

Building design process



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Any building, whether it is a high-rise skyscraper or minute cabin must have a design plan before it is constructed, without a design plan the builders constructing the building would be limited in knowing what it is they are going to build unless for example it was government funded for an institution like the NHS, this would suggest it is to do with healthcare such as a hospital or care home. Buildings can have very complex designs so a structured procedure for the design team to work from is essential to success, for a successful and high performance building it must be aesthetically pleasing, operational, productive, sustainable, easily accessible, cost-effective, secure and safe to be in. The main factors that influence the design process are; finance, the client's needs the design, timing and estimated delivery of the project.

The Architect that is designing the new factory unit must take into the account the financial limits that the client has and design the factory unit accordingly making sure it can be achieved realistically on the budget provided. The architect tasked with designing the factory unit is able to evaluate whether the build is realistic on the funds available by comparing the design to previous builds they have designed in the past or by calculating building costs per m^2 and volume per unit. It is important that the Architect ensures the build is feasible so the budget of the client is not exceeded although 10-15% of projects costs are paid in fees the Architect must still make the project cost effective for the client.

In the design process one of the most important factors is the site that the project intends to be built on and the surrounding environment (for environmental concerns) as there could be hidden threats to whether the

project can go ahead or not concerning the foundations of the ground or the location itself. Obtaining planning approval from the local council is the first stage after acquiring the land to build on so the project can progress. Having a Site Investigation report undertaken of the land proposed to build on will give an analysis of the subsoil composition, bearing values (maximum pressure on foundation soil that provides adequate safety against rupture of soil mass), risk of contamination and the presence of water that could cause damage under the building such as underground stream and rivers.

Understanding the topography of the land to determine whether it is sloping, the actual size, shape and understanding the undulation are important to know before building because they could pose serious threats and changes to the original design. Desk top studies can be obtained to show the land history on ordnance survey plans dating back to the 1800s and the NCB (National Coal Board) can be contacted for mining records of the land. The Architect could also look on the Flood Risk Environment Agency's website and use the postcode of the land to see whether the area is prone to flooding, previous Ordnance Survey plans and drawings are other methods the Architect could use to understand the area better.

There would be no point in building the new factory unless the Client's needs were not going to be met so it is essential for the Architect and the design team to deliver for the client exactly what they are paying them for. As the building is a factory unit it will most likely be being built for industrial use therefore requirements such as parking spaces must be made relative to the required amount. The Client may also want their new factory unit to be sustainable and want to reduce the amount of pollution created in the

building process so that should try to be kept to a minimum by the workers. Special requirements may be needed by the client such as functions rooms for meeting, welfare facilities and a canteen for employees working at the new factory unit.

The Design of the new factory unit must be structurally stable and have fire integrity with materials appropriately selected meaning it is equipped with fire fighting and preventing equipment such as fire extinguishers and fire doors which can hold back a fire for up to half an hour. As part of attaining planning permission for the build the council must deem that it blends in with the surrounding structures which is usual dependent on whether the building is of a similar size, scale and height to others nearby whilst complementing the streetscape.

Environmental impact can be estimated after taking an E. I. A. (Environmental Investigation Agency) assessment which determines the impact on the local and natural environment of building work taking place, biodiversity issues such as flora and fauna (animals in a specific region or area) can also be addressed after the assessment.

It is likely that the Client will want the new factory unit completed as soon as possible however this creates pressure on the design phase so an agreement must be came to as to when the project can realistically be completed after all initial issues in the design process have been addressed so the building is near perfect. A lack of planning in the design phase as a result of haste from the client means an unrealistic timescale is created and the building fails to deliver along with the failure for the work load to be scheduled effectively. It

can take up to three months for the design and approval to be made along with another month for tenders to be submitted (contractors estimates of costs), depending on the scale and complexity of the design it can take anything from 6-24 months for the build to be completed.

P2) Explain the roles and responsibilities of the design team

In a typical design team the Architect is the main leader and is pivotal to the success of the project, the other members of the design team include the Client, Interior Designer, Landscape architect, Building services engineer, Clerk of works, Structural Engineer, Resident engineer, Quantity surveyor and the main contractor paid to carry out the work. In a design team, communication is paramount to having a successful project which is why all members should be transparent with the exchange of information pulling in the right direction at the same time to ensure the project work is carried out as intended to minimise mistakes.

