Study and Preparation of Detailed Report on Precast Concrete Construction

Shailesh A. Pandhe[1], Prajwal N. Shinde[2], Abdulla A. Rohawala[3], Atharva R. Lonari[4],Shubham D. jagtap[5], Aman N. Ansari[6]
[1, 2, 3, 4, 5, 6] Dept of Civil Engineering
[1, 2, 3, 4, 5, 6]Zeal Polytechnic, Narhe, Pune, Maharashtra, India

Abstract- *Most of the construction work in India is done by using the conventional cast-a method of on-site production. However, there has been a lot of demand for housing in India. Therefore, the construction work is to be carried out much more quickly. This could not be achieved in a traditional manufacturing method. This can be done with the help of precast concrete structure. In addition, precast concrete, it has more advantages than the traditional concrete slab. Thus, several works of literature have been studied, and everyone is able to discuss in this article. The pros and cons of building elements, which are also discussed in this chapter. In this paper, we have developed and tested an experimental model of the screws for the connection of precast reinforced concrete columns, and to get it and compare it with the strength of traditional, monolithic and short joints. To this end, a bolt-on link has been developed, which is available as a monolithic joint. Complete the T-beam and column are separately made and are fitted with sturdy screws. The pattern is performed with an axial load on the column, and a quasi-static reversed cyclic lateral load at the end of the bar. The exact same monolithic sample was also tested under the same conditions. The results of the study showed that the use of the load-bearing capacity of the sample, the bolts will be about 20% higher than that of the load-bearing capacity of the monolithic one. In addition, there has been an increase in the instagram and the torque capacity of a bolted connection. So, it turns out that it is possible to build a time, resistant to stretching, with the help of the bolt-on to the time that the connection has been proposed in this study, and it can also be used for the construction of a seismic regions.*

Keywords- Cast in situ, column beam connection, moments, prestress members, precast.

I. INTRODUCTION

Precast concrete systems have become more popular over the past couple of decades. These systems have many advantages compared to traditional on-site construction methods, namely: quality, time and cost. Instagram, et al. the conclusion is that the time is approximately 30%. In addition, the cost-effectiveness of precast concrete systems, it is about 20% compared to conventional systems. Precast concrete systems are the systems that adhere to the principles of "green building". Green building is part of a trend of sustainable construction, which has been developing in relation to the issue of global warming. On the other hand, precast concrete systems, it still faces a number of technical challenges, such as the call of the retention rates, as well as the ease of making these calls. Sometimes, though, the combination is also satisfactory, but it is too complex and requires a high degree of accuracy, allowing for the difficulties in the implementation process. In addition, it may be an extension of the construction period, and an increase in the cost of construction. Many of these types of connections are developed, in particular, beam-to-column connections in moment-resisting profiles, but they are often, in part to screw/welding/pre-stressed / al (CIP) connections. However, they are generally classified as either a dry joint, or if it is a wet compound, or the like to be a strong joint connection. Each power supply has its own advantages and disadvantages. - Welded seams, even if they are in line with the strength and rigidity, and can lead to excessive temperatures which can cause damage or breaks in the area of precast concrete structure. In addition, the implementation of this joint requires a highly educated and skilled workers who can guarantee the quality of the weld in a combination of both. A screw terminal connection, it is most likely the simplest way to connect pre-fabricated elements on your site. Unfortunately, they require a high degree of accuracy in the placement of the channels, steel sheets, prior to the casting of the precast elements. It is very difficult to achieve, due to the risk of slipping. In a another study, it is expected, the risk of a slip and slide through the provision of adequate tolerance of the mounting holes. However, the gap tolerances, resulting in a loss of the initial joint stiffness. Monolithic concrete systems (cleaning in place), are more rigid joints and are suitable for earthquake-resistant buildings. It also ensures that a greater tolerance of various textures. Unfortunately, the construction industry is going to take longer, if the concrete is to be in force; and it must also shuttering and scaffolding is in place.

II. METHODOLOGY

This chapter describes the components of the pilot program and the methods used for the evaluation of a new property (weak points), and improved properties, such as compressive strength and tensile strength), and the strength properties of the concrete mixes made up of several percent of the replacement of plastic granules. This chapter describes the procedures that have been established for the physical testing of composite materials, such as cement, coarse aggregate, natural sand, plastic granules, which are used in the production of concrete.

