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BULLETIN NO.

03-5

Date: **November 2003**
Revised: **November 2008**

Subject: **Special Inspections**

Reference: **N.J.A.C. 5:23-2.20(b)**,
N.J.A.C. 5:23-3.14,
N.J.A.C. 5:23-5.3

Chapter 17 of the Building Subcode, entitled “Structural Tests and Special Inspections,” is modified by N.J.A.C. 5:23-3.14. As per N.J.A.C. 5:23-2.20(b), for purposes of this chapter of the Building Subcode, a special inspection is an independent verification by a qualified person (special inspector) rendered to the code official for **Class I buildings only**. The special inspector is to be independent so that there is no possible conflict of interest. A summary of the special inspections provisions is included to better explain the requirements of the code.

Chapter 17 of the Building Subcode contains requirements for structural tests and special inspections. The Uniform Construction Code adds additional tests and special inspections requirements for New Jersey that are not currently covered by the Building Subcode. Certain special inspections required by Chapter 17 of the Building Subcode were deleted upon adoption because, in New Jersey, they are the responsibility of the construction official.

Approved Special Inspection Agencies: Agencies of this nature are regularly engaged in conducting special tests or inspections. Very often, they specialize in one aspect of the construction industry, due to the complexity of construction. This is why a special inspector who is trained in a specific area may be needed to conduct certain inspections. Special inspectors are independent of the contractor and responsible to the building owner or building owner’s agent. The established and recognized special inspector, or special inspection agency proposed by the permit applicant for each special inspection, must be acceptable to the construction official.

Certified Special Inspectors: As per N.J.A.C. 5:23-5.3, special inspectors are those who will be required to perform field inspections for structural welding, structural steel and bolting, concrete placement, reinforced concrete, prestressed concrete, structural masonry, spray-applied fireproofing, and exterior insulation finish systems (EIFS).

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Building Permits and Reports: The permit applicant is required to submit a statement of the special inspections to be performed at the time of application. The statement is to be prepared by the design professional.

Structural Systems: Special inspections are required for the following as per the corresponding sections of the Building Subcode.

* *Fabrication of Structural Load-Bearing Members/Assemblies*, Section 1704.2: These inspections are normally handled through an in-plant, quality-control process and reports are forwarded to the local construction code office when the elements are delivered.

* *Steel Construction*, Section 1704.3: This section requires the inspection of certain aspects of the on-site erection of steel including welding, high-strength bolting, and joint connection details with specific exceptions listed.

➤Per N.J.A.C. 5:23-5.3, special inspectors are authorized to carry out field inspections for steel construction using the above-referenced section and the following:

1. STRUCTURAL WELDING SPECIAL INSPECTOR -- Inspections in compliance with AWS D1.1.

2. STRUCTURAL STEEL AND BOLTING SPECIAL INSPECTOR -- Inspections to verify compliance with the details shown on the approved construction documents such as bracing, stiffening, member locations, and proper application of joint details at each connection. Also, high-strength bolts to be periodically inspected in accordance with AISC specifications.

* *Concrete Construction and Masonry Construction*, Sections 1704.4 and 1704.5: These sections address the placement of structural concrete and masonry elements.

➤Per N.J.A.C. 5:23-5.3, special inspectors are authorized to carry out field inspections for concrete and masonry construction using the above-referenced sections and the following:

1. STRUCTURAL MASONRY SPECIAL INSPECTOR -- Inspections vary based on “occupancy category” as per Section 1704.5.

2. CONCRETE PLACEMENT, REINFORCED CONCRETE, AND PRESTRESSED CONCRETE SPECIAL INSPECTORS -- Inspections per the following table:

Special Inspector	Inspection
Reinforced Concrete	Inspection of reinforcing steel, including prestressing tendons, and placement
Reinforced Concrete	Inspection of reinforcing steel welding: <ol style="list-style-type: none"> 1) Verification of weldability of reinforcing steel other than ASTM A706 2) Reinforcing, steel-resisting flexural and axial forces in intermediate and special-moment frames, boundary elements of special reinforced concrete shear walls, and shear reinforcement 3) Shear reinforcement 4) Other reinforcing steel
Concrete Placement, Reinforced Concrete, Prestressed Concrete	Inspection of bolts to be installed in concrete, prior to and during placement of concrete, where allowable loads have been increased
Concrete Placement, Reinforced Concrete, Prestressed Concrete	Verification of the use of required design mix
Concrete Placement, Reinforced Concrete, Prestressed Concrete	At the time fresh concrete is sampled to fabricate specimens for strength tests, performance of slump and air-content tests, and determination of the temperature of the concrete
Concrete Placement, Reinforced Concrete, Prestressed Concrete	Inspection of concrete and shotcrete placement for proper application techniques
Concrete Placement, Reinforced Concrete, Prestressed Concrete	Inspection for maintenance of specified curing temperature and techniques
Prestressed Concrete	Inspection of prestressed concrete: <ol style="list-style-type: none"> 1) Application of prestressing forces 2) Grouting of bonded prestressing tendons in the seismic-force-resisting system
Concrete Placement, Reinforced Concrete, Prestressed Concrete	Erection of precast concrete members
Concrete Placement, Prestressed Concrete	Verification of <i>in-situ</i> concrete strength prior to stressing of tendons in post-tensioned concrete, and prior to removal of shores and forms from beams and structural slabs
Concrete Placement, Reinforced Concrete, Prestressed Concrete	Inspection of formwork for shape, location, and dimensions of the concrete member being formed

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* *Soils*, Section 1704.7: A soils report, required as per Section 1802.0 of the Building Subcode, is used to determine compliance with the placement of load-bearing fill.

