Superior Subdivision
Integral part of the CN core route between Winnipeg and Chicago from Hoover (WI) at M. 247.00 to Carson (MN) at M. 479.90

Duluth, Minnesota
About halfway on the CN core route between Winnipeg and Chicago
Steelton Hill in Duluth, MN
Located on the Superior sub between North Steelton at M. 467.50 and Nopeming Jct at M. 472.20
Steelton Hill in Duluth, MN

The track elevation climbs steadily from south to north with grades ranging from 1.50 to 1.90%. The 4.7 mile length of track has 10 curves, two are 5 degrees and one is 4 degrees.

Traffic volume: 62 MGT
Trains per day: 24
+10 switchers and associated movements

North Steelton M. 467.50
Nopeming Jct M. 472.20
Steelton Hill operations

- Due to topography, long trains must stop in Steelton before ascending grade
- Extra engines are attached to rear of train (shovers)
- Once train reaches Nopeming Jct, the shovers are decoupled and must travel back down the hill
- Even with extra engines, long trains can stall
- In event of a stall, all traffic through Steelton Hill is halted until stalled train can reverse down hill back into Steelton
- Steelton siding capacity only 7700 ft
Steelton Hill upgrade project

- Part of a larger Superior subdivision capacity upgrade project.
- Build 4.7 miles of double track to relieve pinch point

**PHASE I**

- NOPEMING JCT 472.2
- 25 MPH TO RAINY SUB

**PHASE II**

- NORTH STEELTON YARD
- MAINLINE ROUTE
- THRU DIVERGING SIDE #16 TURNOUT 25 MPH

**PHASE III**

- U.P. ITASCA YARD
- IITASCA CONNECTION
- RZ SIDING 20 MPH
- PARKLAND SIDING 10 MPH

**NORTH STEELTON**

- 5° CURVE
- 268' LONG

**BRIDGE 468.00**

- 83' LONG

**BRIDGE 467.54**

**BRIDGE 468.33**

- 420' LONG
- WHEEL COUNTER

**ALTERNATE ALIGNMENT**

**BRIDGE 459.18**

- 570' LONG
- WHEEL COUNTER

**BRIDGE 459.58**

- 2440' LONG

**BRIDGE 459.31**

- 320' LONG

**BRIDGE 459.27**

- 320' LONG

**BRIDGE 459.62**

- 550' LONG

**BRIDGE 459.00**

- 590' LONG

**BRIDGE 459.54**

- 490' LONG

**BRIDGE 460.00**

- 390' LONG

**BRIDGE 461.00**

- 390' LONG

**BRIDGE 462.00**

- 390' LONG
Steelton Hill construction

- New track construction 32,261 TF
- Embankment fill 680,611 CY
- Bridges (4) – 816 LF
- Overhead bridges (2)
- Culvert installations (16)
- Rail 136 lbs – 64,522 LF (2,924,997 lbs of steel)
- Ties (concrete) – 16,000
- Ballast - 50,000 TN
- Turn-outs (6)
- New control points (3)
- Budget $56.0M
## 2015 Steelton Hill Workblocks

<table>
<thead>
<tr>
<th>Subdivision</th>
<th>Mile</th>
<th>Activity</th>
<th>WB length</th>
<th>Est. date</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Superior</td>
<td>470.7</td>
<td>Demolition Mission Creek O/H bridge</td>
<td>6 hrs</td>
<td>25-Apr</td>
<td></td>
</tr>
<tr>
<td>Superior</td>
<td>471.8</td>
<td>#20 turnout installation</td>
<td>6 hrs</td>
<td>25-Apr</td>
<td></td>
</tr>
<tr>
<td>Superior</td>
<td>467.0 - 467.8</td>
<td>Major realignment of main track</td>
<td>24 hrs</td>
<td>19-Oct</td>
<td>Siding track from Gary to S. Steelton remains in service</td>
</tr>
<tr>
<td>Superior</td>
<td>Steelton Siding</td>
<td>Move Gary CP to new alignment, re-align siding</td>
<td>12 hrs</td>
<td>26-Oct</td>
<td>Siding track out of service, main track remains in service</td>
</tr>
</tbody>
</table>
Steelton Hill cut-overs 3 & 4

Stage 3 – 24 hrs cut-over existing main to new alignment
Raise track by ~3 ft
Stage 4 – 12 hrs cut-over of existing siding to new alignment
Move Gary CP
Environmental Controls

Clearing / Grubbing

Chipping

Removing Topsoil
13 locations for jack & bore

Average of 1 week per location
Over 30 pieces of equipment (dozers, rollers, excavators, back hoes, etc)
Over 50 trucks per day – average cycle time of 2.2 min
Grading

Fighting the mud

Keeping the streets clean

Seeding mats

New grade up to 4 ft higher
Slope failure – 300 ft long, 30 ft high

2 ft high scarp appears overnight
Slope failure analysis
Slope failure – Repair procedure

4 ft benches

4 ft of ballast interlaced with 3 layers of geogrid
Concrete deck on steel piles, 7 spans, 219 ft long
Concrete deck on steel trestles, 11 spans, 359 ft long, double track
2 through plate girder bridges, 1 span each, 120 ft long
Clear for trains

Sheets are 12 ft from track centre

Sheets, walers & bars

Shoring height = 24 ft
110 ft long piles (HP 14x89)

339 CY concrete per abut.

43,160 lbs reinforcement per abut.

43,160 lbs reinforcement per abut.
Clear last train – 6 hr workblock

Girders arrive on railcars

120,000 lbs per girder

Steel deck
Concrete ties w/ Safelok clips

New power switches

Grex ballast dumping train

Ballast regulator
Dec. 8th - 12 hour workblock
Track re-alignment, build 800 ft of new track, put new CP into service

2 tampers, 2 ballast regulators, 3 hi-rail dump trucks, 4 large excavators, 2 speed swings, 2 TFO trucks, 1 boom truck, 3 front-end loaders, 45 trackmen
Oct. 19th - 24 hour workblock
Build new grade, shift 1400 ft of track, put new CP into service

2 tampers, 2 ballast regulators, 8 large excavators, 2 rollers
4 welding trucks, 1 boom truck, 3 front-end loaders, 60 trackmen
Oct. 26th - 12 hour workblock
Build new grade, shift 800 ft of track, put new CP into service

2 tampers, 2 ballast regulators, 5 large excavators, 2 welding trucks, 1 boom truck, 2 front-end loaders, 20 trackmen
- Coordination of personnel and equipment
  - Up to 7 different contractors working in project area
  - Up to 100 people and 30 pieces of equipment
  - Project manager must ensure conflicts are resolved quickly
  - Each unit and group must be kept productive
CHALLENGES OF A LARGE PROJECT
MINNESOTA WEATHER

- Working through the entire winter
  - Equipment freezes up
  - Employees get tired easily, can get sick or have frostbite
  - Few daylight hours means less daily productivity
  - Ice makes surface areas slick and dangerous
  - Material gets buried under snow

- Working through rain
  - Exposed soils turn to mud
  - Equipment can get stuck or slide down slopes
  - Employees get tired easily
  - Heavy rain can mean several days without grading activity, putting schedule in jeopardy
Steelton Hill Double Track
Superior subdivision capacity upgrade project

In collaboration with:

- City of Duluth
- Duluth Economic and Development Authority
- WLSSD
- Veit & Company Inc.
- Lunda Construction Co.
- Kraemer North America
- North Shore Track Services
- Stack Brothers Mechanical Contractors Inc.
- Golder Associates
- Benesch Engineering
- ...plus many more

High definition pictures courtesy of Dave Schauer (railpictures.net)