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**Night School**

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**Steel Construction** | From the Mill to Topping Out

**Smarter.  
Stronger.  
Steel.**



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## Session Description

### **18.3 Steel Fabrication** **October 29, 2018**

From the start of a project through final shipment, this session will provide a detailed review for each and every step in the fabrication process. Topics include:

- Detailing
- Project management
- Purchasing of material
- Production: receiving material, cutting, hole making, parts, layout, fit, welding, bolting, cambering, assembling, cleaning and coating
- Quality control: inspection, testing and error resolution
- Shipping



## Learning Objectives

- Describe the main tasks addressed to begin detailing: determining format (modeled or not), advanced bill of materials, detailing standards, erection aids, sequencing and submittals.
- List project management activities that relate to steel fabrication.
- List the steps of steel traceability and describe its importance.
- List the main steps of steel fabrication production.

## Night School 18: Steel Construction

From the Mill to Topping Out

Session 3: Steel Fabrication

October 29, 2018



Christian B Crosby, PE, CWI  
Operations Manager  
Cianbro Fabrication and Coating  
Georgetown, MA



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## Night School 18: Steel Construction

From the Mill to Topping Out

Quick recap of sessions 1 and 2...



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## Night School 18: Steel Fabrication

- **18.1 Introduction to the Steel Construction Process**
- 18.2 The Manufacturing of Structural Steel Shapes
- 18.3 Steel Fabrication: A Virtual, Detailed tour of the Steel Fabrication Process
- 18.4 Connection Design as the Fabricator's Representative
- 18.5 It Doesn't Get Built Without the Erector
- 18.6 Erection Engineering – Stability During Construction
- 18.7 Field Fixes and Solution
- 18.8 Quality Control and Quality Assurance

10



## Night School 18: Steel Fabrication

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11

## Night School 18: Steel Fabrication

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12



## Steel Fabrication

A virtual, detailed tour of the steel fabrication process



13

## Steel Fabrication: From start thru final shipment

- Detailing
- Project Management
- Production
- Shipping
- Quality Control



14

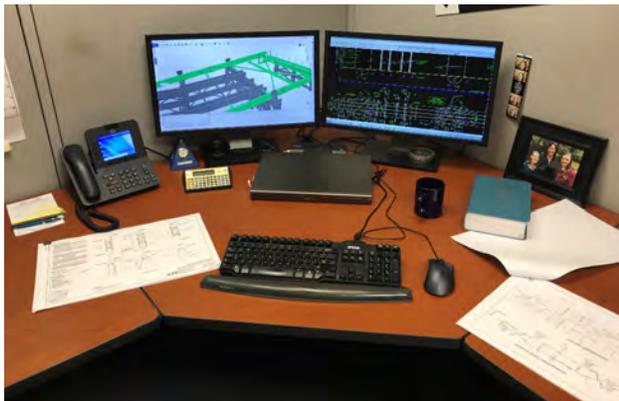


## Steel Fabrication: Detailing – Modeling



17

## Steel Fabrication: Detailing – Project Kick Off

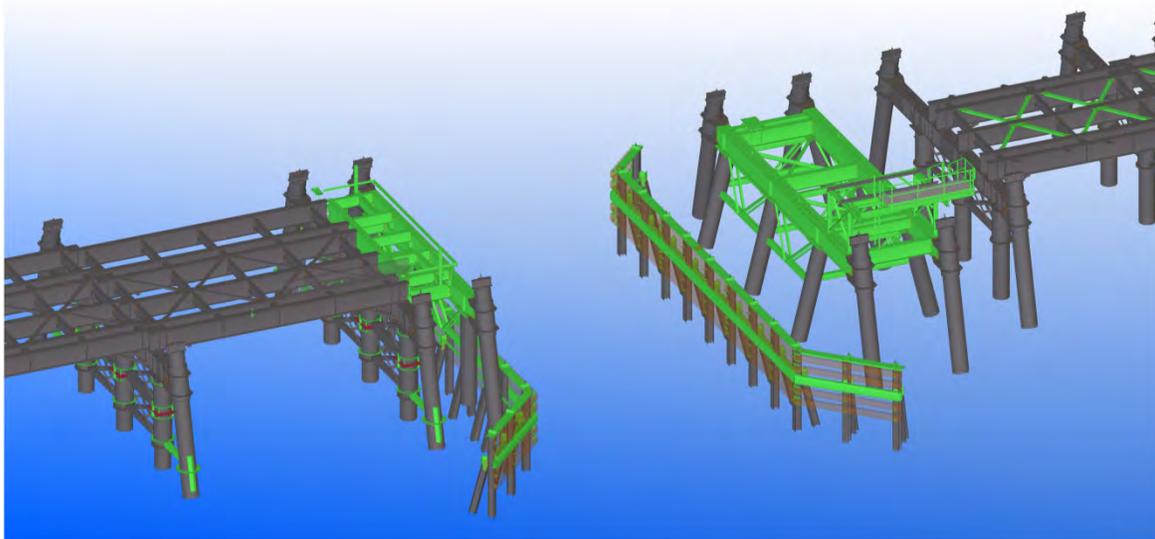


- Review of design DWG
  - Plans, elevations, sections
  - Notes
- Review of specs
- Review of specials



18

## Steel Fabrication: Detailing – Modeling

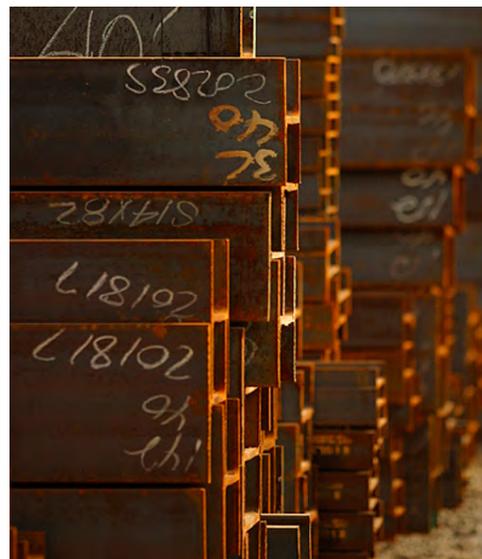


19

## Steel Fabrication: Advanced Bills of Material

Advanced Bills of Mat'l (ABM)

