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Buckling resistance of steel plated girders considering M-V interaction with high compression forces – application to cable-stayed bridges

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Summary

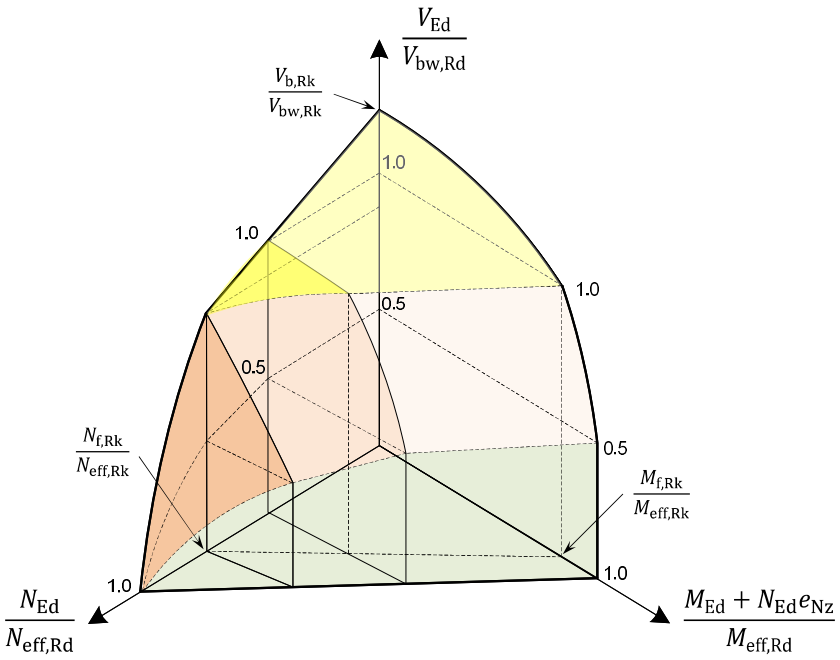
The aim of the research work is to analyse the buckling behaviour of steel plated girders subjected to combined shear, bending moment and high compression forces, and concerns to their application in the field of steel and composite steel-concrete cable-stayed bridges, where they form part of the structural deck.

The intention was to analyse real design options and therefore the studies were focussed on the analysis of longitudinally stiffened girders. Extensive parametric studies were carried out through numerical models, and large-scale experimental testing used to validate and calibrate the results.

The results were then be used to understand the steel panel's behaviour under these interactive loads and therefore depict the influence of the axial compression force on recently proposed M-V interaction curve, develop and harmonise the existing N-M-V curve presented in EN 1993-1-5, and improve design rules for optimised applications in steel cable-stayed bridges.

Keywords

Plate stability, plate buckling, N-M-V interaction, cable-stayed bridges, experimental testing.



N-M-V interaction resistant model proposal for the new prEN 1993-1-5:2021.