

The Side Effect of the Perforation Shape towards Behaviour Flexural in Castellated Beam

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Abstract : In the development of the times, there are many materials used to plan a building structure. Steel became one of the most widely used materials in building construction that works as the main structure. Steel Castellated Beam is a type of innovation in the use of steel in building construction. Steel Castellated Beam is a beam that used for long span construction (more than 10 meters). The Castellated Beam is two steel profiles that unified into one to get the appropriate profile height (more than 10 meters). The profile is perforated to minimize the profile's weight, increase the rate, save costs, and have architectural value. The perforations shape in the Castellated Beam can be circular, elliptical, hexagonal, and rectangular. The Castellated beam has a height (h) almost 50% higher than the initial profile thus increasing the axial bending value and the moment of inertia (I_x). In this analysis, there are 3 specimens were used with 12.1 meters span of Castellated Beam as the sample with varied perforation, such us round, hexagon, and octagon. Castellated Beam testing system is done with computer-based applications that named Staad Pro V8i. It is to provide a central load in the middle of the steel beam span. It aims to determine the effect of perforation on bending behavior on the steel Castellated Beam by applying some form of perforations on the steel Castellated Beam with test specimen WF 200.100.5.5.8. From the analysis, results found the behavior of steel Castellated Beam when receiving such central load. From the results of the analysis will be obtained the amount of load, shear, strain, and Δ (deflection). The result of analysis by using Staad Pro V8i shows that with the different form of perforations on the profile of Castellated steel, then we get the different tendency of inertia moment. From the analysis, results obtained the moment of the greatest inertia can increase the stiffness of Castellated steel. By increasing the stiffness of the steel Castellated Beam the deflection will be smaller, so it can withstand the moment and a large strength. The results of the analysis show that the most effective and efficient perforations are the steel beam with a hexagon perforation shape.

Keywords : Castellated Beam, the moment of inertia, stress, deflection, bending test

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