GUIDELINES FOR THE STRUCTURAL ENGINEER OF RECORD FOR THE DESIGN OF BUILDINGS AND SUBMITTAL OF STRUCTURAL PLANS & CALCULATIONS

Written by

THE PROFESSIONAL PRACTICES & ETHICS COMMITTEE

of

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PREFACE

Many factors have contributed to the need for a Guideline for the structural engineering practice. A few of these factors include the increasing complexity of buildings and the building codes to design by, accelerated construction schedules, lack of adequate peer review, lack of standards set for the practice and the increasingly competitive fee structures.

The growing trend to accelerate the construction schedule, even overlapping the design phase, has placed additional burden(s) on the *Structural Engineer* to perform an accurate analysis and design under extreme time restraints. Sometimes the essential work and coordination required to provide a complete and accurate structural design, including contract drawings, is abbreviated in order to meet these schedules. To compound the problem, some municipalities do not have the resources to perform an adequate structural plan review to determine whether the design is complete or accurate. Many permits are issued solely on the premise that because the submitted calculations and drawings bear an engineer's stamp, the design is adequate. Establishing minimum submittal requirements may serve as a helpful tool for the *Structural Engineer* and building official in preparing and reviewing structural submittals.

Owners/clients have come to treat the cost of design as a line item to be purchased at the lowest cost. In many instances this has resulted in a reduced or inadequate level of service that falls short of the standard of care required for a well-executed project. A guideline that establishes a minimum scope of services will serve to mitigate this practice.

It is common for the practice of structural engineering to vary from office to office and region to region. **It is important to note that this guideline is not inteno**

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1.0 INTRODUCTION

1.1 Submittal Documents are required by code for application for a building permit. The specific requirements are documented in the *International Building Code*, subject to amendments that may be incorporated by the local permit-issuing authority. However, these regulations do not address the specific requirements as they relate to the *Structural Engineer of Record* (herein "**SER"**). For this reason, this guideline attempts to organize and define the responsibilities of the SER in submitting the structural design and *Contract Documents*.

1.2 As a general requirement, the SER should meet the following level of responsibilities.

1.2.1 Be familiar with the current laws governing *Professional Engineer*s and the requirements necessary to provide professional engineering services in the state of Utah.

1.2.2 Be competent in the understanding, and have expertise in the proposed design for which the SER's stamp and signature is affixed.

1.2.3 Apply engineering principals combined with sound judgment in order to safeguard the health, safety and general welfare of the public.

1.3 It is important that the majority of projects involving structural design receive a structural plan review prior to issuing a building permit. This would include all public and commercial projects, incidental structures and *Custom Residential Project*s as defined in the following DEFINITIONS section. A thorough review of the *Permit Submittal Documents* should be performed by a certified plans examiner and/or by a licensed *Professional Engineer*

2.0 DEFINITIONS

Terms used in this document are defined as follows:

Completed Documents. Final design calculations and specifications documenting all aspects of the *Primary Building Structure*. *Construction Drawings* that are considered ready for construction with the exception of minor coordination items.

Construction Drawings. Graphical and pictorial documents describing the design and characteristics of the elements necessary for construction of the *Primary Building Structure*.

Contract Documents. All *Construction Drawings*, calculations and specifications sealed by the SER issued for construction purposes and approved for a building permit.

Custom Residential Project. A project of a size and complexity that the *Primary Building Structure* does not comply with the provisions set forth in sections of the *International Building Code* for conventional light-frame construction, or the prescriptive sections of *International Residential Code*.

Deferred Submittal. Portions of the design that are not submitted at the time of application and submittal for permit but are submitted to the building official within a specific period. Refer to *IBC*, Section 106.3.4.2. This would include, but not be limited to, components such as; pre-engineered trusses, pre-cast walls and framing members and in some cases post-tensioned concrete components.

DOPL. Utah Department of Commerce, Division of Occupational and Professional Licensing.

IBC. *International Building Code* published by the International Code Council.

NCEES. National Council of Examiners for Engineering and Surveying.

Non-Structural Component. An architectural, mechanical, electrical, or special purpose part of the building that, by its size or standardized manufacturing and installation methods, possesses the internal structural capability to perform its function and utilizes its own support or connection to the *Primary Building Structure*.