- Size of project
- Modeled or by hand
- Main Mat'l
- Detail Mat'l
- Purchasing discussed in next section



20

# Steel Fabrication: Detailing – ABM's

CIANBRO FABRICATION & COATING  
 3 Farm Lane  
 Georgetown, MA 01833-1843  
 (978) 352-2591

## ADVANCE BILL OF MATERIAL

MATERIAL SPECIFICATION: A709 Gr50

NO. PCS.	SECTION	SHOP LENGTH	FINISH	MARK	DWG. NO.	ORDER LENGTH	MAX. MILLS	REMARKS	WEIGHT	LINE NO.
										1
2	W8x48	2 3	HDG	11000C	1E3	2 3		PIER 0	216	2
2	W8x48	8 8	HDG	11001C	1E3	8 8		PIER 0	832	3
1	W8x48	1 7	HDG	11002C	1E4	1 7		PIER 3	76	4
1	W8x48	1 7	HDG	11003C	1E4	1 7		PIER 3	76	5
1	W8x48	1 8	HDG	11004C	1E4	1 8		PIER 3	80	6
1	W8x48	1 8	HDG	11005C	1E4	1 8		PIER 3	80	7
1	W8x48	3 5	HDG	11006C	1E5	3 5		PIER 6	164	8
1	W8x48	2 3	HDG	11007C	1E5	2 3		PIER 6	108	9



# Steel Fabrication: Preferred Grades

## Found in Steel Manual

- WF: ASTM A992
- HSS: ASTM A500 Gr C
- Channels: ASTM A36
- Angle: ASTM A36
- S & I Shapes: ASTM A36
- PL:
  - ASTM A36
  - ASTM A572 GR 50
- Bolts: see table 2-6



## Steel Fabrication: Preferred Grades

**Table 2-4  
 Applicable ASTM Specifications  
 for Various Structural Shapes**

Steel Type	ASTM Designation	F <sub>y</sub> Yield Stress <sup>a</sup> (ksi)	F <sub>u</sub> Tensile Stress <sup>a</sup> (ksi)	Applicable Shape Series											
				W	M	S	HP	C	MC	L	HSS				
											Rect.	Round	Pipe		
Carbon	A36	36	58-80 <sup>b</sup>												
	AS3 Gr. B	35	60												
	A500	Gr. B	42	58											
			46	58											
		Gr. C	45	62											
			50	62											
	A501	Gr. A	36	58											
		Gr. B	50	70											
	A529 <sup>c</sup>	Gr. 50	50	65-100											
		Gr. 55	55	70-100											
	A709	Gr. 36	36	58-80 <sup>b</sup>											
	A1043 <sup>d</sup>	Gr. 36	36-52	58											
		Gr. 50	50-65	65											
	A1085	Gr. A	50	65											
		Gr. 42	42	60											



23

## Steel Fabrication: Preferred Grades

**Table 2-5  
 Applicable ASTM Specifications  
 for Plates and Bars**

Steel Type	ASTM Designation	F <sub>y</sub> Yield Stress <sup>a</sup> (ksi)	F <sub>u</sub> Tensile Stress <sup>a</sup> (ksi)	Plates and Bars, in.											
				to 0.75	over 0.75 to 1.25	over 1.25 to 1.5	over 1.5 to 2	over 2 to 2.5	over 2.5 to 4	over 4 to 5	over 5 to 6	over 6 to 8	over 8		
				incl.	incl.	incl.	incl.	incl.	incl.	incl.	incl.	incl.	incl.		
Carbon	A36	32	58-80												
		36	58-80												
	A283 <sup>e</sup>	Gr. C	30	55-75						d					
		Gr. D	33	60-80						d					
	A529	Gr. 50	50	65-100		b	b	b	b	b					
		Gr. 55	55	70-100		c	c	c	c	c					
	A709	Gr. 36	36	58-80											
	A572	Gr. 42	42	60											
		Gr. 50	50	65											
		Gr. 55	55	70											



24



## Steel Fabrication: Preferred Grades for Bolts

**Table 2-6  
 Applicable ASTM Specifications for  
 Various Types of Structural Fasteners**

ASTM Designation	$F_y$ Min. Yield Stress (ksi)	$F_u$ Tensile Stress <sup>1</sup> (ksi)	Diameter Range (in.)	Bolts				Washers			Anchor Rods						
				High-Strength		Common Bolts	Nuts	Hardened	Plain	Direct-Tension Indicator	Threaded Rods	Hooked	Headed	Threaded & NUTTED			
				Conventional	Twist-Off-Type Tension-Control												
F3125	Gr. A325 <sup>1</sup>	–	120	0.5 to 1.5	■												
	Gr. F1852 <sup>2</sup>	–	120	0.5 to 1.25	■												
	Gr. A490 <sup>1</sup>	–	150	0.5 to 1.5	■												
	Gr. F2280 <sup>2</sup>	–	150	0.5 to 1.25	■												
F3111	–	200	1 to 1.25 incl.	■													
F3043	–	200	1 to 1.25 incl.	■													
A194 Gr. 2H	–	–	0.25 to 4				■										
A563	–	–	0.25 to 4				■										
F436	–	–	0.25 to 4 <sup>3</sup>				■										
F844	–	–	any				■										
F959	–	–	0.5 to 1.5				■										
A36	36	58–80	to 10										■				

