

Practice Notes For Construction Managers
PNCM 3: Precast Units - First Issue, September 2003

(Index under: Permanent Works)

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PRACTICE NOTES FOR CONSTRUCTION MANAGERS

PNCM 3: Precast Units

1. Scope of this Practice Note

This practice note covers all R.C. precast units with the exception of prestressed units and modular units.

2. Relevant Regulations

- Construction Sites (Safety) Regulation
- Factories and Industrial Undertaking (Lifting Appliances and Lifting Gear) Regulation
- Road Traffic Ordinance and its Subsidiary Regulations

3. General Guidelines

a. Relevant Terms and Requirements

- ✧ Precast Concrete (預制石屎)
The design of precast concrete shall be in accordance with the Hong Kong Building (Construction) Regulations and BS8110.
- ✧ Steel Lifting Frame (吊運鐵架)
A tailor-made steel lifting frame shall be designed in accordance with BS5950 for lifting precast units.
- ✧ Access and Egress (通道)
Suitable means of access such as gangway, ladder, etc shall be provided from the building or ground to the location of the precast yard.
- ✧ Lifting Appliances (起重機械)
All lifting gear such as tower crane & pulley block shall be examined and inspected by competent examiners or competent persons respectively.

The examination and inspection results shall be entered in the approved form under the F&IU (LALG) Regulation.

✧ Lifting Gear (起重裝置)

All lifting gear such as steel lifting frame, chain slings & hook shall be examined by competent examiners. The examination results shall be entered in the approved form under the F&IU (LALG) Regulation.

✧ Form Release Agent (板模油)

The supply of form release agent shall conform to the relevant regulations. The supplier or manufacturer shall submit the Material Safety Data Sheet for conducting health risk assessment so as to identify the safety, health and fire hazards.

b. Preparation

✧ All drawings and calculations must be prepared and signed by a Registered Structural Engineer. The design should consider all loadings imposed on the precast units due to lifting, handling, stacking, shock or any other reasons.

✧ For off-site casting, the precast units supplier shall submit method statements on the fabrication, casting, demoulding, storage, and transportation of precast units. Special emphasis should be put on the storage of precast units in the storage yard to prevent collapse/overturn of the same.

✧ The whole system for fabrication, transportation, lifting and installation of precast units should be designed by qualified engineers and be clearly stated in method statements. The employment of an independent checking engineer (ICE) to check and certify the design and installation procedures is advisable.

✧ A specific safety meeting shall be held among concerned parties to discuss the method statement for lifting and installation of precast units.

- ✧ Prepare a risk assessment by a project team to identify the potential hazards and to recommend control measures for the lifting and installation of precast units

c. General Safety Rules

i. Off-site Casting and Storage Yard

- The base of the storage area for precast units shall be firm and level and the storage area shall be kept clean.
- The storage facilities and stacking methods shall be of approved types to prevent warping, bowing, chipping or cracking of precast units.
- The placement of precast units shall be kept away from traffic access route so as to prevent collision by vehicles.
- Proper working platform with access ladder shall be provided for pouring concrete at a height.
- Apply form release agent to the surfaces of mould in accordance with the manufacturer's recommendations.
- Do not lift precast units within 24 hours after casting and check with the specific requirements of the concrete strength for lifting.

ii. Transportation of Precast Units

- All trucks for transporting of precast units shall be properly maintained to ensure it is in safe working order.
- The truck driver shall possess a valid driving licence for the required class.
- All lifting appliances and lifting gear for lifting precast units onto the truck shall be tested, fully examined and inspected in accordance with the F&IU (LALG) Regulation.
- The precast units shall be securely lashed on special cradle supports of the vehicles to prevent them from bouncing, tipping or sliding.
- The overall clearance height of the truck, after loading precast units, shall be checked before traveling on public road.
- A temporary traffic arrangement (TTA) or traffic impact assessment (TIA) may be required for transportation of large or long units.

iii. Installation of Precast Units

- To appoint a competent supervisor to supervise the installation of precast units.
- Before lifting the precast unit, check the dimension of the precast unit to ensure that it is within acceptable tolerance.
- The lifting of precast units shall be carried out by experienced riggers.
- Visual inspection of the lifting gear shall be carried out by experienced rigger before every use.
- Lifting device shall be used in lifting operation of precast units. The device shall be connected to the designed lifting point.
- All precast units shall be provided with tag line while lifting by tower crane.
- All hand tools/ equipment shall be inspected by workers prior to use.
- Workers shall use designated access routes to and from the location of precast units.
- Ladders shall be provided for the installation of precast units to enable safety execution of the lifting operation.
- The precast units shall be properly connected to building structure/ structural support before the lifting gear is released.
- Do not stand/stay close to the edges of the building during the process of installation unless the worker uses fall arresting devices.
- The lifting operation shall be suspended if under strong wind condition.
- Maintain all falseworks, temporary supports, props and restraints in position until the precast units had been installed/casted to the structural joint with substantial strength. Removal of the same shall follow the approved procedures of the method statement.

