The Practice of Professional Engineering in California

California Legislative Council of Professional Engineers

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Contact: Bob Katin, PE (bobkatin@katinengineering.com)
California Legislative Counsel of Professional Engineers
INTRODUCTION

California regulates engineering under an obsolete Professional Engineers Act (PE Act) that was enacted in 1931 to license civil engineers, when only civil engineering was generally practiced. As the needs of the public and technology evolved, the practice of engineering evolved into various additional disciplines (e.g., electrical engineering, mechanical engineering, and others). But the law did not change to allow any of the engineers in those disciplines to practice civil engineering. The PE Act holds that only a licensed civil engineer can legally provide any engineering or scientific services relating to any infrastructure, including bridges, tunnels, railroads and water treatment facilities. Yes, even scientists must be licensed as civil engineers before providing services. Only California has such a law even though it is the state that is considered to be at the center of technological advancement. Other states allow licensed engineers to perform any services if the engineer is competent.

The PE Act must be ignored to be able to competently design and build any major modern complex structure since that requires a broad range of engineering and scientific expertise in addition to civil engineering. This has to be done in order to safely design and construct such projects.

Engineers employed in state agencies have opposed any attempt to reform the law to bring it up to today’s standards. Their public employee union, Professional Engineers in California Government (PECG), claims that the PE Act as currently drafted is the only way to regulate engineering, even though it is based on the engineering model that existed in 1931.

It is hard to understand why engineers employed in California agencies want such an obsolete law. They seem to be more interested in being in control of the design and construction of projects rather than in being competent. It is our opinion that this can only result in costly, delayed, and compromised state projects.

Indeed, there are news accounts that indicate the San Francisco-Oakland Bay Bridge, a major state project, is considered by experts to be unsafe, and that the High-Speed Rail project is experiencing engineering related concerns. News accounts also document many existing environmental and engineering concerns with the Delta Tunnels water project.

A serious effort was made to reform the law. Support for reform came from many public and private entities involved with the profession of engineering. Several bills were introduced, but because of the opposition from PECG, they did not succeed.

By refusing to reform the law, the Legislature has effectively reaffirmed the intent to regulate professional engineers with an obsolete law adopted in 1931.
PROFESSIONAL ENGINEERS ACT

Under the PE Act, making designs, plans and specifications, and engineering reports for any project which is a fixed work, or a component of a fixed work, is the practice of civil engineering. The practice of civil engineering includes the study of the laws of nature. Therefore, any person must be licensed as a civil engineer to perform these activities.

The following excerpts from the PE Act remain essentially unchanged from how they were initially enacted in 1931. They establish the practices of civil, electrical and mechanical engineering, and define that civil engineering embraces those studies and activities related to fixed works.

Section 6730 Business and Professions Code:

In order to safeguard life, health, property and public welfare, any person, either in a public or private capacity, except as in this chapter specifically excepted, who practices, or offers to practice, civil engineering, electrical engineering or mechanical engineering, in any of its branches in this state, including any person employed by the State of California, or any city, county, or city and county, who practices engineering, shall submit evidence that he or she is qualified to practice, and shall be licensed accordingly as a civil engineer, electrical engineer or mechanical engineer by the board. [Emphasis added]

Section 6731 Business and Professions Code:

Civil engineering embraces the following studies or activities in connection with fixed works for irrigation, drainage, waterpower, water supply, flood control, inland waterways, harbors, municipal improvements, railroads, highways, tunnels, airports and airways, purification of water, sewerage, refuse disposal, foundations, grading, framed and homogeneous structures, buildings, or bridges:
(a) The economics of, the use and design of, materials of construction and the determination of their physical qualities.
(b) The supervision of the construction of engineering structures.
(c) The investigation of the laws, phenomena and forces of nature.
(d) Appraisals or valuations.
(e) The preparation or submission of designs, plans and specifications and engineering reports.
(f) Coordination of the work of professional, technical, or special consultants.
(g) Creation, preparation, or modification of electronic or computerized data in the performance of the activities described in subdivisions (a) through (f).
Civil engineering also includes city and regional planning insofar as any of the above features are concerned therein.
Civil engineers registered prior to January 1, 1982, shall be authorized to practice all land surveying as defined in Chapter 15 (commencing with Section 8700) of Division 3. [Emphasis added]
LEGISLATIVE COUNSEL OPINION

Summary:

Legislative Counsel Opinion (#1101097) was issued on July 22, 2011 in response to a request by Senator Mimi Walters the author of SB 275 (2009), SB 692 (2011), and SB 1061 (2012). Senator Walters asked:

Whether a licensed professional engineer who is not licensed as a civil engineer may be in responsible charge of designs, plans and specifications, and engineering reports for a project that has components involving fixed works as described in Sections 6731 and 6731.1 of the Business and Professions Code.