Permit Submittal Documents. All *Construction Drawings*, specifications, and calculations that are considered complete as defined

herein, and have been prepared and sealed by the SER for the purpose of obtaining a building permit.

Pre-Engineered Building System. An integrated structural system comprised of all or most of the essential *Primary Structural Component*s necessary for a complete primary structural system engineered and documented by the supplier's *Specialty Engineer*.

Primary Building Structure. The completed combination of structural elements that serve to support the building's self weight, the applicable live load and the environmental loads such as wind and seismic loading. Curtain wall members, interior non-load bearing walls or exterior facades, to name a few items, are not part of *Primary Building Structure*.

Primary Lateral-Force-Resisting System. The part of the *Primary Building Structure* that has been considered in the design to provide the required resistance to seismic and wind forces as prescribed within the applicable codes.

Primary Structural Component. An essential part of the *Primary Building Structure* which may or may not be fabricated at the construction site, but when installed, becomes an integral part of the overall *Primary Building Structure*.

Professional Engineer. A reference to an licensed engineer in general, that is duly licensed as defined by the State of Utah's Licensing Act and Department of Professional Licensing, who may or may not have the specialized knowledge, training and experience relating to the analysis and design of force-resisting systems for buildings and other structures.

Secondary Structural Component. A structural component that is supported by the primary structure, but does not contribute to the overall strength or stability of the *Primary Building Structure*. Such a component must have internal structural integrity to perform its function and must have its interactions with, and its attachments to the primary structure analyzed and designed to assure its proper integration within the total structure.

Structural Engineer. A duly licensed *Professional Engineer* as defined by the State of Utah Licensing Act and Department of Professional Licensing, who has the specialized knowledge, training and experience relating to analyzing and designing force-resisting structural systems for buildings and other structures.

***Structural Engineer of Record* (SER).** A *Professional Engineer* who has responsible charge of the design of the *Primary Building Structure* and is identified as such to the appropriate jurisdiction. The SER prepares and

supervises the preparation of the Structural *Contract Documents* and who has the specialized knowledge, training and experience relating to analyzing and designing force-resisting structural systems for buildings and other structures.

Specialty Engineer. A *Professional Engineer* who is qualified to seal plans and design calculations for pre-engineered structural components or systems.

Refer to the current edition of the *International Building Code* for additional definitions.

3.0 GENERAL SUBMITTAL REQUIREMENTS

3.1 *Permit Submittal Documents* shall be submitted with the SER's seal, signature and date affixed to the cover sheet of the calculations and on each structural drawing. Computer generated signatures should not be used. Refer to Section 6.0 for more information on signing and stamping plans and calculations.

3.2 Only *Permit Submittal Documents* which are complete as defined in the definitions shall be stamped and submitted for approval. Submitting partially complete "placeholder" sets is poor practice and is considered illegal under some state laws. Incomplete drawings should not be submitted.

3.3 A complete set of structural calculations shall accompany "Footing & Foundation Permit" submittals. Significant changes and additions made to the footing & foundation package that were not documented in the calculations, if noted in subsequent package submittals, should require additional plan check review.

3.4 When *Pre-Engineered Building System*s are included in the project, the complete structural calculations and drawings for the system shall be submitted with the project documents and must bear the seal of the *Specialty Engineer*, registered in the state of Utah.

3.5 *Deferred Submittals* shall be clearly defined on the *Permit Submittal Documents*.

3.6 Structural calculations, drawings, notes and/or specifications shall be submitted. A Geotechnical Report should also be submitted when applicable. The number of sets required for submittal shall be determined by the local building official.

4.0 MINIMUM STRUCTURAL CALCULATION REQUIREMENTS

In order to adequately review the technical aspects of design of the *Primary Building Structure* for compliance, the following minimum calculation documentation should be submitted:

4.1 Design Criteria.

4.1.1 The calculations submitted shall clearly document on a summary sheet the information noted below. Documentation shall also be submitted to show how the design loads were established.

4.1.1.1 The current building code used in the design.

4.1.1.2 Itemized dead & live loads used in the gravity design.

4.1.1.3 Snow loading criteria including terrain and exposure category, importance factor, design ground snow load and snow drifting loads.

4.1.1.4 Seismic design criteria including importance factor, site class, seismic use group, design category and response modification coefficient.