III. RESULT AND DISCUSSION

PRECAST CONCRETE CONSTRUCTION

Precast concrete-is a mold for the concrete, and that is to be prepared, dedicated, and set it in the day to day lives, usually in a controlled factory environment, with the aid of molds for re-use. Precast concrete elements can also be combined with other elements into a single structure. It is commonly used for structural components, such as panels, beams, columns, floors, stairs, pipes, and tunnels, and so on. Steel structural frames, can be a cost-effective alternative to the athletes of the structural elements, and pre-reinforced concrete, it is more cost effective (if not more useful. Many of the buildings, which are currently provided by a combination of the means of production methods, which are sometimes, in this design, steel fabrication, on site, the concrete and precast concrete elements

THE PRECAST SLAB

Pre-Stressed-Concrete-Slab-pre-Tensioned concrete is a great addition to any construction project. Sheets can be used universally, which allows them to be installed in various ways the structure and the foundation. Tiles can be used for a variety of projects, ranging from small home projects to large commercial projects. Precast concrete has an edge over that of the traditionally-crafted boards, because it was made in a controlled environment.

The mats have been created due to the casting of just plain concrete in the mold, under strictly controlled conditions. This helps to prevent the effects of environmental factors on the concrete, which increases the strength of the structures that make use of it. Precast concrete is increased with the age of the other materials to be degraded, and it has a high level of resistance against a variety of elements, and the potential ecological risk. In addition, concrete slabs are not time-consuming projects that can save you, the designer, the extra work and expense, starting from the very beginning of the project.

Reinforced concrete slabs are frequently used in industrial and public buildings. Since the drives can be pre-made, it can be formed and stored in a warehouse until they are needed for the project. As soon as he was of the opinion that the disks are on the site, and they have been installed and placed in the appropriate range, to ensure that they are ready, and when the project requires it. If the disc is out of place, they have been cured, in a stable and controlled environment, and it can be used immediately after the completion of the process. Concrete slabs can be made in a variety of shapes, sizes, and designs to choose from. This multi-functionality, and ease-of-use make it the ideal choice for just about everyone.

Pre-fabricated beams

The cross-section of a precast concrete beam depends on its location within the structure, the purpose, and how it is connected to the other elements. The easiest way would be to use a rectangular, probably reinforcing bars sticking out from the top of the link, which is right around that you can use to give a concrete in-situ.

In addition, beams, can be the projections on one or both sides, to maintain the secondary elements, such as the floors or stairs, or carrying bricks or fire. The beams are equipped with recesses at the ends which are placed on the top of the great columns, and cornices, or steel frame.

For a single beam-column connection, the continuity of the transmission of the torque by means of a reinforcement, threaded through the outstanding features and to pass through the column. Dan, knit in place will be implemented. For both internal and external columns, rebar connections should be made on the grill, wheels, or on any type of weld.

THE PRECAST COLUMN

Precast reinforced concrete columns can be either one-or two-story. The process of connecting to the base station, and the removal of the top, it will vary according to the manufacturer's instructions. The foundation is there a connection is to be made on the basis of, and in conjunction with the industry, or through the use of a reinforcement, that is, from the end of the column and in the sleeves, which are then filled with grout. In addition, the column can be installed in a pre-formed hole in the foundation block and sealed it in the desired position.

The column until the column, calls can be made with the wire bar is connected to the matching bracket; with the concrete, and looked to be around the size of the column's cross-section. You can also take advantage of the bars in a polished buses, as described above. This results in a thin chain between the columns, as in the previous approach and it requires a deeper seam. Connections are located between the floors, to the point that is opposite to the elbow, or on the floor.

They are provided with the necessary support structures, and finally, the prefabricated beams, (crown moulding, or aluminum, steel, stainless steel). In addition, there is a certain type of coupling provides a beam-column moment to link, and it will continue to thrive. For a single column, there may be openings through which the reinforcement of changing from one beam to the other. Home speakers have to have some kind of connection.

During the production, and the columns will be laid down to provide stability has been achieved, making the necessary connections, beams, and floors.

The Modular design of reinforced concrete foundations

The technology of precast concrete foundation, it is quite popular in this day and age. The density and the resistance to the weathering effects of this type of foundations is what makes them the same.

The design of a precast concrete foundations shall be carried out in accordance with the following parameters:

The determination of the type of soil in the load-bearing capacity

Please check with the manufacturer of the precast concrete foundation, or, perhaps, are the foundation of a block in a reliable way, you will be able to withstand the design loads.

