

DOCUMENT DATA FORM

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Drawing book 13 - Beam/Girder Connection Details, Bracing

Include work order no. and floor no. if applicable

Roll # DB02

Doc. ID (report #, dwg. #):

Document Date: 472-73

Document Author Name:

Author Organization: SHCR

KEYWORDS - HIGHLIGHT ALL THAT APPLY

Level 1

Bankers Trust	Project 4	WTC 1 North Tower	Add
Below Grade	Project 5	WTC 2 South Tower	
Concourse	Project 6	WTC 3 - Marriott Hotel	
Electrical Substation	Project 7	WTC 4 - South Plaza Bldg.	
Liberty Plaza	Project 8	WTC 5 - North Plaza Bldg	
PATH Station	WFC 1 - Oppenheimer Dow	WTC 6 - Customs House	
PATH Terminal	WFC 2 - Tower B	WTC 7	
Project 1	WFC 3 - American Express	WTC Complex	
Project 2	WFC 4 - Tower D	WTC Plaza	
Project 3			

Level 2

Accident analysis & risk	Fire protection	Misc. Performance Problems	Structural
Architectural	Fire service	News coverage	Tenant alterations
Data request	Landscaping	Police	Tenant Space
Emergency management	Management	Security	Add
Evacuation	Mech./elec.		

Level 3

1993 explosion	Cranes	Frame	Roof	Weight
A/E fitout	Criteria	Frame analysis	Safety	Weld detail
A-242	Dampers	Frequency	Schedule	Weld size
A-36	Debris	Fuel	Sculpture	Welding
A-497	Deck	Furniture layout	Security system	Wind
Aircraft impact	Deflection	Generators	Shear knuckle	Windows
Air cooled condensers	Demolition	Guidelines	Shear test	Yield strength
Analysis	Design	Gypsum board	Shear Stud	Add
Angles	Detailing	Hat truss	Shop drawings	Drawing
Antenna	Doors	Human comfort	Shortening	books
Artifacts	Drawings	HVAC	Slab	
Asbestos	Eastern States Steel	Index	Slurry wall	
Base plate	Egress	Inspection	Smoke control	
Beams	Elevator	Insulation	Smoke test	
Bid documents	Elevator Shaft	Job number	Spandrel beam	
Bid Invitation	Emergency	Joist	Specifications	
Bow tie	communications	L-50	Splices	
Bracing	Equipment	Lighting	Sprinkler	
Bracing truss	Erection marks	Loads	Stability	
Building code	Errors & Omissions	Maintenance	Stairways	
Calculations	Escalator	Marking	Standards	
Carpet	Expansion joint	Mesh reinforcement	Steel	
Ceilings	Exterior columns	Mill inspection	Steel composition	
Certification	Fabrication	Model	Stiffness	
Chillers	Family member	Mullion	Structural review	
Cladding	Field survey	Operations	Surveillance	
Collapse	Fire alarms	Paint	Survey	
Columns	Fireproofing	Partition layout	Survivor	
Communication systems	Fire spread	Partitions	Tenant list	
Composite truss	Fire testing	Photos	Tenant occupancy	
Computer output	Firetower	Pipes	Testing	
Computer program	Flag Pole	Plumbing	Tie	
Concrete	Flammability	Prestressing	Tolerances	
Connections	Floor	Probability, uncertainty	Transfer Girders	
Construction	Floor load	Quality control	Triad	
Contract	Floor slab	Ramp	Truss	
Core beams	Floor system	Reinforcing	Vestibule	
Core columns	Floor trusses	(strengthening)	Vibration	
Corrosion	Formwork	Renovation	Walls	
Cracking	Foundations	Repair	Water supply	
	Fracture	Research & Development	Weather	

BOOK (13)

COLUMN ELEVATION
BEHM CONN.
GIRDER DETAIL
BRACING

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PROJECT THE WORLD TRADE CENTER

TITLE DRAWING BOOK 13 - DATE PAGE

DATE 11/ 3/72

REVISIONS

5-6-73

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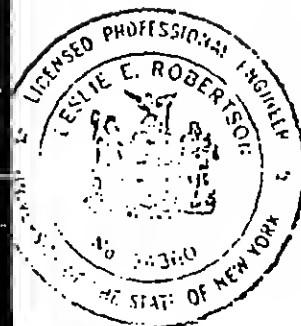
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PROJECT THE WORLD TRADE CENTER TITLE DRAWING BOOK 13 - DATE PAGE DATE 2/ 5/73

REVISIONS

11-24-72

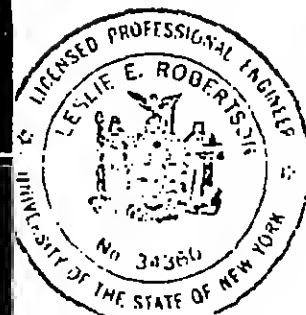
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13- K1.1-3

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PROJECT THE WORLD TRADE CENTER

TITLE DRAWING BOOK 13 - CONTENTS

DATE 11-3-72

REVISIONS

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11/20/72

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- 13 - K1.1 - CONTENTS & DATE PAGE
- K1.2 - GENERAL NOTES
- K1.3 - PIPE OPENINGS IN BEAMS
- K1.4 - TYPICAL STUD DETAILS
- K1.5 - EXISTING BEAMS TO BE REMOVED
13 - K2.1 - GIRDER & COLUMN ELEVATIONS

- K2.2 - COLUMN BASE DETAILS
- K2.3 - TYPICAL GIRDER DETAILS
- K2.4 - GIRDER COLUMN DETAILS
- K2.5 - GIRDER FUTURE COLUMN DETS.

- 13 - K3.1 - GIRDER ELEVATIONS
- K3.2 - TYPICAL GIRDER DETAILS
- K3.3 - GIRDER CONNECTION DETAILS
- K3.4 - GIRDER DETS. AT FUTURE COLS.
- K3.5 - BEAM CONNECTIONS AT GIRDERS

- 13 - K4.1 - BALLROOM GIRDER ELEVATIONS
- K4.2 - BALLROOM GIRDER TYPICAL DETS.
- K4.3 - BALLROOM GIRDER END CONN.

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- K5.2 - CONNECTION AT CANTILEVER
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- K7.2 - BEAM END NOTCHES
- K7.3 - BEAM NOTCHES EXISTING

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- 13 - K9.1 - BRACING 310-332 ELEVATIONS
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- 13 - K10.1 - NOTCH & NEW SUPPORT FOR EXIST. BM.
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- 13 - K11.1 - EL. 310, ZONE K3 - CONN. DET.
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- 13 - K12 - EL. 320, ZONE K3 & K5 PLATFORM DET.
13 - K13 - SECTIONS AT AUTO LIFT - EL. 284.



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TITLE DRAWING BOOK 13 - GENERAL NOTES

DATE 11-3-72

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GENERAL NOTES

The following provisions apply to all Drawing Book 13 drawings, unless specifically shown as noted otherwise in Drawing Book 13 drawings or in the plans.

A. Specification

1. All material, fabrication and erection shall be in accordance with Basic Project Specifications.

B. Dimensions

1. Contractor will be furnished field measurement for existing column locations and splice elevations prior to submitting mill orders.

2. Shop Drawings must indicate these field measurements prior to approval.

3. Columns shall be installed vertical above existing columns, with girder lengths adjusted to fit; however, detail material for future columns shall be installed in its theoretical location.

C. Materials

1. All steel sections, plates, detail materials and other members shall be ASTM A36, unless specifically shown otherwise.
2. Members indicated in the Drawings as "tube" are rectangular seamless structural tubing and shall conform to ASTM A501.

D. Bolted Connections

1. All bolted connections shall be high strength friction type, except where specifically noted as A307, or A490X (bearing Type with threads excluded in shear plane).
2. A minimum of 2-3/4" Ø bolts shall be used at each member connected except where specifically noted in the drawings.

E. Welded Connections

1. All manual welded electrodes shall be E70XX low hydrogen type.
2. All submerged arc welding shall be Grade SAW-2.
3. Studs shall be applied using a stud welding system providing a minimum current of 2000 amperes.
4. Where the symbols  are shown in the drawings the fabricator shall provide a complete penetration weld. The fabricator may provide single or double bevel, V, U or J groove welds conforming to approved welding procedure specifications.

F. Erection Sequence

1. Contractor of primary girder connections require sequencing of girders including shoring of one end prior to installing perpendicular supporting girder; therefore, Contractor to submit Erection Sequence and shoring to the Engineer for approval.

G. Miscellaneous

1. Specific details and notes shall prevail over general details and notes.

Any conflict or apparent conflict between drawings and/or notes shall be submitted to the Engineer for his decision before construction or preparation of shop drawings has begun.

2. Section/details indicated 3.3-10E means Section/Detail E in Drawing Book 13 page 13-K3.3-10.
3. Page numbers in Drawing Book 13 which include more than one page are numbered 2.1, 2.2, 2.3, etc. Page numbers which include only one page are numbered 2 with no decimal. Where reference is made to page numbers with more than one page, the decimal portion of the page number is not included. Therefore, a section or detail indicated 3-2 may be 13-K3-2.1, 2.3, etc.

G. Finishing

1. Compression joints depending upon contact bearing are indicated thus  in the drawings.
2. Where surfaces are finished by milling, plate thickness shown in the Drawings shall be reduced a maximum of 1/8 inch for plates up to and including 2 inches thick, a maximum of 1/4 inch for plates over 2 inches thick, except that plates indicated thus (1.2-16) in the Drawings shall be increased in thickness to allow for milling.
3. Top of Base Plates at future columns shall be at elevation shown in the Drawings, after erection. Base Plates shall be thickened as required for milling operation in order to achieve this elevation.
4. The surface of each girder flange in contact with a cap plate or base plate may be considered finished without further work where the following criteria is met: Contact bearing surfaces shall have at least 75% of the entire contact area in full bearing and the separation of the bearing surfaces shall not exceed 0.01 inch except adjacent to toes of flanges or corners of plates where a localized separation not exceeding 0.025 inch is permissible.



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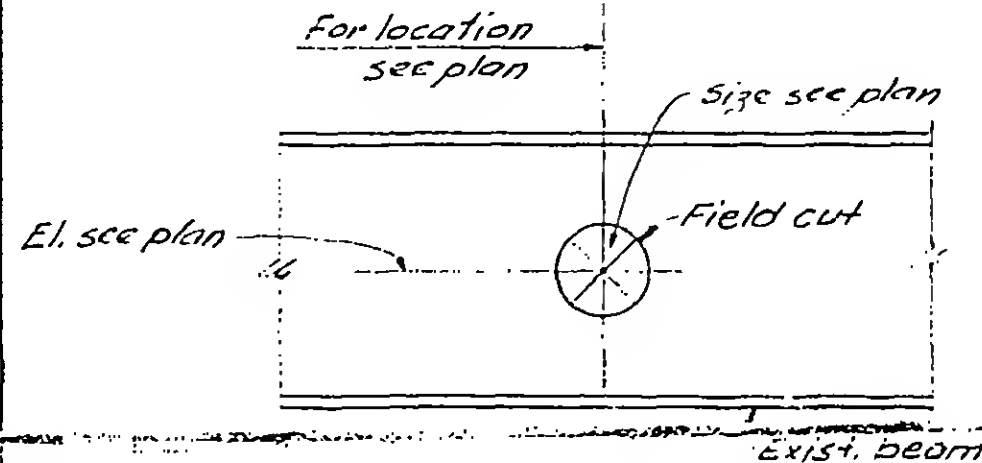
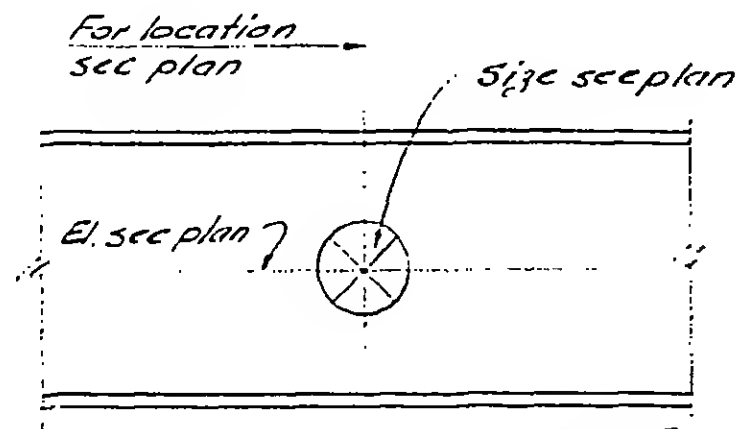
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TITLE PIPE OPENINGS IN BEAMS

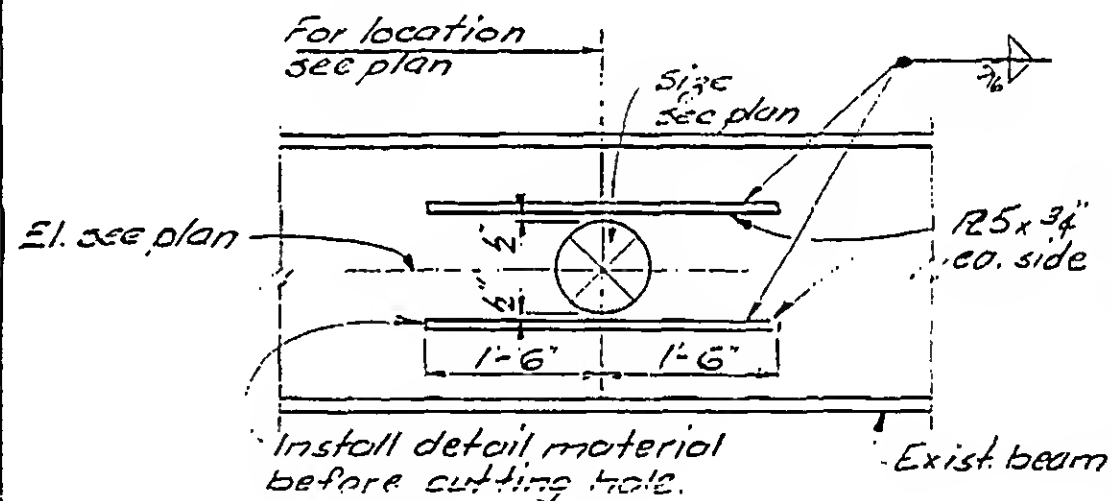
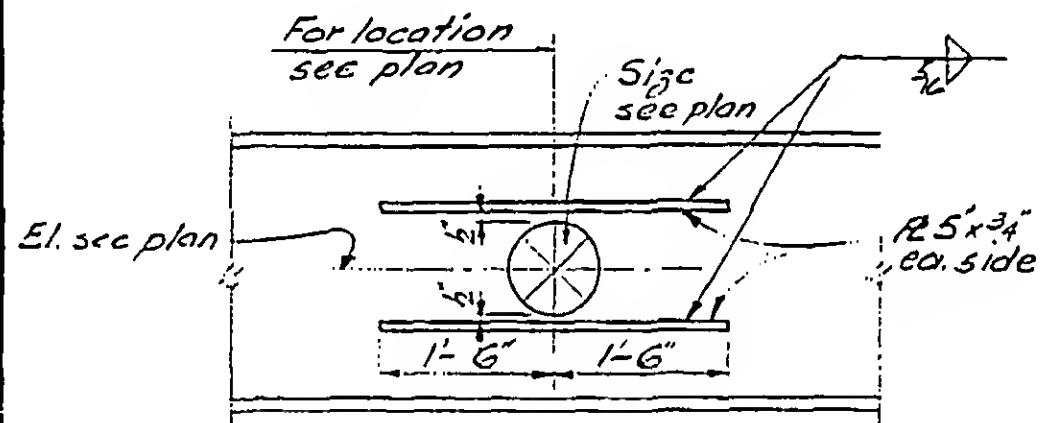
DATE 11-3-72

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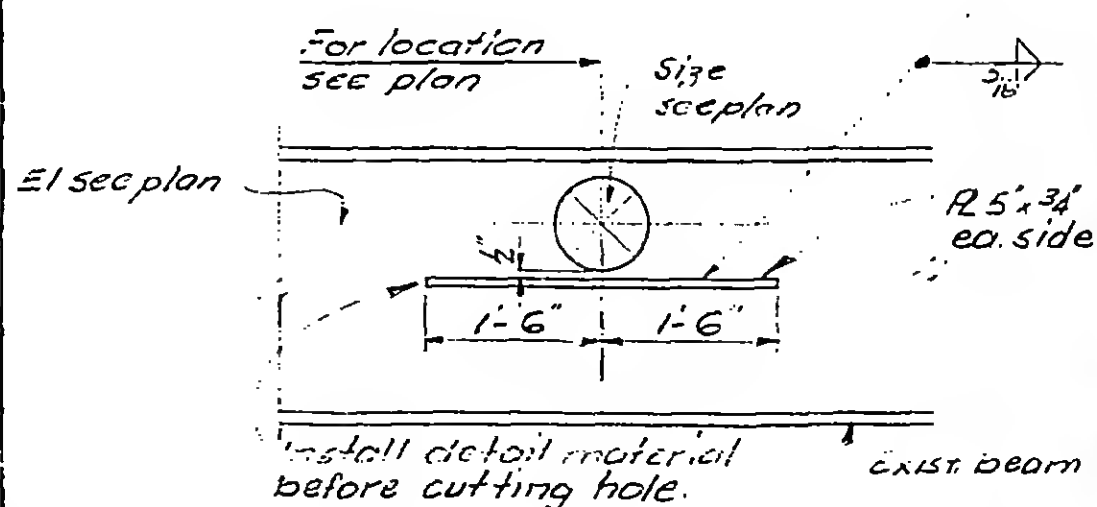
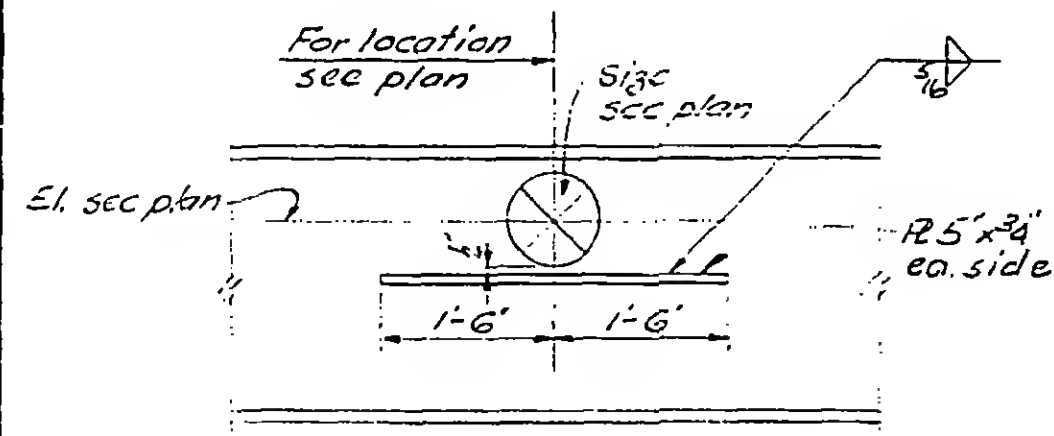
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A E



B F



C as shown
D upside down

C G
D H

G as shown
H upside down

13-K1.3-1



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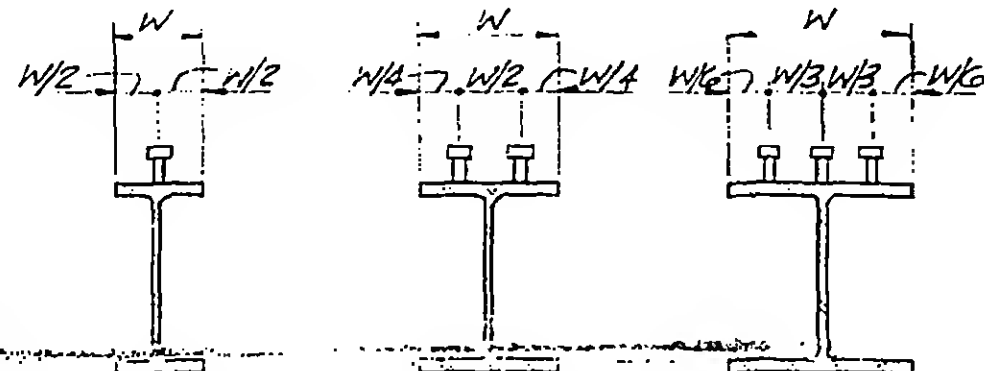
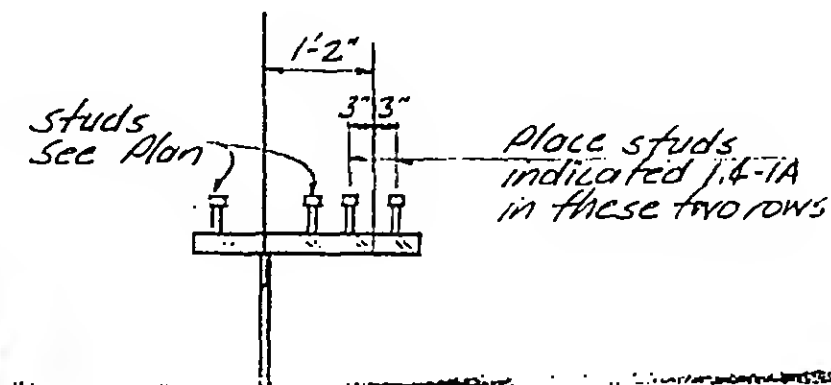
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TITLE TYPICAL STUD DETAILS

DATE 11-3-72

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construction
11-20-72One Row
WS 6
GS WS 9 (Note 4)Two Rows
(Note 4)Three Rows
(Note 5)

A

Notes:

3. All studs are $3/4 \times 0.3$ headed shear studs.
4. Use two rows for $W=6$ " to $W=9$ " where studs in a single row would otherwise be less than 4" o.c. Use two rows for $W=9$ " or more where studs in one row would otherwise be less than 4" o.c.
5. Use three rows for $W=9$ " or more where studs in two rows would otherwise be less than 4" o.c.



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13-K1.4-1

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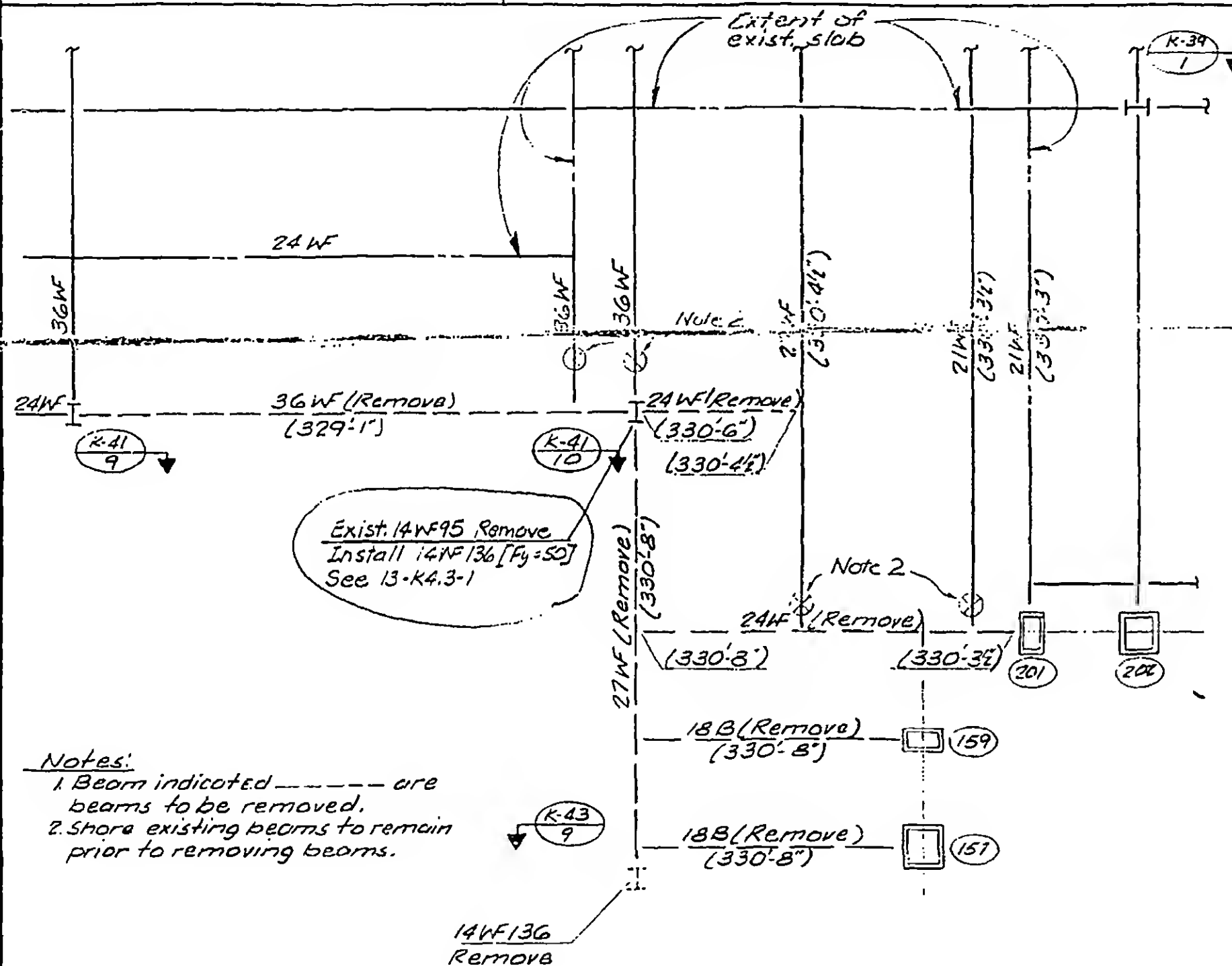
TITLE PART PLAN-EXISTING BEAMS TO BE REMOVED

DATE 11-20-72

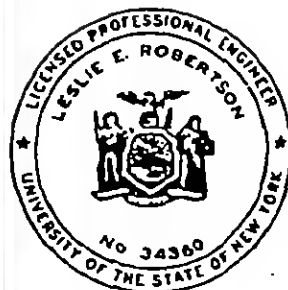
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Part Plan at El. 332'-0"



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TITLE GIRDER ELEVATION LINE 31

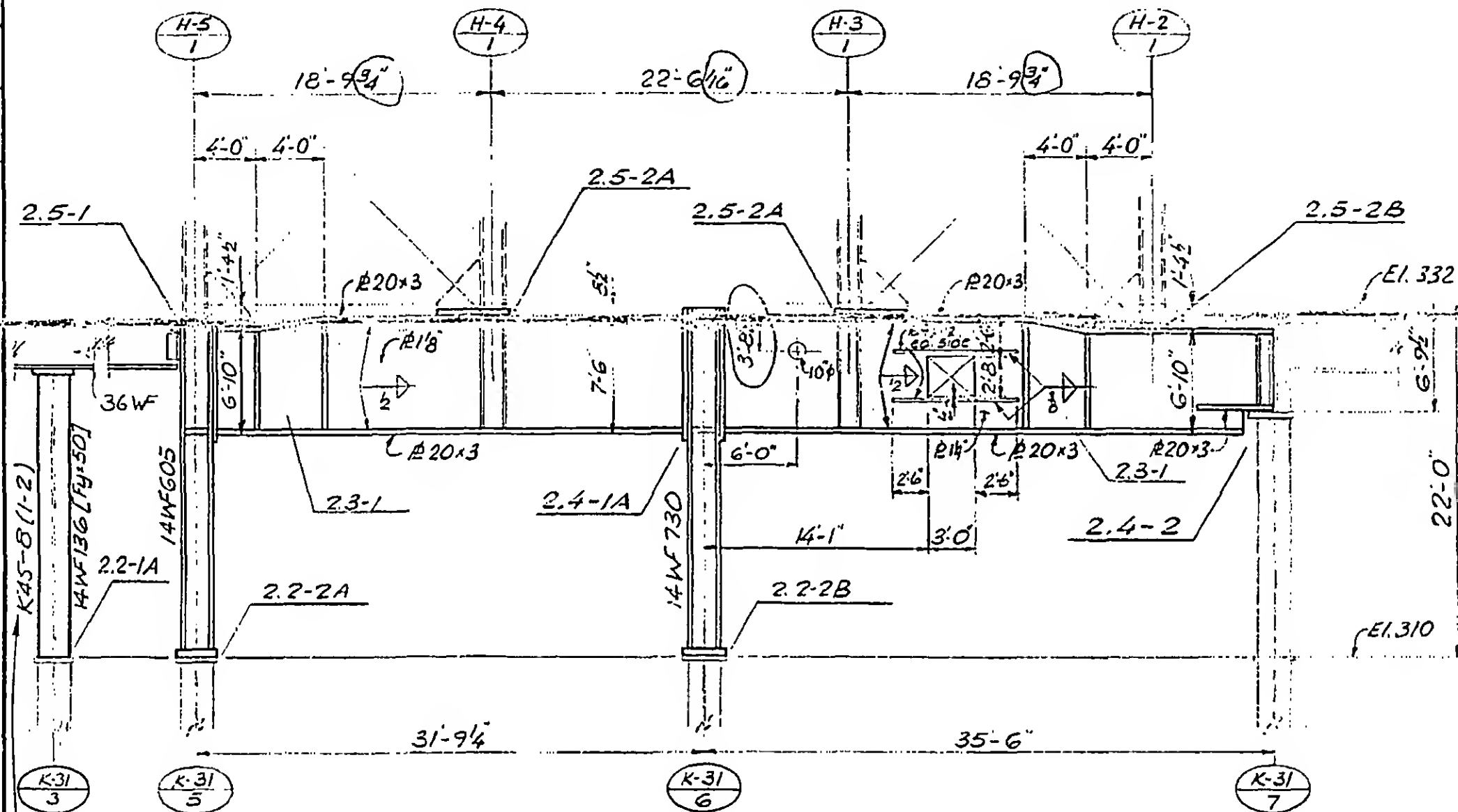
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4-2-73



Note

Cols. designated with KXX-X(X-X) are as fabricated.
Columns to be reworked as reqd and used in locations indicated.



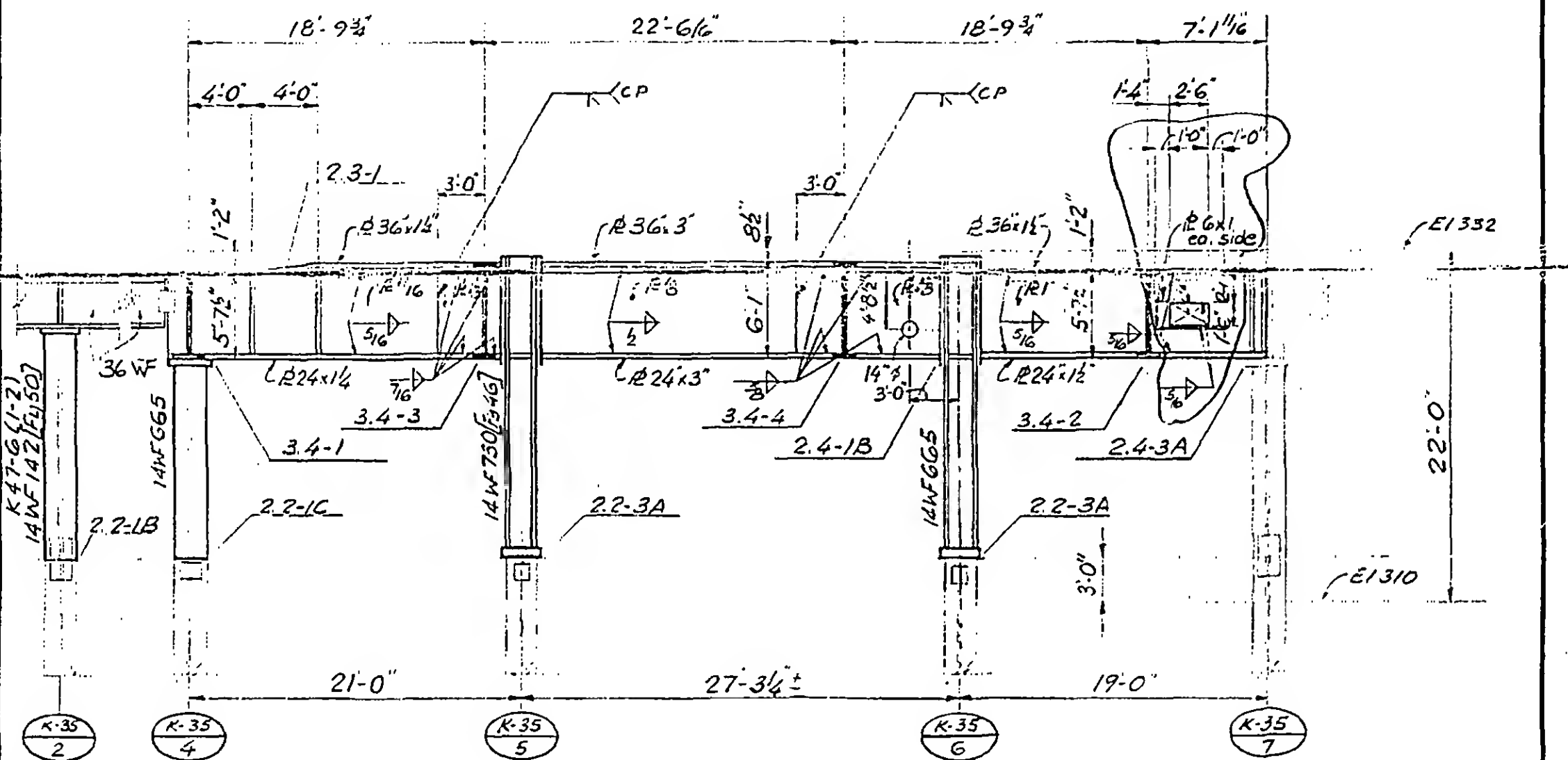
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13-K2.1-2

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TITLE GIRDER ELEVATION LINE 37

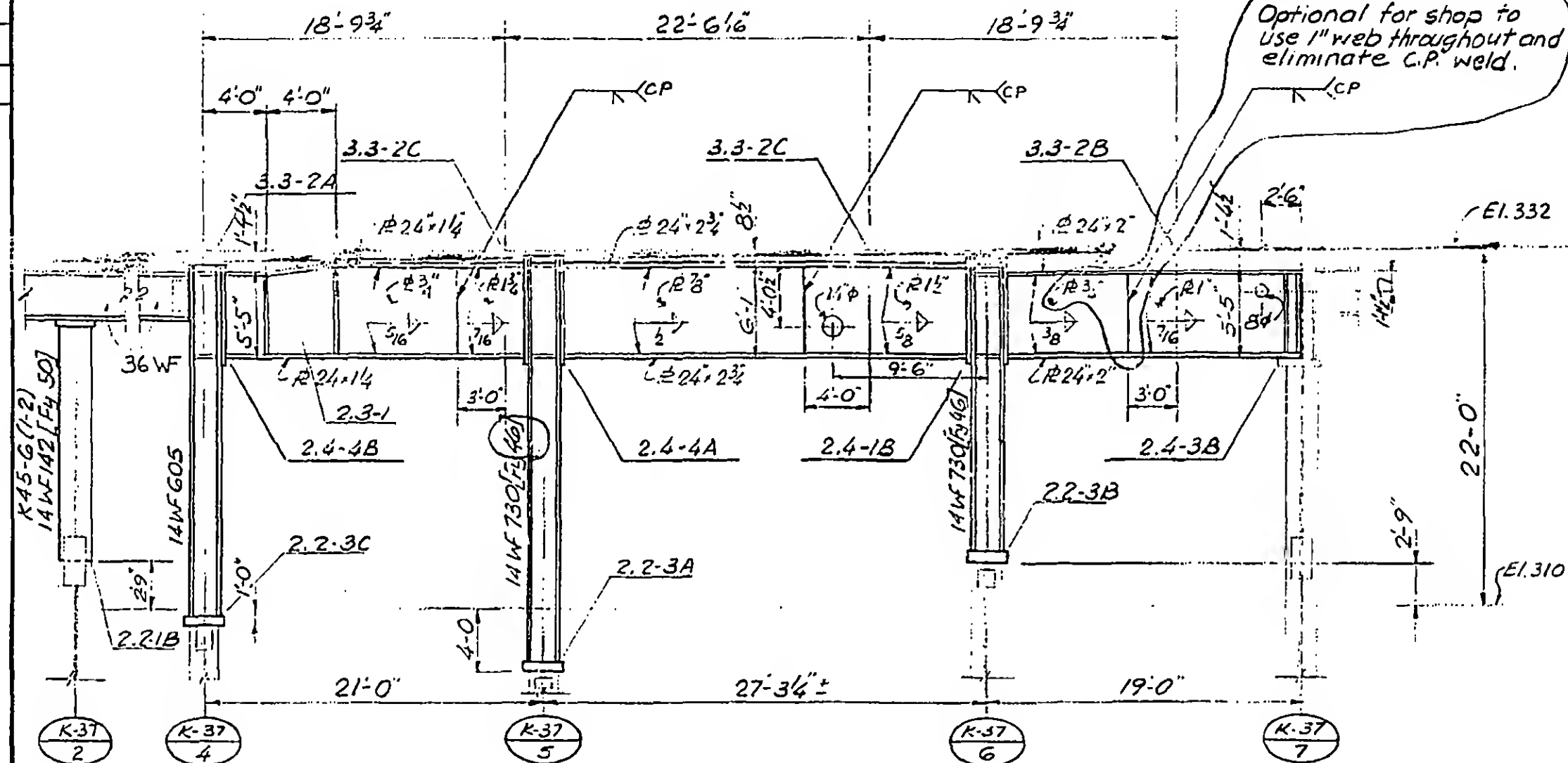
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13-K2.1-3

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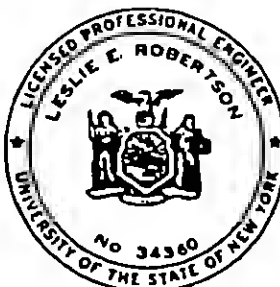
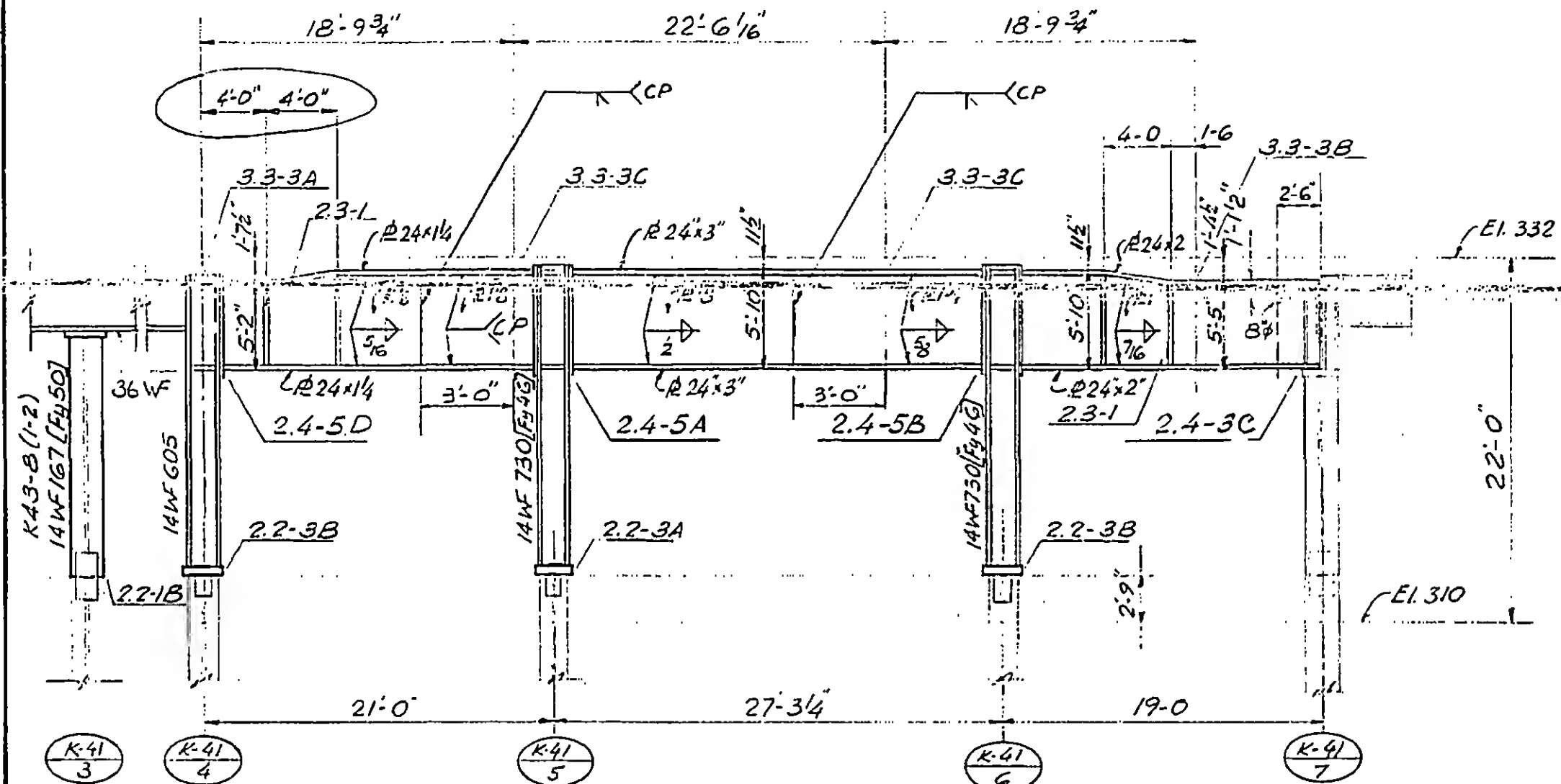
TITLE GIRDER ELEVATION LINE 41

DATE 11-3-72

REVISIONS

RELEASE FOR
CONSTRUCTION
11-20-72

12-11-72



DESIGNED

DRAWN

REVIEWED

13-K2.1-4

SKILLING, HELLE. CHRISTIANSEN. ROBERTSON

Structural & Civil Engineers

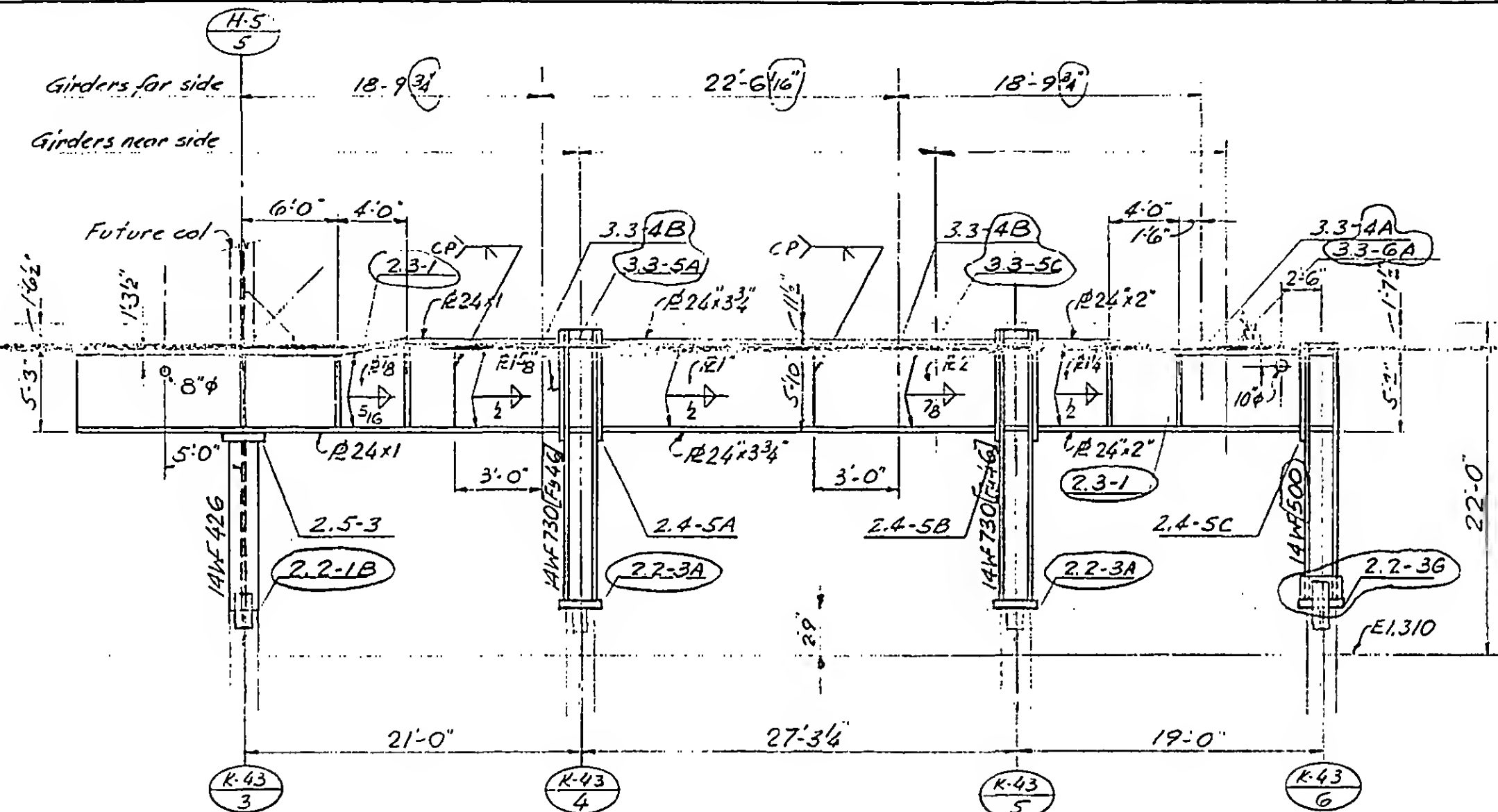
PROJECT THE WORLD TRADE CENTER

TITLE GIRDER ELEVATION LINE 43

DATE 11-3-72

REVISIONS

RELEASE FOR
CONSTRUCTION
11-20-72



DESIGNED

DRAWN

REVIEWED

13-K2.1-5

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER

TITLE GIRDER ELEVATION LINE 45

DATE 11-3-72

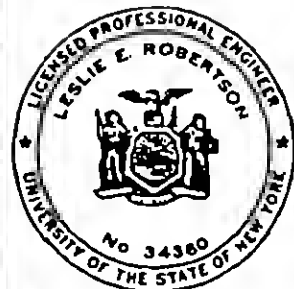
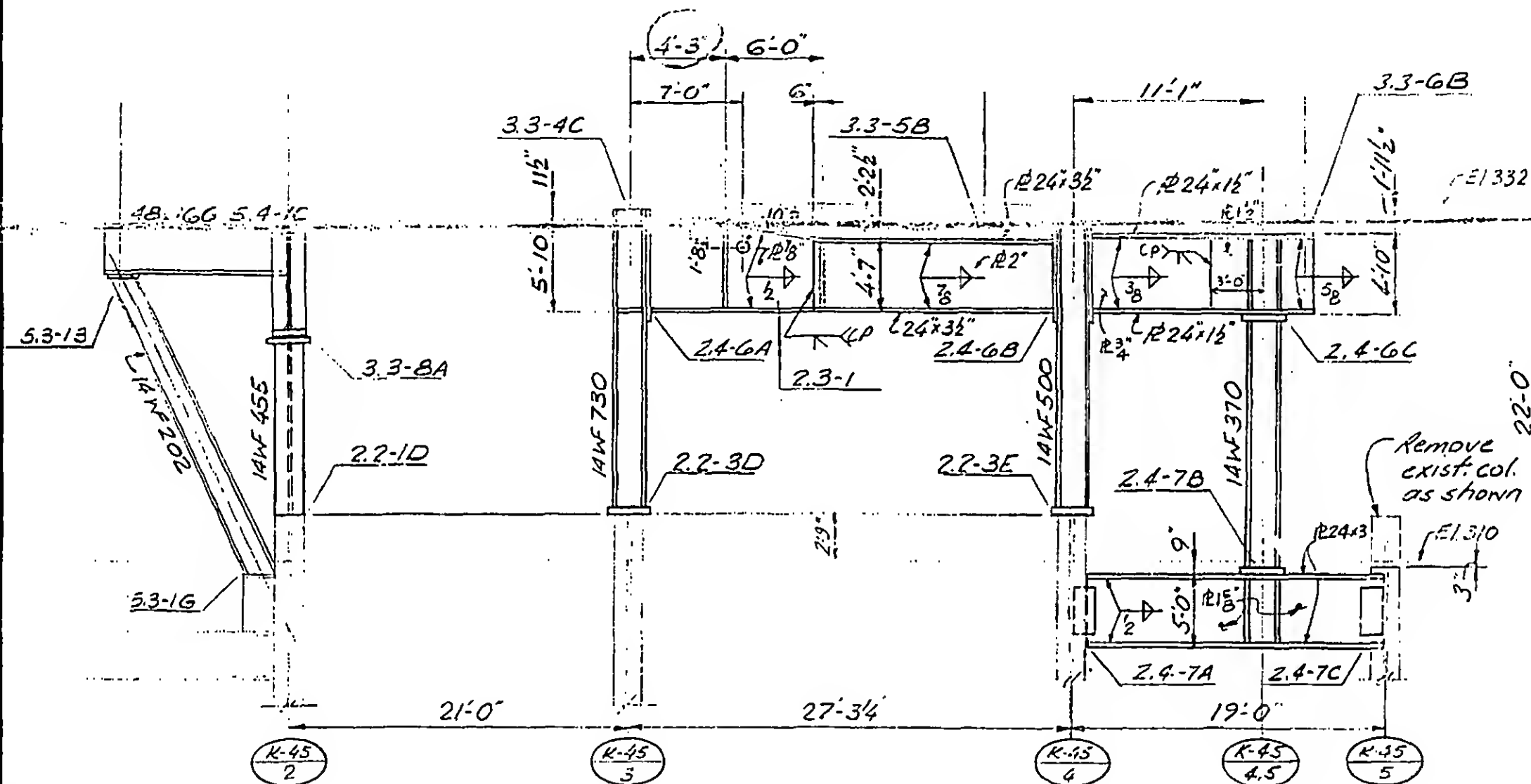
REVISIONS

RELEASE FOR
CONSTRUCTION
11-20-72

12-11-72

2-5-73

4-20-73



DESIGNED

K. Chiang

DRAWN

John F. ...

REVIEWED

13-K2.1-6

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER

TITLE GIRDER ELEVATION LINE 47

DATE 11-3-72

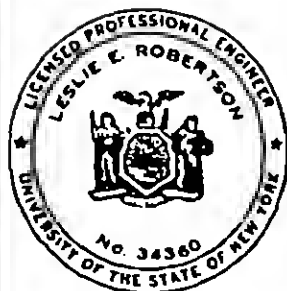
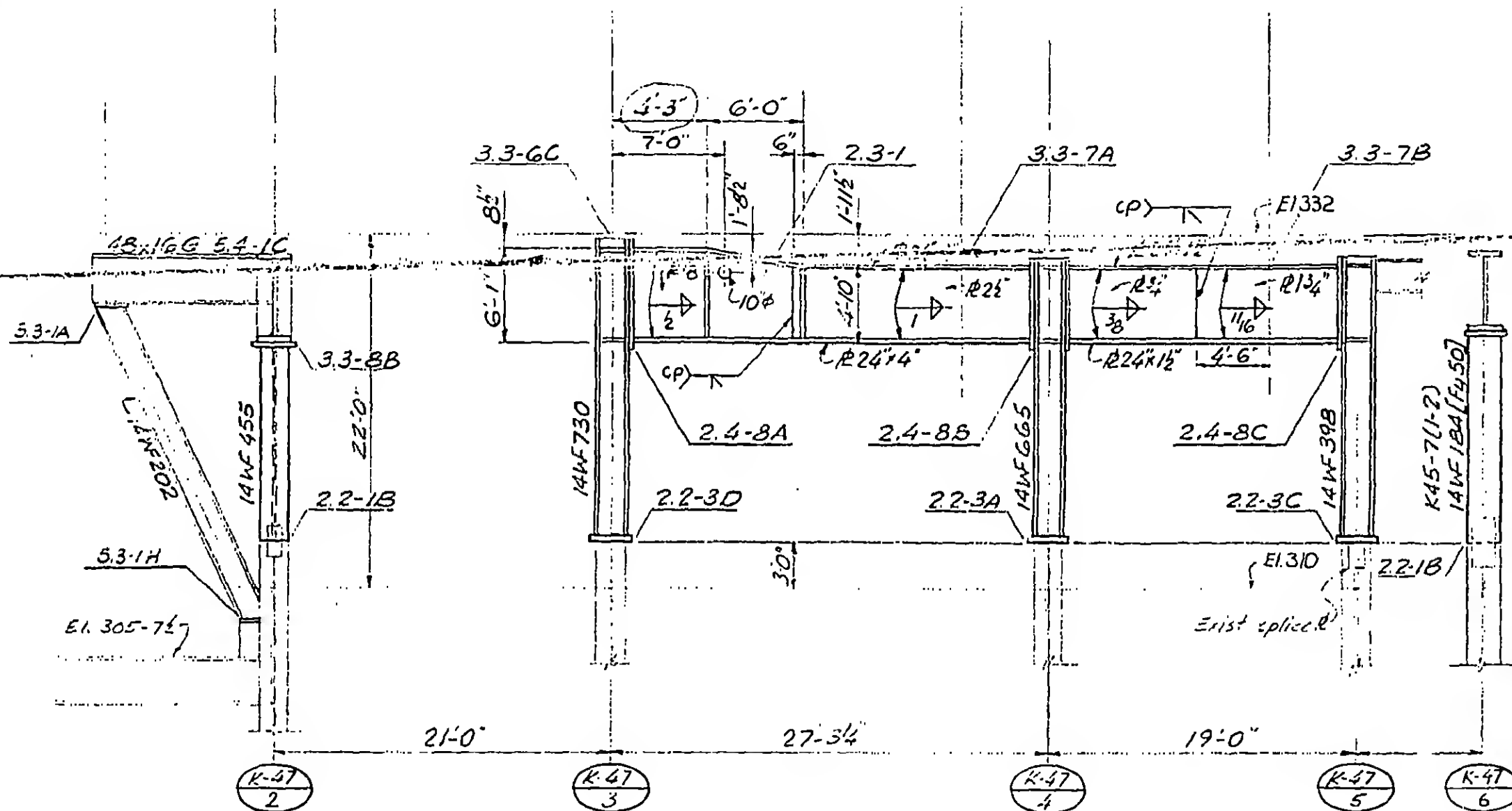
REVISIONS

RELEASE FOR
CONSTRUCTION
11-20-72

12-11-72

2-5-73

4-20-73



DESIGNED

V. Chiang

DRAWN

John G. Roberts

REVIEWED

13-K2.1-7

SKILLING, HELLE. CHRISTIANSEN, ROBERTSON

Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER

TITLE GIRDER ELEVATION

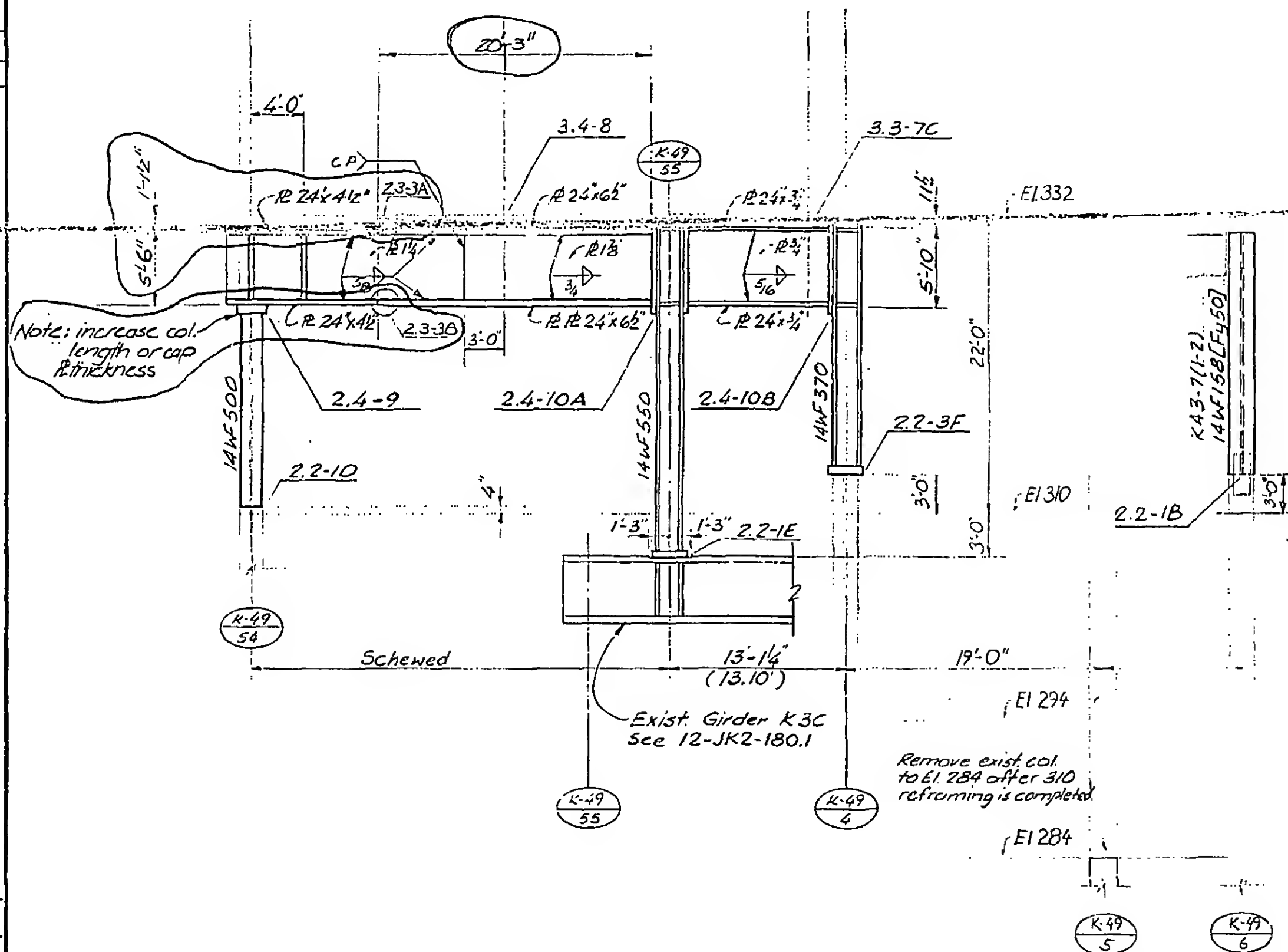
DATE 11-3-72

REVISIONS

RELEASE FOR
CONSTRUCTION
11-20-72

12-11-72

6-4-73



DESIGNED

DRAWN
John F. Farnsworth

REVIEWED

13-K2.1-8

SKILLING, HELLE; CHRISTIANSEN, ROBERTSON

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PROJECT THE WORLD TRADE CENTER

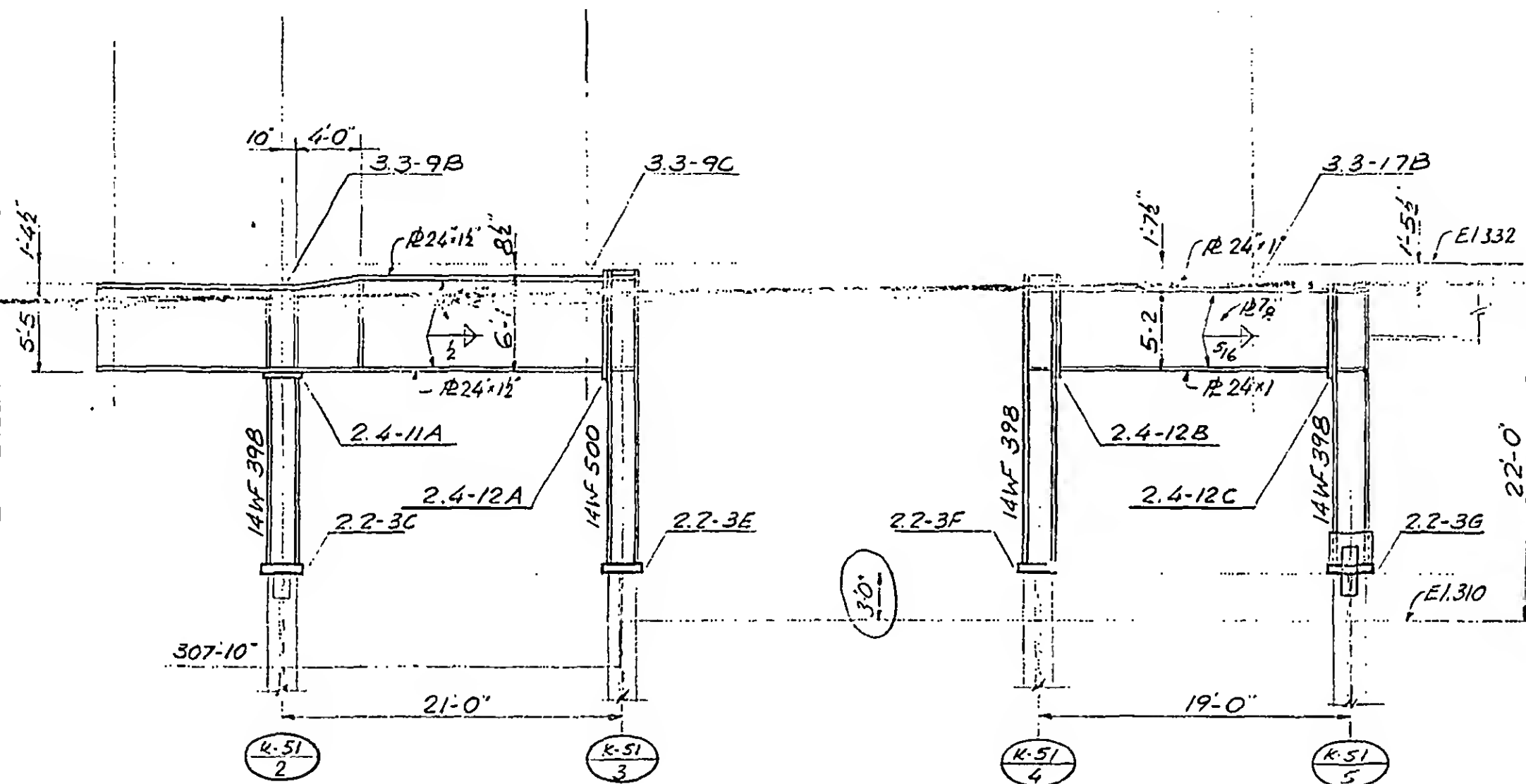
TITLE GIRDER ELEVATION LINE 51

DATE 11-3-72

REVISIONS

RELEASE FOR
CONSTRUCTION
11-20-72

12-11-72



DESIGNED

DRAWN

John G. Givens

REVIEWED

13-K2.1-9

Structural & Civil Engineers

PROJECT *THE WORLD TRADE CENTER*

TITLE GIRDER ELEVATION LINE 53

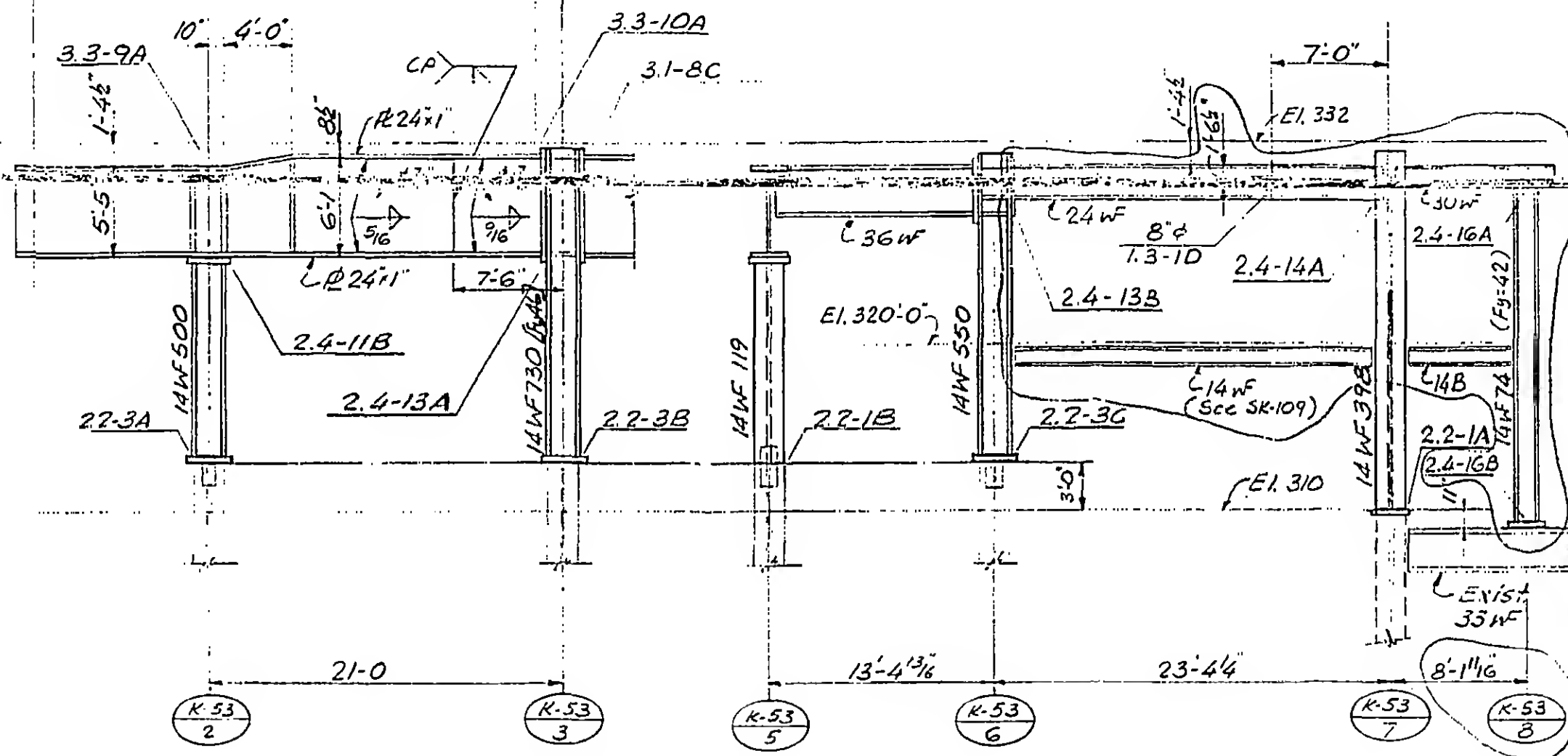
DATE	11-3-72
------	---------

REVISIONS

RELEASE FOR
CONSTRUCTION
11-20-72

12-11-72

4-20-73



DESIGNED
L. Chiang
DRAWN
John G. ...
REVIEWED

13-K2.1-10

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER

TITLE GIRDER ELEVATION LINE 55

DATE 11-3-72

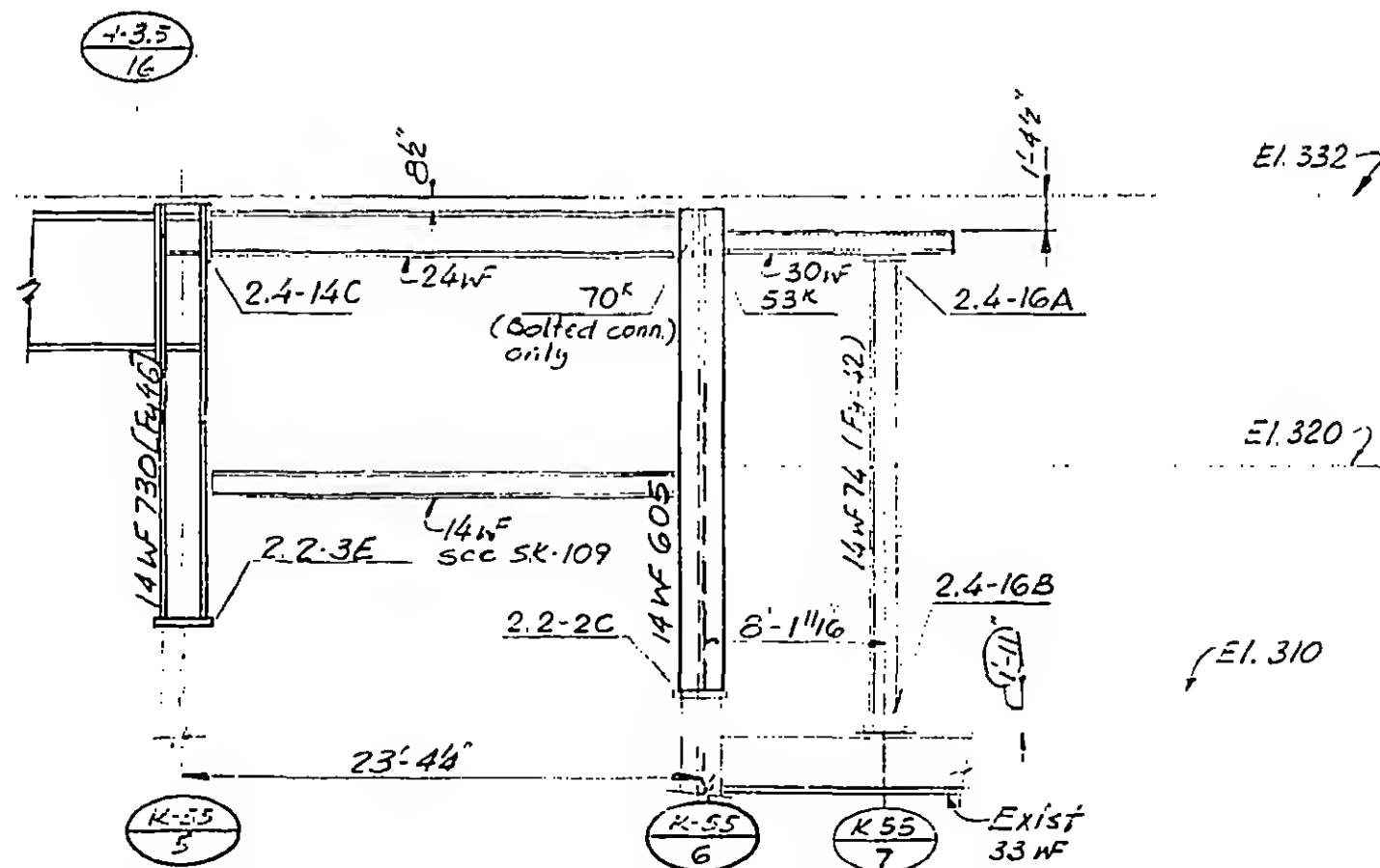
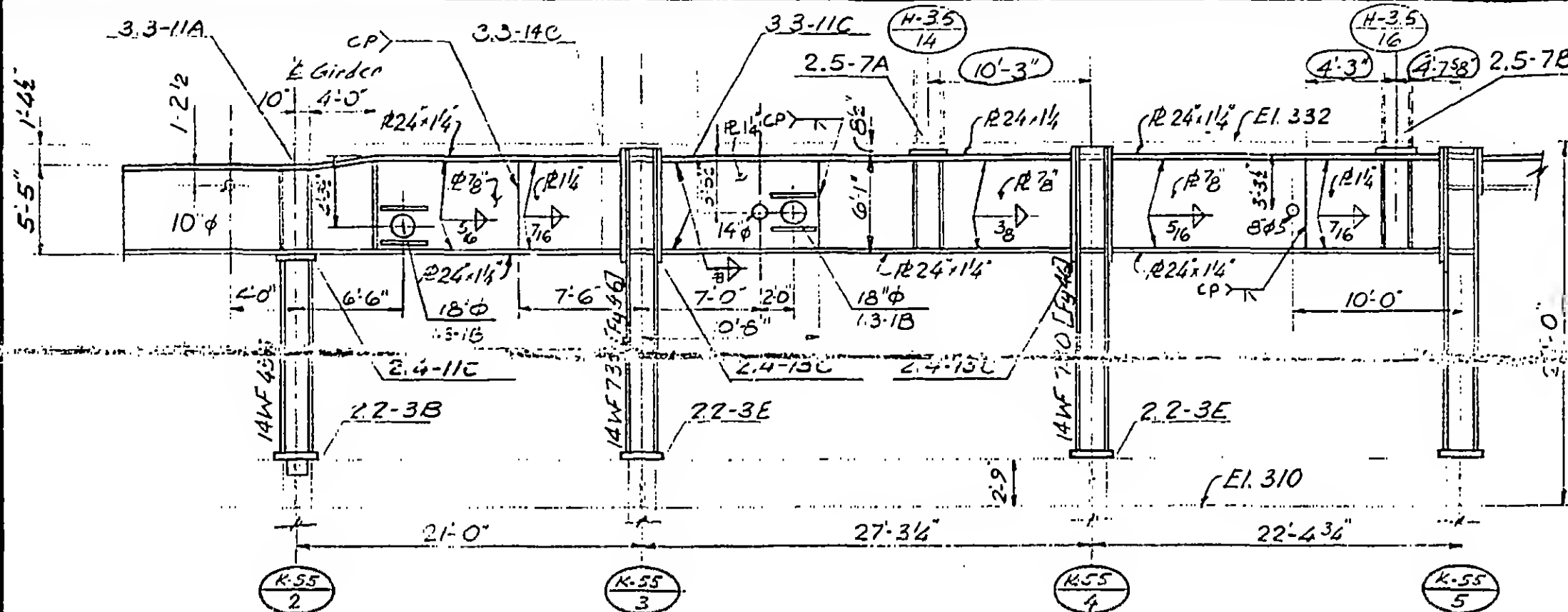
REVISIONS

RELEASE FOR
CONSTRUCTION
11-20-72

12-11-72

4-20-73

8-22-73



DESIGNED

K. Chiang

DRAWN

John Grieco

REVIEWED

13-K2.1-11

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER

TITLE GIRDER ELEVATION LINE 57

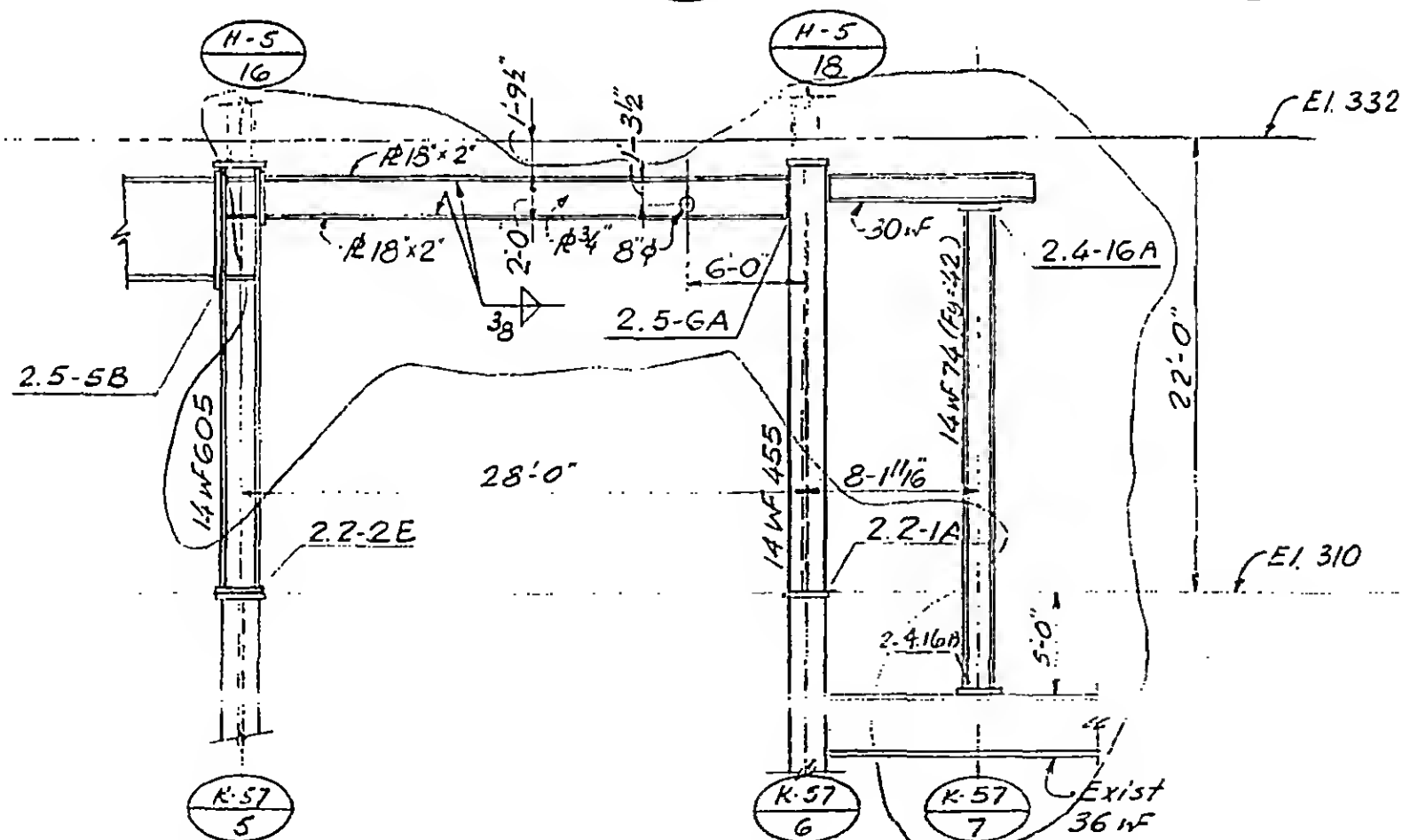
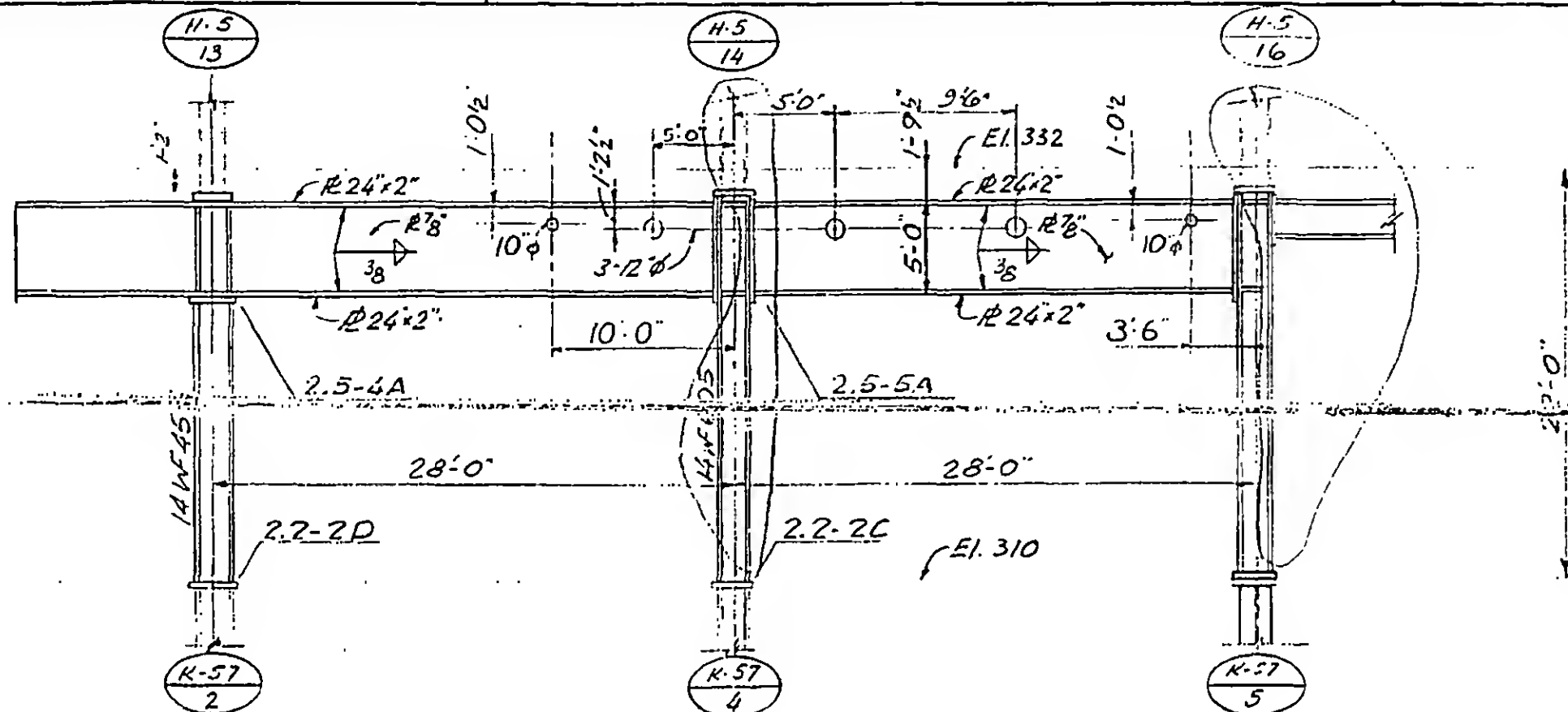
DATE 11-3-72

REVISIONS

RELEASE FOR
CONSTRUCTION
11-20-72

12-11-72

4-20-73



DESIGNED

K. Chiang

DRAWN

John G. G. G.

REVIEWED

13-K2.1-12

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

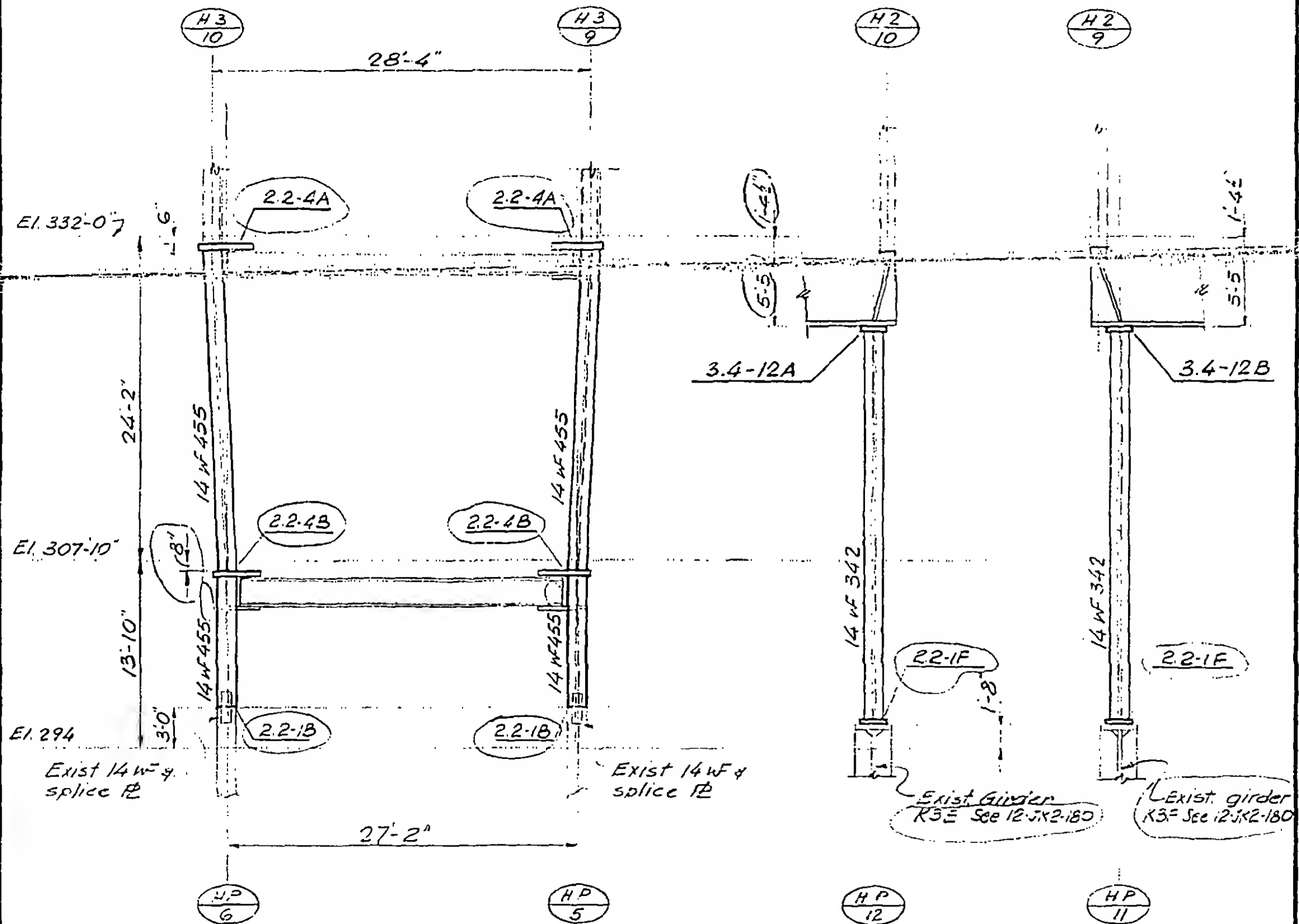
Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER

TITLE COLUMN ELEVATION

DATE 11-3-72

REVISIONS

Released for
construction
11-20-72

DESIGNED

DRAWN

REVIEWED

13-K2.1-13

SKILLING, HELLE. CHRISTIANSEN, ROBERTSON

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PROJECT THE WORLD TRADE CENTER

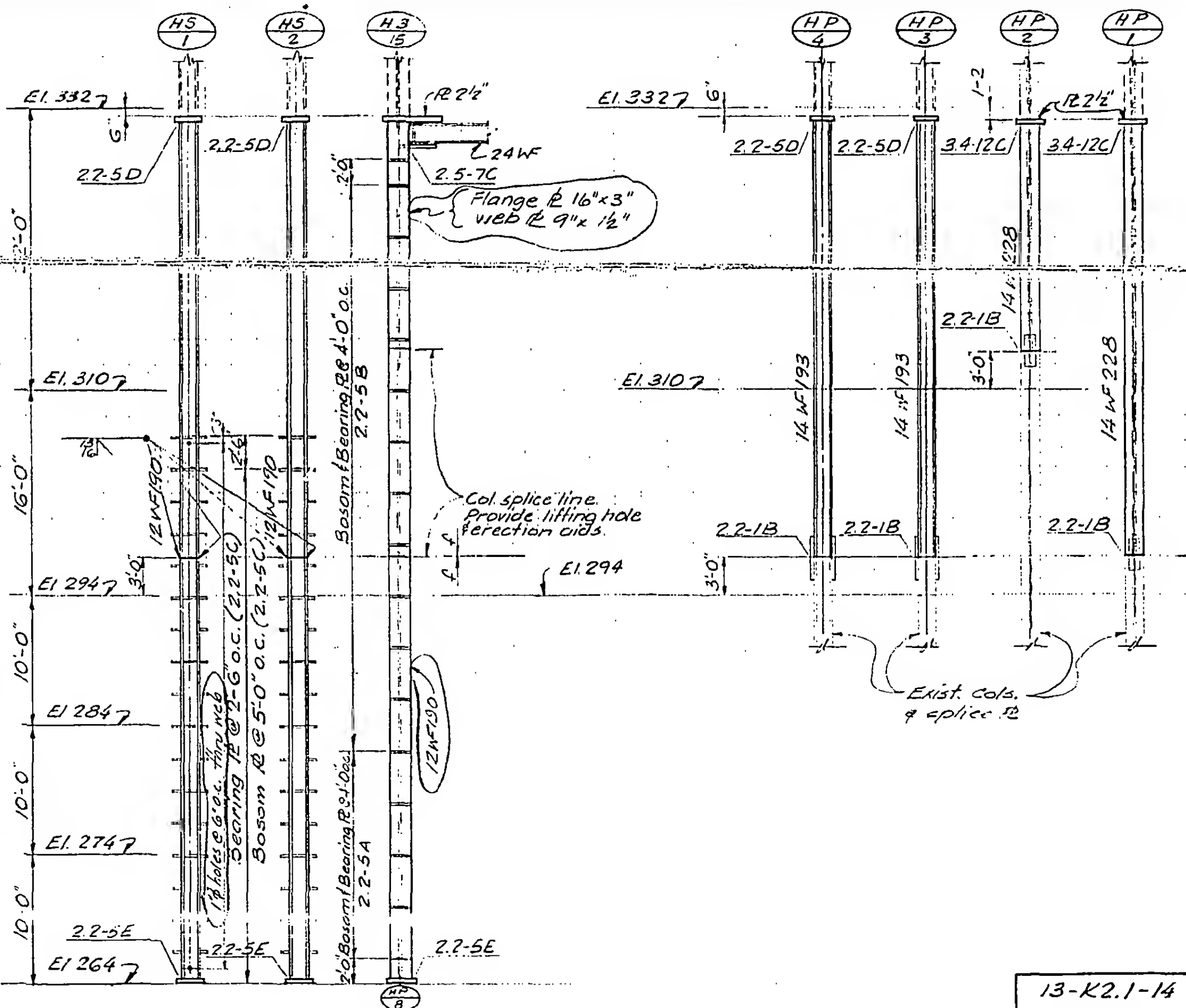
TITLE COLUMN ELEVATIONS

DATE 11-3-72

REVISIONS

RELEASE FOR
CONSTRUCTION
11-15-72

12-11-72



DESIGNED

DRAWN
J. M. G. R.
REVIEWED

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

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PROJECT THE WORLD TRADE CENTER

TITLE COLUMN ELEVATION

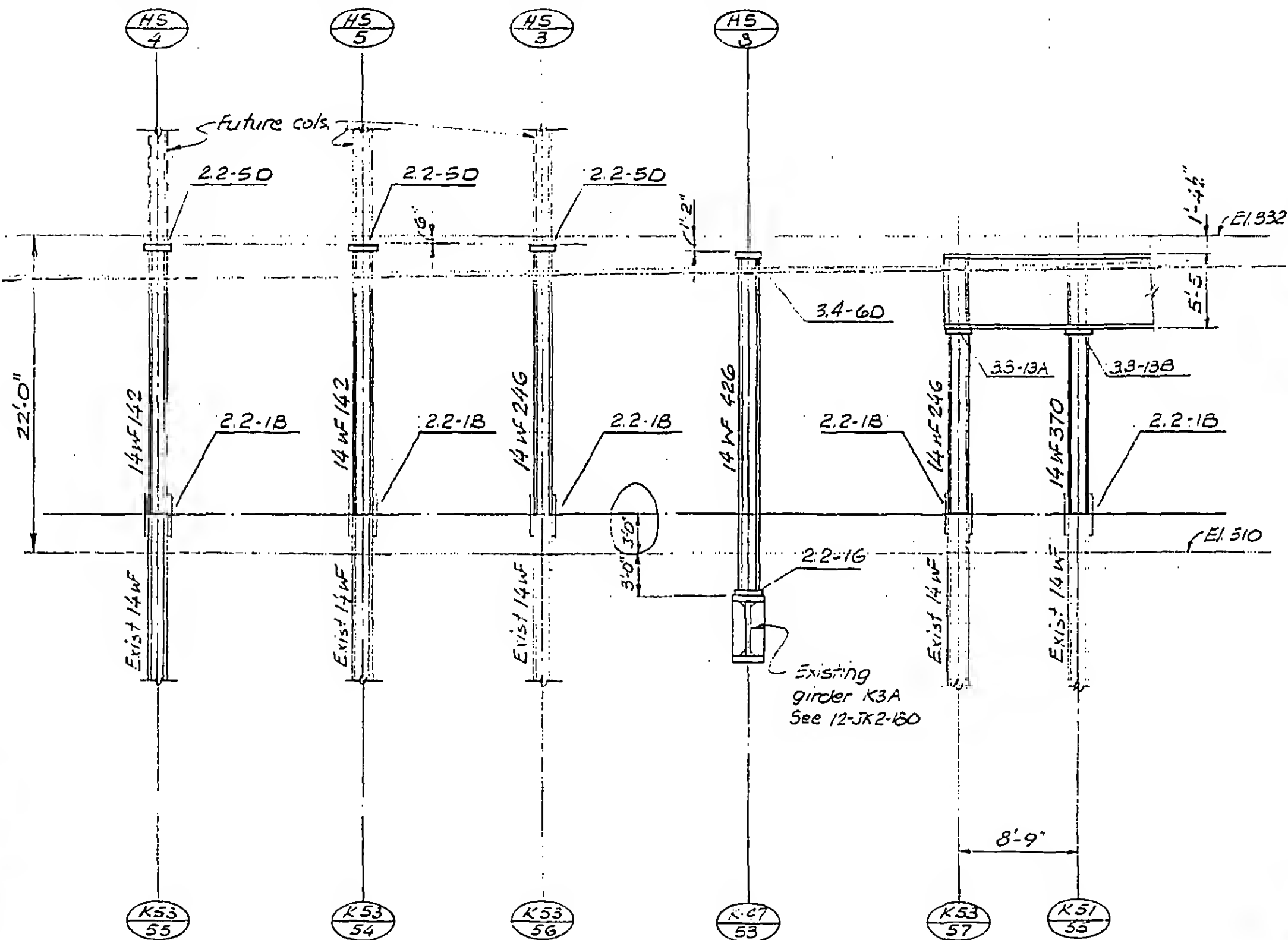
DATE

11-3-72

REVISIONS

Release for
construction
11-20-72

12-11-72



DESIGNED

DRAWN

REVIEWED

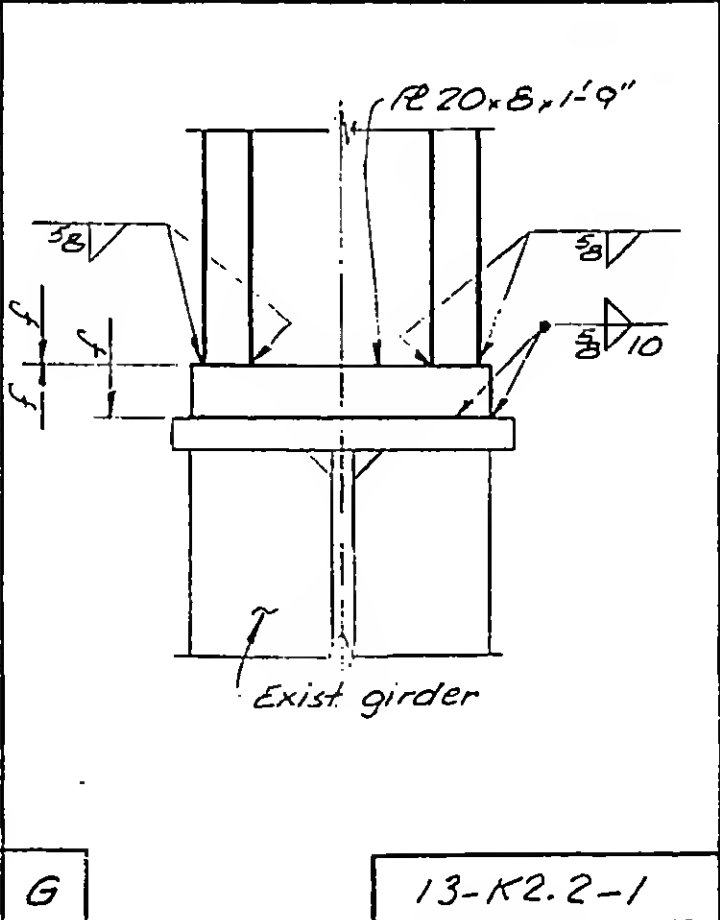
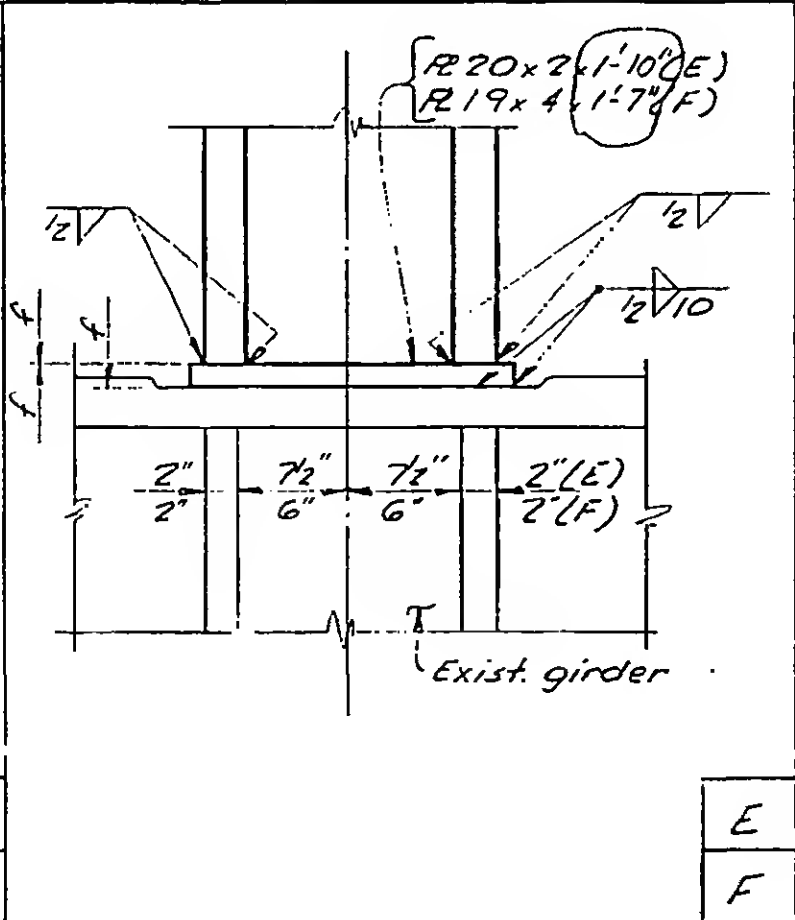
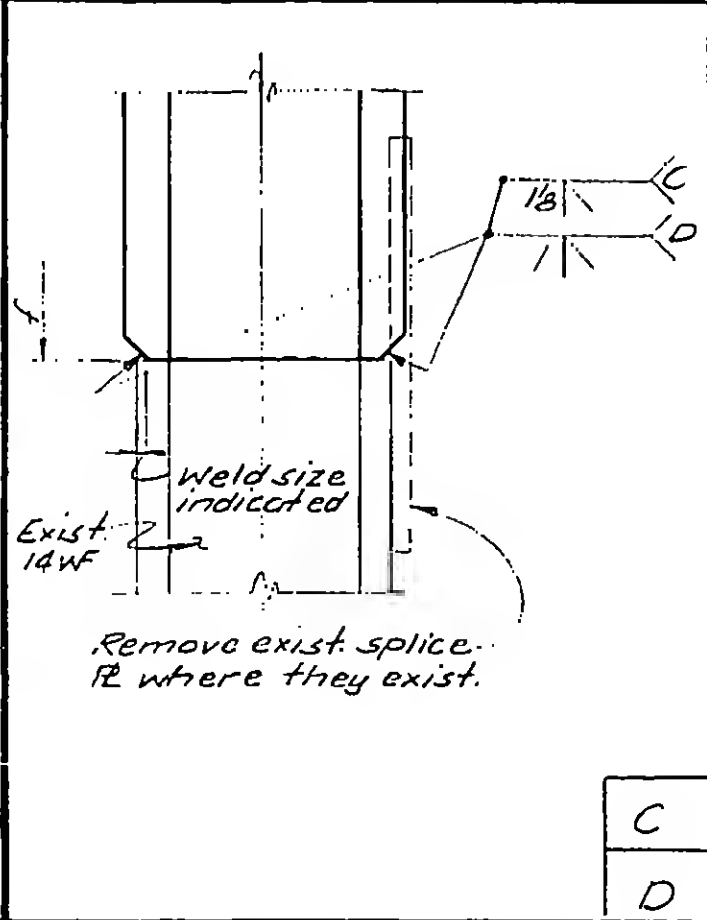
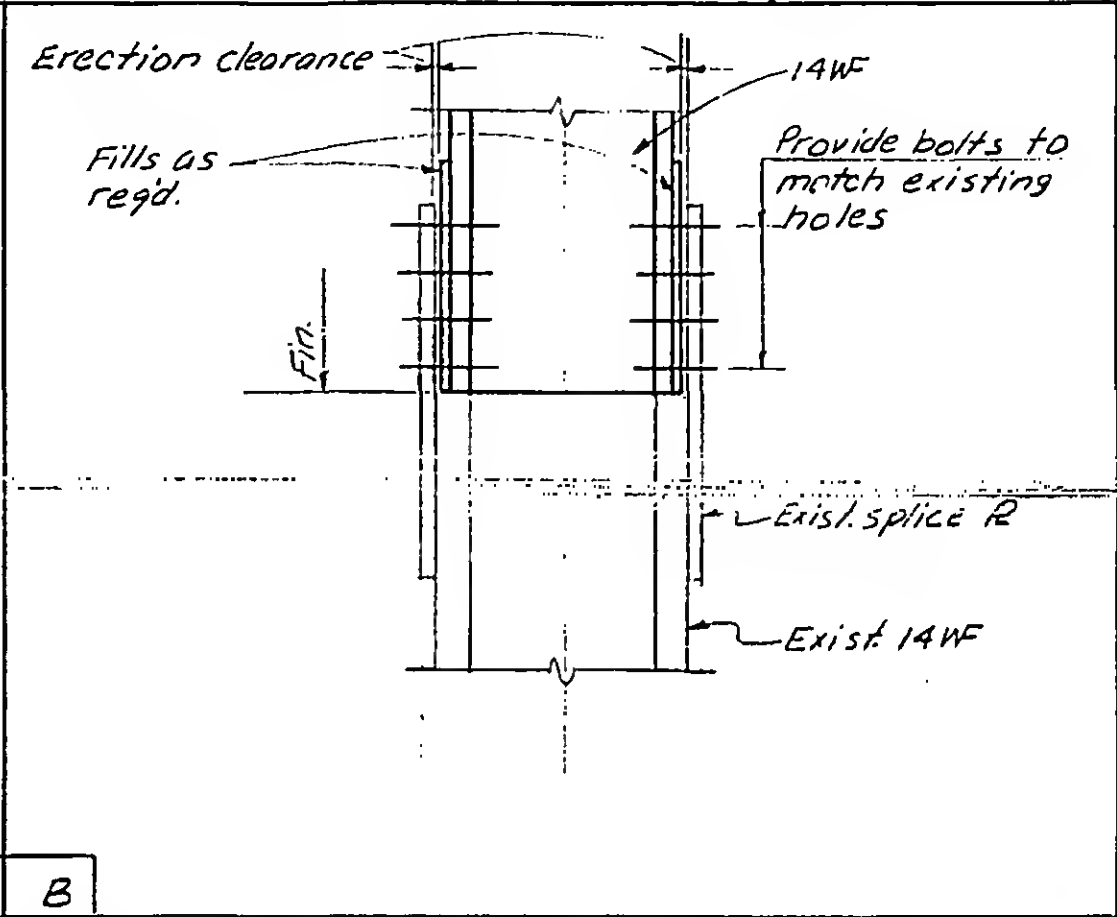
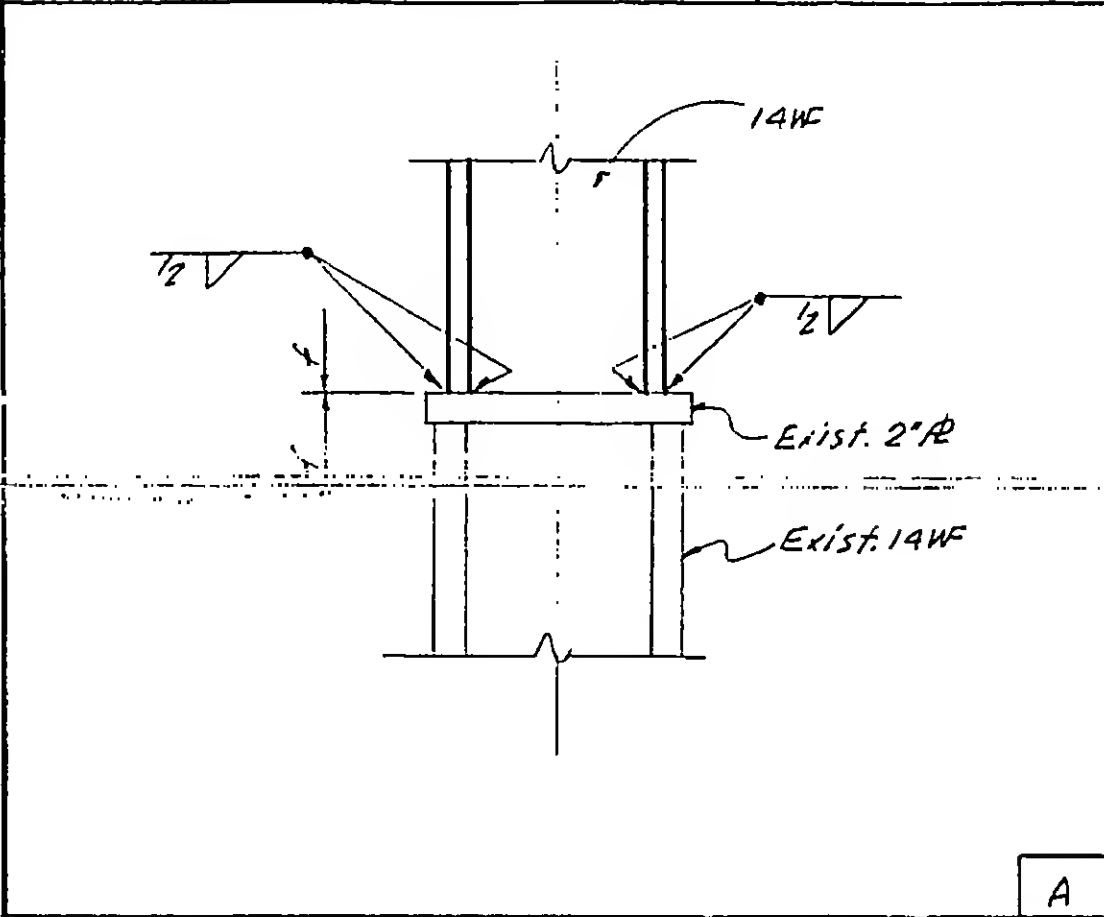
13-K2.1-15

REVISIONS

RELEASE FOR CONSTRUCTION

11-20-72

2-5-73



DESIGNED

DRAWN A.L. Franqui

REVIEWED

13-K2.2-1

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER

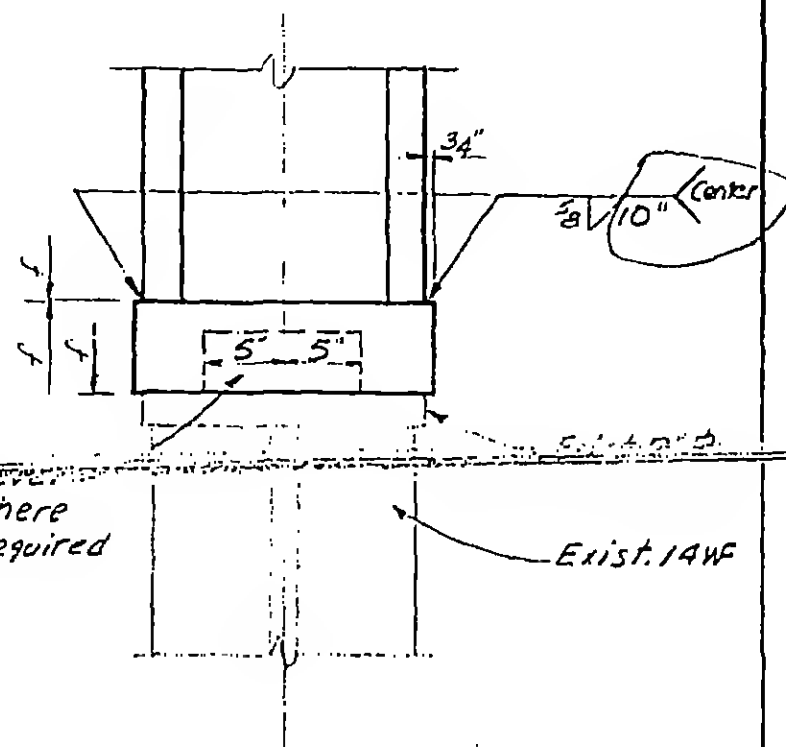
TITLE COLUMN BASE DETAILS

DATE 11-3-72

REVISIONS

RELEASE FOR
CONSTRUCTION
11-20-72

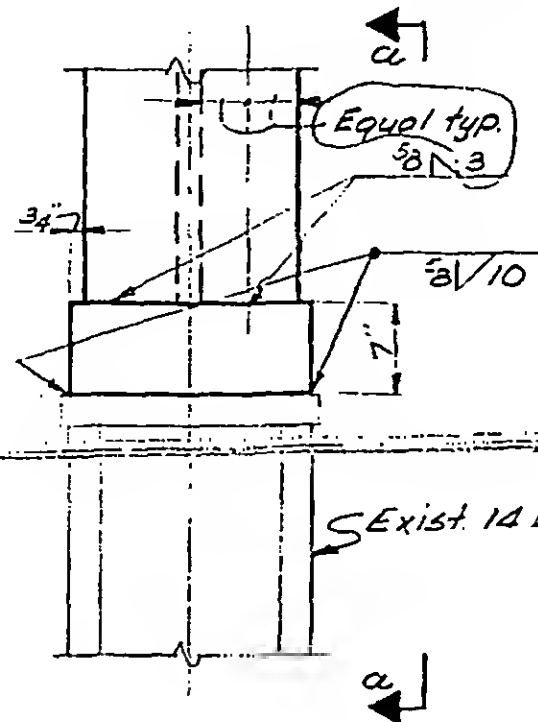
2-5-73



where
required

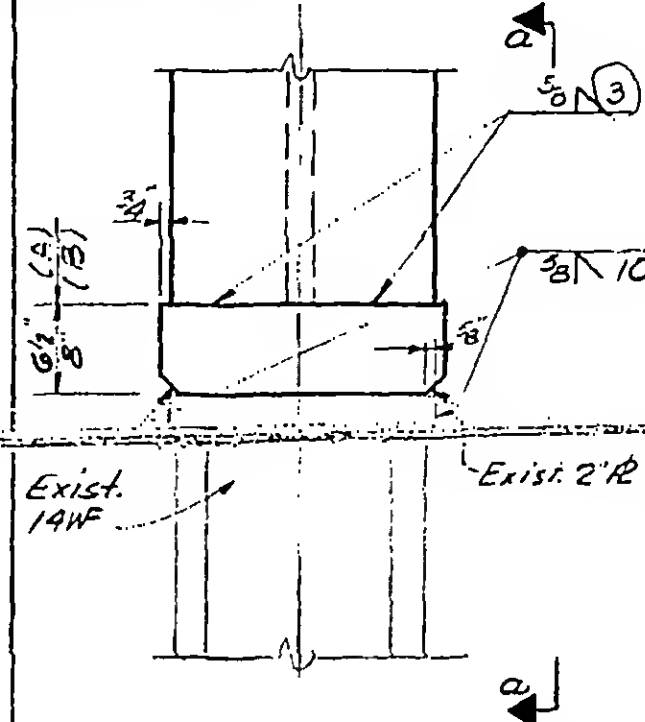
Exist. 14WF

A



Exist. 14WF

E

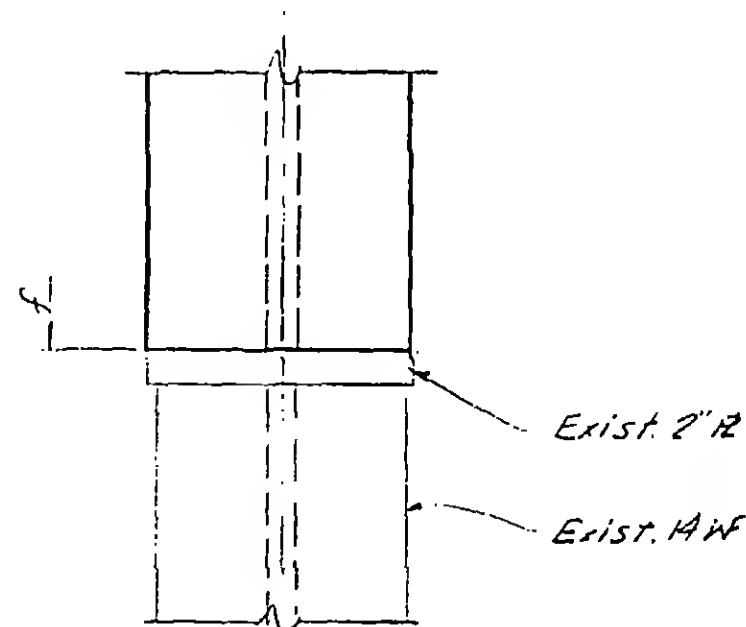


Exist.
14WF

Exist. 2"R

A

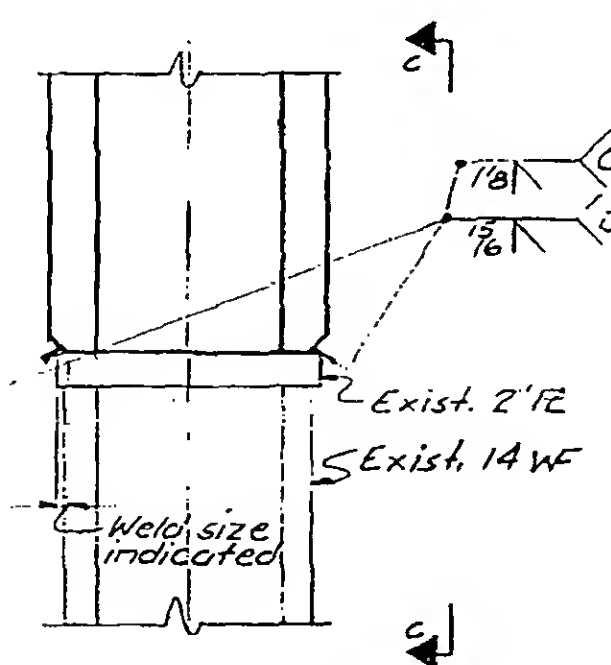
B



Exist. 2"R

Exist. 14WF

C



Exist. 2"R

Exist. 14WF

C

D



DESIGNED

DRAWN
A.L. Frangul

REVIEWED

13-K2.2-2

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

Structural & Civil Engineers

PROJECT

THE WORLD TRADE CENTER

TITLE

COLUMN BASE DETAILS

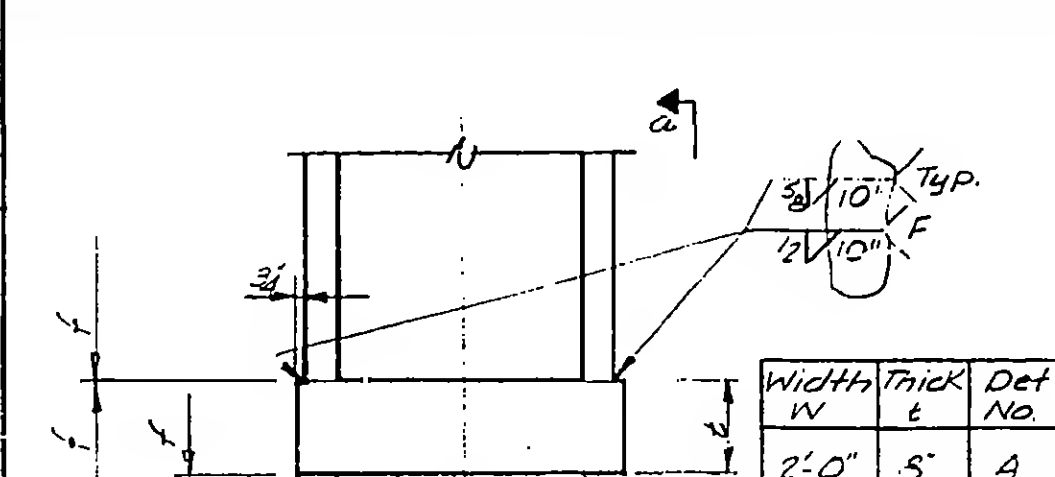
DATE

11-3-72

REVISIONS

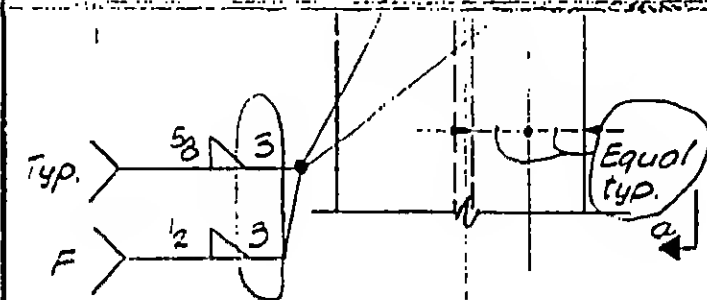
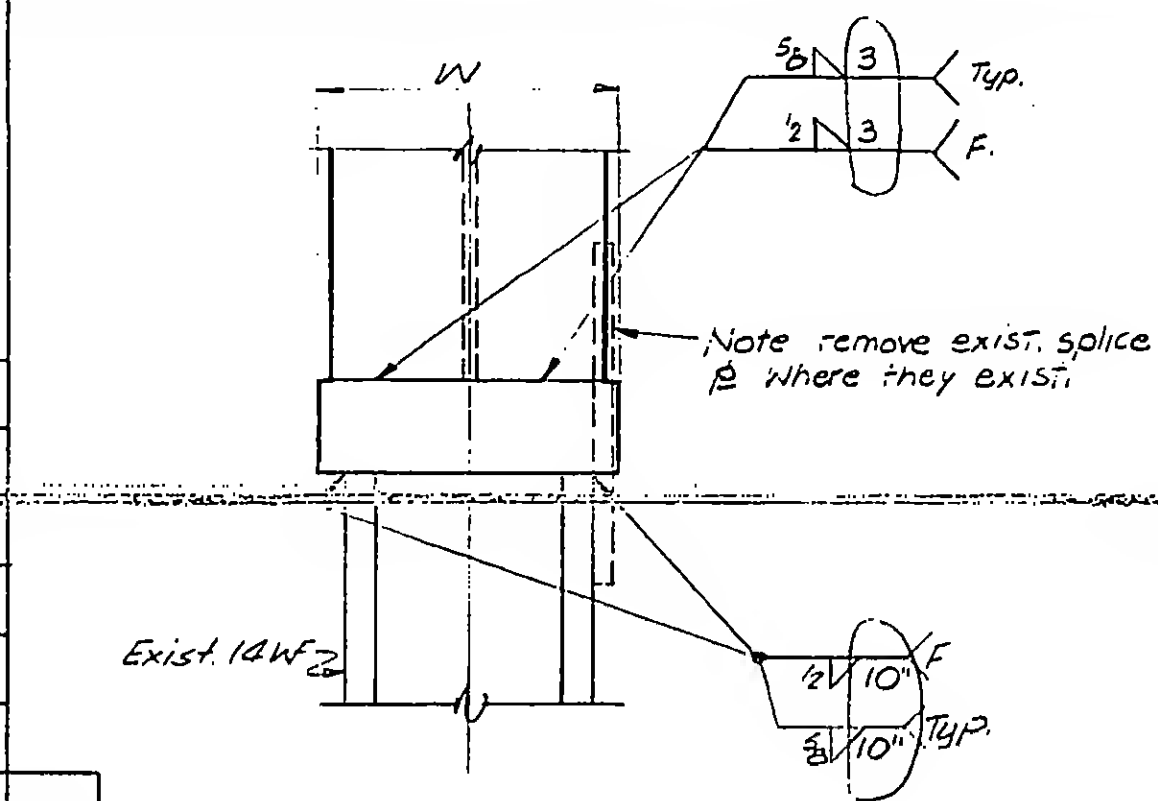
RELEASE FOR
CONSTRUCTION
11-20-72

2-5-73

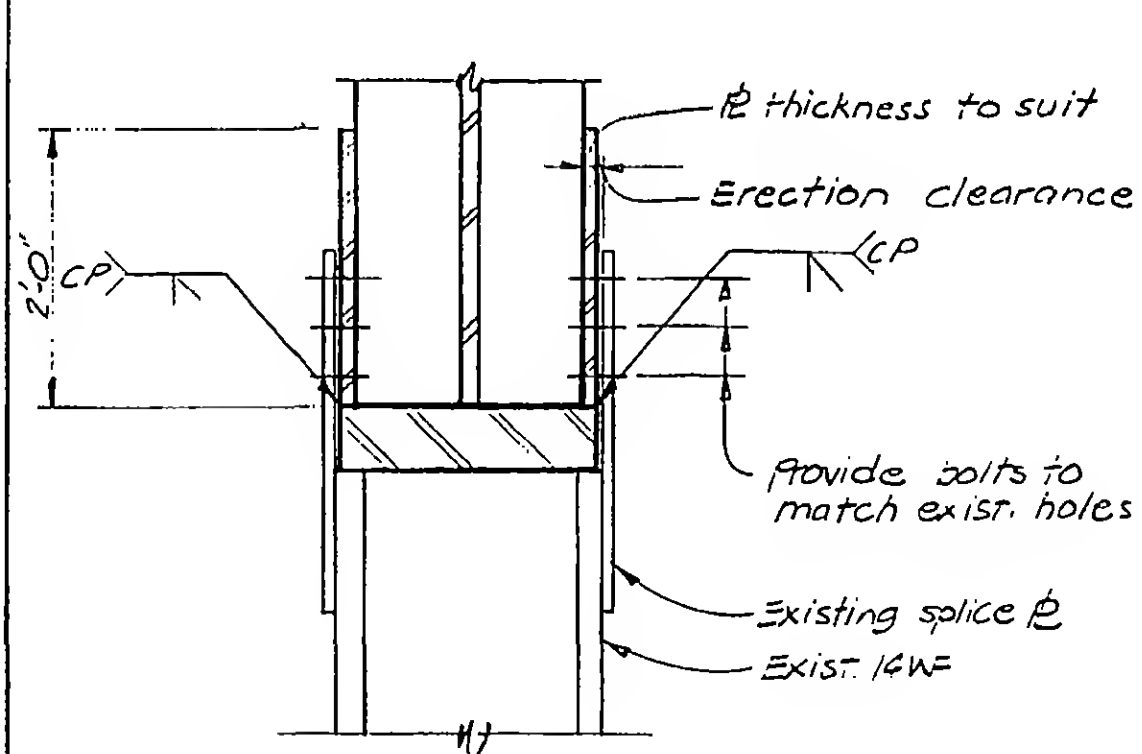
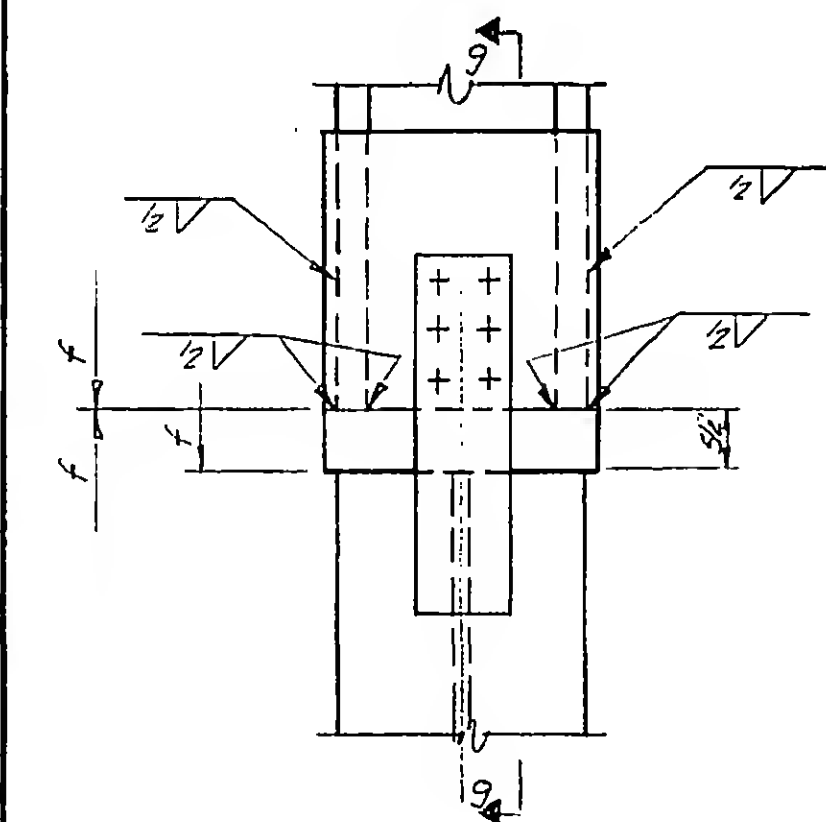


Width W	Thick t	Det No.
2'-0"	5"	A
2'-0"	7"	B
1'-10"	6 1/2"	C
2'-0"	9"	D
2'-0"	6 1/2"	E
2'-0"	5"	F

a



Exist. 14WF2



1/2 thickness to suit
Erection clearance

provide bolts to
match exist. holes

Existing splice @
Exist. 14WF



DESIGNED

DRAWN
G. G. G.

REVIEWED

G 9

13-K2.2.5

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

Structural & Civil Engineers

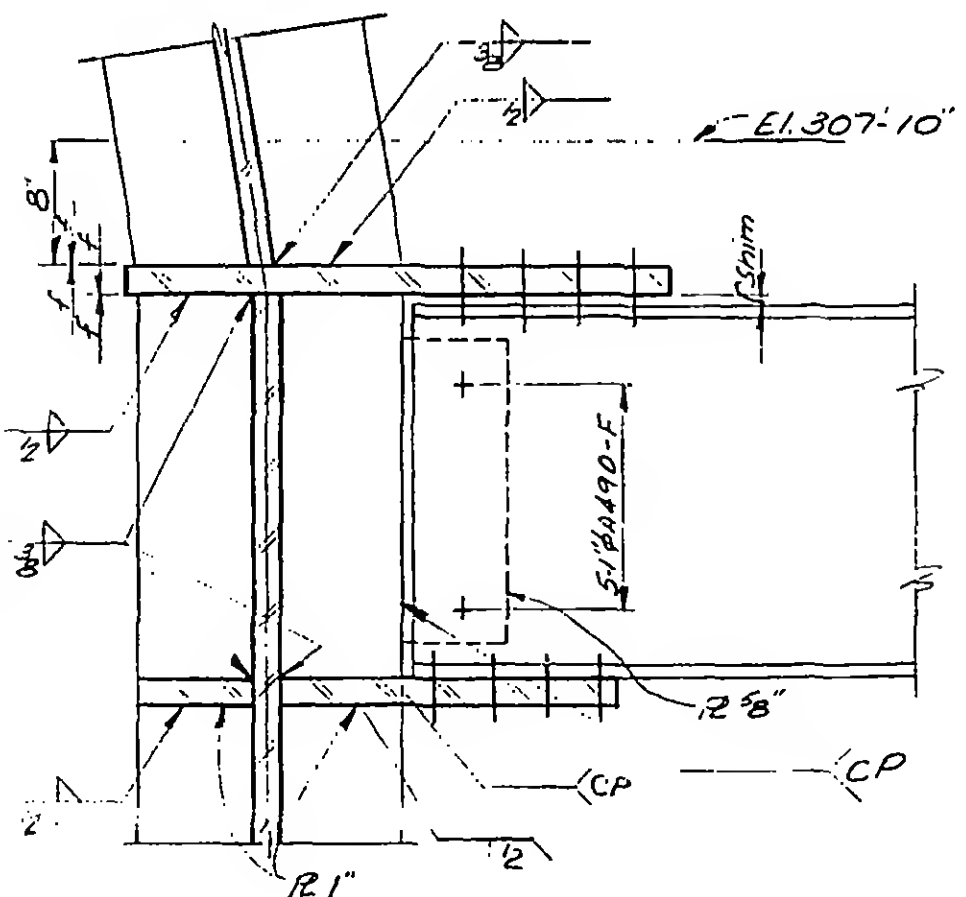
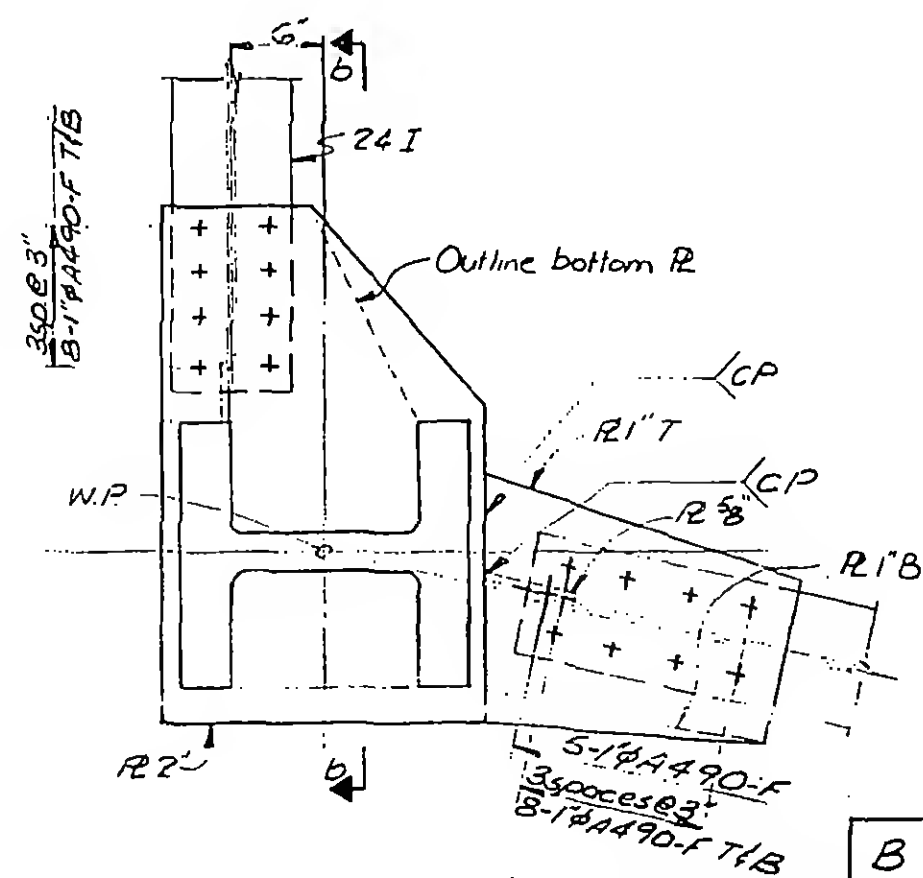
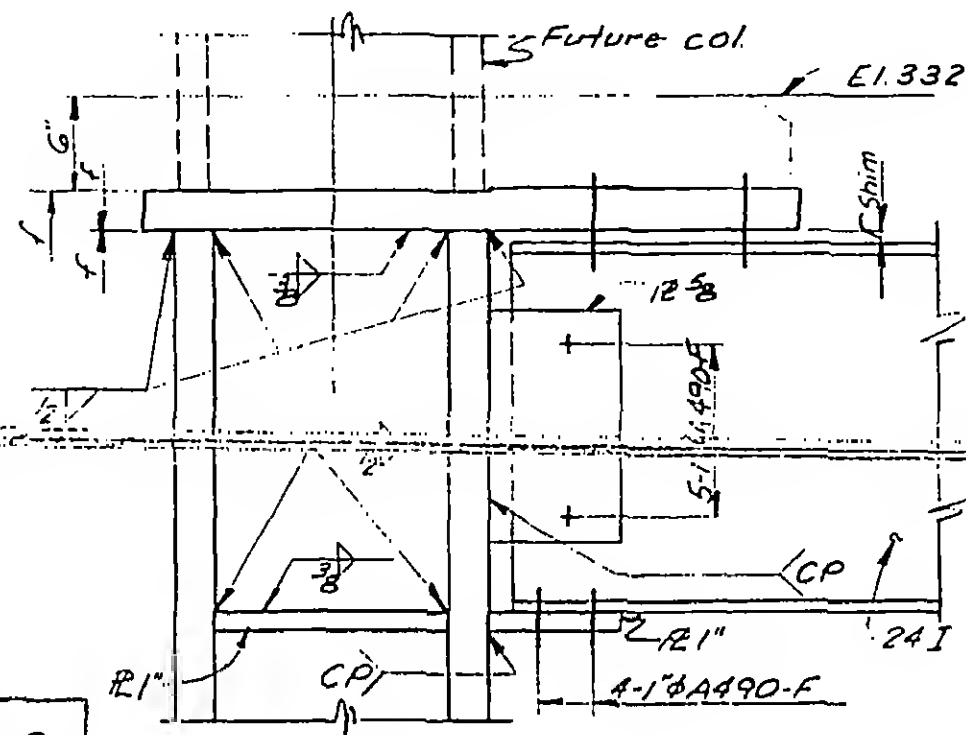
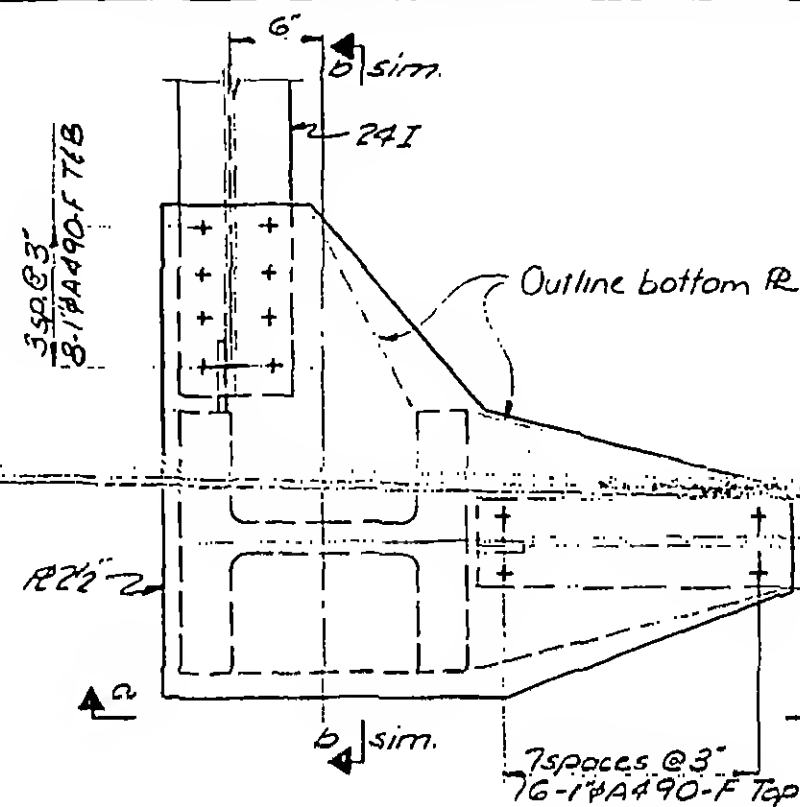
PROJECT THE WORLD TRADE CENTER

TITLE COLUMN DETAILS

DATE 11-20-72

REVISIONS

RELEASE FOR
CONSTRUCTION
11-20-72



DESIGNED

DRAWN
TR

REVIEWED

13-K2.2-4

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

Structural & Civil Engineers

PROJECT

THE WORLD TRADE CENTER

TITLE

COLUMN BASE DETAILS

DATE

11-3-72

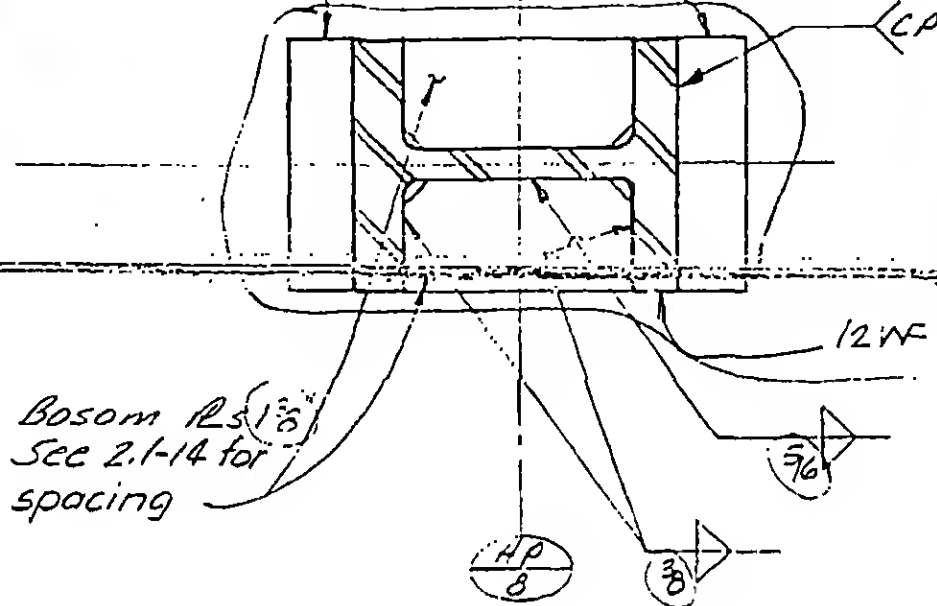
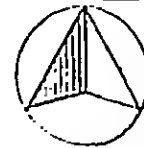
REVISIONS

RELEASE FOR
CONSTRUCTION
11-15-72

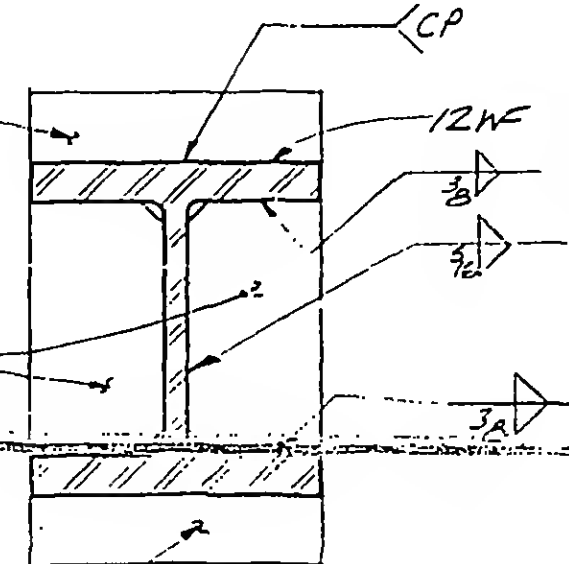
12-11-72

Bearing R5
2" x 1"
See 2.1-14
for spacing

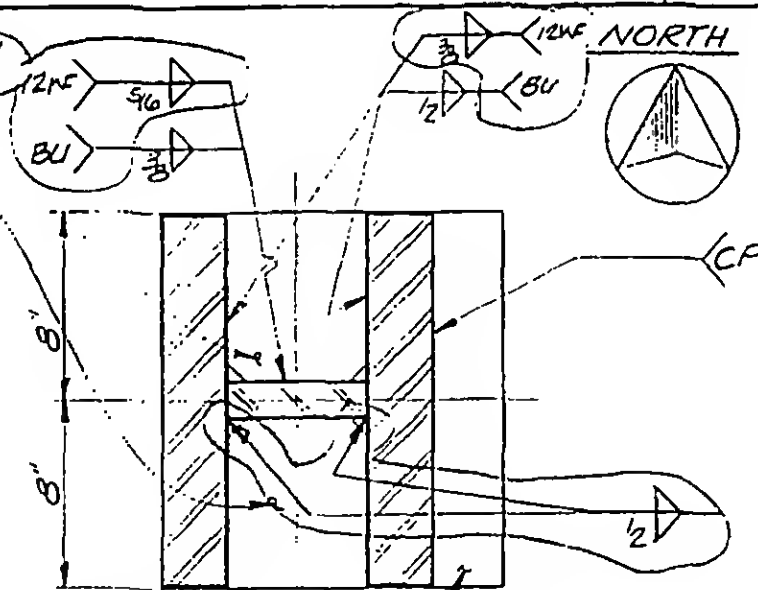
NORTH



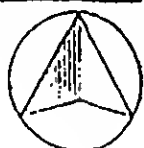
A

Bearing R 3x1"
See 2.1-14 for
spacingBosom R 1"
See 2.1-14 for
spacingBearing R 3x1"
See 2.1-14 for
spacing

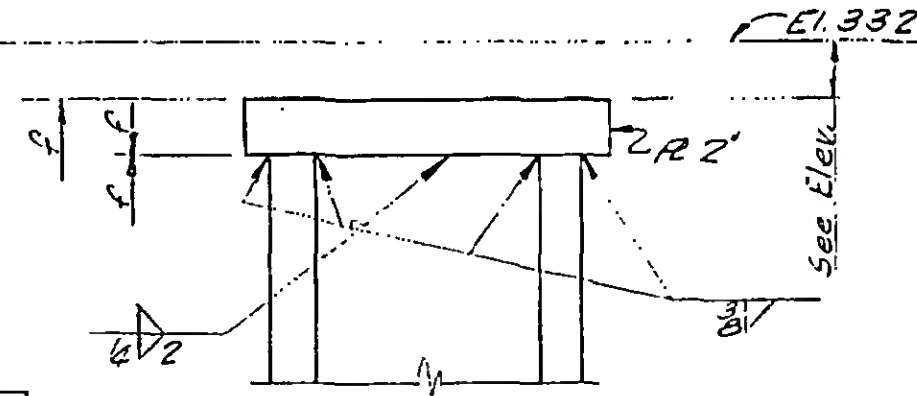
C

Bosom R5 1 1/8"
See 2.1-14 for
spacing

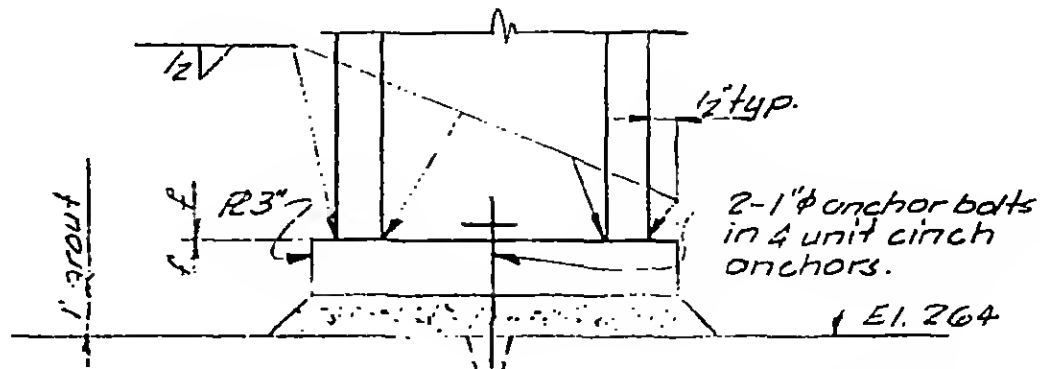
NORTH



D



E



13-K2.2-5



DESIGNED

DRAWN

REVIEWED

Note: Built up
column shown
2WF Bosom &
Bearing R5
notedBearing R5
3" x 14" Built up
2 x 1" 12WF &
See 2.1-14 for
spacing

B

E

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

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PROJECT THE WORLD TRADE CENTER

TITLE TYPICAL GIRDER DETAILS

DATE 11-3-72

REVISIONS

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CONSTRUCTION
11-20-72

See Plan & elevations

SCHEDULE

Thick. t top flange (in)	Thick. stiff R (in)	Weld 1
6/2	2/4	5/8
3 1/2 to 4	1 3/8	1/2
3 to 3 1/4	1/4	1/2
2 or less	1	3/8

See Plan & elevation

Weld 1

Weld 1

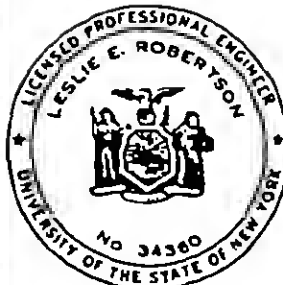
Weld 1

Weld 1

Stiff R (see schedule)
fit to bear top.

