Overview of 2008 REU Project 2:

"Measurement of Slip in Slip-Critical Connections with Different Specification Holes"

by

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Outline

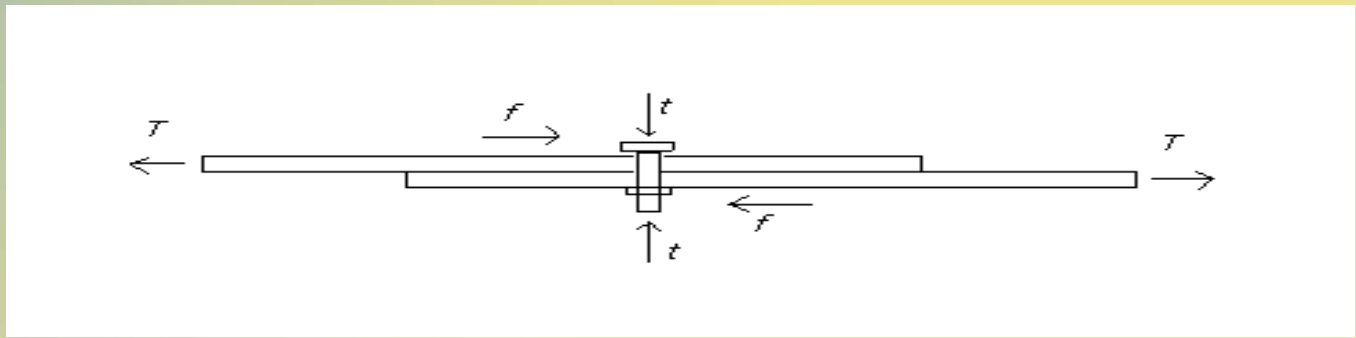
- Objectives
- Introduction and Background
- Proposed Experimental Program
- Project Goals

Objectives

- To fabricate, instrument and test slip-critical connection specimens in order to measure the amount of slip depending on:
  - Faying surface
  - Type of holes
- To augment the experimental data and to provide an expression describing the slip to be expected in connections as a function of:
  - Faying surface
  - Type of holes

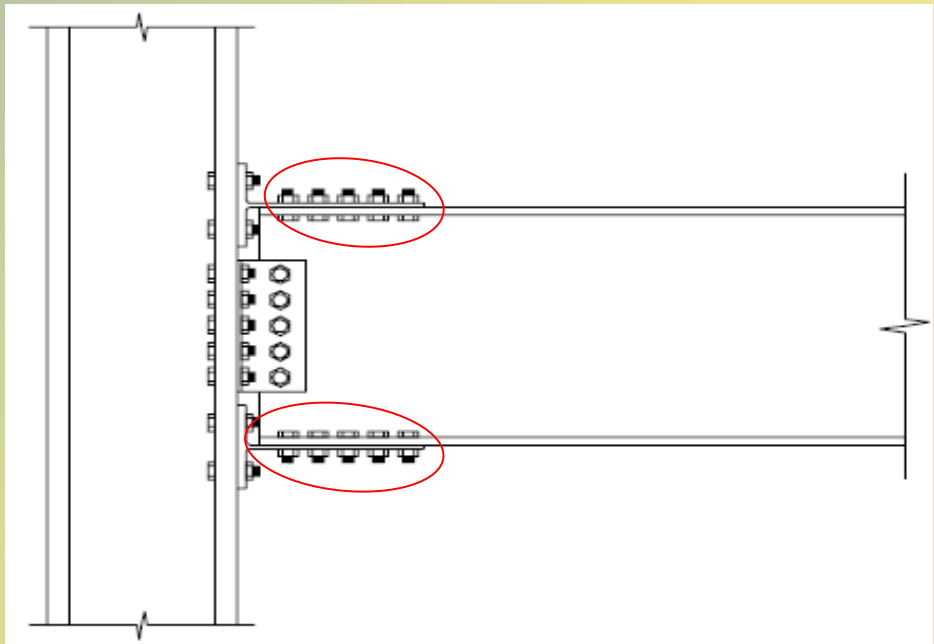
Introduction and Background

- Slip-critical Connections are bolted connections where the design centers around maintaining the static friction within a joint to prevent relative movement between different plies of the connection.



Introduction and Background

- Bolts provide a clamping force (normal force) that acts with the inherent roughness on the faying surface to provide the frictional resistance.