25



## Steel Fabrication: Preferred Grades - Anchors

F1554	Gr. 36	36	58–80	0.25 to 4														
	Gr. 55	55	75–95	0.25 to 4														
	Gr. 105	105	125–150	0.25 to 3														

26



# Steel Fabrication: Detailing – Detailing Standards

- Each shop is different
- Presentation of DWG
- Connection details
- Equipment and level of automation
- Skills and abilities

## DETAILING

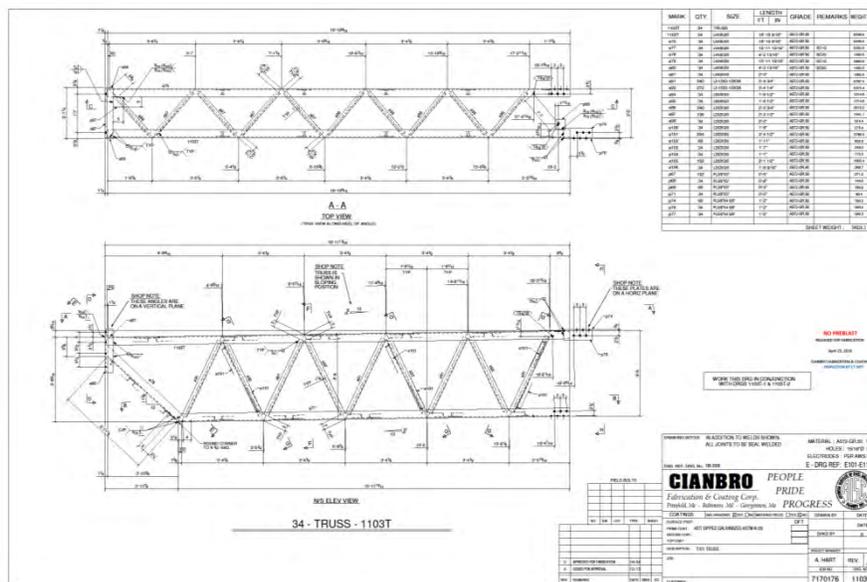


## FOR STEEL CONSTRUCTION

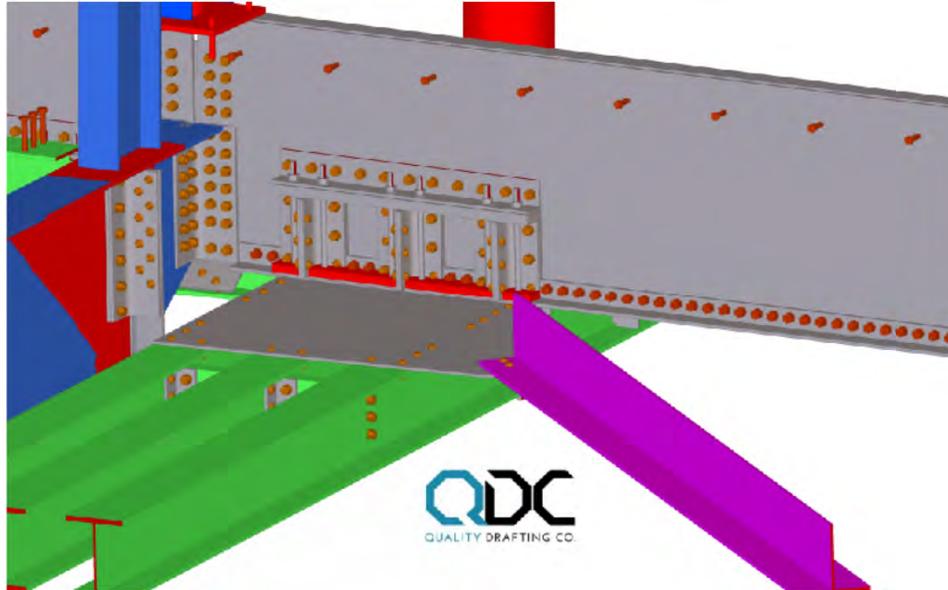
THIRD EDITION



# Steel Fabrication: Detailing – Detailing Standards



## Steel Fabrication: Detailing – Detailing Standards



29

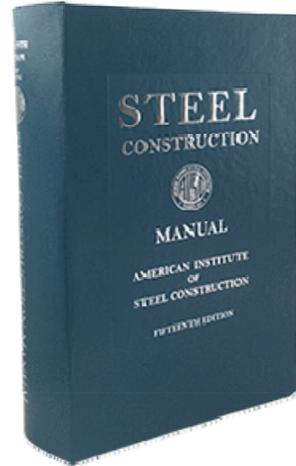
## Steel Fabrication: Detailing – Detailing Standards



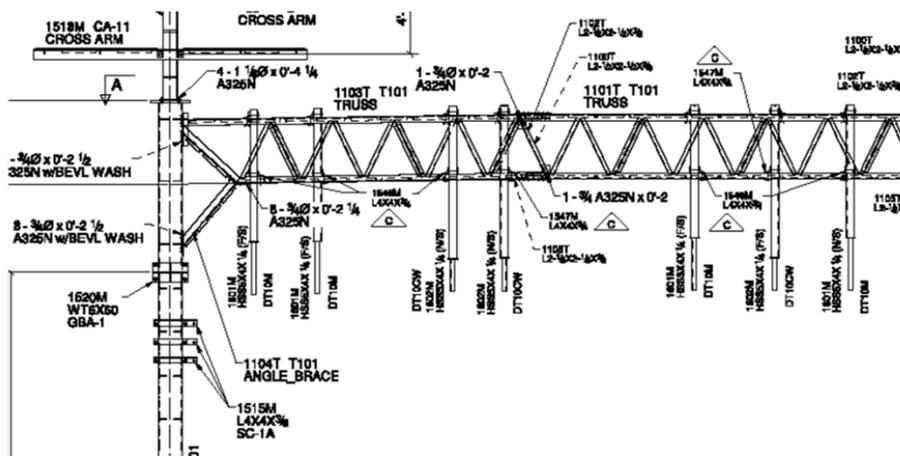
30

## Steel Fabrication: Detailing – Erector Needs

- Erection DWG's
- Column Splices – Steel Manual Table 14-3
- Perimeter cable holes
- Shop assemblies

