California Council of Testing and Inspection Agencies

THE TEST REPORT

A Newsletter of the California Council of Testing and Inspection Agencies

Spring 2009

This Issue

President's Corner

Once again, the city of Las Vegas welcomed our membership for a weekend of entertainment, fine dining and industry discussions for our Annual Business Meeting. A special thanks to Elizabeth Levi for the considerable time and effort she put forth in creating 2009 Annual Business at Treasure Island a success.

As you know, part of Saturday evenings festivities include the awards presentation. Outgoing President Rick Van Horn (Terracon) welcomed the attendees and thanked all Committees and his Board for their hard work and dedication in 2008. The 2008 Board members honored were; John Byerly, Vice President (John Byerly , Inc); Michelle Craig, Secretary (Dynamic Consultants, Inc.), Elizabeth Levi, Treasurer (BSK Associates); Michael Parker, Director (Testing Engineers, Inc.); Jeffry Cannon, Director, (Kleinfelder), and Simon Makdissi, Director (Terrasearch).

As incoming President, I eagerly accepted the gavel and inducted and introduced my 2009 Board; James "Chip" Moore, Vice President (ENGEO, Inc.), Michele Craig, Secretary (Dynamic Consultants, Inc.), Elizabeth Levi, Treasurer (BSK Associates), Directors John Byerly (John Bverly , Inc), Jeffry Cannon (Kleinfelder), Martha McDonnell (Youngdahl), and Rick Van Horn, Immediate Past President (Terracon). Both the incoming Board and I have a lot of work to do ahead of us, and I am honored to be supported by such a great group of our professionals. I am looking forward to an outstanding year of commitment and industry involvement.

While I look on this year with eager anticipation, I cannot help but notice that the same people listed as my Board also share responsibilities on Committees. The key to our longevity in this organization is the fact that we all are talented members of our industry and we remain strong in numbers. I remember in the past how this group moved mountains with one voice and were able to speak as experts on the emerging issues. No longer can we remain divided in this association as we need all of memberships help to succeed with industry issues. Many people will retire, move onto other industry associations, or move out of California. Whatever the reason, we must challenge each other to bring our best to the table every meeting, actively join Committees, and wager our opinions to our peers. I ask every member to consider doing more within this organization so that the hard work of the past does not fall to the wayside. I welcome each and every one of you to let me know your thoughts, as well as your solutions to grow this Association further in 2009.

This year, in an effort to get more people to the Annual Business Meeting, we will plan ahead for speaker involvement, location of event, as well as date availability to gain maximum exposure and attendance. We are already seeking out different locations for pricing, and are working at bridging industry efforts with ASFE, CalGeo, and others.

We're on the Web!
http://
www.cctia.org

Local Buzz!
Doing Business in San Francisco

So, what is on the horizon for CCTIA? The City of San Francisco is developing NEW special Inspection guidelines. The city has introduced what they are calling the San Francisco Administrative Bulletin AB-046 if passed this will increase the office workload for all Special Inspection firms and will require special inspectors to obtain additional experience before working in San Francisco. AB-046 will require all laboratories to prepare an "Area Acceptance Report" for each completed locations within a project. The new guidelines will also require laboratories to leave a hard copy of reports on the jobsite and to submit all daily field 7 lab reports with the final affidavit letter. AB-046 will require special inspectors to obtain 3 years of experience along with their ICC certifications before performing inspections in San Francisco. There are many other changes that would affect our industry if AB-046 is passed and I urge all of our members to become familiar with the new guidelines and attend our next meeting to discuss this issue further.

FAQ10.050

LOW CONCRETE STRENGTHS ON CALIFORNIA SCHOOL PROJECT

Submitted by Testing Lab Manager in Northern California

We have a school project in California where the specified concrete strength is 4000 psi at 28-days. On one specific pour the following strengths were obtained:

7-day strength = 2780 psi
28-day strength =3890 psi (average of 2 cylinders)
56-day strength = 4150 psi (1 cylinder)

Do you report the results as meeting the requirements of the DSA approved document?

Response Submitted by David Chippero

California Building Code, Title 24, Part 2, Chapter 1905A.6.3 Strength Test Specimens states *"Strength test acceptance criteria shall comply with the provisions of ACI 318, Section 5.6.3."* Section 5.6.3.3 notes *"Concrete shall be considered satisfactory if both of the following requirements are met:*

A) Every arithmetic average of any three consecutive strength tests equals or exceeds f'c.

B) No strength test falls below f'c by more than 500 psi when f'c is 5000 psi or less."

Using this guideline, the results above would be acceptable if the 28-day cylinders, when averaged with three consecutive strength test results on the project are equal to or greater than 4000 PSI. This assumes that no individual test was less than 3500 PSI.