Stiff R (see schedule)
fit to bear top

Weld 1 Weld 1



DESIGNED

DRAWN

REVIEWED

13-K2.3-1

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER

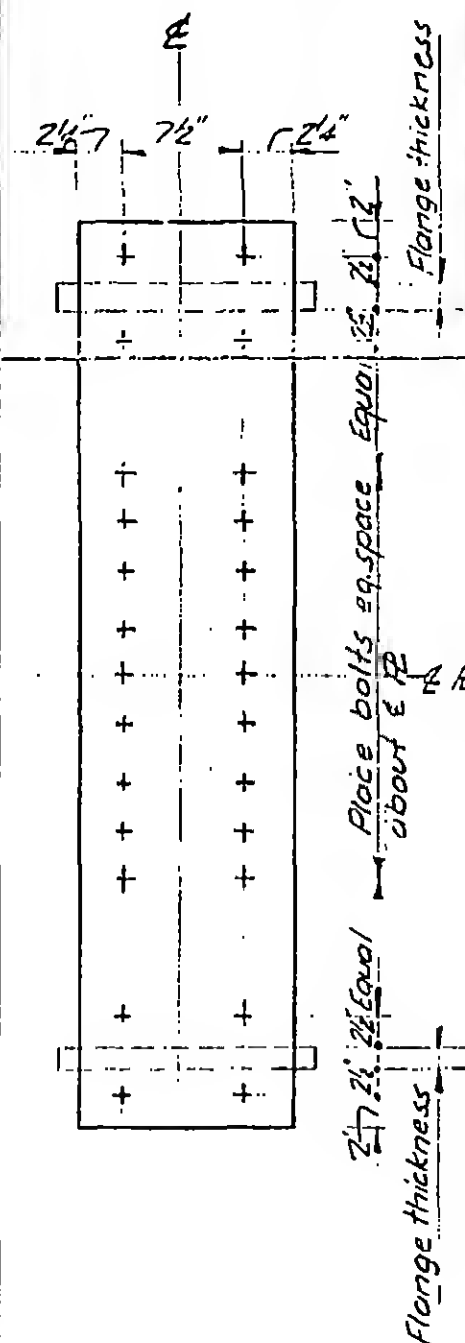
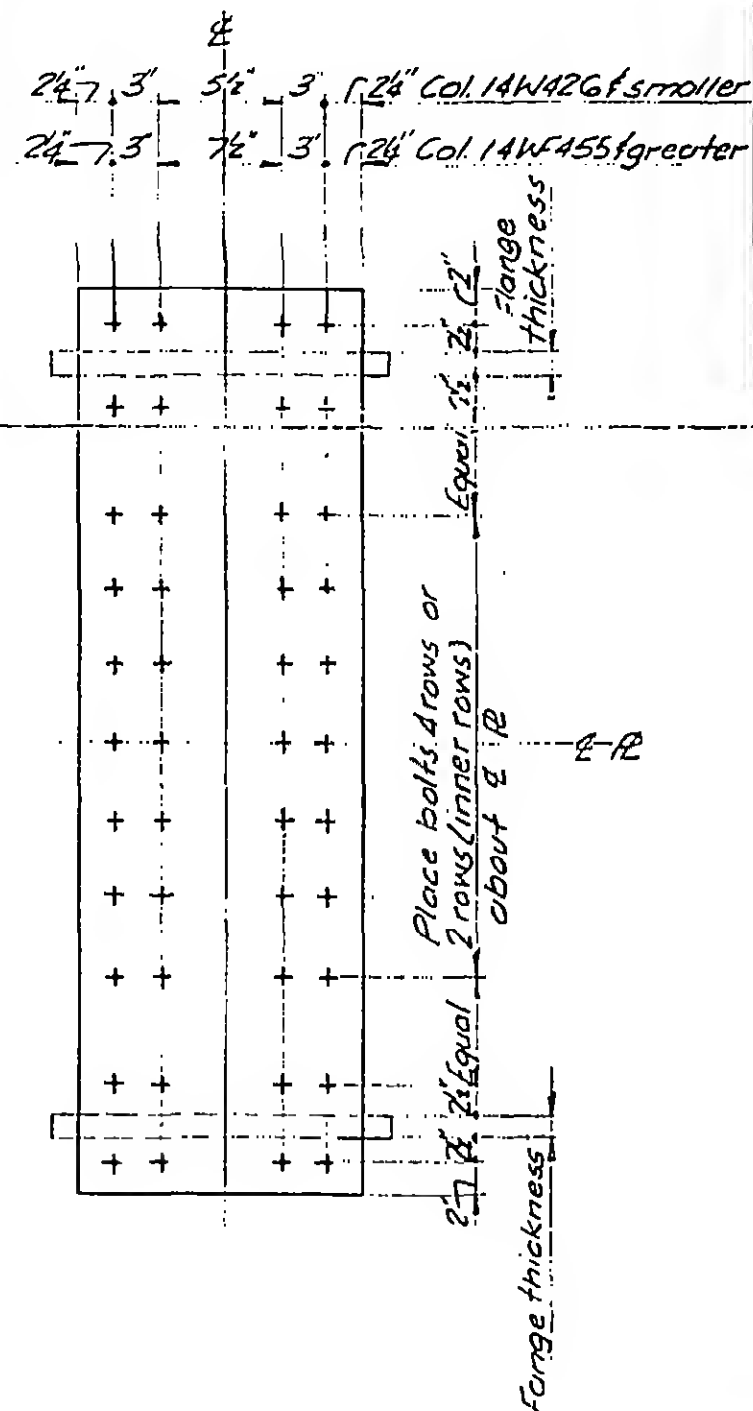
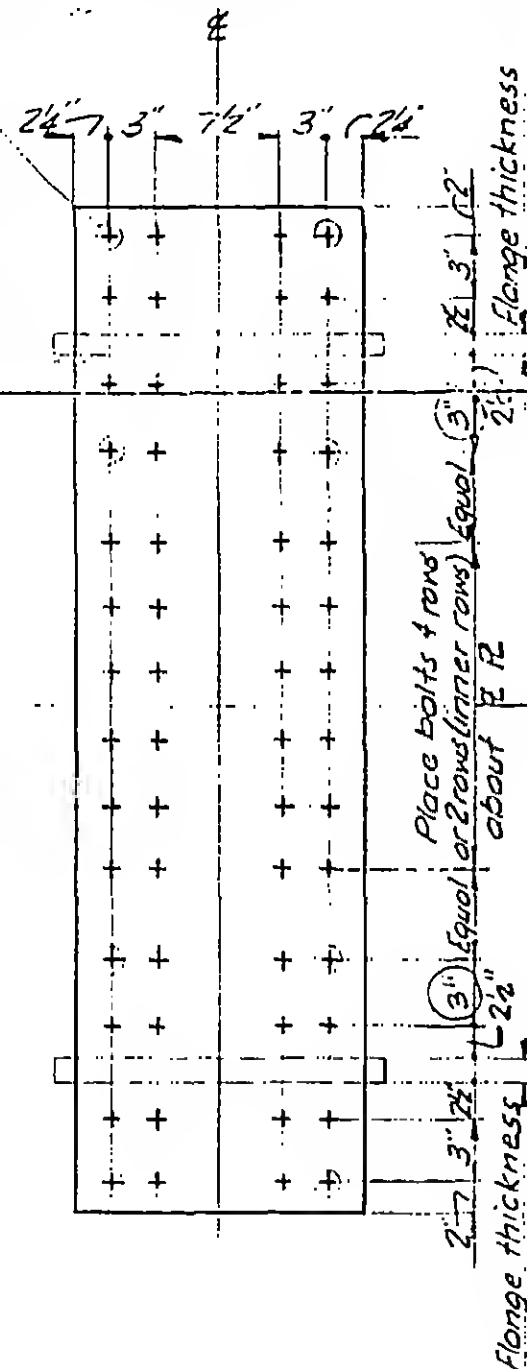
TITLE GIRDER TO COLUMN CONNECTION TYPICAL AT END PLATE

DATE 11-20-72

REVISIONS

RELEASE FOR
CONSTRUCTION
11-20-72

12-11-72

Leave out 4 corner bolts, if
12 bolts called out in detail 2.4-

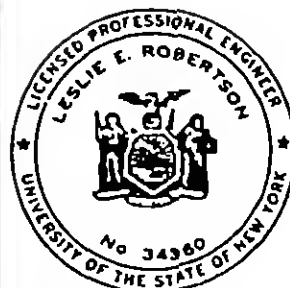
Notes to 2.4 Details

1. See specific 2.4 Details for number of bolts.
2. All bolts of 2.4 Details to be A490 X, unless otherwise noted.

A B

C

13-K23-2



DESIGNED

DRAWN
TR

REVIEWED

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

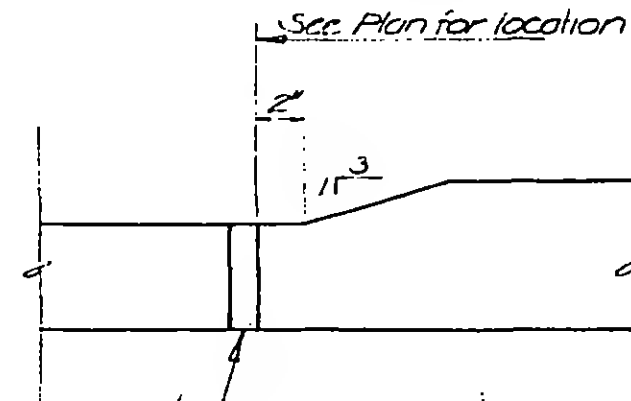
Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER

TITLE GIRDER FLANGE SPLICES - TYPICAL DETAILS

DATE 6-4-73

REVISIONS



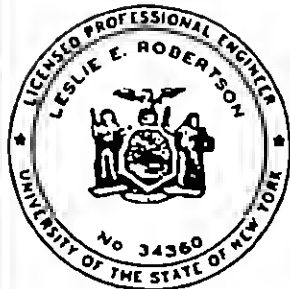
(A) CP weld
grind flush
at web

(B) CP weld
grind smooth
and flush
all surfaces

A

Upside down

B



DESIGNED

DRAWN

REVIEWED

LDRB

13-K2.3-3

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

Structural & Civil Engineers

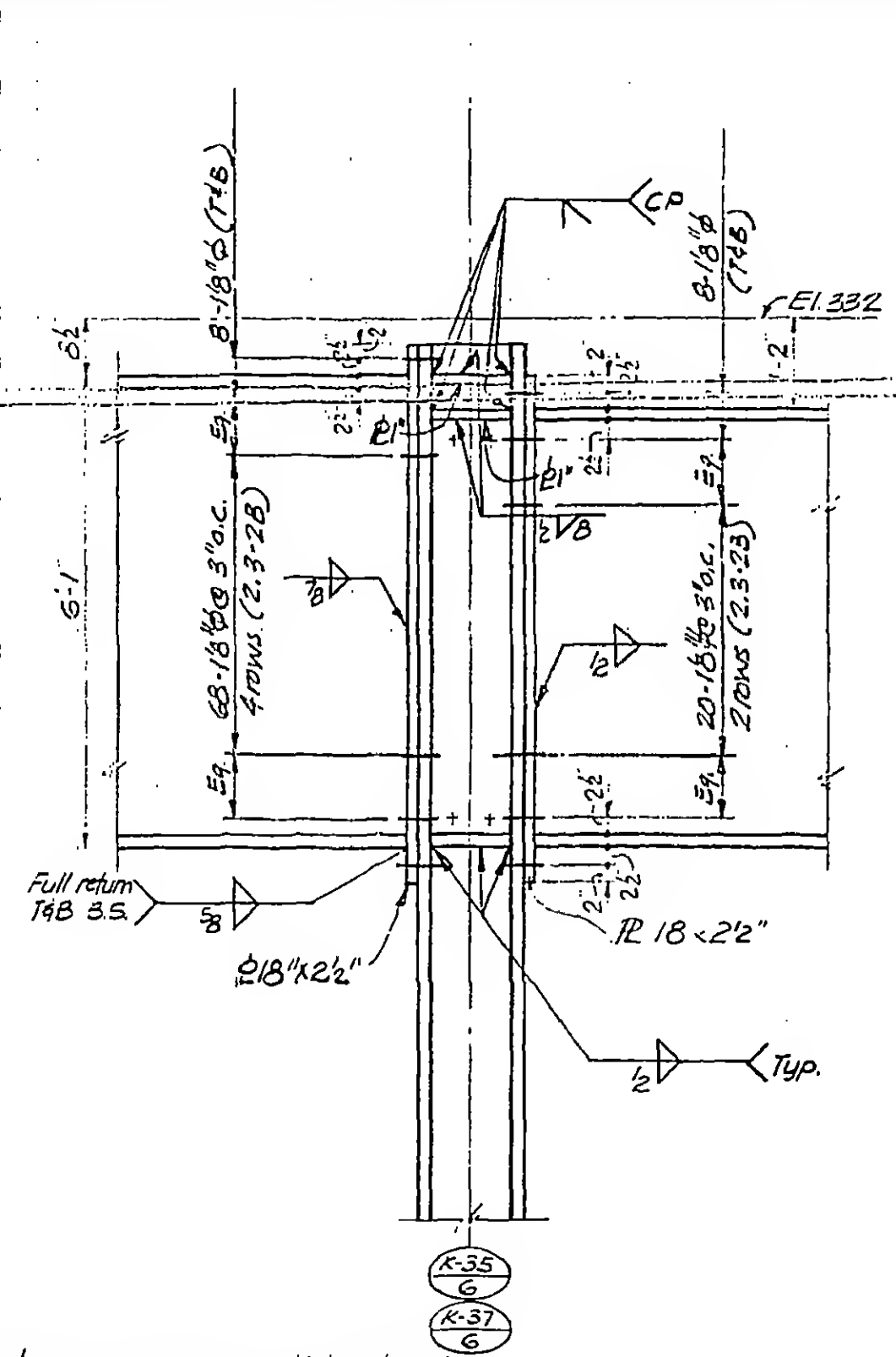
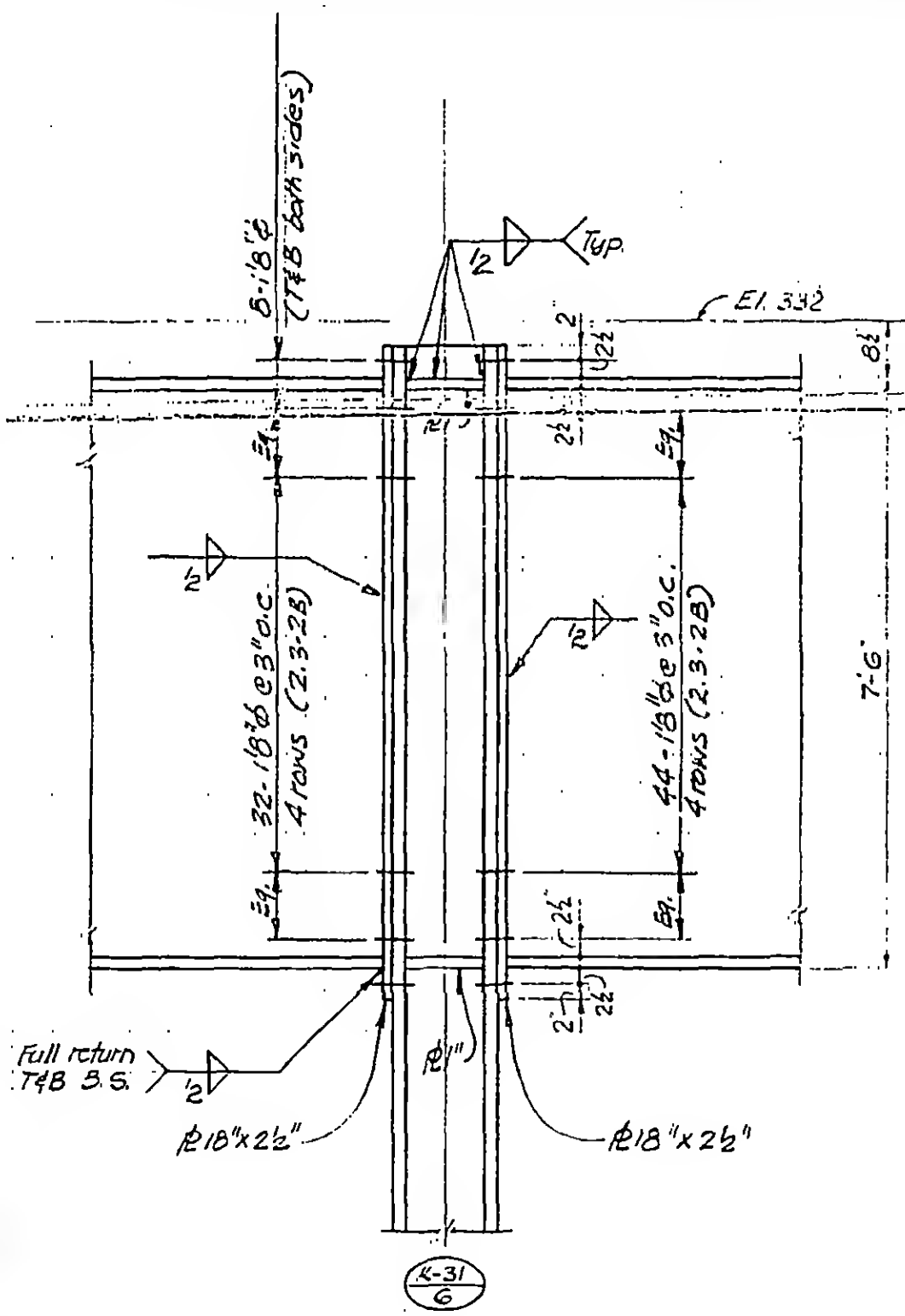
PROJECT THE WORLD TRADE CENTER

TITLE GIRDER COLUMN DETAILS

DATE 11-3-72

REVISIONS

General
Revision
Released for
construction
11-20-72



Note: All bolts to be A490X on this sheet.



DESIGNED

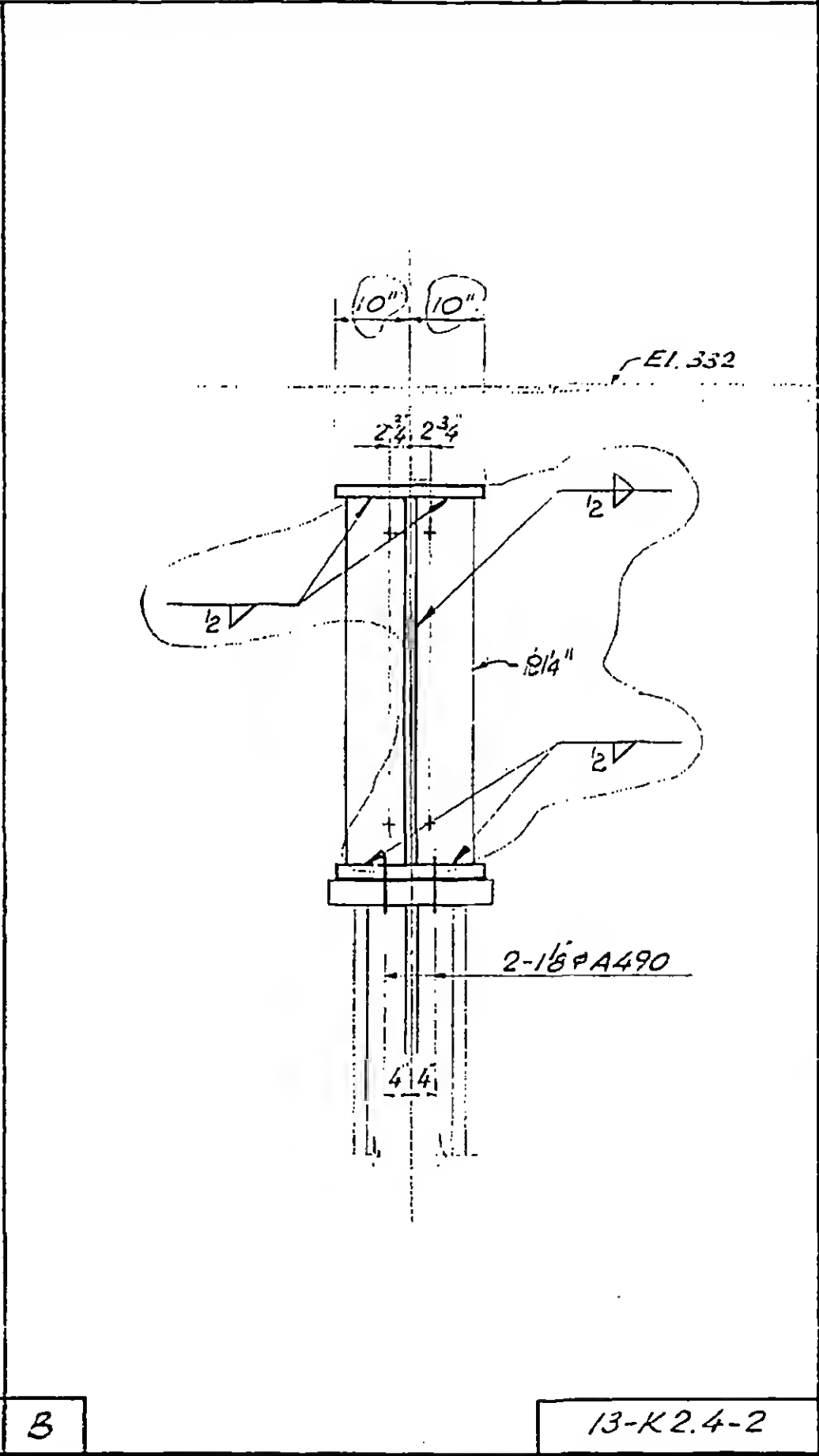
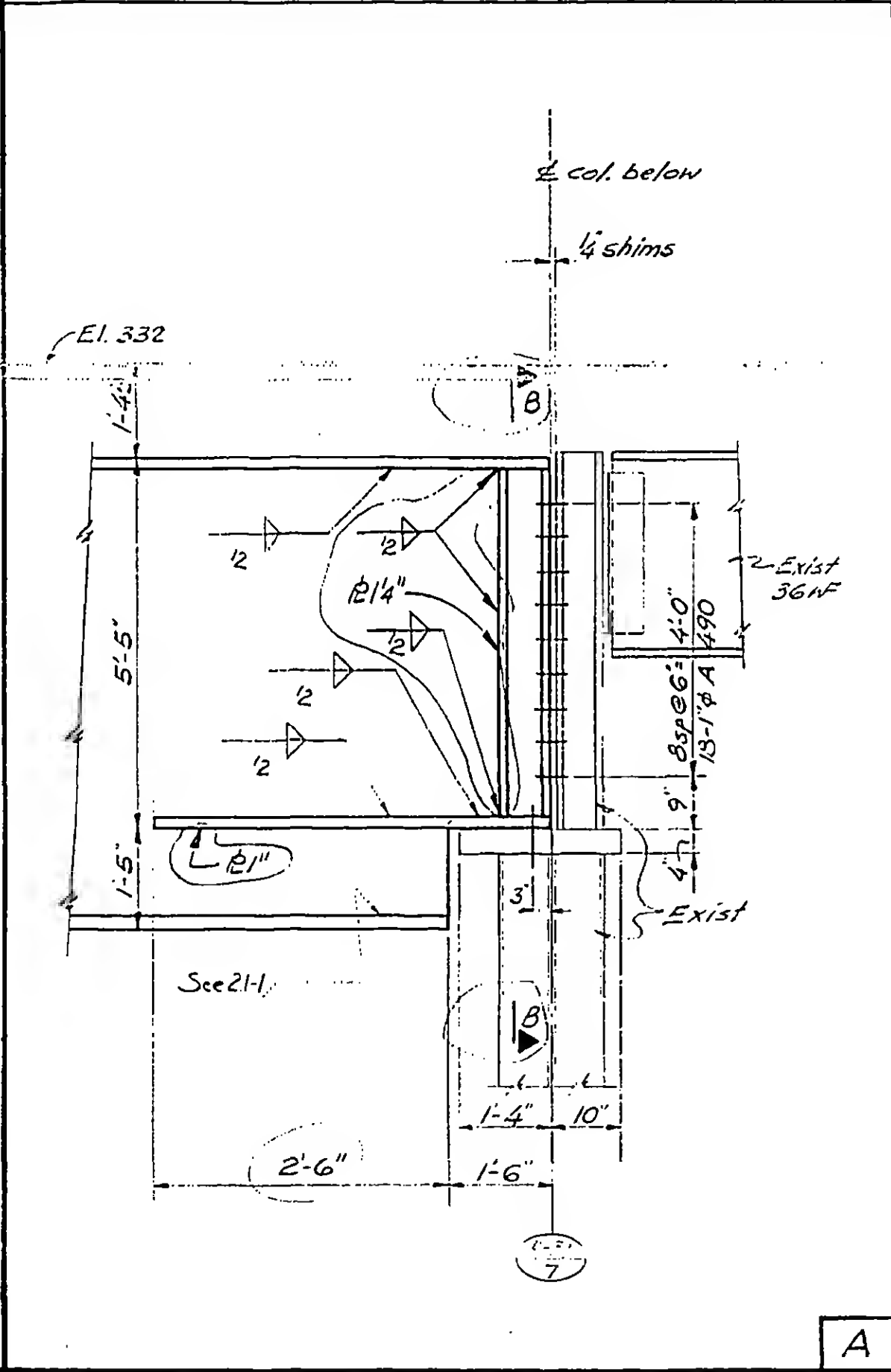
DRAWN
10/1/72
REVIEWED

A B

13-K2.4-1

REVISIONS

Released for construction
11-20-72



LICENSED PROFESSIONAL ENGINEER

LESLIE E. ROBERTSON

UNIVERSITY OF THE STATE OF NEW YORK

NO 34360

DESIGNED

DRAWN *John Robertson*

REVIEWED

A	B
---	---

13-K2.4-2

Structural & Civil Engineers

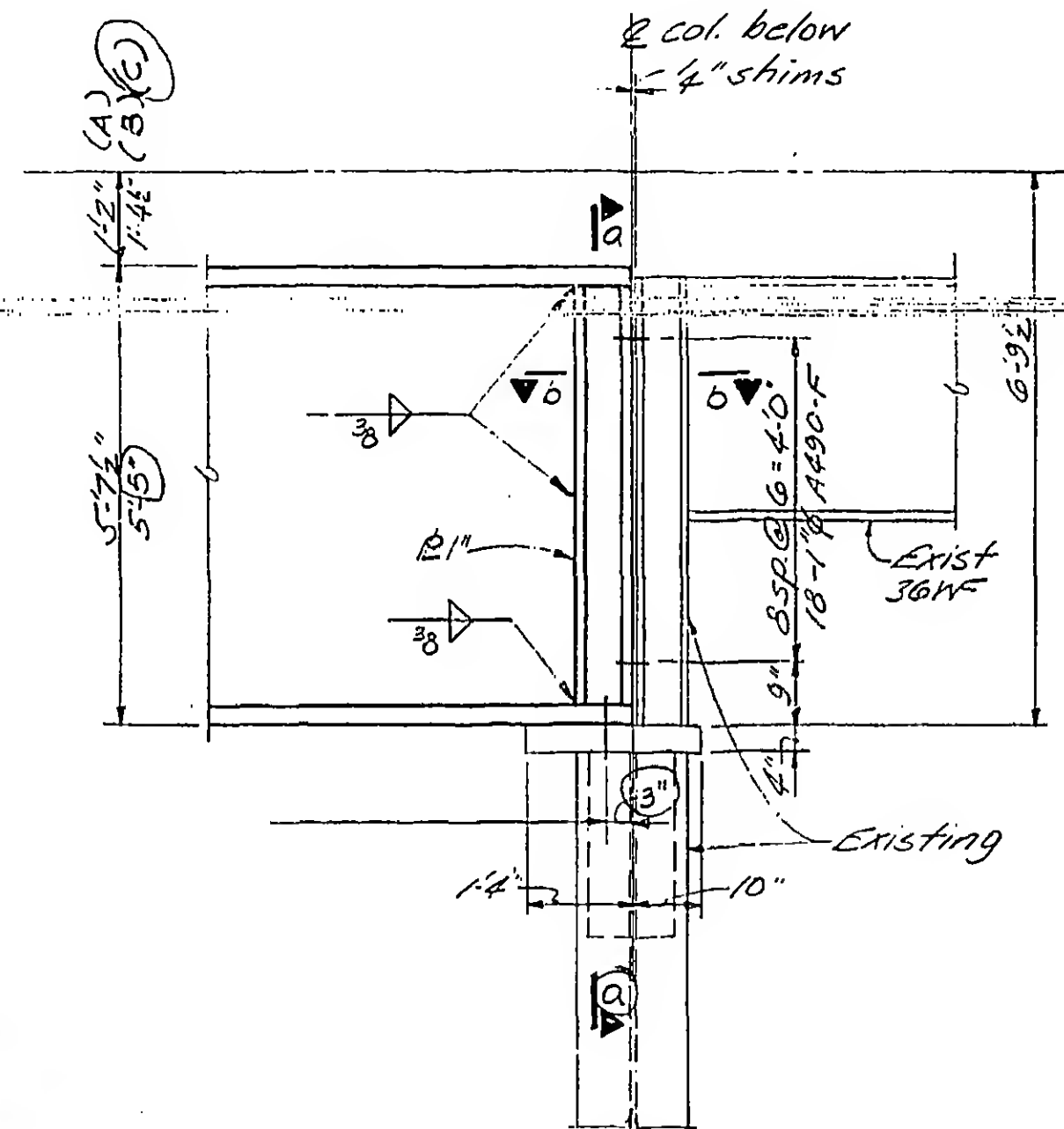
TITLE GIRDER COLUMN DETAILS

DATE 11-3-72

REVISIONS

Released for
construction
11-20-72

2-5-73



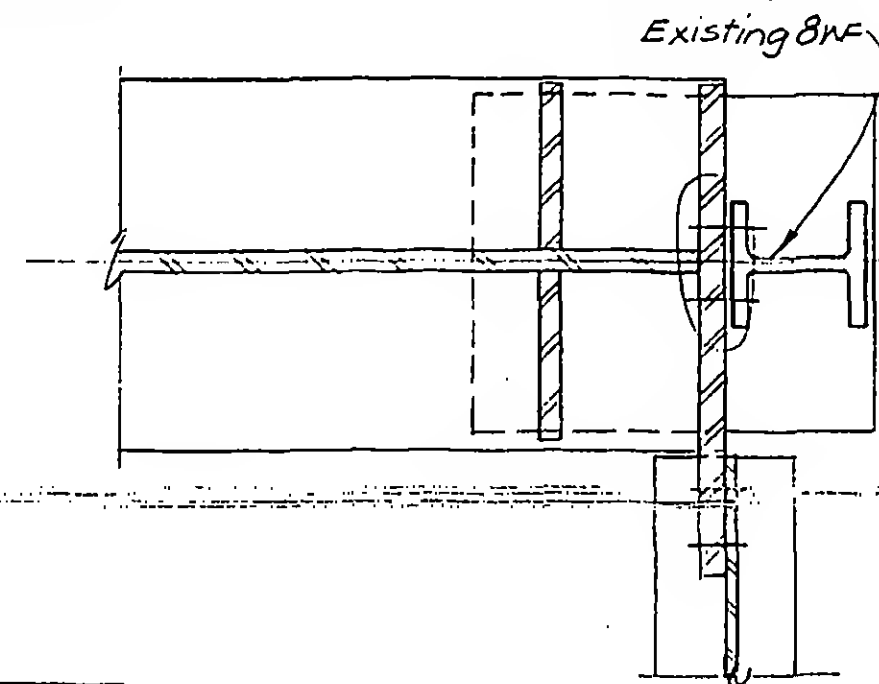
$\frac{K-35}{7}$ (A)
 $\frac{K-37}{7}$ (B)
 $\frac{K-41}{7}$ (C)

A

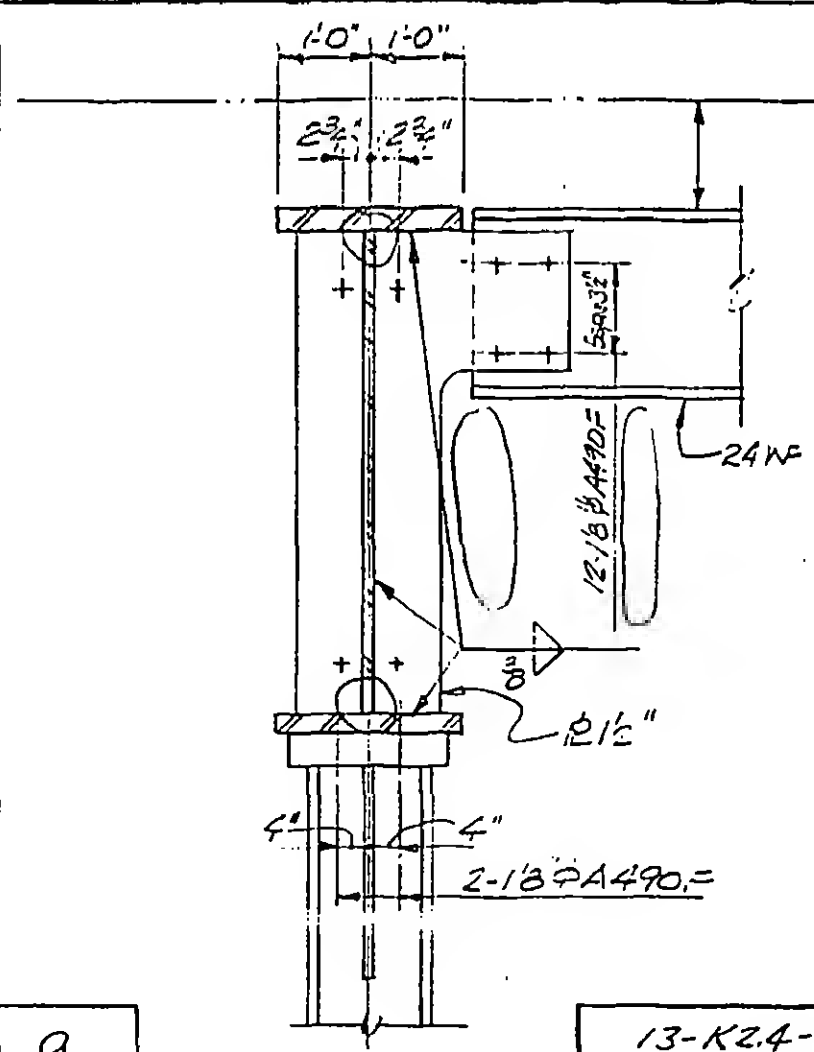
3

C

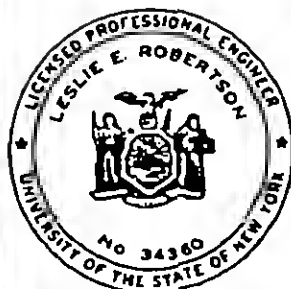
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13-KZ.4-3



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1/11/65

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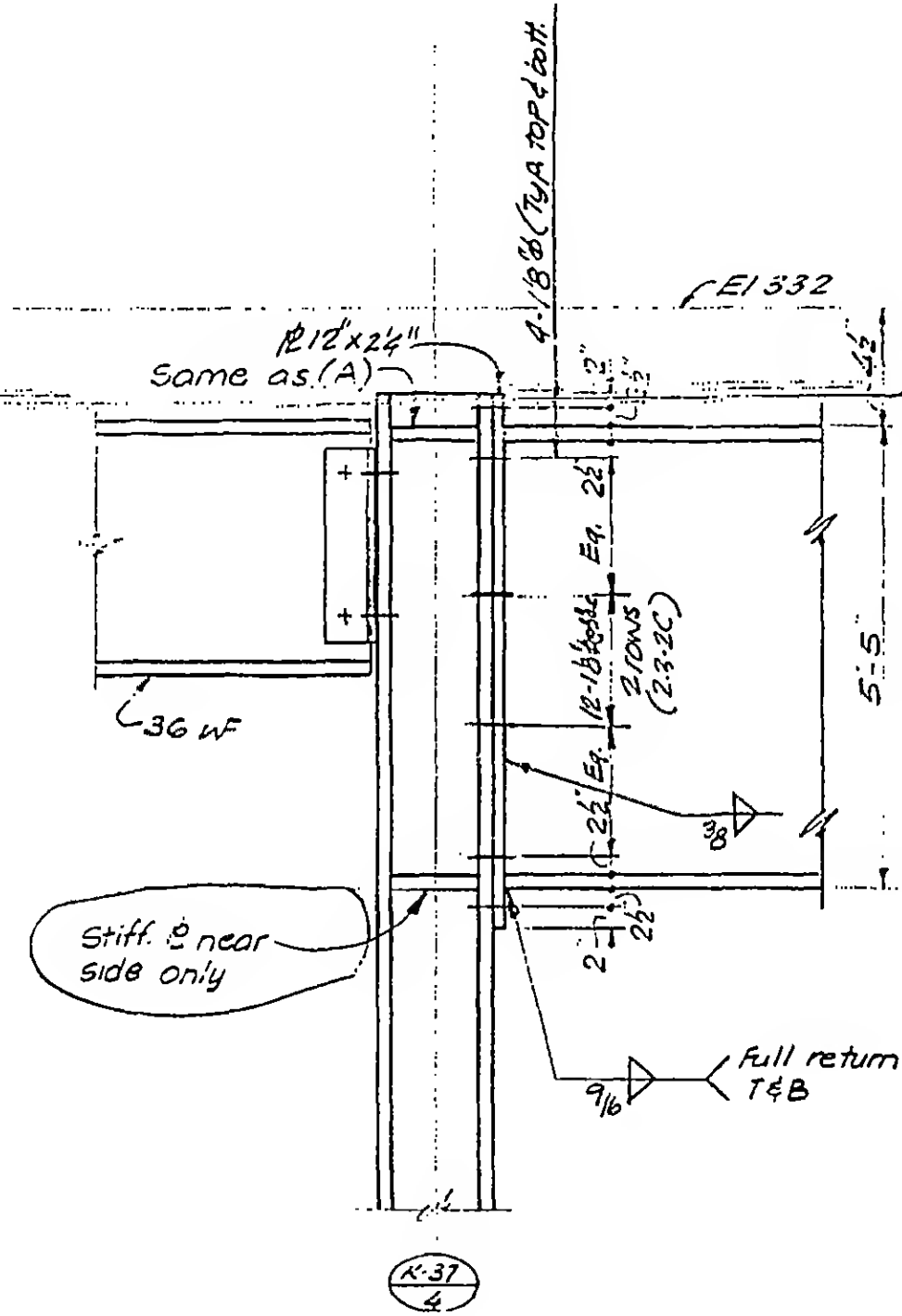
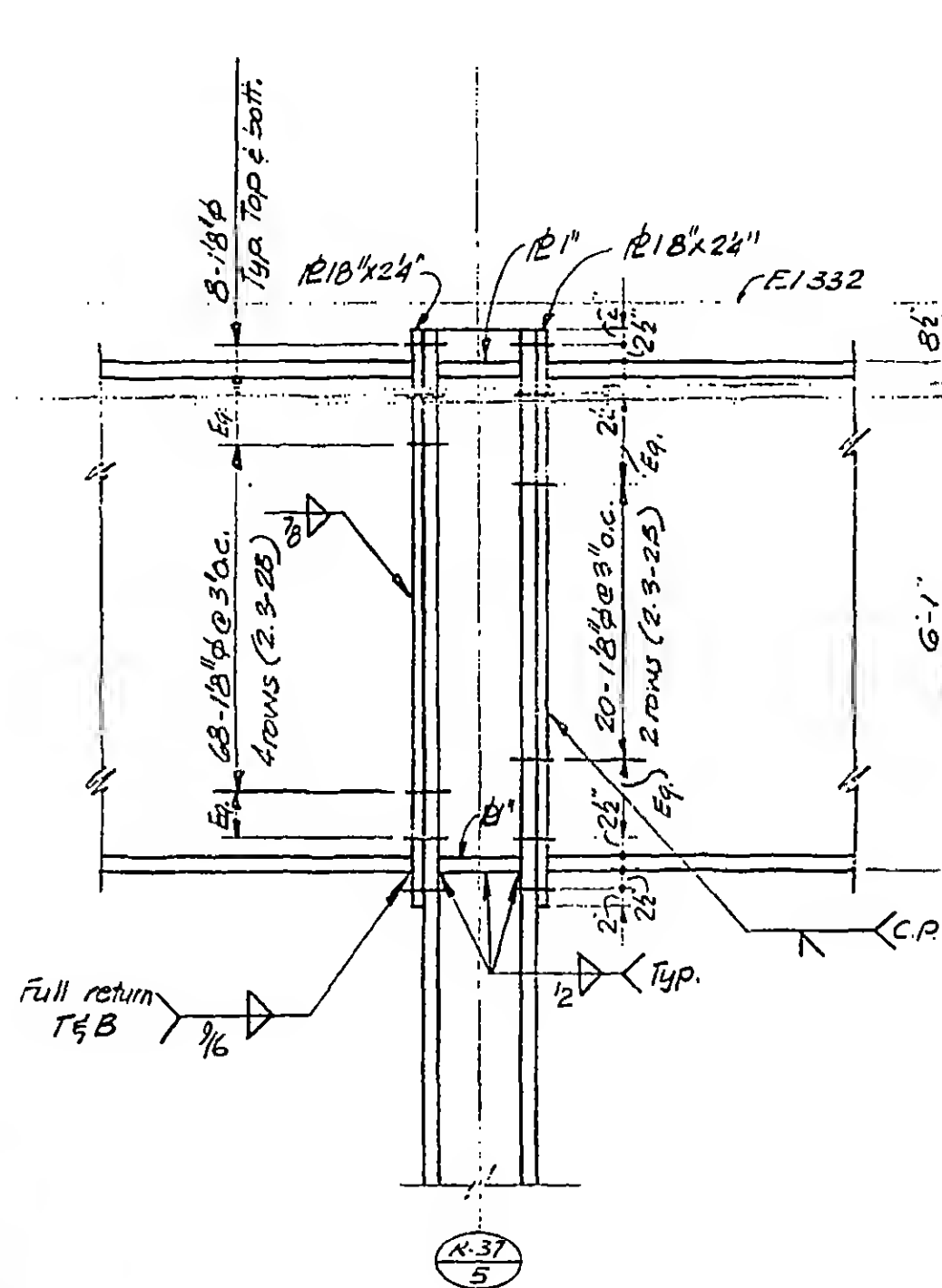
PROJECT THE WORLD TRADE CENTER

TITLE GIRDER COLUMN DETAILS

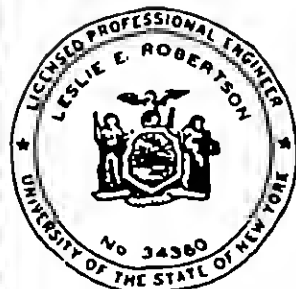
DATE 11-3-72

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2-5-73



Note: All bolts A490X on this sheet



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John G. G...
REVIEWED

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13-K2.4-4

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Structural & Civil Engineers

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TITLE GIRDER COLUMN DETAILS

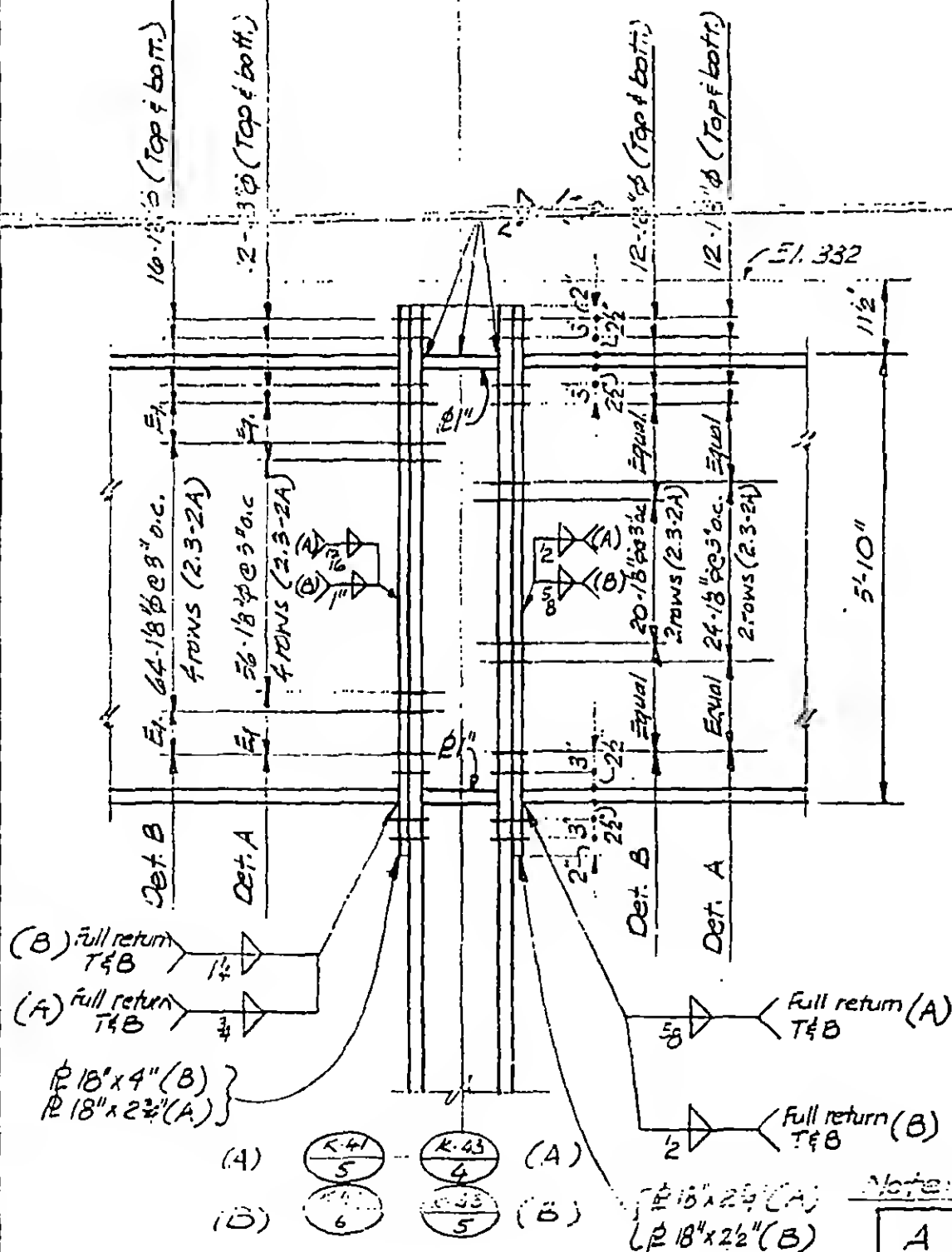
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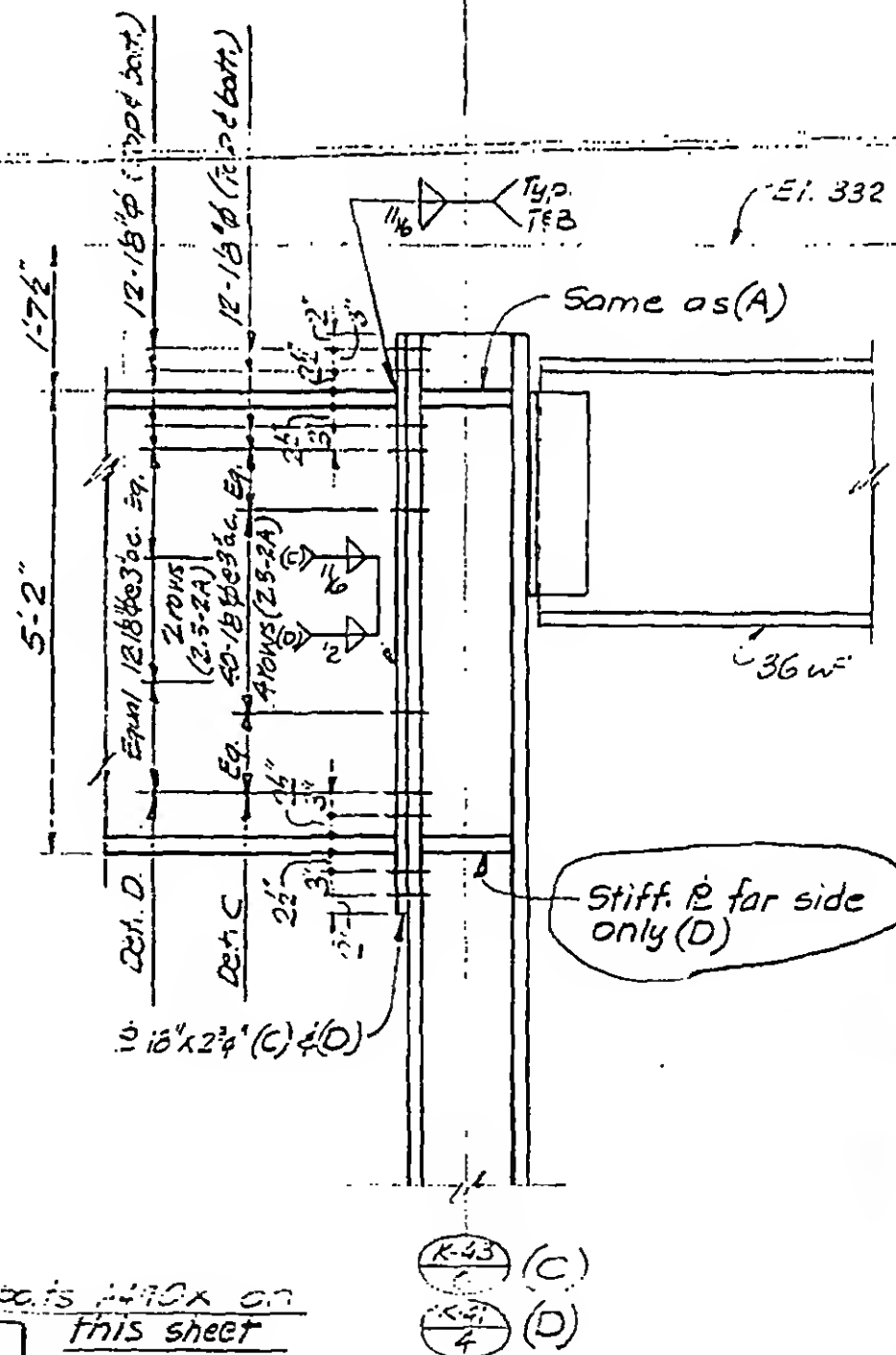
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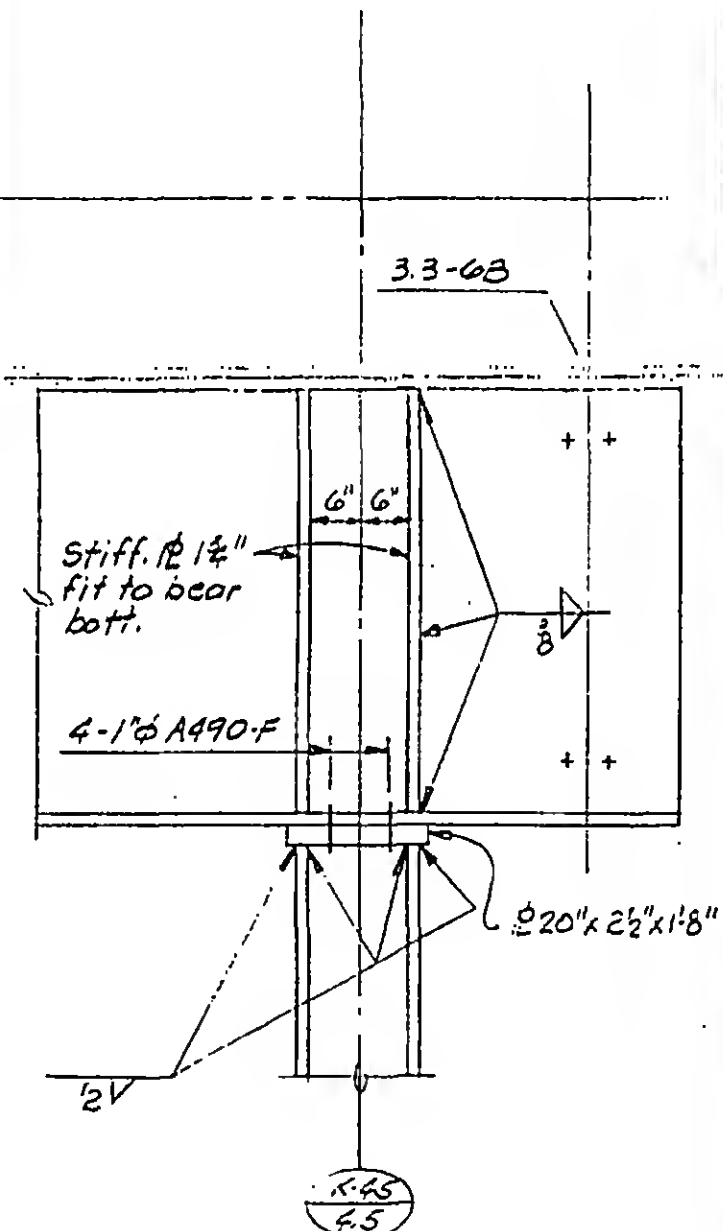
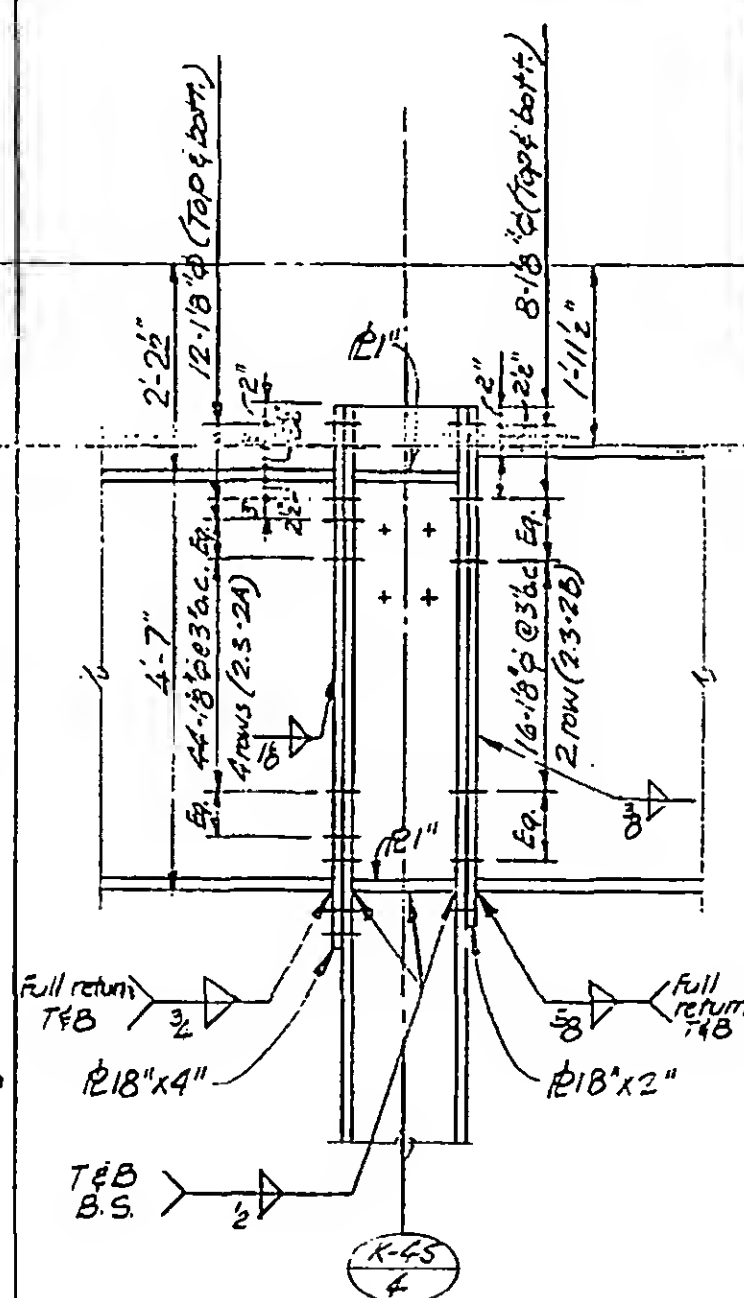
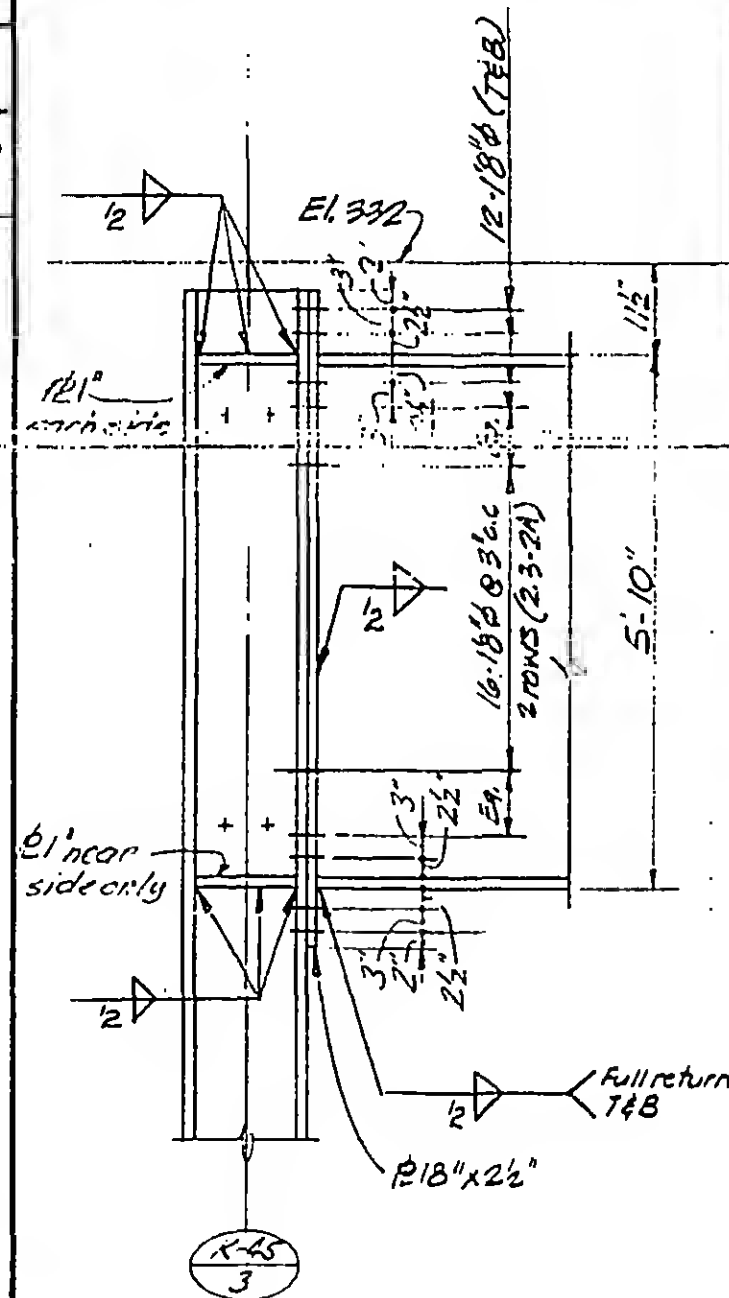
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TITLE GIRDER COLUMN DETAILS

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Note: All bolts to be A490x on this sheet



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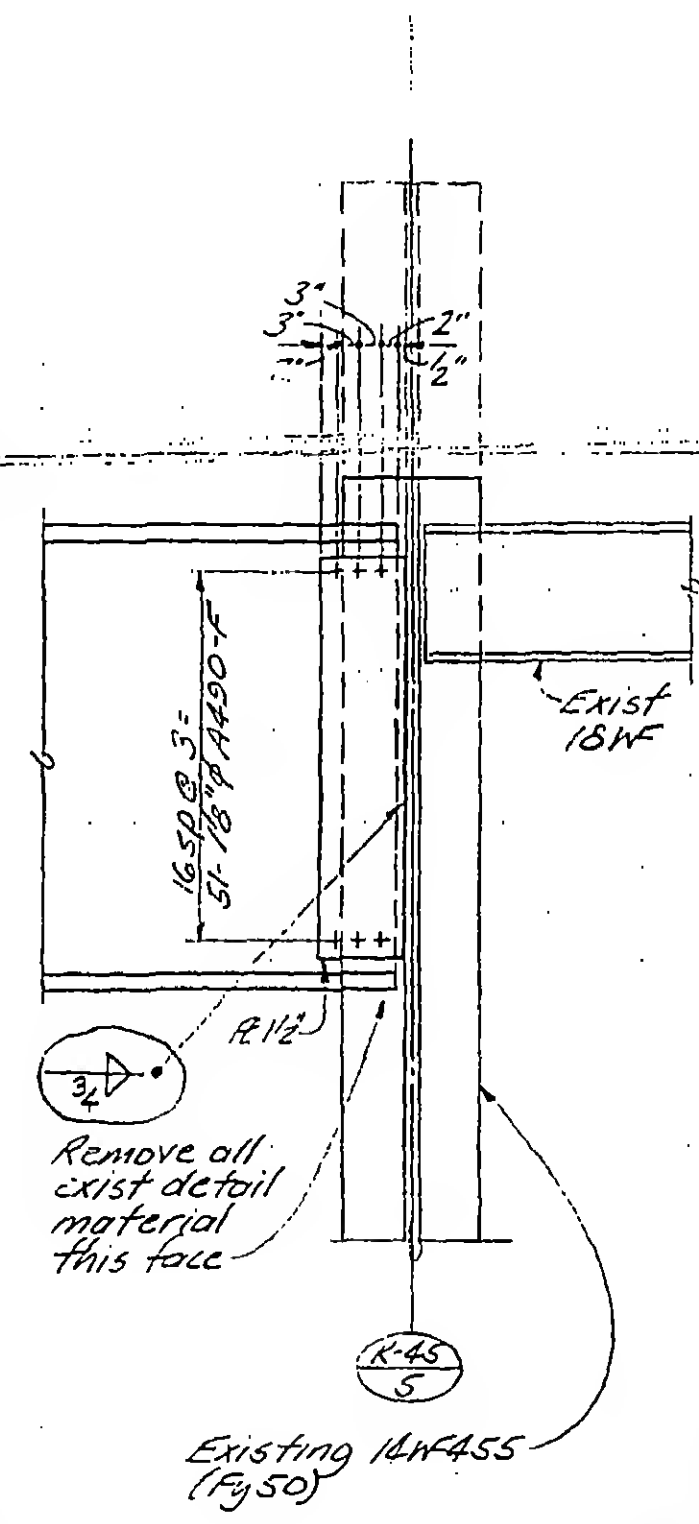
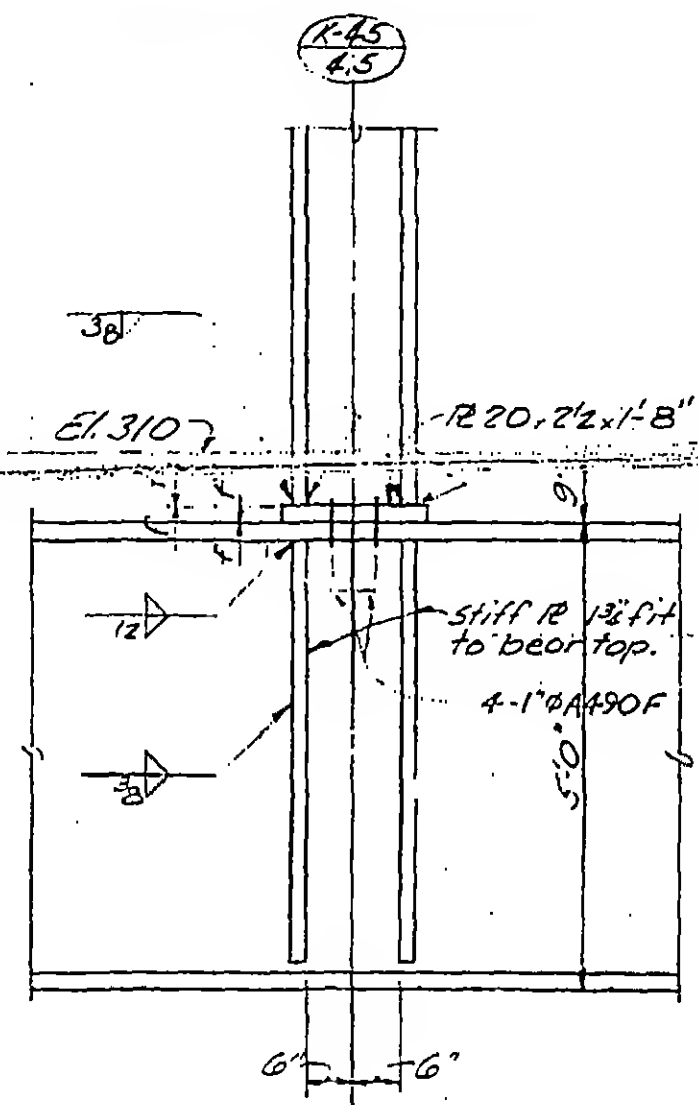
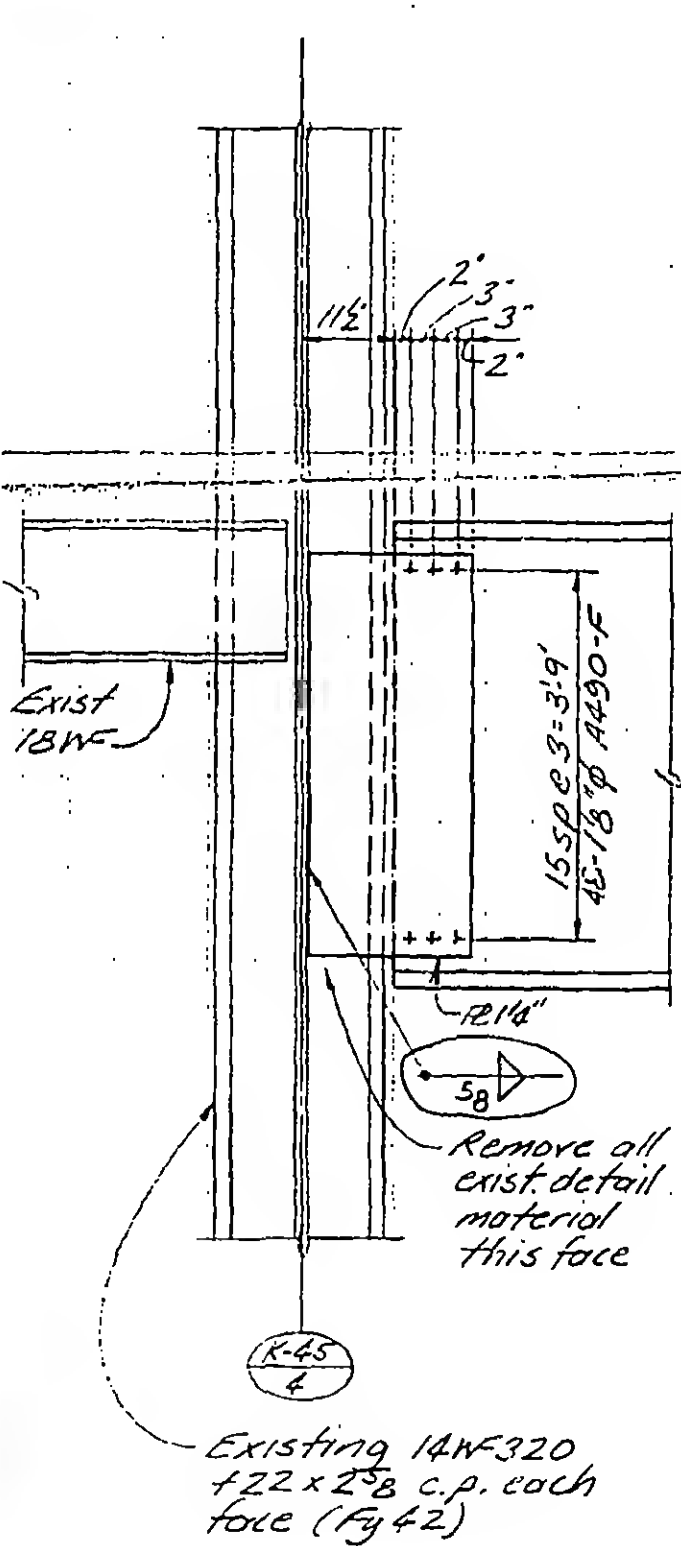
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11-20-72

2-5-73



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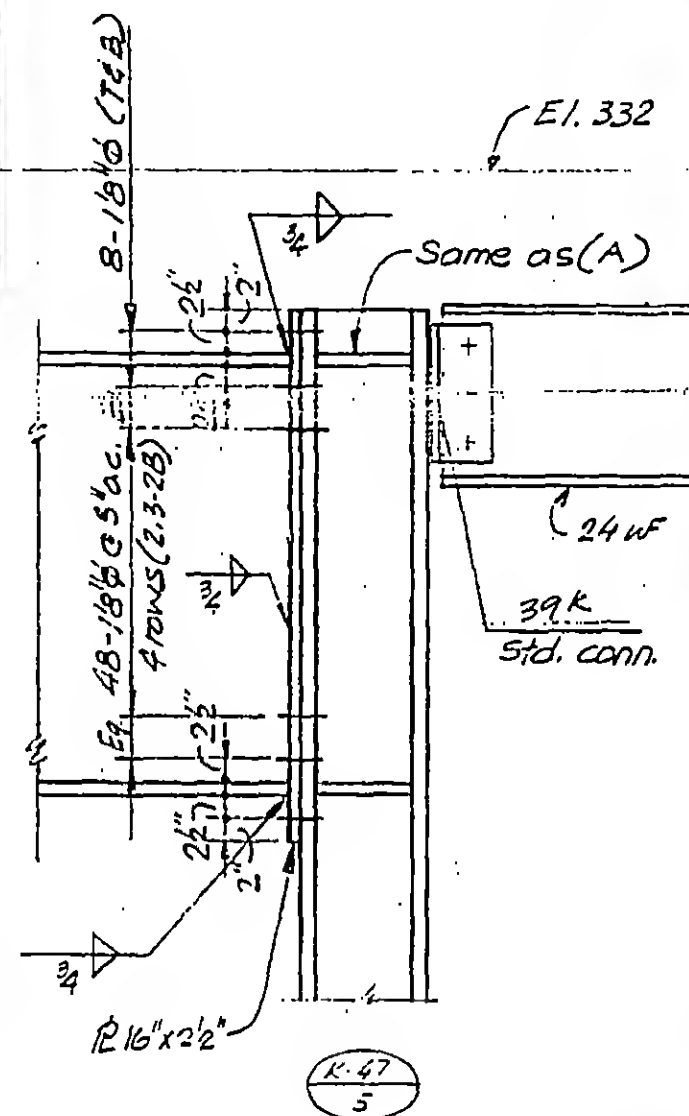
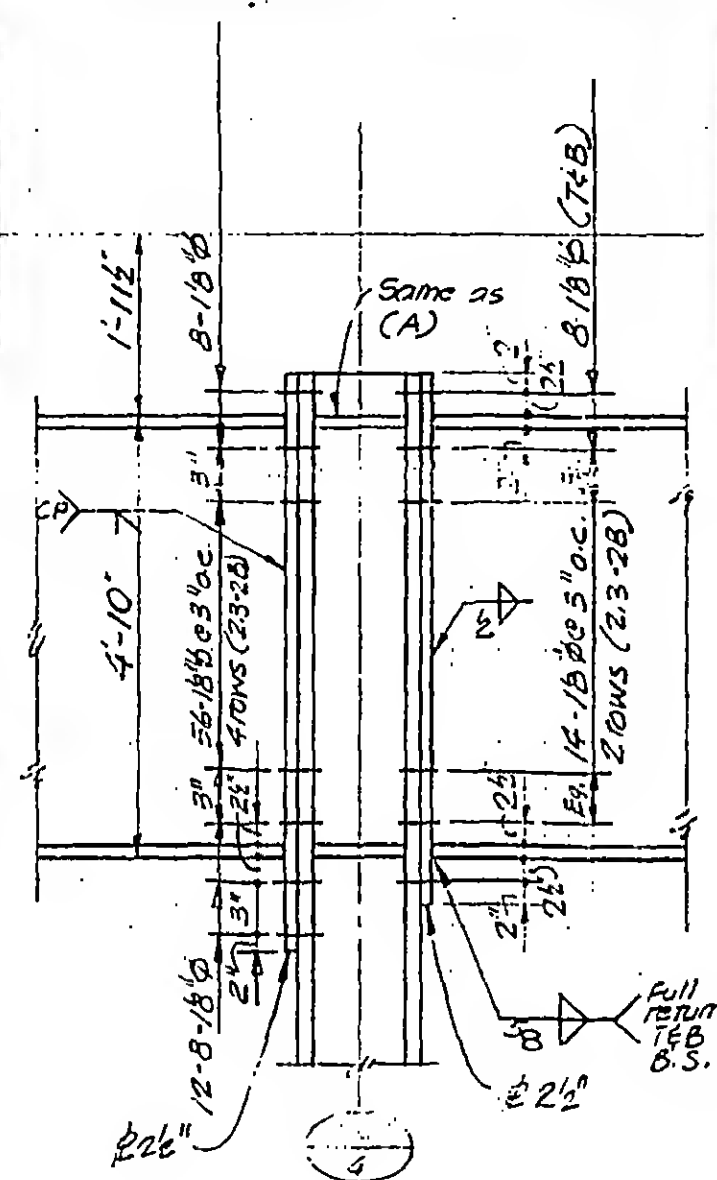
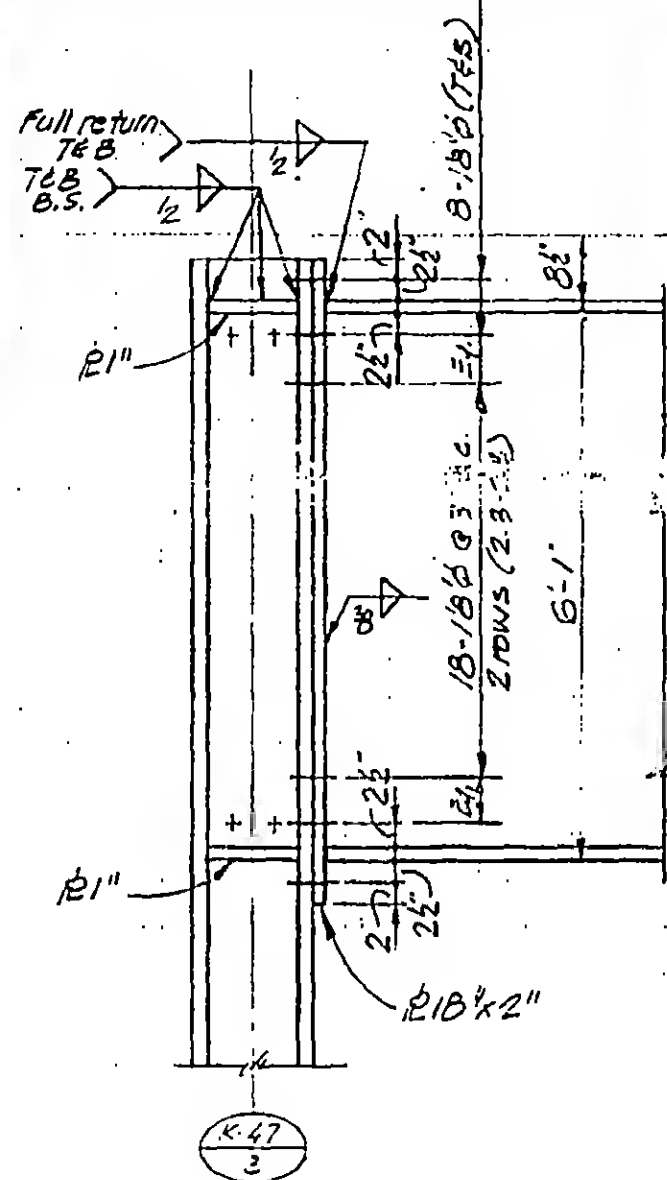
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DATE 11-3-72

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Note: All bolts ASPPX on this sheet

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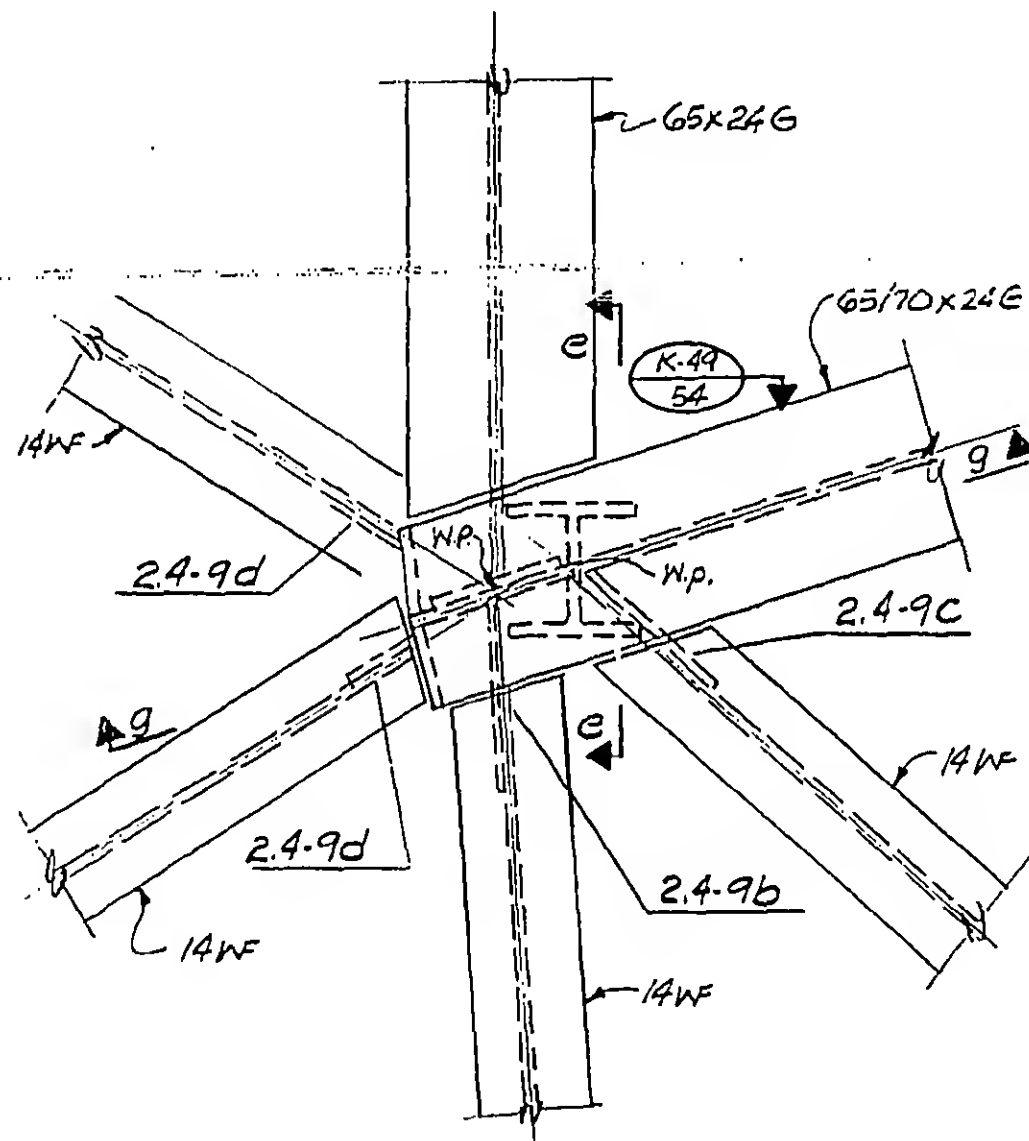
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TITLE GIRDER COLUMN DETAILS

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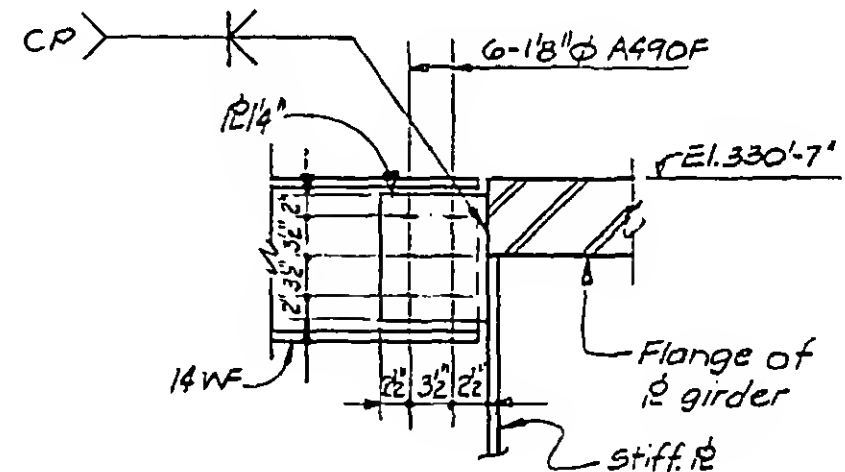
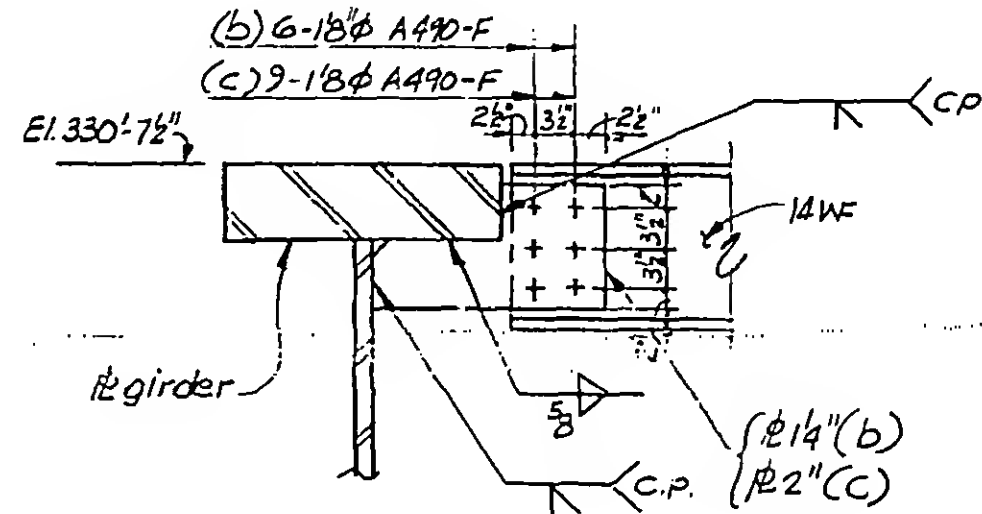
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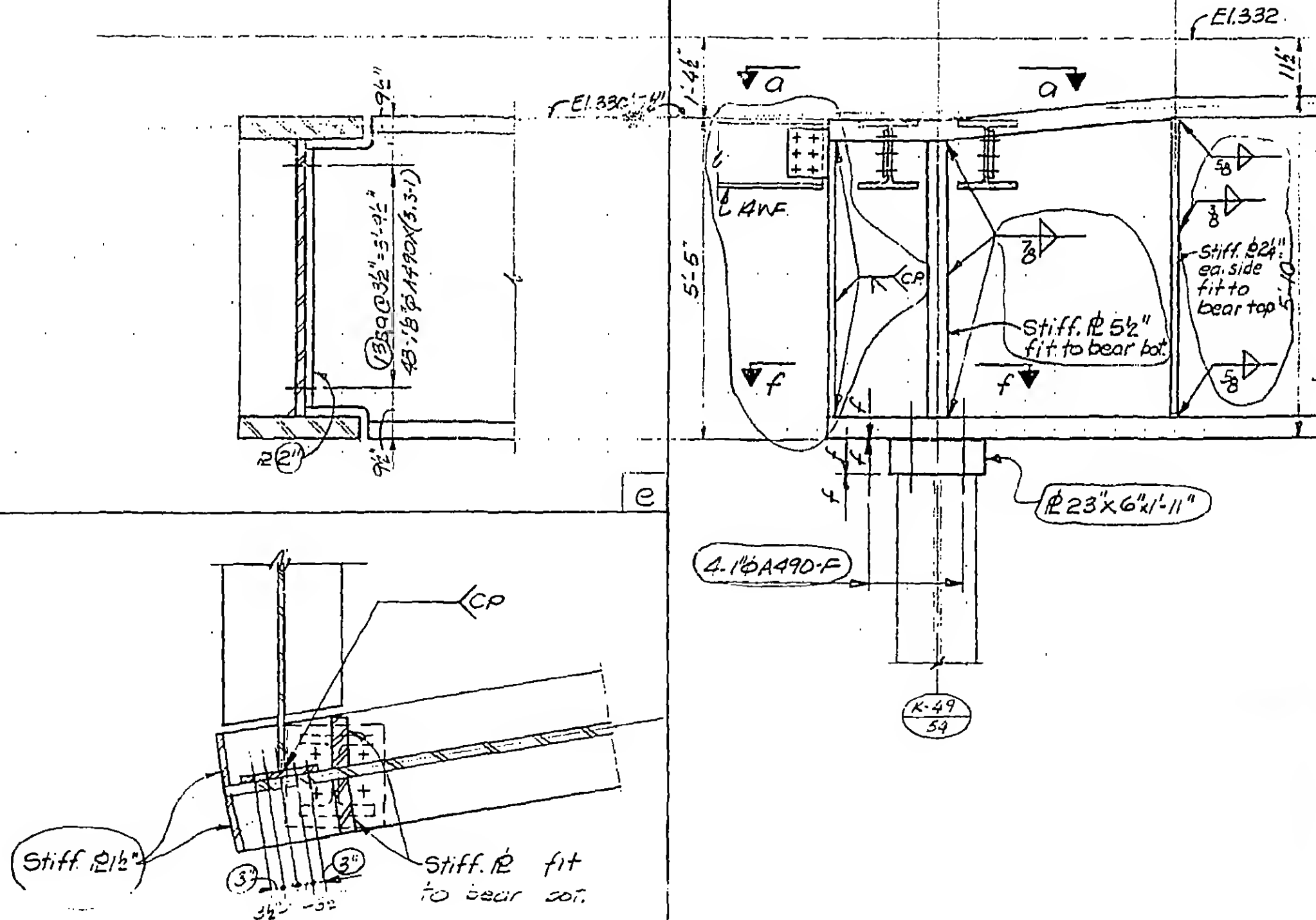
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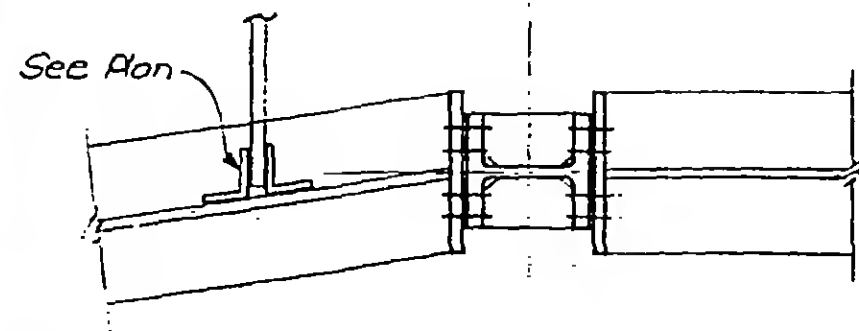
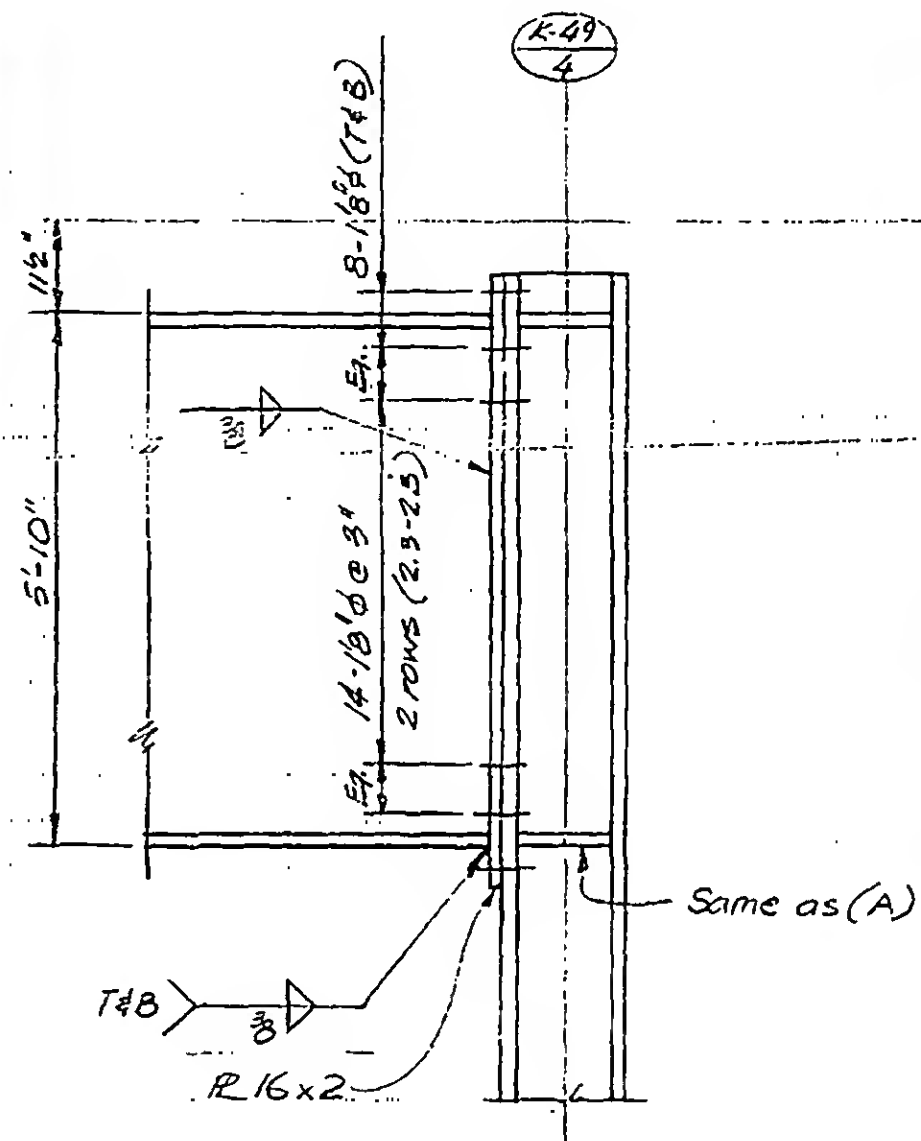
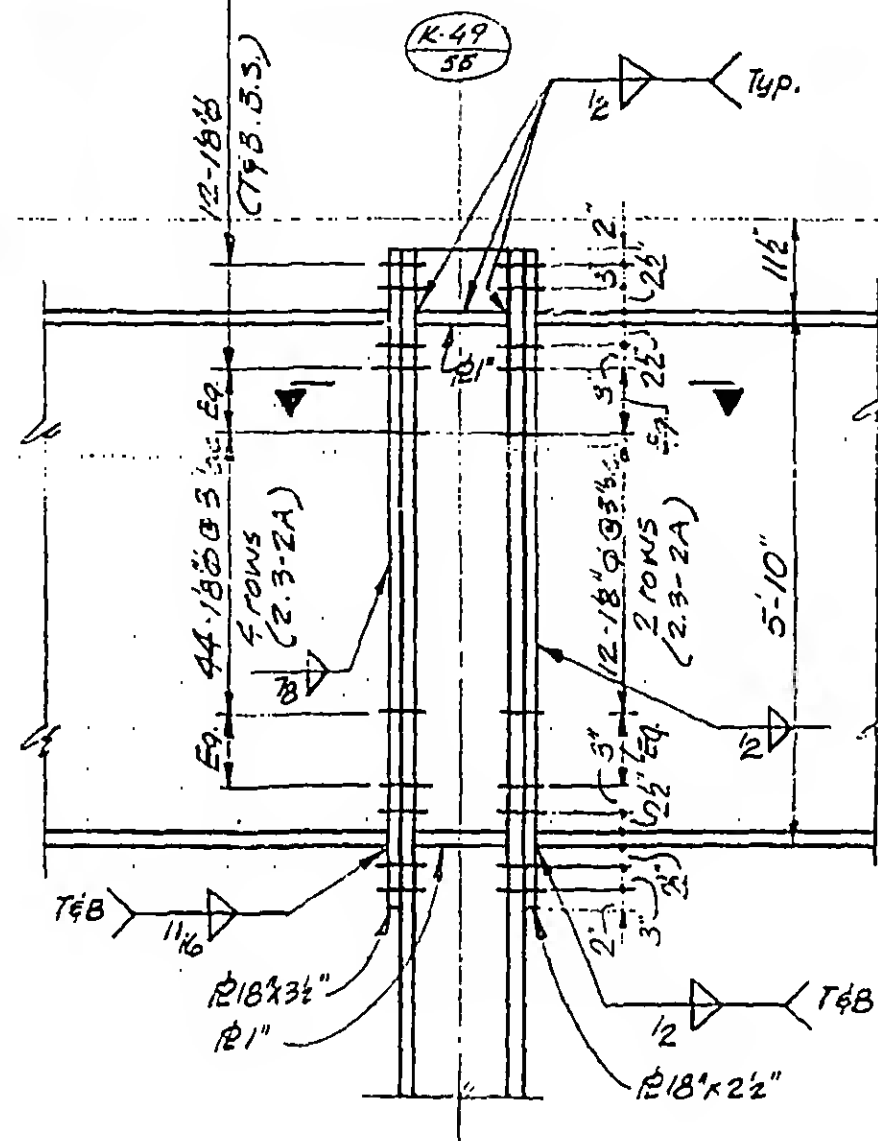
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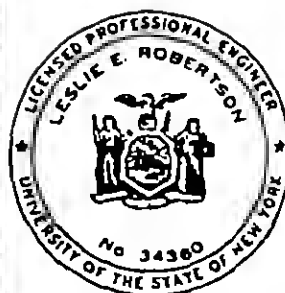
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Note: All bolts 4490X on this sheet.



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John Robertson

REVIEWED

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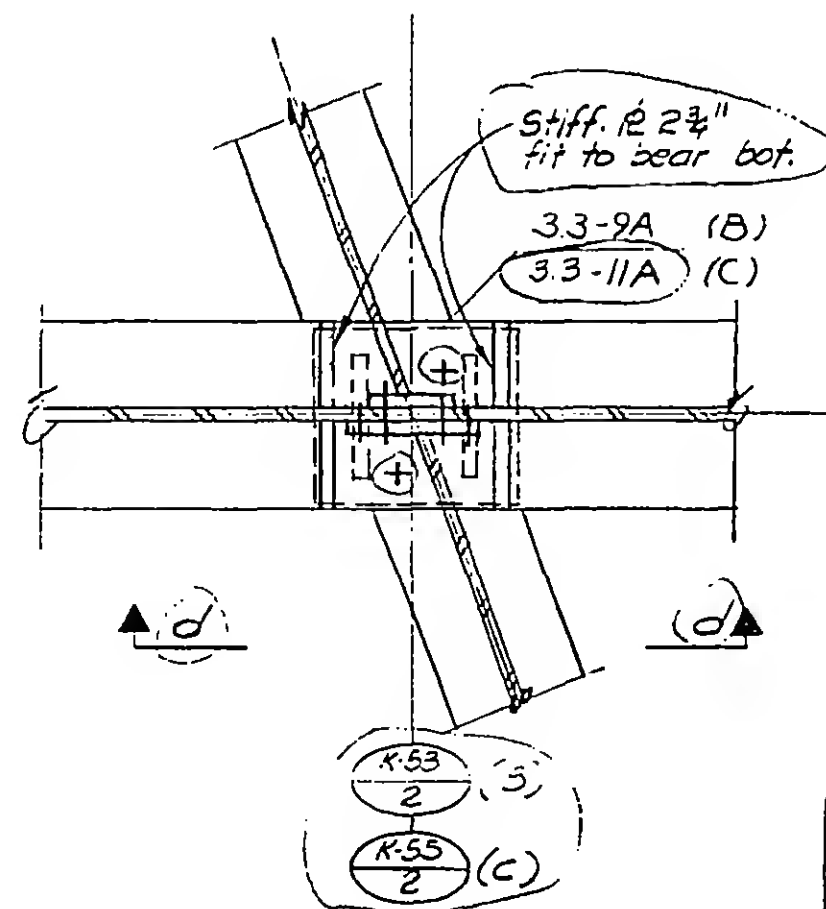
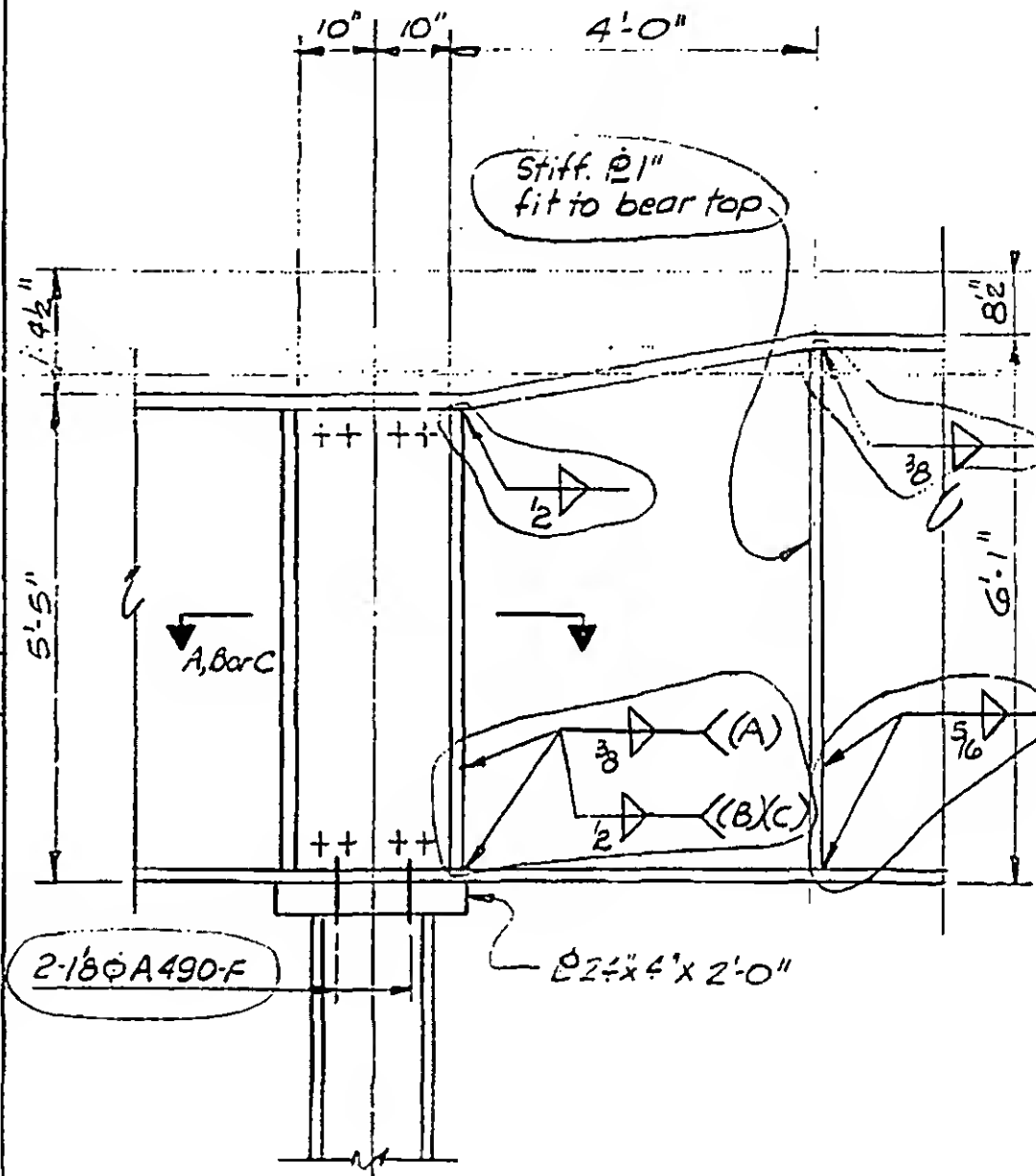
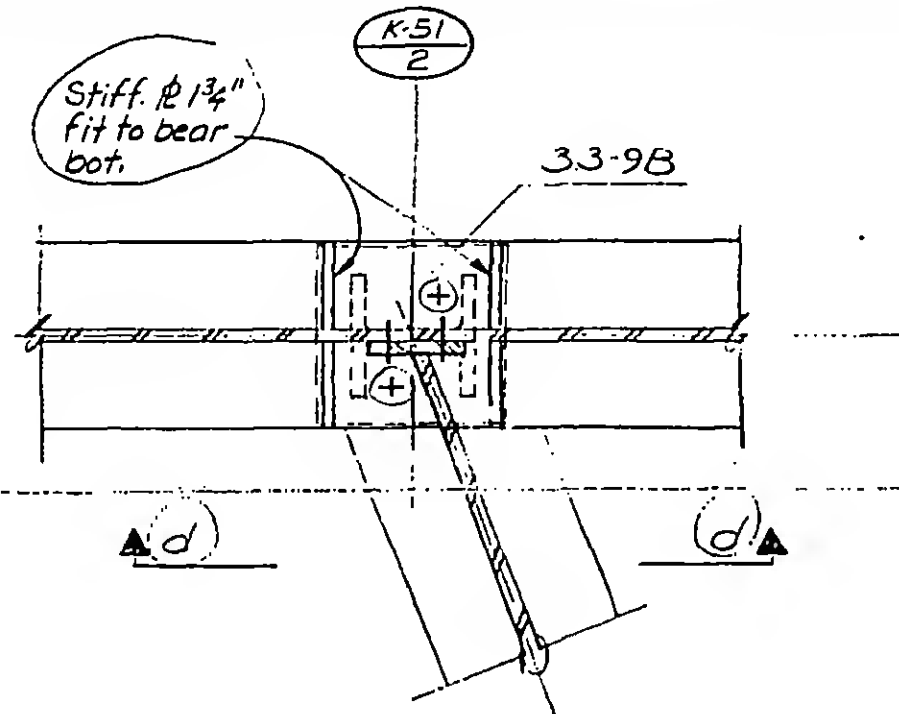
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DATE 11-3-72

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P. J. J. J.

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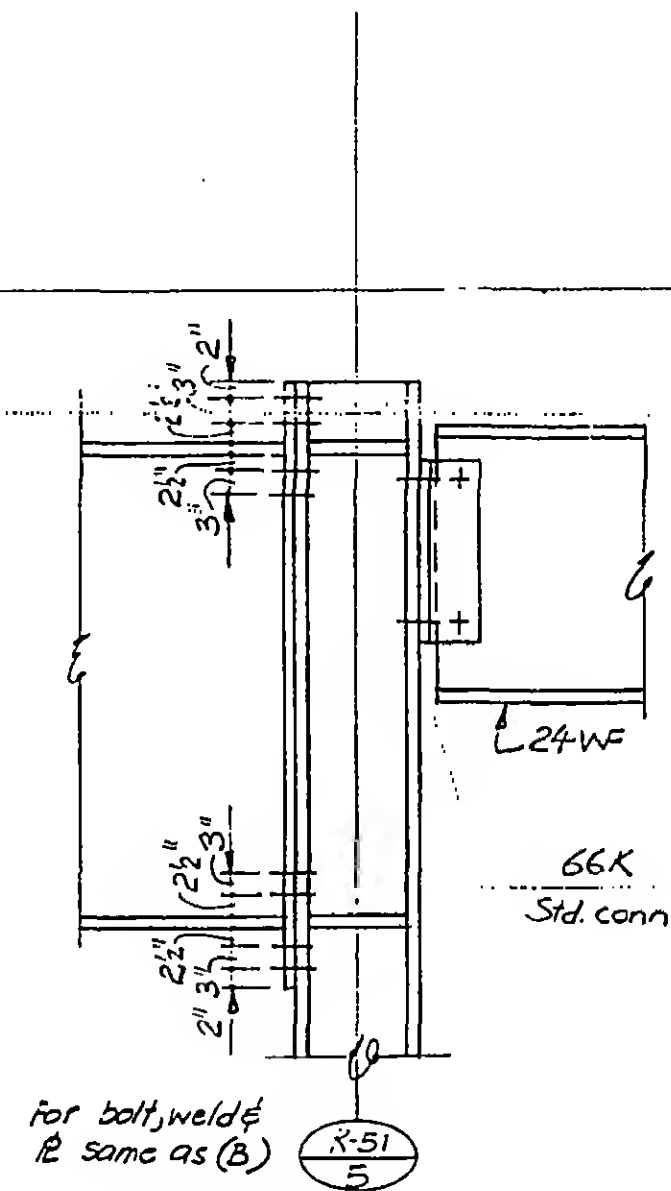
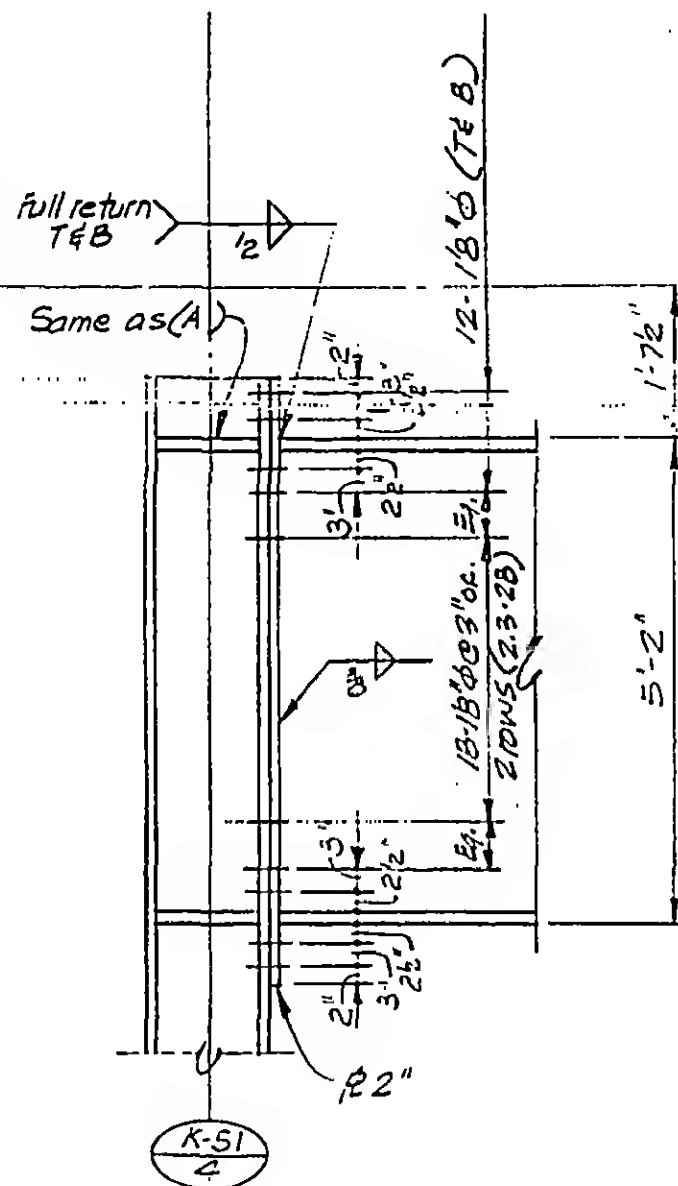
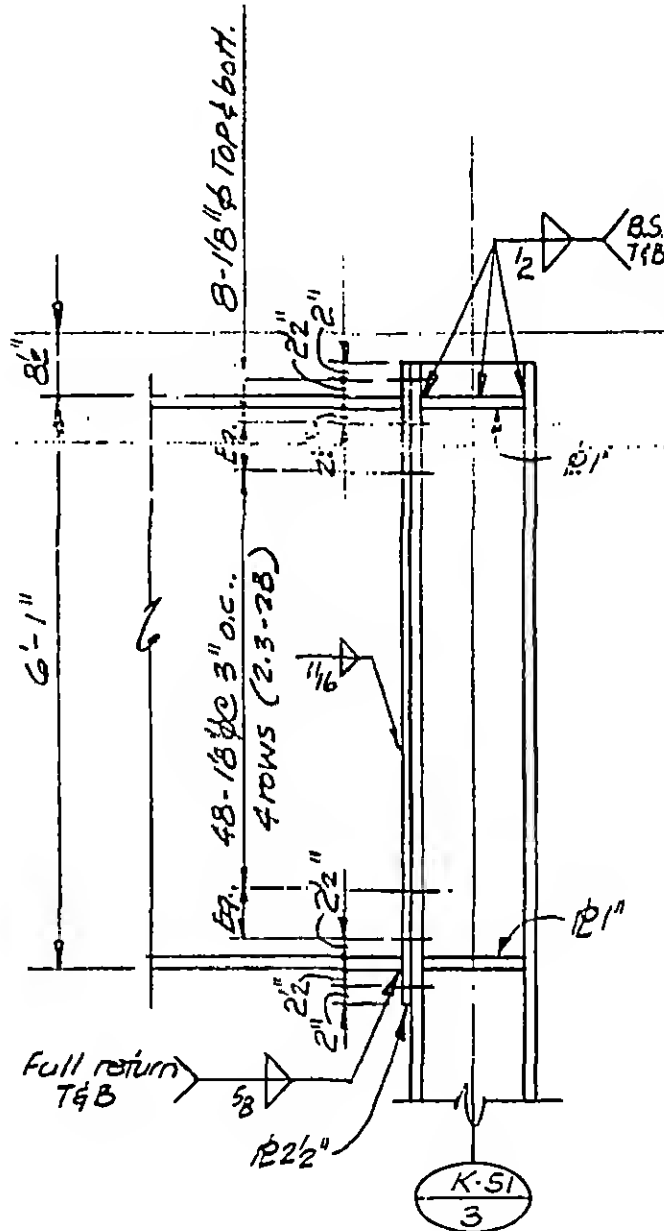
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11-20-72



Note: All bolts A490 X on this sheet



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TITLE GIRDER COLUMN DETAILS

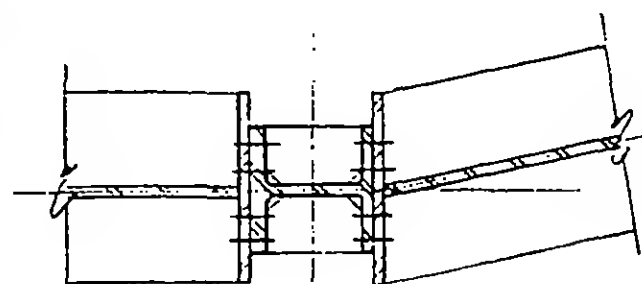
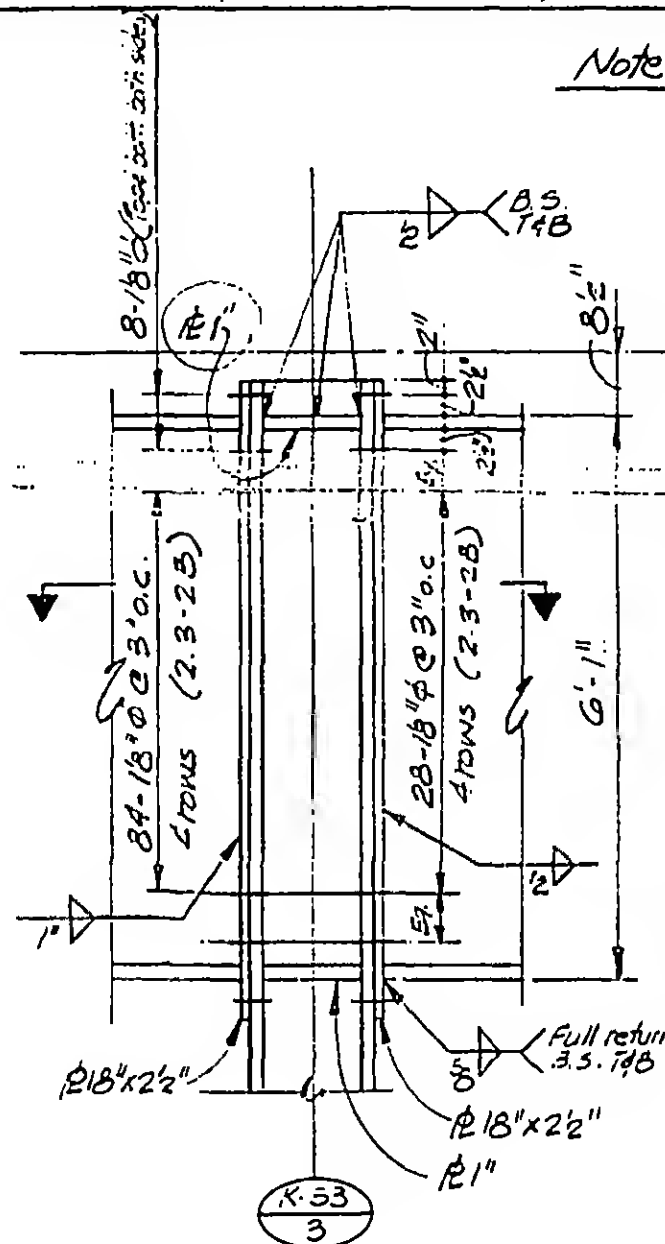
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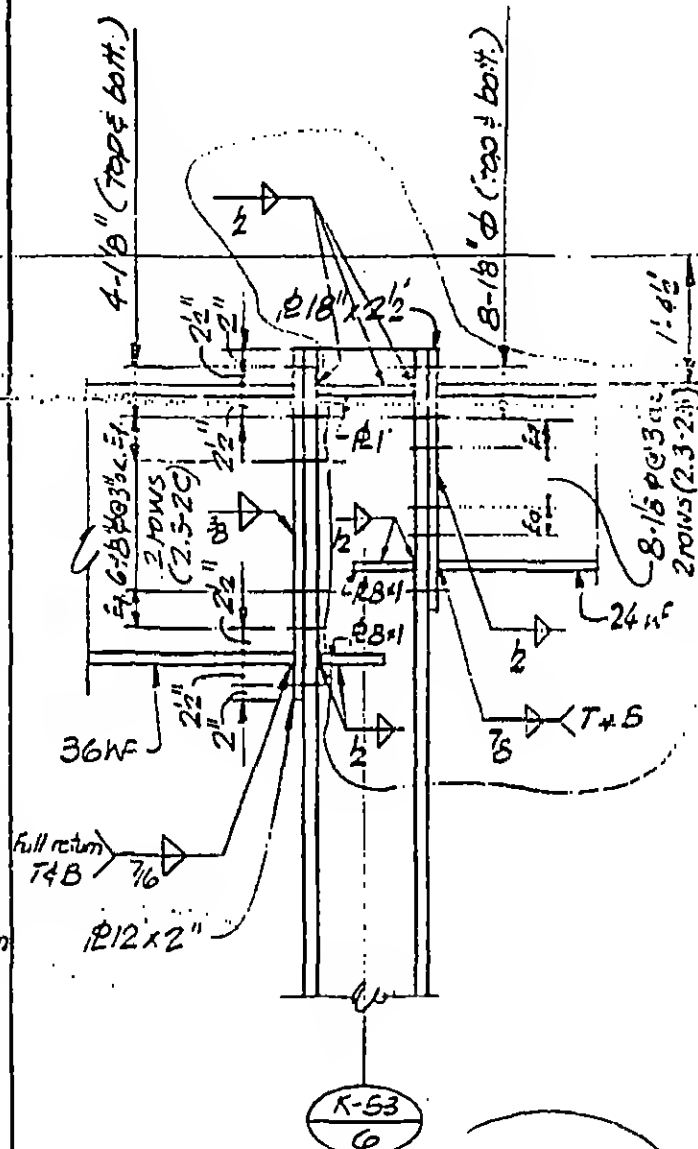
General
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construction
11-20-72

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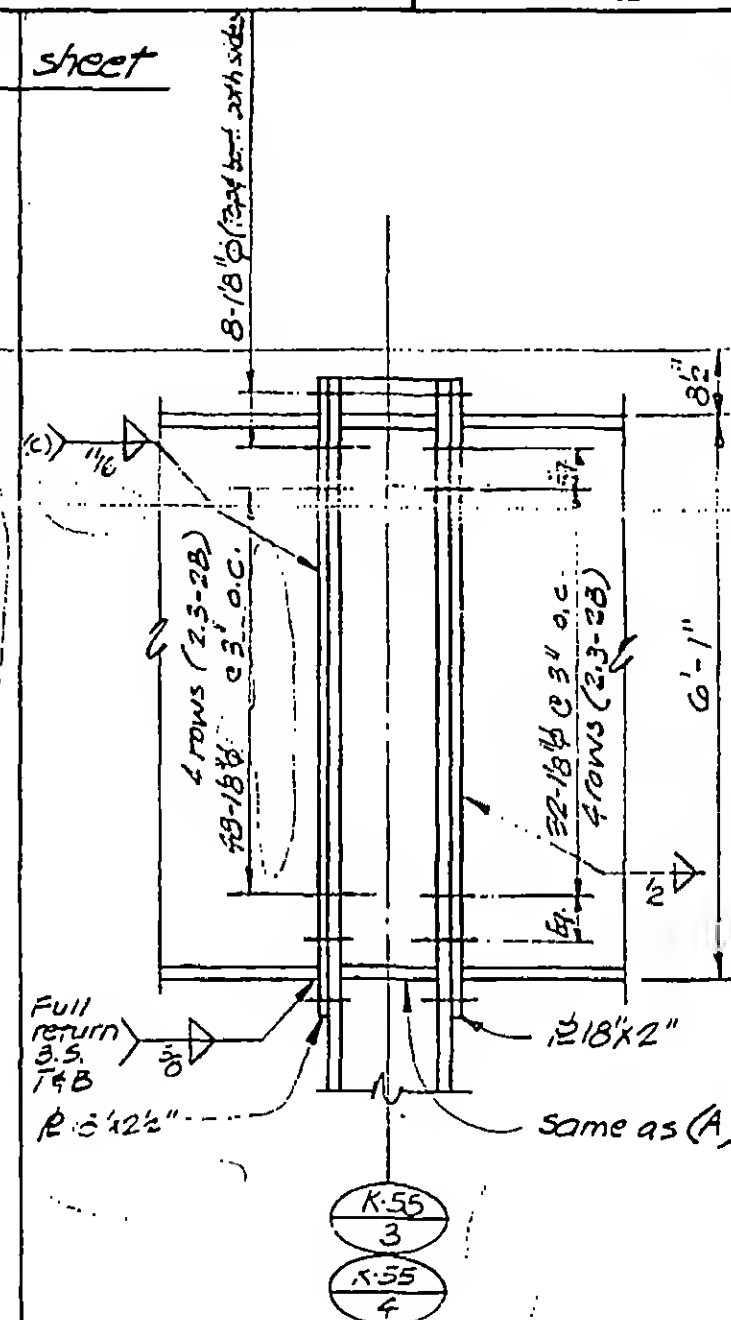
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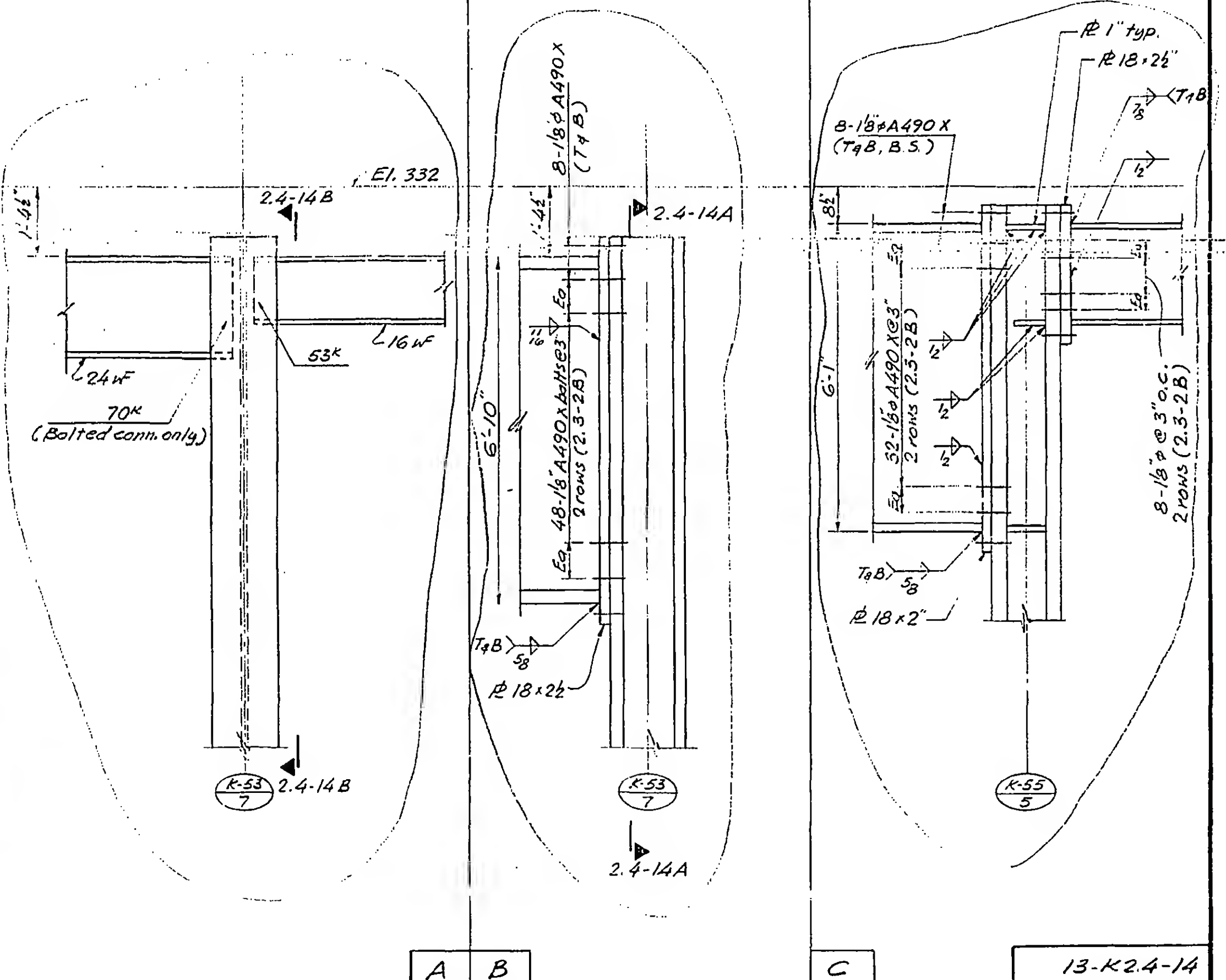
TITLE GIRDER COLUMNS DETAILS

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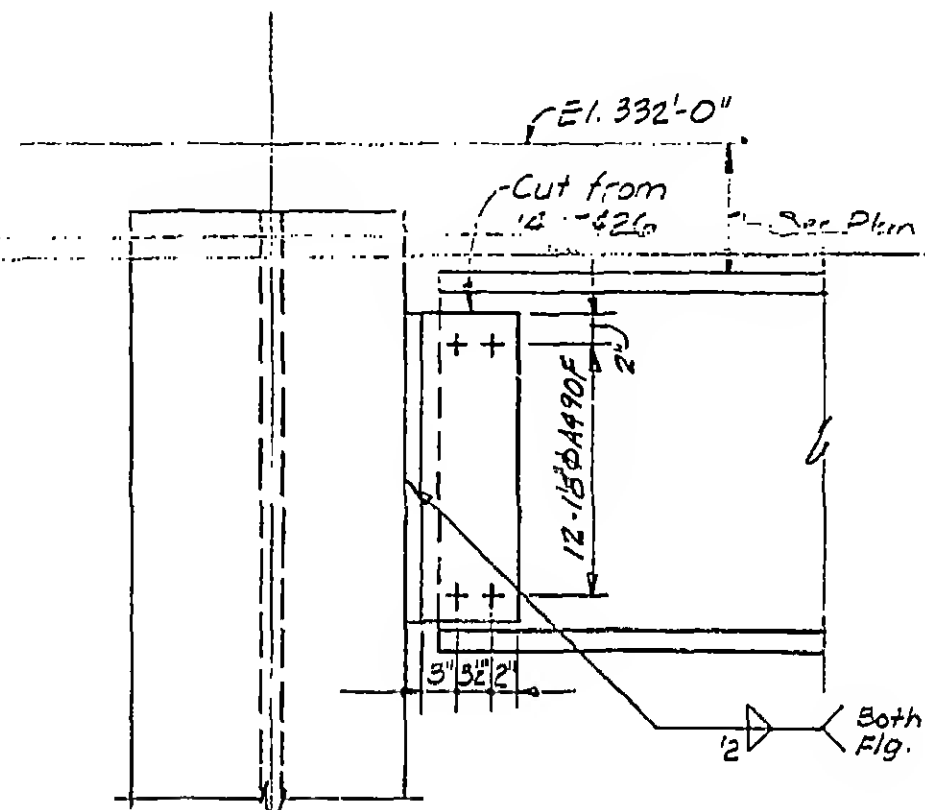
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K-35
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See 9.1-1D

K-41
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See 9.1-1C

K-51
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See 9.1-2

K-43
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See 9.1-1A



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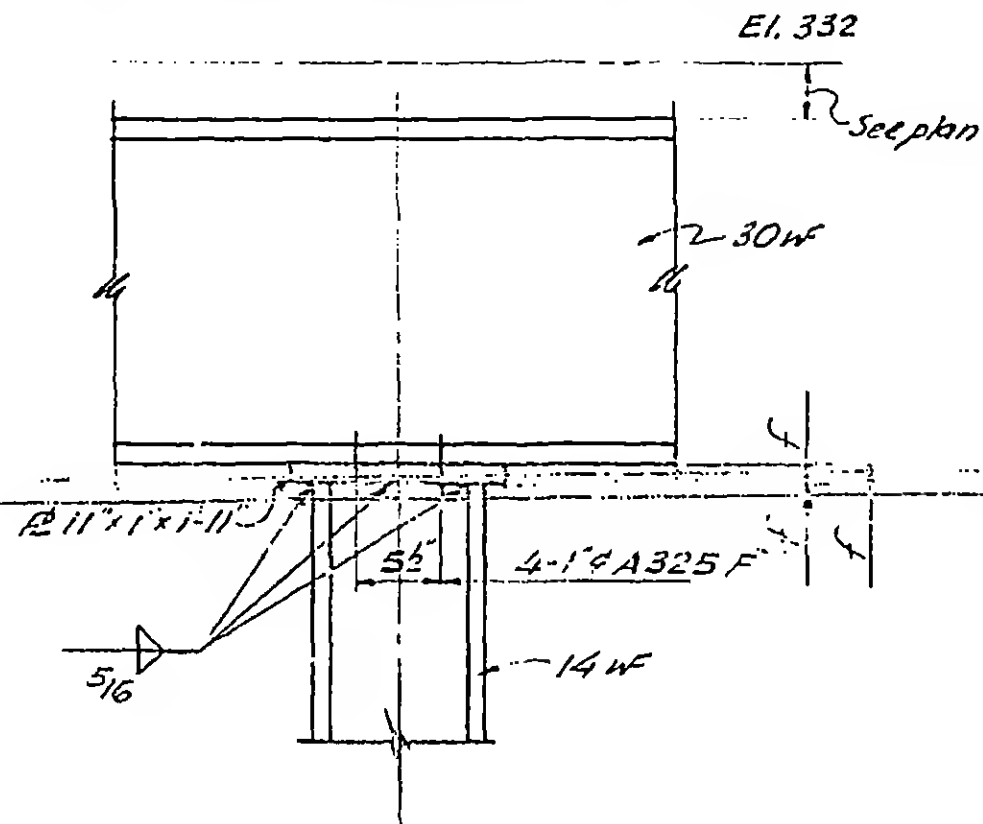
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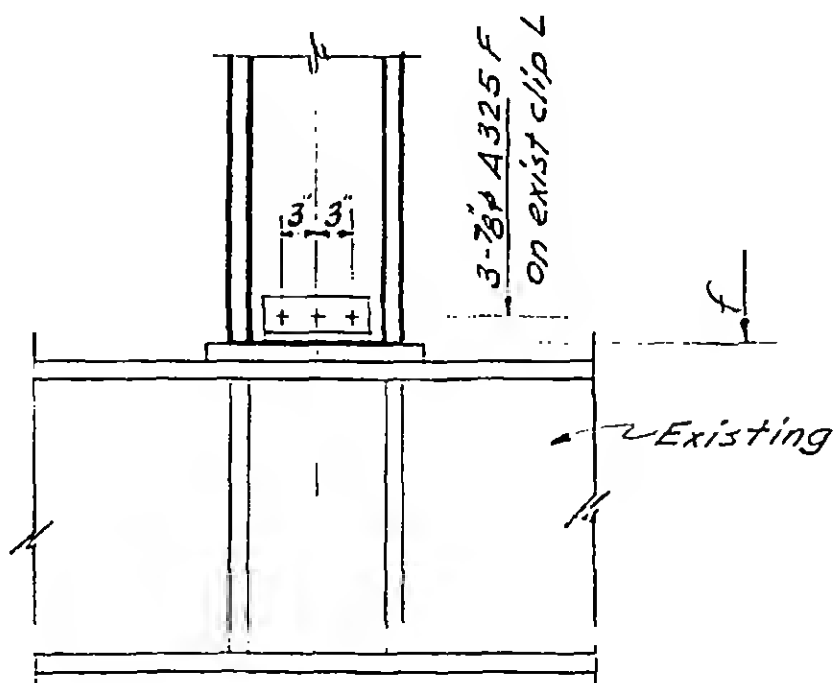
TITLE GIRDER COLUMN DETAIL

DATE 4-20-73

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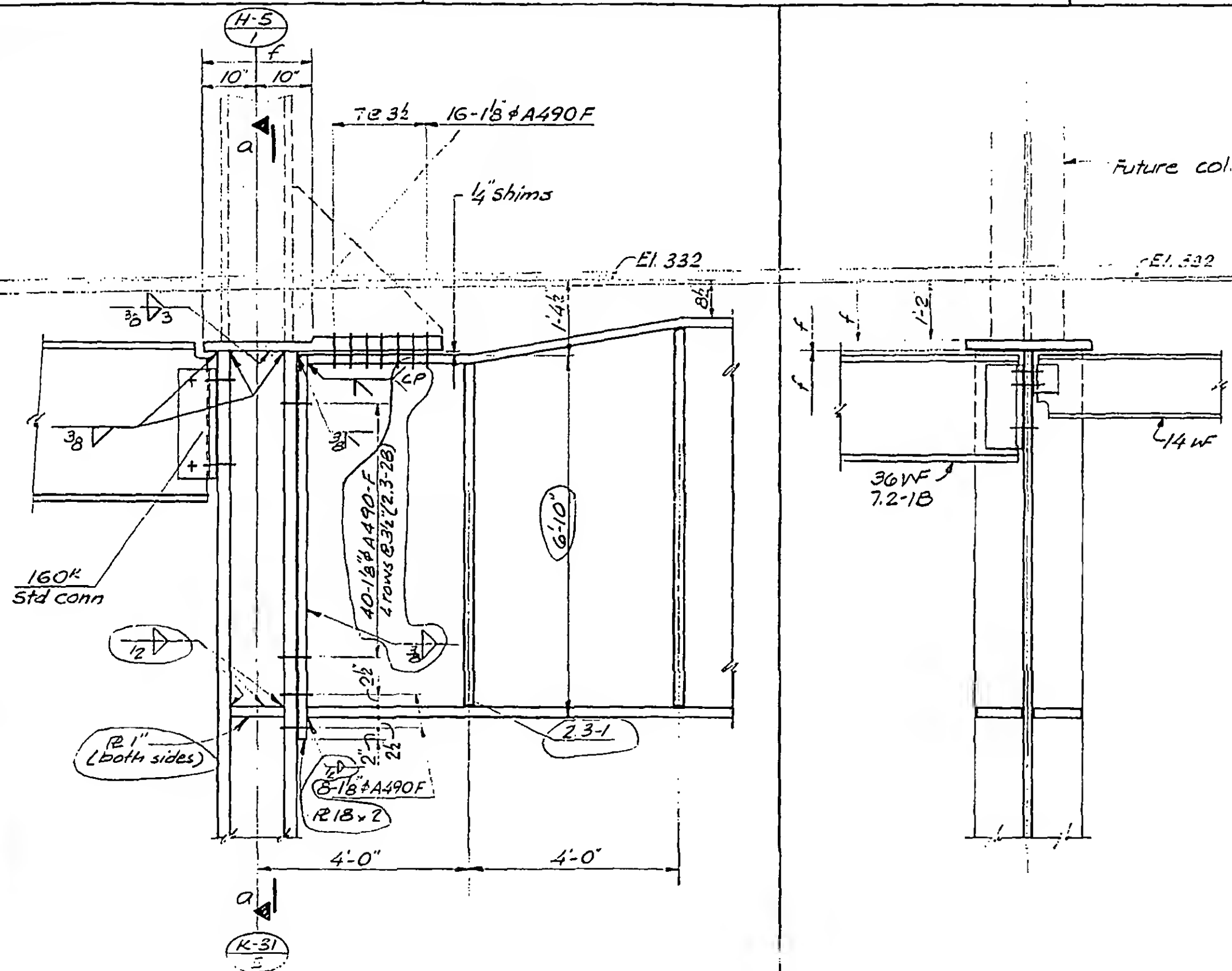
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TITLE GIRDER-FUTURE COLUMN DETAILS

DATE 11-3-72

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11-20-72

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SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

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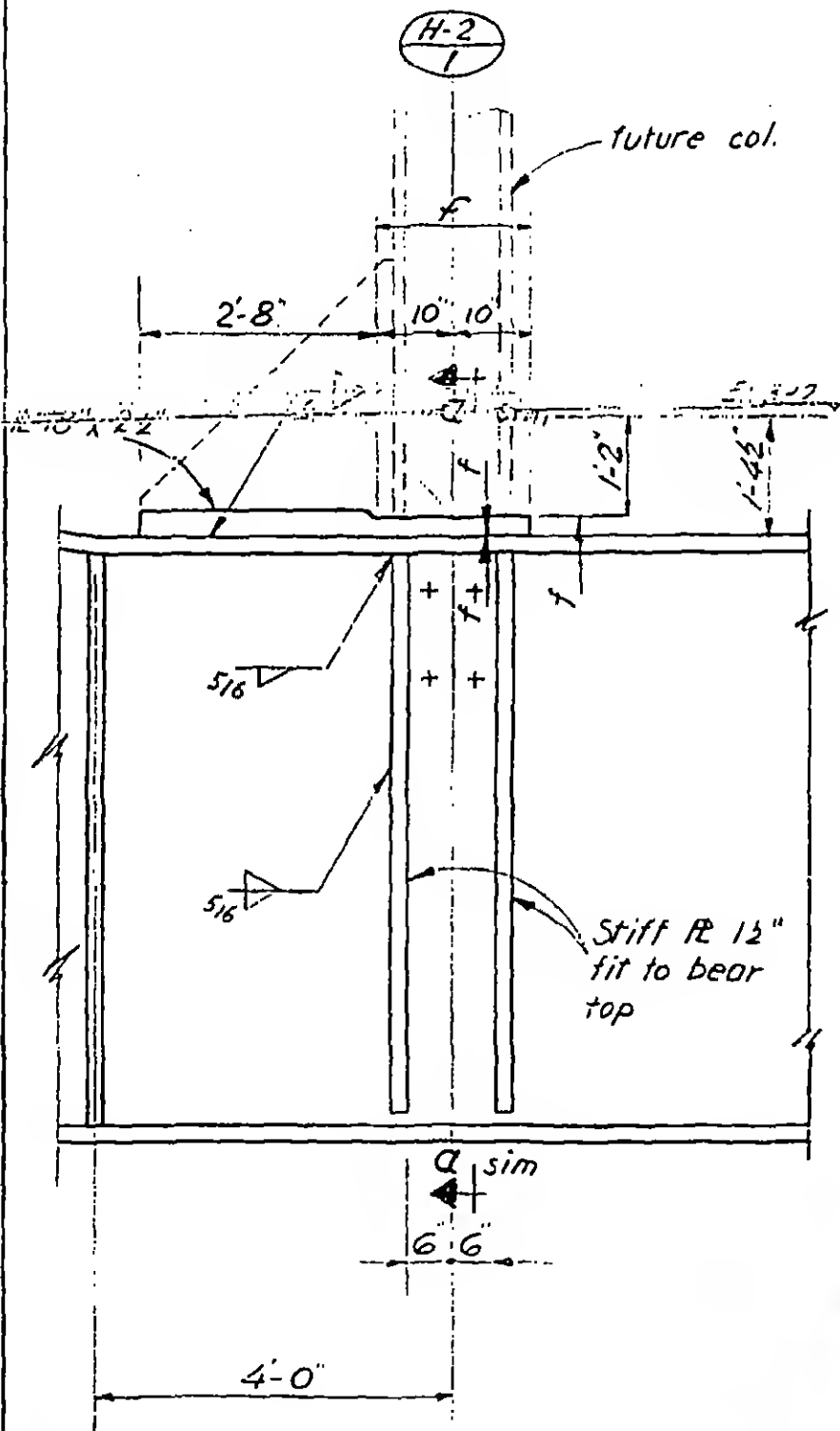
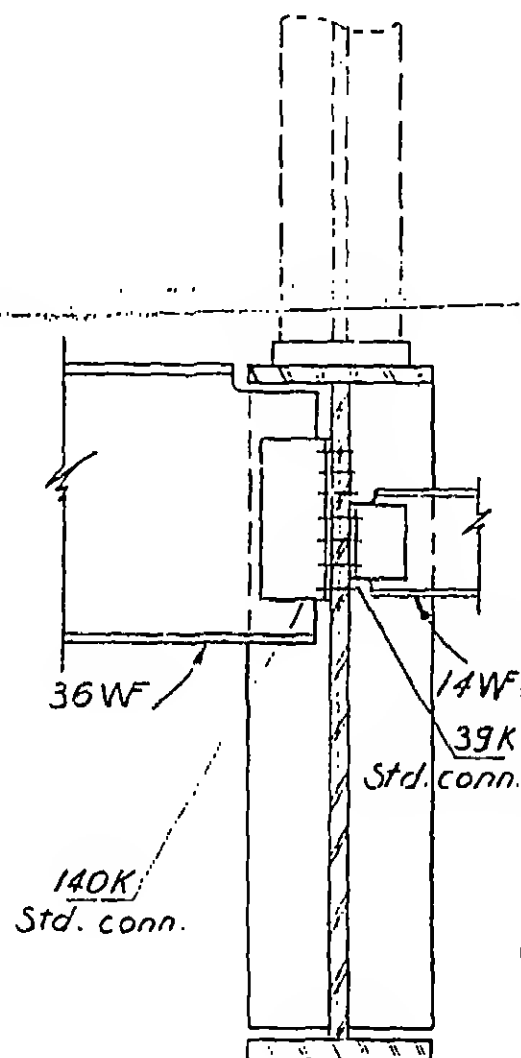
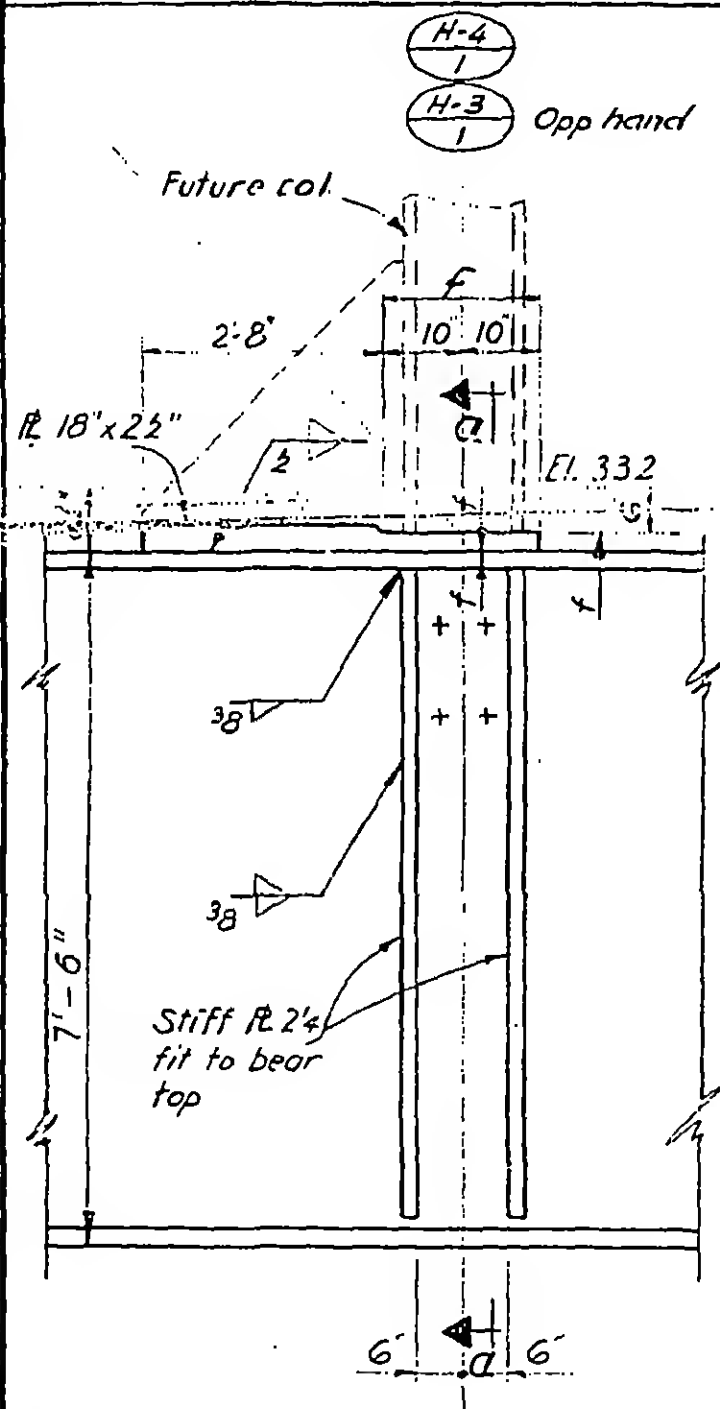
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DATE 1-3-72

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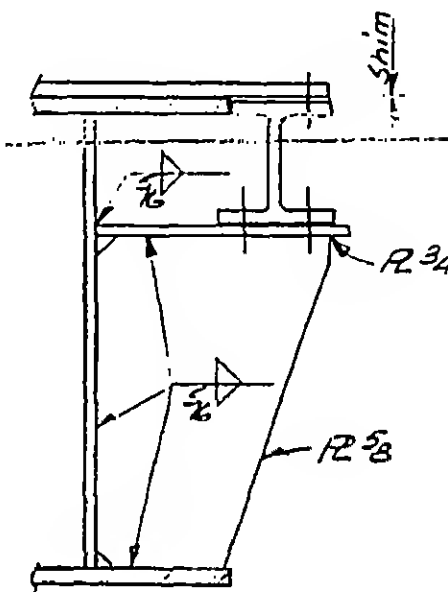
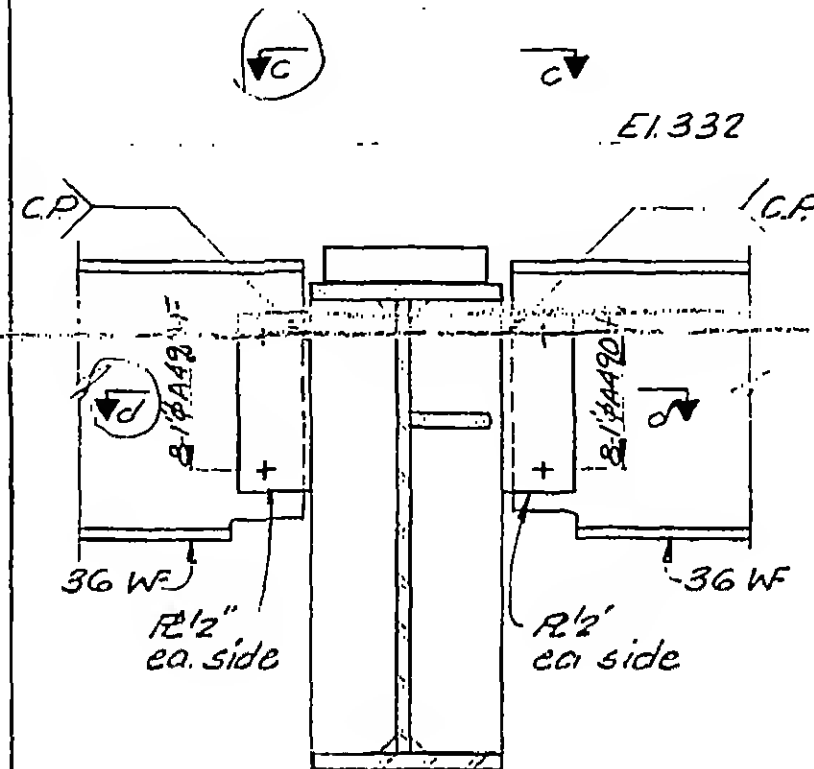
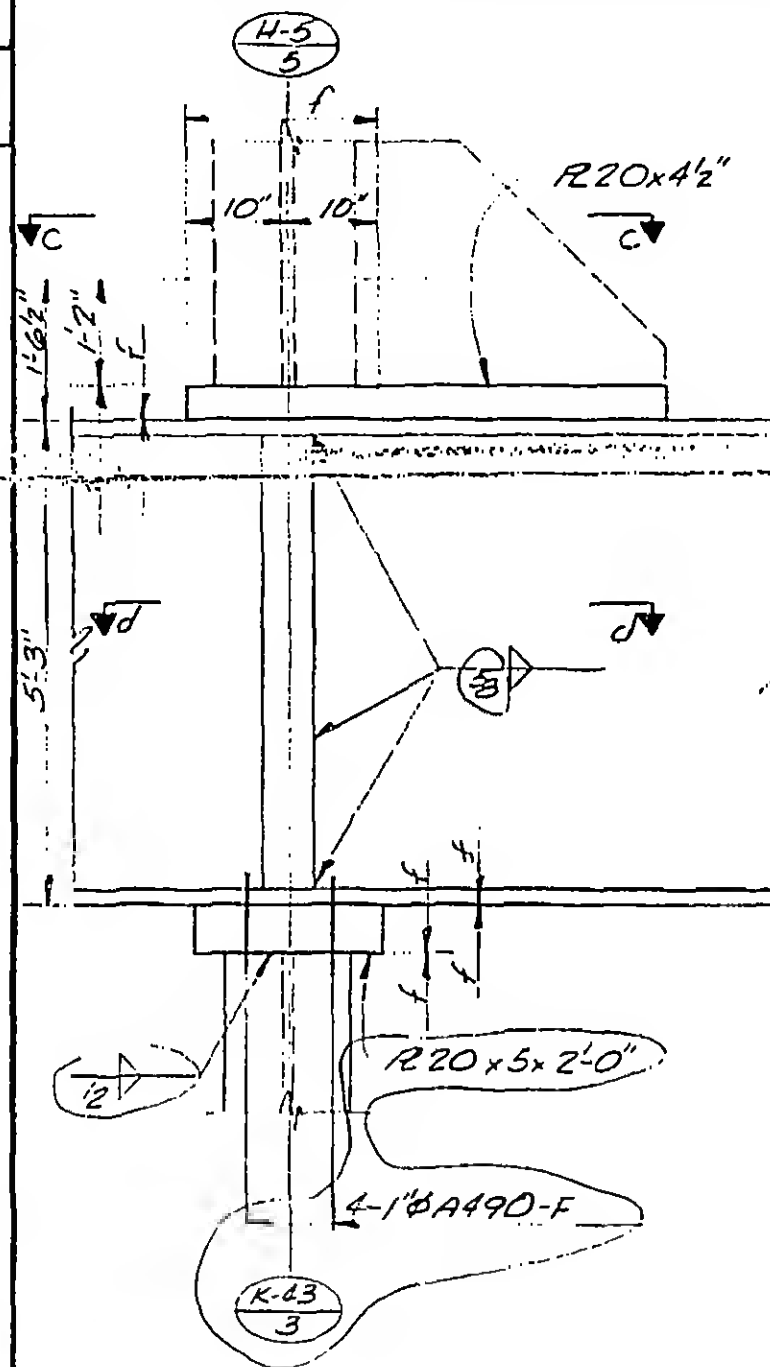
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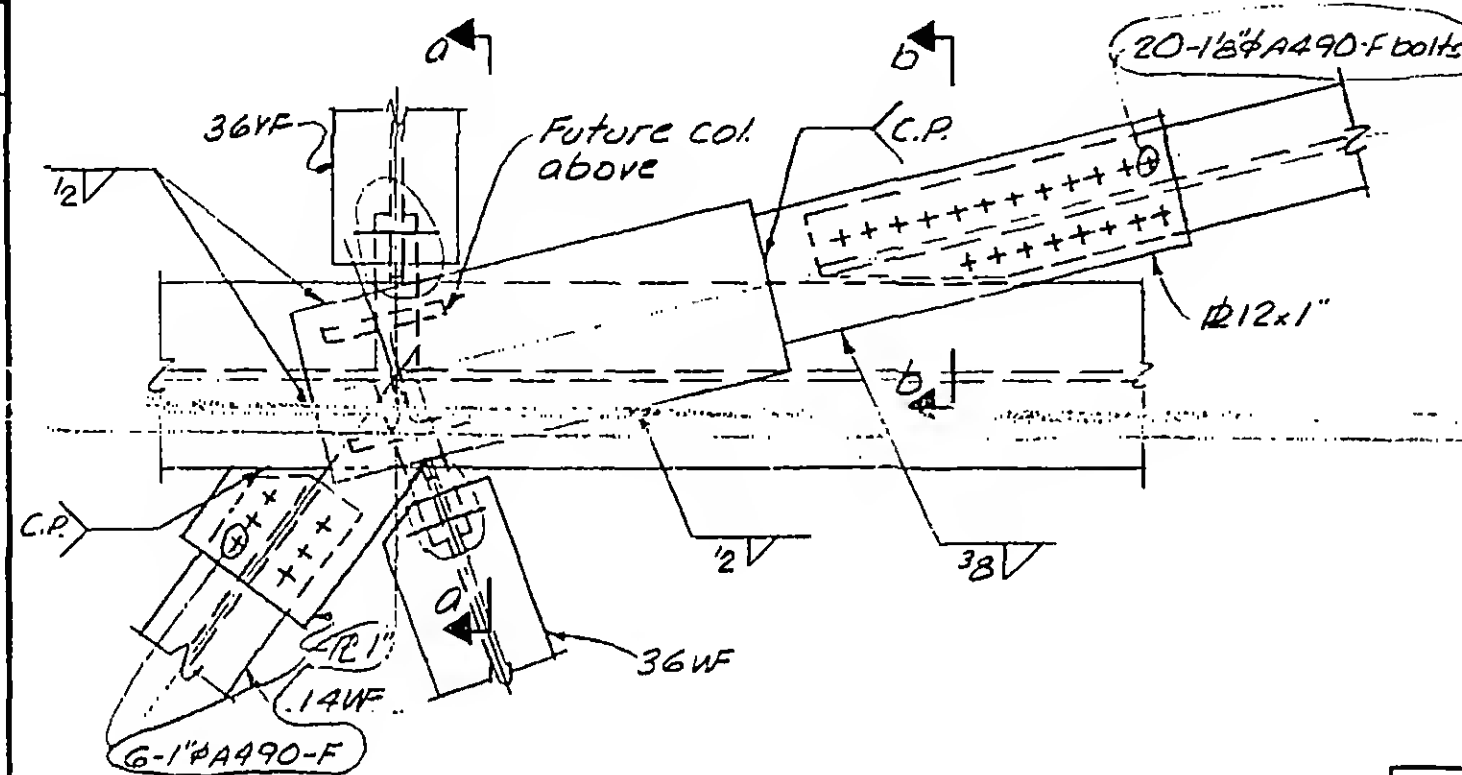
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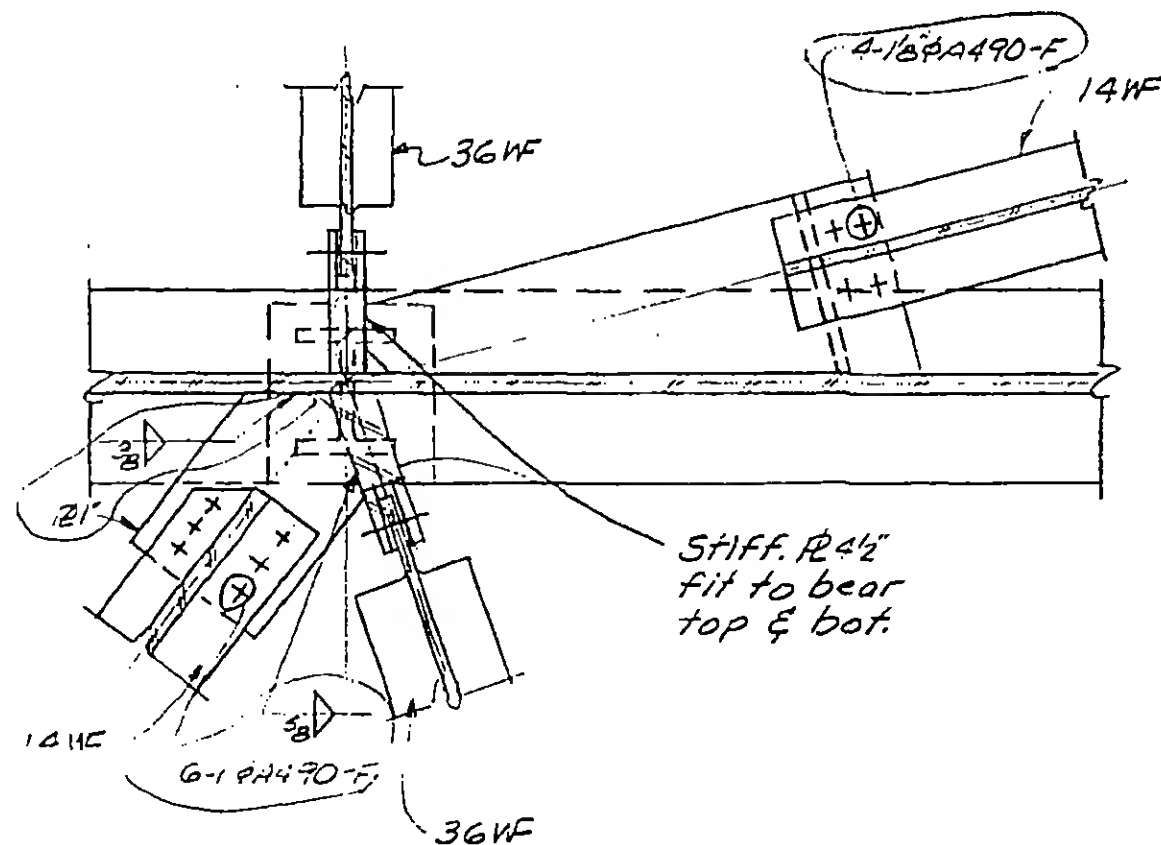
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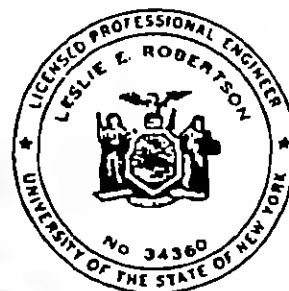


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A.L. Franqui

REVIEWED

SKILLING, HELLE. CHRISTIANSEN, ROBERTSON

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GIRDER - FUTURE COLUMN DETAILS