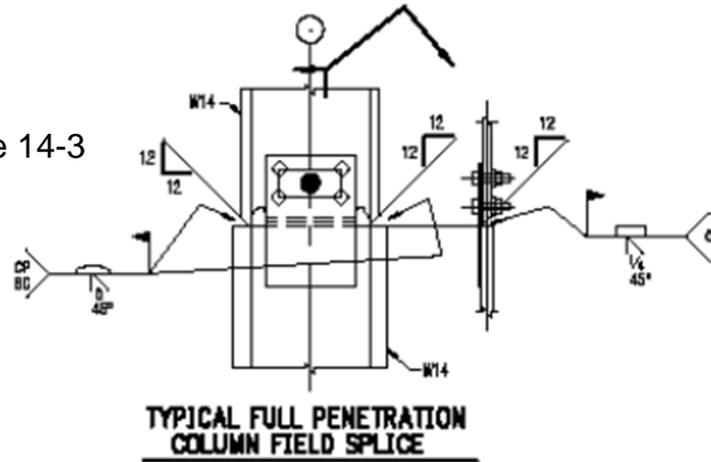


## Steel Fabrication: Erection DWG's



## Steel Fabrication: Column Splice Detail

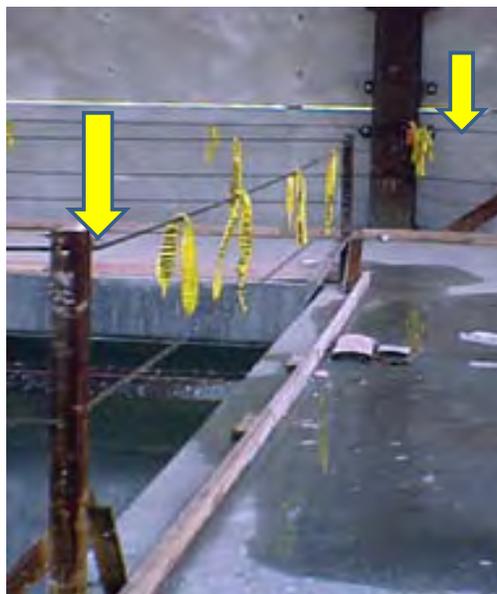
Steel Manual Table 14-3



33

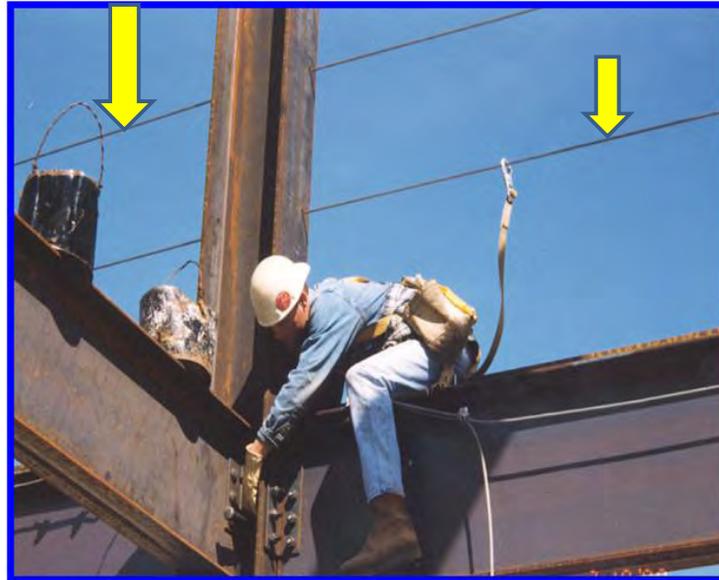
## Steel Fabrication: Perimeter Cable Holes

Perimeter railing  
attached to  
structural steel



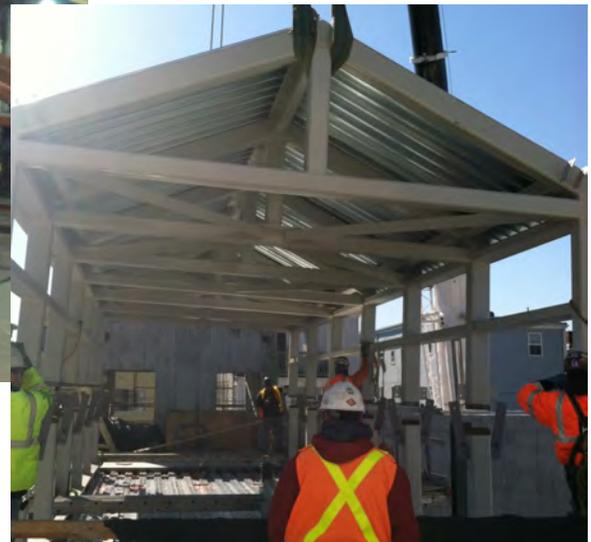
34

## Steel Fabrication: Perimeter Cable Holes



35

## Steel Fabrication: Shop Assemblies



## Steel Fabrication: Detailing – Submittals

- COSP Section 4: Approval Documents
  - 4.1 Owner Responsibility: Released for Construction Design Documents
  - 4.2 Fabricator Responsibility: Approval Documents – The structural steel shop drawings, erection drawings, and embedment drawings or where the parties have agreed in the contract documents to provide digital model(s), the fabrication and erection models.



