

ABSTRACT

INELASTIC SHEAR BUCKLING ANALYSIS OF A HEXAGONAL CASTELLATED WEB PLATE

Author

Annashri Jusuf

**No. Mahasiswa : 327171005
(Program Studi Magister Teknik Sipil)**

This thesis analyzes the critical capacity shear force that would be able to be absorbed by the honeycomb castellated profile's web, also to find out the impact of residual stress against its capability to bear the shear force.

The analysis divided into 3 steps, using 11 samples which made out of the actual sizes of castellated honeycomb profile that are often used in the field. The first step was done to check the relevance between the results from the FEM model with the result from AISC a360-16, this analysis was using the not perforated steel plate with the same height and width as the castellated honeycomb web plate. The result is quite satisfying with average difference percentage approx. 3.82%, this indicates that the finite element modeling was quite accurate.

The second step was done to check the relevance of the finite element modeling with the AISC 31 and as the guidance mark for the residual stressed results. In this step samples are already perforated and experienced the reduction of area until approx. 37.66%. From the finite element analysis the shear capacity of the honeycomb web are far lower than the numbers that was given by the AISC 31. If the designer still wanted to use the shear force capacity formula given by the AISC 31, that they need to take the result from the net section calculation and times it with the correction factor starting from 0.28 until 0.46 depends on its dimension and the type of the web buckling.

The third step was done to measure how significant is the influence of residual stress into the web's capability to absorb the shear force. The result shown that all of the samples experienced another reduction of shear force capacity approx. 24.7% in average calculated from the castellated shear force before the residual stress is added.

Residual stresses that considered in this analysis are only caused by the hot rolling process from the fabrication of the parent section. For other residual stresses caused by welding and kerfs are not included yet. This means that the web's shear force capacities are still able to change, for that reason a further and more detailed analysis is needed in the future.

Key word: Castellated honeycomb profile, pure shear, web buckling, residual stress, critical shear load, slenderness ratio