

Constructive Communication

2011 Summer Newsletter

CALIFORNIA NEW STATE LAW CARBON MONOXIDE LAW EFFECTIVE JULY 1, 2011

- All existing single-family homes that contain a gas heater or appliance, fireplace or an attached garage must install carbon monoxide alarms
- CO alarms must be either battery powered or plug-in with battery backup
- CO alarms must be installed outside of sleeping areas and on every level of a dwelling, including the basement

Q1. What is carbon monoxide?

A Carbon monoxide is a gas produced whenever any fuel, such as gas, oil, kerosene, wood, or charcoal, is burned. A person cannot see or smell carbon monoxide. However, at high levels carbon monoxide can kill a person in minutes. In addition, there are well-documented chronic health effects of acute carbon monoxide poisoning from exposure to carbon monoxide, such as lethargy, headaches, concentration problems, amnesia, psychosis, Parkinson's disease, memory impairment, and personality alterations. (Cal. Health & Safety Code § 13261.)

Q2. Is there a new California law dealing with the issue of carbon monoxide poisoning?

A Yes. The Carbon Monoxide Poisoning Prevention Act of 2010 (Cal. Health & Safety Code §§ 13260 *et seq.*) was signed into law this year. It requires carbon monoxide detectors to be installed in every "dwelling unit intended for human occupancy." The California legislature also modified both the TDS (for residential one-to-four unit real property) and MHTDS (for manufactured homes and mobilehomes) to include a reference to carbon monoxide detector devices. See below for more details.

Q3. What is a carbon monoxide detector?

A It is a relatively inexpensive device similar to a smoke detector that signals detection of carbon monoxide in the air. Under the law, a carbon monoxide device is "designed to detect carbon monoxide and produce a distinct audible

Mechanic's Lien Law California Senate Bill 190

California Governor Brown recently signed Senate Bill 190 effecting additional changes to the California mechanic's lien law. This law will be operative on July 1, 2012.

Senate Bill No. 190 CHAPTER 44

An act to amend Sections 7159, 7159.5, 7159.14, and 8513 of the Business and Professions Code, to amend Section 8422 of the Civil Code, and to amend Section 66499.7 of the Government Code, relating to mechanics liens.

SB 190, Lowenthal. Mechanics liens.

The California Constitution provides that laborers of very class who have worked upon or have furnished material for a property have a lien upon that property for the value of the labor done and material furnished.

The California Constitution requires the Legislature to provide, by law, for the speedy and efficient enforcement of those liens. Existing law, operative July 1, 2012, recodified and revised the law for enforcing mechanics liens.

Existing law provides that certain erroneous information contained in a claim of lien does not invalidate the claim of lien, except as specified.

This bill, operative July 1, 2012, would make various technical, conforming changes related to the recodification of the law for enforcing mechanics liens. The bill would also require that a person forfeit his or her lien if the person willfully includes labor or materials in a lien claim that were not furnished to the property in the claim.

Log into http://totalcapitol.com/?bill_id=201120120SB190 to review the approved version.

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alarm.” It can be battery powered, a plug-in device with battery backup, or a device installed as recommended by Standard 720 of the National Fire Protection Association that is either wired into the alternating current power line of the dwelling unit with a secondary battery backup or connected to a system via a panel.

If the carbon monoxide device is combined with a smoke detector, it must emit an alarm or voice warning in a manner that clearly differentiates between a carbon monoxide alarm warning and a smoke detector warning. The carbon monoxide device must have been tested and certified pursuant to the requirements of the American National standards Institute (ANSI) and Underwriters Laboratories Inc. (UL) as set forth in either ANSI/UL 2034 or ANSI/UL 2075, or successor standards, by a nationally recognized testing laboratory listed in the directory of approved testing laboratories established by the Building Materials Listing Program of the Fire Engineering Division of the Office of the State Fire Marshal of the Department of Forestry and Fire Protection. (Cal. Health & Safety Code § 13262.)

Q4. How does a homeowner comply with this law?

A Every owner of a “dwelling unit intended for human occupancy” must install an approved carbon monoxide device in each existing dwelling unit having a fossil fuel burning heater or appliance, fireplace, or an attached garage.

The applicable time periods are as follows:

- (1) For all existing single-family dwelling units on or before July 1, 2011.
- (2) For all other existing dwelling units on or before Jan. 1, 2013.

(Cal. Health & Safety Code § 17926(a).)

Q5. How many devices and where do I place them in the home?

A This new law requires the owner “to install the devices in a manner consistent with building standards applicable to new construction for the relevant type of occupancy or with the manufacturer’s instructions, if it is technically feasible to do so” (Cal. Health & Safety Code § 17926(b)).

The following language comes packaged with carbon monoxide (CO) detectors:

For minimum security, a CO Alarm should be centrally located outside of each separate sleeping area in the immediate vicinity of the bedrooms. The Alarm should be located at least 6 inches (152mm) from all exterior walls and at least 3 feet (0.9 meters) from supply or return vents. Building standards applicable to new construction are as follows (overview summary only):

• Section R315 *et seq.* of the 2010 edition California Residential Code (CRC) [effective Jan. 1, 2011] (applicable to new one-to-two family dwellings and

townhouses not more than 3 stories and also where work requiring a permit for alterations, repairs or additions exceeding one thousand dollars in existing dwellings units):

Installed outside of each separate sleeping area in the immediate vicinity of the bedroom(s) in dwelling units and on every level including basements within which fuel-fired appliances are installed and in dwelling units that have attached garages.