Counsel opinion stated:

Of the definitions of civil, mechanical, and electrical engineers set forth in the act, only civil engineering includes professional engineering work connected with fixed works (Secs. 6731 and 6731.1). Thus, reading these provisions of the act together, we believe that only licensed civil engineers may be in responsible charge of designs, plans and specifications, and engineering reports for the fixed works components of projects described in Sections 6731 and 6731.1.

Only a licensed civil engineer may be in responsible charge of designs, plans and specifications, and engineering reports for the fixed work components of an engineering project, as described in Sections 6731 and 6731.1 of the Business and Professions Code.

RESPONSIBLE CHARGE

The requirement that an engineer be in responsible charge of the services provided must be explained to understand the extent of the restriction of the law in the PE Act. In statute and regulations an engineer must be fully competent and in independent control of the professional services provided. This requirement prohibits the use of experts who are not civil engineers from performing services for a civil engineer. Those experts are violating the PE Act, and the civil engineer is as well. If the civil engineer is also not competent, that is an additional violation of the law.

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1 Legislative Counsel Opinion: Professional Engineers: Fixed Works – Opinion #1101097 (July 22, 2011) is found in Attachment 1.
AN ENGINEER’S INTERPRETATION

An association of engineering societies, the California Legislative Council of Professional Engineers (CLCPE), interprets the Legislative Counsel opinion to say that under the terms of California’s PE Act:

1. Electrical and mechanical engineering are defined in statute; however, the definitions do not include activities in connection with fixed works. Only civil engineers may therefore conduct work on facilities that are geographically fixed, such as High-Speed Rail, the Delta Tunnels, or the Bay Bridge. The civil engineer in responsible charge must be capable of answering questions. They must be technically knowledgeable to be able to conduct the work themselves. The civil engineer cannot simply “supervise” the work conducted by the subject matter experts who are not civil engineers,

2. Only civil engineers may do work on High-Speed Rail facilities. The train operations are powered by electricity which require electrical engineering designs. Any electrical engineer must also be licensed as a civil engineer to be able to provide such services.

3. Only civil engineers may conduct work on the Delta Tunnels. The pumps require mechanical engineering designs. Any mechanical engineer must also be licensed as a civil engineer to be able to provide such services.

4. Metallurgical engineering is involved on the Bay Bridge to design it with the necessary types of metals, to ensure the strength of welds, and to prevent corrosion. Any metallurgical engineer providing those services must also be licensed as a civil engineer to be able to provide such services.
REFORM HISTORY

CLCPE became aware that state environmental agencies, including the Department of Toxic Substance Control, State Water Resources Board, and Regional Water Quality Control agencies, were increasingly enforcing the obsolete provisions of the PE Act in environmental remediation projects. The same type of enforcement was used by the Office of the State Architect in the construction of schools, hospitals and nursing facilities. Concerns within CLCPE reached a level that caused it to sponsor two bills to reform the law bringing California into conformity with the rest of the nation. The bills, SB 2069 (1998) and SB 191 (1999), did not pass but did start a legislative review of the issue.

The Chair of the Senate Business and Professions Committee, Senator Liz Figueroa, wanted a study of the issues in 2000 and authored SB 2030. SB 2030 called for an independent study of the licensed disciplines of engineering to review and analyze the circumstances of each discipline:

The independent consultant shall perform, but not be limited to, the following: (1) meet with representatives of each of the engineering branches and other professional groups; (2) examine the type of services and work provided by engineers in all branches of engineering and interrelated professions within the marketplace, to determine the interrelationship that exists between the various branches of engineers and other interrelated professions; (3) review and analyze educational requirements of engineers; (4) identify the degree to which supplemental or “overlapping” work between engineering branches and interrelated professions occurs; (5) review alternative methods of regulation of engineers in other states and what impact the regulations would have if adopted in California; (6) identify the manner in which local and state agencies utilize regulations and statutes to regulate engineering work; and, (7) recommend changes to existing laws regulating engineers after considering how these changes may effect the health, safety, and welfare of the public.²

The study, performed by the Institute for Social Research, California State University, Sacramento, (ISR), determined that California is totally out of step with the rest of the country. The report shows all licensed disciplines are equivalent in education and testing. It focuses on certain engineering disciplines, such as chemical, electrical, mechanical, civil, etc., and it shows they all share engineering aspects with each other. The education, testing and practice of the engineering disciplines overlap to a large degree between almost all disciplines, with the exception of electrical engineering, which is a discipline with little overlap.

ISR made ten recommendations, including:

1. Place all disciplines in the same status of licensing, and allow overlapping practice among ALL licensed professional engineers.

2. Give all engineers the right to be in responsible charge of engineering projects when justified by their education and experience.

² Paragraph (b) of B&P Code § 6704.1, added by Section 1 of Chapter 1006, Statutes of 2000 (SB 2030).
After reviewing the study and conducting statewide hearings to discuss the issues, the engineering regulatory agency, the Board of Professional Engineers and Land Surveyors, sponsored legislation containing many of the ISR recommendations to place all licensed engineers at the same level of regard. In 2005 Senator Figueroa introduced SB 246 for that purpose. The reform bill failed.