37

## Steel Fabrication: Detailing – Submittals

- COSP Section 4: Approval Documents
  - 4.3 Use of Digital Files or Copies of the Design Documents.
  - 4.4 Approval: a. correctly interpreted the contract documents. b. reviewed and approved connection details. c. Released to begin fabrication.
  - 4.5 Fabrication and Erection Documents not Furnished by Fabricator.



38



## Steel Fabrication: Detailing – Submittals

- COSP Section 4: Approval Documents
  - 4.6 The RFI Process. Interpretation and implementation of the contract documents, including clarifications and or revisions to the contract documents.
  - 4.7 Erection Documents



39

## Steel Fabrication: Detailing – Submittals

### Connection Design:

- First Class did cover in detail
- Next week's class: 18.4 Connection Design as the Fabricator's Representative
- COSP section 3.1.1 gives the Owner's Designated Representative for Design (ODRD) 3 options for Connection Design



40



## Steel Fabrication: Detailing – Submittals

### Connection Design Options COSP 3.1.1:

Option 1: the complete *connection* design shall be shown in the structural *design documents*.



41

## Steel Fabrication: Detailing – Submittals

### Connection Design Options COSP 3.1.1:

Option 2: in the structural *design documents* or *specifications*, the *connection* shall be designated to be selected or completed by an experienced *steel detailer*.



42



## Steel Fabrication: Detailing – Submittals

### Connection Design Options COSP 3.1.1:

Option 3: in the structural *design documents* or *specifications*, the *connection* shall be designated to be designed by a licensed engineer working for the *fabricator*.



43

## Steel Fabrication: Detailing – Submittals

### Connection Design Options COSP 3.1.1:

There is more to each of these options but I wanted to provide a brief outline for them.

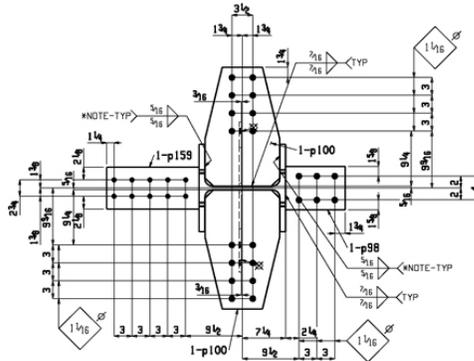


44



## Steel Fabrication: Detailing - Summary

- Project Kick-Off
- ABM's
- Detailing Standards
- Erection Aids
- Submittals



## Steel Fabrication: Project Management

- **Project kick off**
  - Scope of Supply
  - Ordering Mat'l
  - Managing submittals
  - Budgeting
  - Schedules
- This usually occurs at the same time as setting up the detailer.
  - On bigger jobs, this will involve CM, GC, erector, other subs, etc.



47

## Steel Fabrication: Project Management

- Project kick off
  - **Scope of Supply**
  - Ordering Mat'l
  - Managing submittals
  - Budgeting
  - Schedules
- Again, similar to the kick off meeting with detailer.
  - Ensure that no items are missed...



48



## Steel Fabrication: Project Management

### Ordering Mat'l

- Receive Detailer ABM
- Nesting Mat'l
  - Linear Mat'l
  - PL Mat'l
- Additional Testing
  - CVN's, Others
- Mill Orders Main Mat'l:
  - Bundle quantities
  - Check mill rolling
  - Min truck load orders
  - 42K-48K lbs
  - Mills have the info online.



49

## Steel Fabrication: Project Management - Ordering

### Detail Mat'l

- Plate
  - PL 96 x 240. Special sizes are available
  - Talk to each mill on min orders
- Flat Bar
  - Standard lengths 20'-0
- Angle
  - Standard lengths 40'-0
  - 10K lbs
- Rolling schedules
- Back to connection standards.



50

# Steel Fabrication: PM – Ordering Mat'l, Bundle Qty

## Nucor-Yamato Steel

Mayfield, Arkansas  
 NYS

Area: Plant  
 Title: Bundling Practices  
 No: NYS-D-001

Sections	30'	35'	40'	45'	50'	55'	60'	65'
AT8 Wall Tee	5	5	5	5	5	5	5	5
W30X116-391 & W33 thru W44	1	1	1	1	1	1	1	1
30X99-108	3	3	3	3	1	1	1	1
30X90	3	3	3	3	3	1	1	1
W27X114-368	1	1	1	1	1	1	1	1
27X102	3	3	3	3	1	1	1	1
27X94	3	3	3	3	3	1	1	1
27X84	3	3	3	3	3	3	1	1
W24X117-370	1	1	1	1	1	1	1	1
24X104	3	3	3	3	1	1	1	1
24x55-103	3	3	3	3	3	3	3	3
W21X101-273	1	1	1	1	1	1	1	1
44-93	3	3	3	3	3	3	3	3
W18X143-311	1	1	1	1	1	1	1	1



# Steel Fabrication: PM – Ordering Mat'l, Rolling

Nucor-Yamato Proposed Roll/Close Schedule \* ISO 9001:2015 Registered \* October 2  
 Inquire items are followed immediately by the last order date of the book week if available — Highlighted Item

Week Beginning		28-Oct	4-Nov	11-Nov	18-Nov	25-Nov	2-Dec
NYS Fiscal Week		44	45	46	47	48	49
Wide Flange Sections	MIII #						
W44x16x230-335	2				47   10/30		
W40x16x199-593	2				47   10/30		
W40x12x149-392	2				47   10/30		
W36x17x487-652	2				48   11/1		
W36x16.5x231-441	2				48   11/1	48   11/1	
W36x12x135-256	2					48   11/1	
W33x15.75x201-387	2					48   11/1	
W33x11.5x118-169	2					48   11/1	
W30x15x173-433	2					48   11/1	
W30x10.5x90-148	2					48	