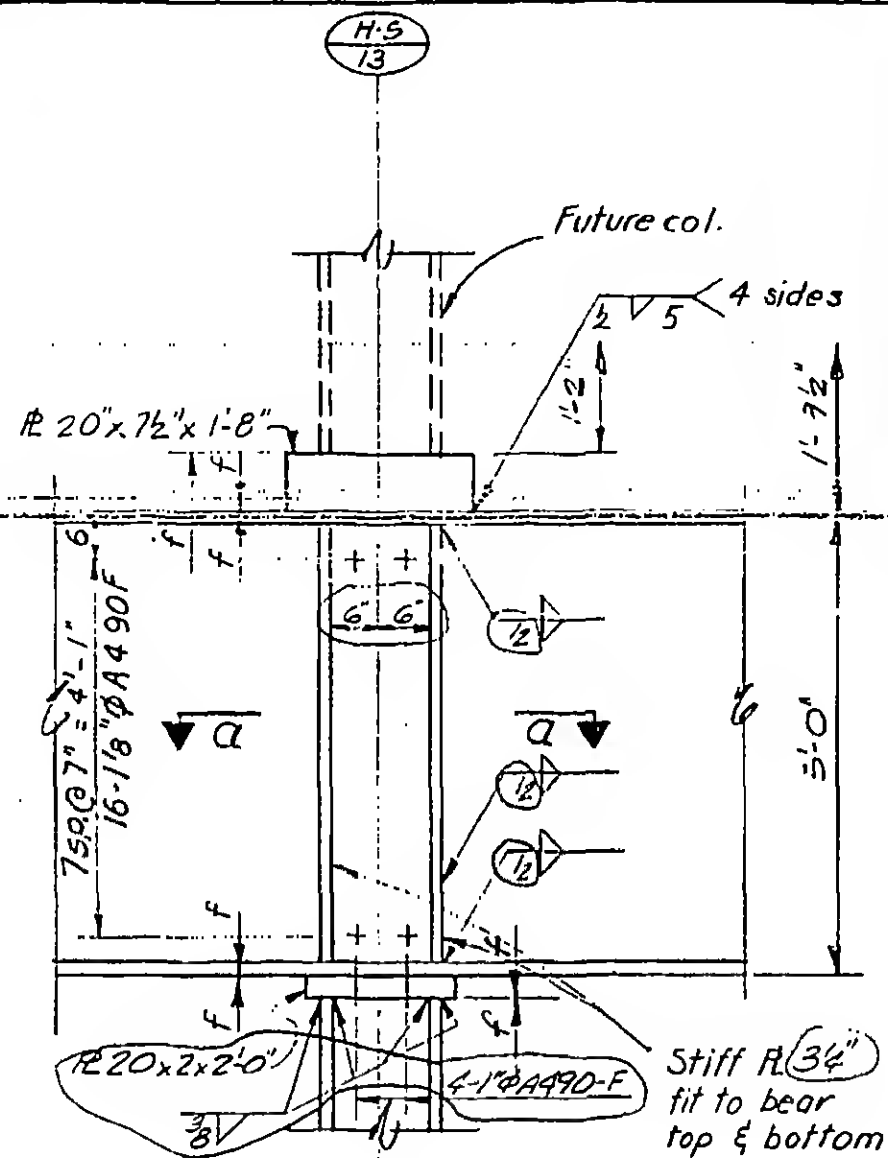
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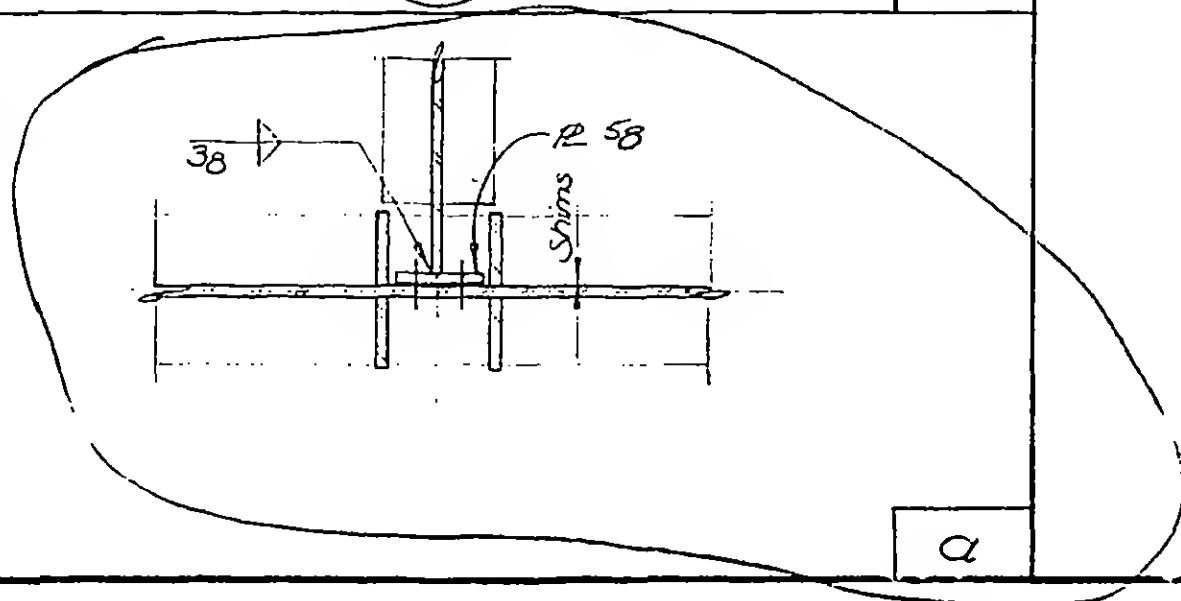
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DATE 11-3-73

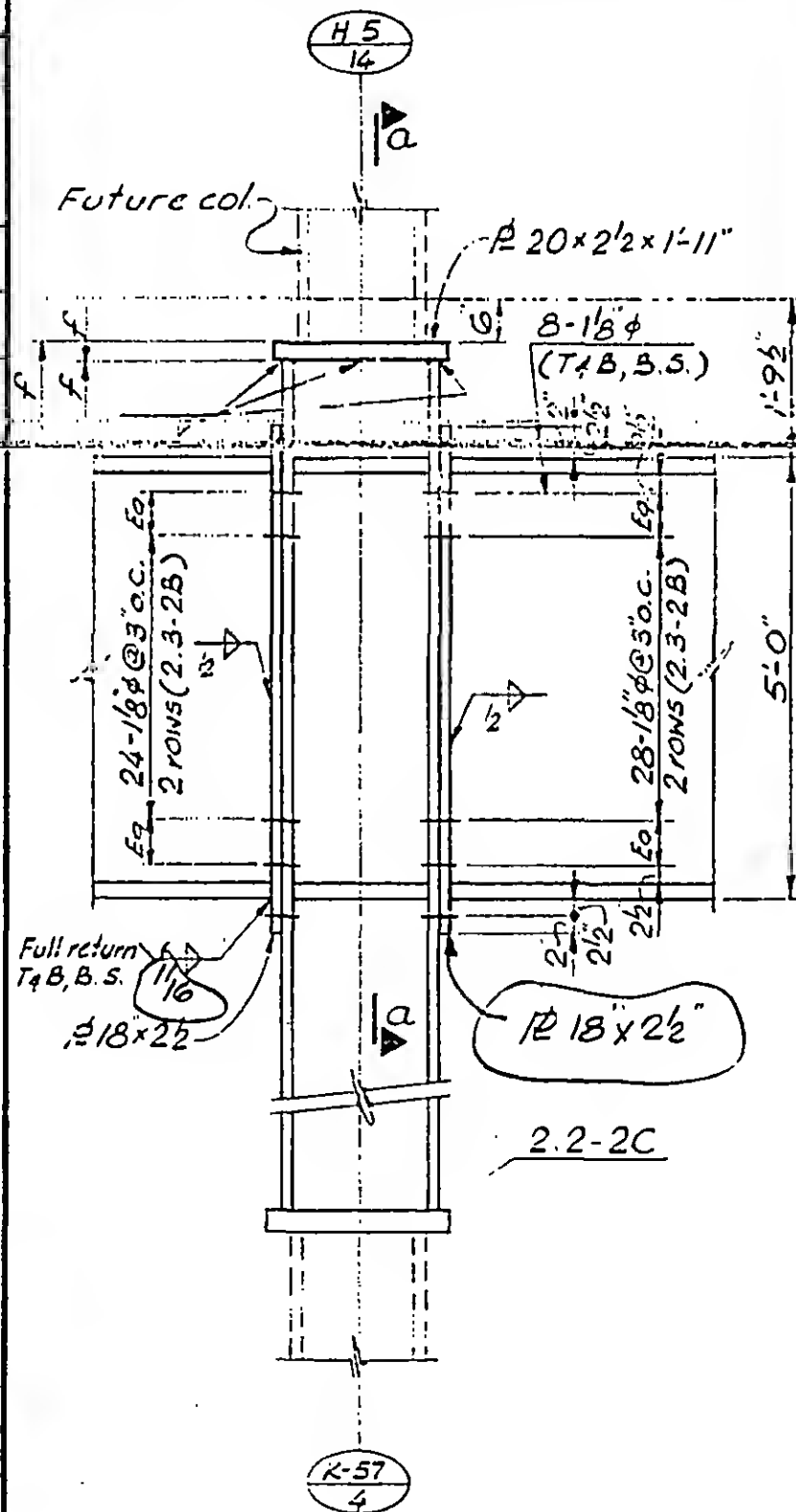
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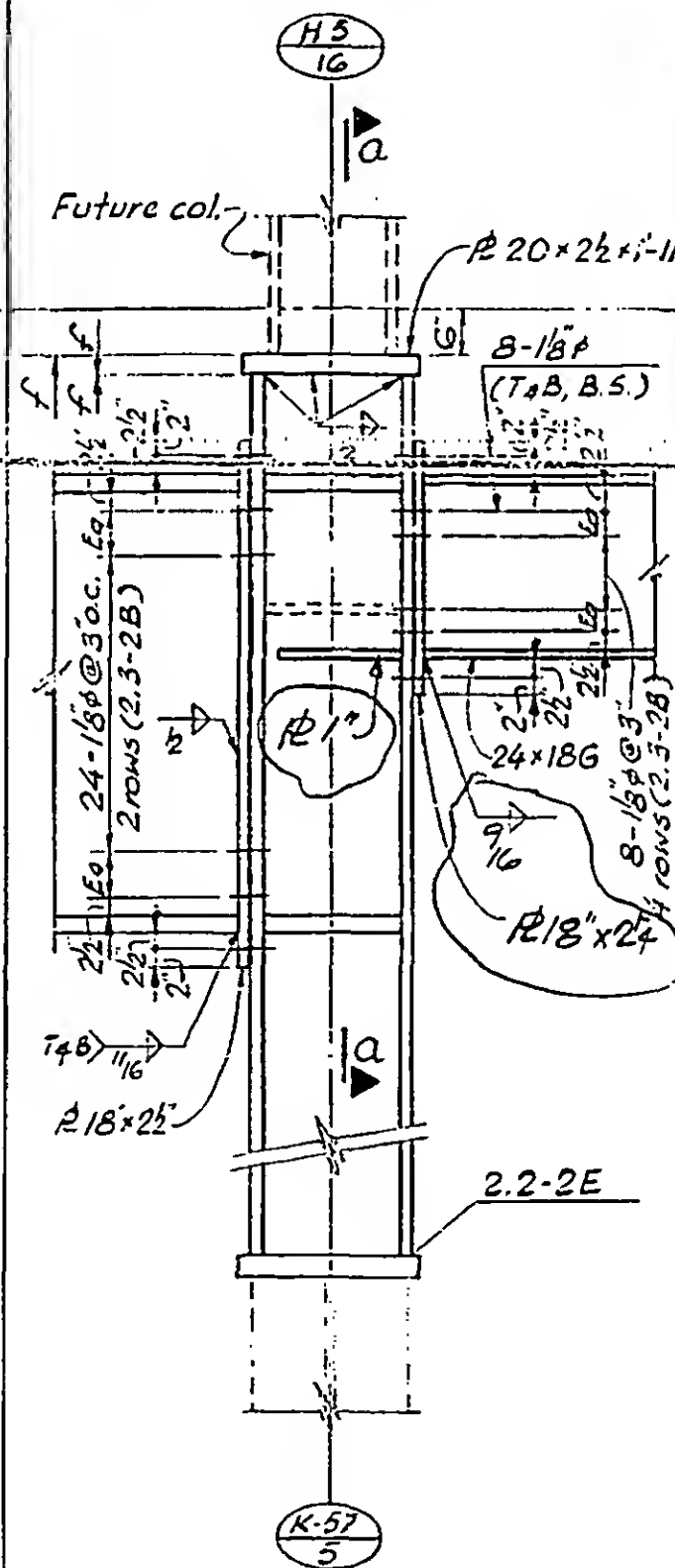
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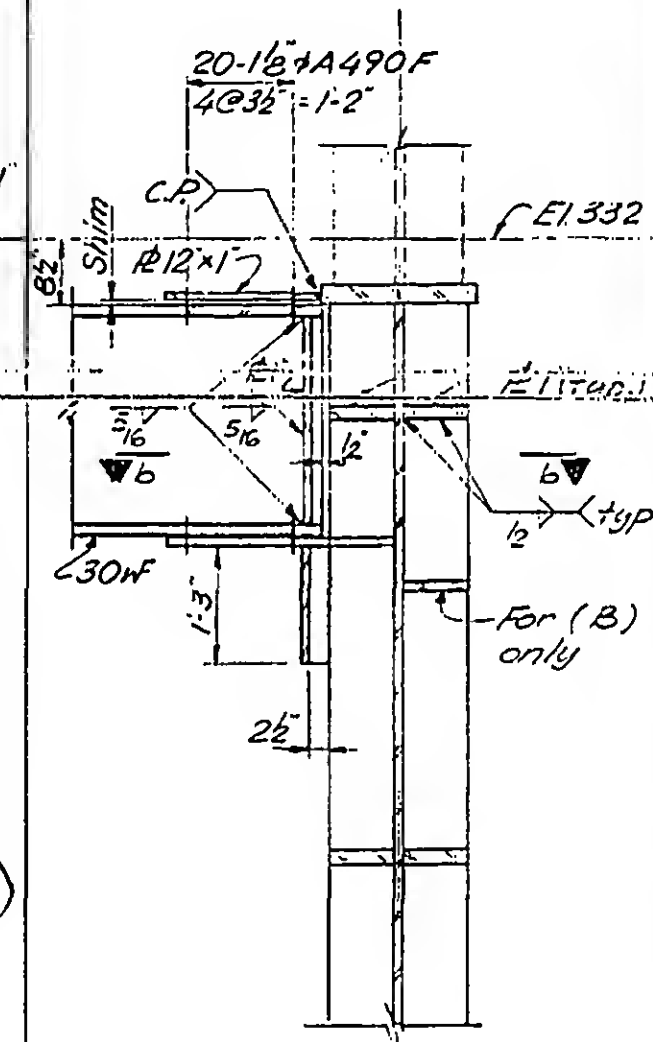
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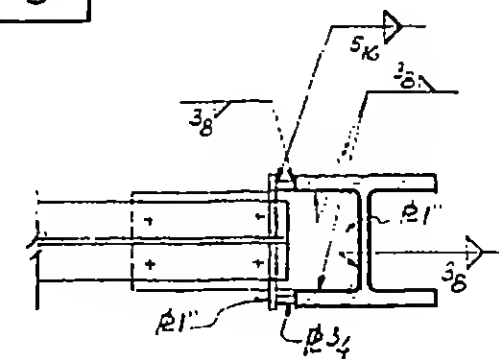
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K. Robertson

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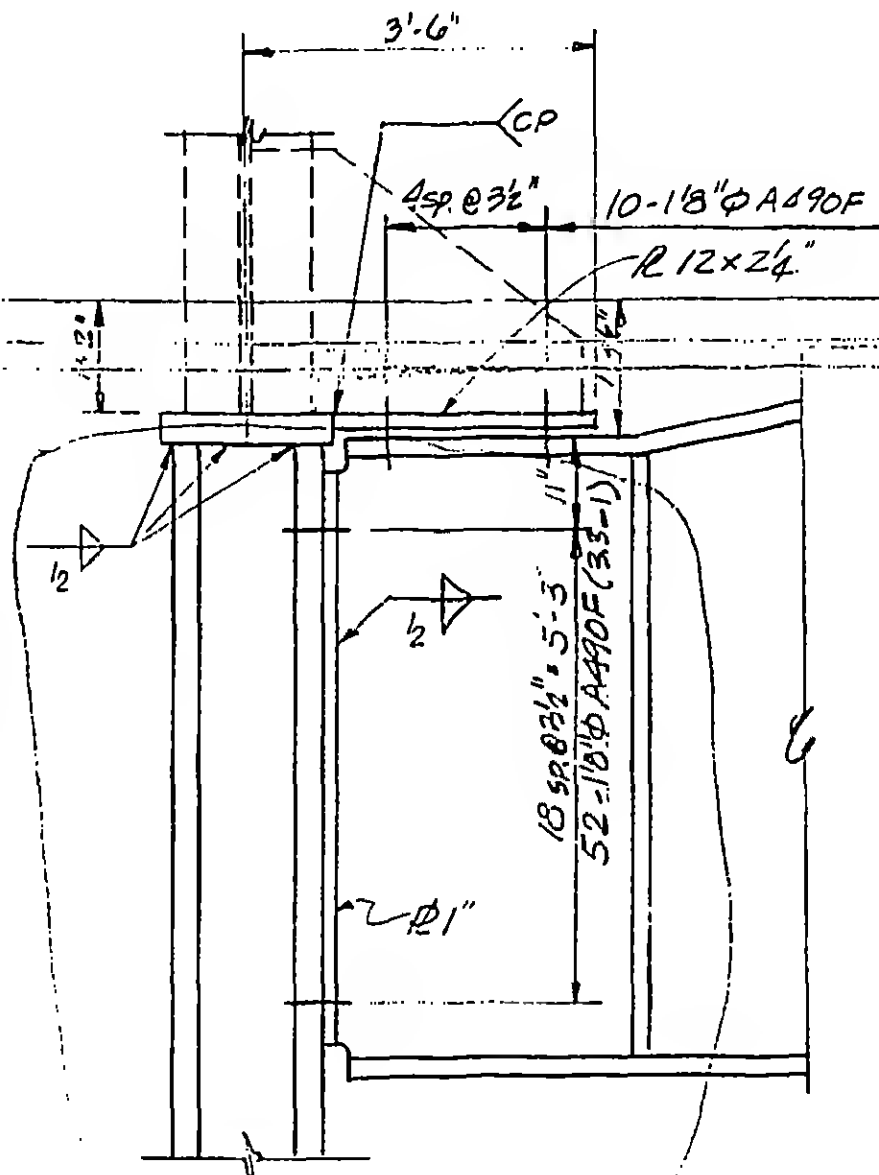
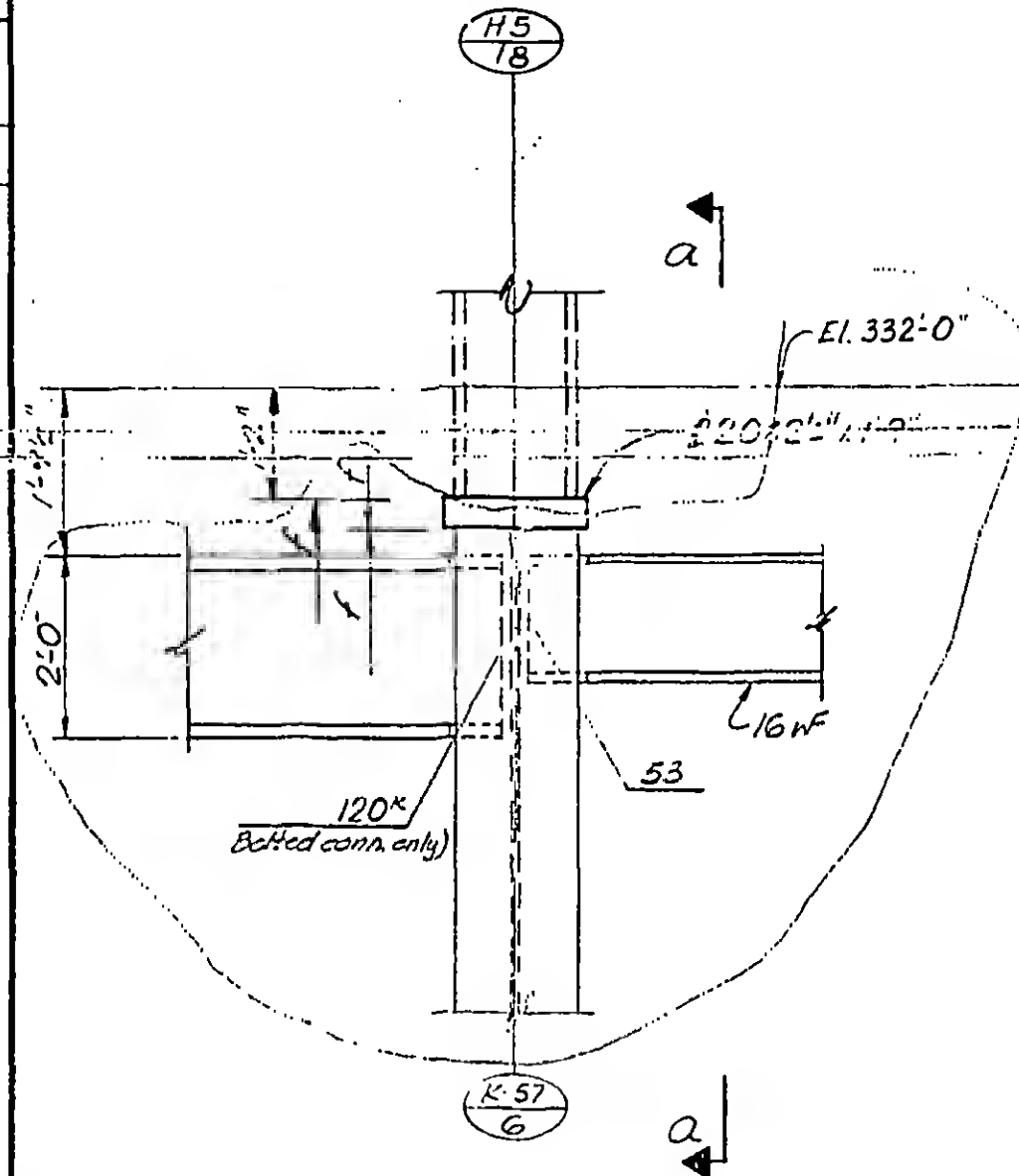
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DATE 11-3-72

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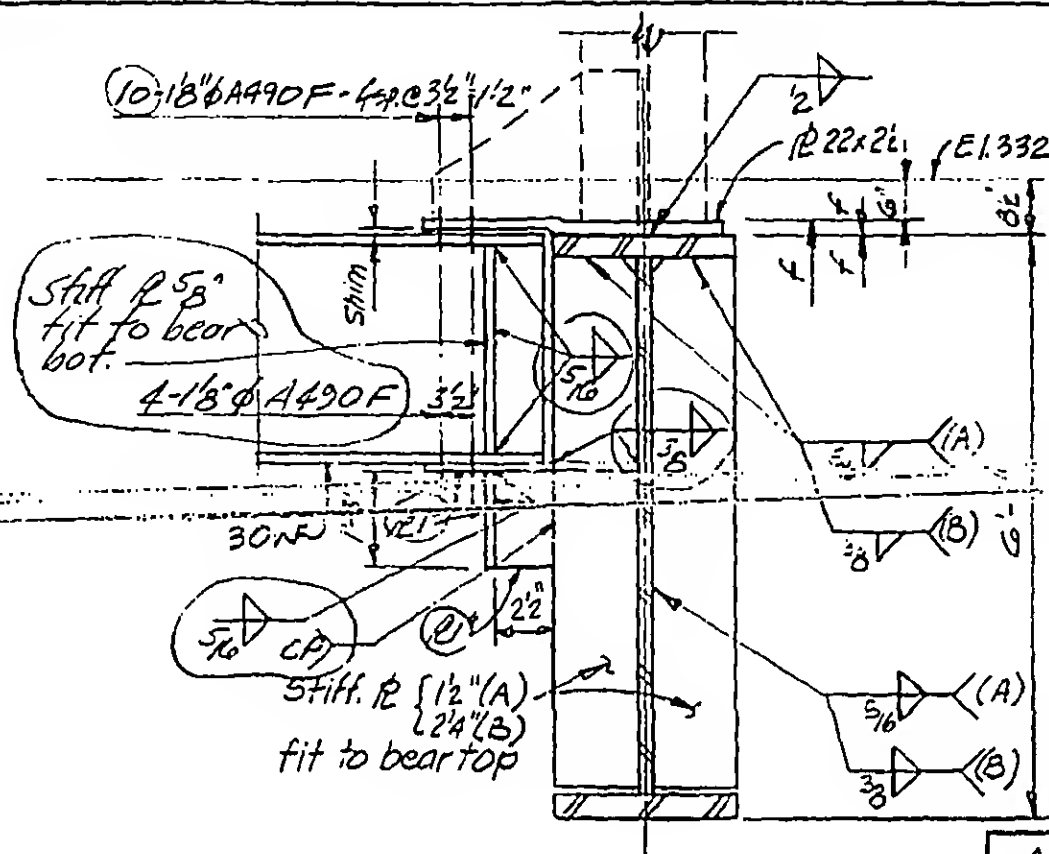
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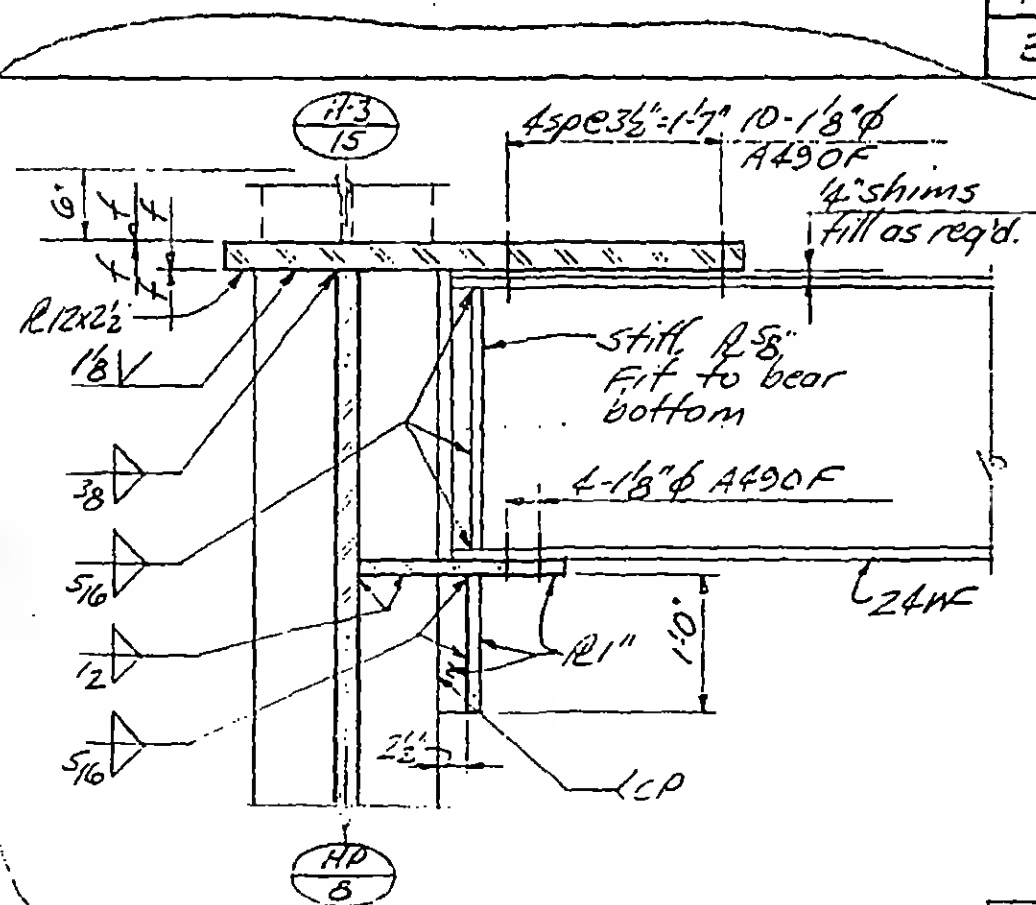
DATE 11-3-72

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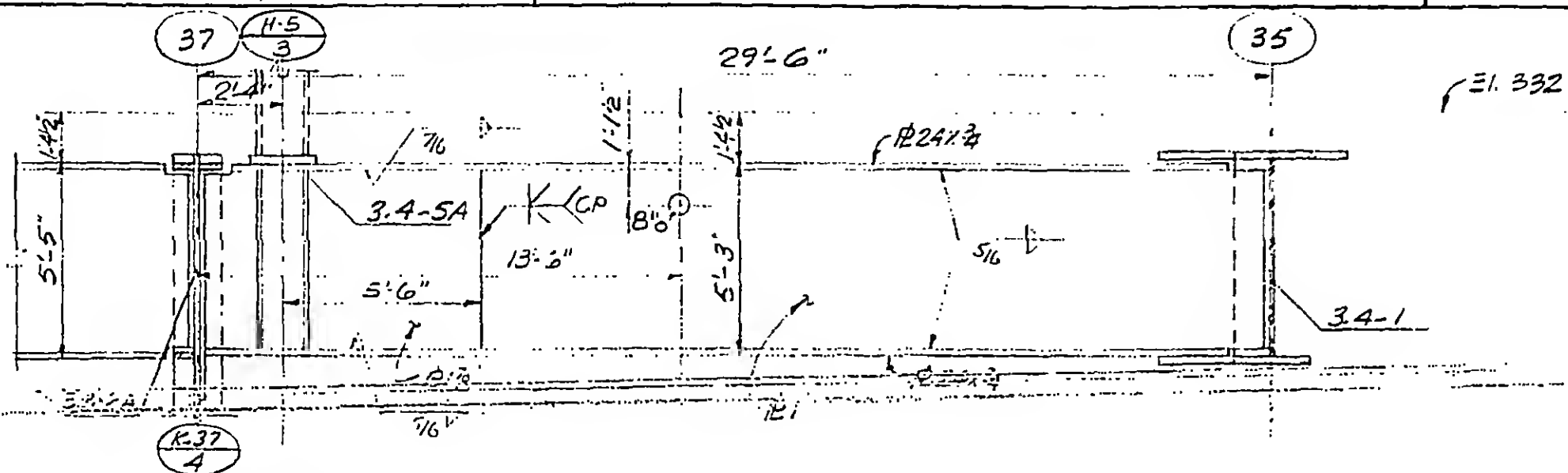
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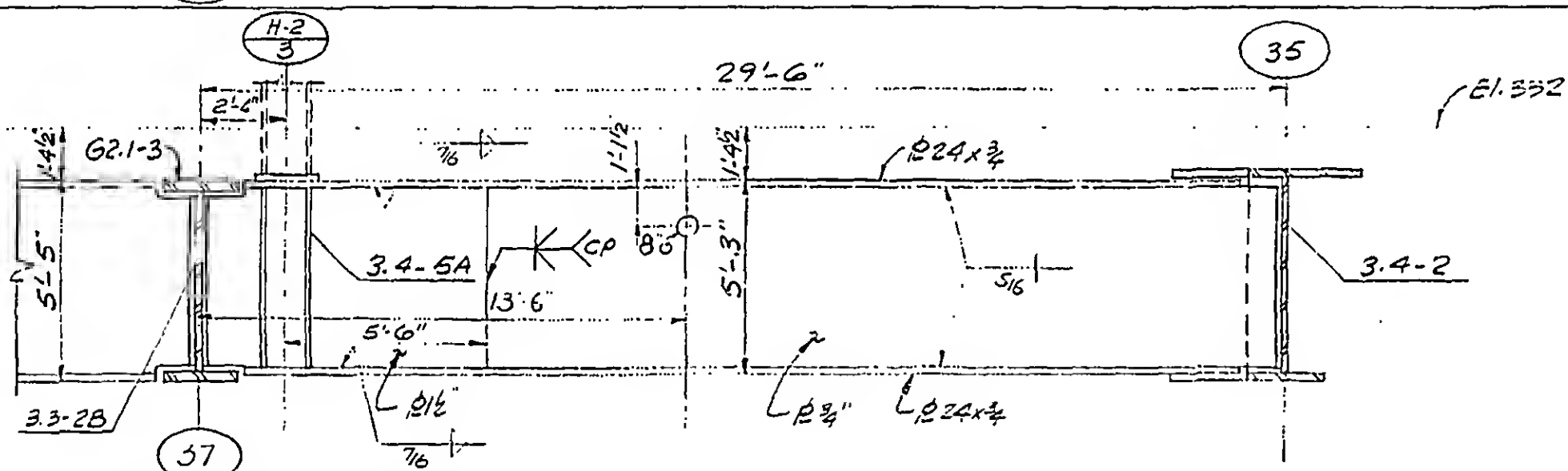
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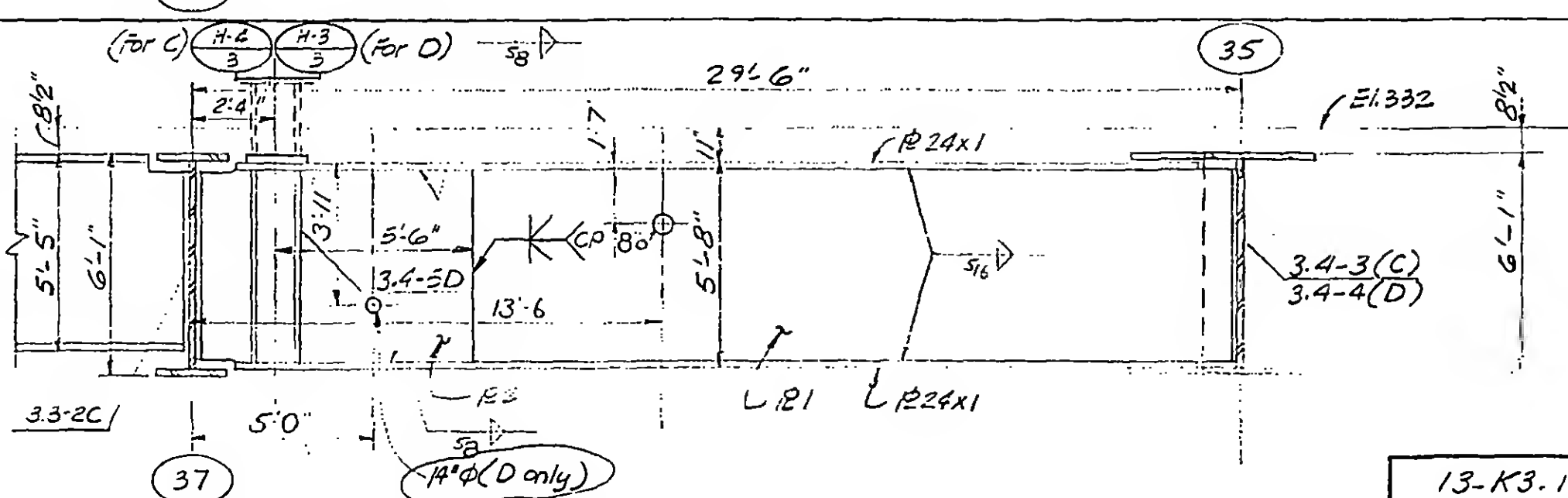
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DRAWN
A.L. Franqui

REVIEWED

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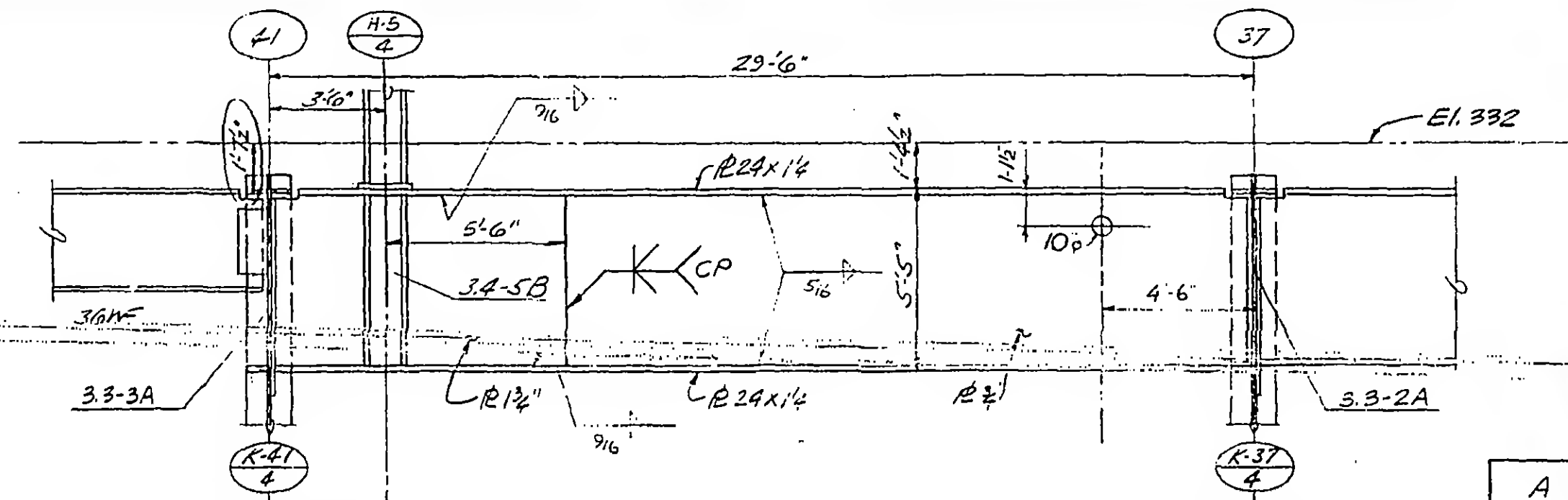
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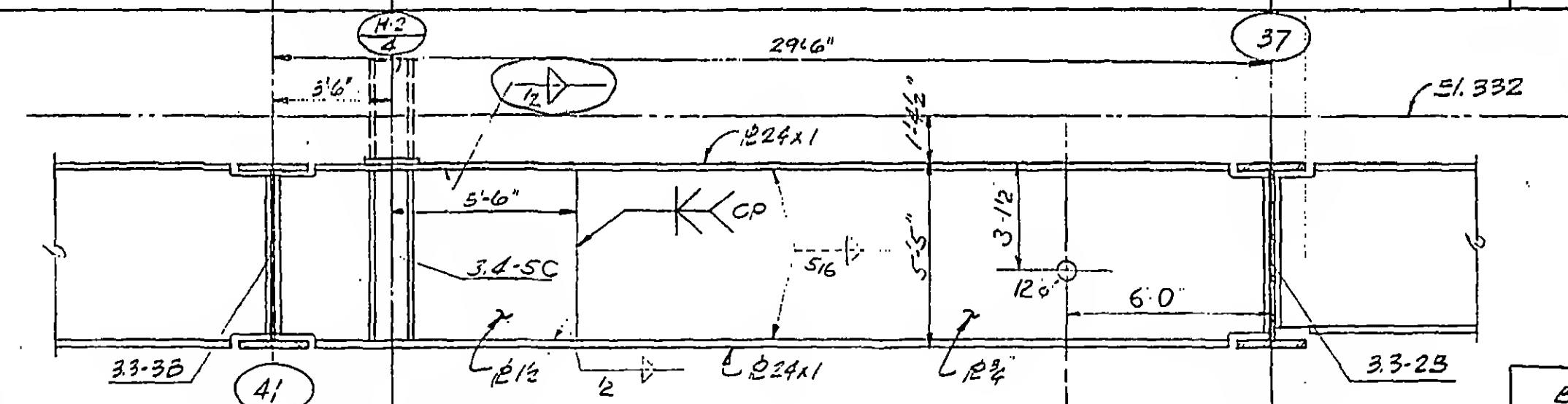
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11-20-72

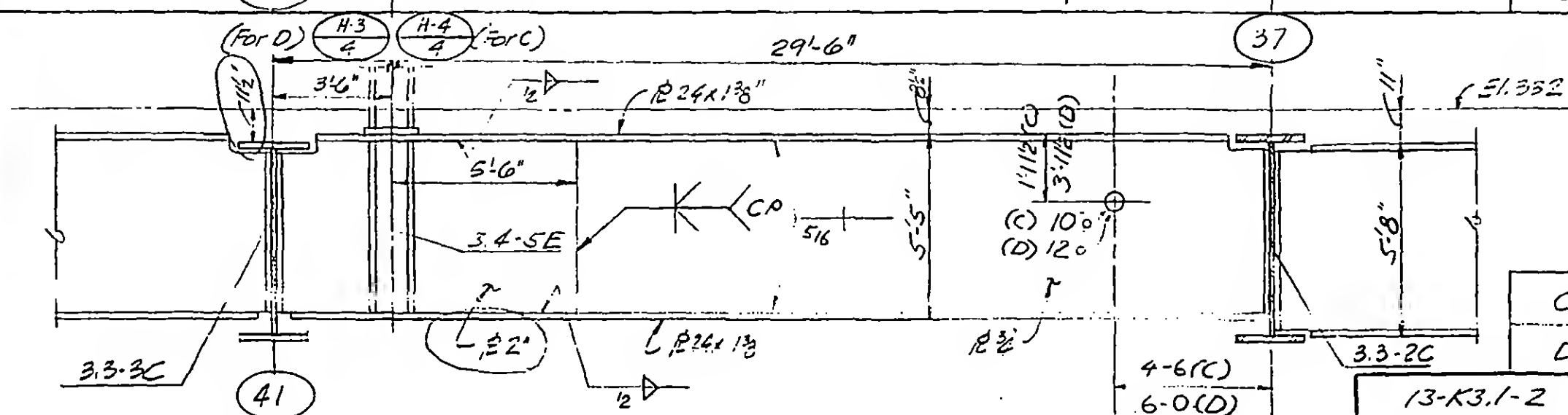
12-11-72



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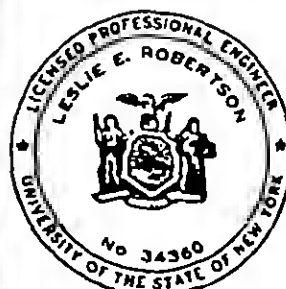
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13-K3.1-2



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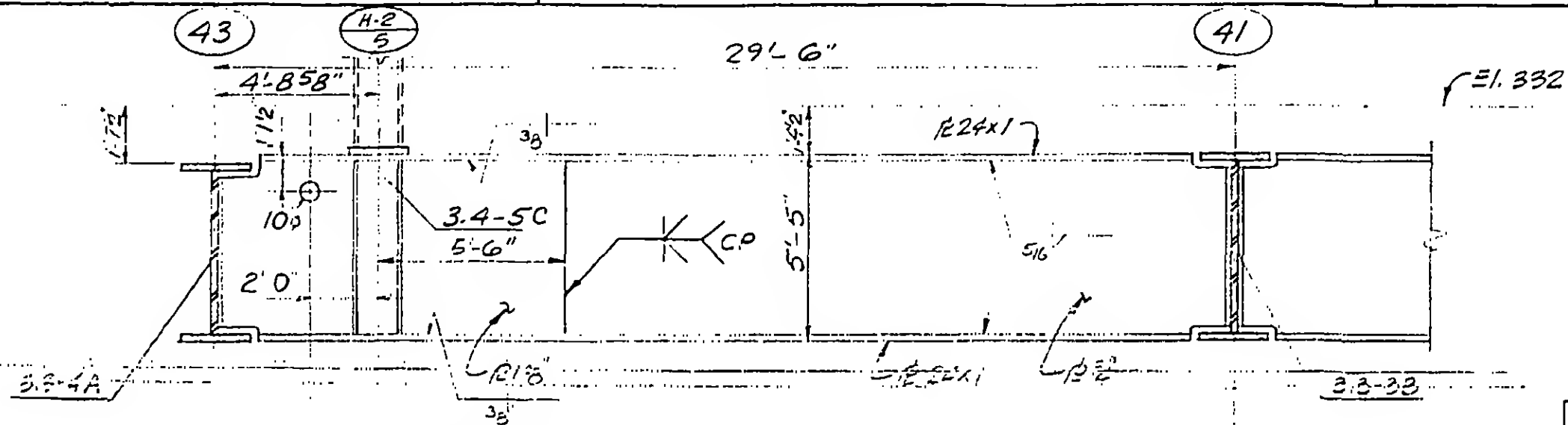
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DATE 11-3-72

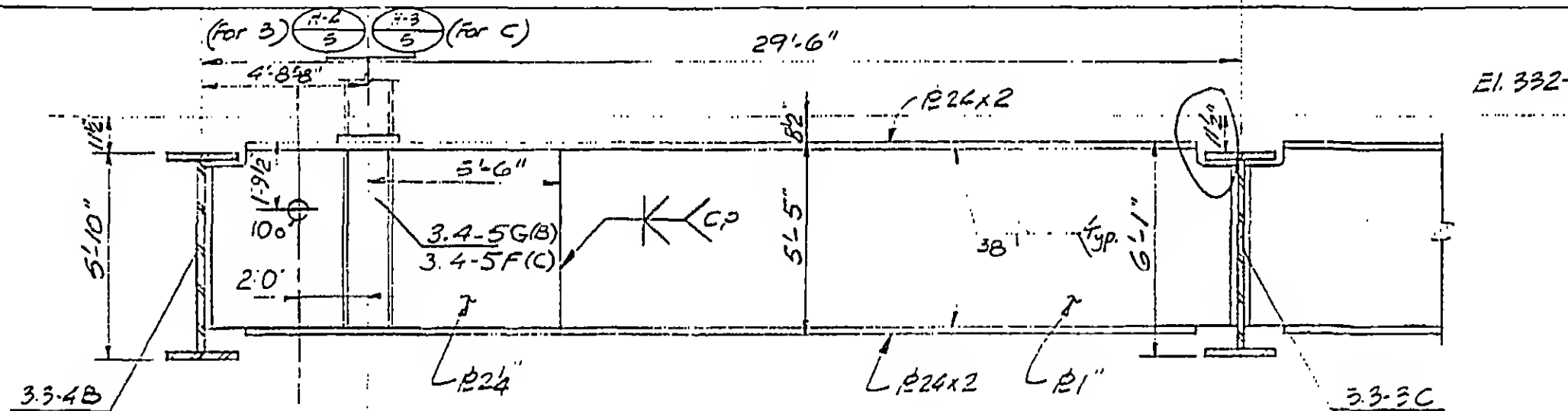
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construction
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DESIGNER

DRAWN
A.L. Fronzoni

REVIEWED

13-K3.1-3

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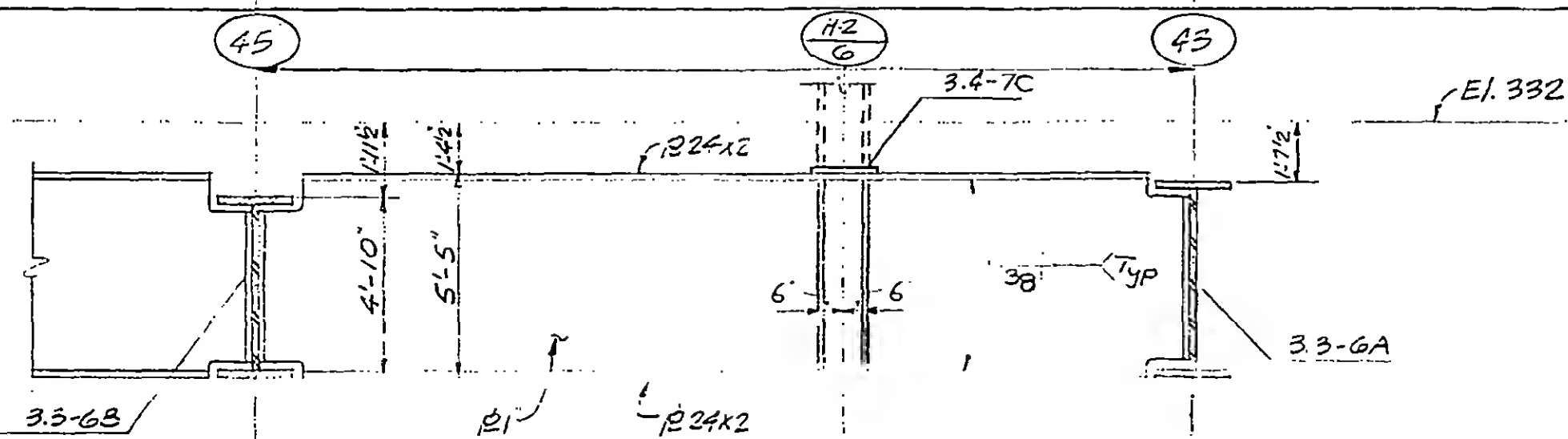
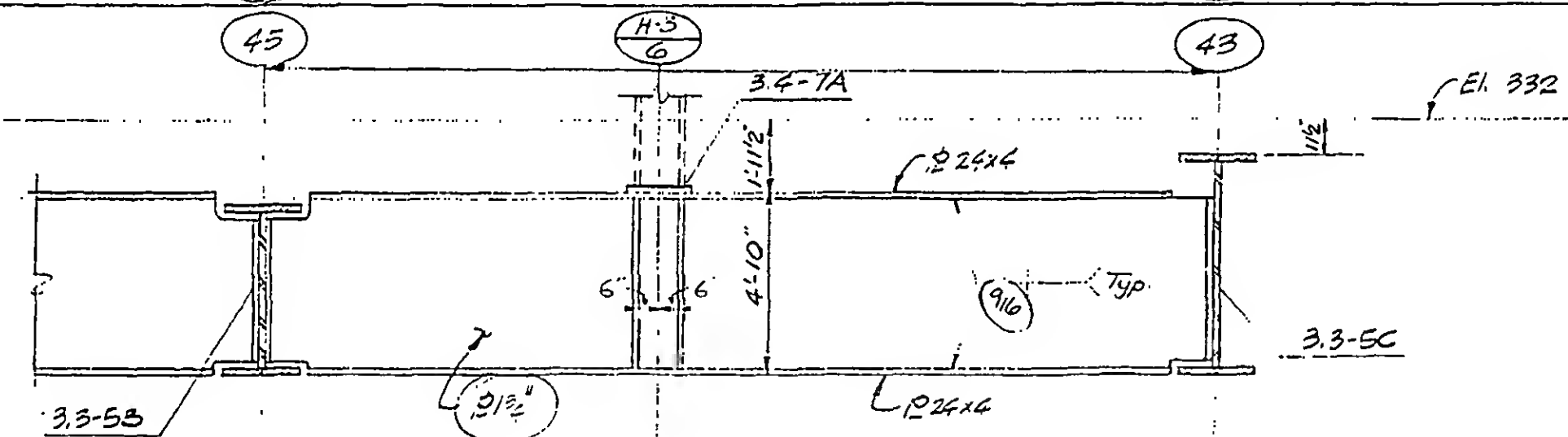
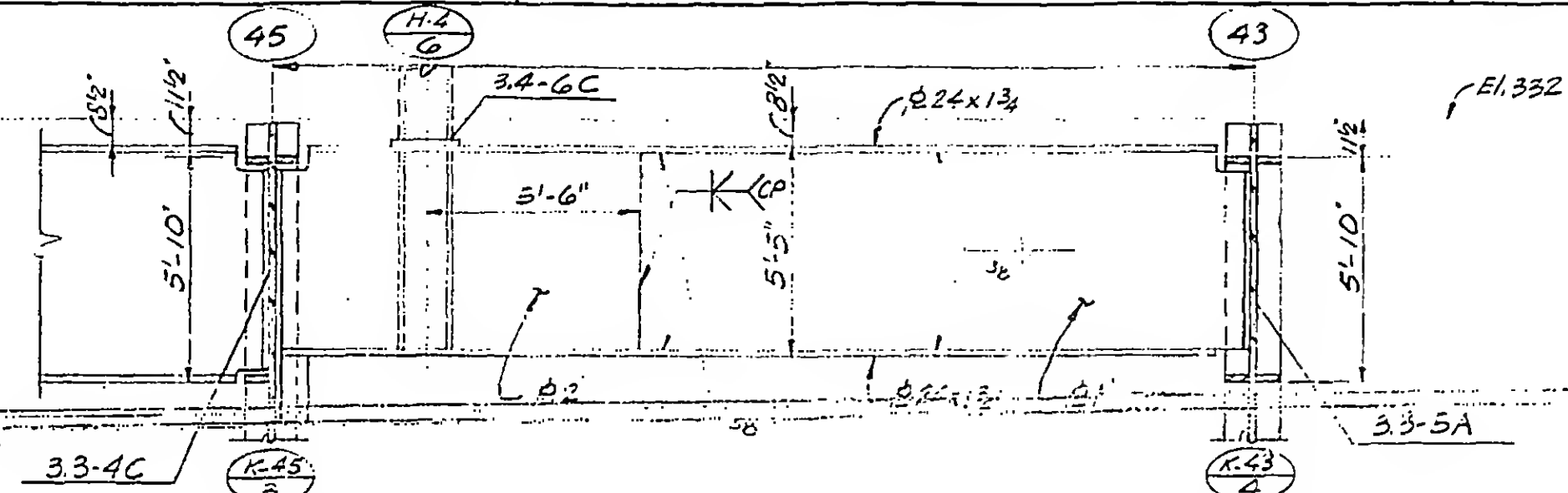
PROJECT THE WORLD TRADE CENTER

TITLE GIRDER ELEVATIONS

DATE 11-3-72

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11-20-72



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A.L. Fronqui

REVIEWED

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PROJECT

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TITLE

GIRDER ELEVATIONS

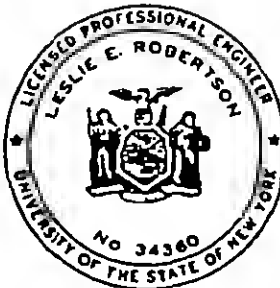
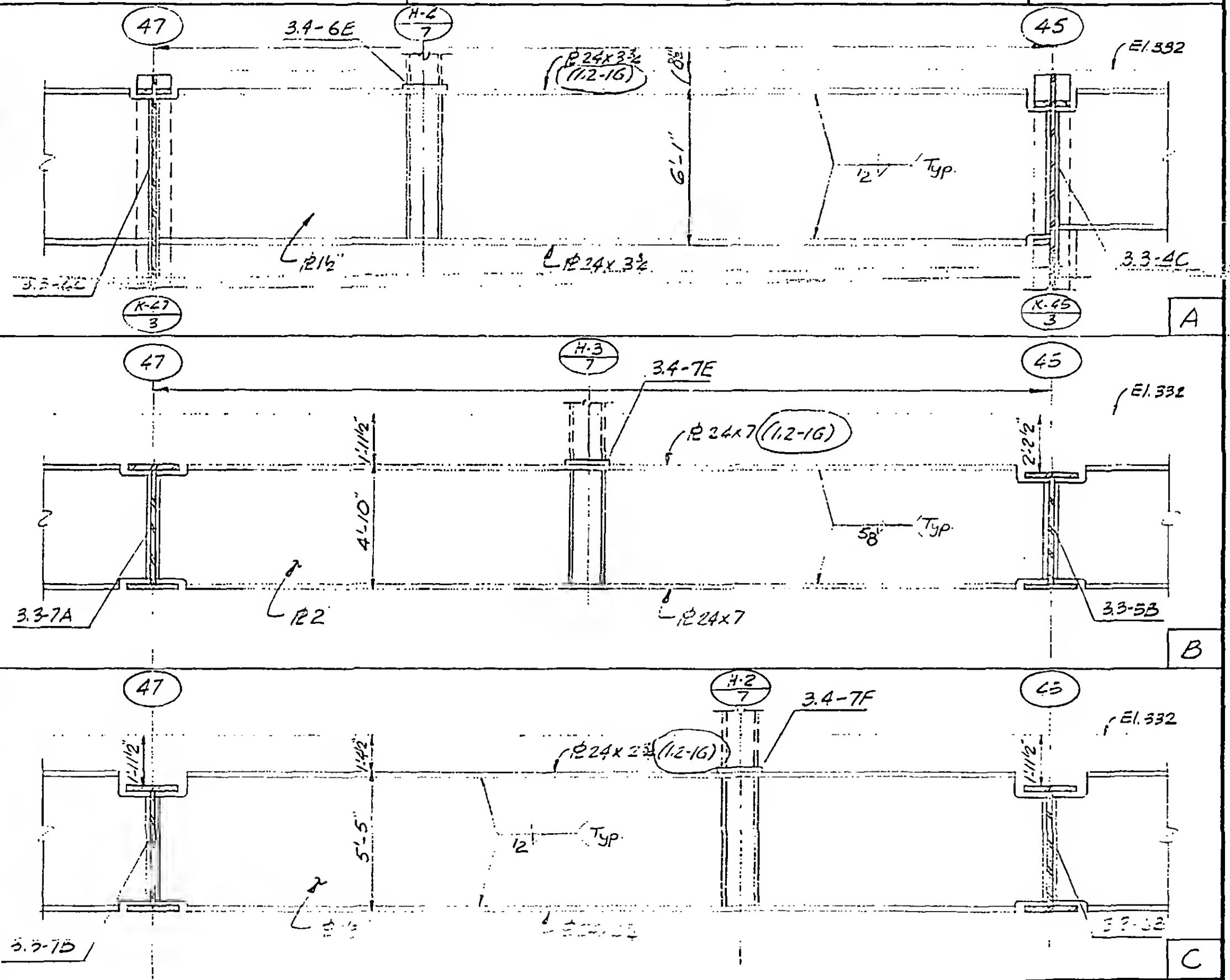
DATE

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DRAWN
A.L. Frangui

REVIEWED

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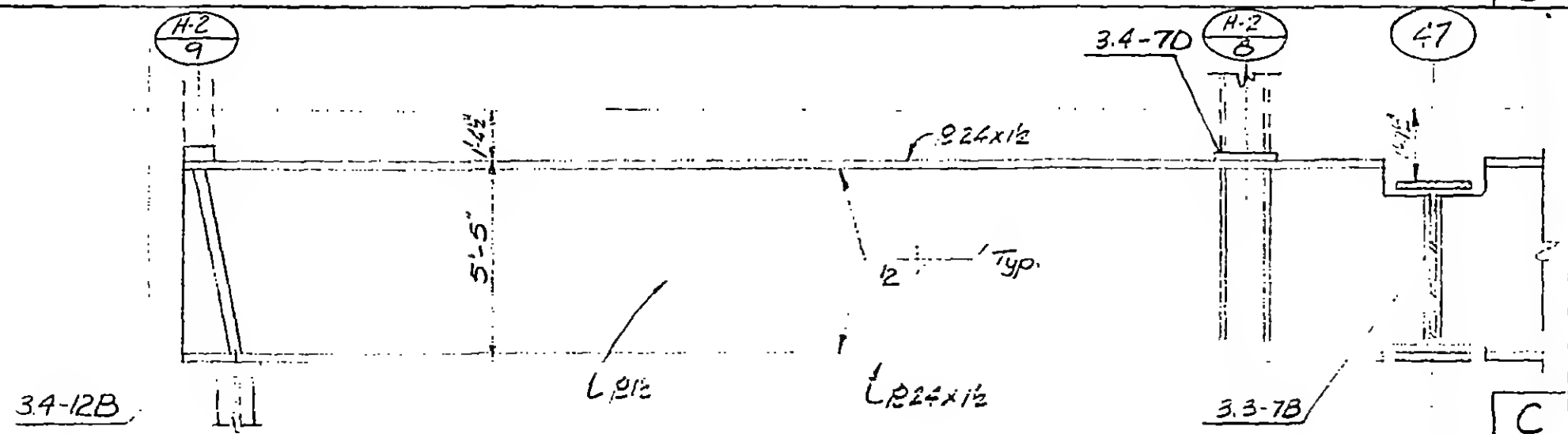
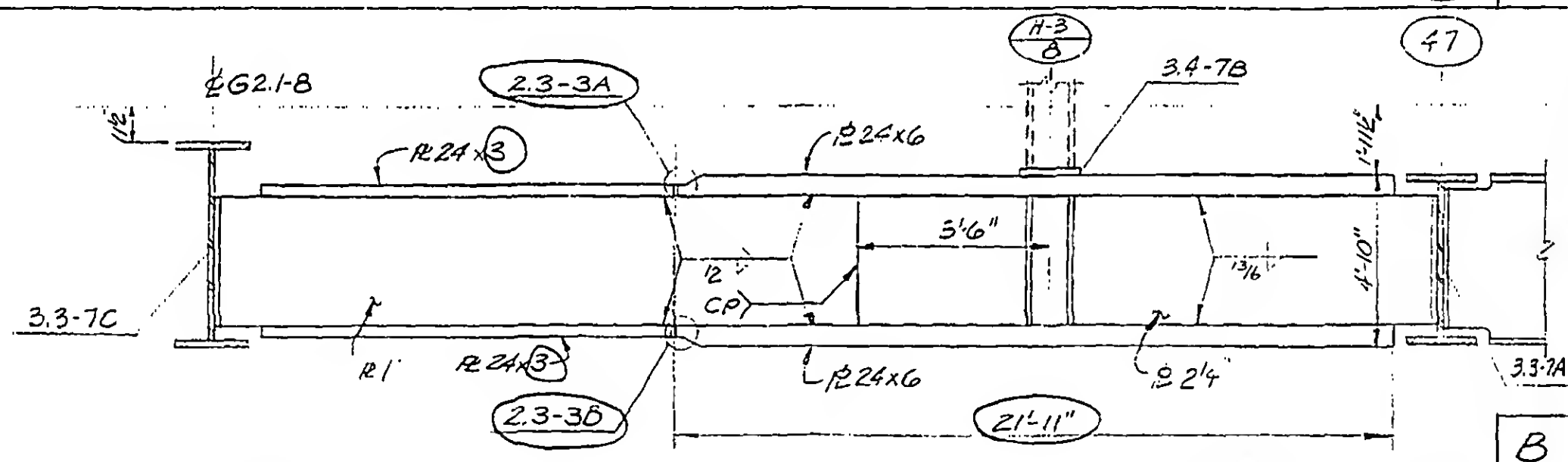
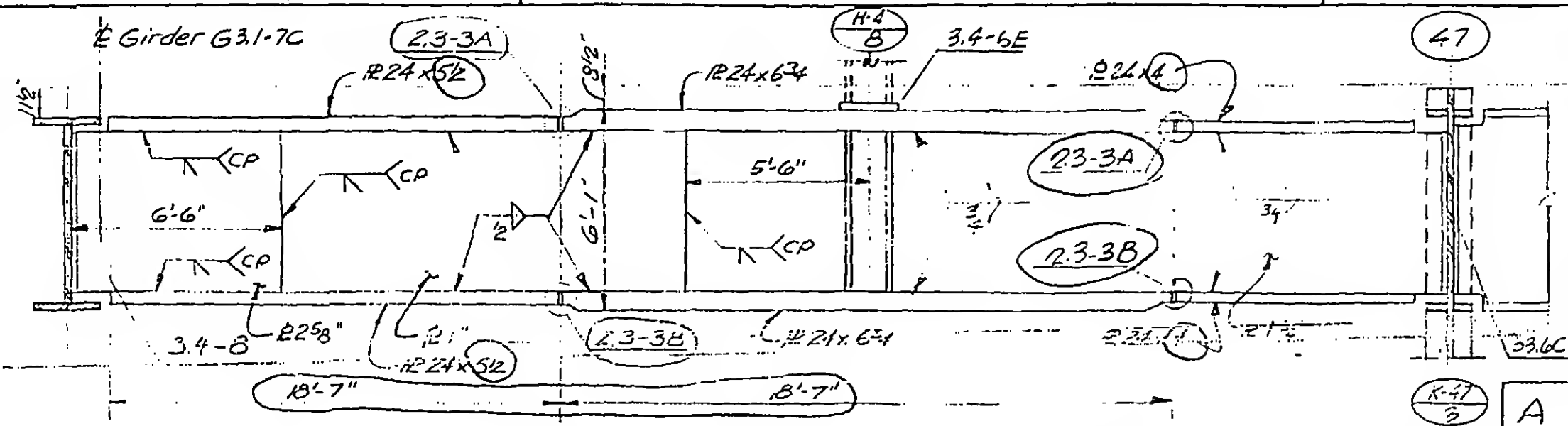
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DATE 11-3-72

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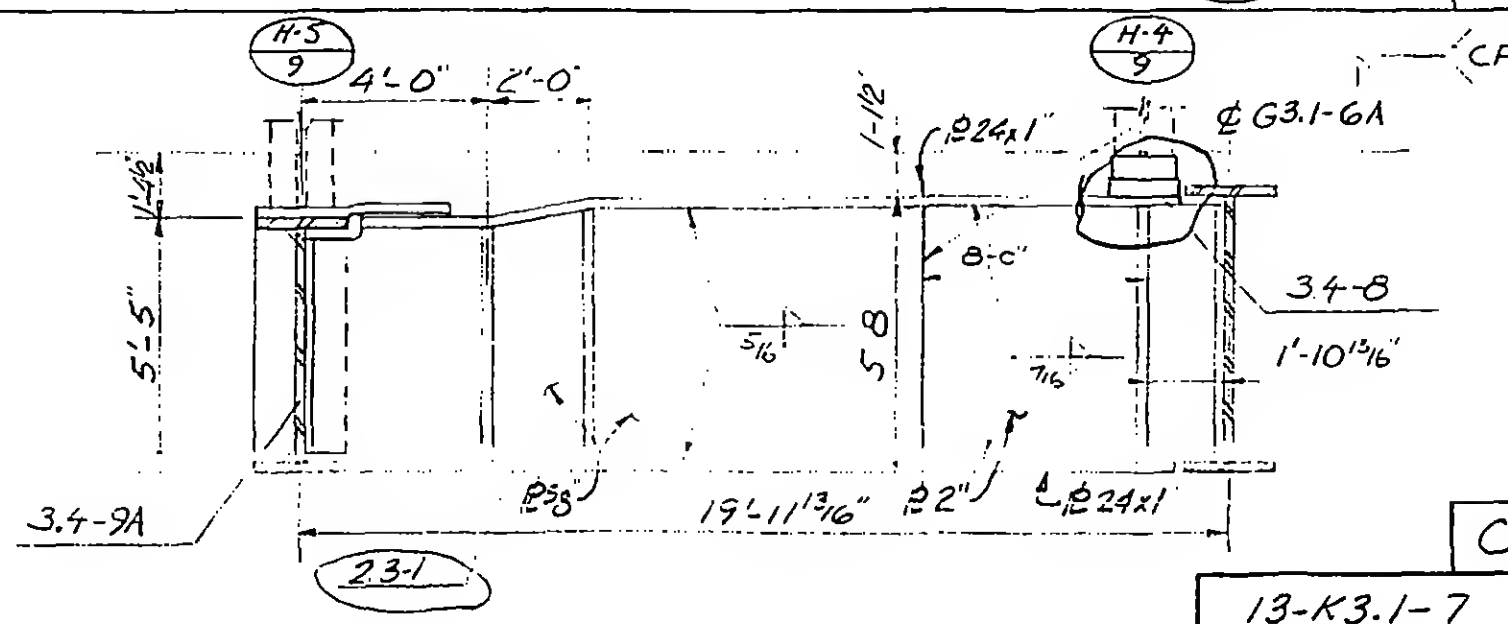
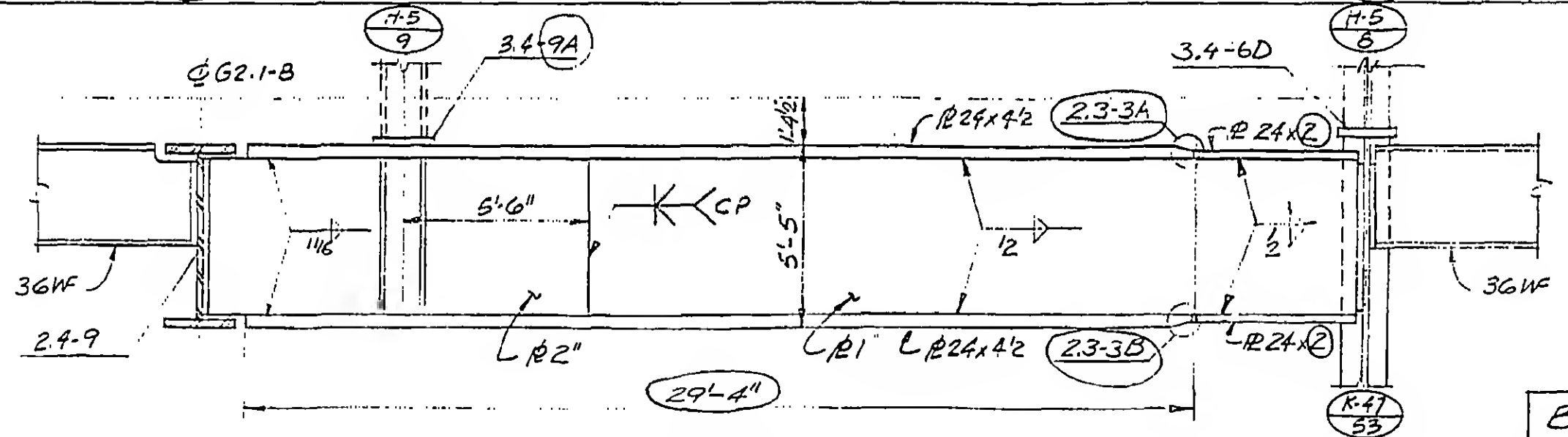
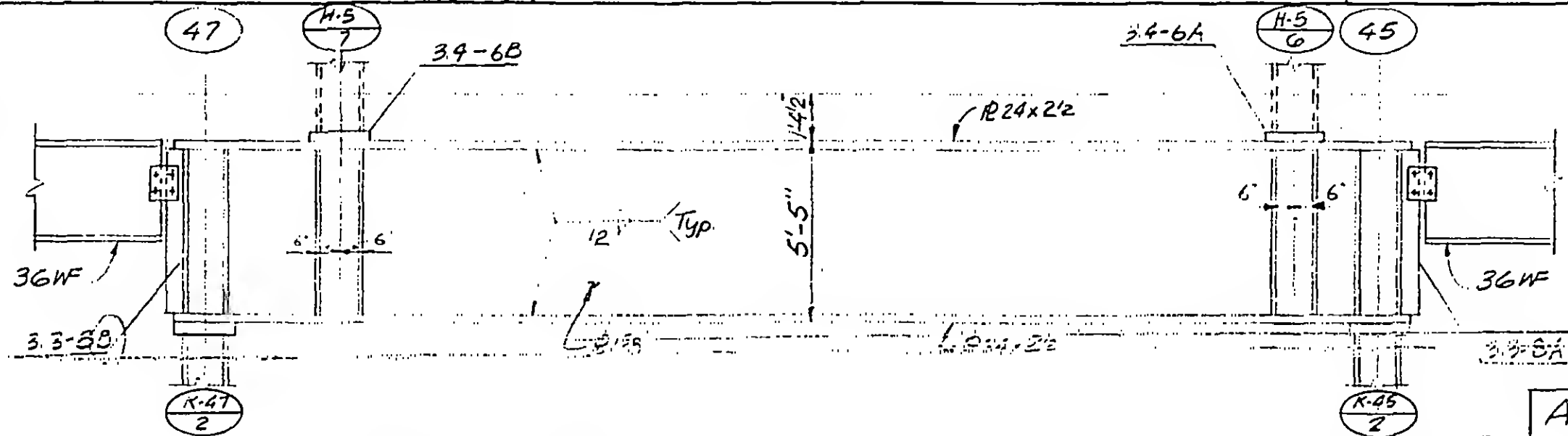
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A.L. Franqui

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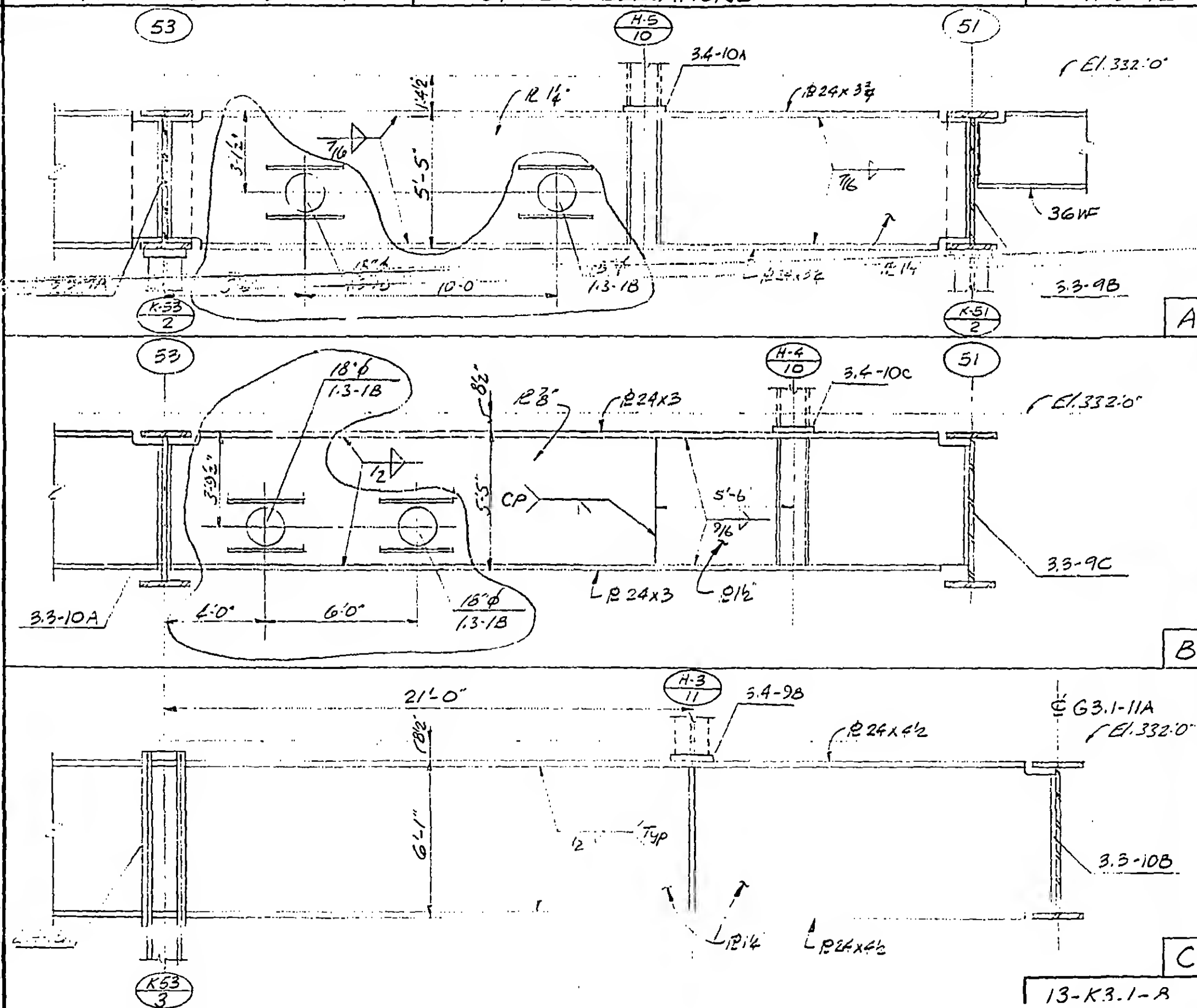
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DATE 11-3-72

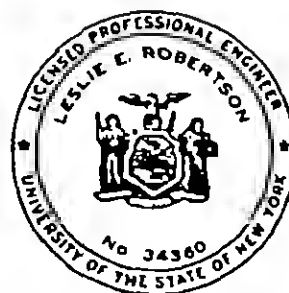
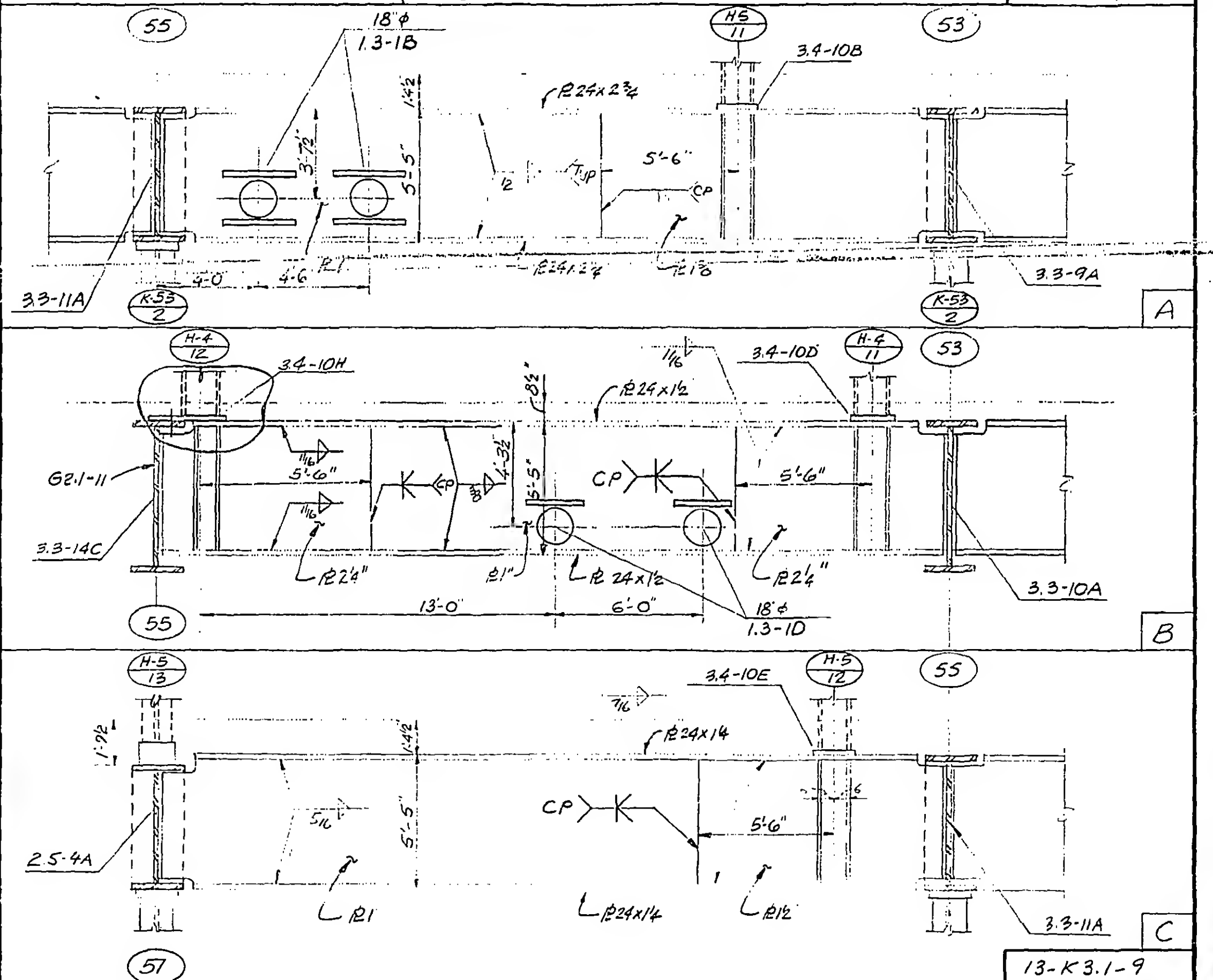
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A. L. Frongui

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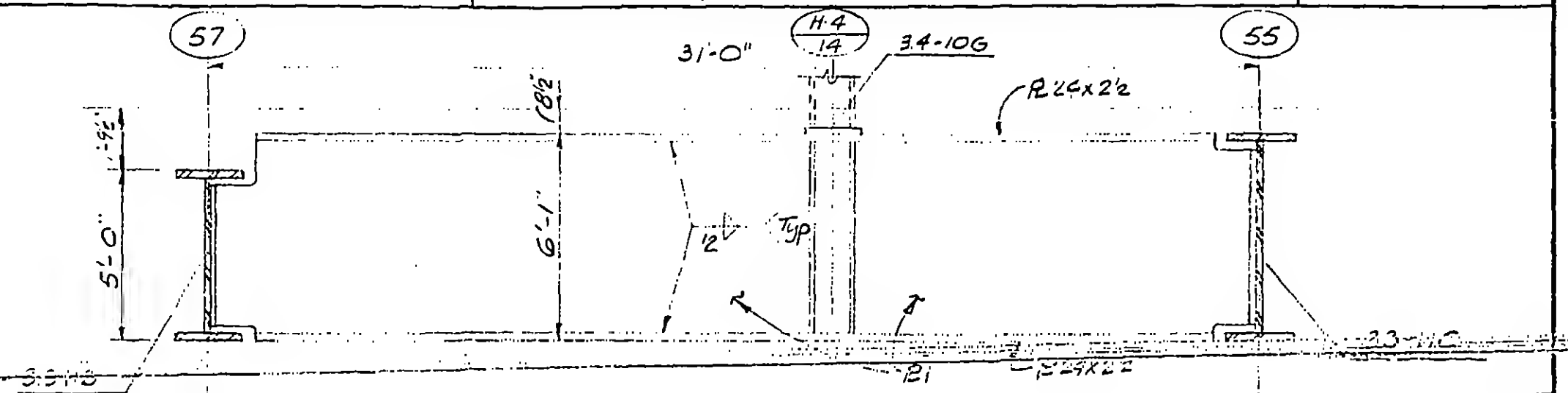
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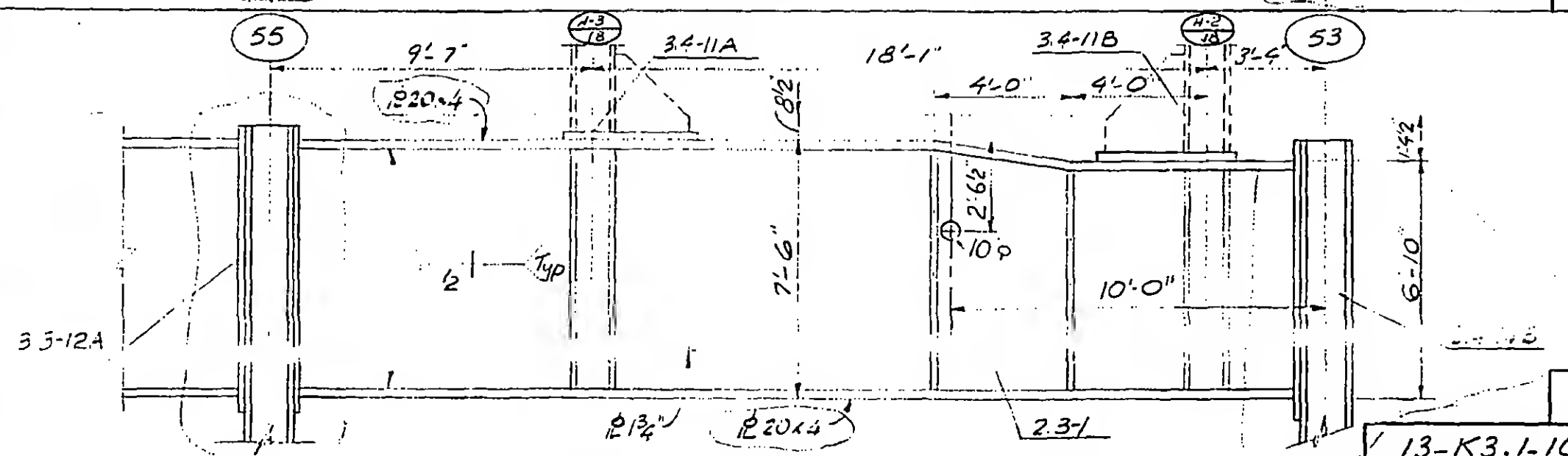
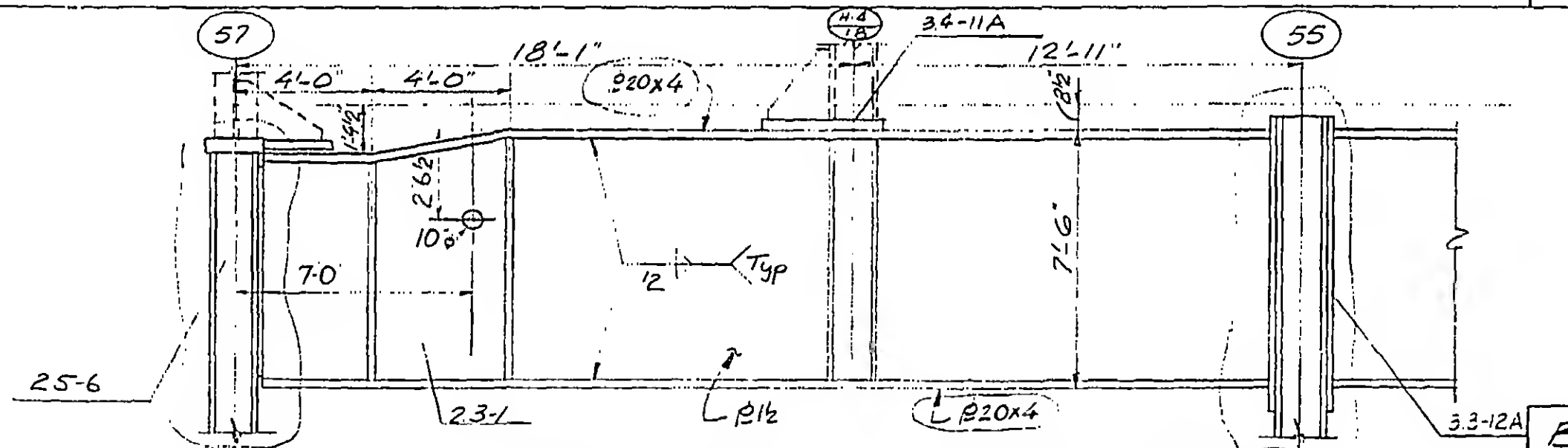
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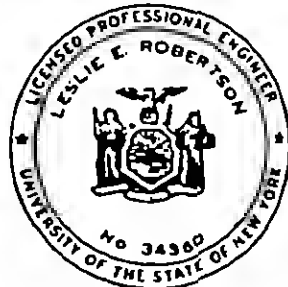
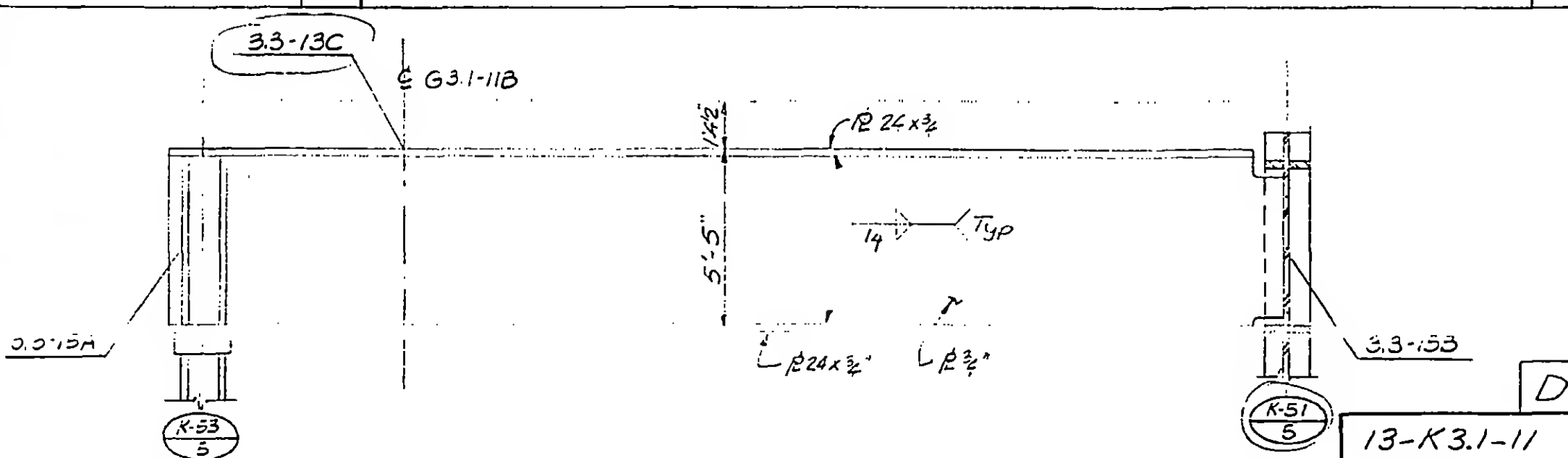
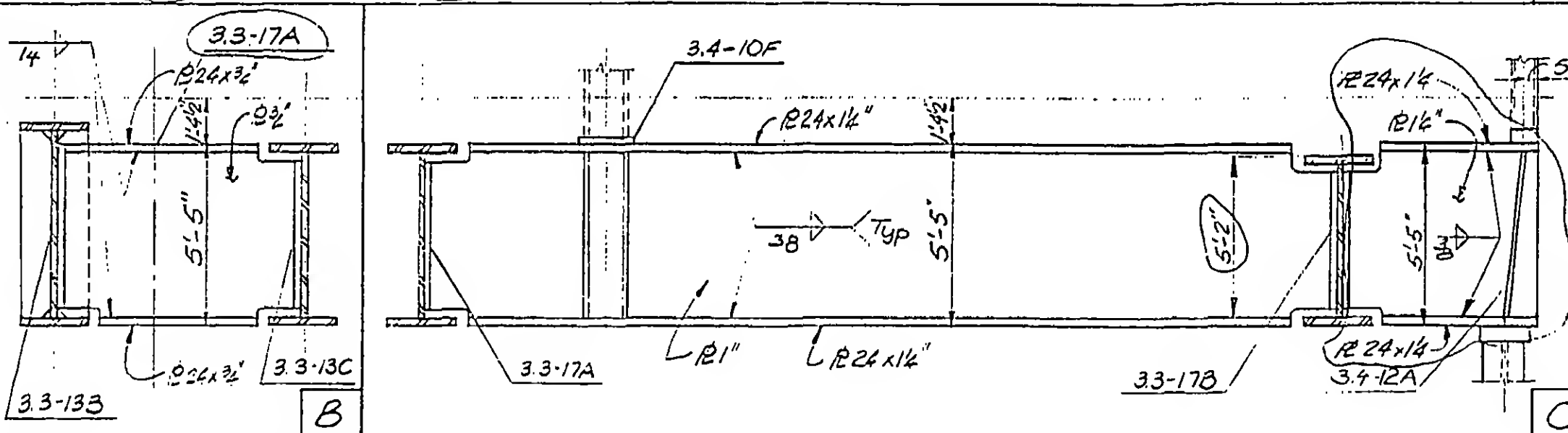
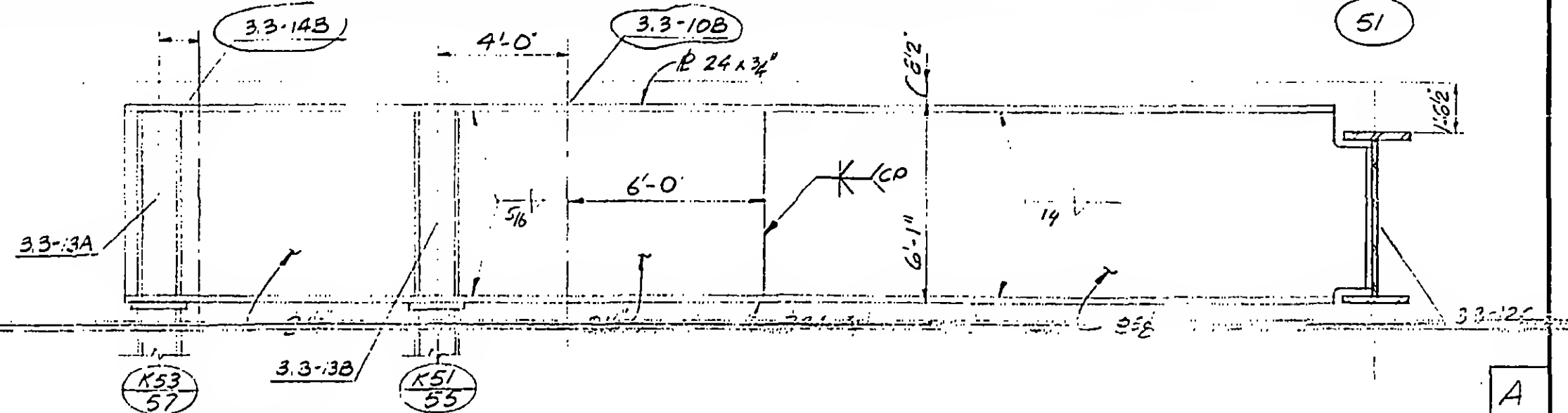
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TITLE GIRDER ELEVATIONS

DATE 11-3-72

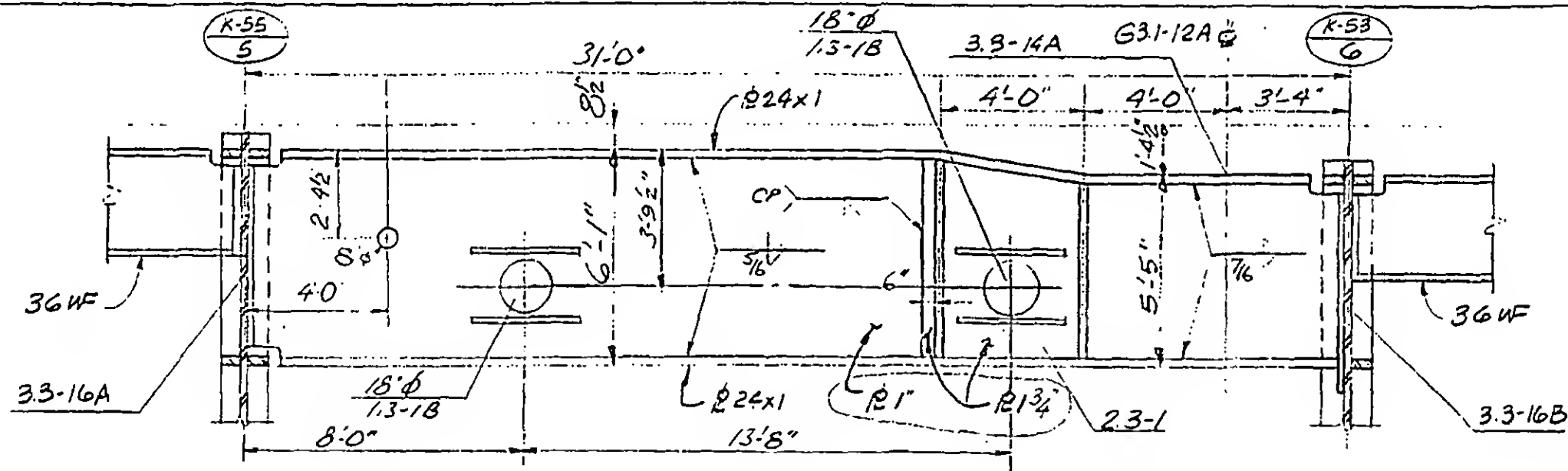
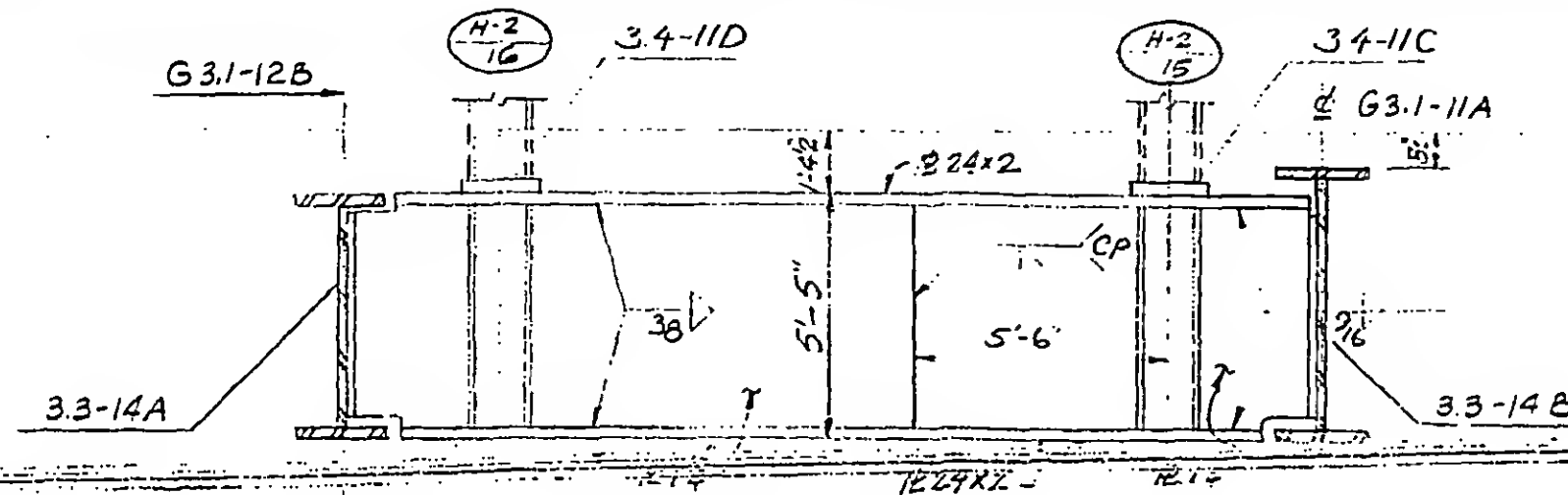
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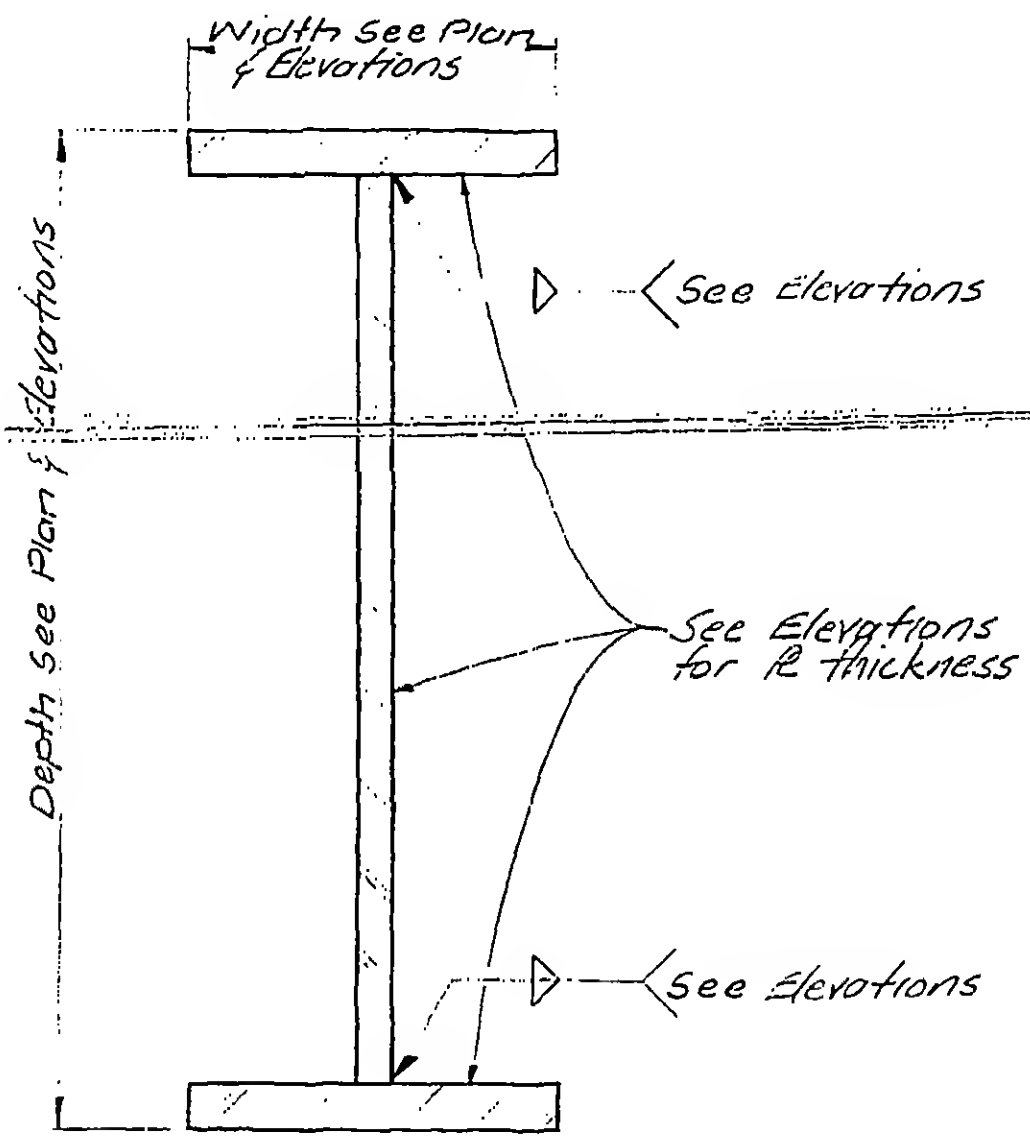
A.L. Frangui

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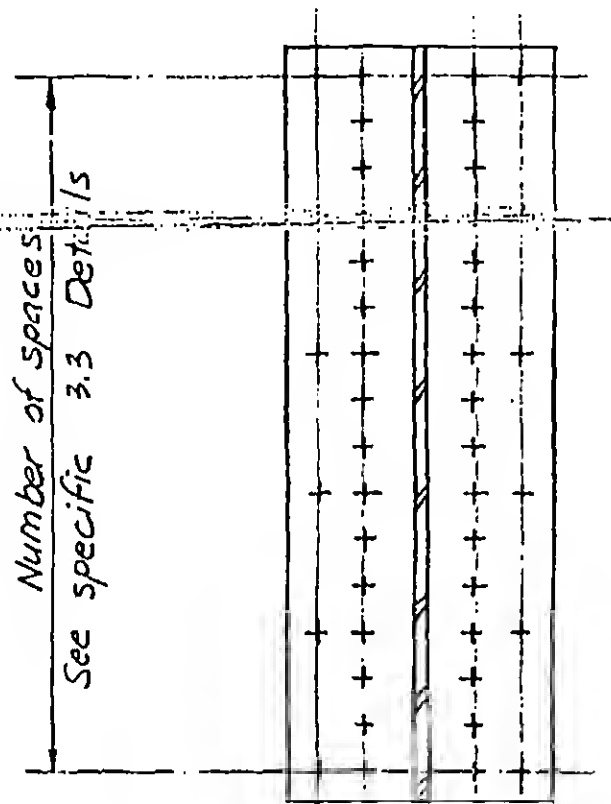
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TITLE GIRDER CONNECTION TYPICAL END PLATE

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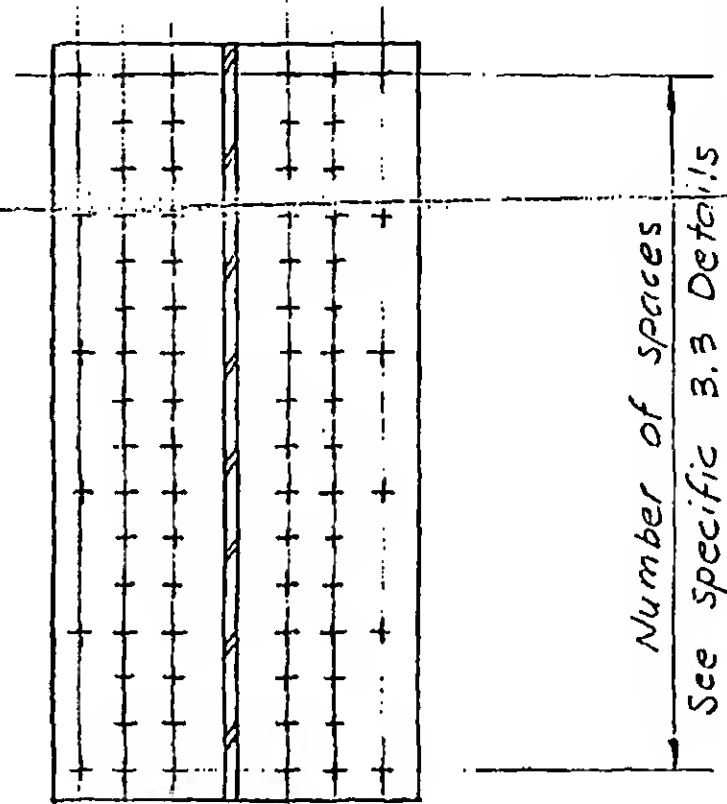
Place bolt each space
these two rows.

Place remaining bolts
approx. evenly spaced
in these two rows.

See specific 3.3 Details for total
number of bolts

4 ROWS

6 ROWS



Place bolt each space
these four rows

Place remaining bolts
approx. evenly spaced
in these two rows.

See specific 3.3 Details
for total number of bolts.

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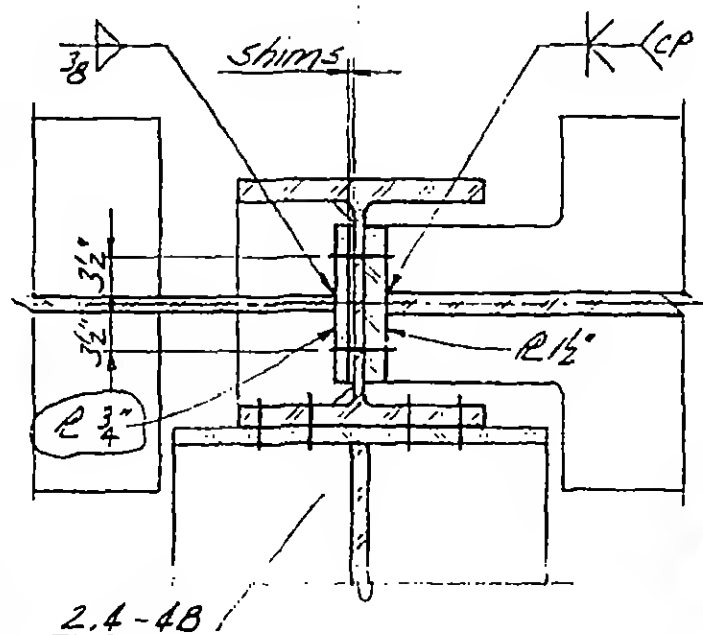
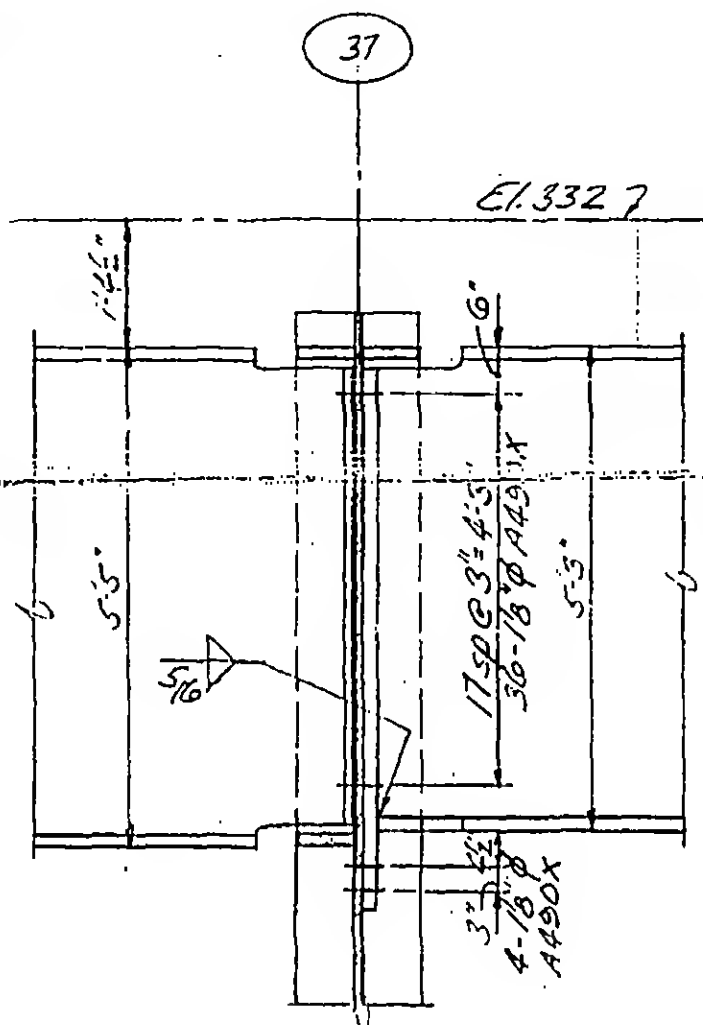
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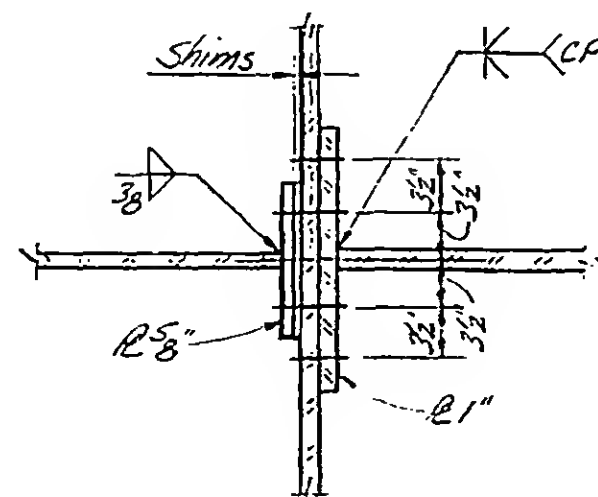
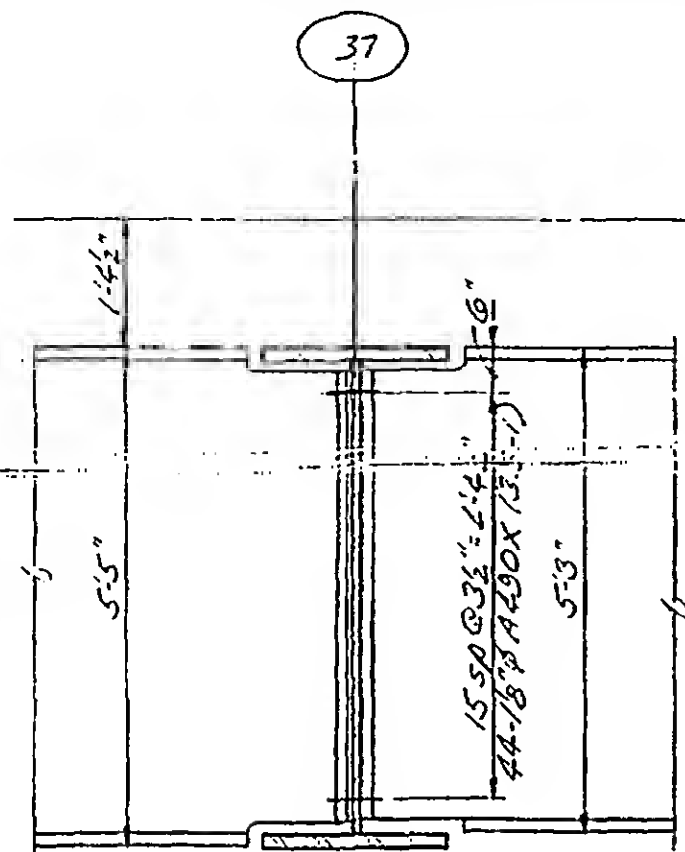
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REVISIONS

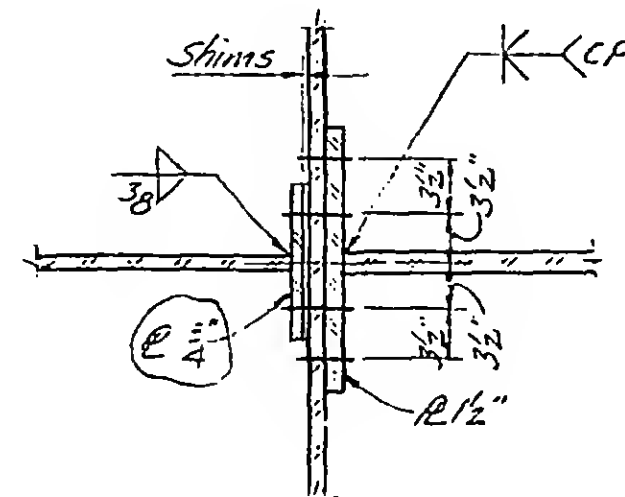
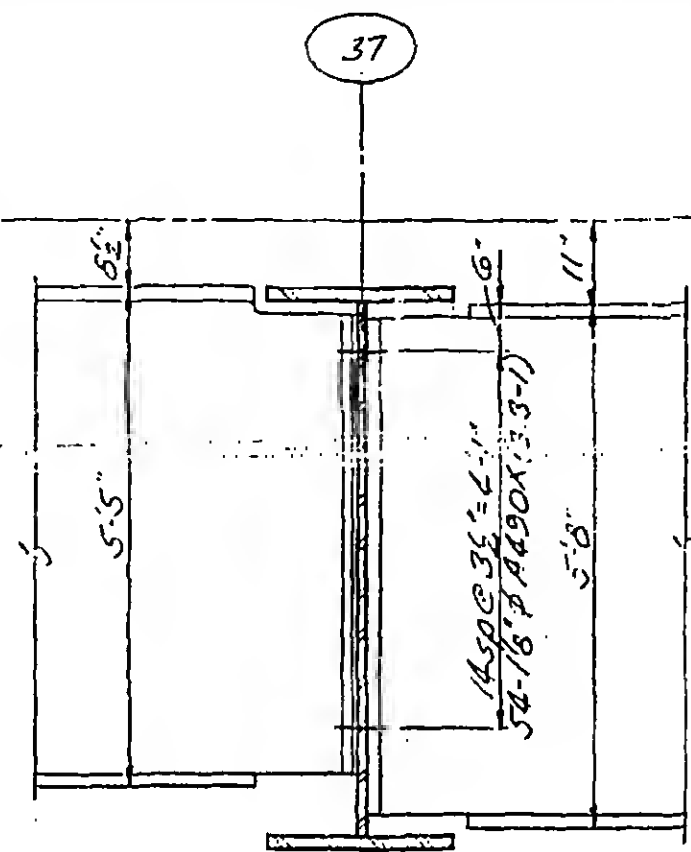
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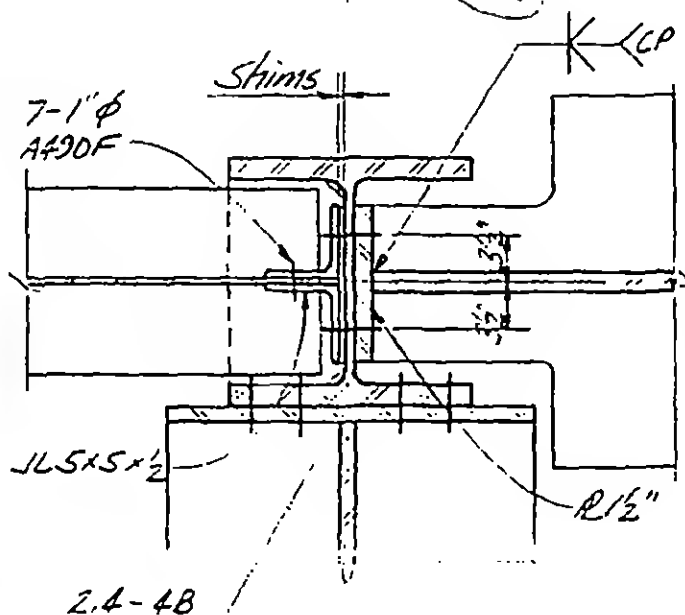
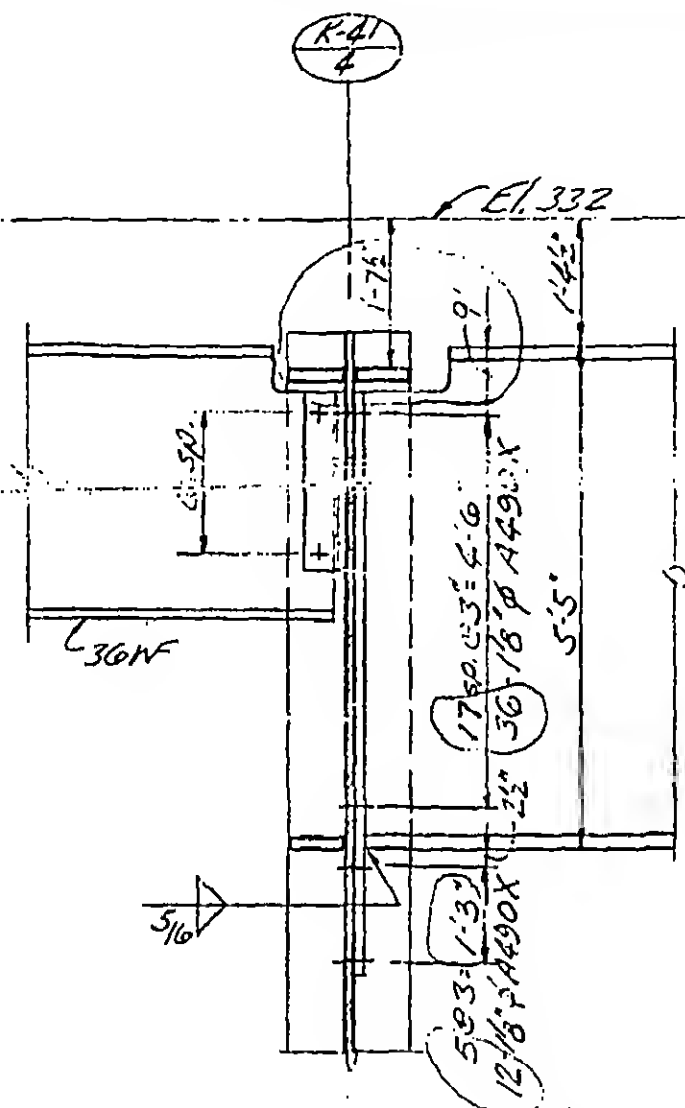
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DATE 11-3-72

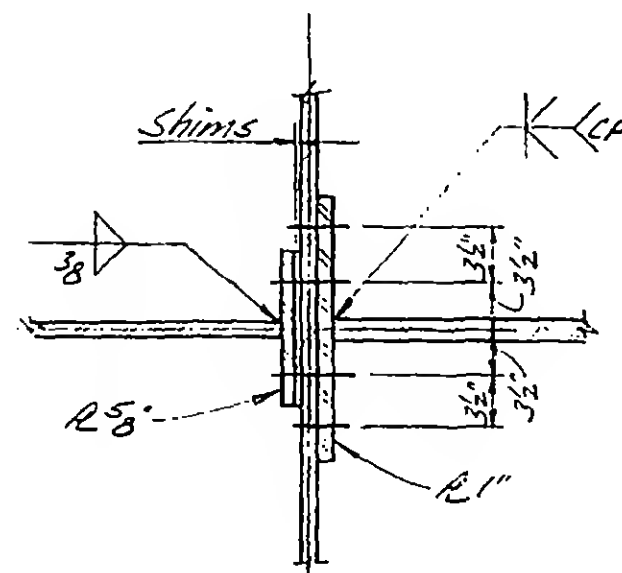
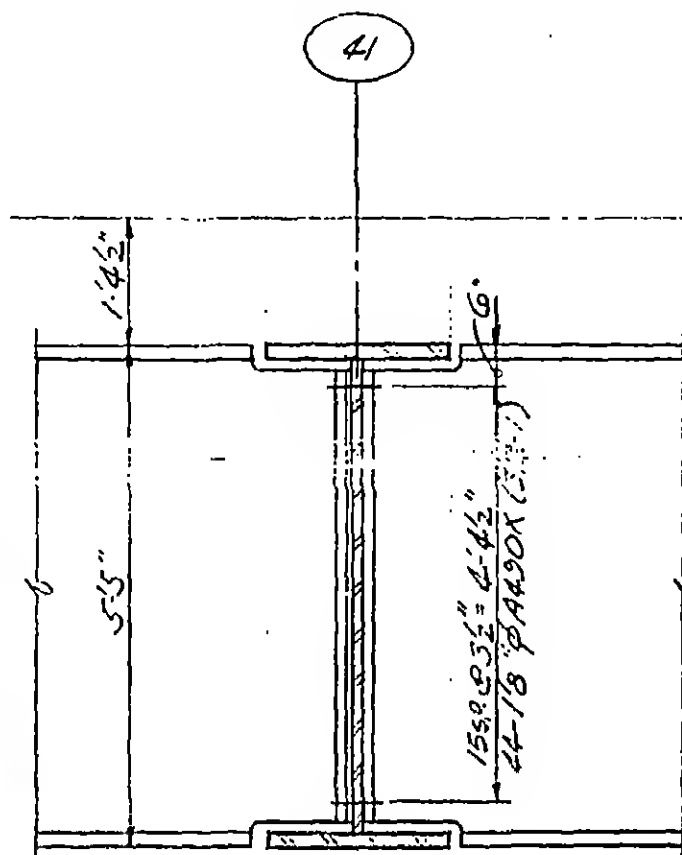
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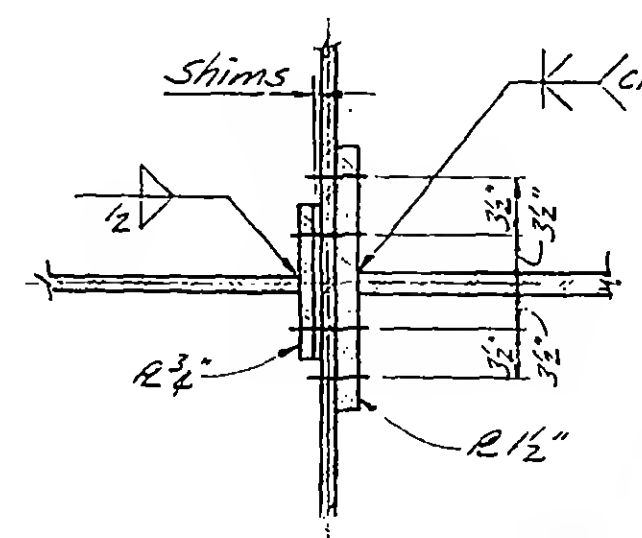
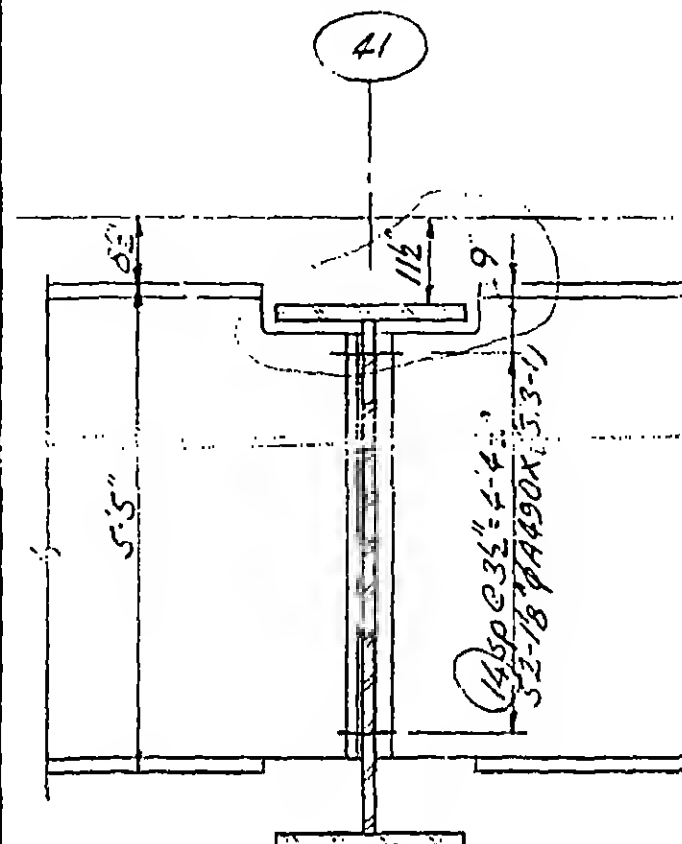
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DRAWN

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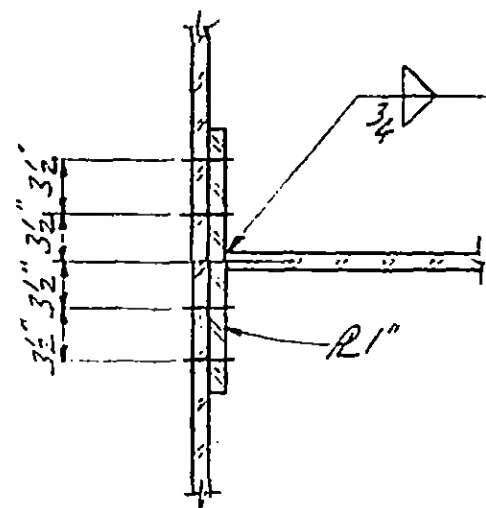
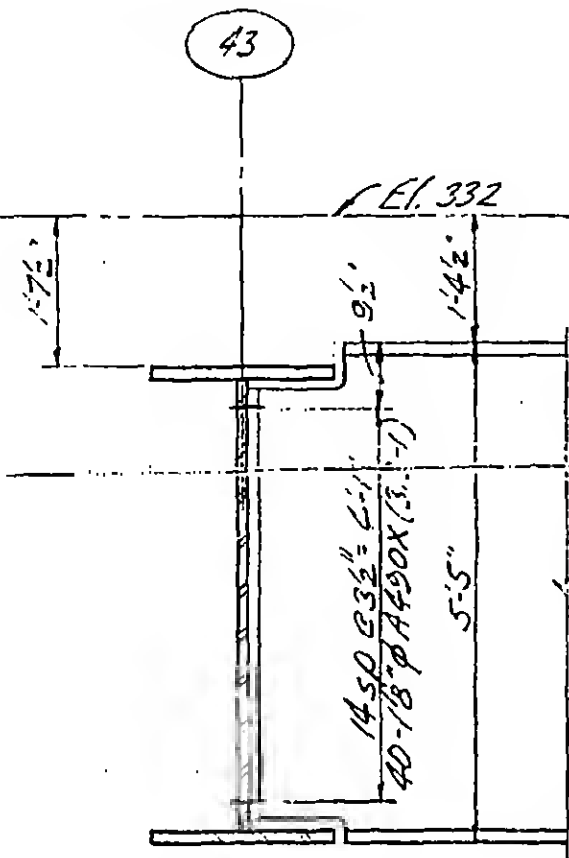
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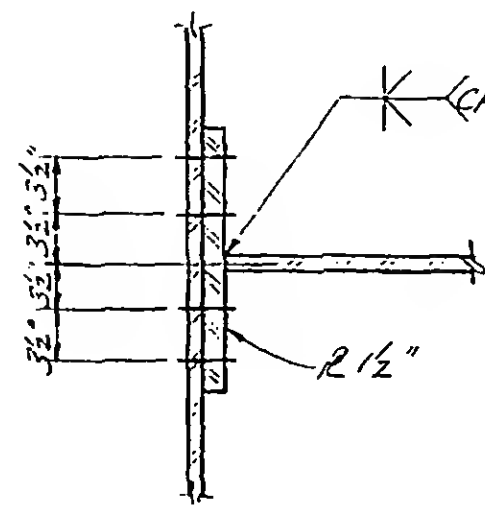
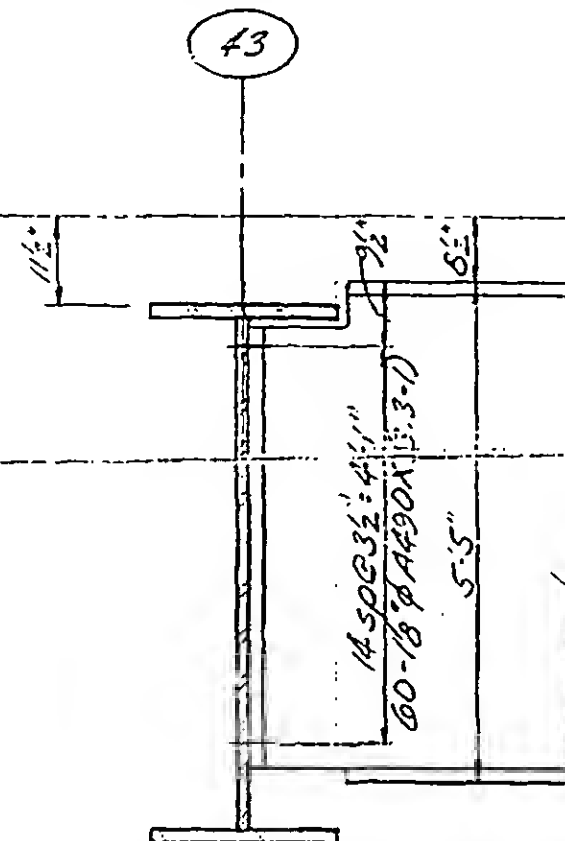
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DATE 11-3-72

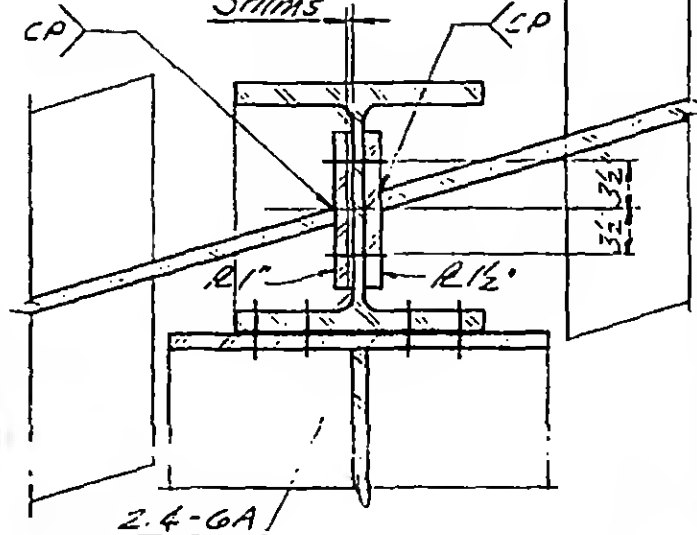
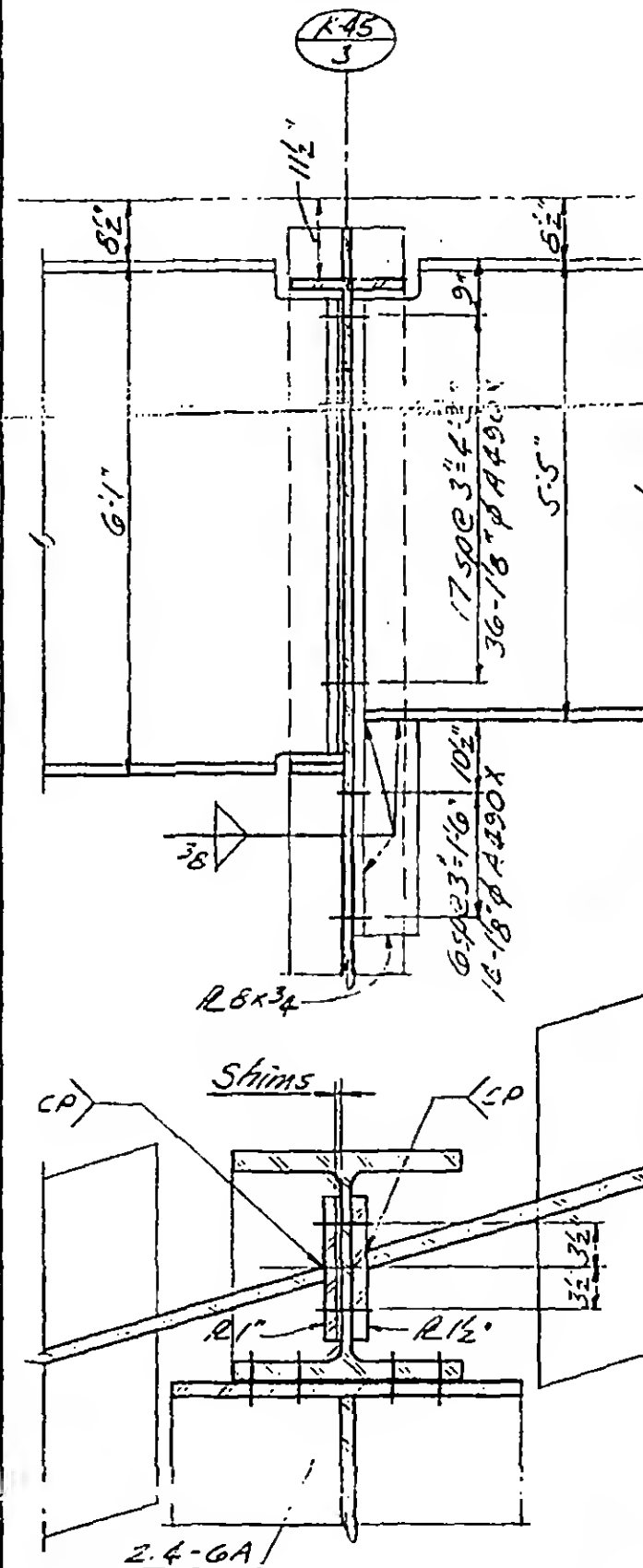
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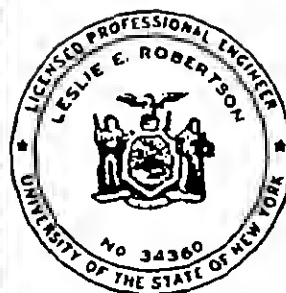
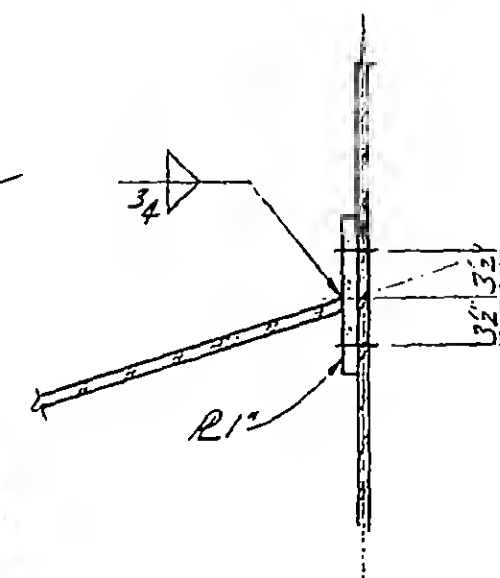
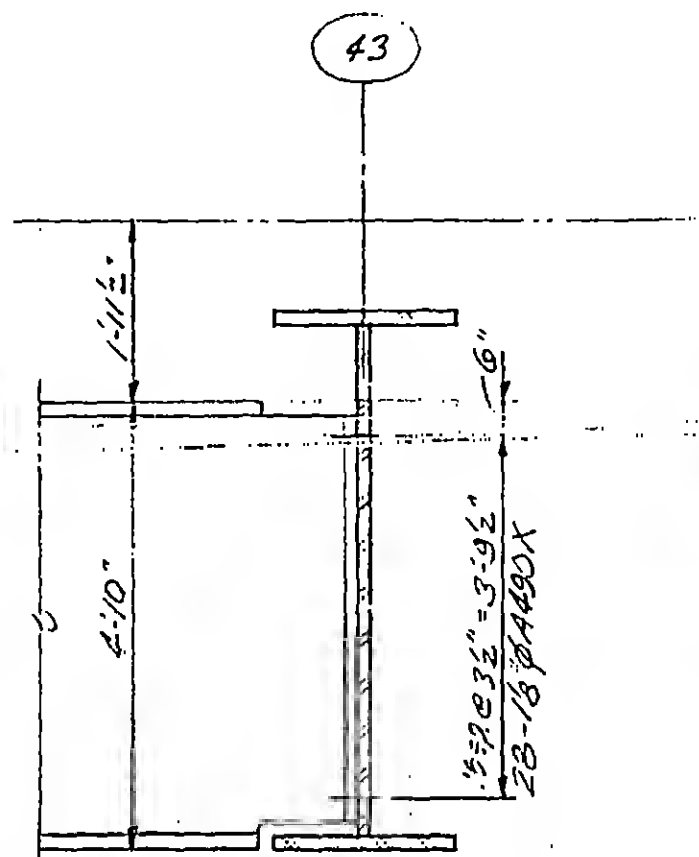
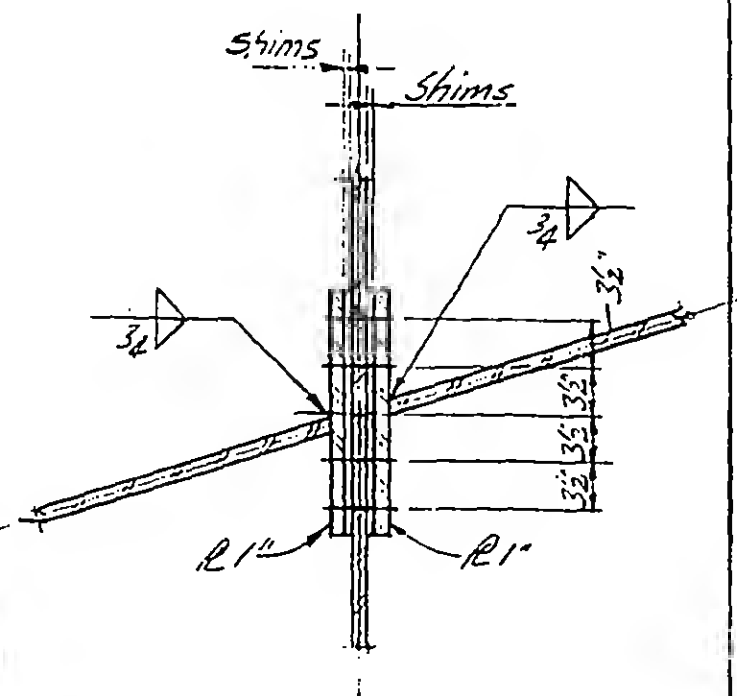
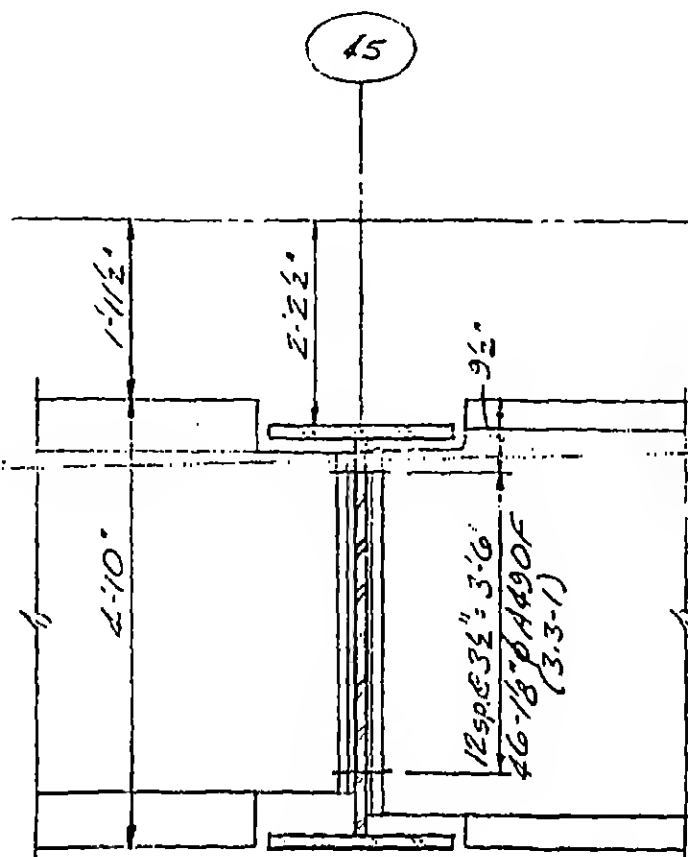
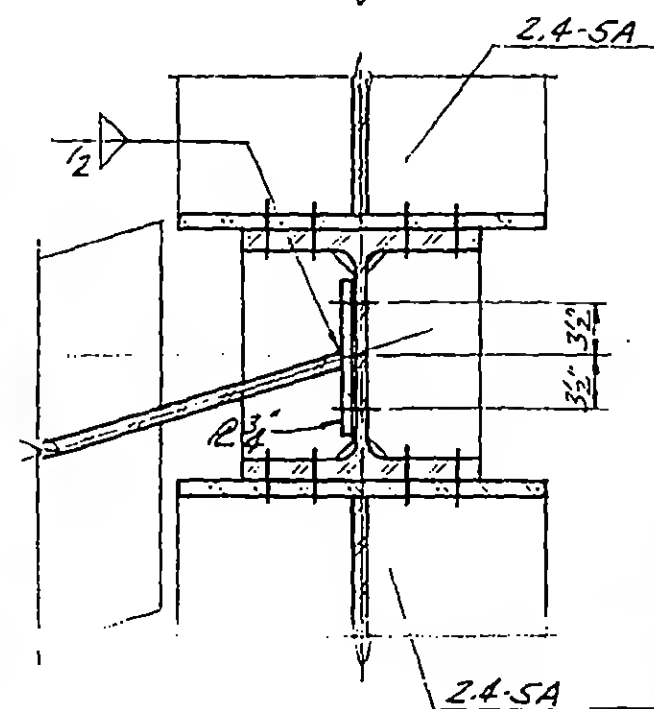
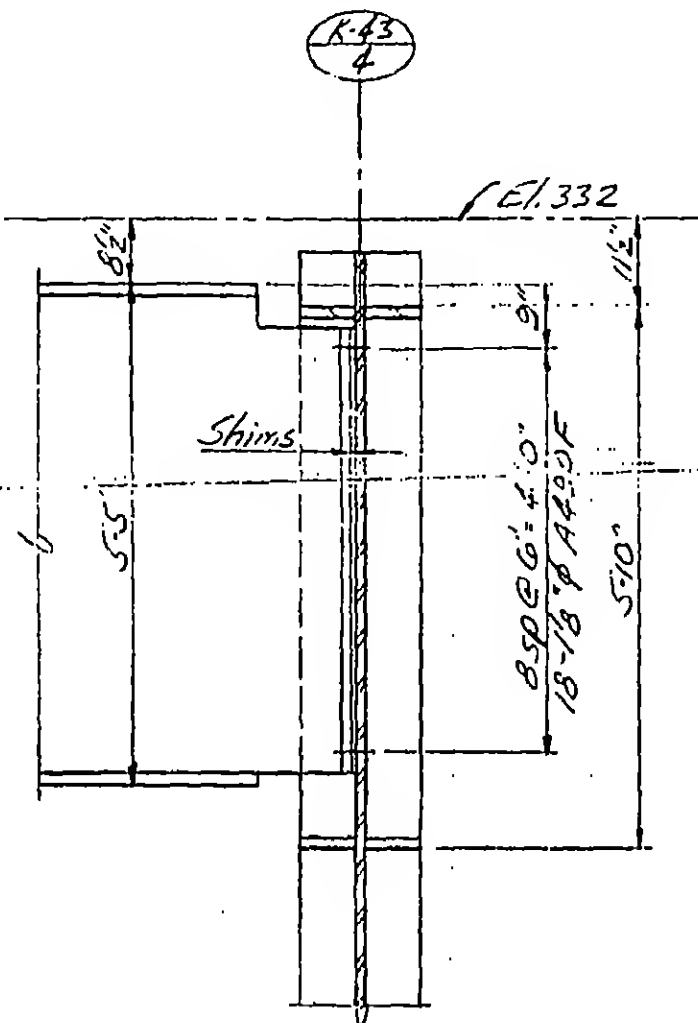
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DATE 11-3-72

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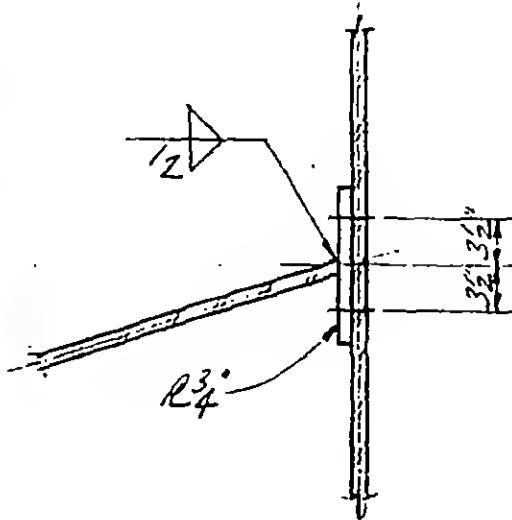
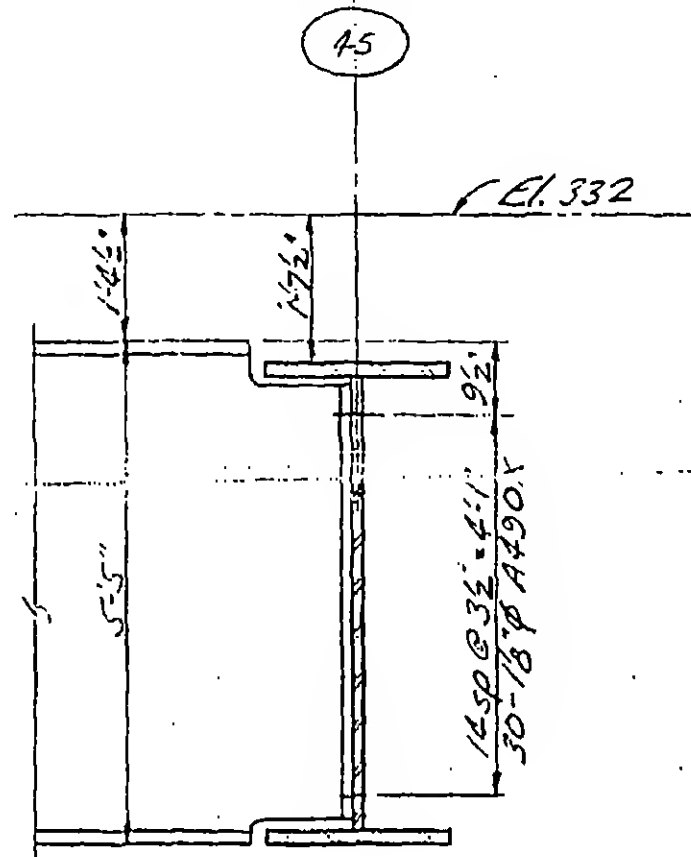
PROJECT THE WORLD TRADE CENTER

