

Axial crush of the tubular structure with various cee-shaped cross-sections

ABSTRACT

Tubular structure with various Cee-shaped cross sections is numerically investigated in order to find the centre of gravity (COG) under axial crush by using program code of ANSYS/LS-DYNA. A subroutine is developed using this code to obtain the COG of deformed shape, during and after crush deformation. The effect of wall thickness of the structure on displacement of COG is also studied. Subsequently, the effect of opening angle of Cee become more prominent as the wall thickness of the structure decreases and as the thickness increases, displacement of the COG in crush direction almost stabilizes for all opening angle of Cee in the range of (10° – 90°). Furthermore, Variation of I_{yy} of structure with thicker wall for different cases of applied weight is approximately identical. The value of mass moment of inertia with respect to X and Z axes through the model COG (I_{zx}) in comparison with I_{yy} can be neglected in the case of axial crush along Y direction.

Keyword: Tubular structures; Cee-shaped cross sections; Wall thickness