Section 1705.1.2 (new) Special Inspections for Connections, Fastening, and Anchorages (12010)

IBC: SECTION 1705, 1705.1, 1705.1.1, 1705.1.2 (New), 1705.2.4, TABLE 1705.2.4, 1705.5.3, TABLE 1705.5.3, 1705.12, 1705.12.1, 1705.12.2, 1705.12.3, 1705.13, 1705.13.1, 1705.13.1.1, 1705.13.1.2, 1705.13.2, 1705.13.3, 1705.13.4, 1705.13.5, 1705.13.5.1, 1705.13.6

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2024 International Building Code

SECTION 1705
REQUIRED SPECIAL INSPECTIONS AND TESTS

1705.1 General. *Special inspections* and tests of elements and nonstructural components of *buildings* and *structures* shall meet the applicable requirements of this section.

1705.1.1 Special cases. *Special inspections* and tests shall be required for proposed work that is, in the opinion of the *building official*, unusual in its nature, such as, but not limited to, the following examples:

1. Construction materials and systems that are alternatives to materials and systems prescribed by this code.
2. Unusual design applications of materials described in this code.
3. Materials and systems required to be installed in accordance with additional manufacturer's instructions that prescribe requirements not contained in this code or in standards referenced by this code.

Add new text as follows:

1705.1.2 Special inspection of connections, fastening, and anchorages. Where this section is specified in Section 1705, s*pecial inspection* of connections, fastening, and anchorages shall be performed in accordance with this section. The following applicable items shall be verified to comply with *construction documents*, valid evaluation reports and manufacturer's printed installation instructions.

1. Materials of members being connected.
2. Component materials, coatings, and surface preparation.
3. Component geometry, thicknesses, clearances, and material cover.
4. Fastener type, quantity, layout, size, length, edge distances, critical spacing, seating or bearing conditions, and embedment depths or thread engagement.
5. Fastener installation torques, pre-tension loads, or other special procedures.
6. Accommodation of specified allowable movements including length, direction, freedom of slip, and clearances.
7. Pretensioned bolts and other similar connectors achieve specified contact between connected members.

1705.2.4 Open-web steel joists and joist girders. *Special inspections* of open-web *steel joists* and joist girders in *buildings*, *structures* and portions thereof shall be in accordance with Table 1705.2.4.

TABLE 1705.2.4 REQUIRED SPECIAL INSPECTIONS OF OPEN-WEB STEEL JOISTS AND JOIST GIRDERS

TYPE	CONTINUOUS SPECIAL INSPECTION	PERIODIC SPECIAL INSPECTION	REFERENCED STANDARD[a]

TYPE	CONTINUOUS SPECIAL INSPECTION	PERIODIC SPECIAL INSPECTION	REFERENCED STANDARD
1. Installation of open-web steel joists and joist girders.			
a. End connections – welding or bolted.	—	X	~~SJI specifications listed in Section 2207.1.~~ 1705.1.2
b. Bridging – horizontal or diagonal.	—	—	—
1.Standard bridging.	—	X	SJI specifications listed in Section 2207.1.
2.Bridging that differs from the SJI specifications listed in Section 2207.1.	—	X	—

a. Where applicable, see Section 1705.13.

1705.5.3 Mass timber construction. *Special inspections* of *mass timber* elements in Types IV-A, IV-B and IV-C construction shall be in accordance with Table 1705.5.3.

TABLE 1705.5.3 REQUIRED SPECIAL INSPECTIONS OF MASS TIMBER CONSTRUCTION

TYPE			CONTINUOUS SPECIAL INSPECTION	PERIODIC SPECIAL INSPECTION
1.	Inspection of anchorage and connections of mass timber construction to timber deep foundation systems. Inspect per section 1705.1.2.		—	X
2.	Inspect erection of mass timber construction.		—	X
3.	Inspection of connections where installation methods are required to meet design loads.			
	Threaded fasteners.	Verify use of proper installation equipment.	—	X
		Verify use of pre-drilled holes where required.	—	X
		Inspect screws, including diameter, length, head type, spacing, installation angle and depth.	—	X
	Adhesive anchors installed in horizontal or upwardly inclined orientation to resist sustained tension loads. Inspect per section 1705.1.2.		X	—
	Adhesive anchors not defined in preceding cell. Inspect per section 1705.1.2.		—	X
	Bolted connections. Inspect per section 1705.1.2.		—	X
	Concealed connections. Inspect per section 1705.1.2.		—	X