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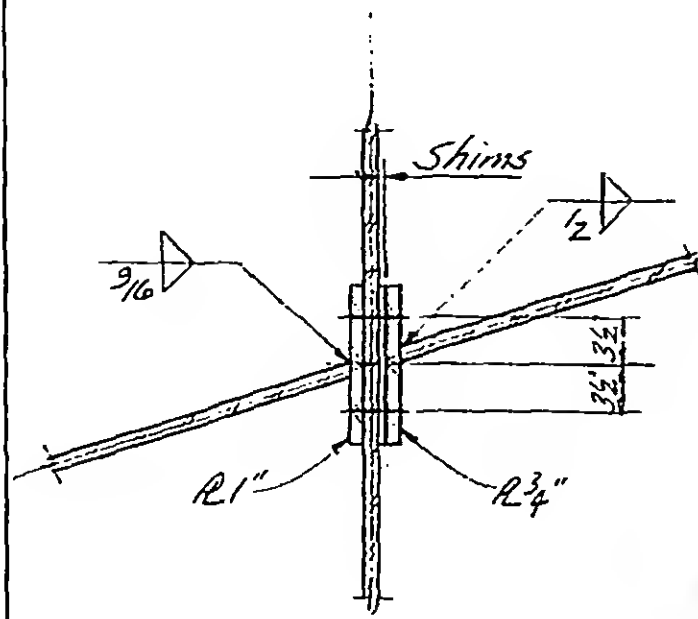
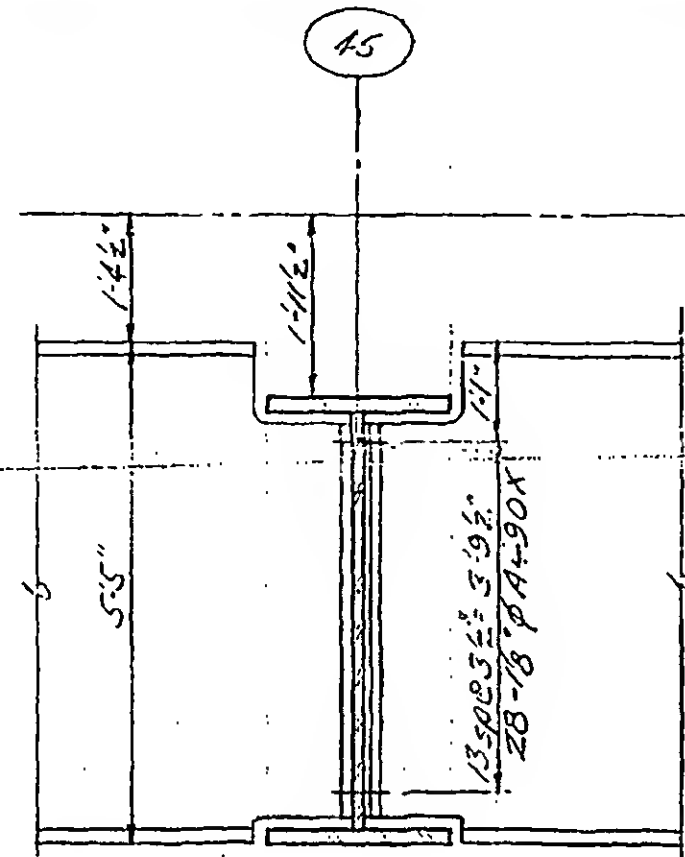
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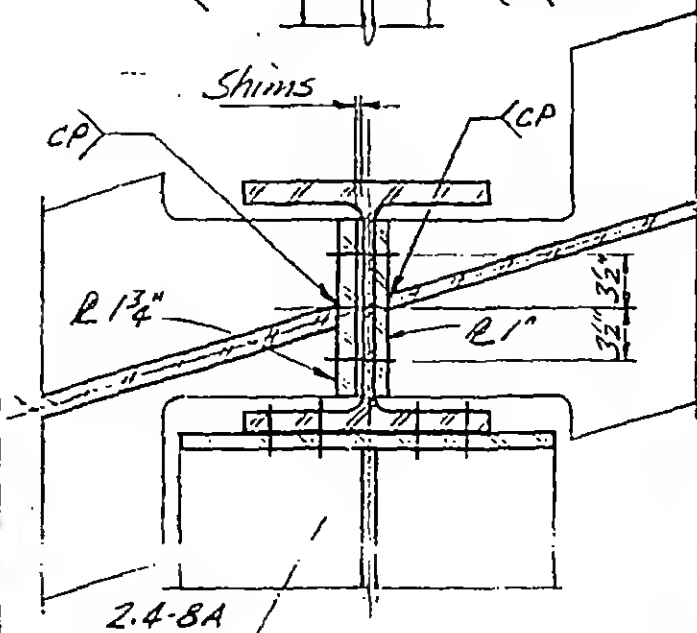
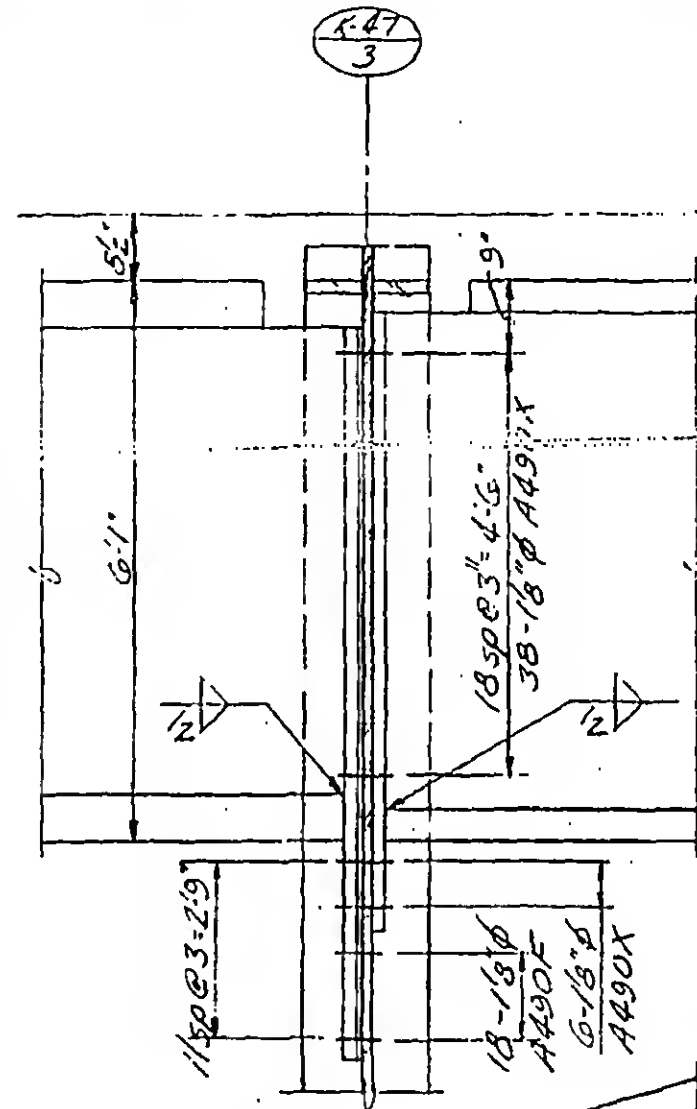
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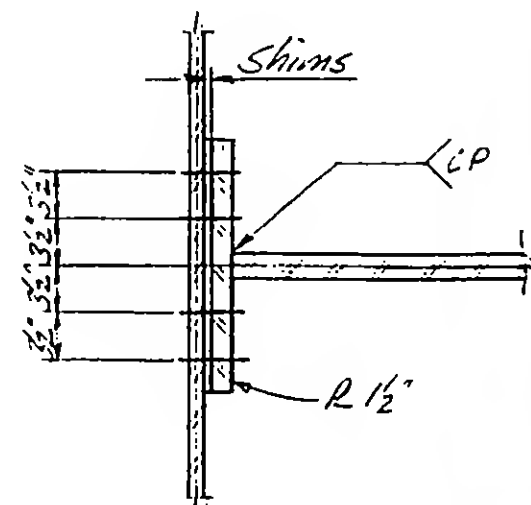
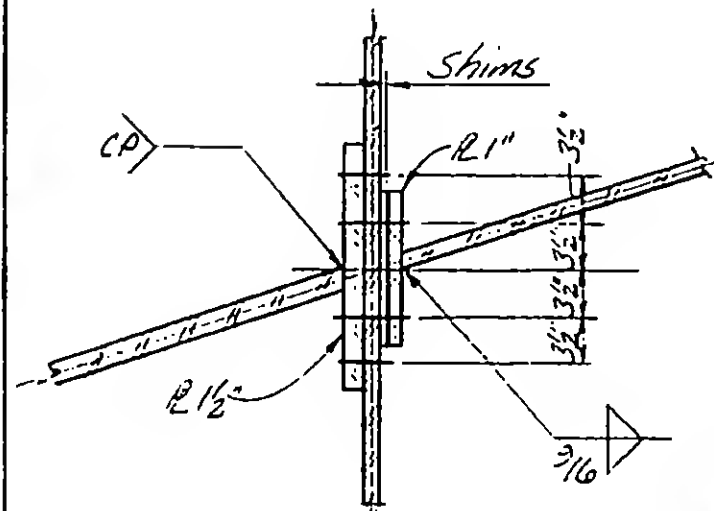
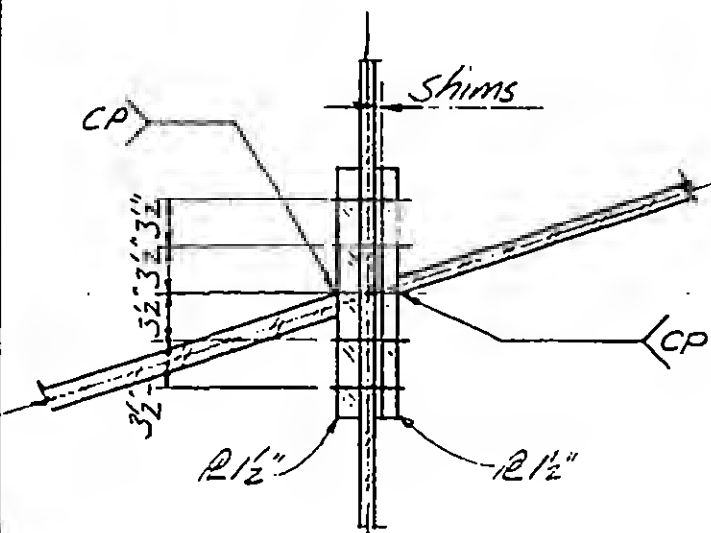
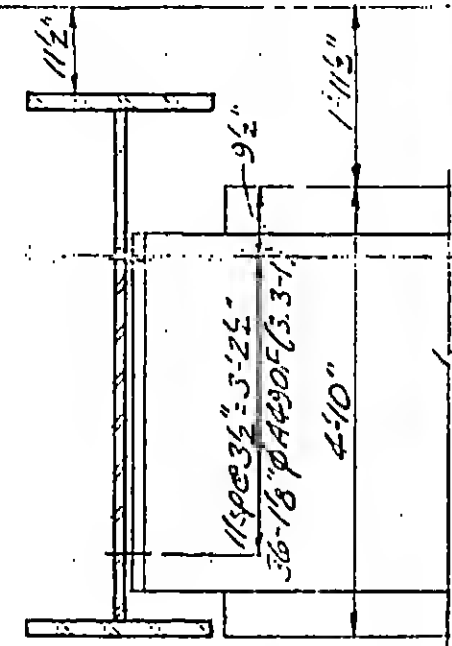
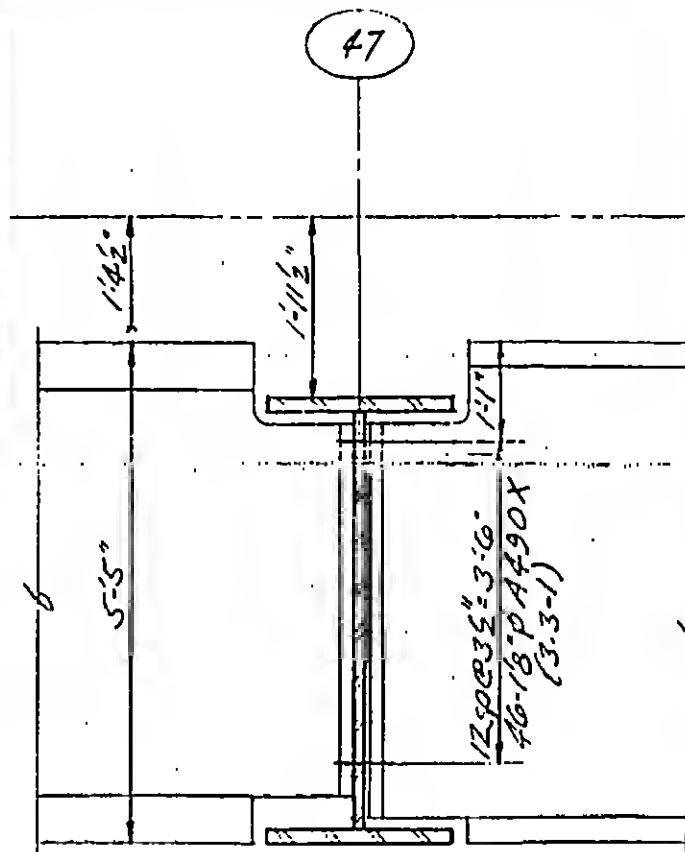
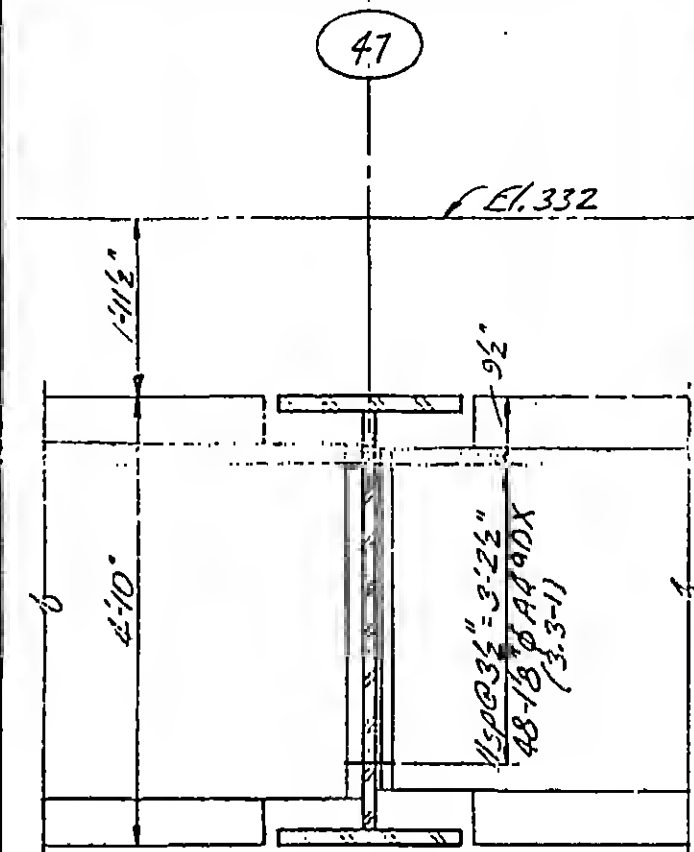
PROJECT *THE WORLD TRADE CENTER*

TITLE *GIRDER CONNECTION DETAILS*

DATE *11-3-72*

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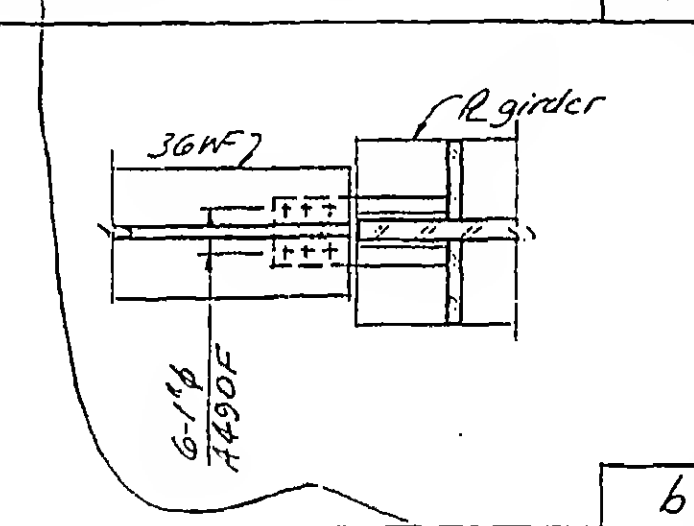
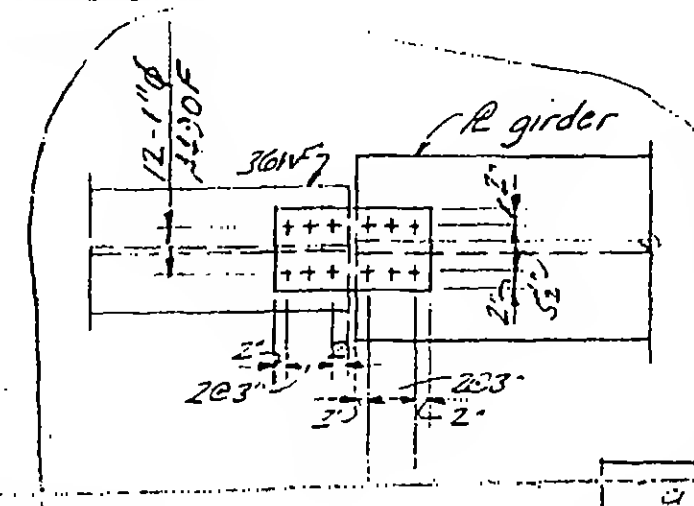
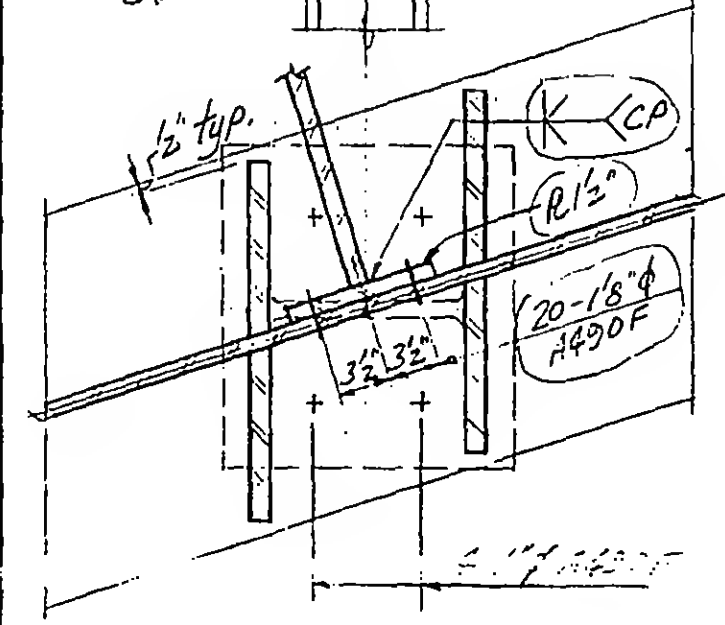
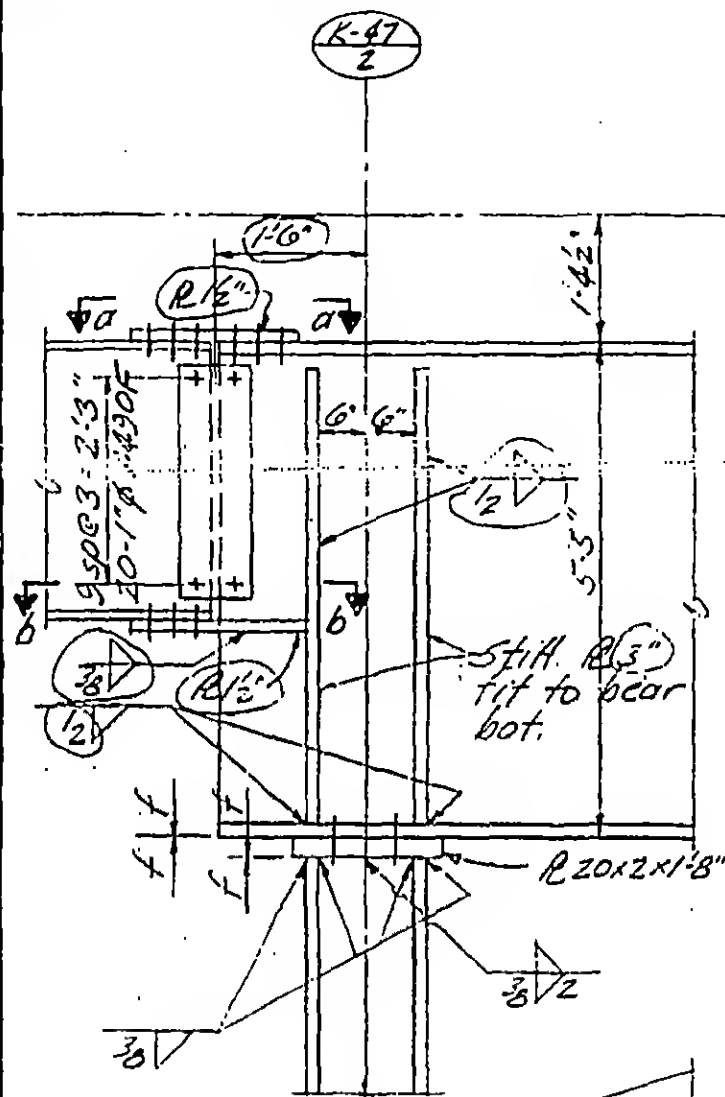
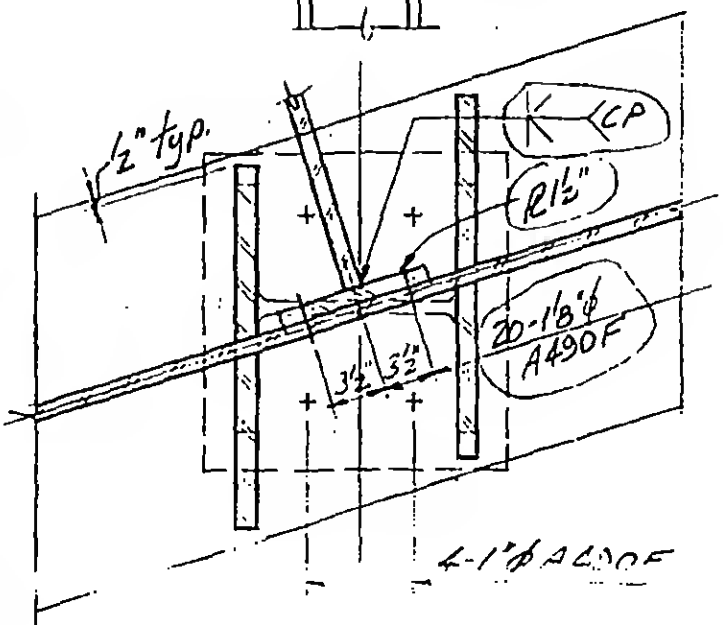
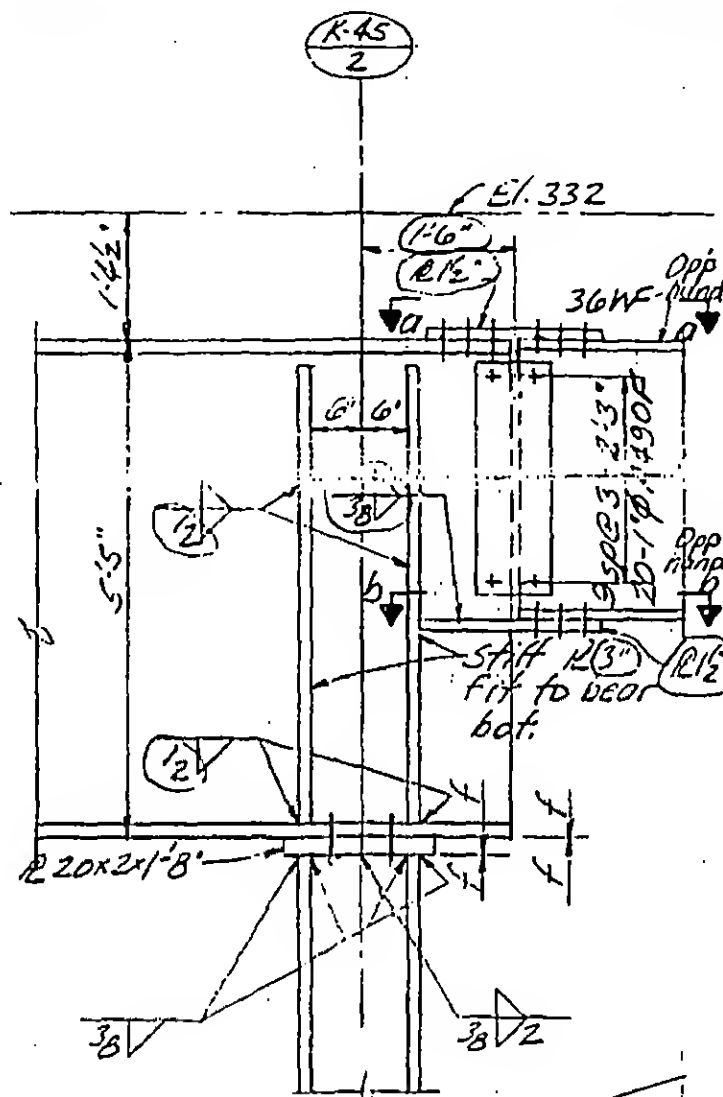
GIRDER CONNECTION DETAILS

DATE _____

11-3-72

REVISIONS

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construction
11-20-72



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REVIEWED

15-K3.3-B

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SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

Structural & Civil Engineers

PROJECT *THE WORLD TRADE CENTER*

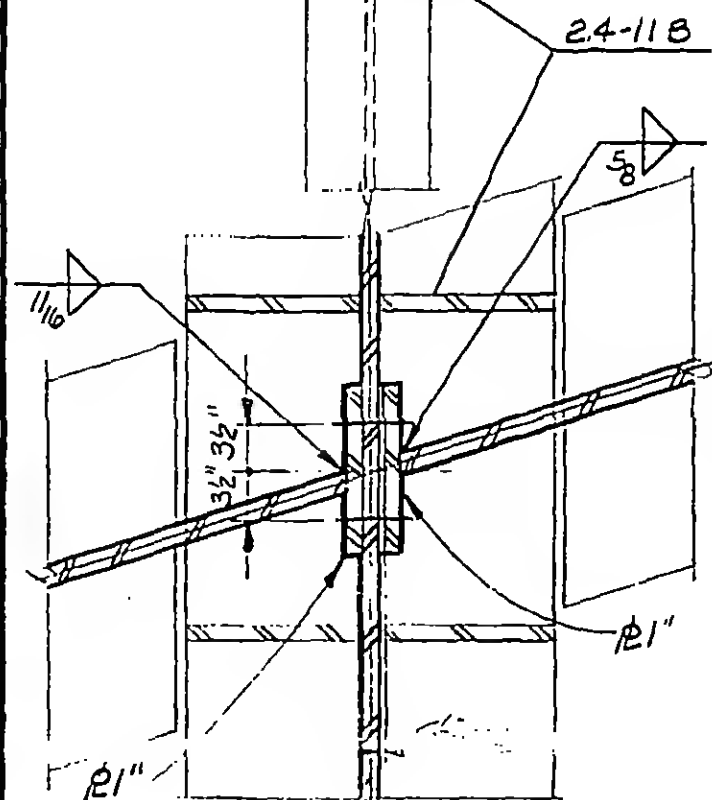
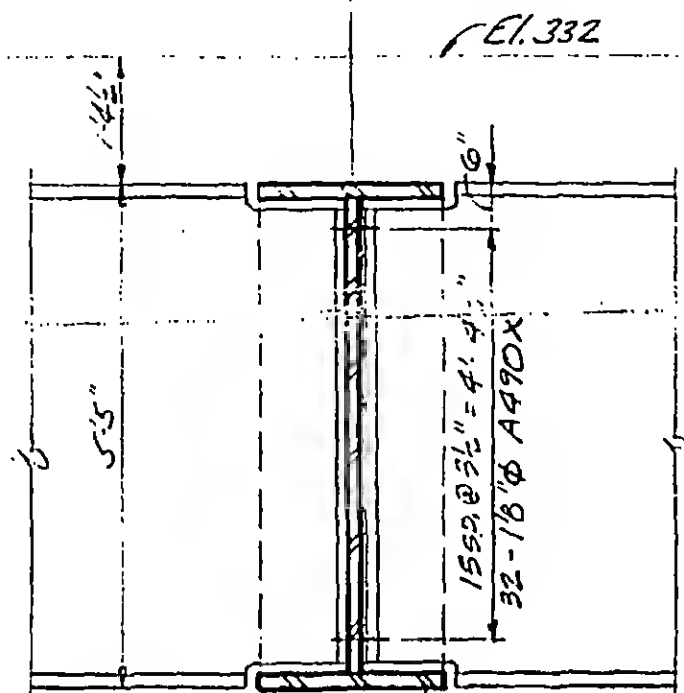
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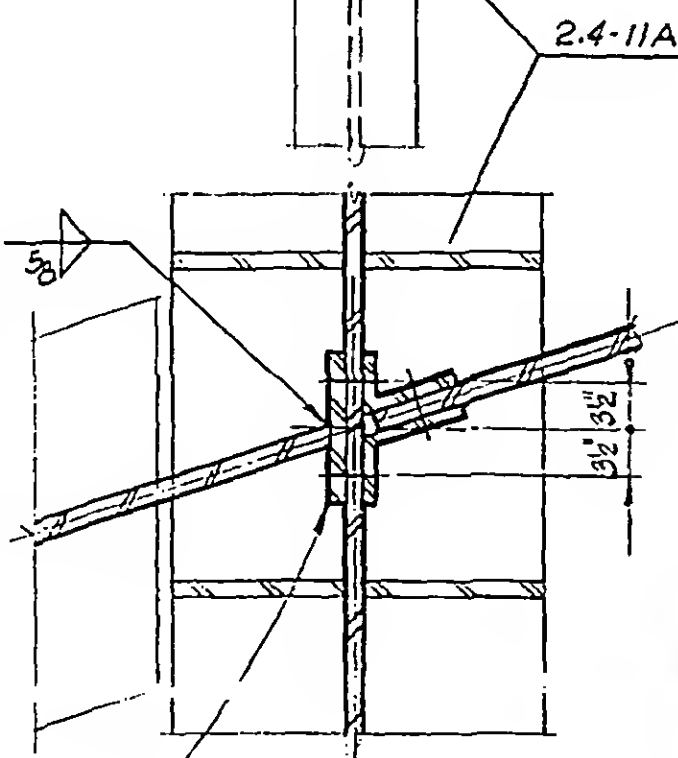
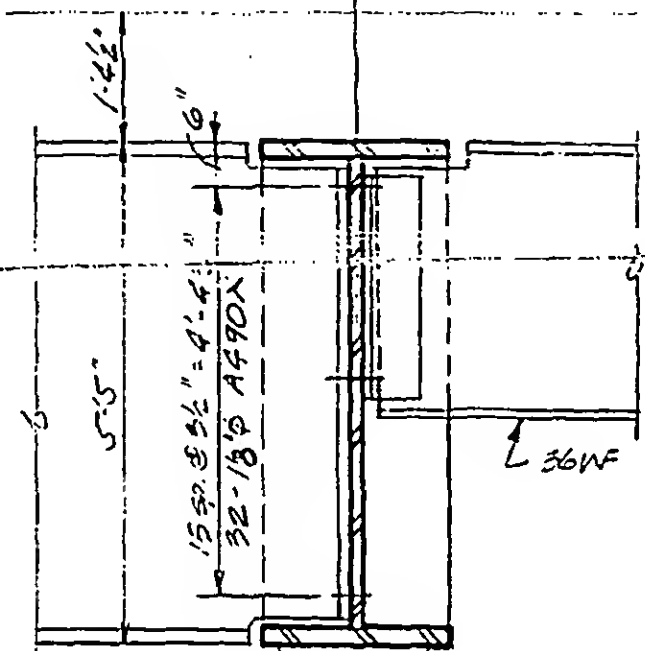
*Released for
construction
11-20-72*

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2*



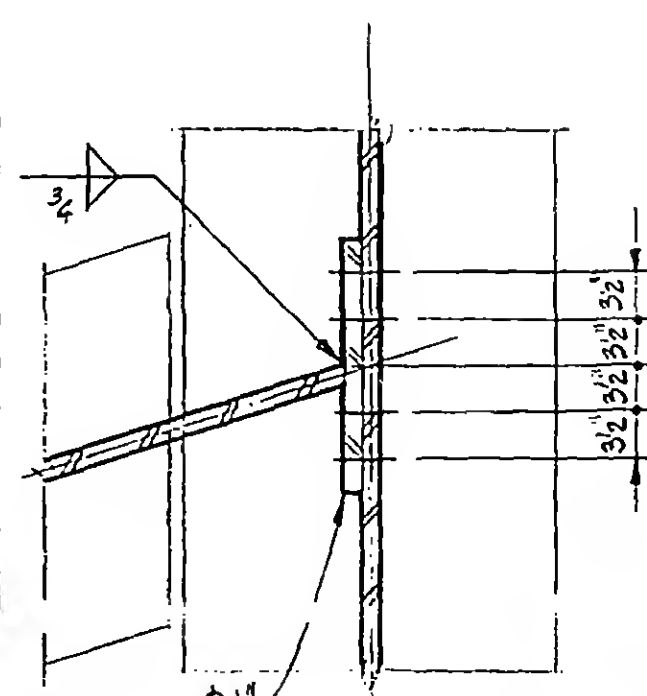
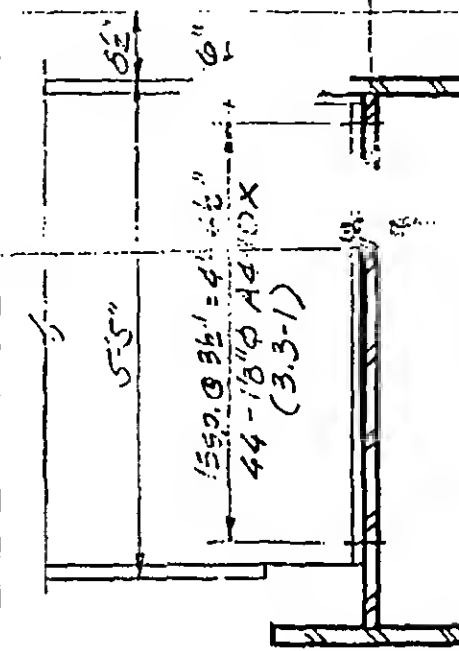
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13-K3.3-9



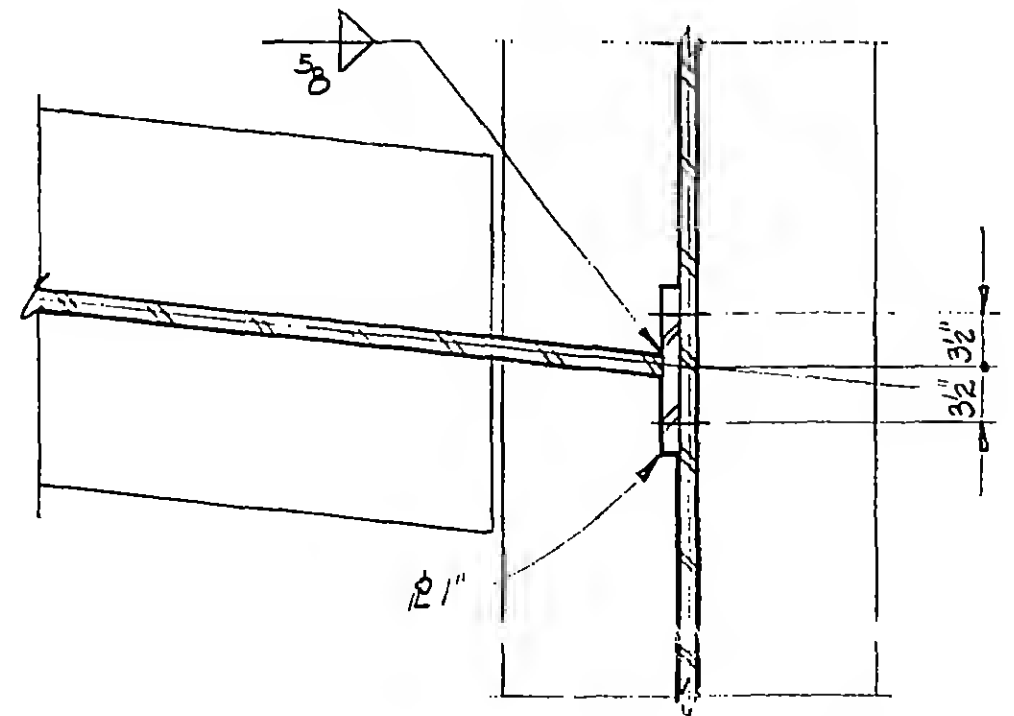
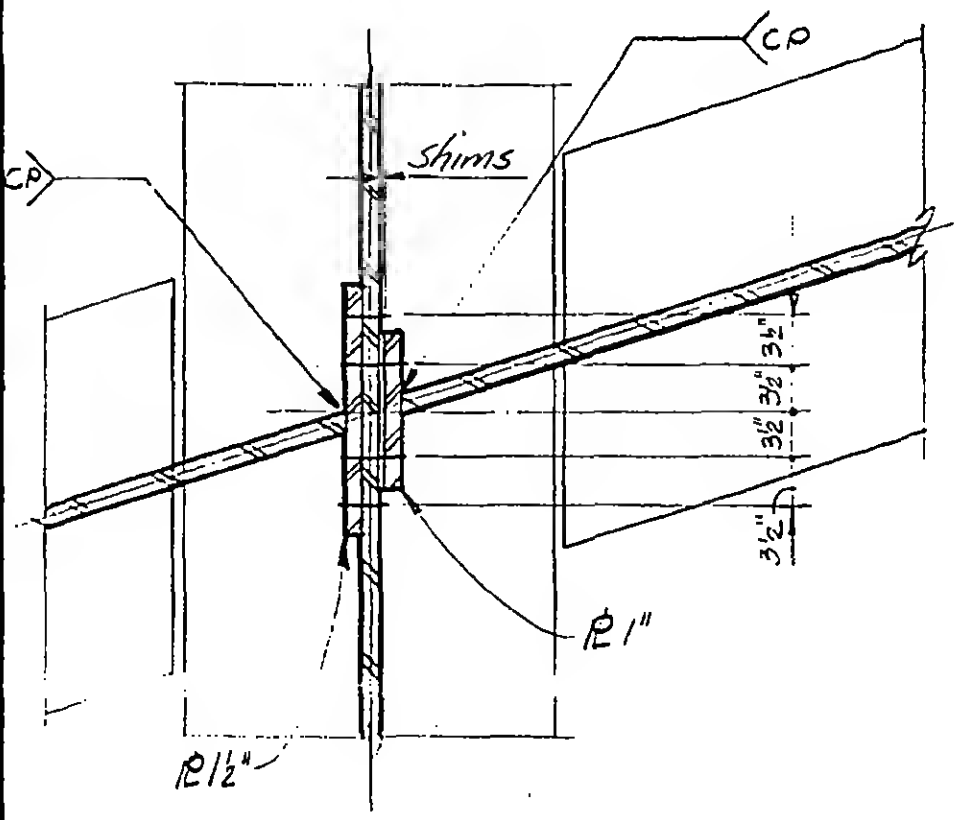
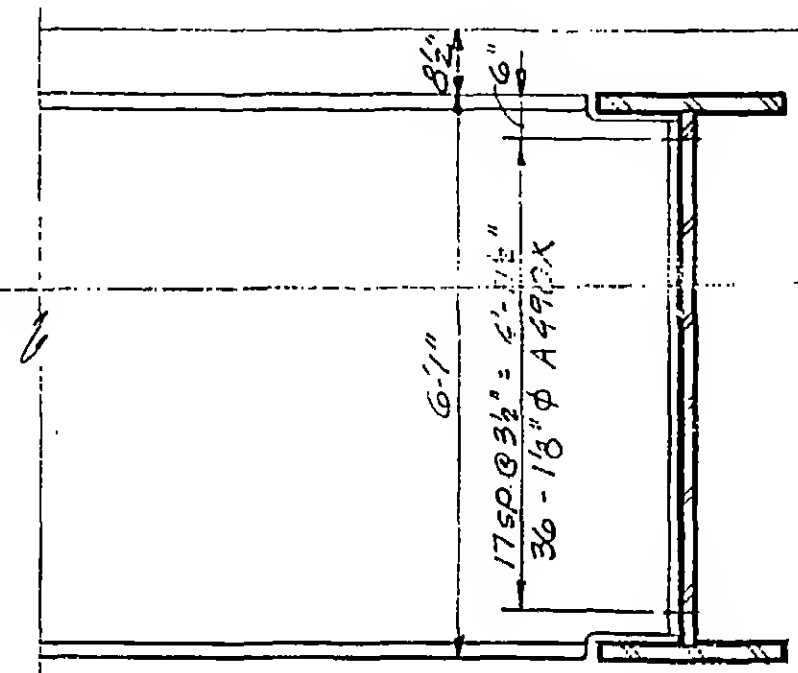
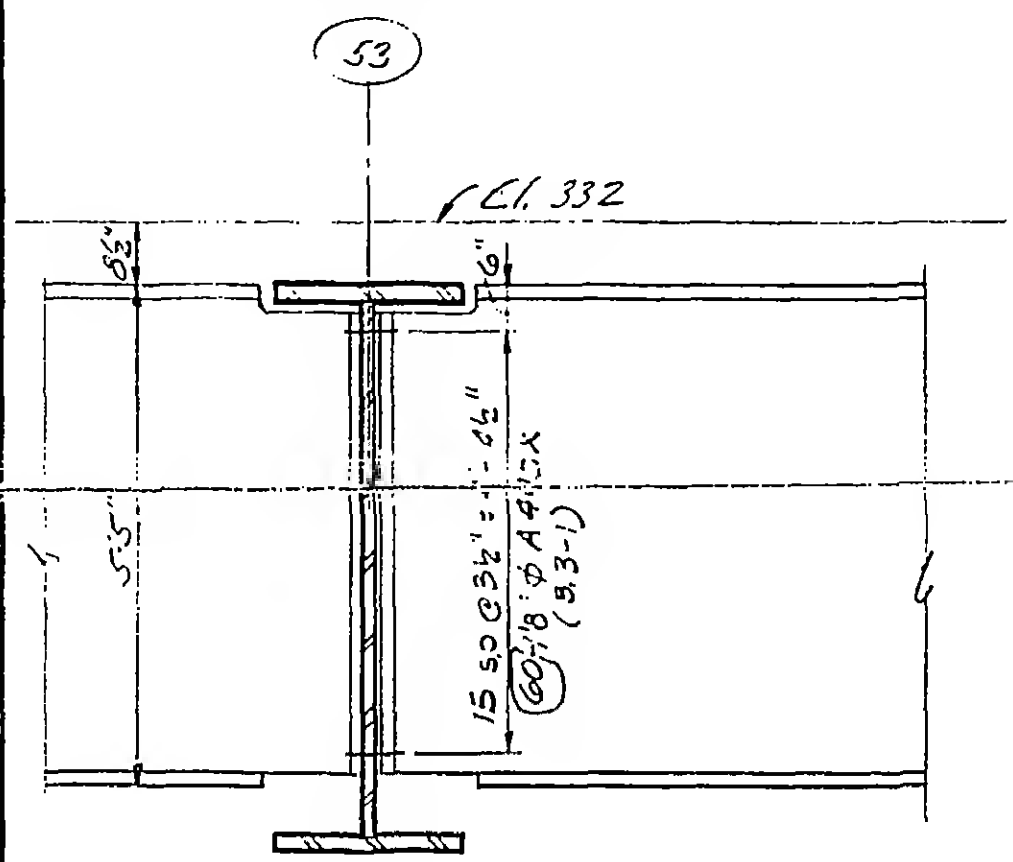
DESIGNED

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REVISIONS

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13-K3.3-10

Structural & Civil Engineers

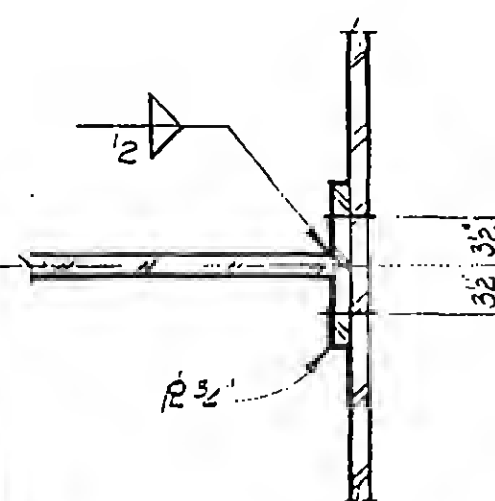
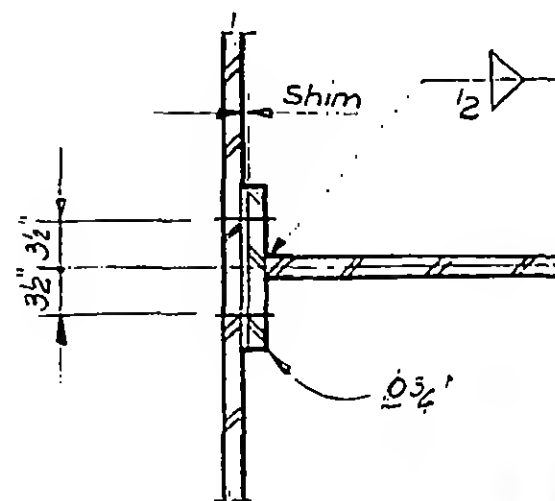
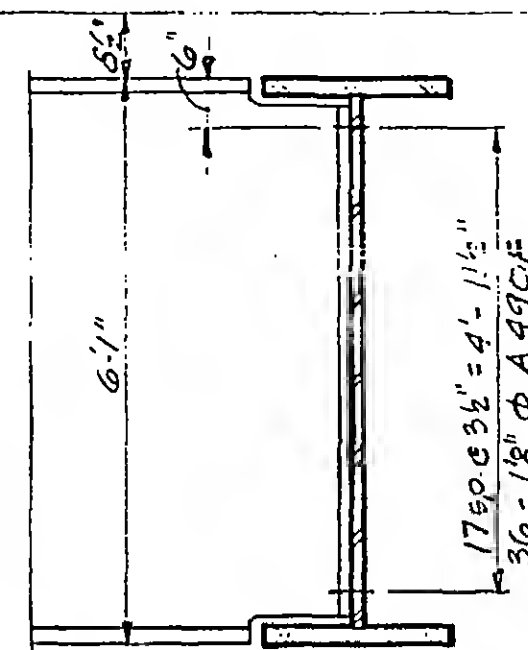
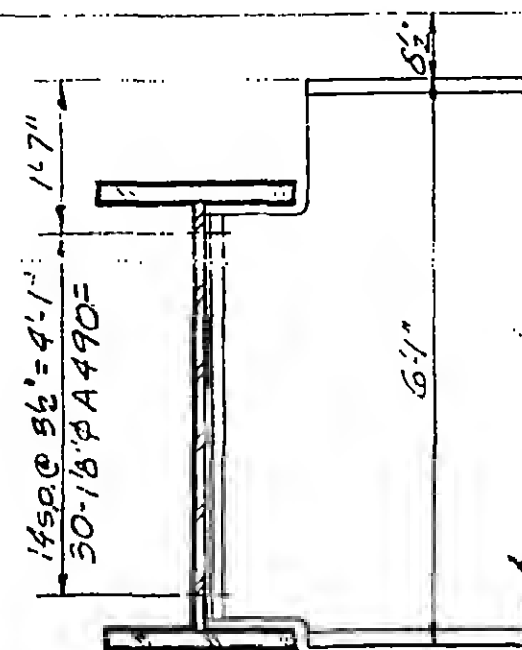
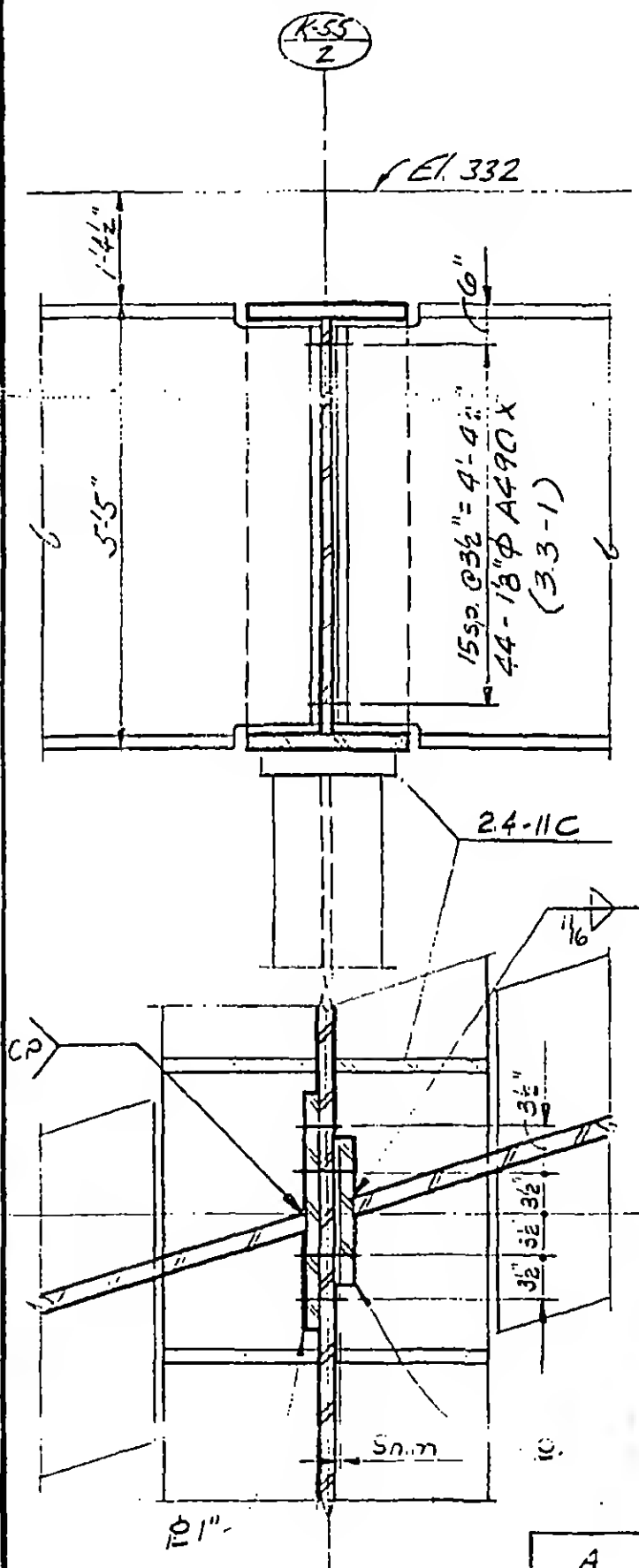
PROJECT *THE WORLD TRADE CENTER*

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released for
construction
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13-K3.3-11

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER

TITLE GIRDER CONNECTION DETAILS

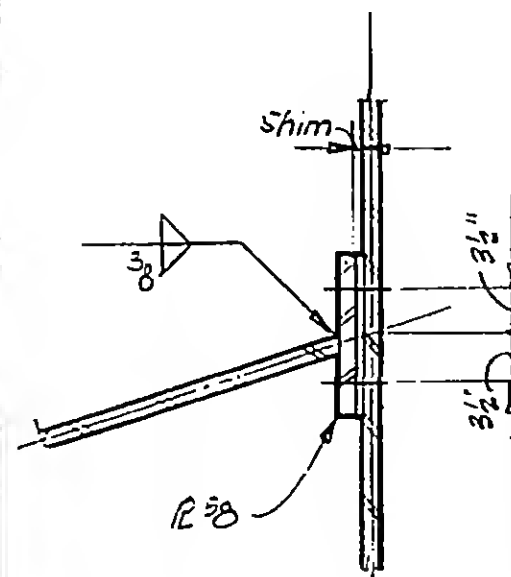
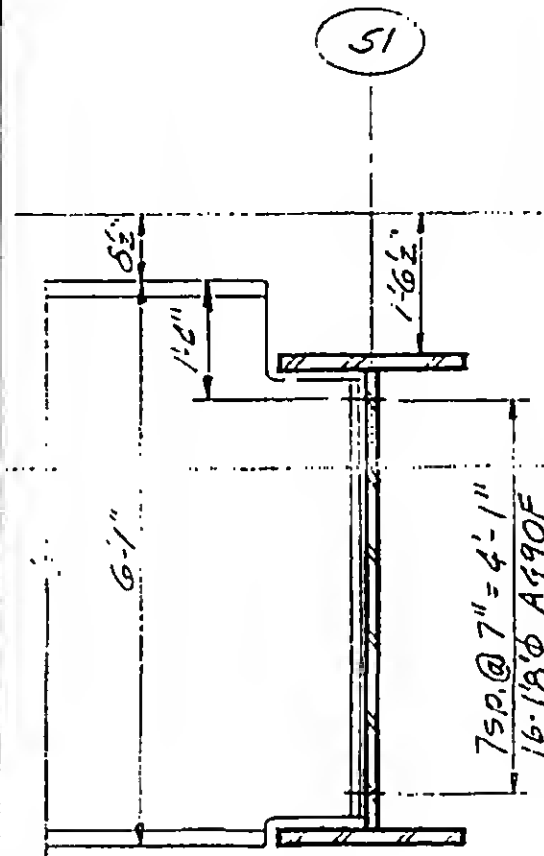
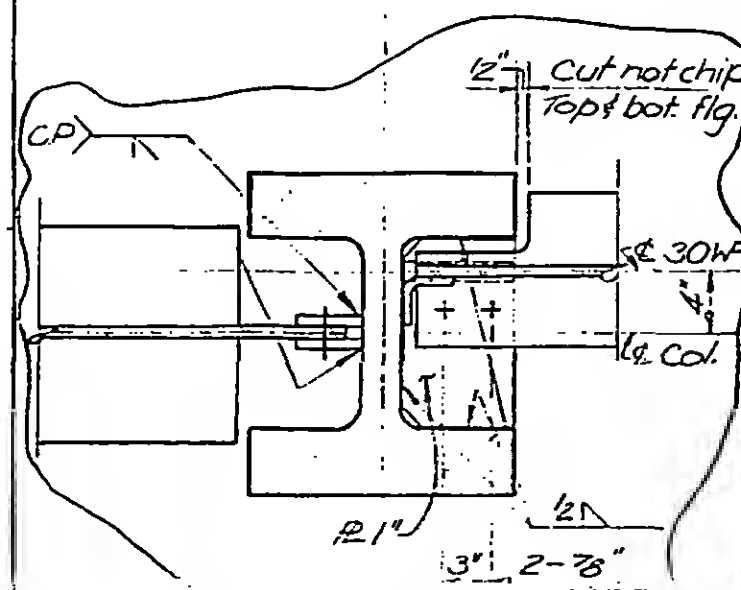
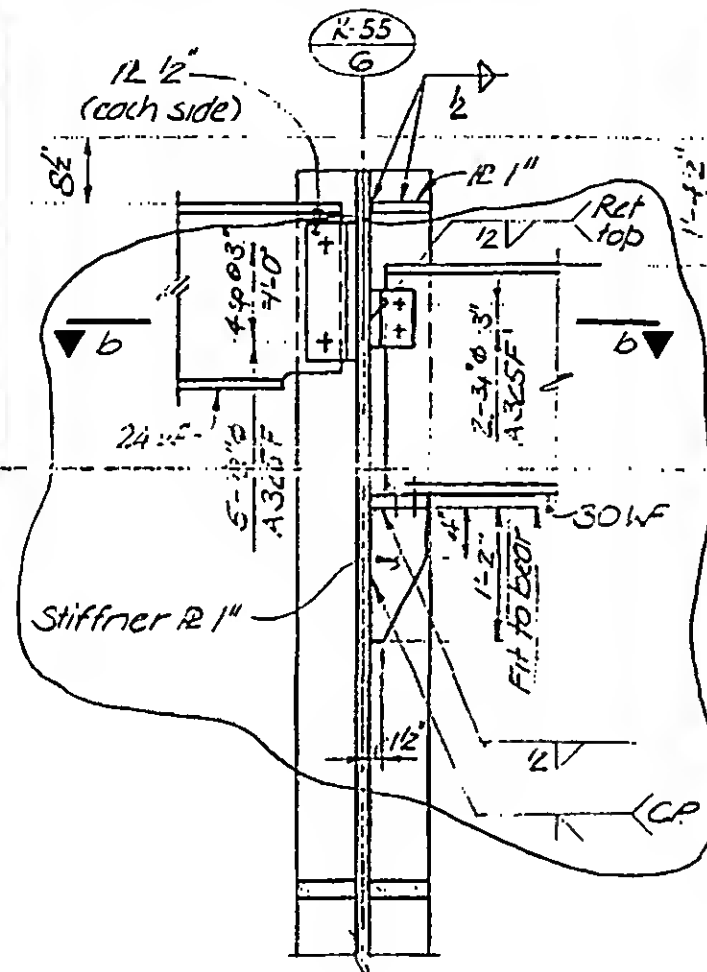
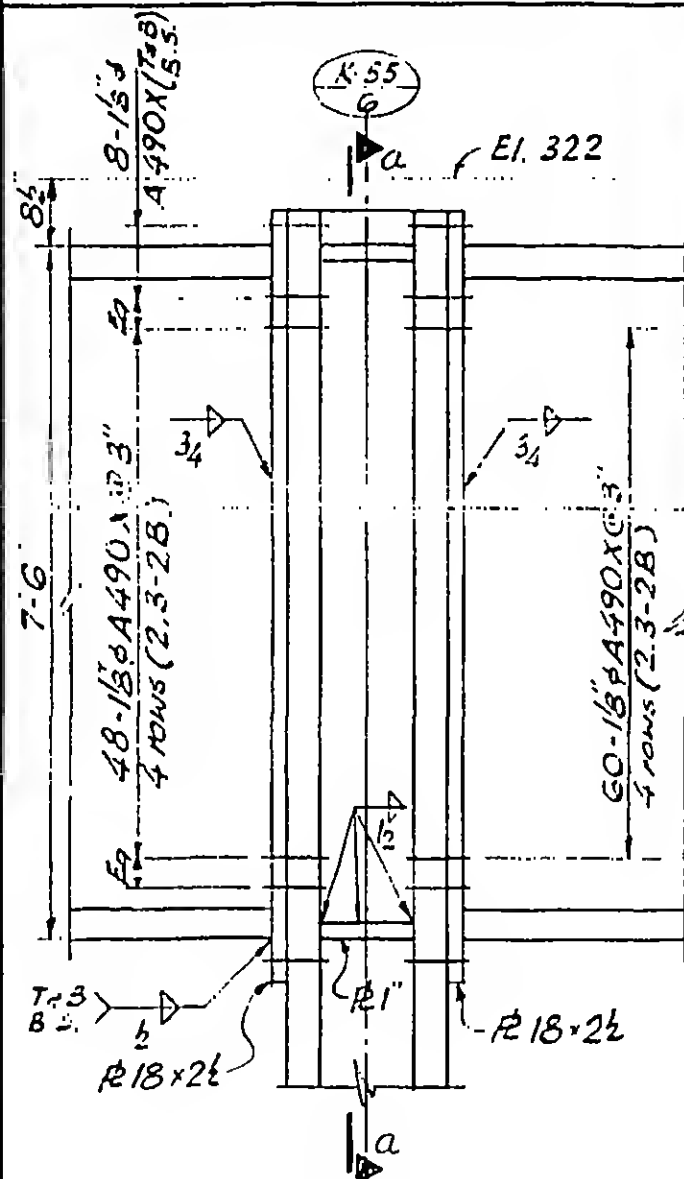
DATE 11-3-72

REVISIONS

Released for
construction
11-20-72

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DESIGNED

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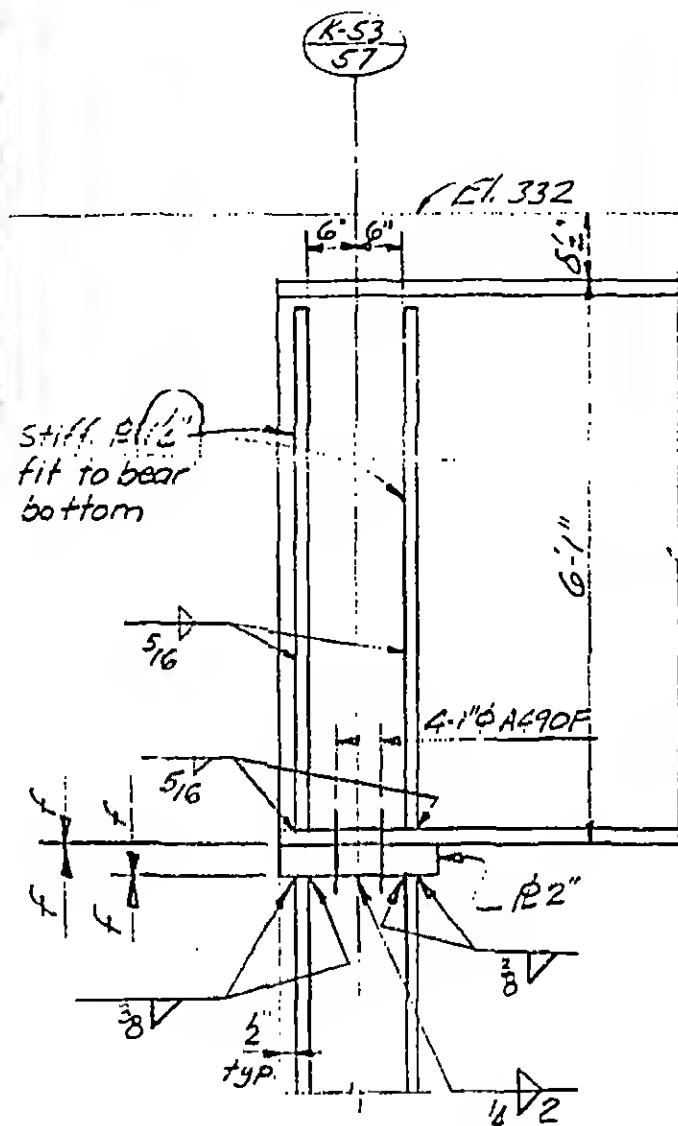
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TITLE GIRDER CONNECTION DETAILS

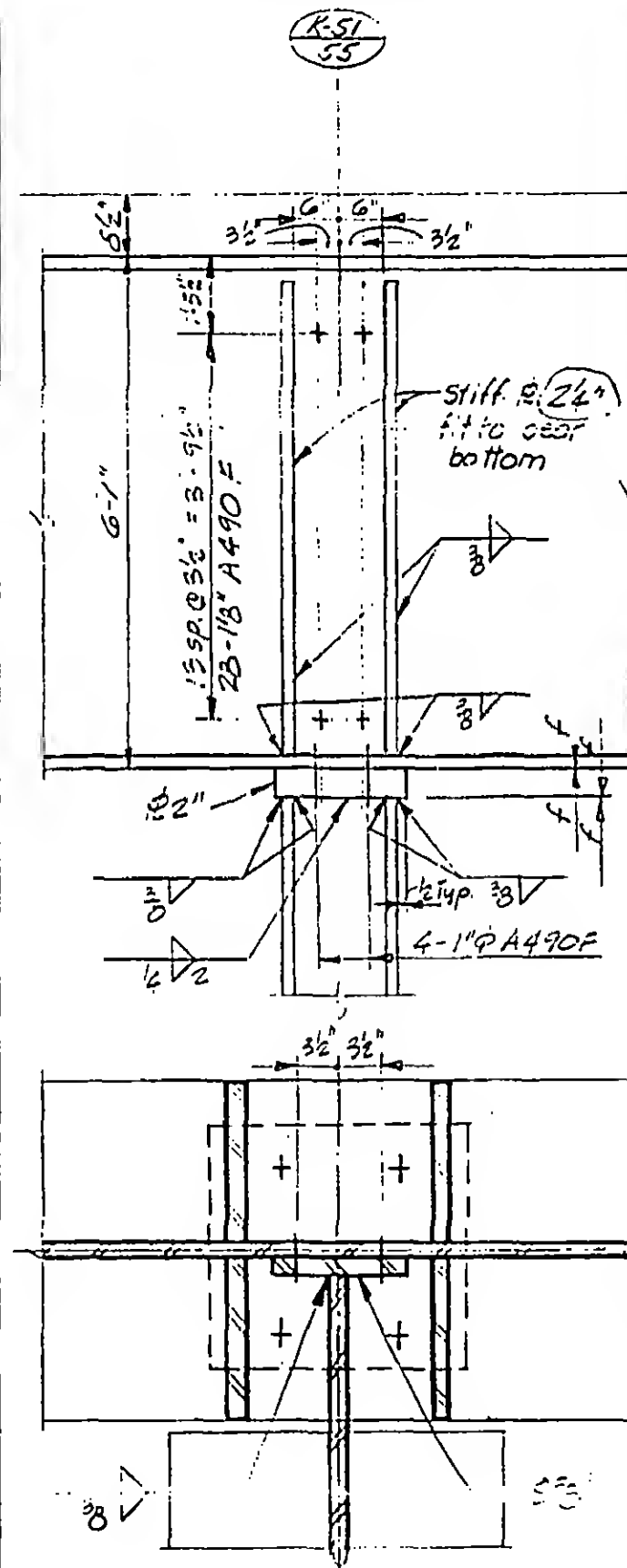
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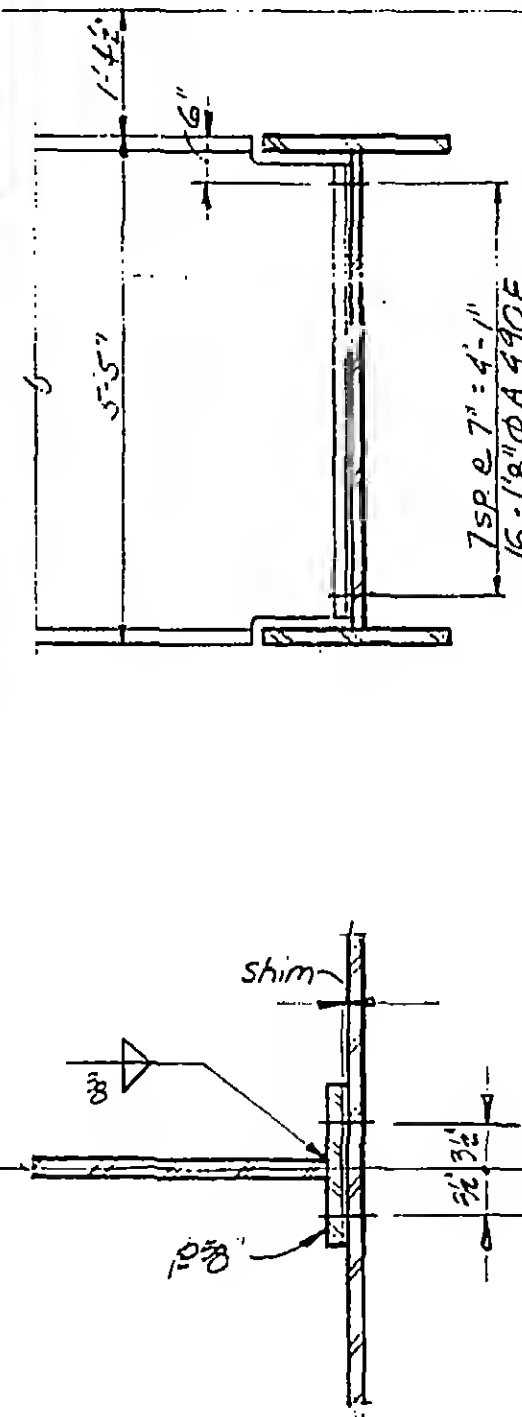
Released for
construction
11-20-72



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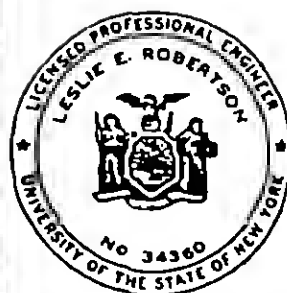


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9

13-K3.3-13



SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

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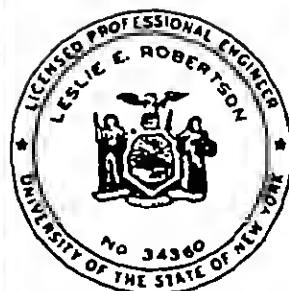
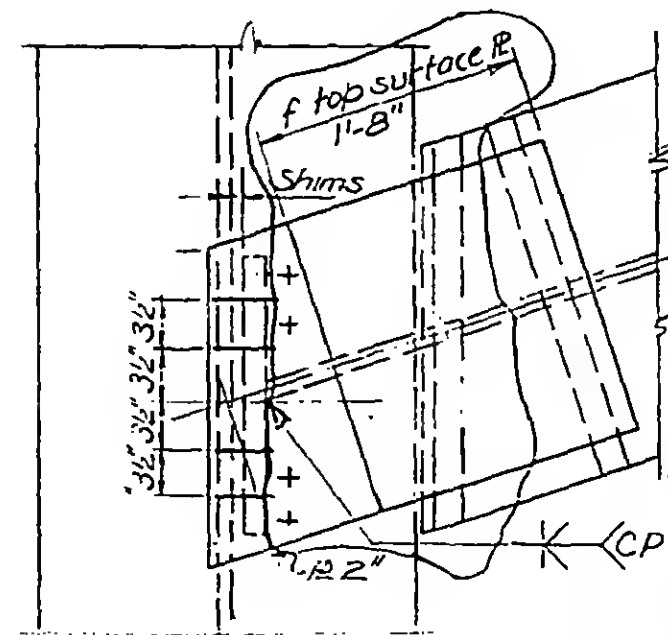
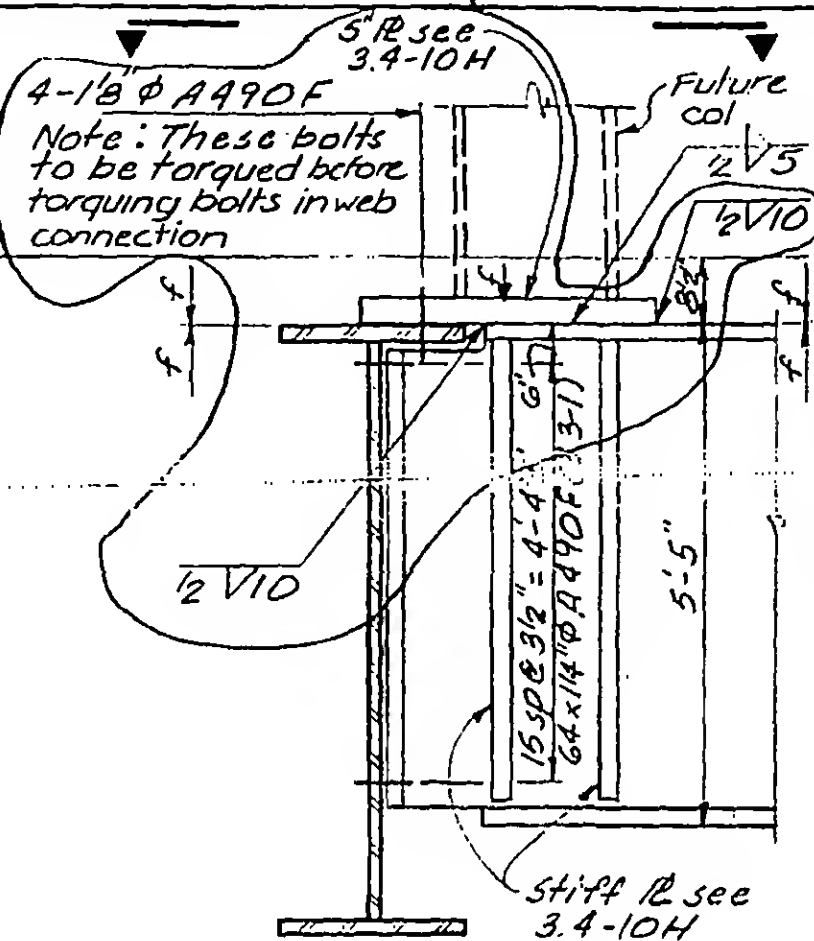
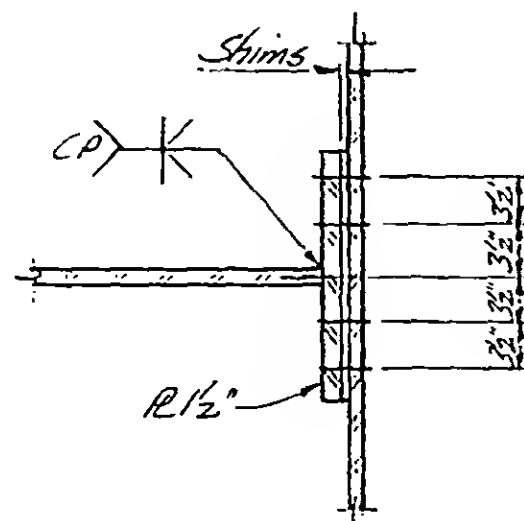
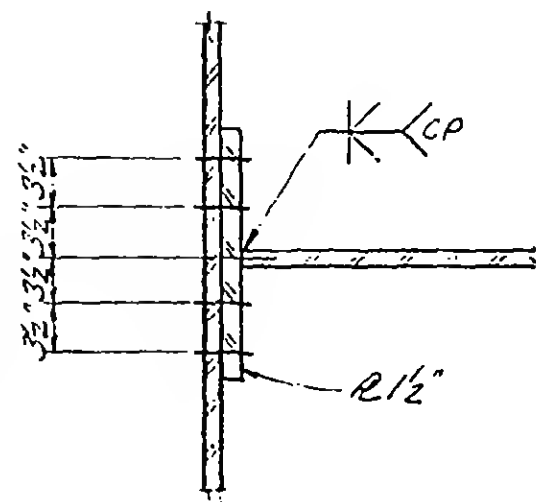
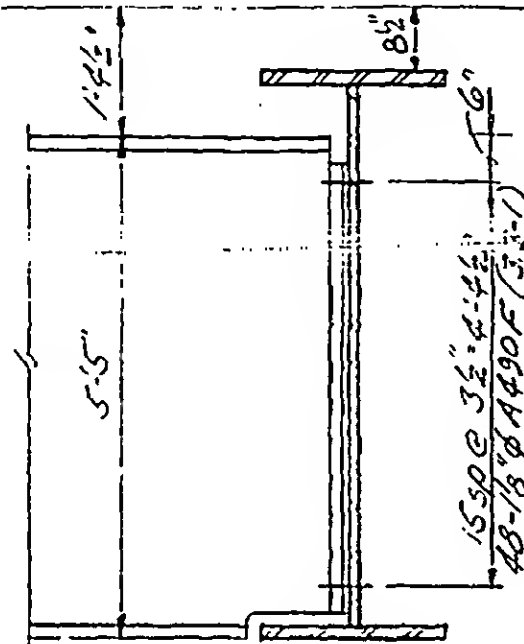
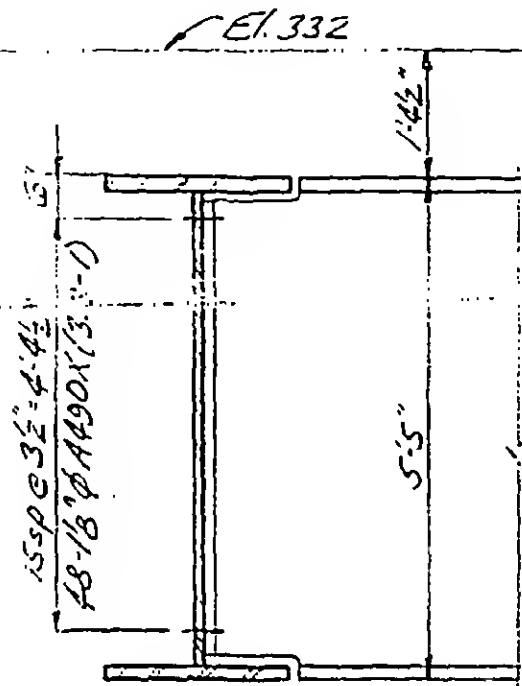
PROJECT **THE WORLD TRADE CENTER**TITLE **GIRDER CONNECTION DETAILS**DATE **11-3-72**

REVISIONS

Released for
distribution
11-20-72

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13-K3.3-14

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

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PROJECT THE WORLD TRADE CENTER

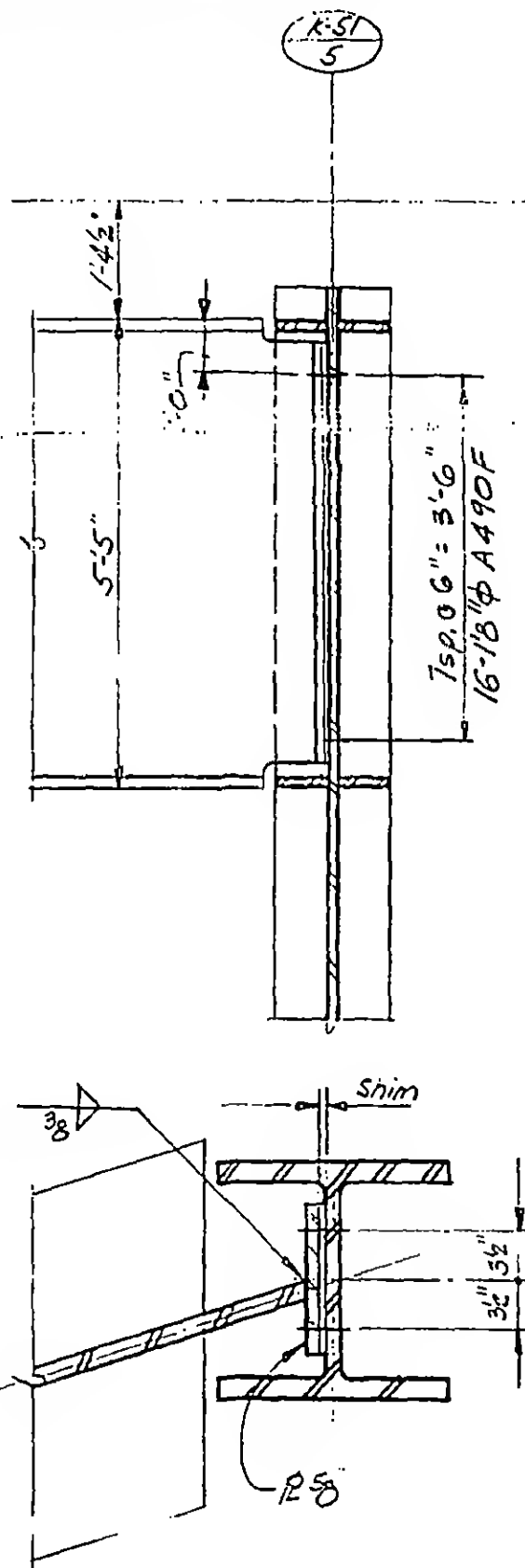
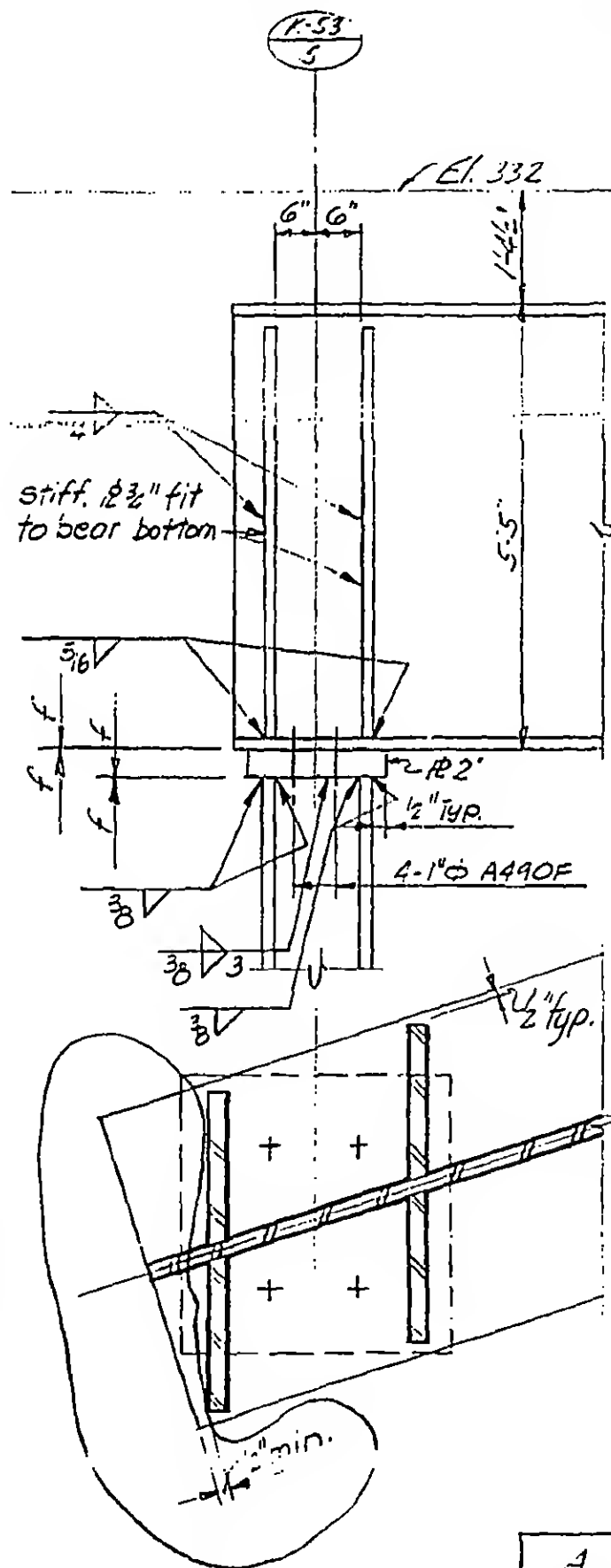
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REVISIONS

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construction
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DESIGNED

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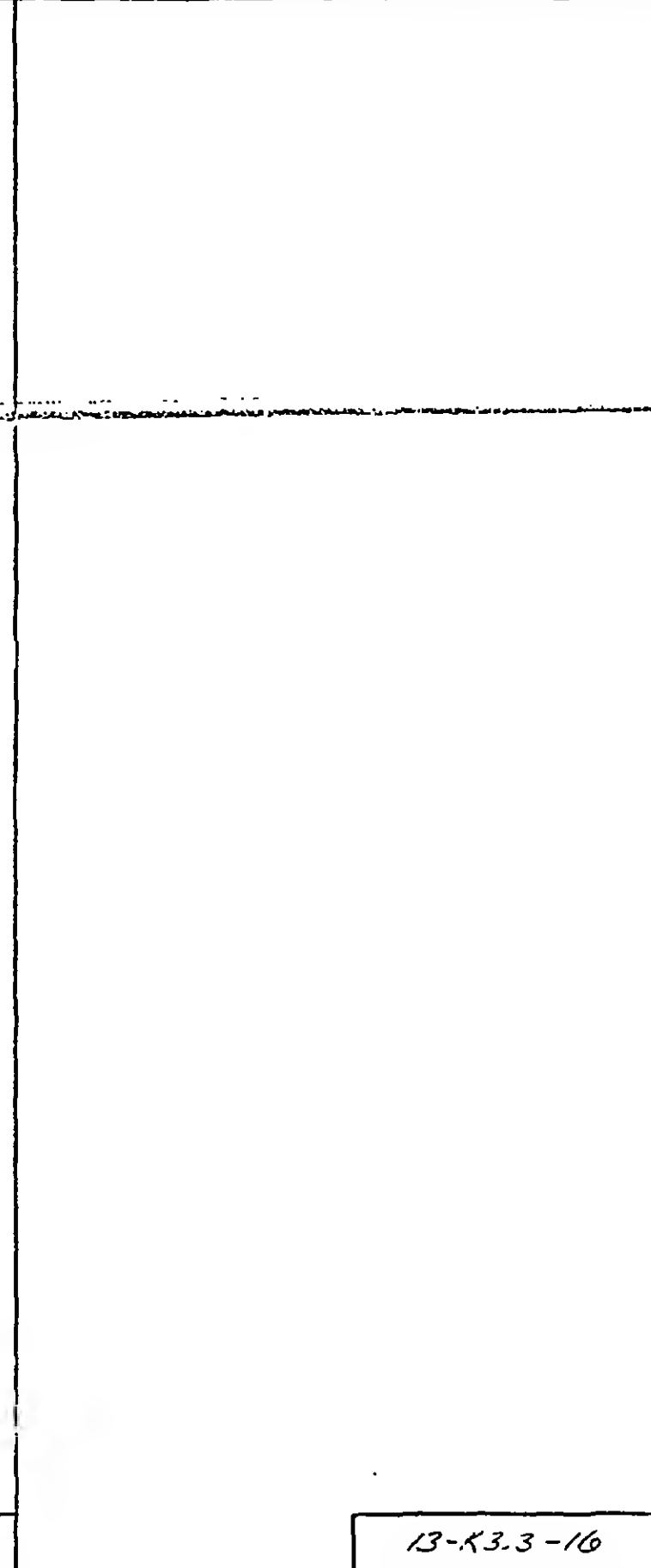
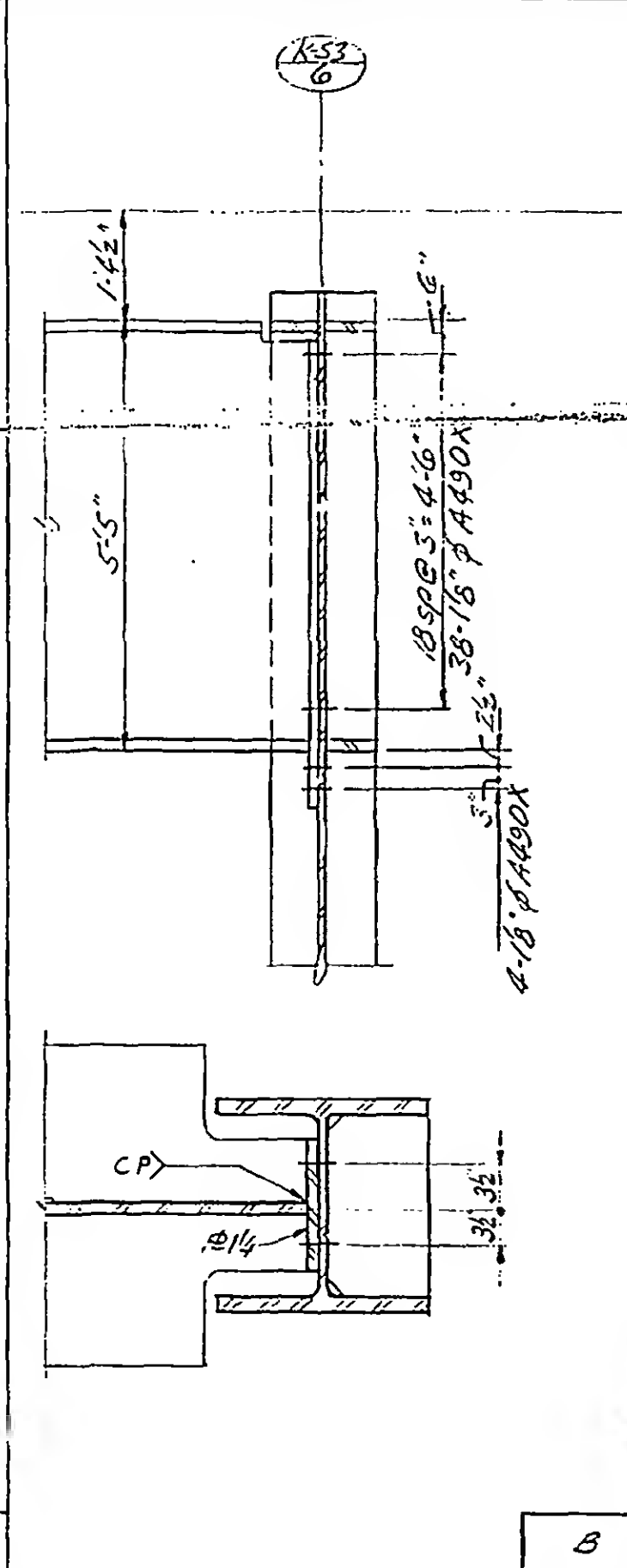
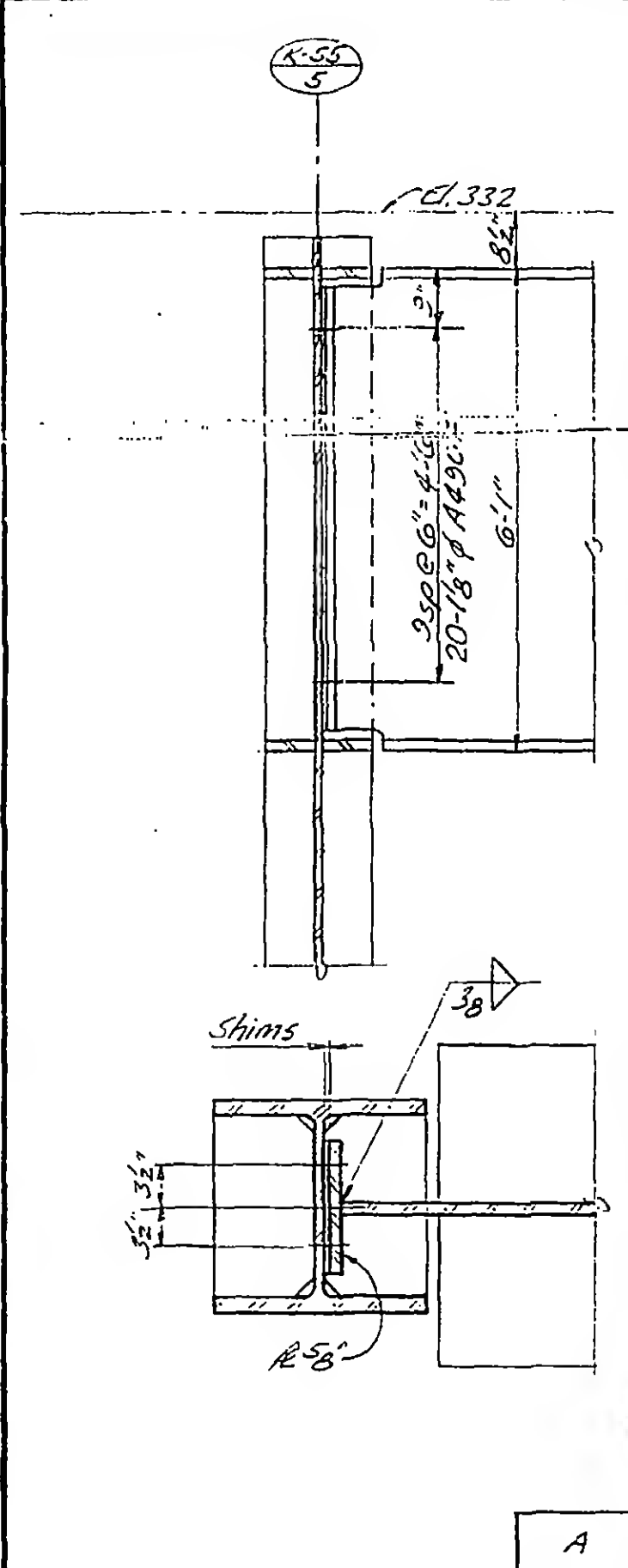
PROJECT: THE WORLD TRADE CENTER

TITLE: GIRDER CONNECTION DETAILS

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REVISIONS

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REVIEWED

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SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

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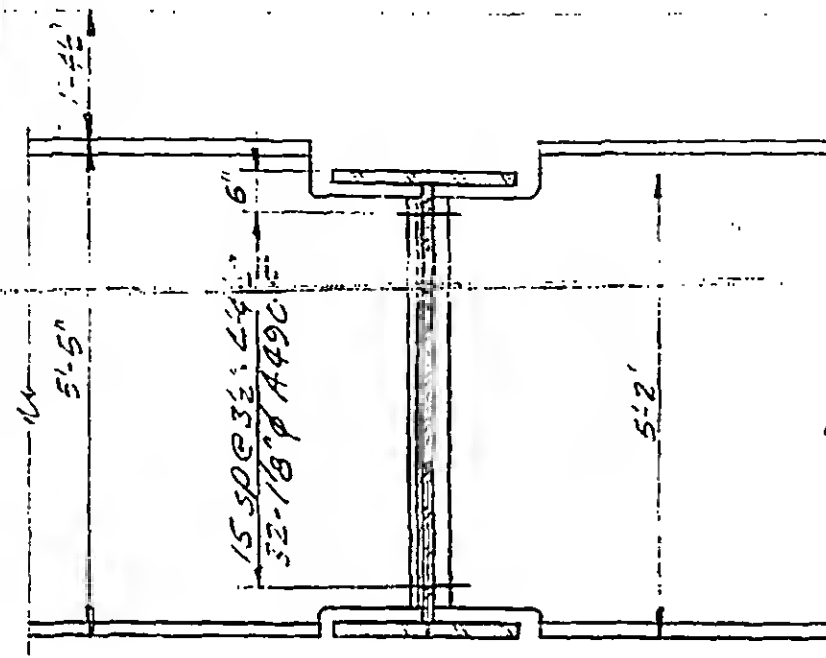
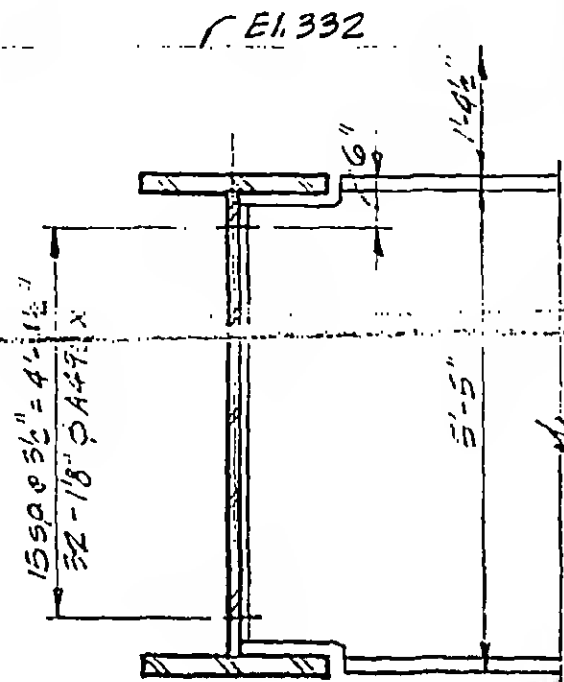
PROJECT THE WORLD TRADE CENTER

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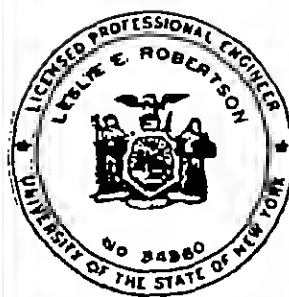
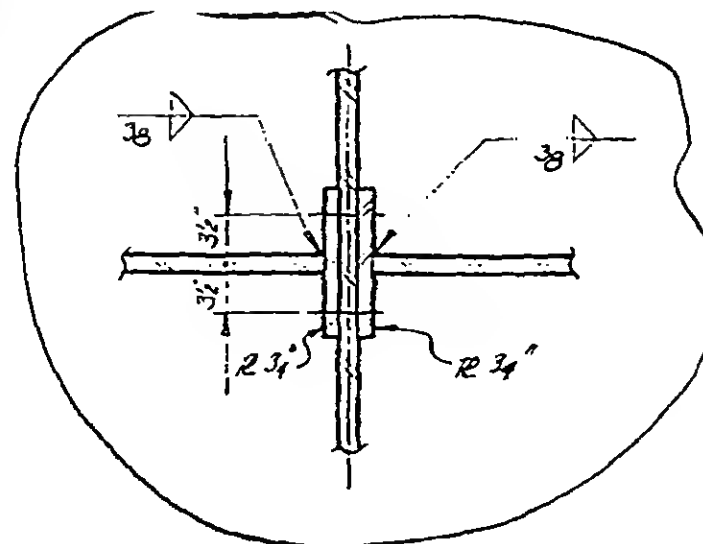
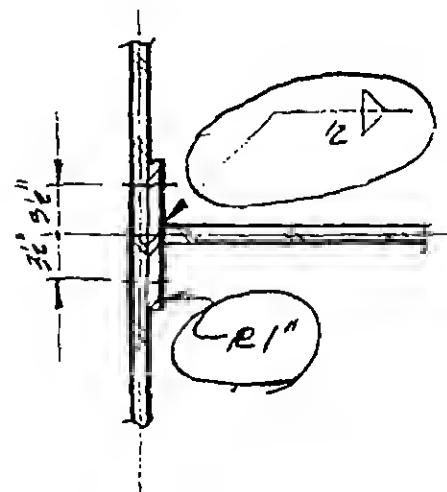
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construction
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For cont.
See 3.4-12A



DESIGNED

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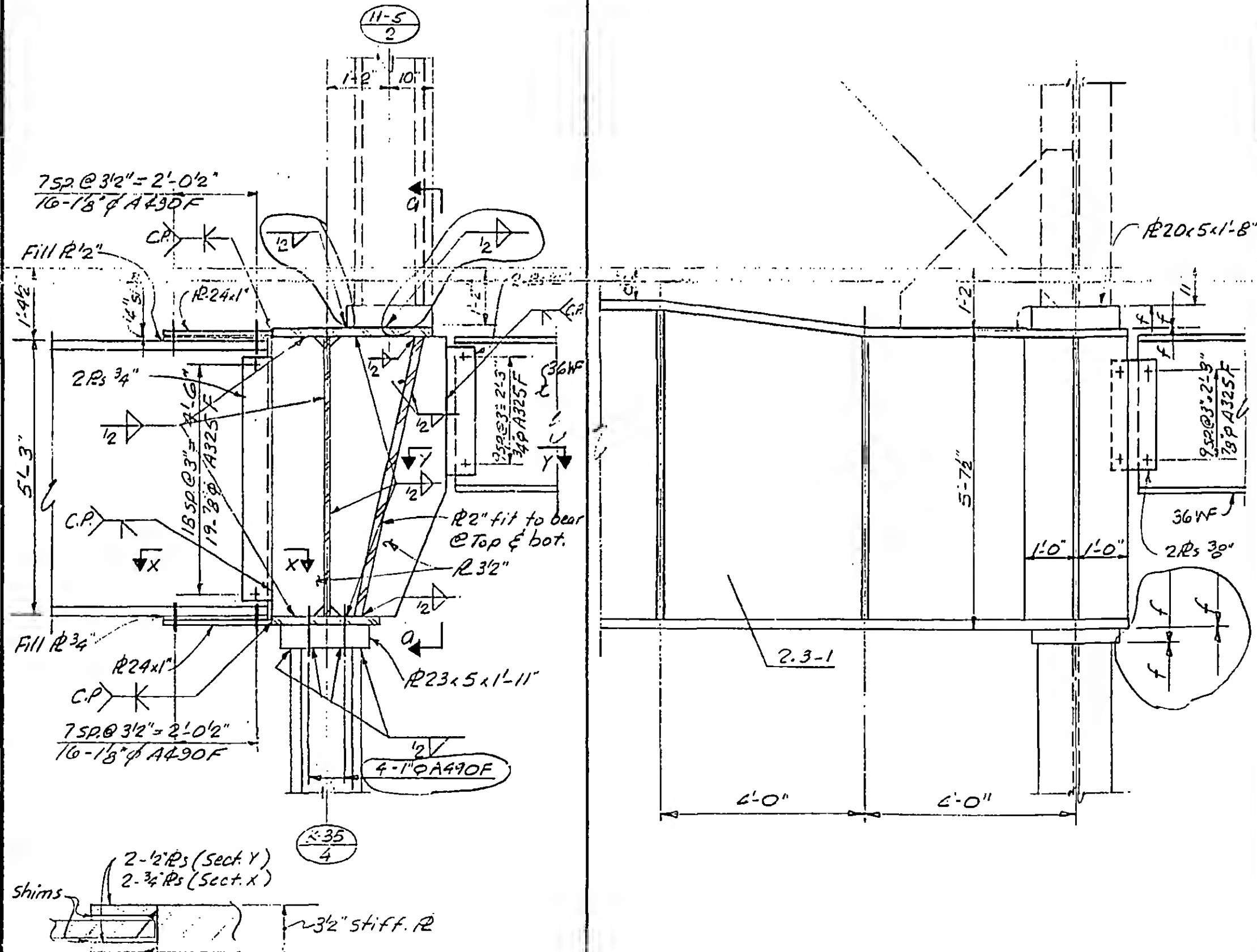
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REVISIONS

General Rev.
RELEASED FOR
CONSTRUCTION
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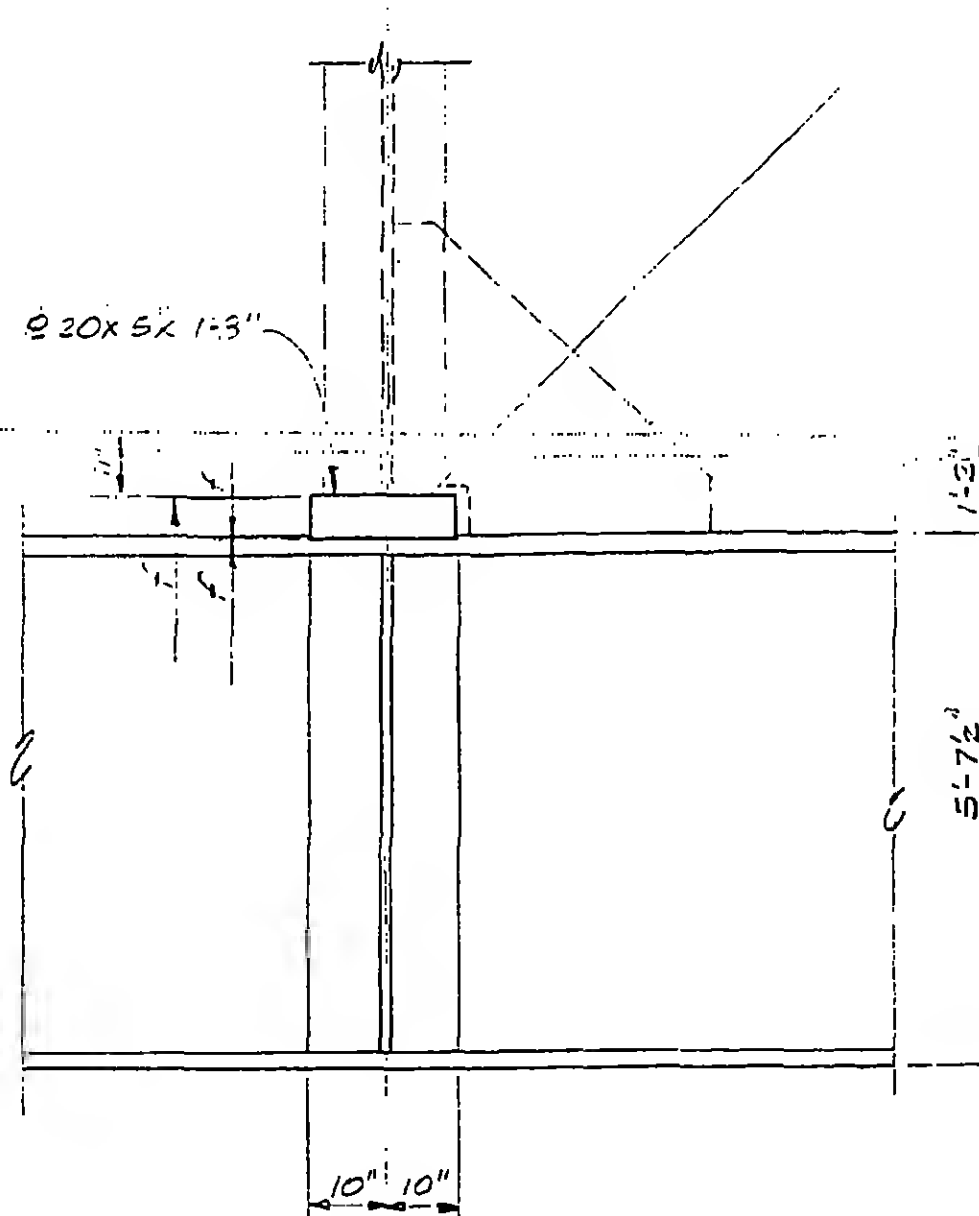
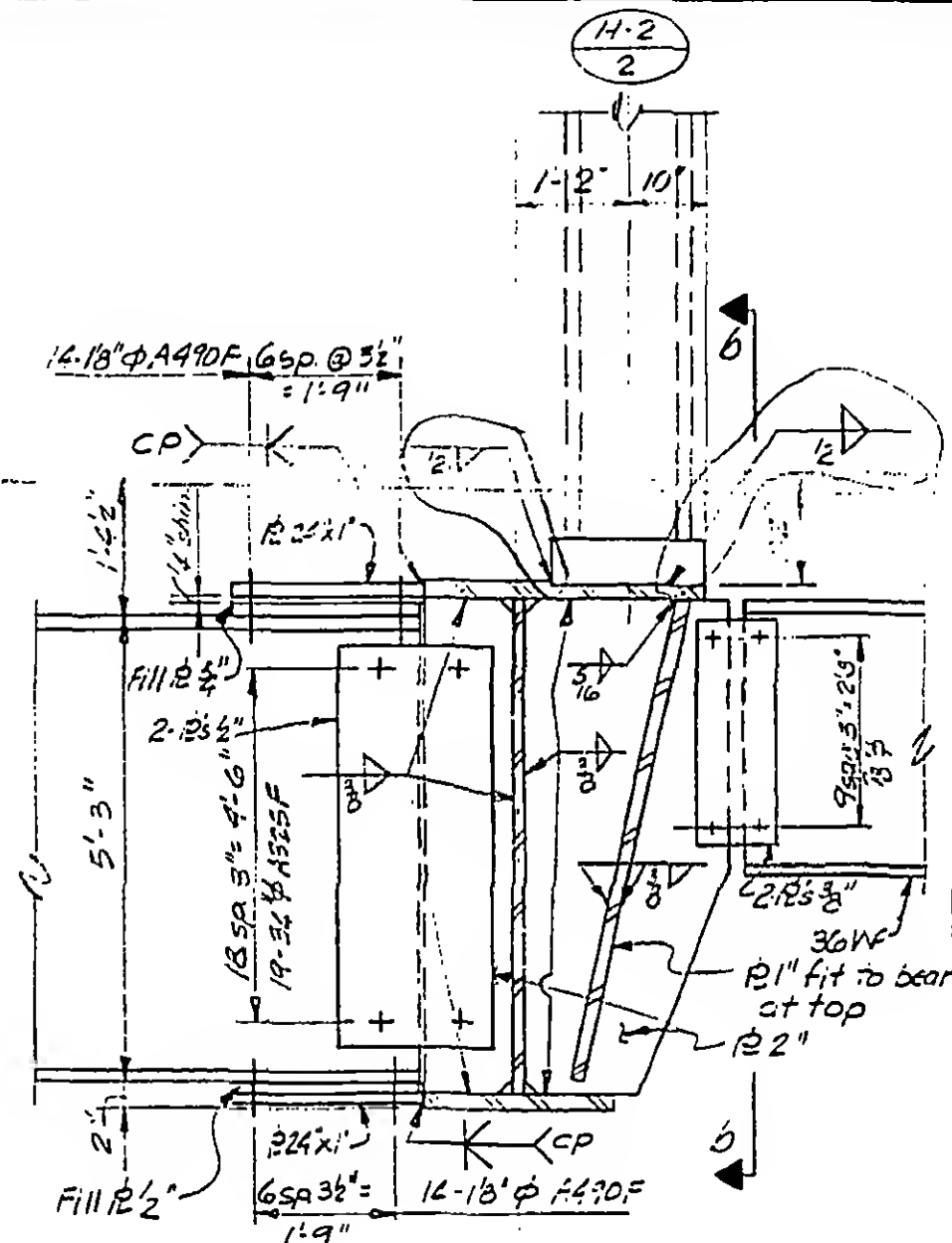
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REVISIONS

General
Revision
Released for
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13-K 3.4-2

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER

TITLE GIRDER DETAILS AT FUTURE COLUMNS

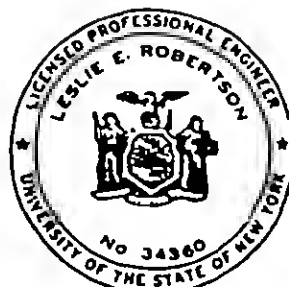
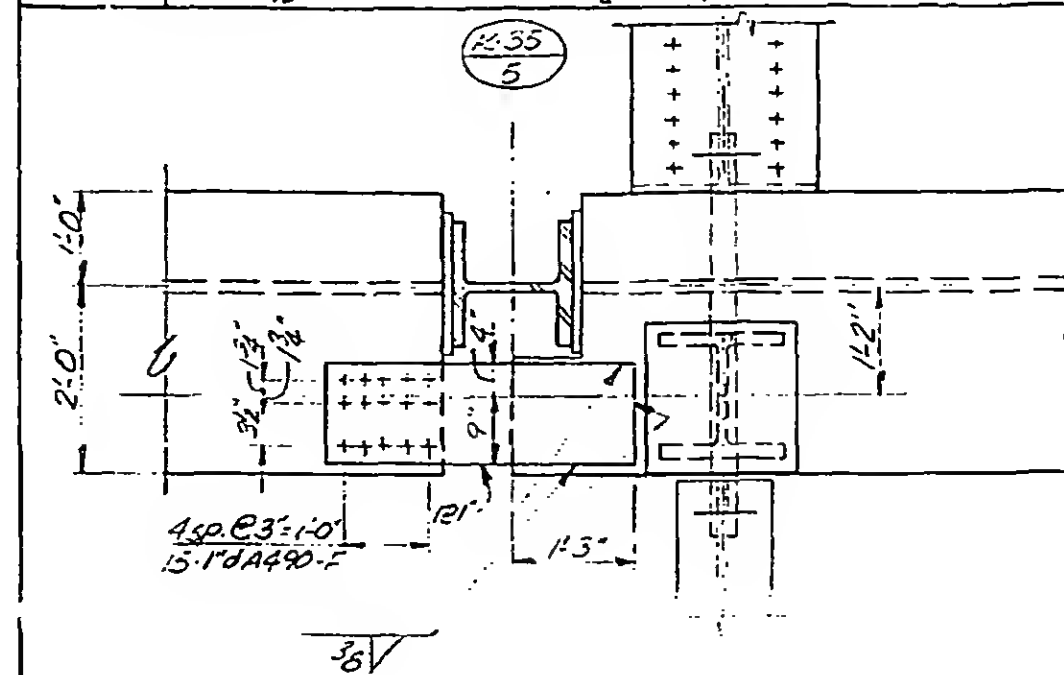
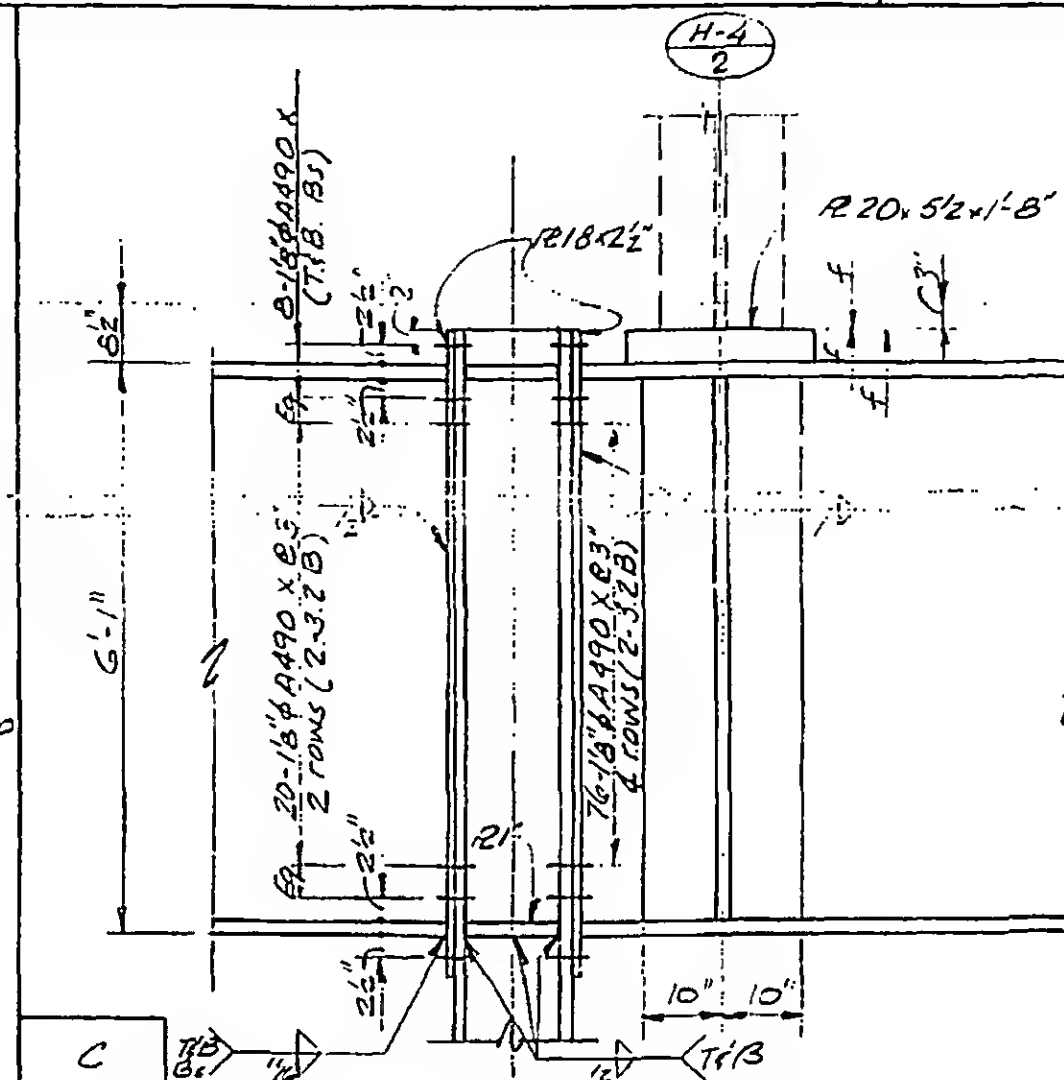
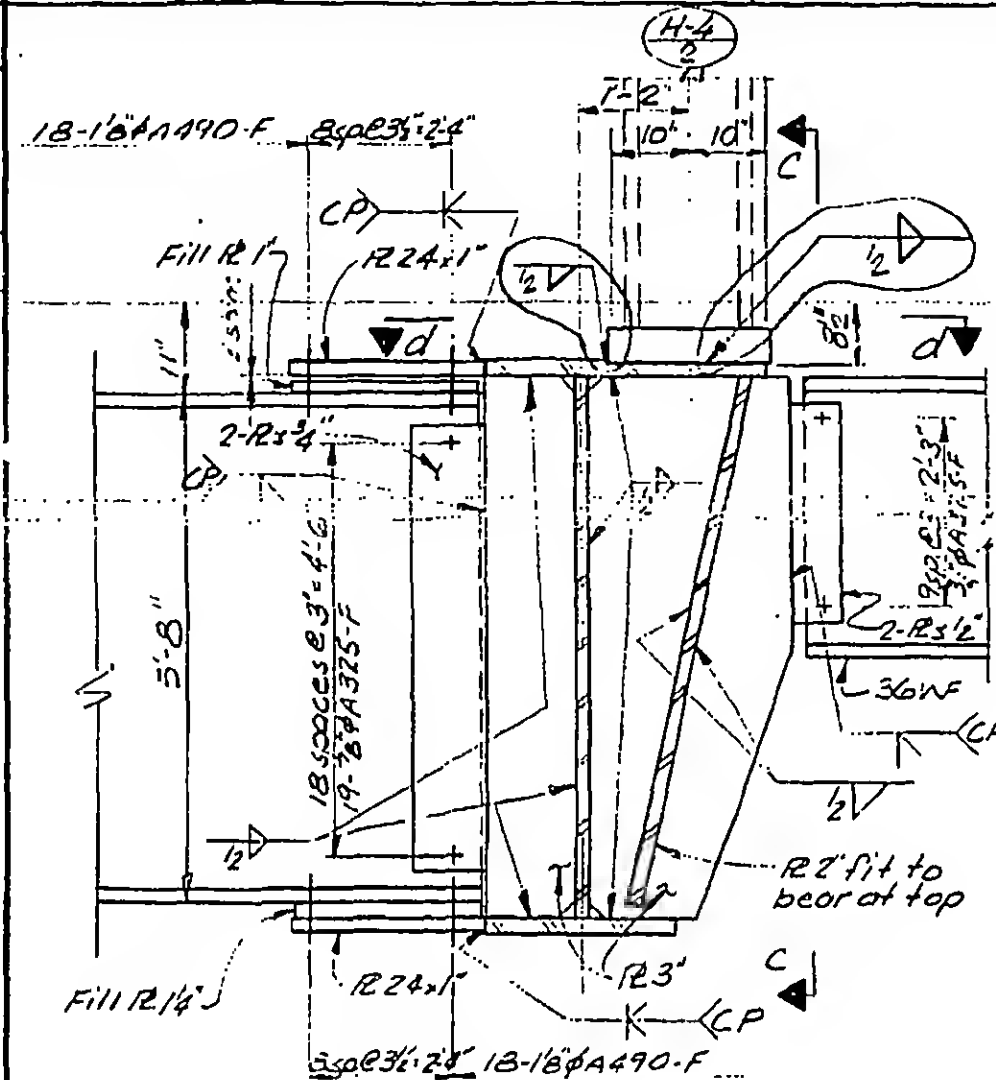
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REVISIONS

GENERAL REVISION
RELEASED FOR
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DESIGNED

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13-K3.4-3

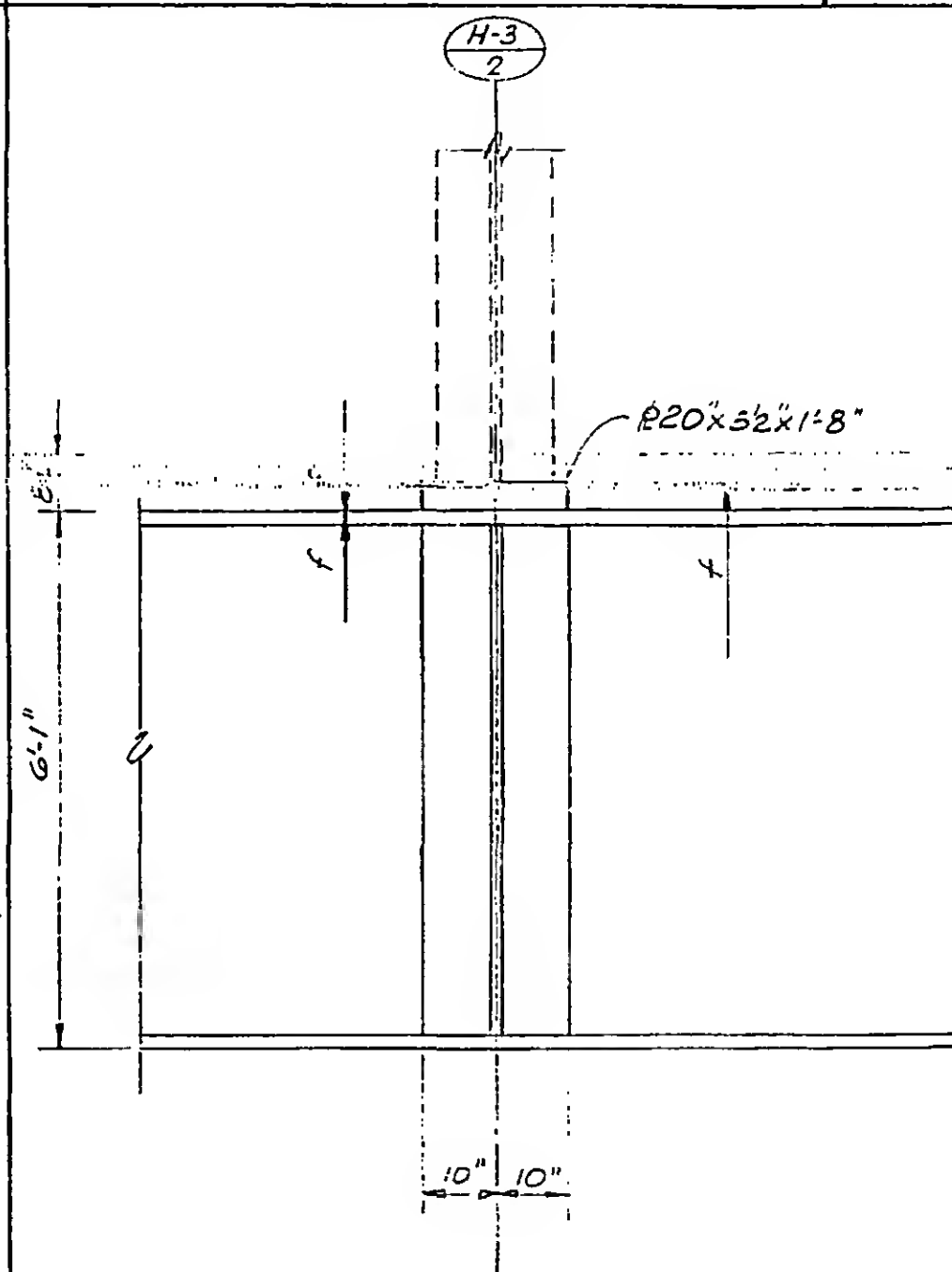
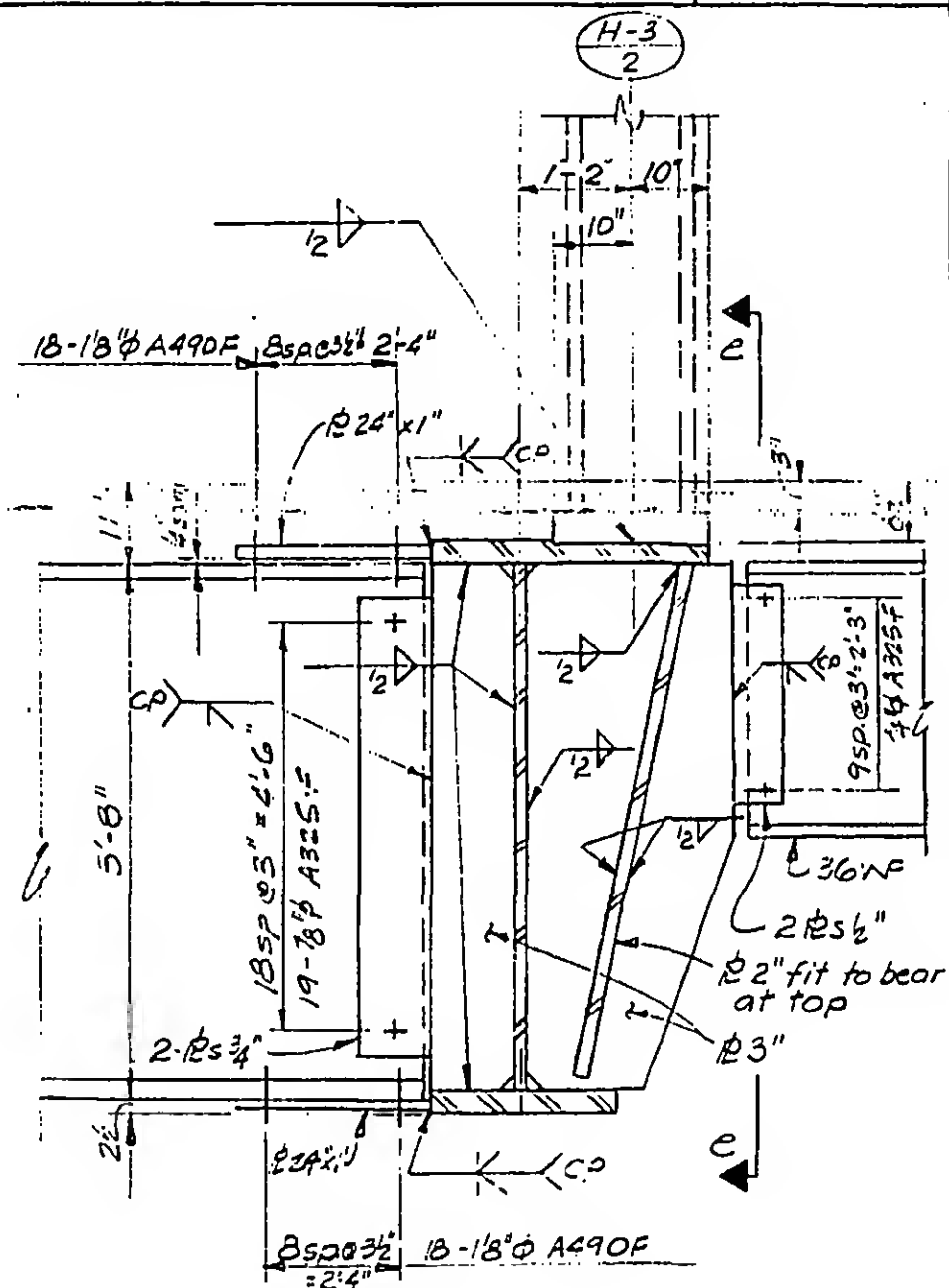
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Revision
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Construction
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Pr. J. W. L.

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13-K 3.4-4

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

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TITLE GIRDER DETAILS AT FUTURE COLUMNS

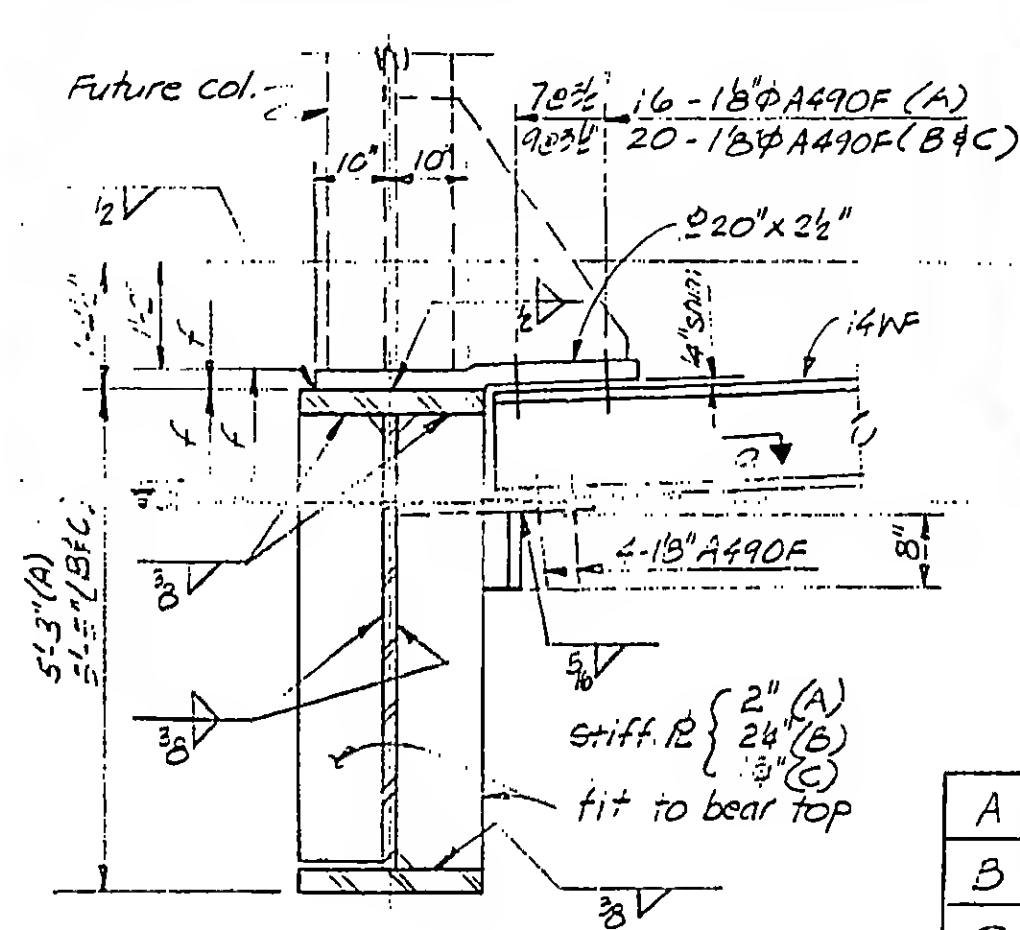
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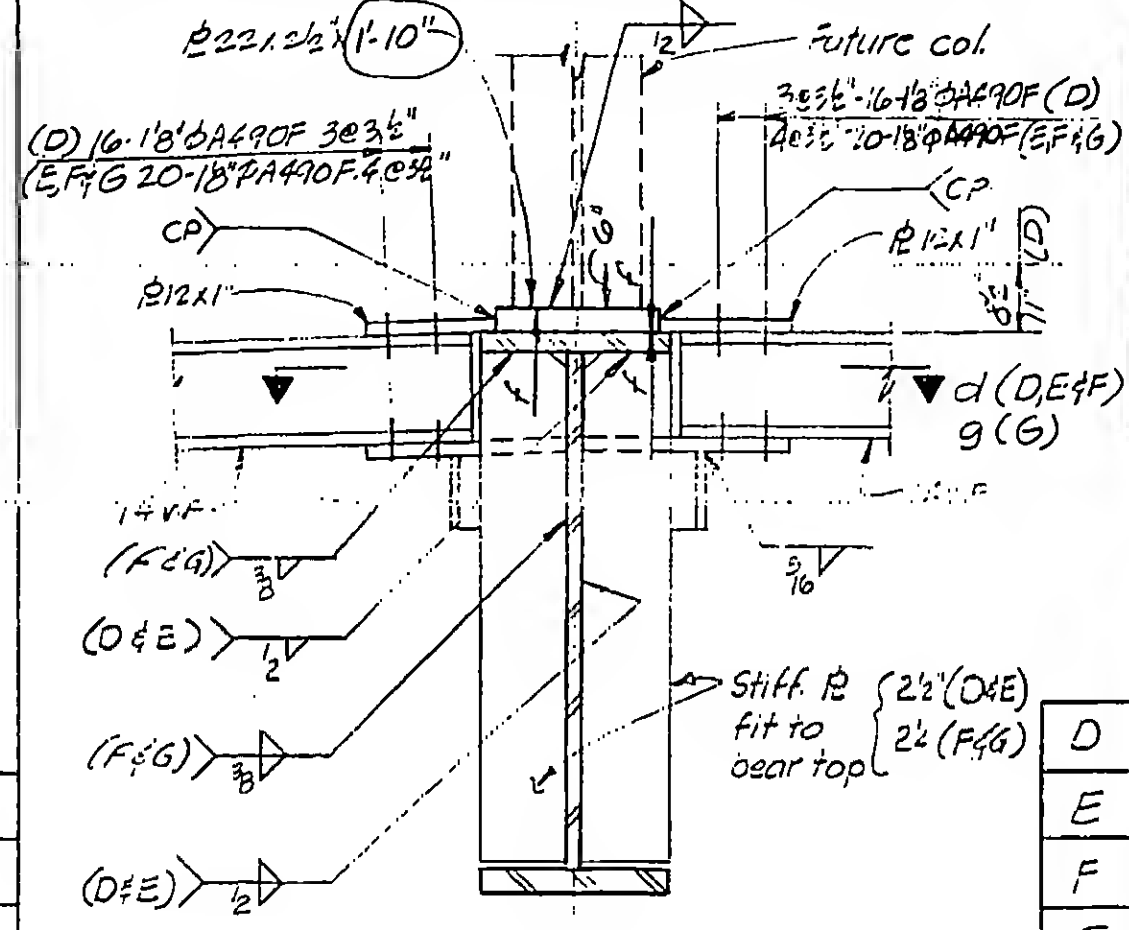
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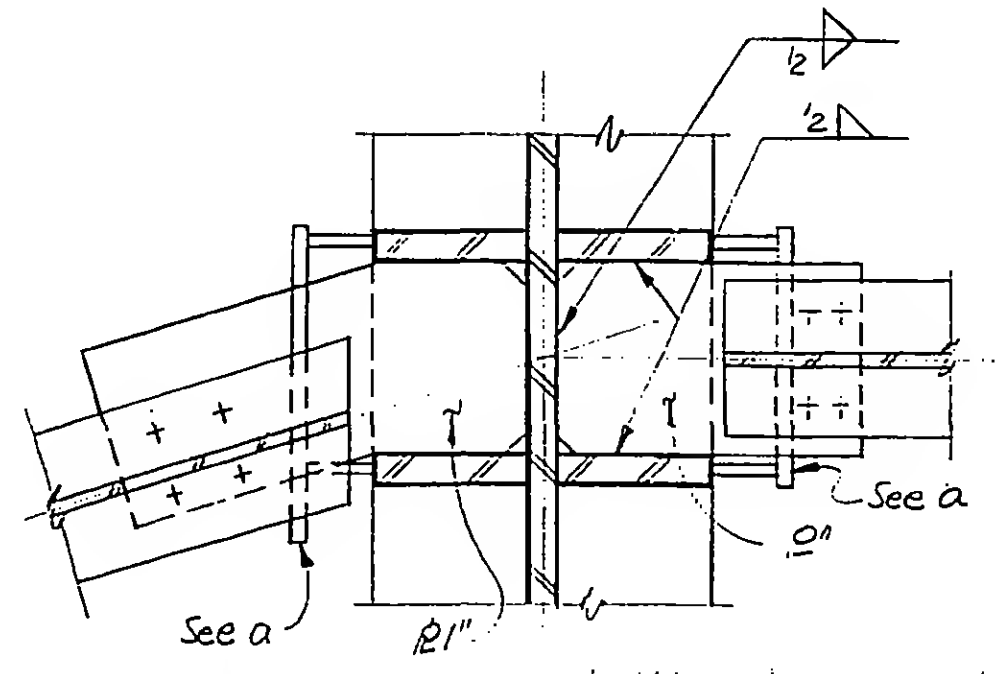
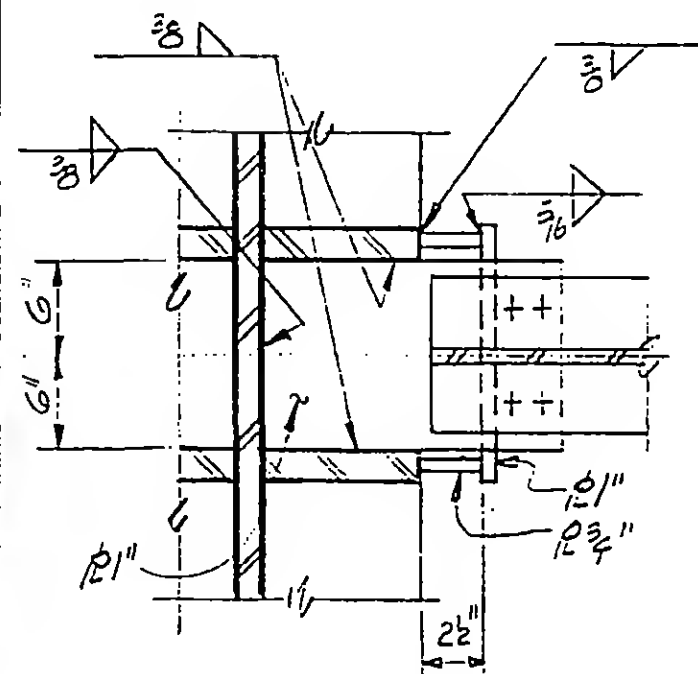
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SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

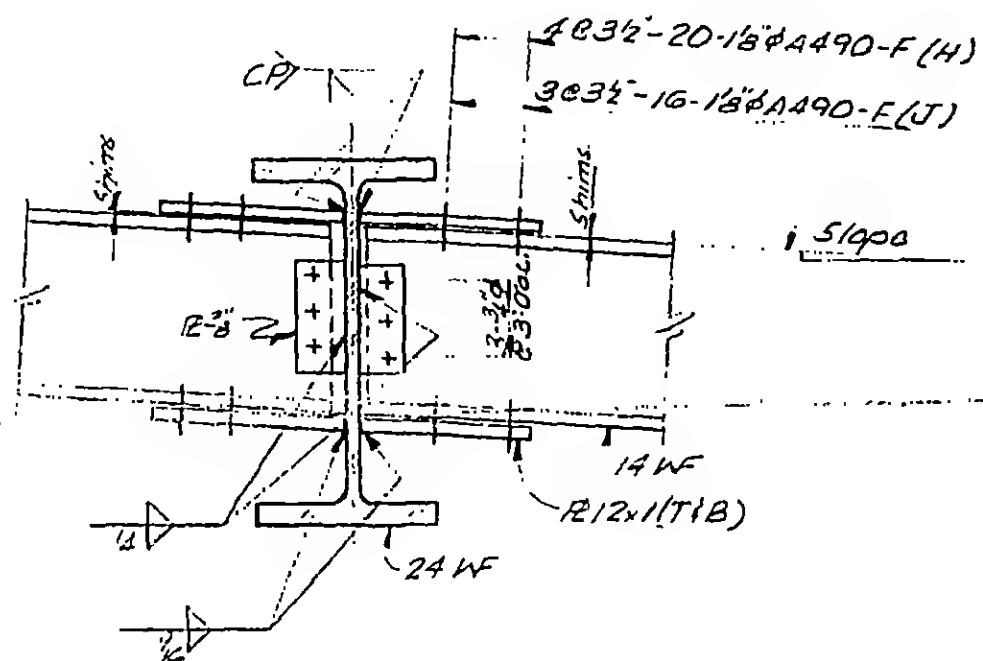
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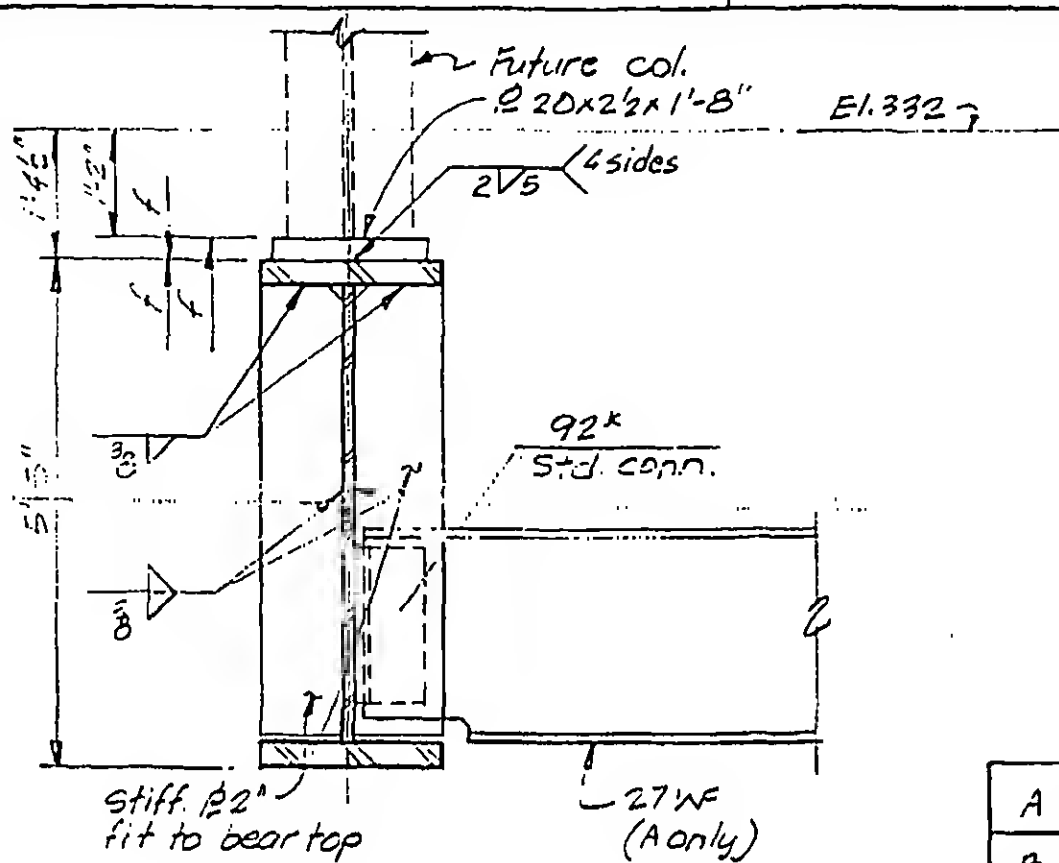
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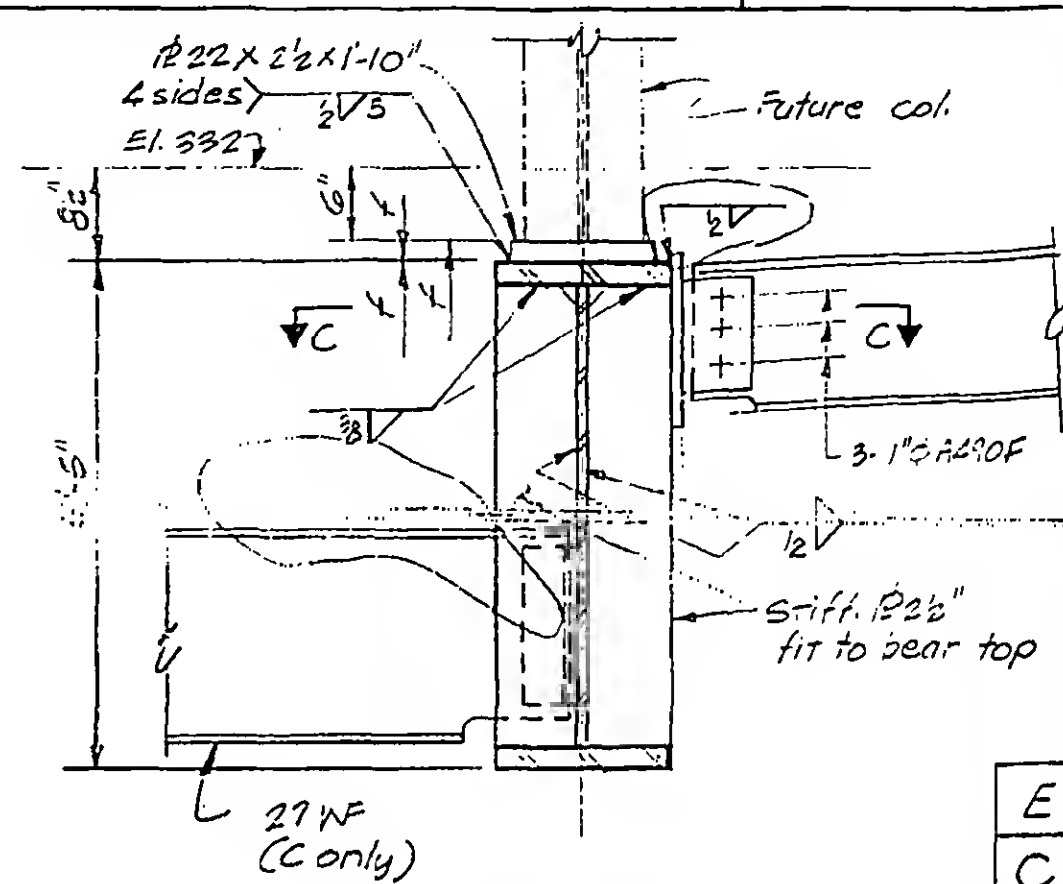
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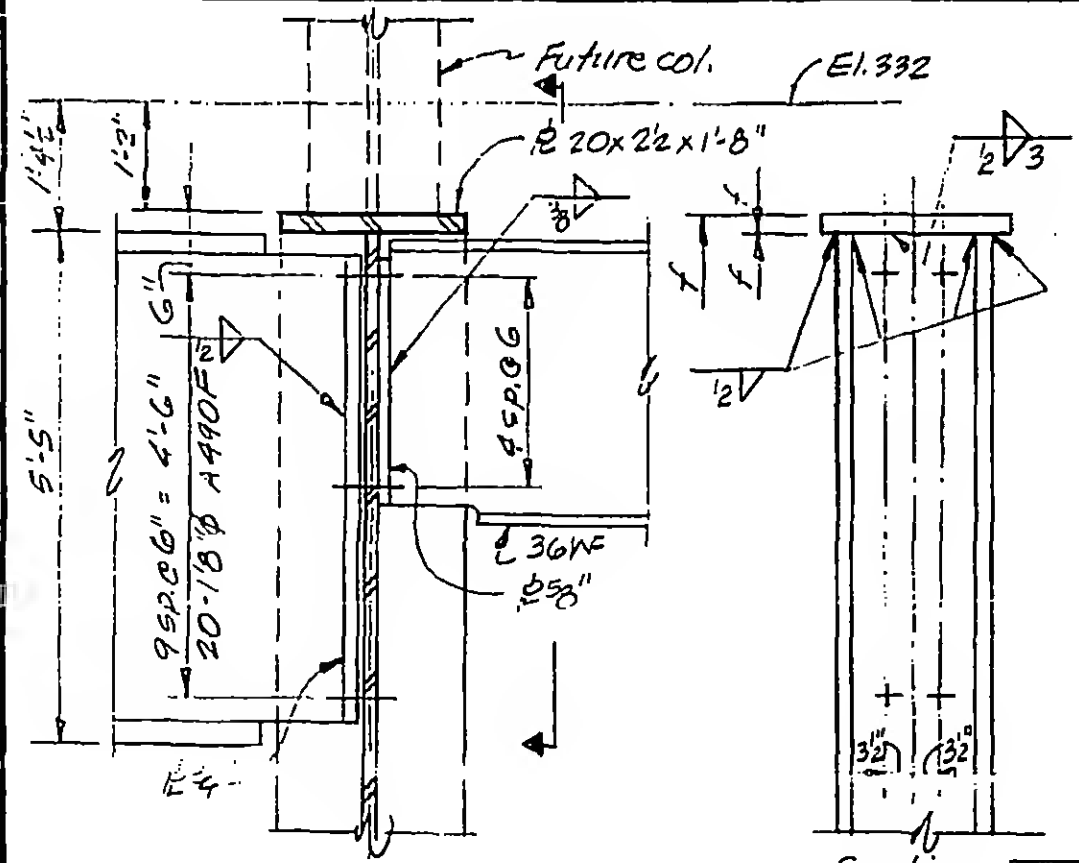
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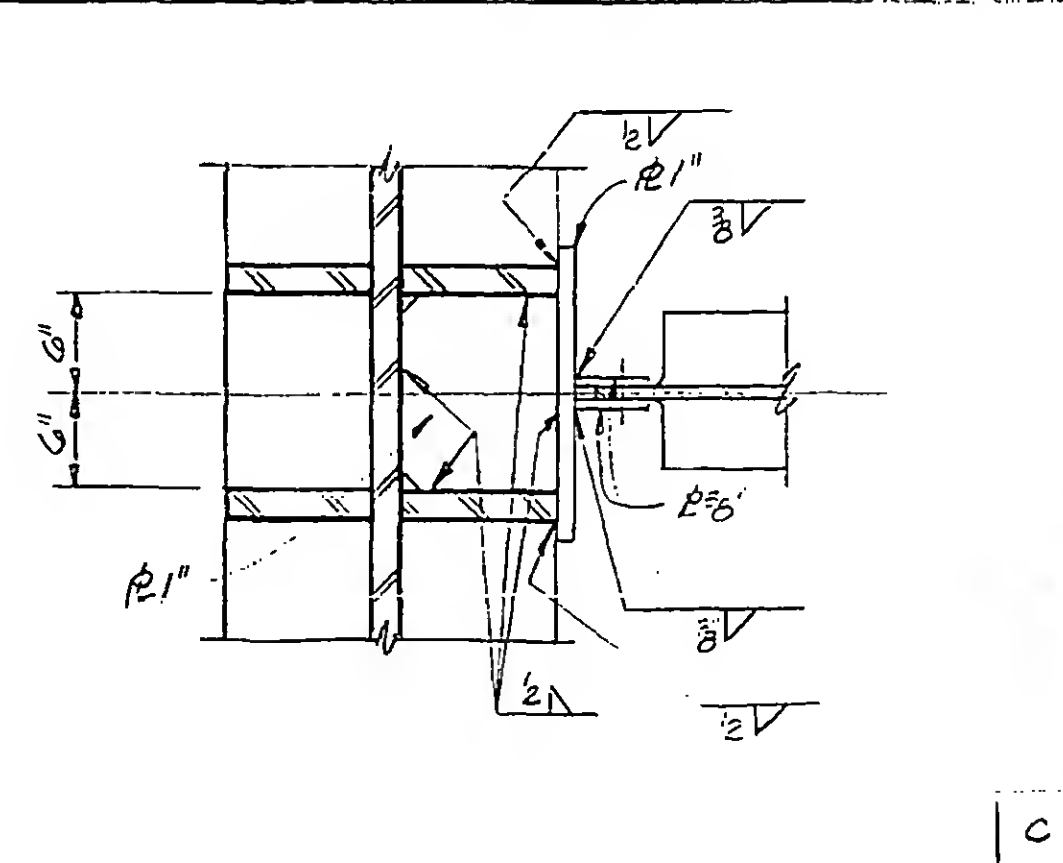
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DESIGNED

DRAWN

REVIEWED

13-K3.9-6

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

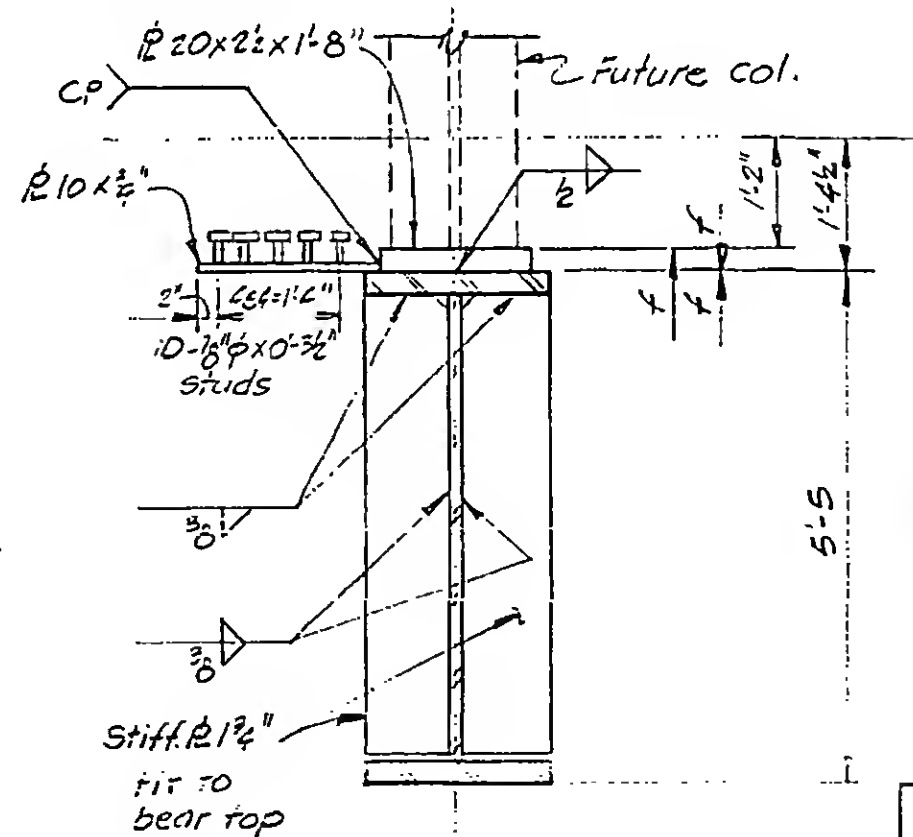
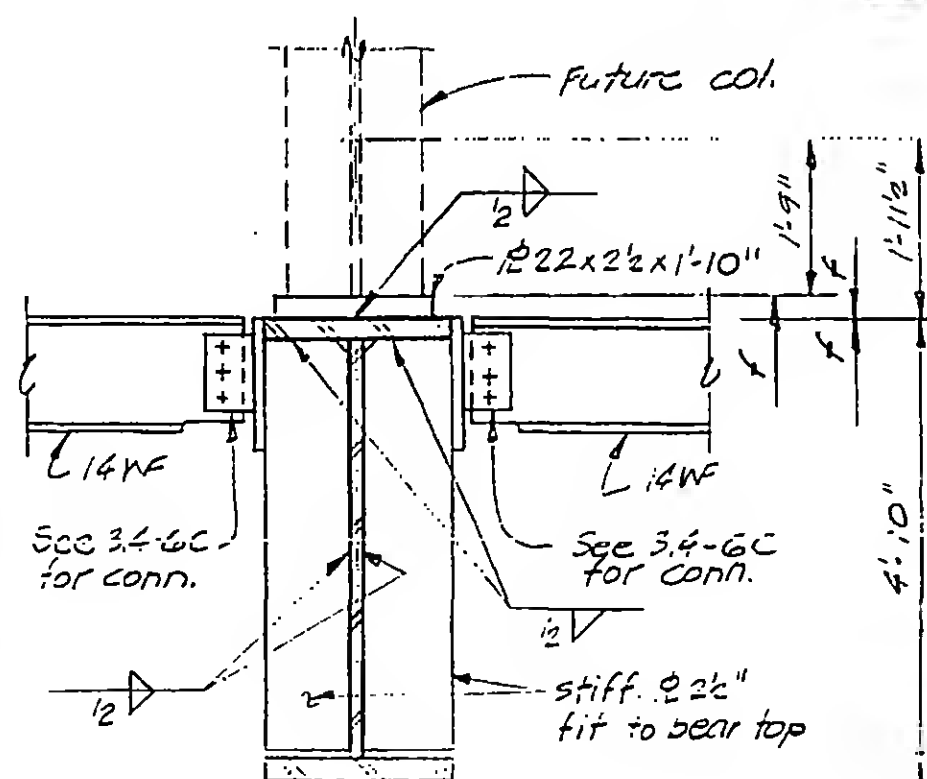
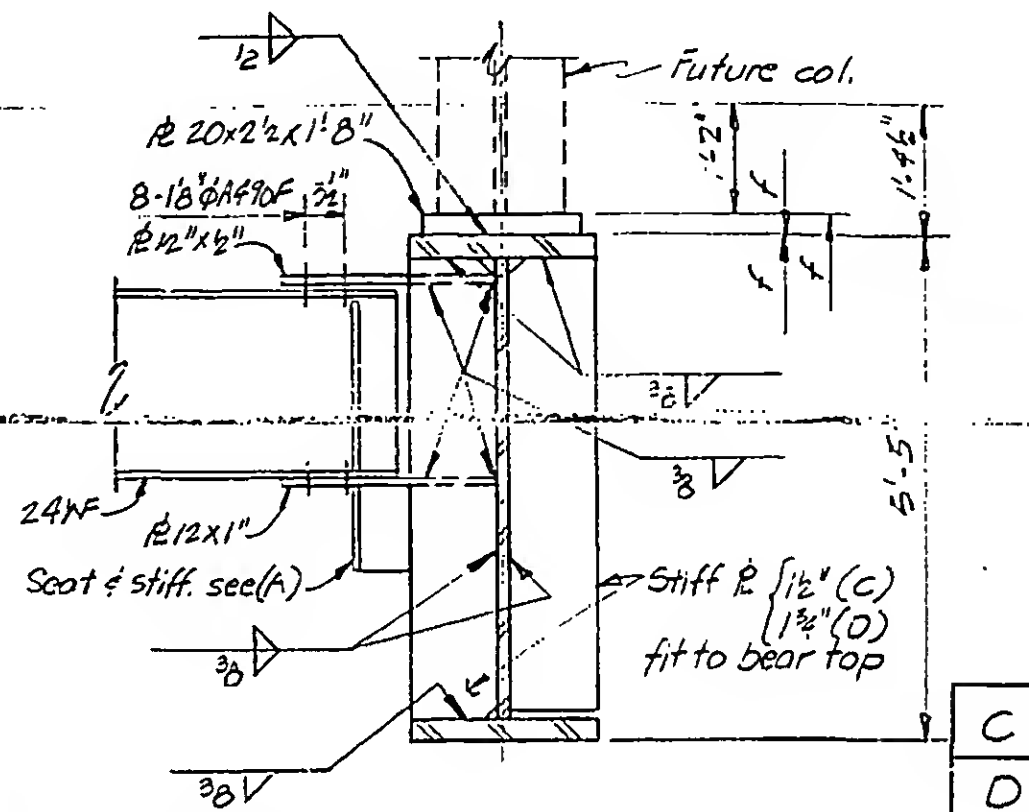
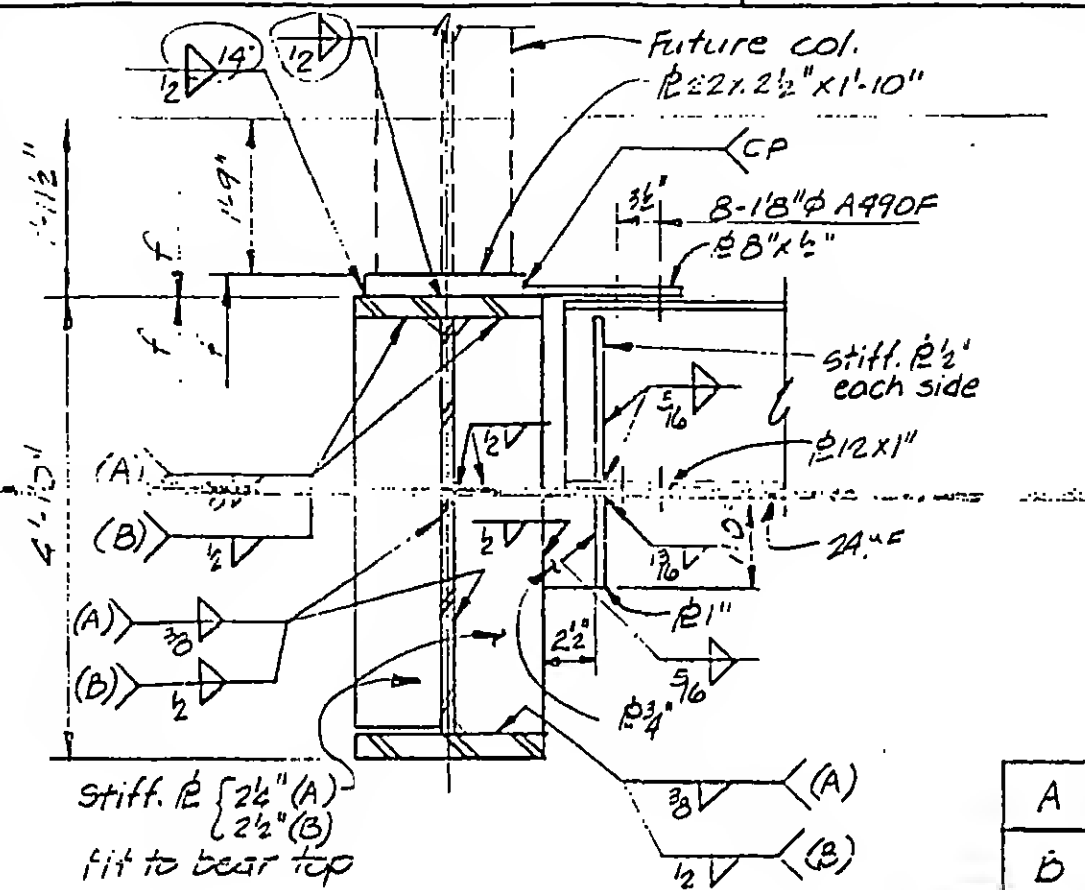
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PROJECT THE WORLD TRADE CENTER

TITLE GIRDER DETAILS AT FUTURE COLS.

