## CRANES TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Crane Information</td>
<td>2</td>
</tr>
<tr>
<td>Crane Tie-Back Detail</td>
<td>3</td>
</tr>
<tr>
<td>AH0008 – Crane Tie-Back Connection</td>
<td>3</td>
</tr>
<tr>
<td>Top Running Bridge Crane Bracket Details</td>
<td>4</td>
</tr>
<tr>
<td>AH0010 - Runway Beam to Bracket Connection</td>
<td>4</td>
</tr>
<tr>
<td>AH0030 - Runway Beam to Column Bracing (Unbraced Bay)</td>
<td>5</td>
</tr>
<tr>
<td>AH0070 - Runway Beam to Column Bracing (braced Bay)</td>
<td>6</td>
</tr>
<tr>
<td>AH0090 - Runway Beam to Bracket Connection (Double Bracket)</td>
<td>7</td>
</tr>
<tr>
<td>AH0110 - Runway Beam to Column Bracing (Double Bracket in Unbraced Bay)</td>
<td>8</td>
</tr>
<tr>
<td>AH0120 - Runway Beam to Column Bracing (Double Bracket in braced Bay)</td>
<td>9</td>
</tr>
<tr>
<td>Top Running Bridge Crane Auxiliary Column Details</td>
<td>10</td>
</tr>
<tr>
<td>AH0150 - Runway Beam to auxiliary column Connection</td>
<td>10</td>
</tr>
<tr>
<td>AH0170 - Auxiliary Column to Frame Column Connection</td>
<td>11</td>
</tr>
<tr>
<td>Top Running Bridge Crane Stepped Column Details</td>
<td>12</td>
</tr>
<tr>
<td>AH0180 - Runway Beam to Stepped Column Connection</td>
<td>12</td>
</tr>
<tr>
<td>AH0200 - Runway Beam to Double Stepped Column Connection</td>
<td>13</td>
</tr>
<tr>
<td>Crane Stop Detail</td>
<td>14</td>
</tr>
<tr>
<td>AH0220 - Crane Stop Detail</td>
<td>14</td>
</tr>
<tr>
<td>AH0225 - Alternate Crane Stop Detail</td>
<td>15</td>
</tr>
<tr>
<td>Hook Bolt And Floating Rail Clamp Details</td>
<td>16</td>
</tr>
<tr>
<td>AH0230 - Rail to Runway Hook Bolt Connection</td>
<td>16</td>
</tr>
<tr>
<td>AH0240 - Rail to Runway Beam Floating Clamp Connection</td>
<td>17</td>
</tr>
<tr>
<td>Monorail/Underhung Cranes</td>
<td>18</td>
</tr>
<tr>
<td>AH0250 - Standard Connection (Crane Steel Not By Nucor)</td>
<td>19</td>
</tr>
<tr>
<td>AH0260 - Optional Connection (Crane Steel Not By Nucor)</td>
<td>20</td>
</tr>
<tr>
<td>AH0255 - Standard Transverse Connection (Crane Steel Not By Nucor)</td>
<td>21</td>
</tr>
<tr>
<td>AH0265 - Optional Transverse Connection (Crane Steel Not By Nucor)</td>
<td>22</td>
</tr>
</tbody>
</table>
GENERAL CRANE INFORMATION

See the MBMA Latest Edition of the Metal Building Systems Manual chapter entitled “Crane Loads” for an extensive discussion of the variables required for properly designing Metal Building systems with cranes.
CRANE TIE-BACK DETAIL

AH0008 – CRANE TIE-BACK CONNECTION

FIELD NOTE:
THE NUMBER OF SHIM PLATES REQUIRED PER CONNECTION TO COLUMN MAY VARY FROM 0 TO 4, (DO NOT EXCEED (4) PLATES) MAXIMUM SHIM SPACE IS 5/8”

SHIM PLATES,
(2) OSP01 PLATES SHOWN FIELD WORK MAY REQUIRE ADDING OR REMOVING SHIM PLATES FOR PROPER CONNECTION TO COLUMN FLANGE.
(4) SHIM PLATES PER COLUMN ARE PROVIDED