1705.12 Special inspections for wind resistance. *Special inspections* for wind resistance specified in Sections 1705.12.1 through 1705.12.3, unless exempted by the exceptions to Section 1704.2, are required for *buildings* and *structures* constructed in the following areas:

1. In wind Exposure Category B, where *basic wind speed*, *V,* is 150 mph (67 m/sec) or greater.
2. In wind Exposure Category C or D, where *basic wind speed*, *V,* is 140 mph (62.6 m/sec) or greater.

1705.12.1 Structural wood. *Continuous special inspection* is required during field gluing operations of elements of the *main windforce-resisting system*. *Periodic special inspection* per section 1705.1.2 is required for nailing, bolting, anchoring and other fastening of elements of the *main windforce-resisting system*, including wood shear walls, wood *diaphragms*, *drag struts*, braces and *hold-downs*.

Exception: *Special inspections* are not required for wood shear walls, shear panels and *diaphragms*, including nailing, bolting, anchoring and other fastening to other elements of the *main windforce-resisting system*, where the lateral resistance is provided by structural sheathing and the specified fastener spacing at panel edges is more than 4 inches (102 mm) on center.

1705.12.2 Cold-formed steel light-frame construction. *Periodic special inspection* is required for welding operations of elements of the *main windforce-resisting system*. *Periodic special inspection* is required for screw attachment, bolting, anchoring and other fastening of elements of the *main windforce-resisting system*, including shear walls, braces, *diaphragms*, *collectors* (*drag struts*) and *hold-downs*. Inspection tasks shall be as follows:

1. Special inspections for screw and bolt attachments to the items above shall be per the quality assurance inspector tasks listed in AISI S240 Section D6.10.
2. Special inspections for welding operations to fasten the items above shall be per the quality assurance inspector tasks listed in AISI S240 Tables D6.7-2 and D6.7-3.

Exception: *Special inspections* are not required for cold-formed steel light-frame shear walls and *diaphragms*, including screwing, bolting, anchoring and other fastening to components of the windforce-resisting system, where either of the following applies:

1. The sheathing is *gypsum board* or *fiberboard*.
2. The sheathing is *wood structural panel* or steel sheets on only one side of the shear wall, shear panel or *diaphragm* assembly and the specified fastener spacing at the panel or sheet edges is more than 4 inches (102 mm) on center (o.c.).

1705.12.3 Wind-resisting components. *Periodic special inspection* per section 1705.1.2 is required for fastening of the following systems and components:

1. *Roof covering*, *roof deck* and roof framing connections.
2. *Exterior wall covering* and wall connections to roof and floor *diaphragms* and framing.

Exceptions: Special inspections for the following items shall be performed in accordance with the referenced section rather than section 1705.1.2.1. *Special inspections* for sidelaps of cold-formed steel deck panels and for fastening of cold-formed steel decks to roof framing and to exterior wall framing shall be performed in accordance with section 1705.2.3.2. *Special inspections* for structural steel connections shall be performed in accordance with section 1705.2.1.3. *Special inspections* for concrete roof deck, concrete roof framing connections, and concrete wall connections to roof and floor diaphragms and framing shall be performed in accordance with section 1705.3.4. *Special inspections* for connections of high-load wood roof *diaphragms* to roof framing shall be performed in accordance with section 1705.5.1.5. *Special inspections* for threaded fastener *mass timber* connections shall be performed in accordance with Table 1705.5.3.

1705.13 Special inspections for seismic resistance. *Special inspections* for seismic resistance shall be required as specified in Sections 1705.13.1 through 1705.13.9, unless exempted by the exceptions of Section 1704.2.

