

Off site and on site production construction essay



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There are many different types of offsite production in this section we will look at four different types:- Volumetric- Panelised- Hybrid- Sub-assemblies There is then on site modern methods of construction, all the different types of modern methods of construction both offsite and on site are often used in conjunction with each other. This creates a construction project with ease.

Volumetric

Volumetric construction is refers to three dimensional units that are constructed offsite and are transported to the site where they are fitted and onto foundations that are already prepared. These units are brought to the site in many different forms that can range from being the shell of the building were the internals are then fitted on site or they can be fully fitted out units (Types of modern methods of construction 2). The units can be put into place using a verity of different techniques such as using a crane or landing platforms dependant on their size (Types of Modern Methods of Construction PODS). Volumetric units can be stacked on top of each other to create different floors of a building dependant on the structural elements of the building (Types of modern methods of construction 5). These units are constructed in factories under controlled conditions and are subjected to quality control procedure before they leave the factory. They are often referred to as modular construction and are used most affectively when identical units are required to be made. They are usually constructed from light weight materials so that they can be transported with ease (Types of Modern Methods of Construction 3). They are often made from an array of materials such as light gauge steel, timber and concrete which can be of

composite construction. Timber frame can often be the basis for the volumetric units as they can be constructed easily and installed on site with little in the way of foundation work. The external cladding of volumetric units can be done off site with specialist sealing required on site. As a lot of the cladding work can be done off site it leads the construction of an air tight building with much of the insulation installed in the factory which can lead to a high thermal performance unit (Types of Modern Methods of Construction 4). Thus these units can be seen as far superior to port cabins that can be considered to be an early version of volumetric units (Types of Modern Methods of Construction 6). This type of construction can be seen to be most effective when creating buildings or housing projects where they have a similar construction. Homes can be made from a number of identical volumetric units and then put into place on site where a pre fabricated roof can be installed (Types of Modern Methods of Construction). Pods are another form of volumetric units have seen to be used in many large scale projects where identical units are required. They have been seen to be used in many projects such as hotels for bathrooms where they are the same in each of the rooms of the hotel. These units are usually become economically viable when over one hundred units are required (Types of Modern Methods of Construction PODS).

Panellised Construction

These are flat panels which constructed in a factory and are assembled on site to make up a three dimensional structure. They are often used in conjunction with other modern methods of construction and can be used in existing structures as a fast way to create new space with a variety of

layouts available (Types of Modern Methods of Construction 7). There are a number of different variations in panels that are made such as wall, floor and roof panels. These can all be assembled on site to create a complete structural shell (Types of Modern Methods of Construction 2). There are further category's of panels that are used when dealing with this type of constructions. Open panels are ones that are not fully completed and need further fitting work done on site such as the insertion of windows, insulation and services (Types of Modern Methods of Construction). There is then closed panels that are similar to open panels have factory fitted service, windows and insulation, they can often already have the internal wall finish complete so when they are installed they create a completed structure. Both these types of panels can be loadbearing and non-load bearing (Types of Modern Methods of Construction Open vs Closed). Loadbearing panels are often made from light gauge pre-galvanised steel and can be used for any form of construction. They are constructed in such a way that they can fit in between the main structural frame of the building. They are often used as a carrier for insulation and exterior cladding (Types of Modern Methods of Construction Load Bearing Panellised). There are two types of structural panels, firstly concrete panels which can include cladding, insulation, windows and doors. Secondly you get composite panels which by nature are composed of a number of different materials. Structural insulated panel fall under this category as they are made from two layers of sheet material which is often composed of oriented strand board. That is bonded to a foam insulation core which aids the buildings thermal properties, this is often made from rigid expanded polystyrene (Types of Modern Methods of Construction SIP). These panels are often used for walls and roofs for all

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types of buildings. On the other hand there are also two main types of non-loadbearing panels. Infill panels being the first, they are panels that are inserted with a structural frame such as masonry. They are composite panels that can contain an insulated core and are have suitable facing material on both side suited to the client's needs. The facing material can varitey from plastic, timber, aluminium and reinforced cements (Types of Modern Methods of Construction Infill Panels). Curtain walling is the second, they are an in closed system that can be used to provide the outer wall for the building. They can protect the inside of the building from the elements and a made so that the building can retain its appearance thought its lifespan. There are three different main types of curtain walling which refers to the way in which they are constructed, unitised, stick system and rain screen (Types of Modern Methods of Construction curtain walling).

Hybrid

Hybrid construction refers to the use of the combination of volumetric construction and panelised construction. This is often used in areas of the building that are containing many services such as kitchens and bathrooms. Pods may be used for the bathroom unit and the rest of the construction finished with panelised construction (Types of Modern Methods of Construction 2). It allows the best of both worlds as volumetric will allow high value added materials and fittings to be factory fitted wilts panelised construction will allow greater flexibility in design (Types of Modern Methods of Construction 3). With this mix of construction methods work can be continued on site wilst pods are being made off site thus speeding the process up (Types of Modern Methods of Construction 6). Great care is

essential with this type of construction as the interface between the two forms needs to be compatible, which can be difficult to achieve when using different contractors (Types of Modern Methods of Construction).

Sub-assemblies and components

This is when large components of construction project are made off site and are brought to the site and fitted. This type of construction is traditionally built as structural form (Types of Modern Methods of Construction 2). These can consist of pre-fabricated foundations, ground beams and other key components can be constructed off site and assembled onsite to form foundations. Floor cassettes can be pre-fabricated which are then anchored into place on site which reduces the health and safety risk of work at height. They are constructed to a high rigidity which meets the regulations and will be able to transfer loads to the foundations (Types of Modern Methods of Construction Floor Cassettes). Roof cassettes are another form of sub assembly and form parts of the roof. They are extremely ridged and are made so that the roof space is clear of all struts and props. They are pre-assembled sections of roof that already contain cladding and underside finishing (Types of Modern Methods of Construction Roof cassettes). Pre-assembled roof structures are roofs that are constructed at ground level and craned into position. This method allows the building to come wind and water tight faster than constructing the roof on site (Types of Modern Methods of Construction). Pre-fabricated chimney stacks can speed up the construction process as they can be made from light weight materials and can be made with a flue liner. They are often clad in brick which can be different colours and tailored to the individual clients needs. They are

constructed with lifting eyes so that they are ready to be positioned on a roof structure ready to go and they don't need a masonry flue (Types of Modern Methods of Construction chimney).

Site – based modern methods of construction

This uses methods of construction on site on items which are partials made off site. Tunnel form construction is one method of this and can be used to make walls and slabs quickly. This form of construction can create a unit that is a cellular reinforced concrete structure. They are constructed via inserting reinforcement into a frame which can then be filled with concrete. This process usually only takes twenty-four hours to complete (Types of Modern Methods of Construction Tunnel form). Insulating formwork is another form of onsite modern method of construction. It combines the strength of concrete with the insulation properties of polystyrene as the formwork. Concrete has a number of benefits including sound insulation, fire resistance and has a high thermal capacity (Types of Modern Methods of Construction Insulating formwork). Both these forms of construction can be load bearing and can be made to take the weight of the structure. Aerated concrete block and planks can be used to create walls, roofs and floors. They have the benefit of being light weight and strong due to the use of concrete (Types of Modern Methods of Construction Aircrete).