TENDER DOCUMENT

FOR

Construction of scaffolding structures for structural safety & Integrity and GPR Tests to be conducted at Dam site under North Koel Reservoir Project, Bihar & Jharkhand

TENDER NO: WAP/INFRA./NK/JH/SF/2025

VOLUME 3: TECHNICAL SPECIFICATIONS

Issued to M/s

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WAPCOS

(भारत सरकार का उपक्रम–जल शक्ति मंत्रालय)

(A Government of India Undertaking-Ministry of Jal Shakti)

Part-I General Specifications

1.1 GENERAL

1.1.1 The work shall be carried out strictly in accordance with particular specifications and drawings. The drawings, specifications, BOQ etc. shall be taken complementary and also supplementary to each other and shall form part this contract. Any work or material shown on drawings and not specifically included in BOQ/specification or vice versa shall be executed and deemed to be included in the scope of work.

1.1.2 In case there are no specifications for items shown on the drawings or where items are not exhaustively described, the general specifications of CPWD shall be followed for which nothing extra shall be paid. In case, no details are available even in CPWD specification, then decision of employer is final & binding on the contractor.

1.1.3 The rates for all items of work unless clearly specified otherwise shall include cost of all labour, materials and other inputs involved in the execution of the items.

1.1.4 The Contractor shall be responsible for furnishing all materials required for execution of the Works. The Contractor shall submit the source and method of execution for the Employer's review before any execution. All materials used in the construction of permanent works required under this Contract shall be of 1st class quality as specified herein and comply with the latest IS Codes or equivalent. The material shall be tested before bringing it to the site.

1.1.5 This specification establishes and defines the requirements of various materials to be used in Civil and Structural works. Whenever any reference to IS Codes is made, the same shall be taken as the latest revision (with all amendments issued thereto) as on the date of submission of the Tender. Apart from the IS Codes mentioned in particular in various clauses of this specification, all other relevant codes related to specific job under consideration regarding quality, tests, testing and/or inspection procedures shall be applicable. Reference to some of the codes in various clauses of this specification does not limit or restrict the scope of applicability of other referred or relevant codes.

1.1.6 In case of any variation/contradiction between the provision of IS Codes and this specification, the provision given in this specification shall be followed, unless the Employer agrees/consents to follow IS codes or other proposal of the contractor as provided in the Contract.

1.1.7 All materials shall be of standard quality and shall be procured from renowned sources/manufacturers approved by the/Employer. It shall be the responsibility of the contractor, to get all materials/manufacturers approved by the Employer prior to procurement and placement of order.

1.1.8 Wherever brand is not mentioned, contractor shall take prior approval of brand complying with the tender specifications however mentioning the brand considered in the Bid submission shall prevail if specified earlier.

1.1.9 Whenever called for by the Employer, all tests of the materials as specified by the relevant IS Codes shall be carried out by the Contractor in an approved laboratory and test reports duly authenticated by the laboratory, shall be submitted to the Employer for his approval. If so desired by the Employer, tests shall be conducted in the presence of the Employer or his authorized nominee.

1.1.10 Quality and acceptability of materials not covered under this specification shall be governed by the relevant IS Codes. In case IS code is not available for the particular material, other codes e.g. B.S. or DIN or API/ASTM etc. shall be considered. The decision of Employer in this regard shall be final and binding on the Contractor.

1.1.11 Whenever asked for, the Contractor shall submit representative samples of materials to the Employer for his inspection and approval. Approval of any samples does not necessarily exempt the

Contractor from submitting necessary test reports for the approved material, as per the specification/relevant IS Codes.

1.1.12 The Contractor shall submit manufacturer's test reports on quality and suitability of any material procured from them and their recommendation on storage, application, workmanship etc. for the intended use. Submission of manufacturer's test reports does not restrict the Employer from asking fresh test results from an approved laboratory of the actual material supplied from an approved manufacturer/source at any stage of execution of work.

1.1.13 All costs relating to or arising out of the tests and submission of test reports and or samples to the Employer for his approval till the date of issuance of Performance Certificate shall be borne by the Contractor.

1.1.14 Materials for approval shall be separately stored and marked, as directed by the Employer and shall not be used in the Works till these are approved.