Exception: The *special inspections* specified in Sections 1705.13.1 through 1705.13.9 are not required for *structures* designed and constructed in accordance with one of the following:

1. The *structure* consists of *light-frame construction*; the design spectral response acceleration at short periods, S_{DS}, as determined in Section 1613.2.4, does not exceed 0.5; and the *building height* of the *structure* does not exceed 35 feet (10 668 mm).
2. The *seismic force-resisting system* of the *structure* consists of *reinforced masonry* or reinforced concrete; the design spectral response acceleration at short periods, S_{DS}, as determined in Section 1613.2.4, does not exceed 0.5; and the *building height* of the *structure* does not exceed 25 feet (7620 mm).
3. The *structure* is a detached one- or two-family *dwelling* not exceeding two *stories above grade plane* and does not have any of the following horizontal or vertical irregularities in accordance with Section 12.3 of ASCE 7:
   3.1. Torsional or extreme torsional irregularity.
   3.2. Nonparallel systems irregularity.
   3.3. Stiffness-soft story or stiffness-extreme soft story irregularity.
   3.4. Discontinuity in lateral strength-weak story irregularity.

1705.13.1 Structural steel. *Special inspections* for seismic resistance shall be in accordance with Section 1705.13.1.1 or 1705.13.1.2, as applicable.

1705.13.1.1 Seismic force-resisting systems. *Special inspections* of structural steel in the *seismic force-resisting systems* in *buildings* and *structures* assigned to *Seismic Design Category* B, C, D, E or F shall be performed in accordance with the quality assurance requirements of AISC 341.

Exceptions:

1. In *buildings* and *structures* assigned to *Seismic Design Category* B or C, *special inspections* are not required for structural steel *seismic force-resisting systems* where the response modification coefficient, *R*, designated for “Steel systems not specifically detailed for seismic resistance, excluding cantilever column systems” in ASCE 7, Table 12.2-1, has been used for design and detailing.
2. In structures assigned to *Seismic Design Category* D, E, or F, *special inspections* are not required for structural steel *seismic force-resisting systems* where design and detailing in accordance with AISC 360 is permitted by ASCE 7, Table 15.4-1.

1705.13.1.2 Structural steel elements. *Special inspections* of *structural steel elements* in the *seismic force-resisting systems* of

buildings and *structures* assigned to *Seismic Design Category* B, C, D, E or F other than those covered in Section 1705.13.1.1, including struts, *collectors*, chords and foundation elements, shall be performed in accordance with the quality assurance requirements of AISC 341.

Exceptions:

1. In *buildings* and *structures* assigned to *Seismic Design Category* B or C, *special inspections* of *structural steel elements* are not required for *seismic force-resisting systems* with a response modification coefficient, *R*, of 3 or less.
2. In *structures* assigned to *Seismic Design Category* D, E, or F, *special inspections* of *structural steel elements* are not required for *seismic force-resisting systems* where design and detailing other than AISC 341 is permitted by ASCE 7, Table 15.4-1. *Special inspection* shall be in accordance with the applicable referenced standard listed in ASCE 7, Table 15.4-1.

1705.13.2 Structural wood. For the *seismic force-resisting systems* of *structures* assigned to *Seismic Design Category* C, D, E or F:

1. *Continuous special inspection* shall be required during field gluing operations of elements of the *seismic force-resisting system*.
2. *Periodic special inspection* per section 1705.1.2 shall be required for nailing, bolting, anchoring and other fastening of elements of the *seismic force-resisting system*, including wood shear walls, wood *diaphragms*, *drag struts*, braces, shear panels and *hold-downs*.

Exception: *Special inspections* are not required for wood shear walls, shear panels and *diaphragms*, including nailing, bolting, anchoring and other fastening to other elements of the *seismic force-resisting system*, where the lateral resistance is provided by structural sheathing, and the specified fastener spacing at the panel edges is more than 4 inches (102 mm) on center.

