EFFECT OF RANDOM STRENGTH PARAMETERS OF FLANGE STEEL ON BENDING RESISTANCE AND DEFLECTIONS OF GIRDERS WITH CORRUGATED WEB

Witold BASIŃSKI *

*Dr. Eng; Faculty of Civil Engineering, The Silesian University of Technology, Akademicka 5, 44-100 Gliwice, Poland
E-mail address: *witold.basinski@polsl.pl*

A b s t r a c t

The study presents results of statistical investigations into random strength parameters of steel used to manufacture flanges of plate girders with corrugated web. In the case of plate girders with corrugated webs, flanges are manufactured from flat sheet steel S235JRG2 or S355J2+N or S275. The guaranteed yield strength R_{emin} is determined on the basis of tests conducted on steel samples. It should be lower than yield strength of flat sheets obtained as the result of testing mechanical properties. This value at the same time should be regarded as the margin of resistance of girders. The material tests were performed on samples randomly collected from 20 girders with corrugated web and flange thickness of 15 and 20 mm, which had been already examined. Coefficients of variation of yield strength $V_{Re}=D(R_e)/E(R_e)$ and partial factors of yield strength γ_m were selected on the basis of the conducted analysis of material tests. The obtained results were related to factors γ_m determined from the tests on thin flat sheets. The impact of yield strength and random cross-sectional area of flanges on bending resistance of girders with corrugated web was shown. Also the effect of the spread of the Young's modulus values and semi-rigid connections on global displacements of tested plate girders with corrugated web was analyzed.

K e y w o r d s : Girders with corrugated web; Normal distribution; Partial safety factor; Bending resistance.