Between 2009 and 2012, three more bills to reform the law were introduced – SB 275 (2009), SB 692 (2011), and SB 1061 (2012). SB 692 was approved in 2011 by the Senate policy committee with a 5 – 0 vote for the bill, but it did not go any further. SB 1061 was introduced to make another attempt at reforming the law, but it became clear the opposition of PECG to any reform would be overwhelming, and the decision was made to accept that fact and the bill was dropped.

By refusing to reform the law, the Legislature has effectively reaffirmed the intent to regulate professional engineers with an obsolete law adopted in 1931.
Support for Reform

A partial list of the broad range of stakeholders from academia, industry, engineering and scientific associations and public agencies supported efforts to reform the law.

**Academia (Engineering School Deans)**
California Poly University Pomona
California State University Long Beach
University California Santa Barbara
University of California Davis
University of California Los Angeles
University of California Riverside
University of Southern California

**Industry**
The Boeing Company (Sr VP)
Catellus Corporation
ChevronTexaco
ConocoPhillips
Dow Chemical
Genentech
Goodrich Aerostructures Group
Hughes Associates, Inc (Fire Science & Engineering)
Jacobs Engineering
Monsanto
Parsons E&C
PG&E
Technip USA Corporation
Union Pacific Railroad, Senior Manager Public Projects
Unocal
Valero Benicia Refinery, VP & GM

**Professional Associations**
American Institute of Chemical Engineers
California Manufacturers and Technology Association (CMTAP)
California Society of Healthcare Engineering
Chemical Industry Council of California
Instrumentation, Systems, and Automation Society (ISA)
National Fire Protection Association (NFPA)
National Fire Sprinkler Association
National Society of Professional Engineers (NSPE)
NorCal Fire Prevention Officers Association
San Diego Association of Governments, Executive Director
Society of Fire Protection Engineers (International)
Western Contra Costa Council of Industries
Western States Petroleum Association (WSPA), President

**Public Agencies**
Bay Area Air Quality Management District
City of Belmont Director of Public Works
City of Beverly Hills City Engineer
City of Concord Director of Public Works
City of Corona Asst. Public Works Director
City of El Cajon Director of Public Works
City of Glendale Director of Public Works
City of Irvine Director of Public Works
City of Long Beach Director of Public Works
City of Los Angeles Asst. GM DOT
City of Los Angeles, Dept. of Public Works
City of Menlo Park Director of Public Works
City of Oakland Fire Department
City of Sacramento, Director of Transportation
City of San Diego Building Department
City of San Diego, Metropolitan Wastewater Department
City of San Francisco Fire Department
City of San Francisco, Public Utilities Commission, Water Quality Manager
City of San Jose Fire Department
City of San Luis Obispo, Director of Public Works
City of Santa Ana, City Engineer
City of Stockton, Director of Public Works
City of Walnut Creek, Associate Traffic Engineer
Contra Costa County Hazardous Materials
County of Placer Public Works
County of Riverside, Director of Transportation
County of San Diego, Director of Public Works
Regional Water Quality Control Board, Unit Chief
San Jose Water Company
Opposition to Reform

The opposition to reform came from two sources, a public employee union (i.e., PECG), and the Consulting Engineers and Land Surveyors of California (CELSOC). Public employee unions have extraordinary influence over the Legislature, and that is why PECG is primarily responsible for the defeat of the reform effort. CELSOC later became American Council of Engineering Companies of California (ACEC-CA). PECG and CELSOC (ACEC-CA) had similar reasons for their opposition. Both entities had their best interests served in restricting engineering services to those provided by civil engineers.

However, there is a major difference in the effect of restricting expertise in the provision of services in the public sector and in the private sector. The civil engineer in state government has an interest in protecting his or her status within the agency. Restricting engineers in other engineering disciplines from being eligible to attain higher status makes the civil engineer more likely to advance to a higher level within state service. The competence of that civil engineer may be important as a matter of individual pride, but seniority and title are more important in attaining higher position.

An engineer in the private sector faces competition from other engineers. The ability to be economically successful is threatened if the engineer provides services that are incompetent. Transparency is significantly greater in the private sector and the word will get around. The engineers who are providing services have economic interests in being recognized for providing competent services. There may be a marginal economic benefit from resisting competition from other disciplines, but the ultimate concern is competency. This means the civil engineer in the private sector will violate the law by making engineers in other disciplines part of the project, but no one complains. The PE Act is continuously violated in the private sector.
PE ACT REFORM LEGISLATION

Between 1998 and 2012 not less than seven bills were introduced in the California Legislature to reform the outdated PE Act. The reforms proposed by each of these bills were all met with fierce opposition and were ultimately unsuccessful. The one exception was SB 2030 in 2000 which called for a study of the manner in which California regulates professional engineers.

Each of the reform bills are outlined below.

