Project Specific Peer Review Guidelines

A Professional Odyssey

By D. Matthew Stuart, P.E., S.E., F.ASCE, SECB

As a result of my exposure to project specific peer reviews (PSPRs) over the course of my 33-year professional career, I became aware of the lack of industry guidelines for structural peer reviews. My interest in this subject led to the acquisition of a compilation of available material on peer review guidelines. This in turn led to the presentation of a paper on the topic at the 2006 Structures Congress in St. Louis. Portions of the same paper appeared in the January 2007 issue of STRUCTURE® magazine.

After the 2006 Structures Congress, Jim Rossberg of SEI approached me about chairing a Standards Committee for the development of a peer review guideline. I subsequently submitted a formal proposal to the SEI Codes and Standards Activities Division Executive Committee. Unfortunately, the proposal was rejected.

I subsequently wrote a follow-up article on peer review guidelines that appeared in the June 2007 issue of STRUCTURE magazine. This article discussed the critical issues that needed to be addressed by any guideline, as well as the benefits that a standard guideline would provide to the structural engineering community and the public as a whole. In addition, the rationale behind the need to concentrate on PSPRs over all other types of peer reviews was also discussed.

In an attempt to find an alternate path for the development of a set of guidelines, I reached out to the Risk Management Division of ASTM to see if that organization would be interested in developing a set of structural PSPR guidelines. Unfortunately, this approach also led to a dead end. At the same time, I was invited by CASE Minnesota to make a presentation on peer reviews at one of the monthly meetings in Minneapolis (April 2008).

At the CASE presentation, Andy Rauch, Chairman of the CASE Guidelines Committee, became aware of my body of work on peer review guidelines. Andy subsequently asked me to participate in the CASE committee with the purpose of working towards the development of a peer review guideline. Unfortunately, at the time I was unable to make a commitment because of a prior obligation to fill an adjunct teaching position at Lehigh University in the fall of 2008.

After my obligation was satisfied at Lehigh, I contacted Andy in 2009 and was asked to submit an outline for the development of a peer review guideline to the Committee. I agreed, and at the same time recommended that he contact Tom DiBlasi with the Structural Engineers Coalition of Connecticut (SEC/CT) about participating, as well, because of Tom's experience with the development of the peer review guidelines associated with the Threshold Review requirements in Connecticut. Tom also agreed to participate and submitted a separate outline of his own.

Developing an outline for the CASE committee gave me a chance to revisit all of the material that I had compiled prior to 2006. As a result, for the first time, I was able to develop what I believed was a comprehensive summary of the critical components required for a PSPR guideline. The entire outline is provided with the online version of this article (**www.STRUCTUREmag.org**). The primary outline sections are also identified in *Figure 1*.

It is my sincere hope that this next step in the process of developing a peer review guideline for the structural engineering community, which has been ongoing for some time – since at least the late 1970s – will result in the publication of standards that can be referenced and used by structural engineers, architects, owners, attorneys and all other stakeholders in our industry.

At the same time, I believe that CASE is the right organization to develop peer review guidelines for the following reasons:

1) The majority of SEI Standards are technical documents, whereas most of the CASE guidelines are geared more toward business practices. This is an important consideration, because even though the material being reviewed in a PSPR is technical in nature, the process itself involves considerable professional business practice acumen.
2) Secondly, the various existing CASE guidelines have been well-accepted, respected and used by the structural engineering community for some time. This track record of success bodes well for the ultimate acceptance and implementation of the proposed structural peer review guidelines.

I. Background
II. Definitions
III. Objectives
IV. Purpose
V. Scope
VI. Qualifications, Liability and Compensation
VII. Procedures
VIII. Check Lists
IX. Reports
X. Resolution of Conflicts of Interest
XI. Certification of Review

Figure 1: Primary Outline Sections.