Foundation construction

Check the height after the founding of the blocks will be created and available for purchase on the site, it is installed in a pristine layer of the soil.

In the case of a pre-shoe-basement of the block of the shoe, and the foundation was laid, on top of already prepared, a layer of lean concrete. About the base is placed on a pre-column. Curved rods pulled out of the column to be placed in the foundation of the element, as shown in the figure below.1. The column reinforcement is formed within the concrete foundation to the final casting of the concrete. When the work is complete, the adjustment of the devices and tools that have been deleted.

PRECAST FLOOR SYSTEM

In the proposed exterior folding system, with two alternative systems have been developed.

Both systems have been adopted formally in place to cover depending on the following factors:

- Concrete slabs are thinner and therefore lighter.
- The different thickness of the composite slab can be achieved, as required by the considerations at the design stage, by varying the thickness of the shell, but it is a constant, the thickness of precast concrete structure.
- Top-concrete and reinforcement rods to provide a simple tool to connect the floors and wall elements.
- The services available on the site, as part of instagram and concrete.

Bathroom and toilet facilities services, the floors tend to have larger diameters, and they need to be folded in order to prevent it falling off. In these areas, with a minimum coating thickness of 85 mm) and is likely to be required for this service. Based on the assumption that the soffit plate is flat, it can reduce the overall thickness of the slab adjacent to the bathroom, it is advisable to limit yourself to just one drop (50 mm) in wet areas. For desk areas, it is advisable to empty, instead of a second to drop in order to prevent the edge of the plate in the non-drip area.

The request System is an Alternative To -pre-stressed bar and a Semi-open Application System

These pre-fabricated wall and flooris composed of pre-stressed slabs, between the load-bearing walls. Where the empty spaces, stairs, and other features to prevent the disks from passing between the walls of plates at right angles, are supported by the surrounding plates.

The advantages of this system are as follows:

- Beams can be eliminated, resulting in a simpler element, and less of a service co-ordination problem.
- The front and rear of the building line of the reinforcement, it is easy to set up.
- You can make the full size windows and doors

- Suitable for irregular rooms require less of a ceiling

The following factors should be taken into account in this system:

- On the roof, all of the major RC gutters to prevent the discs from moving between the walls.
- For a floor planner, level, stairs, and will prevent the drives from moving to the sides.
- The new volume for this system is likely to be a 0 ~ 20% higher than that of the conventional RC beams and slabs.

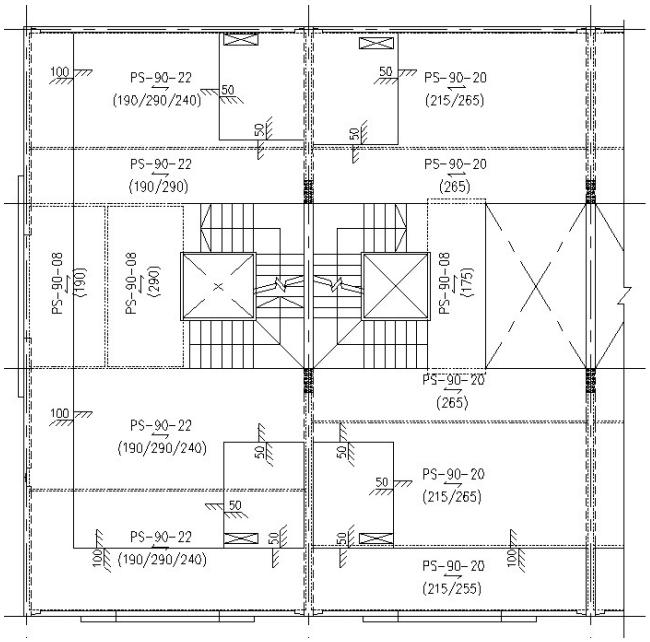

Figure1: Typical floor layout for precast walls with precast slab

IV. CONCLUSIONS

In this study, a couple of bolt connection system has been developed and tested. Taking into account the proposed link is for the purpose of this study was to pre-fabricated structures, which may act as a monolithic structure. In this way, structures built with the use of this technology, and it can be made as soon as a pre-fabricated structures, and with the same performance as a monolithic structure. The preliminary results of this study can be summarized as follows.

