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Technical Code for Safety of High Altitude Operation of Building Construction

建筑施工高处作业安全技术规范

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Notice on Promulgation of Professional Standard "Technical Code for Safety of High Altitude Operation of Building Construction"

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In accordance with requirements of Document CHENGKEZI [86] No.263 issued by Former Ministry of Urban and Rural Construction and Environmental Protection, "Technical Code for Safety of High Altitude Operation of Building Construction" developed by Shanghai Building Construction Technical Research Institute has passed the examination, and is approved as an Professional Standard. the standard number is JGJ 80-91, and the standard is executed on August 1, 1992.

This standard is governed by Ministry of Construction safety standards technique safety standards technique governing organization- China Construction First Building Group Building Research Institute, and explained by Shanghai Building Construction Technical Research Institute. Research institute of Standards & Norms presides over publishing.

Ministry of Construction of the People's Republic of China

August 1, 1992

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Technical Code for Safety of High Altitude Operation of Building Construction

I General Provision

1.0.1 The standard is established for implementing the guideline of safety production in high altitude operation during building construction, and for realizing definite safety requirement, reasonable technique and economic applicability.

1.0.2 The standard is applicable to high altitude operations such as edge-near, hole, climbing, hanging, operating platform and cross operations during the industrial and civil building construction, and normal structures construction.

The standard is also applicable to others engineering construction needing high altitude operations on all classes of hole, excavation, gutter, tank and so on.

1.0.3 So called high altitude operation in this standard should meet specifications "do operation on the position where is 2 m (including 2 m)above the falling height base level and it has falling possibility" specified by national standard "Classification of Works at Heights" GB 3608-83.

1.0.4 High altitude operation should meet specifications related to relative national high altitude operation and safety technique standard, besides this standard.

II General Rules

2.0.1 Technical safety measures and required materials and tools shall be listed in the organization design of the engineering construction.

2.0.2 The a person in charge of the construction should preside over safety techniques for high altitude operation in the engineering, and the corresponding responsibility system should be established.

Gradual safety technique education and disclosure should be carried out before the construction, and all technical safety measures process ands personnel protection items should be put into effect. The construction shall not be processed without full implementation.

2.0.3 Safety marks, tools, instruments, electric utility and all sorts of implements shall be inspected, and they could be used after their sound condition is confirmed.

III Safety Protection for Edge-near and Opening Operation

3.1 Edge-near Operation

3.1.1 Protective measures should be taken for edge-near high altitude operation, and should correspond with following specifications:

1 Guard rails should be emplaced at foundation trench periphery, at verandas that are not emplaced with handrail or fence, material platform and raising platform periphery, at non-external-falsework roofing and floor periphery and at water tank and water tower periphery.

2. Safety protection net should be erected at the periphery of which second floor that its first floor wall height exceed 3.2 m and at periphery which floor height exceed 3.2 m without falsework.

3. Temporary guardrails should be emplaced for staircase heads staircase side in flooring construction. Staircase head at top floor should be emplaced formal guard rails with engineering structure process.

4. Guardrails should be emplaced on passages between headframe and construction elevator, and falsework and building. Safety protection shed should be emplaced at upper position of ground passage. the middle of double-cage headframe passage should be separated and sealed.

5. For all sorts of vertical material receiving platforms, platform head should be emplaced with safety gates or movable guard rails as well as guardrails on both sides.

3.1.2 Specifications and jointing requirements for edge-near guard rails members should correspond with following specifications:

The little end effective diameter of bamboo rail should not be less than 70 mm. the baluster tip diameter should not be less than 80 mm. steel wire which level is not less than 16 should be used for binding balusters and binding circle number should not be less than 3. there should be no slip in binding.

2. The upper bar top diameter of rough lumber rail should not be less than 70 mm. the lower bar top diameter should not be less than 60 mm. and the baluster top diameter should not be less than 75 mm. Wire nail with corresponding length should be used for clenching or galvanized wire which level is not less than 12 should be used for banding, and the surface should be smooth and steady.

3. The upper bar diameter of steel bar rail should not be less than 16mm, the lower bar diameter should not be less than 14 mm. the baluster diameter should not be less than 18 mm. electric welding or galvanized wire should be used for fixing.

5. In case the external side of the edge are facing street, whole closing treatments such as emplacing safety net and others reliable measures should be taken besides guard rails are adopted.

3.1.4 Mechanics calculation and structural style of edge-near guard rails are detailed in Annex 2.

3.2 Opening operation

3.2.1 When opening operation is taken ,or others high altitude operations are taken at opening where there are person or object falling hazard or personal safety hazard because of project and procedure requirement, safeguard devices should be emplaced according to following specifications:

1. Opening of broad or wall shall be emplaced with firm cover board, guard rail, safety net or others falling-proof safeguard facilities.

2. Guard rails and fixing fence gate should be emplaced at the opening of the elevator shaft; a safety net should be emplaced every 2 floors or at most 10 m.

3. Reinforced covering components should be emplaced at upper ports of pipe pile, bored pile and so on, at upper ports of cup-shape and strip foundation, not-earth-filled delve, and sight hole, scuttle and trapdoor.

