

Construction methodology of laying a sewerage pipes



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Briefly explain with the aid of diagramme, the construction methodology of laying a sewerage pipes and describe the reasons of different bedding type for vitrified clay (rigid) pipes and ABS (flexible) pipes.

Above: pipes should be laid with fall.

Side: excavation of trench.

Below: workers are placing the pipes in the trench.

The first thing to construct drains is a ground plan of the site, showing the location of the whole of the sanitary appliances from which the wastewater to the position of the sewer. There are two methods of laying the pipes, first is by using the boning-rod and sight-rails. But the common way of working is by using an ordinary spirit level and a straight-edge.

The construction methodology of laying sewerage pipes is first, the pipes should be laid in a straight line from point to point with a fall meaning at predetermined angle and a predetermined depth. Two feet must then be added for every fall. Next, excavation of trench need to be construct using an excavator so that working space and bedding around the pipes are allowed. Trench that are more than 1200mm depth must be properly shored up. The trench should be dug out from the site so that the pipes can be laid with a fall and the main tapped straight out from the building and should be at least 15 feet long so that a full length of pipe can be laid in the trench.

The first pipe that needs to be laid first is the pipe from the curb to the main. The pipes must be placed between the curb and the main before the water is turned on. If there are any leaks, the pipes need to be repaired. Pipes should

not be covered until they are tested and approved for water-tightness.

Beams are installed between the intervals to avoid landslide occurring at both sides of the trench excavation and to protect the underground pipes.

In refilling the trench, sand or fine gravel should be placed in first and compactly around the pipe without disturbing the joint. Then, the trench will be covered with good ashes or gravel. When the trench is refilled, concreting should be done and carried up minimum of half the height of the pipes, so that these may be securely bedded in it and also at least 6 inches thick all around.

On the left: Bedding detail for rigid pipes (Clayware) Class B bedding

On the right: Bedding detail for flexible pipes (Plastic)

There are two types of bedding pipes that are for vitrified clay (rigid) pipes and ABS (flexible) pipes. The function of bedding is to cover the pipes from soil, large stones or other materials. Rigid pipe materials include clayware, concrete and cast iron while flexible pipe materials include plastics comprise those manufactured from PVC, polyethylene and polypropylene. The performance of each polymer is different depend on the pipe stiffness and the creep ratio. These different beddings require varying degrees of support to the pipe and the compaction of the material. It also depends on the type of pipe for permanent protection against mechanical damage. The bedding factor is the ratio of the failure load in a crushing machine.

List down with explanation the contractor task in landscaping contract.

In landscaping contract, a contractor has to performed many task in order to fulfill the costumer's satisfaction. Their job is to design, plant, develop and maintain a client's landscaped area and their job range can be from local businesses to big urban companies. Some of the contractors work with residential clients in designing the gardens and parks on residential land while others work with governments and businesses to maintain current grassed areas and develop new areas.

Design of landscape

First, the contractor will have to find and meet up with the client. During the meeting they will discuss what type of garden that the client wants by discussing and sharing ideas of trees, flowers and also types of grass that would be suitable for the area. Some contractors will use computer-generated models, pictures and landscape blueprints to help the customers to examine and choose according to their desire. But the most important things during the meeting up with the client is to help the client easily understand on what type of plants that are suitable and are appropriate for the area and what type of plants that they should be avoided or not suitable to plant for the area. This is because sometimes the clients have unrealistic and impossible desires for certain plants that usually will not grow in that particular area, so it is responsible for the contractor to consult the clients and solve these issues. When the final plans of the landscape had been achieved by agreement from the contractor and client, the contractor then

will start their construction work by coordinating the purchase of the plants as well as oversees the work.