CRANE TIE BACK PLATE
(SHOP WELDED)

(4) 3/4” DIA. X 3” A325
BOLTS H0633
NUTS H0320
WASHERS H0220

COLUMN

(2) 3/4” DIA. X 3” A325
BOLTS H0633
NUTS H0320
WASHERS H0220

(2) CLIPS
WK. CBC01

1 BOLTS MUST BE FULLY TIGHTENED.
2 BOLTS TO BE HAND TIGHTENED ONLY. THREADS MUST BE DISTORTED TO PREVENT BOLTS FROM LOOSENING.
3 FIELD SLOTTING OF LATERAL TIE BACK PLATE OR ANGLES IS NOT PERMITTED. FIELD MODIFICATION OF THIS CONNECTION WILL ADVERSELY AFFECT THE STRUCTURAL PERFORMANCE AND INTEGRITY OF THE CRANE RUNWAY SYSTEM.

CRANE TIE BACK CONNECTION
RUNWAY BEAM TO COLUMN CONNECTION

AH0008

LAST REVISION
DATE: 05/22/17
BY: SDF CHK: EGB

DETAIL NAME IF APPLICABLE
AH0008.DWG

4.6.3
TOP RUNNING BRIDGE CRANE BRACKET DETAILS

AH0010 - RUNWAY BEAM TO BRACKET CONNECTION

FACE/COL  08  C/L OF RAIL

Erector Note:
SEE DETAIL AH0008 FOR TIE-BACK CONNECTION

(6)– 3/4” DIA. x 3” A325
BOLTS H0633
NUTS H0320
WASHERS H0220

(2) CLIPS
MK. CBC01

01  LB. ASCE RAIL
02  CAP CHANNEL

CRANE BEAM
w.03

04  " DEEP CRANE BRACKET

(4)– 3/4” DIA. x 3” A325
BOLTS H0633
NUTS H0320
WASHERS H0220

1  BOLTS MUST BE FULLY TIGHTENED.
2  BOLTS TO BE HAND TIGHTENED ONLY.
   THREADS MUST BE DISTORTED TO
   PREVENT BOLTS FROM LOOSENING.
3  FIELD SLOTTING OF LATERAL TIE BACK
   PLATE OR ANGLES IS NOT PERMITTED.
   FIELD MODIFICATION OF THIS CONNECTION
   WILL ADVERSELY AFFECT THE STRUCTURAL
   PERFORMANCE AND INTEGRITY OF THE CRANE
   RUNWAY SYSTEM.

NOTE: SEE RAIL TO RUNWAY BEAM
CONNECTION DETAILS (EITHER HOOK BOLT
OR FLOATING Clamp DETAIL) FOR
ADDITIONAL CONNECTION REQUIREMENTS.

TOP RUNNING BRIDGE CRANE DETAIL
RUNWAY BEAM TO BRACKET CONNECTION

AH0010

LAST REVISION
DATE: __05/22/17__
BY: __SDF_ CHK: __EGB__

DETAIL NAME IF APPLICABLE

AH0010.DWG

4.6.4
AH0030 - RUNWAY BEAM TO COLUMN BRACING (UNBRACED BAY)

TOP RUNNING BRIDGE CRANE DETAIL

AH0030

(2) 3/4" φ x 3" A325 BOLTS H0633/NUTS H0320

COLUMN

ANGLE MK. CBA__

STIFFENER

CRANE BRACKET

RUNWAY BEAM

2"

2"

2"

2"

1/8"
AH0070 - RUNWAY BEAM TO COLUMN BRACING (BRACED BAY)

TOP RUNNING BRIDGE
CRANE DETAIL

RUNWAY BEAM TO COLUMN BRACING (TYPICAL AT BRACED BAY)
AH0090 - RUNWAY BEAM TO BRACKET CONNECTION (DOUBLE BRACKET)

NOTE: SEE RAIL TO RUNWAY BEAM CONNECTION DETAILS (EITHER HOOK BOLT OR FLOATING CLAMP DETAIL) FOR ADDITIONAL CONNECTION REQUIREMENTS.