• Section 420 *et seq.* of the 2010 edition California Building Code (CBC) [effective Jan. 1, 2011] (applicable to other new dwelling units and also where a permit is required for alterations, repairs or additions exceeding \$1,000 in existing dwelling units):

Installed outside of each separate sleeping area in the immediate vicinity of the bedroom(s) in dwelling units and on every level including basements within which fuel-fired appliances are installed and in dwelling units that have attached garages.

Q6. Are there any penalties for noncompliance with this law regarding installation of carbon monoxide detector devices?

A Yes. A violation is an infraction punishable by a maximum fine of \$200 for each offense. However, a property owner must receive a 30-day notice to correct first. If an owner who receives such a notice fails to correct the problem within the 30-day period, then the owner may be assessed the fine.

(Cal. Health & Safety Code § 17926(a).)

Q7. Can a buyer of a “dwelling unit intended for human occupancy” rescind the sale if the dwelling doesn’t have the necessary carbon monoxide detectors?

A No. However, the buyer may be entitled to an award of actual damages not to exceed \$100 plus court costs and attorney’s fees. (Cal. Health & Safety Code § 17926(d).)

Note the following language in the TDS and MHTDS:

Installation of a listed appliance, device, or amenity is not a precondition of sale or transfer of the dwelling. The carbon monoxide device, garage door opener, or child-resistant pool barrier may not be in compliance with the safety standards relating to, respectively, carbon monoxide device standards of Chapter 8 (commencing with Section 13260) of Part 2 of Division 12 of, automatic reversing device standards of Chapter 12.5 (commencing with Section 19890) of Part 3 of Division 13 of, or the pool safety standards of Article 2.5 (commencing with Section 115920) of Chapter 5 of Part 10 of Division 104 of, the Health and Safety Code. Window security bars may not have quick-release mechanisms in compliance with the 1995 edition of the California Building Standards Code.

Q8. Does a seller have any special carbon monoxide disclosure obligations?

A No. The only disclosure obligations are satisfied when

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providing a buyer with the TDS or the MHTDS. If the seller is exempt from giving a TDS, the law doesn't require any specific disclosures regarding carbon monoxide detector devices. (See Cal. Civ. Code §§ 1102.6, 1102.6d.)

The Homeowners' Guide to Environmental Hazards also will include information regarding carbon monoxide.

Q9. May local municipalities require more stringent standards for carbon monoxide detectors?

A Yes (Cal. Health & Safety Code § 17926(e))

Q10. Do landlords have any special obligations regarding carbon monoxide detectors?

A Yes. All landlords of dwelling units must install carbon monoxide detectors as indicated in Question 4. The law gives a landlord authority to enter the dwelling unit for the purpose of installing, repairing, testing, and maintaining carbon monoxide devices "pursuant to the authority and requirements of Section 1954 of the Civil Code [entry by landlord]."

The carbon monoxide device must be operable at the time that a tenant takes possession. However, the tenant has the responsibility of notifying the owner or owner's agent if the tenant becomes aware of an inoperable or deficient carbon monoxide device. The landlord is not in violation of the law for a deficient or inoperable carbon monoxide device if he or she has not received notice of the problem from the tenant. (Cal. Health & Safety Code §17926.1.)

Q11. If the California Building Standards Commission adopts or updates building standards relating to carbon monoxide devices in the future, is the owner required to install the newer device?

A It depends. Yes, when the owner makes an application for a permit for alterations, repairs, or additions to that dwelling unit with the cost exceeding \$1,000. (Cal. Health & Safety Code § 17926.2(b).)

Q12. Where can I obtain additional information?

A This legal article is just one of the many legal publications and services offered by C.A.R. to its members. For a complete listing of C.A.R.'s legal products and services, please visit car.org.

Readers who require specific advice should consult an attorney. C.A.R. members requiring legal assistance may contact C.A.R.'s Member Legal Hotline at (213) 739-8282, Monday through Friday, 9 a.m. to 6 p.m, and Saturday, 10 a.m. to 2 p.m. C.A.R. members who are broker-owners, office managers or Designated REALTORS may contact the Member Legal Hotline at (213) 739-8350 to receive expedited service. Members may also fax or e-mail inquiries to the Member Legal Hotline at (213) 480-7724 or legal_hotline@car.org. Written correspondence should be addressed to:

California Association of REALTORS® Member Legal Services 525 South Virgil Ave. Los Angeles, CA 90020

DON'T WAIT - BUY NOW! Many First Alert alarms are compliant with California law, here are a few to check out:



Protect yourself and your family from the Silent Killer by purchasing your First Alert Carbon Monoxide Alarm from one of these retailers:



Accessible

by the WBDG Accessible Committee ~Last updated: 04-21-2011

Overview

"We hold these truths to be self-evident: that all men are created equal..." - Declaration of Independence, July 4, 1776

In daily life, as we maneuver through society, nothing is more important yet taken for granted more often than access. For millions of people with disabilities, the access that most of us take for granted is difficult, impossible, or achievable only with the intervention of a third party. We live in what is considered an independent society, yet independent access to programs, facilities, and employment are not easily achievable by many. Physical access is historically the arbiter of success and the source of opportunity in

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The Real Lessons of Carmageddon: How Small Behavior Changes Come with Big Payouts

By Climate Guest Blogger

This past weekend Los Angeles residents survived “Carmageddon” – a closure of 10 miles of highway on interstate 405 in southern California between the “101” and the “10” freeways. But the real story about the lessons we can draw from last weekend’s glimpse into a less car-dependent metropolitan mega-city.

