

June 6, 2008

Mr. Jerry Vulgaris
Director of Business Development
Cal Truss
23665 Cajalco Road
Perris, CA 92570

Subject: Smart Components- Lateral Force Resisting Truss Systems

Dear Mr. Vulgaris:

This letter is intended to provide you with constructive information in response to both 1) the literature which you've provided and 2) the meeting time we've spent in which you and your engineer, Rawn Nelson explained your product to our group of local city officials and code consultants. Yours is an innovative product which will likely share a place in the market with other lateral bracing products. It is different than any other similar product/system in that you are not intending to get an ES listing and it poses technical and administrative challenges unique to your product. It is also unique by being a truss system configured similarly to a proprietary plywood shear wall and portal system.

There was an initial request for approval of the Smart Component lateral bracing system which was disapproved for several reasons. It is not defined in Chapter 12 of ASCE 7-05 which establishes R-values and would require using the default value of an undefined system, while the proposal by your engineer stipulated an R=5.5. Your system does not have an ES Listing which is a common certification for proprietary systems which do not fall into a prescriptive code provision category. Lastly, your proposal was based on a tentative position paper referred to as Acceptance Criteria AC63 by which alternative systems can be found equivalent to plywood shear walls and thus accepted using plywood shear wall design parameters. There is no validation by ICC that AC63 is officially in place as an approved methodology, however, if such endorsement becomes available, it must be reviewed to determine the conditions of use and application to your product.

Both you and your engineer have expressed a strong desire to have the Smart Components system approved for use as a lateral bracing system. The system is composed of different configurations such as long walls, narrow walls and portals; each configured with trusses. They are intended to be designed for each application as opposed to other proprietary systems which have a variety of tested and listed shapes and strengths.

Since your product requires an engineer's design of each unique component and there is no precedent for allowing a truss for lateral bracing with an R-value = 5.5 (2001 CBC) 6.5 (2007 CBC) we suggested that a task group convene to listen, discuss and deliberate as to how such submittals should be viewed and processed. The following individuals have participated in the task group.

Name

Scott Fazekas, AIA
Andrew Costley, Ph.D., P.E.
Henry Huang, P.E.
Kam Chitalia, S.E.
Fred Heidari, P.E.
Ed Chung, S.E.

Affiliation

Scott Fazekas & Associates, Inc
Scott Fazekas & Associates, Inc
City of Tustin
City of Irvine
City of Santa Ana
City of Santa Ana

The following comments are in response to the material and discussion presented in an effort to assist you in developing and marketing your product as well as to clarify why approval based on material submitted to date has not been granted. It is also intended to document concerns raised during the review of your material so as to avoid revisiting the same issues since a considerable amount of time has been invested. Some of the statements may overlap others and have some redundancy.

1. It should be submitted for an ES Listing for at least several configurations from which an engineer could re-design and/or interpolate for custom configurations. This might be a compromise instead of testing as many configurations.
2. Jurisdictions do not have the time to spend the hours needed for product approval such as that involved in an ES Report process. Guidelines by which to plan check are not readily available.
3. The R-value cannot be calculated and it should not be the role of a plan check engineer to make an interpretative decision to allow an R=5.5 decision on a case-by-case basis. An R-value for an undefined system would be acceptable but admittedly is felt to be too conservative.
4. A code change proposal to include an R-value in ASCE7-05, Chapter 12 would establish a prescriptive basis for arriving at design loads. Connection overstrength criteria should accompany such a code change.
5. The ability to have clear guidelines by which to plan check is important if a product is to be approved.
6. Site/field application conditions raises concerns.
 - a. No structural observation of a relatively unique system which relies on precise field conditions is proposed with this product. Site practices could easily and unknowingly have more substantive negative effects on this system.

- b. The margin of safety for damage to chords, braces and connections does not seem as good as with a conventional plywood panel.
 - c. How finish materials are applied presents physical obstacles. Installing intermediate braces to achieve 16" o.c. nailers could change and/or damage the truss elements.
 - d. How will brittle finishes nailed to both chords affect the ability of the braces to work and accept loads?
 - e. How can specific configuration and brand of Smart Component be identified in the field? What about imitations?
7. No agency has yet approved this product except for minimally loaded, single story conditions and no known approvals formally acknowledged the values and basis for approval being requested.
 8. The truss concept with isolated critical joint connections was not believed to have the same durability as the plywood shear wall with spaced edge and field nailing.
 9. If plywood shear walls are to be the accepted basis as equivalency and thus the basis for approval guidelines, the prescriptive aspect ratio of 2:1 should be adhered to or use the load reduction formula when reduced beyond that allowed by the Code. This of course, is the reason many proprietary products with higher aspect ratios see ES Listings.
 10. A single point load at the base due to overturning does not seem to have the load as evenly distributed as the continuous edge of plywood nailed to the sill. Particularly in discontinuous systems, would actual performance be equivalent?
 11. Initial tests performed to determine equivalency to plywood shear walls did not have finish materials which may have an effect on performance.
 12. Measured strength, Δ_m and calculated ASD, Δ_s were used in equivalency analysis.
 13. Provide experimental comparison test of Smart Component with plywood shear wall ie: 4' x 8' to show equivalency.
 14. Show that the calculated Δ corresponds to measured Δ .
 15. Data presented is difficult for a person other than the product engineer to follow. Identify all tabular values and specify what is measured v.s. calculated. Specify number of tests for each respective size/configuration.
 16. Clarify if test sample webs/plates are at 100% of chord capacity v.s. designed (production) sample webs/plates are at engineer's design loads.

17. Obtain "industry verification" of equivalency procedure particularly since plywood shear walls failed during "SC" tests.
18. The hysteresis charts show that the Smart Component wall deflects more than plywood at initial phases of cyclical tests.
19. The Acceptance Criteria AC63 which would allow a system other than a plywood shearwall to be considered equivalent to plywood and thus eligible for an equivalent R-value is only conceptual at this time. AC63 states that equivalency is established when the R-value, Omega and Drift are found to be equivalent. How can compliance ever be determined when R cannot be calculated or derived from a test?
20. The AC 130, which you submitted to show equivalency of the truss shear wall only shows the criteria for equivalency which is to be applied if testing systems which are made of plywood. Section 1.2.1 clearly scopes this Standard as applicable to plywood. This does not show ICC endorsement of using a method of determining equivalency between a truss and a shearwall.

The above listed questions and observations are intended to be informative to those who have not yet been tasked with reviewing submittals using Smart Components as well to be constructive to you in developing your answers to plan review questions in advance. It may also assist with your overall product testing and marketing strategy.

Sincerely,

Scott Fazekas & Associates, Inc



Scott Fazekas, AIA, CBO
President