1705.13.3 Cold-formed steel light-frame construction. For the *seismic force-resisting systems* of *structures* assigned to *Seismic Design Category* C, D, E or F, *periodic special inspection* shall be required for both:

1. Welding operations of elements of the *seismic force-resisting system*.
2. Screw attachment, bolting, anchoring and other fastening of elements of the *seismic force-resisting system*, including shear walls, braces, *diaphragms*, *collectors* (*drag struts*) and *hold-downs*.

Inspection tasks shall be as follows:1. Special inspections for screw and bolt attachments to the items above shall be per the quality assurance inspector tasks listed in AISI S240 Section D6.10. 2. Special inspections for welding operations to fasten the items above shall be per the quality assurance inspector tasks listed in AISI S240 Tables D6.7-2 and D6.7-3.

Exception: *Special inspections* are not required for cold-formed steel light-frame shear walls and *diaphragms*, including screw installation, bolting, anchoring and other fastening to components of the *seismic force-resisting system*, where either of the following applies:

1. The sheathing is *gypsum board* or *fiberboard*.
2. The sheathing is *wood structural panel* or steel sheets on only one side of the shear wall, shear panel or *diaphragm* assembly and the specified fastener spacing at the panel or sheet edge is more than 4 inches (102 mm) on center.

1705.13.4 Designated seismic systems. For *structures* assigned to *Seismic Design Category* C, D, E or F, the *special inspector* shall examine *designated seismic systems* requiring seismic qualification in accordance with Section 13.2.3 of ASCE 7 and verify that the *label*, anchorage and mounting conform to the *certificate of compliance*.

1705.13.5 Architectural components. *Periodic special inspection* per section 1705.1.2 is required for the erection and fastening of exterior cladding, interior and exterior nonbearing walls and interior and exterior *veneer* in structures assigned to *Seismic Design Category* D, E or F.

Exception: *Periodic special inspection* is not required for the following:

1. Exterior cladding, interior and exterior nonbearing walls and interior and exterior *veneer* 30 feet (9144 mm) or less in height above grade or walking surface.

2. Exterior cladding and interior and exterior *veneer* weighing 5 psf (0.24 kN/m^2) or less.
3. Interior nonbearing walls weighing 15 psf (0.72 kN/m^2) or less.

1705.13.5.1 Access floors. Periodic *special inspection* per section 1705.1.2 is required for the anchorage of access floors in *structures* assigned to *Seismic Design Category* D, E or F.

1705.13.6 Plumbing, mechanical and electrical components. *Periodic special inspection* of plumbing, mechanical and electrical components shall be required for the following:

1. Anchorage of electrical equipment for emergency and *standby power systems* in *structures* assigned to *Seismic Design Category* C, D, E or F shall be inspected per section 1705.1.2.
2. Anchorage of other electrical equipment in *structures* assigned to *Seismic Design Category* E or F shall be inspected per section 1705.1.2.
3. Installation and anchorage of piping systems designed to carry *hazardous materials* and their associated mechanical units in *structures* assigned to *Seismic Design Category* C, D, E or F shall be inspected per section 1705.1.2.
4. Installation and anchorage of ductwork designed to carry *hazardous materials* in *structures* assigned to *Seismic Design Category* C, D, E or F shall be inspected per section 1705.1.2.
5. Installation and anchorage of vibration isolation systems in *structures* assigned to *Seismic Design Category* C, D, E or F where the *approved construction documents* require a nominal clearance of $^1/_4$ inch (6.4 mm) or less between the equipment support frame and restraint shall be inspected per section 1705.1.2.
6. Installation of mechanical and electrical equipment, including duct work, piping systems and their structural supports, where *automatic sprinkler systems* are installed in *structures* assigned to *Seismic Design Category* C, D, E or F to verify one of the following:
   6.1. Minimum clearances have been provided as required by Section 13.2.4 ASCE/SEI 7.
   6.2. A nominal clearance of not less than 3 inches (76 mm) has been be provided between *automatic sprinkler system* drops and sprigs and: structural members not used collectively or independently to support the sprinklers; equipment attached to the *building structure*; and other systems' piping.