**SB 2069 (Knight, 1998)**

**Status:**
Failed passage in Senate Business and Professions Committee on a 2-3 vote.

**Summary:**
Would authorize professional engineers to practice in any engineering practices, if competent, and exempt persons practicing other professions or occupations from engineering practice restrictions so long as they are working within their own occupation or profession.

**Sponsored by:**
California Legislative Council of Professional Engineers (CLCPE), to eliminate existing civil, mechanical, or electrical engineering practice restrictions on: (a) other registered professional engineers who are competent to practice in those engineering branches and (b) other persons when they are practicing in other lawful professions or occupations.

**SB 191 (Knight, 1999)**

**Status:**
Set for hearing in Senate Business and Professions Committee. Testimony taken but no vote. Died in Senate B&P Committee.

**Summary:**
Essentially identical to SB 2069 (1998). Would authorize any licensed professional engineer to practice civil, electrical or mechanical engineering if competent to do so, and exempt the practice of any other legally recognized occupation from the engineering practice acts.

**Sponsored by:**
California Legislative Council of Professional Engineers (CLCPE)

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3 SB 2069 (Knight) text, history and analyses is found at [http://www.leginfo.ca.gov/cgi-bin/postquery?bill_number=sb_2069&sess=9798](http://www.leginfo.ca.gov/cgi-bin/postquery?bill_number=sb_2069&sess=9798).

4 SB 191 (Knight) text, history and analyses is found at [http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=199920000SB191](http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=199920000SB191).
**SB 2030** (Figueroa, 2000)

Institute for Social Research Report

**Status:**

Passed by the Legislature and signed into law by Governor Gray Davis (Chapter 1006, Statutes of 2000).

**Summary:**

Required the Department of Consumer Affairs (DCA) to contract with an independent consultant to conduct a study of California’s regulatory regime with respect to professional engineers. The bill also extended the sunset date for the Board for Professional Engineers and Land Surveyors (Board) and implemented changes recommended by the Joint Legislative Sunset Review Committee (Joint Committee) and the DCA.

**ISR Report Recommendations:**

Accordingly, DCA contracted with California State University, Sacramento’s (CSUS) Institute for Social Research (ISR) to research and examine the regulation of professional engineers in California, the education requirements of engineers, the testimony of stakeholders, and compared California’s regulatory regime to that of other states. The ISR report, *The Engineering Title Act Study: The Practice/Title Act Distinction and Protection of the Public Health, Safety and Welfare*, was released in November of 2002 and made a number of recommendations to reform California’s regulation of professional engineers.

Among these recommendations, ISR recommended the removal of “all prohibitions against overlapping practice between engineering disciplines from the Professional Engineers Act and Board Rules.” In addition, ISR found that California’s hierarchical regulatory structure was unique and unjustified and recommended that the state “eliminate title protection and offer practice protection to all regulated disciplines.” Primarily, ISR made this recommendation because, by offering only title act protection to various branches of engineering, the state permits any individual to practice within those branches so long as he or she does not use one of the protected titles such as “chemical engineer” or “nuclear engineer.” ISR found that “no other state allows the unlicensed practice of regulated engineering disciplines.” ISR also reported that most other states offer a generic “professional engineer” license (similar to the licensing of physicians and surgeons, architects, and attorneys).

**Review of ISR Report by the Board:**

In 2004, the Board underwent sunset review by the Joint Committee. The primary focus of the review concerned recommendations made in the ISR study and the work of a Task Force.

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5 SB 2030 (Figueroa) text, history and analyses is found at [http://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=199920000SB2030](http://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=199920000SB2030).

appointed by the Board to review that study. The study made several recommendations regarding the continued licensure and regulation of engineers in individual disciplines of engineering, the reporting of legal actions against engineers, and the collection of information regarding the practice of engineering in California. It was decided by the Board, DCA, and the Joint Committee to have this ISR study reviewed by a Task Force appointed by the Board consisting of two members of the Board, committee consultants of the Legislature, a representative from DCA, and various other members of the public and two engineers not affiliated with the Board. The Task Force held five meetings throughout the state to discuss the ISR recommendations and receive public comment regarding those recommendations or others being considered by the Task Force. The Task Force made its final recommendations and the Board approved the recommendations. In turn, the Joint Committee met to review the issues and recommendations presented by the Board, DCA, and the Joint Committee staff, and adopted each of the Board’s recommendations.

As amended June 20, 2005, SB 246 (Figueroa) reflected the changes necessary for the Engineers Licensing Act to implement the recommendations in the ISR report.

**SB 246** (Figueroa, 2005)

**Status:**

Set for hearing in Assembly Business and Professions Committee in 2005. Testimony taken. Held in Committee and under submission. Reconsideration was granted, and the bill was again set for hearing, but was not heard. The following year (2006) the bill was gutted and amended to an unrelated subject (Human milk), passed and signed into law by Governor Arnold Schwarzenegger (Chapter 480, Statutes of 2006).