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CONSTRUCTION
11-24-72

DESIGNED

DRAWN
M. G. G. G.

REVIEWED

13-K 3.4-7

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

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PROJECT THE WORLD TRADE CENTER

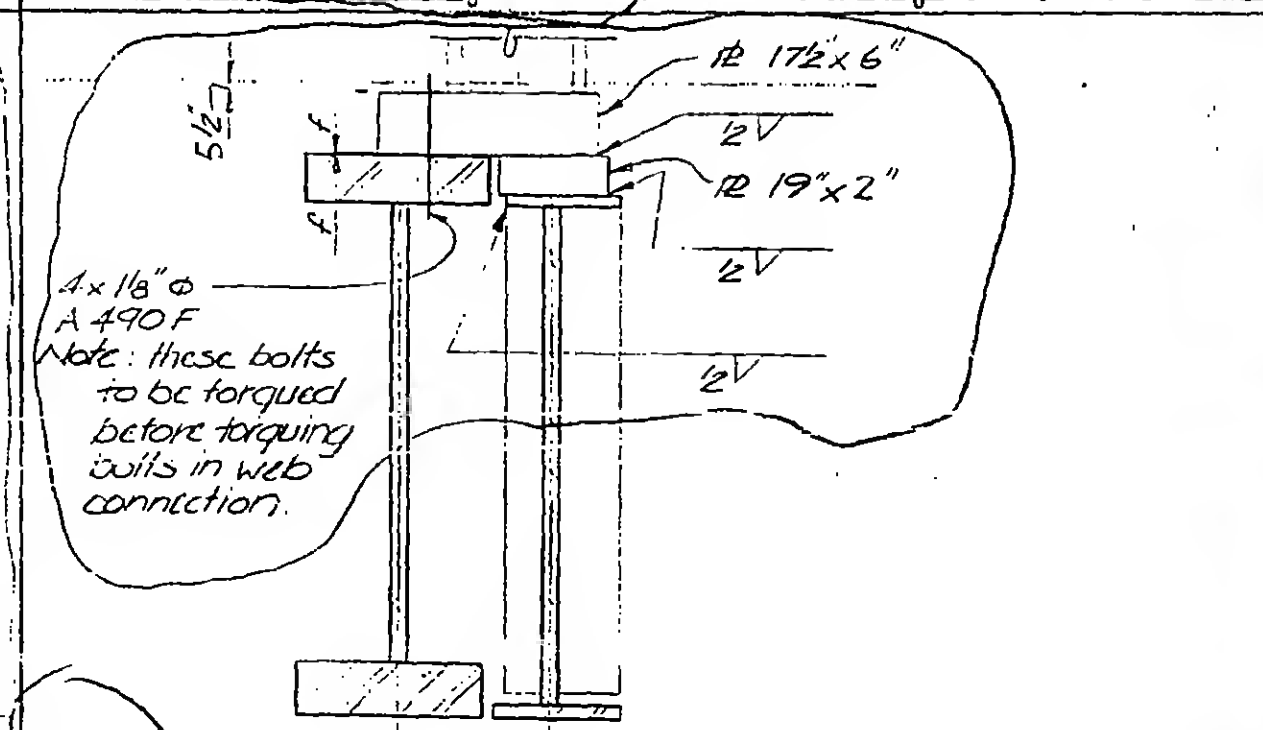
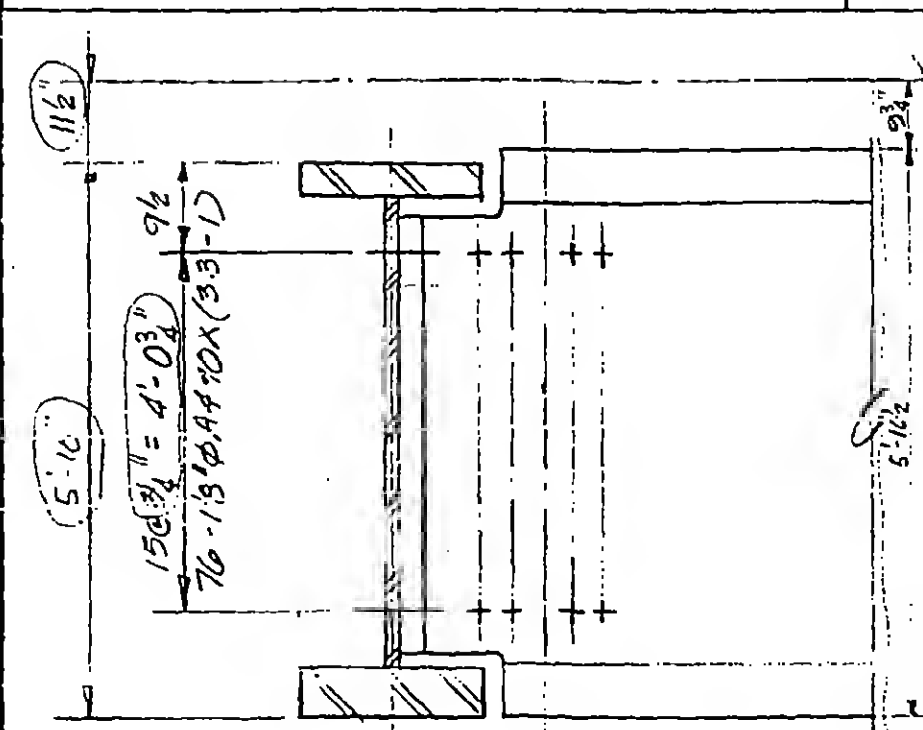
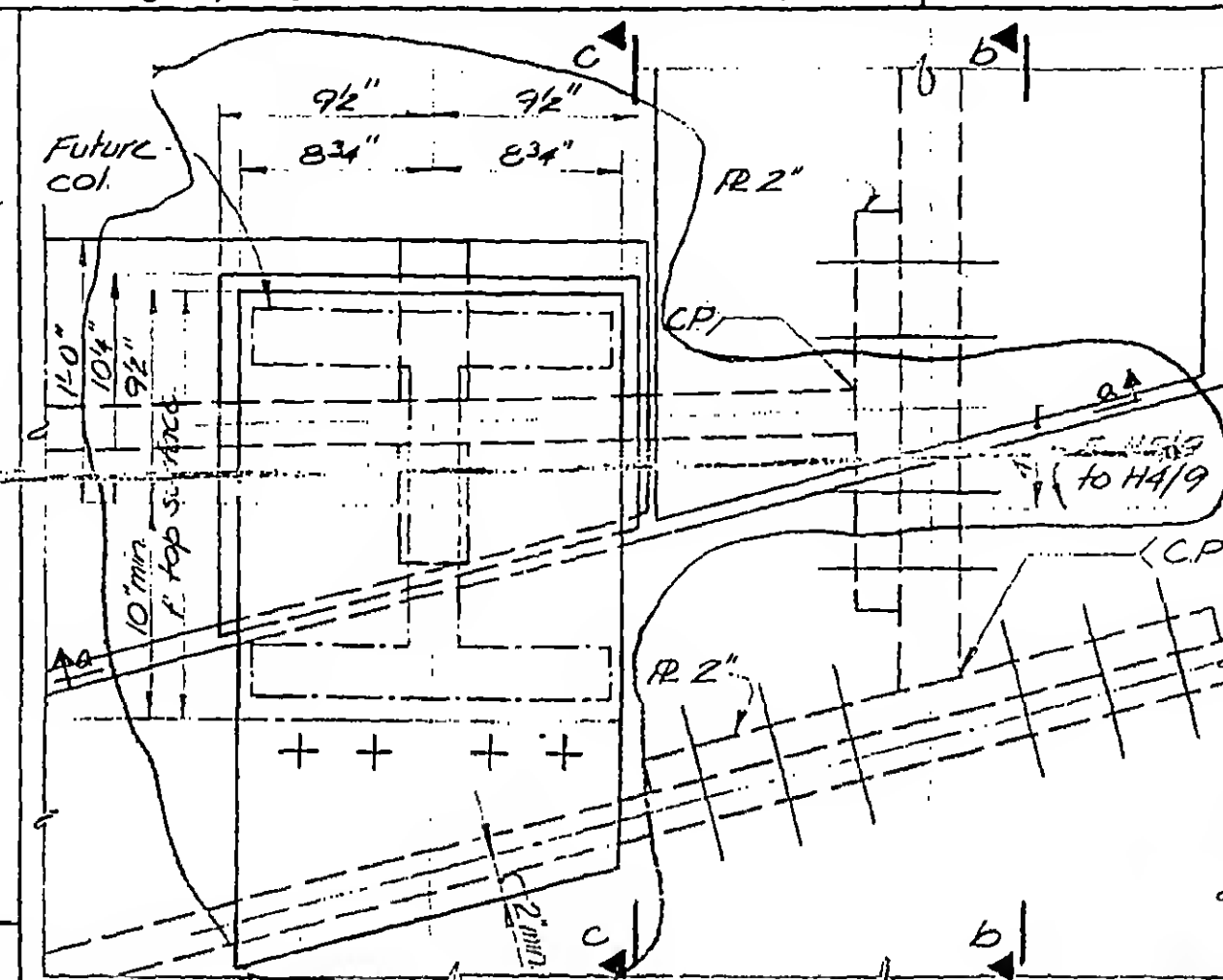
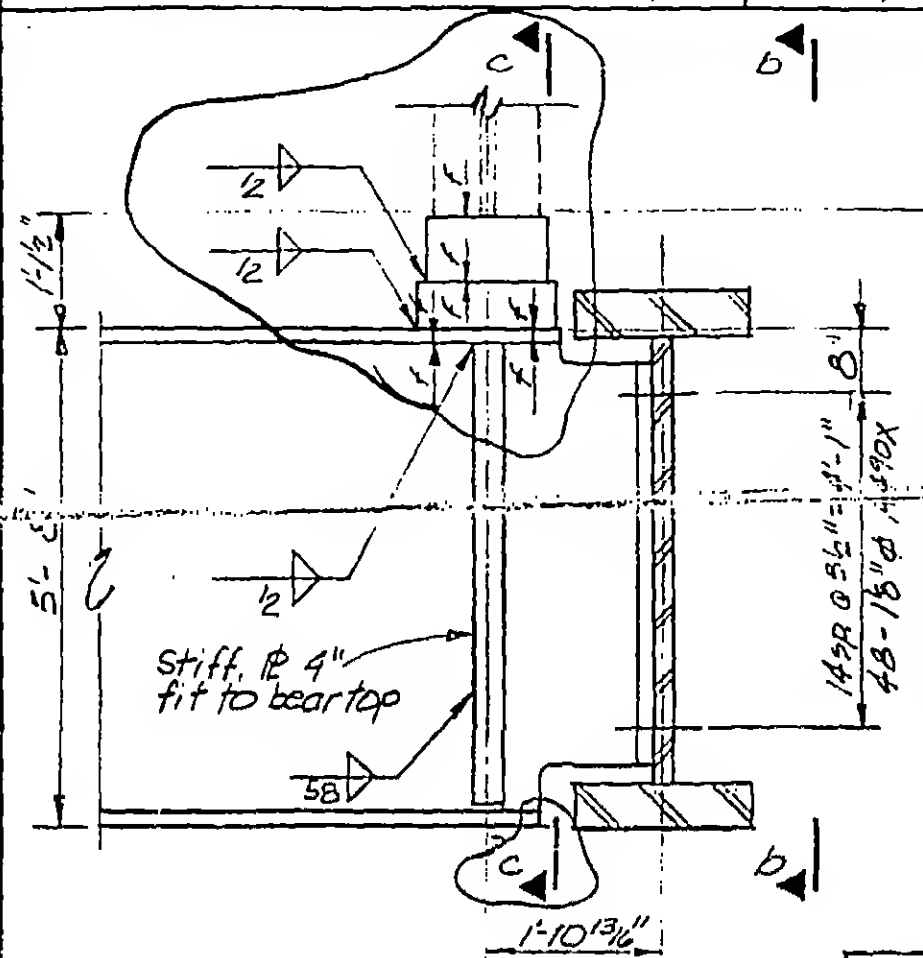
TITLE GIRDER DETAILS AT FUTURE COLS.

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REVISIONS

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6-20-73R



4x1/8" φ
A 490 F
Note: these bolts
to be torqued
before torquing
bolts in web
connection.

DESIGNED
K.C.DRAWN
P.M.O.REVIEWED
W.A.B.

13-K34-8

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

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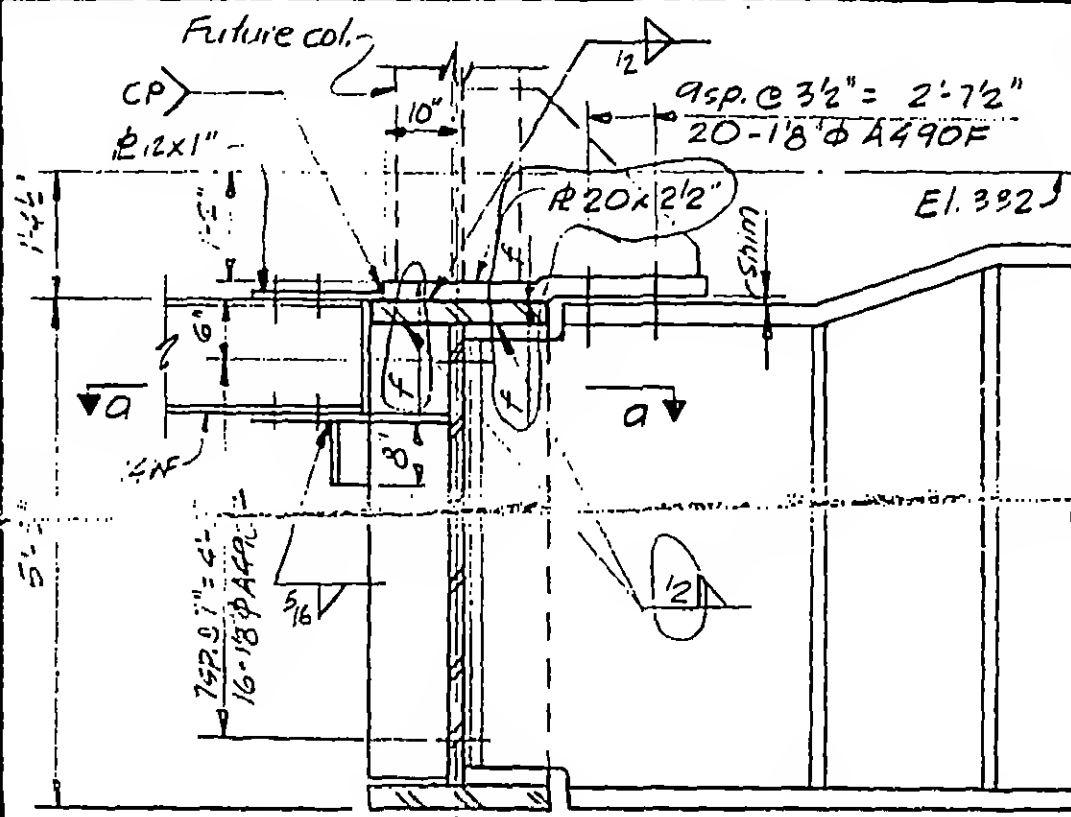
PROJECT THE WORLD TRADE CENTER

TITLE GIRDER DETAILS AT FUTURE COLS.

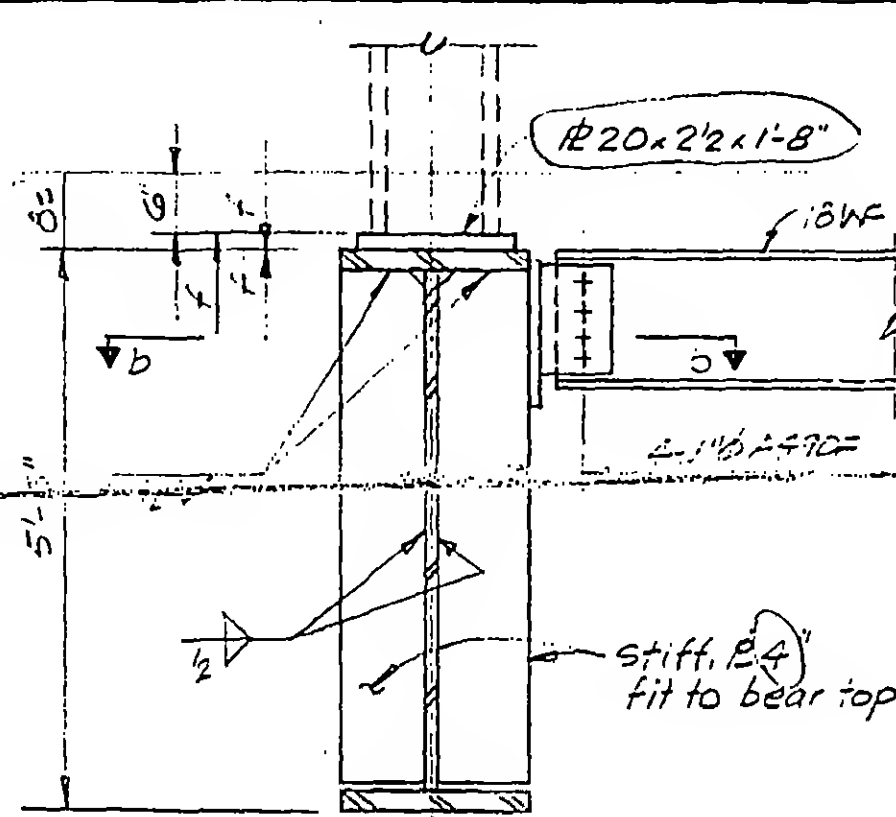
DATE 11-3-72

REVISIONS

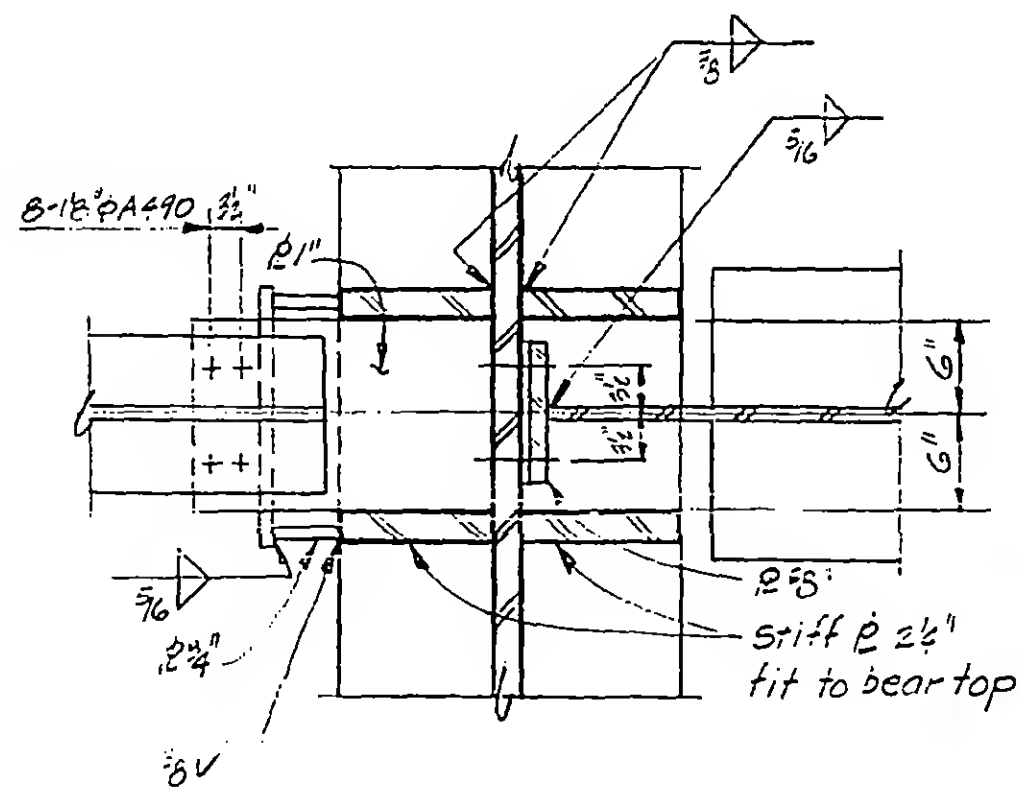
RELEASED FOR
CONSTRUCTION
11-24-72



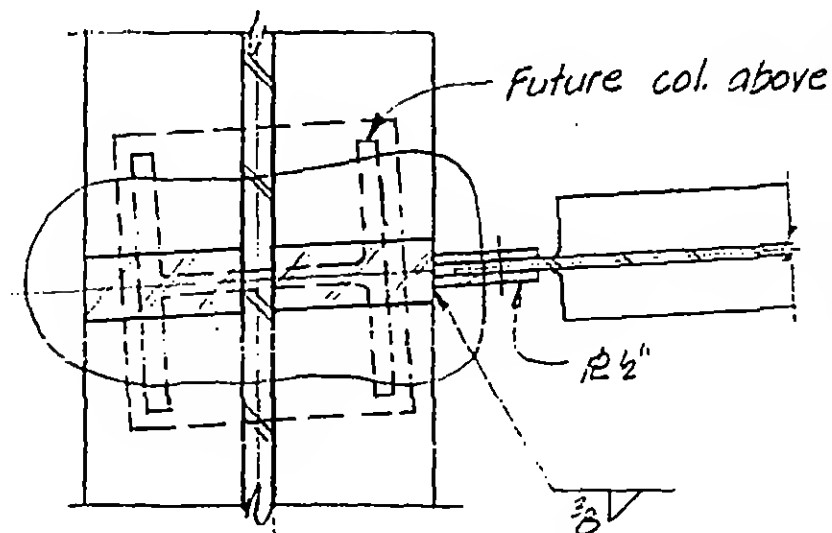
A



B



a



b



DESIGNED

DRAWN

REVIEWED

13-K3.A-9

2, 13-K3.A-9

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER

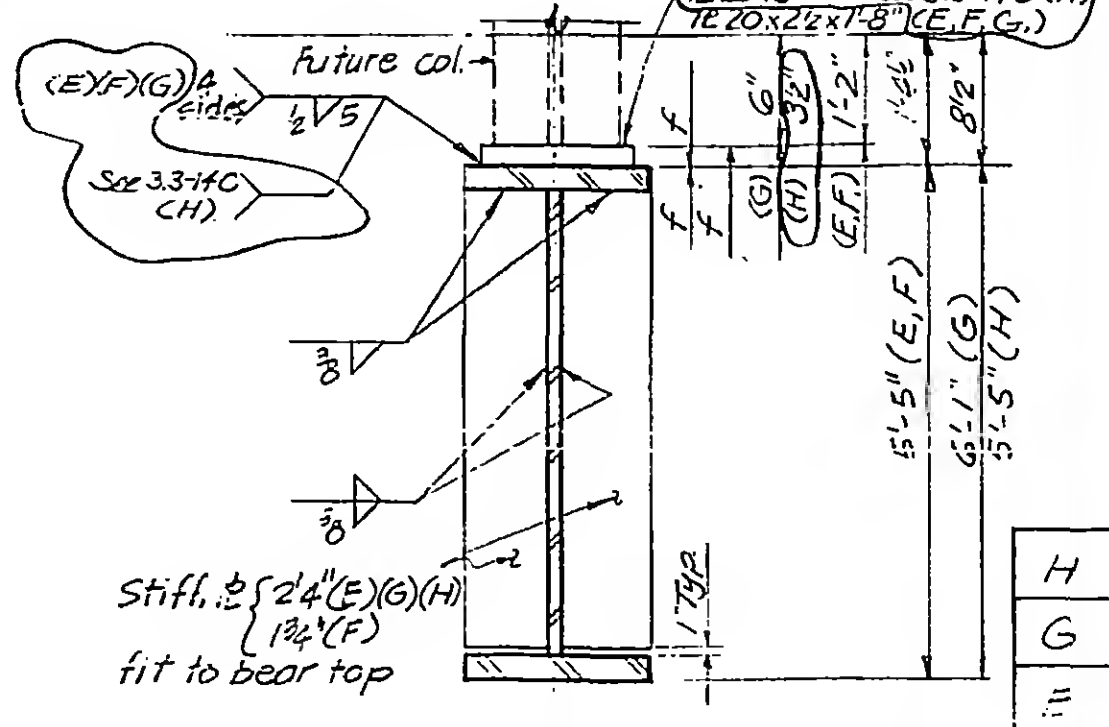
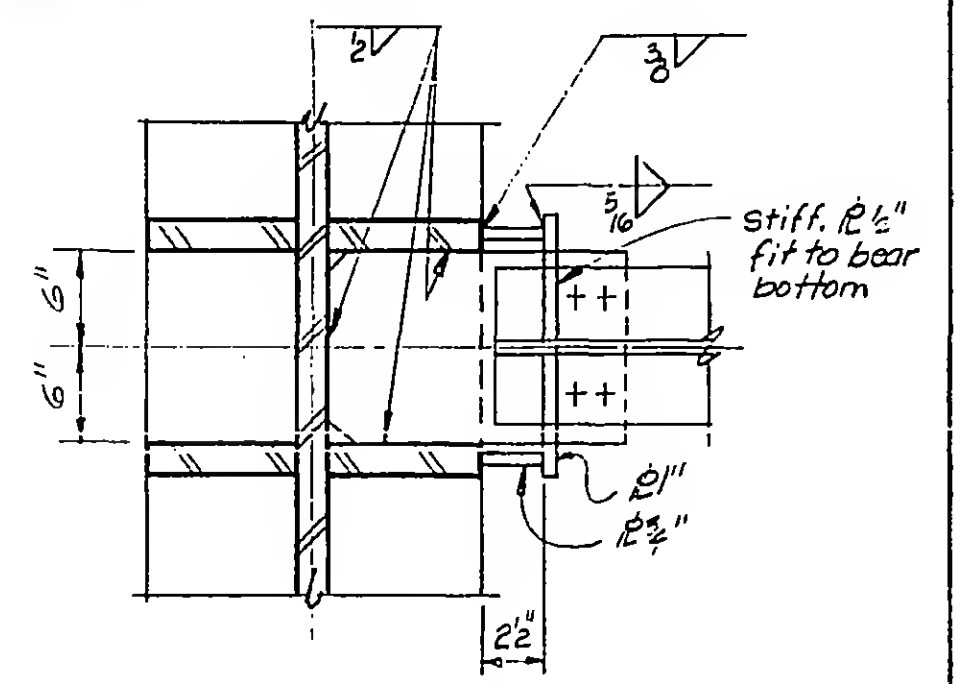
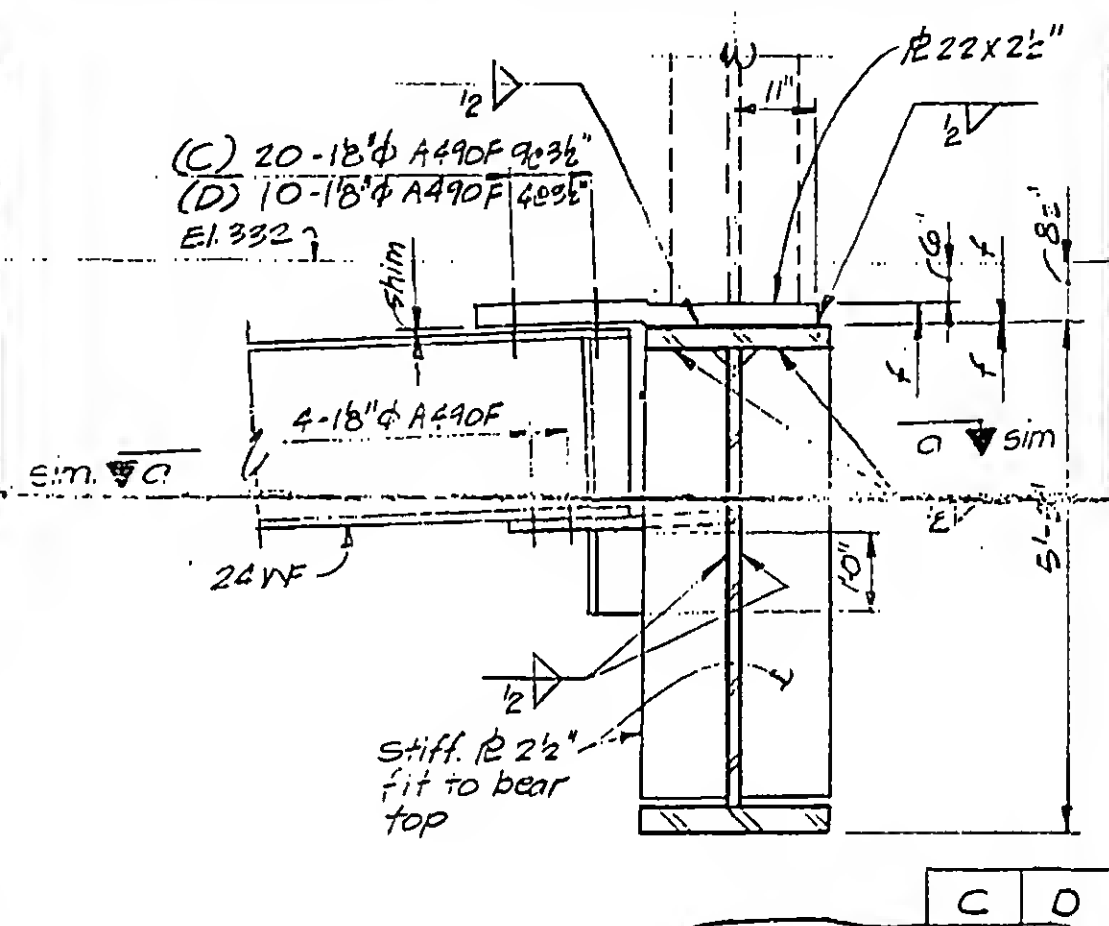
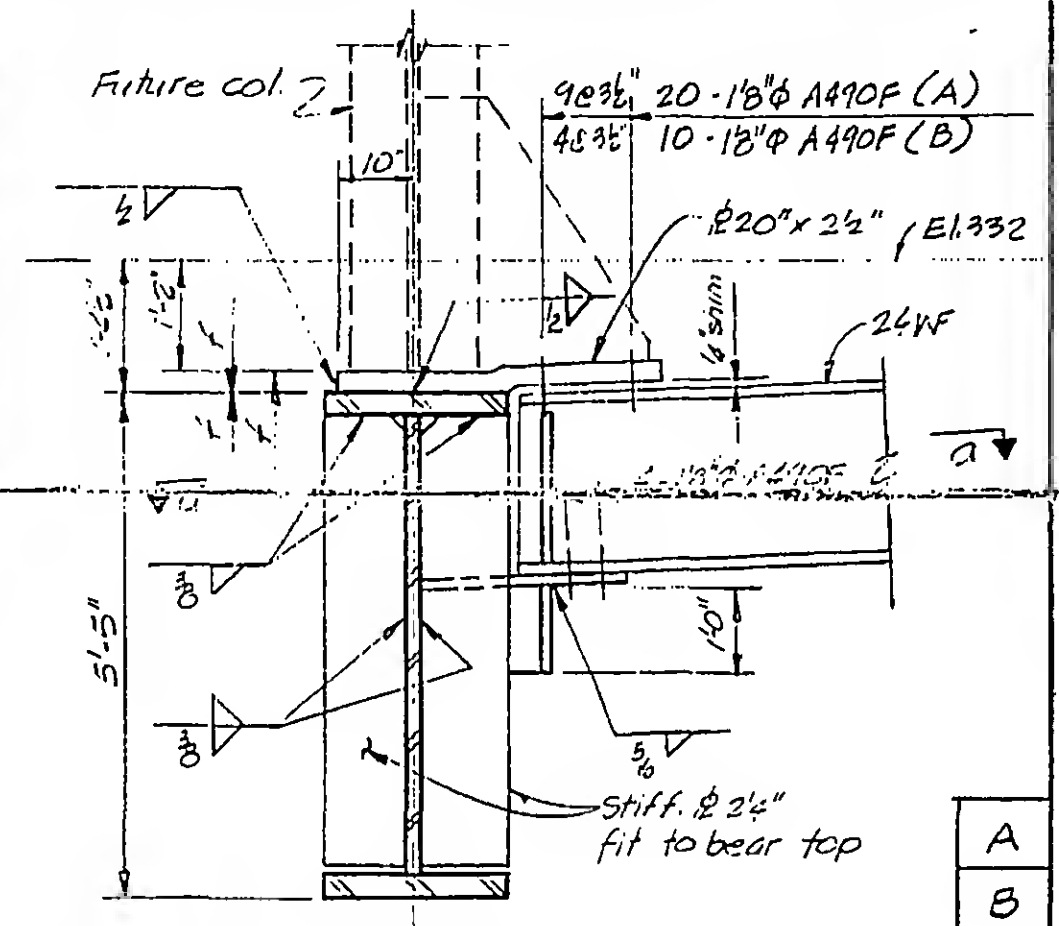
TITLE GIRDER DETAILS AT FUTURE COLUMNS

DATE 11-3-72

REVISIONS

RELEASED FOR
CONSTRUCTION
11-24-72

6-4-73



1043-L.2

Structural & Civil Engineers

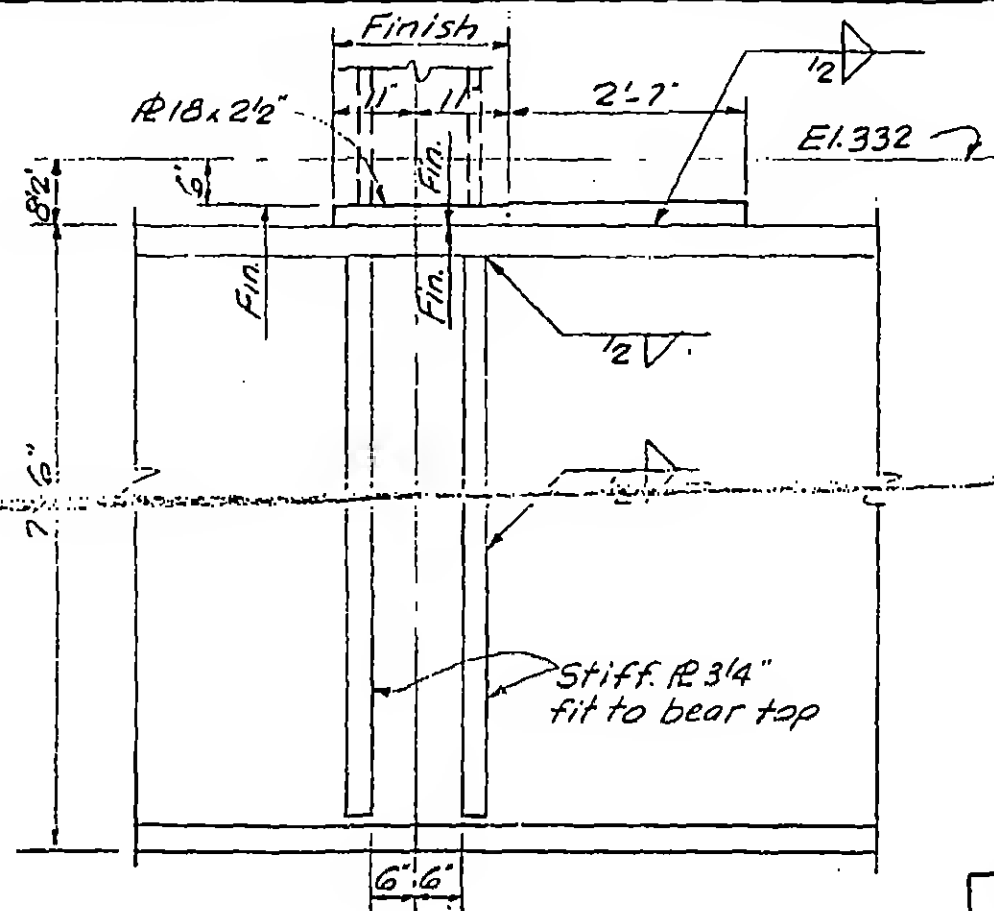
PROJECT THE WORLD TRADE CENTER

TITLE	GIRDER CONN. AT FUTURE COLUMNS
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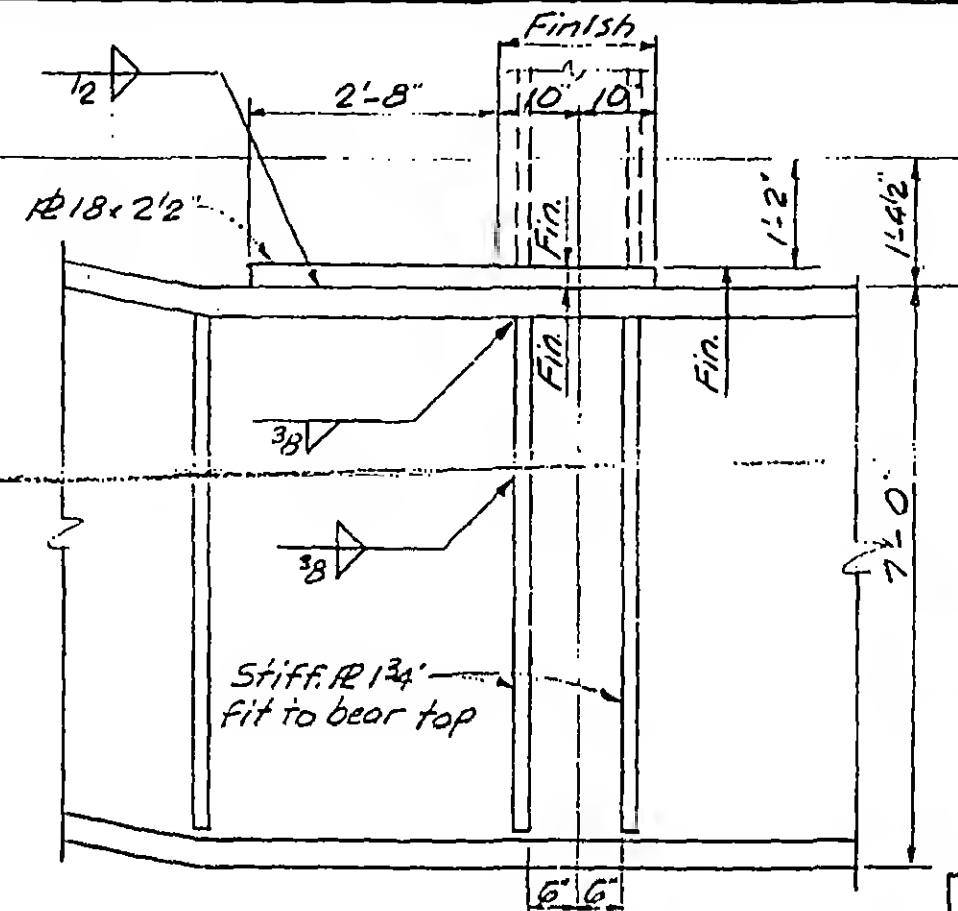
DATE 11-3-72

REVISIONS

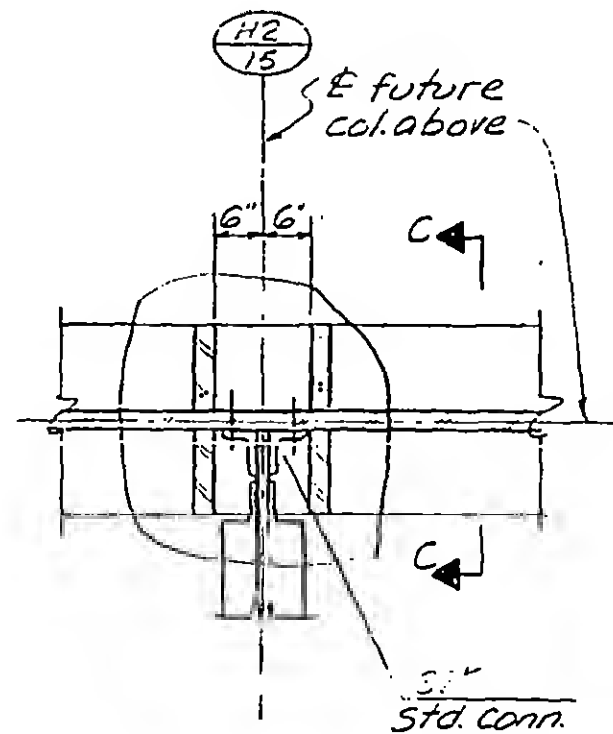
RELEASED FOR
CONSTRUCTION
11-24-72



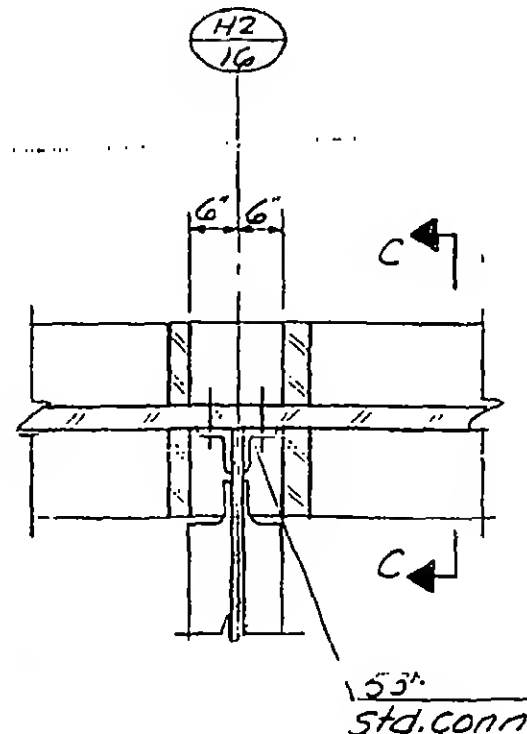
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E

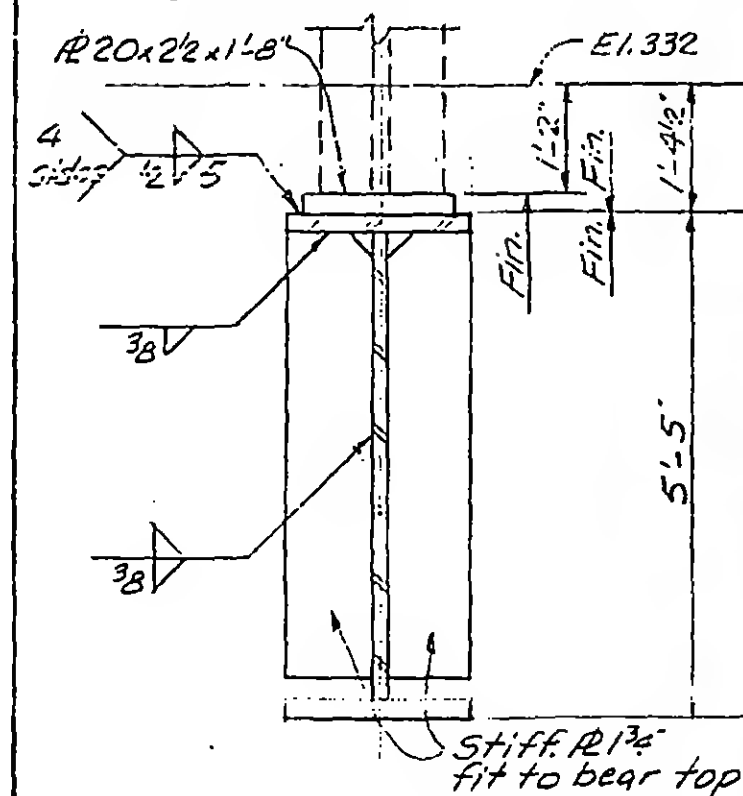


C

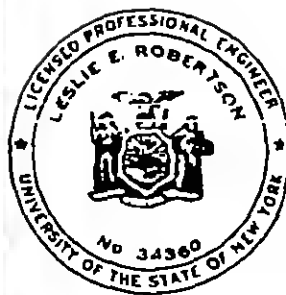


□

C



13-K3.4-11



DESIGNED

DRAWN
A.L. Frangui

REVIEWED

Structural & Civil Engineers

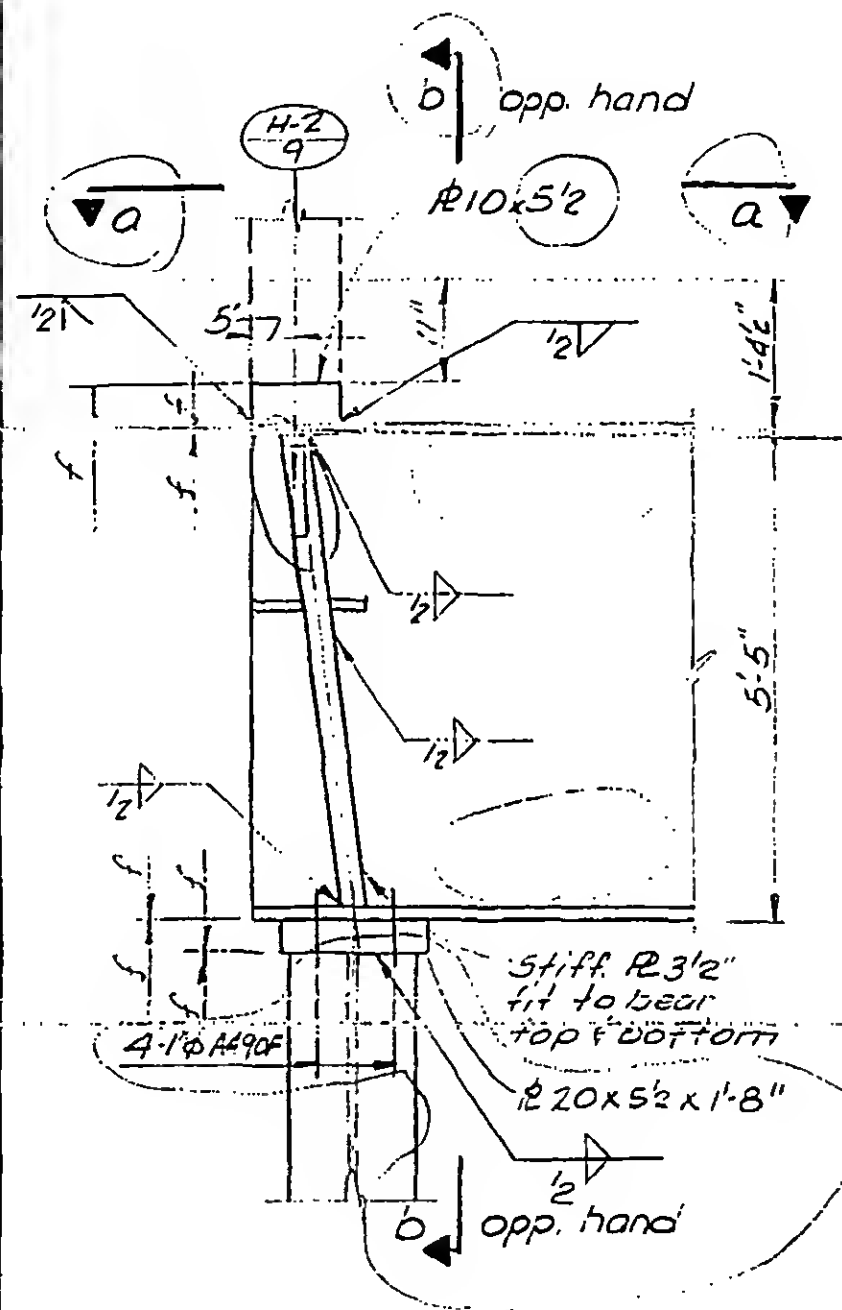
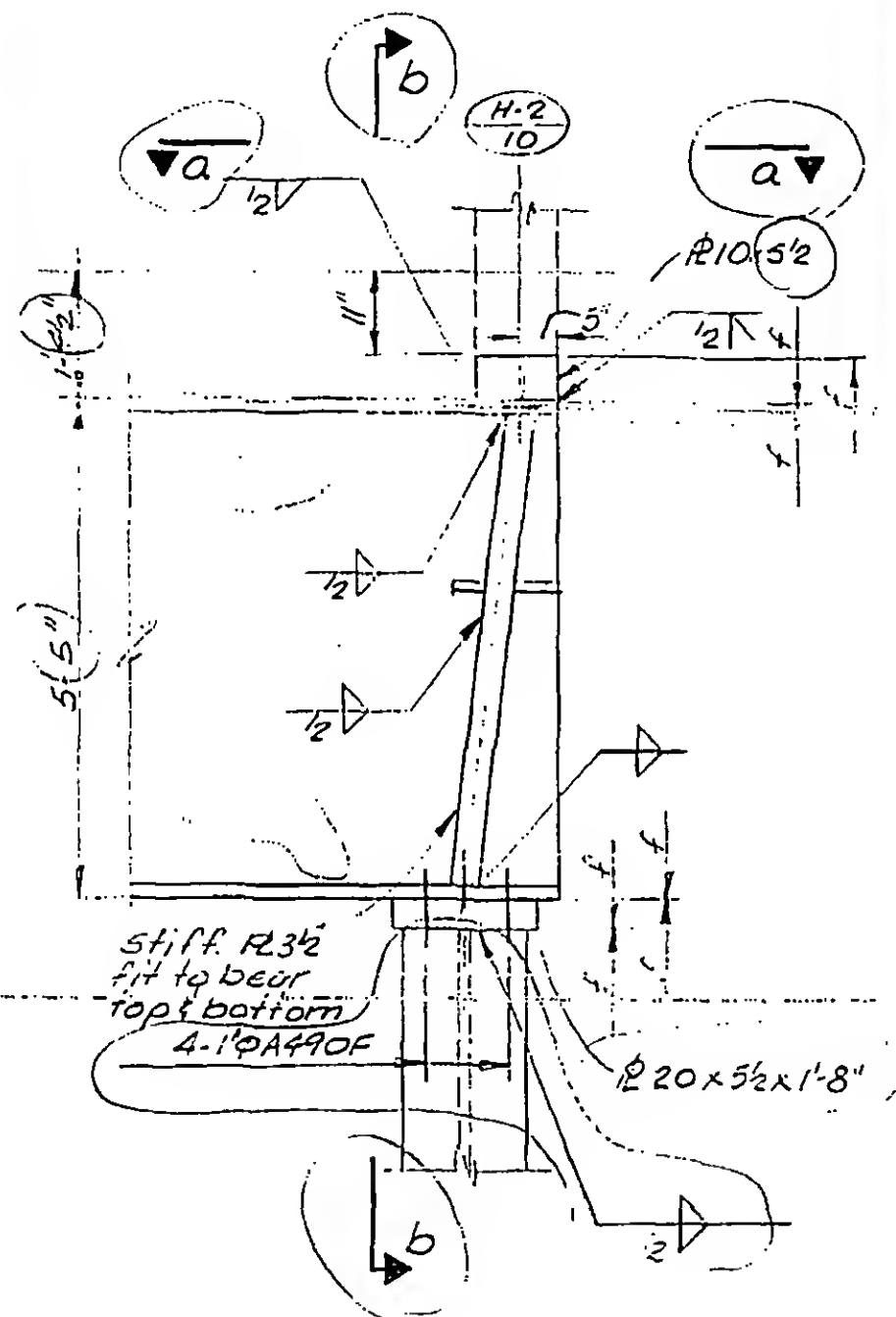
PROJECT *THE WORLD TRADE CENTER*

TITLE GIRDER DETAILS AT FUTURE COLUMNS

DATE 11-3-72

REVISIONS

Released for
construction
11-24-72



DESIGNED

DRAWN

REVIEWED

A

B

13-K3.4-12.1

SKILLING, HELLE. CHRISTIANSEN, ROBERTSON

Structural & Civil Engineers

PROJECT

THE WORLD TRADE CENTER

TITLE

GIRDER DETAILS AT FUTURE COLUMNS

DATE

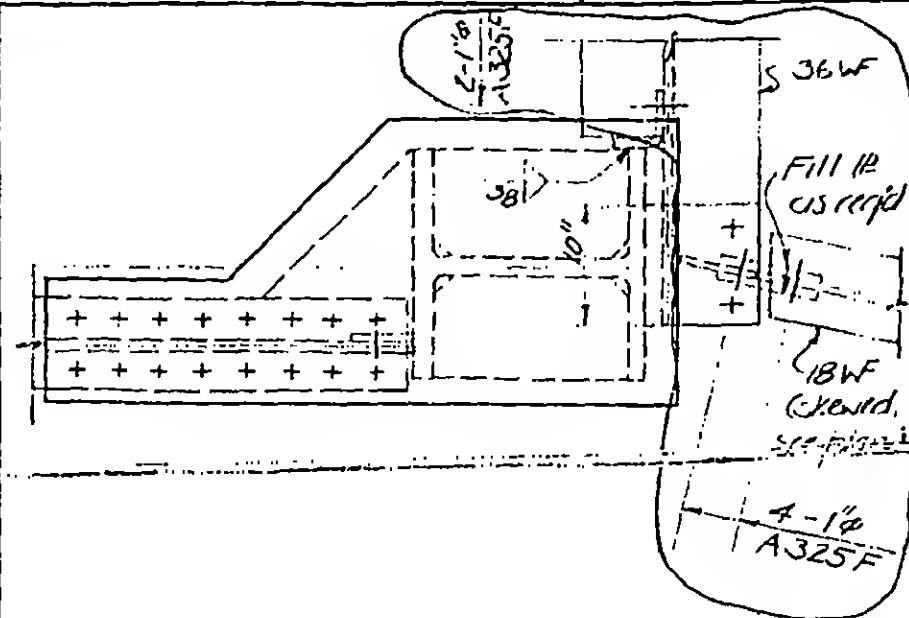
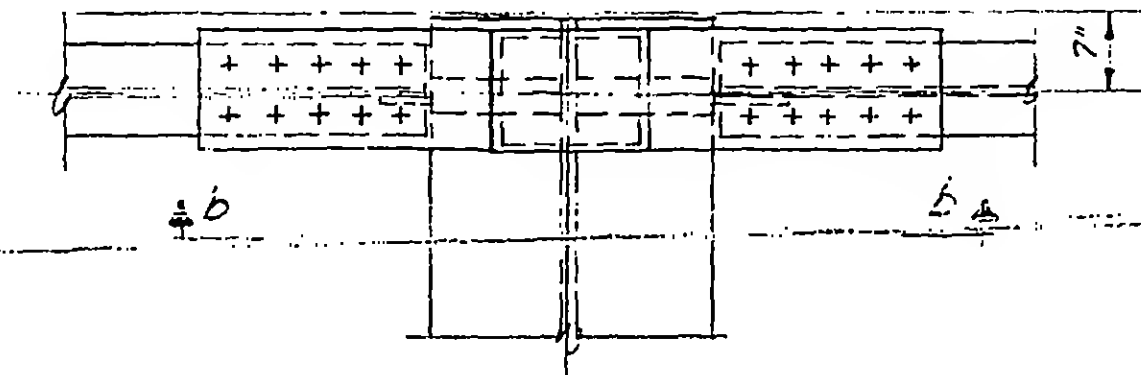
11-24-72

REVISIONS

Released for
construction

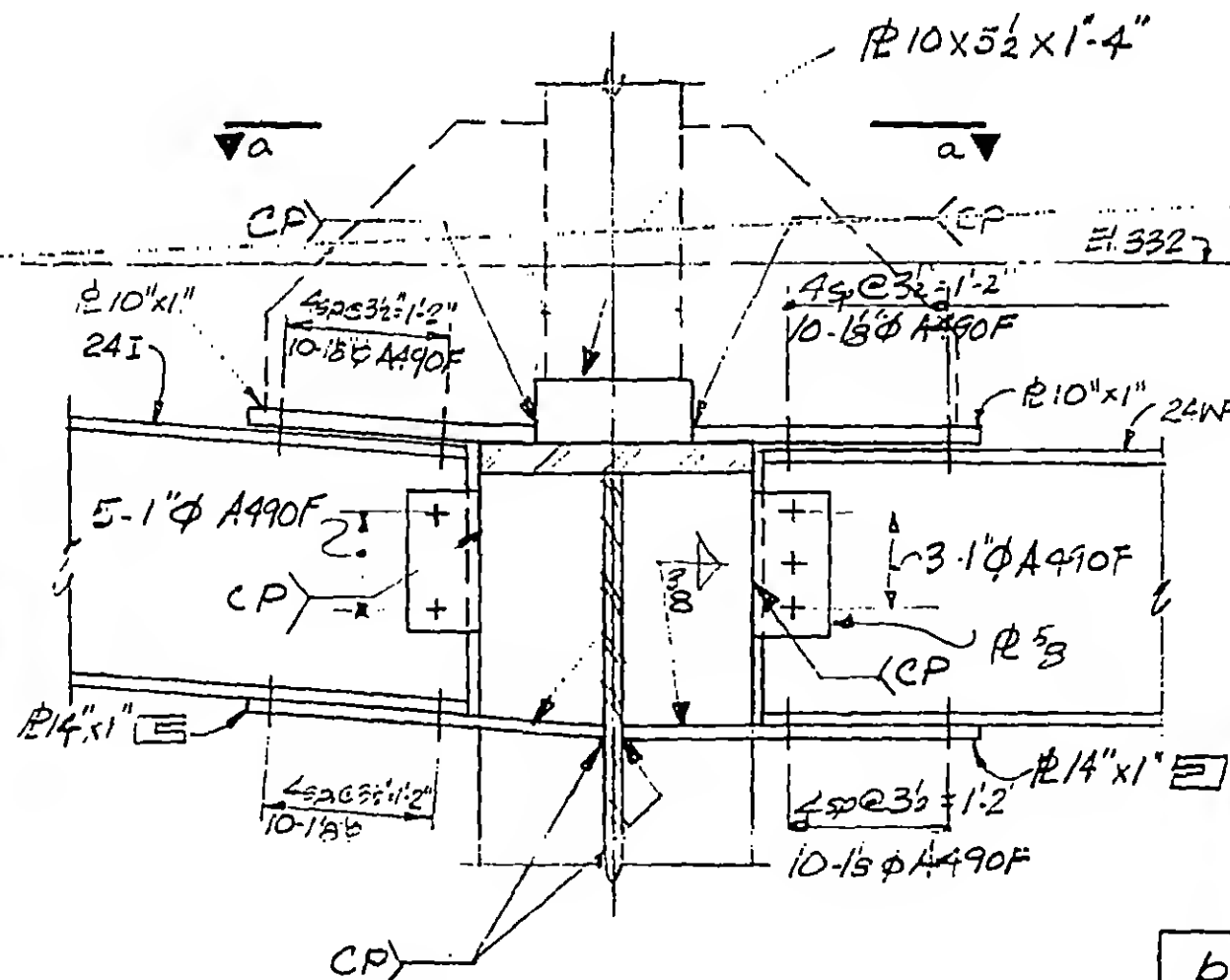
11-24-72

6-4-73



a

c



El. 332

c

Tsp @ 3/2" = 2'-0 1/2"

15-7/8" A490F

R 22"

Stiff R 1/2
Fit to DEEP
bot.

Fill as req'd R 8"

3-1/8" A490F

24WF

12 1"

4-1/8" 3/2" A490F

38"

18WF

L 4 x 3/2 x 3/8

21"

CP

R 1"

L 3/2" A325F

1"

5/8"

1/4"

Fit to DEEP

bot.

13-K3.4-12.2

b

c



DESIGNED

DRAWN

REVIEWED

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER

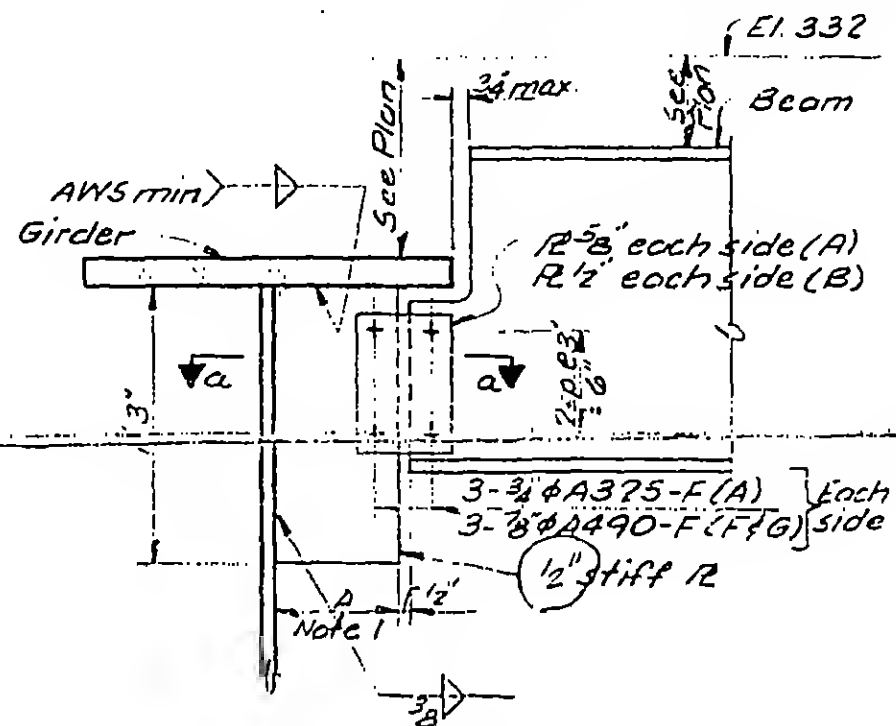
TITLE BEAM CONNECTIONS AT GIRDER

DATE 11-3-72

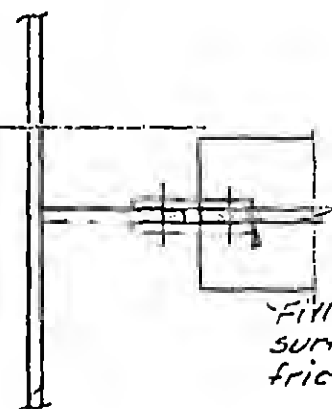
REVISIONS

RELEASE FOR
CONSTRUCTION
11-20-72

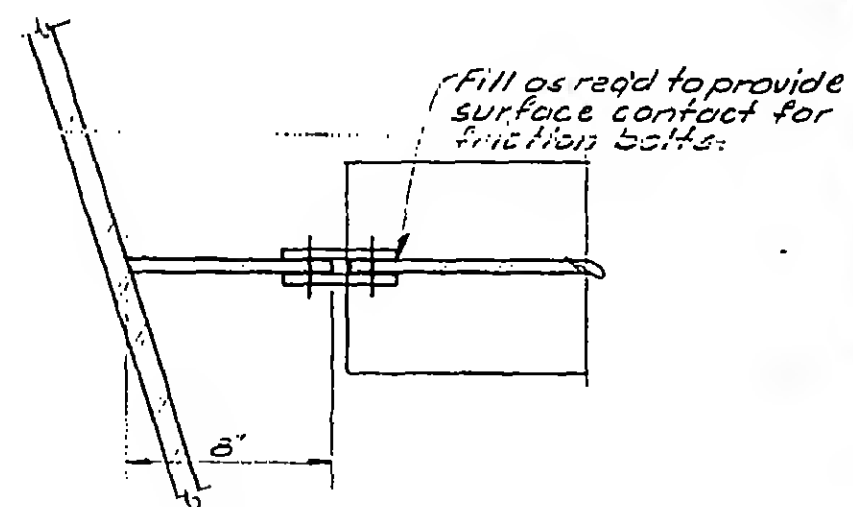
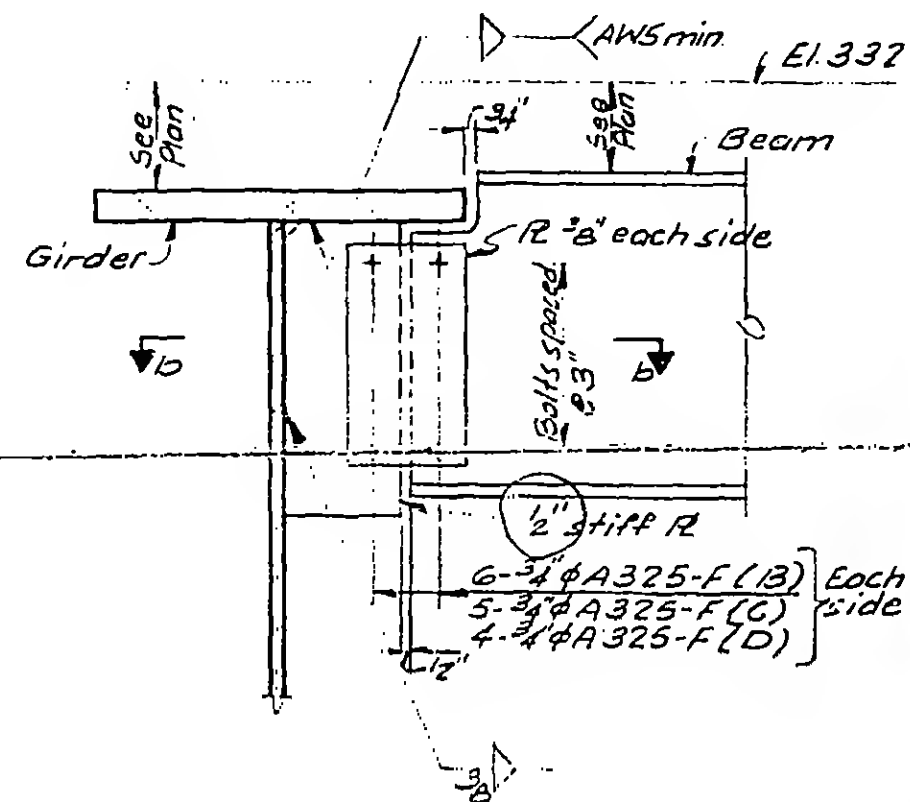
2-5-73



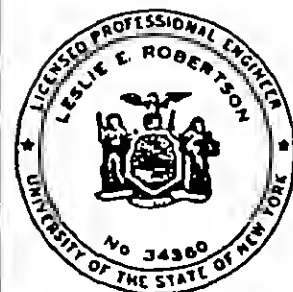
Note 1

Dim A = 8 or 1/2 of girder flange width,
whichever is smaller.

Section a-a



Section b-b



DESIGNED

DRAWN

J. H. Roberts

REVIEWED

F	B
G	C
	D

13-K3.5-1

Structural & Civil Engineers

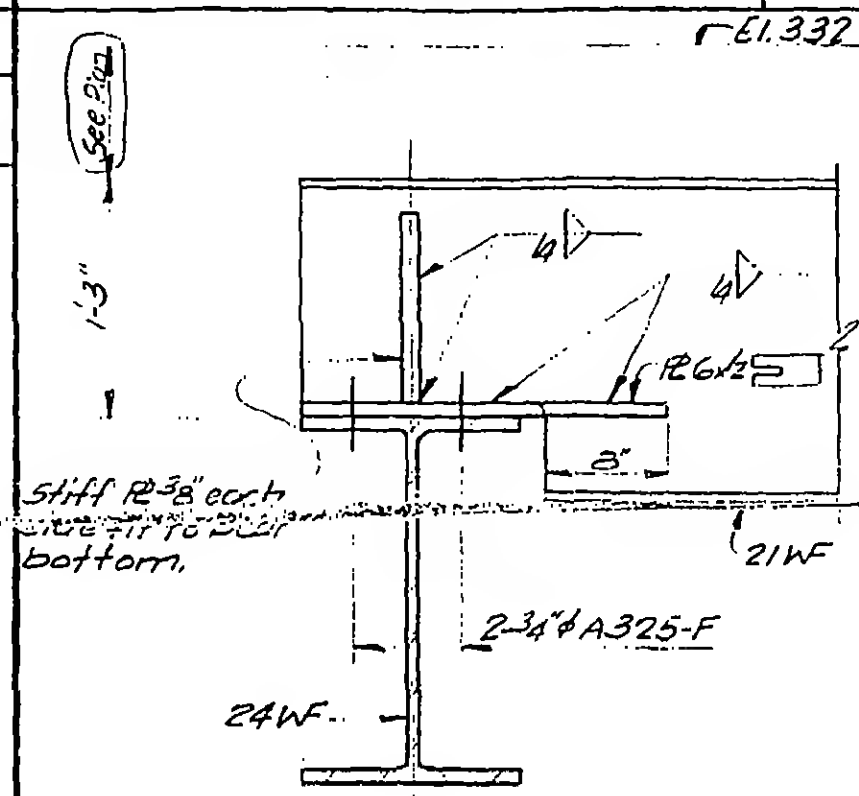
PROJECT THE WORLD TRADE CENTER

TITLE BEAM CONNECTIONS AT GIRDERS

DATE 11-3-72

REVISIONS

RELEASE FOR
CONSTRUCTION
11-20-72

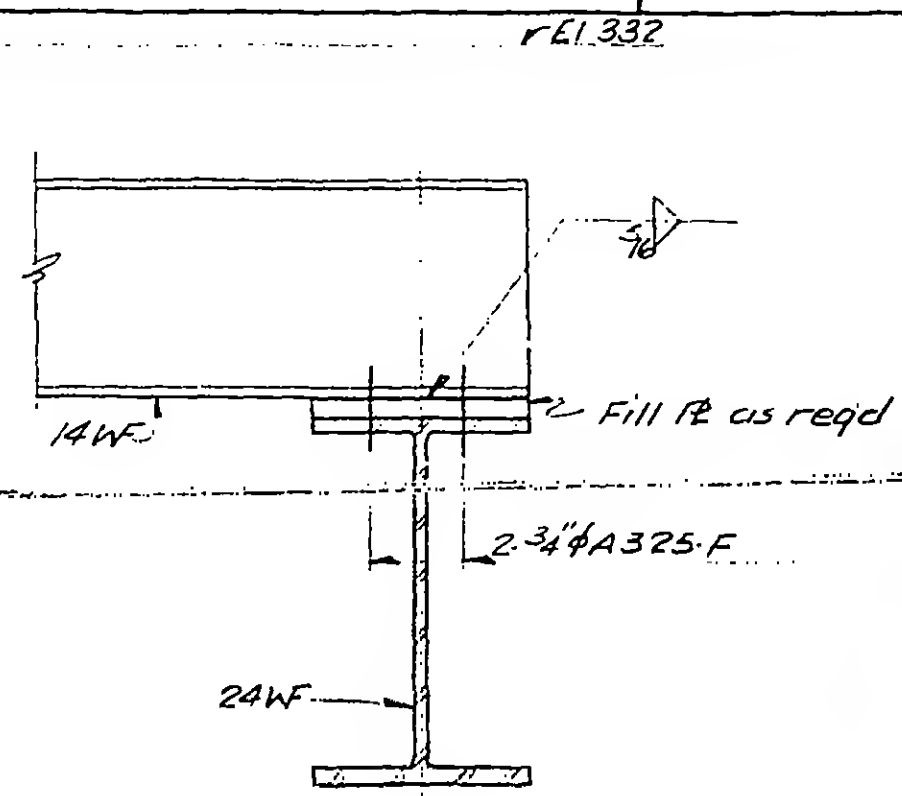


stiff 12-18" earth
above 10' to 20'
bottom.

21WF

2-34" ϕ A325-F

24WF..



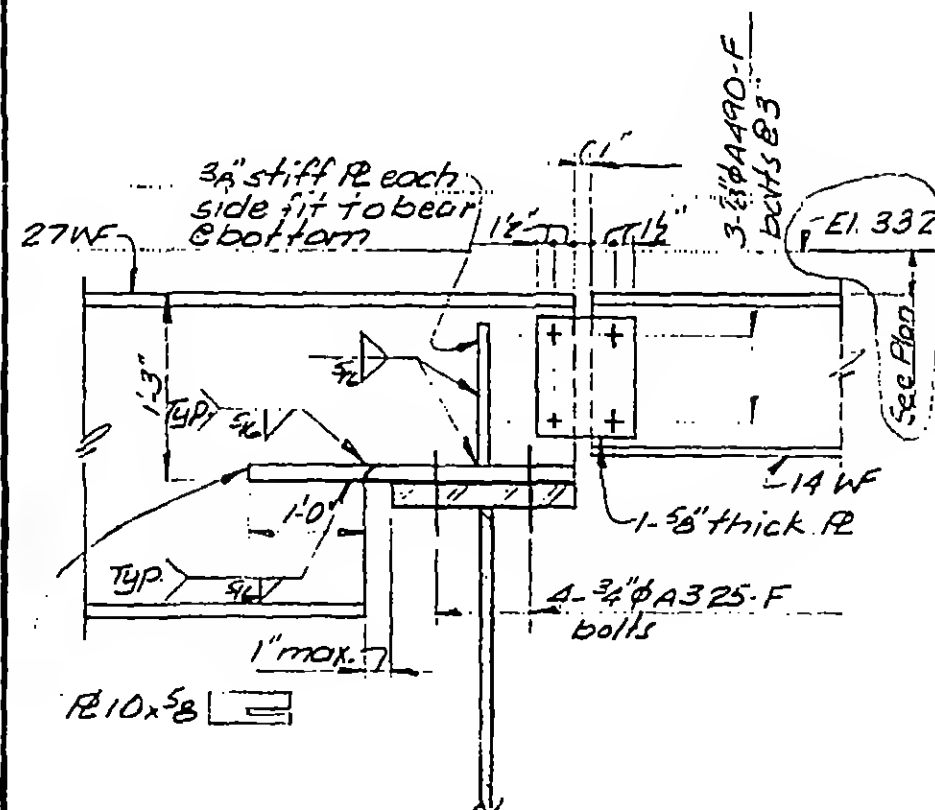
- Fill it as req'd

2. $3/4" \phi A325.F$

24WF.

۴

B



27WF 3" stiff R each
side fit to bear
bottom

3-236A490-F
b6vts03

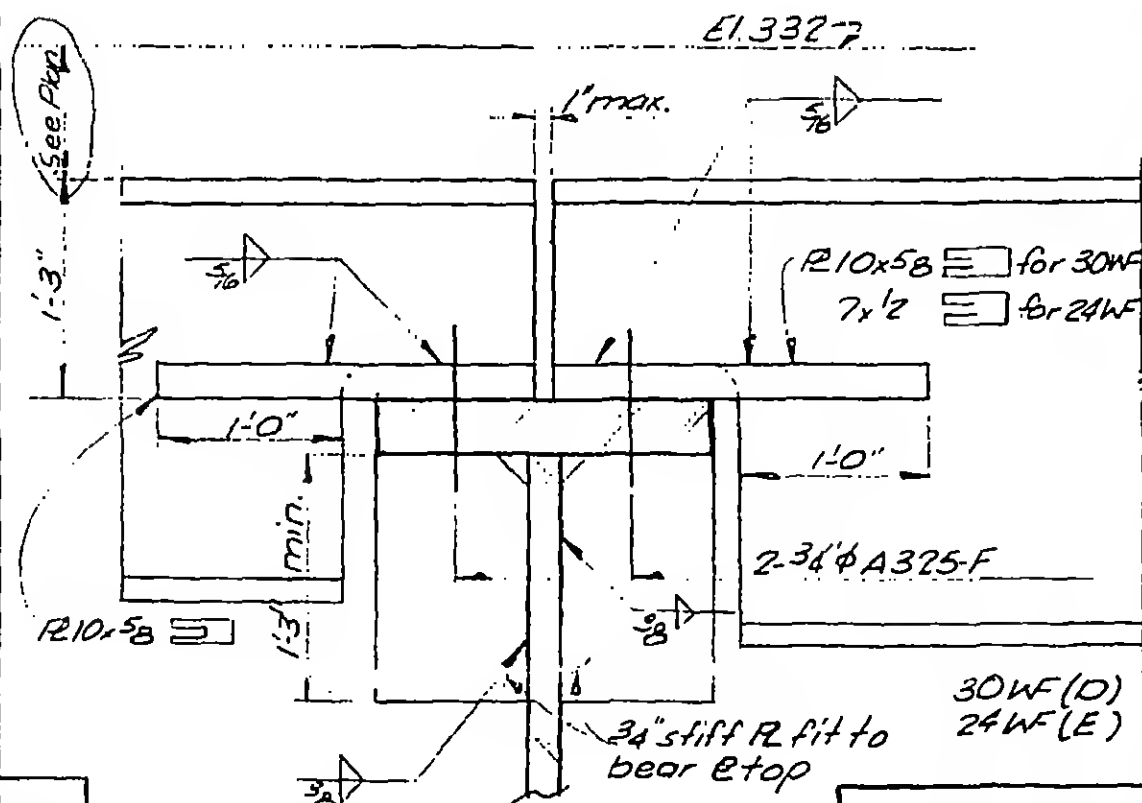
1-E

14 WF

-1-5" thick. R

4- $\frac{3}{4}$ " ϕ A325-F
bolts

$\varnothing 10 \times 5$



E1.332-7

$R_{10 \times 58} \equiv$ for 30W
 $7 \times \frac{1}{2} \equiv$ for 24W

7x1/2  for 24WF

7-34'φ 4325-F

30WF(D)

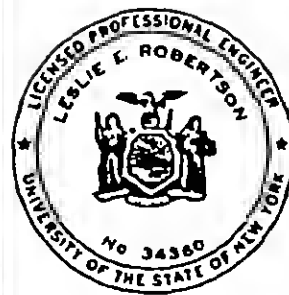
24 WF (E)

34" stiff R fit to
bear @ top

13-K3.5-2

C

5



DESIGNED

DRAW

TE

REVIEWED

Structural & Civil Engineers

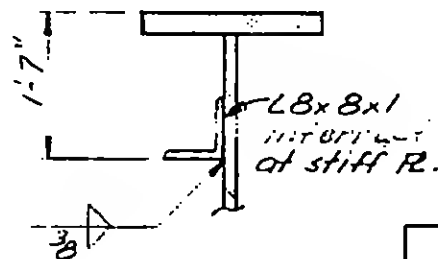
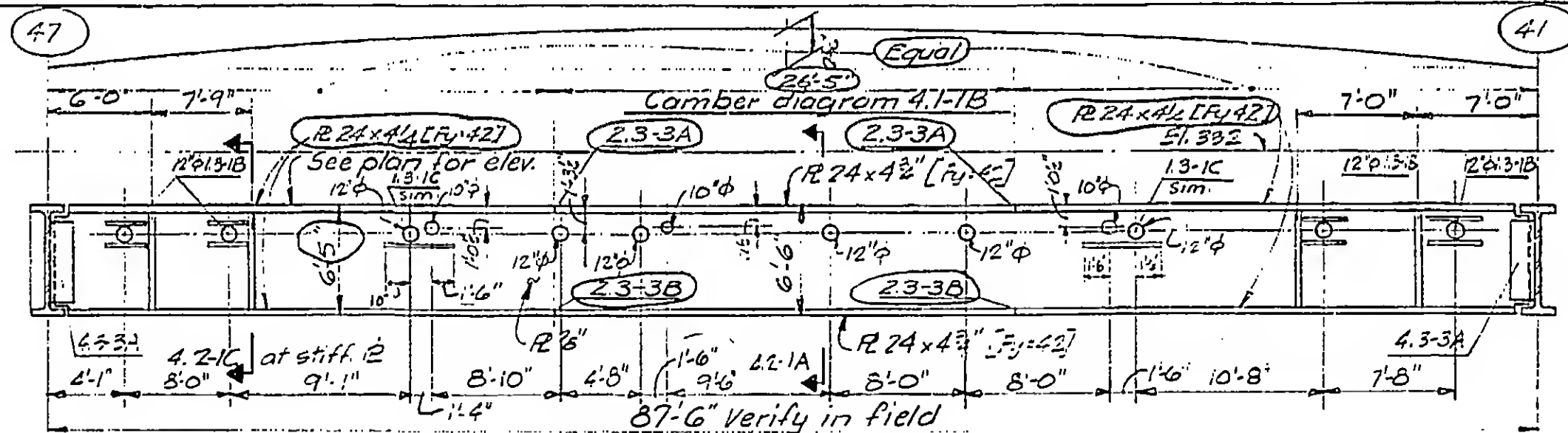
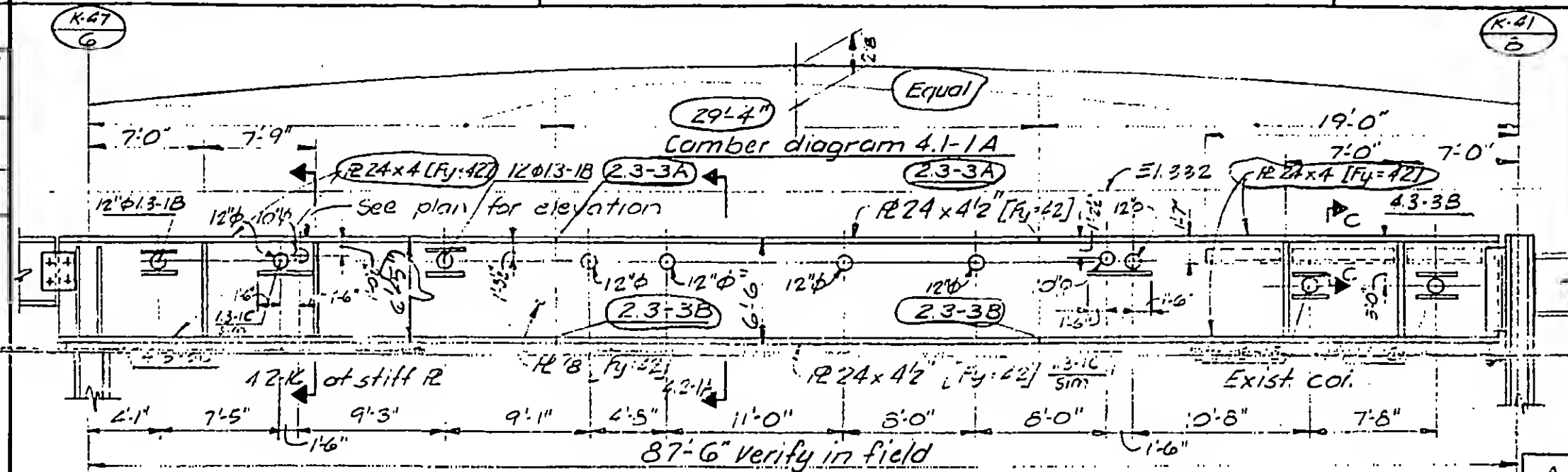
TITLE	BALLROOM GIRDER - ELEVATIONS
-------	------------------------------

DATE 11-3-72

RELEASE FOR
CONSTRUCTION
11-20-72

12-11-72

6-4-73



C

13-K 4.1-1



DESIGNED
WAB

DRAWN
TR

REVIEWED

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER

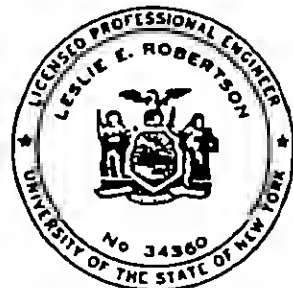
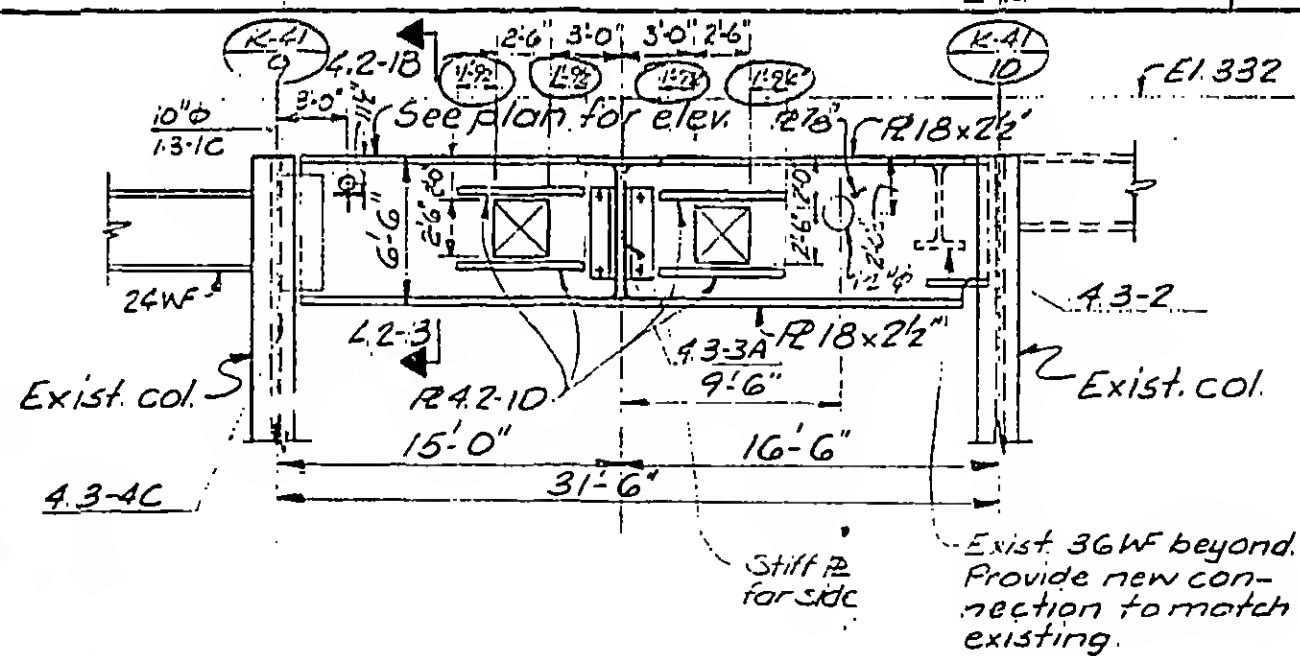
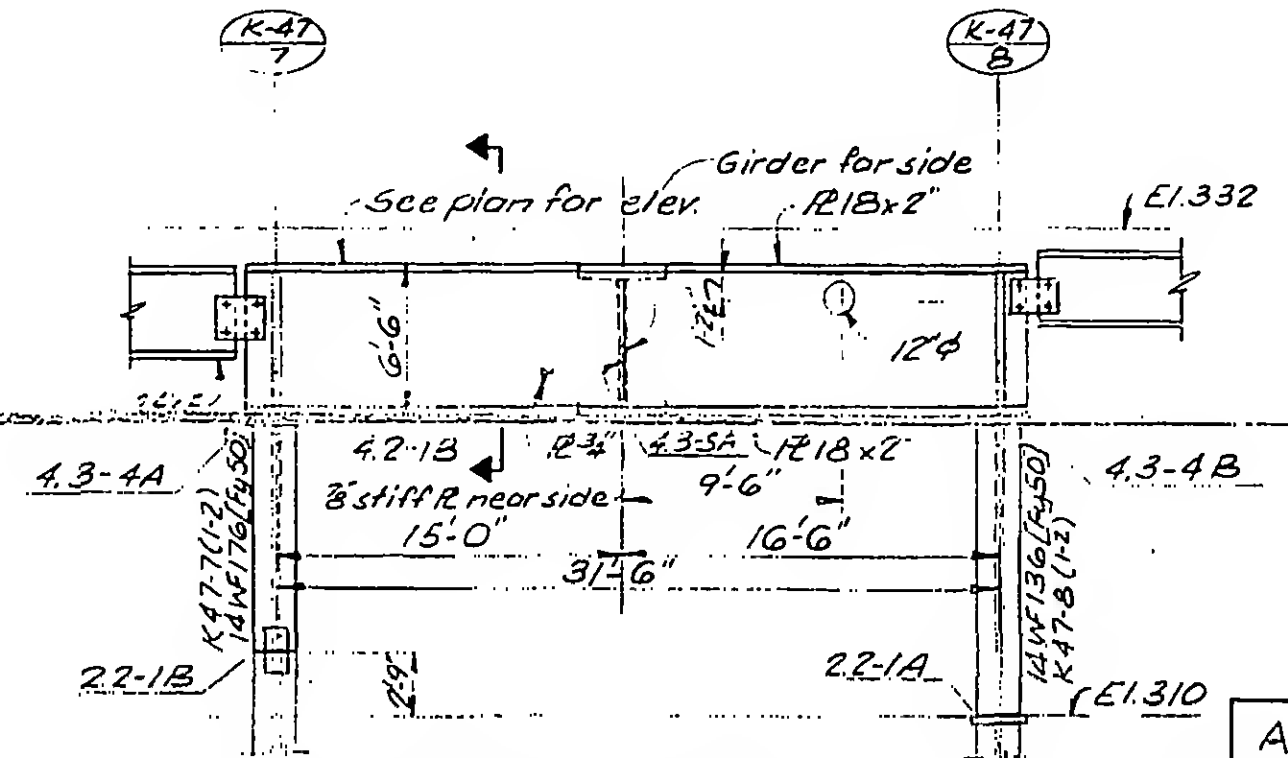
TITLE BALLROOM GIRDER - ELEVATIONS

DATE 11-3-72

REVISIONS

RELEASE FOR
CONSTRUCTION
11-20-72

6-4-73



DESIGNED

N.A.B.

DRAWN

TR

REVIEWED

13-K-4.1-2

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER

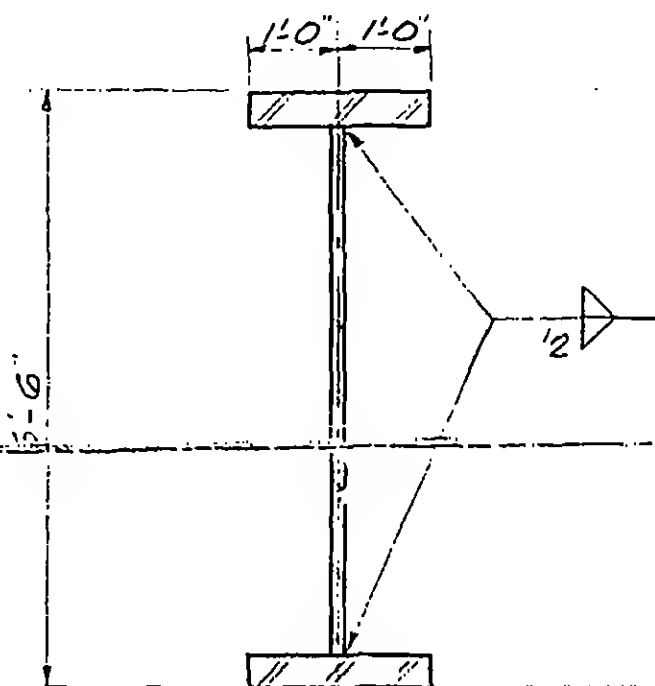
TITLE BALLROOM GIRDERS-TYPICAL DETAILS

DATE 11-3-72

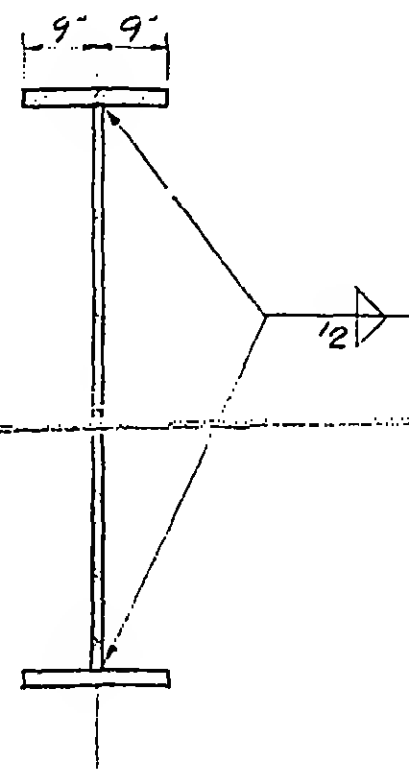
REVISIONS

RELEASE FOR
CONSTRUCTION
11-20-72

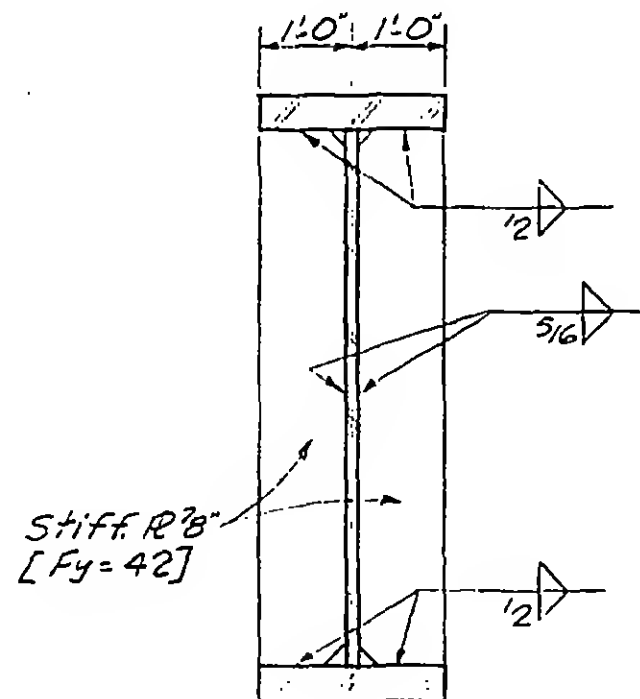
6-4-73



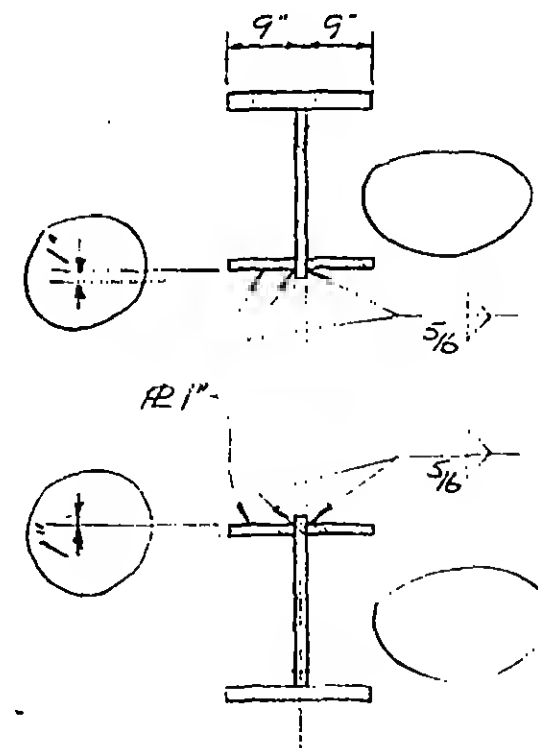
A



B



C



D

13-K4.2-1



DESIGNED

DRAWN
A.L. Franqui

REVIEWED

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

Structural & Civil Engineers

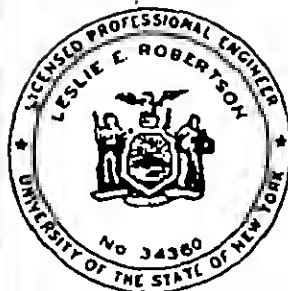
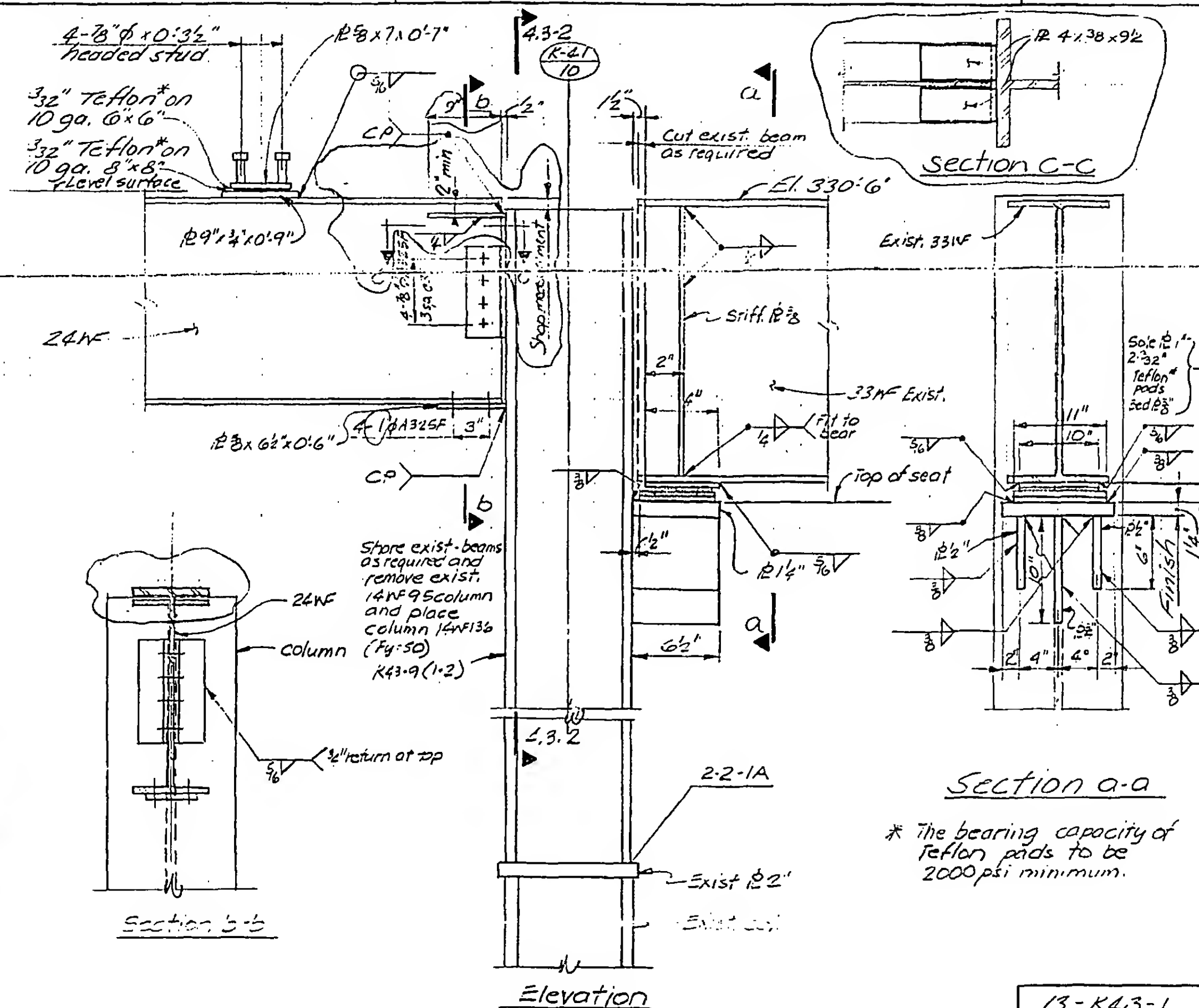
PROJECT THE WORLD TRADE CENTER

TITLE BALLROOM GIRDER - SLIDE CONNECTION

DATE 11-3-72

REVISIONS:

General
Revision
Released for
construction
11-24-72
3-21-73



DESIGNED

DRAWN

REVIEWED

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

Structural & Civil Engineers

PROJECT

THE WORLD TRADE CENTER

TITLE

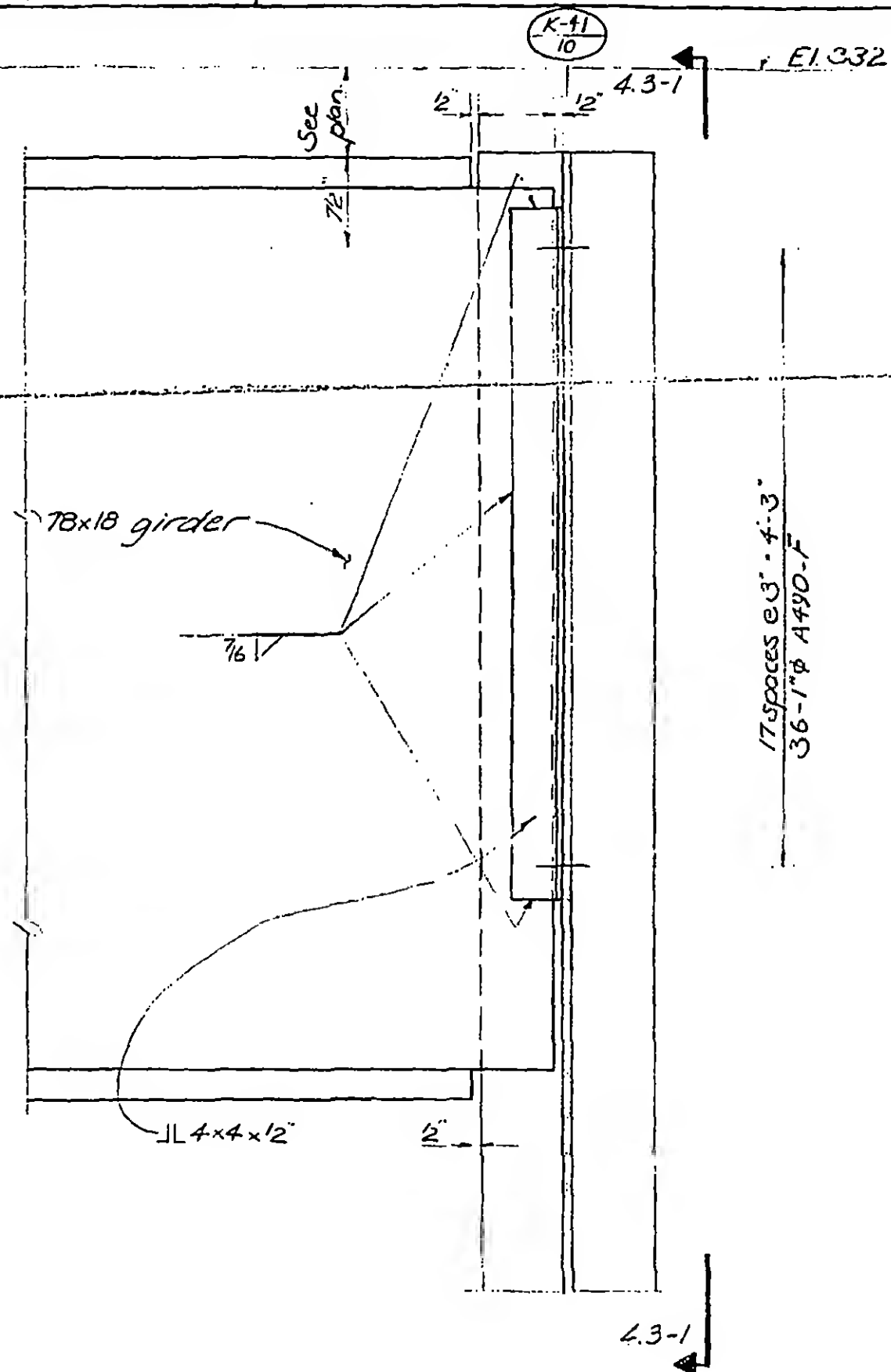
BALLROOM GIRDER - END CONNECTION

DATE

11-3-72

REVISIONS

General revision
released for
construction
11-24-72



DESIGNED

DRAWN

REVIEWED

13-K 4.3-2

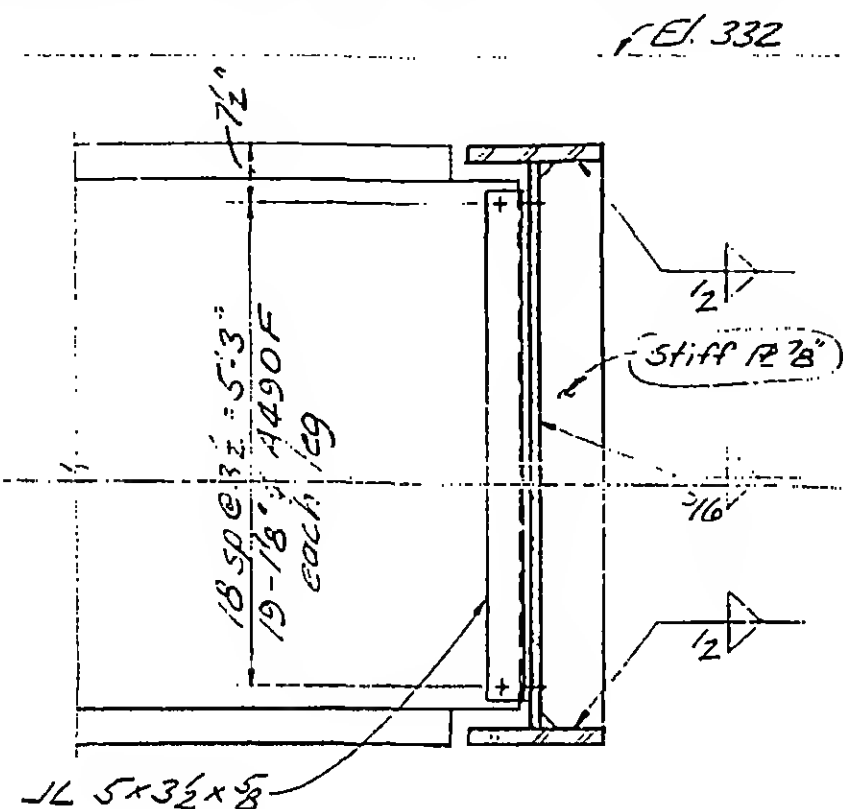
Structural & Civil Engineers

TITLE BALLROOM GIRDERS- END CONNECTIONS

DATE	11-3-72
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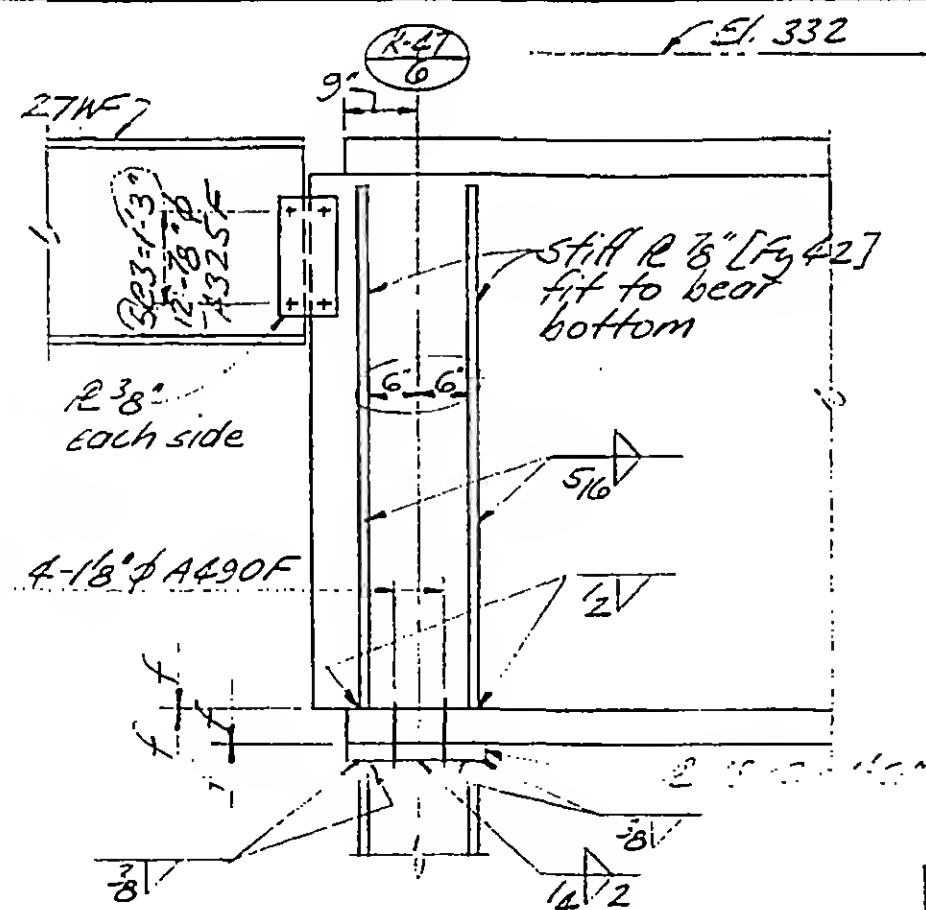
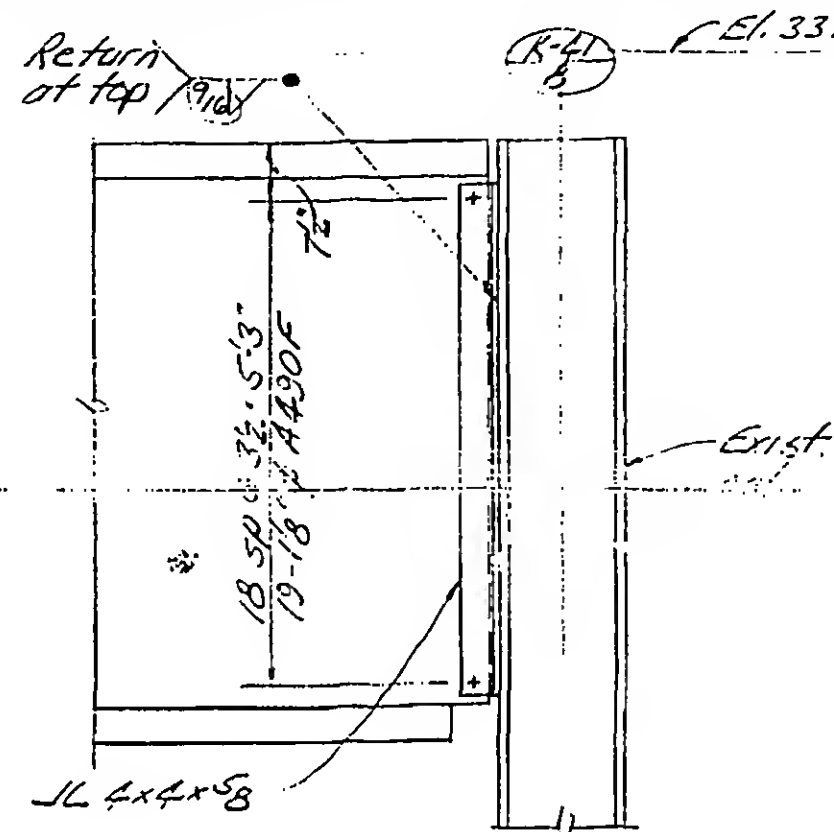
REVISIONS

RELEASE FOR
CONSTRUCTION
11-20-72



A

6



①

13-K4.3-3



DEFINITION

DRAWN

REVIEWS

SKILLING, HELLE. CHRISTIANSEN. ROBERTSON

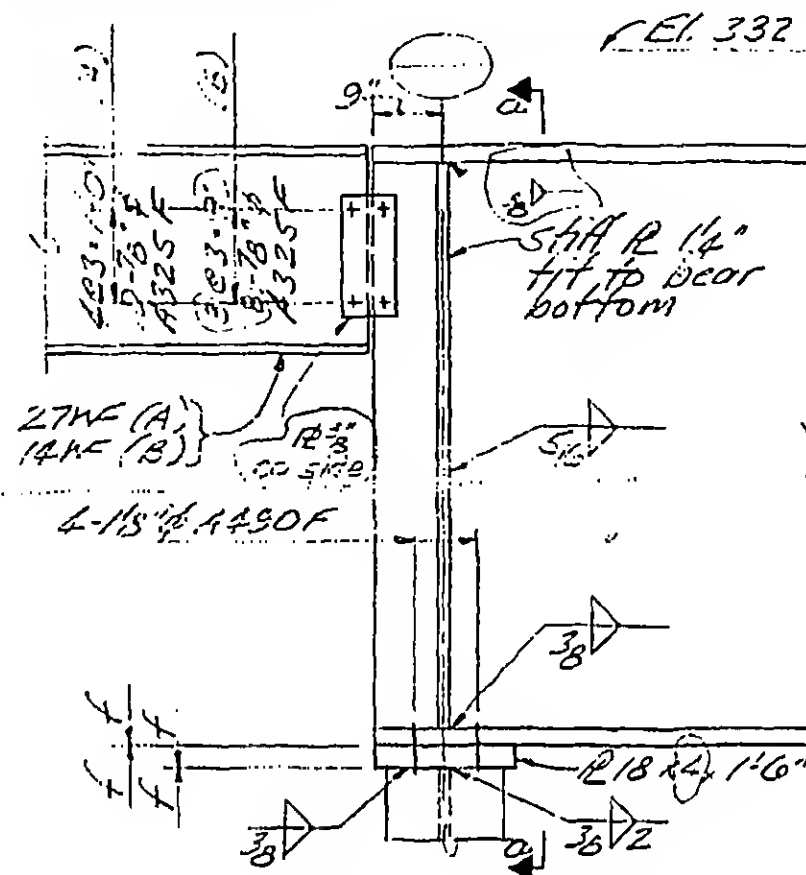
Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER

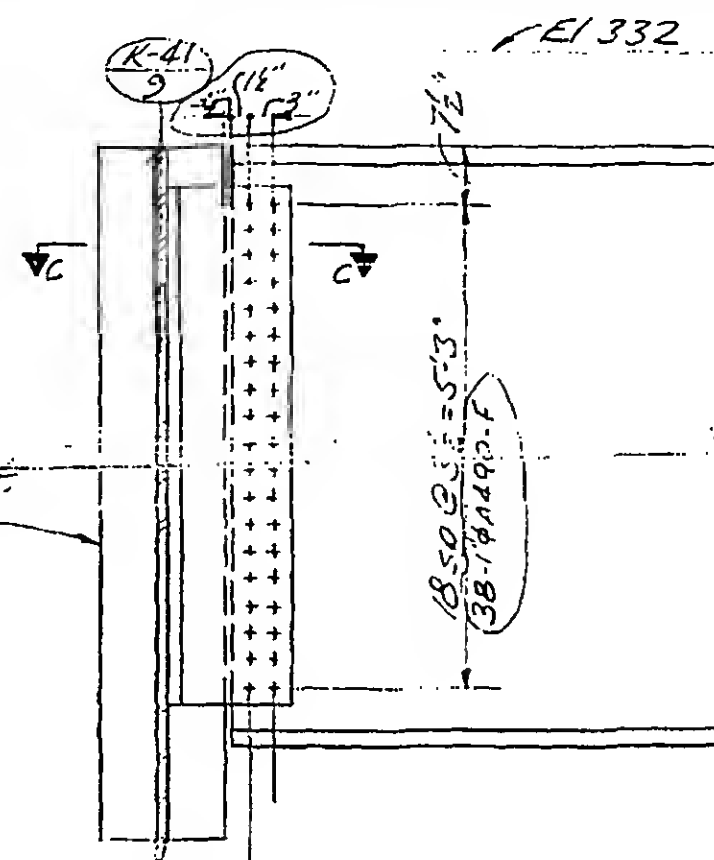
TITLE BALLROOM GIRDER END CONNECTION

DATE 11-3-72

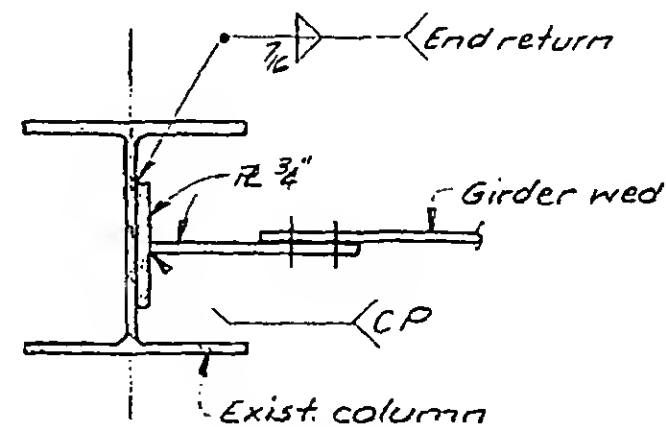
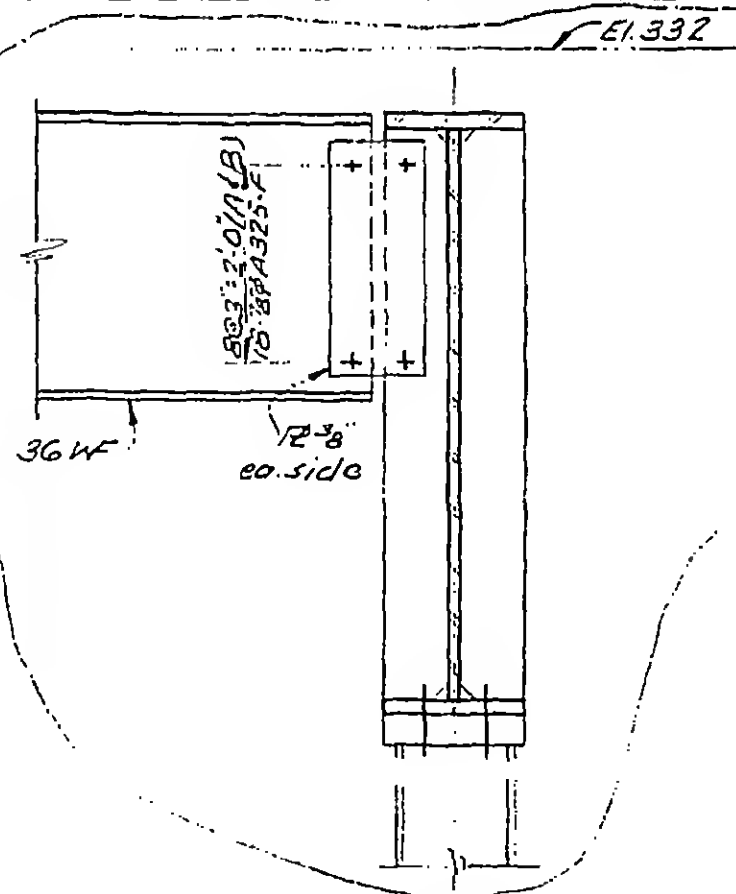
REVISIONS

RELEASED FOR
CONSTRUCTION
11-20-72

A
B
C



C



DESIGNED

DRAWN

REVIEWED

13-K4.3-4

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

Structural & Civil Engineers

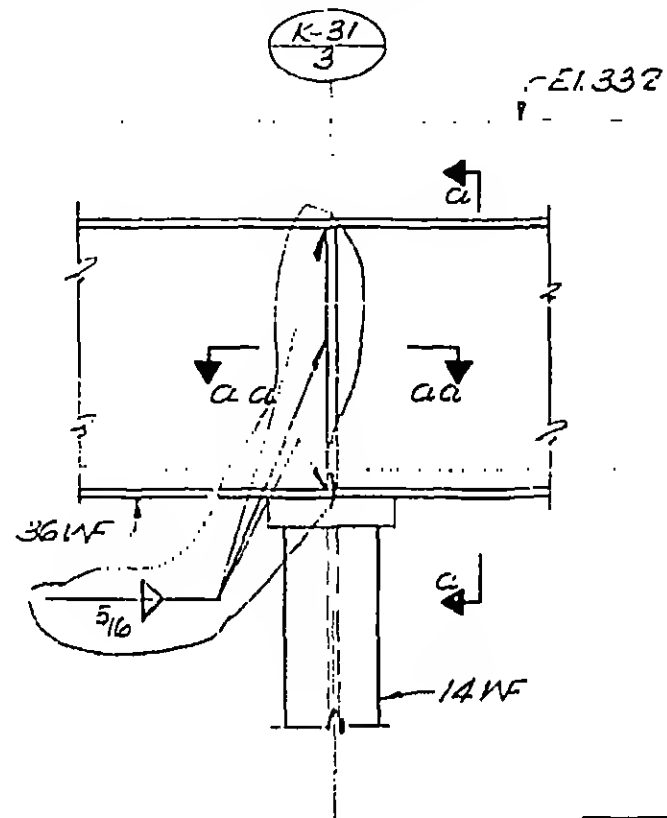
PROJECT THE WORLD TRADE CENTER

TITLE CONNECTIONS AT COLUMN

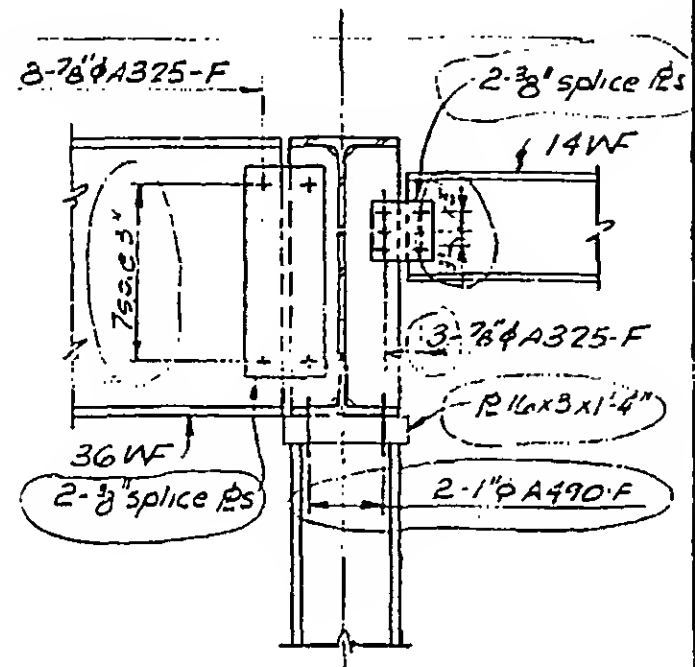
DATE 11-3-72

REVISIONS

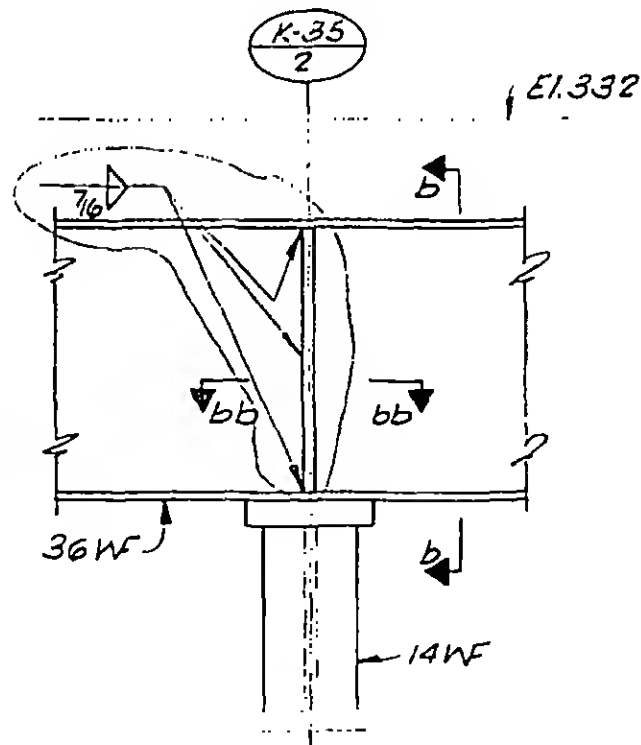
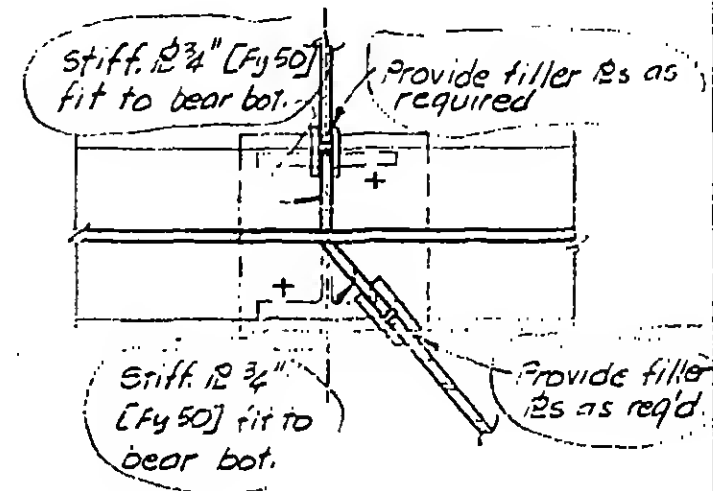
Released for
Construction
11-24-72



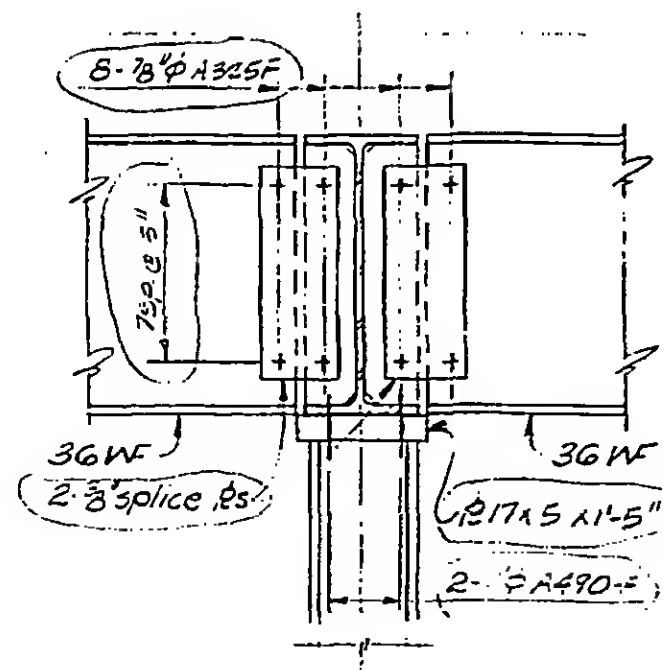
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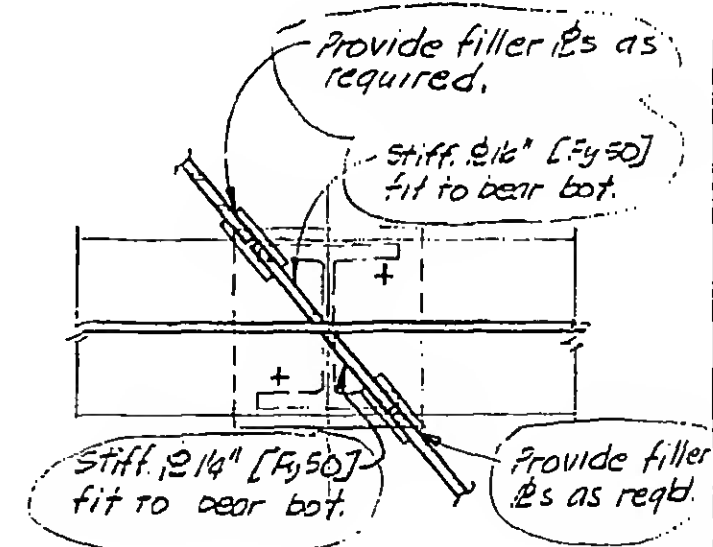
a a-a



B



b b-b



B

13-K5.1-1



DESIGNED

L.E.R.

