

## ENGINEERING STANDARDS UPDATE

Because [Standards Know-How Isn't Just for Nerds](#)

### Topics this month:

- **The Greening o' LANL**
- **Training & Qual**
- **LANL Standards Issued in February**
- **O&M Criterion Changes**
- **I-Code Errata**
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- **When Good Conduct of Engineering Isn't Followed**

The Standards Homepage (on the LANL public website): <http://engstandards.lanl.gov/>

### THE GREENING O' LANL

April's a pretty green month, having [Earth Day](#) April 22 and all, but this is March which runs a close second with St. Patrick's Day and all the Kelly green beer and related [public transportation use that's warranted](#). Heck, I even become Irish that day (O'Ruch). So here are two related good-news stories (thanks to the LANL Standards).

First of all, LANL has received another Leadership in Energy and Environmental Design (LEED) building certification from the US Green Building Council. This is the third for us, and it's the TA-63-144 TRU Waste Facility (TWF) Operations Support Building. It's a small, 6500 GSF building and was awarded LEED Gold Certification in February. It's probably LANL's first building with substantial photovoltaic (PV) roof panels—and also rooftop solar-thermal water heating. LEED Gold is mandate of [ESM Chapter 14, Sustainable Design](#) based on DOE order requirements. Solar-thermal is also per Chapter 14 (when cost-effective), driven by the Energy Independence and Security Act. So these technologies should appear on some more buildings in the future.

Also, as I&C Standards POC Allen Hayward points out, in January there was a great article in [LANLtoday](#) (and later the [ADNHHO Quarterly Newsletter](#)) about a new energy savings initiative by Utilities and Institutional Facilities (“Lab joins Better Buildings Smart Labs Accelerator”).

This UI initiative is successful in part because it builds on other initiatives that have been driven by the LANL Engineering Standards for years. Examples of this are in the article: In the last paragraph, it points out that 63 buildings at LANL have building automation systems connected to the yellow network, and that 45 of the 63 buildings have a night set-back feature for lighting and temperature reduction. The requirement for web-based automation systems was put into the LANL Engineering Standards Manual I&C Chapter in 2002. As a result, the article also highlights the growing impact that one small part of the Standards has achieved in the last 15 years. The article further notes that the NSSB was one of the first buildings built using the new standards and notes that the automation system saves about \$100,000 annually.

Beyond building automation, there are many other longstanding requirements in the LANL Standards that contribute to energy efficiency and overall sustainability, including energy conservation and metering, water conserving fixtures, recycled content, and LEED certification (as noted above).

## **TRAINING & QUAL**

### **Electrical Standards Course – Thurs, March 16**

Four-hour course 17998 covers the electrical engineering standards in Chapter 7 of the LANL Engineering Standards Manual and discusses mandatory requirements and good practices for those involved in electrical design. Strongly suggested for electrical designers, electrical engineers, electrical safety officers, and facility managers. AEs are also encouraged to attend. Taught by Electrical Standards POC Eric Stromberg from 7:30–11:30 am, Otowi Building 03-261, “Main Gate” Classroom Rm. F200W.

### **CGD Training -- Thurs, March 30**

The usual one-two punch:

8-10 a.m. Course 30726, CGD Overview for Managers, CGD Preparers, others. Prereq for 30727.

10:15 a.m.-4:00 p.m. Course 30727, required for CGD Preparers and reviewers (like QPA) to be qualified.

Taught at TA-00-1308 White Rock Training Center Rm 117.

**To register for LANL courses**, sign up via [UTrain](#) (AEs without cryptocard via Yolanda Trujillo at 665-5696 or [ytrujillo@lanl.gov](mailto:ytrujillo@lanl.gov) with Z number).

- On [UTrain](#) click on the “catalog” tab and select “advanced catalog search”
- Enter course number as the “ID”, then “search”
- Add-to-do-list
- Go to your to-do-list and click on ‘register’

Disenroll a similar way.