If you have an interest in this topic and have a desire to participate in the development of the proposed new CASE peer review guidelines, I encourage you to contact Andy Rauch (**arauch@bkbm.com**). If, however, you feel that the development of a structural peer review guideline is not a worthwhile endeavor, then I ask that you consider the following. PSPRs will continue to occur in our industry, whether they are mandated by a governmental agency, dictated by a state law or happen voluntarily at the request of an owner, attorney or other interested party. With this in mind, at the very worst we should consider them as a necessary evil, and recognize that it is in everyone's best interest to agree to a set of acceptable guidelines to help better control the process.▪

*D. Matthew Stuart, P.E., S.E., F.ASCE, SECB (**mstuart@pennoni.com**) currently works as the Structural Division Manager at the Corporate Headquarters of Pennoni Associates, Inc., which is located in Philadelphia, Pennsylvania.*

Project Specific Peer Review Guideline

I. Background

A. **Project Peer Reviews**: For many licensed professional, the practice of structural engineering in the U.S. today includes involvement with peer reviews of projects. Engineers can have their own designs peer reviewed, as well as be involved with a peer review of another engineer's design. These project peer reviews take many forms and can occur at any phase of the project preplanning, design, construction or completion.

B. **Types of Reviews**: Peer reviews are sometimes conducted for internal project purposes only, while others occur as a result of requirements outside of the individual's company. External project peer reviews can include those mandated by state and local codes and statutes. In most states and municipalities, however, there are no legislated or mandatory peer reviews that must be performed for new project designs. Never the less, independent, voluntary peer reviews of structural designs are performed on a regular basis at the request of various municipalities, private owners/developers and other interested parties all across the country.

C. **Extent and Thoroughness**: The extent and thoroughness of peer reviews varies a great deal. Peer reviews can be performed by personnel (both licensed and unlicensed) employed by the local building official or other similar authority, and/or by independent licensed consultants retained by the governing agency, owner/developer or other interested party. Peer reviews conducted by building authorities and other similar governmental agencies are often referred to as a plan review.

D. **Quality of Review**: In most cases, the quality of a peer review is driven by the availability of well established guidelines and/or check lists. In other cases, the quality of the peer review is based on the experience and knowledge of the selected reviewer, whether that person is an in-house employee of a governing body or an independent private consultant.

E. **Need for Uniformity and Control**: Anecdotal experiences of many design professionals indicates that most of the mandatory project reviews are conducted in a professional manner because they involve specific guidelines and/or check lists that assure a thorough and orderly review process. On the other hand, it appears that voluntary reviews and mandatory reviews conducted by unlicensed individuals are very often conducted in a haphazard and unprofessional manner. Therefore, in order to bring some uniformity and control to independent structural project peer reviews conducted in the U.S., the following document has been developed to establish an industry guideline for the structural engineering community.

II. Definitions

All of the following definitions were approved in 2006 by CASE, NCSEA and ASCE/SEI as a part of their involvement with the SEI BPAD EXCOM.