## Steel Fabrication: Project Management

- Project kick off
- Scope of Supply
- Ordering Mat'l
- **Managing submittals**
- Budgeting
- Schedules
- Working with Detailer and CM, GC, customer
- RFI's and Logs
- Revised contract doc's
- DWG submittals and Logs
- Buy out's



53

## Steel Fabrication: Project Management

- Project kick off
- Scope of Supply
- Ordering Mat'l
- Managing submittals
- **Budgeting**
- Schedules
- Mat'l
- Labor
- Subs
- Other items
  - Bolts
  - Joist and Deck
  - Bearings



54



## Steel Fabrication: Project Management

- Project kick off
- Scope of Supply
- Ordering Mat'l
- Managing submittals
- Budgeting
- **Schedules**
- Coordination:
  - Site
  - Erector
  - Customer
- Software:
  - MS Project
  - Primavera
  - Excel



55

## Steel Fabrication: Project Management



- Project kick off
- Scope of Supply
- Ordering Mat'l
- Managing submittals
- Budgeting
- Schedules



56

## Steel Fabrication: Production

- Receiving Mat'l
- Cutting
- Hole Making
- Parts
- Layout
- Fit
- Welding
- Bolting
- Cambering
- Assembling
- Cleaning
- Coating
- Shipping



57

## Steel Fabrication: Production – Receiving Mat'l

- Receiving Mat'l
  - Trucking
  - Rail
- Traceability



58

## Steel Fabrication: Production – Traceability

- AISC 360, Spec. for Structural Steel Buildings (steel spec), Sect. N2.1, Mat'l ID. Takes us to COSP section 6.1
- COSP Section 6.1  
“...demonstrate...a method of mat'l ID, visible up to the point of assembling members...”



59

## Steel Fabrication: Production – Traceability

- So how do shops do this?
  - Visual inspection of mat'l to A6.
  - Mark the material as they off load deliveries with heat #, PO, job #, size, etc.
  - Place in a specific yard location.
  - Update their material inventory system with received mat'l.
  - Issue a pull ticket to bring material into plant.
  - Use a nested cut list to process mat'l at which point the mat'l receives a piece mark or ship mark.



60



## Steel Fabrication: Production – Traceability



61

## Steel Fabrication: Production – Traceability



62

## Steel Fabrication: Production – Traceability



63

## Steel Fabrication: Production – Traceability



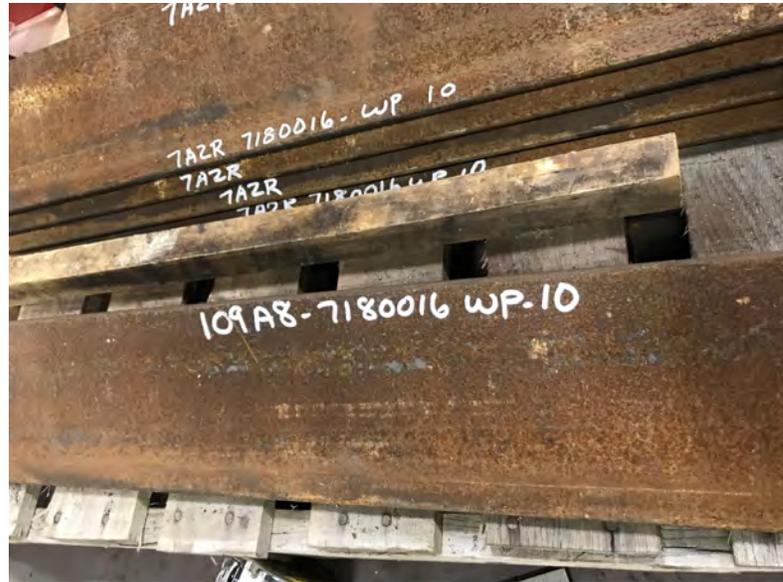
64





## Steel Fabrication: Production – Traceability

- Traceability
  - Typical ship marking system for fabricators



67



## Steel Fabrication: Production – Cutting

### Cutting

- For WF, C, large L; etc. most shops use a band saw.
- PL: burn tables and shear. Plasma and oxy fuel.
- Steel spec, Sect. M2, item 2 address thermal cutting.
- COSP section 6.2 address thermal cutting.

Small L: shear or saw.



68

## Steel Fabrication: Production – Cutting



69

## Steel Fabrication: Production – Cutting



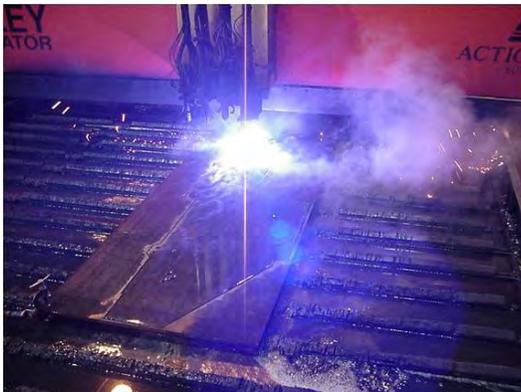
70



## Steel Fabrication: Production – Cutting



## Steel Fabrication: Production – Cutting



72

## Steel Fabrication: Production – Cutting



73

## Steel Fabrication: Production – Cutting



74

## Steel Fabrication: Production – Cutting



75

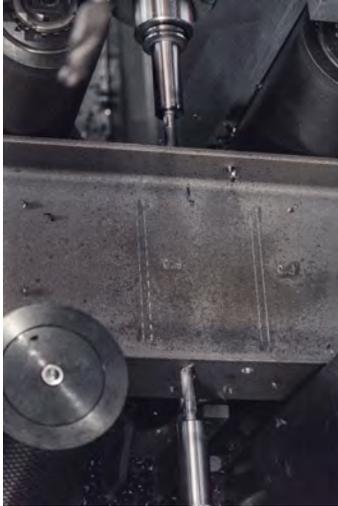
## Steel Fabrication: Production – Hole Making

- Hole Making
  - Steel spec, section M2.5 addresses bolted construction...
  - RCSC section 3.3, bolt holes. Sizes: standard, oversized, short slot and long slot. Table 3.1. Also, thermal cut and burrs are address.
  - Drilling and punching are the main processes for hole making.