CAP’s Jorge Madrid and Brennan Alvarez have the story.



Hailed by the media as a disaster-level disruption in weekend mobility, the closure of a major traffic artery that links two sides of the country’s second-largest city went off without much incident at all.

In fact, according to numerous [twitter](#) and [facebook](#) updates, real-time online Google traffic monitoring, and [round-the-clock coverage by the LA Times](#), roads and highways throughout the city were uncharacteristically clear throughout most of the weekend.

LA mayor Antonio Villaraigosa declared “[mission accomplished](#)” on Sunday afternoon after the massive 2-day, 11-lane, repair and improvement project was completed 17 hours ahead of schedule – without so much as one major traffic jam, worker injury, reported road rage incident, or disruption in hospital, emergency, or airport operations.

“A lot is said about the fact that this is the car capital of the United States,” Villaraigosa said. “Everybody has seen we can get out of our cars every once in a while and survive.”

While all this could make for an amusing “only in LA” punch line, the real story is far more important to our national dialogue about mobility in America’s metropolitan centers. It also highlights the importance of crucial infrastructure investments, especially during challenging economic times.

The first thing to consider is that car-dependent metropolitan centers like Los Angeles are completely

vulnerable to shocks in their primary transportation arteries – unlike their more transit friendly counterparts San Francisco, New York, and DC. This kind of vulnerability does not usually rear its head in the wider public domain until we are faced with a crisis, both real and/or anticipated. But when it does surface the problem usually becomes quite clear, as one editorial in the [LA Times](#) describes:

[Times](#) describes:

It hurts to lose the 405 even for a weekend not because freeways are so valuable or because we love them so much but because we’ve painted ourselves in a corner in terms of mobility. We have left ourselves no escape hatches or viable alternatives.

Secondly, many experts credit the success of this particular closure to an [information and outreach blitz](#) from the media, public officials, and social networking websites like facebook and twitter, asking “Angelinos” to stay out of their cars and enjoy local recreation in their own immediate neighborhoods via walking, biking, and public transit (a breakthrough idea to be certain).

The city’s official marketing website launched a campaign ([405 things to do in LA](#)) that promised “tweeting 405 fun and iconic things to do in Los Angeles ... without a car.” It turns out with enough information and a little bit of coaxing even the most car-dependent city in America can change its commuting behaviors.

Granted, this was one weekend out of the year and many residents likely chose to simply delay their driving instead of re-aligning their transit priorities altogether. However, this experience could serve as a real example to residents that altering their normal commuting behaviors – if only just a bit – could have exponential impacts across the city when aggregated over a large swath of the population.

For example, harmful pollution and smog levels dropped, according to air quality monitors stationed across the city – not an easy accomplishment in the [peak summer time heat](#). Likewise, [public transit ridership increased](#) 15 percent to weekend highs, and many residents found their carless weekend was a [welcomed reprieve](#) from the stress of driving and anxiety of needing to traverse the city on their day off.

These kinds of small-time behavior changes (and big-time payouts) should not be taken lightly. According to a recent [study](#) by the University of California at Irvine, there is a strong correlation between long vehicle commutes and severe mental and physical health problems, including high blood pressure, increased bouts of anger and depression, and even obesity and heart disease. This could

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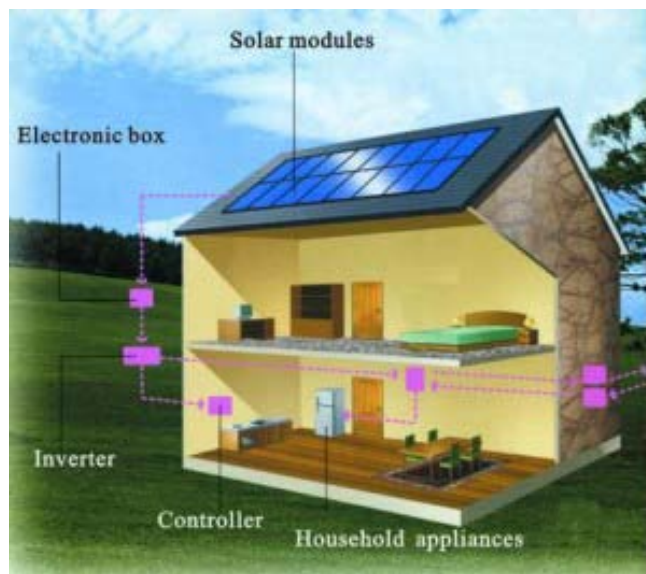
be increasingly dangerous for the 1 in 6 Americans who spend an hour and a half commuting to and from work each day.

Another [study](#) by the American Public Transportation Association (APTA) found that households that use public transportation and live with one less car can save \$9,000 on average every year, and reduce driving by 4,400 miles each year per household. The same APTA study found that one person switching to public transit can reduce their contribution to harmful daily pollution by 20 pounds per day or more than 4,800 pounds in a single year.

