



# Special Inspections: An Update and Critique

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# Agenda

- History of Special Inspections
  - In the U.S.
  - In N.C.
- “Word on the Street”  
(i.e. Top 10 Points of Confusion)
- Conclusion and Summary

# History of Special Inspections in the U.S...

- Hyatt Regency & L' Ambiance Plaza



114 people killed  
Attachment detail of steel walkway  
June, 1981  
Kansas City, Missouri



28 workers killed  
Lift slab construction  
April, 1987  
Bridgeport, Connecticut

## History of Special Inspections in the U.S...

- 1982 US House Sub-Committee on Science and Technology studies Structural Failures
- 1984 the Sub-Committee presents report of findings
  1. Need for improved communications during the construction process
  2. Need for Construction Inspection
- 1988 Special Inspections adopted in BOCA
- 2000 Chapter 17 of the IBC was adopted as the IBC was created from the legacy codes (UBC, BOCA, SBC)





## History of Special Inspections in NC...

- In 2002 NCSBC adopts the IBC with Chapter 17 included (with the discretion language)
- In January 2003 SCO is first in NC to require SI for projects within their jurisdiction
- Since 2003 a variety of programmatic guidelines have been developed by several NC jurisdictions including but not limited to:  
New Hanover, Mecklenburg, Catawba, Guilford, Raleigh, Wake County...
- In March of 2007 Special Inspections became mandatory with change in “discretion” language



## Section 1704 – Special Inspections

- **1704.1.2 Special Inspections Requirement**

1. Buildings or other Structures listed in table 1604.5 in occupancy category II if:
  - 1.1. Building height exceeds 45 feet or three stories, or
  - 1.2. The building is an underground building per section 405.1
2. Buildings or other structures listed in Table 1604.5 in occupancy Categories III or IV
3. Piles, Piers or Special Foundations
4. Retaining walls exceeding 5 feet height per section 1806.2
5. Smoke Control and Smoke Exhaust Systems
6. Spray Fire Resistant Materials or
7. Special cases described in Section 1704.13



Synopsis of Table 1604.5:

**Occupancy Category I** - Structures that represent low hazard to human life

**Occupancy Category II** - Structures except those listed in categories I, III and IV


**Occupancy Category III** - Structures that represent a substantial hazard to human life

**Occupancy Category IV** - Structures designated as essential facilities




# “Word on the Street”





1. The Statement of Special Inspections  
Should be Written by the Structural Engineer  
of Record.



# Materials / Systems that may Require Special Inspections

- Smoke Control Systems
- Spray-Fireproofing
- Intumescent Fire Coatings
- EIFS
- Exterior Wall Panels
- Suspended Ceilings
- Electrical Equipment
- HVAC and Piping carrying hazardous or toxic materials
- Roofing Systems and much more...



~~1. The Statement of Special Inspections  
Should be Written by the Structural Engineer  
of Record.~~

**1. The Statement of Special Inspections should be written by the design team (each member using their respective expertise) with this activity being led by the Prime Designer.**



2. Adherence to the QBS process is not required for Special Inspections



# NC Administrative Code

**107.5 Special Inspections.** Special Inspections required by the building code or the building inspector shall be performed by a North Carolina registered design professional or an inspector under his responsible charge.




~~2. Adherence to the QBS process is not required for Special Inspections.~~

**2. Adherence to the QBS process is required for Special Inspections.**



3. Procurement of Special Inspections is  
Required through the Designer of Record.



## Two Key Options are Available for Procurement of SI:

1. The Special Inspector may be selected as a Qualified Independent Firm
2. The Special Inspector may be selected through the designer's contract


\*\* Although only two “key procurement options” exist the resulting potential contractual relationships with designers, Materials testing Agents and Special Inspections Providers can be widely varied.






## Examples :

1. SI is contracted with a single Independent Firm who will also provide CMT
2. SI is contracted with a single Independent Firm, however a separate firm will provide CMT
3. SI is contracted with multiple Independent Firms (based on expertise) some with CMT some without
4. SI is contracted with the design team and the design team hires sub-consultants to perform the required Inspections
5. SI is contracted with the design team and the design firms perform all of the SI.
6. More...



