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TN 235 DISCUSSION

Tests on tapered and haunched beams

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In § 1 the Authors state that 'the tapered beams . . . were provided at the ends with supports which satisfied the boundary conditions . . . ' and 'The haunched beams . . . support at the deeper end represented the conditions at the column–rafter joint of a pitched roof portal frame.' Were these supports in fact bolted end plated moment connections to columns of the sort commonly used in present practice? If not, would this materially affect the application of the results?

24. Is it correct to infer that the haunched beams series H_A which behaved unsatisfactorily were all two-flanged with the haunch web cut from plate and that the series H_B beams were three-flanged with the haunch formed from a universal beam cutting?

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The test arrangements for the tapered and haunched beams are shown in Figs 3 and 4 respectively. In both cases, the end supports provided lateral and torsional restraint. In the case of the haunched specimens the end connection to the column was of the end plated moment type commonly used in practice. However, the connections were designed to remain in the elastic range throughout the tests so that the post-buckling behaviour of the beams could be observed and recorded without complications due to joint failure or the joint behaving plastically. The props shown in Fig. 4 were used to simplify the column connection at the lower end and as a means of preventing the movement of the top of the column. This ensured that the vertical deflexions of the test specimens were kept within the range of the deflexion gauges and within the travel of the hydraulic jack which applied the force at the shallower end of the specimens. The column section was strong enough to require no web stiffener opposite the compression flange of the test specimens, the position of which varied according to the depth of the haunch at the rafter–column connection.

26. All the haunched specimens tested had only two flanges, as shown in Fig. 1(b), and, with the exception of specimen H_{A1}, had a web stiffener at section J to prevent web buckling as a result of the inward acting component of the compressive force from the sloping flange of the tapered length.

27. The behaviour of a two-flanged haunched beam would be improved if longitudinal beads of weld were deposited on the toes of the compression flange in order to get rid of the residual compressive stresses in these regions which

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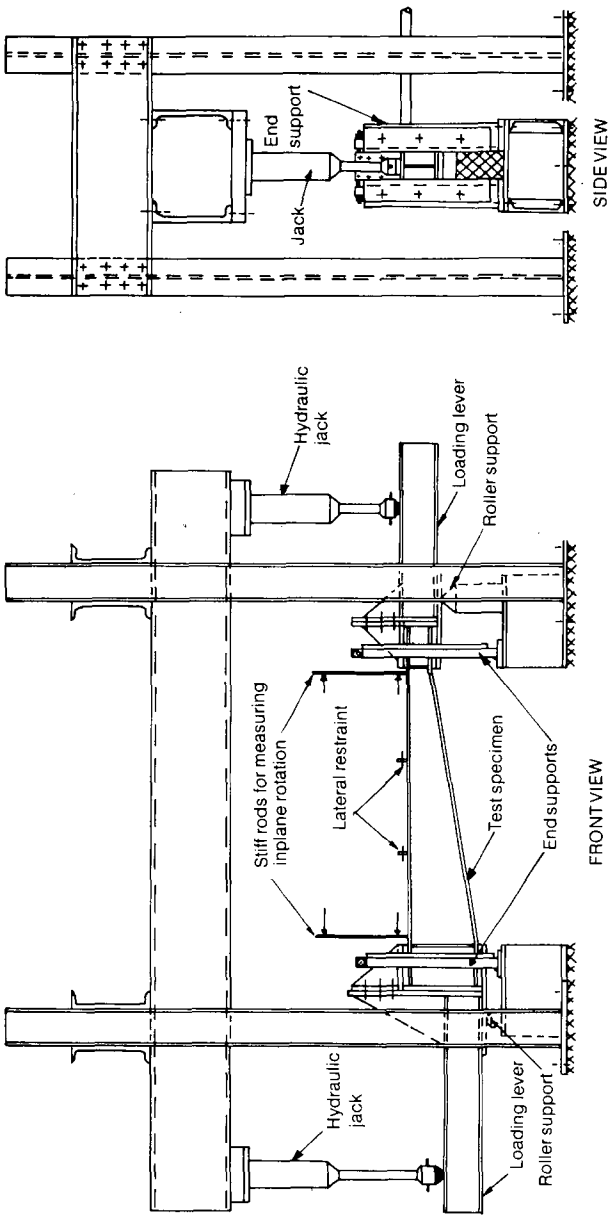

Fig. 3. Test arrangements for tapered beams

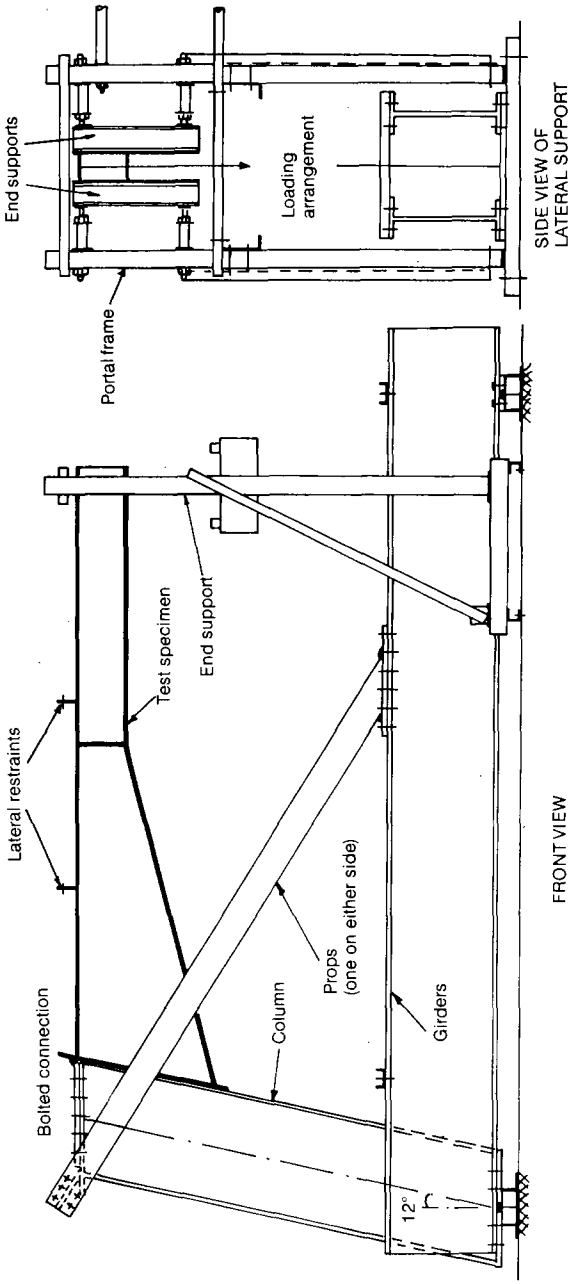

Fig. 4. Test arrangements for haunched beams

result from the weld in the web adjacent to the flange. This procedure introduces residual tensile stresses in the toes of the compression flange, thus enhancing the response of the haunched beam by reducing the risk of local buckling in this region.