1.1.15 All rejected materials shall be immediately removed from the site by the Contractor at his own cost.

1.2 GENERAL STANDARDS

The new facilities shall be completed to high standards of construction and specification. The facilities shall be technically and functionally suitable to meet the Employer's objectives:

i. The Architectural finishes shall be of such quality that will ensure better hygienic conditions.
ii. The architectural design takes into account the requirements of physically challenged persons
iii. All the material procured or to be used should be to the satisfaction of the Employer before being used for the works intended to.
iv. Provision should be made for internal and external signages, display boards, in the required area.

1.3 UNACCEPTABLE MATERIALS AND PROCESSES

The materials and processes given below must not be used in the New Facilities or in connection with the New Facilities.

- High alumina cement in structural elements
- Calcium chloride as a concrete additive
- Sea dredged aggregates or aggregates for use in reinforced concrete
- Asbestos cement products; or asbestos in any other form including vermiculite containing asbestos fibrous dust
- Lead or any products containing lead for use in connection with drinking water
- Materials which are generally composed of mineral fibres either man made or naturally occurring which have a diameter of 3 microns or less and a length of 200 microns or less or which contain any fibres not scaled or otherwise stabilised to ensure that fibre migration is prevented
- Plastics for water storage and delivery that release toxic materials
- Plywood with glues, resins and surface treatments that produce irritant volatiles
- Decorative finishes containing lead or asbestos
- Materials containing chlorofluorocarbons (CFCs)
- Paints and wood preservatives containing pentachlorophenois (PCPs) tributyl tin oxide (TBTO) or Lindane
- Any treatment of materials either before or after installation which give rise to toxic or hazardous emissions or particles
- Any other substances generally known at the time of use to be deleterious to health and safety or to the durability of the works in the particular circumstances they are used

1.4 INTERPRETATIONS

Wherever any reference is made to any Indian Standard, it shall be taken as reference to the latest edition with all amendments issued thereto. In the event of any variation between the CPWD specifications and the Indian Standard, the former shall take precedence over the latter.

1.5 MEASUREMENTS

1.5.1 In booking dimensions, the order shall be consistent and in the sequence of length, width and height or depth or thickness.

1.5.2 Rounding off: Rounding off where required shall be done in accordance with IS: 2-1960. The number of significant places rounded in the rounded off value should be as specified.

1.6 MATERIALS

1.6.1 Samples of all materials to be used on the work shall be got approved by the contractor from the Engineer-in-Charge well in time. All materials to be provided by the contractor shall be brand new and as per the samples approved by the Engineer-in-Charge.

1.6.2 Materials obtained by the contractor shall be subjected to the Mandatory tests. Where such materials do not conform to the relevant specifications, the matter shall be taken up by the Engineer-in-Charge for appropriate action against the defaulters. In all such cases, necessary documents in original and proof of payment relating to the procurement of materials shall be made available by the contractor to the Engineer-in-Charge.

1.6.3 Samples, whether submitted for approval to govern bulk supplies or required for testing before use and also the sample of materials bearing 'Standard mark,' if required for testing, shall be provided free of cost by the contractor. All other incidental expenditure to be incurred for testing of samples e.g. packaging, sealing transportation, loading, unloading etc. and testing charges shall be borne by the contractor.

1.6.4 The materials, supplied by the contractor shall be deemed to be complying with the specifications.

1.6.5 Materials stored at site, depending upon the individual characteristics, shall be protected from atmospheric effects due to rain, sun, wind and moisture to avoid deterioration.

1.6.6 Materials like timber, paints etc. shall be stored in such a way that there may not be any possibility of fire hazards. Inflammable materials and explosives shall be stored in accordance with the relevant rules and regulations so as to ensure desired safety during storage.

1.6.7 The unit weight of materials unless otherwise specified shall be reckoned as given in IS: 1911-1967.

1.7 SAFETY IN CONSTRUCTION

1.7.1 The contractor shall employ only such methods of construction, tools and plant as are appropriate for the type of work or as approved by Engineer-in-Charge in writing.

