

SLIP-CRITICAL QUESTIONS

In Victor Shneur's article "57 Tips for Reducing Connection Costs" (*Modern Steel Construction*, July 2003), I think the author could have expanded on tip 39. The first bulleted item in tip 39 states, "Fillers in slip-critical joints are not required to be developed." This statement is correct, but it would have been helpful to remind readers that the requirements of the *LRFD Specification* are that any joint designed as slip-critical also must be checked at the factored load level (Section J3.8). After designing a joint as slip-critical, the designer must then deal with the remaining bulleted items in the tip 39 list as he checks the capacity at factored load levels. Whether or not a particular slip-critical joint requires developed fillers is dependent on how it meets the bearing-joint filler requirements at factored load.

It is worthwhile to examine how the AISC *LRFD Specification* handles the issue of fillers. The position that slip-critical connections do not require development of fillers is discussed in the Commentary to J6. The first bulleted item in the Shneur list of tip 39 is supported by the Commentary and the issue of the need for fillers in bearing-type connections is outlined in the body of the *Specification*, Section J6. The introduction to a list of four items in Section J6 (pg. 69) says, "...one of the following requirements shall apply." The first three in the list are explainable. The last item says, "The joint shall be designed as a slip-critical joint." This is inconsistent. Suppose the designer rejects the first three options and chooses the fourth, i.e., he opts to make the joint slip-critical. It becomes a circular argument: having just made the joint slip-critical as the resolution of a difficulty in the bearing type connection, he again has to check it as a bearing-type connection. The *Specification* should be revised to eliminate this absurdity.

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BEHIND THE 1/3 STRESS INCREASE

In response to the article in the October 2003 issue of *Modern Steel Construction* about the 1/3 stress increase, let me begin by saying I don't care one bit whether the historical 1/3 stress increase is retained or not. I believe it served the profession well for over a hundred years, but it is now outdated. However, having said that, I must protest the reason given by Mueller and Carter for eliminating it.

In my opinion (and I researched the subject well back in 1978) the 1/3 stress increase was never intended to account for two environmental loads acting at their maximums simultaneously. The original intent was to compensate for the lack of understanding of wind loads. That is why it has always been applied to the combination of D + W (and the SBC-99 still allows this). It was known back then that wind load was highly localized, gusty and transitory, but for design purposes, wind always was applied as a static load over the entire surface, so the designer was granted a little slack because the existing code design for wind was too conservative.

The real reason that this increase is no longer appropriate is because we have done a better job of measuring wind forces in wind tunnels and codifying them. By using spatial averaging techniques, we now apply wind to various zones on a building instead of just smearing it over a whole side or roof. That is why the 1/3 stress increase is outdated, not because maximum wind and maximum snow rarely occur at the same time. It was never intended to be a load-combination reduction factor.

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LIBERAL ARTS COURSES?

Your September editorial was a classic case of misguided intentions. You correctly identified a serious problem (the poor communication skills of most engineers), while proposing an unworkable solution (the requirement that they take more liberal arts courses). Most engineering schools already require a certain number of "humanities" or "social science" courses. Engineers treat these as unwelcome guests and generally do not take them seriously. They learn little or nothing in these courses. If these requirements were increased, the engineers merely would put in the time, but without a basic change of attitude.

Your comparison of engineers with attorneys and physicians is silly. These people generally have a B.A. degree before entering medical or law school, and have a broader-based educational background. There are two possible correct solutions to this problem, and each will offend many people:

1. Require engineering students to have a B.A. degree prior to starting engineering school. This was my personal route, though very few take this course, and most engineering students would oppose this course.
2. Integrate the writing skills into the engineering course by requiring engineering teachers to be skilled at written communication, and include writing assignments as part of the class work. This would be opposed by most engineering faculty.

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