Gems School Site Visit Report

February 2017

Site visit of M.tech

Submitted by : S4 CASE

DEPARTMENT OF CIVIL ENGINEERING

SCMS School of Engineering and Technology, Karukutty

Kerala Technological University

GENERAL DETAILS

The Department of Civil engineering of SCMS School of Engineering and Technology (SSET) organized a one day site visit to Kakkanad. The visit was in accordance with our design subject. The continuous guidance of faculty member made the site visit a grand success. The visit gave us a new exposure to prefabricated construction and design.

- LOCATION : KAKKANAD
- SITE VISITED : SITE 1: PREFABRICATED SCHOOL BUILDING, KAKKANAD
- DAY AND DATE :SATURDAY , 18-02-2017
- BRANCH : CASE
- NUMBER OF STUDENTS : 08
- ACCOMPANYING FACULTY : SANDEEP TN
- DEPARTURE : 9:30 PM (FROM SSET)
- ARRIVAL : 2:00 PM PM (AT SSET)

ACKNOWLEDGEMENT

We take this opportunity to thank Prof. Madhavan, principal SSET and Dr. Anitha G. Pillai for allowing us to have an industrial visit.

We also extend our gratitude to our faculty members Sandeep T.N. and Airin M.G.

INTRODUCTION

We, the students of M.tech, CASE went for an IV to a prefabricated construction site of Gems international school at Kakkanad. The work has been carried out by KEF INFRA. We started our journey on 18th February from the college at 9.30 a.m. We reached our destination at 11.00 a.m.

Before going to the construction site, we were given certain instructions by the person in charge. Then we went to the conference hall in the site. From there we were provided with certain safety measures like helmets, Do's & Don'ts.

Construction of pre-fabricated building

Almost all the members used in the construction are prefabricated such as column, walls, beams, slabs, stairs, etc. Two types of wall panels are used here. They were solid wall and double wall. Of which, double walls are completely hollow and solid walls will be having sleeves for

providing reinforcement. Wall panels used here will be having level difference on either faces for the beams to rest on it firmly. Lift core wall is also pre-casted and they act as the shear wall.

All the slabs used in the construction are pre-stressed and some of the beams are also pre-stressed. Since the slabs are pre-stressed, due to pre-stressing force, an upward camber will be developed in the opposite direction of slab. Due to this the deflection will be very small and slabs having span more than 16m can be cast prior to construction.

The upward camber will be clearly visible on the slab. In order to make it flat and aesthetic, screeding will be provided for the slabs.

Bond breakers are also provided to seal the gaps between the joints and to avoid leakage while screeding. The bond breakers will be then removed after the hardening of screed.

If the joints are treated well, precast construction is advantageous than the conventional way of construction. Partition walls for the toilets are only cast -in-situ. It was because, thin walls less than 100mm thick is practically impossible to precast.

The stairs are also pre-fabricated. The space left after in the panels and columns after placing the reinforcement will be filled using mortar.

Placing of pre – fabricated slab

Precast concrete is a construction product produced by casting concrete in a reusable mold or "form" which is then cured in a controlled environment, transported to the construction site and lifted into place. In contrast, standard concrete is poured into site-specific forms and cured on site. Precast stone is distinguished from precast concrete by using a fine aggregate in the mixture, so the final product approaches the appearance of naturally occurring rock or stone.

Precast (panels) are only used within ranges of exterior and interior walls. Compressed in concrete and stone, creating a solid but maneuverable wall or face. By producing precast concrete in a controlled environment (typically referred to as a precast plant), the precast concrete is afforded the opportunity to properly cure and be closely monitored by plant employees. Using a precast concrete system offers many potential advantages over onsite casting. Precast concrete production is performed on ground level, which helps with safety throughout a project. There is greater control over material quality and workmanship in a precast plant compared to a construction site. The forms used in a precast plant can be reused hundreds to thousands of times before they have to be replaced, often making it cheaper than onsite casting when looking at the cost per unit of formwork.