Construction of landscape

After the designing of landscape has been done, the contractor will start purchasing the required plants for the growing area. They will be contracting with lots of suppliers and outside vendors to make sure that the project run smoothly and stay on schedule. Then, the contractors will transport the required plants from nursery to the site. The conditions of the plants need to be check and analyse during the delivering of the plants. Contractors also have to find suitable area placement for storing the soil fertilizers, plants and drainage material that will be used in the future. Before the installation of the specific plants, the planting area needs to be check for any discrepancies by removing any unwanted plants that cover the area. The construction of the area and gardens will be constructing by the contractors that will install the plants and tender the flowers, shrubs, trees, foliage and turf according to the requirement.

When the installation of plants is finished, the new plants need to be take care by watering and tending the plants for a certain amount of time. The plants need enough of water in order to adapt to the new environment. The contractors also have to build retaining walls to prevent land slide, provide paved area and installed the irrigation systems which can control the spread out of water in the area so that it is even. By installing an irrigation system, all of the plants and trees will get enough of water. If the clients asked to

install the fountains, rockery and the water features such as sprinklers in their garden, the contractors will then installed the water features.

In aspects of indoor job, the hiring, supervising, training and firing of workers are also being done by the contractors including the leave for the workers. They also have to contact with the clients for invoicing and collecting fees for the landscaping job.

Repair and remediation of landscape

Usually the repairing and restoring the landscape that has been affected by the local conditions and subsidence or that requires new management due to neglect in taking care of the previous landscape is all done by the contractors. The contractors will be responsible for all renovation and remediation processes including the digging up existing plants, trees and flowers and re-installing back all the landscape materials with a new one. They also have to build up new additions to the landscape area to make an interesting view of landscape and installing new and fresh soil that contain high minerals to replace the old existing soil.

Maintenance of landscape

To maintain a landscape contractors use the same sorts of skill and tasks like remediation and repair. Contractors have to do lots of job such as terracing, turfing the area, prune trees, garden maintenance, lawn mowing, remove weeds, waste removal, maintaining sprinkler, concreting, maintaining flowers and dealing with any damage from disturbances such as flood and storms. Certain contractors had to remove hazards depend on their contracts. To

maintain a landscape, the contractors usually construct a drainage system, construct landscape features such as garden beds and hardscape such as patios, walkways, driveways and pool decks to maintain the area. On top of that, contractors also have to set up the lighting for the external area which the lighting can provide a safe especially at night and be the source of light for outdoor areas. Maintaining the landscape is one part of work that needs to be performed by the contractors.

Briefly explain three (3) influencing factors for road design.

The three factors that most influenced the road design are the strength of sub-grade beneath the road, maintenance cost of the road and the numbers of traffics that uses the road.

Strength of sub-grade

The design of a road is influenced by the sub-grade support that is depending on the soil type, material density, temperature and moisture content. Sub-grade is the natural occurring ground at formation level which its homogeneity is important. Before a sub-grade is prepared, it is important to avoid hard and soft spots in sub-grade. When the sub-grade is suitable, it then can be compacted. It is important to recognize where the moisture may enter the sub-grade in order to control the moisture movement. This is because moisture tends to affect the sub-grade properties including load bearing capacity, shrinkage and swelling. Drainage, groundwater table and infiltration also can affect the moisture content in sub-grade which will result in excessively under load.

The temperature of environment on sub-grade also affects the performance of road. Example: Asphalt becomes stiff and brittle at low temperatures while it is soft at higher temperatures. If the temperature is too high, permanent deformation in asphalt may occur. Sub-grade also must be able to support the loads that been transmitted from the pavement structure. The load bearing capacity is influenced by the degree of compaction, moisture content and type of soil. A good sub-grade is the one that can support a high amount of loading without excessive deformation.

The strength of sub-grade also depends on the type of soil. Certain soils can shrink or swell depending on the moisture content. When this happen, soils with excessive fines content may be frost heave. Any road type constructed over the shrinkage, swelling and frost heave will tend to deform and crack.