d. **Inspection and Maintenance**

- ✧ All temporary bracings, brackets, falsework, etc. shall be regularly checked by competent supervisor to ensure it is properly installed and maintained.
- ✧ The inspection of falsework shall be carried out before first use; re-inspection shall be carried out for any alteration or after adverse

weather. The inspection results of falsework shall be recorded in approved form. Copies of the inspection record shall be kept in site office for record.

e. Monitoring

- ✧ Risk assessment shall be carried out by registered safety officer prior to the process of lifting and installation.
- ✧ The competent supervisor shall regularly coordinate with the precast units supplier for off-site casting of the precast units.
- ✧ The Area Foreman shall monitor the installation of the precast units to ensure the procedures are correct and the erection is accurate. Unsafe acts shall be stopped during the erection of the precast units and be reported to the Site Agent and/ or Safety Officer. Arrange remedial actions to rectify the irregularities.
- ✧ Check the quality of the precast units and replace any precast units that have been damaged on transportation, lifting or erection.
- ✧ The Safety Officer shall carry out routine safety inspection to identify hazards and make recommendations for the installation of precast units and monitor any remedial actions taken to rectify irregularities. The Safety Officer shall check & retain the inspection records related to the precast units.

4. Common Malpractice and Mistakes

- Poor treatment to construction joints.
- Temporary works installation/erection does not strictly comply with the approved design.
- Allow unacceptable tolerance.
- Misalignment /damage / blockage of concealed services.
- Debonding caused by improper removal of laitance, dirt and grease from precast concrete surface prior to casting in-situ concrete

5. Responsibility

a. Construction Manager shall:

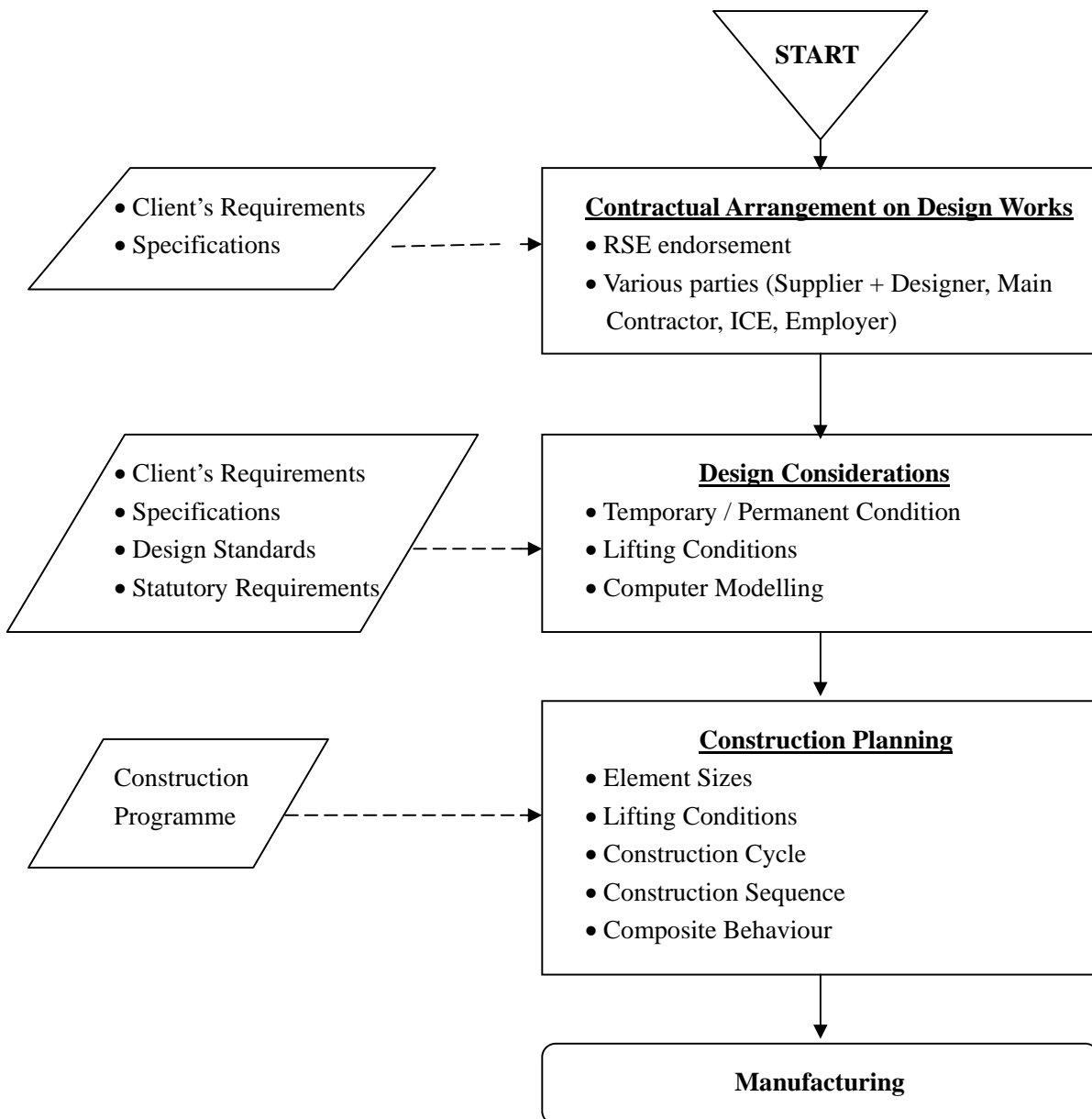
- ✧ Hold full responsibility to select and control the precast units supplier and subcontractor.
- ✧ Take close liaison between all relevant parties starting from the planning stage.
- ✧ Continuous review the fabrication, storage, transportation and installation processes to ensure the safety and quality aspects.
- ✧ Ensure all irregularities/mistakes are duly rectified.

