Waffle slab advantages and disadvantages pdf

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Flat grid is also known as Waffle slab. It is a type of building material. On the outside of Flat Grid, it has two directional reinforcement. That?s why it looks like pockets. On wood, metal and concrete structure Waffle slab is very common nowadays. Features 1. This type of reinforcement provides resilience to the structure.2. It does not require any extra material.3. The surface of this type of slab is smooth.4. There is no need of using many columns.5. This type of foundation is crack and sagging resistant.6. Waffle slab has the ability to hold lots of loads.7. There is no requirement of beam mining.8. Rolled fill does not require to use in Waffle slab.9. In Flat Grid trench mesh can be used.10. Thickness of Waffle slab is 85 to 100 mm.11. Minimal concrete volume is found in Waffle slab.12. Curving this type of slab is lower than any footing slabs.13. In Waffle slab or Flat Grid very less amount of steel is used. 1. Concrete waffle slab is used to make industrial and commercial construction.2. Wood waffle slab and metal waffle slab is used to make other construction.3. This type of material is generally used to make airport, parking garage.4. Flat Grid is good for large working area like foundation or floors.5. Flat grid is used in particular project like clean rooms and places required low frequency vibration.6. Specifically, it is used to make ceiling and floor slabs.7. This type of slab is used in wood, metal and concrete construction. Advantages of Flat Grid 1. Flat Grid has the ability to carry lots of load.2. Weight of Waffle slabs is lighter than others.3. This type of slab is perfect for 7m to 16m.4. Steel and metal amount is very low in Flat Slab.5. This type of slab is cheaper than others.6. This type of slab requires light framework.7. In Waffle slab coffer style is generally exposed for visual appearance.8. Using of this type of slab is overall affordable in large area construction. Disadvantages of Flat Grid 1. To make this type of construction skilled laboure and proper supervision is required.2. Moulds or casting form cost is way more expensive.3. This type of slab reduces headroom.4. This type of slab increases storey heights.5. Waffle slab creates problem in lighting facilities and hanging pipes. 1. Vertical support stand is required for Flat Grid2. Horizontal shaped beam is required in Waffle slab3. Different type of pods is required.4. Wall connectors are needed in Flat Grid5. Metal bars are also used in Flat Grid6. Cube junctions are also required in Waffle Slab7. Hole plates can be used in Flat Grid. Services using Waffle Slab 1. Waffle slab can be used in electricity and telecommunication area2. It can also be used inside registrable tile system.3. This type of slab is circulated through ceiling4. It is easy to clean, required plenum ventilation.5. It can also be repaired without stopping the whole process. Example of Waffle slab 1. Chhatrapati Shivaji Terminal, India.2. Metropol Parasol, Italy.3. Lodytel communication development center, Spain. Service Provider There are various service providers available in India. A. Supreme Fiber Glass Pvt. Ltd in Mumbai.B. Envo Plast in Kolkata.C. Teknik Kalip in Mumbai and Bangalore.D. Utracon in Gujrat.E. Geo Plast in Chennai.F. Maruti Plastics in Mumbai. What's new in Flat Grid There are services available in this new Flat Grid. Spanish architects, Alarcon & Associates have modified this new Waffle Slab. 1. Air conditioning option is available here.2. Plumbing is also provided in this type of slab.3. Lightning is also available in this system.4. Insulation materials is the new feature in this Waffle slab.5. Wiring option is also available in this new system. So, in this article we discuss elaborately about the Waffle slab or Flat Grid. What's new features are available right now. We also let the viewers know about the service providers in India and example of construction using Waffle slab or Flat Grid. If readers like this post please comment below this article and let us know about your opinion. Image Courtesy: fantasticeng.com Join TheConstructor to ask questions, answer questions, write articles, and connect with other people. When you join you get additional benefits. Have an account? Log in Home » Waffle Slab or Ribbed SlabThe waffle slab or ribbed slab is a structural component that is plain at its top and has a grid-like system on its lower surface.The top of the ribbed slab is generally thin and the bottom grid lines are