4.1.1.5 Wind loading criteria including minimum wind design speed, exposure category and importance factors.

4.1.1.6 Special loading(s) (where applicable).

4.1.1.7 Reference to the geotechnical report and values used in design.

4.1.2 Materials (wood, steel, concrete, masonry, etc.), grade of materials and stresses of materials used in design (bending, shear, compression) should be noted in the calculations, notes and/or specifications.

4.1.3 Load combinations used in design for each material should be documented.

4.2 Gravity Design. The following key items shall be included:

4.2.1 Design of the Primary Structural Components. This design should document the location, tributary area, span, loading and controlling condition for each member designed.

4.2.2 Calculations of the *Primary Structural Component*s should be keyed to the plans for reference.

4.2.3 Calculations should note the final member size as shown on the plans, including the support condition.

4.2.4 Calculations for design of the connections between the *Primary Structural Component*s unless specifically noted as a Deferred Submittal.

4.3 Lateral Design. The following key items shall be included:

4.3.1 Factors used in determining base shear should be indicated in addition to the required seismic design criteria required in section 4.1.1.4 .

4.3.2 Factors used in determining overall wind load should be indicated as required in section 4.1.1.5.

4.3.3 Comparison between wind load vs. seismic load for controlling design of the *Primary* and *Secondary Structural Component*s.

4.3.4 Clearly defined type of *Lateral-Force-Resisting System* used and which *Primary Structural Component*s are part of the system.

4.3.5 Computer analysis and design results should be submitted with an input model or sketch showing geometry, loading, boundary conditions, etc.

4.3.6 Design of *Primary Structural Component*s relating to the Lateral Force Resisting System. These components would include, but are not limited to, diaphragms, collectors, drag struts, out-of-plane anchorage and connection design.

4.3.7 Design of *Secondary Structural Component*s unless specifically noted as a Deferred Submittal.

4.4 Footing & Foundation Design. The following key items shall be included:

4.4.1 Clearly documented loading conditions and locations for reference.

4.4.2 Design of the primary footing and foundation components.

4.4.3 Design of *Secondary Structural Component*s required at the interface between foundation and structure above. These components would include base plates, anchor bolts and embed plates.

4.4.4 Effects of lateral loading including uplift, overturning and shear transfer to soil must be included.

4.4.5 The requirements for engineered fill or other specific placement criteria should be noted in the calculations and on the plans.

4.4.6 A geotechnical investigation and report is typically performed, and is recommended for all public and commercial projects. A soils investigation is often needed per the *IBC* requirements.

4.4.7 Using "assumed" soil properties (bearing pressure) in the design and then requiring field verification may be acceptable depending on the size and complexity of the project and approval of the local building department. However, the subsequent field report should be submitted to the building department and approved prior to the continuation of work, similar to a *deferred submittal*.

5.0 MINIMUM STRUCTURAL DRAWING REQUIREMENTS

No matter how detailed and accurate the calculations and computer analysis is, if the information is not shown or described adequately on the *Construction Drawings*, it will generally not be built by the contractor. At a minimum, construction of the missing components will be left to the interpretation of the contractor and the building inspector. The following minimum structural drawing requirements must be submitted to help eliminate this problem.

5.1 Structural Notes. The following information should be identified on the documents:

5.1.1 Loading and basic design criteria, refer to section 4.1.1.

5.1.2 Material stresses used in design, refer to section 4.1.2.

5.1.3 Quality assurance plan documenting special inspection requirements.

5.1.4 *Deferred Submittal* information.

5.1.5 Other structural requirements as they pertain to the *Primary Building Structure.*

5.2 Structural Plans. As a minimum the *Construction Drawings* should indicate the following information:

5.2.1 Structural layout of the overall foundation system, floor framing plans and roof framing plan. Providing a grid system with grid dimensions is encouraged to facilitate reference to the plans.

5.2.2 The foundation plan should include an applicable footing schedule. Other applicable schedules or designations on the plan should be referenced back to the schedules contained on other sheets.

5.2.3 The foundation plan, footing schedule or general notes shall document the criteria used in design, such as the bearing pressure and engineered fill requirements.

5.2.4 Size and location of all structural framing components for the *Primary Building Structure* must be shown for each direction and at all levels of structure.

5.2.5 Indicate location of each lateral force resisting component such as, but not limited to, lateral bracing, shear walls, moment frames.