**Summary:**

As amended June 20, 2005, SB 246 would have established chemical, control system, fire protection, nuclear, petroleum, and traffic engineering as “practice acts” in California, and provide for the discontinuation of agricultural, industrial, and metallurgical engineering as “title acts.” The bill would also have extended the sunset date for the Board.

**Sponsored by:**

The Board for Professional Engineers and Land Surveyors (Board) was the sponsor of this bill. The amendments reflected the recommendation of the Joint Legislative Sunset Review Committee (Joint Committee) that the title acts of agricultural, industrial and metallurgical engineering should be allowed to phase out over time, similar to the title acts of corrosion, quality, safety and manufacturing; and that the remaining title acts, chemical, control systems, fire protection, nuclear, petroleum and traffic engineering, be converted to practice acts.

The recommendation to convert title acts to practice acts was the culmination of a process involving the Joint Committee, the Board, a Board task force, and an independent study conducted by the Institute for Social Research (ISR) at California State University Sacramento. The Joint Committee recommended the changes in the bill because: (1) The current regulatory

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7 SB 246 (Figueroa) text, history and analyses is found at [http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=200520060SB246](http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=200520060SB246).
system was nonsensical and in need of reform; (2) Elevating the six title acts to practice acts would better protect the public by ensuring that only those who have the necessary education and experience may practice as a chemical, control systems, fire protection, nuclear, petroleum or traffic engineer; (3) Converting the six title acts to practice acts would bring equity and fairness to the profession.

SB 275 (Walters, 2009/2010)8

Status:

Failed passage in Senate Business, Professions and Economic Development Committee (BP&ED) on a 2-5 vote in 2009 and granted reconsideration. Was heard again by BP&ED in 2010, and failed passage on a 2-0 vote.

Summary:

Would, in addition to civil, electrical and mechanical engineering, establish agricultural, chemical, control system, fire protection, industrial, metallurgical, nuclear, petroleum, and traffic engineering as “practice acts” in California. Would provide that the professional practice of engineering in the branches may overlap and limit the scope of overlap to an engineer's area of competency (as determined by education and experience) and to those activities incidental to practice in an engineer's branch of licensure. Would further provide that a professional engineer may practice engineering only in those areas in which he or she is by education or experience competent and proficient.

SB 275 made essentially the same changes as SB 246 in 2005; however, the significant difference was that it proposed to convert all nine title acts into practice acts.

Sponsored by:

California Farm Bureau Federation and Chemical Industry Council of California to regulate all engineering disciplines in the same manner, and to allow overlap between disciplines without arbitrary restrictions.

8 SB 275 (Walters) text, history and analyses is found at http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=200920100SB275.
**SB 692 (Walters 2011/2012)**

**Status:**

Passed by Senate Business, Professions and Economic Development Committee (BP&ED) in 2011 on a 5-0 vote. Amended in Senate Appropriations and re-referred to Senate BP&ED. Failed passage in Senate BP&ED on a 2-0 vote in 2012.

**Summary:**

Essentially the same as SB 275 from 2009/2010, this bill would, in addition to civil, electrical and mechanical engineering, also establish agricultural, chemical, control system, fire protection, industrial, metallurgical, nuclear, petroleum, and traffic engineering as “practice acts” in California (as opposed to “title acts”). Would provide that a professional engineer may practice engineering work only in the field or fields in which he or she is by education or experience competent and proficient.

In August of 2011, the author amended the bill in response to issues raised in a Legislative Counsel Opinion (#1101097, issued on July 22, 2011). The bill was later amended in January 2012 to further reflect the Opinion. As amended, the bill authorized an engineer to practice engineering only in the field or fields in which he or she is by education or experience competent and proficient, and further specified that any validly licensed engineer may practice without limitation or restriction in any of the 12 practice disciplines, effectively allowing overlap in practice between any of the 12 practice disciplines.

**Sponsored by:**

The California Farm Bureau Federation sponsored the bill to regulate all engineering disciplines in the same manner, and allow overlap between disciplines without arbitrary restrictions. The bill was amended to reflect the Legislative Counsel’s Opinion that only a licensed civil engineer may provide any civil engineering services for fixed works. Even if each of the title acts were established as practice disciplines, no engineer licensed in any of the new practice disciplines would be able to practice engineering work on any project involving fixed works, unless they were licensed as a civil engineer.

Therefore, converting title acts to practice acts was still important, but that it was also necessary to allow overlap across all engineering disciplines if the licensed professional engineer is by education or experience competent and proficient to do the work. The January 2012 amendments proposed to allow any validly-licensed engineer to practice without limitation or restriction in any branch of engineering provided they are competent and proficient by education or experience in that engineering practice.

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9 SB 692 (Walters) text, history and analyses is found at [http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201120120SB692](http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201120120SB692).
Status:

Summary:

Sponsored by:
The California Farm Bureau Federation to (1) Reform the Professional Engineers Act to allow licensed engineers to provide all engineering services, if competent, and (2) Allow other professions to provide services without the requirement for being licensed as an engineer.