76

## Steel Fabrication: Production – Hole Making



Drill Line



Punch Line

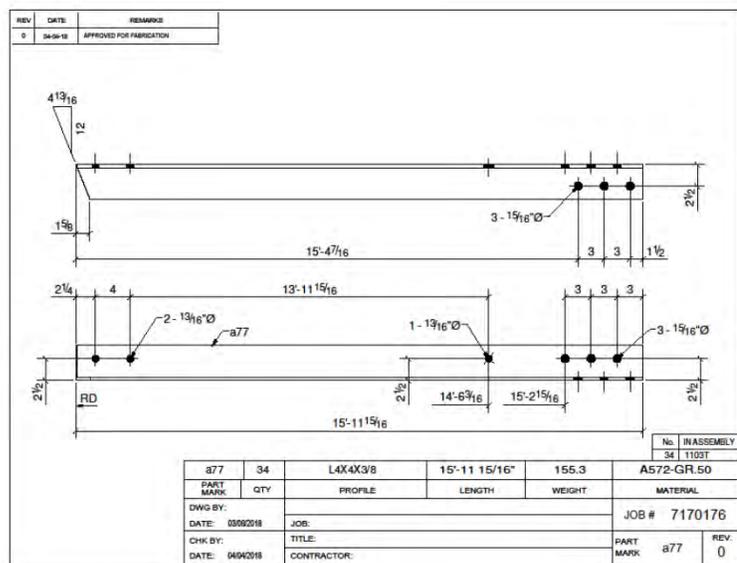
Mag Drilling



77

## Steel Fabrication: Production – Parts

- Parts
  - Recap
  - Received mat'l
  - Cut main sticks
  - Cut detail



78

## Steel Fabrication: Production – Parts



79

## Steel Fabrication: Layout

- Layout by hand



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## Steel Fabrication: Production – Layout

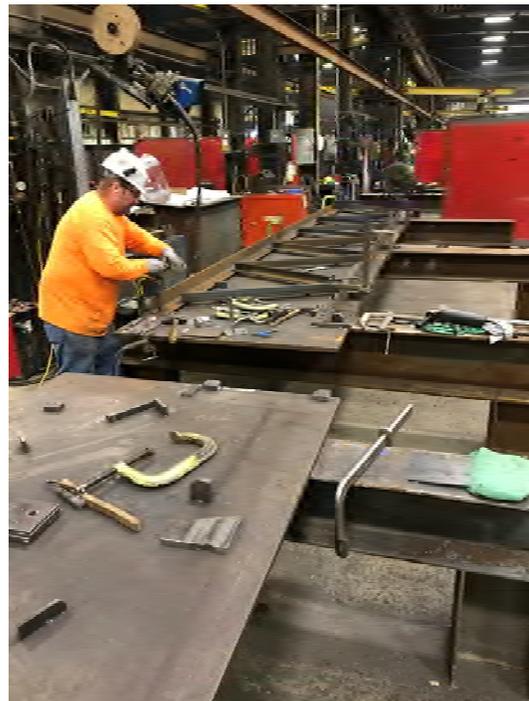
Layout automated



81



## Steel Fabrication: Production – Fitting



82



## Steel Fabrication: Production – Fitting



83

## Steel Fabrication: Production – Welding AWS D1.1

- Gen Requirements
- Design
- Prequal & Qualifications
- Fabrication
- Inspection



84

## Steel Fabrication: Production – Welding AWS D1.1



85

## Steel Fabrication: Production – Welding AWS D1.1



86

## Steel Fabrication: Production – Bolting

- RCSC
  - Sect 1: Gen Require
  - Sect 2: Components
  - Sect 3: Bolted Parts
  - Sect 4: Joint Types
    - Snug tight
    - Pretensioned
    - Slip critical
  - Sect 5: Limit States

- Sect 6: Washers
- Sect 7: Preinstallation Verification Testing
- Sect 8: Installation
- Sect 9: Inspection
- Sect 10: Arbitration



87



## Steel Fabrication: Production – Bolting



88



## Steel Fabrication: Production – Bolting



89

## Steel Fabrication: Production – Cambering

- Cambering
  - Mechanical
  - Heat (Steel Spec, M2.1)
  - Tolerances COSP 6.4.4



90



## Steel Fabrication: Production – Cambering



Mechanical

91



## Steel Fabrication: Production – Cambering



92



## Steel Fabrication: Production – Cambering



Heat

93

## Steel Fabrication: Production – Assembling



94

## Steel Fabrication: Production – Cleaning



- Cleaning per SSPC
  - SP1: Solvent
  - SP2: Hand tool
  - SP3: Power tool
  - SP5: White metal blast
  - SP6: Commercial blast
  - SP7: Brush blast
  - SP10: Near white blast



95

## Steel Fabrication: Production – Coating



- Coating
  - Primer
  - Multi coat paint
  - Hot dip galv
  - Metalizing



96

## Steel Fabrication: Shipping



Legal and Permit Load Sizes Vary by State and City so the following is approximate sizes. So check with your local fab shop.



