

## **Annex 9C - An American view: Design Professional Site Presence in Typical US Practice**

### **INTERNATIONAL EXPERIENCE – INDEPENDENT OVERSIGHT OF CONSTRUCTION**

#### **PRACTICE IN THE USA**

Following is a paper by Glenn Bell, providing an overview of the system that is used in the USA.

##### ***About Glenn Bell***

*Glenn Bell has 45 years' experience in the design and investigation of buildings and other structures. He was CEO of SGH (a large firm of consulting engineers) from 1995 through 2016. Forensic engineering and learning from failures have long been his passion and he was co-principal investigator of SGH's investigation of the Hyatt Regency Walkways failure in 1981. He worked on SGH's analysis for the US government of the collapse of the Twin Towers in 9/11 and helped to found the American Society of Civil Engineers Technical Council on Forensic Engineering in the mid 1980s. Its mission is to reduce the incidence of structural failures by learning from them. Glenn has written extensively on Forensic Engineering, including two book chapter and is currently leading the creation of a CROSS entity in the US (due to go live middle of this year). Glenn is a Board Trustee of IStructE and is President-Elect of the US Structural Engineering Institute.*

#### **DESIGN PROFESSIONAL SITE PRESENCE IN TYPICAL US PRACTICE**

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In typical US building construction practice, the controlling governmental authority is known as the Authority Having Jurisdiction (AHJ, aka, Building Official), who is employed by the city or town in which the construction occurs. The AHJ has overall authority, amongst other things, for assuring that the construction meets the applicable Building Code.

Building Codes are typically promulgated at the State level. However, some of the larger US cities (e.g., New York and Los Angeles) have their own codes separate from the state in which they are located. While there has been great diversity in contents of codes and standards over the years, in the past decade particularly these requirements have been brought closer together, and the so-called International Building Code<sup>1</sup> (IBC) forms the basis for most code applications in the US. States, cities, and towns either adopt the IBC wholesale or adopt it with their own particular variations, changes, and exceptions. The IBC contains relevant requirements for the design professional's presence (structural and otherwise) during construction. So, for the purpose of this document I will describe what the IBC requires. What states and cities adopt and enforce are for the most part modest variations on this. The IBC is on line. You can find the 2015 version of it here: <https://codes.iccsafe.org/content/IBC2015/toc>. With respect for on-site activities the relevant sections are mostly in Chapter 17 – Special Tests and Inspections.

Chapter 17 requires that the owner or an agent of the owner who is other than the contractor engage an “approved agency” to conduct special inspections. The approved agency may be the “Registered Design Professional in Responsible Charge” or it may be a different person or agency for some or all of the work.

Inspections are required for all but minor construction. The degree of inspection depends on the nature of the construction and the perceived hazard. For example, high seismic and wind regions have special requirements.

- 1704.2.3 requires an inspection plan be submitted to the AHJ prior to the start of work.
- 1704.2.4 sets forth the requirements for reporting inspections.
- 1704.2.5 requires that certain off-site fabrications be inspected in addition to what is inspected in the field.

Section 1705 lays out what must be inspected and how. It includes, generally, requirements for steel, concrete, masonry, wood, foundations, and soils. Depending on the situation, the inspections may have to be continuous (i.e., full time) or they may be periodic.

Of particular interest to the Edinburgh school issue, 1705.12.5 requires that architectural components be inspected, including exterior cladding and its fixings.

Of particular interest to Grenfell, 1705.14 and 1705.17 have requirements for fire resistive materials, fire stops and fire joints.

Regardless of the special requirements outlined in Chapter 17, most states require the structural engineer of record to visit the site periodically to ascertain that the construction generally conforms to the project document requirements. Attachment A shows an example of a final inspection affidavit used in Massachusetts.

An example of a comprehensive set of instruction forms for the City of San Francisco is

here:

[https://sfdbi.org/sites/default/files/Documents/Boards\\_and\\_Commissions/Structural\\_Subcommittee/formSI101\\_2009.pdf](https://sfdbi.org/sites/default/files/Documents/Boards_and_Commissions/Structural_Subcommittee/formSI101_2009.pdf)

The impetus for the engineer on-site presence requirements we have today was a series of major structural collapses that occurred in the decade between 1978 and 1987, the “last straw” of which was the Hyatt Regency Walkways failure, which killed 114 people.

- **Hartford Civic Center, 1978:**  
<https://buildingfailures.wordpress.com/1978/01/18/hartford-civic-center-roof-collapse/>
- **Willow Island Cooling Tower Failure, 1978:**  
[https://en.wikipedia.org/wiki/Willow\\_Island\\_disaster](https://en.wikipedia.org/wiki/Willow_Island_disaster)
- **Kemper Arena, 1979:** <https://eng-resources.uncc.edu/failurecasestudies/building-failure-cases/kemper-arena/>
- **Coco Beach Condominium Collapse, 1981:** <https://eng-resources.uncc.edu/failurecasestudies/building-failure-cases/harbor-cay-condominium-cocoa-beach-florida/>
- **Hyatt Regency Kansas City Walkways Failure, 1981:**  
[https://en.wikipedia.org/wiki/Hyatt\\_Regency\\_walkway\\_collapse](https://en.wikipedia.org/wiki/Hyatt_Regency_walkway_collapse)
- **L’Ambiance Plaza Condominium, 1987:**  
[https://en.wikipedia.org/wiki/L%27Ambiance\\_Plaza\\_collapse](https://en.wikipedia.org/wiki/L%27Ambiance_Plaza_collapse)

It took some years to put the requirements into place, and they have evolved and improved with time, but these failures were the genesis of the requirements.

While we have no direct scientific causal evidence of the impact of these requirements, it is a fact that since they were introduced we have not experienced major building failures with anywhere near the rate of this decade. The rate of



## **PRACTICE IN SWEDEN**

There follows a slightly edited extract from the Swedish national building authority description of the **independent inspection manager** role:

<https://www.boverket.se/en/start/building-in-sweden/swedish-market/laws-and-regulations/building-process/>

- The main rule is that there shall be one or more inspection managers for measures [i.e. construction projects] that require building permits, demolition permits, site improvement permits or notification. ...
- No inspection manager is needed for certain basic measures, as in relatively uncomplicated matters where the developer is deemed to be able to meet its responsibilities without support of an inspection manager. However, the building committee can decide that an inspection manager is required, except for measures that do not require permits or registration.
- The building committee's assessment of whether the inspection manager is required may not be appealed.
- An inspection manager must be certified by an accredited certification body.
- An inspection manager must also have an independent standing in relation to the developer or contractor of the measure [i.e. construction project] that is to be inspected. Among other things, this means that the inspection manager and the people implementing the measures to be inspected cannot work in the same company...
- The inspection manager must be present at technical consultations, inspections and the building committee's work site visits.
- The inspection manager must also document his or her work site visits and note observations that may be of value in the evaluation prior to the final clearance [i.e. certification of completion].
- The inspection manager must also issue a statement to the developer and the building committee as a basis for the final clearance.