

***BIC Regular Meeting  
of  
March 15, 2017***

***Agenda Items 8***



# The Department of Building Inspection's Tall Building Review Process

Ronald Tom  
Assistant Director, DBI  
City Hall, Room 416 – March 15, 2017



# Thank You

- **DBI welcomes this opportunity to talk about its work to make San Francisco's tall buildings safer.**
- **We appreciate the Building Inspection Commission's work and oversight.**
- **We look forward to continuing to collaborate with you, other city agencies, chosen experts, and others.**





# December 6 BIC Letter



- Code-Prescriptive Structural vs. Performance-Based Structural Designs
- Tall Building Safety
- Peer Review Process
- Special Inspections
- Record Retention





# Types of Structural Designs

## Code-Prescriptive Structural Design

- **Most Common: over 99% of San Francisco buildings.**
- **Like a recipe.**
- **Peer Review:** Required since 2008 for all code-prescriptive buildings over 240 feet.

Wood-framed,  
low-rise buildings  
under five stories



## Performance-Based Structural Design

- **Rare. Less than 1% of buildings in San Francisco.**
- **Peer Review:** Requires mandatory peer review.

Tall buildings  
over 240'





# Code-Prescriptive Structural Design



Projects that are structurally designed and built according to San Francisco Building Code requirements.

# 99.9%

of the roughly **200,000 buildings** in San Francisco are code-prescriptive.



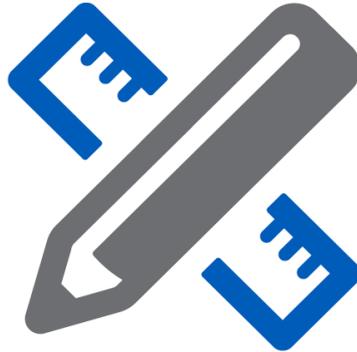
**Like a Recipe:** Specifies building requirements, including height and size restrictions.



**Peer Review:** Required for all code-prescriptive buildings over 240' since 2008.



# Performance-Based Structural Design



When choosing to submit a performance-based structural design, the project sponsor commits to utilize advance detailed computer analyses and designs to develop a building that will have the same performance as a code-prescriptive structural designed project, and one that meets or exceeds code requirements in the San Francisco Building Code.