The Division of the State Architect holds a different position regarding low strength concrete test results. DSA believes that the LEA approved laboratory should report all failing test results immediately as a non-conformance. It is then up to the design professional and DSA to determine a corrective action plan. If an approved stamped change order is not received from DSA, the failing results should be reported on your laboratory verified report, DSA Form 291. In the 2007 California Administrative Code, Title 24, Part 1, section 4-335b, Performance of Tests, it states, *"Where a sample has failed to pass the required tests the architect or engineer, subject to the approval of DSA, may permit retest of the sampled material."* Section 4-335d, Test Reports also notes, *"Reports of test results of materials not found to be in compliance with the requirements of the plans and specifications shall be forwarded immediately to DSA, the architect, the structural engineer, and the project inspector."*

So although the 56-day strength test met the 28-day f'c requirements, DSA does not consider the results to be valid. The test report must be distributed noting, "*the results did not meet the requirements of the DSA approved documents.*" There are no provisions in the California Building/ Administrative Code, Title 24 that allow the use of a 56-day test result in lieu of the required 28-day test result. However a 56-day test result may be useful to the design professional and DSA in arriving at a corrective action plan.

Reference Documents
2007 California Administrative Code, California Code of Regulations, Title 24, Part 1

2007 California Building Code, California Code of Regulations, Title 24, Part 2, Volume 2

Building Code Requirements for Structural Concrete (ACI 318-08) and Commentary

David Chippero is the Special Inspection Division Manager at Testing Engineers, Inc. He can be reached at davidc@Testing-Engineers.com

FAQ10.052

HOW IS A BOLT HEAD FORMED?

Submitted by S.E. in Oakland, California

A colleague of mine suggested that the head of a high-strength bolt was attached to the shaft by welding the two parts. Could you explain the process for the assemblage?

The head of a bolt is formed by heating the end of a piece of steel round bar and then forging (reshaping) the heated end into a head. The head is not welded on or otherwise "attached" to the end of the round bar.

For example, the production of a 1" diameter x 12" long A 325 bolt begins by cutting a 20 ft. length of 1045 steel round bar into 13-11/16" pieces. Since the finished bolt length of 12" is measured from the end of the bolt to the underside of the head, we must add 1-11/16" to the cut length of the bolt. After cutting the bolt to length, this added material (1-11/16") is heated to approximately 2000 degrees Fahrenheit and forged into whatever head style the specific bolt requires. In the case of an A325 bolt, the head style is a heavy hex structural bolt. After the head is forged, an A325 bolt undergoes a heat-treating process in which the bolts are quenched and tempered to develop the high strength mechanical properties required by the specification. The next step in the process is to test the bolts to ensure that they meet the strength requirements. After verification, they are threaded with 1-3/4" of 8 pitch Unified National Coarse thread.

Information provided by Portland Bolt & Manufacturing Company, www.portlandbolt.com

Terry Egland is a principle at Testing Engineers, Inc. and a registered engineer in California. He can be reached at Terry@Testing-Engineers.com

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FAQ10.057

WATER-CEMENT RATIO vs STRENGTH

Submitted by Technician in San Leandro, California

Many published articles relate how changing the water-cement ratio has a large effect on concrete strength. Is there a simple explanation for this effect?

Response Submitted by Terry Egland

In general, there exists a fundamental inverse relationship between porosity and strength of solids. This strength-porosity relationship is applicable to a wide range of materials, such as iron, stainless steel and granite. Think of examining a concrete core, which exhibits voids created by a lack of consolidation. You can imagine, why with a lack of internal structure, the compressive strength would be lower than expected. On a much smaller scale, there is a theoretical volume of water (based on curing conditions) required to hydrate a given volume of cement. Once you have added more than that amount it creates capillary porosity (i.e. microscopic cavities or voids). The higher the water-cement ratio the more porous the weaker the strength. Generally, to maximize strength and durability, the water-cement ratio should be the lowest possible to hydrate the cement while maintaining its workability.

Terry Egland is a principle at Testing Engineers, Inc. and a registered engineer in California. He can be reached at Terry@Testing-Engineers.com

Got a question?

Send it to Q&A,CCTIA, 2811 Teagarden St. San Leandro, Ca.94577 or email terry@testing-engineers.com

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FAQ10.048

Validity of Mortar Testing

Submitted by PM in Southern California

During a preconstruction meeting, concern was voiced that the mortar testing should be suspended since it would not represent the actual field strength conditions. What circumstances can be stated to explain the concern?

