



# THE STATICAL ANALYSIS OF SEMI-RIGID FRAMES BY DIFFERENT CONNECTION TYPES

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## Abstract

In this study, elastic supported frames are analyzed by using a computer program. The connection flexibility is modeled by linear elastic rotational and lateral springs. Having the same geometry and cross-sections, the statical analysis is examined for five different spring combinations. Response characteristics of ten different two-storey frames are compared with reference to rotations and displacements of their joints. The study indicates that rotations and displacements of connections increase as the spring coefficients decrease.

## 1. Introduction

For conventional analysis and design of a steel-framed structure, the actual behavior of beam-to-column connections is simplified to the two idealized extremes of either rigid-joint or pinned joint behavior [1]. This assumption does not represent the actual behavior of a frame. Faults occurred during construction of a structure or later make a behavior of beam-to-column connection seem to be a behavior of semi-rigid connection.

Semi-rigid frames are frames for which the beam-to-column joints are neither pinned nor rigid [2]. Semi-rigid frames have been studied in a few decades [3-8]. Semi-rigid frames in most of these studies were represented only by rotational springs. In fact, frame elements in a structure have a semi-rigid behavior through the axial direction of themselves, indeed. In this study, the behaviors of beam-to-column connection are designed by discussing this lateral behavior. The supplemental effect of lateral springs will be discussed.

The behavior of two-storey frame will be examined by using two different connection models. In the first model, linear elastic rotational springs which represent flexible connection behavior are located at the ends of beams. In the second model, lateral springs are located at the ends of beams for the analysis indeed. The statical analysis is examined on these two semi-rigid models to obtain the rotations and displacements of joints and the moment values of spans.

**Key Words:** Semi-Rigid, Statical Analysis, Steel Frame