**Brand New**  
Performance-based  
buildings (2000–2016)

**<.4%**

**Rare.** Percentage of performance-based permits for new buildings issued out of **3,866 total**.

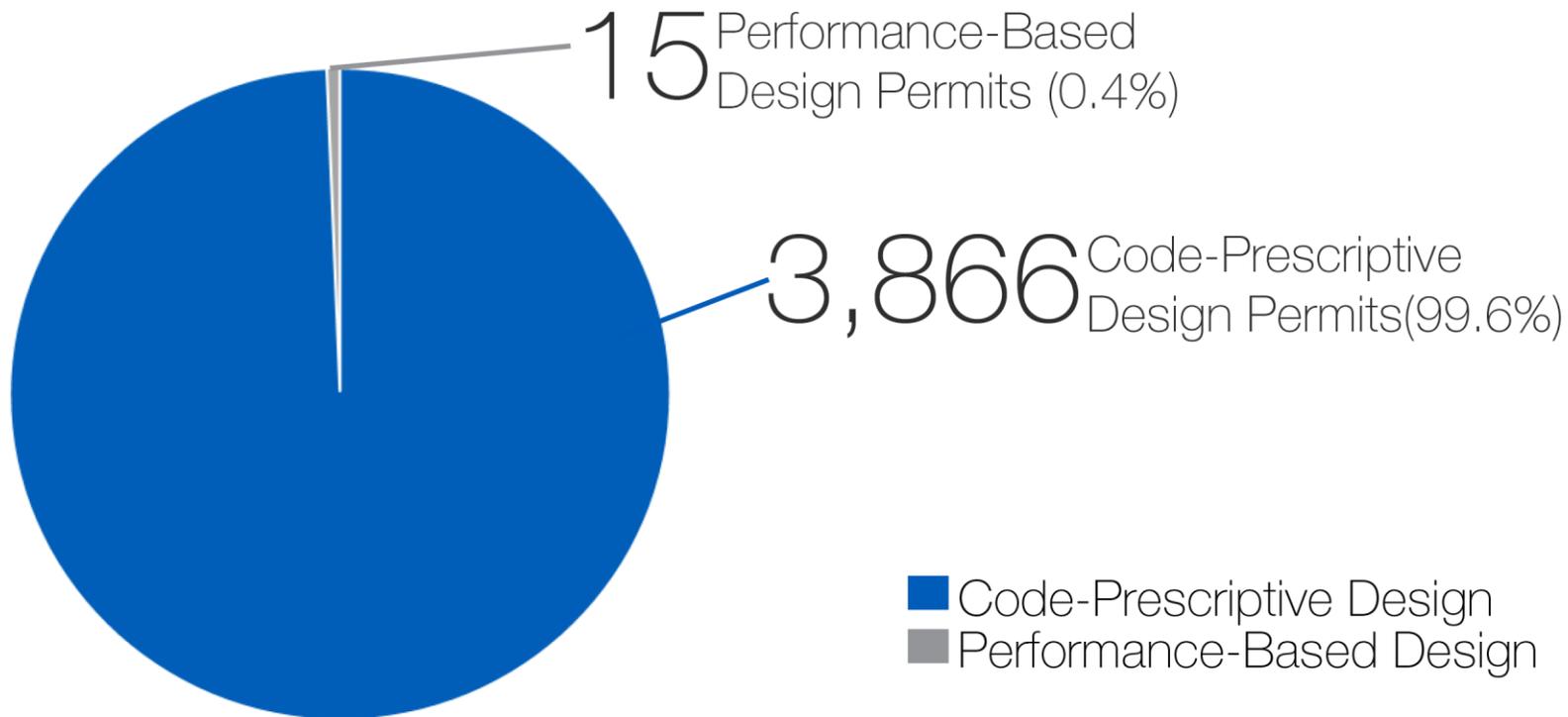


**Peer Review:** Requires a **mandatory** peer review.



# Comparison of Structural Designs

## DBI Building Permits for New Buildings Issued Between 2000-2016





# Record Retention Policy



- San Francisco's current record retention requirements go above and beyond CA Building Code—DBI is making them even stronger.
- DBI is updating and improving its record retention policy for peer review documents.



**200,000**  
Buildings in  
San Francisco



**2 Million**  
Records  
Since 2000



Building  
Permits Since  
**1906**



# Tall Buildings in San Francisco



The transformation of San Francisco's skyline over the last decade has dramatically shifted to the South of Market neighborhood.



# A Collaborative Approach...



## Developers/Owners

- Hire design professionals, special inspectors, contractors, and sub-contractors
- Design projects
- Draft project plans
- Submit plans that follow SFBC
- Choose Code-Prescriptive or Performance-Based design
- Comply with peer review requirements
- Address any inconsistencies DBI identifies
- Choose building materials
- Requires dewatering
- Work with other City agencies during construction
- Maintain safety of building during construction and after Certificate of Final Completion
- Disclose any safety concerns



## Design Professionals

- Propose structural, seismic, and geotechnical plans that follow the San Francisco Building Codes
- Keep building records
- Responsible for reviewing special inspection compliance documents

### Design Professionals include:

- Architect
- Mechanical Engineer
- Electrical Engineer



## DBI

- Ensures submitted project plans and construction follow San Francisco Building Codes
- Inspects life safety systems in a building to ensure they are code-compliant
- Monitors all changes approved in the field by Engineer of Record
- Issues Certificate of Final Completion



# ...With Distinct Roles & Responsibilities

## Depiction of Average Time Spent on Job Site

Periodically

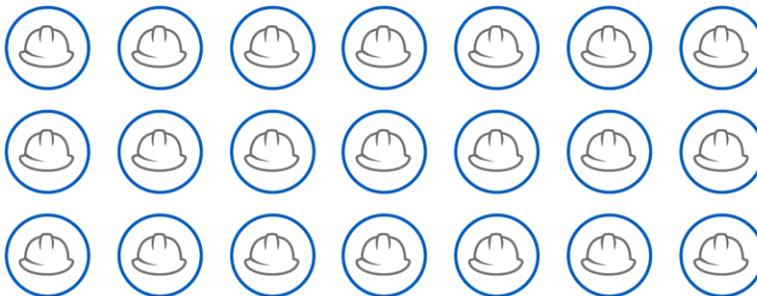


**DBI Building Inspectors**  
Spot Check Important Milestones

Daily



**Designers & Engineers**  
Engineer of Record;  
Continuous, Full-Time Special  
Inspectors; Geotechnical Engineers;  
and other Design Professionals



