

***WABO/SEAW
Liaison Committee***

Washington Association of
Building Officials &
Structural Engineers Association
of Washington

WHITE PAPER 1-2006

Title: Guideline – Structural Plan Review Philosophy

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Abstract:

This white paper is intended to establish a guideline for a uniform approach to structural plan review of the construction documents submitted for a building permit

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Committee Mission Statement:

- *Improve communications between the public jurisdictions that administer building codes and the engineering design community that prepares construction documents.*
- *Improve consistency and quality of engineering submittals and project reviews.*
- *Build consensus between the engineering design community and building officials with regard to code interpretation and submittal requirements.*

INTRODUCTION:

SEAW and WABO share a common interest in building safety. Both organizations recognize the importance of plan review. However, individual engineers and reviewers may not always agree on what a plan reviewer should cover in his or her review. Although the level of review varies from jurisdiction to jurisdiction, some building departments feel they have a responsibility to verify to a high level of detail that the plans comply with the code. On the other side of the counter, some licensed engineers feel that since they are taking on the liability through their seal and signature, building departments should not review their work at all. The following guideline and commentary is intended to lay out a common approach by establishing a suggested uniform approach or philosophy that can be used by plan reviewers working for the local jurisdiction.

While the words “reasonable” and “adequate” are used many times throughout this white paper, they are not defined (other than in a dictionary), and deliberately so. The intent is that the commentary gives a general flavor for what the committee felt was “reasonable” or “adequate”.

It should be emphasized that this document is not a rule with the force of law behind it. Nobody is forced to follow it, but a building official may adopt it as an operating policy or philosophy, if he or she so chooses. Anybody wishing to invoke the principles in this white paper should check with the building official for the local jurisdiction. The committee intended this white paper to

give guidance on communication that would lead to a positive outcome for both a design engineer and a plan reviewer, with the hope of fostering increased recognition and mutual respect for the complexities each faces.

GUIDELINE:

The following should be used by reviewers as a guide to how to approach their duties:

- **Purpose of Plan Review** – Plans are reviewed by local jurisdictions in order to verify they are in substantial compliance with the code.
- **Character of Plan Review** – The permit approval process should be a collaborative effort between the design professional and the plan reviewer.
- **Scope of Review** – The focus of the plan reviewer should be on the approval of the construction documents, not on review aids.
- **Level of Review** – It is reasonable for the plan reviewer to require enough information in the construction documents or review aids to conduct a review of the plans.
- **Engineering Judgment** – The plan reviewer should consider the engineer’s judgment, where there is no direct conflict with a code requirement.
- **Plan Reviewer Judgment** – The plan reviewer should exercise judgment in deciding which issues to address in conducting a review.

COMMENTARY:

Purpose of Plan Review

A plan reviewer’s function is to perform a necessary third-party quality assurance effort to verify the designer has done an adequate job in complying with the code. The plan reviewer’s job is to conduct a verification that the plans are in substantial compliance with the code, with the goal of protecting the general health, safety, and welfare of the public.

Character of Plan Review

While the code says the building official is “authorized and directed to enforce” and interpret the provisions of the code, court cases also reinforce that the design professional is ultimately responsible for code compliance through the contract with the owner. Given the respective roles and responsibilities of the designer and the reviewer, the process of ensuring a building conforms to the code should be a collaborative effort between the two.

A part of collaboration is the maintenance of open lines of communication between the design engineer and the reviewer. A reviewer should be aware of different levels of appropriate communication, based on levels of complexity—a phone call could be sufficient to handle easy issues, although written follow up may be needed.

Scope of Review

A plan reviewer's job is to review and approve the construction documents for permit issuance. Supporting documentation such as structural calculations may be submitted as aids to help the reviewer with his or her review, and are not part of the approved construction documents. That is, all information necessary to determine a design complies with the code should be on the plans. While submitting clear and complete review aids may aid in expediting the review, they should only be relied upon to support the information on the plans. For example, while structural calculations may be useful to determine if a design engineer has addressed a particular issue, they are not part of the construction documents and should not be reproduced on the plans. As such, it should not necessarily be the reviewer's primary focus to check the mathematical accuracy of the submitted calculations. However, any details that are included in the calculations and are necessary for construction should be shown on the plans.