A third takeaway is that all metro areas should invest in the kind of transit infrastructure that could prevent another Carmageddon-like panic, while at the same time provide the kind of quality-of-life payouts that residents enjoyed during their weekend reprieve from gridlock. And it's not just about our enhanced leisure; this issue has serious implications for our economy, public health, and safety.

We already know that investments in public transit create nearly twice as many jobs as investments in new highway construction. We also know that if we want to get serious about mitigating the [dangerous effects of vehicle pollution and smog](#), particularly public health impacts like asthma and respiratory disease, then we need to reduce exhaust from vehicles. Finally, we must address the fact that the transportation sector accounts for approximately [33 percent](#) of total carbon dioxide emissions from fossil fuel combustion.

A step in the right direction is Mayor Villaraigosa's [30/10 initiative](#), which aims to accomplish 30 years worth of transit projects at an accelerated 10 year pace. Back in Nov of 2008, LA voters agreed to tax themselves a half-cent sales tax for traffic relief and transportation upgrades throughout the county (68 percent of voters approved this during the height of the recession); the fund is projected to raise \$40 billion over the next 30 years.



their house.

The 30/10 initiative will leverage the funds raised through this sales tax to secure long-term bonds and loans from the federal government, which will allow LA Metro to build 12 key mass transit projects in 10 years, rather than 30. The initiative is expected to create 160,000 new jobs, as well as reduce pollution emissions by 521,000 pounds, and save 10.3 million gallons of gas and 191 million fewer vehicle miles traveled per year. The [LA Times](#) describes the project as:

The most important initiative ever proposed by Mayor Antonio Villaraigosa. If, as seems increasingly likely, it's embraced by Congress, it will become one of the nation's most significant public infrastructure projects.

When the would-be disaster that was Carmageddon passed without incident, residents and city officials released a collective sigh of relief. It turns out that some Southern Californians can live without their cars for a weekend, enjoy their neighborhood on a bike or on foot, and get to work on a train or bus once or twice a week. This may seem miniscule, but aggregated across millions of people, the results can be exponential. Carmageddon was a sort of litmus test for the possibility of a car free weekend in the city, one that could have ended very badly, and LA passed without incident.

It should be noted that not all folks who live in LA are fortunate enough to have adequate transit to get to the places they need to be. Additionally, we must acknowledge that not all residents can enjoy a breath of fresh air on their bikes – LA is also home to some of the [worst air quality in the nation](#). Finally, we know that one weekend will not magically change the culture of a city that was built for the automobile.

However, with projects like the Mayor's 30/10 initiative and other commitments to invest in public transit, along with some slight behavior modifications in the way Angelinos commute, more residents will be able to experience the simple pleasure of enjoying their city with less gridlock, less smog, and less stress.

Ten Facts on Solar Power

Author: [Jonathan Lake](#)

Solar power was mainly used for powering small electrical devices. But now, with the great technological advancements, people are hoping that solar power will soon become widely accessible even to ordinary individuals. In the UK and the US, solar power is used in the different states but it's not that prevalent yet despite the large savings to the household electricity bill that can be achieved.

Here are 10 little known facts that might interest you.

1. Albert Einstein received a Nobel Prize in 1921 for his experiments on photovoltaic and solar power.
2. Silicon from a ton of sand can be used in photovoltaic panels to generate the same amount of electricity that a 500,000 T of burning coal can produce.
3. 10,000 US households are now using solar energy to power

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4. John Herschel (British Astronomer) was able to cook food by using solar power 200 years ago during his African journey
5. In 1982, the first large scale power plant was opened in California.
6. If you can use solar power in your home's heating system, you can slash the electric bill by as much as 50%.
7. In the last thirty years, the price of solar panels has dropped considerably by at least 200%. Solar power kits can now be purchased from \$200-\$500.
8. In the year 2000, USDOE claimed that solar power is almost perfect (99%) in San Francisco; since California gets a lot of sunlight, 200 megawatts of green electricity can be generated if all the rooftops of county buildings and homes are covered with PV panels. By including school buildings, and added 1,500 megawatts is achievable. The generated power is enough to cover the city's electrical needs during an entire day.
9. Germany is now using solar power despite its undesirable climate. The energy generated during sunny days is stored in batteries.
10. Energy from the sun travels for approximately 9 minutes to reach Earth.

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education, employment, and social freedom. Thus, accessibility is a civil rights issue for many people with disabilities and for our society. See the [History of Accessible Building Design](#) to learn more.

Definition and Goals of Accessible Design



(Courtesy of Bill Brack)

If we live long enough, all of us may eventually have a disability that requires a modification of the built environment. The [number](#) of Americans having a disability is projected to grow rapidly as our population ages. One outgrowth of this is that the line between who is and who is not a person with a disability will steadily erode. We must redefine and redirect our traditional understanding of designing for accessibility to not only include those persons permanently disabled, but also those temporarily disabled due to an injury as well as any other potentially debilitating condition.

The Accessible branch of the WBDG is designed primarily to provide insight and raise awareness on accessible design issues. For information about compliance with accessibility guidelines and standards for a particular government or public facility, contact the [Department of Justice](#) or the [U.S. Access Board](#). The Access Board is an independent federal agency devoted to accessibility for people with disabilities. Key responsibilities of the Board include developing and maintaining accessibility requirements for the built environment, transit vehicles, telecommunications equipment, and electronic and information technology; providing technical assistance and training on these guidelines and standards; and

enforcing accessibility standards for federally funded facilities. For additional resources, see the Access Board's Links Page.

