



# Monotonic behavior of plate girder with corrugated curve web versus plate girder with flat web

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## Abstract

In this study the application of corrugated steel members as an alternative to flat members are presented. The monotonic behaviors of the corrugated steel members are investigated through numerical simulations. The aim is to ensure that by using the corrugated members we could eliminate the needs of stiffeners and improves the monotonic behavior of the members while undergoing large deformation. A series of finite element analysis and an extensive parametric study on the geometry of the corrugated was carried out to study the behavior of the corrugated members. For finite element analyses program ANSYS 11 has been used to execute linear and non-linear analyses. results and findings of this study demonstrate that Increasing the thickness in simple and corrugated plate increased the ultimate bearing capacity, stiffness, ductility and energy dissipation and the out of plane displacement in corrugated plate is less than the simple plate because the waves increased the stiffness and buckling capacity.

**Keywords:** Plate girders, monotonic behavior, corrugated steel, load-displacement curve, finite element method

## 1- Introduction

Steel structures have been widely utilized in the building constructions due to their higher strength and ductility. Corrugated web girders represent a new structural system emerged in the past two decades. Curve corrugated steel webs, as shown in Fig. 1(a), provide enhanced shear buckling strength and they are used to increase the shear stability of the webs of beams and weight savings due to elimination of the need for transverse stiffeners.