1.7.2 The contractor shall take all precautions and measures to ensure safety of works and workman and shall be fully responsible for the same. Safety pertaining to construction works such as excavation, centering and shuttering, trenching, blasting, demolition, electric connections, scaffolds, ladders, working platforms, gangway, mixing of bituminous materials, electric and gas welding, use of hoisting and construction machinery shall be governed by CPWD safety code, relevant safety codes and the direction of Engineer-in-Charge

1.8 ABBREVIATIONS

The following abbreviations wherever they appear in the specifications, shall have the meaning or implication hereby assigned to them:

Mm	Millimetre
Cm	Centimetre
M	Metre
Km	Kilometre
Mm2/sqmm	Square Milimetre
Cm2/sqcm	Square centimetre
Dm2/sqdm	Square decimetre
M2/sqm	Square metre
Cm3/ cubic cm	Cubic centimetre
Dm3/ cubic dm	Cubic decimetre
M3/cum	Cubic metre
Ml	Millilitre
Kl	Kilolitre
Gm	Gram
Kg	Kilogram
Q	Quintal
T	Tonne
Fps system	Foot pound second system
°C	Degree Celsius temperature
Fig	Figure
Re/Rs	Rupee/ Rupees
No	Number
Dia	Diameter
AC	Asbestos cement
CI	Cast Iron
GC	Galvanised corrugated
GP	Galvanised plain
GI	Galvanised iron
PVC	Polyvinyl chloride
RCC	Reinforced cement concrete
SW	Stone ware
SWG	Standard wire Gauge

1.9 CARRIAGE OF MATERIALS

The carriage and stacking of materials shall be done as per CPWD specification or as directed by the Engineer-in-Charge. Any tools and plants, required for the work shall be arranged by the Contractor. Nothing shall be paid extra on account of Carriage.

1.9.1 RESPONSIBILITY FOR LOSS OR DAMAGE

Loading, carriage, unloading and stacking shall be done carefully to avoid loss or damage to the materials

Part II- Scaffolding Specifications

2.1 Scaffolding Work

Scaffolding is defined as any structure, framework, swinging stage, suspended scaffolding, or boatswain's chair, of a temporary nature, used or intended to be used for the support or protection of workers engaged in or in connection with construction work, for the purpose of carrying out that work or for the support of materials used in connection with any such work; and includes any scaffolding constructed as such and not dismantled, whether or not it is being used as scaffolding; and also includes any plank, coupling, fastening, fitting or device used in connection with the construction, erection, or use of scaffolding.

Scaffolding process is defined as the planning for, the design of, the erection of, the inspection of, the use of, and the dismantling of any scaffolding. The scaffolding process does not include the erection of structures constructed using scaffolding components, such as falsework, temporary grandstands, lighting towers, etc.

2.1.1 MATERIALS

The HSE Regulations and various standards prescribe scaffolding made of timber, steel tubes, aluminum tubes or prefabricated frames. Other materials provided they are suitable and adequate in strength, may be used subject to the approval of the Secretary of Labour. All scaffold materials must be in sound condition and be examined by a competent person before use.

2.1.2 ERECTION, ALTERATION AND DISMANTLING

All scaffolding, whether notifiable or not, must be erected, altered and dismantled by competent workers under proper supervision.

Scaffolding must not be used unless the employer or employer's representative on the work is satisfied that it is safe for use and complies with the regulations.

Scaffolding must not be altered or interfered with except on the instructions of the employer or employer's representative. Scaffolders must ensure that members of the public are not endangered while they are erecting, altering or dismantling scaffolds. They should also ensure that the lower working platforms are not used while the upper lifts are being worked on unless a fully decked platform, with screens if necessary, separates the part being erected or dismantled from the lower part in use.

2.1.3 DUTIES OF PRINCIPALS, CONTRACTORS, SCAFFOLDING ERECTORS AND USERS OF SCAFFOLDS

All those involved in the construction work have responsibilities for the scaffolding process, and for the protection of those who use the scaffold in the course of their work. While the actual scaffolding process can vary fromproject to project, it is up to those involved to clarify the various responsibilities. The following may provide some assistance in the clarification of roles.

Property developers have responsibilities as principals under the HSE Act.Main contractors, project management consultants, and subcontractors who plan or order a scaffold erected have responsibilities as principals and as employers under the HSE Act with respect to the scaffold. Scaffolding contractors who erect the scaffold, and contractors and subcontractors who use the scaffold, have responsibilities as employers under the HSE Act. Employees of all the above have responsibilities as employees under the HSE Act.

(Note that each party can have responsibilities as both principal and employer at the same time.)

Specific duties of each party to the scaffolding process may include the following.

(a) Property developers, project management consultants, owners, and persons who control the workplace need to ensure that:

I. Adequately qualified contractors and consultants are employed on the project.

II. Sufficient monies are available to fund the works and the temporary works so that provisions can be made to protect employers, employees and others against the various hazards that may arise.