SB 1061 (Walters, 2012)  

10 SB 1061 (Walters) text and history is found at http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201120120SB1061.
MEDIA COVERAGE

Media reports document numerous dangers to public safety and welfare because of engineering issues with state projects in California. The complexity and magnitude of large-scale modern projects require the expertise of a wide range of engineering disciplines. To limit project oversight and operations to only civil engineers fails to recognize the competencies and abilities of other disciplines of professional engineers.

San Francisco-Oakland Bay Bridge

Reports in the Sacramento Bee have highlighted construction and management problems related to the $6.5 billion San Francisco-Oakland Bay Bridge.\(^{11}\) The Bee has reported on numerous construction lapses on the bridge project, including a series of stories covered investigations of the rusted main cable and anchor bolts, cracked cables and their potential safety dangers, and even called call for a criminal probe.

Although the bridge opened for use in 2013, problems with fabrication and construction, including design and materials related corrosion have necessitated multimillion-dollar retrofits. After conducting a risk assessment, an outside engineering expert called Caltrans’ failure to respond right away “egregious” and “unacceptable,” and declared a design choice which left portions inaccessible for repair to be a violation of a fundamental engineering principle – “to engineer explicitly for repairability.”\(^{12}\)

The PE Act requires that engineering projects be under the supervision of a professional engineer in “responsible charge.” Decisions appear to have been made by an impersonal bureaucracy with not one in “responsible charge.” No one was held responsible for the mistakes made.

High-Speed Rail

In more than fifty news reports, the Los Angeles Times has noted numerous issues with California High-Speed Rail. The proposal involves some 800 miles of high-speed rail lines which travel from between Los Angeles and San Francisco in as little as two hours and forty minutes at speeds up to 220 MPH. The plan approved voters in 2008 calling for $9.95 billion in bonds to build the new transit system will create tens of thousands of new jobs. However, cost estimates have ballooned ranging from $64 billion upwards to $98 billion, and the completion date of the first phase has been pushed back 13 years.

The High-Speed Rail plan calls for some 36 miles of tunneling through the geologically complex mountains north of Los Angeles, making it the most ambitious tunneling project in the nation’s history.\(^{13}\) While High-Speed Rail is still in its beginning phases, indications of a mismanaged High-Speed Rail Authority have highly politicized the project. It is inevitable that engineering and design issues will be multiplied and magnified by the complex and divergent factors involved in the High-Speed Rail project. Such issues will become increasingly complicated by the outdated PE Act.

Delta Tunnels

California WaterFix and Eco Restore, formerly known as the Bay Delta Conservation Plan, is a $15.5 billion proposal by Governor Jerry Brown and the California Department of Water Resources to build two tunnels, 40-foot in diameter and 30 miles long, to carry fresh water from the Sacramento River under the Sacramento-San Joaquin Delta toward intake stations for the State Water Project and the Central Valley Project. The tunnels would be buried 150 feet underground. Numerous media reports on the complexity and impact of the issues, reveal a water-delivery project that has tremendous implications for the environment and agriculture and cities throughout California’s San Joaquin Valley and which has already expended $200 million on design and planning.

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14 https://en.wikipedia.org/wiki/California_Water_Fix_and_Eco_Restore
15 https://ww2.kqed.org/science/2016/07/25/about-that-17-billion-water-project-delta-tunnels-101/
July 22, 2011

Honorable Mimi Walters
Room 3082, State Capitol

PROFESSIONAL ENGINEERS: FIXED WORKS - #1101097

Dear Senator Walters:

You have asked whether a licensed professional engineer who is not licensed as a civil engineer may be in responsible charge of designs, plans and specifications, and engineering reports for a project that has components involving fixed works as described in Sections 6731 and 6731.1 of the Business and Professions Code.

By way of background, the Professional Engineers Act (Ch. 7 (commencing with Sec. 6700), Div. 3, B. & P.C.) establishes the Board for Professional Engineers, Land Surveyors, and Geologists (hereafter the board) within the Department of Consumer Affairs and provides for the licensure and regulation of professional engineers by the board. In order to safeguard life, health, property, and public welfare, the act requires a person who practices, or offers to practice, civil, electrical, or mechanical engineering in this state to submit evidence

\[1\] All section references are to the Business and Professions Code, unless otherwise indicated.

\[2\] Section 6701 defines the term “professional engineer” for purposes of the act, as follows:

“6701. ‘Professional engineer,’ within the meaning and intent of this act, refers to a person engaged in the professional practice of rendering service or creative work requiring education, training and experience in engineering sciences and the application of special knowledge of the mathematical, physical and engineering sciences in such professional or creative work as consultation, investigation, evaluation, planning or design of public or private utilities, structures, machines, processes, circuits, buildings, equipment or projects, and supervision of construction for the purpose of securing compliance with specifications and design for any such work.”
that he or she is qualified to practice and requires the person to be licensed by the board as a civil, electrical, or mechanical engineer (Sec. 6730). The act makes it unlawful for a person other than a licensed professional engineer to stamp or seal any plans, specifications, plats, reports, or other documents with the seal or stamp of a professional engineer or to use specified titles without a license (Sec. 6732). The act also makes it a crime for a person to practice or offer to practice civil, electrical, or mechanical engineering in this state without legal authorization (Sec. 6787).

