

Article Abstract

Title:	Effect of cross section on collapse load in pipe bends subjected to in-plane closing moment
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Abstract:	A comparison between pipe bends with assumed cross sections, namely elliptic and semi oval to include ovality along with wall thinning, was performed to determine the plastic collapse load under in-plane closing bending moment using finite element limit analysis based on an elastic-perfectly plastic material considering geometric nonlinearity. Twice-elastic-slope method was used to obtain collapse load from the moment-rotation curve drawn for each pipe bend model considered. The effect of ovality on collapse load is significant and higher for elliptic cross sections for almost all cases while the thinning effect is negligible for both the cross sections. The study concludes that the use of elliptic cross section is suitable for analyzing pipe bend with ovality. Therefore, a closed-form solution is proposed to determine collapse load of pipe bend based on the finite element results of elliptic cross sections.
Keywords:	Collapse load. Ovality. Pipe bend. Thinning. Twice-elastic-slope.