Proposed Outline for Metal Building Temporary Bracing Design Guide

Chapter 1 – Introduction

- Necessity for Temporary Bracing
  - Collapse Prevention
  - Construction phase stability requirements - AISC/OSHA/MBMA
  - Safety
- References
  - ASCE 37
  - ASCE 7
  - AISC Design Guide 10
  - AISC Code of Standard Practice
  - MBMA Metal Building Systems Manual
- Discussion of loads during construction
  - Dead, Construction, Live, Wind, Ice, Snow, Thermal
- Discussion of stability of overall structure, partially completed structure, and individual elements
  - Understanding frame and component behavior at different stages of construction
- Bracing elements (permanent and temporary) overview
- Prescriptive Option versus Engineered Option

Chapter 2 – Design Loads and Stability During Construction

- Loads per ASCE 37
  - Dead, self-weight superimposed dead loads
  - Construction
  - Live
  - Wind
  - Snow / Ice
  - Thermal
- Loads per ASCE 7
  - Complementary standard for ASCE 37
- Stability under gravity loads
  - Vertical load path (loads on roof sheeting to purlins to rafters to columns to base plates to foundation to soil)
  - Superimposed dead loads during construction
  - Construction live loads
  - Stability of individual elements of the structure for construction loads (e.g., OSHA anchor rod requirements)
  - Available strength for structural elements before full building system is completed
  - Foundation considerations
- Stability under wind loads

  - Lateral load path (loads on wall panel to girts to column or rafter to bracing to base plate to foundation to soil)
  - Calculation of wind loads on bare frame
  - Effects of wall sheeting / roof sheeting / secondary members
  - Lateral load path for partially constructed building system
  - Available strength for structural elements when full building system has not been installed
  - Foundation considerations
- Additional Considerations
  - Erection Sequencing
  - Ground Assemblies

Chapter 3 – Bracing Overview

- Elements of temporary bracing
  - Wire rope bracing
  - Tension/compression struts and braces, temporary and permanent elements
  - Dead men
  - Temporary foundations
  - Connections for temporary bracing elements

Chapter 4 – Temporary Bracing - Prescriptive Option

- Building Restrictions and Limitations for Prescriptive Option
- Description of temporary bracing requirements for Prescriptive Option.
- Design Requirements
  - Primary member bracing requirements for common sections
  - Secondary member bracing requirements for common sections
  - Vertical bracing requirements

Chapter 5 – Prescriptive Option – Sample Project

- Sample project from MBCEA/MBI
- Determination of prescriptive bracing requirements
- Reference tables/figures from Chapter 4

Chapter 6 – Temporary Bracing - Engineered Option

- Calculation of Loads
- Evaluation of permanent structure for construction loads at various stages of completeness
- Determination of temporary bracing requirements

Chapter 7 – Engineered Option – Sample Project

- Sample project based on input from MBCEA/MBI

- Calculation of Loads
- Analyze selected frames/members/connections for strength at various stages of completeness
- Determination of temporary bracing requirements

Chapter 8 – Erection Plans and Temporary Bracing Documents

- Required content
    - Identify Erection Sequences and Crane Paths
    - Identify locations of temporary bracing
    - Provide temporary bracing details
    - Indicate stop points / stable points
    - Sequence notes
    - General notes
    - Example documents for sample projects