Thoughts on:

Hydraulic Wrenches

DTI’s for HMLTs

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Hydraulic Wrenches for Tightening Anchor Bolts

- Loose anchor nuts have been found on many HMLTs
- Likely not fully tightened during construction
- Loose nuts greatly influence stress distribution
- Iowa field studies increases of 3 times or more
Nut Movement
Slugger Wrenches

- Very difficult (and dangerous) to tighten by hand
  - “Slugger” wrench

Steps

- Place wrench on nut
- Hit with sledge hammer

Find someone dumb enough to hold the wrench while a guy swings a sledge hammer at it
Hydraulic Wrenches for Tightening Anchor Bolts

- Hydraulic wrenches commonly used in other industries to tighten large nuts
- Electric over hydraulic pump
- High torques (>10,000 ft-lbs)
- Easy to use and much safer
- Can be pricy
  - $5,000 to $10,000
Hydraulic Wrench on HMLT
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Hydraulic Wrenches for Tightening Anchor Bolts

- Need to follow defined procedures
  - Developing based on IA and SD research
- If not, nuts will likely loosen
  - Observed in fatigue tests
- Must ensure leveling nuts are properly positioned (i.e., level)
  - Hyd. Wrench **WILL** bend the base plate
  - Could result in cracks at weld toe
- Several states have purchased and have had very good experience
DTIs for HMLTs

- Provide a direct measure of tension
- Commonly used in standard HS bolted joints
- Typical sizes to 1-1/2 inch
- Larger sizes available
  - Prudent to verify/obtain calibration based on specific anchor bolt grade
  - e.g., 55 ksi for 36 ksi etc.
DTIs for HMLTs

- Suggest to install DTI on **bottom** of base plate
  - Can achieve tension **without** having base plate in contact with leveling nut
  - Can bend base plate
  - Potential issues with oversized / slotted holes

- Placing on bottom will ensure top nuts are fully tensioned to base plate...which is the goal
  - i.e., to the leveling nuts
  - Avoids any potential friction issues

- DTI in combination with hydraulic wrench should be considered
  - Incorporate into fatigue tests to ensure no “unknown” issues