There are many different types of precast concrete forming systems for architectural applications, differing in size, function, and cost. Precast architectural panels are also used to clad all or part of a building facades or free-standing walls used for landscaping, soundproofing, and security walls, and some can be prestressed concrete structural elements. Storm water drainage, water and sewage pipes, and tunnels make use of precast concrete units.

Interior view of the walls, supports, and roof of a precast building

The main advantage of the prefabricated construction is that the time required to complete the construction will be very less when compared to the conventional way of construction. So we could generate revenue earlier.

They are planning to start the school in the coming Academic year.

BRIEF HISTORY

Ancient Roman builders made use of concrete and soon poured the material into moulds to build their complex network of aqueducts, culverts, and tunnels. Modern uses for pre-cast technology include a variety of architectural and structural applications — including individual parts, or even entire building systems.

In the modern world, precast paneled buildings were pioneered in Liverpool, England, in 1905. The process was invented by city engineer John Alexander Brodie, a creative genius who also invented the idea of the football goal net. The tram stables at Walton in Liverpool followed in 1906. The idea was not taken up extensively in Britain. However, it was adopted all over the world, particularly in Eastern Europe and Scandinavia.

In the US, precast concrete has evolved as two sub-industries, each represented by a major association. The precast concrete products industry focuses on utility, underground and other non-prestressed products, and is represented primarily by the National Precast Concrete Association (NPCA). The precast concrete structures industry focuses on prestressed concrete elements and on other precast concrete elements used in above-ground structures such as buildings, parking structures, and bridges. This industry is represented primarily by of the Precast/Prestressed Concrete Institute (PCI).

REINFORCEMENT

Reinforcing concrete with steel improves strength and durability. On its own, concrete has good compressive strength, but lacks tension and shear strength and can be subject to cracking when bearing loads for long periods of time. Steel offers high tension and shear strength to make up for what concrete lacks. Steel behaves similarly to concrete in changing environments, which means it will shrink and expand with concrete, helping avoid cracking.

Rebar is the most common form of concrete reinforcement. It is typically made from steel, manufactured with ribbing to bond with concrete as it cures. Rebar is versatile enough to be bent or assembled to support the shape of any concrete structure. Carbon steel is the most common rebar material. However, stainless steel, galvanized steel and epoxy coating can be used to prevent corrosion.

BUILDING AND SITE AMENITIES

Precast concrete building components and site amenities are used architecturally as fireplace mantels, cladding, trim products, accessories and curtain walls. Structural applications of precast concrete include foundations, beams, floors, walls and other structural components. It is essential

that each structural component be designed and tested to withstand both the tensile and compressive loads that the member will be subjected to over its lifespan.

A precast concrete unit

Multi-storey car parks are commonly constructed using precast concrete. The constructions involve putting together precast parking parts which are multi-storey structural wall panels, interior and exterior columns, structural floors, girders, wall panels, stairs and slabs. These parts can be large; for example, double-tee structural floor modules need to be lifted into place with the help of precast concrete lifting anchor systems.

APPLICATIONS AND BENEFITS

Precast concrete sandwich wall panels have been used on virtually every type of building, including schools, office buildings, apartment buildings, townhouses, condominiums, hotels, motels, dormitories, and single-family homes. Although typically considered part of a building's

enclosure or "envelope," they can be designed to also serve as part of the building's structural system, eliminating the need for beams and columns on the building perimeter. Besides their energy efficiency and aesthetic versatility, they also provide excellent noise attenuation, outstanding durability (resistant to rot, mold, etc.), and rapid construction.

In addition to the good insulation properties, sandwich panels require fewer work phases to complete. Compared to double-walls, for example, which have to be insulated and filled with concrete on site, sandwich panels require much less labor and scaffolding.

LIST OF STUDENTS

1. Acxa Kuriakose
2. Aparna M. V.
3. Aswathy Devika
4. Chanchal Mary Peter
5. Gayathri Krishnakumar
6. Merlin Mary Vilson
7. Nikitha Eliza Mathew
8. Paul Wilson P.
9. Reshma C