- In the example above, it can be concluded that it is a prefab structure is designed and manufactured with precision, planning, and has a high potential to respond to the new demands of the market.
- A mix of C & factory and be created prefabs, in place of the usual "all of the prefabs, or any representation approach, and offers more advantages in terms of time, cost, and quality.
- The repetition of pre-fabricated elements, it is necessary, in order to meet the requirement of cost-effectiveness.
- The use of precast concrete for more than a traditional compression offers significant benefits, such as improved quality control, reduced construction time, construction debris, dust, and noise in the workplace, and the intensity of work at the site. In addition, it will result in an increase in the total area, resulting in a significant loss.
- A significant reduction of this factor can be achieved, even for the seismic zones IV and V.
- It is easy to carry out non-destructive testing (NDT) if you need to, and it's easy to soften
- Pre-fabricated, it is moved in the direction of the use of a non-standard approach to the design of the modular elements, that is, the optimization of the capabilities and limitations of the site.
- For commercial structures, and use other standard products such as the walls, ledges, etc.). prefab offers an abundance of benefits.
- Pre-fabricated, allowed technology and flexible construction, and a transparent surgesin areas that don't have turrets, such as the parking space.
- The collected material, the best way to help the achievement of the sustainable development goals of the green house.

REFERENCES

[1] B Jaivignesh and A Sofi "Study on Mechanical Properties of Concrete Using Plastic Waste as an Aggregate" Article in IOP Conference Series: Earth and Environmental Science. DOI 2017 *IOP Conf. Ser.: Earth Environ. Sci.* 80 012016

[2] MB Hossain, P Bhowmik, KM Shaad, Department of Farm Structure & Environmental Engineering, Bangladesh Agricultural University,Mymensingh 2202, Bangladesh "Use of waste plastic aggregation in concrete as a constituent material" ARTICLE IN International Journal of Innovative Research in Science, Engineering and Technology ISSN: 1017 – 8139.

[3] Azad Khajuria, Puneet Sharma, " Use of Plastic Aggregates in Concrete", Article in International Journal of Innovative Technology and Exploring Engineering (IJITEE)ISSN: 2278-3075, Volume-9 Issue-1,DOI November 2019.

[4] Md. Zakaria Habib, Md. MasudAlom and Md. MozammelHoque, Department of Civil & Environmental

Engineering, Uttara University, Dhaka 1230, Bangladesh Department of Civil Engineering, Dhaka University of Engineering & Technology, Gazipur 1700, Bangladesh "Concrete production using recycled waste plastic as aggregate" Article issued in (PDF) ResearchGate (link) DOI 26 June 2016.

[5] Dr Muhammad MaqboolSadiq, Muhammad RafiqueKhattak, Assistant Professor, at NUST, Islamabad. "Literature Review on Different Plastic Waste Materials Use in Concrete ",Article in Journal of Emerging Technology and Innovative Research. DOI June 2015.

[6] Parvesh Kumar, Gaurav Kumar, M.Tech. student, Department of Civil Engineering, NNSS SAmalkha Group of Institutions, Department of Civil Engineering, Affiliated to Kurukshetra University, Kurukshetra, Haryana, India. "Effect of Recycled Plastic Aggregates on Concrete" Article in International Journal of Science and Research (IJSR),ISSN (Online): 2319-706 Index Copernicus Value (2013): 6.14 | Impact Factor (2015): 6.391.

[7] Rafat Siddique, Jamal Khatib, InderpreetKaur , a)Thapar Institute of Engineering and Technology, Deemed University, Patiala – 147 004, India. b)School of Engineering and the Built Environment, University of Wolverhampton, City Campus, Wolverhampton, West Midlands WV1 1SB, United Kingdom. "Use of recycled plastic in concrete: A review" Available online at www.sciencedirect.com. DOI 5 November 2007.

[8] Gate Vishnu, (Student) S. B. Patil College of Engineering, Indapur, Maharashtra. Admile P. R (Assistant Professor) and Dr. Nemade P. D (Principal) of S. B. Patil College of Engineering, Indapur, Maharashtra. Article in ISSN (Available online at www.ijariit.com).

[9] AshwiniManjunath from Department of Civil Engineering, Atria Institute of Technology, Bangalore, Karnataka, India. "Partial replacement of E-plastic Waste as Coarse-aggregate in Concrete" Article in www.sciencedirect.com, International Conference on Solid Waste Management, 5IconSWM 2015.