1. BOLTS MUST BE FULLY TIGHTENED.
2. BOLTS TO BE HAND TIGHTENED ONLY. THREADS MUST BE DISTORTED TO PREVENT BOLTS FROM LOOSENING.
3. FIELD SLOTTING OF LATERAL TIE BACK PLATE OR ANGLES IS NOT PERMITTED. FIELD MODIFICATION OF THIS CONNECTION WILL ADVERSELY AFFECT THE STRUCTURAL PERFORMANCE AND INTEGRITY OF THE CRANE RUNWAY SYSTEM.

TOP RUNNING BRIDGE CRANE DETAIL
RUNWAY BEAM (BY NUCOR) TO BRACKET CONNECTION
AH0120 - RUNWAY BEAM TO COLUMN BRACING (DOUBLE BRACKET IN BRACED BAY)

TOP RUNNING BRIDGE
CRANE DETAIL

RUNWAY BEAM TO COLUMN BRACING (TYPICAL AT BRACED BAY)

(2)–3/4” φ x 3” A325
BOLTS H0633/NUTS H0320
AT EACH ANGLE

CRANE BRACKET

RUNWAY BEAM

COLUMN

STIFFENER

BRACE STRUT

Ĉ OF BRACE STRUT

AND ROD BRACING

ANGLES

MK. CBA

1/8” 1/8”
TOP RUNNING BRIDGE CRANE AUXILIARY COLUMN DETAILS

AH0150 - RUNWAY BEAM TO AUXILIARY COLUMN CONNECTION

NOTE: SEE RAIL TO RUNWAY BEAM CONNECTION DETAILS (EITHER HOOK BOLT OR FLOATING CLAMP DETAIL) FOR ADDITIONAL CONNECTION REQUIREMENTS.

TOP RUNNING BRIDGE CRANE DETAIL
RUNWAY BEAM TO AUXILIARY COLUMN CONNECTION

AH0150.DWG

LAST REVISION
DATE: 05/22/17
BY: SDF CHK: EGB

DETAIL NAME IF APPLICABLE
AH0150.DWG

4.6.10
AH0170 - AUXILIARY COLUMN TO FRAME COLUMN CONNECTION

(2)–3/4" φ x 3" A325
BOLTS H0633
NUTS H0320
WASHERS H0220

1 1/2" 1 1/2"

1 1/4"

1/2" 1/2"

(4)–3/4" φ x 3" A325
BOLTS H0633
NUTS H0320
WASHERS H0220

TOP RUNNING BRIDGE CRANE DETAIL
COLUMN TO AUXILIARY COLUMN ATTACHMENT

AH0170

LAST REVISION
DATE: 02/16/15
BY: AK CHK: EGB

DETAIL NAME IF APPLICABLE
AH0170.DWG

4.6.11
TOP RUNNING BRIDGE CRANE STEPPED COLUMN DETAILS

AH0180 - RUNWAY BEAM TO STEPPED COLUMN CONNECTION

NOTE: SEE RAIL TO RUNWAY BEAM CONNECTION DETAILS (EITHER HOOK BOLT OR FLOATING CLAMP DETAIL) FOR ADDITIONAL CONNECTION REQUIREMENTS.

1 BOLTS MUST BE FULLY TIGHTENED.
2 BOLTS TO BE HAND TIGHTENED ONLY. THREADS MUST BE DISTORTED TO PREVENT THE BOLTS FROM LOOSENING.
3 FIELD SLOTTING OF LATERAL TIE BACK PLATE OR ANGLES IS NOT PERMITTED. FIELD MODIFICATION OF THIS CONNECTION WILL ADVERSELY AFFECT THE STRUCTURAL PERFORMANCE AND INTEGRITY OF THE CRANE RUNWAY SYSTEM.
AH0200 - RUNWAY BEAM TO DOUBLE STEPPED COLUMN CONNECTION

NOTE: SEE RAIL TO RUNWAY BEAM CONNECTION DETAILS (EITHER HOOK BOLT OR FLOATING CLAMP DETAIL) FOR ADDITIONAL CONNECTION REQUIREMENTS.