DRAWN

TR

REVIEWED

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

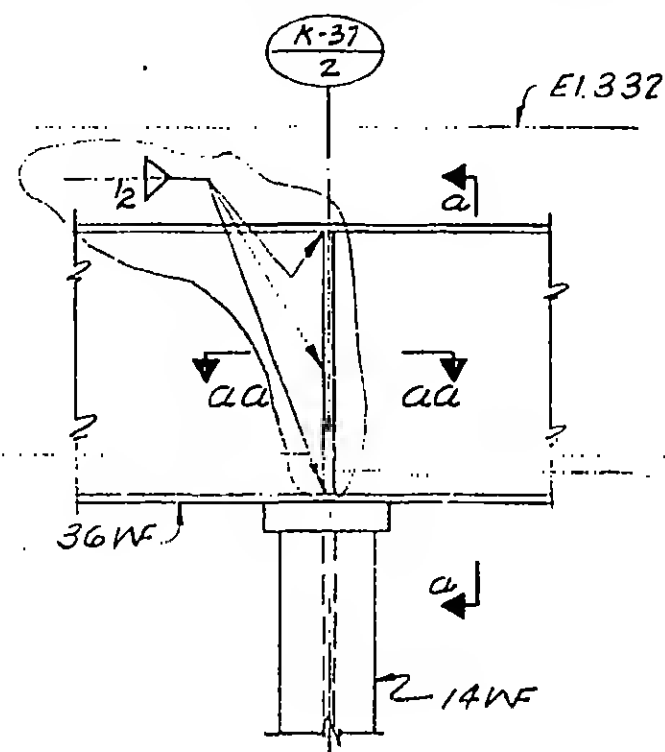
Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER

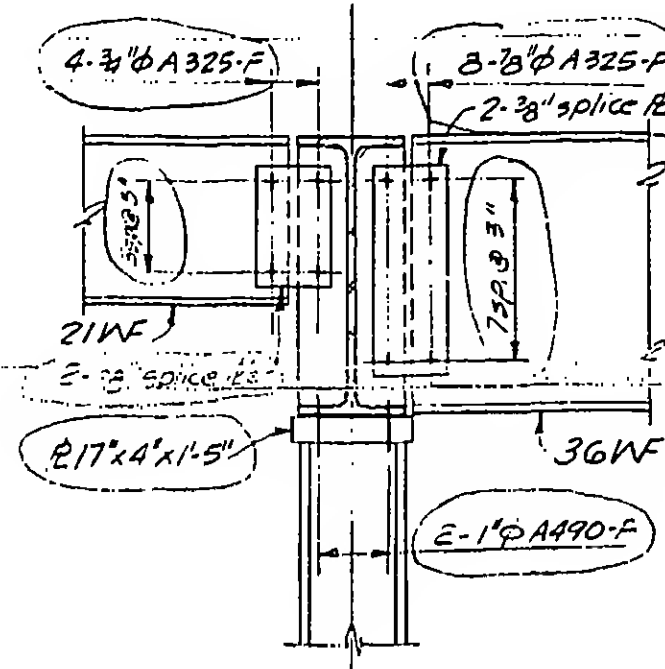
TITLE CONNECTIONS AT COLUMN

DATE 11-3-72

REVISIONS

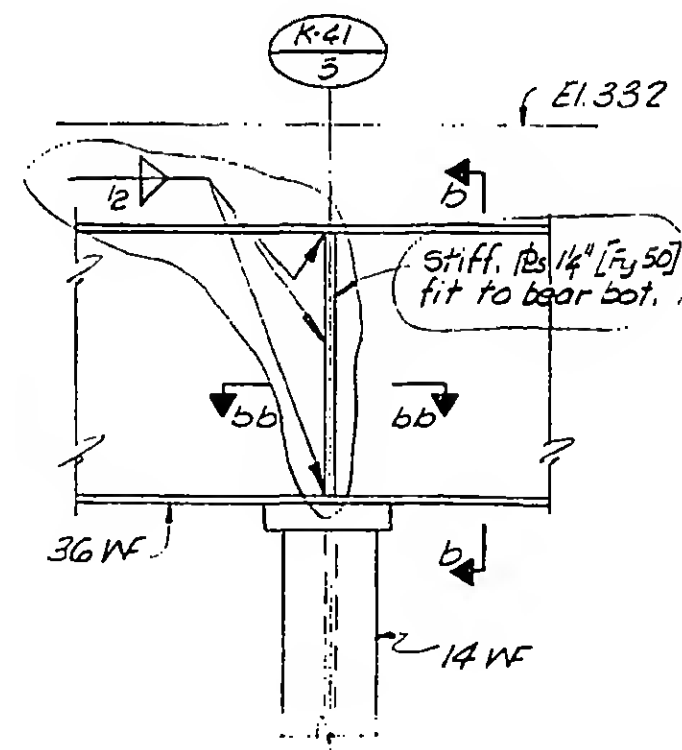
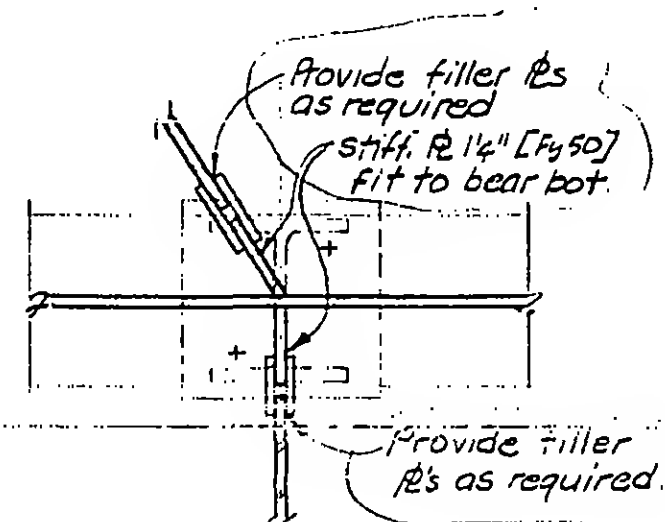
Released for
construction
11-24-72

A

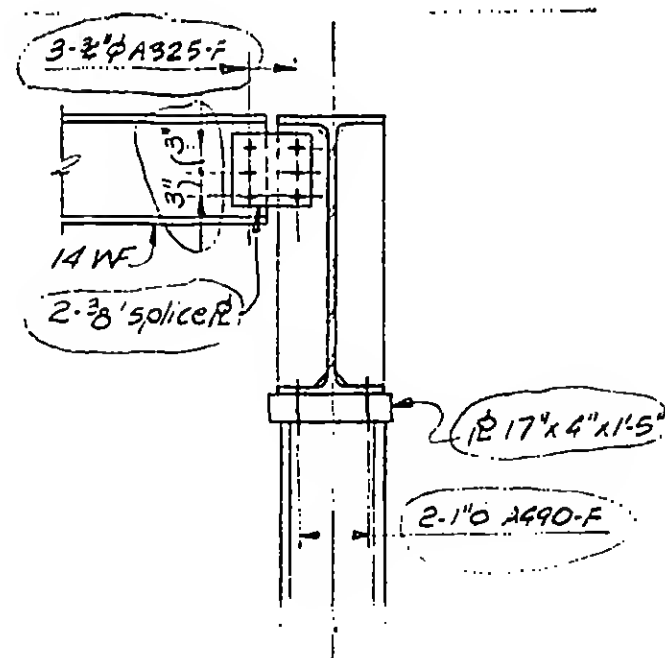


a

aa

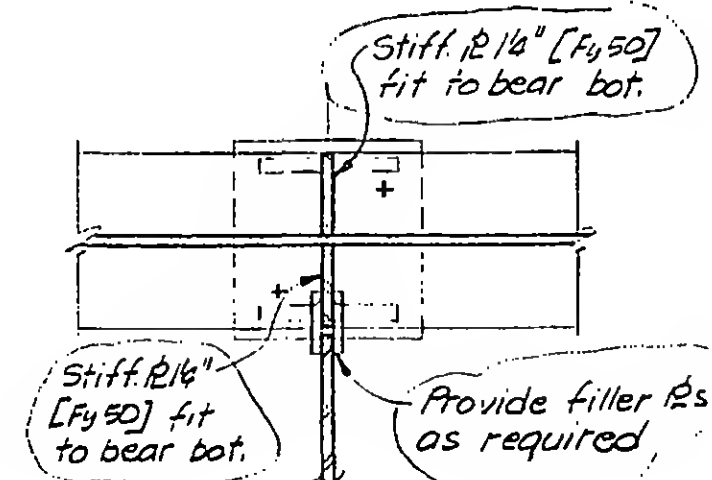


B



b

bb



13-K5.1-2

DESIGNED
NABDRAWN
TR

REVIEWED

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER

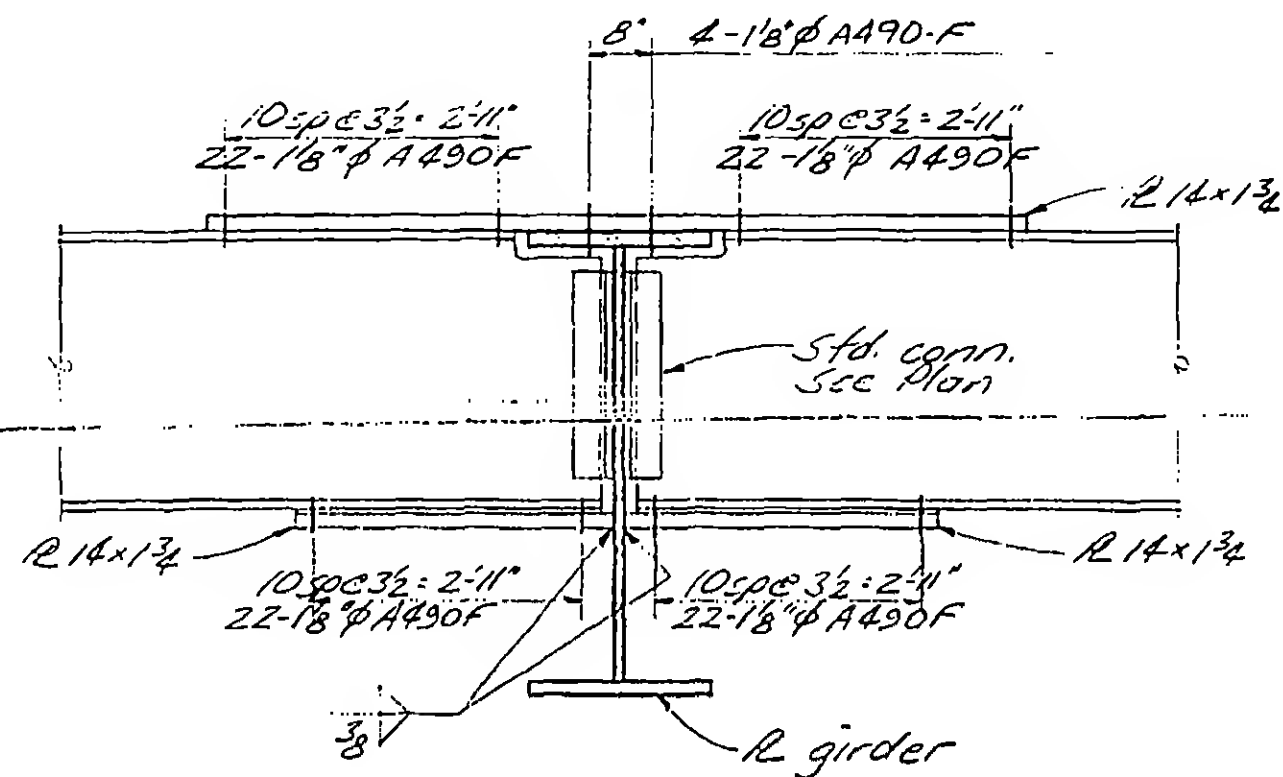
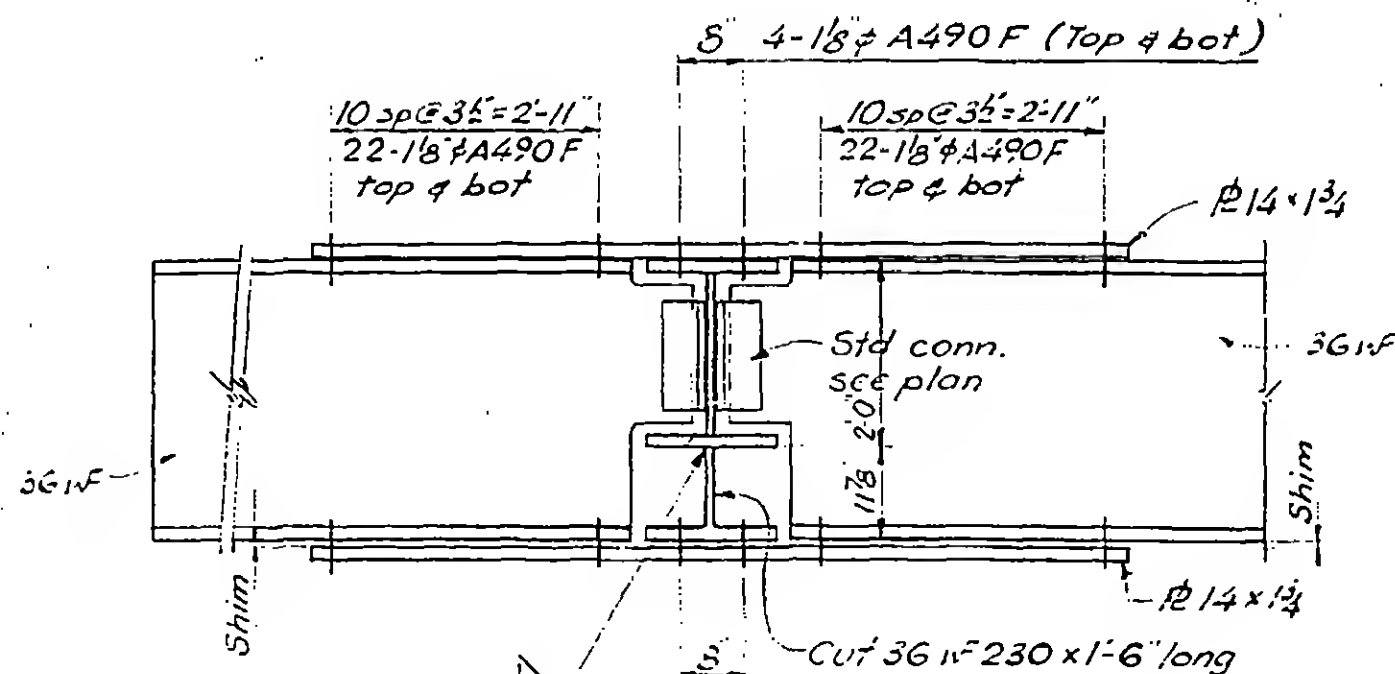
TITLE CONNECTION DETAIL AT CANTILEVER

DATE 11-3-72

REVISIONS

Released for
Construction
11-24-72

4-20-73

A
B

DESIGNED

L. Robertson

DRAWN

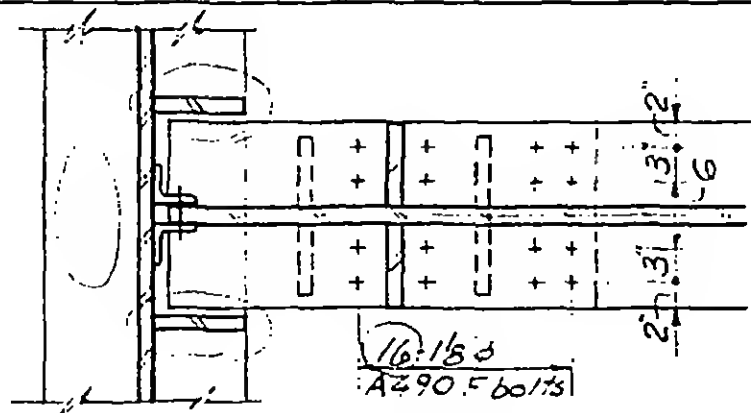
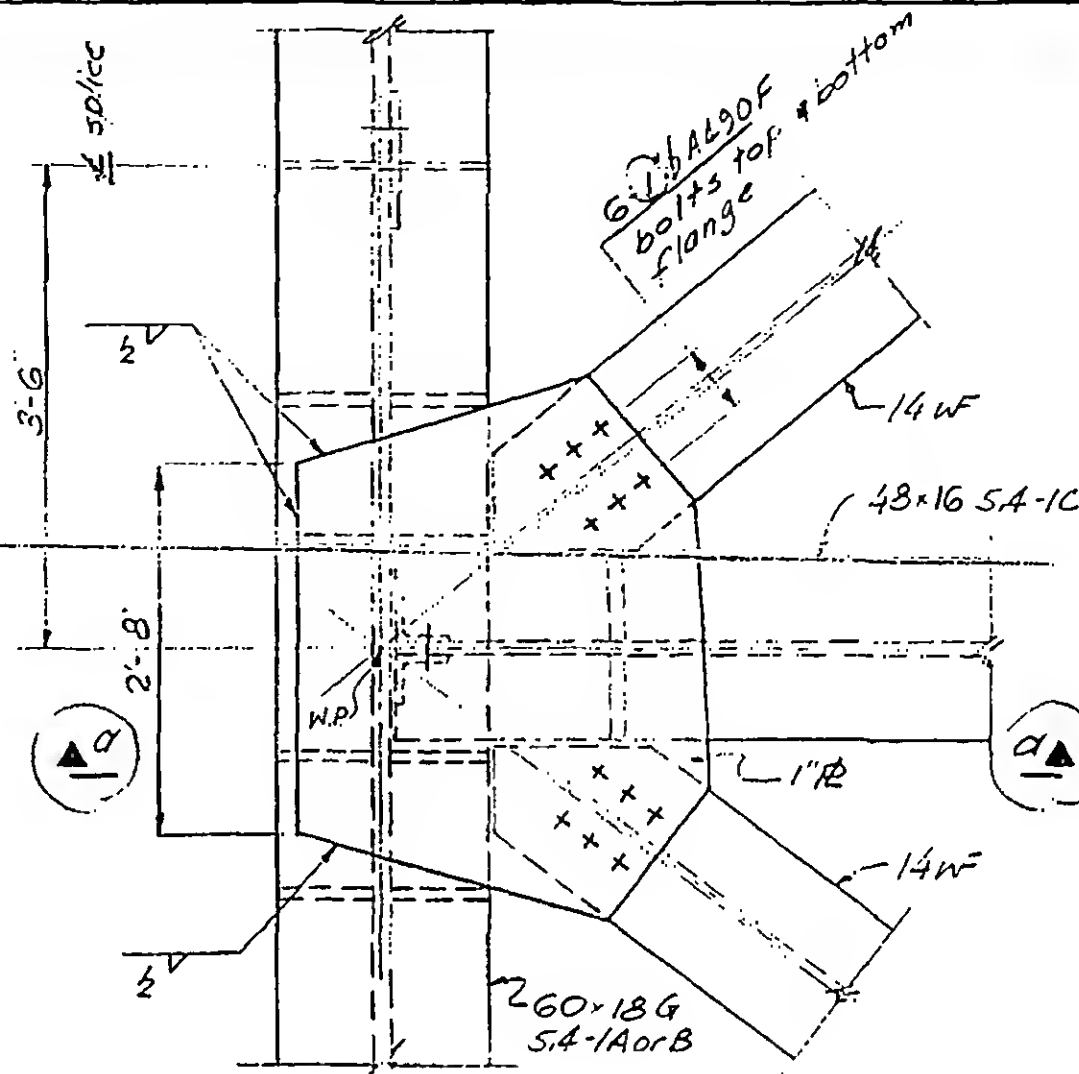
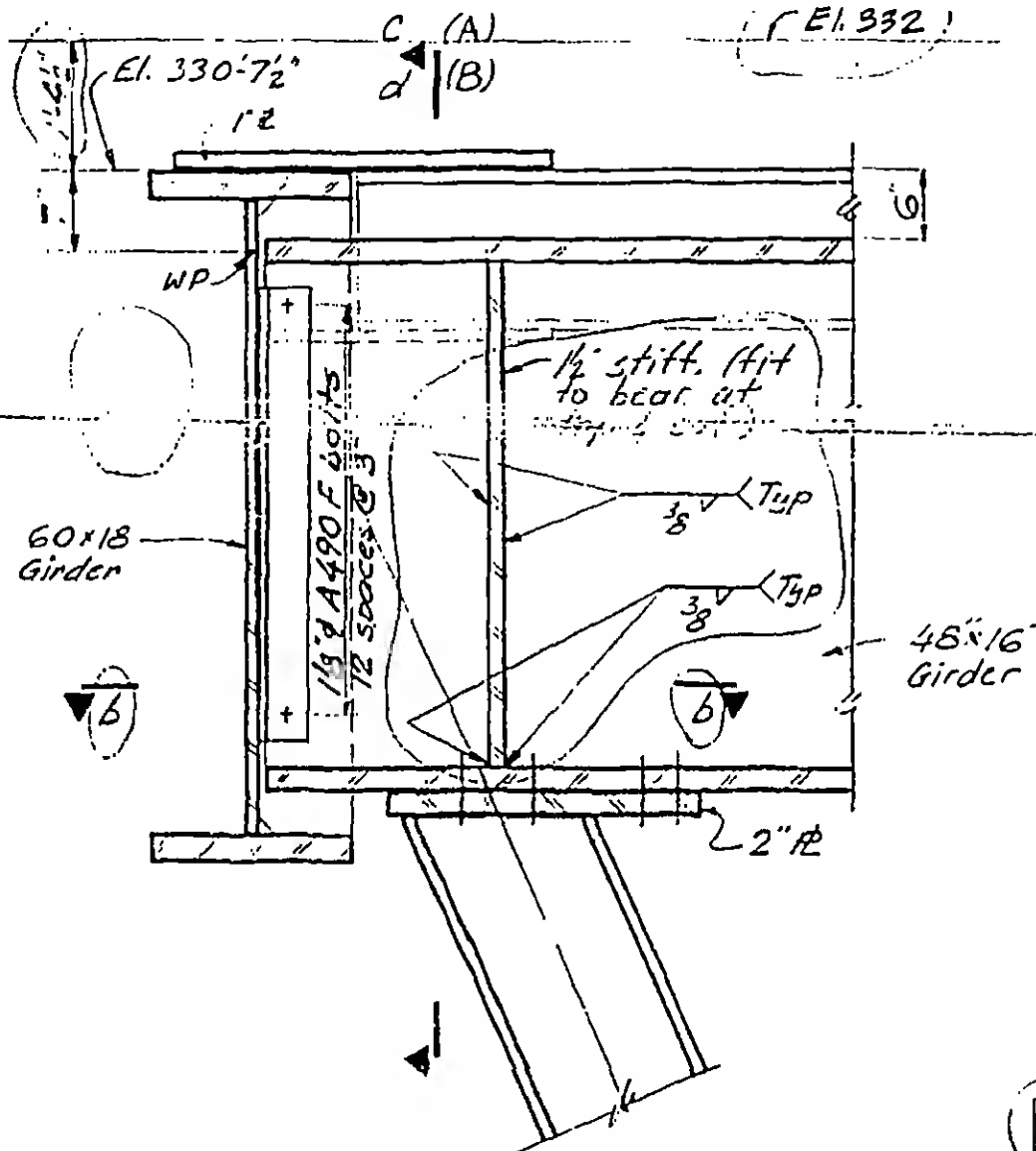
REVIEWED

13-K5.2-1

SCALE

REVISIONS

Released for
Construction
11-24-72



DESIGNED
DRAWN
CHECKED

JG

PROJECT THE WORLD TRADE CENTER

TITLE CONNECTION DETAILS AT CANOPY

DATE 11-3-72

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

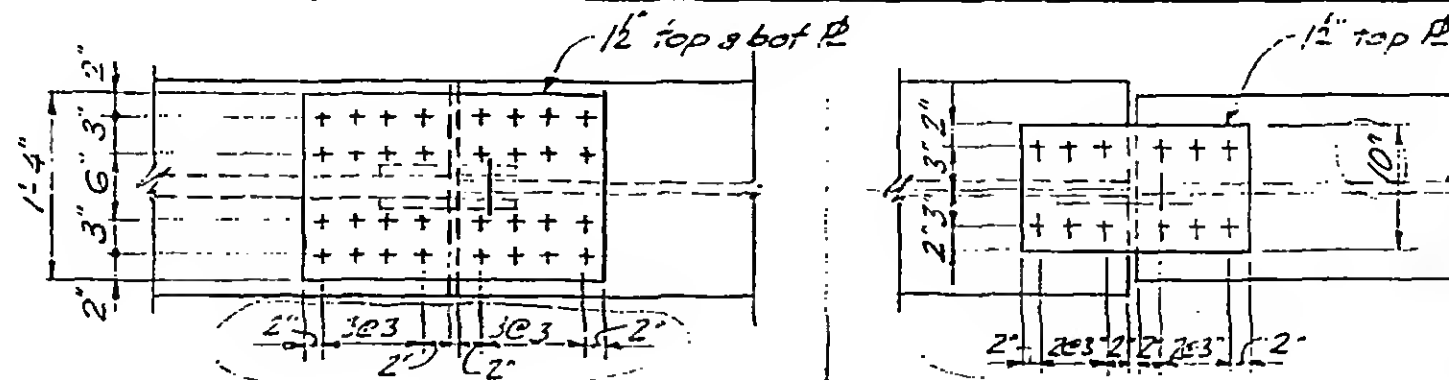
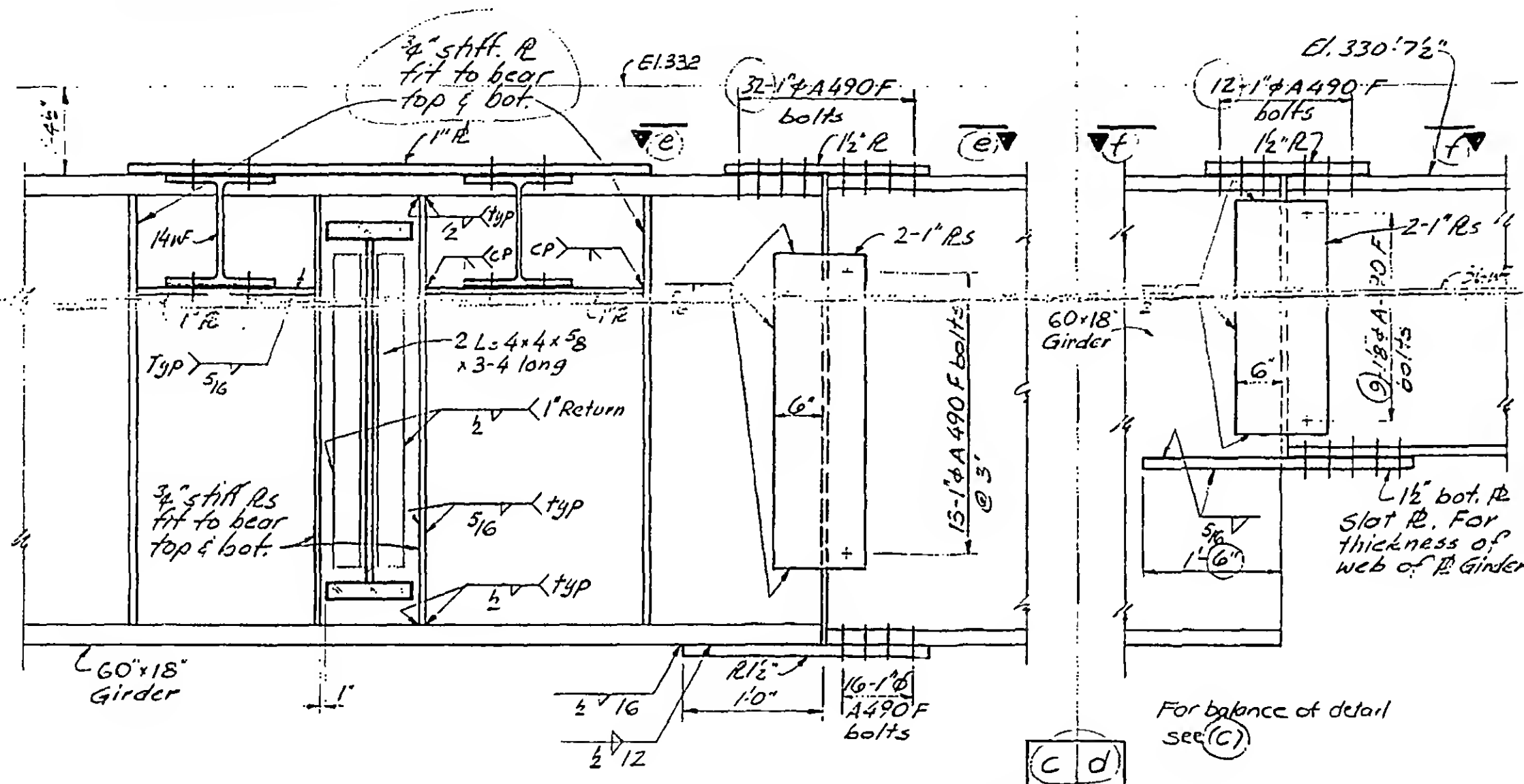
Structural & Civil Engineers

DWG
NO 13-K5.3-1.1

SCALE

REVISIONS

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construction
11-24-72



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DRAWN
REVIEWED

JG

PROJECT THE WORLD TRADE CENTER

TITLE CONNECTION DETAILS AT CANOPY

DATE 11-3-72

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

Structural & Civil Engineers

DWG. NO 13-K5.3-1.2

SKILLING, HELLE. CHRISTIANSEN, ROBERTSON

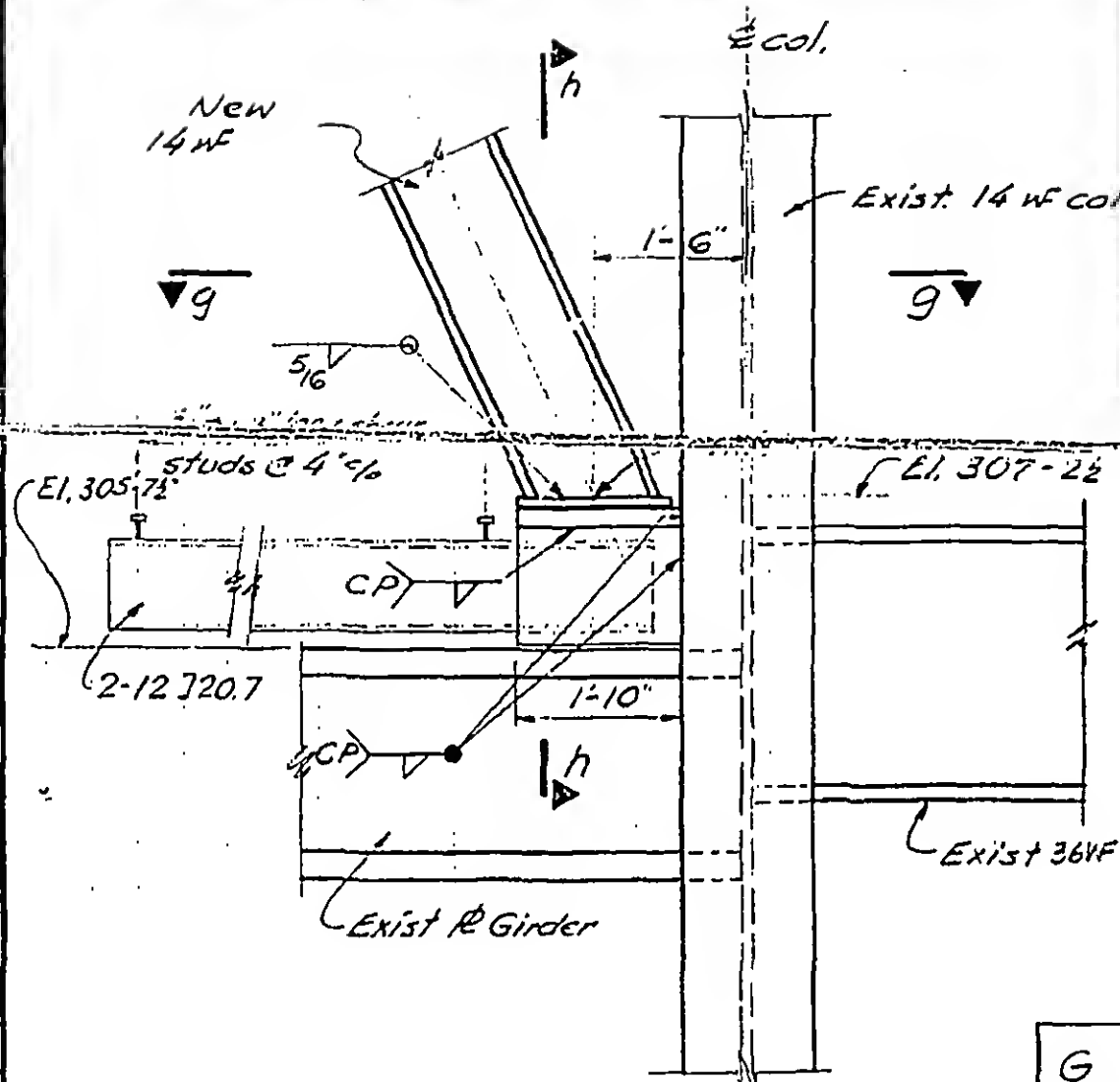
Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER

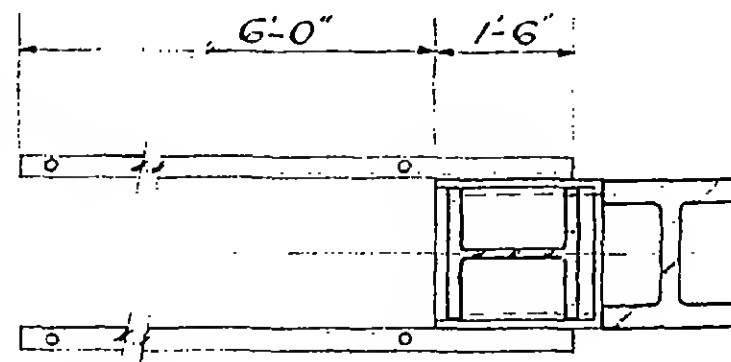
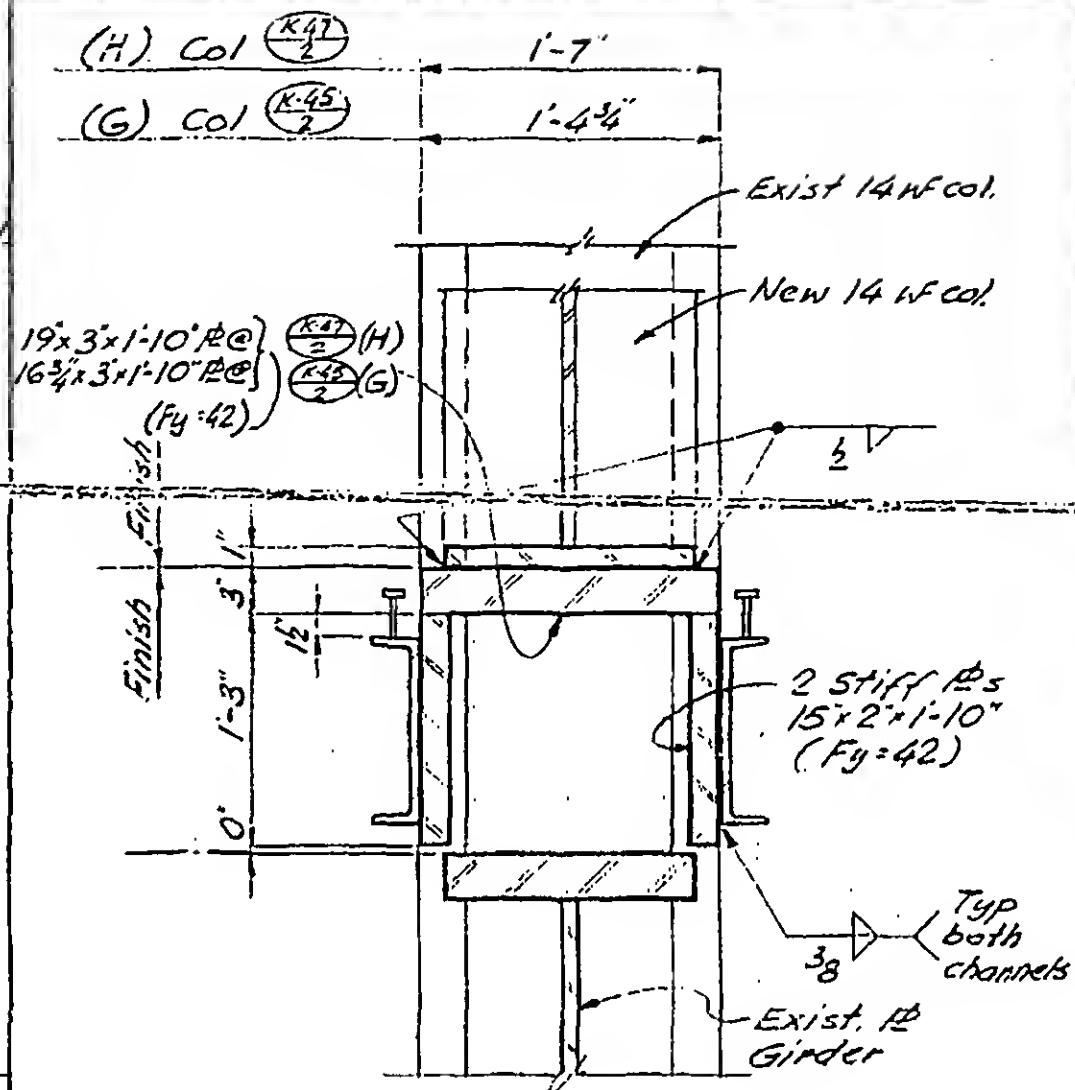
TITLE CONNECTION DETAILS AT CANOPY

DATE 2-5-73

REVISIONS

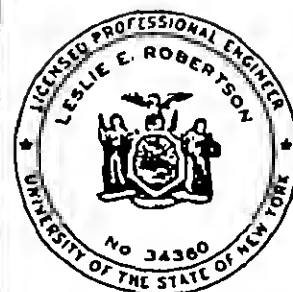


G
H



g h

13-K5.3-1.3

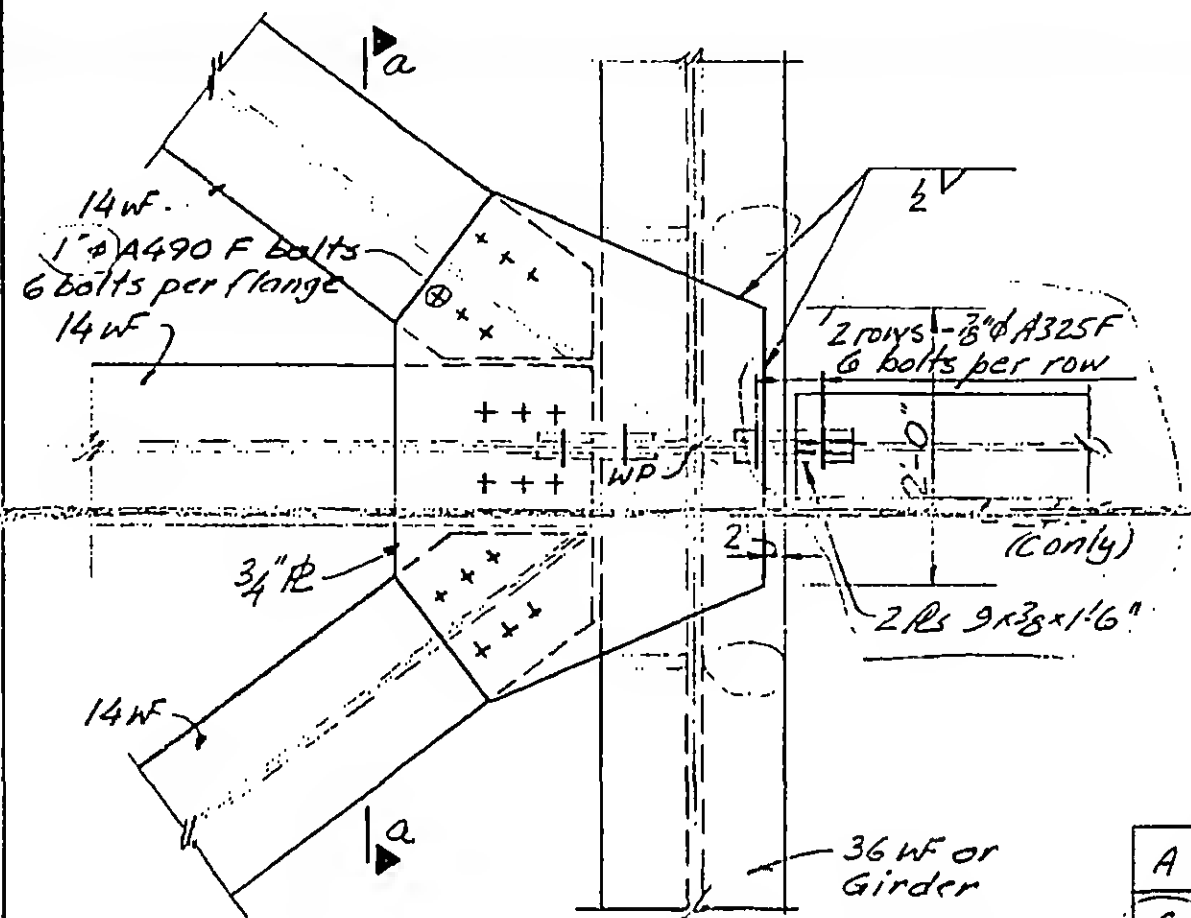
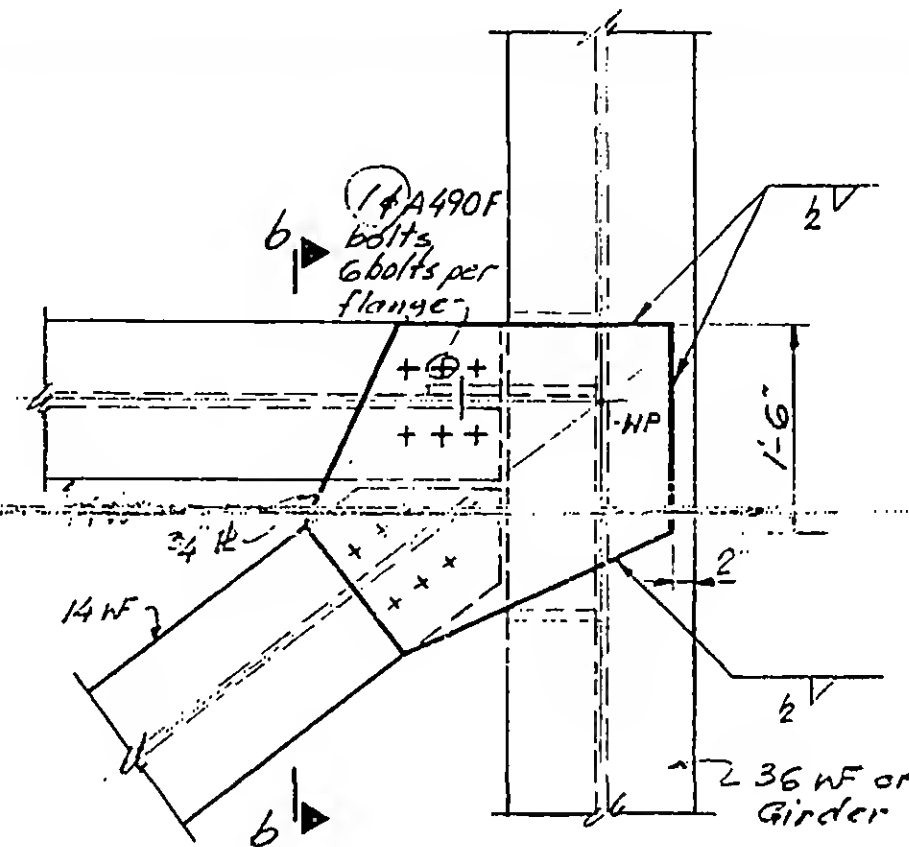


DESIGNED

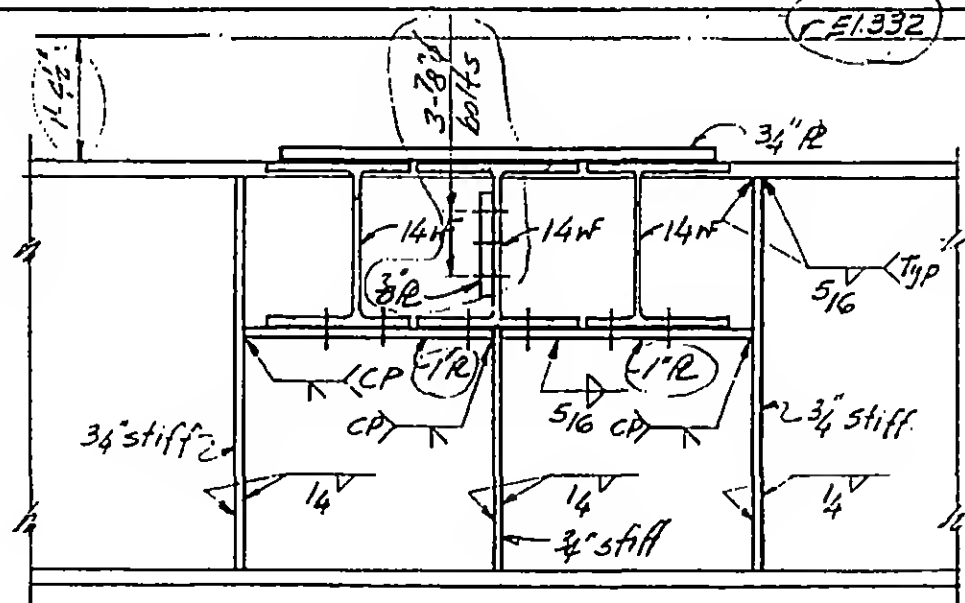
DRAWN
REVIEWED

SCALE

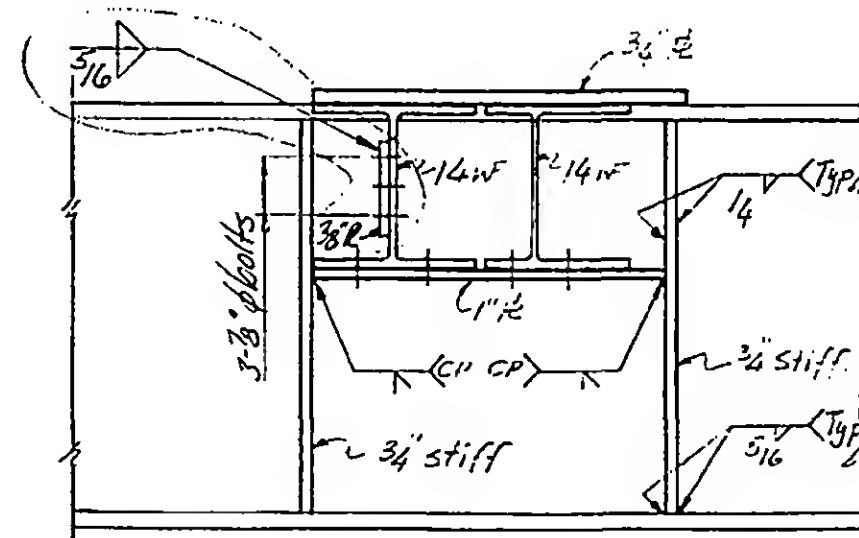
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Construction
11-24-72A
C

B



a



b



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REVISED

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PROJECT THE WORLD TRADE CENTER

TITLE CONNECTION DETAILS AT CANOPY

DATE 11-3-72

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

Structural & Civil Engineers

DWG
NO. B-K5.3-2

SKILLING, HELLE. CHRISTIANSEN, ROBERTSON

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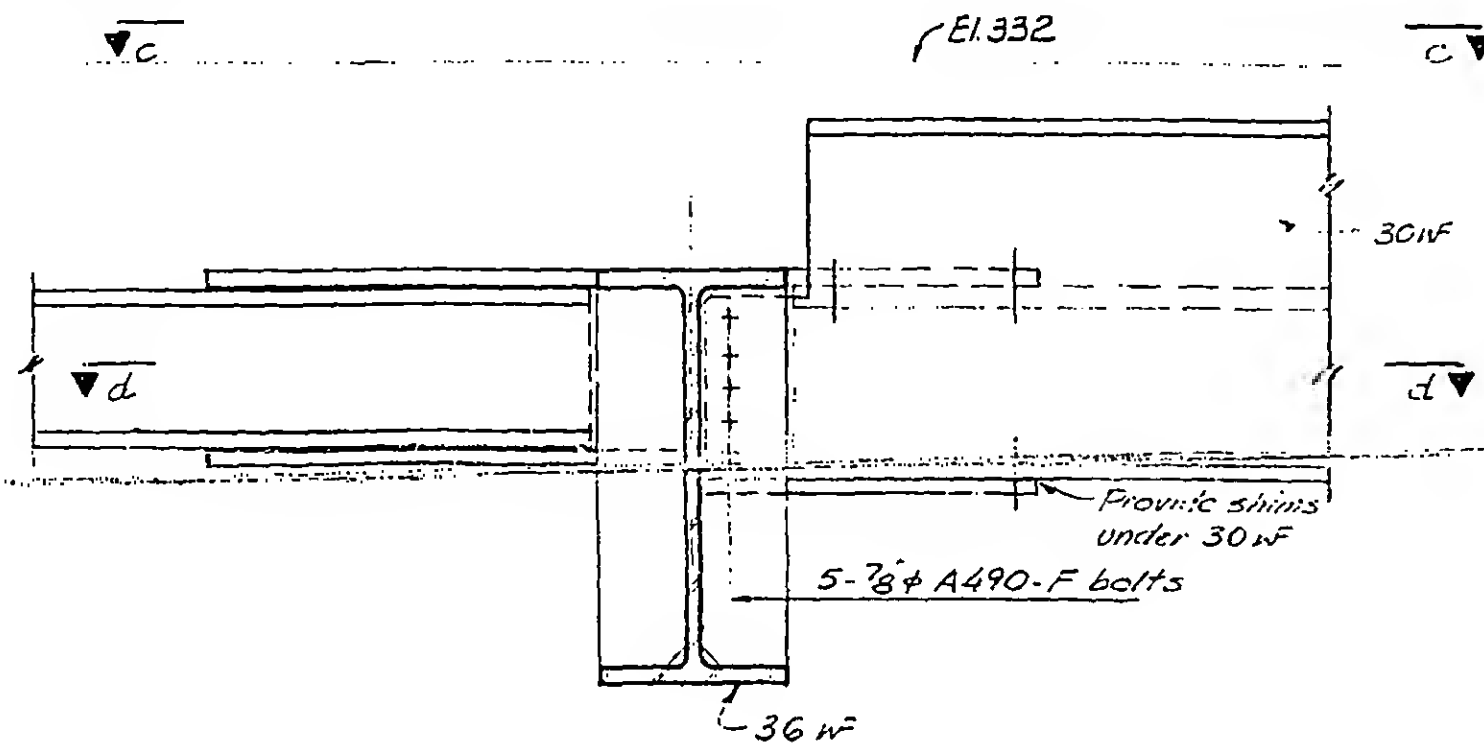
PROJECT THE WORLD TRADE CENTER

TITLE CONNECTION DETAILS AT CANOPY

DATE 11-24-72

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11-24-72



a



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13-K5.3-3.1

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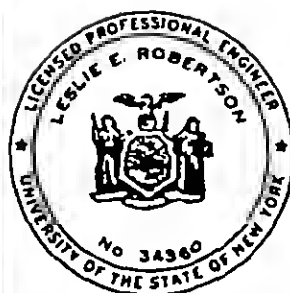
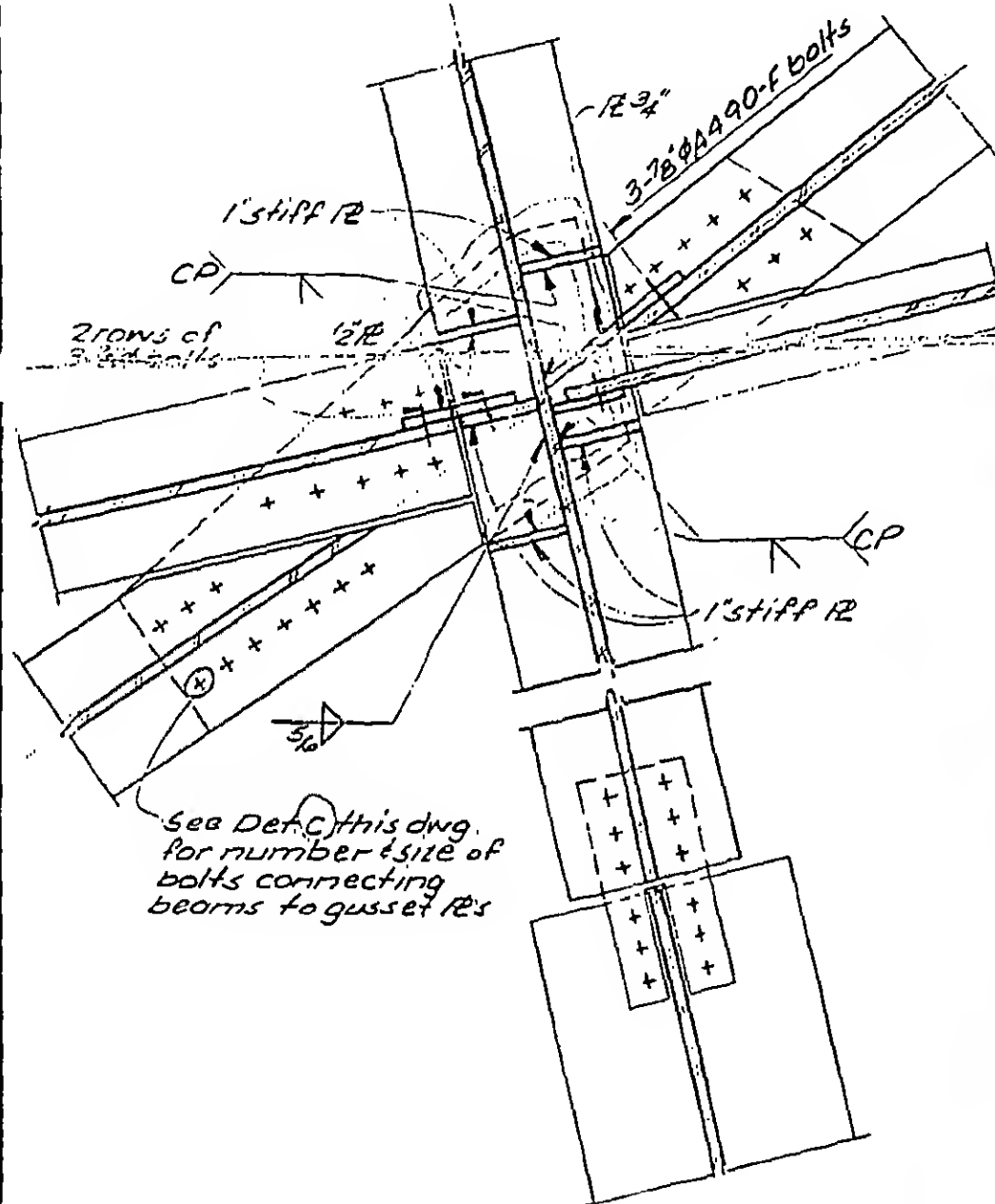
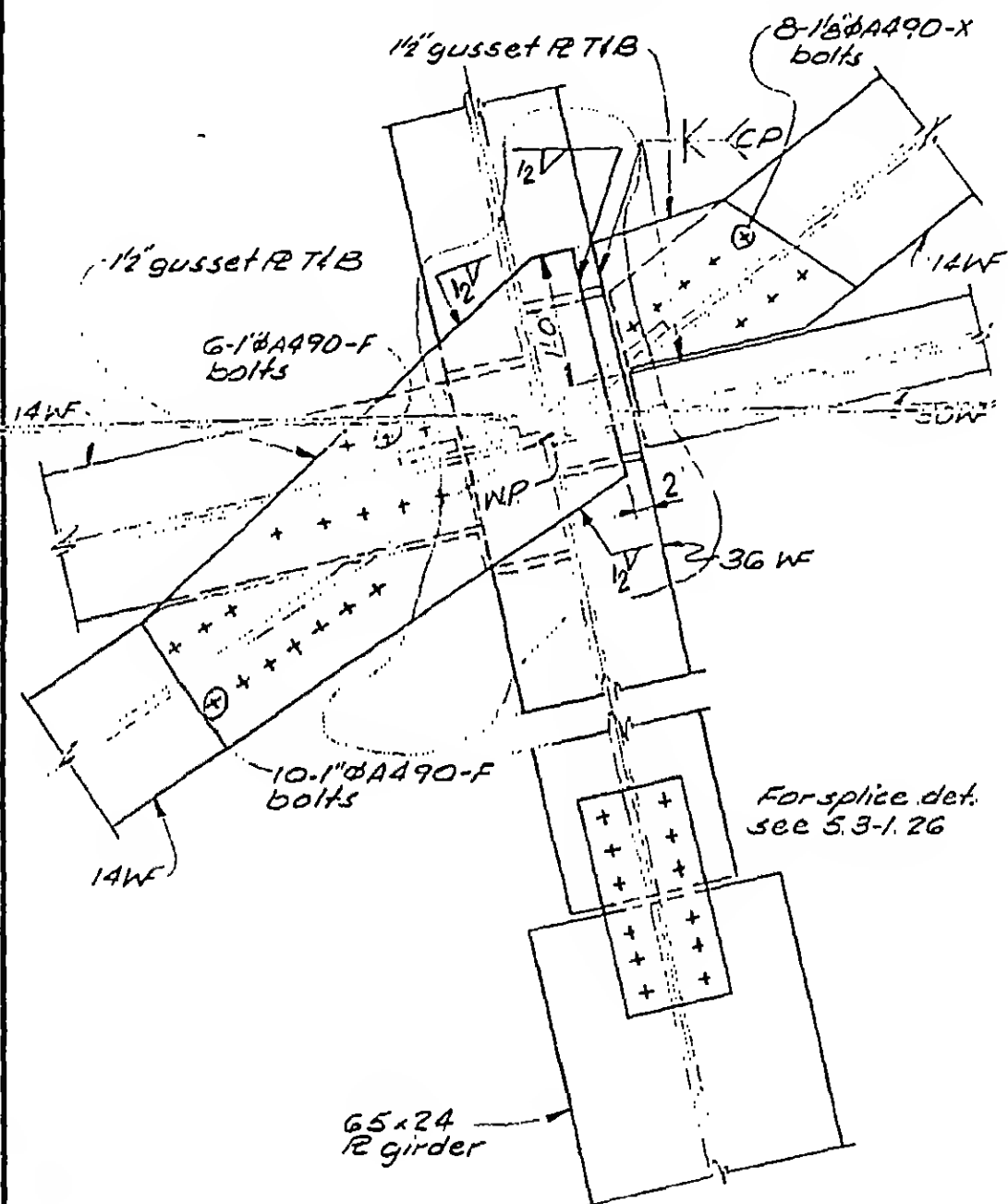
TITLE CONNECTION DETAIL AT CANOPY

DATE 11-24-72

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11-24-72

4-20-73



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DRAWN
T.R.

REVIEWED

c

d

13-K53-3.2

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

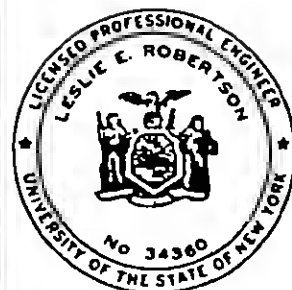
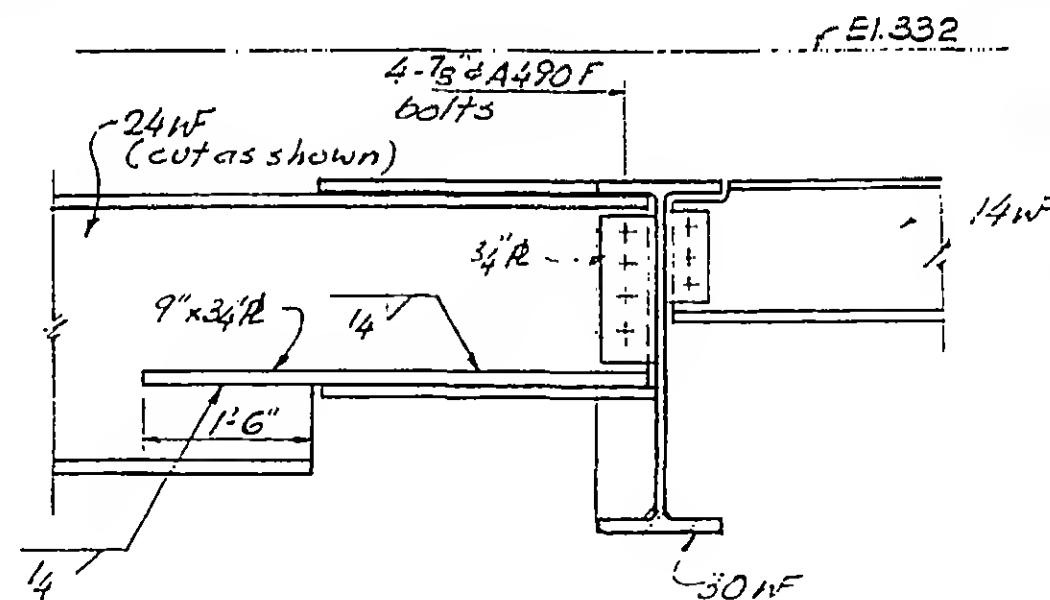
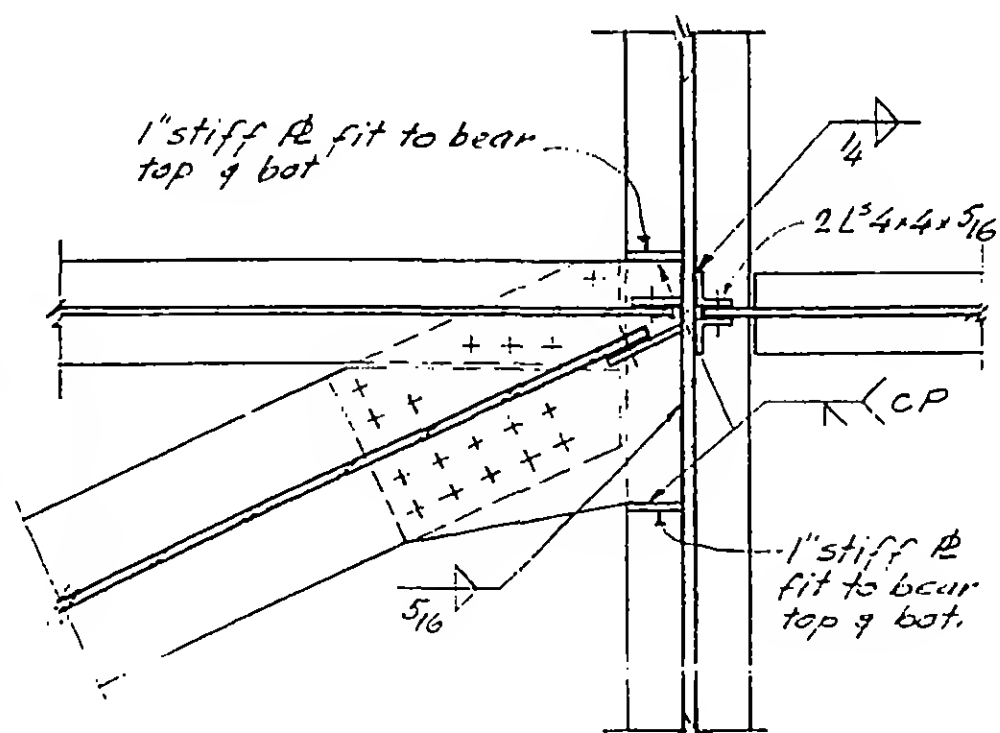
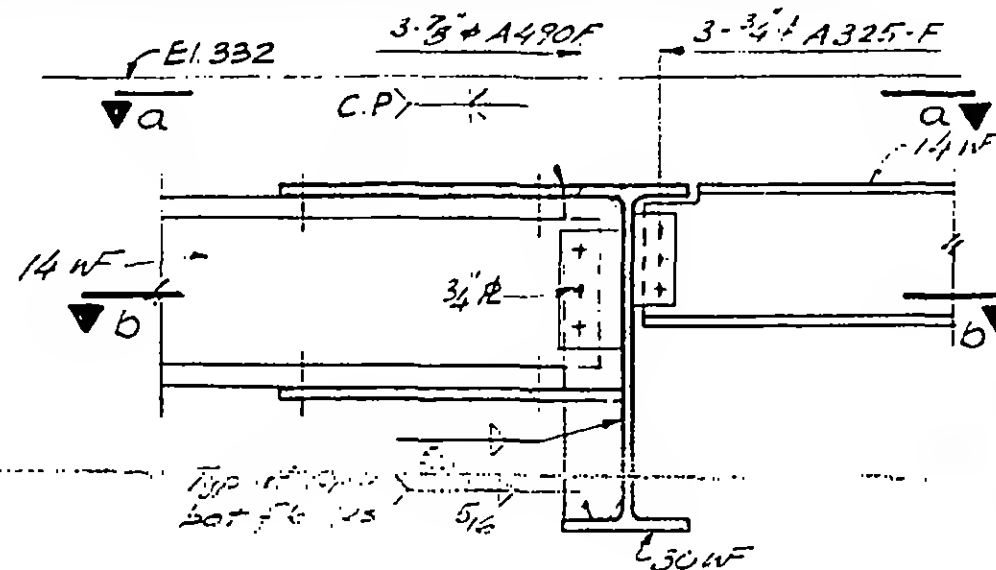
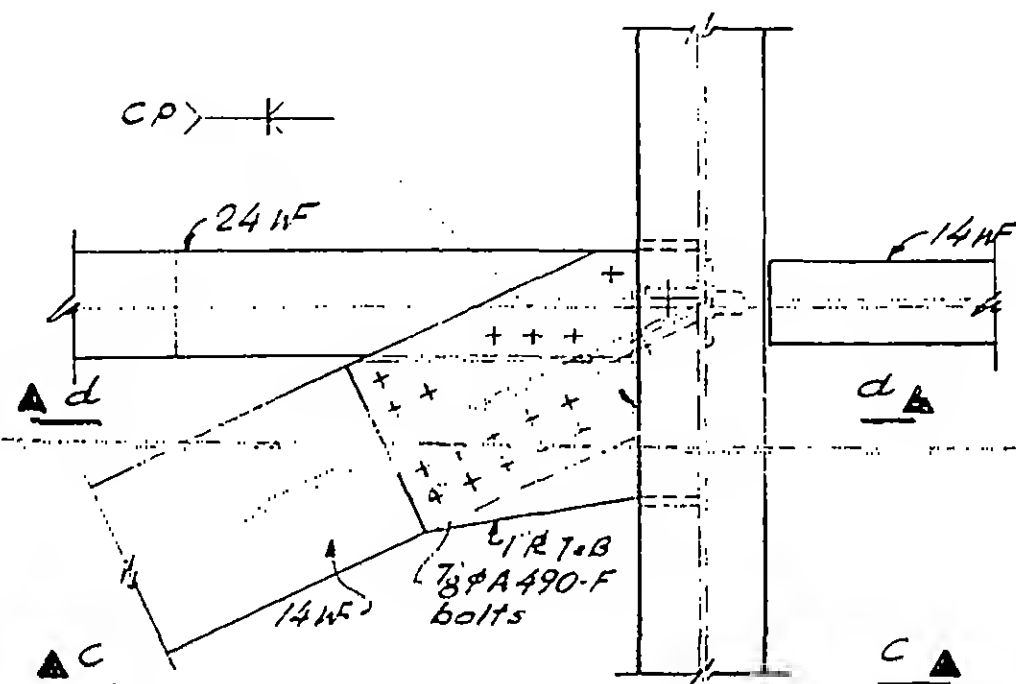
Structural & Civil Engineers

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TITLE CONNECTION DETAILS AT CANOPY

DATE 11-24-72

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SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

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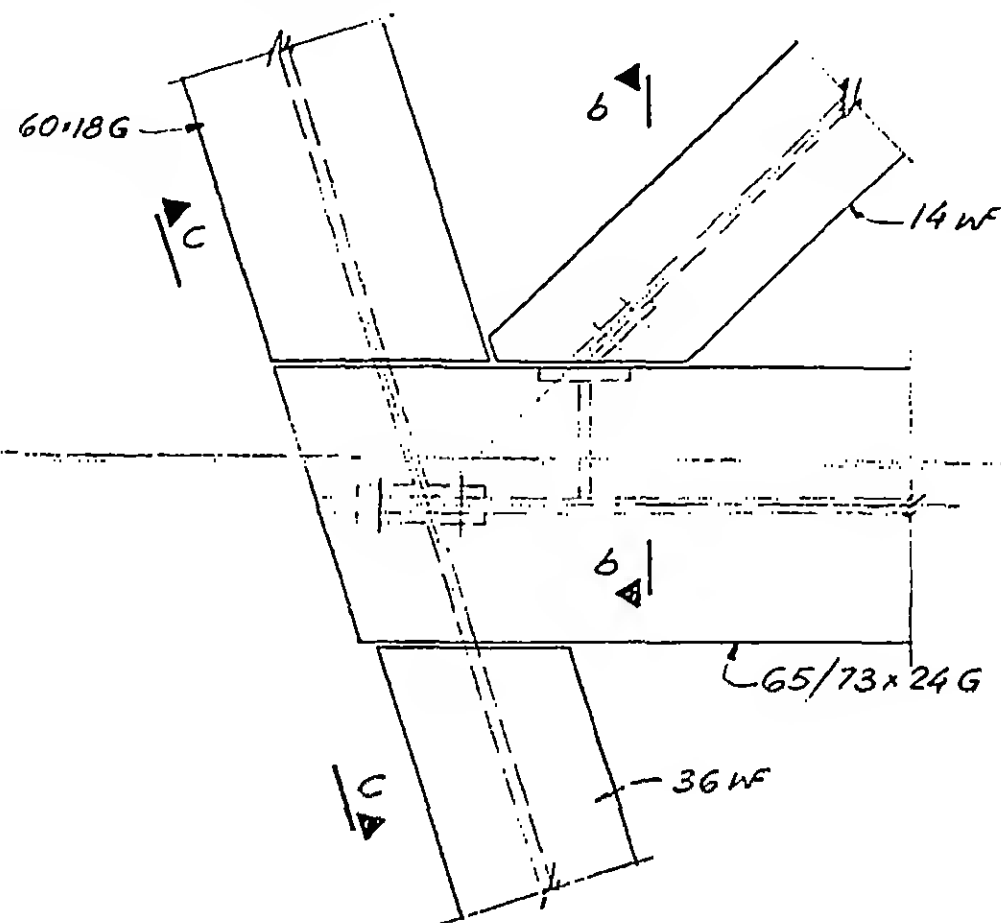
PROJECT THE WORLD TRADE CENTER

TITLE CONNECTION DETAILS AT CANOPY

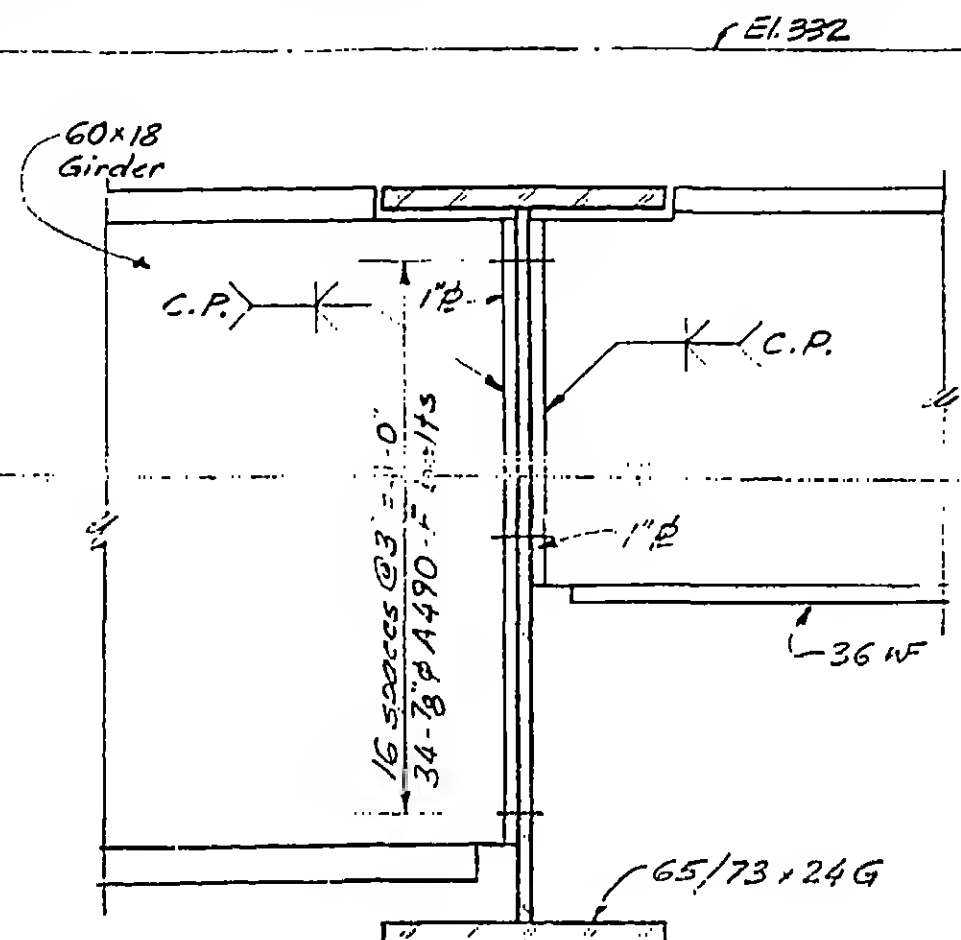
DATE 11-24-72

REVISIONS

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11-24-72

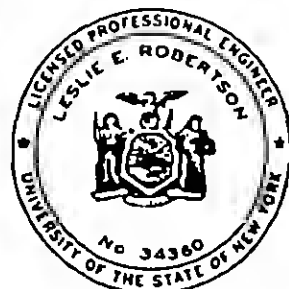
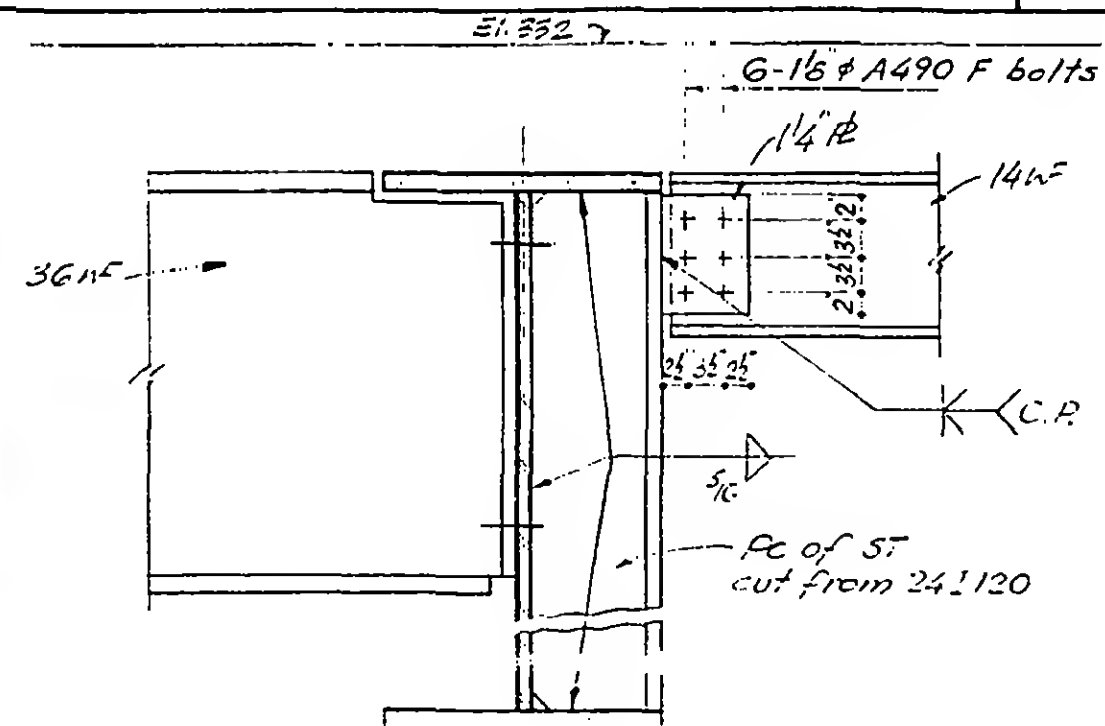


a



b

c



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13-K5.3-5

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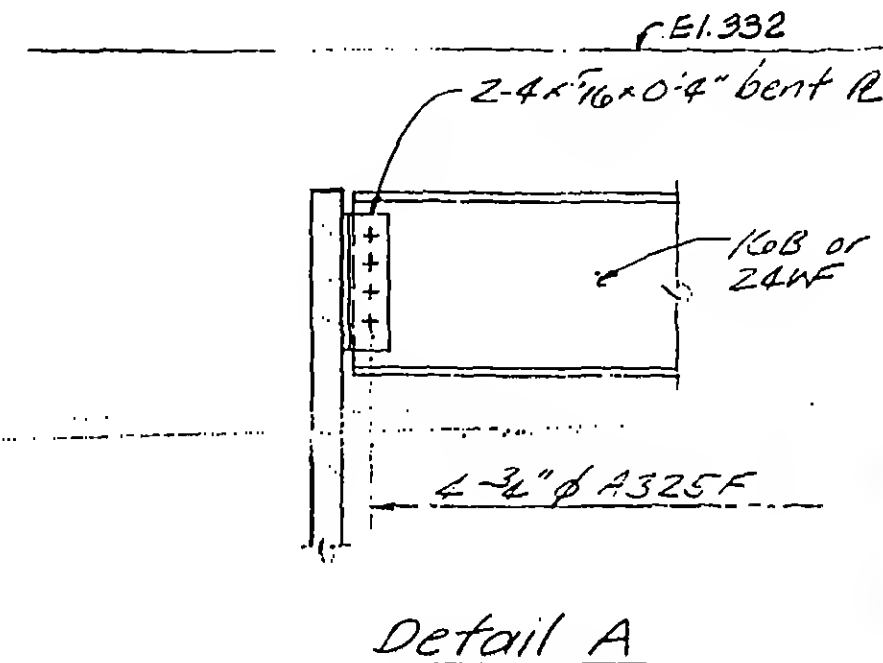
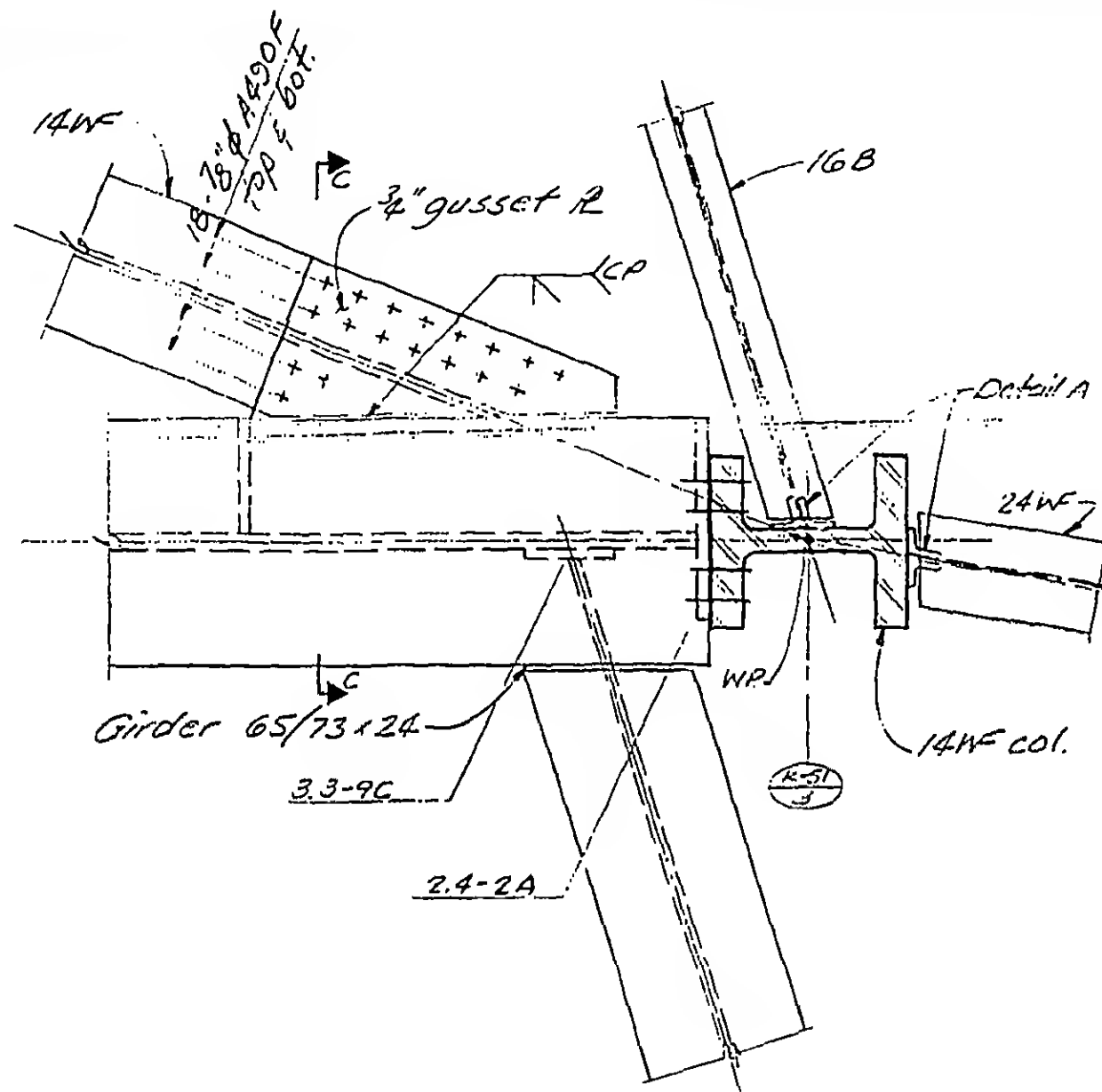
PROJECT THE WORLD TRADE CENTER

TITLE CONNECTION DETAILS AT CANOPY

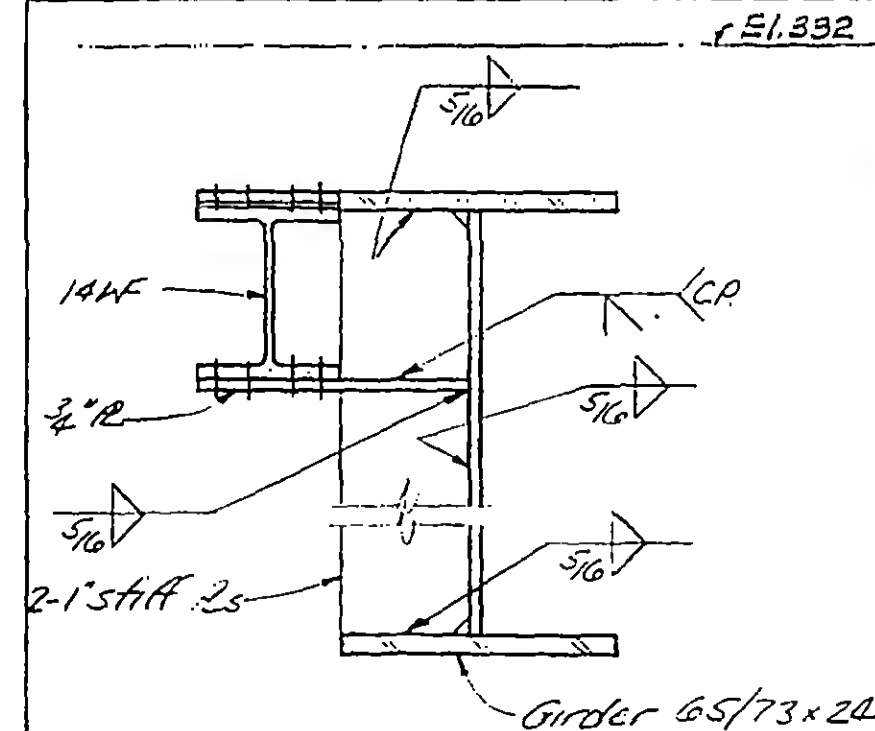
DATE 11-24-72

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construction
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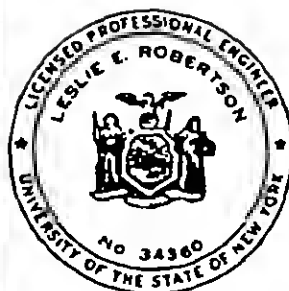
b



a

c

13-K5.3-6



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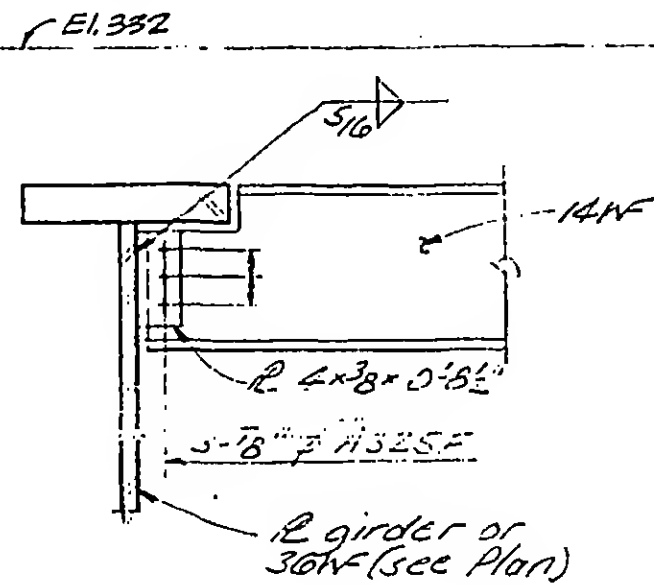
Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER

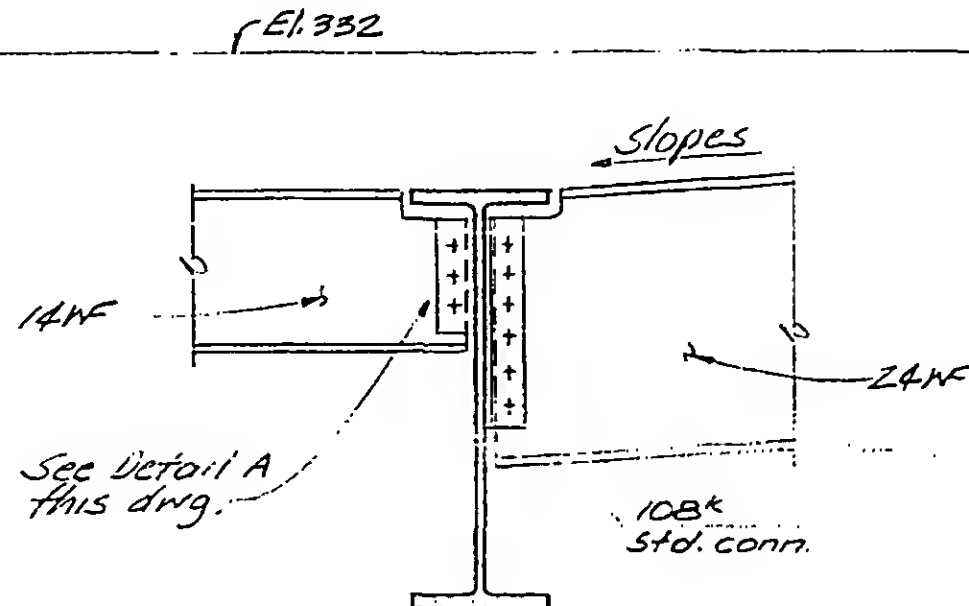
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DATE 11-24-72

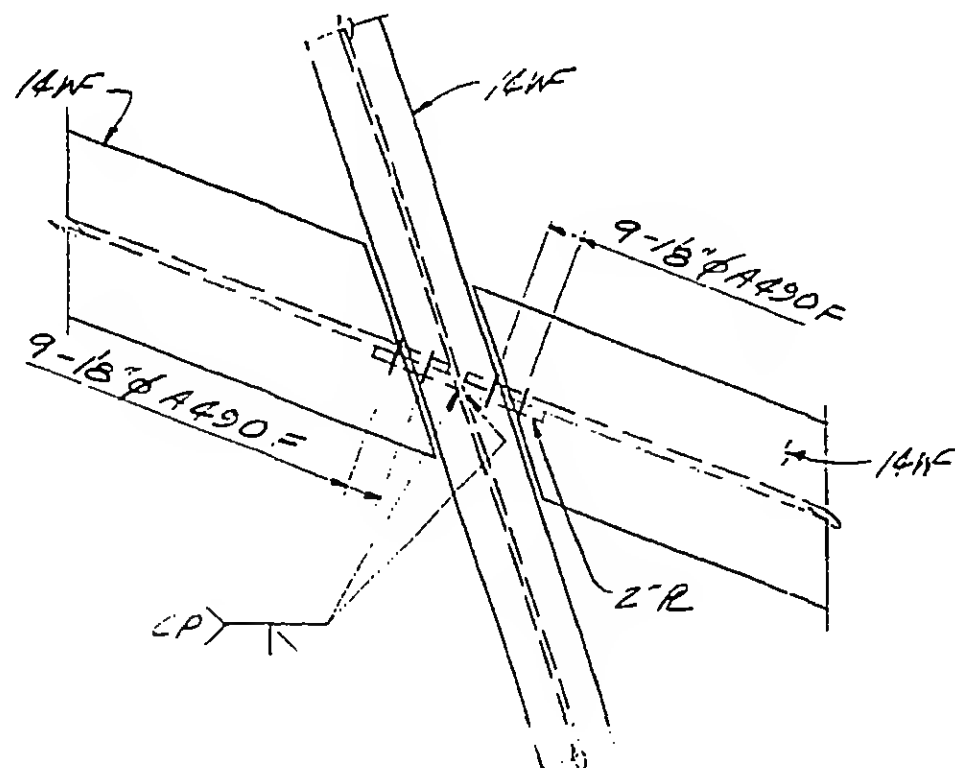
REVISIONS

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construction
11-24-72

A



B



C

13-K5.3-7



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SKILLING, HELLE. CHRISTIANSEN, ROBERTSON

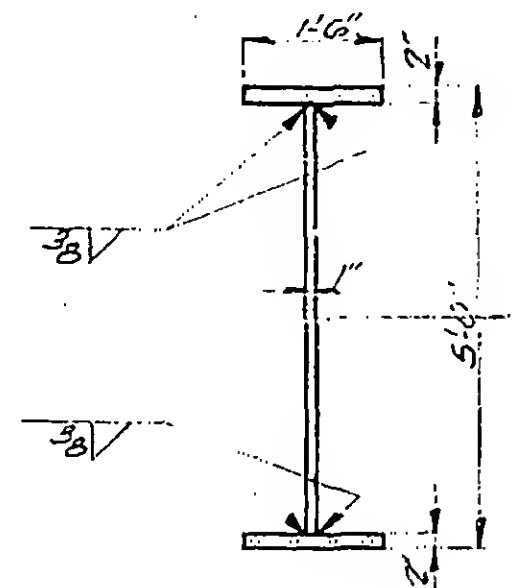
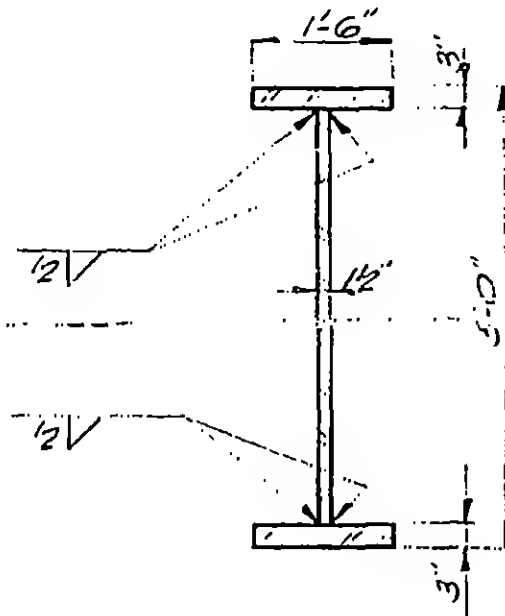
Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER

TITLE GIRDER DETAILS AT CANOPY

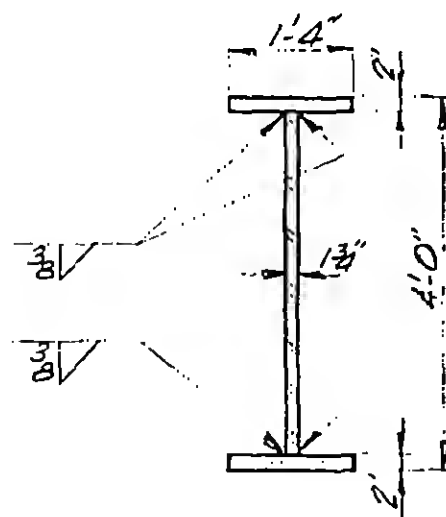
DATE 11-3-72

REVISIONS

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construction
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A

B



C

13-K5.4-1



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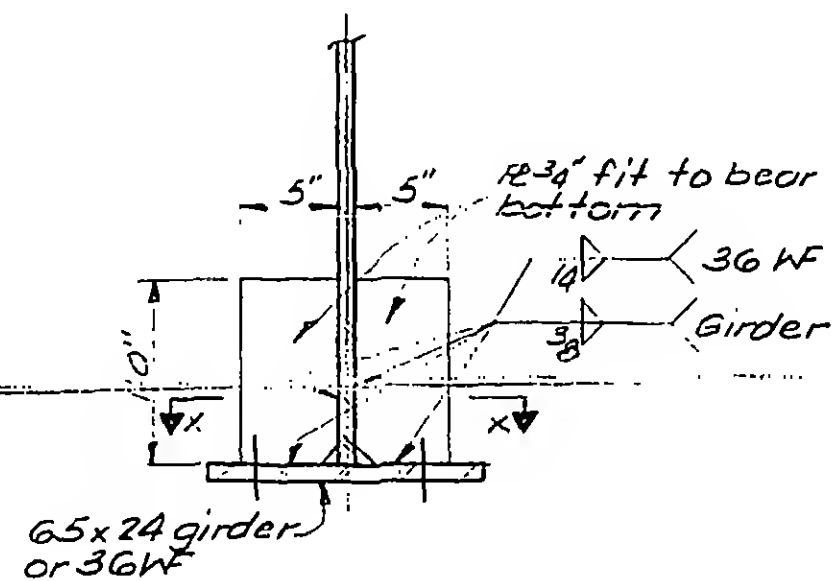
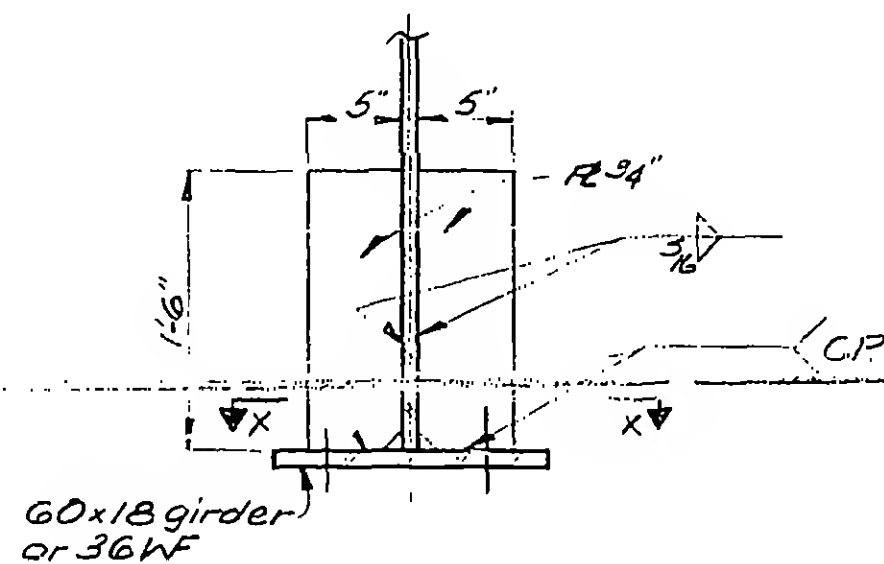
PROJECT THE WORLD TRADE CENTER

TITLE CONNECTIONS FOR FUTURE CONOPY

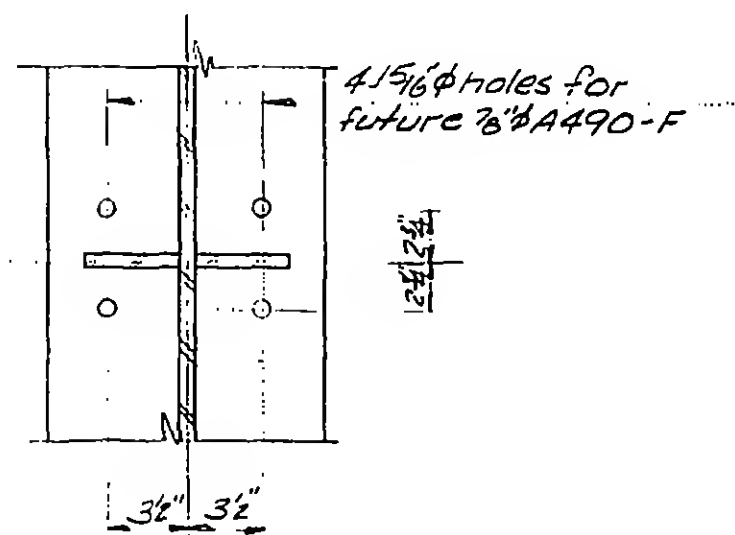
DATE 11-3-72

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A B



X

13-K5.5-1



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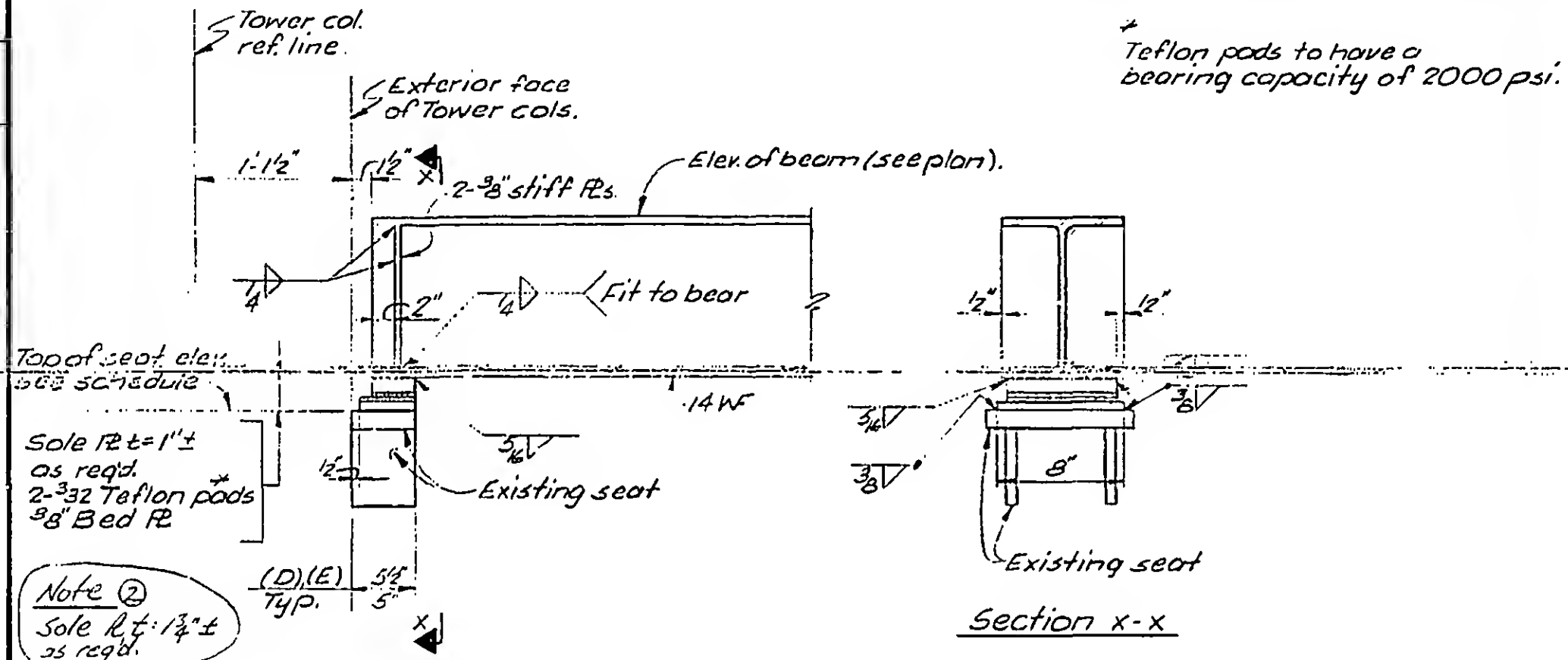
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PROJECT THE WORLD TRADE CENTER

TITLE SLIDE CONNECTIONS TOWER B

DATE 11-3-72

REVISIONS

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11-20-72

Note ②

Sole R t=1 3/4"± as reqd.

D

E

F

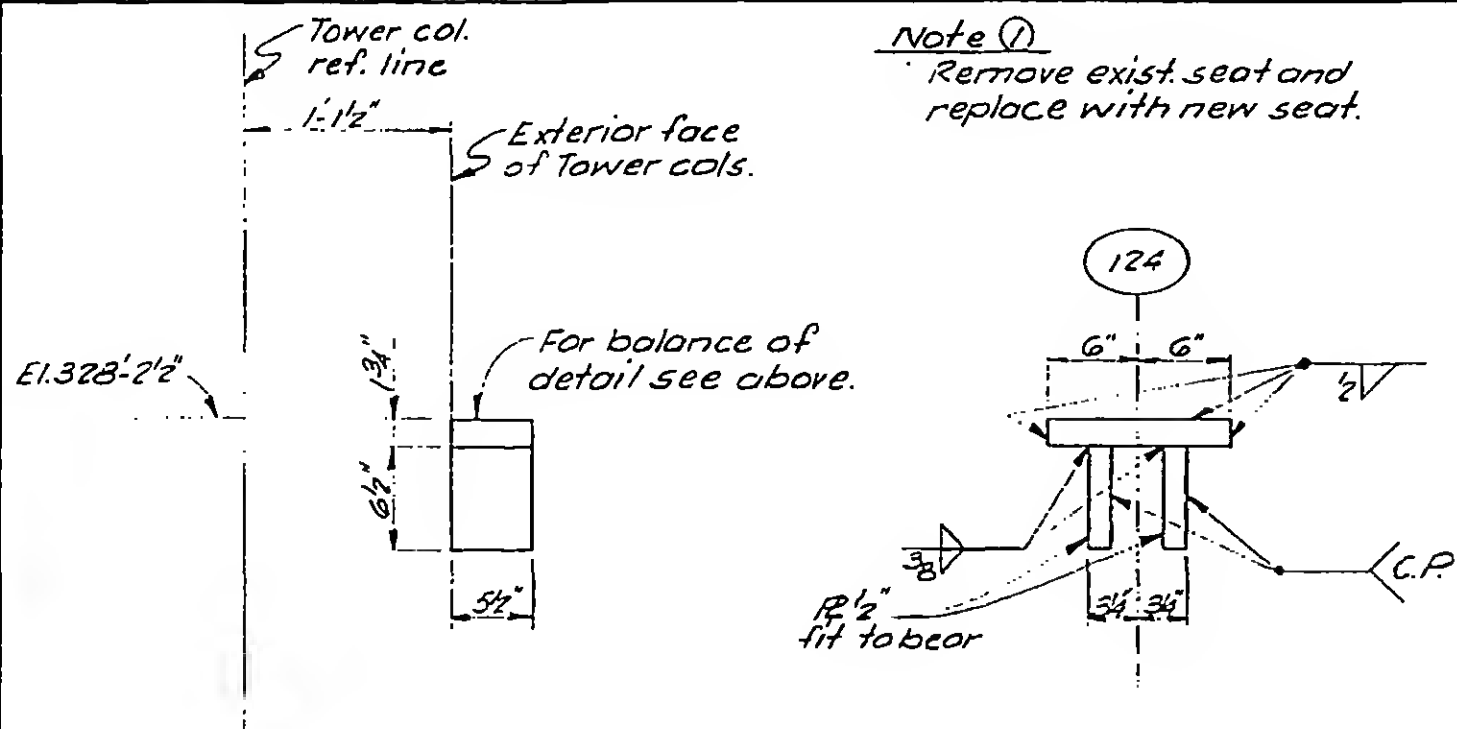
G

H

J

K

M



Schedule

Detail Number	Elevation Top of Seat
② D	329'-3 5/8"
① E	328'-2 1/2"
F	324'-1"
G	322'-8 1/2"
H	318'-7"
J	317'-2 1/2"
K	313'-1"
M	311'-8 1/2"



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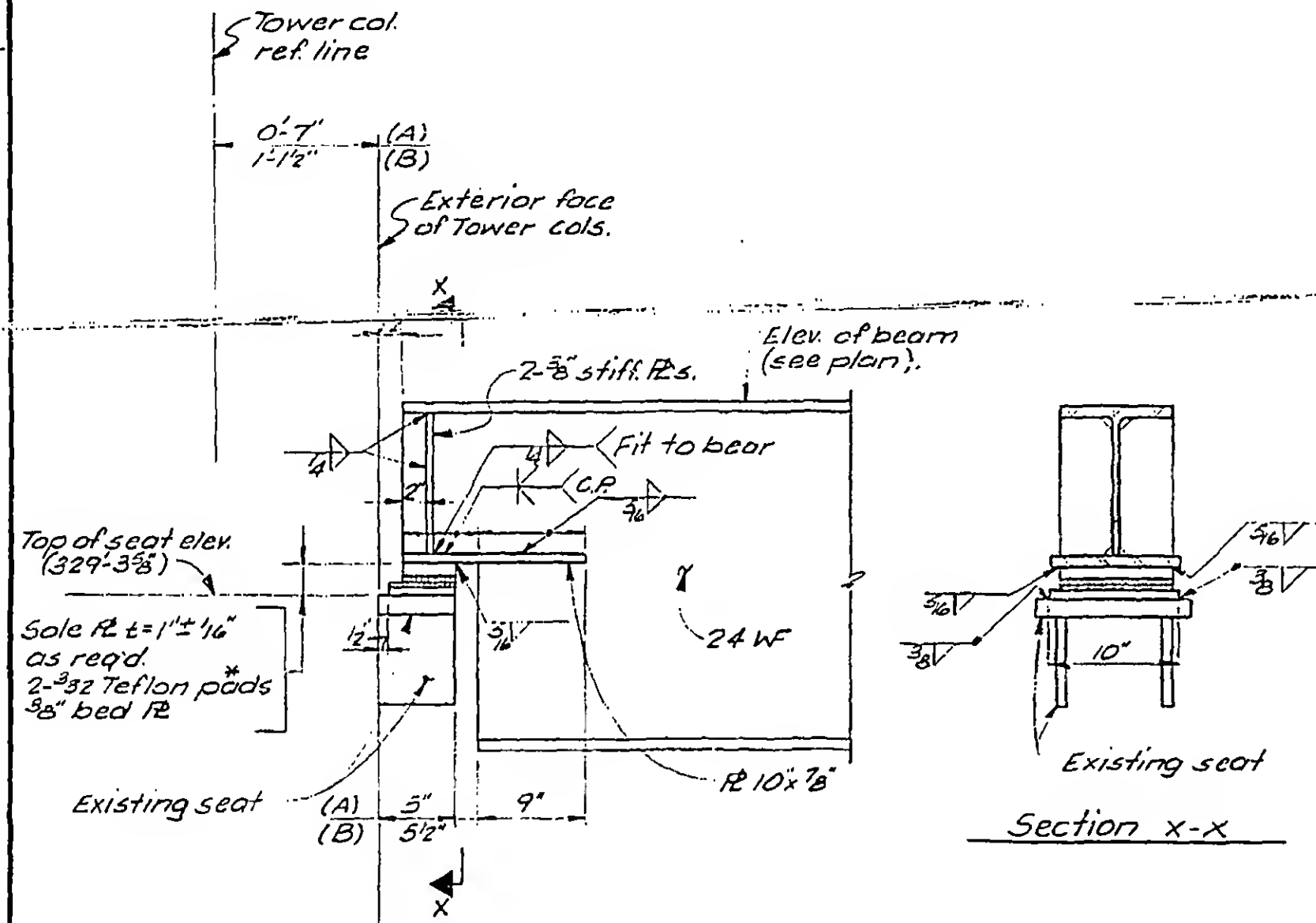
Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER

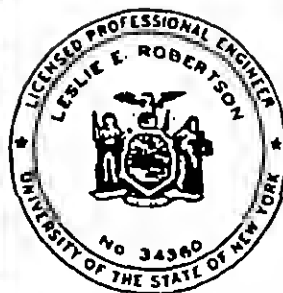
TITLE SLIDE CONNECTIONS TOWER B

DATE 11-3-72

REVISIONS

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CONSTRUCTION
11-20-72

* Teflon pads to have a bearing capacity of 2000 psi.



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A

B

13-KG.1-2

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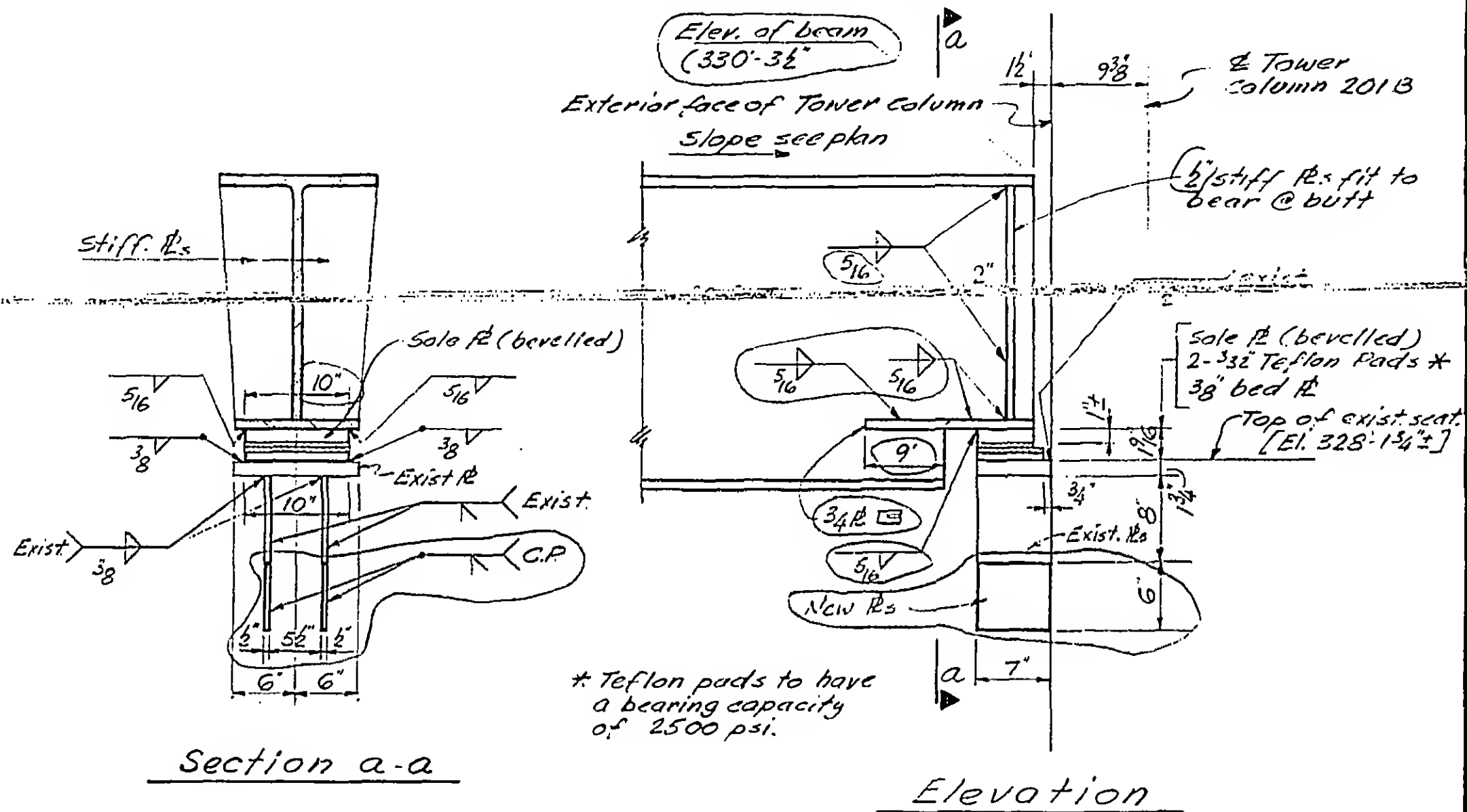
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PROJECT THE WORLD TRADE CENTER

TITLE SLIDE CONNECTION Tower B

DATE 11-3-72

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CONSTRUCTION
11-20-72

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13-K6.1-3

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TITLE SLIDE CONNECTIONS

DATE 11-20-72

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Add bevelled fill
if necessary to
accommodate
sloped girder. ∇C
(Typ. T & B)

12" 3' 12" 1" 72" 72"

30W
El. varies
12"

Remove exist
beam as indicated

$\overline{C} \nabla$ Top of beam
El. 330'-4 1/2"

↖ Erist 2/WF
see 12-JK4-20
Detail 1

35' 2" (T & B)
8-58" φ
(T & B)

/ Fit to
bear

ϵ of seat
behind

Remove east beam
as indicated

Top of beam
E1. 330'-35"
21WF
Sec 12-JK4-20
Detail 2

El varies --

Typ γ $\frac{1}{4}$
2. $\frac{1}{2}$ $\frac{1}{2}$

10/10/10

1d

a.

Top & bot fls for
Detail - 1 only --

1" sole fl
2.32" Testen pads x
2.8" Bed fl

g of seat

2. ϕ 5 7" 38"
x 0.7" long

536015
1325 f111111
749p=)

5/16

102

56' N

14.

1

1

7

A handwritten sketch of a coordinate system. It shows a horizontal axis and a vertical axis intersecting at an origin. There are tick marks on both axes. A point is marked in the first quadrant and labeled with the number '12'.

12

Age Group	Percentage
15-19	10
20-24	25
25-29	45
30-34	65
35-39	80
40-44	90
45-49	95
50-54	98
55-59	100
60-64	100

11

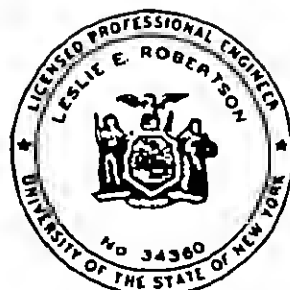
*Teflon pads to have a bearing capacity of 2000 psi

a

4

6

13-KG.1-4



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PROJECT

THE WORLD TRADE CENTER

TITLE

SLIDE CONNECTION

DATE

4-20-73

REVISIONS

Level surface
E1.330.5Bed by others. See
Detail R 8-AB3-47.8

Ø 11" x varies x 0'-11"

24WF



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A

13-K6.1-5

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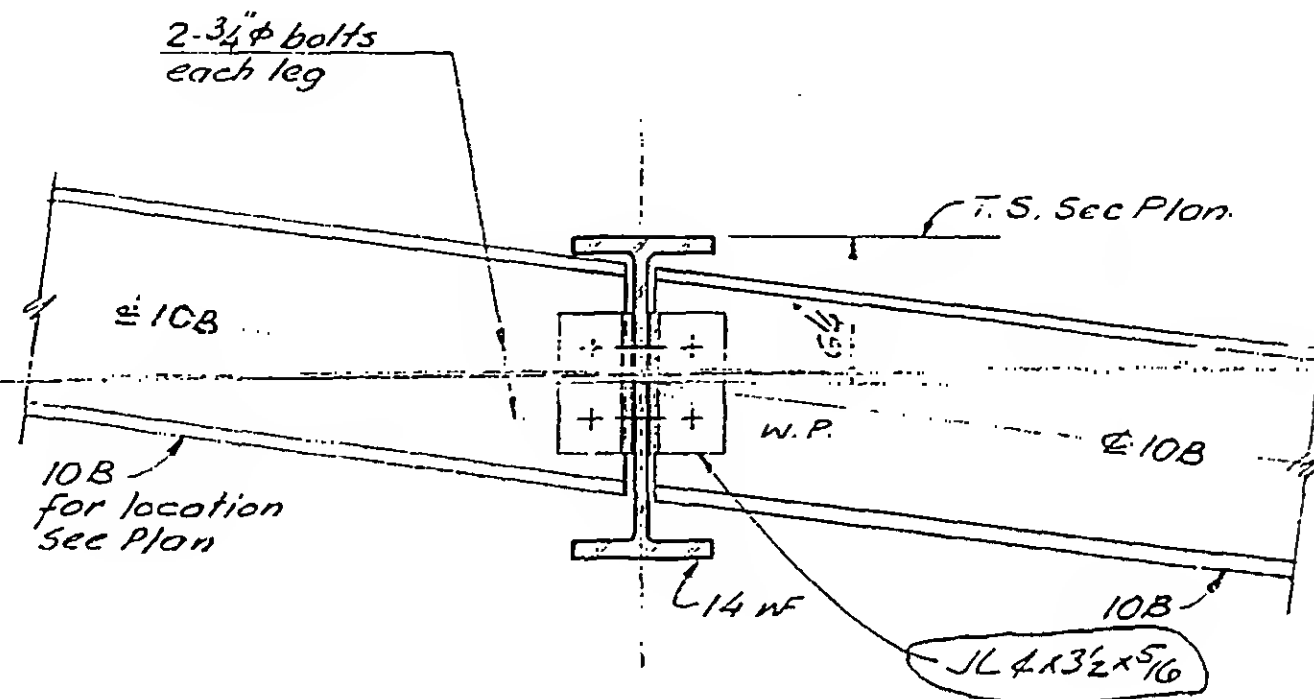
PROJECT *THE WORLD TRADE CENTER*

TITLE BEAM CONNECTION DETAIL AT STAIR

DATE 11-3-72

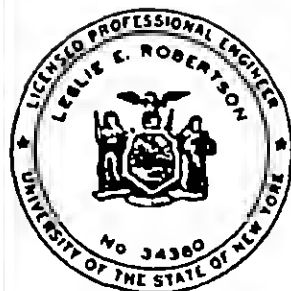
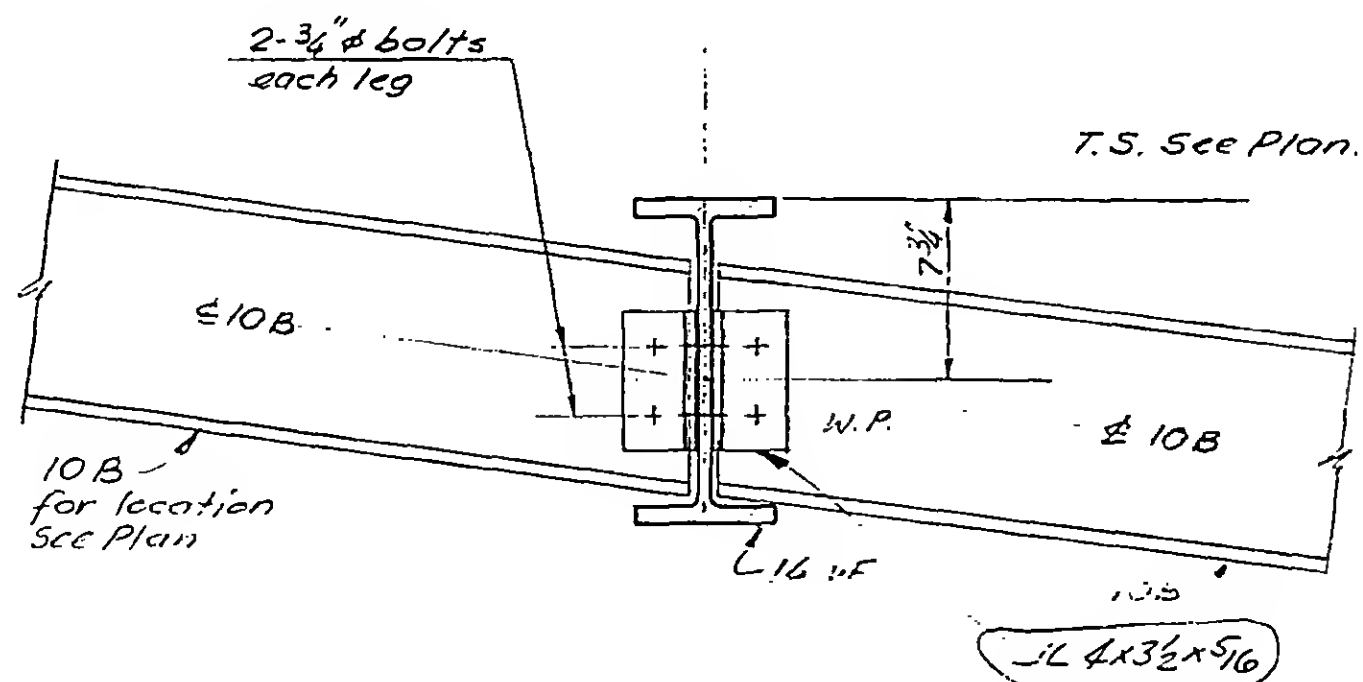
REVISIONS

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11-20-72



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F



ORDER

PRAWN

REVIEWS

13-KG.2-1

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

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PROJECT THE WORLD TRADE CENTER

TITLE DETAIL OF HANGERS AT STAIR

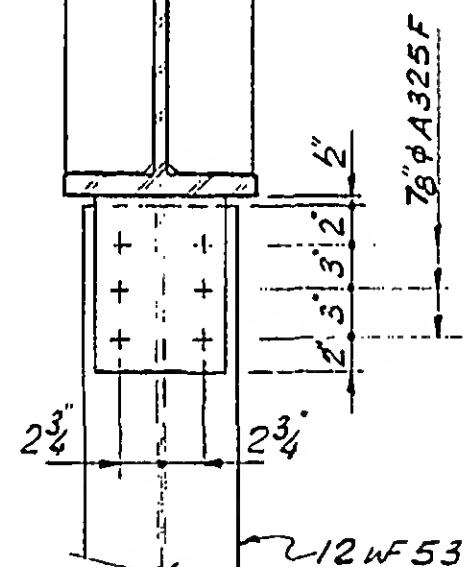
DATE 11-3-72

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11-20-72

El. 332'

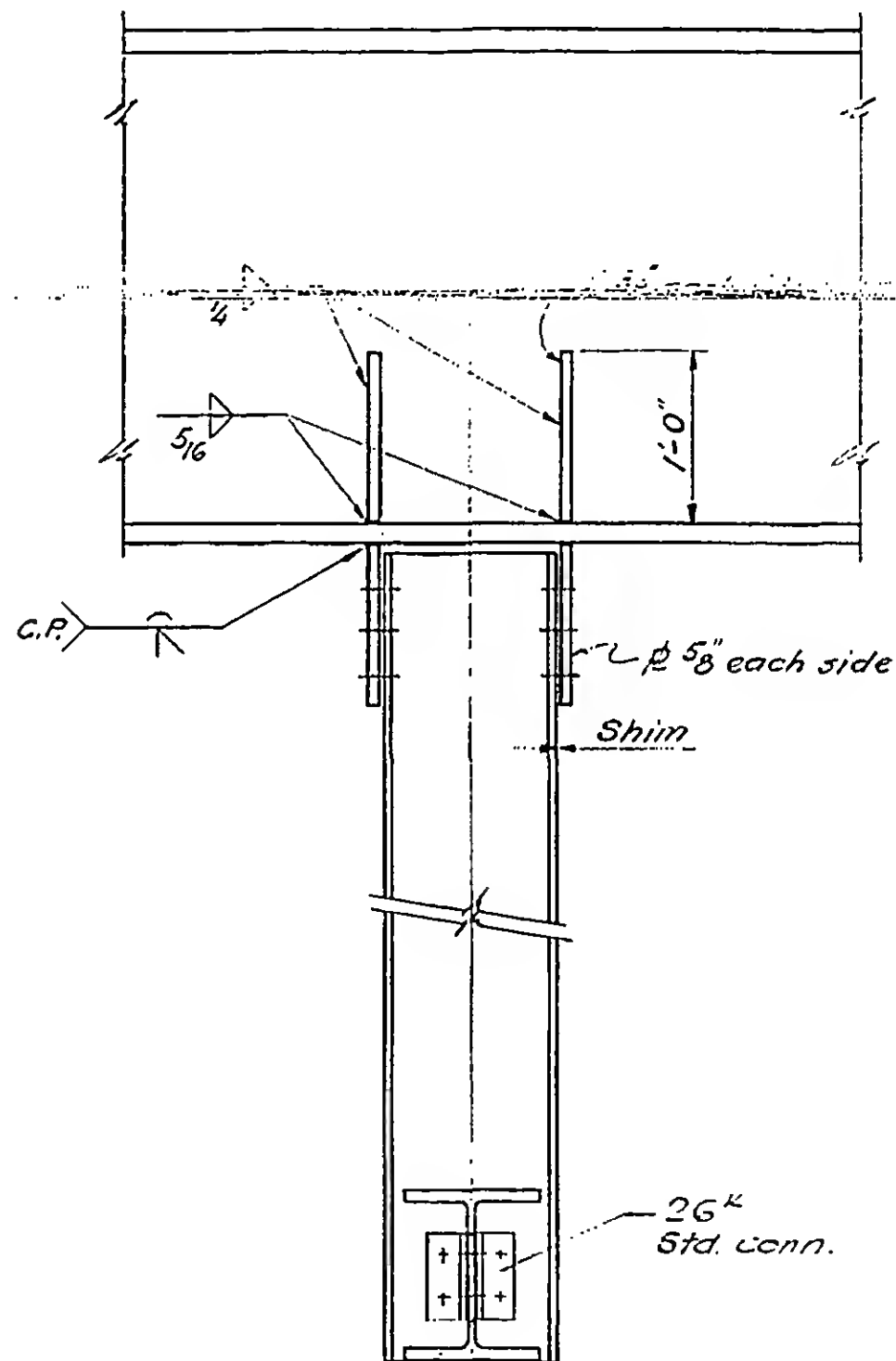
Elevation
See plan



Elevation
(see plan)

Beam at
lower level

Elevation



Section a-a

13-K6.2-2



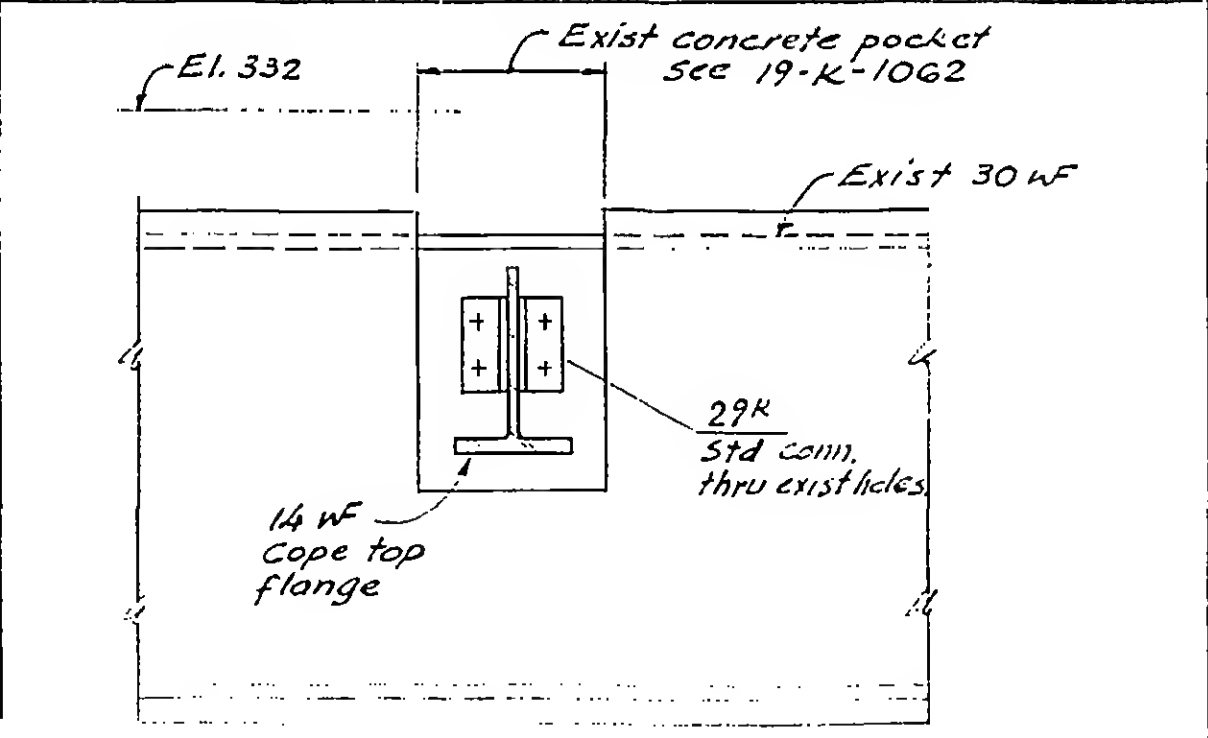
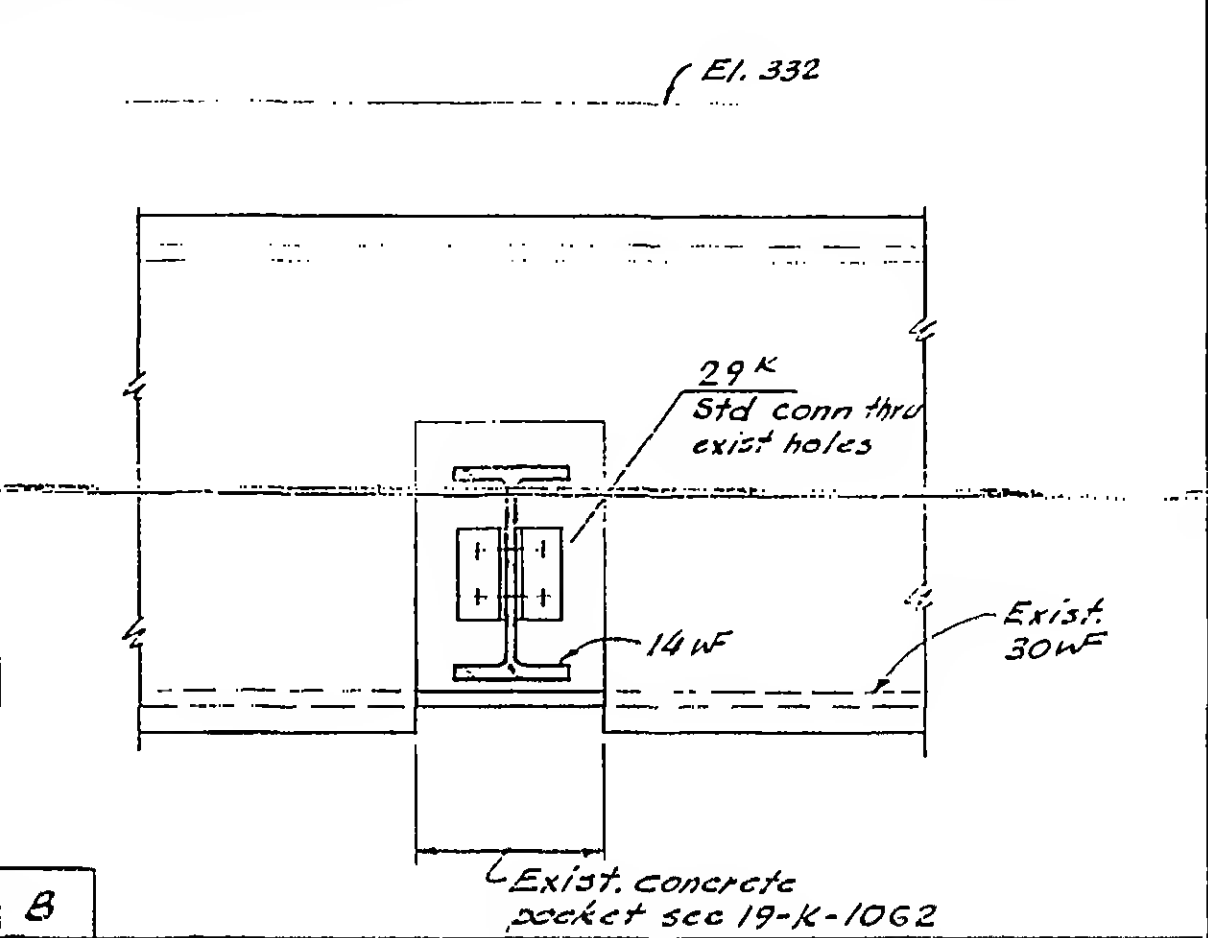
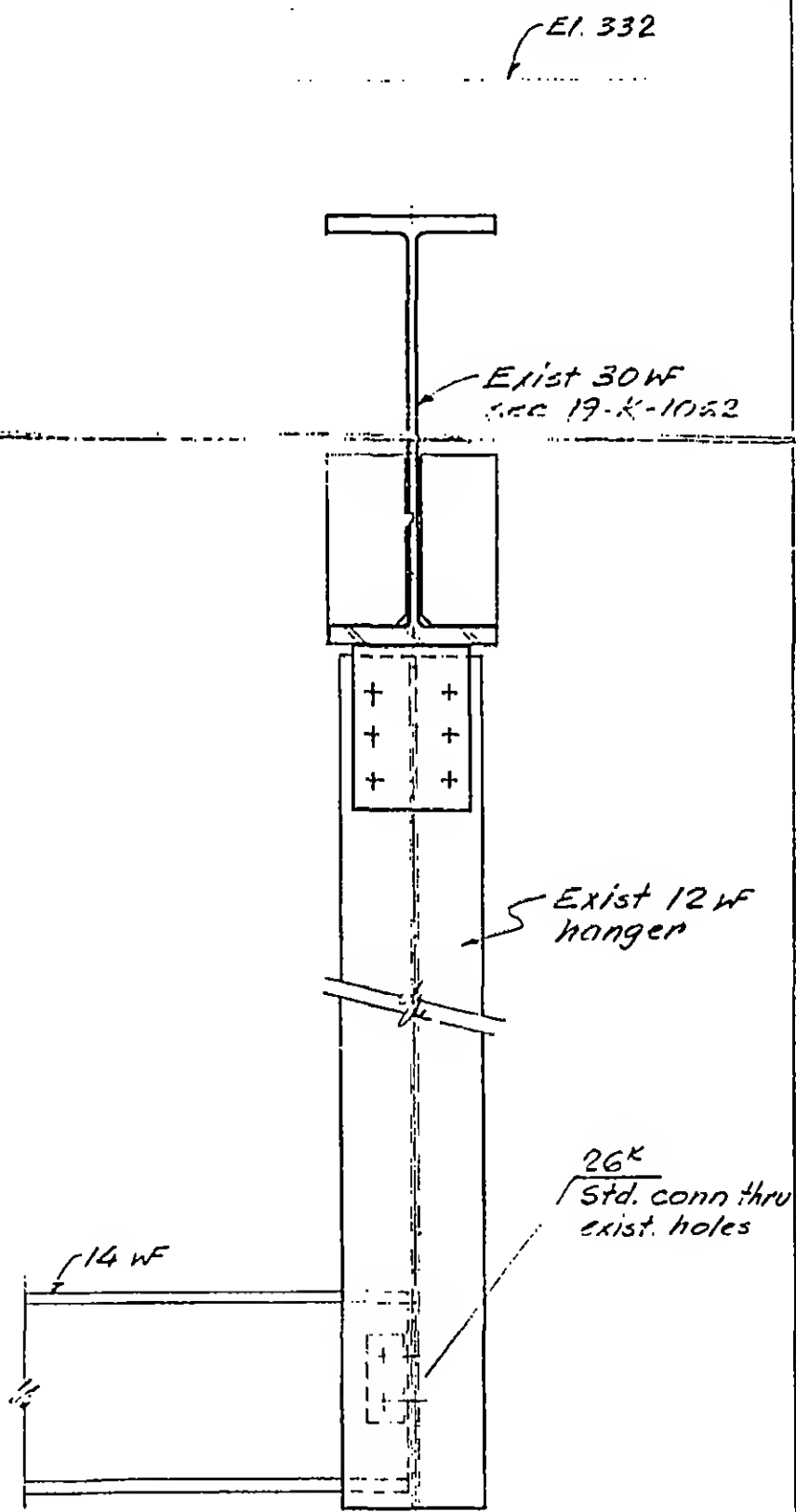
DESIGNED

DRAWN
John Gucius

REVIEWED

REVISIONS

Releged for construction 11-20-72



DESIGNED

DRAWN *John G. ...*

REVIEWED

Structural & Civil Engineers

PROJECT

THE WORLD TRADE CENTER

TITLE

DETAIL TO EXISTING AT STAIR

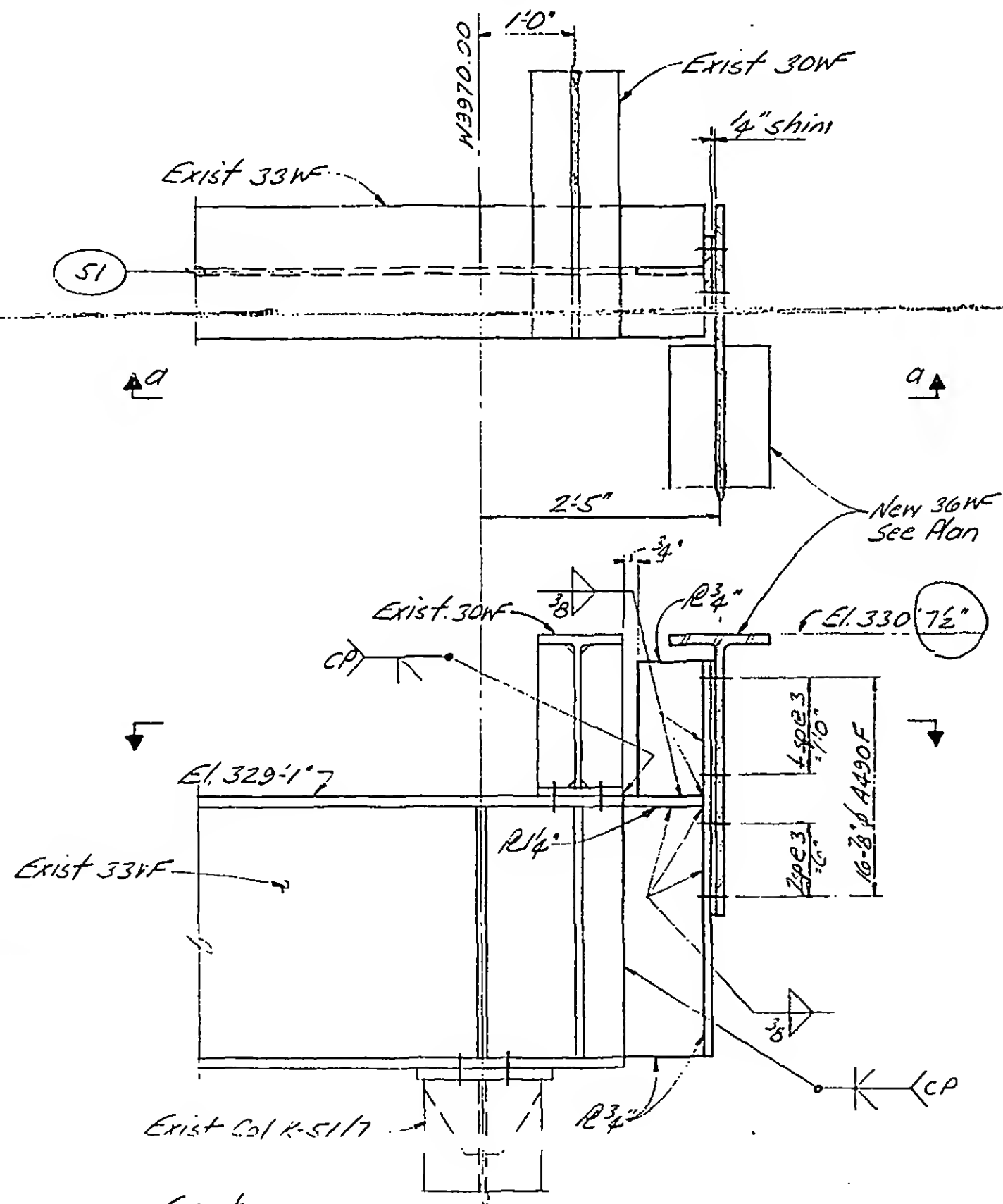
DATE _____

11-3-72

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2-5-73



Section a-a



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13-KG.2-4

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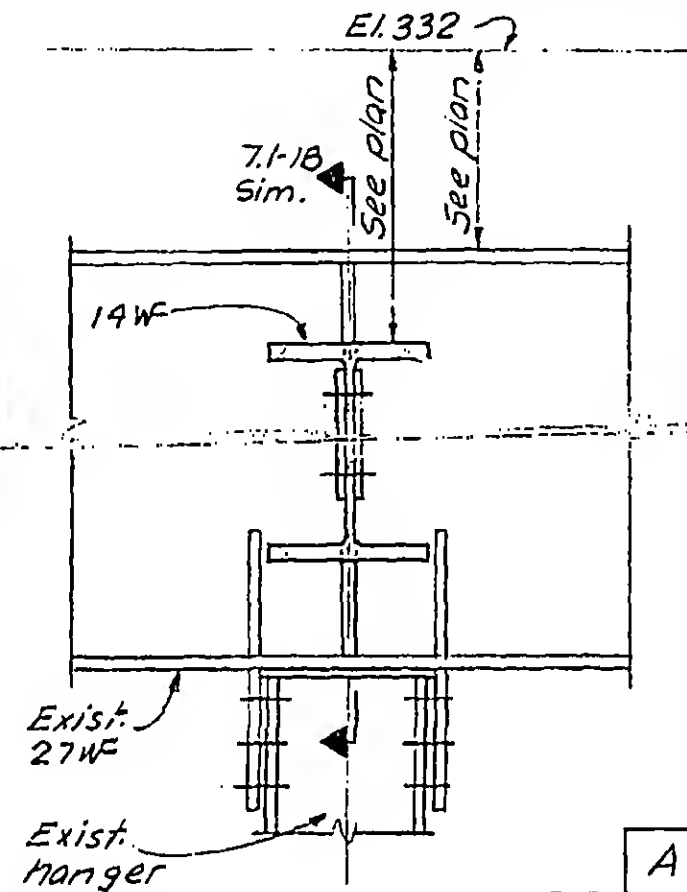
TITLE BEAM CONNECTIONS AT EXISTING

DATE 11-3-72

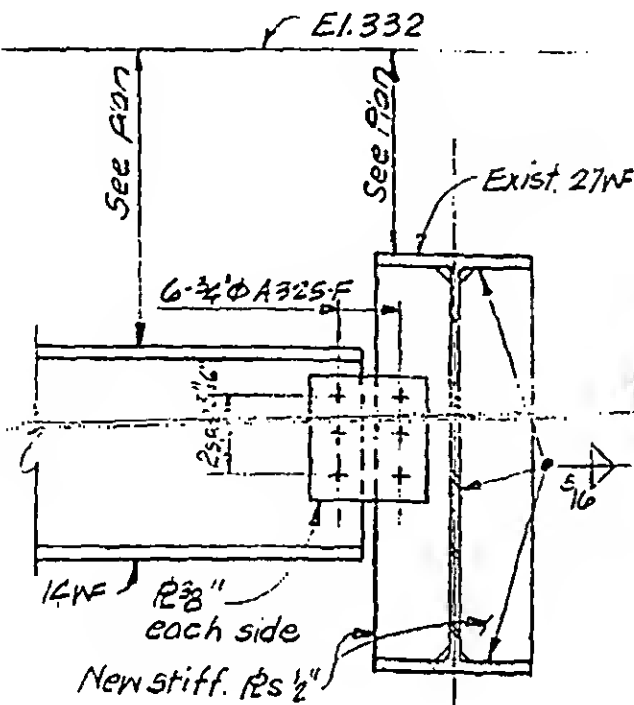
REVISIONS

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construction
11-20-72

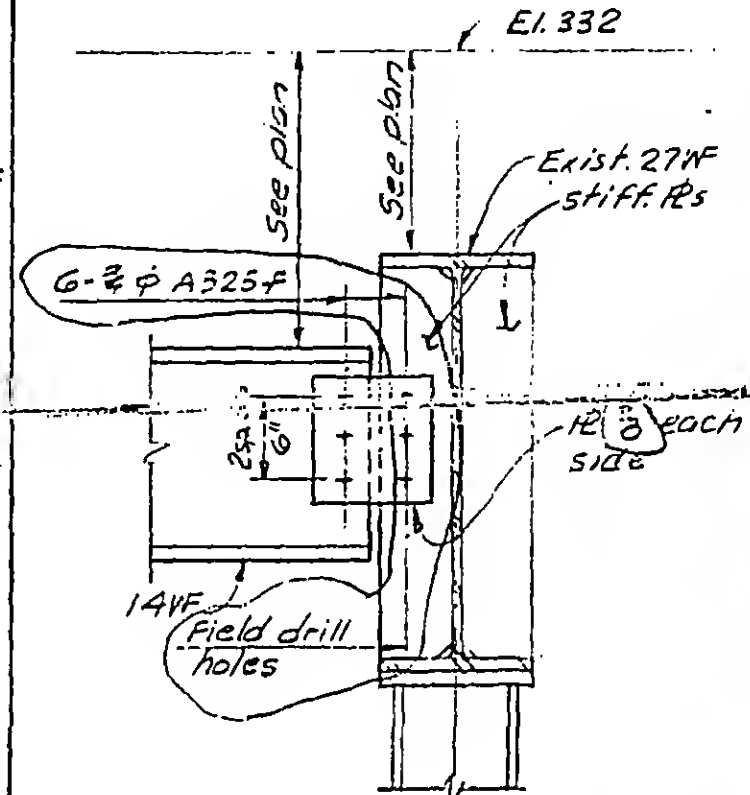
2-5-73



A



B



C



DESIGNED

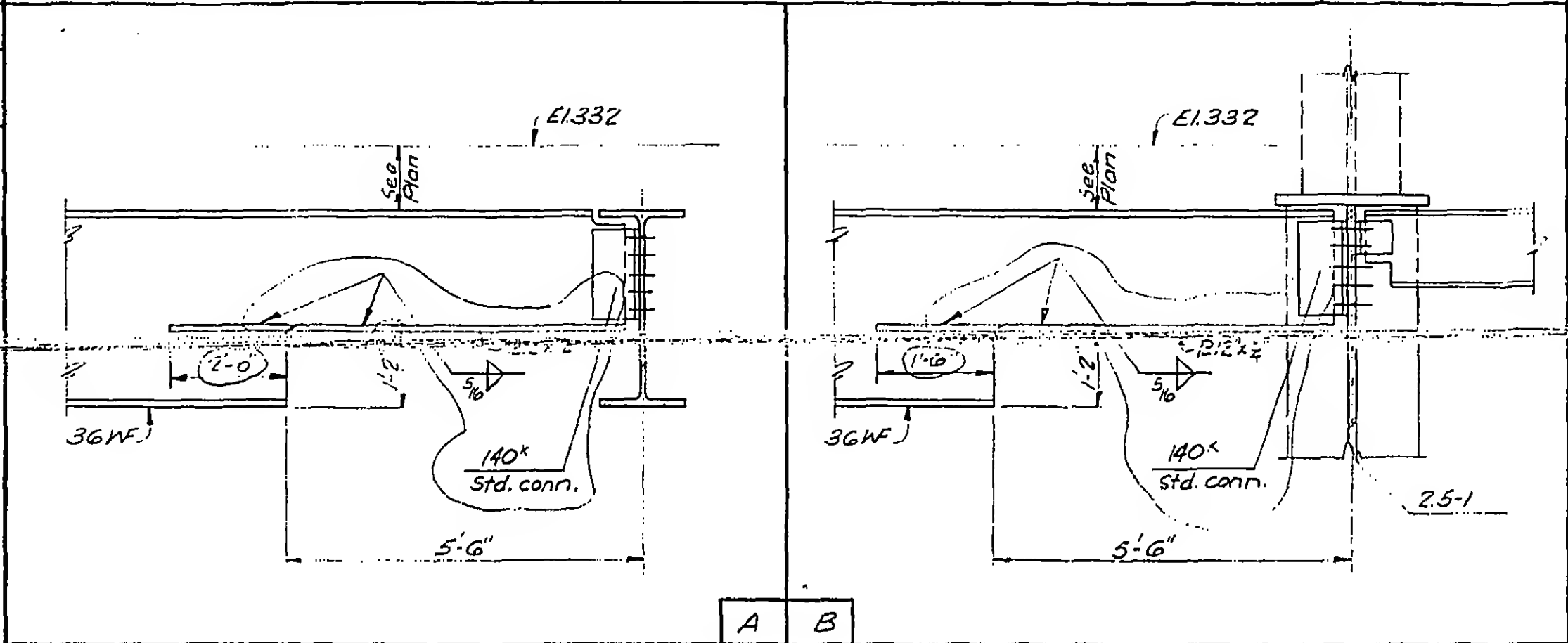
DRAWN
A.L. Frangui

REVIEWED

13-K7.1-1

REVISIONS

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VAD

DRAWN

TR

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13-K7.2-1

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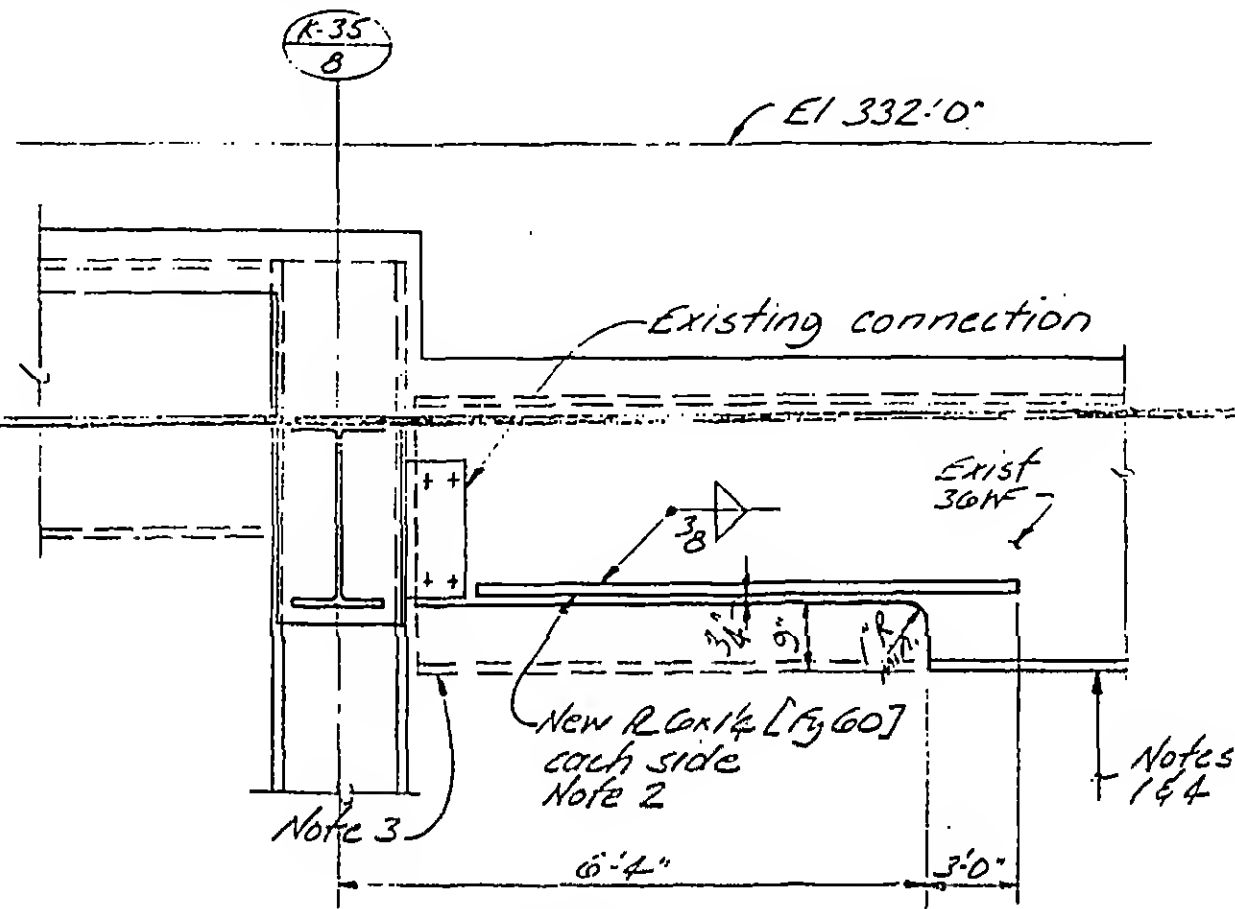
Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER

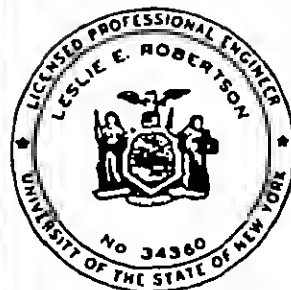
TITLE BEAM NOTCH IN EXISTING BEAM

DATE 11-3-72

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construction
11-20-72Section A-AProcedure

1. Shore
2. Install new Rs
3. Remove portion of beam indicated
4. Remove shore



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13K7.3-1

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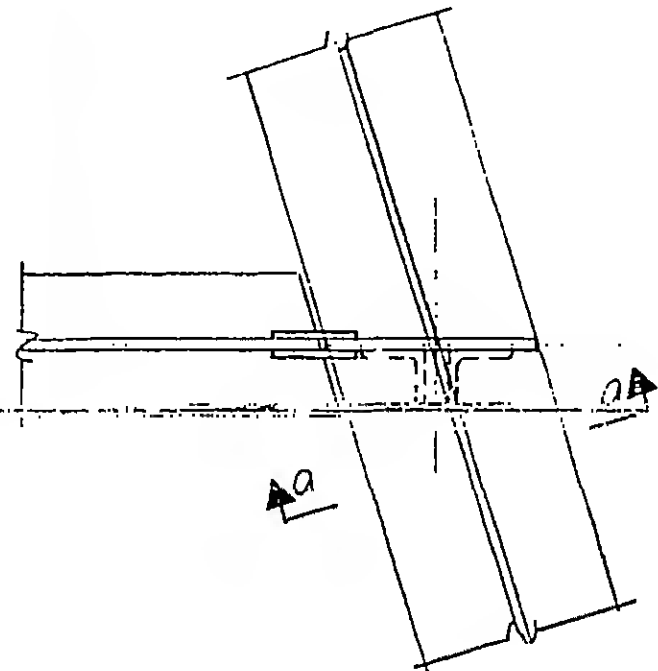
PROJECT THE WORLD TRADE CENTER

TITLE HANGER DETAILS ABOVE MECHANICAL PLATFORM

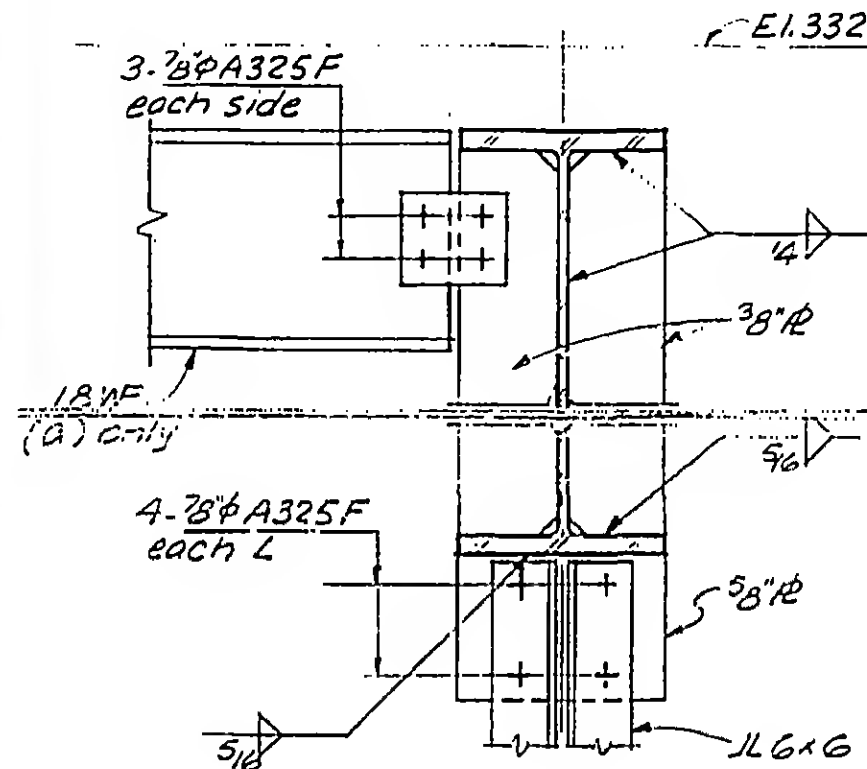
DATE 11-3-72

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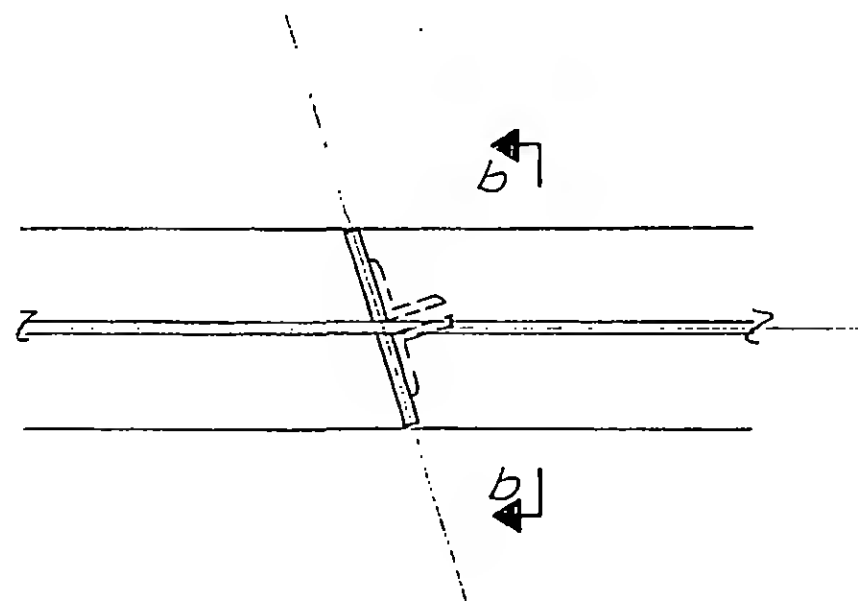


A

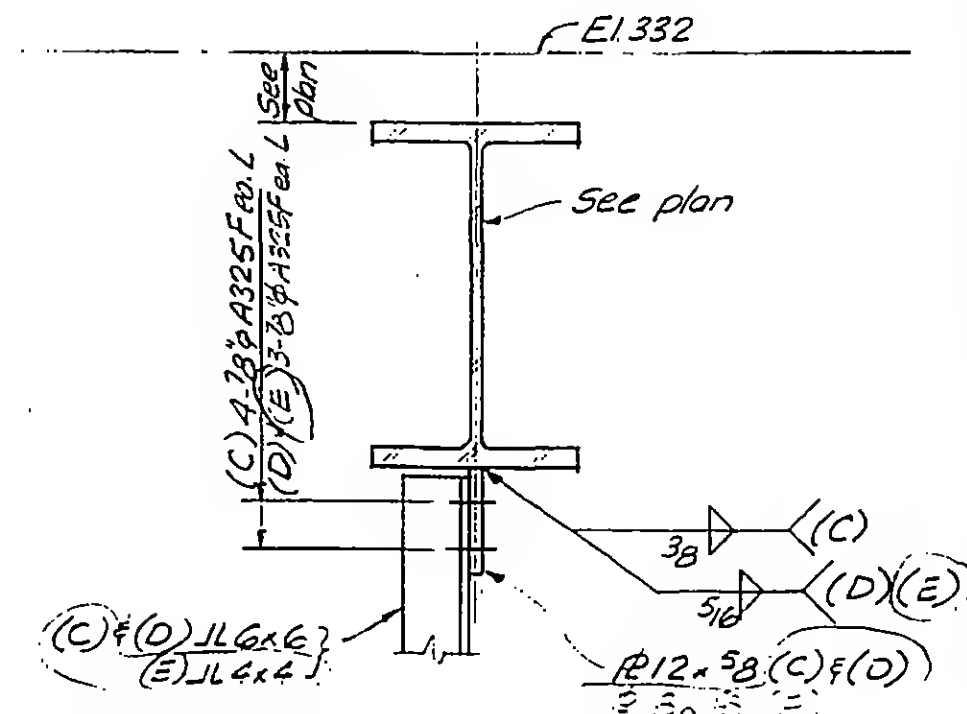


a

b



C



SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

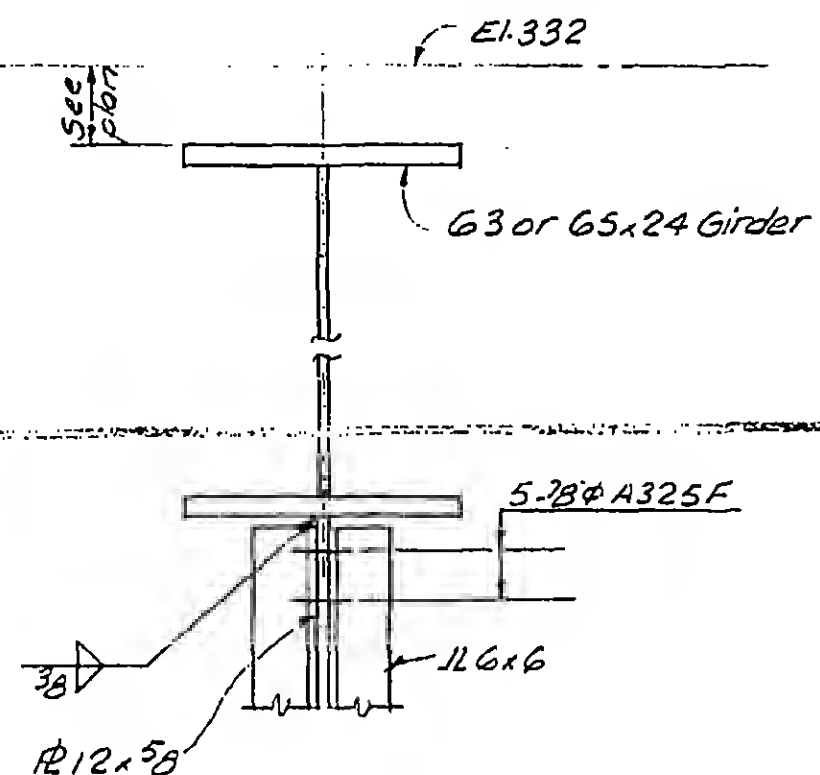
Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER

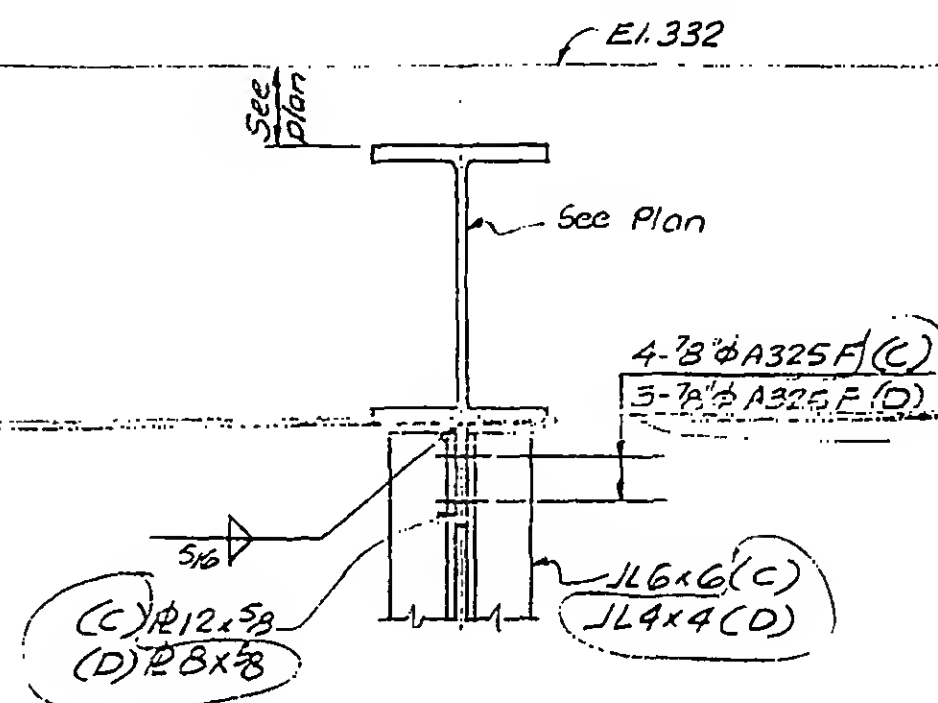
TITLE HANGER DETAILS ABOVE MECHANICAL PLATFORM

DATE 11-3-72

REVISIONS

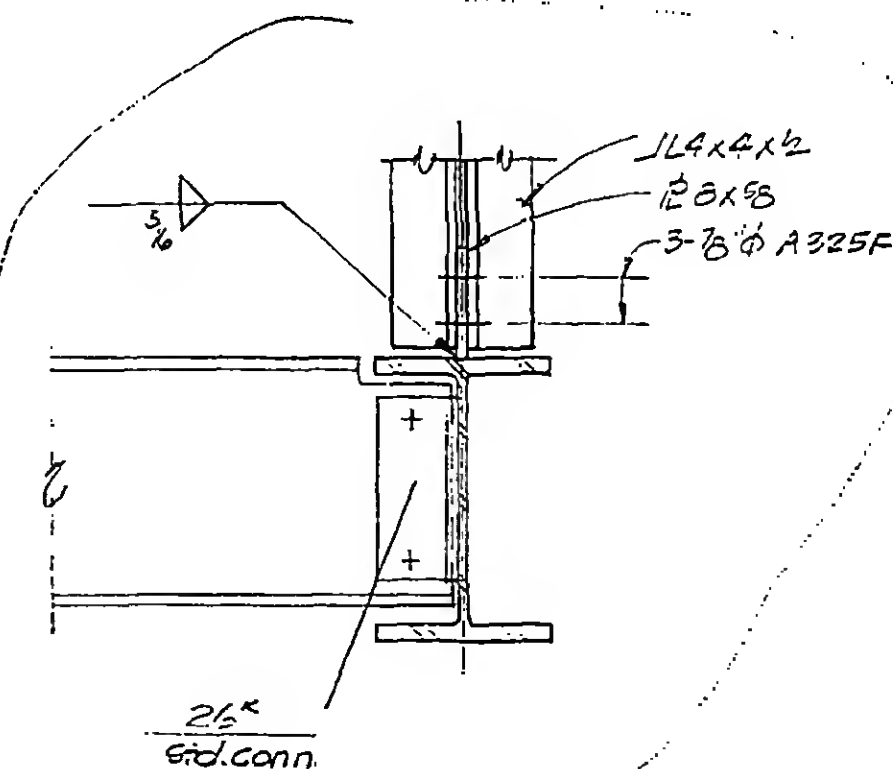
Released for
construction
11-24-72

A



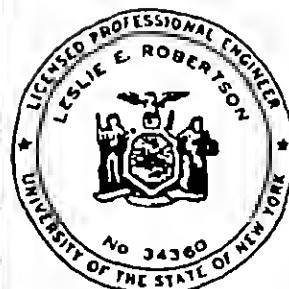
C

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13-K8.1-2



DESIGNED

DRAWN
A.L. FRANQUI

REVIEWED

Structural & Civil Engineers

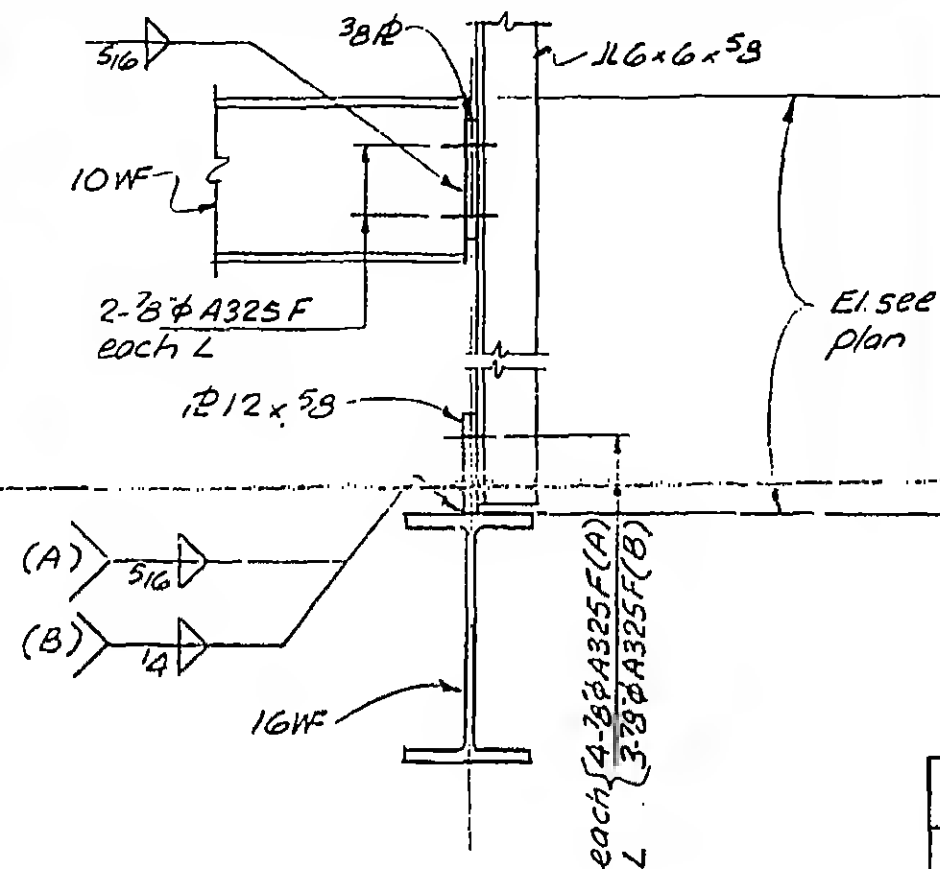
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DATE 11-3-72