### **Geometric Dimensioning and Tolerancing Classes (GD&T) and Print Reading Workshops (Non-LANL)**

The Northern New Mexico ASME Section offers GD&T and print-reading classes geared to the mechanical R&D and weapons work done at LANL (not so much facility work). Courses cost close to \$1000 each. Upcoming:

[Print Reading and Engineering Drawing Practices](#) April 17-18, Monday-Tuesday, from 7:30 to 4:30PM, in Room 203B at the Research Park.

[GeoTol Pro Fundamentals Using ASME Y14.5-2009 Standard](#) April 19-20, all day Wednesday and Thursday, same hours and room as above.

**LANL STANDARDS ISSUED IN FEBRUARY**

<b>ESM <a href="#">STD-342-100</a></b>	
Ch. 13 Welding, Joining, & NDE, Vol. 6 NDE, ITM-1306-NDE-PT-201, Fluorescent, Water-washable Penetrant with Non-aqueous Wet Developer and Form 01, Penetrant Testing Inspection Report Form	Initial issue, no former KSL or LANL procedure. Thanks to SME David Harvey, POC David Bingham.

Many Standards points-of-contact are working hard to update most of the LANL Master Spec Section this fiscal year. That's why there are so many this month and why there will be many more in future months. Thanks to them and the [Technical Committee members](#) and others who are commenting on drafts.

<b><a href="#">Master Specifications STD-342-200</a></b>	
	<b>For these, thanks to POC Scott Richardson and, for the sustainability input, Mackenzie Mathews, student in the UI Site Sustainability Program:</b>
06 1000 R3 Rough Carpentry	Updating references and enhancing the sustainability aspects.
06 2000 R2 Finish Carpentry	Updating references and enhancing the sustainability aspects.
06 4100 R2 Architectural Wood Casework	Updating references and enhancing the sustainability aspects.
07 0150.19 R3 Preparation for Reroofing	Updating of all references and general editing.
07 0155 R3 Roof Patching	Updating of all references and general editing.
07 2100 R3 Thermal Insulation	Added polyisocyanurate foam board insulation and updated references.
08 1400 R3 Wood Doors	Updated references and enhanced sustainability aspects.
08 4113 R3 Aluminum-Framed Entrances and Storefronts	Updated manufacturers an references and general editing.
	<b>For these, thanks to POC Eric Stromberg:</b>
26 0553 R3 Identification for Electrical Systems	Major revision to align with new P101-13.
26 0553 R4 Identification for Electrical Systems	Arc flash and shock hazard labels modified.
26 2713 R4 Electricity Metering	Major revision to reflect new UI requirements and DOE guidelines. Also thanks to Maura Miller and Vinny Bovenzi.

### O&M CRITERION CHANGES

Below are recent [O&M Criterion](#) changes issued by MSS-MP, the Maintenance Programs Group of Maintenance and Site Services Division. Implementation is required 30 days from issue date for non-nuclear facilities, 60 days for nuclear facilities.

It's best to use Internet Explorer to access them on the SharePoint site to avoid authentication issues.

PMI 601-A r1: Fixed Crane Maintenance, Repair, and Testing	Added caution on securing load block before removing gear box cover to 601-A.001, 601-A.002, and 601-A.003; added new Step 1.20 to 601-A.003, and renumbered the former 1.20 to 1.21.
PMI 601-C R0 Inspection of Overhead, Gantry, Monorail, and JIB Cranes and of Lifting Devices Other than Cranes	Canceled. All directions are in ASME B30.2 and the KONECRANES Crane Inspection Training Manual (formerly P&H Crane Training Institute). Jeff Sharp, <a href="mailto:jjsharp@lanl.gov">jjsharp@lanl.gov</a> or 665-6800 on this and above.
PMI 721-C R2.1: Wet Automatic Sprinkler Systems Six-Month Inspection and Testing	Deleted the work "fully" from Step 3.1.
PMI 728-B R0: Fire Foe Tube Monthly Inspection, Testing, and Maintenance	New Issue. <a href="http://pmd-shpt-prod:6129/DocumentLibrary/MSS/workinstructions/728-BWD.pdf">http://pmd-shpt-prod:6129/DocumentLibrary/MSS/workinstructions/728-BWD.pdf</a>

### I-CODE ERRATA

As an update to September's article, errata lists for the I-Codes are published periodically by the ICC.

