## One-page English Summary:

**Project name:** Shear buckling coefficients for longitudinally stiffened haunched steel plate girders.

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This thesis provides a comprehensive examination of the buckling behavior of longitudinally stiffened haunched steel plate girders under shear loading. The work initiates with a detailed literature review, identifying gaps in current knowledge and methodologies and pinpointing the lack of comprehensive studies on the influence of various geometric parameters on the buckling response of such girders.

Then, employing the finite element method (Ansys 2024 R1), it is conducted a model analysis to validate initial findings against experimental data found in the literature, to make sure the FE model is suitable to represent the analysis and be able to carry an extensive parametric study aimed at understanding the influence of various geometric parameters on the buckling behavior of these girders.

The research meticulously explores factors such as the inclination angle of the haunches, the aspect ratio of the panels, the size of the flanges, and the presence of longitudinal stiffeners on the critical buckling load. By systematically varying these parameters, the thesis provides new insights into their effects on shear buckling behavior, contributing significantly to the body of knowledge in the field.

Based on the findings, the optimal position that a single longitudinal stiffener should take is first discussed, and this is also compared with different inclinations and positions of the stiffener. Then, new expressions are then developed to calculate shear buckling coefficients, adapted to longitudinally stiffened haunched steel plate girders. These equations are obtained by using Machine Learning using all the parameters mentioned above. These findings not only enhance the precision and reliability of girder design but also propose modifications to existing design codes and practices.

Furthermore, the thesis underscores the importance of considering these factors in the design and analysis of steel structures, particularly bridges, where the accurate prediction of buckling behavior under shear loads is crucial for safety and performance. The research methodology, combining theoretical analysis with numerical simulation, sets a precedent for future studies in this area.

The thesis concludes with recommendations for further research, suggesting areas where additional investigation could further refine and validate the proposed design expressions.