5.2.5 Sufficient detail cuts, references to schedules and specific information identifying the *Primary Structural Component*s.

5.3 Dimensioning on Plans.

5.3.1 Providing adequately dimensioned project drawings is one of the most important elements in the preparation of complete *Construction Drawings* and the accomplishment of a well-executed project. The project drawings should include dimensions that allow for the proper installation and assembly of the building structure. This dimensioning of the building is usually provided by the prime professional (Architect) and the primary source of dimensions occur on their drawings.

5.3.2 The SER shall assist in coordinating the dimensions needed for the accurate location of the building structure.

5.3.3 Depending on personal practice and based on the complexity of the project, dimensioning of the structural drawings may be warranted. All dimensions shown on the structural drawings should be coordinated with the architectural drawings and other disciplines.

5.3.4 The *CASE Document 962 D*, "A Guideline Addressing Coordination and Completeness of Structural Construction Documents", prepared by the Council of American Structural Engineers, CASE National Guidelines Committee, addresses recommendations regarding dimensioning of structural drawings. SEAU encourages the SER to reference and follow some of these guidelines. However, following all of these guidelines is not considered the minimum standard practice by SEAU in the state Utah.

5.4 Structural Detailing.

5.4.1 *Primary Structural Component* connections required to transfer gravity load from roof to floor to foundation must be detailed. These connections would include, but are not limited to, joist to beam or wall, beam-to-beam, beam to column and column to foundation.

5.4.2 Details must be shown for all lateral force resisting connections. These types of connections are; diaphragm shear transfer, out of plane anchorage, bracing connections, moment frame connections and force transfer to foundations.

5.4.3 Structural schedules should also be included and referenced when applicable.

5.4.4 Structural detailing of *Secondary Structural Component*s such as parapets, fascias and canopies must be included in the structural drawings or be specifically addressed on the architectural sections.

5.4.5 On simple bearing wall buildings, such as on small warehouses and offices, all conditions relating to the *Primary Building Structure* may be addressed on architectural wall sections or details. In these cases the structural detailing may be incorporated into the architectural sections. This practice is not recommended and may not be acceptable to the building official. Furthermore, the official may require that these drawings be sealed and signed by the SER.

5.5 Non-Structural Drawings.

5.5.1 It is not acceptable practice for the SER to stamp architectural, mechanical, electrical or other drawings and specifications for which the SER does not intend to be responsible nor has the required expertise.

5.5.2 Refer to section 7.0 regarding “Incidental Practice”.

6.0 STAMPING & SIGNING PLANS and CALCULATIONS

6.1 Requirements pursuant to the State of Utah's Professional Licensing Act Rule R156-22-601,701, Unprofessional Conduct and Seal Requirements.

6.1.1 It is unprofessional conduct to sign and submit incomplete plans to a building official for the purpose of obtaining a building permit.

6.1.2 All work must have been prepared under the direct supervision of the engineer who is stamping and signing the work.

6.1.3 Each original set of final drawings, calculations, specifications must, as a minimum, be sealed, with original signature and date placed on the cover or title sheet.

6.1.3 A seal may be a wet stamp, embossed or electronically produced.

6.1.4 The use of copies of original set of plans, specifications, drawings, calculations, which contain the original seal, original signature and date are permitted, if the seal, signature and date are clearly recognizable.

6.2 Requirements noted in the *NCEES* Model Law Rule 240.20.c., Seal on Documents.

6.2.1 These requirements are very similar to the Professional Licensing Act Rules with some minor revisions and additions.

6.2.2 In addition to requiring stamping of final documents. Working drawings or unfinished documents are not required to have a seal and signature if they contain a statement to the effect: *Preliminary, Not For Construction, Recording Purposes, or Implementation.*

6.2.3 Computer-generated seals not signed with a digital signature may be used on final original drawings provided a handwritten signature and date is placed across or next to the generated seal.

6.2.4 Drawings or documents that do not require certification may be transmitted electronically, but shall have the generated seal removed before transmitting.

6.2.5 Drawings or documents that are signed using a digital signature must have an authentification process attached to or logically associated with the electronic document. The digital signature must be:

a. Unique to the person using it.

b. Capable of verification.

c. Under sole control of the person using it.

d. Linked to a document in such a manner that the electronic signature is invalidated if any data in the document is changed.

