

CASE STUDY OF U-BOOT TECHNOLOGY IN CONSTRUCTION

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ABSTRACT

The U-boot beton box is a formwork-like formwork made of recycled polypropylene, which is a product of industrial plastic waste that is used to build exposed concrete slabs in reinforced concrete structures. The use of U-boot technology helps us to reduce the amount of concrete used to lay slabs. That means we are conserving the natural resources of the next generation. The U-boot beton is a box-shaped structure made of recycled polypropylene, an industrial bi product, designed to create lightweight slabs and raft foundations in reinforced concrete. Thus, the orthogonal beam grid, closed at the top and bottom by plane slabs of different heights, is obtained without having to make two different concrete shapes, all implied by the remarkable retention of concrete and reinforcement. The U-boot beton helps to place the mushroom pillars where the beams are completely absent. The U-Boot Beton is used to build slabs that have a large span or can support large loads without beams. It is a very simple and very quick process to place U-boot betons as it is lightweight and easy to understand the process. Due to its chemical properties, it will not react with any material we use in preparing concrete.

I. INTRODUCTION

U-Boot Beton is a form of recycled polypropylene that can be used to create bare slabs and rafters. It is used in Italy for the first time. U-boot beton is an easy solution to many problems in laying slabs and laying foundations where the ground layer capacity is very low. It can be used instead of a raft base where slabs are used to distribute loads in deep soil. But we use U-boot betons to transfer loads to deep ground in U-boot technology. Disposable form of hollow slabs has two modes in the formation of reinforced concrete at the site. The U-Boot Beton is used to build slabs that have a large span or can support large loads without beams.

II. U BOOT BETON

U-Boot Beton is a reconstituted polypropylene form designed to form two-way blank slabs. It is used to build slabs that have a wide span or can carry large loads without beams. Light weight concrete that is developed by mixing a mixture of loose or gaseous concrete inside the mixture. The U boot is used for a variety of building components, such as slabs or foundations. Technically and economically, they offer great design solutions. The U-boot beton formwork is shaped like a drunken pyramid and measures 52 x 52 sq. Cm. usually 10, 13, 16, 20, 24, and 28 inches high. The type of sandwich that lifts two or more basic items allows for loading of items of varying lengths. Single Beton and Double Beton are two different types of beton. When lying reinforced slabs, a single boot beton is often used and a double U boot beton is used by placing double reinforced slabs. The Single U beton boot booty is usually a style of open polypropylene box that can be closed to withstand the entry of concrete into the beton using a sealing plate. The Double U Boot beton contains two closed boxes each.



Fig 1. U-Boot Beton

III. COMPONENTS OF U BOOT

The components of the U-Boot are the connecting bridge, spacer joint, and lock plate. U-Boot Sandwich Boot Beton is a combination of different materials. The spacer joint is used to attach two or more U-buttons when adjusting to the shutter, so that the distance between the spaces of the U-boot betons can be adjusted. The lock plate is used to close the U boot concrete box which can withstand the flow of concrete in the box. Closing plate and its quality plays a major role as it creates problems if the concrete is visible from the damaged plate to the concrete after the concrete is installed, a connecting bridge is required to connect the two betons length wherever necessary to increase the length of the concrete. . An important feature in U-Boot technology is the space joint. U-boots based on perpendicular directions may not fit well and as a result may cause disruption to the U-boots. To stop this distraction, the U-boots should be connected to each other by a space joint.

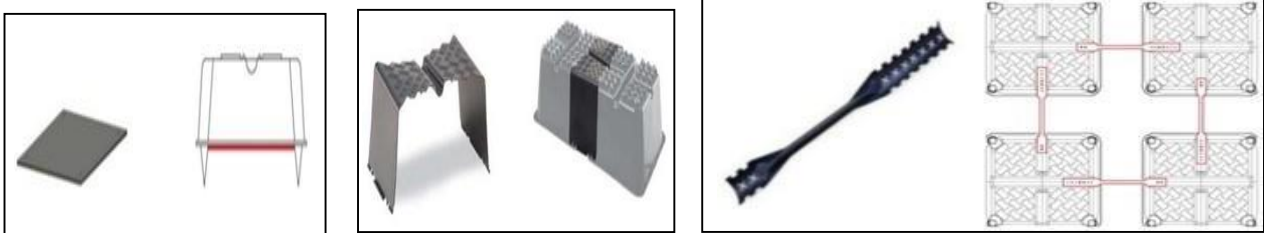


Fig 2. Connection Bridge, Spacer Joint, Closing Plate

IV. OBJECTIVE

U-Boot beton is used to build slabs with a large span that can support large loads without beams. Rather than being a conventional system of mono directional load transfer, due to the monolithically formed bi directionally it carries loads directly to the columns and then to the base and ground below. Because the beams are not entirely in this type of structure, they can also be used for laying mushroom pillars. It is a very easy and quick process to place U-boot betons as it weighs very little (1 to 2kg) and is easy to use.