Principles and a process that support accessible design include:

Laws, Codes, and Standards

- Know what laws apply and which standards they reference:
 - Project developer (government vs. private entity)
 - Project use (residential, retail, office, etc.)
 - Funding sources (public vs. private)
 - Building type (new construction vs. renovation)
 - Housing type (Single family vs. multifamily)
 - Housing ownership (Condo vs. rental)

Planning for Access

- Consider access early in the process and throughout all phases of the [project](#). continued on page 7
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- Identify conflicts and synergies in context with other [design objectives](#)
 - Examples might include:
 - [bollards](#) as a way to address [safety/security](#) and its impact on access and aesthetics
 - ramps vs. stairs for functional and access and [aesthetics](#), etc.
 - retrofitting a historic building to meet access and [historic preservation](#) issues at the same time
 - choosing sustainable materials, such as pervious pavers, consider the type of paver selected. Those which must be installed with gaps or spaces between them may not be suitable for use on accessible routes.

[Provide Equal Access](#)

Accessible design benefits all of us at some point in our lives. The goal of accessible design is to provide equal use of the built environment for all people.

[Plan for Flexibility: Be Proactive](#)

Being proactive by planning for flexible design features

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and products will increase the likelihood of providing equal access over the life cycle of the facility.

Note: Information in these Accessible pages must be considered together with other design objectives and within a total project context in order to achieve quality, high-performance buildings.

Emerging Issues

Revision of ABA and ADA Accessibility Guidelines

The U.S. Access Board's guidelines issued under the Americans with Disabilities Act (ADA) and the Architectural Barriers Act (ABA) have been completely updated and revised. The ADA Accessibility Guidelines (ADAAG) cover the construction and alteration of facilities in the private sector (places of public accommodation and commercial facilities) and the public sector (state and local government facilities). The accessibility guidelines issued under the ABA primarily address facilities in the federal sector and others designed, built, altered, or leased with federal funds. The guidelines under both laws have been combined into one rule entitled Americans with Disabilities Act and Architectural Barriers Act Accessibility Guidelines that contains three parts: a scoping document for ADA facilities, a scoping document for ABA facilities, and a common set of technical criteria that the scoping sections will reference. As a result, the requirements for both ADA and ABA facilities will be made more consistent. The updated guidelines were published as a final rule in the Federal Register in July of 2004. This provides information on the adoption of enforceable standards based on these guidelines under the ADA and ABA.

The federal agencies are revising their standards so that they are consistent with the updated guidelines. For the ADA, the responsible agencies are the U.S. Department of Justice (DOJ) and the U.S. Department of Transportation (DOT). The responsible agencies for the ABA are the U.S. Postal Service (USPS), the Department of Housing and Urban Development (HUD), the General Services Administration (GSA), and the U.S. Department of Defense (DOD). Until an agency revises its standards, the current standards will remain in effect. The updated guidelines have been adopted by the General Services Administration for Federal ABA facilities other than postal, housing, and military facilities, by the Department of Transportation for transportation facilities, and by the United States Postal Service for postal facilities. The updated guidelines have not yet been adopted by the DOJ for places of public accommodation, commercial facilities, and all other state and local government facilities, other than transportation. The updated guidelines also have not been adopted by HUD. For more information, contact the [U.S. Access Board](#) for a Guide to ABA & ADA

currently in effect.

Building Information Modeling

A Building Information Model (BIM) is a digital representation of physical and functional characteristics of a facility. As such, it serves as a shared knowledge resource for information about a facility forming a reliable basis for decisions during its [life cycle](#) from inception onward. BIM has the potential to truly [integrate](#) accessibility into a project by considering accessibility early and throughout all phases of the project.

Wheeled Anthropometry

Anthropometry is the study of the dimensions and abilities of the human body. The IDEA Center in Buffalo started a major long-range program to establish a database on the anthropometry of wheeled mobility in 1999. This program was initiated as part of the Rehabilitation Engineering Research Center on Universal Design at Buffalo. The U.S. Access Board also began supporting the effort in 2001.

Accessible Design and the Relationship to Sustainable Design

As we strive toward whole building design, we become more aware of the relationship between accessible and sustainable design. Simply put, buildings are not sustainable if they are not accessible. Accessible and sustainable designs are intrinsically connected through the design process. For example, when locating buildings on a site to optimize solar orientation, accessibility of the building entrance(s) must be taken into consideration. Will optimal solar orientation create a condition that results in building entrances

which are located on a circuitous route from site arrival points? Accessibility must also be considered when selecting sustainable building materials. For example, pervious pavers may be specified to increase water infiltration, but if the installation of the pavers results in wide spaces between them or an unstable ground surface, then accessibility is not achieved.



Photo Credit: [Wikipedia](#)

The three prongs of access: environmental, social, and economic issues are also in alignment with sustainability models.

