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November 5, 2004

Mr. Charles Coleman
S.I. Storey Lumber Company
285 Sike Storey Road
Armuchee, GA 30105

Dear Mr. Coleman:

An analysis of the Streetguard timber barrier has been performed to evaluate the barrier's ability to safely contain and redirect 1800-lb cars and 4405-lb pickups traveling at 25 mph and impacting the barrier at 15 deg. Both the geometry and strength of the barrier were evaluated.

Geometry of the Streetguard timber barrier was compared to that of a standard W-beam guardrail and the Streetguard is considered adequate for vehicles impacting at 25 mph and 15 deg.

Data from eight crash tests performed with vehicles ranging in weight from 1970 lbs to 5432 lbs, impacting at 45 and 60 mph, and at impact angles of 15 and 20 deg were used to establish a design transverse force for vehicles impacting at 25 mph and 15 deg. For an 1800-lb car, the force is 2.8 kips and for the 4405-lb pickup, the force is 4.8 kips.

With this load distributed over a length of 4.0 ft, as is done in AASHTO LRFD, and placed at mid-span of a rail element, the maximum applied bending moment is 3.79 ft-k. The bending capacity of the rail element with a dynamic load factor of 1.6 is 3.9 ft-k, which is greater than 3.79 ft-k and the rail strength is OK.

Strength of the 8" x 8" post, based on strength of the soil when the post is embedded 41", was computed for both cohesionless and cohesive soils. The cohesionless soil was assumed to be the standard soil, specified in NCHRP Report 350 for full-scale crash tests of guardrails. For that situation, the soil provides a post strength of 2.2 kips. The maximum applied load on a post is 4.55 kips. This means that if the collision load is applied on the rail element at a post, the post will move in the soil much the same as a post in a W-beam guardrail moves in a crash test. Load from the vehicle is then distributed to adjacent posts upstream and downstream. The three posts would then be able to resist the collision load of 4.55 kips and some energy would be absorbed by the post(s) moving in the soil.

If the posts are embedded in a cohesive soil with a low cohesion (cohesion = 2 psi), the strength of the post would be 4.8 kips, which is greater than the applied load of 4.55 kips and is adequate.

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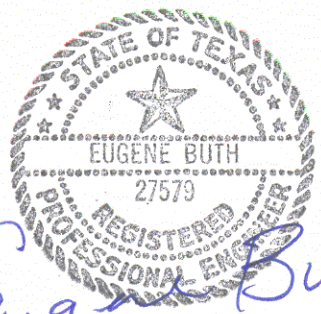
The computed bending moment capacity of the 8" x 8" post with a dynamic load factor of 1.6 is 152 in-kips. Maximum bending applied to the post at 12 in below grade is not more than 150 in-kips. Therefore, the post is adequate in bending.

It is concluded the Streetguard timber guardrail is adequate to contain and redirect a 4405-lb pickup impacting at 25 mph at an impact angle of 15 deg.

Should you have any questions regarding this analysis, please feel free to contact me at 979-845-6159 or by e-mail at g-buth@tamu.edu.

Sincerely,

C. Eugene Buth, P.E.
Senior Research Engineer



16 June 2005