V. INSTALLATION PROCEDURE

- With wooden decking, the entire slab area to be cast on the site is closed, then the lower reinforcement bars are laid out according to plan in two parallel directions and the lattice is arranged for maximum reinforcement.
- Lay low reinforcement on top of formwork, which acts as reinforcing slab pressure.
- Set up triangular reinforcement as a beacon for project purposes. Provides U-boot betting fixing area as well as proper betting alignment.
- Place U-boot buttons between the triangle reinforcement now. Spacer members, contact bridges and closing plates are used when necessary.
- Finish the extra reinforcement above the U-boot buttons properly, which acts as slab reinforcement.
- Place the concrete in the shutter after the installation of enter tensile reinforcement. Initially, the concrete was placed in a shutter so that the concrete was filled only with U-shaped spacers. The entire surface of the slab should have been laid this way.
- As the laid concrete begins to set, restart the complete installation of the concrete into the U-boot concrete, so that it is completely immersed in the concrete. Once properly set up, streaming can be restarted and the U-Boot Beton fully buried from the beginning.
- If the structure is hardened, the formwork can be removed. In soffit writing the face is smooth.



Fig 3. Installation of U-Boot Beton

VI. APPLICATION

- Raft foundation
- Mushroom pillars
- Parking lots
- Malls, Hotels, Restaurant, Auditoriums
- Hospital
- Fire Resistance Structure
- Temples
- Earthquake resistance structure

VII. ADVANTAGES

1) Benefits of Building

- Reduction within the normal load of a building with a weight of columns and thus inspiration.
- Reduced foundations so shallow mining reduces the cost of mining.
- Growing low value.
- Great span and great architectural freedom.
- There are no beams between the pillars.
- Reduce between the number of columns so that part of the pillars are improved.
- Improved sound behavior.
- The concrete and metal materials used to make the slabs are usually greatly reduced due to the fact that the betons embedded in the concrete are left blank.
- Due to the high durability of the U-boot material, the structure provides the same amount of volume.
- The body weight of a building is usually greatly reduced as there is a weight loss of concrete and steel. This enables owners to undertake a project even when the ground capacity (SBC) is low.
- Polypropylene material, because the melting point of polypropylene is very high height to 230o c the structure is generally heat-resistant and fire-resistant. Can't catch the fireside so easily.

2) Economic Benefits:

- Compared with other systems, reducing the use of concrete and connectors.
- Opportunities to provide additional parking spaces to reduce additional columns.
- There is no need for a false roof and reduce the need to repair the false ceiling if necessary.

VIII. IMPLEMENTATIONS



Fig 4. Shakthidham temple, Aurangabad, Maharashtra



Fig 5. Railway station enlargement, Parma, Italy

IX. CONCLUSION

1. In view of the fact that the structural behavior of this new type of monolithic flat slab is similar to that of a solid slab, with the exception of the edge column connection, we can certainly speak of the practicality and advantages of the new technology.
2. Consumption of concrete reduced - 1 kg of recycled plastic replaces 100 kg of concrete. Reducing material consumption makes it easier to make construction time faster, reducing total costs. Apart from that, it has led to a reduction in dead weight by up to 50%, which allows to create base sizes smaller.
3. Technology is naturally green and durable. Avoiding cement production allows for reduced global CO2 emissions. The use of boot technology fits the LEED scores in North America.
4. This technology is most likely to be in modern construction and perhaps the future of public engineering with this new type of hollow slab.

X. REFERENCE

- [1] Post tension services india pvt.ltd.
- [2] Daliform group building innovation pvt. It is limited. Italy.
- [3] Mateus R. et al. Stability testing and new lightweight construction technology for partition walls - Compared with conventional technology. To: Building and Environment 67, 2013, pp 147-159.
- [4] Churakov A., 2014, "Biaxial hollow slab with new types of voids," Construction of Unique Buildings and Buildings, Russia, Vol. 6 (21), pp. 70-88.
- [5] J. N. S. Suryanarayana Raju, M. SenthilPandian, Mechanical Study on Concrete with Waste Plastic, International Journal of Research in Civil Engineering, Architecture & Design, Vol. 1, Issued 1, July-
- [6] Kasib R. Malak, The Use of Waste Plastic in Concrete as an Integrated Recovery, International Journal of Engineering, Education and Technology (ARDIJEET), ISSN: 2320-883, Vol. 3, SCHEDULE 2, April 2015.
- [7] Daliform site for new group building, creatori, dell glue.