**Owner's Construction  
Team On-site**  
Contractors, Subcontractors



# From Design to Construction

## Construction Design Process



1<sup>st</sup>



2<sup>nd</sup>



## SITE PERMIT

A set of conceptual design development drawings for new and existing construction

- First step of seeking project approval from DBI and the Planning Department
- Approval recognizes proposal as a legal project
- Does not allow construction
- Structural design criteria required for peer review projects

## ADDENDA

Detailed construction documents

- Describe specific elements of construction (e.g. structural, architectural, mechanical, electrical, and plumbing)
- Reviewed by DBI generally in order of construction sequence
- Authorizes construction for each new addendum approved



# Peer Review in San Francisco and Other Cities



- DBI has an **extensive and robust** peer review process.
- Since March 2008, all new building projects in SF are subject to these **robust standards**.
- DBI continues to improve its peer review processes to **ensure the independence of outside experts**.
- In comparison to the peer review processes required by other cities, SF remains **among the most stringent**.





# Peer Review Process

Pre–  
2008

## NO WRITTEN REQUIREMENTS

No written peer review process in place.

Mandatory peer review not required.



Mar. 2008–  
Oct. 2016

## FORMAL REQUIREMENT

AB 082 and 083 formally require third-party peer reviews

for all tall buildings over 240 feet.



Oct. 2016–  
Present

## IMPROVEMENTS UNDER DEVELOPMENT

AB 082 and 083 in place.

Third-party peer review panel appointments are made by DBI without project sponsor input, at the expense of project sponsor. Proposing an RFQ of qualified, third party experts for future tall building review.





# Permitting, Inspection, & Occupancy

1<sup>st</sup>



## SITE PERMIT

Issued after Planning approval & when DBI approves architectural/life safety and accessibility related conceptual documents.

2<sup>nd</sup>



## ADDENDA

Issued individually when DBI approves detailed construction document packages, e.g. structural, architectural, mechanical, electrical, and plumbing.

3<sup>rd</sup>



## INSPECTION

Visual inspections of site to ensure work is code compliant & conforms to approved plans & permit documents.

4<sup>th</sup>



## OCCUPANCY

Certificate of Final Completion & Occupancy (CFC) allows occupancy.



# Code Required: Special Inspection

## REQUIRED

by SF Building Code



## CONDUCTED

by certified third parties engaged by the developer



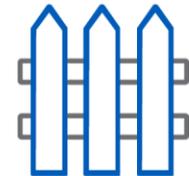
## MONITORS

for material and workmanship critical to a building's integrity



## SEPARATE

performed by qualified third parties in addition to inspections by DBI and the project's design team





# Outside SFBC: Dewatering

## DEWATERING:

Removal of water from a construction site in order to make it suitable for construction.

Dewatering is the owner's responsibility...



...which includes the **construction team**...

and **geotechnical engineers**.



### City agencies

including PUC and DPH, are responsible for aspects of dewatering, including discharged water.



Dewatering is **not referenced** in San Francisco Building Codes.



DBI plays **no permitting role** in dewatering.



# Thank You!

Ronald Tom, Assistant Director, DBI  
[ronald.tom@sfgov.org](mailto:ronald.tom@sfgov.org)

Additional information available from the full report and FAQ.



# Department of Building Inspection's Tall Building Review Process, March 2017, FAQ

## About the March 2017 DBI Tall Buildings Report

### What is the Tall Buildings Report?

In response to questions received by the Department of Building Inspection (DBI) from the Building Inspection Commission (BIC) in December 2016, the report provides answers and insights to DBI's regulatory policies and procedures.

The report examines tall buildings over 240 feet—including the governing codes, number, and type of construction. Though tall buildings remain rare, representing less than 1 percent of San Francisco's cityscape, the number of tall building project proposals received by DBI has increased since the early 2000s. In response, the department has rigorous safety processes and protocols in place to ensure that these complex structures are safe and adhere to the stringent requirements of the San Francisco Building Code.