A. Peer Reviews

1. Risk Management Peer Reviews (RMPR)
   a. **Organizational Peer Review** (OPR): A confidential review of general, project process, human resource, financial management, professional and business development programs of a firm by qualified, objective and experienced colleagues.
   b. **Technical Peer Review** (TPR): A review of a number of representative Contract Documents designed and developed by a firm to determine how projects are produced in order to enhance the extent of the OPR.
   c. **Quality Assurance Peer Review** (QAPR): A review of the Contract Documents for a project by a member of the same firm (with a similar background and extent of experience to that of the project engineer) not involved with the original design development of the same project.
2. Pre-Construction Peer Reviews (PCPR)
   a. **Project Specific Peer Review** (PSPR): A review of the Contract Documents of a specific project. Review may be of the complete set of drawings, specifications and calculations or just specific components.
      i. **Independent**: Review conducted at the request of an Owner, Client or other interested party. Review is typically conducted by an independent licensed engineer with a level of experience consistent with the project being reviewed
      ii. **Mandatory**: Review conducted as required by local or State ordinances, rules or laws. Review can be performed by an independent licensed engineer, or a licensed employee of the reviewing authority with a level of experience consistent with the project being reviewed. Plan Reviews conducted as a part of the permitting process for a project in which the Plan Reviewer is required to be a licensed engineer also fall into this category.
   b. **Project Coordination Review** (PCR): Review conducted to confirm appropriate interface and coordination has occurred between the different professional disciplines for a specific project. Although coordination reviews can be performed by any member of the design team, a PCR can also be provided by individuals or firms not involved with the original design development of the same project.
   c. **Constructability Review** (CR): Review conducted as a continuation of the PCR to assess the economics and fit up of a specific project. A CR can also include a Value Engineering effort.
3. Investigative Peer Reviews (IPR)
   a. **Construction Claims Review** (CCR): Review conducted to assess claims made against the design professional concerning change order requests. Review typically conducted at the request of the project Contractor.
   b. **Errors and Omissions Claim Review** (EOCR): Review conducted to evaluate claims made against design professional concerning incomplete or incorrect Contract Documents. Review typically conducted at the request of the Owner.
   c. **Failure Review** (FR): Review of Contract Documents as they relate to construction or in-service failures or collapses.

B. Other

Include definitions of appropriate relevant terms similar to that provided in SEC/CT-301-08 and ASCE 22-97 including the participants: Peer Reviewer, Engineer of Record (EOR), Owner, Client, Stake Holder, etc.

III. Objectives

A. **Primary Objective**: Provide guidelines for referral and reference by structural engineers (and other related stakeholders) involved with the design and construction of buildings (Assembly, Business, Educational, Factory, High-Hazard, Institutional, Mercantile, Residential, Storage and Utility Groups) covered under the Use and Occupancy Classification of the current Building Codes for use with the proper execution of Independent Project Specific Peer Reviews (PSPR).

This intentionally excludes bridge design and construction.

B. The objectives do **not** include the development of Risk Management Peer Review (RMPR) guidelines for Organizational Peer Reviews (OPR), Technical Peer Reviews (TPR) or Quality Assurance Peer Reviews (QAPR).

C. Future guidelines may be developed to address Mandatory Project Specific Peer Reviews (PSPR), Project Coordination Reviews (PCR), Constructability Reviews (CR), and Investigative Peer Reviews (IPR).

IV. Purpose

A. Enhance Public Safety

1. Provide a mechanism for improved public safety by avoiding harm that could result to building occupants and/or by-standers by discovering and assuring the correction of:
   a. Calculation and or design errors common to fast track projects.
   b. Mistakes or blunders made by inexperienced engineers/ designers.
   c. Human error.

B. Establish uniform methods of conducting project specific peer reviews.

C. Prevent adversarial confrontations and disputes between the EOR and the peer reviewer.

D. Prevent situations in which the peer reviewer uses the review as a marketing opportunity to the detriment of the EOR.

V. Scope

Since Voluntary PSPR's can take many forms, including reviews of only a single component or facet of a building or an entire building of any type, it is very important that the CASE guideline not be as restrictive as the Connecticut or Massachusetts threshold review guidelines. In other words, although the CASE guidelines may make recommendations for what should and should not be peer reviewed for a given situation and building type, the guidelines should still include provisions for the review of just about any structural component of a building for any given purpose.

A. Extent of Review

It would be appropriate for the guidelines to recommend the thoroughness of the review for the following items by indicating what percentage of each item should be checked (i.e. 25% of the beam sizes, etc.). In some cases, however, a 100% check of all the building components and/or Contract Documents may be appropriate for a given project.