Section 6702 defines the term “civil engineer” for purposes of the act, as follows:

“6702. ‘Civil engineer’ as used in this chapter means a professional engineer in the branch of civil engineering and refers to one who practices or offers to practice civil engineering in any of its phases.”

Furthermore, Sections 6731 and 6731.1 set forth specific practices that constitute civil engineering and provide as follows:

“6731. Civil engineering embraces the following studies or activities in connection with fixed works for irrigation, drainage, waterpower, water supply, flood control, inland waterways, harbors, municipal improvements, railroads, highways, tunnels, airports and airways, purification of water, sewerage, refuse disposal, foundations, grading, framed and homogeneous structures, buildings, or bridges:

“(a) The economics of, the use and design of, materials of construction and the determination of their physical qualities.

“(b) The supervision of the construction of engineering structures.

“(c) The investigation of the laws, phenomena and forces of nature.

“(d) Appraisals or valuations.

“(e) The preparation or submission of designs, plans and specifications and engineering reports.

“(f) Coordination of the work of professional, technical, or special consultants.

“(g) Creation, preparation, or modification of electronic or computerized data in the performance of the activities described in subdivision (a) through (f).

“Civil engineering also includes city and regional planning insofar as any of the above features are concerned therein.

“Civil engineers registered prior to January 1, 1982, shall be authorized to practice all land surveying as defined in Chapter 15 (commencing with Section 8700) of Division 3.” (Emphasis added.)

“6731.1. Civil engineering also includes the practice or offer to practice, either in a public or private capacity, all of the following:
“(a) Locates, relocates, establishes, reestablishes, or retraces the alignment or elevation for any of the fixed works embraced within the practice of civil engineering, as described in Section 6731.

“(b) Determines the configuration or contour of the earth’s surface or the position of fixed objects above, on, or below the surface of earth by applying the principles of trigonometry or photogrammetry.

“(c) Creates, prepares, or modifies electronic or computerized data in the performance of the activities described in subdivisions (a) and (b).

“(d) Renders a statement regarding the accuracy of maps or measured survey data pursuant to subdivisions (a), (b), and (c).”

(Emphasis added.)

Thus, under Sections 6731 and 6731.1, the practice of civil engineering embraces various studies and activities in connection with fixed works for irrigation, drainage, waterpower, water supply, flood control, inland waterways, harbors, municipal improvements, railroads, highways, tunnels, airports and airways, purification of water, sewerage, refuse disposal, foundations, grading, framed and homogeneous structures, buildings, or bridges. The term “fixed works” is not defined. However, the word “fixed” connotes a sense of permanency, and has been defined as settled, or established (San Francisco Pioneer Woolen Factory v. Brickwedel (1882) 60 Cal. 166, 173). Thus, “fixed works” as used in the act may be construed to mean permanent established works of the type set forth in Section 6731.

Section 6734 additionally guides the scope of practice of civil engineers, and subdivision (a) of Section 6735 specifies requirements regarding the preparation of civil engineering plans. These provisions read, in pertinent part, as follows:

“6734. Any person practices civil engineering when he professes to be a civil engineer or is in responsible charge of civil engineering work.”

“6735. (a) All civil (including structural and geotechnical) engineering plans, calculations, specifications, and reports (hereinafter referred to as ‘documents’) shall be prepared by, or under the responsible charge of, a licensed civil engineer and shall include his or her name and license number.”

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3 See Section 2 of Chapter 625 of the Statutes of 1983 for another Section 6731.1, which includes language that has the same effect as subdivisions (a) and (b) of Section 6731.1 set forth above.

4 The term “responsible charge” is defined in both statute and regulation. Section 6703 provides that “responsible charge of work” means the independent control and direction, by the use of initiative, skill, and independent judgment, of the investigation or design of professional engineering work or the direct engineering control of those projects. Regulations (continued...)
The act also defines "electrical engineers" and "mechanical engineers"; however, those practice areas are not defined to include engineering involving studies or activities in connection with fixed works (Secs. 6702.1, 6702.2, 6731.5, and 6731.6). Instead, under the act, engineering involving studies or activities in connection with fixed works is only included within the practice of civil engineering.

The board has adopted regulations pursuant to the act applicable to the practice of professional engineering. These regulations, set forth in Division 5 (commencing with Section 400) of Title 16 of the California Code of Regulations, among other things, require a professional engineer to practice and perform engineering work only in the field or fields in which the professional engineer is by education or experience fully competent and proficient (16 Cal. Code Regs. 415).