This document reviews the key topics covered in the report. A full copy of the report is available online at [www.sfdbi.org](http://www.sfdbi.org).

## About DBI

### What is the Department of Building Inspection?

Founded in 1994 by voter referendum Proposition G, the Department of Building Inspection was created to provide the public with more responsive and more responsible building inspection services by separating the Bureau of Building Inspection from the Department of Public Works. The agency is overseen by the seven-member citizen Building Inspection Commission (BIC), also established by Proposition G.

DBI's vision is to work with all San Franciscans for a safer community. The department is responsible for the proper and judicious implementation of the San Francisco Building Code, as well as the City's disability access regulations, as it applies to the more than 200,000 residential and commercial buildings in the City.

## What does DBI do?

DBI staff works closely with a building's developer and/or owner, and the developer's or owner's chosen design team, to ensure that submitted project plans and their construction follow the San Francisco Building Code. The San Francisco Building Code provides the minimum standards for protecting life safety, health, property, and welfare of the general public. DBI performs its enforcement of the building codes by regulating the design, construction, quality of materials, use and occupancy, and location of all structures. The department's role in reviewing and inspecting buildings is established and defined through the San Francisco Building Code.

DBI does not propose building plans or make repairs nor construct or design buildings. Once DBI issues a Certificate of Final Completion and Occupancy, upkeep of the building, including continued maintenance and safety, is the responsibility of the owner. DBI will respond to residents' complaints of a possible code violation by performing a visual inspection. Complaints may be filed with DBI online, in person, through email, or through the City's 311 central complaint line.

In order for DBI to conduct its final inspection and issue a Certificate of Final Completion and Occupancy, approval from all other agencies having jurisdiction must be provided to DBI. Additionally, documentation of all required special inspection compliances must be submitted to and approved by DBI Special Inspection services staff. This includes the final compliance reports from the architect or engineer of record and/or the special inspection agency that inspected the work requiring special inspection.

## What are the responsibilities of special inspectors and the engineer of record?

Special inspectors and the engineer of record are hired by the project owner or developer as part of the project's design team. Special inspection is the monitoring of materials and workmanship critical to the integrity of a building's structure or are otherwise required for public safety. The process is separate from the inspection conducted by DBI and the project's engineer of record. The reviews are performed by highly specialized experts who are certified and qualified for a particular field.

Depending on the element being monitored, special inspection may be conducted on a periodic or continuous basis. Examples of areas for special inspection include welding, concrete placement and sampling, and pile driving, the pounding of support piles into soft soils to uphold the building's structure. Special inspection is a requirement of Chapter 17 of the California Building Code and is further regulated through Administrative Bulletin 042 of the San Francisco Building Code. DBI recently updated the qualification requirements for special inspection with the approval of Information Sheet S-14 in February 2017. Special inspectors, who are hired by the project sponsor, must now be selected from the vetted list reviewed and provided by DBI. Special inspectors must apply and regularly renew their application and certification, demonstrating their qualifications to provide particular special inspection services.

The project's engineer of record is responsible for ensuring that construction is in accordance with the permitted plans, which have been approved as meeting the minimum standards of the San Francisco Building Code. Included within these responsibilities is identification of the areas of construction to require special inspection. The engineer of record is responsible for compiling and submitting to DBI final signed compliance reports for all areas of special inspection attesting that construction followed the approved plans. These Special Inspections must be received by DBI prior to its final inspection to allow occupancy of the building. The reports are kept permanently by DBI, as required by its Record Retention Policy. As tall buildings are complex projects, and most require adjustments and modifications of plans to address field conditions, these plans are resubmitted to DBI to reflect "as-built" changes per field conditions.

While DBI inspectors will visit a work site on a regular, as needed basis, the engineer of record provides frequent and regular observance to the progress of construction. Tall building projects may also have many special inspectors providing full-time observation, in specific areas, as required. DBI inspectors will "spot check" the regular written reports required of special inspectors at the conclusion of each of their visits, but the primary responsibility for demonstrating the code compliance of construction belongs to the engineer of record in working closely with the special inspectors.

