

CE 4990 - Construction Scheduling

Week 1: Steel Frame Project

Fall 2011

January 13, 2012

Introduction

You are a construction manager for a project to build a steel frame for an office building¹. The building has four stories, 80,000 square feet of built area, weighs approximately 400 tons of structural steel or about 10 pounds per square foot. Fabrication and erection cost \$9 per square foot. A total of 964 pre-fabricated structural steel members will be used in the construction. The standard bay size in the building is 30 feet by 30 feet and there are 3 bays along the width and 7 bays along the length of the building. (See class website for details and pictures.)

Construction Logic: Sequences

Construction is completed in six sequences. Each sequence consists of three steps. First, steel beams are hoisted into place. Then, a bolting crew bolts the beams together. A decking crew then lays down decking and welds it into place. Sequences are placed in pairs, each pair stacked on top of each other. Bolting for a sequence can not begin until hoisting for that sequence is complete. Then, decking for a sequence can not begin until bolting for that sequence is more than half way complete.

In the first two sequences, vertical steel beams are hoisted into place. All other beams will be attached to these beams. The first two sequences also consists of laying beams for the ground floor. The second and third sequence consist of constructing the second and third floor. The fourth and fifth sequence consists of constructing the roof.

As a project manager, some of your major concerns are as follows:

- Ensure safety of all workers. Plan to reduce fall distances at all time staying within OSHA specifications (typically no more than one floor)²
- Maximize equipment utilization.
- Maximize labor utilization.
- Sometimes labor crews may be double booked.
- There is limited material storage space as well

Your job is to manage the construction site to construct the building as quickly as possible in as little time as possible. This means reducing the delay in the project and keeping costs low.

¹This case study has been adapted from: Daccarett, V., and T. Mrozowski. 2005. Aisc digital library: Construction management of steel construction. Available via <http://www.AISC.org> [accessed 01/10/2007].

²*Hint:* In order to reduce the fall distance, a sequence can not be started until the sequence below it is half way done.