

Zeitschrift: IABSE congress report = Rapport du congrès AIPC = IVBH
Kongressbericht

Band: 8 (1968)

Artikel: Free discussion

Autor: Dwight, J.B.

DOI: <https://doi.org/10.5169/seals-8767>

Nutzungsbedingungen

Die ETH-Bibliothek ist die Anbieterin der digitalisierten Zeitschriften auf E-Periodica. Sie besitzt keine Urheberrechte an den Zeitschriften und ist nicht verantwortlich für deren Inhalte. Die Rechte liegen in der Regel bei den Herausgebern beziehungsweise den externen Rechteinhabern. Das Veröffentlichen von Bildern in Print- und Online-Publikationen sowie auf Social Media-Kanälen oder Webseiten ist nur mit vorheriger Genehmigung der Rechteinhaber erlaubt. [Mehr erfahren](#)

Conditions d'utilisation

L'ETH Library est le fournisseur des revues numérisées. Elle ne détient aucun droit d'auteur sur les revues et n'est pas responsable de leur contenu. En règle générale, les droits sont détenus par les éditeurs ou les détenteurs de droits externes. La reproduction d'images dans des publications imprimées ou en ligne ainsi que sur des canaux de médias sociaux ou des sites web n'est autorisée qu'avec l'accord préalable des détenteurs des droits. [En savoir plus](#)

Terms of use

The ETH Library is the provider of the digitised journals. It does not own any copyrights to the journals and is not responsible for their content. The rights usually lie with the publishers or the external rights holders. Publishing images in print and online publications, as well as on social media channels or websites, is only permitted with the prior consent of the rights holders. [Find out more](#)

Download PDF: 14.01.2026

ETH-Bibliothek Zürich, E-Periodica, <https://www.e-periodica.ch>

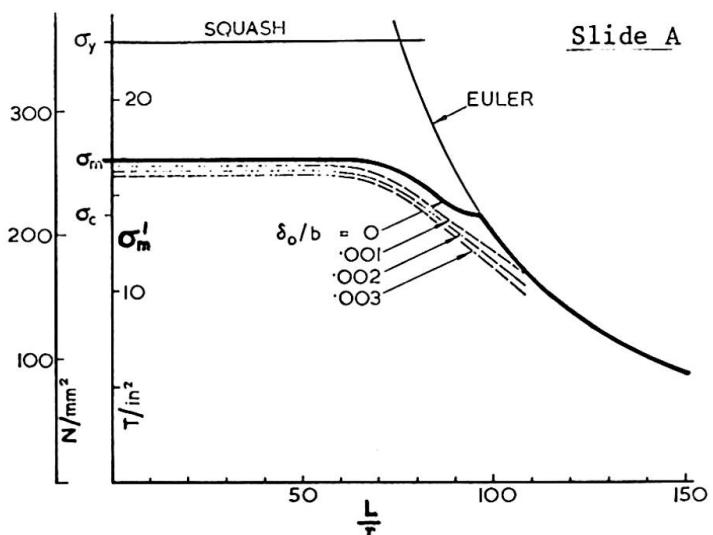
Free Discussion

Discussion libre

Freie Diskussion

J. B. DWIGHT, M.A., C.Eng.,
 Lecturer,
 Department of Engineering,
 University of Cambridge,
 England

Dr. Graves Smith's interesting work on the interaction between local buckling and overall buckling could be of considerable importance in terms of practical design. Slide A shows some theoretical curves which he has given elsewhere and which refer to a square tubular column, having walls with a width to thickness ratio (b/t) of 60, in a steel with a yield stress of about 23 ton/in² (355 N/mm²). They show failure stresses plotted against slenderness ratio, assuming pin-ends. The full curve refers to a perfect member, without imperfections, and is similar to those he shows for aluminium columns in fig. 7; curves of this type have also been obtained by Bijlaard and Fisher. The dashed curves refer to members which contain a slight initial sinusoidal waviness in the component plates. Real-life members always contain geometrical imperfections, and I think we must consider the dashed curves as being the more realistic in practical terms. Instinct would make one want to round off the corner, and I believe that Dr. Graves Smith has done some tests on steel columns, not reported here, that in fact agree with this view.

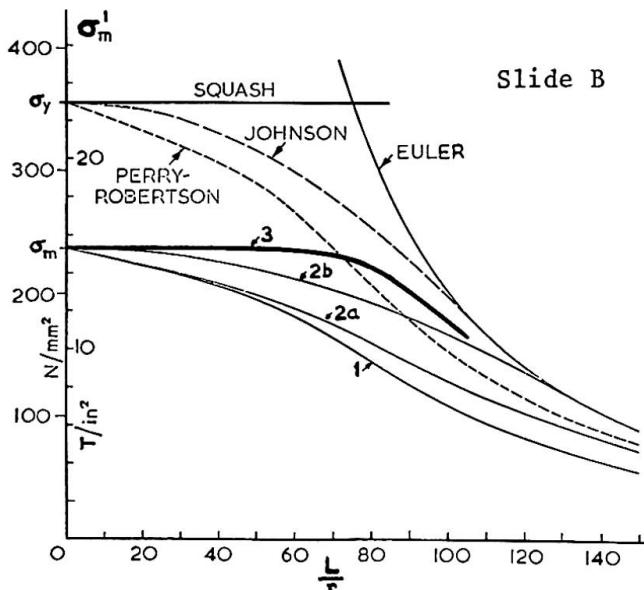


The interesting thing on all the curves is the long flat portion, showing that the full section strength can be developed up to a considerable member length. In slide B, which refers to the same section, these results are compared with two current design philosophies, curve 3 being Graves Smith's theoretical one for a member having a small initial waviness. In heavy steel design it is common to use a simple "effective width" procedure, in which one

takes a fixed effective width for each plate and disregards the rest. Thus for a thin square tube a certain area in the middle of each side is assumed ineffective and is ignored, and the load carrying capacity is based on what is left, regardless of the length of the column. Curve 1 shows the effect of this procedure, and it is seen to be very over-safe when compared with Graves Smith's findings, and to under-estimate the strength by up to 30%.

The light-gauge steel people do it differently. Their procedure is to construct a modified strut-curve, based on a fictitious material with a yield stress equal to the maximum stress (σ_m) for a short column. Curves 2a and 2b show the effect of doing this, curve 2a being a Perry Robertson type of strut-curve (Great Britain), and curve 2b a Johnson parabola (United States). The variation between 2a and 2b is due not to any basic difference in local buckling philosophy, but simply to the different column formulas used in the two countries. It is seen that the British

curve (2a) seems still too safe while the American curve (2b) appears more realistic. (For comparison there are also shown, dashed, the basic column curves used in the two countries).



I finish by saying that, although Graves Smith's general finding is very interesting and should lead to economies, it needs confirming by practical tests on larger specimens, with different section shapes and including residual stresses. Unsymmetrical sections might have a different behaviour.