* *Pile Foundations*, Section 1704.8: This section requires inspections during the driving of pile foundations.

Finishes:

* *Sprayed, Fire-Resistant Materials*, Section 1704.10: Special inspections are required for sprayed, fire-resistant materials applied to structural elements and decks. Details include structural member surface conditions, application, thickness, density, and bond strength.

➤ Per N.J.A.C. 5:23-5.3, special inspectors are authorized to carry out field inspections for sprayed, fire-resistant materials using the above-referenced section and the following:

1. **SPRAY-APPLIED FIREPROOFING SPECIAL INSPECTOR** -- Inspections are to be based on the fire-resistance design as designated in the approved construction documents.

* *Mastic and Intumescent Fire-Resistant Coatings*, Section 1704.11: Special inspections are required for mastic and intumescent fire-resistant coatings applied to structural elements and decks.

* *Exterior Insulation and Finish Systems (EIFS)*, Section 1704.12: Special inspections are required for all EIFS applications. Exceptions: installations over a water-resistive barrier, or over masonry or concrete walls.

➤ Per N.J.A.C. 5:23-5.3, special inspectors are authorized to carry out field inspections for EIFS using the above-referenced section and the following:

1. **EIFS SPECIAL INSPECTOR** -- Inspections are required for all EIFS applications except where EIFS applications are (a) installed over a water-resistive barrier with a means of draining moisture to the exterior, or (b) installed over masonry or concrete walls.

Special Inspection for Smoke Control: A special inspector, qualified as per Section 1704.14.2 of the Building Subcode, is required to test smoke control systems. The inspector inspects for leakage testing, recording of device location, pressure difference testing, flow measurements, and detection and control verification.

Quality Assurance for Seismic Resistance: A quality assurance plan for seismic resistance is required for Seismic Design Category D buildings¹. This includes a plan prepared by a design professional that shows the design of each designated seismic system. The quality assurance plan identifies the seismic designated systems and seismic force-resisting systems. Sections 1705.1 through 1705.4 of the Building Subcode contain the required quality assurance seismic systems and the required plan information.

Special Inspections for Seismic Resistance: Special inspections are required for seismic force-resisting systems; designated seismic systems; and architectural, mechanical, and electrical components in Seismic Design Category D buildings¹. The following components are special inspections related to seismic resistance found in Section 1707 of the Building Subcode.

- * *Structural Steel*
- * *Structural Wood*
- * *Cold-Formed Steel Framing*
- * *Architectural Components*
- * *Mechanical and Electrical Components*
- * *Seismic Isolation Systems*
- * *Storage Racks and Access Floors*

Structural Testing for Seismic Resistance: Prior to construction, all materials and assemblies used for isolation damping systems in Seismic Design Category D buildings¹ are required to be tested and verified as per Section 1708 for seismically isolated structures.

Special Cases: N.J.A.C. 5:23-2.19(a) authorizes the building subcode official to require special inspections for proposed work that is unusual in nature. Some examples include alternative construction materials and systems, unusual design applications of materials, and materials and systems required to be installed in accordance with additional manufacturer's instructions that prescribe requirements not contained or referenced in the Building Subcode.

¹In New Jersey, the only buildings that fall into Seismic Category D are those with an importance factor of Category IV in Table 1604.5 such as hospitals, fire and police stations, aviation control towers, etc. Figures 1613.5(1) and 1613.5(2) each display a map for the earthquake ground motion for the United States. Figure 1613.5(1) shows that New Jersey has a maximum of 0.350g for short-period acceleration (0.2 seconds). Figure 1613.5(2) shows that New Jersey has a maximum of 0.065g (interpolated) for one-second acceleration. These numbers are to be used in the equations found in Section 1613.5.3, with the results then used in Section 1613.5.4. The final results from Section 1613.5.4 shall be compared with their corresponding value from Table 1613.5.6(1) for short-period accelerations and Table 1613.5.6(2) for one-second accelerations. (As per Section 1613.5.2, when the soil properties are not known in sufficient detail to determine the site class, Site Class D shall be used unless the building official determines that Site Class E or F soil is likely to be present at the site.)

Short-period accelerations $\rightarrow S_s = 0.350g$ [maximum from Figure 1613.5(1)] and $F_a = 1.520$ [from Table 1613.5.3(1) using Site Class D soil, interpolated]

$$S_{MS} = F_a S_s = 1.520 \times 0.350 = 0.532g$$

$$S_{DS} = 2/3 S_{MS} = (2/3) \times 0.532 = 0.355g$$

Table 1613.5.6(1) = Seismic Design Category D

One-second period accelerations $\rightarrow S_1 = 0.065g$ [maximum from Figure 1615(2)] and $F_v = 2.4$ [from Table 1613.5.3(2) using Site Class D soil]

$$S_{M1} = F_v S_1 = 2.4 \times 0.065 = 0.156g$$

$$S_{D1} = 2/3 S_{M1} = (2/3) \times 0.156 = 0.104g$$

Table 1613.5.6(2) = Seismic Design Category C

Here, there are two Seismic Design Categories listed; however, the more severe category is followed for design, therefore making most of northern New Jersey fall within Seismic Design Category D for Category IV buildings.