often ribs that can be placed perpendicular to one another.It is commonly used where large spans are required to avoid multiple columns interfering with space (such as auditoriums).Therefore thicker slabs spanning between the wide beams (to avoid beams below the bulging for aesthetic reasons) are needed.Purpose of Waffle Slab:The waffle slabs provides stiffer and lighter slabs than an equivalent flat slabs.They provide low flooring deflection, have finish and firmness.Wonderful vibration control.Types of Waffle Slab:1.One-way Ribbed Slab System:The one-way joist flooring slab consists of a sequence of small, reinforced concrete T beams which might be connected with girders carried by the building column.T beams are known as joists that are formed by installing steel panes at a constant spacing.Concrete is cast between those spacing to make those ribs.2.Two-way Ribbed Slab System (Waffle System):The system was designed to reduce the load of concrete slab.The dome-shaped type of the matrix, surrounded by orthogonal ribbing forms a two-way configuration for large-spanning slabs.The voids between all the domes reduce the dead load, as this width results in a portion of the slab being less than the flat slab.Waffle Slab Construction Procedure:In-situ waffle slabs are constructed by pouring concrete into the site or grounds with proper arrangements.In precast waffle slabs, the slab panels are inserted, joined with proper reinforcement, and the concrete is filled.The prefabricated waffle slabs are more expensive than the other two methods.In this case, reinforcement is provided in the slab panels while casting with some tension.Therefore, they do not require internal reinforcement in the site.Waffle slab construction procedure.(ribbed slab)Characteristics of ribbed slabs:Waffle slabs are generally suitable for flat areas.Reinforcement within the waffle slabs is offered in the form of a mesh or individual bars.Separate digging for beams is not required within the case of waffle slabs.The bottom surface of the slab looks like waffles which are obtained using cardboard panels, pods, etc.The thickness recommended for waffle slab is 85 to 100 mm while the overall depth of the slab is limited to 300 to 600 mm.The width of the beam or rib provided in the waffle slabs are typically 110 to 200 mm.And the recommended rib distance is 600 to 1500.Reinforced waffle slabs can be constructed for a span of up to 16 meters, while prefabricated waffle slabs are superior in length.The waffle slabs are good against shrinkage are lower than rigid rafts and footing slabs.Waffle slabs require only 70% concrete and 80% steel to concrete and steel for use for the hardened raft.Also read: One Way Slab and Two Way SlabAdvantages of Waffle Slab:Waffle slabs are used for big span slabs or flooring used when there is a limited need for multiple columns.The load-carrying capability of the waffle slab is greater than other varieties of slabs.They provide an aesthetic look and good structural stability.It has good vibration control capability because of two-directional reinforcement.These slabs are lighter and require much less amount of concrete, so it is economical.The construction of these slabs is easy and fast with good supervision.Many services such as lighting, plumbing pipes, electrical wiring, air conditioning, insulation materials might be provided by offering holes within the waffle bottom surface to the depth of the waffle slab, this method is known as a whole deck.Disadvantages of Waffle slab:Formwork tools required are very expensive due to the big quantity requirement of pods and a few special instruments.The ground height must be greater so the variety of flooring is reduced.They are not appropriate for sloping areas, if there is a sloping space, the area must be filled by leveling or digging.They are not suitable against high winds or cyclonic areas due to their lightness.Uses and applications of ribbed slab:It is used where vibration is an issue and the place where massive span slabs are to be constructed i.e. in areas where the number of columns is small.For example in airports, hospitals, commercial and industrial buildings and the place low slab deflection and excessive stability are required.Also read: Flat Slab, Concrete slab, Sunken Slab & Post Tension SlabConclusion:A waffle slab offers a material significantly more structural stability without using further materials, this makes a ribbed slab perfect for large flat areas such as foundations or floors.

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