An Architect's responsibility in the design team is primarily to satisfy and understand the Client whilst communicating effectively with the rest of the team so that the project will be completed in a suitable timescale and cost effective to the client. The Architect is paid to understand the client's brief and develop a plan on how to meet the needs of the client whilst maintaining the new development is sustainable for the good of the environment. It is important for the Architect to produce a design that can realistically be constructed which does not infringe anyone's health and safety. An understanding of Health and Safety legislation such as the Health and Safety at Work Act 1974 is essential so there is a prevention of accidents in the workplace. They are responsible for the management of the design process

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and select specialists in their specific areas; the architects must co-ordinate the input from the design team and ensure it works together.

A Civil Engineer's role in the design team is concerned with what is happening below the ground, the foundations and the final touches. How these factors can affect the new factory unit that is being built there is determined by the Civil Engineer who will have a good understanding of them. It is the Civil Engineer's responsibility to undertake the Site Investigation report which then allows them to analyse the sub soil complexity in turn determining what foundations and substructures are needed for that particular area before building work begins. The groundwork structure is approved by the Civil Engineer so it is suitable for the new factory unit alongside including essentials for the employees that will use the building such as roads, footpaths, parking spaces, under passes, tunnels and bridges for ease of access to the unit. Drainage below the ground of the new unit is also accounted for by the Civil Engineer with traffic management taken care of after a highways and transportations assessment of the surrounding area is undertaken.

The CDM Co-ordinator is responsible for the design and construction safety issues associated with the factory unit, they have a deep understanding of the relevant Health and Safety legislation related to the project which helps them prepare and maintain a CDM file of all the Health and Safety incidents including accidents. An F10 form is produced which informs Health and Safety Executive that there is a new project going ahead, Health and Safety then have the right to turn up and visit a site, they can then advise as to

what needs to be changed to increase safety, the Health and Safety inspectors also have the authority to hand out fines accordingly.

Quantity surveyors are assigned their role by the Architect and are effectively accountants for the building work; it is their responsibility to estimate how much the materials needed for the building work to go ahead are going to cost the client. The Quantity surveyor can advise the Architect and the client on the cost of the job and re-evaluate the cost during the project in case it does not all go to plan. The Q. S. can help the client to keep within their budget perhaps by using cheaper materials opposed to the intended ones used in the initial design. A Bill of Quantities (BOQ) is prepared which is a document consisting of a list of materials needed for the construction work and their estimated quantities (costs). The Contractor tenders against the Bill of Quantities prepared by the tenderer giving their prices for what is listed, the offers are compared in order to see whether they are good or poor value and the eventual tenders are negotiated for the best solution.

The Structural Engineer is tasked with making sure the building is structurally sound and safe for the inhabitants, safety is paramount to the Structural Engineer because if the structure of the new factory unit is not designed to withstand the forces that will be imposed on the factory it could prove disastrous for people working inside who are at a heightened risk of injury. It is essential for the Structural Engineer to make best use of the funds that are available to them in making the new factory unit cost effective; they must provide the correct materials that complement the design specification such as the right bricks, concrete and wood. Structural

Engineers are employed by the contractor depending on the contract of the job and can work closely with the Civil Engineer to understand the feasibility of the building.

(P3) The production team working on the proposed new factory unit will include the Main Contractor, Managing Director (MD) of the Main Contractor; the Managing Director is accountable for Head Office Admin, Contract Managers and the outside contractors and consultants. The Site manager is accountable to the contract managers but is accountable for the site personnel, sub contractors, trades foremen and the ganger.

Site personnel such as the engineers are responsible for the planning and schedules of the project such as projecting when concrete pours will take place, they are usually housed in on site cabins with internet access for ease of communication with other members of the construction team. Alongside their planning duties, engineers are often turned to when a problem arises and are expected to resolve that problem as fast as possible in order to keep the project on-track for completion.