(A more complete list of what constitute review aids will be handled in a separate White Paper.)

Level of Review

What constitutes a reasonable plan review will vary, depending on many factors including:

- Project scope (e.g., a single family residence versus a large commercial building)
- Structural complexity (e.g., conventional wood framing versus a 450 foot tall concrete shear wall building)
- Plan clarity and completeness
- Whether the plans are prepared by a registered design professional versus a lay person.

It is recognized that the level of review will vary with each jurisdiction, depending on the resources and time they have available. It is also recognized that the level of review should vary with the complexity of a project—a simple single family residence does not need the same level of review as a large commercial building or a school. Often, building departments receiving permit applications for the more complex structures have engineering expertise on staff, and will tend to conduct more in-depth reviews than those who lack that expertise. However, it is not unreasonable for a reviewer to ask for enough information on the plans or in review aids to conduct a review of the plans.

Engineering Judgment

Many engineers feel that a reviewer should defer to his or her judgment on engineering issues, particularly reviewers without engineering backgrounds. However, reviewing a set of structural plans inherently involves looking at the engineering methods employed by the designer, and those methods reflect the engineer's judgment. The following principles represent a balance between the engineer's and the reviewer's responsibilities:

- In general, a design engineer should be able to articulate his or her rationale as to how a particular engineering issue is addressed. It is appropriate for a reviewer to ask the engineer how he or she arrived at his or her design. However, if the design engineer is able to give a reasonable (i.e., rational and technically justified) explanation, the reviewer

should defer to the engineer's judgment, particularly if the issue under discussion is not directly addressed in the code. Design engineers' responses to issues raised by the plan reviewer should address the concerns expressed and promote a collaborative effort. "Because I say so" or "Because I'm an engineer and you're not" or similar ways of avoiding answers are not reasonable nor collaborative explanations.

- Reviewers should keep in mind there can be several ways of solving design issues, and if reasonably justified as described in the bullet above, deference should be given to a design engineer's unique solution to a problem (e.g., using a method or detail that hasn't been seen before).
- Incorrect application of engineering principles is always an appropriate issue for a reviewer to raise. For instance, if an engineer calculates overturning moments on a multi-story shear wall by summing the shears at the first story and then multiplying by the height of the first story, engineering judgment cannot make the incorrect application of the principles of static equilibrium disappear. This is not compliance with the code. However, in general, if there is a disagreement between the design engineer and the plan reviewer regarding the application of engineering principles, but the design engineer is able to give a reasonable explanation as described in the first bullet above, then deference should be given to the design engineer, since he or she carries the responsibility and liability.
- It is appropriate for a reviewer to ask an engineer to justify a design that directly contradicts a code requirement. For example, a reinforced concrete column that does not have ties or spirals at the code-required spacing should be questioned, since ductile detailing is an important design feature that helps structures to survive earthquakes. Most of the requirements such as this are in the code as a result of tests, studies, debate, compromise, and ultimately, a consensus of experts in the field. If the design engineer wants to provide a design that is different, he/she must be able to provide a rationale that takes the engineering issues into account.

Plan Reviewer Judgment

The plan reviewer must always exercise judgment in conducting a review. Judgment is used to decide what issues are important and need to be addressed on the plans, and whether or not the designer has done a reasonable job (see "Purpose of Plan Review", above). He or she should avoid delving into the minutiae of details and losing sight of the primary life-safety issues. If the plans examiner expresses serious concerns about the design, the engineer should respond with information that addresses the code issues. After the important issues have been addressed, the reviewer should use his or her judgment and consider concluding the review.

In exercising his/her judgment, however, the plan reviewer should refrain from imposing his/her own idea of what constitutes "best practices" on the design engineer. If a design complies with the code, it should be approved, regardless of whether or not the plan reviewer would have designed it differently based on his or her experience.

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