
	H	Tender Action	*Identification and evaluation of potential contractors and/or specialists for the project.* *Obtaining and appraising tenders; submission of recommendations to the client.*	**3C** Investment decision
Construction	J	Mobilisation	Letting the building contract, appointing the contractor. Issuing of information to the contractor. Arranging site hand over to the contractor.	
	K	Construction to Practical Completion	Administration of the building contract to Practical Completion. Provision to the contractor of further Information as and when reasonably required. Review of information provided by contractors and specialists.	**4** Readiness for Service
Use	L	Post Practical Completion	L1 Administration of the building contract after Practical Completion and making final inspections. L2 Assisting building user during initial occupation period. L3 Review of project performance in use.	**5** Benefits evaluation

The activities in *italics* may be moved to suit project requirements, ie:

D *Application for detailed planning approval;*
E *Statutory standards and construction safety;*
F1 *Application for statutory approvals;* and
F2 *Further information for construction.*
G+H *Invitation and appraisal of tenders*

Amended November 2008

RIBA Outline Plan of Work 2007

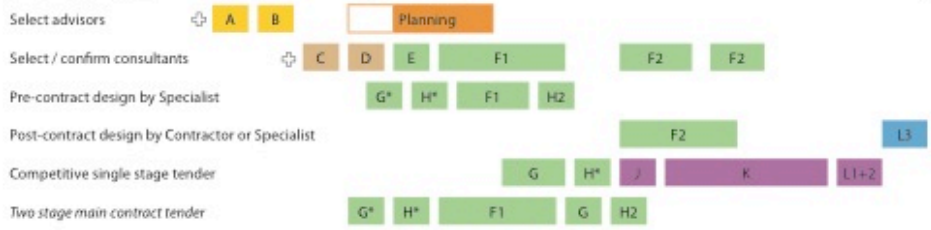
Work Stage Sequences by Procurement Method

The diagrams illustrate different sequences for completion of work stages for various procurement methods, but are not representative of time. In arriving at an acceptable timescale the choice of procurement method may be as relevant as other more obvious factors such as the amount of work to be done, the client's tendering requirements, risks associated with third party approvals or funding etc.

✣ This symbol indicates that prior to commencement time should be allowed for appointing consultants.

Fully designed project single stage tender

Fully designed project with design by contractor or specialist

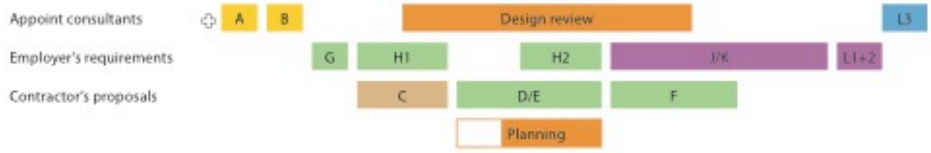


G* First stage documentation, H* First stage tender may include Contractor's Proposals, H2 Second stage tender

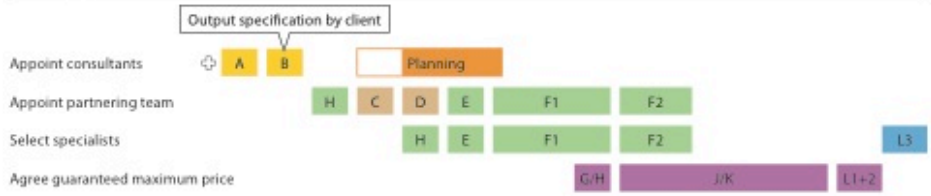
Design and build project single stage tender

Note: final design activity by Client may be at stage C, D, E or possibly F. These stages not repeated by contractor

Design and build project two stage tender (all design by contractor)



Partnering contract



Design and construction sequences may be as shown for Management contract/ Construction management

Amended November 2008

RIBA Outline Plan of Work 2007

Work Stage Sequences by Procurement Method