PDF users, if you have the very latest printing available from IHS, most known errors are fixed in that pdf, but there may still be some newly discovered ones. Those with older pdfs should check the edition notice (aka copyright page, which is on the back of the title page) against the latest printing info in table below. If you don't have the latest pdf, you should download it (then log out, then dump the old pdf).

Affected I-Code	This info also posted under ESM Chapter:
IFC-2015 errata: As of 2/17/2017, Fourth Printing is latest. PDF users, download from <a href="#">IHS</a> . Errata are <a href="#">here</a> (from ICC errata site <a href="#">here</a> ).	2 - Fire Protection
IECC-2015 errata: As of 2/17/2017, <b>Third</b> Printing is latest. PDF users,	14 - Sustainable Design

download from <a href="#">IHS</a> . Older hardcopy users, errata are <a href="#">here</a> (from ICC errata site <a href="#">here</a> ).	
IBC-2015 errata: As of 2/17/2017, Third Printing is latest. PDF users, download from <a href="#">IHS</a> . Older hardcopy users, errata are <a href="#">here</a> (from ICC errata site <a href="#">here</a> ).	16 - IBC Program
IEBC-2015 errata: As of 2/17/2017, Fifth Printing is latest. PDF users, download from IHS. Older hardcopy users, errata are <a href="#">here</a> (from ICC errata site <a href="#">here</a> ).	16 - IBC Program

Print users (older, bound books from ICC or homemade printings) should download the errata from table above—and possibly print any/all pages you’d use and keep stuffed in the book.

For other codes and national standards there are also errata that must be managed at times in a similar way. ESM Ch 1 Section Z10 notes that “Errata (correct errors) to any document...are mandatory regardless of contract award date or code of record.”

**DOE TECHNICAL STANDARDS ACTIONS**

DOE Tech [Stds](#) activity (beta [here](#)) in the past month: None

**WHEN GOOD CONDUCT OF ENGINEERING ISN’T FOLLOWED**

Thanks to Kevin Krank for this first one—it’s a horror show. Two years after the \$350 million Millennium luxury residential tower in San Francisco was completed, it had already settled 10 inches (6 inches in its lifetime was predicted). LANL prevents settlement problems by insisting on the geotechnical work required by the International Building Code in ESM Chapter 5 Structural Section IV, Geotechnical Investigations.

**Millennium Tower reviewed building design, but not the ground**

*“My interests went as far as the concrete,” says engineer who reviewed the troubled tower*

by [Adam Brinklow](#) Feb 3, 2017, 1:22pm PST  
<http://sf.curbed.com/2017/2/3/14500782/millennium-tower-peer-revie>



The developers behind the [sinking Millennium Tower](#) paid for an independent review of the tower itself before it was built, but not of the site it sits on, according to new testimony [at City Hall on Thursday](#).

The Government Audit and Oversight Committee quizzed Jack Moehle, a [professor of structural engineering at UC Berkeley](#), whom Millennium Partners and its engineer consultants hired to conduct an independent peer review of the building design while it was being entitled.

“The interest was to do an internal review to ensure that the structural system selected was suitable,” Moehle told city lawmakers at Thursday’s hearing. “[So] that if there was a formal peer review for the city later that most questions would be dealt with already.”

Moehle says he inspected the high-rise’s design from top to bottom—but no lower than the bottom. **A geotechnical review—i.e., an assessment of the condition of the soil under the building site—wasn’t part of the process, because no one ever hired a geotechnical engineer.**

**[Update:** Note that Moehle’s testimony referred only to the lack of a geotech engineer on the voluntary review conducted by the developer ahead of time.]

“My interests went as far as the concrete mat,” says Moehle, referring to the slab that forms the base of the building.

The condition of the dirt matters because the 58-story, concrete-framed Millennium Tower's foundation design relies on the properties of the soil to keep the building in place.