1. Building Components
   a. Main Frame (including individual horizontal and vertical framing elements, diaphragms and lateral resisting systems).
   b. Foundations (shallow, deep, etc.).
   c. Connections (shear, moment, expansion).
   d. Components and cladding (including site cast tilt-up panels, lintels, etc.).
2. Contract Documents

   It is typically necessary for the Peer Reviewer to have access to the project Geotechnical Report, Site/Civil Drawings, Architectural Drawings and MEP Drawings in order to gain a proper understanding of the Structural CD's. Therefore, although these same documents may not be included in the actual review, they should be listed as a part of the supporting material that needs to be provided to the peer reviewer in order to facilitate a thorough and proper review.
   a. Drawings
   b. Calculations
   c. Specifications
   d. Shop drawings and submittals
3. Documentation and reporting: See Section IX; Reports

B. Timing, Sequence and Frequency

Although it is recommended that a peer review commence at the concept or early stages of the design process, in order to positively influence the decision making process of the EOR from the onset of the project, the peer reviewer should be cautioned not to usurp or supplant the EOR's position as the design engineer of record.

1. Before, during or after the SD, DD, CD or CA Phase.

   It should be recognized that, in many cases, the Owner or other interested party may not request a peer review until well into or in some cases after the design process has been completed. Therefore, the guidelines should account for this variability.
2. Interim as a part of a design/build or fast-track project.
3. For partial permitting (i.e. Foundation Permit or Steel Bid Issue)

C. Exceptions and Exclusions

1. Pre-engineered or proprietary components.
2. As stipulated by the extent/limitations of the work established for each project specific peer review.

VI. Peer Reviewer Qualifications, Liability and Compensation:

A. Qualification of Peer Reviewer

CASE may want to consider creating a certification program for Structural Peer Reviewers similar to that required by the City of Chicago.

1. Background and or years of experience
2. Credentials
3. Avoidance of conflict of interests

   Including referencing of any current or previous peer reviews between the EOR and peer reviewer.
4. Registration

B. Establishment of extent of liability of Peer Reviewer

This section may also need to defer to the local and state regulations.

1. The responsibility and liability for the project structural design should remain fully with the EOR. The peer reviewer should be formally indemnified by the Owner or Client.
2. The peer reviewer should state in the report the limitations of the review and the deferral of the overall project liability to the EOR.

C. Compensation of Peer Reviewer

1. The Owner, Client or interested Stake Holder that requested the peer review should provide compensation to the peer reviewer.
2. The compensation of the peer reviewer should be based on a QBS (Quality Based Selection) process and not a low "bid" process.

3. Partial payment of the peer reviewer's fee should occur after submission of any interim or final reports. Final payment of the remaining fee should occur after the resolution of any outstanding review comment conflicts, and after the peer reviewer has issued the final "sign-off" letter.

VII. Procedure

A. Owner, Client or interested Stake Holder recognizes need for a project specific peer review.

B. Owner, Client or interested Stake Holder refers to CASE Project Specific Peer Review Guideline to develop appropriate scope of review in the context of the project specific concerns.

C. Owner, Client or interested Stake Holder issues formal RFP.

It may be appropriate for this section of the guidelines to reference CASE document #5 (An Agreement for Structural Peer Review Services) that defines the Summary of Services.

It is not always necessary to issue a RFP for a peer review, as the Owner and or Client may choose a peer reviewer based on a previous or existing relationship. However, the selected peer reviewer should still provide confirmation that his or her qualifications are appropriate for the specific project under review.

1. The RFP should include the criteria for the basis of the review (i.e. Code, project specific BOD, etc.), and the procedures required for back checking of any document revisions required by the EOR in response to the peer reviewer's report/recommendations.
2. The RFP should establish the limitations of the peer reviewer's liability and method of compensation.

D. Peer reviewer selected based on qualifications recommended by CASE Project Specific Peer Review Guideline.

E. EOR submits copies of all specified documents that are to be reviewed and any relevant supporting information to the peer reviewer.

It may be appropriate to require a face-to-face meeting between the EOR and peer reviewer under the auspices of the Owner/Client in order to foster a spirit of cooperation between both parties from the get-go.

F. Peer reviewer exams documents using available relevant check lists in the context of locally accepted structural engineering standards of care.