6.3 SEAU's Recommended Practice.

6.3.1 All Licensing Act rules must be followed to comply with state law.

6.3.2 All documents leaving an engineer's office or control are considered final documents and should be stamped, signed and dated unless the documents are clearly identified: ***Preliminary, Not For Construction***.

6.3.3 Completed drawings and calculations that are submitted for building department plan review but are not final should be stamped, signed, dated and clearly identified: ***For Permit Review Only, Not For Construction.***

6.3.4 Completed drawings and calculations that have satisfied the permit review process and have had corrections made, should be stamped, signed, dated and clearly identified: ***Final Construction Documents***.

6.3.5 Seals or stamps may be computer-generated or ink stamped. Only final drawings or plan check drawings should bear a seal.

6.3.6 Drawings or documents that do not require certification may be transmitted electronically provided the seal has been removed before transmitting.

6.3.7 **Computer generated signatures and dates are not permitted**. All final documents must bear original "wet" signature and date.

6.3.8 Plans: Each sheet within a set of final drawings that represent the separate structural discipline must bear an original stamp, signature and date. Drawing cover sheets may also be stamped and signed provided a notation is added clearly indicating the discipline for which the *Professional Engineer* is responsible.

6.3.9 Calculations: The front page of each set of calculations must bear an original stamp, signature and date.

6.3.10 Technical Reports: Documents that represent a professional opinion and address technical aspects of a project, shall be stamped, signed and dated.

7.0 INCIDENTAL DESIGN PRACTICE

7.1 Current State of Utah Licensing Act Rules.

7.1.1 Currently there is no definition of Incidental Design in the Licensing Act rules. The only reference is Rule R156-22-601 that references *NCEES* Model Law. Model Law states: "Licensees shall undertake assignments only when qualified by education or experience in the specific technical fields of engineering or surveying involved".

7.1.2 The model law implies that it is not acceptable practice for the SER or other disciplines to stamp and submit drawings or specifications for which they do not have the required expertise, nor will be responsible. However, definition of experience or education is lacking and enforcement is difficult.

7.2 Licensing Act Rule Change

7.2.1 The State of Utah's Professional Engineers and Professional Land Surveyors Licensing Board and *DOPL* are implementing a rule change that better defines Incidental Design, and what is acceptable practice.

7.2.2 The proposed definition is as follows:

"Incidental practice" means "architectural work as is incidental to the practice of engineering" as used in section 58-22-102(9) and "engineering work as incidental to the practice of architecture" as used in section 58-3a-102(6), which:

(a) can be safely and competently performed by licensee without jeopardizing the life, health, property and welfare of the public;

(b) is in an area where the licensee has demonstrated competence in the area of incidental practice by adequate education, training and experience;

(c) arises from and is directly related to work performed in the licensed profession;

(d) is substantially less in scope and magnitude when compared to the work performed or to be performed by the licensee in the licensed profession; and

(e) is work in which the licensee is fully responsible for the incidental practice performed as provided in section 58-3a-603(1) or section 58-22-603(1).

7.2.3 The above definition will also apply to other disciplines.

7.2.4 It is considered professional misconduct if an engineer engages in the practice of incidental design that does not meet all of the above criteria.

8.0 CONCLUSION

At the time of organization, one of SEAU's goals was to ***"Promote high standards of Structural Engineering in the best interests of clients, community, public and profession"***. The preceding guideline has been prepared with that goal in mind. It is in the best interest of the engineering community to provide the service a client is expecting and needs. Professional engineers have an obligation to protect the life, health and welfare of the public. SEAU feels the preceding guideline outlines services that are required to fulfill that obligation. Many engineers provide services well above and beyond these recommendations.

Beyond protecting the public welfare, quality construction documents are in everyone's best interest. They speed construction, provide the basis for a quality competitive bid, reduce risk for owners and clients and foster better business for everyone involved. Not providing the minimum services as outlined may place unnecessary risk on the engineer, owner and design team, and in addition, may be the basis for a complaint against an engineer's license.