Where flexible sprinkler hose fittings are used, *special inspection* of minimum clearances is not required.

Reason: This proposal does not add any new special inspections to Chapter 17, nor does it override inspection tasks that are already defined in referenced standards. Special inspections of certain connections specified in Chapter 17 do not take the place of the building official's framing inspections. The building official has authority to determine the acceptable qualifications for the special inspector.

The proposed language for these connection, anchorage and fastening special inspection requirements strives to clarify the following:

Identify a required task,

Identify a procedure to complete that task (whether by description or by referenced standard),

Define a frequency for the task (continuous vs periodic), and

Identify a standard by which to verify compliance (construction documents, evaluation reports, ASTM standard, etc.).

This proposal reduces room for interpretation, helps with enforceability of the provisions, and results in a more consistent levels of quality assurance. The descriptions of the items are written generally to include a broad range of materials, but the requirements only apply when proposed section 1705.1.2 is specifically invoked within the detailed requirements of section 1705, as indicated in this proposal.

Table 1705.2.4 Item 1a – "End connections" calls for periodic special inspection of open web steel joist end connections per SJI 100 or 200. However, those standards do not contain any special inspection requirements for member end connections. Therefore, the proposed revision clarifies what items need to be considered by the special inspector to verify that the completed end connection is compliant, and references proposed section 1705.1.2 in lieu of SJI specifications since there are no tasks for inspection of end connections defined in SJI 100/200.

Table 1705.5.3 calls for special inspection of mass timber connections and anchorages. Required tasks related to inspection of threaded

fastener items are clearly identified in the table. However, inspection tasks related to adhesive anchors, bolted connections, and concealed connections are not specified. There are no referenced standards that detail inspection tasks for these items so the proposed language clarifies what items need to be considered when inspecting connections per the noted line items of the table.

Sections 1705.12.1 and 1705.13.2 call for periodic special inspection of nailing, bolting, anchoring, and other fastening of certain lateral force resisting systems but the specific inspection tasks are not identified and the NDS referenced standard does not include special inspection provisions. The proposed language in this section adds a reference to 1705.1.2 as a means for verifying compliance.

Sections 1705.12.2 and 1705.13.3 call for periodic special inspection of nailing, bolting, anchoring, and other fastening of certain lateral force resisting systems. Tasks necessary to complete these inspections are specified in AISI S240. The applicable section number of the referenced standard is provided. QAI tasks for welding elements of the of the lateral force resisting system are not provided in Section D6.10, but IBC requires special inspection of welding operations. Therefore, Tables D6.7-2 and D6.7-2 are used to define the inspection tasks to comply with the IBC requirement.

Section 1705.12.3 requires special inspections of certain roof framing connections, wall connections to diaphragms and framing, roof covering, roof deck, roof framing connections, exterior wall covering, and exterior wall framing. Exceptions have been listed for referenced standards that already specify special inspection tasks. Proposed section 1705.1.2 covers conditions that are not already addressed preexisting code provisions.

Section 1705.13.5 requires special inspection of fastening of certain instances of exterior cladding, nonbearing walls, and veneer. The proposed section 1705.1.2 provides a list of items to be referenced when verifying compliance.

Section 1705.13.5.1 requires special inspection of the anchorage of access floors. Specific inspection tasks are not identified in this section. The proposed language in this section adds a reference to proposed section 1705.1.2 as a means of verifying compliance.

Section 1705.13.6 requires special inspection of the anchorage of electrical equipment for emergency and standby power systems, anchorage of piping systems designed to carry hazardous materials and their associated mechanical units, anchorage of ductwork designed to carry hazardous materials, and anchorage of vibration isolation systems. Specific inspection tasks are not identified in this section. The proposed language in this section adds a reference to proposed section 1705.1.2 as a means of verifying compliance.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Proposal does not add cost because it does not add work scope, it clarifies the tasks necessary to verify compliance when special inspections for connections are required.