~~3. Procurement of Special Inspections is  
Required through the Designer of Record.~~

**3. Procurement of Special Inspections can be performed through one of two “fundamental options” with multiple variations.**



4. The Designer of Record knows the drawings better than anyone and as a result is best suited to be the Special Inspector of Record.




## Qualification of the Agents of the Special Inspector:

- Structural Steel Bolting and Welding
- ICC
- NICET
- EIFS and Other Specialty Systems
- Smoke Control and Other Mechanical Systems



~~4. The Designer of Record knows the drawings better than anyone and as a result is best suited to be the Special Inspector of Record.~~

**4. The Designer of Record was selected through a QBS process as a result of their design capabilities. When selecting a Special Inspector careful consideration should be given to “Inspection Qualifications.”**



5. The Statement of Special Inspections can/should limit the frequency of periodic inspections.



## Chapter 17 Definition:

**Special Inspection, Periodic.** The part-time or intermittent observation of work requiring special inspection by an approved special inspector who is present in the area where the work has been or is being performed and at the completion of the work.




~~5. The statement of Special Inspections can/should limit the frequency of periodic inspections.~~

**5. The Statement of Special Inspections should never limit the frequency of periodic inspections. The discretion of periodicity should remain with the Special Inspector of Record and should be based in part on the quality of previously inspected work.**





6. Special Inspections should only be performed when requested by the contractor



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**6. Periodic Special Inspections should be performed when requested by the contractor and on an intermittent basis to assure consistent quality of construction.**



7. Special Inspections fees can be budgeted for 1% of total constructed cost.



## Special Inspections Budget Considerations:

- Structural Frame Material Type
- Size of Project
- Ultimate Use of Completed Building
- Seismic Design Category
- Wind Exposure Category
- Deep Foundations
- Schedule of Construction
- Quality Control Program



~~7. Special Inspections fees can be budgeted for 1% of total constructed cost.~~

**7. Special Inspections fees may be budgeted for 1% during pre-design, however, further budgeting exercises will prove useful through DD to more accurately anticipate SI fees.**



8. Special Inspections is just an additional layer of cost on a building project.



$$\sum \gamma_i Q_i < \phi R_n$$

Q= Nominal Load

R= Nominal Strength

$\gamma$  = Load Factor

$\phi$  = Resistance Factor (Strength Reduction Factor)



## **Excerpt from 1997 UBC:**

### **2107.1.2 Allowable Masonry Stresses.**


When quality assurance provisions do not include requirements for special inspections the allowable stresses for masonry in section 2107 (Working Stress Design of Masonry) shall be reduced by one half.





~~8. Special Inspections is just another layer of cost on a building project.~~

**8. Special Inspections is Quality Assurance of constructed building elements which has resulted in an increased certainty of material performance. This certainty has allowed for cost savings through the reduction of safety factors.**



9. The Special Inspector's contract may be held by the contractor.



## NCSBC Section 1703, Approved Agency:

**1703.1.1 – Independence.** ...shall be objective, competent and independent from the contractor responsible for the work being inspected...

**1703.1.2 – Equipment.** ...shall have adequate equipment to perform tests...

**1703.1.3 – Personnel.** ...shall employ experienced personnel educated in conducting, supervising and evaluating tests and/or inspections.




~~9. The Special Inspector's contract may be held by the contractor.~~

**9. To maintain "Independence" the Special Inspector's contract cannot be held by the contractor.**



10. Special Inspections are required only for the specific systems called out in Chapter 17.



**1704.13 Special Cases.** Special Inspections 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 manufacturer's instructions that are not prescribed in this code...



## Examples of Special Case Special Inspections:

- fire-caulking
- steam pipe installation
- sprinkler systems
- standpipe systems
- site storm drainage and more...



~~10. Special Inspections are required only for the specific systems called out in Chapter 17.~~


**10. Special Inspections of materials and systems other than specifically prescribed in Chapter 17 may be required per SCO requirement / approval.**





## Conclusion / Summary

1. Special Inspections is not just Structural anymore...
2. Special Inspections is a Professional Service and therefore required to be procured through QBS
3. Special Inspections is a critical element of the State Construction Building process



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