Site administration making sure all necessary paperwork is completed and the security team are there to deter people trespassing or thieving from the site. Sub Contractors include plumbers, electricians, roofers, scaffolders, glazed glass fitters, cladders, road layers and sewage contractors. Trades foremen are in charge of bricklayers, joiners, plasterers and painters. Gangers are made up by the general labourers, concreters, drain layers and plant drivers (JCB diggers, excavators, dumpers and rollers).

P4) Describe the legal implications that may arise from poor or miscommunications affecting the project

In the Production Team it is very important that the members communicate so that legislation is obeyed and work is not completed incorrectly which provokes claims and slows progress in the build. As a result of miscommunication claims for misinformation or carrying out abortive work can be made if you can justify the extent and basis of reasons why, these could be for example, day to day errors that are uncovered which can now be rectified and clarified with instructions or variations orders.

More serious breaches of negligence or failing to fulfil contracted obligations are a ‘tort’ in law and will result in legal actions. Most professional people have indemnity against design risk and sometimes losses are recovered from insurers. Any client entering into a contract situation with builders must ensure insurance for loss is covered also; the builder has public liability insurances alongside insurance for their employees and for the works.

M1) Explain how the RIBA plan of work provides an effective and structured framework for the design process in complex projects and how it is sometimes modified or not strictly followed

The RIBA (Royal Institute of British Architects) plan of work 2013 provides a structured framework for the design process of new buildings; it provides both the stages for the design and construction phases of projects. Although Architects will have the necessary qualifications that indicate to clients and their employers that they are competent enough to head the design team and work on a project, the RIBA plan of work provides guidance for all the phases of the project including the design and construction. With a <https://assignbuster.com/building-design-process/>

structured plan everyone involved in the project knows their role and can continue with it whilst the rest of the project continues to progress, the Architect will maintain full control of the plan but has a better understanding of who is doing what and what is being done at what time.

The first section covers stages A + B which consist of the Appraisal and Design Brief. Client's needs + requirements are taken into account alongside the budget, purpose group of the building, numbers of people using the building, accommodating visitors, parking, site access, land suitability, site investigation reports, shape and whether there is a slope/undulation.

Stage C is the Concept. Design proposals and concepts must be agreed before any construction work can go ahead and drawings are sketched on feasibility options.

Stages D + E are the design development and technical design, final design proposals are developed and confirmed after consultation of previous proposals. The client has options now that they can see all of the detailed designs and are then able to decide on a final design which leads us on to the pre-construction phase of the RIBA plan of work.

Stages F, G & H being the production information, tender documentation and tender action; a design team is put together to produce documentation drawings and specifications ready for tender action. In stage F production information must be prepared and final decisions related to the design work can be made. Drawings, schedules and specifications are finalised after taking all of the new designs into account which are then sent to the Architects, engineers and Main Contractor who are directly involved. Stage G

involves the Bill of Quantities and tender documents production under the NJCC (National Joint Consultative Committee) procedure for selective tendering outlined in stage H

Stages I, J & K revolve around mobilisation placing the contract for production of the building.

Stage L is the final step of the RIBA plan of work and is simply the post construction phase of the project where it is completed and handed over to the Client for use.

The RIBA plan of work is especially important for Architects when they are tasked with designing a building that will have a very complex structure; it is comprised into three sections containing the feasibility phase, the pre-construction phase and the construction phase. It is not only the Architect that must know the stages of the plan because when changes need to be made and accommodated, the other key players in the team need to be made aware of the developments of the design as it continues. If the key players are not communicating and do not fully understand the changes being made or how they will affect the structure it can be very detrimental to success.

In the feasibility phase the Architect will work with the client in order to understand the requirements of the building and to recommend anything that can improve the building as a whole. It must incorporate ‘buildability’ which is a term used to describe whether a building can be constructed easily or not and must be financially feasible. In the pre-construction phase the Architect can produce sketches of the layout, design and construction in

order for the client to approve what the Architect has designed. Drawings to be submitted to the local authority building control will also be drawn and when the outline is approved final decisions can be made relating to the design, specification and construction. If changes need to be made they can still be accommodated at this early stage but will incur additional costs, these changes must be noted so that everyone can be informed of them therefore they are pulling in the right direction. The plan may not always be strictly followed when there is a deadline that needs to be met and completing a particular stage may be ignored when it is not seen to be necessary to save time.