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Classroom Acoustics

Acoustical performance is an important consideration in the design of classrooms. Research indicates that levels of background noise and reverberation, little noticed by adults, adversely affect learning environments for young children, who require optimal conditions for hearing and comprehension. Poor classroom acoustics are an additional educational barrier for children who have hearing loss and those who use cochlear implants, since assistive technologies

amplify both wanted and unwanted sound. Children who have temporary hearing loss, who may comprise up to 15% of the school age population according to the Centers for Disease Control, are also significantly affected, as are children who have speech impairments or learning disabilities. Kids whose home language is different than the teaching language are also at additional risk of educational delay and failure. For more information, see the U.S. Access Board's site on [classroom acoustics](#).

Seismic codes for nonstructural engineering

Mechanical, electrical, and plumbing components are not always taken into account when the thought of earthquakes comes up, but proper attachment to the structure can be just as important as proper attachment of a beam or column.

Beau M. Sanders, PE, SE; and Uriah J. Wolfe, PE, SE, LEED AP; GRAEF, Milwaukee

While most people know that earthquakes can cause buildings, bridges, and other structures to crack, distort, and even fail, mechanical, electrical, and plumbing system failures often get overlooked. People fear earthquakes because they can be injured from falling structural elements like columns or beams or architectural components like brick facades or windows. But what about the lights overhead, the rooftop units, pipes, or storage tanks? These nonstructural components can injure people when their supports and attachments fail.

The number-one goal of a building code is to protect people. The building code that governs the majority of the United States is the International Building Code (IBC), which is published by the International Code Council (ICC). IBC Chapter 16, as well as Chapters 11-13 and 15-23 of American Society of Civil Engineers (ASCE) 7—Minimum Design Loads for Buildings and Other Structures, address seismic design. Although the main purpose of the IBC is to safeguard against major structural failures and loss of life, this does not imply that damage should be limited or the function of the building be maintained. Buildings and other structures that support the mechanical, electrical, or plumbing (MEP) components are divided into occupancy categories (IBC Table 1604.5), which are used to determine the level of seismic loads and detailing required.

Essential facilities such as hospitals, police and fire stations, power plants, or water treatment facilities are examples of higher level occupancy categories (III or IV), which can require a higher level of analysis, design, and detailing than a lower occupancy category building in the same region of the country. Essential facilities like these require immediate occupancy or continued use after an earthquake, which can require continued function of MEP components after an earthquake as well. Life safety systems such as fire sprinkler systems and essential electrical systems require seismic bracing to stay in service. To determine the level of analysis, design, and detailing that will be required for the structural,

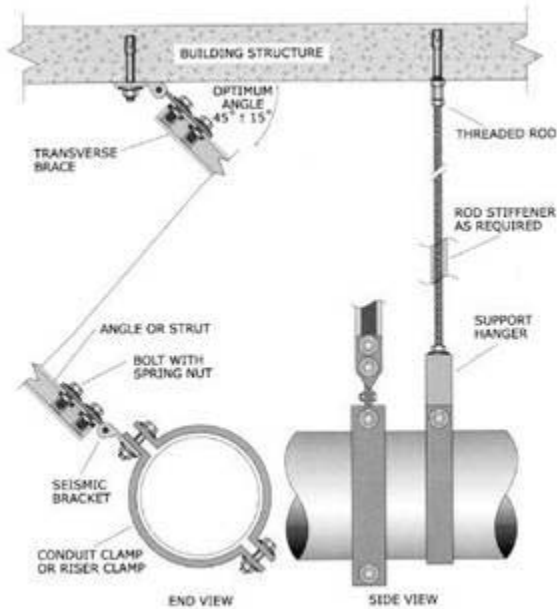
architectural, and MEP components, the structural engineer will need to calculate the seismic design category. This calculation takes into account the location of the building near a fault, the occupancy category of the building (as previously mentioned), and the soil characteristics of the site. Seismic design categories A, B, or C are deemed low to moderate, whereas categories D, E, or F are deemed high to severe. Structures located in California, for example, will typically fall into a high to severe category, while structures located in Wisconsin will fall into low to moderate. Once the seismic design category has been determined, the analysis and design begins. The design of MEP supports and anchorages is covered in ASCE sections 13.3, 13.4, and 13.6.

Below is a partial list of some important items that should be considered and shown by MEP engineers on the construction documents. The list is culled from three very useful documents produced by the Federal Emergency Management Agency (FEMA)—412, 413, 414—as well as from the authors' personal experience. The FEMA documents are only guides; in all instances local building codes, such as the IBC, control the design.

- The most important thing to remember when detailing and installing seismic restraints for any type of MEP equipment is to make sure building structures are capable of supporting the seismic bracing loads. This should be verified by a trained professional, such as a licensed structural engineer of record.
- The general design concept, including size of bracing and anchorage sizes, should be shown on construction documents. Ask the local building official if the bracing connections and sizes need to be stamped by a licensed engineer.
- Raceways, conduits, ducts, and cable trays: There are a number of different ways to support raceways, but different bracing systems should not be mixed. Each run of conduits or cable trays must have at least one transverse support at each end of the run and at least one longitudinal support anywhere on the run. Seismic

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bracing is not required per ASCE 7 if the ducts or piping are supported 12 in. on center or less or if the



area of the duct is less than 6 sq ft. Figure 1 shows an example of conduit bracing for a larger diameter conduit.

