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Engineering Ethics and Responsible Charge

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Engineering Ethics and Responsible Charge

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Preface

This course provides an overview of the responsibilities of being in *responsible charge*, and the ethical considerations faced by a licensed engineer who is in that position.

Each state board has its own definition as to what constitutes the responsible charge duties of a professionally licensed engineer. However, this course is based principally on the California Code of Regulations, Title 16, Division 5, Section 404.1, "Responsible Charge – Professional Engineer" interpretation of the term.

Disclaimer: This course is only a summary overview of responsible charge principles and ethical considerations, found in a small group of state board statutes, and not to be used as a professional guide to the full scope of being the PE in responsible charge.

Any engineer who is in responsible charge should thoroughly read and interpret all board rules and laws pertaining to the practice of engineering within their practicing jurisdictions!

Responsible Charge

The term "responsible charge" refers to the extent of control that a PE is required to exercise, while maintaining their independent control and direction of PE services or design work, and to the engineering decisions which can be made only by a "responsible" PE.

EOR and delegated engineers

The engineer that is in responsible charge is typically considered to be the *engineer of record*. Those PE's who undertake a specialty service and provide services or creative work, (delegated engineering documents) regarding a *portion of the engineering project* is often considered to be the delegated engineer. The *delegated engineer* is the engineer of record for that portion of the engineering project.

To be in responsible charge means:

- If the project fails, you're responsible!

- If something is overlooked in the design, you are responsible!
- If someone under your authority makes a mistake or an error in judgment, you are responsible!
- If you sealed it without a proper and thorough review, then you are responsible!
- And above all else, if someone is injured, or the health, safety and welfare of the public are compromised, you are responsible!

It's a considerable "responsibility" to be the engineer in responsible charge of a project, and not a duty that is taken lightly.

"Direct supervisory control and responsibility"

This phrase is the essence of responsible charge; when a PE has direct professional knowledge and is the actual designer or author, or has been in responsible charge of a design project from the beginning to the end. They have direct supervisory control of technical personnel, and are responsible for all aspects of the design process for that project.

Engineering Decisions and Extent of Control

Making Responsible Decisions

Responsible decisions are those engineering decisions which must be made by and are the direct responsibility of the PE in responsible charge.

They are those decisions which have an effect on projects which could potentially present a danger to life, health, property, or public welfare.

These decisions may include, (but not limited to) the:

- choice of engineering alternatives to be researched and investigated, and the comparison of those alternatives within the scope of the design project.
- choice or development of design standards or methodologies, and materials to be used.
- preparation of engineering plans and specs, calculations, reports, and other documents for the engineered product.
- choice or development of the techniques or methodologies used in testing and evaluation of materials, etc.
- review and evaluation of manufacturing, fabrication or construction methods or controls to be used.

- evaluating of test results, materials and workmanship, in the means in which they affect the character and integrity of the completed design project.
- development and control of operating and maintenance procedures.

In making or reviewing and approving engineering decisions, the PE shall be physically present or shall review and approve through the use of proper communication means, the engineering decisions prior to their implementation.

Extent of Control

The *extent of control* required to be in “responsible charge” shall be such that the engineer has the full authority to make or review and approve the engineering decisions.

In addition, extent of control shall be such that the engineer will determine the applicability of design criteria and technical recommendations provided by others, before incorporating such criteria or recommendations into the design process.

Degree of control

Responsible charge shall mean that *degree of control* an engineer is required to maintain over engineering decisions made personally or by others over which the engineer exercises supervisory direction and control authority.

The requirements for Responsible Charge are typically outlined in your state board's rules to:

- address the degree of control required of the EOR
- identify those engineering decisions which must be made by and are the responsibility of the *Engineer of Record*
- establish a means of evaluating whether or not an engineer meets the guidelines for being the *Engineer of Record*.

Exclusions of responsible charge

The term “responsible charge” does not refer to any of the following:

- the concept of financial liability
- management control in a hierarchy of PEs, except as each of the individuals in the hierarchy exercises independent engineering judgment and thus responsible charge
- such administrative and management functions as accounting, labor relations, personnel

performance standards, marketing of services, or goal setting. While an engineer may also have such duties in this position, it should not enhance or decrease one’s status of being in responsible charge of the engineering

Successor Licensee - In situations of unavailability

In situations when the PE in responsible charge of an engineering project is unavailable or unable to complete the project or when the project is an adaptation of a previous design, a successor licensee may assume responsible charge of the project as long as the successor licensee exercises the requisite extent of control and assumes responsibility for the engineering decisions.