b. Site Agent shall:

- ✧ Be familiar with the statutory & contractual requirements regarding precast unit.
- ✧ Ensure the design of precast units complied with the regulations and nature of work.
- ✧ Chair regular and ad-hoc meetings to review and discuss the installation process.
- ✧ Assign competent supervisors to supervise the installation work and to take remedial actions for any irregularities.

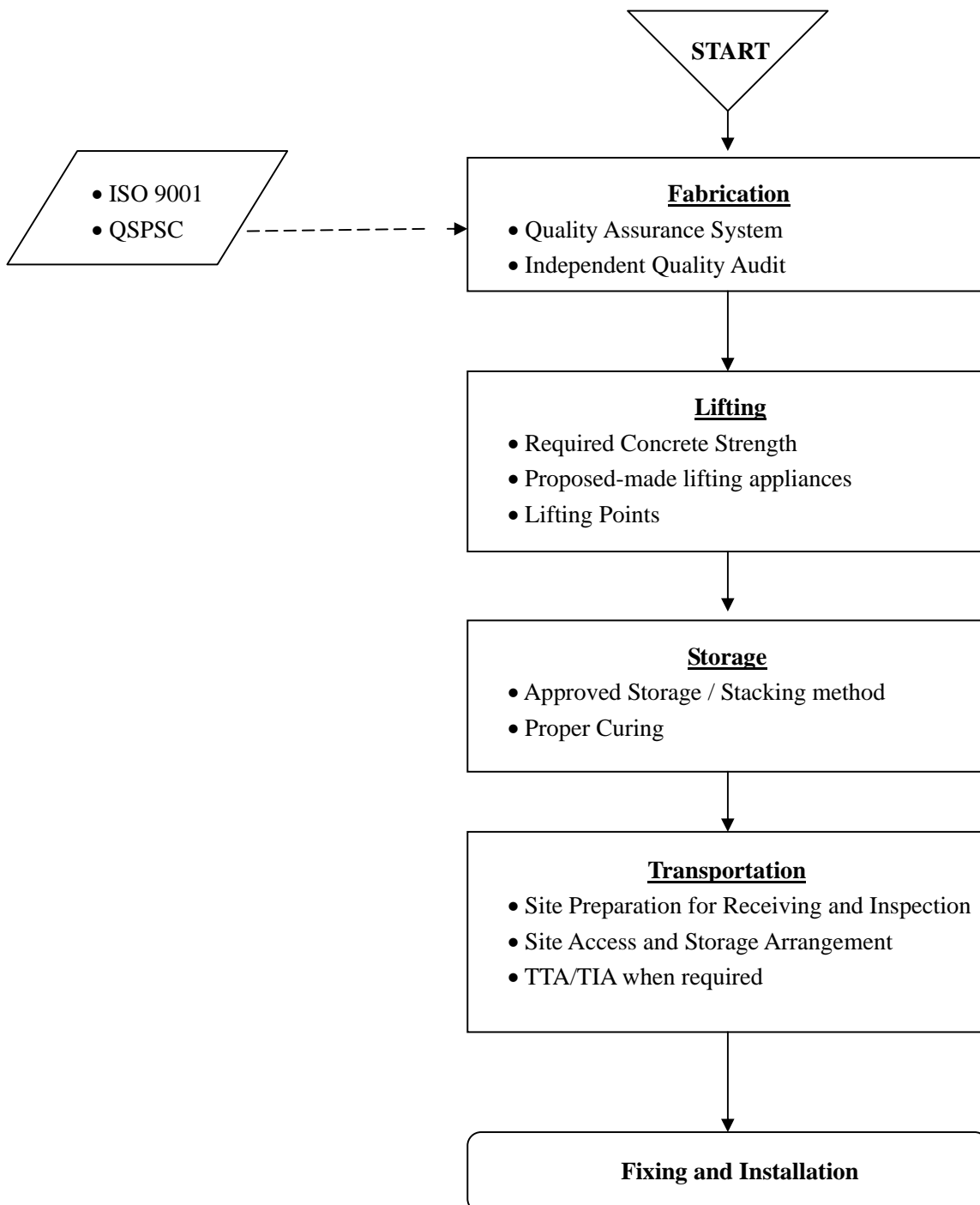
6. Flowchart A

Flow Chart for Precast Construction (Planning Process)



7. Flowchart B

Flow Chart for Precast Construction (Manufacturing Process)



8. Flowchart C

Flow Chart for Precast Construction (Installation Process)