Maintenance cost

The second factor that influenced the road design is the maintenance cost of road such as cost of improvements, effects of controlling or limiting right-of-way on abutting residential and commercial properties where channelization restricts vehicular movements. At the end of a certain period, the road will deteriorated to its failure condition which will then have to maintain back to restore its structural integrity and serviceability. The maintenance cost and life cycle cost depends on the type of pavement used. For rigid type of pavement such as concrete, the maintenance cost is low as it is can withstand huge amounts of loads while for flexible type of pavement such as tar macadam, the maintenance cost is high because it needs to resurfacing the layer every five years. But to install the rigid pavements require more

labour, more time to harden and more complex compared to flexible pavements. The maintenance of road is necessarily because it can cause road accidents to users. Cleaning and emptying of gully pots, silt traps and manholes, jetting and cleaning sewers, road sweeping, litter removal and road verge landscape management have to consider also as it is under the maintenance cost.

The operation and maintenance activities also part of maintenance cost. The inspection and monitoring, post inspection maintenance including litter and removal of debris, unplanned maintenance due to operational problems or pollution incidents must be considered. The labour, the plant and the material used to do the maintenance works must also be calculated.

Numbers of traffic

The third factor that influenced the road design is the numbers of traffic that used the road. The traffic consideration that must be considered is the design and actual capacities that the road can hold, the design-hour turning movements especially during peak hour or office hour, the size and operating characteristics of vehicle (the load of the vehicle), vehicle speeds, transit involvement and accident experience. If the road used is very frequent, the design of the road must be strong enough to hold large capacities of load. The size of the road also based on the numbers of traffic. If the road is usually used the size of the road have to be bigger to avoid jam.

Briefly explain four (4) requirements of joints for cladding system.

The four requirements of joints that are important for cladding system are weather resistance and are allowed for structural, thermal and moisture movement, good durability, easily maintained and easily made or assembled.

Weather resistance

The most important requirement of joint is it needs to resistance to wind pressure, rain and other nature elements such as heat, moisture, sound such as airborne and vandalism. It must sufficiently well to exhibit the persistent resistance to the elements. If we neglect the need for properly sealing the joint, there will be a water leakage in the building. Once the seal has lost its weather-proofing, the building will suffer water penetration into the building and the thermal insulation performance will decrease. Requirement of joints of cladding also must allowed movement of moisture so that the air in the building contains moisture and not too dry. High frequency thermal movement can affect the jointing of cladding system because the building materials can expand and contract due to the changing of temperature and humidity. It is best to use flexible joints in the cladding system where the joints will not be effected when the building materials expand and contract. It will control of the internal environment and the temperatures of the building. Example: Using gasket joints can prevent thermal heat from getting into the building, resistance to environmental attack, prevent fire from spread within the voids and insulate sound against airborne from external of the building and prevent it from transmitting to other parts of the building.

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Strength, stability and good durability

The other requirement of joints for cladding system is strength, stability and durability. Strength of joint means that it is able to support its own self weight between the building materials and to the structural frame. It does not require additional support from others. Stability of joint means that it can resist and undergoes strong wind pressures and other environmental attack. It also can cater for frame movements which it allows differential movements between the joints, the structural frame and other building elements. The integration between vertical and horizontal frame elements is compatible. Durability of joints for cladding system means that it is maintenance free and has the ability to weather well.

Easily maintained

The joints for cladding system must be easily maintained so that maintenance workers can easily repair and maintain the joints if there is a defect in the joints. For gasket joint, the maintenance is complex because it uses air pressure to join the cladding and needs skilled labour to perform the task. Joints on surfaces that require painting need to allow for maintenance of the surface coating. Usually when the installation and repair is relatively simple, the maintenance required is high, requiring frequent treatment depending on the location of the elements to which it is exposed.

Easily made or assembled

Joints for cladding system must be easily made or assembled so that it can be easily obtained and it is not limited. Meaning the manufacturers easily

and constantly produced the jointing and easily obtained in the market. The installation of the jointing also must be simple so that the workers can easily install and can minimise the construction time. Example: Filled joint is the simplest of jointing compared to drained joint. Unlike gasket joint, it is more complex to install because it has difficulty in ensuring dimensional accuracy and control during manufacture and installation.