- Rigid floor-mounted equipment: Do not shim, or attach directly to the steel structure or concrete structure. Do not use oversize holes. Where continuous angles are used on either side of the equipment, provide a minimum of four bolts (two to the structure and two the equipment) per side. Where angles are used at each corner, a minimum of three bolts per connection shall be used (two to

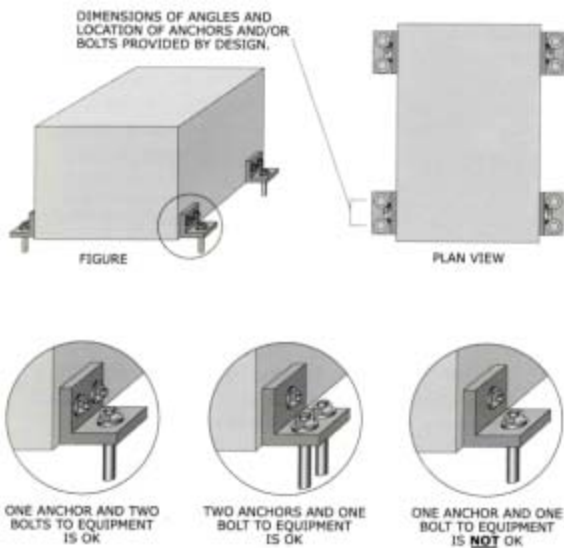
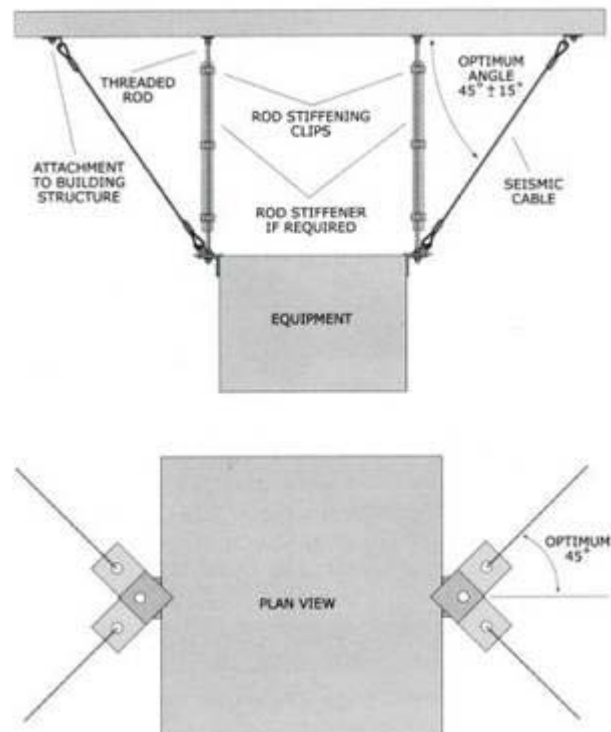


Figure 78: Four or more angles used to attach the equipment to the building.

- Talk to the structural engineer of record to understand the type of construction being used. Certain fasteners cannot be used with certain types of construction.
- Anchors: When choosing an anchor, a designer must take into account the particular application. When

using anchors for safety-related applications, such as sprinkler systems, heavy suspended pipes, etc., anchors must be IBC approved and designed per the American Concrete Institute (ACI) 318 Appendix D, and should be designed by a licensed structural engineer of record. Some anchors should not be used with vibratory loads. ASCE 7 does not allow for expansion anchors to be used in mechanical equipment rated over 10 hp unless they have vibration isolators. Contact an anchor supplier to determine the proper product for your application. Approved construction documents may require special inspection or field testing per IBC Chapter 17.

- Special inspection: Special inspection may be required for certain installations. As mentioned above, the installation of anchors will need to be periodically inspected in seismic design categories C, D, E, or F. Some examples of systems that require this inspection are electrical equipment for emergency standby power; piping systems intended to carry flammable, combustible, or highly toxic content; and HVAC ductwork that will contain hazardous materials. Special inspection also will be required for isolator units and energy dissipation devices that are part of the seismic isolation system.
- Power-actuated fasteners: Used to directly fasten equipment for permanent installation, these are typically not used for equipment weighing more than 40 lbs or for equipment not allowed by code for tension applications in seismic design categories D, E, or F per ASCE 7.
- Suspended equipment:



Attachment should be located just above the center of gravity to minimize swinging. It should be a rigid

Disney California Adventure – A Bird’s Eye Construction Update

I thought it was time again to take the trip up to the top of Mickey’s Fun Wheel of Death (okay, just [Mickey’s Fun Wheel](#) to folks who don’t have height issues) to bring you our first 2011 update on the continuing construction at [Disney California Adventure](#). I consider this a small, personal sacrifice to give you guys some awesome views of what is going on. Keep in mind that the aerial photos were taken from a red, stationary gondola, on January 29, 2011, so things will



even be farther along, when you have your visit!

The construction is noticeable from the time you enter the park, so I want to stop there for just a few seconds and show you what is happening down there, before we hit the air.

They are currently working to build the new (and temporary) park entrance, so you need to walk around a few walls to enter the turnstiles. Once you get there, you will go under the Golden Gate Bridge and take a look. It’s pretty vacant, except for a few walls and this...

