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# Evaluating the Parameters Affecting Behavior of the Steel Frames with Infilled Masonry

**Amir Hosein veisi nezhad[1], Amirodin sadrnejad, Iraj Rasoolan**

**[1]Department of Civil Engineering, Behbahan branch, Islamic Azad University, Behbahan, Iran.**

**Department of Civil Engineering, K.N.T university of tehran, Iran.**

**Department of Civil Engineering, shahid chamran university of Ahvaz, Iran.**

Veysinejadamir @ yahoo.com

sadrnejhad@hatmail.com

I.rasoolan @ scu.ac.ir

## ABSTRACT

If we consider infilleds as nonstructural members, in case of a strong earthquake, these infilleds interact with the confining frame which leads to a change in the expected behavior of structure. It is very important to pay more attention to the role of the infilleds and consider them in structure design and analysis. Based on what we said, it seems necessary to have an accurate and simple analytical technique. According to this study, using a finite element software, frame and infilleds are modeled and these items are evaluated: how the infill cracks, kind of connection of beam to column, the effect of column direction and the effect of infilled thickness on the behavior of steel buildings. The results show that as the infilled thickness increases, energy dissipation will increase in the system. Also in different beam to columns connections (rigid, semi-rigid and hinge) infilled cracking is the same; however, the hinge connection has the widest crack compared to other connections.

**Keywords: Infilled, Cracking, Seismic Performance, Finite Elements**

## 1. INTRODUCTION

Infilleds can cause several problems for structures. Some of these problems are: random plastic hinge formation in columns, column shear failure and soft story formation, steel connections torsion and failure. Infill strength is very variable; it depends on the condition of the contact area and how the wall work was done. Frame strength is also not exactly known. Resistance can be estimated better and more accurately than strength; however, it also depends on various qualitative parameters as well as other factors.
There is a lot of uncertainty around the dynamic behavior of infilleds after corner failure. Since masonries are very brittle, the remaining strength after cracking is much lower than the final strength. Therefore, infill strength and its behavior after cracking against earthquake is not clear. Fig.1 shows throwing failure and various cracks (border, diagonal, and corner) in infilleds. Fing.2 shows an example of infill collapse during an earthquake.

**Figure 2. kind-of crack in infilled in bam earthquake in 1382. (Iran)**