(b) Main contractors, project management consultants or subcontractors who engage others or contract for the erection of a scaffold need to:

I. Plan the work to be carried out from the scaffold and to specify any special requirements for the scaffold, e.g. any loads the scaffold may be expected to carry.
II. Co-ordinate the erection, use and dismantling of the scaffold.
III. Ensure the safety of others who may be in the vicinity of the scaffold, including members of the public.
IV. Provide for public protection including gantries, screening. This may include co-ordination with local authorities and obtaining permits as necessary.
V. Provide information about the foundation conditions for the scaffold, including information about the strength of verandahs and suspended slabs upon which the scaffold is to be erected.
VI. Provide information about the proximity of power lines and protective methods.
VII. Clearly communicate via specifications, drawings, or other informations, the scope and all requirements for the scaffold required, to the scaffolding erector.
VIII. Co-ordinate/delegate all subsequent inspections and alterations needed to ensure the safety of the scaffold and those using the scaffold. This will include the need to ensure that a scaffold register or scaffold record system is kept up to date
IX. Ensure protection of the scaffold from construction vehicles or other vehicles in the vicinity, including co-ordination of crane activities over the scaffold.

(c) Scaffolding erection companies must:

I. Develop a clear understanding of the scaffold required and the work that is to be carried out from the scaffold, including the need for protective gantries, screening, foundation conditions, and power cables.
II. Design and plan the scaffold and the erection process, including co-ordination with other employers who are in the vicinity, to ensure safety during construction, use, alteration and later dismantling of the scaffold.
III. Provide a scaffold that complies with the manufacturer's specification and the code of practice.
IV. On completion of the erection of the scaffold, inspect and certify that it is safe to use, and to hand over the scaffold to their principal. The hand over must include any information that could affect subsequent users of the scaffold, and any limitations of the scaffold.
V. Co-ordinate with the principal on the need for subsequent inspections and alterations as work proceeds on the project, e.g. alteration of working platforms, increasing the height of the scaffold, etc.

(d) Users of the scaffold must:

I. Understand any limitations of the scaffold that could affect their work, e.g. load limits.
II. Not alter the scaffold in any way that could affect its safety.
III. Liaise with the main contractor or the scaffold erector to have ties, work platforms, relocated or altered, etc., as necessary.
IV. Carry out their own works so as not to endanger others in the vicinity.

2.1.4 SCAFFOLDING REGISTER AND INSPECTION OF SCAFFOLDS

All suspended scaffolds and all other scaffolds which exceed 5 m in height, or from which a person could fall 5 m or more, are to be inspected before first use and at regular intervals. Details of these inspections are to be recorded in an on-site scaffold register or in a suitable scaffold record system and signed by person carrying out the inspection. These inspections may be carried out by a certificated scaffolder of the appropriate class, or by a competent person such as a registered engineer.

(a) Initial inspection

Before first use, the scaffold is to be finally inspected and any defects found are to be rectified before use.

(b) Subsequent inspections

The scaffold is to be inspected at the following intervals:

(i) Daily in the case of suspended scaffolds, or weekly in the case of all other scaffolds while the scaffolds are in use.

(ii) After each structural alteration, addition or change to the nature of the scaffold or its anchorages or ties.

(iii) Monthly while the scaffold is set up but not in use.

(iv) After any storm or occurrence that could adversely affect the safety of the scaffolding.

Should any defect be found during these inspections, the defect must be rectified prior to being reused.

Sample registers and checklists are included in Appendix A, although these are offered for guidance only.

2.1.5 PROTECTION AND MAINTENANCE

All scaffolding must be protected against accidental damage from traffic or other causes and should, where necessary, be barricaded or, alternatively, be well stayed or braced to avoid damage from vehicles.

2.1.6 ACCESS TO WORKING PLATFORMS

Access must be adequate and safe for the working conditions and type of work carried out. Employers should give consideration to the number of users of the scaffold and their need to carry materials, tools and equipment to the working platforms. Access may be provided by permanently installed stairways, temporary stairways or portable inclined ladders. Employees should not be expected to climb vertical ladders, or to climb the scaffold structure to gain access to working platforms.

Portable ladders should comply with the following:

(a) Ladders should be pitched at a slope of not less than 1 in 4 and not more than 1 in 6.

(b) Ladder should be securely tied to prevent them moving.

(c) Ladders should be provided with landings top and bottom, and the landing should be properly guarded.