STEP CRANE COLUMN DETAIL
RUNWAY BEAM TO STEPPED COLUMN CONNECTION

BOLTS MUST BE FULLY TIGHTENED.
BOLTS TO BE HAND TIGHTENED ONLY. THREADS MUST BE DISTORTED TO PREVENT THE BOLTS FROM LOOSENING.
FIELD SLOTTING OF LATERAL TIE BACK PLATE OR ANGLES IS NOT PERMITTED. FIELD MODIFICATION OF THIS CONNECTION WILL ADVERSELY AFFECT THE STRUCTURAL PERFORMANCE AND INTEGRITY OF THE CRANE RUNWAY SYSTEM.
CRANE STOP DETAIL

AH0220 - CRANE STOP DETAIL

FRAME COLUMN BEYOND

CRANE STOP MK. MXC.01

CRANE RAIL

END OF RAIL

4" (STD)

(6) 03 "φ x 04 "
A325 BOLTS H005, NUTS H006

CRANE BEAM

(2) 3/4"φ x 3" A325 BOLTS (MK. H0633), NUTS (MK. H0320), AND WASHERS (MK. H0220)

CRANE BRACKET OR AUXILIARY CRANE COLUMN

END OF BEAM

1/8"

02

CENTERLINE OF COLUMN

1/2"

ENDWALL STEEL LINE

TOP RUNNING CRANE STOP

AH0220
AH0225 - ALTERNATE CRANE STOP DETAIL

FRAME COLUMN BEYOND
CRANE STOP Mk. Mxc 01
CRANE RAIL

END OF RAIL 4" (STD)

1" EDGE OF WELDED CLIP TO EDGE OF CRANE STOP BASE PLATE

CLIPS Mk. CBC01 WITH A TOTAL OF (5) 3/4"φ x 3" A325 BOLTS H0633, NUTS H0320, AND WASHERS H0220

(6) 03 "φ x 04 " A325 BOLTS H005, NUTS H006

CRANE BEAM

(2) 3/4"φ x 3" A325 BOLTS (Mk. H0633), NUTS (Mk. H0320), AND WASHERS (Mk. H0220)

CRANE BRACKET OR AUXILIARY CRANE COLUMN

1/8"

END OF BEAM
CENTERLINE OF COLUMN

ENDWALL STEEL LINE
02
07

TOP RUNNING CRANE STOP

AH0225

AH0225.DWG
HOOK BOLT AND FLOATING RAIL CLAMP DETAILS

AH0230 - RAIL TO RUNWAY HOOK BOLT CONNECTION

RAIL SIZE: 01
HOOK BOLT DIAMETER: 02
JOINT BARS: 03

<table>
<thead>
<tr>
<th>RAIL</th>
<th>HOOK BOLT DIA.</th>
</tr>
</thead>
<tbody>
<tr>
<td>25#–30#</td>
<td>5/8&quot;</td>
</tr>
<tr>
<td>40#–60#</td>
<td>3/4&quot;</td>
</tr>
<tr>
<td>80#–105#</td>
<td>7/8&quot;</td>
</tr>
</tbody>
</table>

RAIL TO RUNWAY BEAM HOOK BOLT CONNECTION
TOP RUNNING BRIDGE CRANE DETAIL
AH0240 - RAIL TO RUNWAY BEAM FLOATING CLAMP CONNECTION

rail size: 01
joint bars: 02
rail clamps: 03
bolt size: 1" Ø A325 w/ (1) lock washer

rail to runway beam floating clamp connection
top running bridge crane detail
MONORAIL/UNDERHUNG CRANES

- Underhung crane beams have rigid specifications with regard to tolerances. Many suppliers of underhung systems require hardened flanges where crane wheels come in contact with the crane beam. NBS’ standard approach to underhung and monorail cranes is to design for the effects on the primary structural system only. Nucor will qualify back a maximum vertical frame deflection due to crane load combination; project engineer of record needs to review this information with crane supplier. As a standard, all beams, rails, connections to main frames, etc. are by others. NBS will design the frame of the building for the vertical and lateral loads and the building longitudinal bracing for the longitudinal loads.