The [Electronica](#) Countdown stage – which will be around through April. Not exciting, but alas – this construction area has just finished its demolition

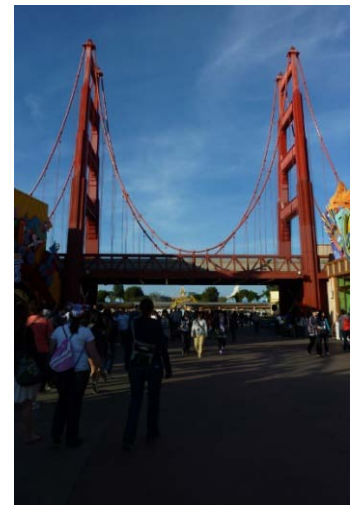
phase. The Radiant Sun and its fountain are now officially a memory. I’ll be excited when I start seeing the bones of the Carthay Circle Theater growing up from behind that stage, since I lived in that neighborhood when I first moved to Los Angeles.

If you turn around and look behind you – toward the entrance, this is your view...

The Golden Gate Bridge will be leaving in the near future, but most notably – it’s barren in the front. Somewhat of a tan wasteland with that beautiful tile mural of the mountains removed. Cool thing is that we won’t be looking at it for long, once the alternate entrance opens up.

Now that I’ve completely depressed you, let’s head toward Mickey’s Fun Wheel and start brightening up this story!

I stopped off at the [Blue Sky Cellar](#) and found this little map of the Car’s Land main drag – from directly opposite the



actual location. Therefore, I did a little “You are Here →” photography for you with the next two photos. The actual location is in the top photo, with the map below – just how you would see it if standing there.

Here’s a close-up of Flo’s from over the walls... Now that we’ve seen it from the



ground, let’s head up into the sky! That circular area looks like they have the foundations for either the JunkYard Jamboree or [Luigi’s Flying Tires](#) in place. Can’t completely tell with all of the construction trailers in place.

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Let's look over to the south...

The rockwork that makes up the backdrop to the [Radiator Springs Racers](#) is taking shape quite nicely. If you check out our upcoming blog on the new Blue Sky Cellar exhibits, you can catch a glimpse of the ride testing in progress!



Now let's move on to the two projects that will be coming sooner than you think!

First stop – [The Little Mermaid](#). Due to open in Spring of 2011 ([keep watching for the actual date...](#)), the exterior of the building is getting close to being completed. They've already started working on the interior sets and installing the vehicles!



I love the brilliant color of the building – especially here at dusk. I think it will be a beautiful backdrop to Paradise Park.

Last but not least, turn your eyes to the corner of the park and the retheming that is going on there. Soon to come are new eateries, as well as Goofy's Sky School.

Let's talk eateries first. According to the Blue Sky Cellar, the new area promises *Boardwalk Pizza and Pasta* and the *Paradise Garden Grill* – all in an outdoor garden atmosphere

that kind of reminds me of the LA Farmer's Market. This is all going into the old *Pizza O Mow Mow* and *Burger Invasion* area.

That squiggly blue coaster in the background is the old [Mullholland Madness](#) coaster. (Yes – I, too, see the similarity between that one and a stripped down [Primeval Whirl](#) in [Animal Kingdom](#) at [Walt Disney World...](#))



Let's look at it closer, with its shiny new blue coat of paint...



This coaster is being transformed into Goofy's Sky School – a story that is quite similar to the old [Barnstormer](#) from Walt Disney World's [Magic Kingdom](#). There will even be chickens....

On that note, I'm going to leave you pondering the fun we'll have over the course of the year – keeping you updated with all of the progress. Thanks for peeking over the fence with me!

Photos by N. Johnson

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attachment with brackets to the equipment using double nuts and washers. Equipment weighing less than 75 lbs does not require special seismic requirements per ASCE 7. See Figure 3 for an example of suspended equipment with seismic bracing.

- Housekeeping pads must be designed for the equipment weight and the seismic loads.
- Isolators: Talk to your equipment representative about whether an isolator is required. The three main types are open, housed, and restrained. Never use housed vibration isolators for seismic applications as they

cannot resist uplift. Never use open vibration isolators without snubbers or bumpers. Installation is critical when installing isolators; if an isolator is installed incorrectly, vibration will cause it to malfunction or become a noise problem. See Figure 4 for an installed example of vibration isolators. There are a number of proprietary products on the market today that help with vibration isolation. Ask your equipment representative which product would be most appropriate for your specific job.

Earthquakes are major physical occurrences that can have
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devastating effects on both existing infrastructure and human life. Due to advancement through research and better code development, structural engineers are better able to design buildings to withstand earthquakes and significantly reduce loss of life and destruction of property.

Unfortunately, MEP components are not always taken into attaching the components to the structure can be just as important as properly attaching beams or columns. With careful communication and coordination with the structural engineer of record as well as a firm grasp of existing building codes, an MEP engineer can design a system that functions properly before, during, and after an earthquake.

UPCOMING EVENTS

- JUNE 23 DIFFERENCES, DISCREPANCIES AND CONFUSIONS BETWEEN THE ADA AND THE CALIFORNIA ACCESSIBILITY STANDARDS**
Mission 261 Restaurant, San Gabriel @ 6:30pm
- JULY 22 29TH ANNUAL AWARDS & INSTALLATION 2011 BUSINES CONFERENCE**
Almansor Court (9AM ~ 10PM)
700 S. Almansor St. Alhambra, CA 91801
- JULY 30 & 31 DRAGON BOAT FESTIVAL**
Mother's Beach Park, Long Beach
- AUGUST 30 ENVIRONMENTAL ASSESSMENT**
Mission 261 Restaurant, San Gabriel
6:30pm

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