

BASIC COMPRESSIVE STRENGTH OF STEEL
PLATES FROM TEST DATA

(By Yuhshi FUKUMOTO and Yoshito ITOH)

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Discussion

By Ichizou MIKAMI (Kansai Univ.)

The authors have provided useful information for purposes of estimating the compressive strength of steel plates. The writer would like to make some comments regarding the ultimate strength formulas.

The writer⁵⁶⁾ proposed a formula

$$\sigma_{cr}/\sigma_y=1/\beta^{0.7} \dots\dots\dots (15)$$

where $\beta=(b/t)\sqrt{\sigma_y/E}=\bar{\lambda}/0.526$, and compared it with 105 test results for single plates and square box. This formula coincides with one proposed by Komatsu and Kitada⁵¹⁾ and may be rewritten as follows :

$$\begin{aligned} \sigma_{cr}/\sigma_y &= 0.638/\bar{\lambda}^{0.7} && \text{for } \bar{\lambda} \geq 0.526 \\ \sigma_{cr}/\sigma_y &= 1.0 && \text{for } \bar{\lambda} < 0.526 \end{aligned} \dots\dots\dots (16)$$

Fig. 8 shows the various curves of Eqs. (2), (3), (4) (5), (6), (7), (8), (9), (10), (11), and (16). It is found from this figure that the writer's formula of Eq. (16) lies between the mean curve of Eq. (10) and the mean minus two standard deviation curve of Eq. (11) for the results of plates with residual stresses and is close to the mean minus one standard deviation curve.

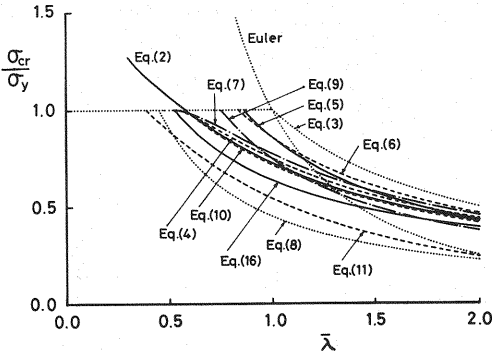


Fig. 8 Various desing curves.

REFERENCES

56) Mikami, I., Dogaki, M. and Yonezawa, H. : A Survey of Tests and Appraisal of Simpler Approach on Stiffened Plates under Compression, Proc. of JSCE, No. 334, pp.181~184, June, 1983(in Japanese).

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The writers wish to thank Mikami for his interesting and valuable discussion of their paper. The discussor's formula, Eq. (16), is shown in Fig. 9 with the test results of 383 plates with residual welding stresses. The writers' proposed formulas, *M* and *M-2 S* functions, are also shown in this figure. As shown in Fig. 9, the discussor's formula falls in between *M*,

Eq. (10), and *M-2 S*, Eq. (11), curves, and Eq. (16) does not represent a lower bound of the test results. It was mentioned in the writers' paper that the plate strength curve proposed by Komatsu and Kitada⁵¹⁾ which coincides with the discussor's one falls in between *M* and *M-2 S* curves.

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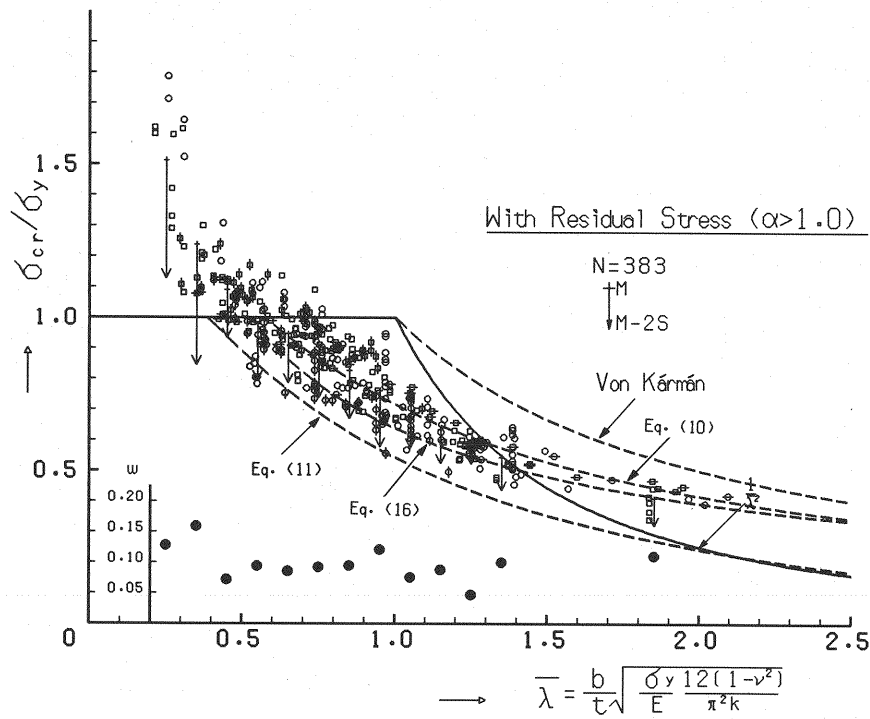


Fig. 9 Test results and Mikami's formula.