- There are capacity limits for the monorail and underhung cranes. For both crane types, we will not design to a CMAA service class above C. The monorail crane capacity limit is 5 tons and the underhung capacity limit is 10 tons.

- It is important to specify clearly on the sketch of the building(s) included with the order proposal the start and stop point, direction, orientation, and capacity of each monorail or underhung crane in the structure. Please also note that NBS standard connection type designed for is the “truss” type. NBS will provide a web stiffener plate to be welded in place directly over the centerline of the crane connection in the rafter by an AWS certified welder in the field. This stiffener plate is shipped loose for the customer to place and weld because of the uncertainty of the exact end location of the crane attachment, allowing the customer more flexibility during erection to allow for unknowns.
AH0250 - STANDARD CONNECTION (CRANE STEEL NOT BY NUCOR)

NOTE:

- NBS IS PROVIDING FOR CRANE CAPACITY ONLY. ADDITIONAL REINFORCEMENT ON RIGID FRAMES DUE TO CRANE LOADS IS NOT BY NBS. SEE DETAIL ABOVE FOR WEB REINFORCEMENT INFORMATION AT CRANE ATTACHMENT LOCATIONS.

- ALL WELDING MUST BE PERFORMED BY AWS CERTIFIED WELDERS WHO ARE QUALIFIED FOR THE WELDING PROCESSES AND POSITIONS INDICATED. ALL WORK MUST BE COMPLETED AND INSPECTED IN ACCORDANCE WITH THE APPLICABLE AWS SPECIFICATIONS. WELD ELECTRODES USED FOR THE SMAW (OR STICK) WELD PROCESS MUST BE 70 KSI STEEL AND LOW HYDROGEN CONTENT.

UNDERHUNG / MONORAIL
CRANE ATTACHMENT POINT DETAIL

AH0250
AH0260 - OPTIONAL CONNECTION (CRANE STEEL NOT BY NUCOR)

UNDERHUNG / MONORAIL
CRANE ATTACHMENT POINT DETAIL

RUNWAY BEAM, STUB/CRANE BEAM, SWAY BRACING
AND CONNECTIONS (NOT BY NUCOR)
AH0255 - STANDARD TRANSVERSE CONNECTION (CRANE STEEL NOT BY NUCOR)

**NOTE:**

- NBS IS PROVIDING FOR CRANE CAPACITY ONLY. ADDITIONAL REINFORCEMENT ON RIGID FRAMES DUE TO CRANE LOADS IS NOT BY NBS. SEE DETAIL ABOVE FOR WEB REINFORCEMENT INFORMATION AT CRANE ATTACHMENT LOCATIONS.

- ALL WELDING MUST BE PERFORMED BY AWS CERTIFIED WELDERS WHO ARE QUALIFIED FOR THE WELDING PROCESSES AND POSITIONS INDICATED. ALL WORK MUST BE COMPLETED AND INSPECTED IN ACCORDANCE WITH THE APPLICABLE AWS SPECIFICATIONS. WELD ELECTRODES USED FOR THE SMAW (OR STICK) WELD PROCESS MUST BE 70 KSI STEEL AND LOW HYDROGEN CONTENT.

**TRANSVERSE UNDERHUNG CRANE ATTACHMENT POINT DETAIL**

AH0255
AH0265 - OPTIONAL TRANSVERSE CONNECTION (CRANE STEEL NOT BY NUCOR)

**Diagram:**

**Details:**
- Support Beam
- Shop Welded Stiffeners
- Field drill holes in bracket for bolts (not by N.B.S.)
- Shop welded crane bracket (by N.B.S.)
- Sway bracing is required by others (not by N.B.S.)
- Stub column or crane beam (not by N.B.S.)

**Text:**

**Transverse Underhung Crane Attachment Point Detail**

Runway beam, stub/crane beam, sway bracing and connections (not by NUCOR)

**AH0265**