Response Submitted by Kurtis K. Siggard

Care must be taken in how we sample, test, and report mortar tests. Mortar, by its nature retains water for an extended period of time. The water in the mix is necessary to maintain the workability of the mortar and to create the bond between the masonry unit and mortar. There have been significant problems lately with field-testing pre-blended mortars that are proportioned to meet the property requirements of ASTM C 270. Many of these pre-blended products have constituents that retain a greater amount of water requiring less retempering of the mortar. Due to the high water/cement ratio of these mortars when sampled soon after mixing, and the molding of samples in watertight containers, sampled strength may be much lower than the strength of the mortar used in construction. ASTM C 1586 5.5.3.1 states: *Measuring mortar compressive strength of field-sampled mortar has no relevance unless preconstruction testing is performed in the laboratory using similar mixing equipment, mortar materials, and the same specimen geometry. Even when this is done, the field compressive strength data can only be compared to the preconstruction mortar strength data in general, due to other factors, such as weather, temperature of mortar, and the absorption properties of the specific masonry units being used.*

Kurtis K. Siggard is Executive Director of CMACN, Concrete Masonry Association of California & Nevada. He can be reached at kurt@cmacn.org

Next Edition of The Test Report:

CALIBRATION / STANDARDIZATION / VERIFICATION

WHAT'S THE DIFFERENCE?

Is there a subject you would like covered?

Email us your question and it may appear in the next edition of The Test Report.

info@cctia.org

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Current Members

Applied Materials & Engineering, Inc.	ES Geotechnologies	Ninyo & Moore, Inc.
BSK Associates	Engeo, Inc.	Professional Service Industries, Inc.
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Blackburn Consulting	GeoCon Consultants Inc.	RES Engineers, Inc.
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CHJ, Inc.	Heider Engineering	Smith Emery Company
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Condor Earth Technologies	Inland Foundation Engineering, Inc.	Terracon Consulting Engineers & Scientists
Consolidated Engineering Laboratories	Inspection Consultants, Inc.	Terrasearch, Inc.
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Construction Testing and Engineering, Inc.	KC Engineering Co.	Testing Engineers-San Diego, Inc.
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Coverall Engineering & Co., Inc.	Krazan & Associates, Inc.	URS/D & M Consulting Engineers
Dynamic Consultants, Inc.	Matriscope Engineering Laboratories Inc.	Youngdahl & Associates, Inc.

FAQ10.014

DO METAL FASTENERS IN CONTACT WITH WOOD PERSERVATIVE REQUIRE CORROSIION PROTECTION?

This question appeared in the October 2001 Inspection Division Quarterly Newsletter – City of Santa Clara, California.

Do foundation hold-downs bolts, anchor bolts, plate washers, straps, nails, etc. attaching pressure preservative treated wood, have to be hot-dipped zinc coated galvanized, stainless steel, silicon bronze or copper?

Response Submitted by Terry Egland

The International Residential Code (R319.3) and the International Building Code (2304.9.5) have similar requirements for fasteners used with treated wood. The IRC states, "Fasteners for pressure-preservative and fire-retardant-treated wood shall be of hot-dipped zinc coated galvanized steel, stainless steel, silicon bronze or copper. The coating weights for zinc-coated fasteners shall be in accordance with ASTM A153.

Exceptions:

1. One-half inch (12.7mm) diameter or greater steel bolts.
2. Fasteners other than nails and timber rivets shall be permitted to be of mechanically deposited zinc-coated steel with coating weights in accordance with ASTM B695, Class 55, minimum."

The codes do not discriminate between types of preservatives and do not take into account exposure conditions, nor do they contain provisions for other hardware such as connectors or flashing.

The potential for corrosion of hardware in contact with treated wood occurs when metals in the preservative (such as copper) are different from the metals in the hardware (the iron in steel, or aluminum). In a wet environment these dissimilar metals create a small electrical current that triggers a chemical reaction resulting in galvanic corrosion.

In damp or wet exposure, hardware in contact with pressure-treated wood must be corrosion resistant. Hardware includes fasteners (e.g. nails, screws, and bolts) and all connectors (e.g. joist hangers, straps, hinges, post anchors, and truss plates).

Regardless of exposure condition, fasteners and connectors should be specified in compliance with the hardware manufacturer's recommendations and the building codes for their intended use.

A conclusion from the above would indicate that shear wall nailing to a pressure-treated sill plate requires galvanized nails.

Terry Egland is a principle at Testing Engineers, Inc. and a registered engineer in California. He can be reached at Terry@Testing-Engineers.com

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UPCOMING MEETINGS & SEMINARS

CCTIA General Membership Meeting – w/DSA Speakers
March 26, 2009 11:30am
Courtyard by Marriott Fairfield Hotel
1350 Holiday Lane
Fairfield, CA

CalGeo Annual Conference
April 2 – 4, 2009
The Lodge at Sonoma

ASFE Annual Spring Meeting
April 16 – 19, 2009
Renaissance Washington DC

CCTIA General Membership Meeting
April 23, 2009
Sheraton Pleasanton Hotel
5990 Stoneridge Mall Road
Pleasanton, CA