(d) Maximum height between landings should not exceed 6.3 m.

(e) Ladders should extend at least 1 m above landings.

(f) The base of ladder should be offset from the head of ladder below, so that the ladders do not form a single continuous ladder.

2.2 TUBE SCAFFOLDING IN STEEL

2.2.1 SCOPE

This part deals with standing scaffolds where the standards, ledgers guardrails, midrails and putlogs are made of steel or aluminium tubes. The general rules may be applied to hanging scaffolds made of metal tubing.

2.2.2 GENERAL REQUIREMENTS

The general requirements for metal tubes and fittings of steel or aluminium are:

(a) Metal tubes must be purpose made with outside diameters accurately gauged to fit properly into the metal couplings and to allow complete interchangeability.

(b) Tubes in use on a scaffold must be in good condition, free from bends and defects that might affect strength, reasonably free from corrosion and cut square at the ends. Tubes which are 3 m and over in length should be reamed, if cut, to ensure safety when using internal joiners.

(c) When the loss of metal by corrosion or other causes reduces any cross section of a tube so that its corresponding weight is less than 90 percent of its original weight, the affected length of tube is to be discarded and rendered unfit for further use in scaffolding.

(d) Steel tubes must be hot-dipped galvanised or painted when used in scaffolds which are exposed for prolonged periods to marine or corrosive atmospheres.

(e) Fittings and couplings must be specially made for the tubes in use and must be of a satisfactory quality as to strength and performance.

(f) Fittings must be carefully maintained in good order and condition. They must not be left lying around but stored in bags, boxes or bins, and kept well oiled and protected from rusting.

(g) Special attention must be given to the care and checking of screw threads and nuts; worn or distorted parts must be discarded or replaced. Cracks or other flaws must be watched for.

2.2.3 MATERIALS

STEEL TUBES

Steel tubes shall comply with AS 1576.3 or BS 1139 and meet the following requirements:

Minimum yield strength	200 MPa
Outside diameter	48.3 mm
Minimum wall thickness	4.0 mm

Where steel tubes complying with BS 6323 parts 1 to 4, and with a minimum outside diameter and wall thickness 48.3 mm and 3.2 mm respectively are used for scaffolding, such tubes shall be galvanised in accordance with Annex-A of BS 1139 section 1.1.

COUPLERS AND ACCESSORIES

Couplers and accessories shall comply with AS 1576.2 or BS 1139 as appropriate for scaffold system being considered.

SPECIFIC REQUIREMENTS FOR STANDING SCAFFOLDS

STANDARDS

Standards must be pitched on base plates and set up vertically with spacings in accordance with table 1. Joints in standards must be staggered and must not occur:

(a) In adjacent standards in the same lift, i.e. joints should be two bay lengths apart; or

(b) In the same standard in adjacent vertical lifts, i.e. joints should be two vertical lift heights apart.

Sleeve couplers or spigot fittings shall be used to connect standards.

LEDGERS

Ledgers must be:

(a) Continuous for the full length of the scaffold;

(b) Attached to both rows of standards at the level of each lift; and

(c) Horizontal and fixed with right-angle couplers to the inside of the standards.

Joints in ledgers shall be staggered and shall not be located in the middle third of the distance between adjacent standards, or in horizontally or vertically adjacent ledgers in the same bay.

Sleeve couplers or spigot fittings shall be used to connect ledgers. Ledger spacings must conform to table 1.

PUTLOGS

Putlogs must be placed at each pair of standards for all scaffolds. For a medium-duty scaffold, one intermediate putlog must also be provided in each bay to support timber scaffold planks when the span exceeds 2 m. For a heavy-duty scaffold, one intermediate putlog must be provided to each bay to support timber scaffold planks when the span exceeds 1.6 m. Putlogs may be connected to ledgers with either right-angle couplers or putlog couplers. However, right-angle couplers only must be used when putlogs are required to transmit forces that are when:

(a) Putlogs are underslung from ledgers;
(b) Putlogs are used as ties and spreaders;
(c) Putlogs are placed adjacent to ties and spreaders;
(d) Putlogs are to be connected to braces.

Putlog spacings must comply with table 1.

TIES

Ties must be uniformly spaced over the face of the scaffolding in accordance with table 1.

