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DISCUSSION ON PAPER 8504

The design of transverse stiffeners on webs loaded in shear—an ultimate load approach

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Notation

- b stiffener spacing
- b_e effective width
- d depth of girder
- i radius of gyration of the stiffener cross-section
- t_w web thickness
- λ slenderness

Mr D. W. Smith, Fellow

The Authors put forward only one reason why designers should use a fully plastic method when designing stiffeners, namely economy. Will they please give some examples of the extent of this economy? I suspect that they are talking about pence.

Dr M. Herzog, Consulting Engineer

It might be of interest to compare the rather complicated design formulae in the Paper with a simple proposal[35] of mine published in 1978.

63. It suffices to design the transverse stiffeners plus the collaborating web plate of the panel under consideration ($b_e \leqslant b$ or $b_e \leqslant 200t_w$) as struts with $\lambda = d/i$. The sectional area of the stiffener must not be smaller than $bt_w/20$ or $dt_w/13$.

Professor Dr-Ing Valtinat and Mr Tang

64. A comprehensive study of the load carrying behaviour of plate girders with slender webs and transverse stiffeners must contain full information necessary to enable the engineer to design and calculate the girder and all details such as connections, stiffeners, supports and so on. Paper 8504 has shown that the proportions of these elements very often have been chosen with respect to constructional reasons but without any verification. The tests have made clear that the stiffener dimensions could be very much smaller and are still able to withstand the actions on them. We thought it should be demonstrated that here is a possibility to achieve more economy by reducing some stiffener material. The fully plastic method designing the stiffener has been used because this method was the most suitable one to verify the test results.

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65. Mr Herzog's proposal[35] is very interesting. It deals with double-sided flats and seems to be a phenomenological result from tests. The simple construction rule is confirmed by some tests but we cannot see a mechanical background, which should be given to enable the engineer to design stiffeners with other cross-sections. As Mr Herzog shows in his publication (below Table 1) the intermediate stiffeners (with a cross-sectional area of 12·9 cm^2) of six test girders were designed according to constructional rules but they are much too strong compared with what is necessary. Since in his publication we do not find failed stiffeners, we do not know the really lowest necessary cross-section.

Reference

35. HERZOG M. Action of transverse stiffeners in tension field girders of constructional steel according to tests. *Schweissen und Schneiden*, 1978, **30**, Sept., 365–367 (in German).