4. Red light warning should be emplaced at night for all sorts of openings and holes, besides safeguard facilities and safety marks are emplaced.

3.2.2 Measures such as emplacing guard rails, covering components, erecting safety net and setting fence gate should be taken correspond with following requirements:

The opening which short edge size is less than 25 cm and greater than 2.5 cm on floor, roof truss and platform should be covered through sturdy cover board. cover boards should be prevent from displacement.

2. Opening on floor etc. which side length is 25- 50 cm, opening installed with precast components and temporary opening could be covered with bamboo and wood cover board. covering board should be emplaced stoutly in all directions, and fixing measures should be taken.

3. Grid formed through fastener clipping with steel pipe should be emplaced to cover opening which side length is 50-150 cm, and bamboo fence and ledger board should be covered on the grid. And rebar protecting net running through the concrete slab is also adopted, and the steel grid spacing interval shall not be greater than 20 cm.

4. Guard rails should be emplaced at periphery of opening with 150 cm or more side length, and the safety net should be emplaced under the opening.

4.1.4 Mobile ladder, its quality shall be checked and accepted according to current national standard.

4.1.5 Bottom of ladder butt shall be steady and can't be blocked up to use. Top of ladder shall be equipped with tightening devices. Appropriate operating angle of stand ladder shall be 75±5 degree; appropriate spacing between pedals shall be 30 cm; lacking step is unallowable.

4.1.6 If it is required to prolong the ladder for use, reliable joining means shall be offered and joint shall be no more than one. intensity of ladder beam after joining shall not below intensity of single-ladder's beam.

4.1.7 When use folding stair, its upper included angle shall be 35 - 45 degree; its hinge must be solid and be equipped with reliable tension-brace devices.

4.1.8 Fixed-type step ladder shall be made from metallic materials. Its width shall not exceed 50cm; its support shall be angle steel of no less than L70×6; and it shall be buried and welded firmly. Rung located at ladder top shall be flush with climbing super-face and shall be equipped with handrail of 1~1.5m high.

When use step ladder to conduct climbing operation, the appropriate climbing height is 5m. when the climbing height adds 2m, it is required to install safety cage; when it adds 8m, platform between ladders is required.

4.1.9 Operators shall go through specified passage. They are forbidden to climb through non-specified passages between verandas or discretionarily climb with construction equipment like crane boom.

It is required to look on ladder without any thing in hands while going up and down the ladder.

4.1.10 It is required to use steel ladder jack or climbing steps installed at steel column when ascend to install steel column. Construction of ladder jack is showed in figure 4.1 of appendix 4.

Ladder or operation desk shall be used for joint column of steel column. Height of cross rod of operation desk shall conform the following rules: When there isn't requirement of windproof electric welding, the height shall be no less than 1m; when there is requirement of windproof electric welding, the height shall be no less than 1.8m. Refer to figure 4.2 of appendix 4.

4.1.11 When ascend to install steel beam, ladder jack or tubular scaffold can be set up on both sides in accordance with height of steel beam. Refer to figure 4.3 of appendix 4 for structural form.

If it is necessary to walk on beam surface, Tight-wire can be used as cross rod at one

6.0.2 Safety protection facilities shall be checked and received by superintendent of unit construction and organizing persons concerned to take part in the work.

6.0.3 Check and receive of safety protection facilities shall possess the following materials:

1. Construction design and related checking computation data

2. Examining and receiving record of safety protection facilities

3. Change record and visa of safety protection facilities

6.0.4 Examination and receiving of safety protection facilities mainly include following contents:

1. Distribution of all manner of technical measures such as verges and holes;

2. Specification and material quality of component, material and instrument used for technical measures.

3. Technical measures' node construction and stationary case of node and building;

4. Fastening extent of fastener and junction piece;

5. Verification about whether property and quality of things and equipment for safety protection facilities are qualified.

6.0.5 Check and receiving of safety protection facilities shall be carried out item by item according to classification and examining and receiving records are required. The facilities against provisions shall be checked again after repairing to be qualified. Spot test shall be carried out on regular basis during construction period.

Fig. 6.1 Cross operation passage shield (Unit: mm)

Annex 7 Wording Explanation

1. It is required in this provision to define the wordings used to express the degrees of strictness. In implementation, deal with each case in accordance with the following statements of wordings:

(1) Wordings used to express requirements that must be very strictly followed without any deviation thereof.

Wording in positive form to be used is "must", and the equivalent expressions are "it is necessary (required to)…", "only … is permitted…"

Wording in negative form to be used is "shall not", and the equivalent expressions are " it is not allowed (permitted, acceptable or permissible)…"

(2) Wordings used to express something shall be done in this way under normal conditions.

Wording in positive form to be used is "shall".

Wording in negative form to be used is "shall not" or "is required to be not …", "it is not allowed (permitted, acceptable, permissible)…"

(3) Wordings used to expression the action steps are allowed with possibilities for selection or when the conditions are permissible it should be done first:

Wording in positive form to be used is "should" or "may", and the equivalent expression is "it is recommended that…"

Wording in negative form to be used is "should not", and the equivalent expression is "it is not recommended …"

2. Wording of “shall be executed according to …….” or “shall conform to the provisions of…….” is used when other relevant codes and standards shall be followed.

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