The information in this guideline was developed to create a better understanding of the scope of minimum services that should be provided by the *Structural Engineer of Record* in the design, documentation and submittal for all projects. **It is important to note that this guideline is not intended to establish legal responsibilities, the "standard of care", or define the quality of performance.**

This guideline only attempts to address structural design and submittal of construction documents. There has been no attempt to address studies, consulting services, construction services, or any of a host of other services provided by engineers. However, it is SEAU's opinion that these services are typically required to provide complete construction documents.

APPENDIX A

COMMENTARY & RECOMMENDATIONS ON SUBSTANDARD PRACTICE

A1.0 HOW SUBSTANDARD PRACTICE AFFECTS THE ENGINEERING PROFESSION.

It is common knowledge that substandard structural design practices pose a safety threat to the public. If errors and/or omissions go undetected during the permit review process or during construction, the results may be catastrophic. Tragic failures highlighted in past news have had a detrimental affect on the public's perception of structural engineering as a profession.

Frequently, the structural design on a project may be treated as a line item to be purchased at the lowest cost. In many instances the *Professional Engineer* that performs a reduced or substandard service is awarded the project because of a much lower proposed fee. The typical owner/client has no knowledge of the level of structural engineering service necessary to protect his investment and the safety of the public. His only criteria for selection is fee. This trend creates increasingly difficult circumstances for the engineering firm that provides the necessary level of service. Without any enforcement of minimum standards it is very difficult to convey to the owner/client that "you get what you pay for".

Problems arising from substandard practice often lead to financial loss to the owner and fuel the growing litigious climate, and in turn affect the insurance industry. The cost of professional liability insurance continues to rise due to this trend. The increased cost of doing business usually only affects the engineering firm that provides the necessary level of service. This is because the *Professional Engineer* that performs substandard service rarely carries liability insurance.

A2.0 EXAMPLES OF SUBSTANDARD PRACTICE.

The following examples are provided to better facilitate an understanding of how substandard practice affects the profession and public.

A2.1 **Example:** ***Failure to provide complete Permit Submittal Documents***.

Description:

The engineer submits construction documents to the local building jurisdiction that are incomplete but the documents are accepted and logged in for review. Upon review it is found that there are many *Primary Structural Component*s that have not been designed, shown on the plans nor detailed. In haste to resubmit, the engineer resubmits the documents addressing only a portion of the missing components. The re-submittal is processed. Again comments are made with regard to the items not addressed. Re-issuing of numerous submittals takes place until the structural design has been adequately addressed.

Result:

1. Violation of Professional Conduct, Licensing Act Rule R156-22-601 (1) b.
2. Loss of time in the construction schedule.
3. Added expense to the municipality due to the extra time spent on numerous re-checks and undue stress placed on the building official and plan reviewer to approve the plans and issue a permit.
4. Potential for errors and omissions in the design due to the piecemeal way that the documents were submitted.

Solution:

1. Develop the proper tools to identify and reject incomplete submittals at the time of submittal.
2. Prepare a brief checklist for easy reference.

A2.2 **Example:** ***Sealing and signing Contract Documents for a design that the Professional Engineer does not have the appropriate knowledge, training or expertise.***

Description:

An engineer is currently working as a mechanical design engineer for the aerospace industry. As a moonlighting project, the engineer is retained to provide the structural design on a small commercial project. The architect prepares the plans and sections and the engineer prepares the structural calculations and redlines the plans. The design is submitted for permit review using incorrect snow load and wind load criteria. Seismic design has not even been addressed.

Result:

1. Violation of Professional Conduct, Licensing Act Rule R156-22-601 (4), reference to *NCEES* Model Law 240.15.
2. If no structural plan check review is performed and a permit is issued, the risk of structural failure may exist and the potential for injury or loss of life is increased.
3. If structural plan check is performed, the same delays in construction and the potential for errors will occur as in the previous example.

Solution:

1. Policy should require structural plan reviews on all projects in order to police this type of practice.
2. A complaint should be filed requesting an investigation of the engineer for practicing outside his or her area of expertise. Many times this will at least result in *DOPL* sending a letter of concern to the individual.

A2.3 **Example:** ***Failure of the Professional Engineer to exercise responsible charge in supervision of an employees' work product.***

Description:

A small structural engineering firm is overwhelmed with it's work load. As a result the principal of the firm, the only licensed *Professional Engineer*, allows a project to be submitted without a proper review of the employee's design. The submittal documents were stamped and signed in haste. Due to the employee's lack of experience many errors and omissions exist within the design and drawings.