97

## Steel Fabrication: Shipping

	WIDTH	HEIGHT	LENGTH
Standard Flatbed	8'-6	5'-0	Either 48'-0 Or 53'-0
Legal Load	Up to 8'-9	Up to 13'-6	Up to 55'-0
Permit, Signage	Less than 14'-0	Varies by Authority	Up to 85'-0
Special Permit, Escorts	14'-0+	Varies by Authority	Over 85'-0



98



## Steel Fabrication: Shipping



99

## Steel Fabrication: Quality Control

### Quality Management System Requirements

- Management
- Contract & Spec Review
- Detailing
- Doc & Data Control
- Control of QC Records

- Purchasing
- Mat'l ID
- Fab Process Control
- Inspection & Testing
- Calibration of  
Inspection, Measuring,  
Test Equipment



100



## Steel Fabrication: Quality Control

- Control of Nonconformances
- Corrective Action
- Handling, Storage, Delivery of Product & Mat'l
- Training
- Internal Audit



101

## Steel Fabrication: Quality Control

### Fab Tolerances

- COSP Section 6.4
- AWS D1.1
  - 5.21 Tolerances of joint dimensions
  - 5.22 Dimensional tolerance of welded structural members
  - 5.23 Weld profiles



102



## Steel Fabrication: Quality Control

- **18.1 Introduction to the Steel Construction Process**
  - Reviewed in detail Steel Spec Chapter N



103

## Steel Fabrication: Summary

- Detailing
- Project Management
- Production
- Shipping
- Quality Control



104

**AISC** | Questions?



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### CEU/PDH Certificates

Within 2 business days...

- You will receive an email on how to report attendance from: [registration@aisc.org](mailto:registration@aisc.org).
- Be on the lookout: Check your spam filter! Check your junk folder!
- Completely fill out online form. Don't forget to check the boxes next to each attendee's name!



## Individual Webinar Registrants

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### CEU/PDH Certificates

Within 2 business days...

- New reporting site (URL will be provided in the forthcoming email).
- Username: Same as AISC website username.
- Password: Same as AISC website password.



## 8-Session Registrants

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### CEU/PDH Certificates

One certificate will be issued at the conclusion of  
all 8 sessions.



## 8-Session Registrants

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Access to the quiz: Information for accessing the quiz will be emailed to you by Wednesday. It will contain a link to access the quiz. EMAIL COMES FROM NIGHTSCHOOL@AISC.ORG

Quiz and Attendance records: Posted Tuesday mornings.  
[www.aisc.org/nightschool](http://www.aisc.org/nightschool) - click on Current Course Details.

Reasons for quiz:

- EEU – must take all quizzes and final to receive EEU
- CEUs/PDHS – If you watch a recorded session you must take quiz for CEUs/PDHS.
- REINFORCEMENT – Reinforce what you learned tonight. Get more out of the course.

NOTE: If you attend the live presentation, you do not have to take the quizzes to receive CEUs/PDHS.



## 8-Session Registrants

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**Access to the recording:** Information for accessing the recording will be emailed to you by this Wednesday. The recording will be available for three weeks. For 8-session registrants only. EMAIL COMES FROM NIGHTSCHOOL@AISC.ORG.

**CEUs/PDHS** – If you watch a recorded session you must take AND PASS the quiz for CEUs/PDHS.



## Night School Resources for 8-session package Registrants

Find all your handouts, quizzes and quiz scores,  
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## Night School Resources for 8-session package Registrants



### Night School 13: Design of Industrial Buildings

#### 8-SESSION PACKAGE RESOURCES

Event	Date	Handouts	Video	Quiz	Attendance
NS13 - Design Criteria	1/30/2017 7:00:00 PM	<a href="#">Handouts</a>	<a href="#">View</a> Passcode: NS13DSN	Pass Score: 80	Pending
NS13 - Economic Considerations	2/6/2017 7:00:00 PM	<a href="#">Handouts</a>	Available 02/08/2017 5pm EST	Available 02/08/2017 5pm EST	Pending
NS13 - Lateral Load Systems and Details	2/13/2017 7:00:00 PM	<a href="#">Handouts</a>	Available 02/15/2017 5pm EST	Available 02/15/2017 5pm EST	Pending
NS13 - Preliminary Design Procedures	2/27/2017 7:00:00 PM	<a href="#">Handouts</a>	Available 03/01/2017 5pm EST	Available 03/01/2017 5pm EST	Pending
NS13 - Crane Girder Design and Frame Analysis	3/6/2017 7:00:00 PM	<a href="#">Handouts</a>	Available 03/08/2017 5pm EST	Available 03/08/2017 5pm EST	Pending
NS13 - Frame Member and Connection Design	3/13/2017 7:00:00 PM	<a href="#">Handouts</a>	Available 03/15/2017 5pm EST	Available 03/15/2017 5pm EST	Pending
NS13 - Transfer Crane Girder & Longitudinal Bldg Bracing Dsn	3/27/2017 7:00:00 PM	<a href="#">Handouts</a>	Available 03/29/2017 5pm EST	Available 03/29/2017 5pm EST	Pending
NS13 - Building Envelope and Bracing Design	4/3/2017 7:00:00 PM	<a href="#">Handouts</a>	Available 04/05/2017 5pm EST	Available 04/05/2017 5pm EST	Pending
NS13 - Final Exam	4/10/2017 7:00:00 PM			Available 04/12/2017 5pm EST	



## Night School Resources for 8-session package Registrants

- Weekly “quiz and recording” email.
- Weekly updates of the master Quiz and Attendance record found at [www.aisc.org/nightschool](http://www.aisc.org/nightschool). Scroll down to Quiz and Attendance records.
  - Updated on Tuesday mornings.



## Night School Resources for 8-session package Registrants

- Webinar connection information:
  - Found in your registration confirmation/receipt.
  - Reminder email sent out Monday mornings.
- Link to handouts also found here.





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