BRACES

Braces comprising scaffold tubes must be connected as close as practicable to standard ledger intersections. Where required:

(a) Transverse diagonal bracing must be fixed at each lift, either to ledgers with right-angle couplers or to standards with swivel couplers.
(b) Longitudinal diagonal bracing must be fixed to every standard with swivel couplers and/or to extended putlogs on every lift with right- angle couplers.

Diagonal bracing must be continuous and be joined with sleeve couplers. The detailed requirements for steel and aluminium tubular scaffolds are summarised in table 1.

TABLE 1: TUBULAR SCAFFOLDS IN STEEL AND ALUMINIUM

Member	**Light-Duty**	**Medium-Duty**	**Heavy-Duty**	**Notes**
1. Working Platforms				(i) Maximum height of scaffold must not exceed 33 m.
Number per bay that may be used at one time, when				(ii) Height of each lift must not exceed 2.1 m, except for the first lift which may be up to 3 m in height.
(a) height does not exceed 33 m	2	1	1	
(b) height does not exceed 13.5 m	4	2	2	
2. Scaffold Planks				When the span of a medium-duty platform decked ...
(a) Timber planks				With timber planks exceeds 2.0 m, one
(solid or laminated)	2.4 m	2.0 m	1.2 m	intermediate putlog must be used.
(b) Metal planks				One intermediate putlog must be used
(steel or aluminum)	2.4 m	2.4 m	1.8 m	on heavy-duty platforms decked with timber planks.
3. Standards				(i) All members, including bracing,
(a) Longitudinal spacing	2.4 m (max)		1.8 m	guardrails and mid rails, consist of
(b) Transverse spacing	1.55 m (max)		1.27 m	either steel tubes for steel scaffolds, or aluminum tubes for aluminum
4. Ledgers				scaffolds. Aluminum tubes and steel
(a) Horizontal spacing (between standards)	1.45 m			tubes must not be mixed unless it is a requirement of a special design.
(b) Vertical spacing (i.e. Lift height)	2.1 m (max) 1.8 m (min)			(ii) Putlogs are connected to ledgers at each pair of standards.
5. Putlogs				(iii) Guardrails and mid rails are fixed

Maximum span	1.45 m	1.27 m	to the inside of standards. (iv) All dimensions are from centre to centre of the respective members.
6. Ties (a) Horizontal spacing (b) Vertical spacing	4.8 m (i.e. on alternative pair of standards) 4.2 m (i.e. on alternative lifts)		(i) One tie must be provided at or as near as practicable to the top-most working platform. (ii) The vertical tie spacing may be increased to 8.4 m provided one substantial tie is placed at the top-most working platform and that transverse dogleg bracing is used on alternate pairs of standards. (iii) The horizontal tie spacing may be increased to 9.6 m provided that substantial ties are placed at the end pairs of standards and that plan bracing is placed at the level of the ties.
7. Bracing (a) Transverse diagonal (b) Longitudinal diagonal			At each end of standards and at not more than every tenth pair of standards along the scaffold. This is not required when dogleg bracing is used in lieu of ties. One diagonal for every 3 bays or less in length, and 3 lifts in height of scaffold, on outer face and at approximately 40 Degree slope, arranged either in a zigzag pattern from bottom to top or sloping continuously from bottom to top.

BRACING

Adequate bracing must be provided as follows:

PLAN BRACING

Where the horizontal tie spacing cannot be complied with, plan bracing shall be provided. Even with this bracing provided, the maximum horizontal distance between tie points shall not exceed 9.6 m.

DOGLEG BRACING

Where it is impracticable to fit ties at the vertical spacing specified, dogleg bracing shall be provided. With such bracing the distance between tie points shall not exceed 8.4 m or 4 lifts.

Temporary ties may be required to ensure stability of the scaffold during erection and dismantling.

When plan or dogleg bracing is used, the ties are required to carry substantial loads. The ties shall be capable of carrying this load.

(a) Transverse diagonal bracing must be fixed to each end pair of standards and at not more than every tenth pair of standards along the scaffold. This bracing may be temporarily removed on a working lift to facilitate movement of materials but must be replaced as soon as practicable. This bracing is not required when dogleg bracing is used in lieu of ties.

(b) Longitudinal diagonal bracing must be fixed to the external face of the scaffold, and at regular intervals along its length. The bracing, which is required to resist wind and earthquake forces in particular, must be capable of withstanding a horizontal force of not less than one-tenth of the total of the weight of the scaffold and the full live load on the working platforms.