Turning now to the question presented, that is, whether a licensed professional engineer who is not licensed as a civil engineer may be in responsible charge of designs, plans and specifications, and engineering reports for a project that has components involving fixed works as described in Sections 6731 and 6731.1, we are guided by rules of statutory construction. The primary task of statutory interpretation is to ascertain the legislative intent so as to effectuate the purpose of the law consistent with the language of the statute (Hsu v. Abbara (1995) 9 Cal.4th 863, 871). The intent of the enacting body, whether that be the Legislature or the electorate, is the paramount consideration (Legislature v. Eu (1991) 54 Cal.3d 492, 505). Statutory terms are construed in accordance with the usual, ordinary import of the language employed, in harmony with the overall legislative scheme (IT Corp. v. Solano County Bd. of Supervisors (1991) 1 Cal.4th 81, 98). Furthermore, statutory principles of construction also apply to administrative regulations (Duke Molner Wholesale Liquor Co. v. Martin (1960) 180 Cal.App.2d 873, 884).

As discussed above, a person is practicing civil engineering when the person is in responsible charge of civil engineering work (Sec. 6734). Thus, to the extent a professional engineer is in responsible charge of designs, plans and specifications, and engineering reports for the fixed work components of a project, the professional engineer would be practicing civil engineering.

(...continued) adopted by the board, which further defines "responsible charge," provide that responsible charge directly relates to the extent of control a professional engineer is required to maintain while exercising independent control and direction of professional engineering services or creative work and to the engineering decisions that can be made only by a professional engineer (16 Cal. Code Regs. 404.1(a)). For the purpose of evaluating whether an engineer is in responsible charge, the regulations require the consideration of specified factors, including whether the professional engineer who signs engineering documents is capable of answering questions asked by individuals who are licensed by the board in the appropriate branch of professional engineering relevant to the project (16 Cal. Code Regs. 404.1(b)).
engineering (Secs. 6731, 6731.1, and 6734). Furthermore, all civil engineering plans, calculations, specifications, and reports are required to be prepared by, or under the responsible charge of, a licensed civil engineer (Sec. 6735). Of the definitions of civil, mechanical, and electrical engineers set forth in the act, only civil engineering includes professional engineering work connected with fixed works (Secs. 6731 and 6731.1). Thus, reading these provisions of the act together, we believe that only licensed civil engineers may be in responsible charge of designs, plans and specifications, and engineering reports for the fixed works components of projects described in Sections 6731 and 6731.1.

However, with regard to the components of an engineering project that are not connected with fixed works, subdivision (d) of Section 404.1 of Title 16 of the California Code of Regulations provides as follows:

“(d) Portions of Projects. Nothing in this section prohibits a professional engineer from providing services for portions of or to add to or to modify an engineering project engineered under the responsible charge of another licensee as long as the professional engineer exercises the requisite extent of control and assumes responsibility for the engineering decisions as required by subdivision (a) and meets the criteria described in subdivision (b), as well as meeting the requirements of the Professional Engineers Act and Sections 411 and 415. The professional engineer need only be in responsible charge of the portions, additions, or modifications or the portion of the project affected by the addition or modification and not of the entire project. Except as provided in Sections 6735(b), 6735.3(b), and 6735.4(b) of the Code, the original licensee is not relieved of any responsibility arising from the engineering services of which he or she was in responsible charge.”

Thus, a professional engineer who is not a civil engineer may provide services for portions of, or to add to or modify, a project engineered under the responsible charge of another licensed engineer as long as the professional engineer exercises the requisite extent of control and assumes responsibility for the engineering decisions as specified in Section 404.1 of Title 16 of the California Code of Regulations. In our view, therefore, even if an

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4 Section 411 of Title 16 of the California Code of Regulations establishes requirements relating to an engineer’s seal and, as described above, Section 415 of these regulations require that an engineer shall practice only in the field in which he or she is fully competent and proficient.

5 These sections provide that a civil engineer, electrical engineer, or mechanical engineer is not responsible for damage caused by subsequent changes to documents prepared by, or under the responsible charge of, the respective licensed engineer if the subsequent changes or uses are not authorized or approved by the engineer, provided the engineering service rendered by the engineer who signed the documents was not also a proximate cause of the damage.
engineering project contains fixed work components, a professional engineer who is not licensed as a civil engineer may be in responsible charge of a portion of the project that does not involve those fixed work components if the criteria for the exercise of responsible charge are otherwise met.

Accordingly, it is our opinion that only a licensed civil engineer may be in responsible charge of designs, plans and specifications, and engineering reports for the fixed work components of an engineering project, as described in Sections 6731 and 6731.1 of the Business and Professions Code. However, a licensed professional engineer who is not a civil engineer may be in responsible charge of designs, plans and specifications, and engineering reports for the components of an engineering project that are not fixed works.

Very truly yours,

Diane F. Boyer-Vine
Legislative Counsel

By

Sergio E. Carpio
Deputy Legislative Counsel

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