Result:

1. Violation of Professional Conduct, Licensing Act Rule R156-22-601 (2) & (3).
2. All of the results listed in the previous examples are possible.

Solution:

1. All engineering firms should develop a quality control program as well as provide the proper mentoring of its employees.
2. Policy should require structural plan reviews on all projects in order to police these problems.
3. If this type of practice occurs often with a particular firm, a complaint should be filed requesting an investigation into the individual's practice.

A3.0 RECOMMENDATIONS FOR BUILDING OFFICALS & PLAN REVIEWERS

A3.1 Maintain an open dialogue with the design professional when questions arise in the review of submitted plans.

A3.2 Provide a copy of a checklist to the *Professional Engineer* who may be submitting incomplete documents. Make note of which items in the design or drawings are deficient. A brief checklist can be developed within the department or by a professional organization such as ICC or SEAU.

A3.3 If subjective issues arise during the document review process a request for a second opinion from another *Structural Engineer* may be helpful. Having an independent review can resolve conflicts in a timely manner.

A3.4 The State of Utah's Professional Engineers & Professional Land Surveyors Licensing Act rule defines unprofessional conduct to include:

> (1) submitting an incomplete final plan, specification, report or set of construction plans to: (a) a client, when the licensee represents, or could reasonably expect the client to consider the plan, specification, report or set of construction plans to be complete and final; or
>
> (b) to a building official for the purpose of obtaining a building permit.
>
> (2) failing as a principal to exercise responsible charge;

Building officials and subcontracted plan reviewers have the responsibility of reporting unprofessional conduct to the Department of Professional Licensing.

A4.0 RECOMMENDATIONS FOR FELLOW LICENSEES

A4.1 In the interest of public welfare the engineering profession must police and help enforce the minimum standard of practice that is required and the rules of professional conduct. A first step is to try and work within the system, such as having an open dialogue with the other engineers and addressing problems often encountered when performing peer reviews and plan checks.

A4.2 *NCEES* Model Rules for Professional Conduct require that a licensee, as an obligation to society, provide information and assistance to the *DOPL* when having knowledge of another design professional's possible violation of the rules of professional conduct. In other words, is it considered professional misconduct NOT to report on another design professional who is in violation of the rules of conduct. This would include: repeatedly submitting incomplete or substandard documents, providing services beyond their expertise or being grossly negligent in performing their work.

A4.3 Structural engineers should also alert the local building official when observing a potential problem on a project or with a project under construction, even when an individual is not directly involved with the project.

A5.0 RESOURCES

A5.1 The Department of Professional Licensing is an excellent resource for checking on license status, disciplinary action, and for filing a complaint. Filing a brief complaint on suspect practice can easily be done through *DOPL*'s website, www.*DOPL*.utah.gov.

A5.2 The Utah Professional Engineers and Professional Land Surveyors Licensing Board acts as an advisory committee to assist DOPL. The board is comprised of members from each engineering discipline. Contact SEAU for the individual(s) that represents the structural engineering discipline.

A5.2 The Structural Engineers Association of Utah (SEAU) is another excellent resource for reporting problems and pursuing action. The organization is committed to maintaining public safety and upholding the minimum standard of practice for the profession. Currently SEAU has a "professional practices and ethics review committee" that serves as a facilitator in dealing with substandard practice. To contact SEAU see their website, www.seau.org.

APPENDIX B

"TOP TWELVE" STRUCTURAL REVIEW COMMENTS

Signs of Substandard Practice

1. Engineering calculations submitted using the incorrect code cycle.
2. Engineer has failed to stamp, sign and date drawings and calculations.
3. Lateral design of structure has not been addressed or is incomplete.
4. Engineer did not consider all snow loading on the roof; i.e. sliding snow, wind drift, doubled eave loads and impact.
5. Calculations do not address all primary structural elements shown on plans.
6. Primary structural elements are missing on structural plans.
7. Lack of connection and attachment detailing.
8. Structural layout is inconsistent with the architectural drawings.
9. Vertical and lateral load paths are not clearly defined on the structural drawings.
10. Incorrect design, attachment and anchorage of structural elements supporting masonry or concrete.
11. Inconsistent or incorrect use of load combinations in design.
12. Structural drawings, design, or portions thereof, have been stamped by the architect.