

## **1.5 TRANSPORT AND ERECTION**

### **1.5.1 TRANSPORT**

Transport of prefabrication elements must be carried out and with extreme care to avoid any flock and distress in elements and handled as far as possible to be placed in final portion.

Transport of prefab elements inside the factory depends on the method of production selected for the manufacture. Transport of prefab elements from the factory to the site of action should be planned in conformity with the trafficable rules and regulations as stipulated by the authority the size of the elements is often restricted by the availability of suitable transport equipment, such as tractor-am-tailor, to suits the load and dimension of the member in addition to the load carrying capacity of the bridges on the way.

While transporting the prefab elements in various systems, such as wages, trucks, bullock cards etc. care should be taken to avoid excessive cantilever actions and desired supports are maintained. Special care should be taken in negotiating sharp beds uneven of slushy roads to avoid undesirable stresses in elements and in transport vehicles.

Before loading the elements in the transporting media, care should be taken to ensure the base packing for supporting the elements are located at specified portion only.

### **1.5.2 ERECTION**

It is the process of assembling the Prefabrication element in the find portion as per the drawing. In the erection of prefab elements the following items of work are to be carried out.

- 1). Slinging of the prefabricated elements.
- 2). Tying up of erection slopes connecting to the erection hooks.
- 3). Cleaning the elements and the site of erection.
- 4). Cleaning the steel inserts before incorporation in the joints lifting and setting the elements to correct position.
- 5). Adjustments to get the stipulated level line and plumb.

- 6). Welding of deats.
- 7). Changing of the erection tackles.
- 8). Putting up and removing the necessary scaffolding or supports.
- 9). Welding the in sorts laying the reinforced in joints.

The erection work in various construction jobs by using prefab elements differs with risk condition, hence skilled foremen, and workers to be employed on the job.

### **Equipment's required for erection**

Equipment's required for the prefab elements in industry can be classified as.

- 1) Machinery required for quarrying of course and fine aggregates
- 2) Conveying equipment, such as but conveyor, chain conveyors etc.
- 3) Concrete mixers
- 4) Vibrators
- 5) Erection equipment such as cranes, derricks, chain pulley etc.
- 6) Transport machines
- 7) Work shop machinery for fabricating and repairing steel.
- 8) Bar straitening, bending and welding machines
- 9) Minor tools and takes, such as concrete buckets etc...
- 10) Steam generation a plant for accelerated curing

### **Planning co-ordination**

It is important to have the pre caster erector/installer and builder working together to achieve best performance.

#### **Site Access and storage**

- Check for site accessibility and precast panels delivery to site especially low bed trailers

- Check whether adequate space for temporary storage before installation and ground conditions. (firm ground & leveled)
- Uneven ground will cause overstress & crack panels.

### **Planning crane Arrangement**

- Plan the crane capacity and lifting gears based on
- Heaviest weight of precast panels
- Lifting heights.
- Working radius
- Position of crane in relation to final panel location

### **Plan other equipment's**

- Boom lift and scissor lift for unhooking installed panels.
- Lifting gears

### **Skilled personnel's**

- Competent crane operators
- Rigger
- Signaled etc

### **General considerations for crane selection**

- Total lifting weight
- Crane model
- Crane safe working load (SWL) (i.e) Based on 15% capacity build in F.O.S. 1.33 o Lifting capacity must be 1.5 times the total weight i.e) F.O.S 1.5
- Lifting and swing radius
- Crane counter eight

- Crane boom length is relation to the vertical and horizontal clearance from the building.

## **Installation Process**

### **Installation of vertical components Verification of Delivered Panels**

- Check the panels delivered for correct marking lifting hook and position etc.
- Surface finishing condition
- Pc Dimension compliance
- Reinforcement Provision/position
- Architectural Detail compliance

#### **1. Setting out**

- Check the panels delivered for marking, lifting hook and condition.
- Set the reference lines & grids
- Check starter bars for vertical components before hoisting for installation

#### **2. Setting out Quality control point**

- Ensure correct offset line
- Check shim pedal/plate level and firm
- Rubber gasket property secured
- For external wall/column place backer rod.

#### **3. Hoisting, Rigging and Installation**

- While tilting provide rubber pad to avoid chip off.
- Lift and rig the panel to designated location
- Adjust the panel in position and secure
- Lifting of space adding items with balanced centre of gravity.

- Ensure horizontal alignment correct
- Ensure panel vertically to correct plumb
- Check panel to panel gap consistency
- Check stability of prop before releasing hoisting cable.

#### **4. Grouting works**

- Prepare and apply non shrink mortars to seal
- For corrugated pipe sleeve on spliced sleeve pour NSGT or proprietary grouts into pipe slab.
- Keep installed panels undisturbed for 24 hrs.
- Check joint widths are consistent before grouting
- Grout used should be same grade of components and self compacting to prevent cracking.
- Collect test cube sample for testing for critical element or load bearing elements

#### **5. Connecting joints**

- Cast in situ joints install rebars as required
- Set up forms for casting joints
- Do Concreting
- Remove forms after sufficient strength
- For external connections sealant shall be used
- Panel with welded connections welding as required

### **Installation of Horizontal Elements**

#### **1. Setting out**

- Set reference line/offset line to required alignment and level of slab/beam during installation
- Put temporary prop to support the precast slab/beam elements
- Before Hoisting check Dimensions
- Check level and stability of shim
- Check protruding/ starter bars are within the Specified tolerance to prevent any observation during the erection process

## **2. Hoisting & Installation**

- Put temporary props to support slab/beam
- Lift and rig the elements in designated location
- Align and check the level before placement
- The beams shall prop at least 2 location
- Balcony planter box and shall be supported more than 2 location based on design considerations
- Check level of precast elements

## **3. Connections/Jointing**

- Precast with cast-in-situ joints place the lap rebars as required
- Set formwork for casting joints
- Remove formwork after concrete strength is achieved
- Supporting beams shall be designed to form part of formwork joints
- The connecting/lapping rebars tied & secured
- Same grade of concrete to be used that of panel.

## **4. Installation using Big canopy**

- Big canopy high rise precast concrete construction system

- This is used for faster and efficient

## 5. Erection Purpose

- In Japan
- Used to construct the 26 storey pre-cast concrete 30,763m<sup>2</sup>
- The system realized 60% reduction in labor requirement for the frame erection.
- In Singapore
- DBS China square used the system to erect is efficient and faster