Introduction and Background

- The prediction of the load at which a connection slips is a function of:
  - Bolts in the connection
  - Pretension in the bolts
  - Condition of the faying surfaces in contact
  - Number of plies in the connection
  - Type of holes

Introduction and Background

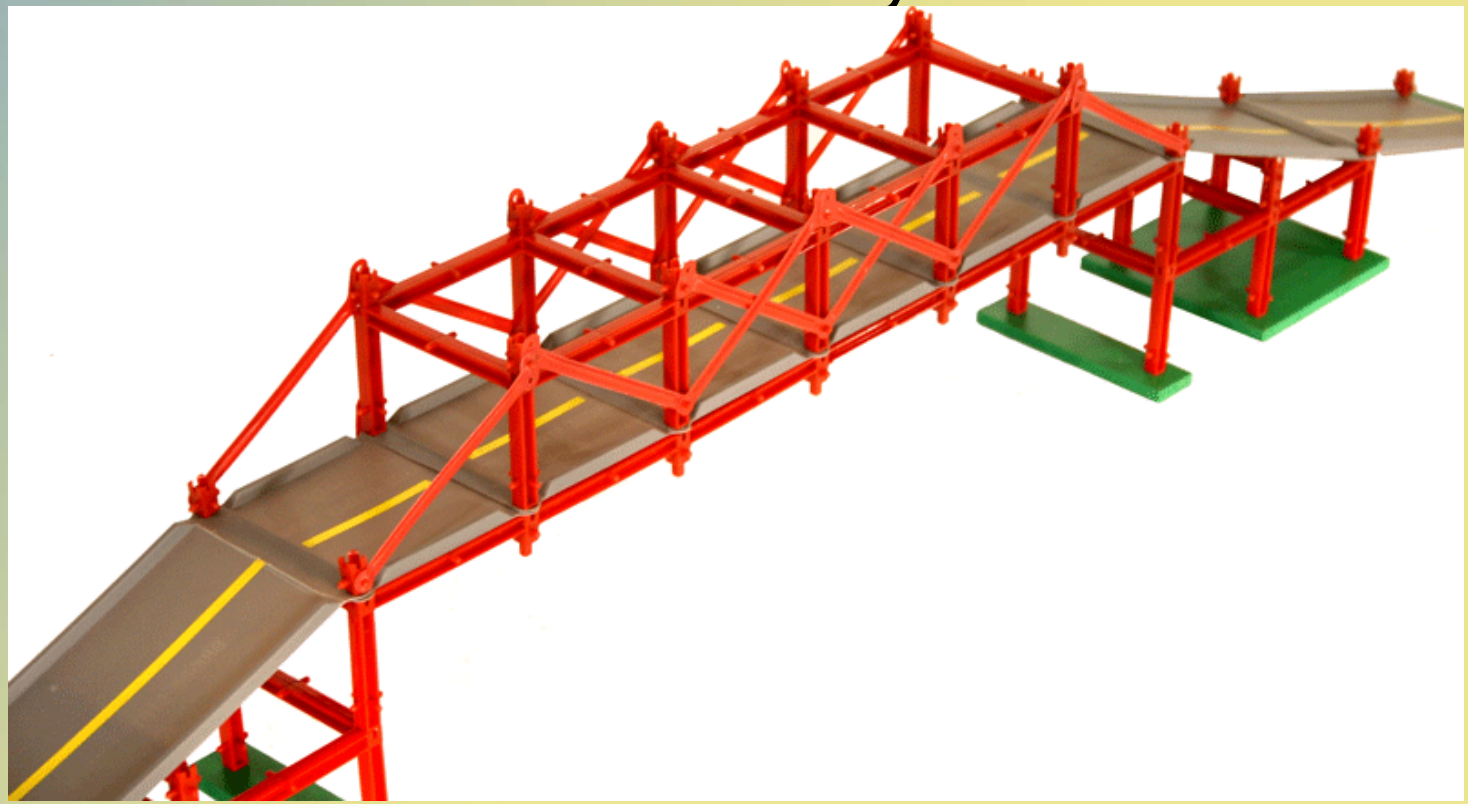
- AISC and RCSC have entertained numerous equations over the years to predict the slip load of connections
- Connection Slippage results in:
  - Small relative displacement
  - Loud noises
  - Secondary order effects that affect the integrity of the structure

Introduction and Background

- High rise structures where connection slippage could lead to excessive drift and P-Delta effect in columns

Introduction and Background

- Long span roof trusses and transfer trusses where connection slippage could lead to secondary order effect

