

TECHNICAL NOTES

FOREST PRODUCTS LABORATORY

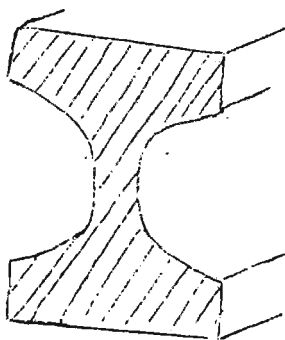
U. S. FOREST SERVICE

MADISON, WISCONSIN

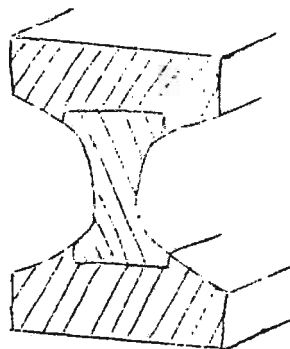
No. 3-1

THREE-PIECE WING BEAMS AS STRONG AS SOLID BEAMS

Bending tests conducted upon DeH-4 I-beams built up of 3 parts (2 flanges and a web and solid beams of the same cross section indicate that the two types have practically the same strength.



1-Piece Cross-Section



3-Piece Cross-Section

Ten test beams of each type were constructed as shown in the sketch above. The specimens were made of closely matched material, the solid beams and the flanges of the 3-piece beams being cut side by side from planks of clear Sitka spruce. Cold casein silicate glue was used in making the built-up beams.

Under 4-point loading, which simulates the actual loading in service, the average maximum loads sustained by the two types were nearly the same. The difference was in favor of the built-up beams, but was too slight to be significant.

The construction of I-beams of 3 pieces as suggested offers certain obvious advantages. It permits the utilization of cross-grained material in the web, and since smaller pieces are required than in the case of the one-piece I-beam, it is probable that from two to four times as many beams could be produced from a given amount of lumber.