REVISIONS

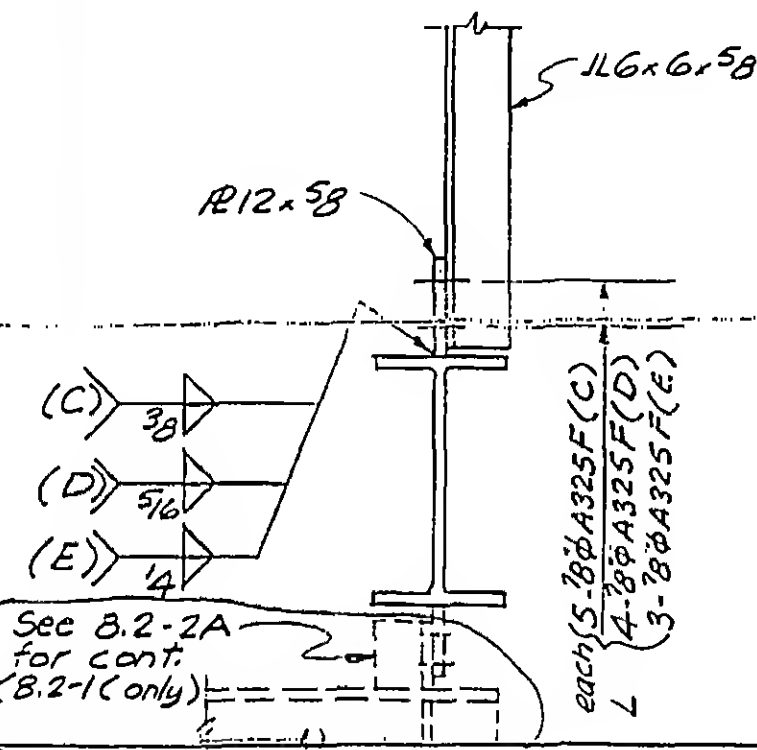
Released for
construction
11-24-72

2-5-73



A

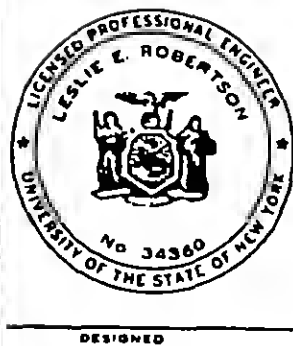
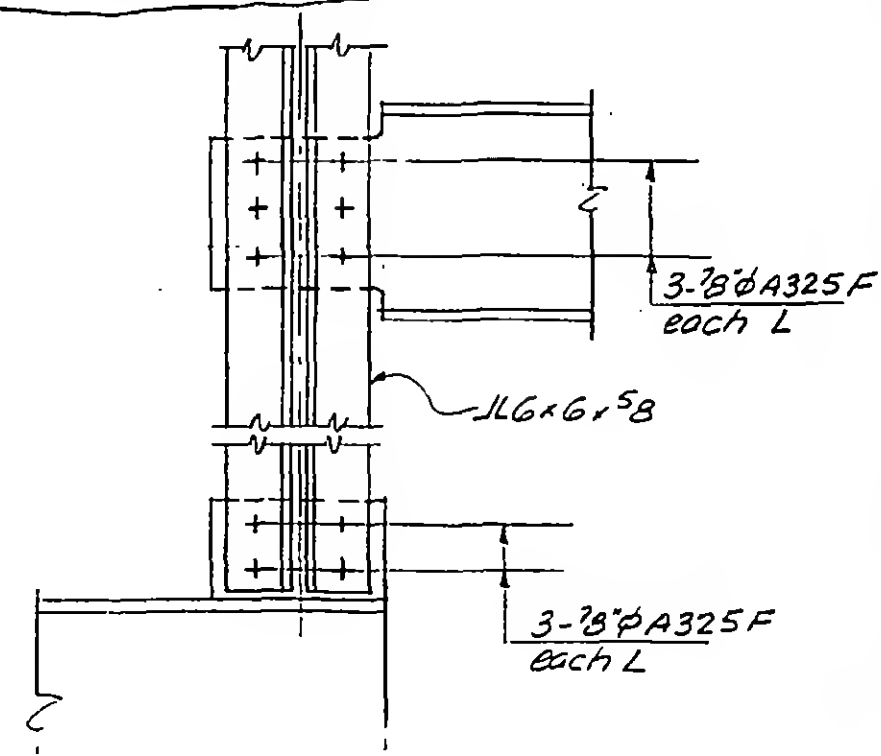
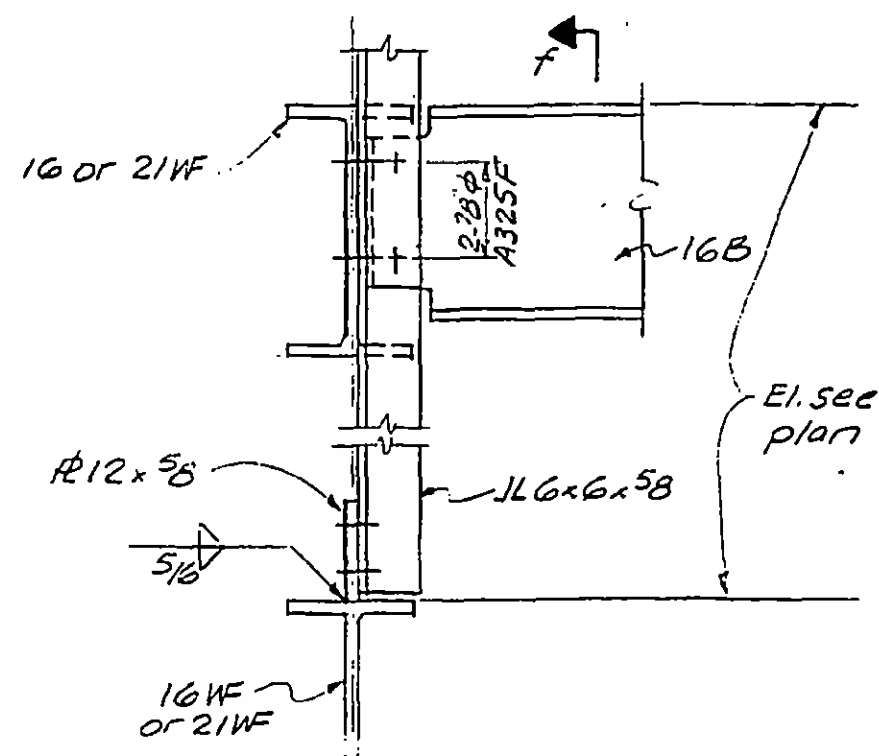
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SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

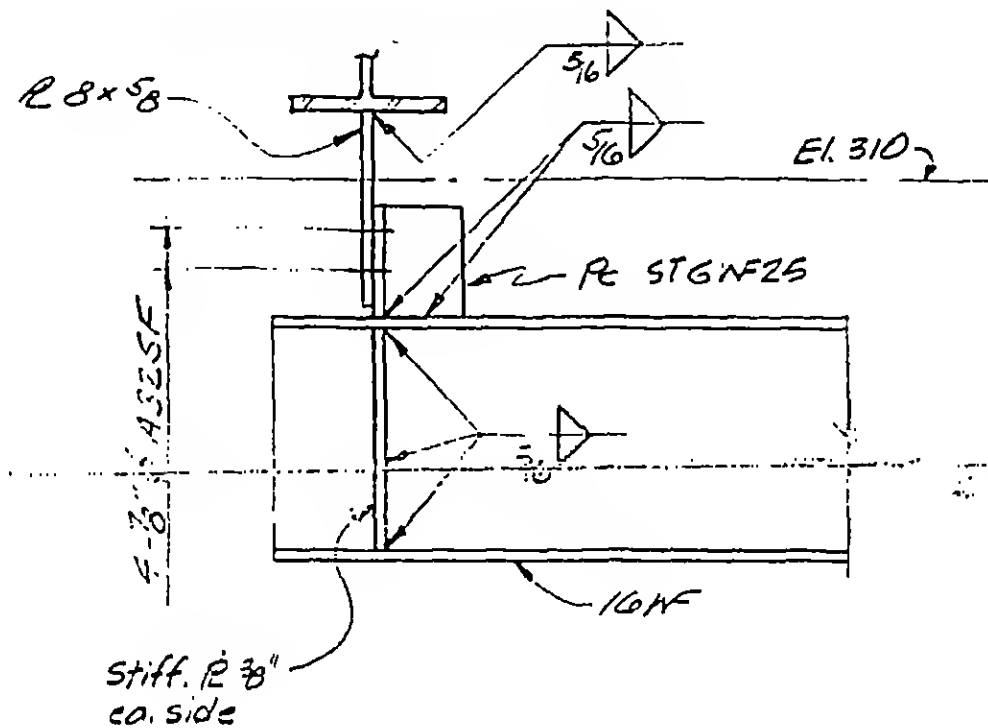
Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER

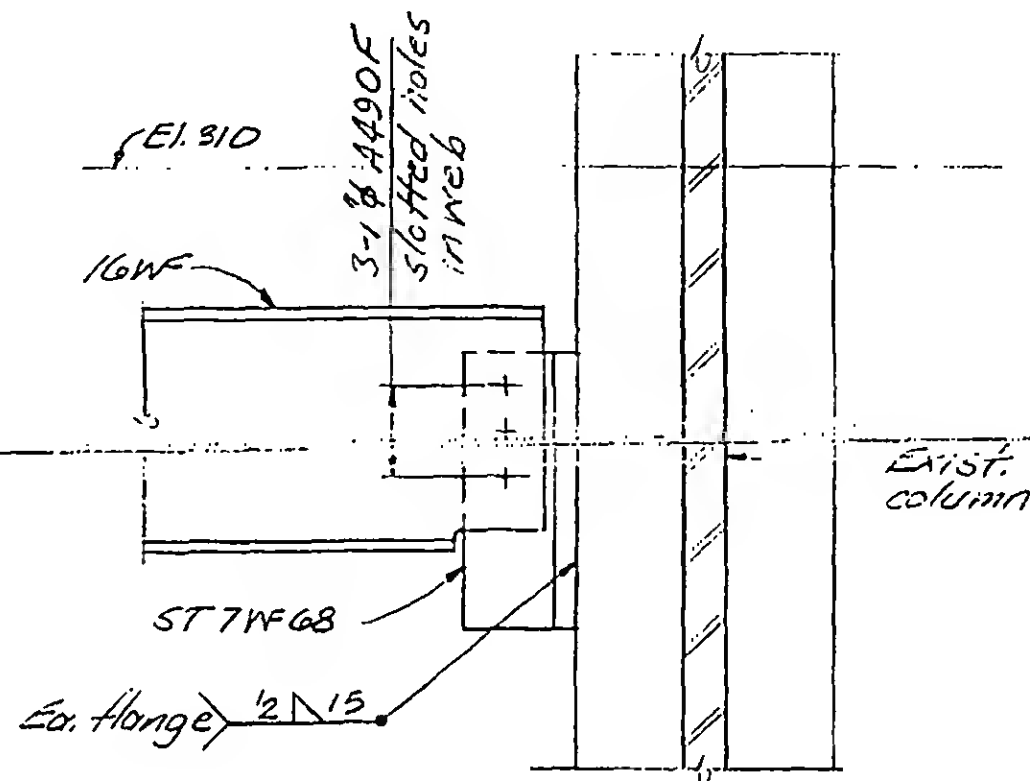
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DATE 2-5-73

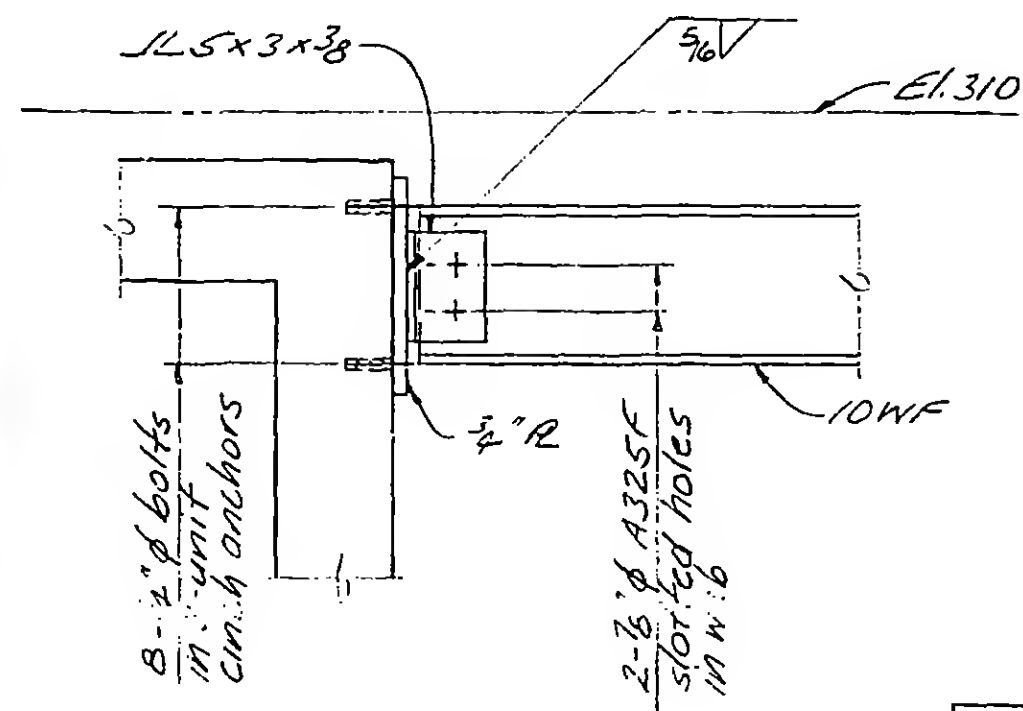
REVISIONS



A



B



C



DESIGNED

DRAWN

REVIEWED

13-K8.2-2

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER

TITLE CONNECTION DETAILS - INTERMEDIATE LEVEL

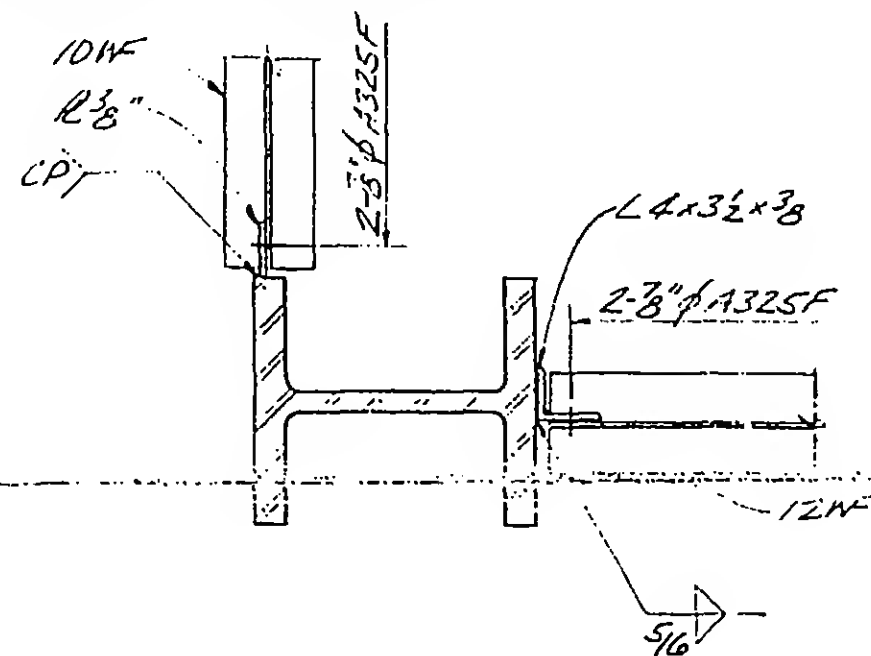
DATE 11-3-72

REVISIONS

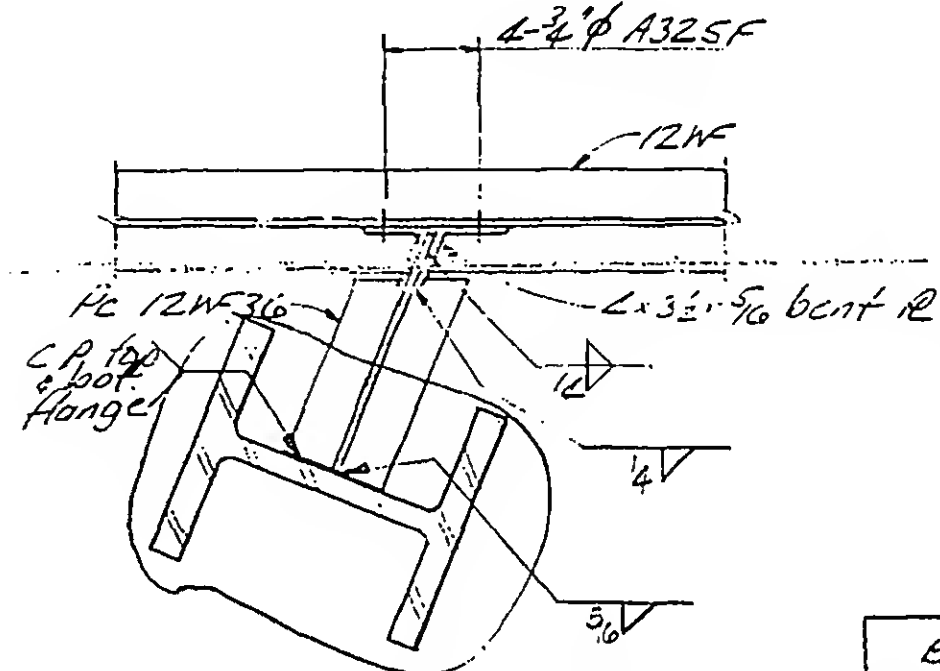
Released for
construction

11-24-72

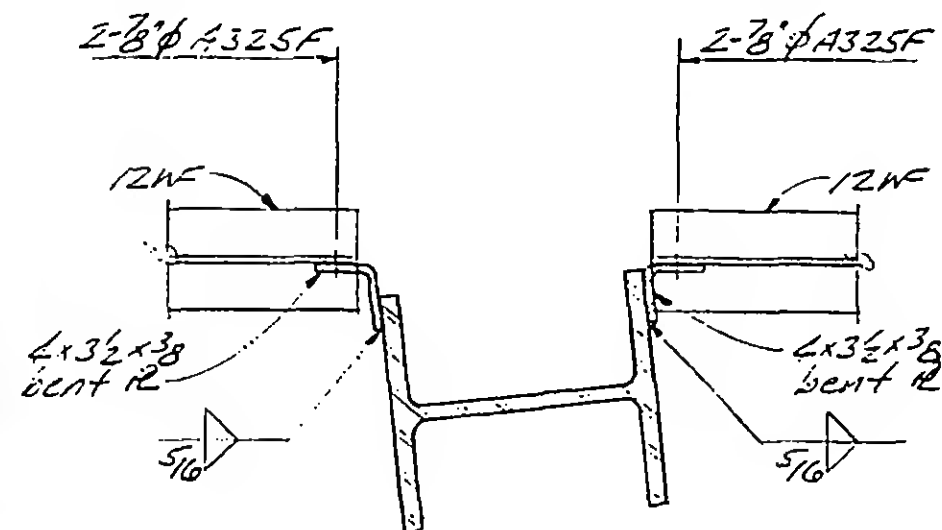
2-5-73



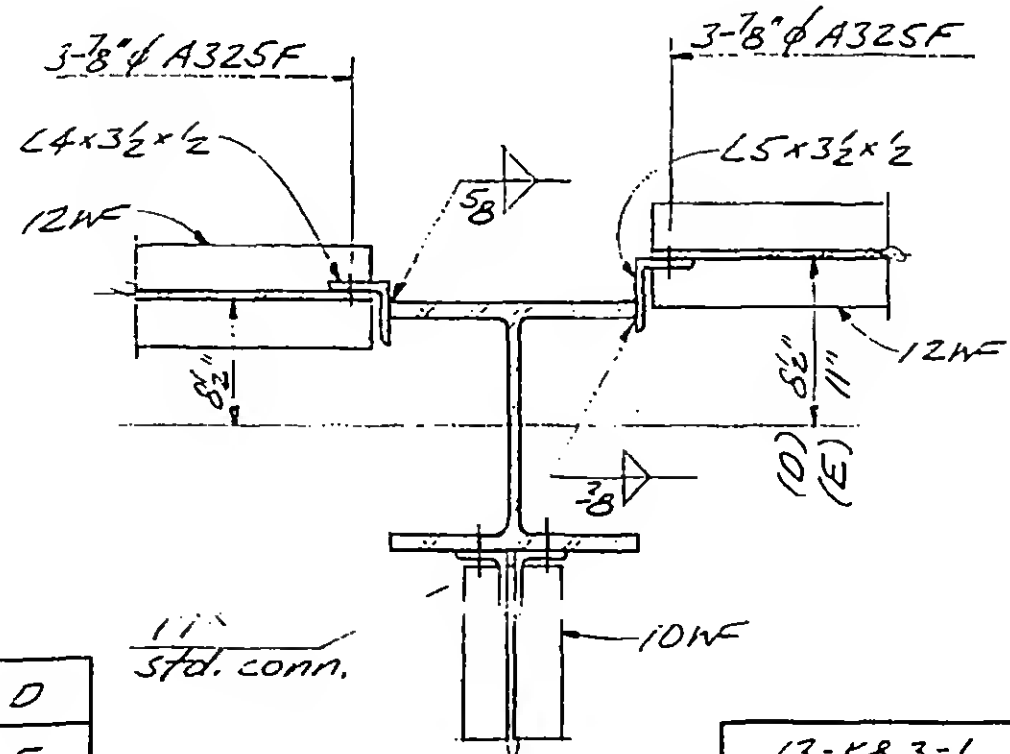
A



B



C



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13-K8.3-1



DESIGNED

DRAWN

REVIEWED

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

Structural & Civil Engineers

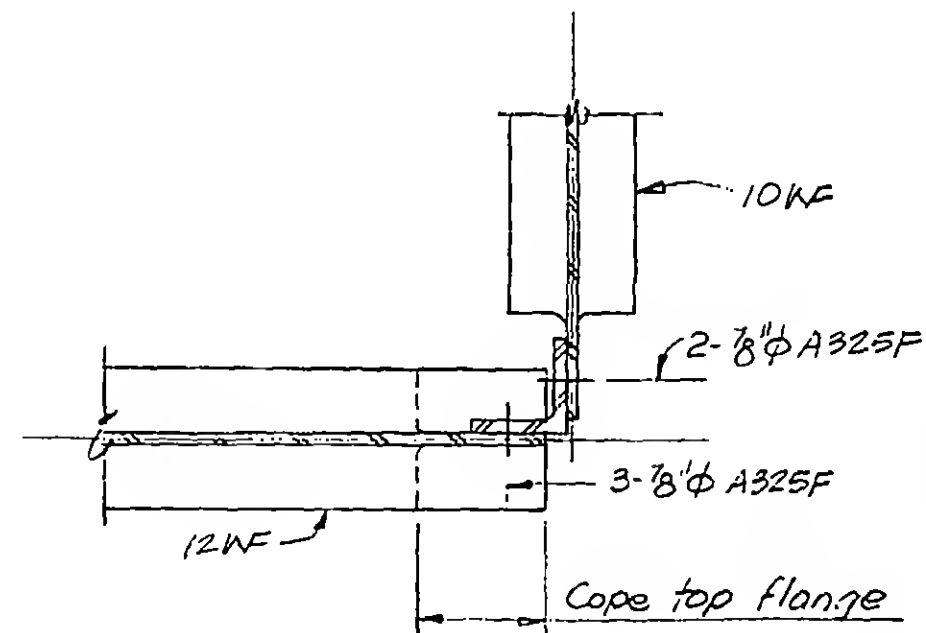
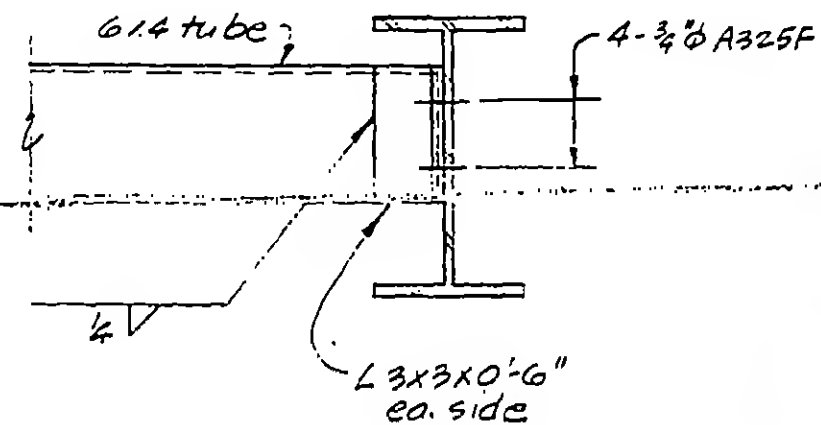
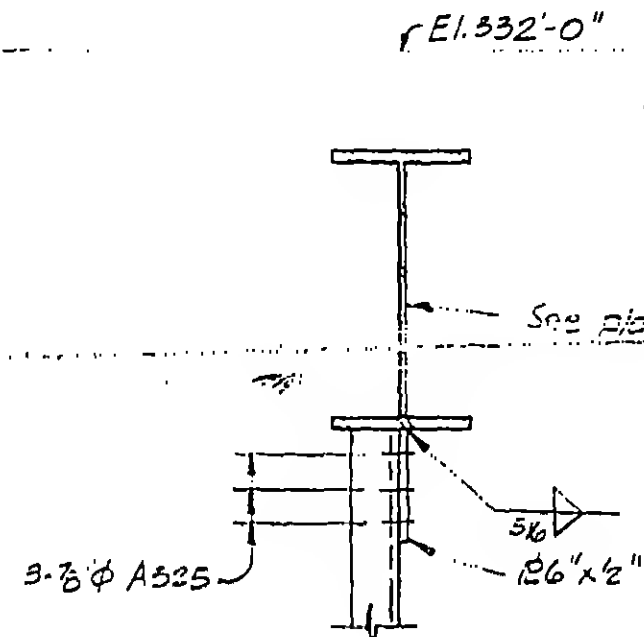
PROJECT THE WORLD TRADE CENTER

TITLE CONNECTION DETAILS INTERMEDIATE LEVEL

DATE 11-3-72

REVISIONS

Released for
Construction
11-24-72



DESIGNED

DRAWN

REVIEWED

13-K8.3-2

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

Structural & Civil Engineers

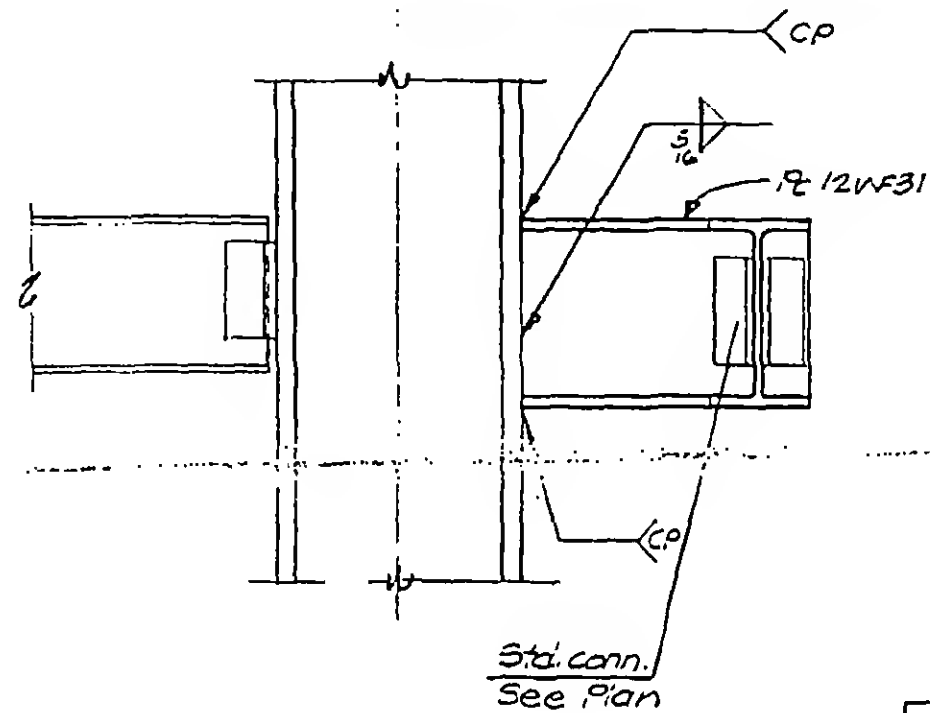
PROJECT THE WORLD TRADE CENTER

TITLE INTERMEDIATE LEVEL DETAILS

DATE 11-24-72

REVISIONS

Released for
construction
11-24-72



DESIGNED

DRAWN

REVIEWED

13-K8.3-3

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER

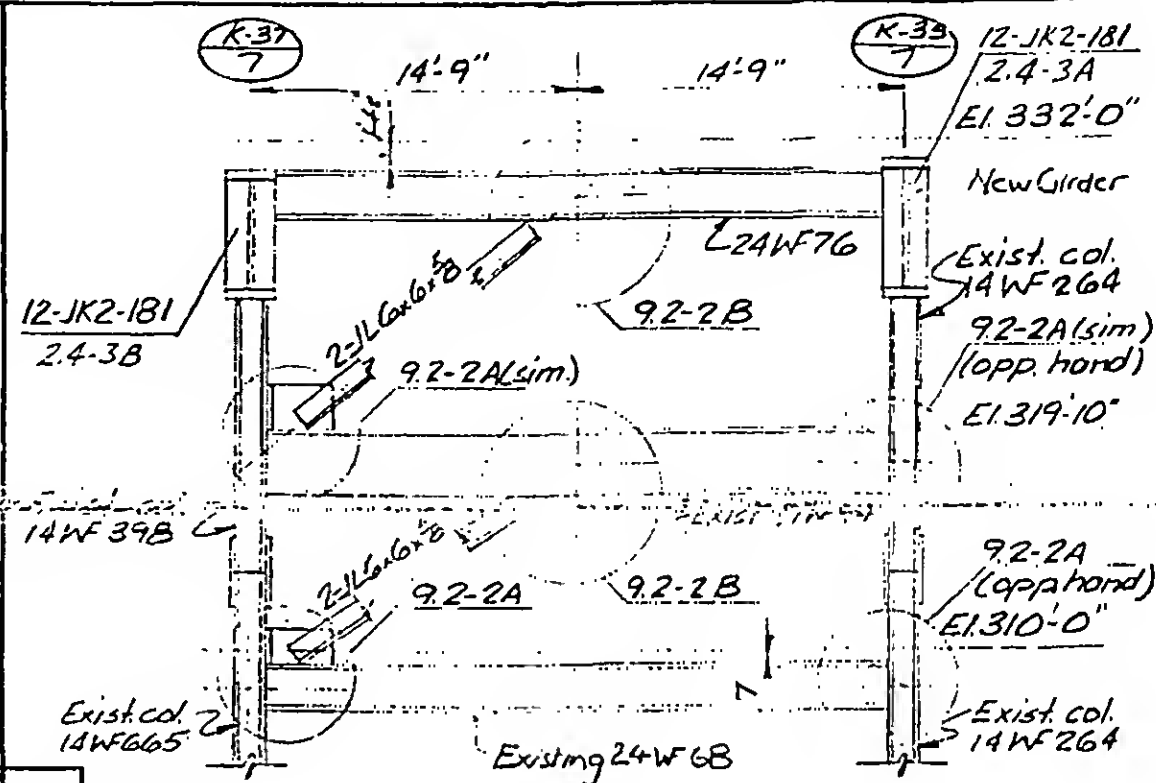
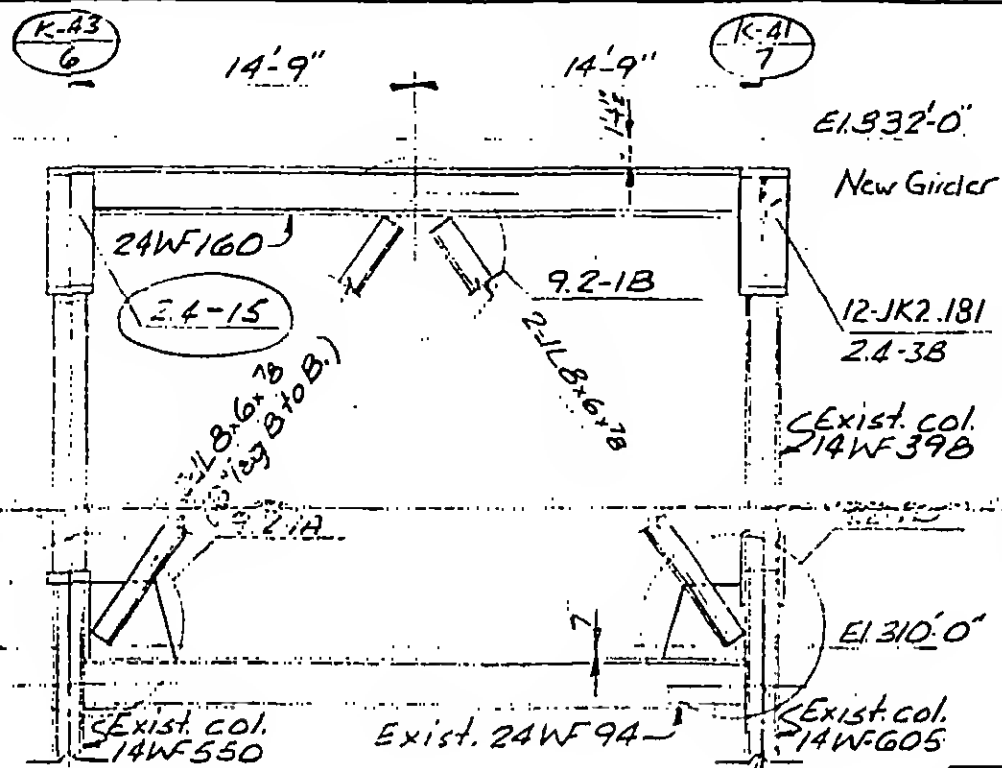
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DATE 11-3-72

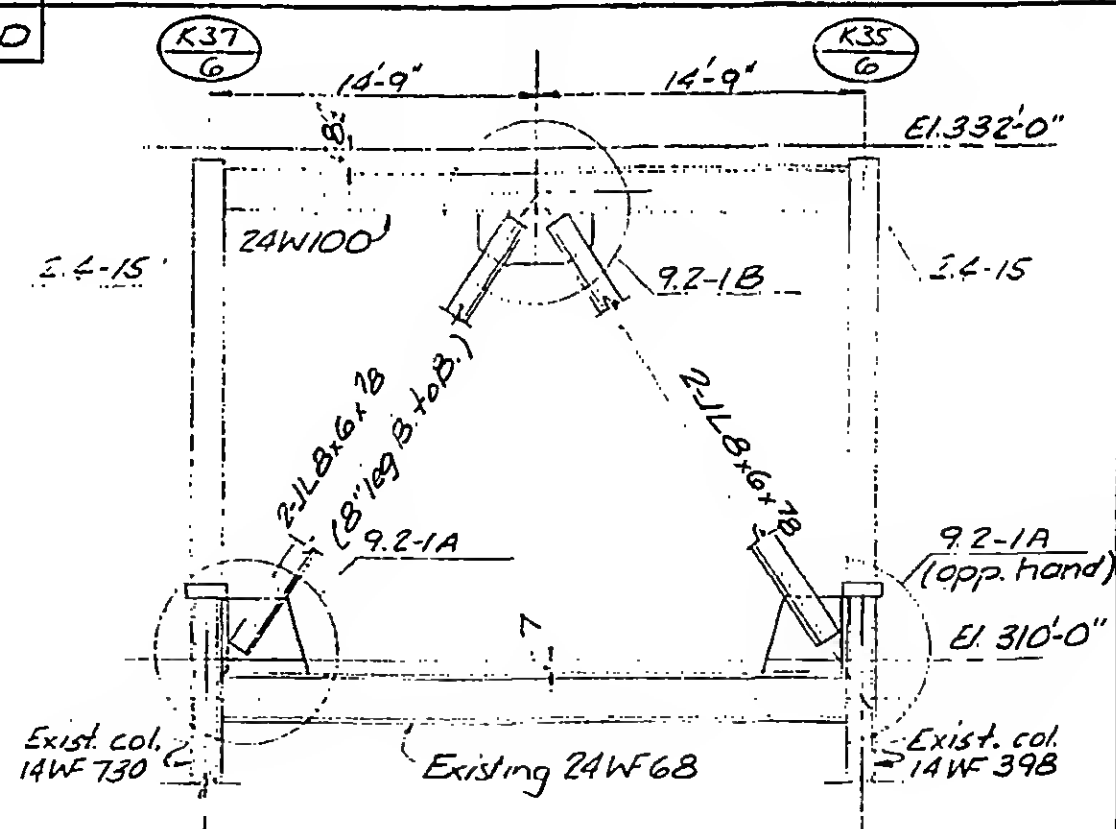
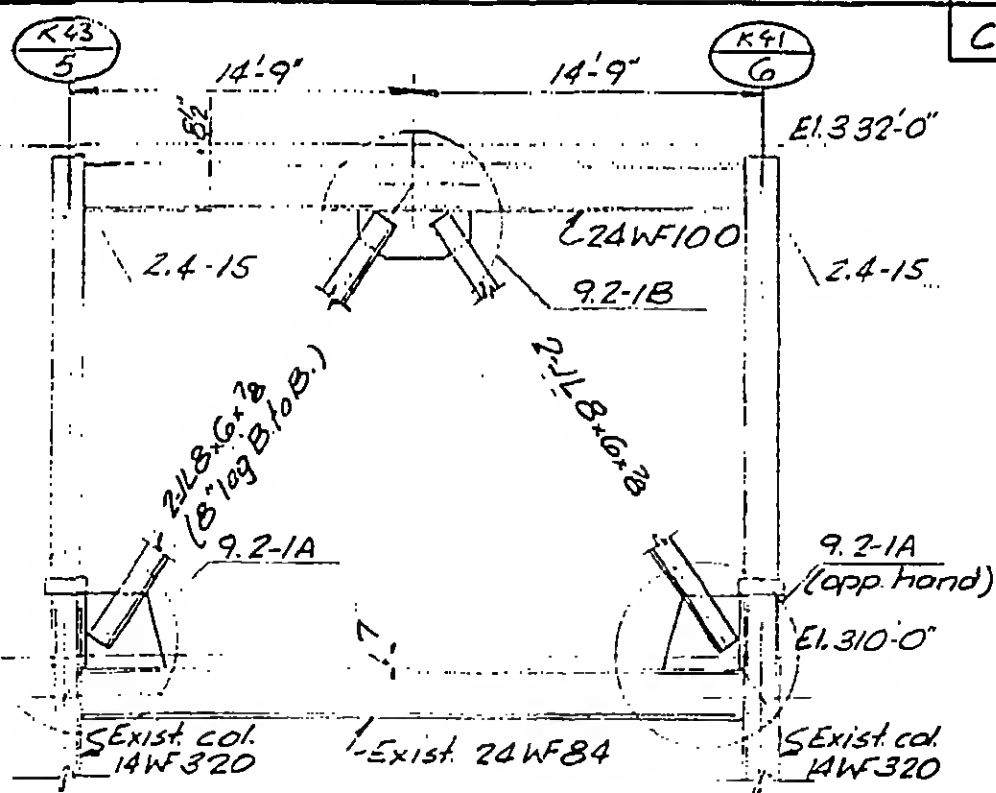
REVISIONS

Released for
construction
11-20-72

12-11-72



A	B
C	D



DESIGNED

DRAWN
J Banks

REVIEWED

13-K9.1-1

Structural & Civil Engineers

PROJECT *THE WORLD TRADE CENTER*

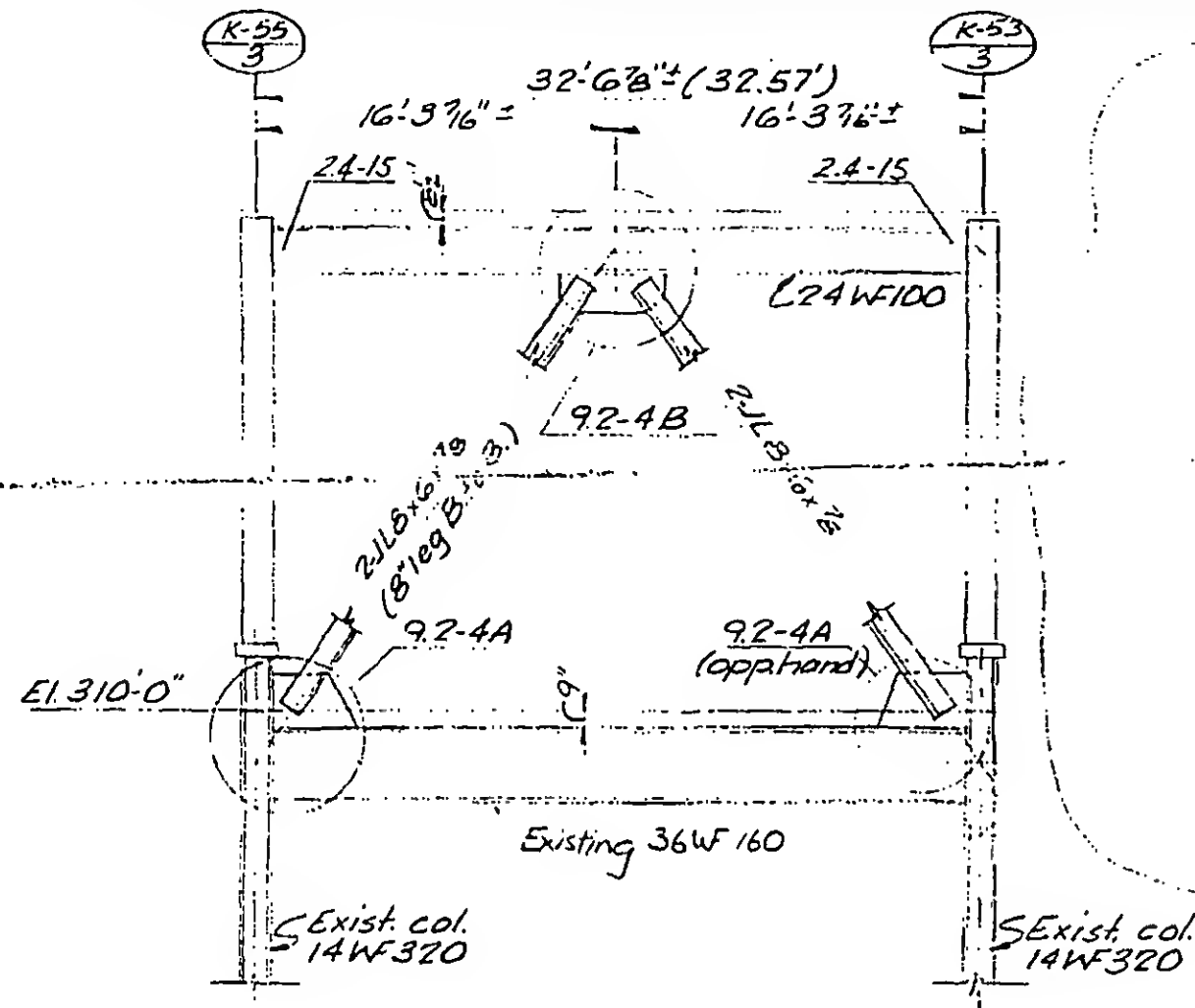
TITLE BRACING 310-332 ELEVATIONS

DATE 11-3-72

REVISIONS

Released for
construction
11-30-72

4-20-73



DESIGNED

DRAWN

j Banks

REVIEWED

13-K9.1-2

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

Structural & Civil Engineers

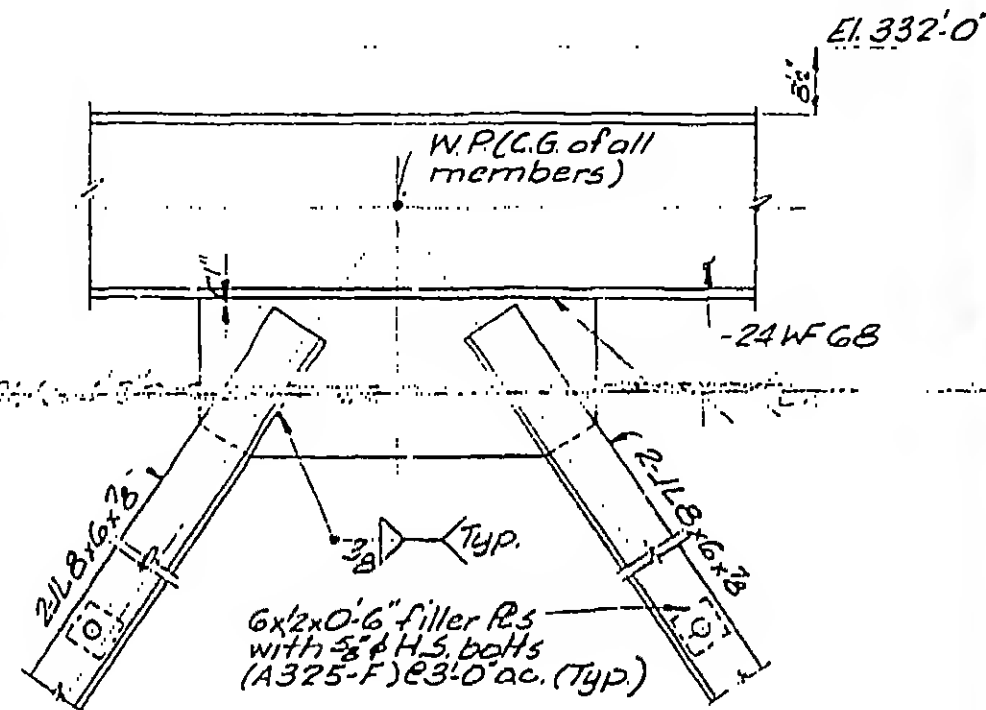
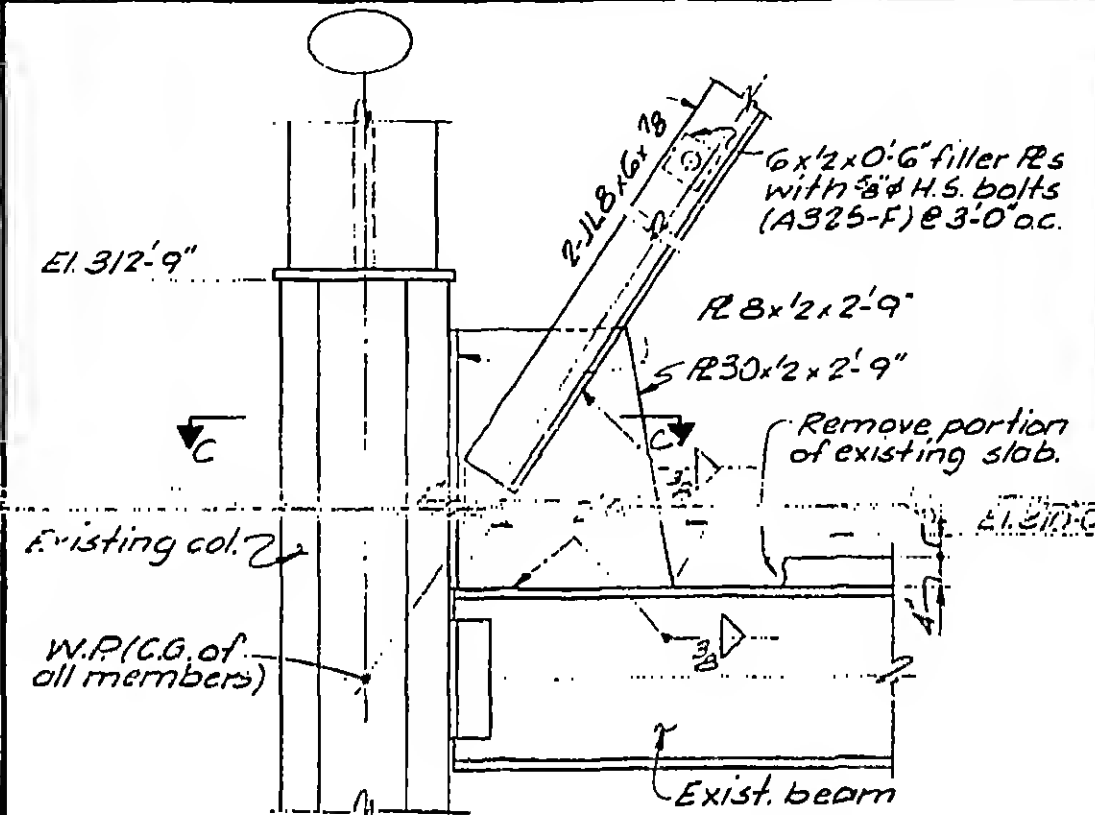
PROJECT THE WORLD TRADE CENTER

TITLE BRACING 310-332 DETAILS

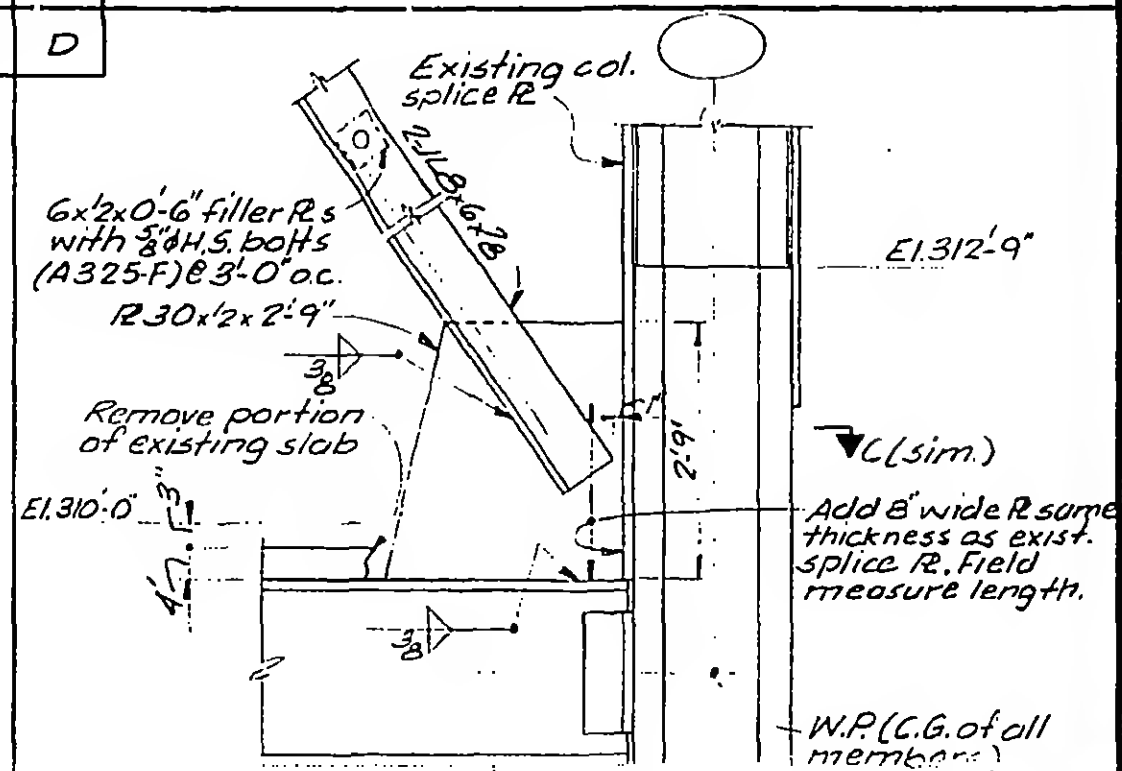
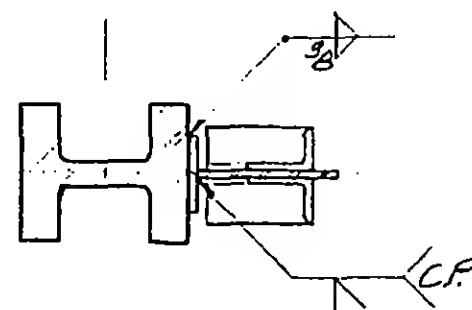
DATE 11-3-72

REVISIONS

Released for
construction
11-20-72



A	B
C	D



DESIGNED

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER

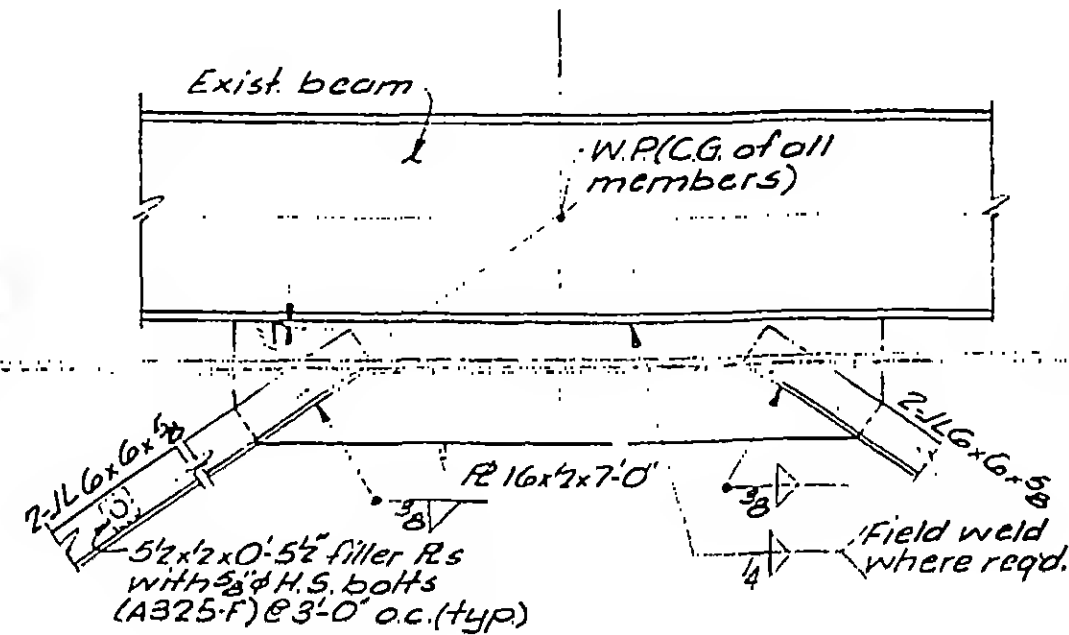
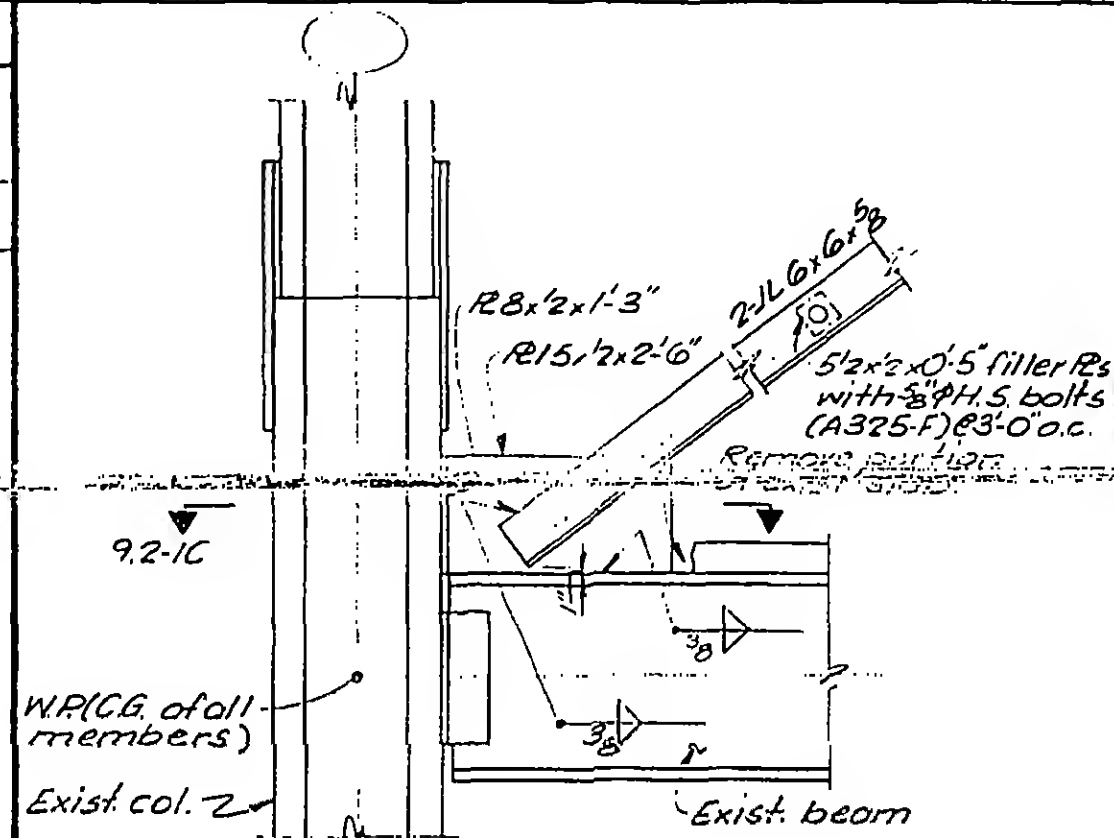
TITLE BRACING 310-332 DETAILS

DATE 11-3-72

REVISIONS

Released for
construction
11-20-72

4-20-73



A

B



DESIGNED

DRAWN
TR

REVIEWED

13-K9.2-2

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

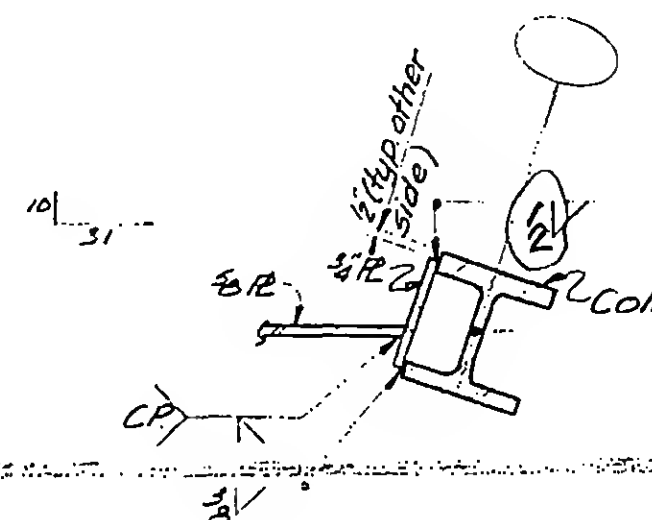
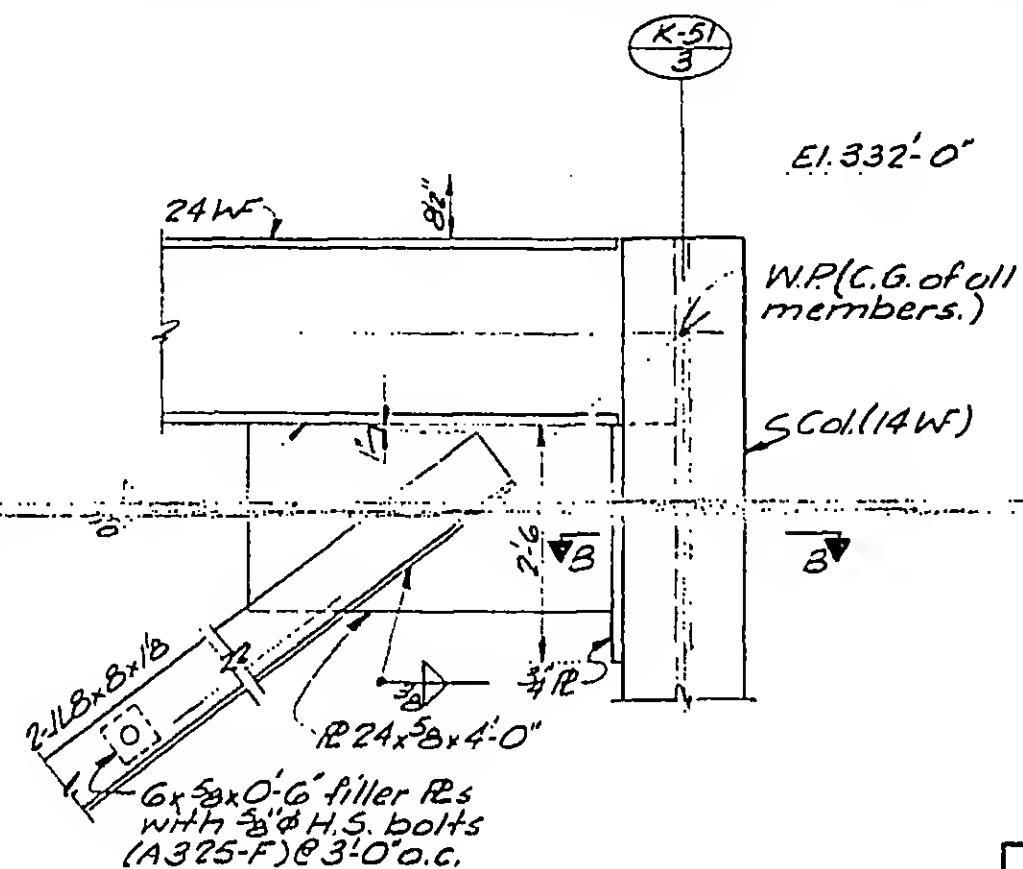
Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER

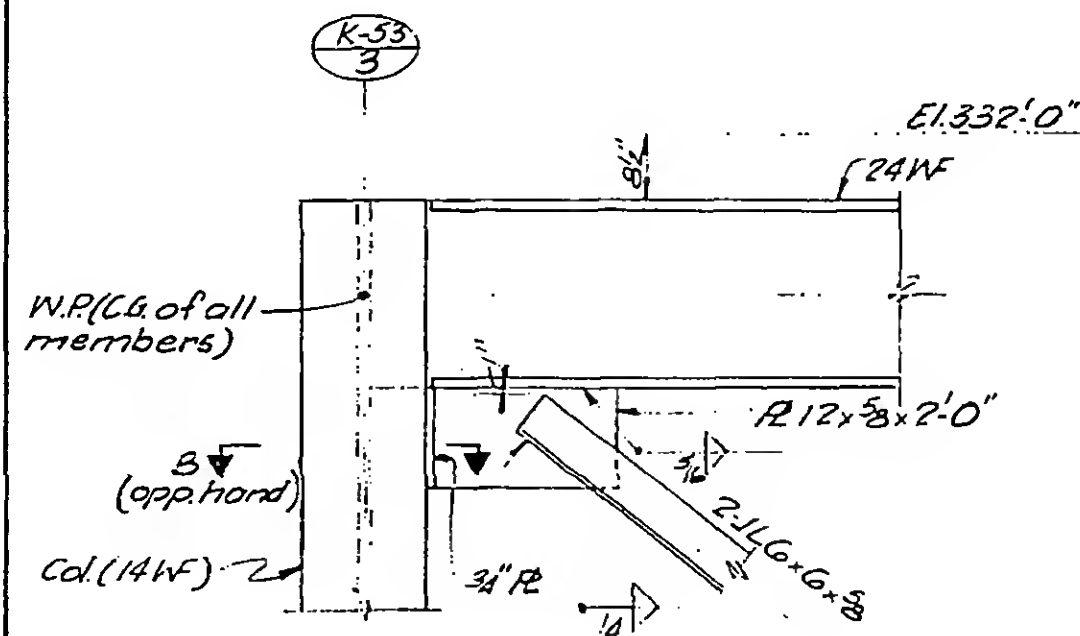
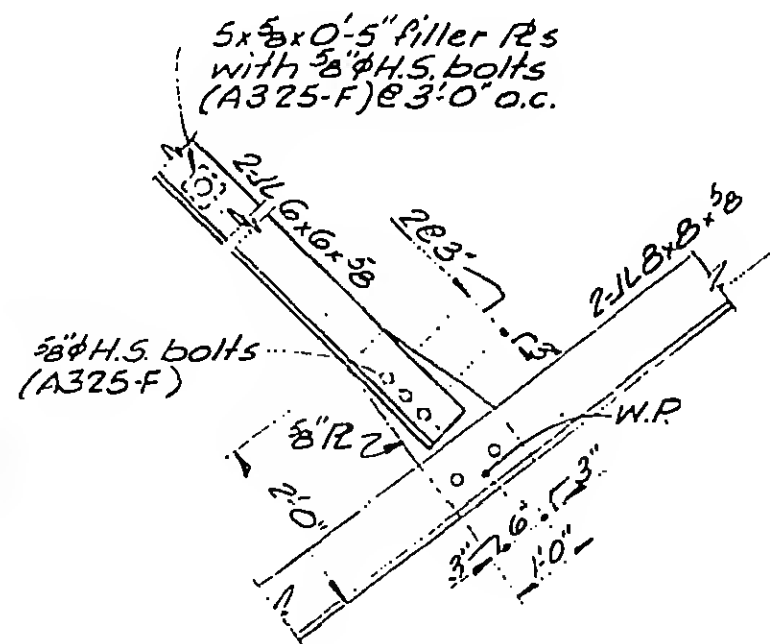
TITLE BRACING 310-332 DETAILS

DATE 11-3-72

REVISIONS

Released for
construction
11-20-72

A	B
C	D



DESIGNED

DRAWN

TR

REVIEWED

13-K9.2-3

SKILLING, HELLE. CHRISTIANSEN, ROBERTSON

Structural & Civil Engineers

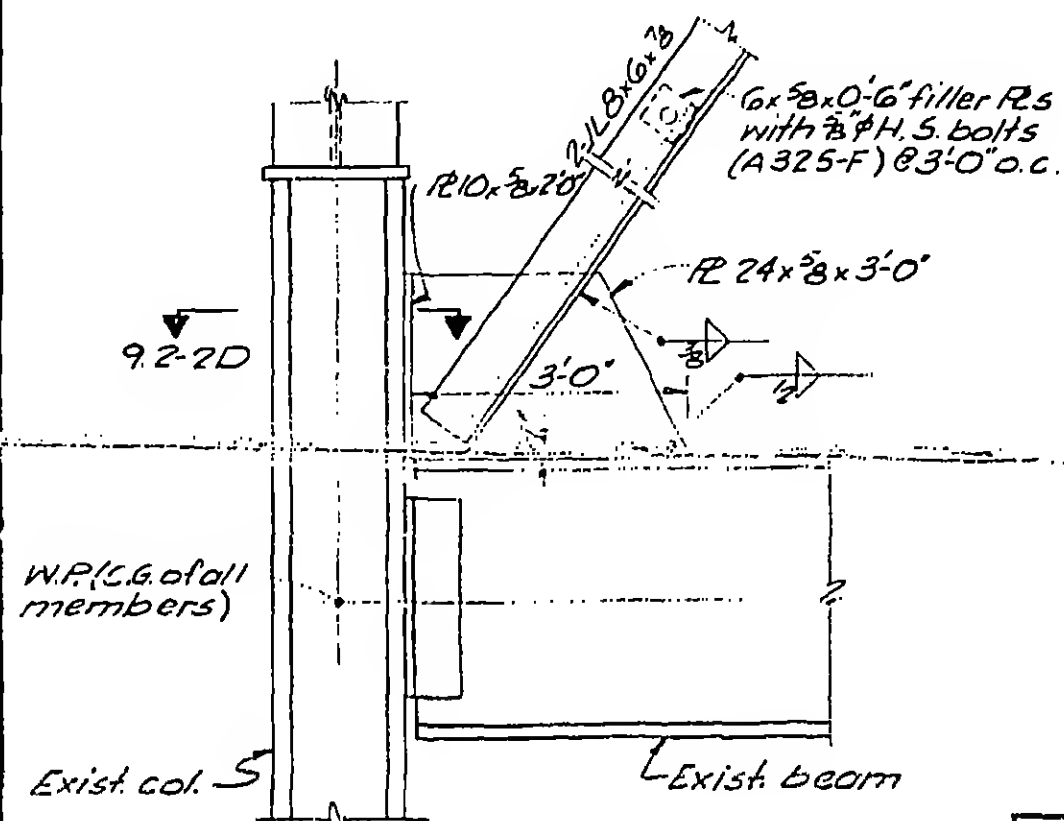
PROJECT THE WORLD TRADE CENTER

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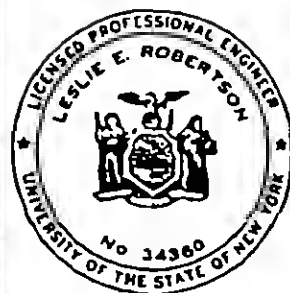
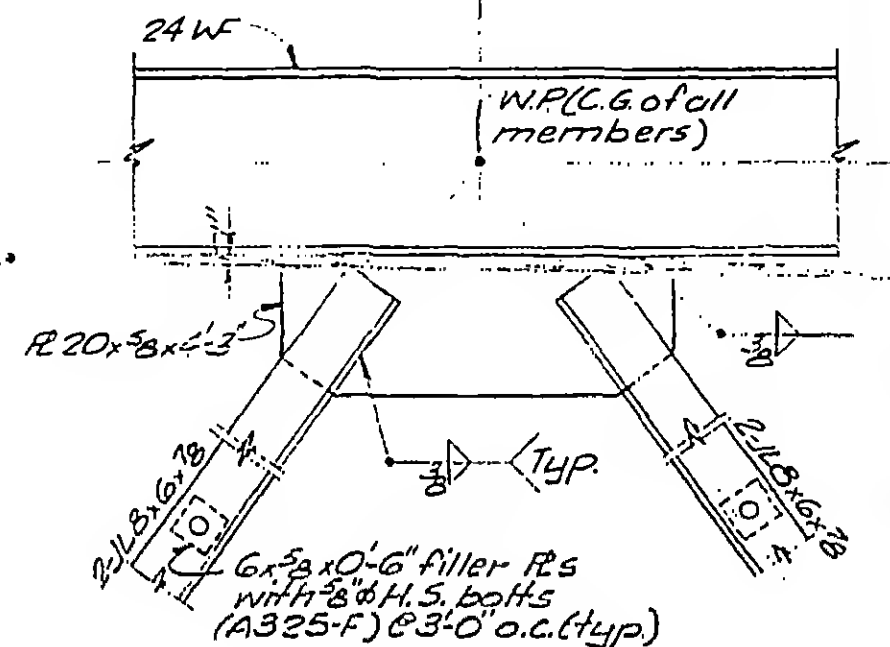
DATE 11-3-72

REVISIONS

Released for
construction
11-20-72



A	B



DESIGNED

DRAWN
TR

REVIEWED

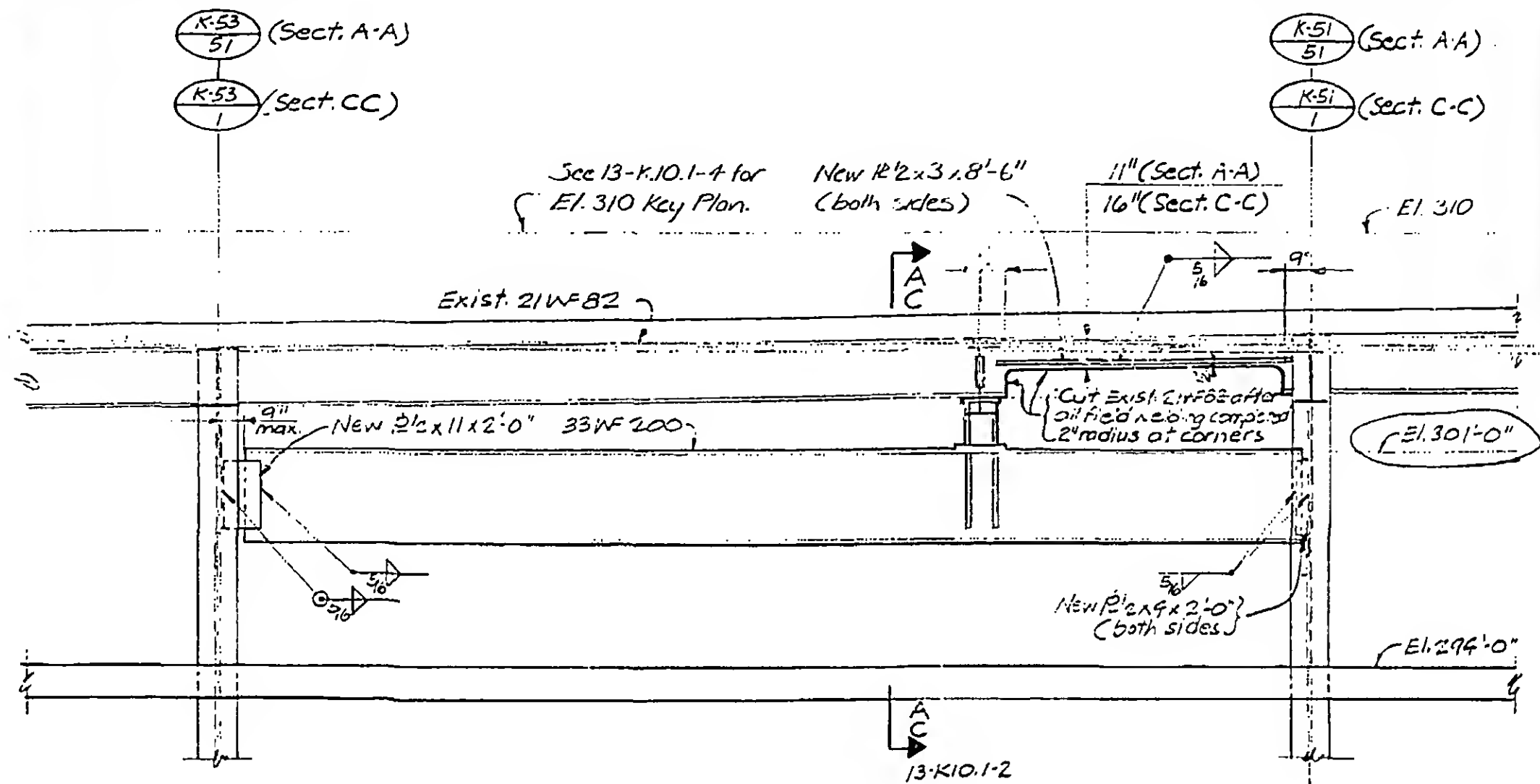
13-K 9.2-4

Structural & Civil Engineers

TITLE NOTCH & NEW SUPPORT FOR EXIST. BEAMS-ELEVATION

DATE 3-15-73

5-7-73



DESIGNED

577.

DRAWN

W. H. Davis

REVIEWED

A
C

13-K10.1-1

SKILLING, HELLE. CHRISTIANSEN, ROBERTSON

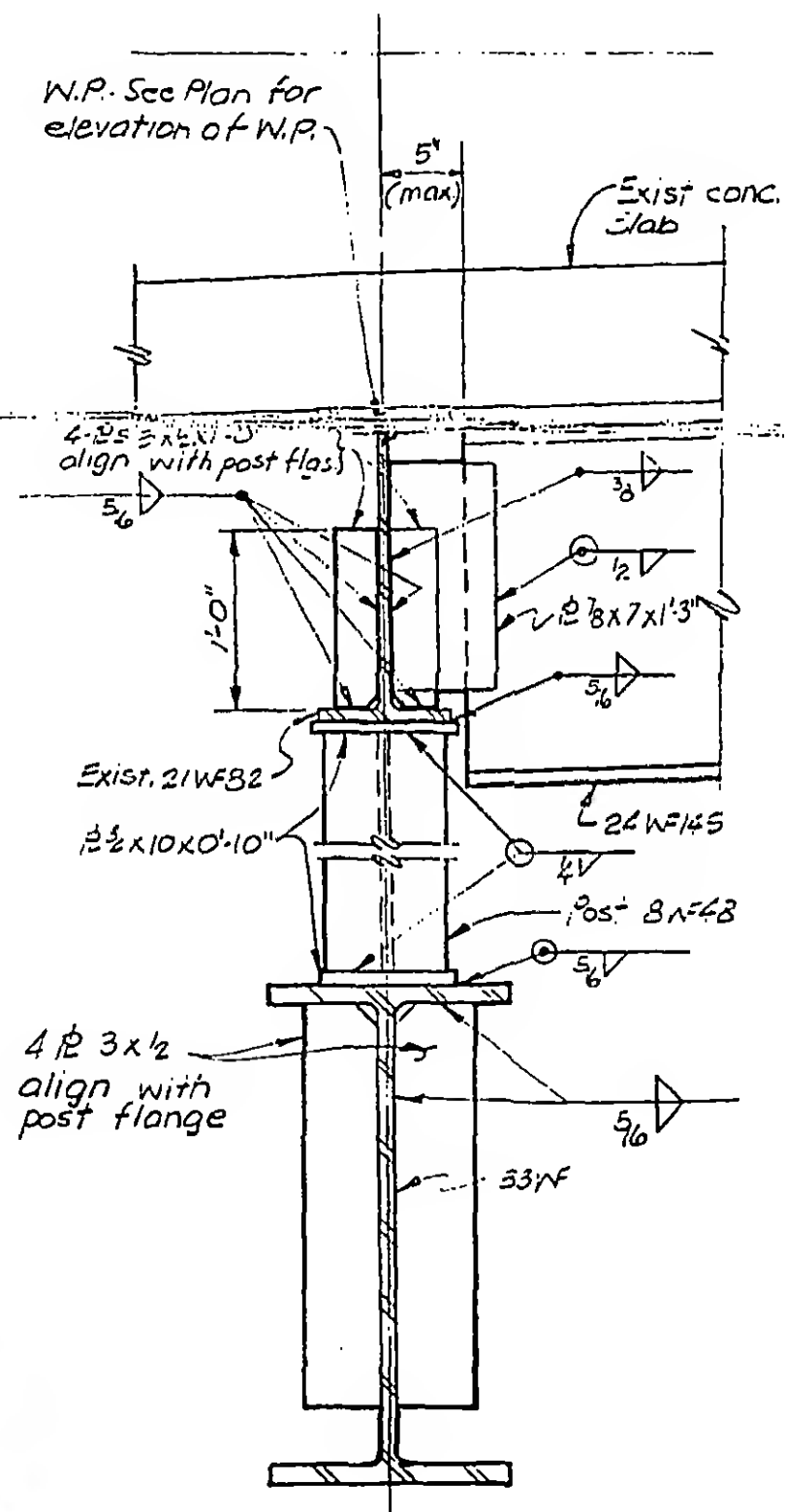
Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER

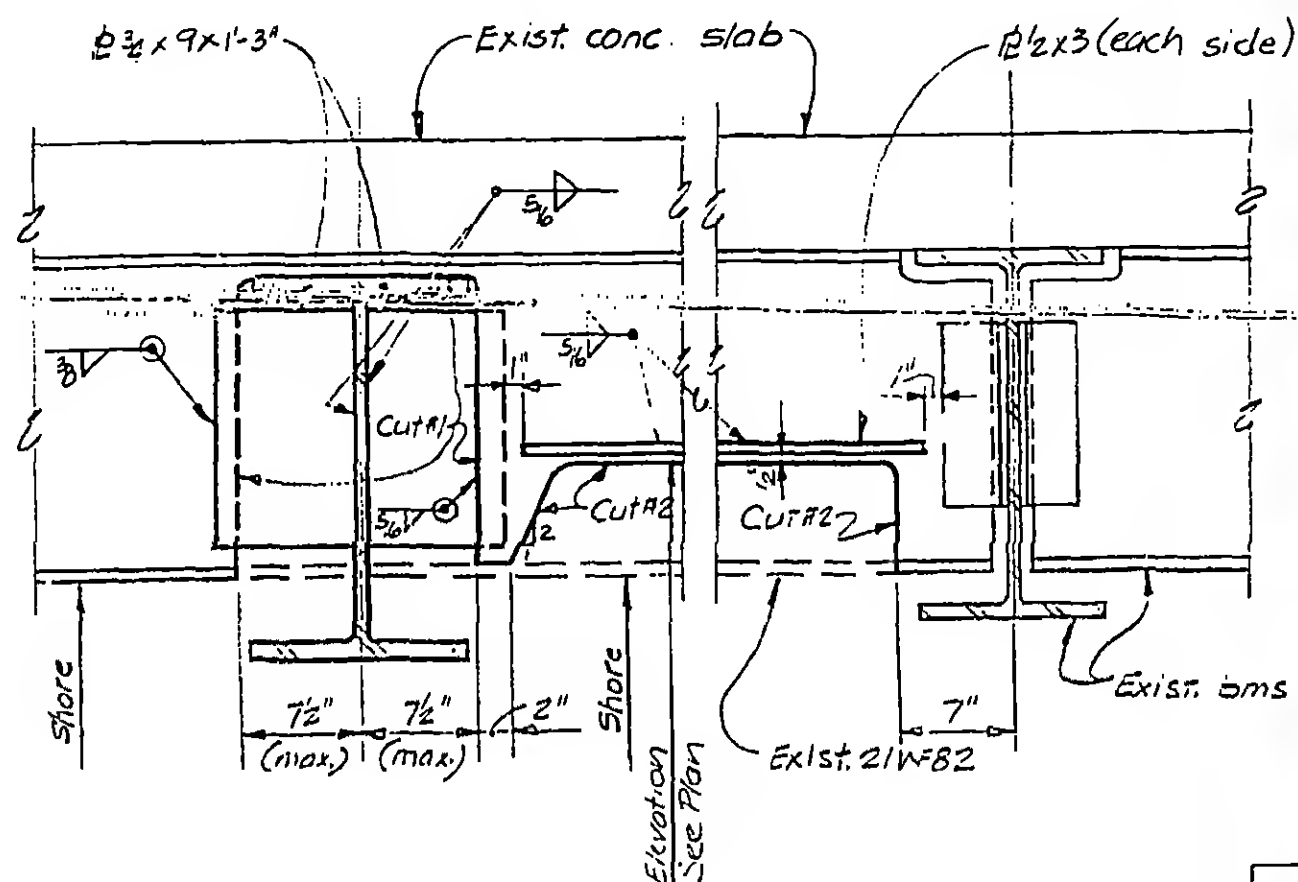
TITLE NOTCH & NEW SUPPORT FOR EXIST. BEAMS - SECTIONS

DATE 3-15-73

REVISIONS

W.P. See Plan for
elevation of W.P.See 13-K10.1-1 for
E1. 310 Key Plan.

E1. 310

Construction Sequence

1. Place shores.
2. Make cut #1 (1" radius at corners)
3. Complete all steel erection and field welding.
4. Remove shores.
5. Make cut #2 (2" radius at corners)

DESIGNED
JTMDRAWN
Pillipoli

REVIEWED

A

G

opp.
hand.

13-K10.1-2

SKILLING, HELLE. CHRISTIANSEN. ROBERTSON

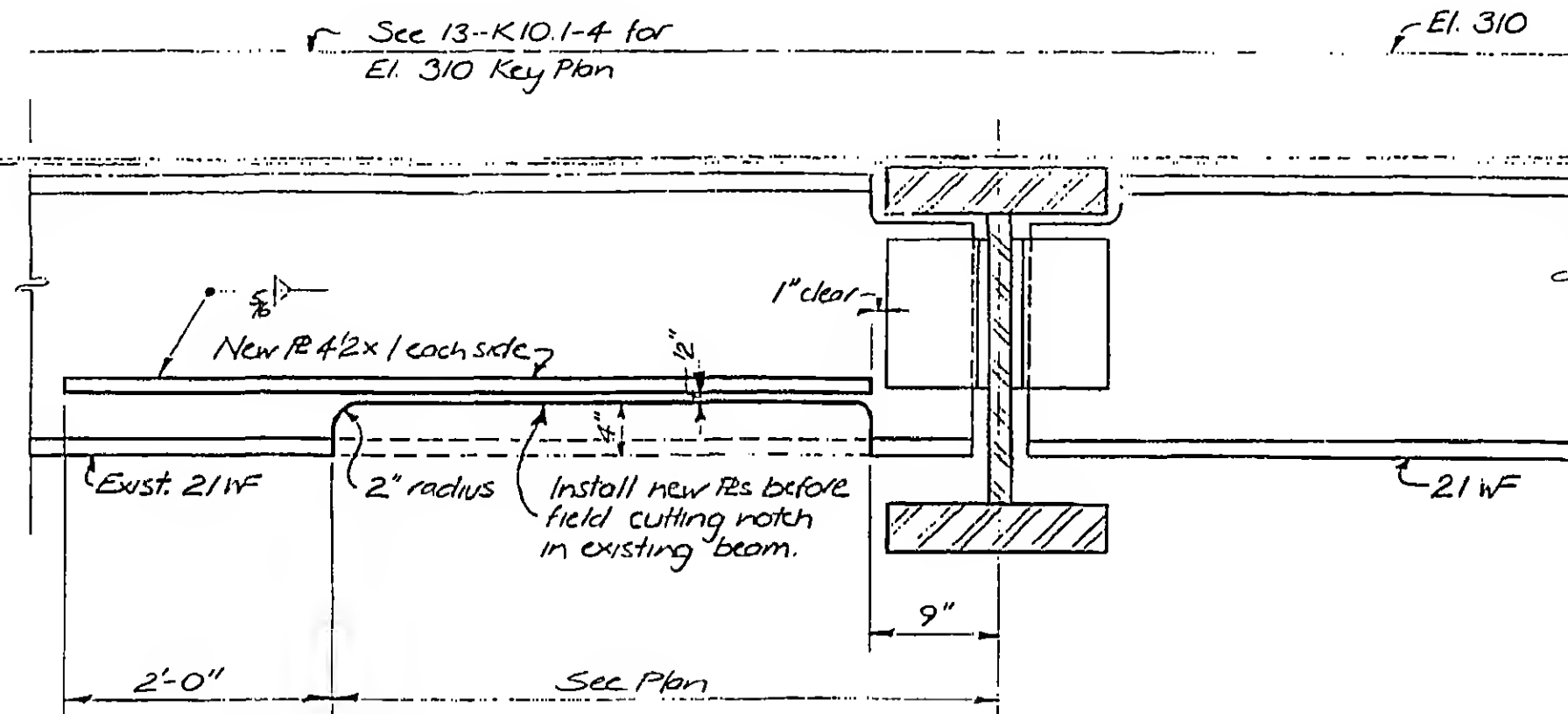
Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER

TITLE NOTCH & NEW SUPPORT FOR EXIST. BEAM - SECTION

DATE 3-15-73

REVISIONS



DESIGNED

DRAWN

REVIEWED

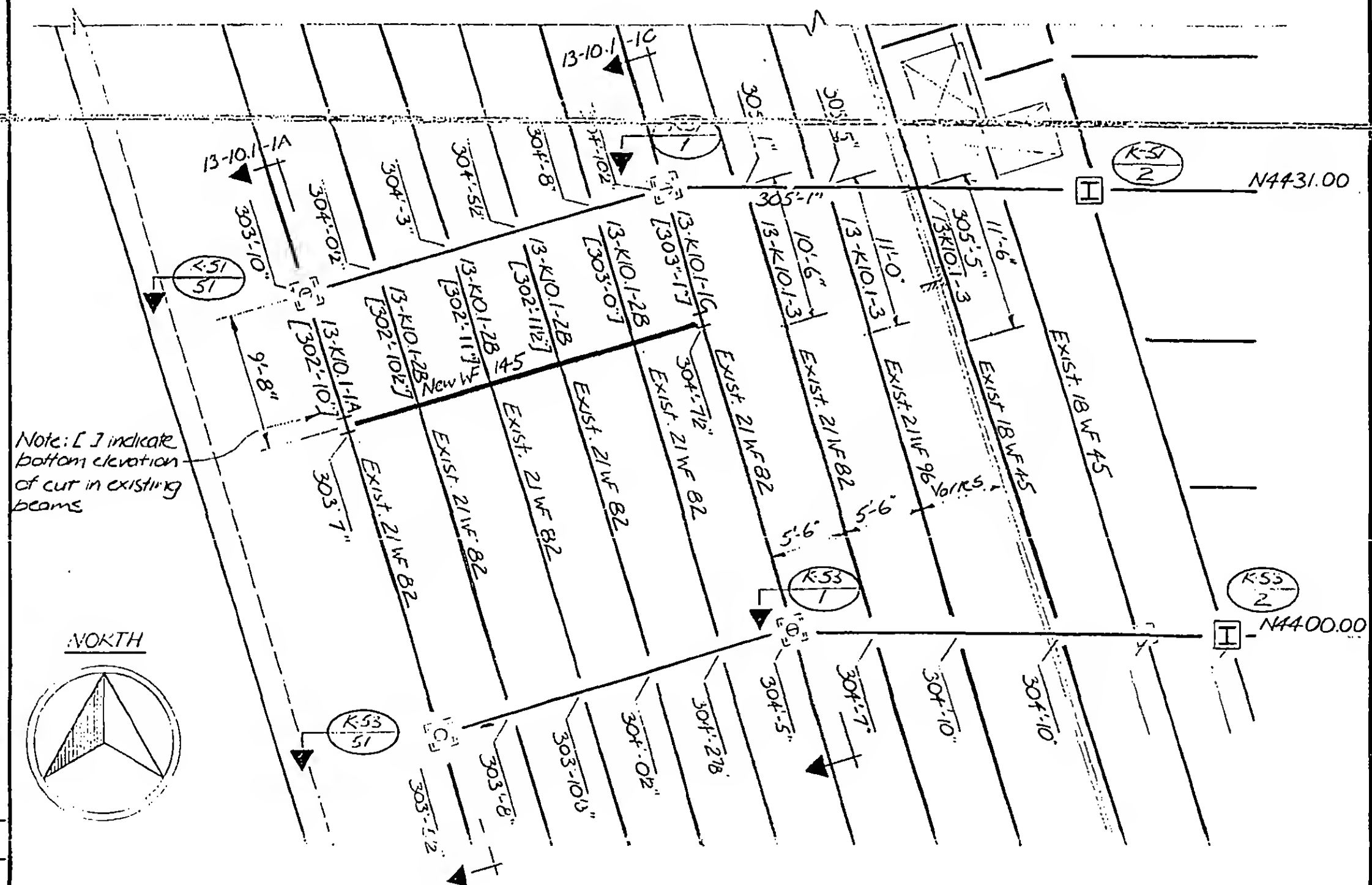
13-K10.1-3

Structural & Civil Engineers

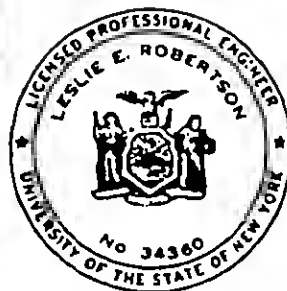
TITLE NOTCH & NEW SUPPORT FOR EXIST. BEAMS-KEY PLANET 310

DATE 3-15-73

REVISIONS



13-K10.1-4.



DESIGNED

DRAWN
J. Brink

REVIEWED

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

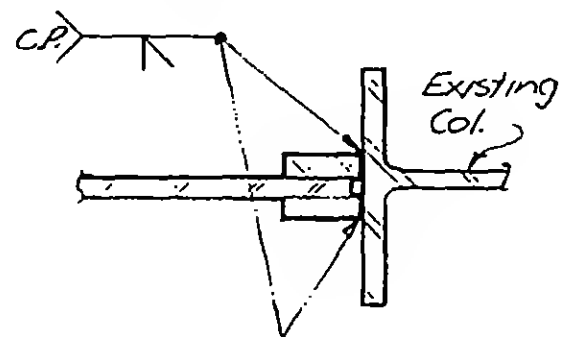
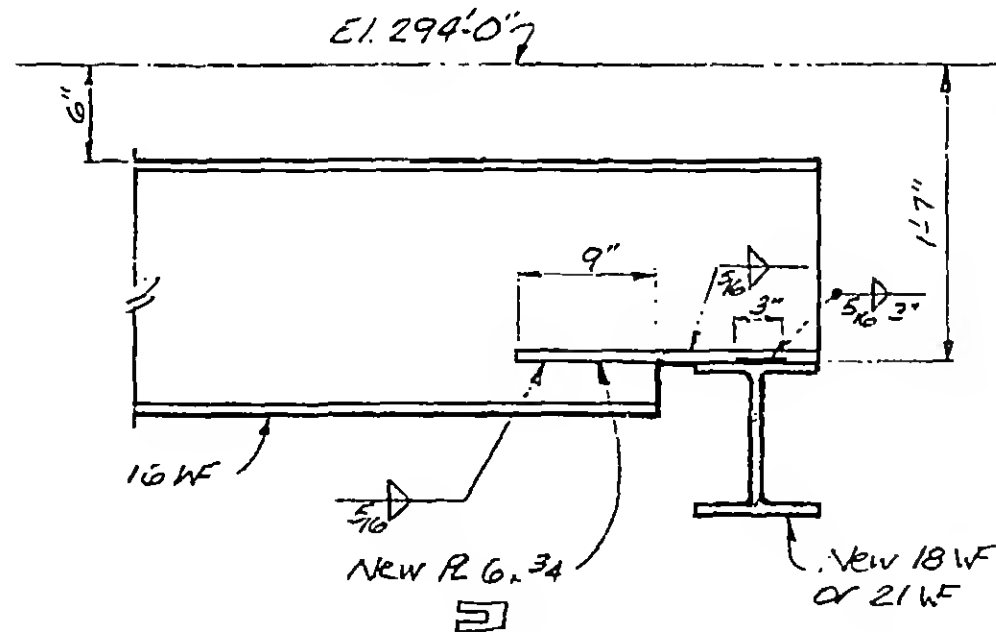
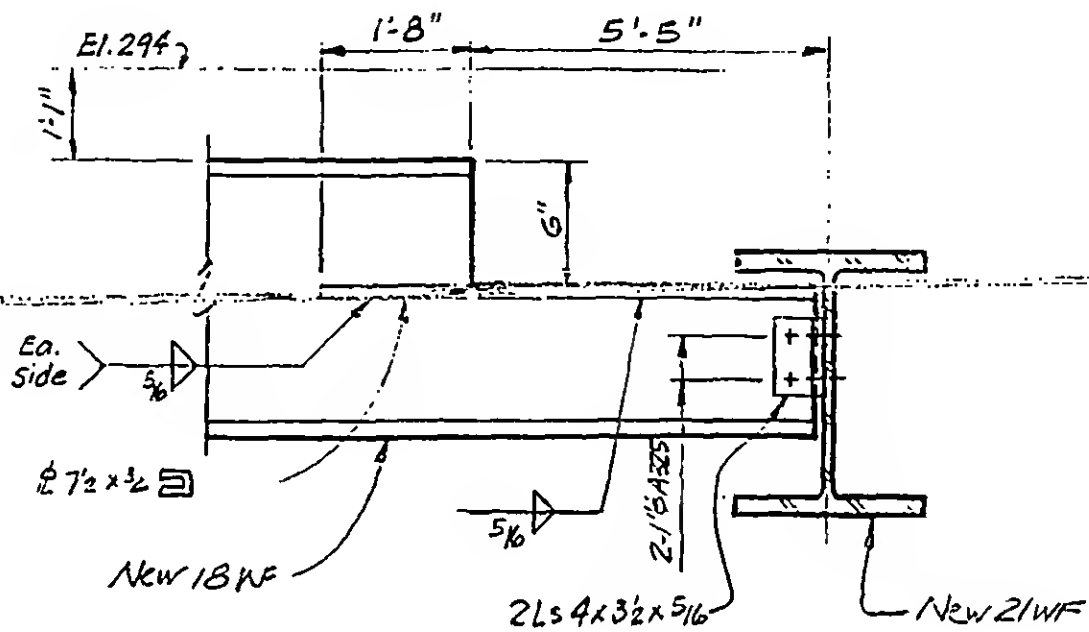
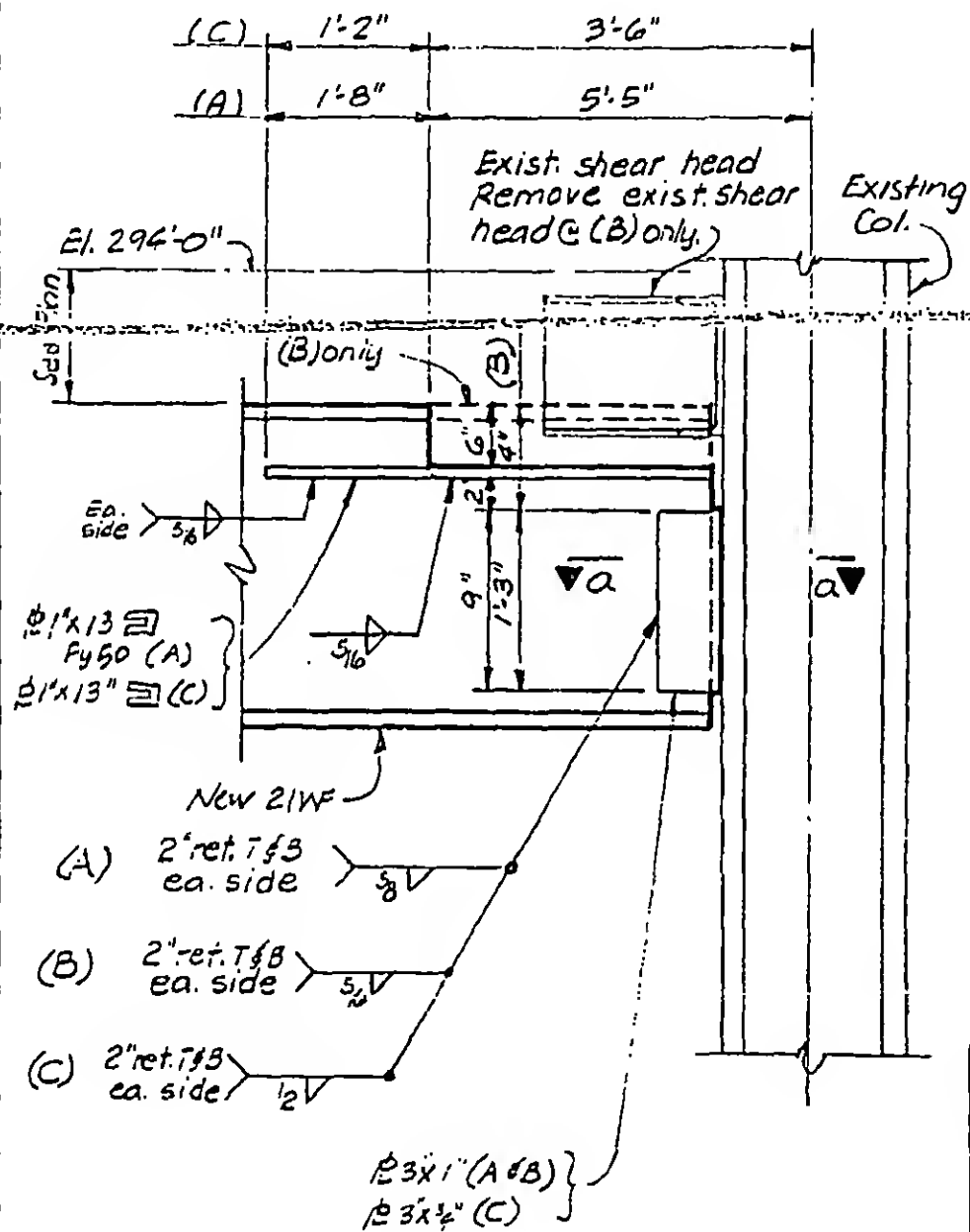
Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER

TITLE SECTION AT ESCALATOR - EL. 294'-0"

DATE 3-15-73

REVISIONS



DESIGNED KC

DRAWN Miller

REVIEWED

A

B

C

a

E

13-K10.2-1

Structural & Civil Engineers

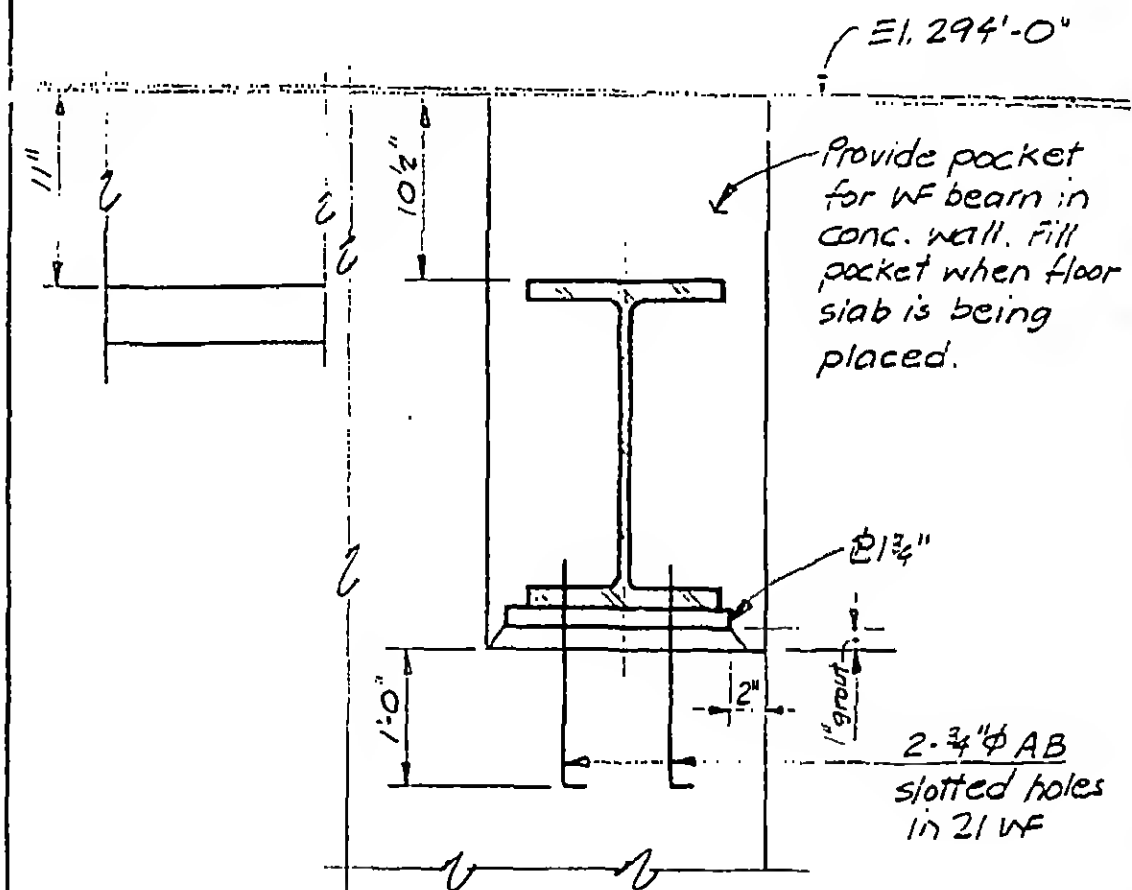
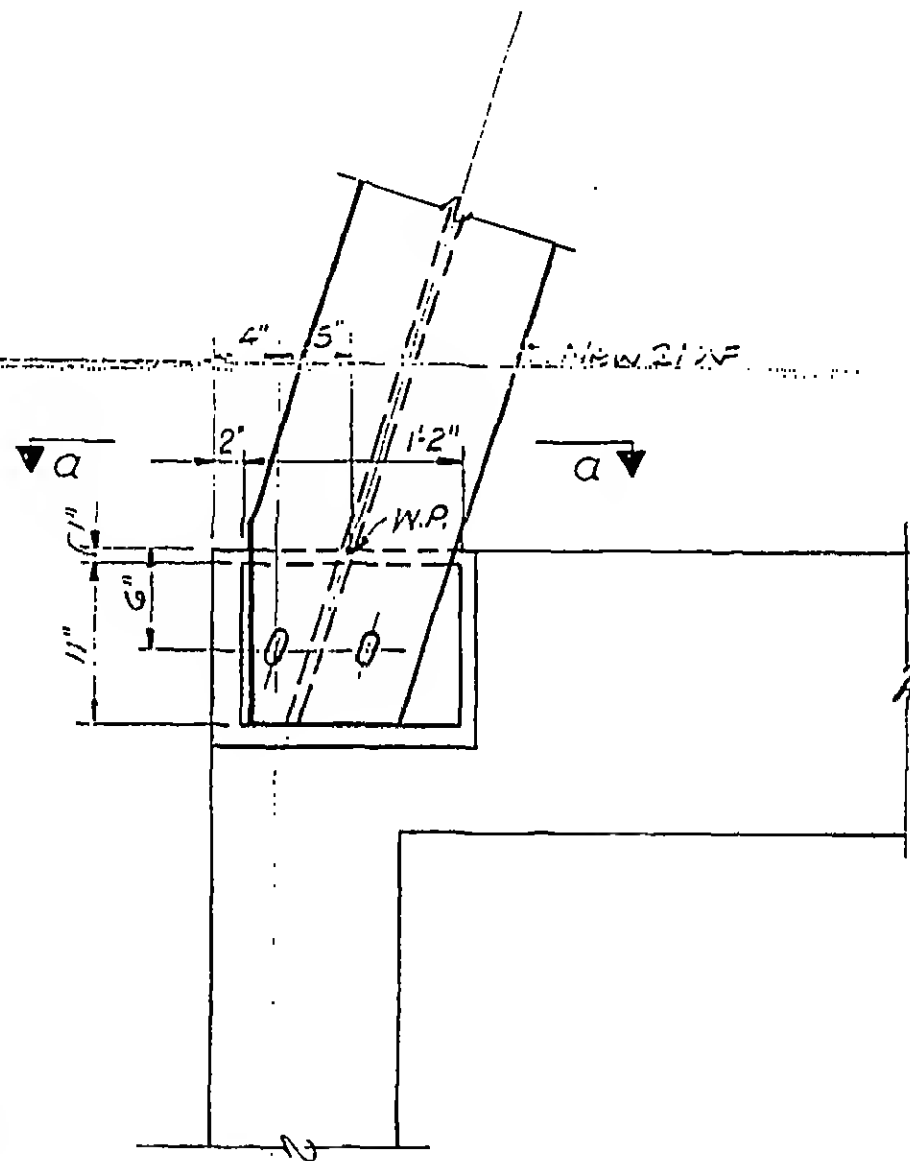
Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER

TITLE SECTION AT ESCALATOR - EL. 294'-0"

DATE 3-15-73

REVISIONS



DESIGNED
KC

DRAWN
11/12/66

REVIEWED

 q

13-K10.2-2

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

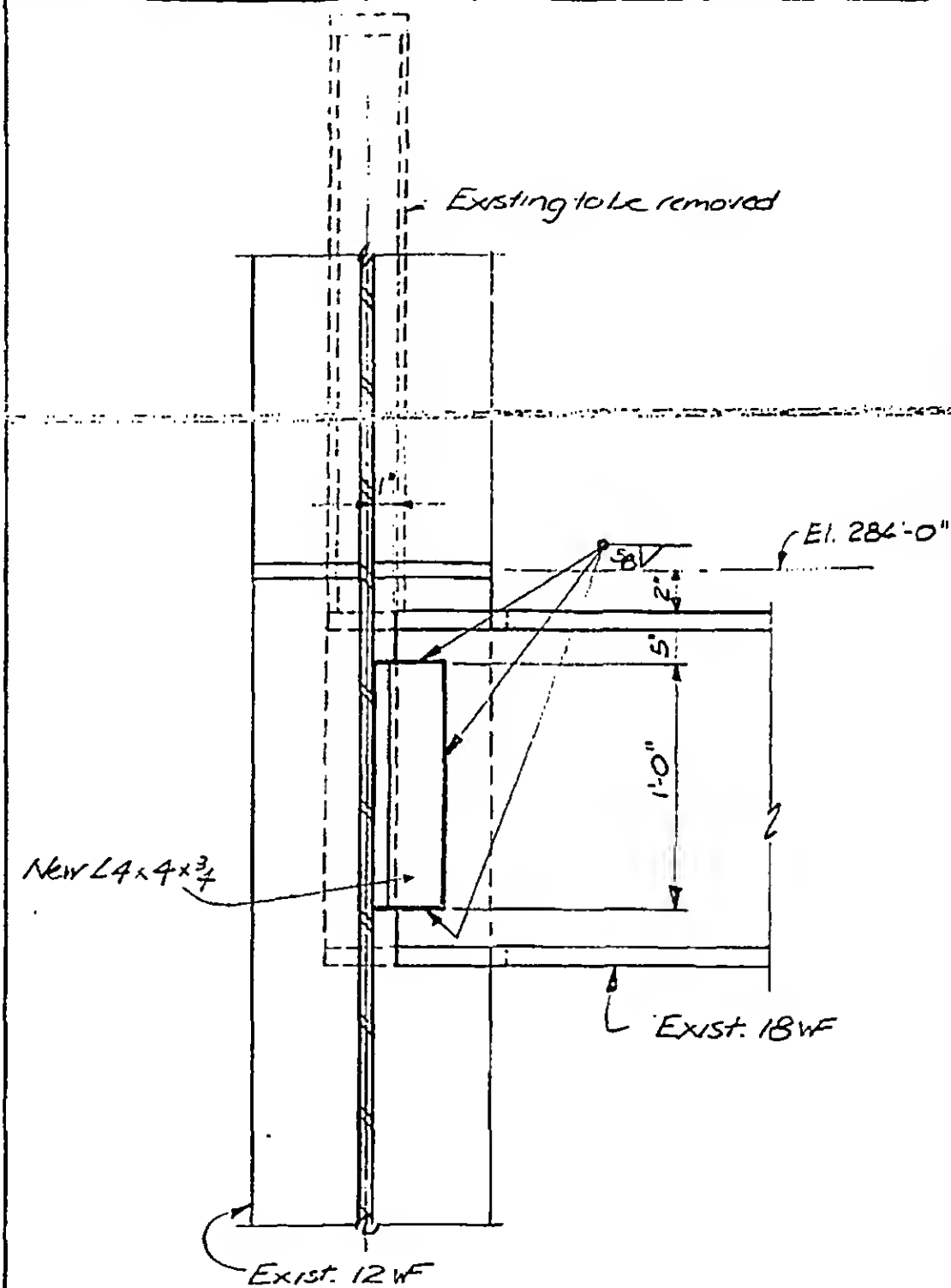
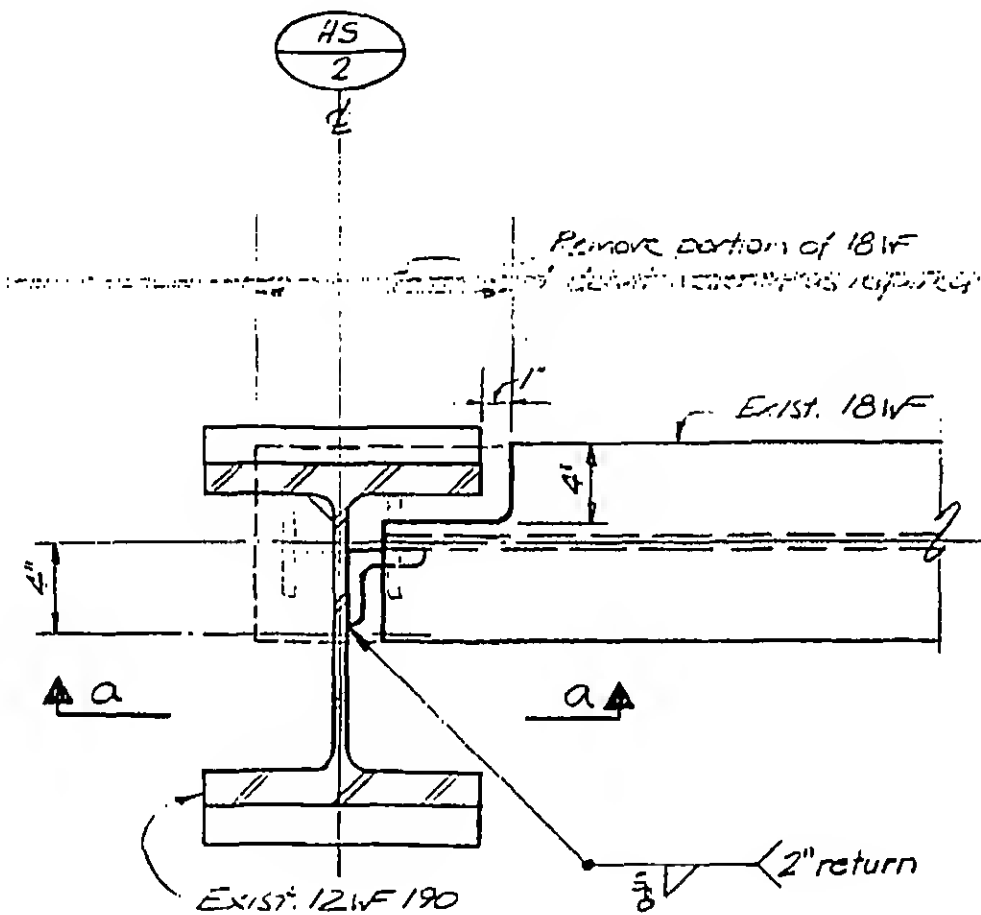
Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER

TITLE DETAIL AT COL. H5/2 - EL. 284

DATE 3-15-73

REVISIONS



DESIGNED

DRAWN

REVIEWED

A a

13-K/10.3-4

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

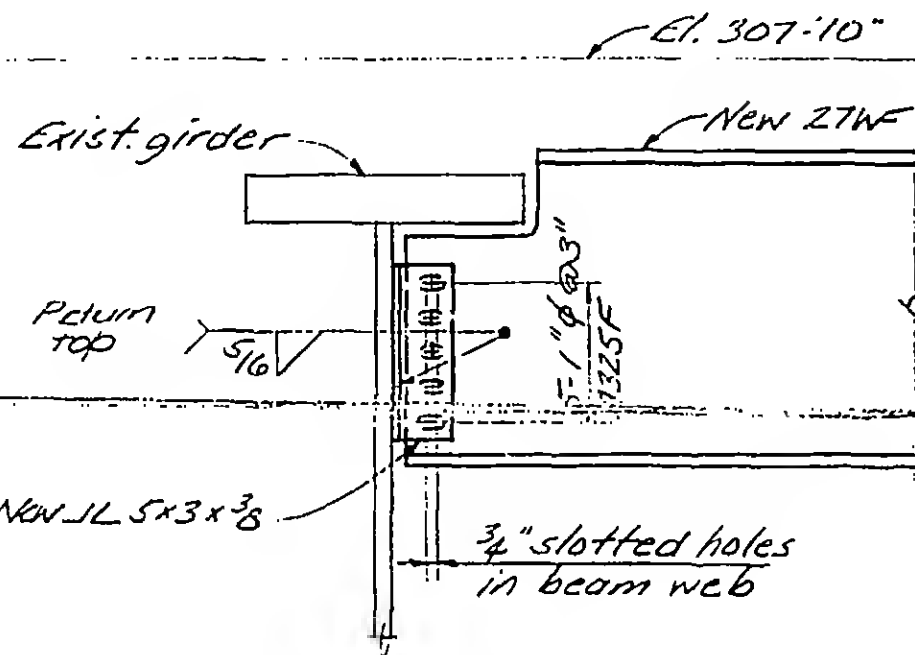
Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER

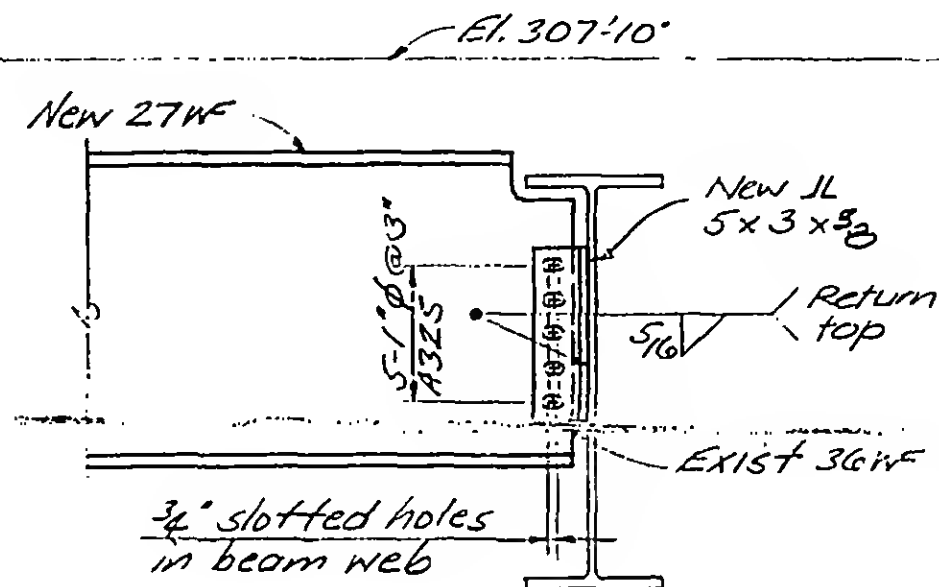
TITLE EL. 310, ZONE K3 - ESC. H1 & H2 - CONN. DETAILS

DATE 5-7-73

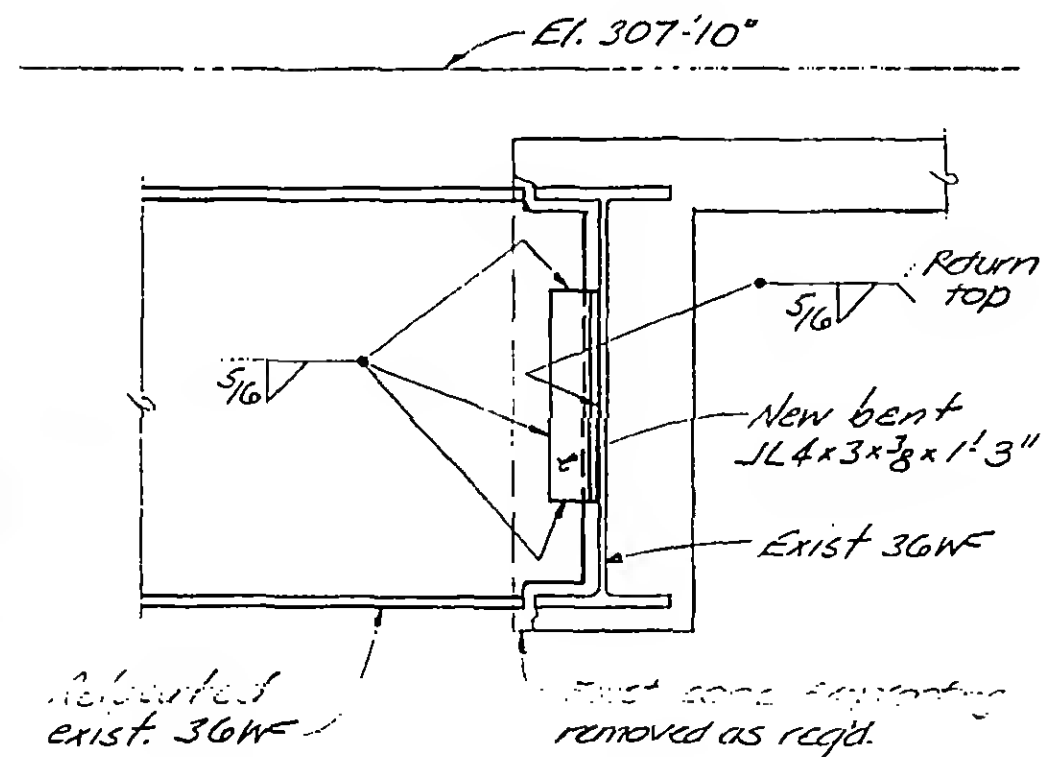
REVISIONS



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B



C



DESIGNED

KC

DRAWN

JG, JB

REVIEWED

U2013

13-K-11.1-1

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

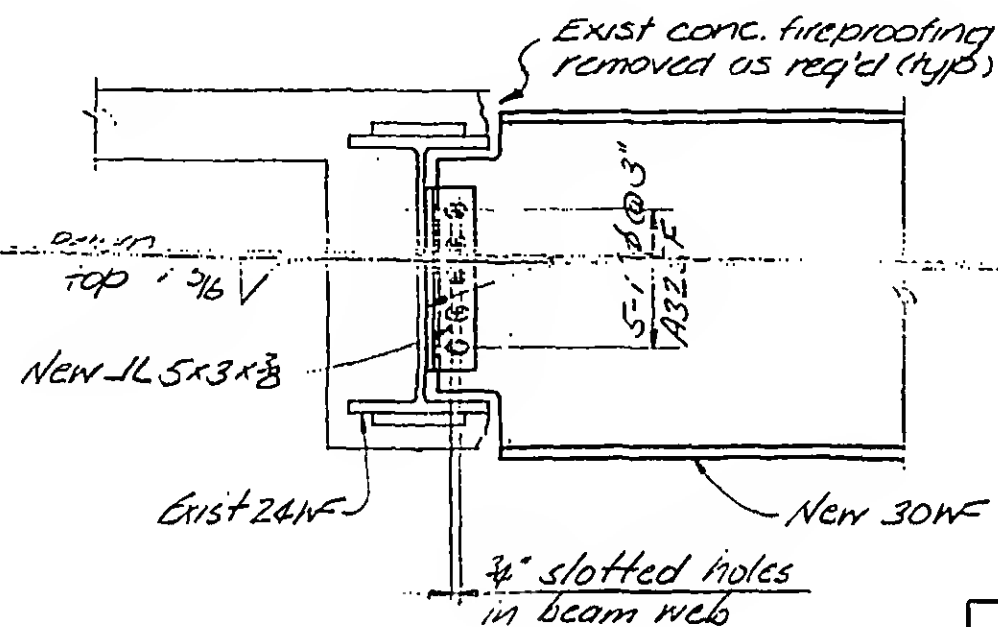
Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER

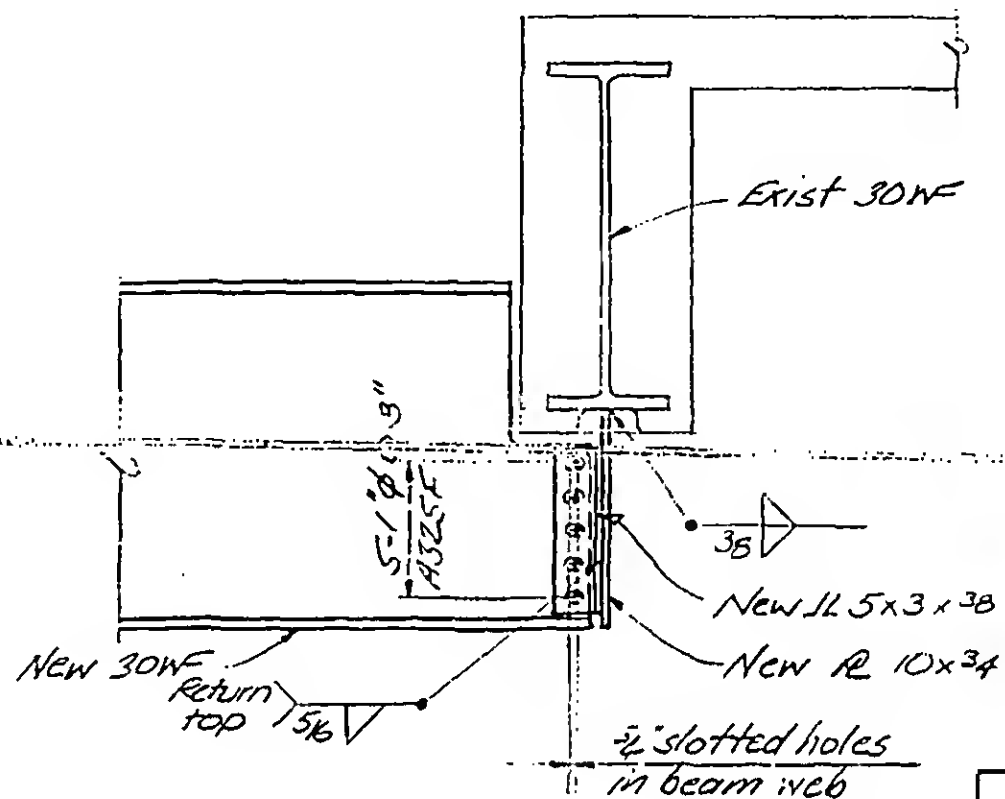
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DATE 5-7-73

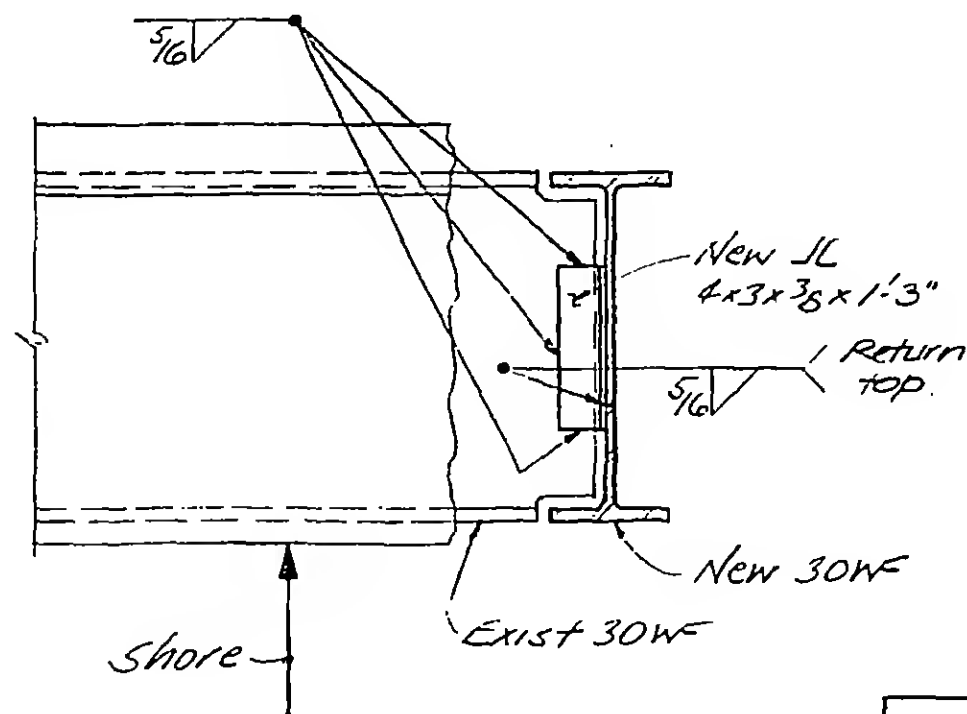
REVISIONS



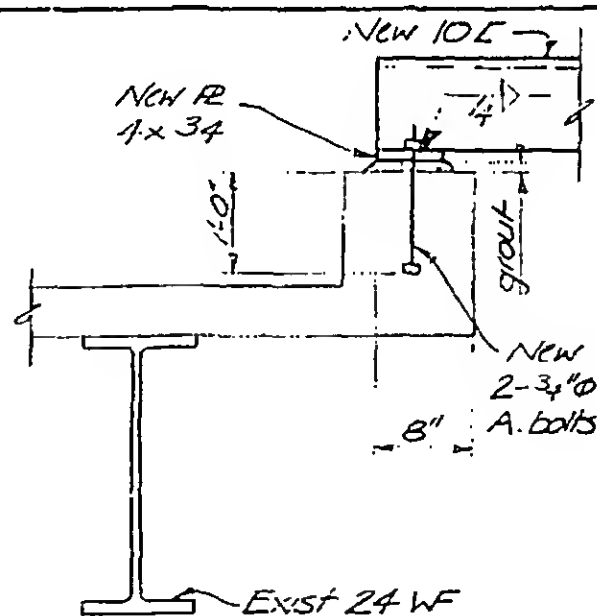
A



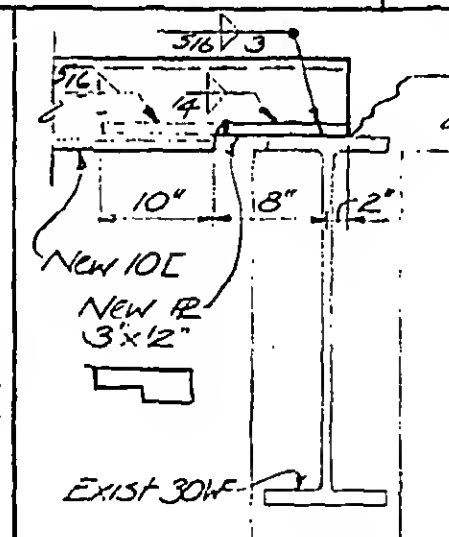
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C

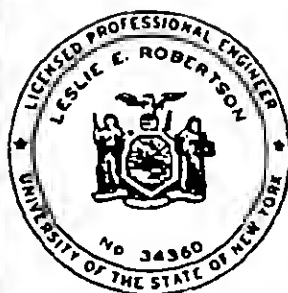


D



E

13-K11.1-2



DESIGNED KC

DRAWN JB

REVIEWED mab

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

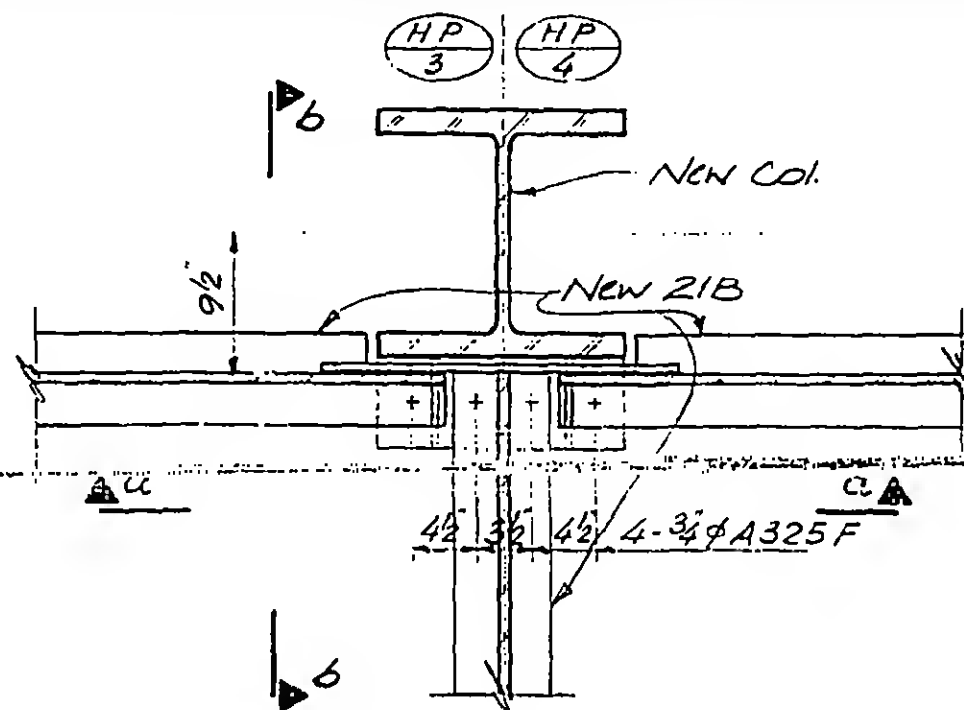
Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER

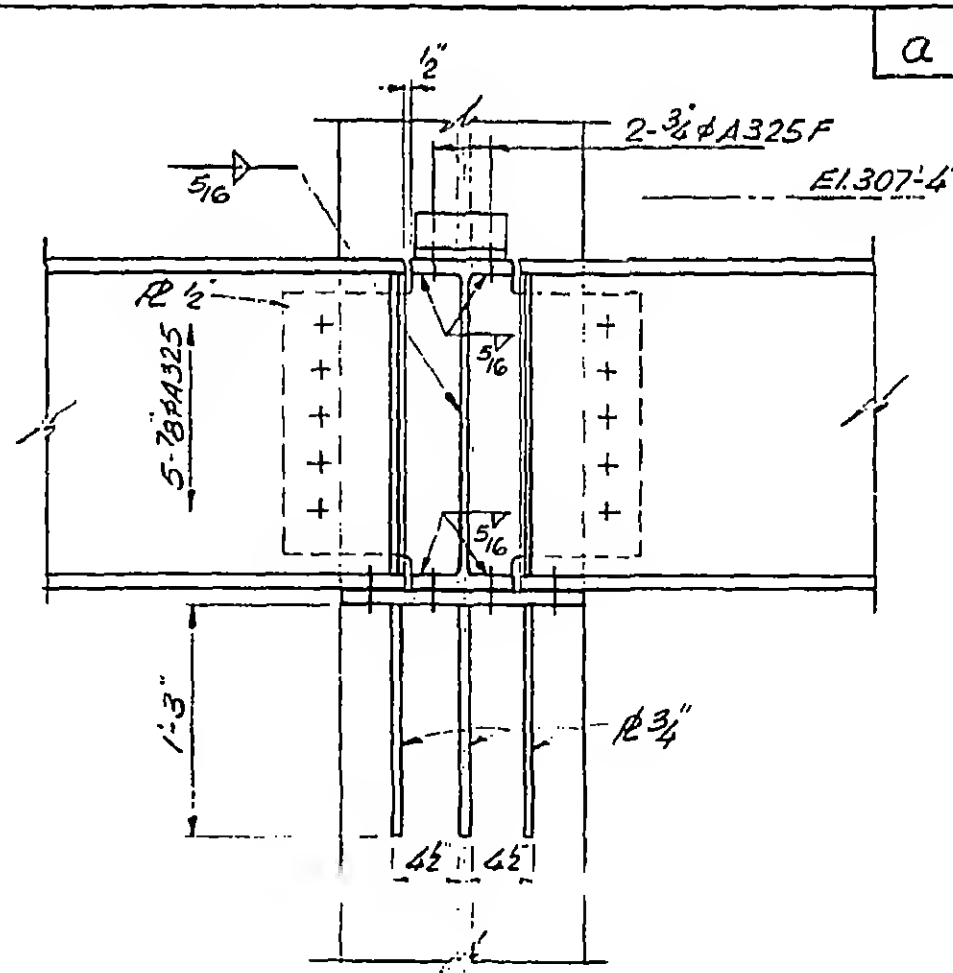
TITLE EL. 310 - ZONE K3 - "H" ELEV.-CONN DETAILS

DATE 5-7-73

REVISIONS

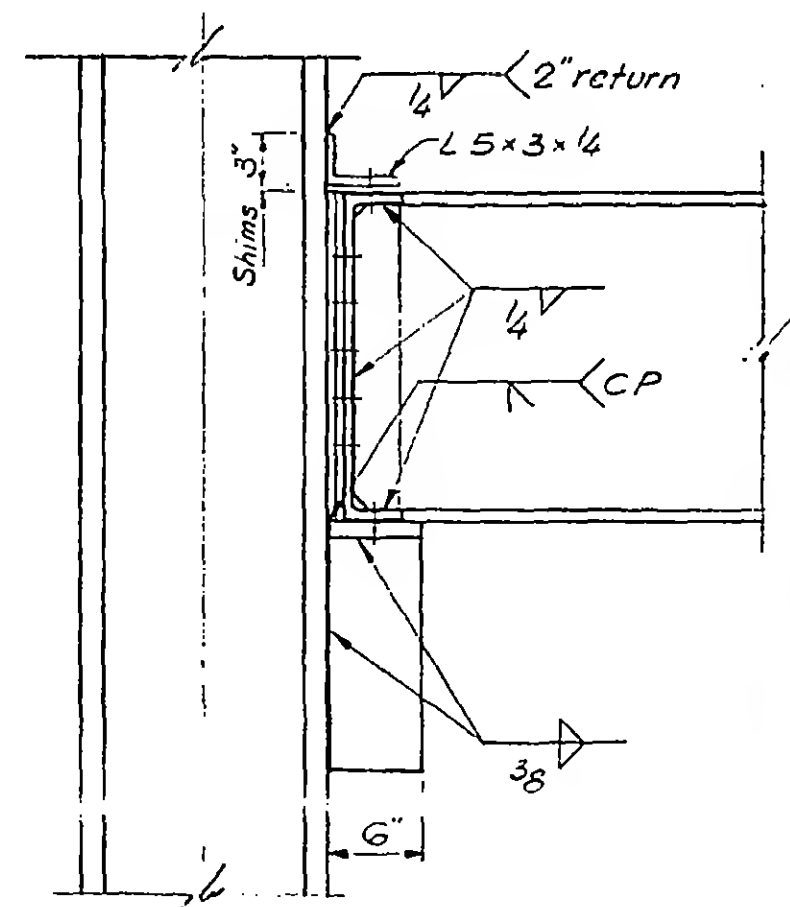


A



a

b



13-K11.1-3.1



DESIGNED

by [Signature]

DRAWN [Signature]

REVIEWED

[Signature]

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER

TITLE EL. 310 - ZONE K.5 - F.A. INTAKE-CONN. DETAILS

DATE 5-7-73

REVISIONS

NEW $\phi 6 \times 12 \times 0-7$ " (A)
NEW $\phi 9 \times 3 \times 0-10$ " (B)

New beam

a

a

2- $\frac{3}{4}$ " A325Face of
Exst. Tower B
Spandrel.

B

A

Exst. 33 WF

Return
top 1/4"NEW JL $4 \times 3 \times \frac{3}{8} \times 0-10$ "

New 16 WF

C

2- $\frac{3}{4}$ " A325
 $\frac{3}{4}$ " slotted holes
in seat ϕ and
clip LSpandrel stiff R
(A only)NEW 16 WF (A)
NEW 24 WF (B)NEW L $5 \times 3 \times \frac{3}{8}$ NEW R { 12" (A)
34" (B)

(A) 6"

(B) 9"

5/16"

5/16"

2" grout

3- $\frac{3}{4}$ " ϕ A325 F @ 3 $\frac{3}{4}$ " slotted holes
in beam web
Exst Slob

Exst 16 WF (D)

NEW JL $5 \times 3 \times \frac{3}{8}$

Exst 24 B (E)

See 114-1B

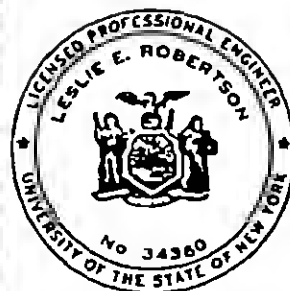
Return
top 1/4"

D

a

E

13-K11.2-3.1



DESIGNED

K. Chiang

DRAWN

John G. ...