## About Tall Buildings

### What is the definition of a tall building?

San Francisco has provided a codified definition for tall buildings since 2008. Through Administrative Bulletins 082 and 083, the San Francisco Building Code identifies a tall building as 240 feet and greater.

Tall buildings remain rare in San Francisco, representing less than 1 percent of the cityscape. Beginning in the early 2000s, DBI began receiving more proposals for tall buildings. Many developers sought locations in the City's downtown and South of Market (SoMa) neighborhoods, and developed plans for tall buildings intended for both residential and commercial use. The increase in tall building proposals correlated with advancements in construction that allowed for a greater adoption of concrete, as opposed to steel, as the construction material.

### **What is DBI's role in reviewing tall buildings?**

DBI does not propose, design, or construct buildings. DBI's main role during the plan review and permit issuance stages is to ensure that the submitted project meets the minimum building standard code requirements stipulated in the San Francisco Building Code. Tall buildings are complex structures, and a team of design professionals is brought together by the project owner for their development and their review to ensure safety.

It is the responsibility of the project sponsor and/or owner to determine the scope of a project and to work with the hired team of professionals to develop the design, build the structure, decide on materials, and agree on important building elements to construct a safe and code-compliant building.

The project's design team generally consists of an architect, structural engineer, and geotechnical engineer. A project's architect provides the building's design, while the structural engineer is responsible for the structural and seismic system. The structural engineer of record works in concert with the property owner's chosen geotechnical engineer to determine the building's foundation. Generally, the geotechnical engineer compiles a soil report, which would include the foundation design, seismic ground motion requirements, and related analysis of expected settlement. The structural engineer uses the soil report to design the building accordingly.

DBI works closely with a building's developer and/or owner's chosen engineer of record to ensure that submitted project plans and construction meet and/or exceed minimum requirements of the San Francisco Building Code. DBI also inspects life-safety systems in a building to ensure that they are code compliant and issues a Certificate of Final Completion and Occupancy (CFC), which allows occupancy. Once a CFC is issued, DBI will respond to any citizen complaints about the building, but the responsibility for continued maintenance and safety is that of the owner.

## **Governing Codes**

### **What is the San Francisco Building Code?**

San Francisco is internationally recognized for having among the most stringent building codes of U.S. cities. Updated every three years, building codes serve as "living documents," constantly revised in an effort to improve regulations and update the minimum safety standards. The San Francisco Building Code, compliant with international, national, state, as well as specific, additional City requirements, provides the minimum safety standards the buildings constructed must meet or exceed.

Minimum standards identified by the San Francisco Building Code encompass building quality, strength, effectiveness, fire resistance, durability, and safety. The San Francisco Building Code includes mechanical, electrical, plumbing, green building, and energy requirements, as well as additional San Francisco amendments. These amendments are established as Administrative Bulletins (AB), guiding documents drafted by the Code Advisory Committee and approved by the Building Inspection Commission, and Information Sheets (IS), developed by DBI and used to provide consistency in administrative policies, code interpretation and implementation by DBI staff and other users of the San Francisco Building Code.

## **Types of Structural Design**

### **What is structural design?**

A building's structural design details how the building will be constructed to be able to perform safely and uphold against such opposing forces as lateral wind and earthquake movements or the vertical weight of the projected occupancy. These design and seismic criteria are set by the San Francisco Building Code. The building code also assigns the requirements for a building's structural detailing, the prescribed demands for material and its specific arrangement, as part of the provisions to ensure buildings are able to safely withstand an earthquake.

Buildings vary in their expected performance for resisting seismic forces. Structures such as hospitals and public safety buildings, for example, are identified as "essential buildings" and are required to be designed and constructed to meet the highest, or maximum, standards for performance during an earthquake. Most buildings are not considered "essential buildings" and therefore do not need to meet these highest standards. However, San Francisco Building Code requires that all new buildings are built not to collapse during a seismic event.

There are two types of structural designs: code-prescriptive and performance-based.

### **What is a code-prescriptive structural design?**

A code-prescriptive structural design describes projects that are designed and built according to San Francisco Building Code requirements. Project sponsors of a code-prescriptive structural design are required to strictly adhere to the methods, design, and materials provided in the San Francisco Building Code to build a code-prescriptive building. A typical code-prescriptive design is a four-story, wood-framed building. The vast majority—over 99 percent—of buildings in San Francisco follow a code-prescriptive structural design.

