



U.S. Department  
Of Transportation  
**Federal Highway  
Administration**

400 Seventh St., S.W.  
Washington, D.C. 20590

May 15, 1992

Refer to: HNG-14/SS-27

David S. Johnson, P.E.  
Preconstruction Engineer  
Montana Department of Transportation  
2701 Prospect Avenue  
Helena, Montana 59620-9726

Dear Mr. Johnson:

Thank you for your letter of March 6 requesting Federal Highway Administration's (FHWA) acceptance of round wood posts for use where breakaway supports are needed. The question of accepting round sections based upon testing of dimensioned timber posts was discussed informally at both meetings of the Small and Large Sign Support Testing Study oversight representatives. It is our recollection that the test of a 127-mm (5-inch) round wood post (as included in the crash test matrix) was expected before extrapolating dimensioned posts crashworthiness to round wood posts. However, because it seems that there will not be enough pooled-funds to test that system and your letter requested acceptance of posts larger than 127-mm in diameter, we have reconsidered our position.

From what little testing has been done on large wood sign supports, we believe that these posts fail in bending as well as in shear. Therefore, the section modulus of the posts ought to be considered along with the cross-section area. Since the test results for the 140-mm x 190-mm (nominal 6-inch x 8-inch) post were near the upper limit of acceptability, we are unwilling to accept a round post of an equivalent section modulus without testing. However, we are willing to consider acceptable those round wood posts, which have a section modulus no greater than 80 percent of that for the 140-mm x 190-mm rectangular post. The enclosed table shows that the post sizes listed in our letter are acceptable up to the 190-mm (7.5-inch) diameter with a 70-mm (2.75-inch) hole under this criterion. The crashworthiness of larger diameter posts should be proven through testing. Also, the specifications for posts close to the margin of acceptability should contain a limit on the maximum diameter at 100 mm (4 inches) above the groundline.

Sincerely yours,

L.A. Staron, Chief

Federal-Aid and Design Division

Enclosure

Geometric and Roadside Design Acceptance Letter Number SS-27

Rectangular Wood Posts					
Nominal Size	Width (in)	Depth (in)	Hole Diameter (in)	Area (in <sup>2</sup> )	Section Modulus (in <sup>2</sup> )
4 x 4	3.5	3.5	0.0	12.25	7.15
4 x 6	3.5	5.5	1.5	14.00	17.29
6 x 6	5.5	5.5	2.0	19.25	26.40
6 x 8*	5.5	7.5	3.0	24.75	48.26

$$48.26 \times 80\% = 38.61$$

Round Wood Posts				
Diameter (in)	Hole Size** (in)	Area (in <sup>2</sup> )	Section Modulus (in <sup>2</sup> )	Within 80%?
4.0	0.0	12.57	6.28	Yes
4.5	0.0	15.90	8.95	Yes
5.0	0.0	19.63	12.27	Yes
6.0	0.75	23.79	21.14	Yes
6.5	1.25	25.11	26.64	Yes
7.0	2.00	24.68	32.37	Yes
7.5	2.75	24.03	37.32	Yes
8.0	3.25	25.00	44.83	No ***

\*6" x 8" weakened post was successfully tested in weak soil

\*\*Holes are centered at approximately 100 mm (4 inches) and 460 mm (18 inches) above the ground, with their axes horizontal and in a plane parallel to the sign face.

\*\*\*Unacceptable without confirmation testing.

SI conversion table:

$$\begin{aligned} \text{In} &= 25.4 \text{ mm} \\ \text{In} &= 645.16 \text{ mm}^2 \\ \text{In} &= 16\,387.064 \text{ mm}^3 \end{aligned}$$