The peer reviewer should be cautioned to avoid the tendency to comment on a particular facet of the EOR's design simply because the solution proposed by the EOR is different from how the peer reviewer might have solved the same problem had he been the EOR, as long as the design solution proposed by the EOR is practical, constructible and satisfies the project design requirements (i.e. Code, BOD, etc.).

G. Peer reviewer issues formal RFI's and EOR responds in writing as required.

By this stage of the process open, two-way lines of communication should be well established between the peer reviewer and the EOR, with the Owner and or Client copied on all correspondence and telephone log records. Restricting the lines of communication between the peer reviewer and the EOR by requiring that all contact only occur through the Owner or Client should be avoided.

In addition, it should be noted that in some States (Pennsylvania for example) it is a violation of the Professional Engineering Rules and Regulations for the peer reviewer to work for the same Owner/Client as the EOR, without the knowledge of the EOR.

H. Interim or final report is issued to both Owner/Client and EOR.

I. Conflicts and or disputes are resolved.

J. Peer reviewer provides final "sign-off" letter.

VIII. Check Lists

Rather than developing a new standalone check list, it is recommended that CASE refer to the latest edition of existing available peer and plan review check lists, such as; A Guideline Addressing Coordination and Completeness of Structural Construction Documents (CASE), Checklist for the Quality Assurance of Calculations, Design and Drawing Production (66th Annual SEAOC Convention), Guideline for Professional Structural Concept Review Checklist (APEGBC), Supplemental Structural Correction Sheets (City of Los Angeles DBS), and the Building Code Compliance Structural Review Checklist (Gwinnet County Georgia Department of Planning and Development).

Any relevant checklist should also include a review of computer program input and output. It is also recommended that, if the peer reviewer has no experience with the software or computer programs used by the EOR, the peer reviewer should take the time to independently check the results of the EOR's software solutions via either manual calculations or similar software in use by the peer reviewer. User manuals for programs that have been developed internally by the EOR (i.e. spreadsheet programs) should be provided to the peer reviewer.

IX. Reports

It may be appropriate for this section of the guidelines to reference the National Practice Guidelines for the Preparation of Structural Engineering Reports (CASE 962-A).

A. Content: Written report covering all aspects of the peer review, including conclusions and recommendations.

B. Format
1. Scope, extent and or limitations of review.
2. Status of the project documents at each stage of the review.
3. Description/discussion of analysis/review
4. Conclusions
5. Recommendations

C. Frequency: Interim or at the end of the review process.

D. Written responses from the EOR, including corrective actions to be taken, should be formally submitted to the peer reviewer and included as a part of the final report.

E. See Section VII; Procedure; paragraph J; for final "sign-off" letter.

X. Resolution of Conflicts and Disputes

In addition to the conflict resolution procedures recommended below, CASE may want to consider creating an Advisory Board, similar to that recommended by the Massachusetts peer review legislation, for the resolution of peer review conflicts.

A. To facilitate the avoidance of conflicts and disputes, both the reviewer and EOR should operate in a spirit of cooperation towards a constructive conclusion that is complimentary to both parties as well as the Client.

B. When honest differences of opinion occur and…
1. …the reviewer's recommendation is considered desirable by both parties but unnecessary to the successful completion of the project, and could result in an extended project schedule or extra construction cost, the Owner should make the final decision concerning the proposed design change.
2. …the EOR is opposed to the reviewer's recommendation, the Owner (or Stake Holder that requested the peer review) can elect to bring in other third party experts to resolve the conflict.

3. …there is a total impasse between all parties, the Owner (or Stake Holder that requested the peer review) can either decide to accept the EOR's design/position or engage a new consultant (someone other than the original peer reviewer).

XI. Certification of Review

Would it be possible to develop a program by which a peer review conducted using the CASE guidelines would be acceptable for use in place of a mandatory state and or local plan and or peer review, or for a peer review required by, for example, the UFC 4-023-03 for progressive collapse analysis of MLOP and HLOP structures subject to Alternate Load Path procedures?