Evaluating whether an Engineer is in Responsible Charge

Sample Evaluation Test

To evaluate whether or not an engineer meets the criteria of being the Engineer of Record, the following should be considered:

- 1) The engineer shall be fully competent in answering questions relevant to the engineering decisions made during the engineer’s work on the project, and answered in enough detail as to leave no doubt as to the engineer’s proficiency in the work performed and involvement in said work.
- 2) The engineer shall be completely in charge of, and satisfied with, all engineering aspects of the design project.
- 3) The engineer shall have the ability and availability to review design work at any time during the development of the project and shall be able to exercise sound judgment in reviewing these documents.

Proving that the EOR is in responsible charge

The engineer that is signing the documents must be able to answer questions asked by individuals (within the relevant areas of expertise), who are licensed by the Board in the appropriate branch of engineering relevant to the project and who are fully competent and proficient by education and experience in the disciplines of professional engineering relevant to the project.

Such questions should be relevant to the engineering decisions which were made during the individual’s participation in the project, and in sufficient detail to leave no question as to the engineer’s technical knowledge of the engineering tasks performed.

When defending one's decisions, it is not necessary to defend those decisions in an adversarial or defensive manner.

One need only demonstrate that the individual in responsible charge has:

- made the decisions
- reviewed the decisions
- approved the decisions
- possessed sufficient knowledge of the project to make, or review and approve them

Examples of questions to be answered by the engineer could relate to:

- criteria for design
- methods of analysis
- methods of manufacture and construction
- selection of materials and systems
- economics of alternate solutions
- environmental considerations

The individual should be able to clearly express the extent of control and how it is exercised and to demonstrate that the engineer is answerable within said extent of control.

Portions, Additions and Modifications of Projects

Responsible for the parts, not the whole!

As previously mentioned in regards to delegate engineers, under normal circumstances there is nothing that will prohibit a PE from providing services for portions of, in addition to, or modifications of an engineering project engineered under the responsible charge of another licensee; as long as the PE exercises the requisite extent of control and assumes responsibility for the engineering decisions as properly required.

The PE 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.

Sealed Documents and "Responsible Charge"

Signed Documents

Signed and sealed documents will be deemed to have been prepared properly under the responsible charge of a licensee when the following conditions were properly met and documented.

Supervision - licensee has supervised the preparation of the documents and has continuous input into their preparation prior to their completion.

Review Process - The licensee reviews the final documents, and verifies that the work has been completed to their full satisfaction.

Changes, modifications - licensee has the authority to make any necessary and appropriate revisions to the final documents. Any revisions to a document containing the seal and signature of a licensee shall be described and dated.



If the revisions are not done by the original licensee, the revisions must also be sealed/signed by the licensee in responsible charge of the revisions.

The EOR is ultimately responsible for complying with all of the preceding requirements whether the work is performed locally or at a remote location, with the licensee in responsible charge of the work being the individual to sign and seal the engineering documentation.

Delegation and Responsible Charge

Sharing the workload

It's acceptable for a licensed PE to rely on the work of a subordinate engineering intern or associate, even though the person is not a licensed engineer; provided the PE is acting as the EOR and is in responsible charge of that person.

It should also be noted that responsible charge relates to engineering decisions made within the scope of engineering functions, and does not refer to management control, administrative or personnel management functions.

So to reiterate, in cases where the PE is acting as EOR and is in responsible charge, the PE is permitted to rely upon the work of EIs and other non-licensed engineers and technical personnel.

Know your design staff

A PE should have personal knowledge of the technical abilities of their technical personnel performing the engineering work and be satisfied that these capabilities

are sufficient, in order to seal their engineering work with your name on it. There is a level of trust that is earned over time, between a signing engineer and those that collaborate in performing the work.

Diligence of the signing vs non-signing officer

When acting as the responsible engineer, it should be taken into consideration whether non-signing engineers and personnel will tend to review and perform engineering as diligently as they would if they were the actual signing EOR.

With tight deadlines and pressure from clients and upper management, projects tend to get expedited when going out the door. It's always easier to rush a project that doesn't have one's name on it.