As [an Iowa State University design professor explained it](#):

“Imagine driving a broomstick into beach sand—you can only go so far before there's enough broomstick in contact with the sand to put up fearsome resistance. This has always been a standard technique for building in liquid soil, and it's why coastal construction always comes with the dulcet tones of a pile driver.”

The building sits on hundreds of giant concrete “sticks” that use soil friction to hold the concrete slab in place. So the behavior of all that dirt matters.

Moehle told supervisors Thursday **that all he said was that the foundation was up to code, not that it would necessarily work as intended.** “I'm not qualified to do that.”

Supervisor Aaron Peskin pressed Moehle on why he didn't insist on an analysis of the ground, saying: “[Your] letter says, I have reviewed the design criteria and find it acceptable ... But you don't have any language in your letter: Be forewarned, you may want to get a geotechnical consultant?”

To which Moehle replied, “It wasn't my place,” pointing out that many projects opt not to examine the soil and, since foundations must be built first, developers are usually eager to expedite its review.

Via email, a spokesperson for Millennium Partners says “It was clear from Professor Moehle's testimony that Mission Street Development met and in fact exceeded the requirements of the city” by paying for the independent review...

**Standards Update readers may be thinking “not my tax dollars.” True, but THIS IS:**

[Legislative Council Sues Company for Sinking Garage](#)

Posted: Monday, February 6, 2017 11:30 pm | *Updated: 12:41 am, Tue Feb 7, 2017.* By Phaedra Haywood. The New Mexican



The Legislative Council is suing Gerald A. Martin Ltd., the Albuquerque business that won the contract to build the state-owned parking garage just west of the Capitol, claiming that it failed to take precautions, and now the garage has been slowly sinking since its completion in 2009. Luis Sánchez Saturno/New Mexican file photo

The New Mexico Legislative Council is suing the construction company that built the state-owned parking garage just west of the Capitol six years ago, claiming unstable soil under the multilevel structure is causing it to sink and that it requires nearly \$1 million in repairs.

The lawsuit filed in state District Court in Santa Fe says a testing firm examined the soil under the 602-space parking garage, whose entrance is at 485 Galisteo St., before construction began and warned that potential settlement problems could occur and suggested appropriate remedies.

According to the complaint, the testing firm's report said whoever built on the site would need to take steps such as sufficiently compacting the soil, using appropriate fill materials and grading the site in such a way to ensure that moisture would rapidly drain away.

Gerald A. Martin Ltd., the Albuquerque business that won the contract to build the garage, failed to take these precautions, the suit says, and the garage has been slowly sinking since its completion in 2009.

Signs of adverse settling appeared in 2013, the lawsuit says, and by 2014, parts of the garage had sunk by as much as five or six inches. However, the builder didn't respond to the state's requests that the contractor examine or fix the problem, the complaint alleges.



“[Gerald A. Martin] has refused and continues to refuse to acknowledge its responsibility to remedy the construction defects, and instead has elected to remain silent while the conditions of the Parking Structure continues to deteriorate,” the complaint states. “It is now necessary to implement a costly and extensive remedial program, which will include jacking the walls to their original position and underpinning the structure with helical piers at depths sufficient to handle the load of the Parking Structure. Additionally, a moisture protection plan must be implemented to minimize future water intrusions and the potential for subsequent settlement. While the cost of the remedy is not yet known, estimates to date exceed \$900,000.”

The Legislative Council is a bipartisan body whose duties include management of state buildings on behalf of the Legislature. No one from either party in the case could be reached for comment Monday evening.

Contact Phaedra Haywood at 505-986-3068 or [phaywood@sfnewmexican.com](mailto:phaywood@sfnewmexican.com). Follow her on Twitter @phaedraann.com.

## **LAST MONTH'S UPDATE TOPICS**

Miss an issue? The archive is at "Monthly Update" on the Standards homepage. Last month's topics:

- Engineers Week
- Civil POC Change, Glovebox Spec Ownership
- Training & Qual
- Who Moved my PC Category?
- SDDR Central
- Engineering Processes
- LANL Standards Issued in January
- DOE Technical Standards Actions
- When Good Conduct of Engineering Isn't Followed

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