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TPC Architects, Inc.
Newsletter

Japan's Strict Building Codes Saved Lives

(New York Times, March 11, 2011; excerpts from article by JAMES GLANZ AND NORIMITSU ONISHI)

You can view the entire article at http://www.nytimes.com/2011/03/12/world/asia/12codes.html?_r=4

Hidden inside the skeletons of high-rise totowers, extra steel bracing, giant rubber pads and embedded hydraulic shock absorbers make modern Japanese buildings among the sturdiest in the world during a major earthquake. And all along the Japanese coast, tsunami warning signs, towering seawalls and well-marked escape routes offer some protections from walls of water.

These precautions, along with earthquake and tsunami drills that are routine for every Japanese citizen, show why Japan is the best-prepared country in the world for the twin disasters of earthquake and tsunami - practices that undoubtedly saved lives, though the final death toll is unknown.

In Japan, where earthquakes are far more common than they are in the United States, the building codes have long been much more stringent on specific matters like how much a building may sway during a quake.

Japan has spent billions of dollars developing the most advanced technology against earthquakes and

CONSTRUCTION TESTING

The author of this month's special article is Dan Smith of Mid Pacific Engineering, Inc. in Sacramento, (916) 239-4230, dansmith@midpacificeng.com. TPC Architects has a long-standing professional relationship with Dan and appreciates his expertise in the area of geotechnical engineering and construction testing. I hope that you enjoy this article!

- Dan Kinnoin

Testing services are integral to the successful construction of any building project. Testing is performed to verify that the work performed by the contractor(s) complies with the project plans and specifications prepared by the design team. Testing services can be broken down into two general categories: Site Grading and Building Construction.

Site Grading

During the grading phase of work, site excavations are performed and earthen fills are placed and compacted using heavy earth moving equipment to create the surfaces upon which buildings and pavements will be supported. Needless to say this is a critical phase of construction work as it lays down the earthen "foundations" for your structures. Some key points to make this phase of work successful are:

Hire a qualified and experienced grading contractor with good local knowledge of the typical construction practices used in the area.

Make sure the recommendations of the Geotechnical Engineering Report are carefully followed. The report prepared for your site will contain specific recommendations for the preparation of ground surfaces and compaction of fills as well as pertinent information regarding items requiring special attention or construction procedures.

Retain the same engineer who originally prepared your geotechnical report for construction testing. This is the engineer who has intimate knowledge of your site and is best suited to help solve problems during grading. If for some reason there is a need to replace the original geotechnical engineer of record, make sure the new engineer concurs with the recommendations of the original geotechnical report and accepts in writing its conclusions and recommendations and also agrees to become the new engineer of record.

Having your Geotechnical Engineer involved early in the construction process can be very helpful especially during those initial discussions with your contractor about how much testing needs to be performed, what needs to be tested and when, and who will be responsible for scheduling the testing and notifying the engineer. Being clear about when the Geotechnical Engineer needs to be present on site to observe and test certain aspects of grading is very important and can the alleviate the need for re-working materials at additional costs and delays in the schedule.

Include a contingency fund to deal with unforeseen soil and site conditions. Take into consideration that the geotechnical report was prepared based on interpolating between discreet points of exploration and the conditions across the site are not necessarily uniform.

To reduce potential construction delays and costs due to wet soils, consider starting grading well after the winter rains and more into the late spring/early summer months when conditions are more favorable.

tsunamis.

Japan has gone much further than the United States in outfitting new buildings with advanced devices called base isolation pads and energy dissipation units to dampen the ground's shaking during an earthquake.

The isolation devices are essentially giant rubber-and-steel pads that are installed at the very bottom of the excavation for a building, which then simply sits on top of the pads. The dissipation units are built into a building's structural skeleton. They are hydraulic cylinders that elongate and contract as the building sways, sapping the motion of energy .....

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Lastly, make sure you receive proper project documentation, including daily field reports, test results and a final letter, for your records.

Building Construction

The next phase of testing begins with the building construction. Your Architect and Structural Engineer have prepared a set of plans and specifications based on current building codes, which require a minimum scope of testing and inspections to verify the quality of construction and materials. This work typically includes the inspection and testing of numerous types of materials used in your structure ranging from concrete and steel reinforcing for slabs and foundations to structural steel, masonry, and wood materials for the building super structure.

Most jurisdictions require that a special inspection form be signed by the owner, structural engineer, architect and a selected testing firm. This form contains a list of all of the required special inspections and testing, and is a commitment from the owner to perform all of the required work.

Most commonly, the owner is required to retain a building official approved Special Inspection firm. Only appropriately certified individuals are permitted to perform certain inspections and evaluations and these individuals are required to meet certain prerequisites for certification and must pass examinations. The building official typically maintains a list of approved testing firms listing the qualified work items each firm is approved to perform.

While some of the special inspections services may be similar to or the same as conventional testing services (i.e. checking steel reinforcing and casting of concrete cylinders for slabs and foundations), more involved inspections using specially qualified inspectors are required when special foundations such as deep piling or drilled piers are needed or for when structural system require welding, high strength bolts or post-tensioned concrete slabs/foundations.

When selecting a special inspection firm be sure that the firm is qualified to perform all the testing on required on your project and get personal referrals for reputable companies.

Make sure you understand what is being tested and what is not being tested when reviewing proposals. Additionally, be aware that only a minimum amount of testing is required by code. As the owner, you have the ability and the right to increase the amount of testing for your project based on your comfort level and particular needs. By working closely with your architect, structural engineer, and contractor, you may determine that some specific items not included on the typical list of inspections are important to your project's future performance, and therefore deserve additional inspection and testing.

Consider some contingency for additional testing due to a prolonged construction schedule, and unforeseen conditions that may arise during construction.

Lastly, make sure you receive proper documentation of all testing and inspections performed on the project for your records. Documentation of Special Inspections in the form of final letter is often required to obtain a certificate of occupancy.

Make sure the selected special inspection firm will provide the necessary final documentation in a timely manner.

Next Month: **Construction Phase Primer, Part One**

I encourage you to contact me personally with any questions you may have.

Sincerely,

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