Establish QA protocols

Right or wrong, many engineering firms tend to have one engineer that seals every project leaving the office. Often this can be hundreds of projects annually, preventing the EOR from being deeply involved in many of the design decisions.

Establishing (QA) quality assurance standards and processes that the staff must follow can help to minimize the risks associated with the wholesale sealing of engineering documentation.

Well trained and vetted staff

When do you know that a staff is adequately trained, so that you don't have to verify each and every aspect of their work? There is always the chance that mistakes



can be made due to inexperience, indifference, or negligence on the part of unproven associates.

Maintaining a trustworthy staff, that is satisfied in their positions within the organization, helps to reduce turnover and helps in fostering a reliable group that will work hard to maintain the reputation and good standing of the company and the EOR.

No engineer is 100% perfect, but every conceivable effort must be made to ensure that your staff has a sincere dedication to the protection of your reputation, and more importantly to the public's health, safety and welfare; even if they do not have their signature on the work.

Responsible Charge and Engineering Firms

The Principal Officer

A "principal" is an individual who is either an officer of the corporation, or is designated by a firm as being in full authority and responsible charge of the services offered by that firm.

They are the qualifying agent for the Certificate of Authorization (CA) to practice engineering for the company, within a given jurisdiction and are typically the Engineer of Record for design projects completed by that firm (unless otherwise stated.)

When required, any licensed engineer working for the company can become the "Engineer in Responsible Charge" or "Engineer on Record (EOR)" for a project; taking the responsibility for the engineering work done on a project.

The EOR within an engineering firm is a PE who is in responsible charge for the preparation, signing, dating, sealing and issuing of any engineering document(s) for any engineering service or creative work performed by that firm.

A licensed PE, when acting as an EOR, is allowed to delegate work to others and is allowed to have non-licensed persons working under their direct supervision provided that the engineer continues to remain in "responsible charge".

In other words, a licensed PE is not required to personally perform the complete design, research all of the data, or complete all engineering tasks; however they are required to always exercise "supervisory direction and control authority" in accordance with their state board's engineering laws and rules.

Liability in Responsible Charge

Liabilities of being in Responsible Charge

Personal liabilities of engineers in responsible charge tend to vary from state to state. Being in responsible charge opens up conditions of full liability exposure, both personally and corporately.

Under certain state laws, an engineer would be expected to be involved directly in all engineering decisions for an engineering firm. This is an unrealistic scenario when the company's workload exceeds the scope of a single engineer.

Company insurance with “tail coverage”

Engineers in responsible charge should verify that their company carries full professional insurance and that they, as the PEs in responsible charge, are specifically a "named insured" on the policy.



An EOR should verify that the company's insurance is adequate enough to cover the risk of the projects they will be responsible for supervising.

Malpractice Tail Coverage

In addition, an EOR should inquire as to whether the insurance has "malpractice tail coverage". This is an extended reporting period endorsement, offered by the malpractice insurance carrier, which provides an insured professional the option to extend coverage after the cancellation or termination of a claims-made policy.

Have an indemnity agreement with the firm

Any engineer that assumes the position of "Engineer in Responsible Charge" for a project should have some type of an “indemnify, defend and hold blameless” agreement with their employer and make sure adequate malpractice insurance is in place.

When properly written, the intent of a hold harmless or indemnification agreement is to impose on one party the responsibility to pay all liability, damages, costs, expenses, and even attorney's fees for the other party to the agreement. Even if it wasn't your fault and the other party was at fault, you may still be obligated to pay damages.

Aiding and Abetting (or Assisting)

Aiding and Abetting

This is a violation of engineering ethics rules which can be easily overlooked by PEs in the position of responsible charge.

Even when a PE does not personally perform a rules violation, should they assist another unqualified or unlicensed individual in circumventing or violating board rules and laws, then they become equally guilty of that act.

Sealing the work of someone not licensed

With the act of aiding and abetting, the violation usually presents itself during the stamping or sealing of a plan prepared by someone else. Such as when a PE seals a plan or some other engineering document which was prepared by someone else that was not properly licensed to do the work.

Sealing the work of an entity not licensed in that jurisdiction

Other times, aiding and abetting occurs when one performs work with, or for an entity that is contracted to do the engineering work but is not licensed to practice within that state.

A typical case such as this is when an engineer is solicited to perform work for an out-of-state firm that has been hired to perform the engineering, but doesn't itself have a Certificate of Authorization to offer or provide professional services in the state of practice.