### **What is a performance-based structural design?**

In the case of a performance-based structural design, the project sponsor commits to employing advanced, detailed computer analyses and designs to develop a building that is capable of the same performance as a code-prescriptive design. Performance-based structural designs must also demonstrate their ability to meet or exceed the same code requirements found in the San Francisco Building Code.

An example of a common performance-based structural design in a tall building (over 240 feet). Beginning in the early 2000s, the number of projects relying on performance-based structural designs began to increase. Performance-based structural designs remain rare—representing less than 0.1 percent of the more than 200,000 buildings in San Francisco.

### **How is a structural design chosen?**

Applications for a new project must be based upon using one of these methods: indicating either a completely code-prescriptive or a wholly performance-based structural design for a building. The choice between a code-prescriptive or performance-based structural design is solely that of the permit owner, developer or project sponsor.

## **Peer Review of Tall Buildings**

### **What is peer review?**

Peer review, also referred to as structural design review, represents reviewers with additional specialized, individual expertise to supplement DBI's own plan review. Codified since March 2008 as a mandatory requirement for new tall buildings (at least 240 feet) and performance-based structural designs, peer review is performed by a two-to three-person panel.

### **Who serves on a peer review panel?**

Peer review consists of two to three experts, depending on the requirements of the proposed project. Typically, the panel may include a seismic expert, a structural engineer, and a geotechnical engineer. Both the structural and technical engineer must be registered professional engineers in California and current practitioners in their fields. They are expected to provide approval of the proposed project addenda, a collection of detailed construction documents. The seismic expert is generally a respected academic from a locally recognized institution.

Experts may not serve on the peer review for a proposal if a conflict of interest exists with the project. It is the responsibility of each person considered for peer review to disclose any potential conflict of interest. Though peer review members are compensated by the project sponsor, they are not considered part of the design team and are under the purview of DBI. Peer review participants are required to provide DBI with written copies of their proposed scope of work under their contract with the project sponsor.

## **Recent Changes**

### **How is DBI strengthening its processes?**

DBI is constantly reviewing its processes to strengthen and improve building safety, especially around tall building construction. This review includes a thorough analysis of the role of mandatory peer review and special inspectors in tall building projects, as well as DBI's own record retention processes.

In October 2016, DBI Director Tom Hui, in coordination with the Building Inspection Commission (BIC), tightened the regulations regarding peer review panels to ensure true independence of outside experts and ease of collaboration with DBI staff.

Since October 2016, all peer review appointments are now made by DBI without input from the project sponsor. All peer review panelists continue to be compensated at the expense of the project sponsor. However, DBI is developing a new policy to increase peer review independence via DBI payment of review panels.

In addition:

- DBI is working to create a pool of vetted, qualified experts to work with on future peer review projects.
- DBI staff has reviewed peer review requirements of other cities, and found San Francisco's requirements are among the most stringent.
- Since 2008, San Francisco Building Code explicitly prohibits conflicts of interest with peer review experts. Any current updates would only seek to strengthen these provisions.

Further amendments initiated by DBI include an expansion of peer review requirements based on the soil composition for a projected site. As of November 2016, a second geotechnical engineer is required to review new tall buildings located in Class F soils, the softest grounds, which have the greatest magnification of ground shaking during an earthquake. DBI is also conducting its own analysis of Administrative Bulletins (ABs) 082 and 083, which govern peer review, for possible improvements to the regulations. Department Director Tom Hui has also contacted the Structural Engineers Association of Northern California (SEAONC) and requested the organization's review of ABs 082 and 083. SEAONC has confirmed that it is assembling a team and setting a meeting schedule to consider ABs 082 and 083.

San Francisco's current record retention requirements go above and beyond CA Building Code—DBI is making them even stronger. DBI is updating and improving its record retention policy for peer review documents to include:

- Scanning and indexing of all peer review documents related to a project;
- Scanning and indexing of each issuance of a structural design review letter; and
- Scanning and indexing files as far back as 2008.

*For more information on tall building safety, DBI's review policies, and a full copy of the report, visit the DBI's website at [www.sfdbi.org](http://www.sfdbi.org).*