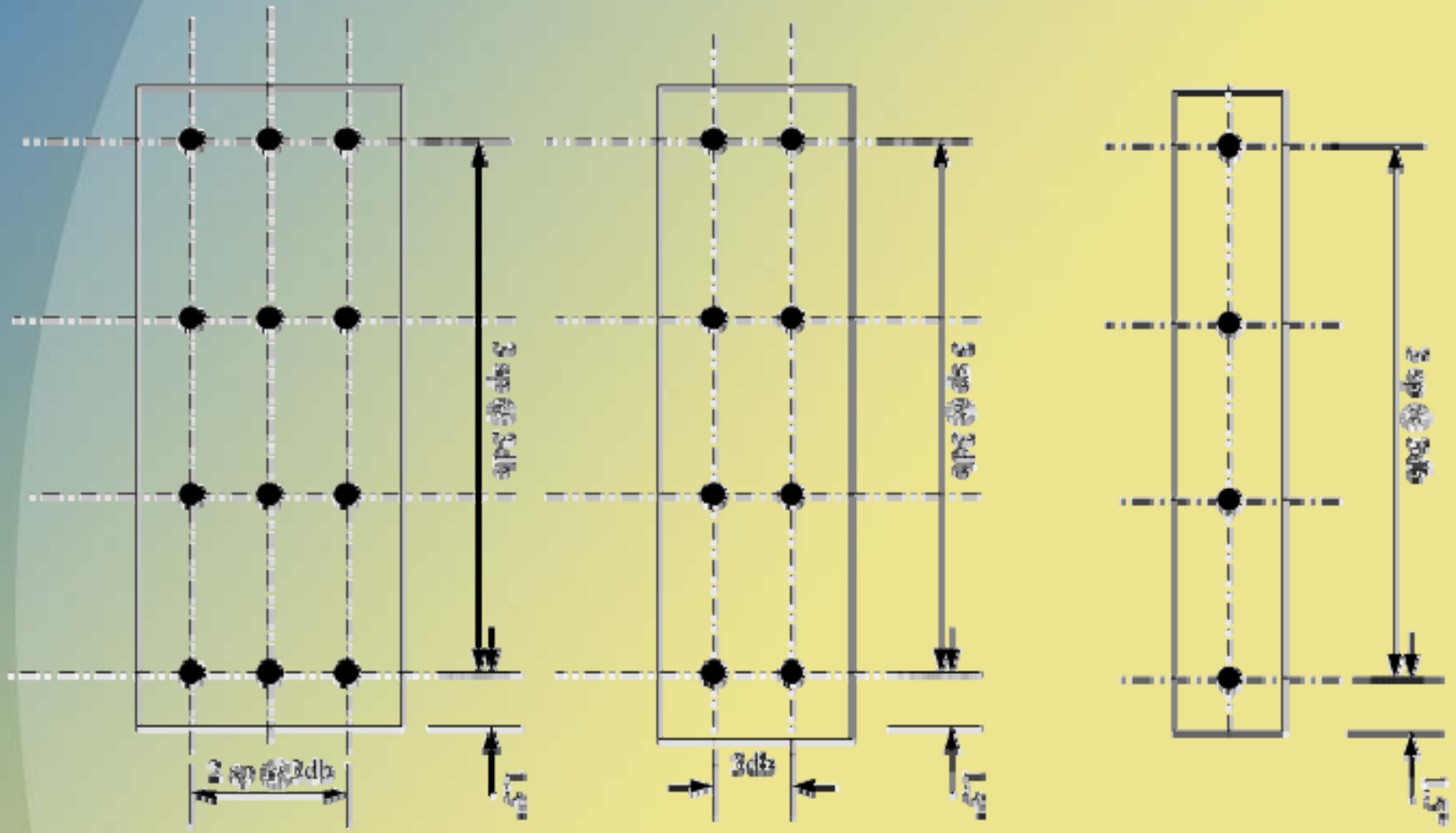


Introduction and Background

- Grondin (2008):
  - Summarized the theoretical basis of determining the slip load.
  - Addressed the issue of the consequences of slip integrity of a structure.

Proposed Experimental Program

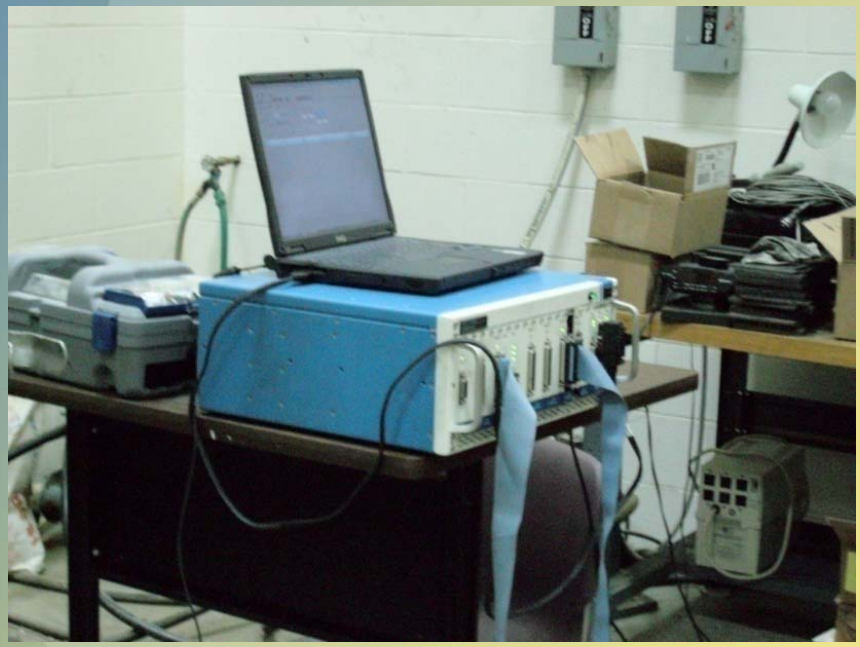
30 to 40 specimens will be fabricated in the high-bay lab



Experimental Program

- Type of Holes to be used:
  - STD
  - OVS
- Bolt size to be used :
  - d_b = ½”, ¾”, 1”

Experimental Program



Project Goals

- To expand Grondin's work with respect to connection slip
- To provide method of predicting displacement associated with the slippage of connections