A licensee aids and assists when they help a person or firm provide services they are not otherwise authorized to do.

Not considered Aiding and Abetting

When collaboration with other appropriately and properly licensed professionals or firms, this would not be considered a case of this type of a violation.

For example, a PLS may provide a sealed plat to an authorized engineering firm preparing a subdivision plan. Or a PE competent in the area of practice may provide structural, mechanical, or electrical design to an authorized architectural firm.

Within Area of Competence

By Education and/or Experience

A PE shall practice and perform engineering work only in the field or fields in which he or she is (by education and/or experience), fully competent and proficient to perform.

A PE is not prohibited from:

- signing plans that include engineering work in areas of practice, other than that in which he/she is fully competent and proficient, (if such work was performed by other engineers who were fully competent and proficient in such work.)

- performing engineering work in areas which involve the application of new principles, techniques, ideas or technology.
- supervising other engineers who may respectively be performing engineering work in areas other than those in which the supervising PE is fully competent and proficient.

Sealing of Documents

Seal of the responsible engineer

The sealing and signing of documents in the engineering profession is a means of authenticating engineering documentation, and identifies the engineer that is in responsible charge of the project.



Unsealed docs
Board rules generally provide that signing and sealing is required only when the engineering or surveying document is "final".

An unsigned and unsealed document is normally an indication that it is not a final document; however it could also indicate that the engineer in responsible charge is possibly in violation of the Board's rules, by performing unlicensed work.

Many PEs have adopted the practice of stamping all non-final documents in some manner before submittal. For example, a stamp of "Preliminary" or "For Illustration Purposes Only", or "Not a Final Document" on documents that might otherwise appear to require signing and sealing indicates to the public that the absence of a seal and signature is something other than negligence or oversight.

Maintaining Integrity in Responsible Charge

Engineer's ethical code of conduct

There are ethical guidelines outlined in state board rules and laws, which provide an enforceable code of conduct, providing general and specific guidance for how a PE should conduct himself or herself when practicing their profession; especially while in the position of responsible charge.

The laws establishing and governing the licensing of PEs makes it apparent that the primary purpose of these ethics laws is to protect the safety and welfare of the public.

Thus, those licensed to provide engineering services assume a higher duty than just the earning of a paycheck; with economic gains being secondary to the engineer's ethical obligations, should the two ever conflict with one another.

Displaying integrity, fairness, and honesty while in responsible charge

There is a certain degree of confidence that is placed on the professional engineering profession, as their practice has a direct effect on a public's health, safety, and welfare.

Most engineers do not take this sense of duty lightly, and practice in an ethical manner, working diligently to maintain the public trust placed on them, providing engineering services with integrity, fairness and honesty.

NCEES model law

The need for this type of integrity, fairness, and honesty in the practice of engineering is reflected in the enforcement sections of the NCEES Model Law.

A majority of the violations outlined in this act are directly related to integrity, fairness, and honesty and specifically contain words such as fraud, deceit, dishonesty, or false.

Some examples being: "any fraud or deceit in obtaining or attempting to obtain or renew a certificate of licensure", or "knowingly making false statements or signing false statements".

Unethical responsible charge

An EOR displays a level of fraud and deceit when they sign and seal plans not done under their direct control and personal supervision, or when they practice outside of their personal area of practice and expertise.

These practices run the risk of causing potential harm to the public, as well as lowering the virtue of the profession.

Acting unethically with the licensing boards

The ethical character of an engineer can also be displayed in the licensee's interactions with their licensing boards. When they misrepresent or provide false and misleading information to their board they are exhibiting dishonest behavior that can lead to serious disciplinary actions.

Avoiding errors of omission

Failing to disclose disciplinary actions received from other boards, or hiding criminal convictions are both errors of omissions. If either of those occurs, it is best to report honestly to the board and deal with the situation forthright, rather than to give a dishonest answer hoping that the actions are not discovered.

Conclusion

Being placed in the position of being the engineer in responsible charge requires that the EOR set an example for the rest of the staff.

Practicing in an ethical manner, plus learning and following the board's rule helps to guarantee that there are no injuries to the public's health, safety, and welfare. In addition, it helps to ensure that there are no disciplinary actions in one's future.

As the saying goes, "if you stamp it, you own it!"

Bibliography

- 1) California Code of Regulations, CCR 404.1.
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