

FURTHER IMPROVEMENT OF AN ENERGY DISSIPATION DEVICE FOR USE IN STEEL FRAMES COMPOSED OF CHEVRON BRACINGS

Mir Saber GHEIBI

*Graduate Student, School of Civil Engineering, University of Tehran, Iran
saber_gheibi@ut.ac.ir*

Shahrokh MAALEK

*Faculty Member, School of Civil Engineering, University of Tehran, Iran
maalek@ut.ac.ir*

Keywords: Passive Damping Device, Half Circular Energy Dissipator, Chevron Bracing

A passive damping device, that consisted of full circle for use in X braced frames was developed previously (Louheghalam, 2002; Yoosefi, 2004; Pabesang, 2006; Maalek et al., 2006; Kamjoo, 2010; and Maalek and Pabesang, 2011). Also a device composed of half a circle was developed for use in chevron and V bracing systems (Sadri-Tabai-Zavareh, 2008) as shown in Figure 1. The latter has been investigated here for further development. Previous works have proved its suitability with a better energy absorption capacity than the so called TADAS energy dissipator with much less fabrication efforts and material consumption. Here, with the aid of detailed finite element analyses, a parametric study has been made in order to achieve the best combination of the diameter of the half circular device and its sectional properties for different span lengths under lateral cyclic loading. A typical hysteretic curve is shown in Figure 2 that demonstrates the desirable energy absorption capability of this device. The use of such systems in actual structures has been discussed and methods of the analysis of such structures have been presented. The design requirements have also been suggested for steel structures composed of braced panels incorporating such devices.

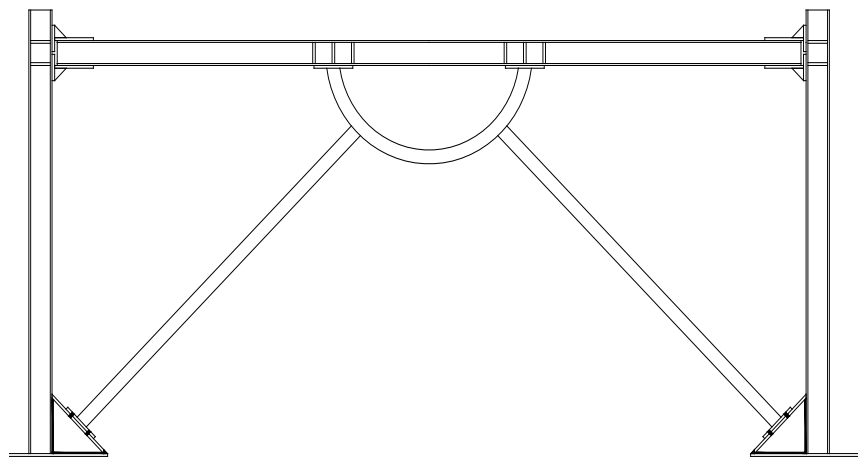


Figure 1. The half circular device system (Sadri-Tabai-Zavareh, 2008)

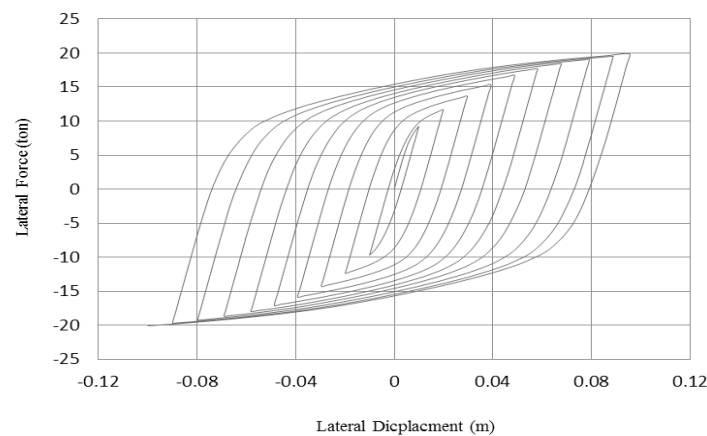


Figure 2. A typical hysteresis curve for a frame composed of a half circular device in terms of lateral force- displacement relationship

REFERENCES

- Kamjoo V (2010) A study on the behaviour of X braced frame composed of circular damping devices, M.Sc. Thesis School of Civil Engineering, College of Engineering, University of Tehran, Tehran, Iran
- Louheghalam A (2002) A numerical investigation of the behaviour of anew passive damping system, M.Sc. Thesis, School of Civil Engineering, College of Engineering, University of Tehran, Tehran, Iran
- Maalek S and Pabesang P (2011) The presentation of a circular passive energy dissipation device for use in steel braced frames, *Proceedings of the Structural Engineering World Congress*, Italy
- Maalek S, Pabesang P and Louheghalam A (2006) The Presentation of new passive damper system and compare it with TADAS, *1st International Congress on Seismic Retrofitting*, Iran
- Pabesang P (2006) Presentation of new passive energy dissipating device for use in braced frames, MSc Thesis, School of Civil Engineering, College of Engineering, University of Tehran, Tehran, Iran
- Sadri-Tabai-Zavareh SMR (2008) A study on the behaviour of new passive damping device for use in X and types of braced frames, M.Sc. Thesis, School of Civil Engineering, College of Engineering, University of Tehran, Tehran, Iran
- Yoosefi SA (2004) Investigation of nonlinear behaviour of the spatially braced frame (SBF), M.Sc. Thesis, School of Civil Engineering, College of Engineering, University of Tehran, Tehran, Iran