عنوان مقاله:

A Modified Three-Strut (MTS) Model for Masonry-Infilled Steel Frames with Openings

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خلاصه مقاله:

Nonlinear numerical modeling of masonry-infilled frames is one of the most complicated problems in structural engineering field. This complexity is attributed to the existence of joints as the major source of weakness and material nonlinearities as well as the infill-frame interaction. Although there are many numerical studies on micro-modeling of solid masonry-infilled steel frames, however, few researches have been conducted on infilled frames with openings. This paper develops a two dimensional numerical model using the specialized discrete element software UDEC (۲۰۰۴) for the nonlinear static analysis of masonry-infilled steel frames with openings. This model is employed to investigate the effect of the size of central window openings on the lateral strength and stiffness of infilled steel frames. Furthermore, the efficient three-strut macro-model proposed for pushover analysis of solid infilled frames is modified for those having central window openings. It was found that the modified three-strut (MTS) model can be used confidently to predict both the stiffness and capacity of such frames up to failure. This model can be easily employed in seismic vulnerability analysis of existing steel frames having infill panels with central window openings.

کلمات کلیدی:

Masonry-Infilled Steel Frame, Discrete Element Method, Opening, Nonlinear Static Analysis, Numerical Modeling, Strut