REVIEWED

WAB

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

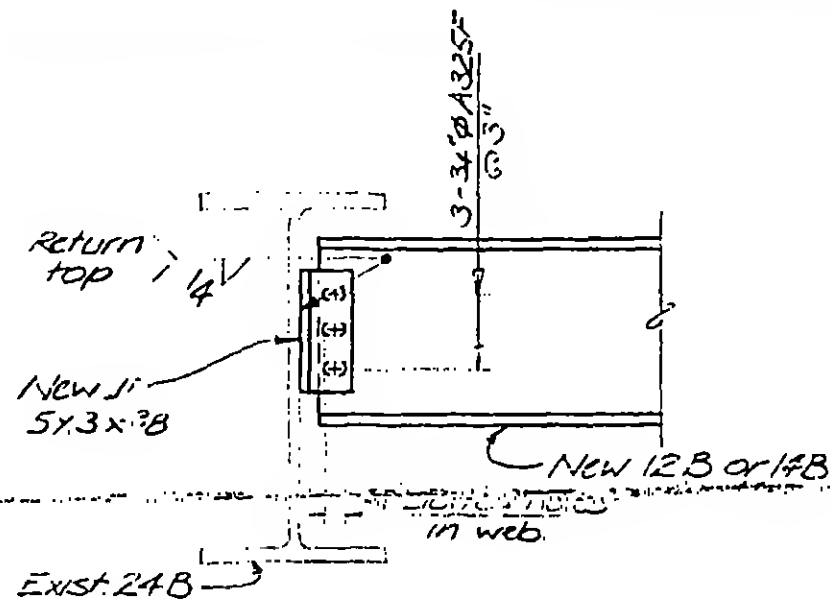
Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER

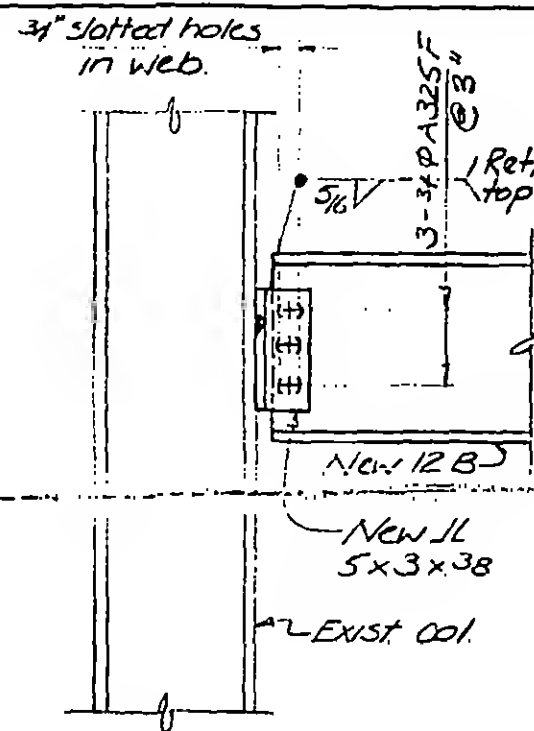
TITLE EL. 310 ZONE K-F.A. INTAKE CONN. DETAILS

DATE 5-7-73

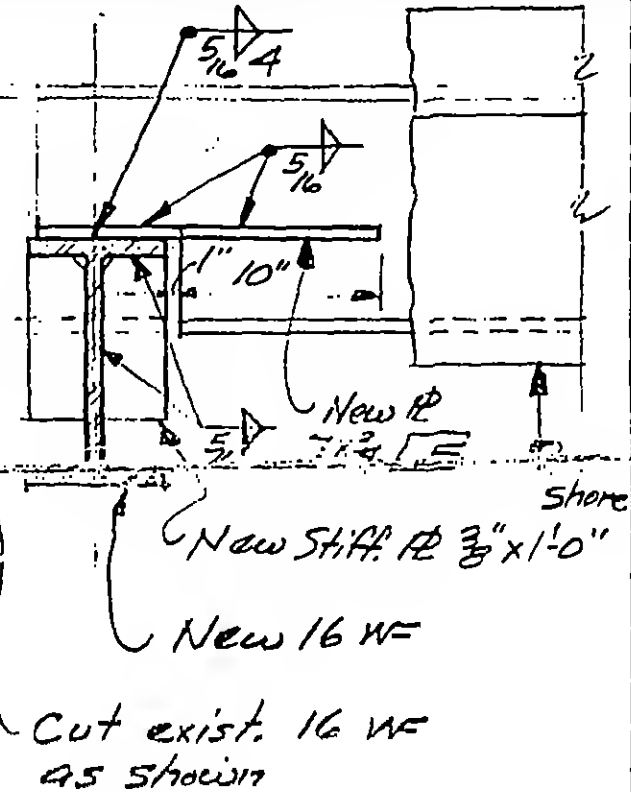
REVISIONS



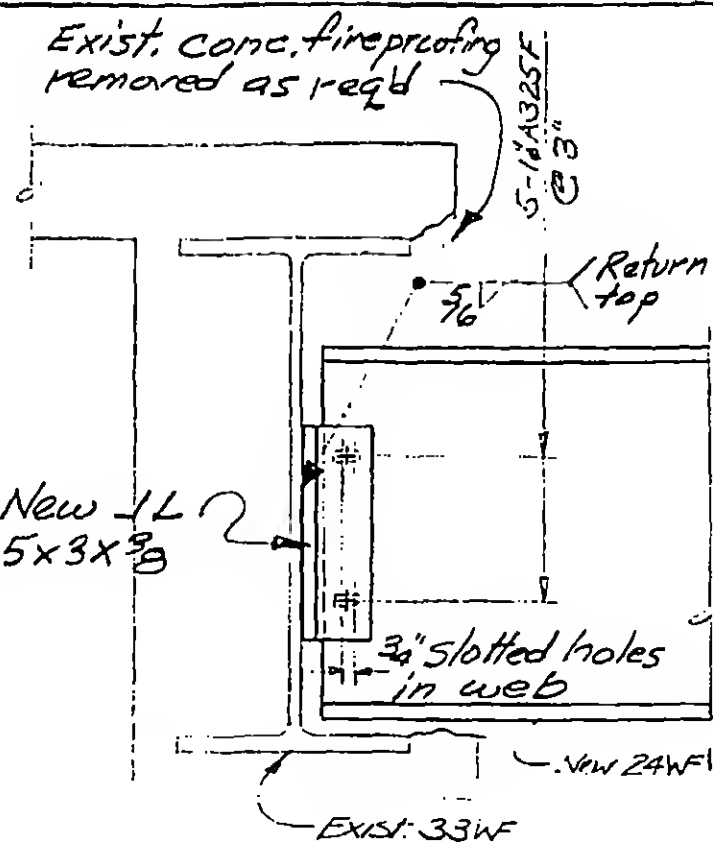
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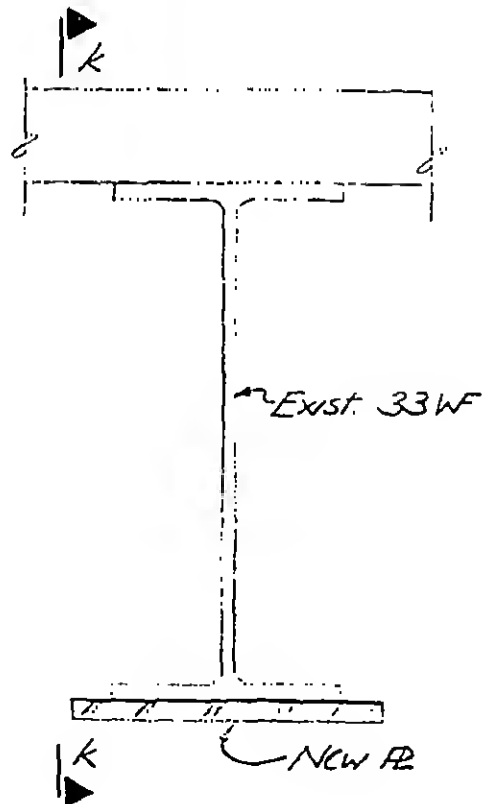
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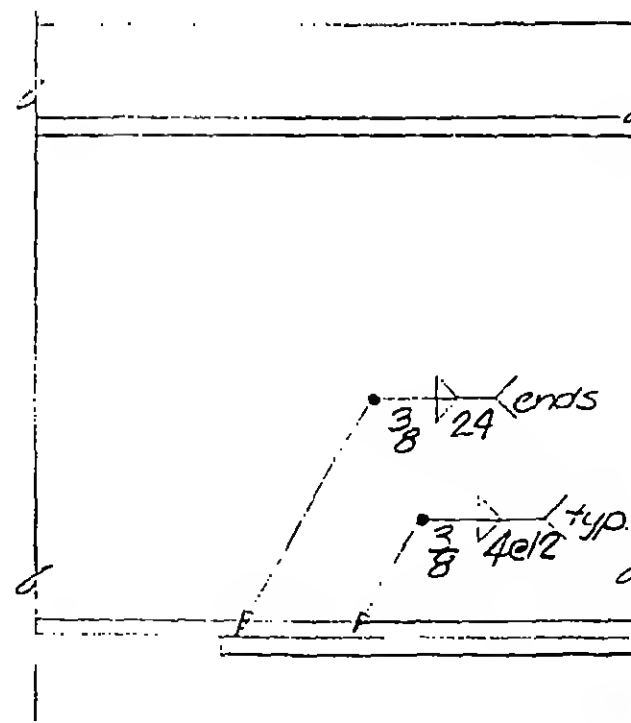
H



J



K



K

13-K11.2-3.2



DESIGNED

DRAWN J Banks

REVIEWED WAB

SKILLING, HELLE. CHRISTIANSEN. ROBERTSON

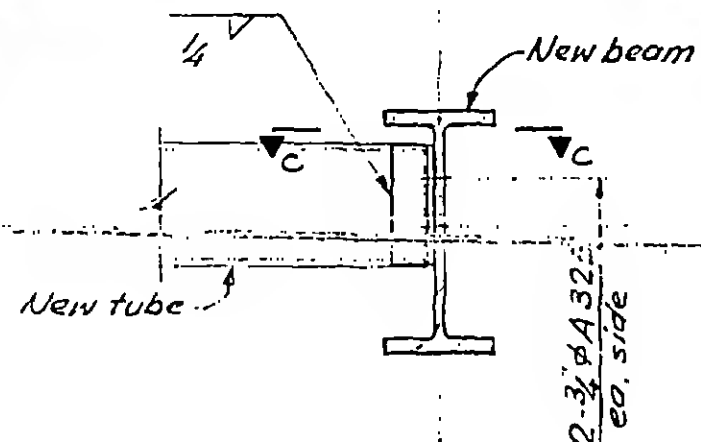
Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER

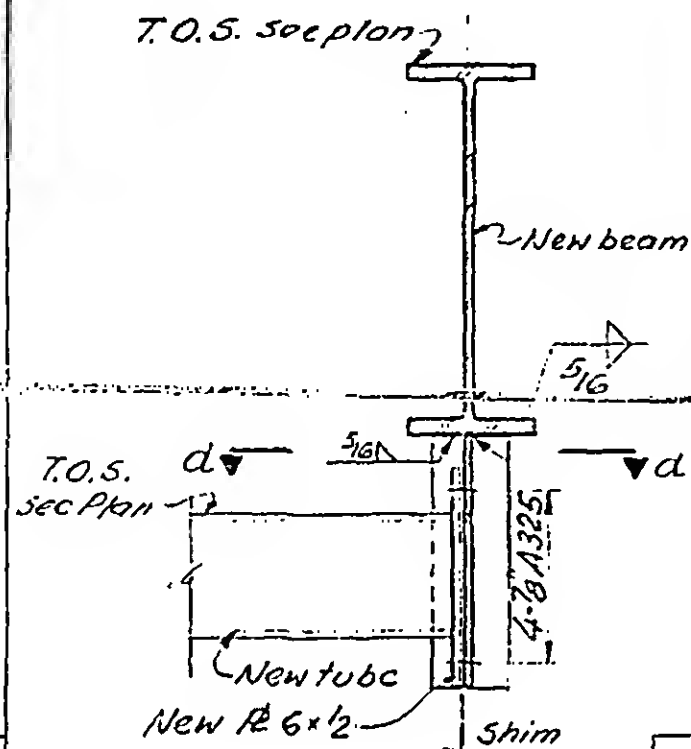
TITLE EL 310-ZONE K3-"H" ELEV.-CONN DETAILS

DATE 5-7-73

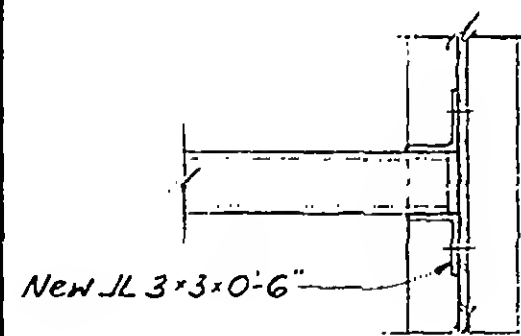
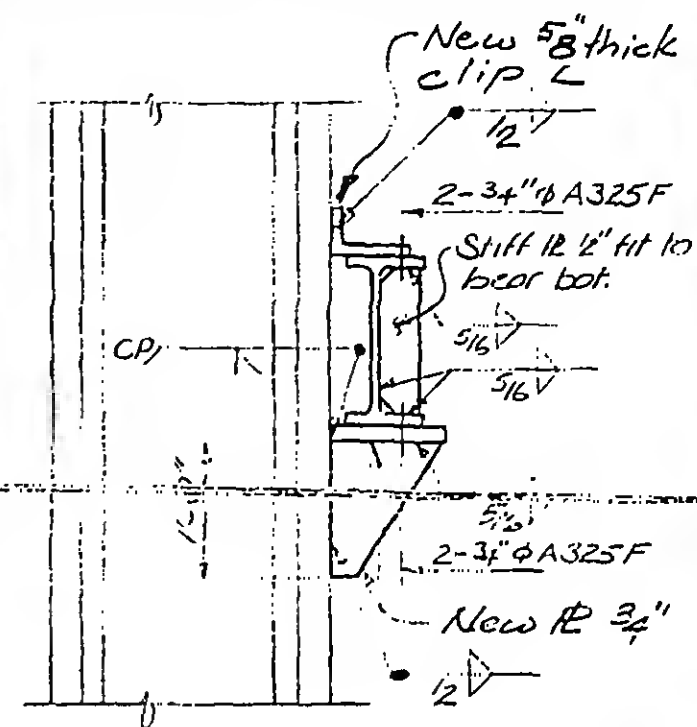
REVISIONS



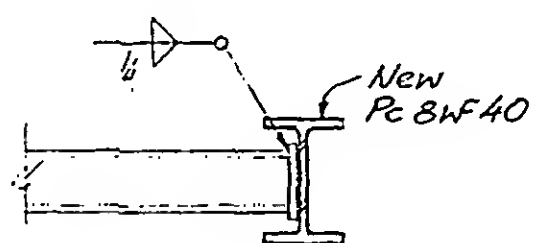
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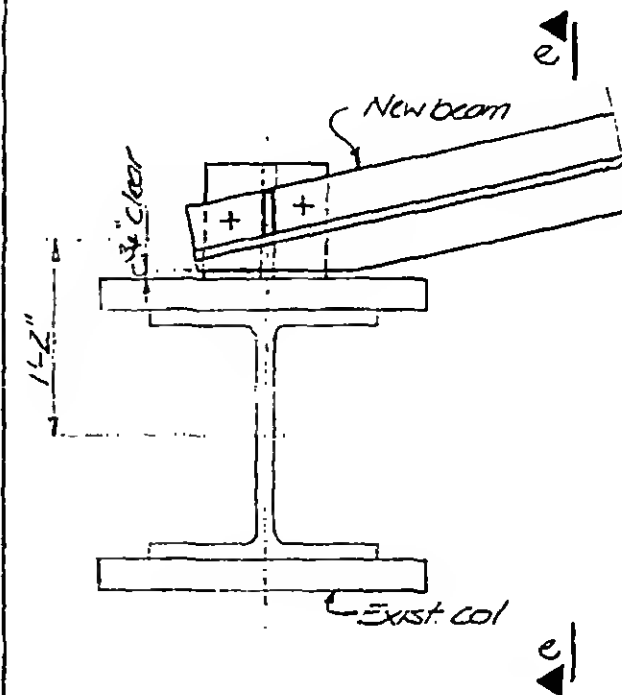
D e



C



d E



13-K11.1-3.2



DESIGNED

K. Chiang

DRAWN

J. Robertson

REVIEWED

1/10/73

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

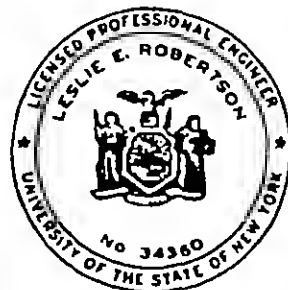
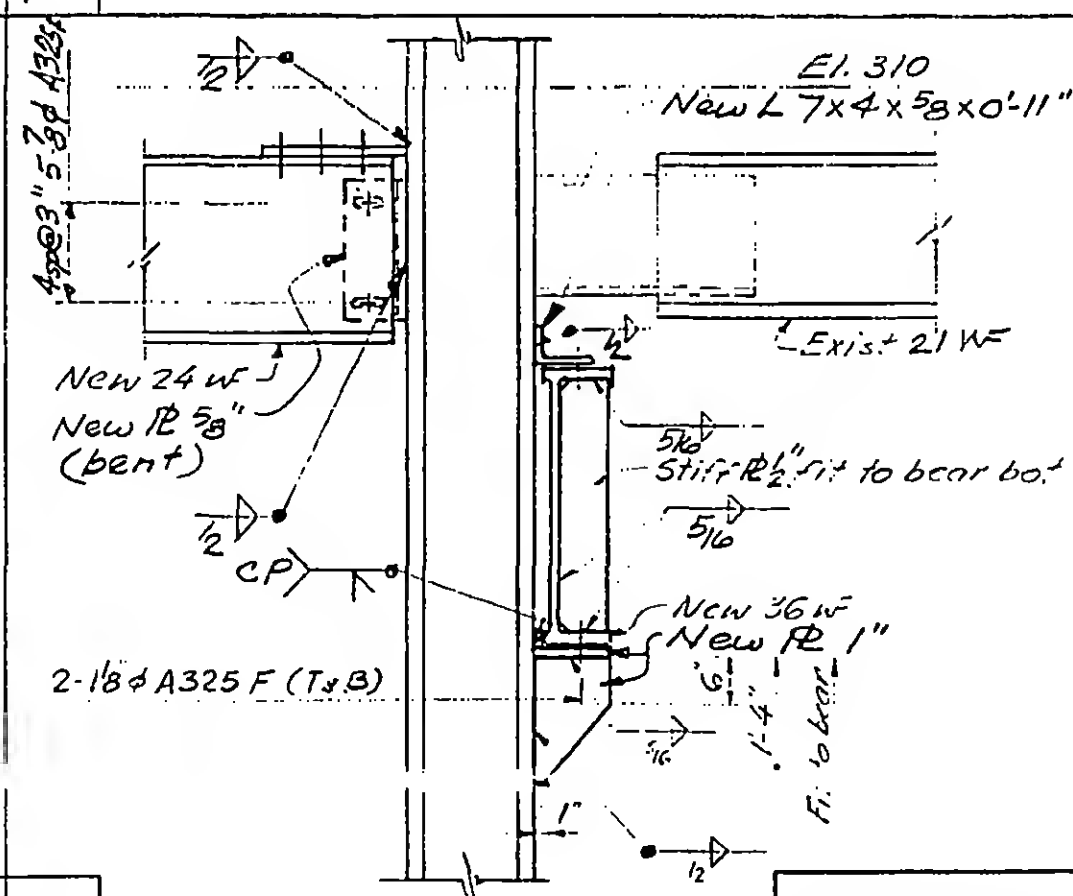
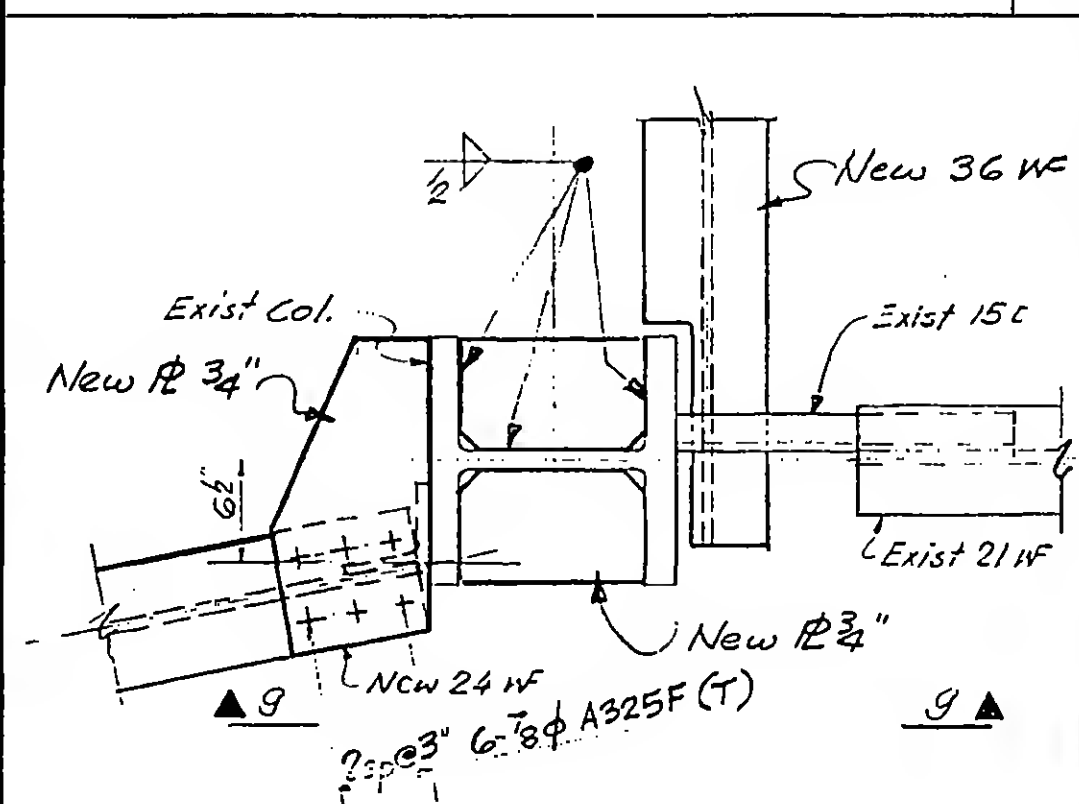
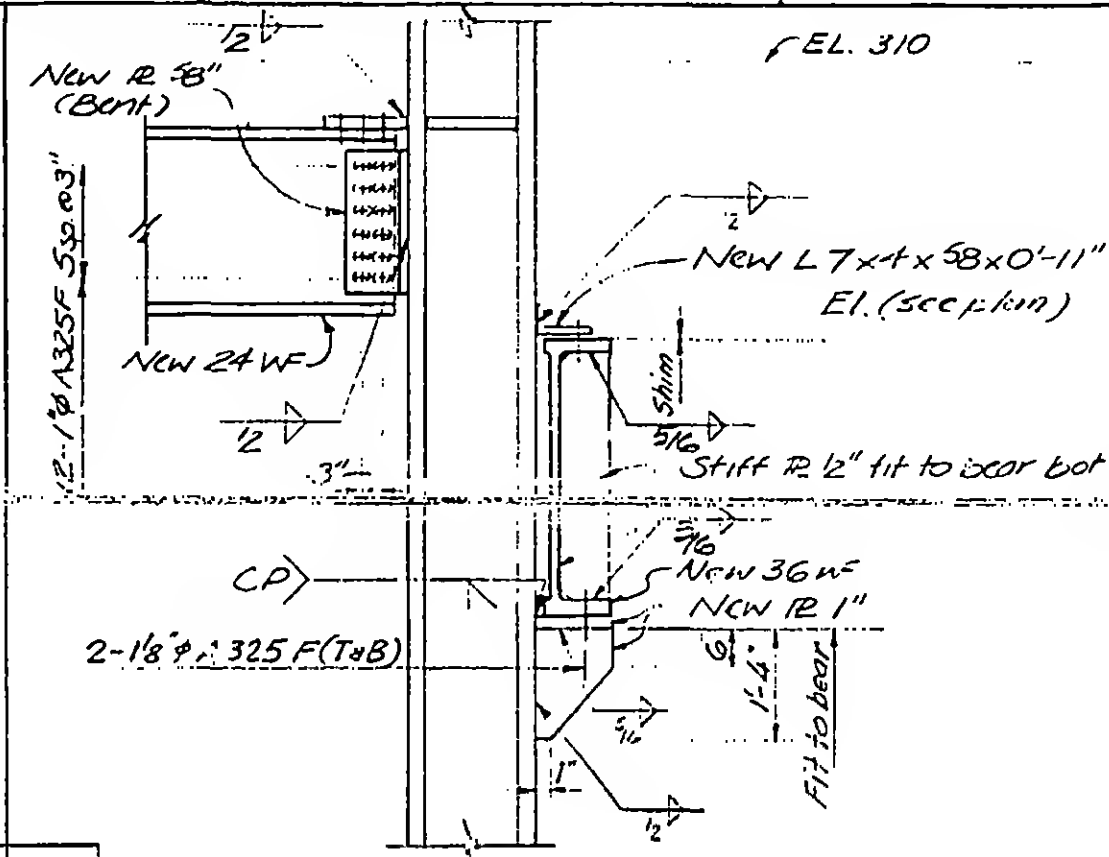
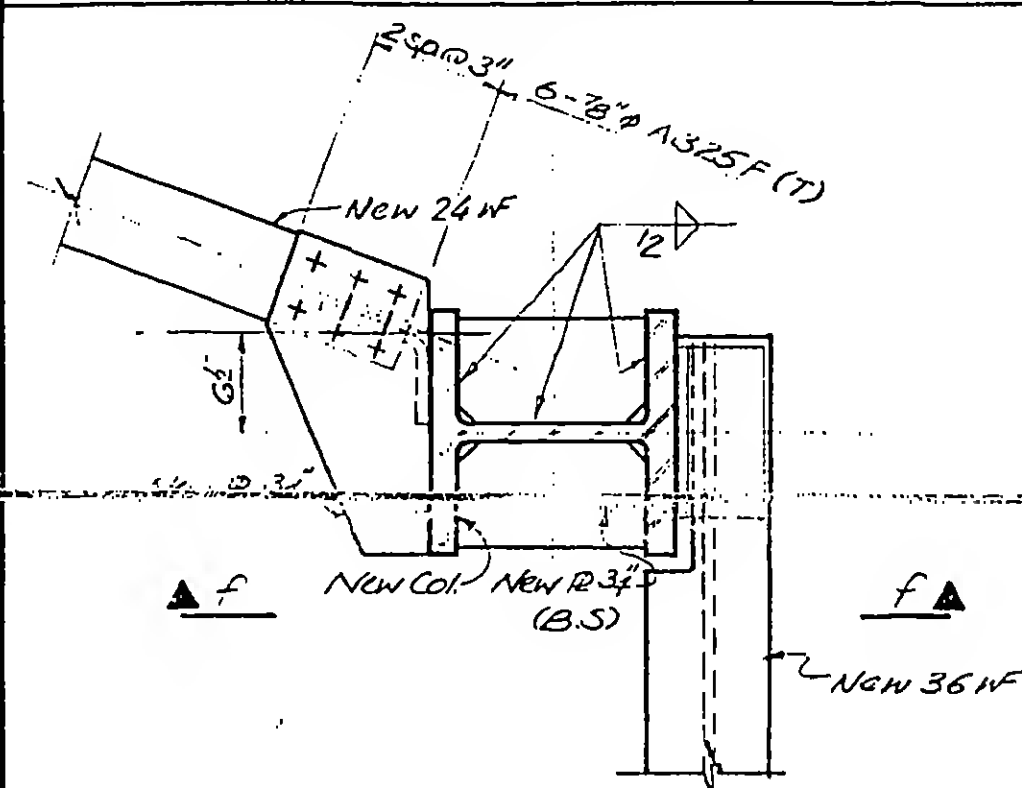
Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER

TITLE EL. 310 - ZONE K3 - "H" ELEV.-CONN DETAILS

DATE 5-7-73.

REVISIONS



DESIGNED

L.E.R.

DRAWN

John G. Jones

REVIEWED

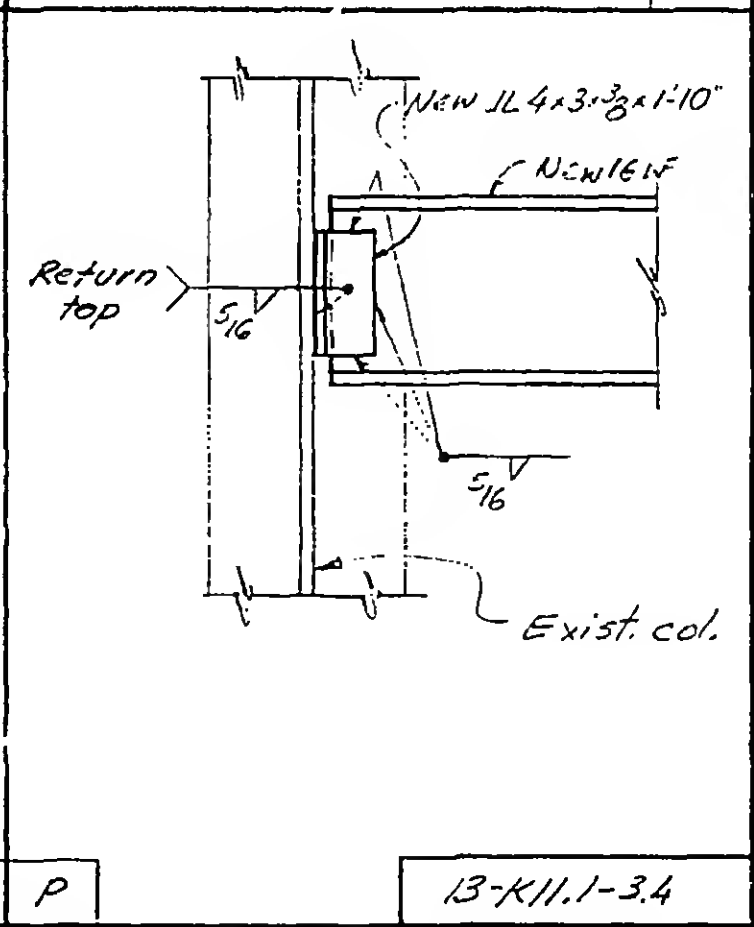
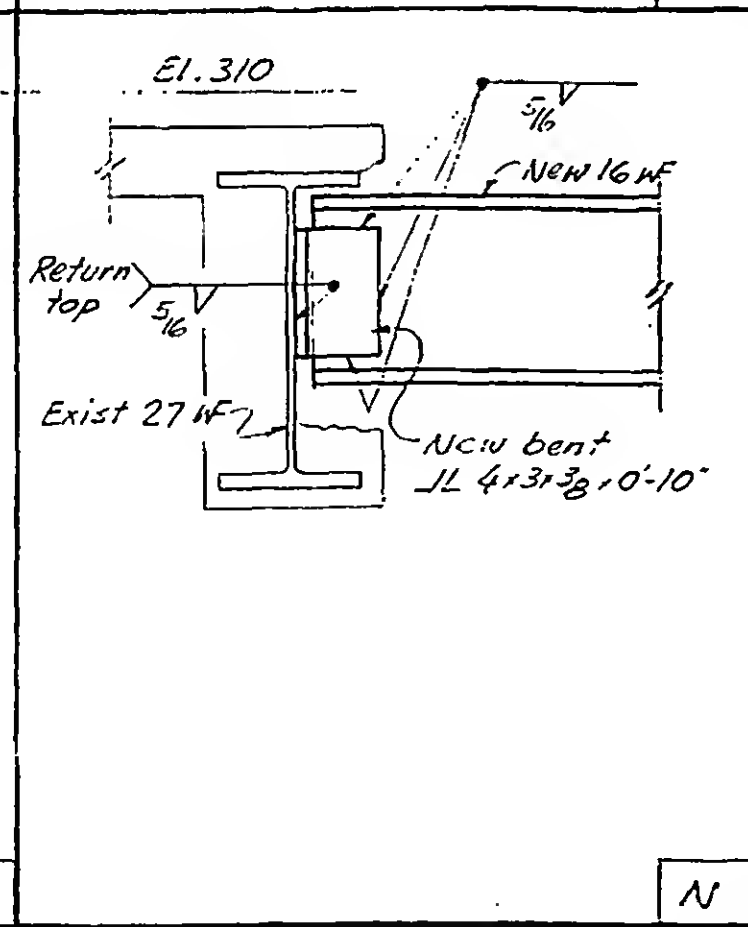
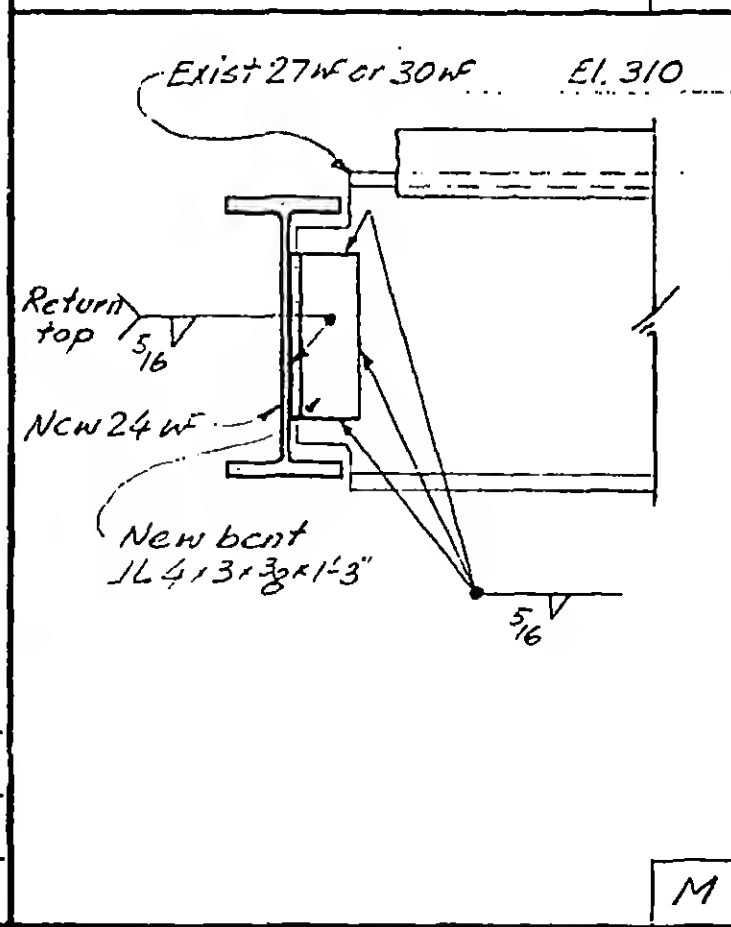
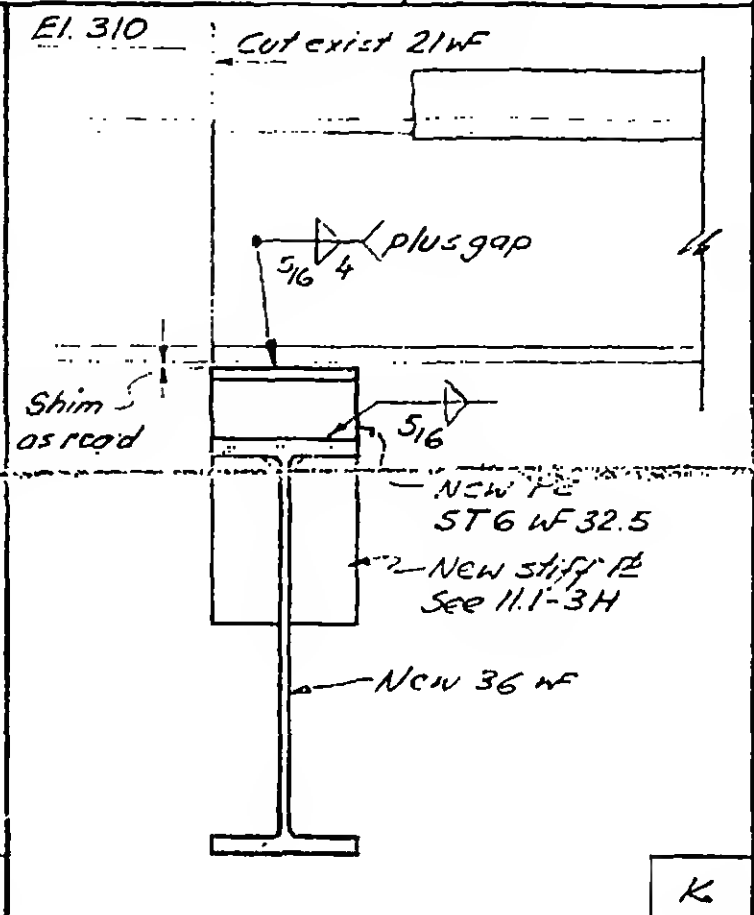
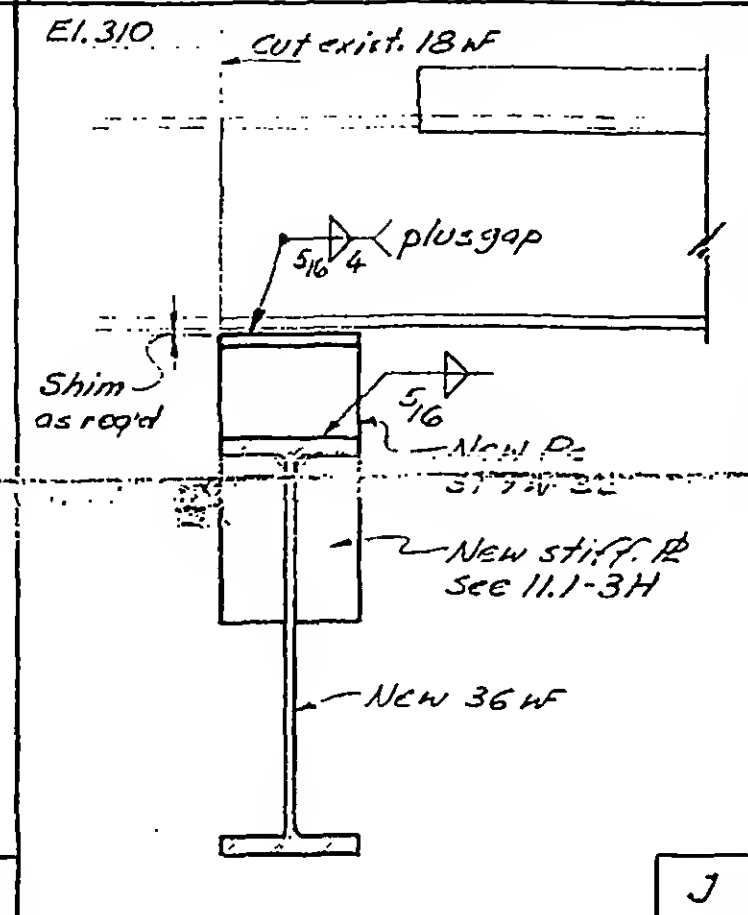
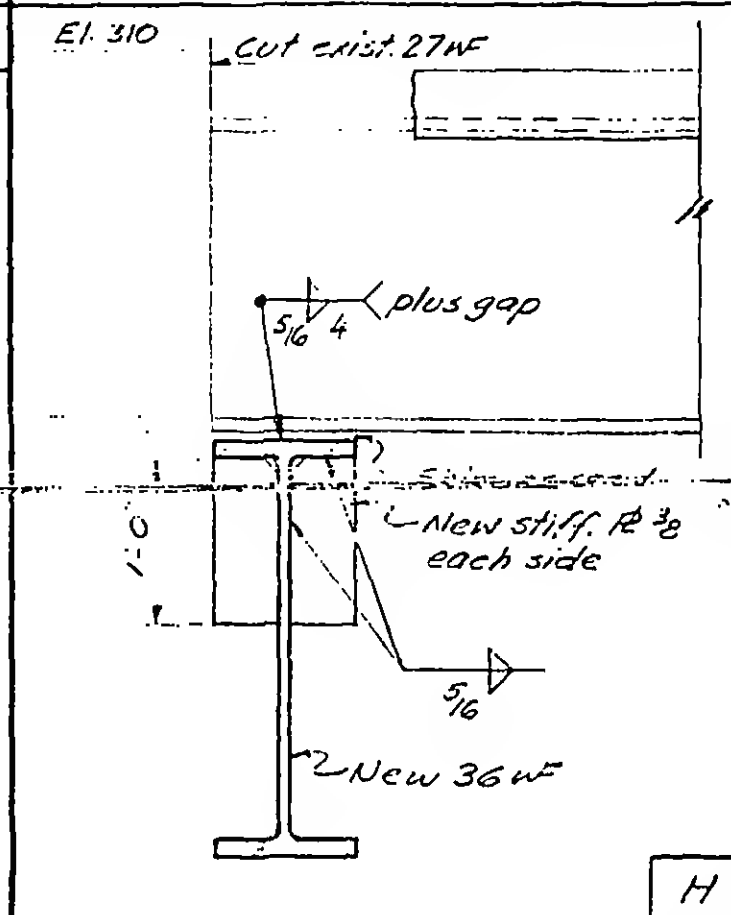
WOB

G

9

13-K11.1-3.3

REVISIONS



DESIGNED
 DRAWN *John J. ...*
 REVIEWED *WAB*

13-K11.1-3.4

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

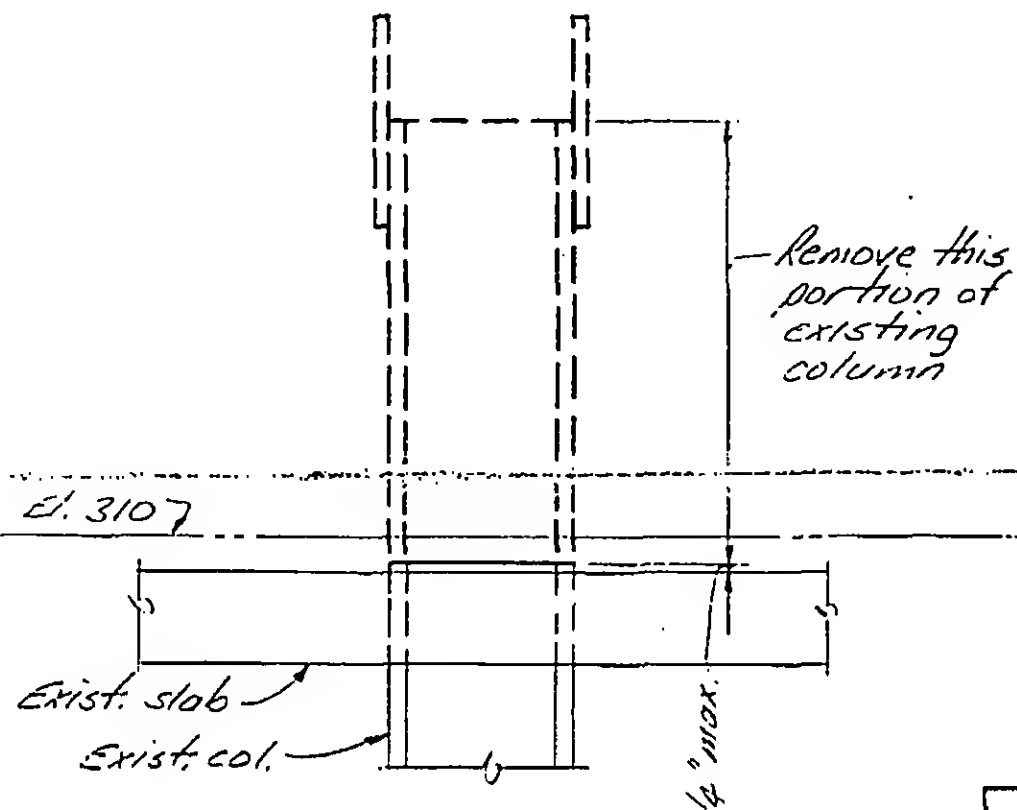
Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER

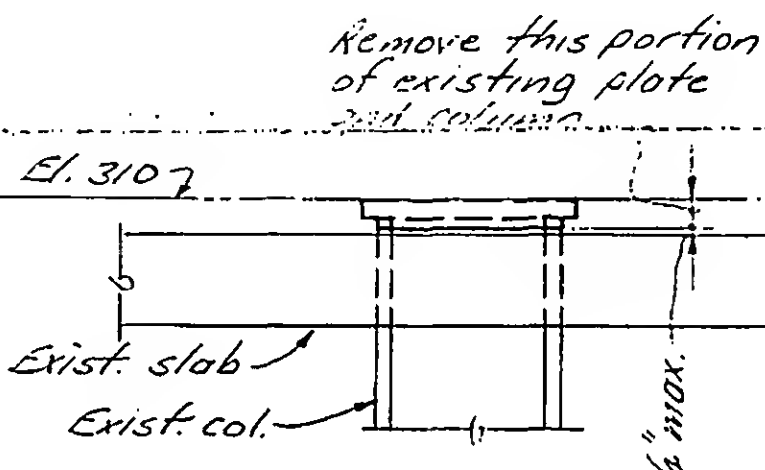
TITLE EL. 310 - ZONE K3 - COLUMN REMOVAL DETAILS

DATE 5-7-73

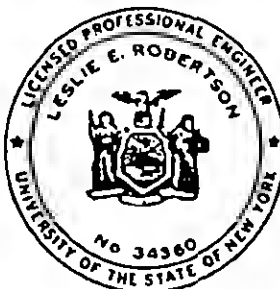
REVISIONS



A



B



DESIGNED

DRAWN

JA

REVIEWED

WAB

13-K11.1-4

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

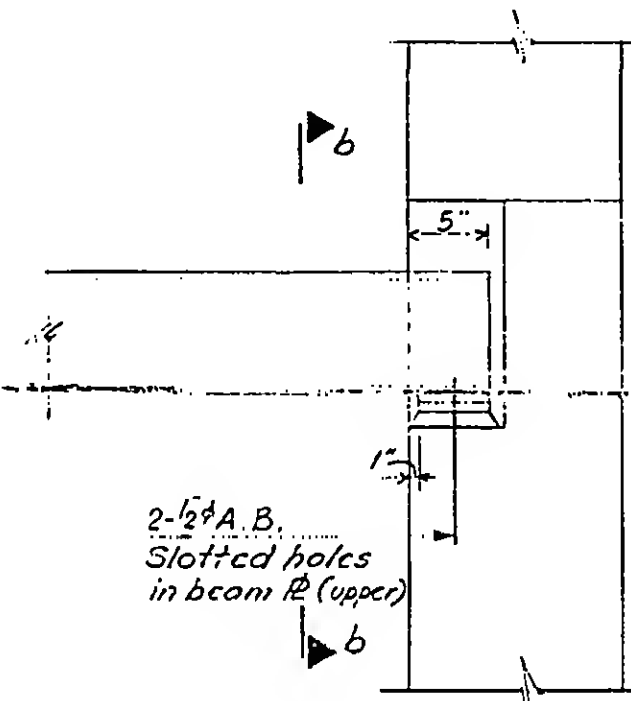
Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER

TITLE E1. 310 - ZONE K5-SERVICE ELEV.-CONN DETAILS

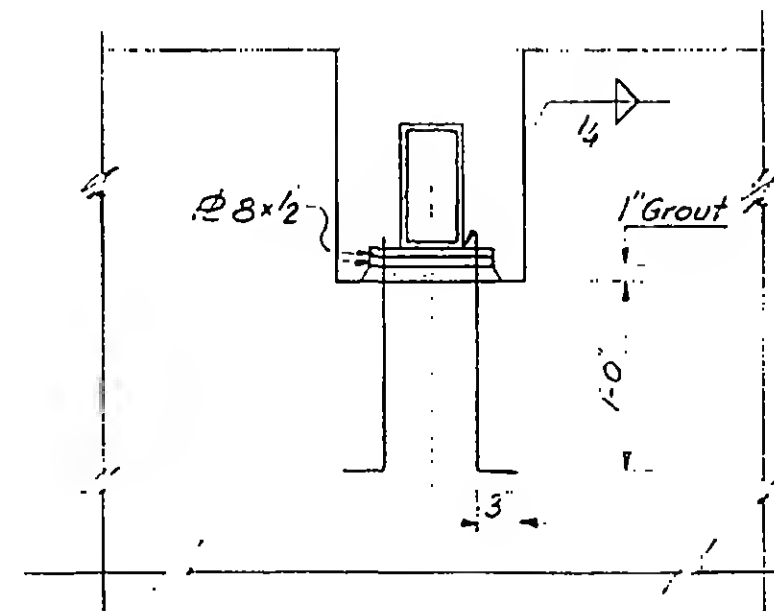
DATE 5-7-73

REVISIONS



A

a



13-K11.2-4.1



DESIGNED

K. Chiang

DRAWN

John Friedman

REVIEWED

L. Robertson

SKILLING, HELLE. CHRISTIANSEN, ROBERTSON

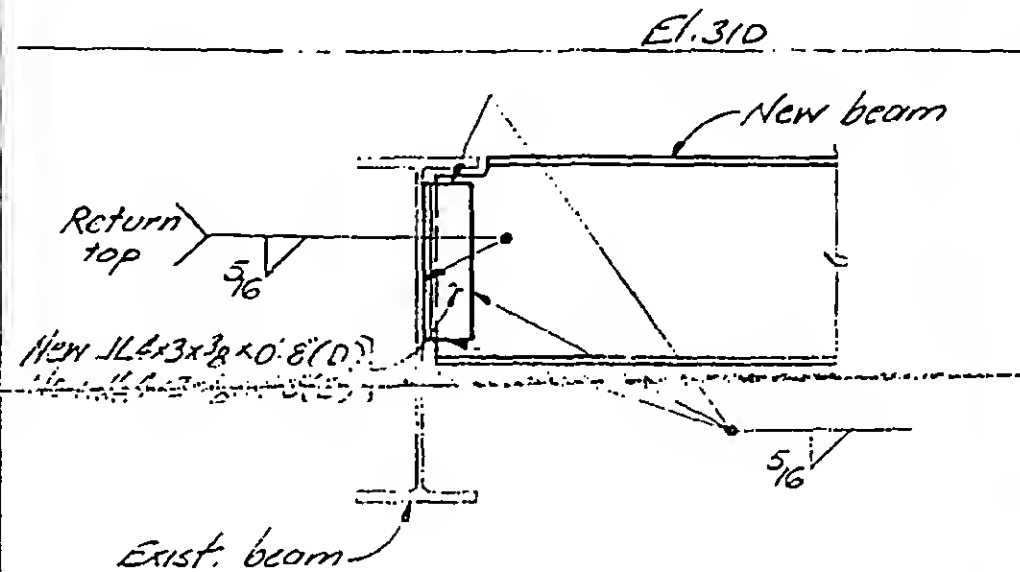
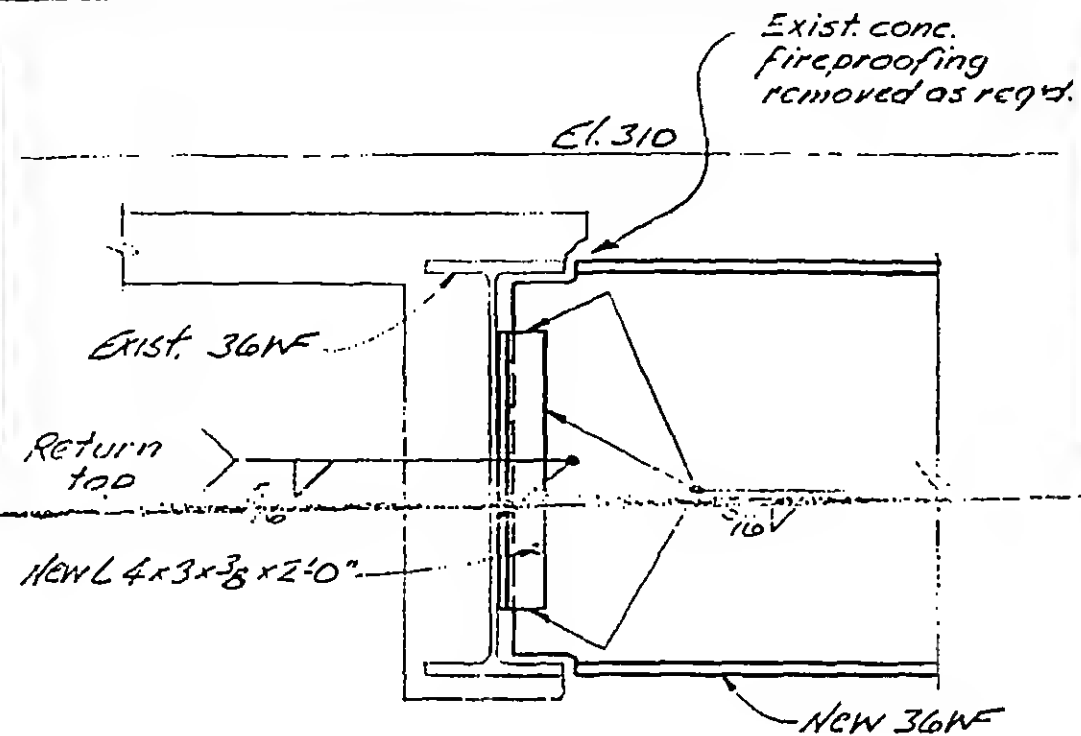
Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER

TITLE EL. 310 - ZONE K5 - SERVICE ELEV. - CONN. DETAILS

DATE 5-7-73

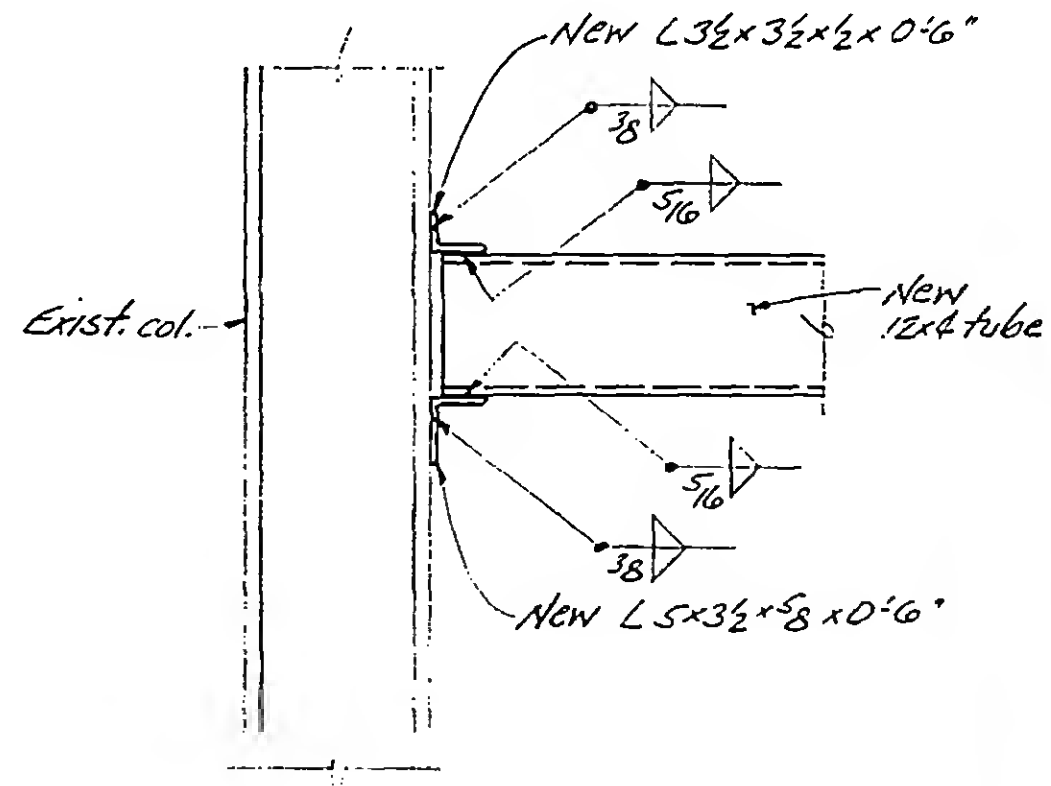
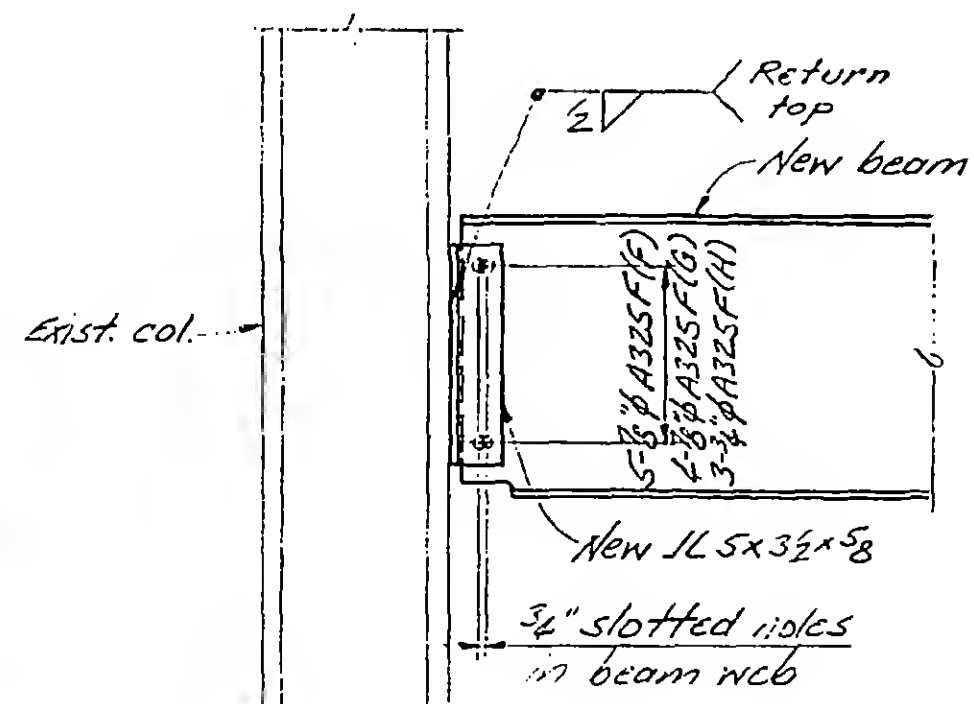
REVISIONS



C

D

E



F

G

H

K

13-K-11.2-4.2



DESIGNED

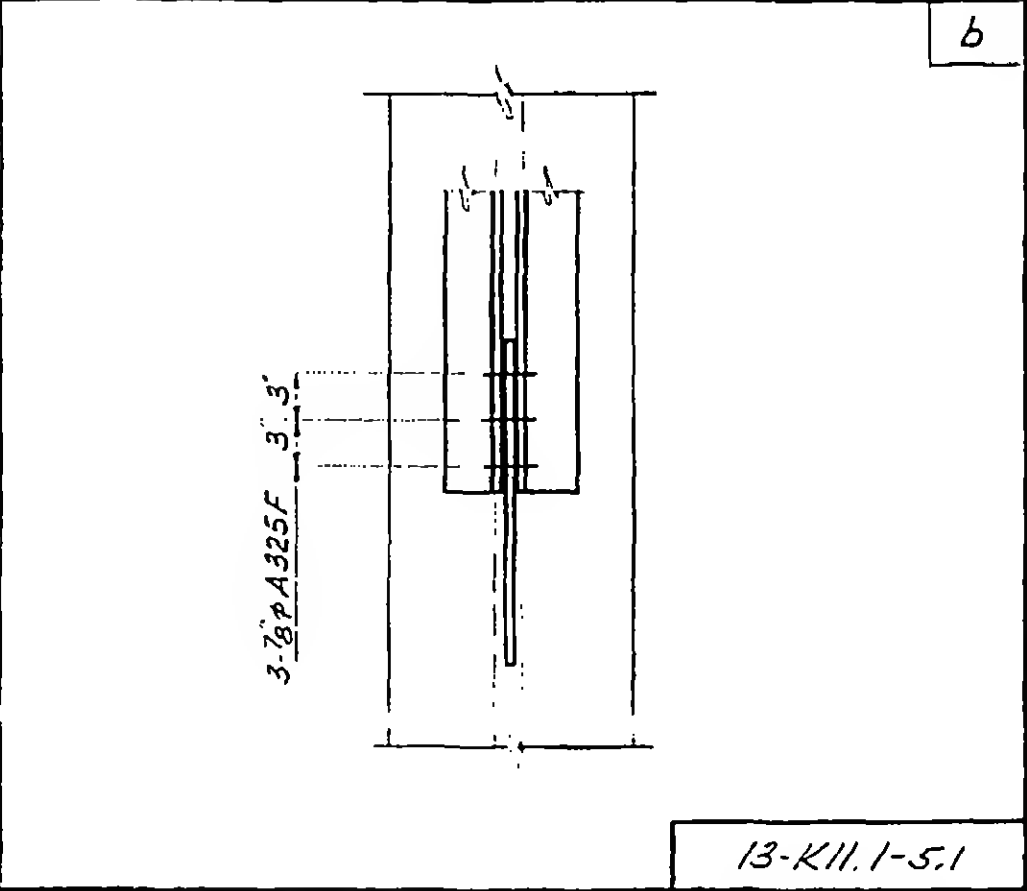
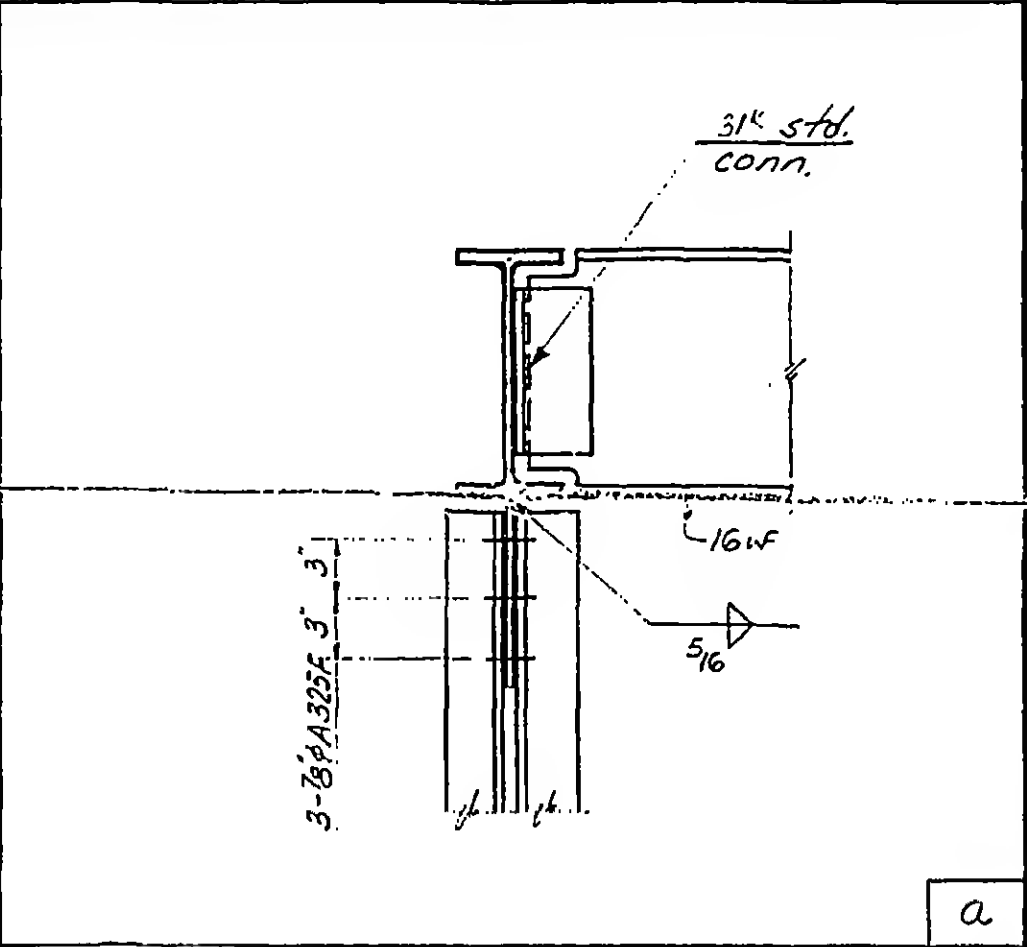
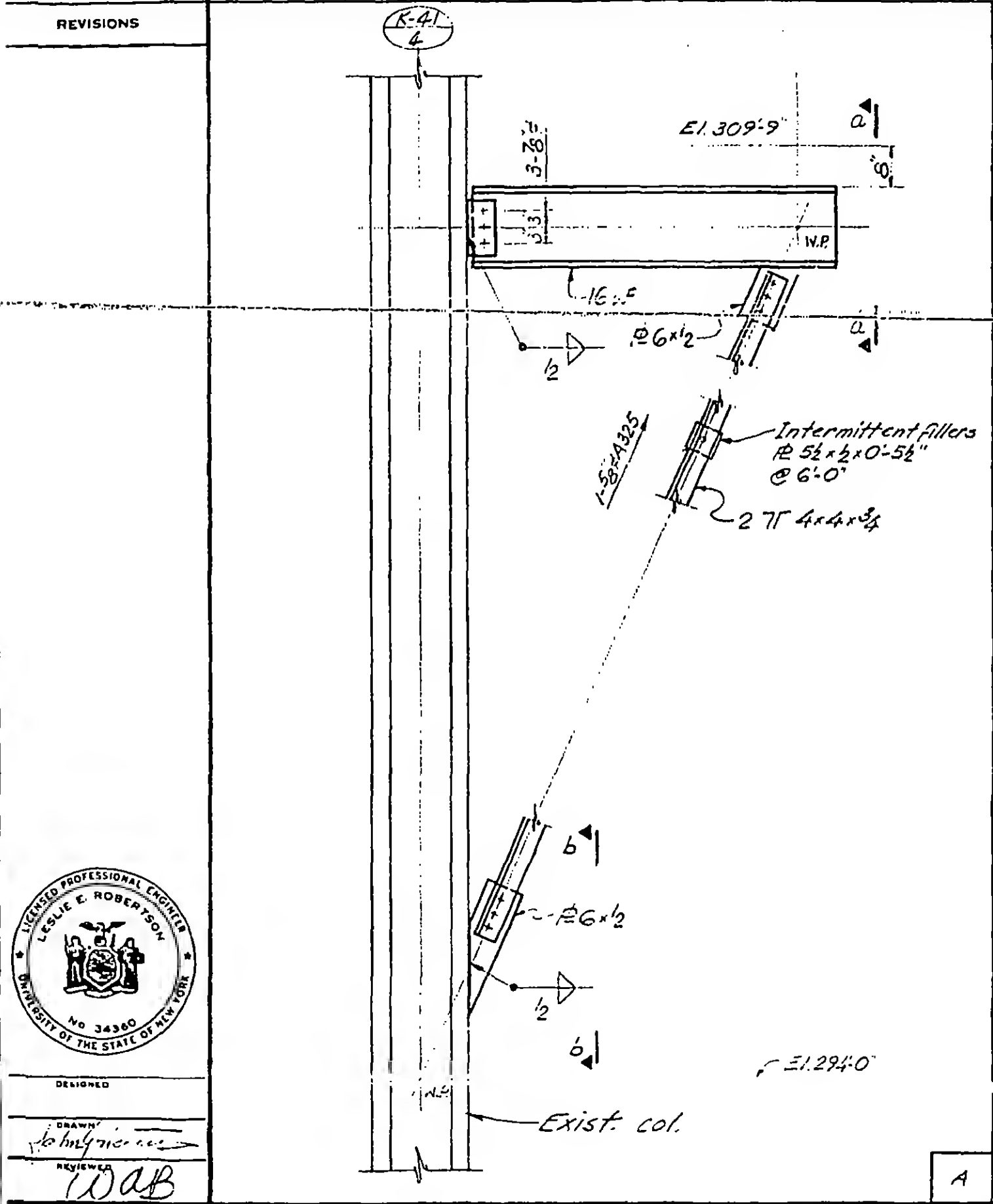
DRAWN

J. A.

REVIEWED

CWB

REVISIONS



DESIGNED

DRAWN
J. H. Robertson

REVIEWED
WAB

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

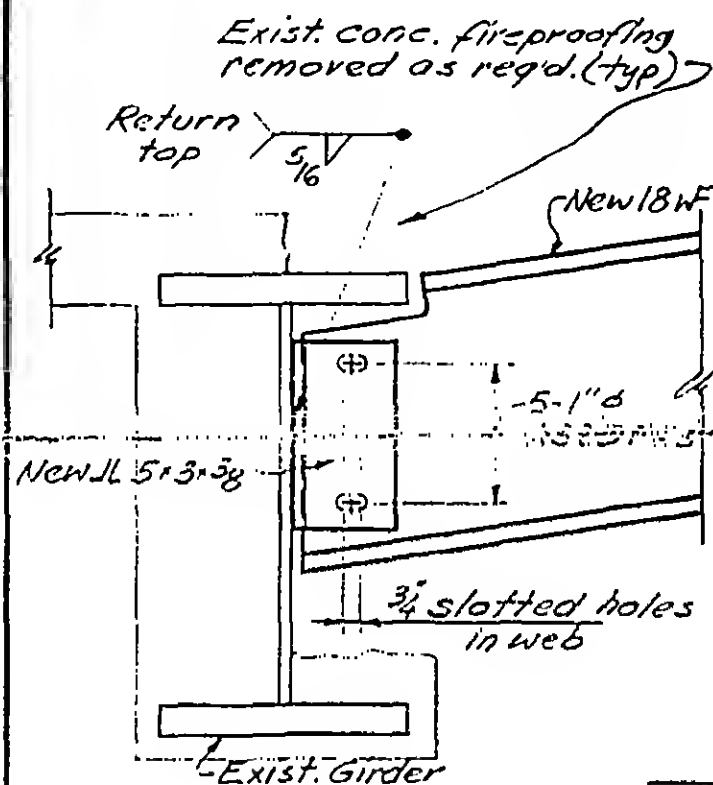
Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER

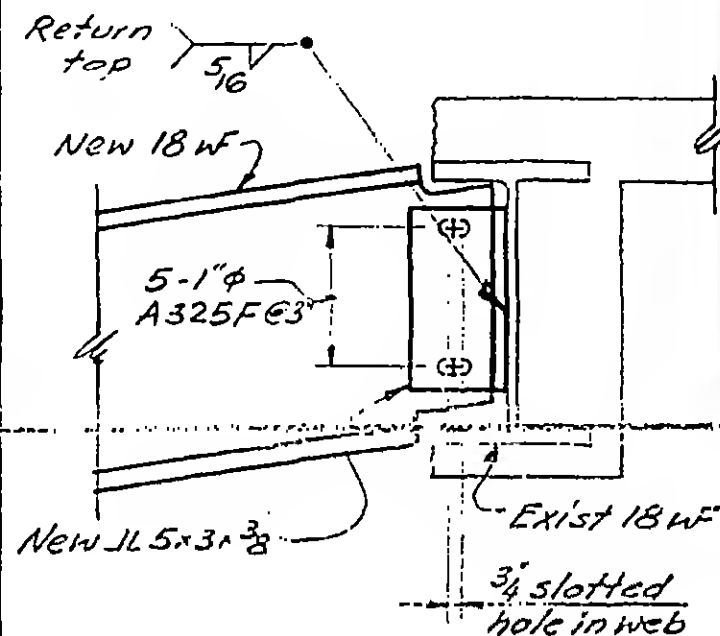
TITLE EL. 310-ZONE K5-STAIR K6A-CONN. DETAIL

DATE 5-7-73

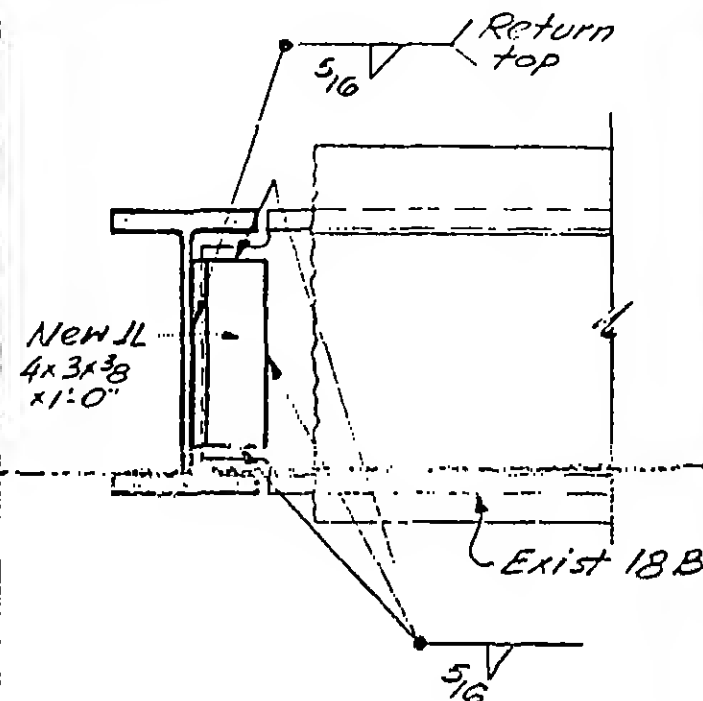
REVISIONS



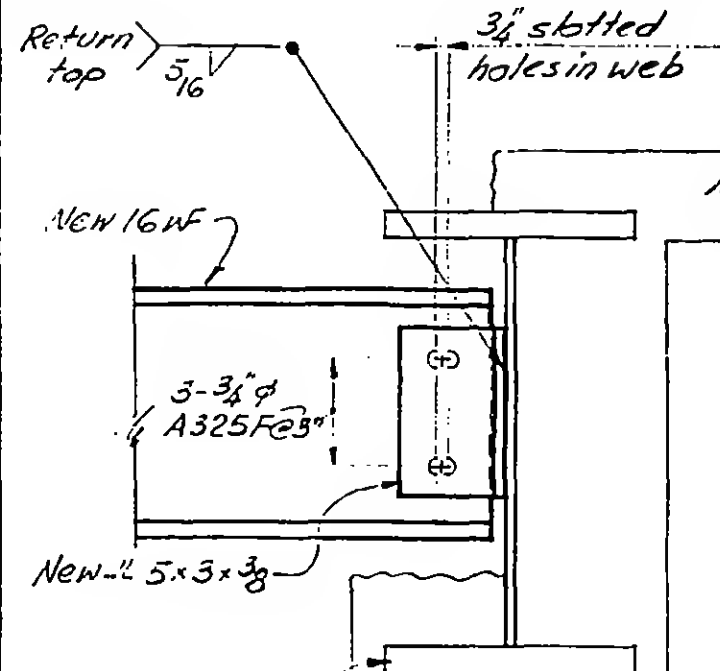
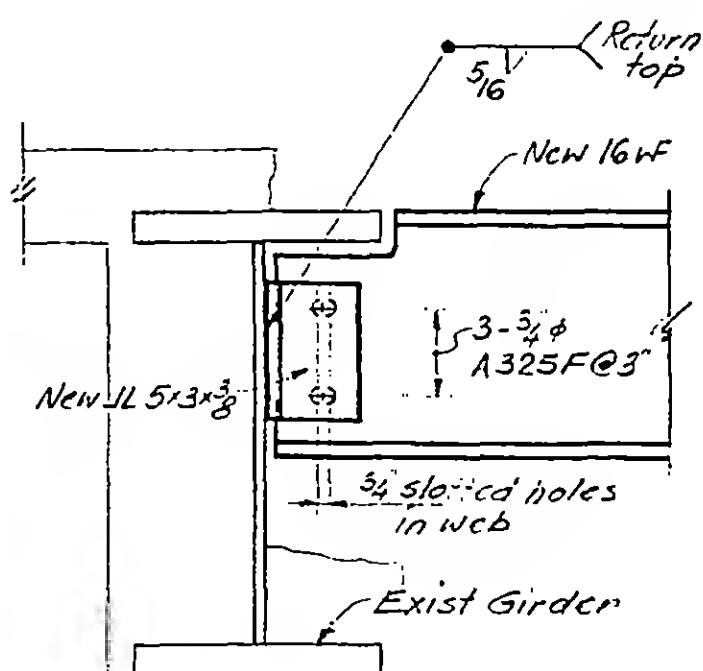
A



B



C



DESIGNED

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

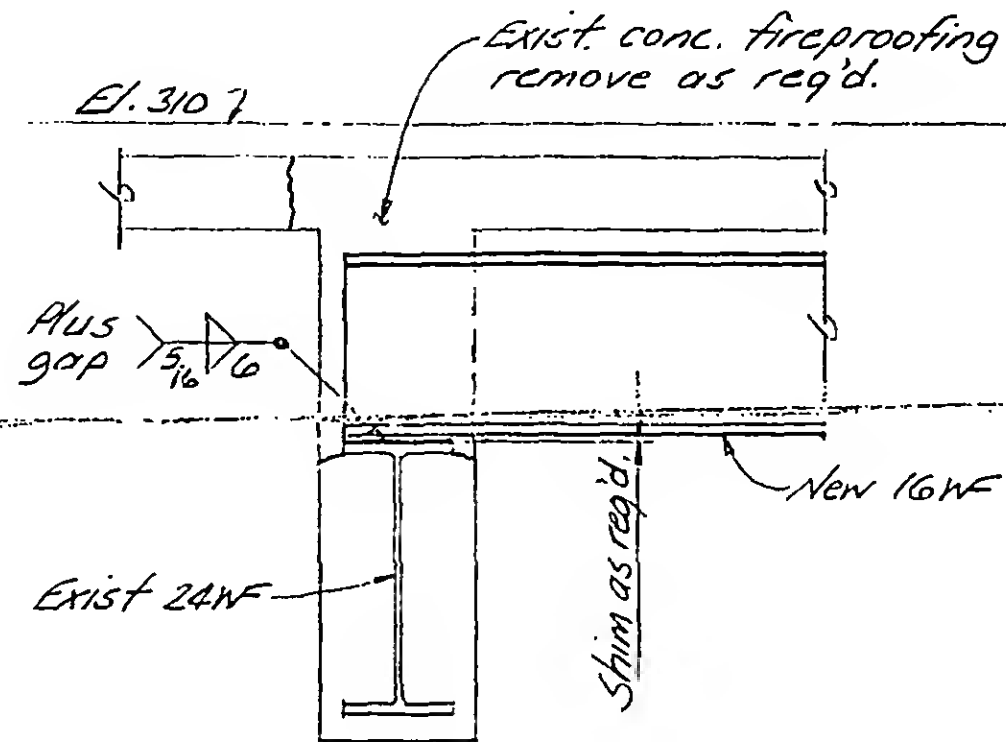
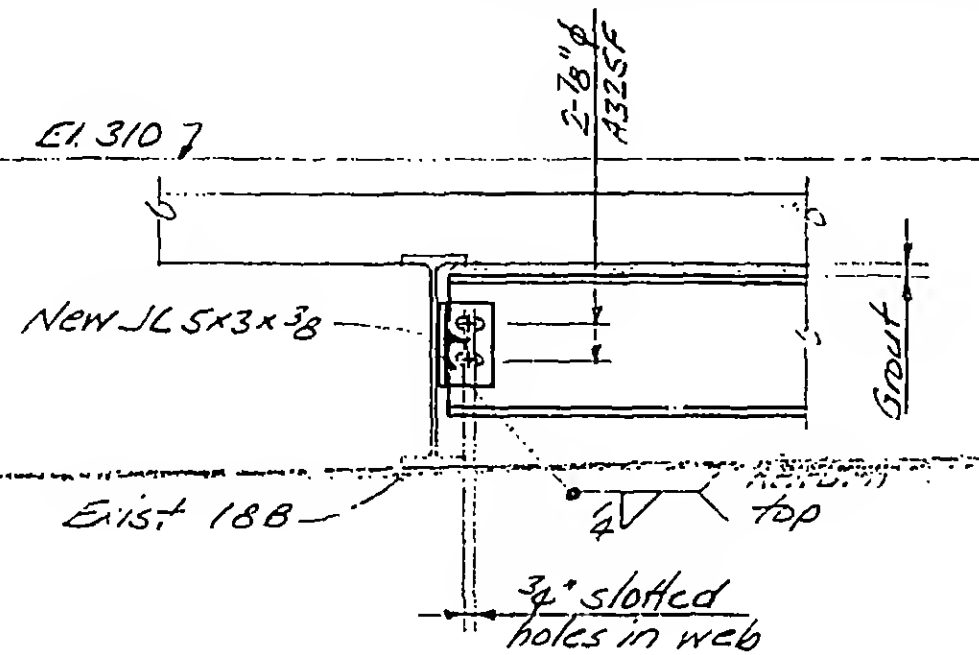
Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER

TITLE EL. 310 - ZONE K1 - NEW OPENINGS CONN. DETAILS

DATE 5-7-73

REVISIONS



DESIGNED

DRAWN

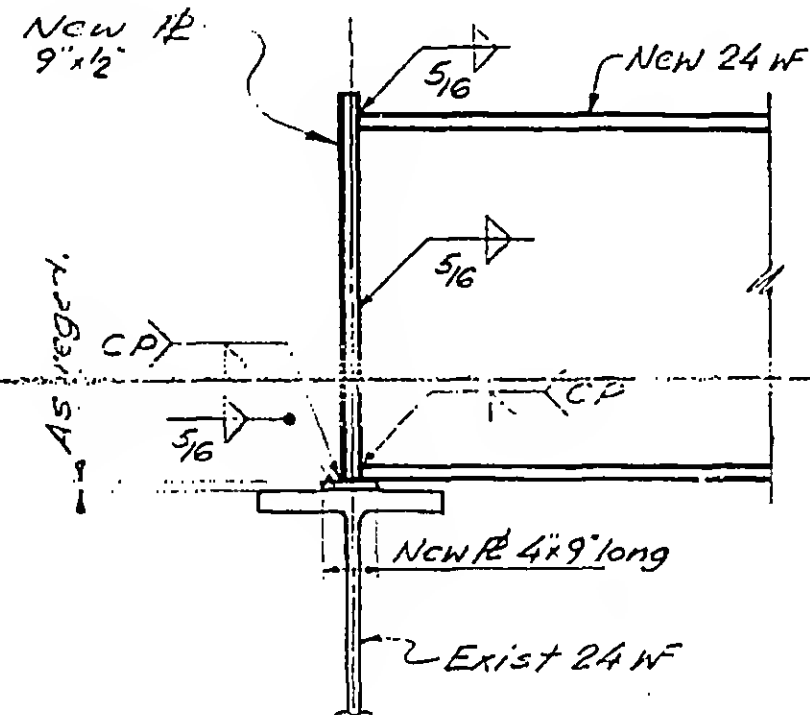
JA

REVIEWED

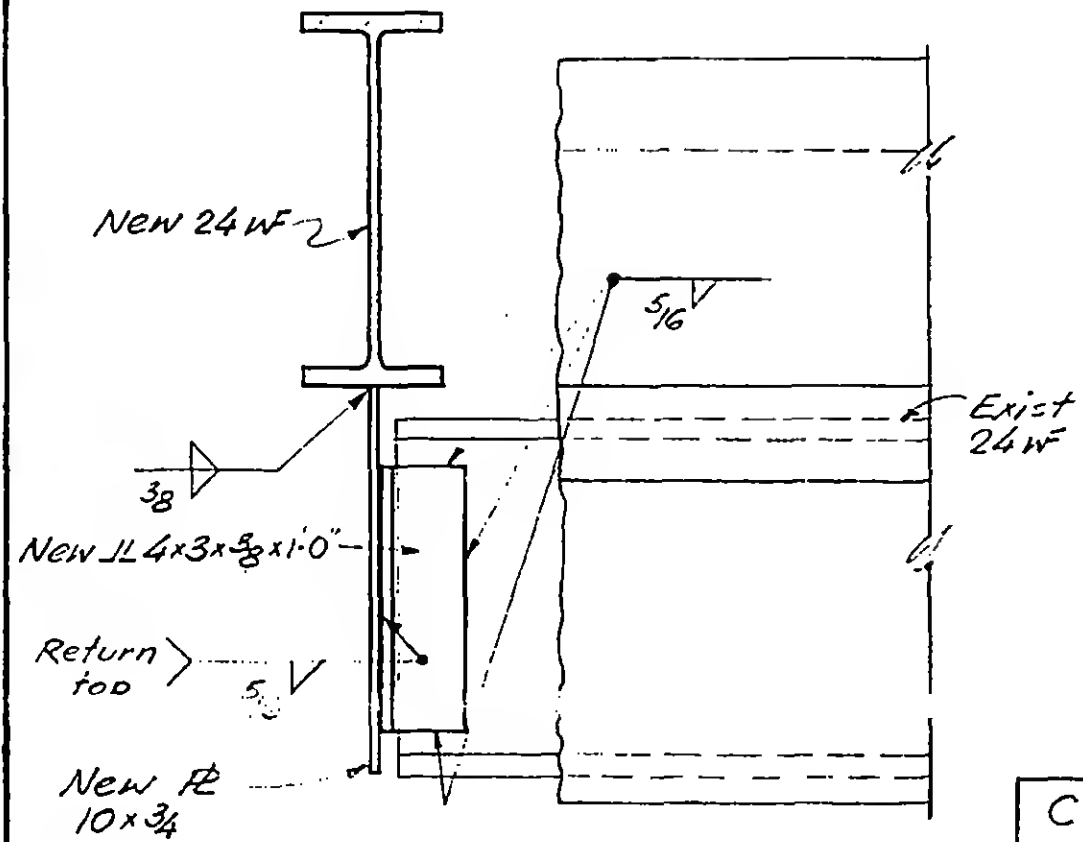
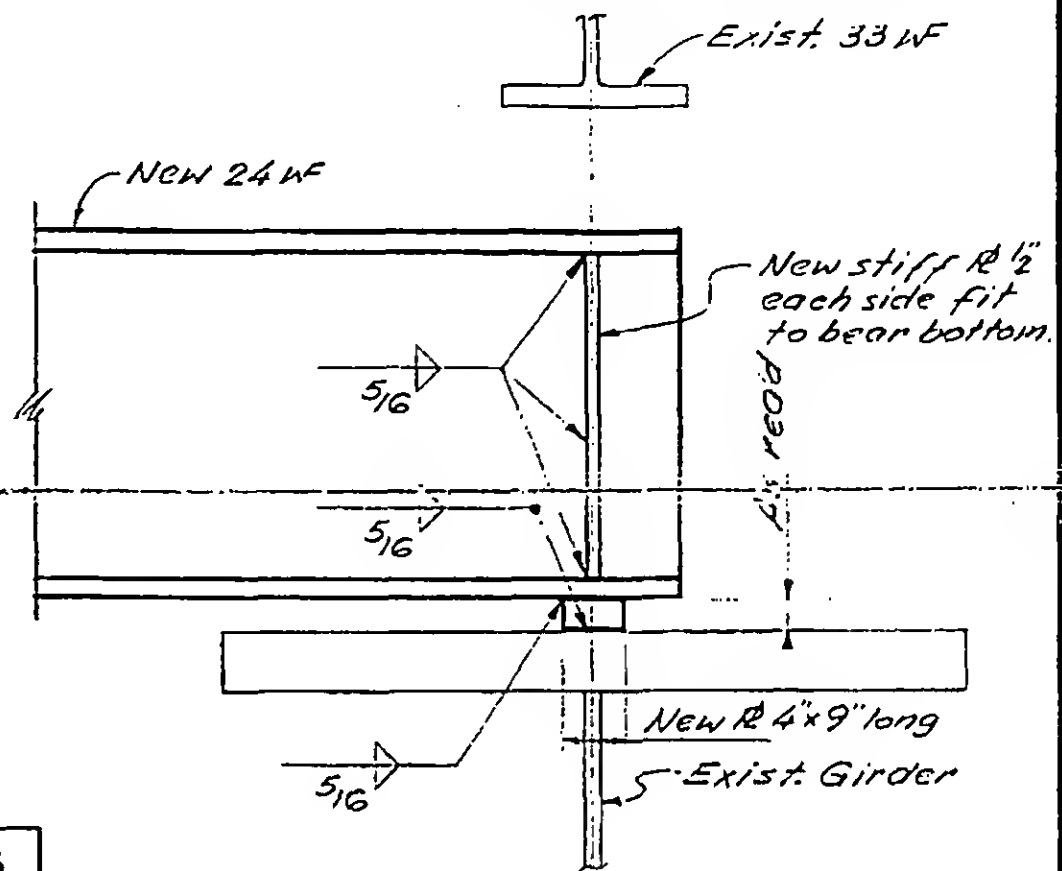
LWAB

13-K11.1-5.2

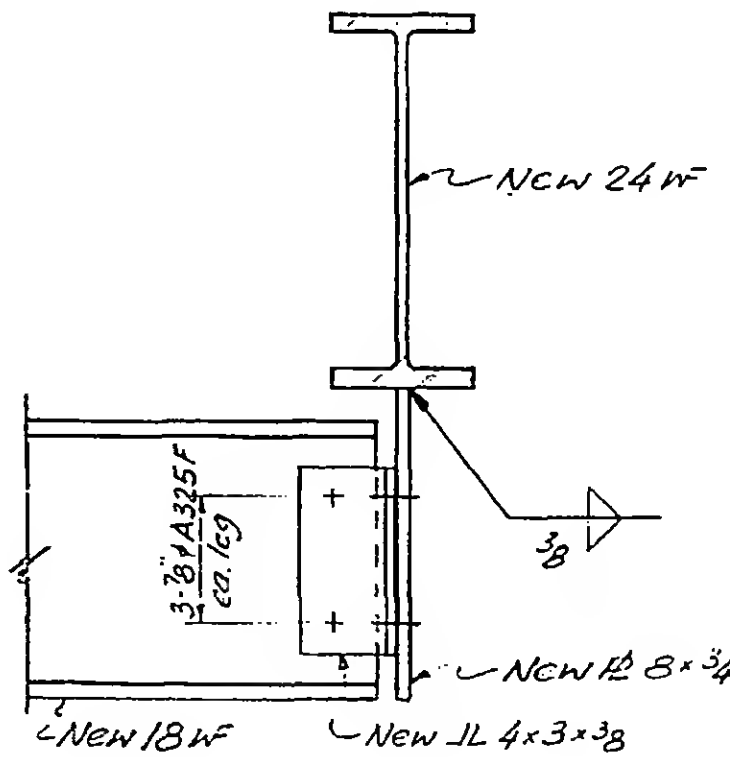
REVISIONS



A B



C D



13-K11.2-2.1



DESIGNED

DRAWN

REVIEWED

John F. Robertson

WLB

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

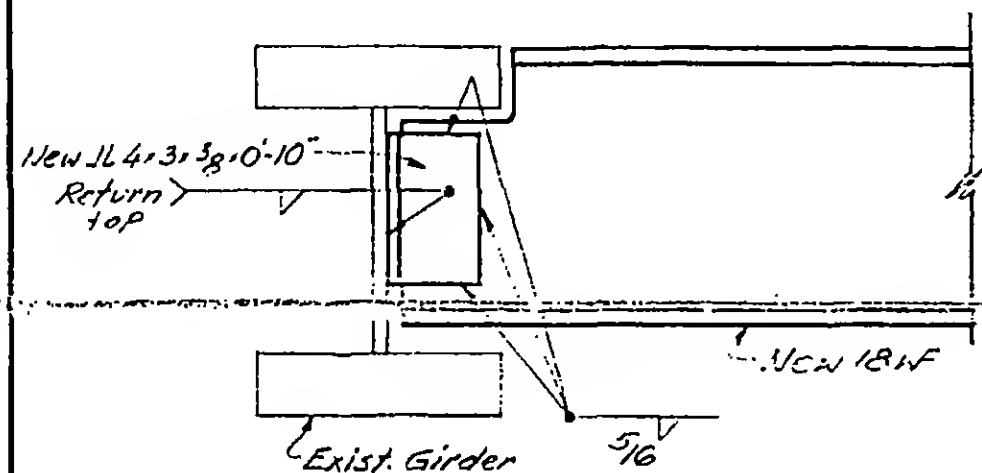
Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER

TITLE EL 310 - ZONE K5-STAIR 8-CONN. DET.

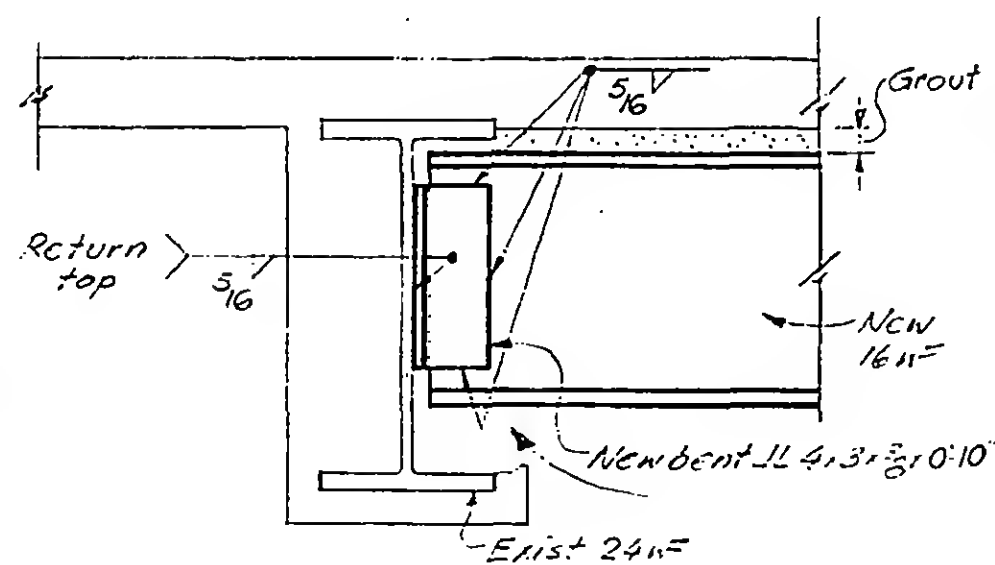
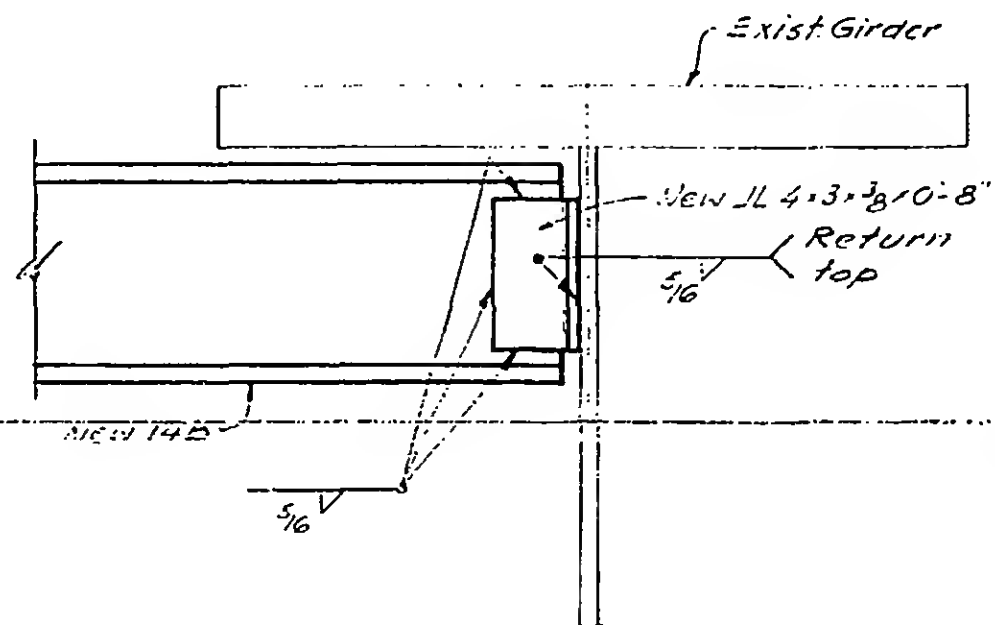
DATE 5-7-73

REVISIONS



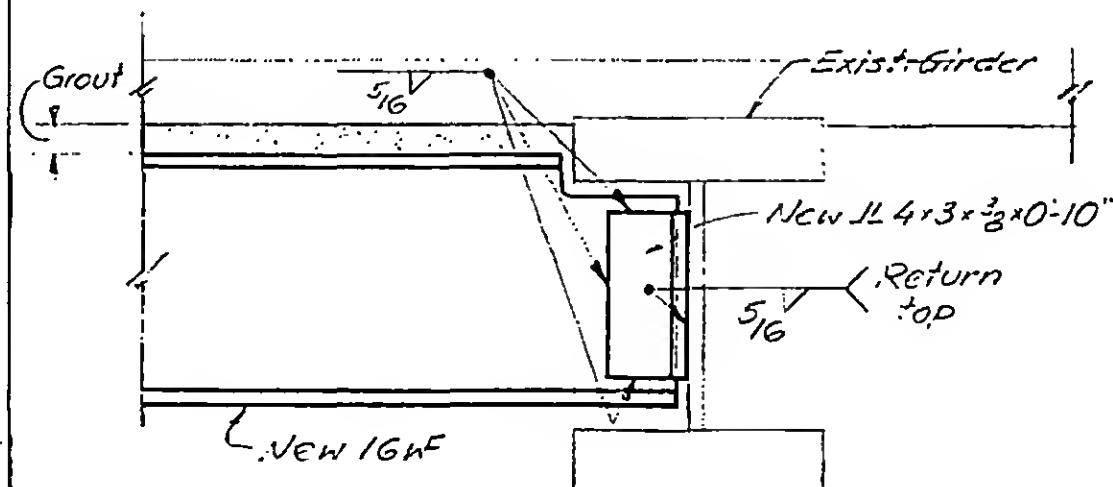
E

F



G

H



Exist. conc. fireproofing removed as req'd.

13-K11.2-2.2



DESIGNED

DRAWN John G. ...

REVIEWED

wab

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

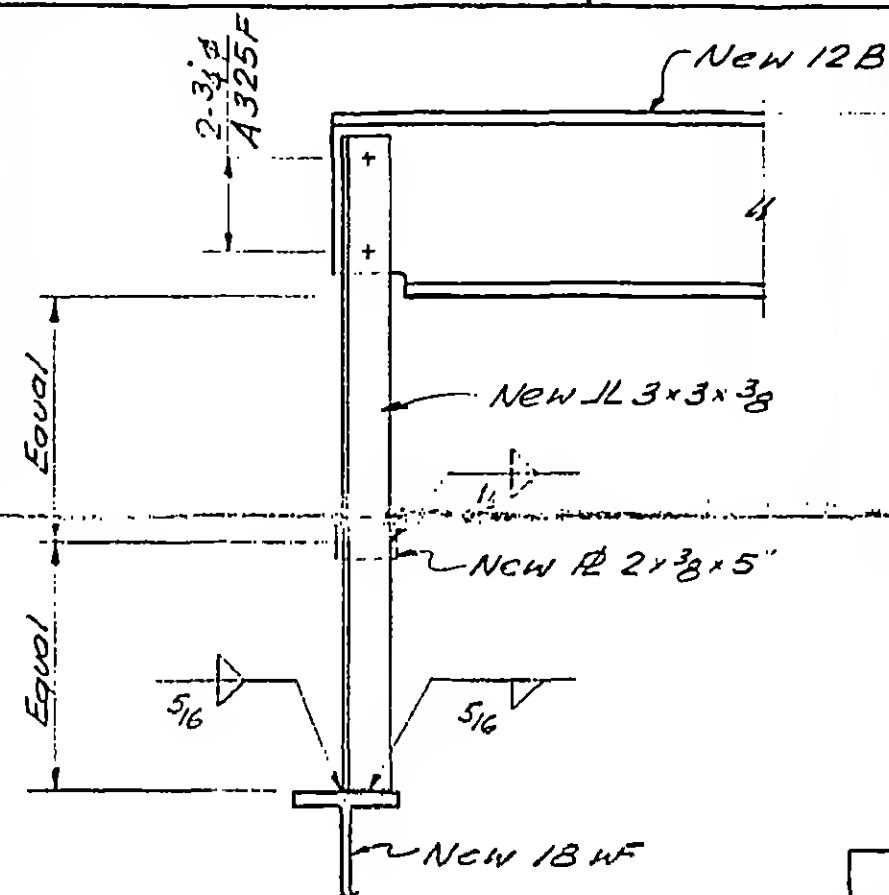
Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER

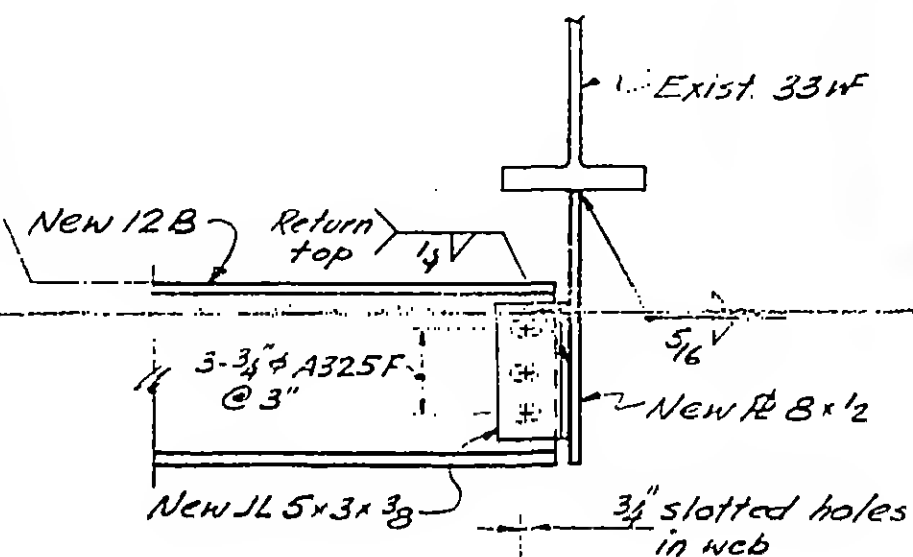
TITLE EL 310 - ZONE K5-STAIR 8-CONN. DETAILS

DATE 5-7-73

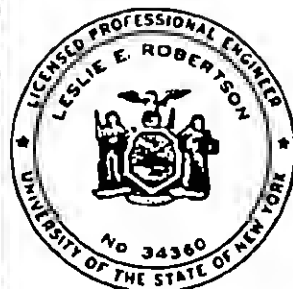
REVISIONS



J



K



DESIGNED

REVIEWED

WAB

13-K11.2-2.3

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

Structural & Civil Engineers

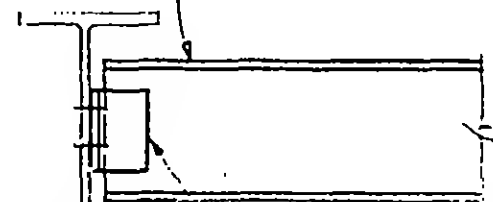
PROJECT THE WORLD TRADE CENTER

TITLE EL. 310 ZONE K3 & K5 - FIRE DAMAGE - CONN. DETAILS

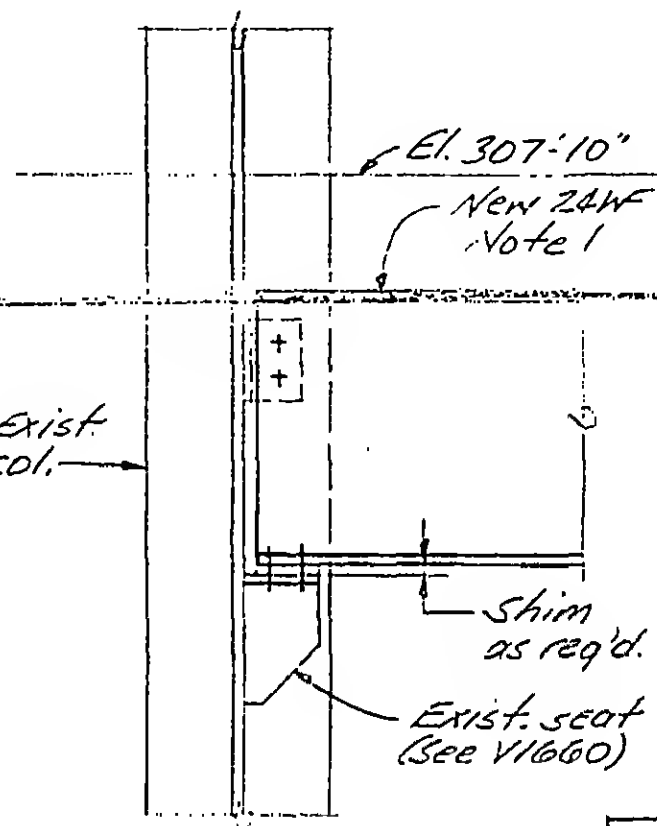
DATE 5-7-73

REVISIONS

New beam

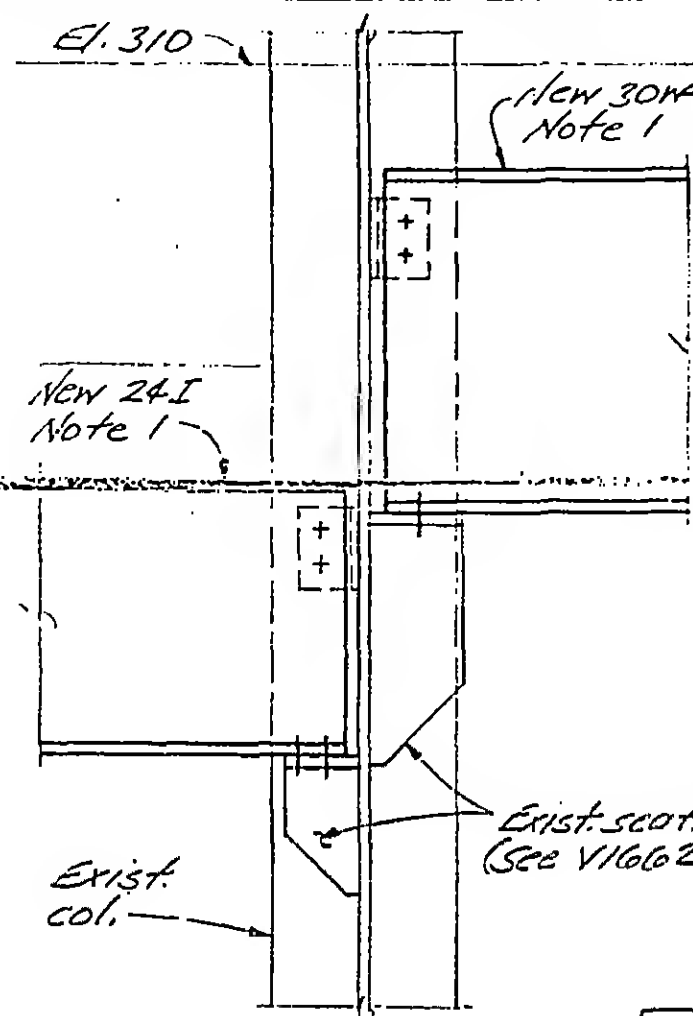
New conn. to
match exist.
Exist. beam

A

Exist.
col.Exist. seat
(See V1660)

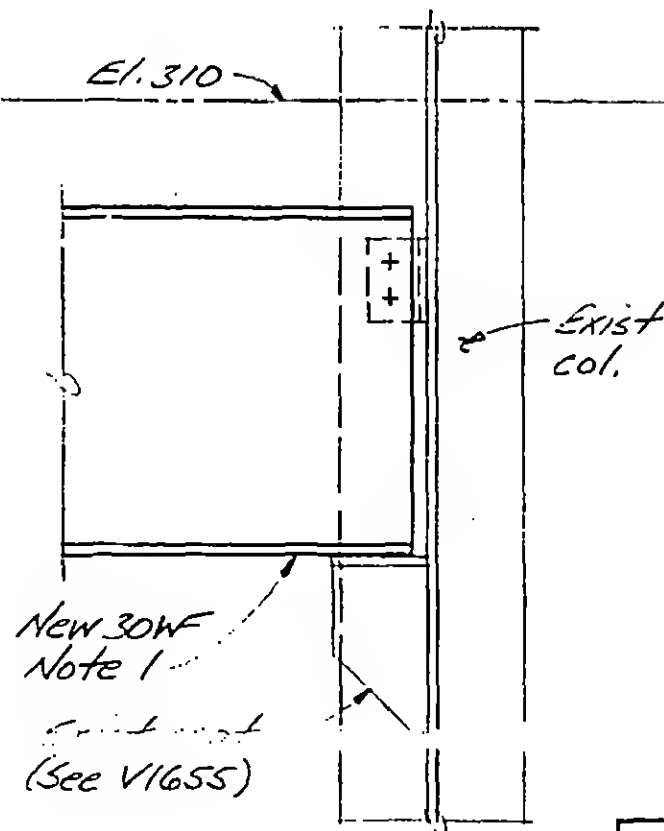
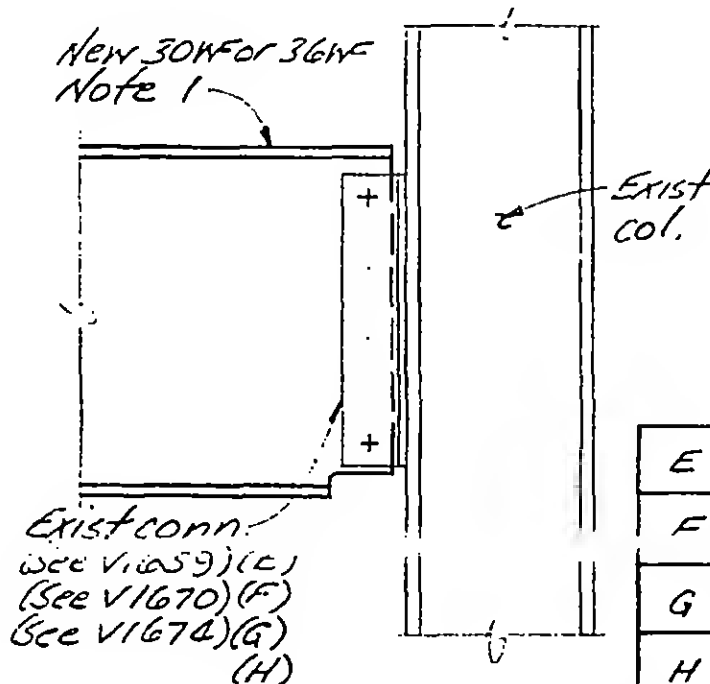
B

El. 310

New 24I
Note 1Exist.
col.Exist. seats
(See V1662)

C

El. 310

New 30WF
Note 1Exist. seat
(See V1655)New 30WF or 36WF
Note 1Exist. conn.
(See V1659) (E)
(See V1670) (F)
(See V1674) (G)
(H)E
F
G
H

Notes:

1. Fabricate new beams to
match exist. conn.

13-K11.3-1



DESIGNED

DRAWN

J. G.

REVIEWED

WAB

SKILLING, HELLE. CHRISTIANSEN, ROBERTSON

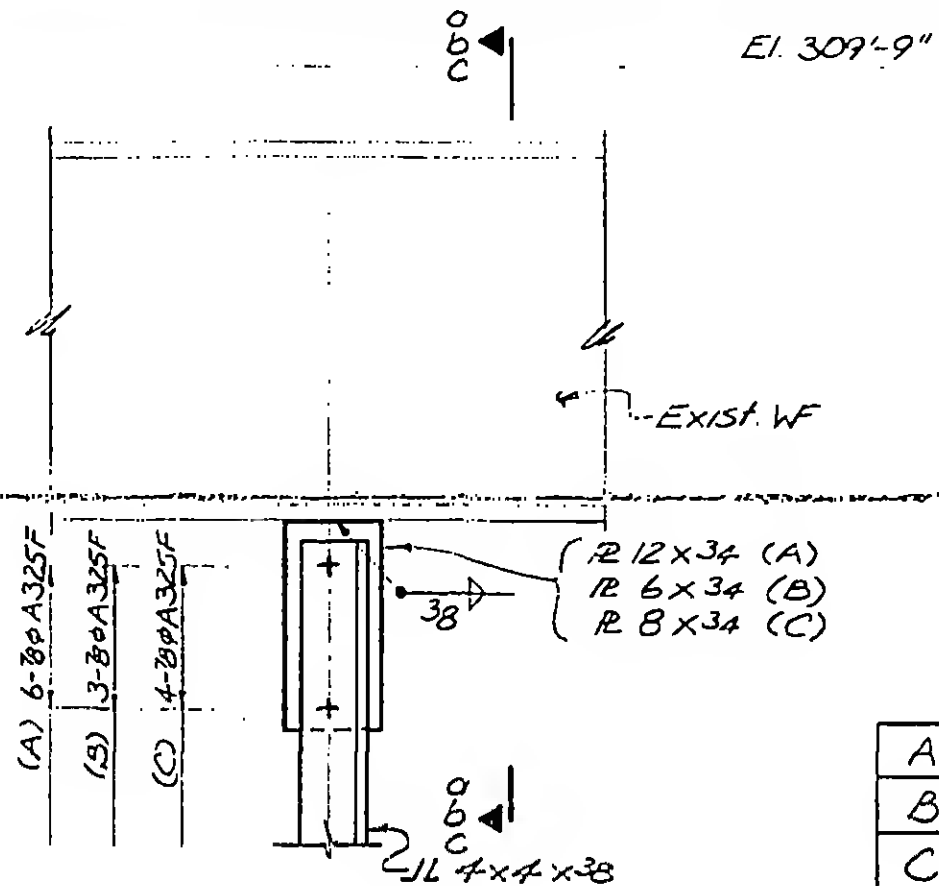
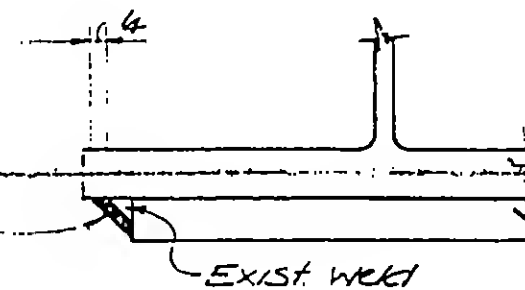
Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER

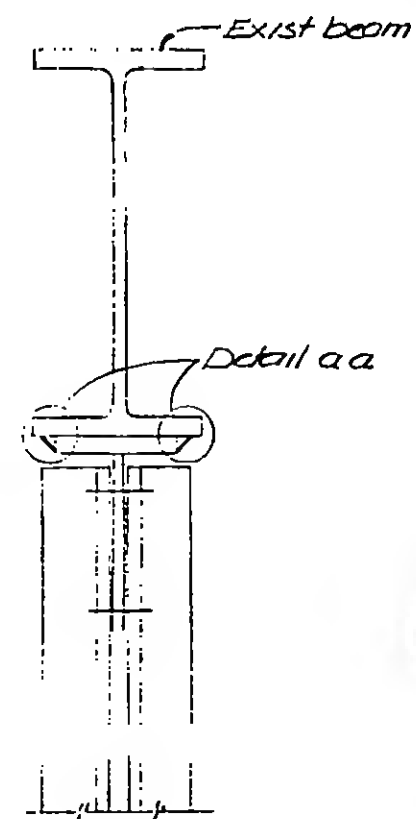
TITLE EL. 310 - ZONE K-5 - HANGER DETAILS.

DATE 5-7-73

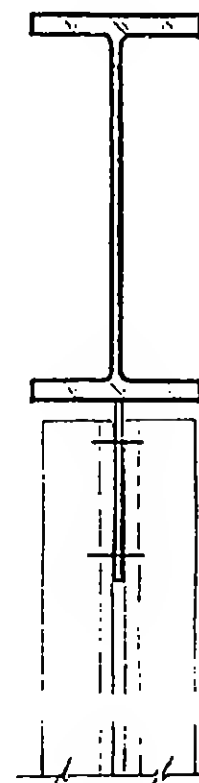
REVISIONS

Build out
exist weld
as shown

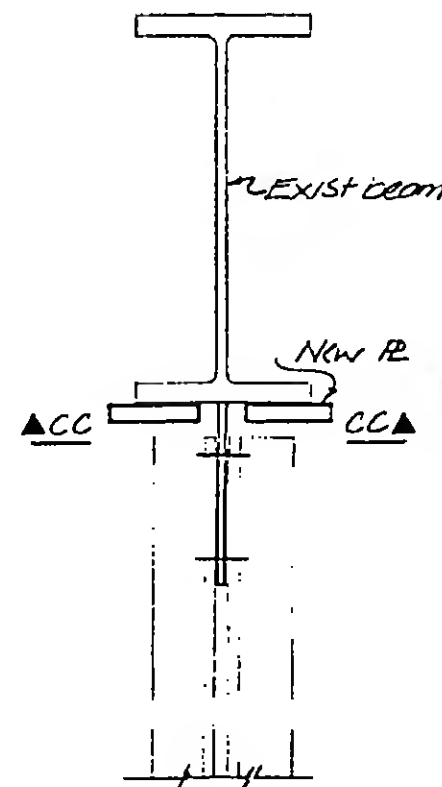
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a

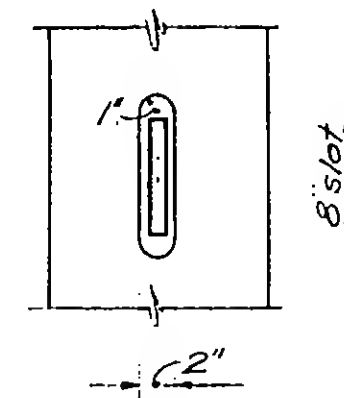


b



c

CC



13-K11.4-1



DESIGNED

J. G.

DRAWN

J. G.

REVIEWED

WAB

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

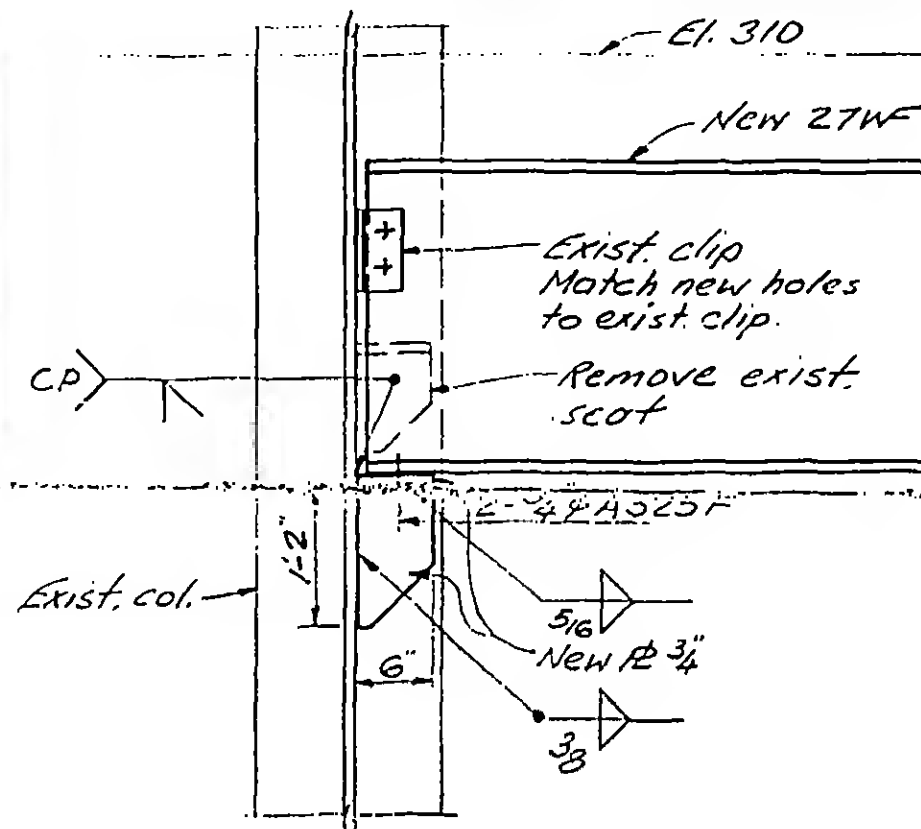
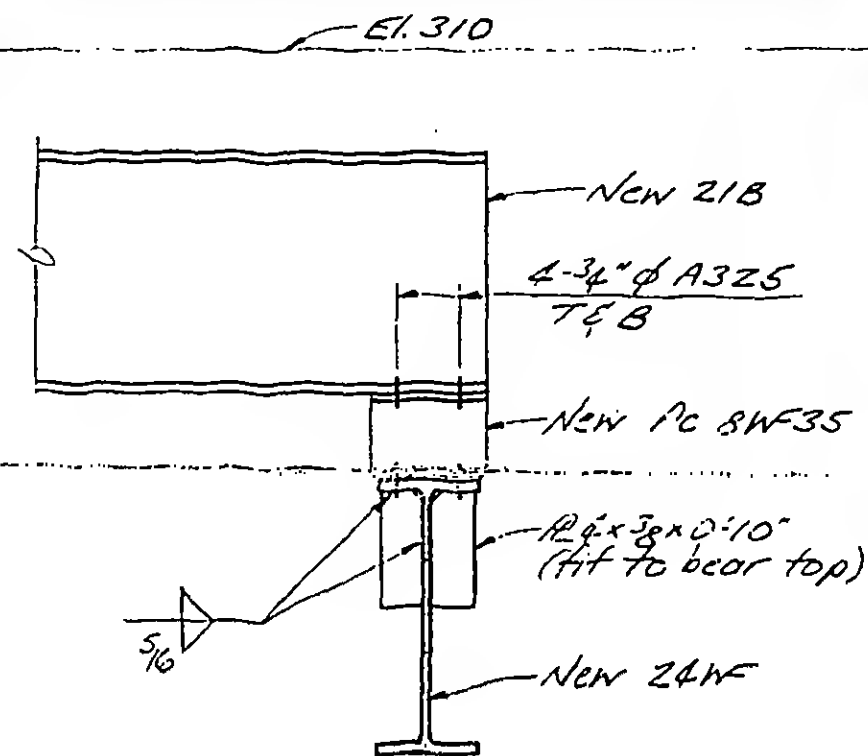
Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER

TITLE EL 310 - ZONE K5 - ESC. H3 & 4 - CONN. DETAILS

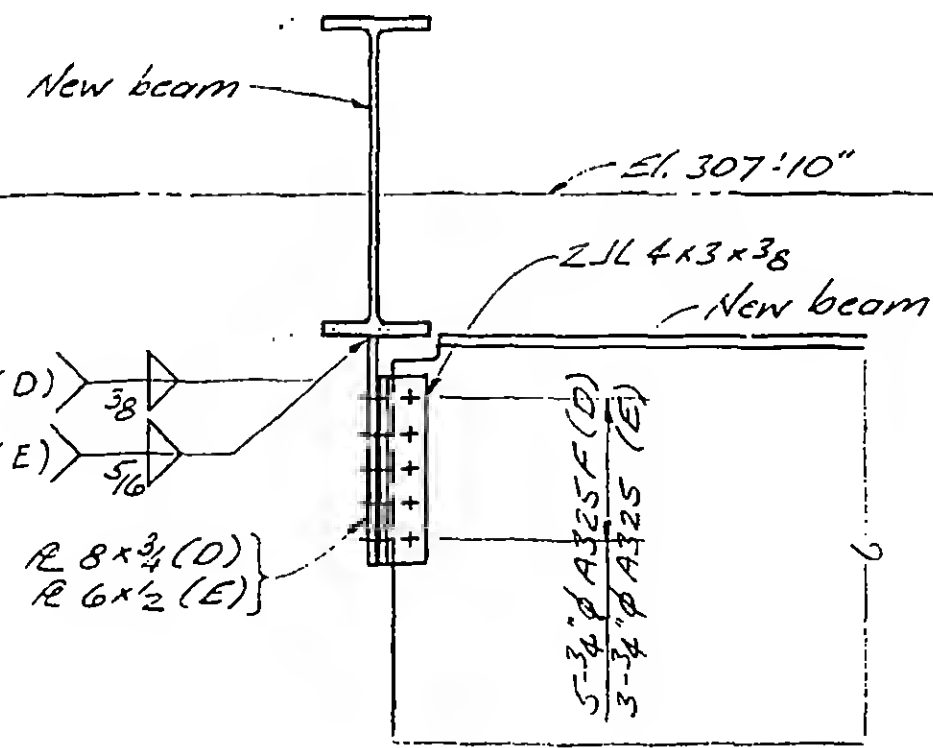
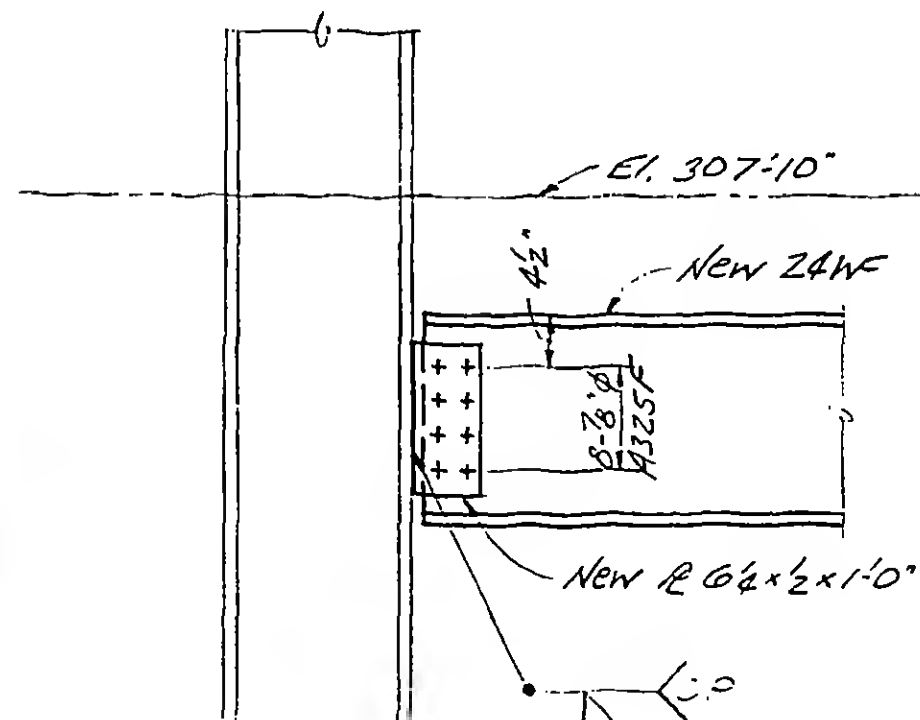
DATE 5-7-73

REVISIONS



A

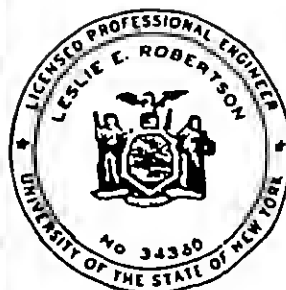
B



D

C

E



DESIGNED KC

DRAWN JA

REVIEWED WLB

13-K11.2-5.1

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

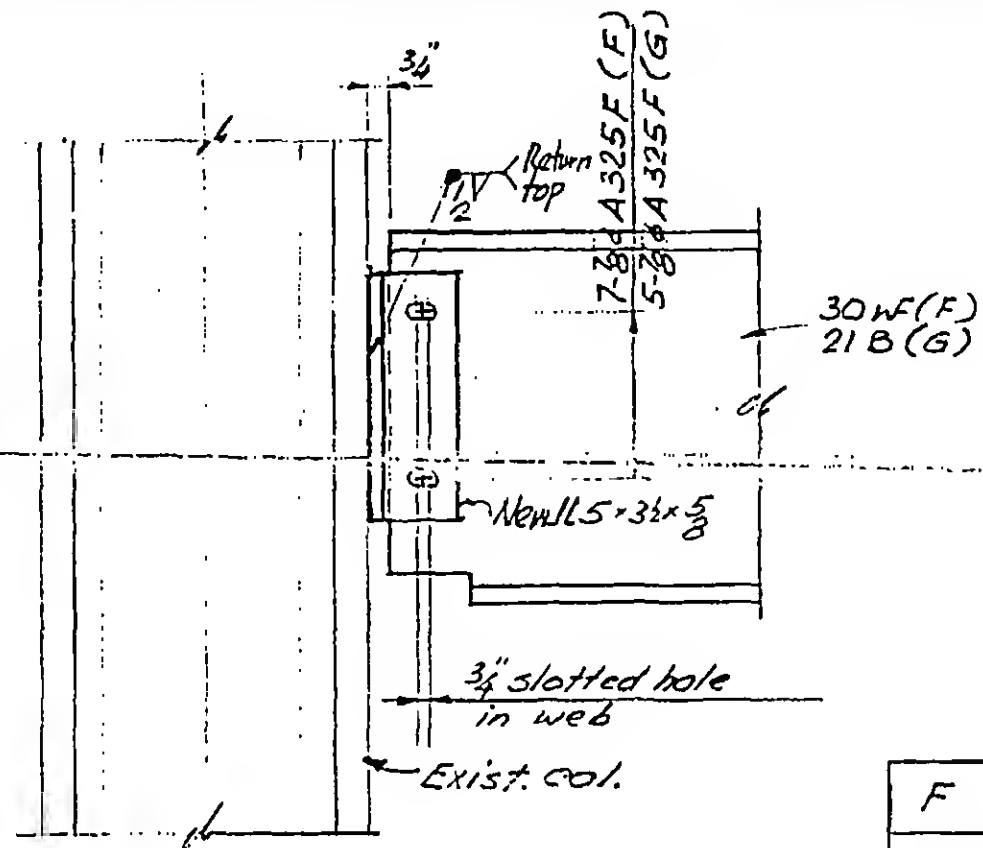
Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER

TITLE EL 310 ZONE K5 ESC. H3 & 4 CONN. DETAIL

DATE 5-7-73

REVISIONS



F

G



DESIGNED

DRAWN John J. Robertson

REVIEWED WAB

13-K11.2-5.2

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

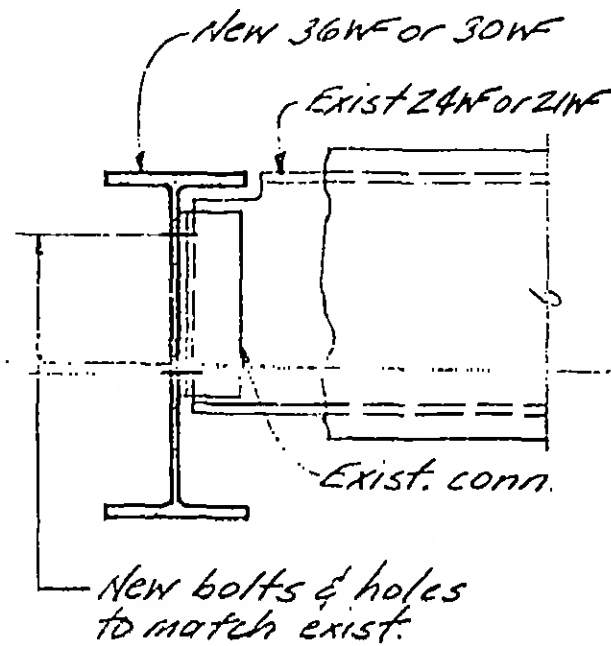
Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER

TITLE EL. 310 R3 & K5 - FIRE DAMAGE-CONN. DETAILS

DATE 5-7-73

REVISIONS



New 12WF
Note 1, 11.3-1



Exist. conn.

New 12WF

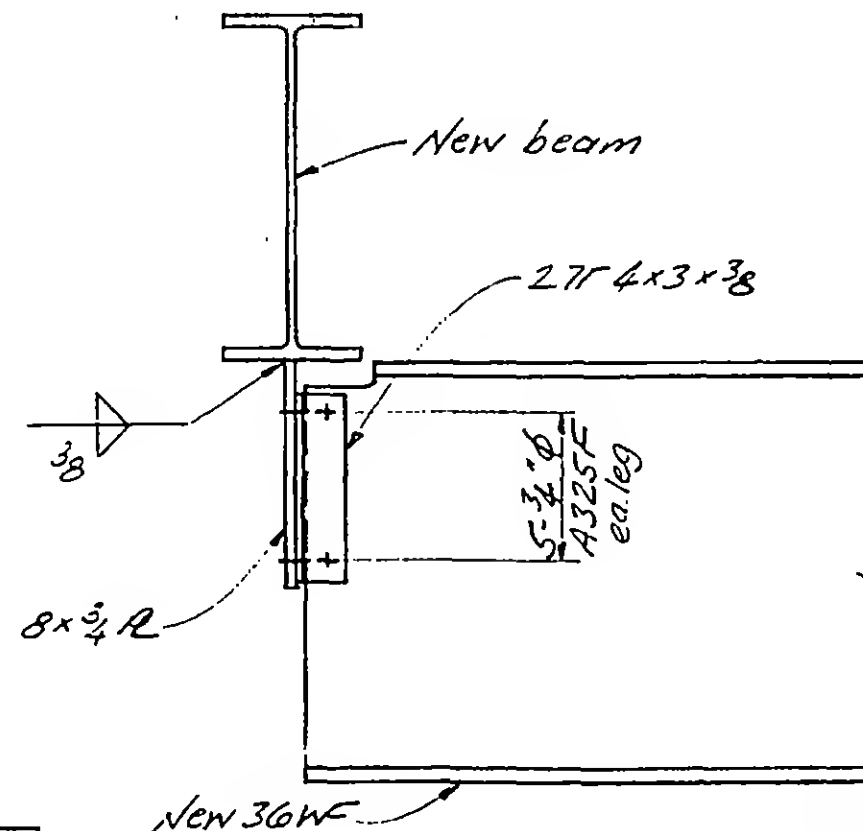
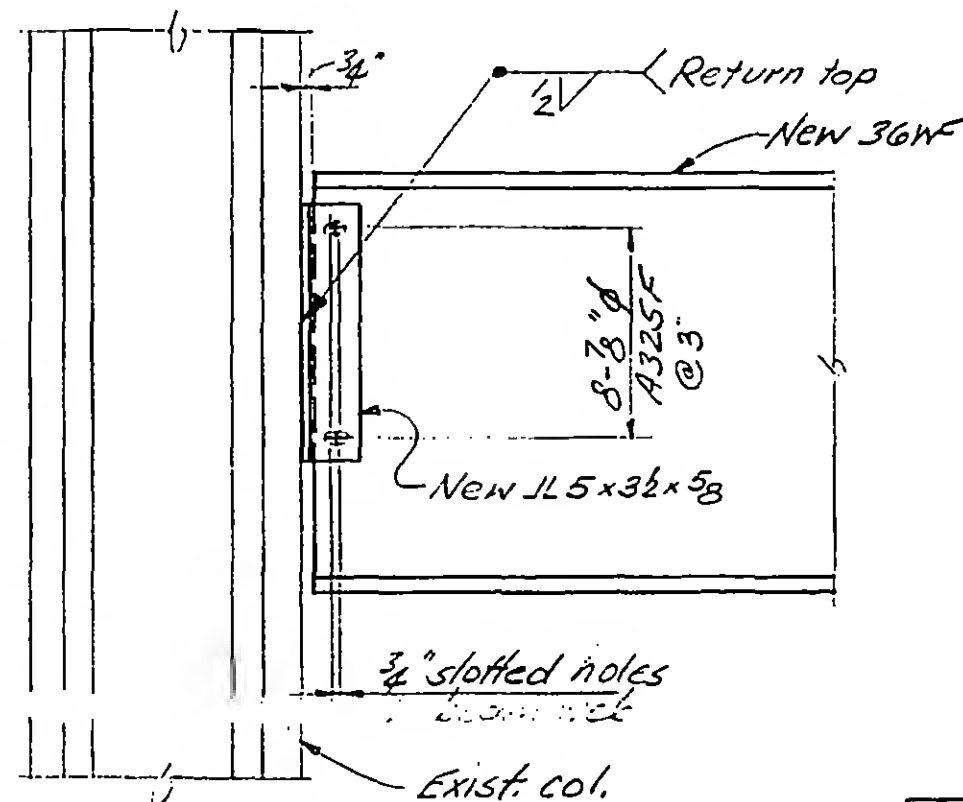
New bolts
and holes
to match
exist.

Exist. col.

A

B

C



D

E

13-K/11.3-2



DESIGNED LC

DRAWN JA

REVIEWED WAB

SKILLING, HELLE. CHRISTIANSEN, ROBERTSON

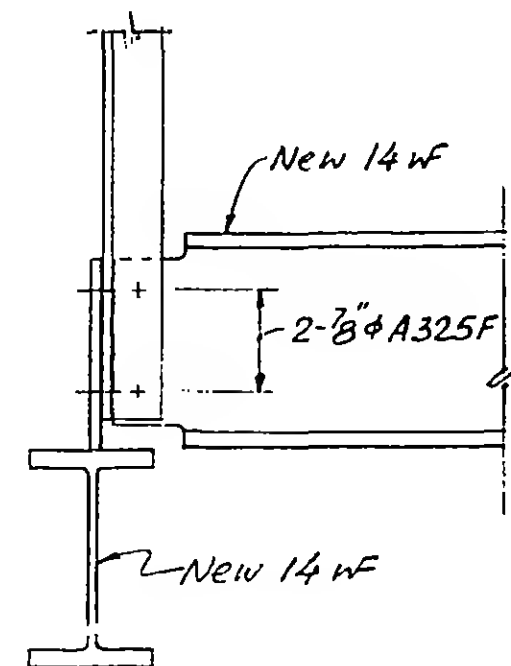
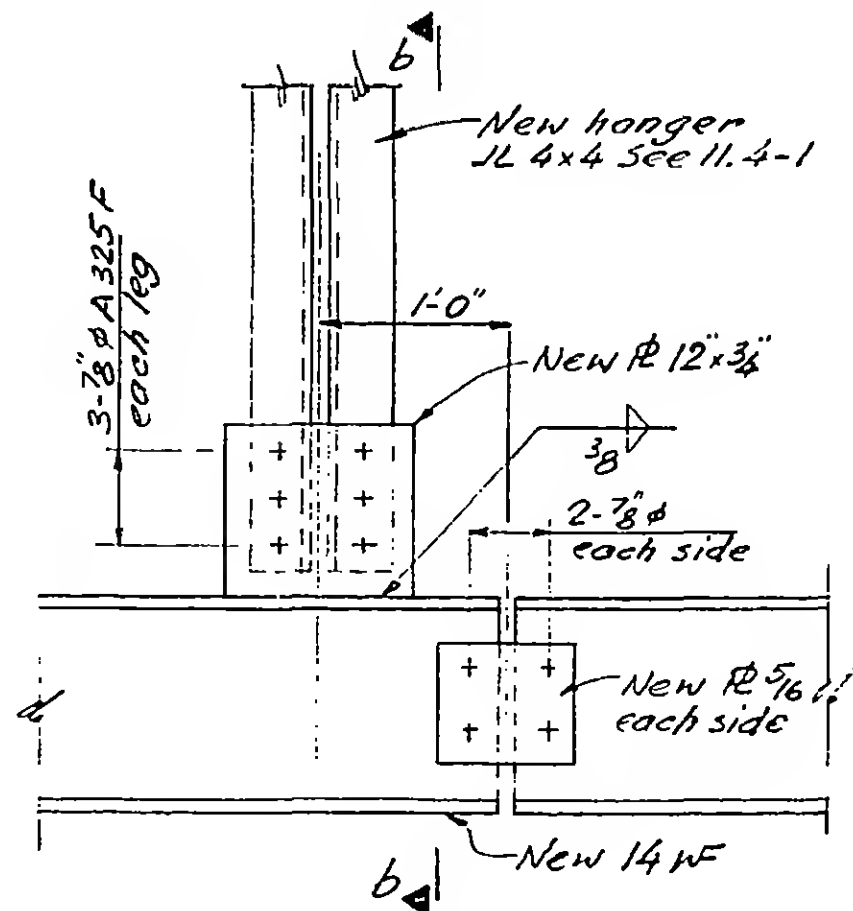
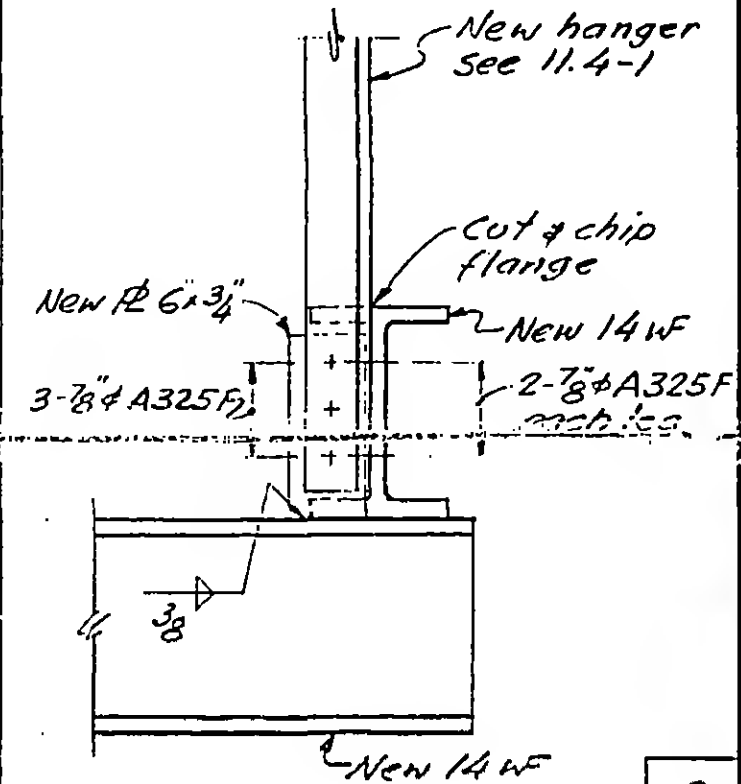
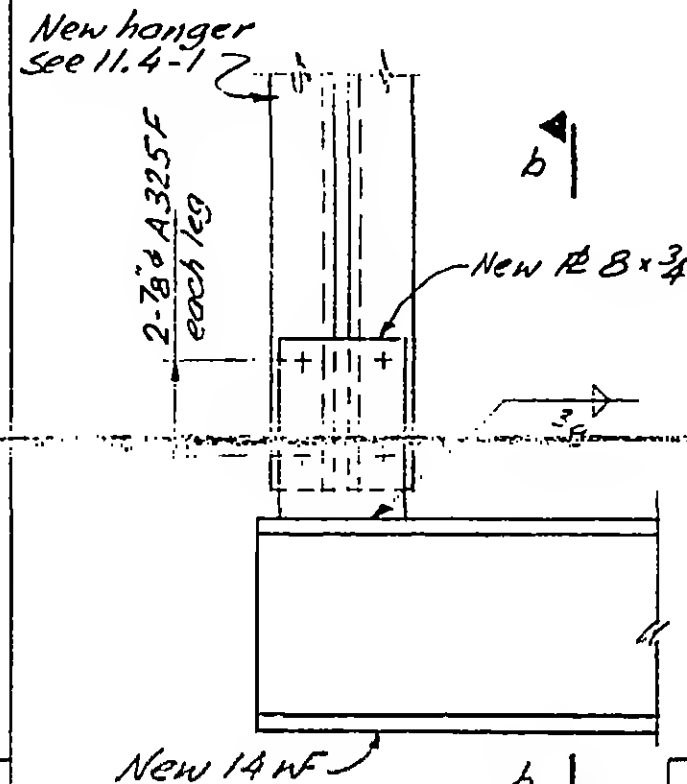
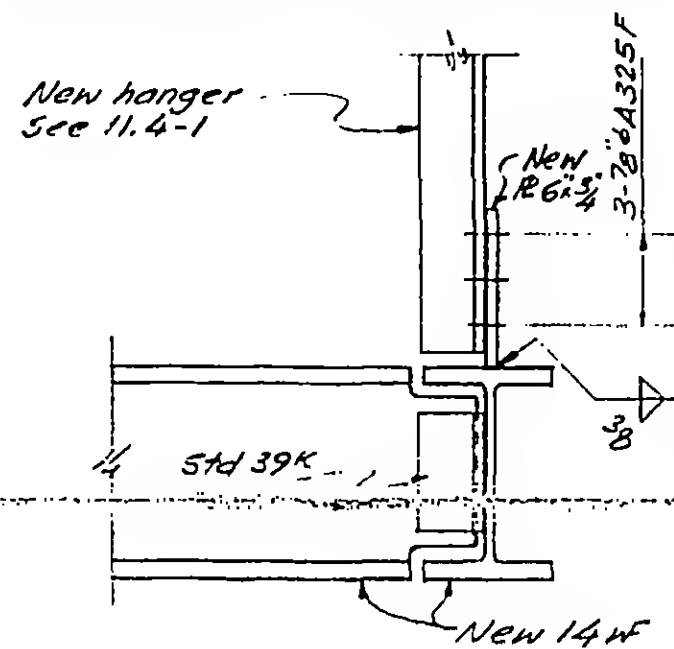
Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER

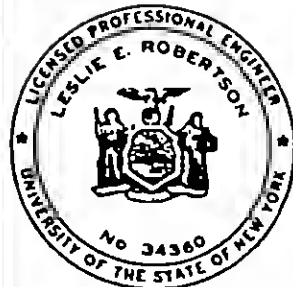
TITLE EL. 303'-6"-ZONE K5-MECH. PLATFORM-CONN. DETAILS

DATE 5-7-73

REVISIONS



13.11.4-2



DESIGNED

DRAWN
John J. Roberts

REVIEWED

MAB

SKILLING, HELLE. CHRISTIANSEN, ROBERTSON

Structural & Civil Engineers

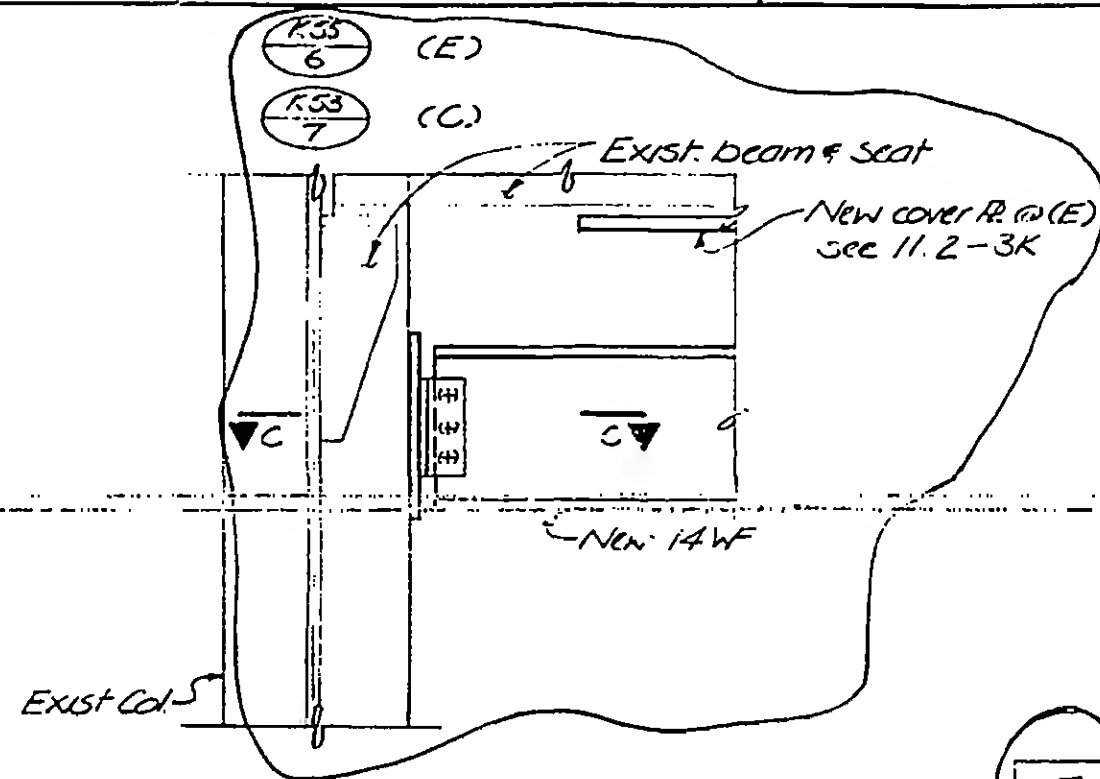
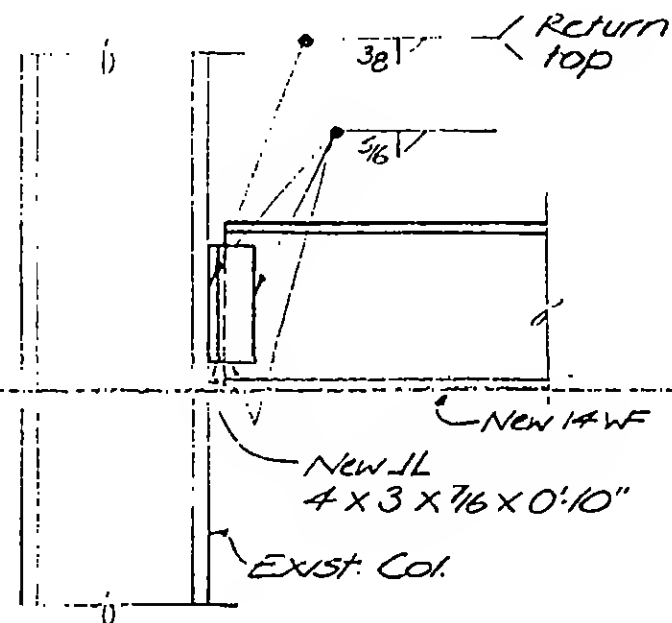
PROJECT THE WORLD TRADE CENTER

TITLE EL. 303-6 ZONE K5 - MECH. PLATFORM - CONN. DETAILS

DATE 5-7-73

REVISIONS

6-4-73

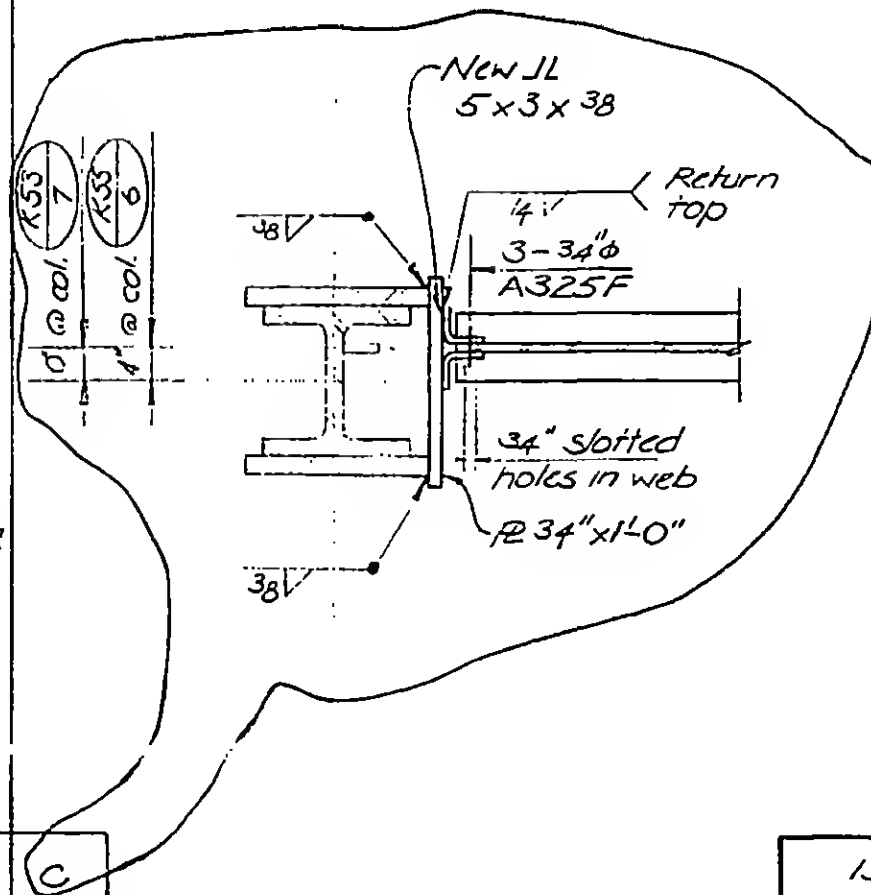
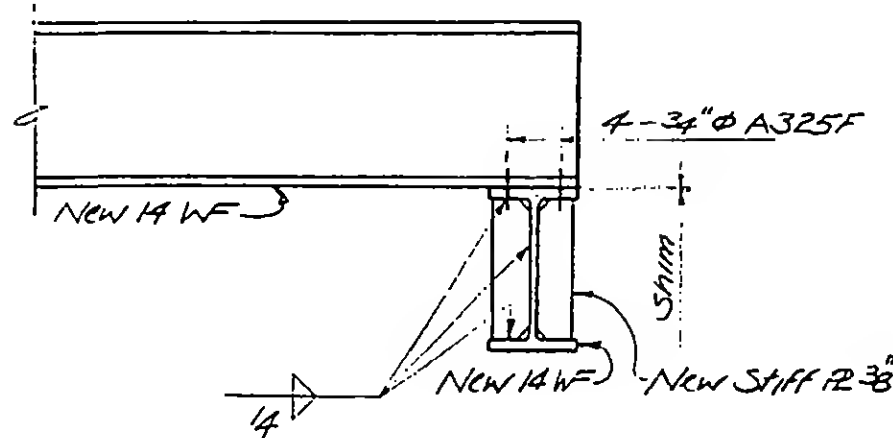


A

B

E

C



D

C

13-K11.4-3



DESIGNED

DRAWN
T. BanksREVIEWED
WAB

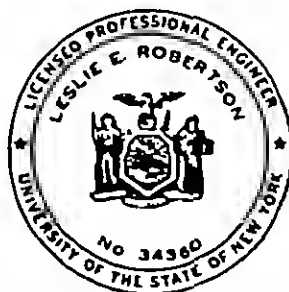
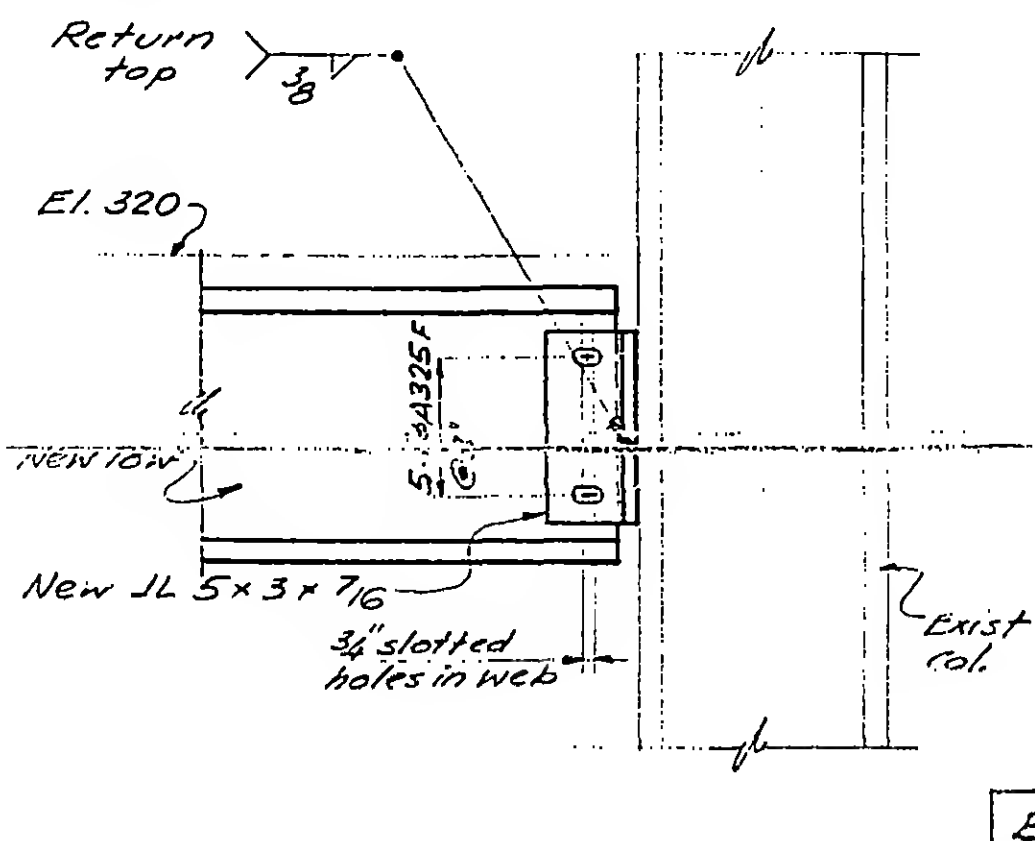
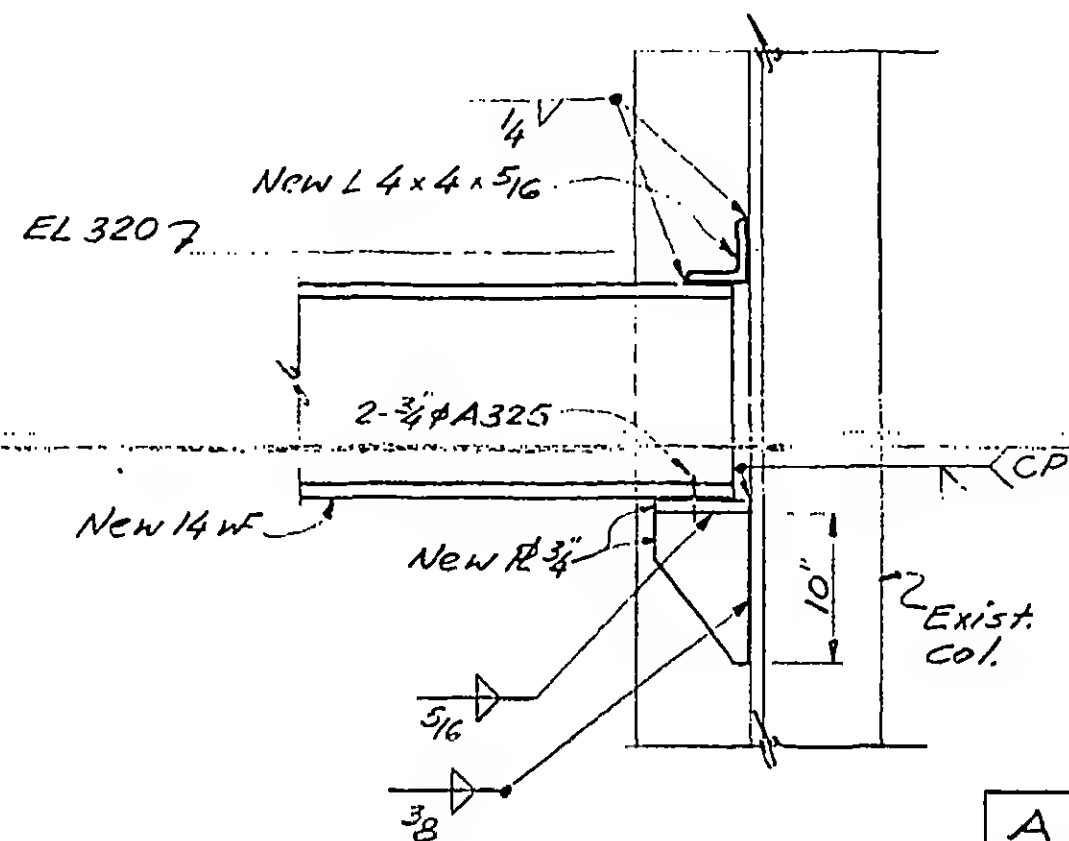
Structural & Civil Engineers

PROJECT *THE WORLD TRADE CENTER*

TITLE *EL 320-ZONE K5-MEZZ. LEVEL-CONN. DETAIL*

DATE 5-7-73

REVISIONS



DESIGNED

DRAWN
John P. Carter

REVIEWED
49d1b

13-K12-1

SKILLING, HELLE. CHRISTIANSEN, ROBERTSON

Structural & Civil Engineers

PROJECT

THE WORLD TRADE CENTER

TITLE

E1.320-ZONE K3-HANGERS-CONN DETAILS

DATE

5-7-73

REVISIONS

For upper part
Sec 8.1-3(A) $\phi 8 \times \frac{3}{4}$
(B & C) $\phi 6 \times \frac{1}{2}$ (C) $\frac{5}{16}$
(A & B) $\frac{3}{8}$ (A) 4- ϕ A325 F
(5) 3- ϕ A325 F
(C) 2- ϕ A325 F

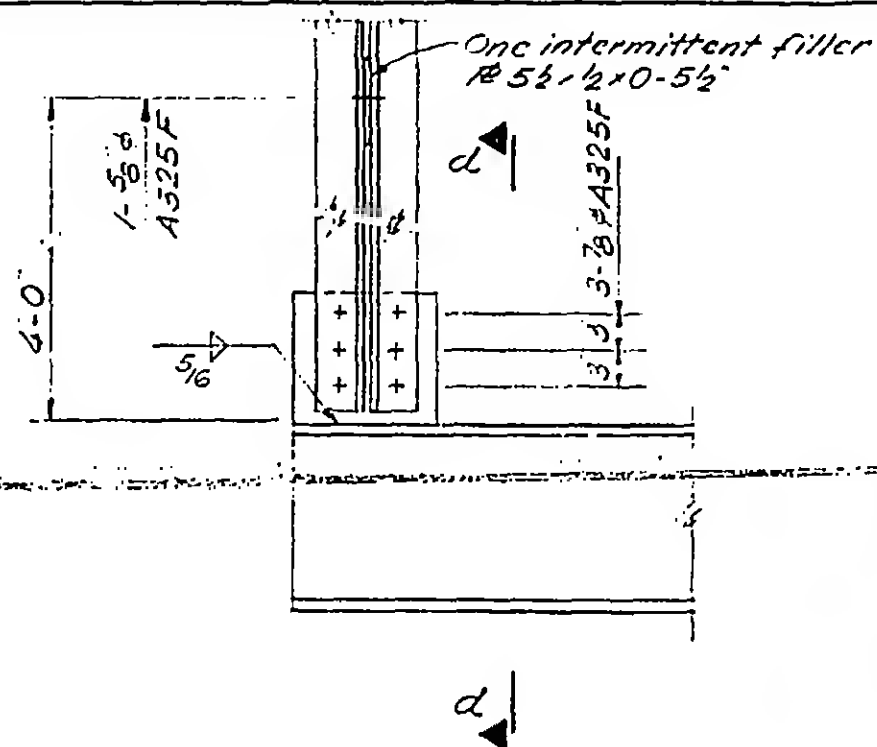
Q

a

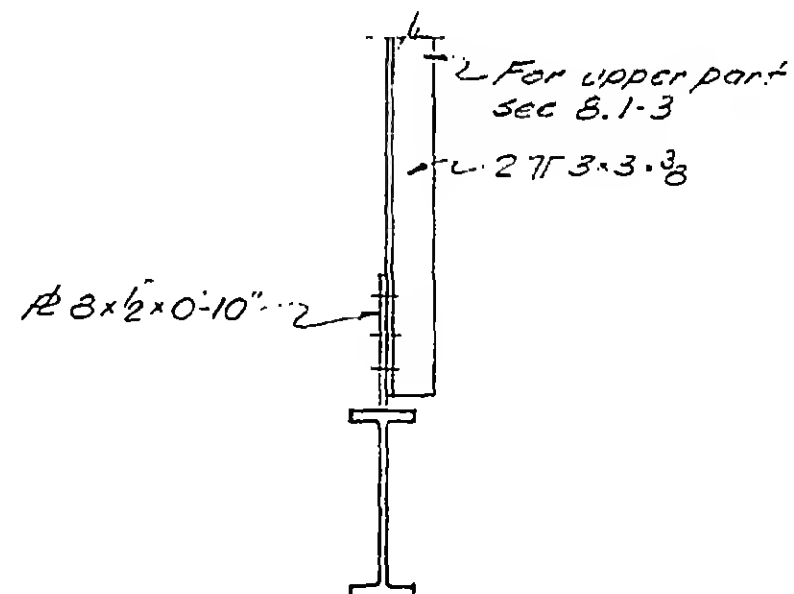
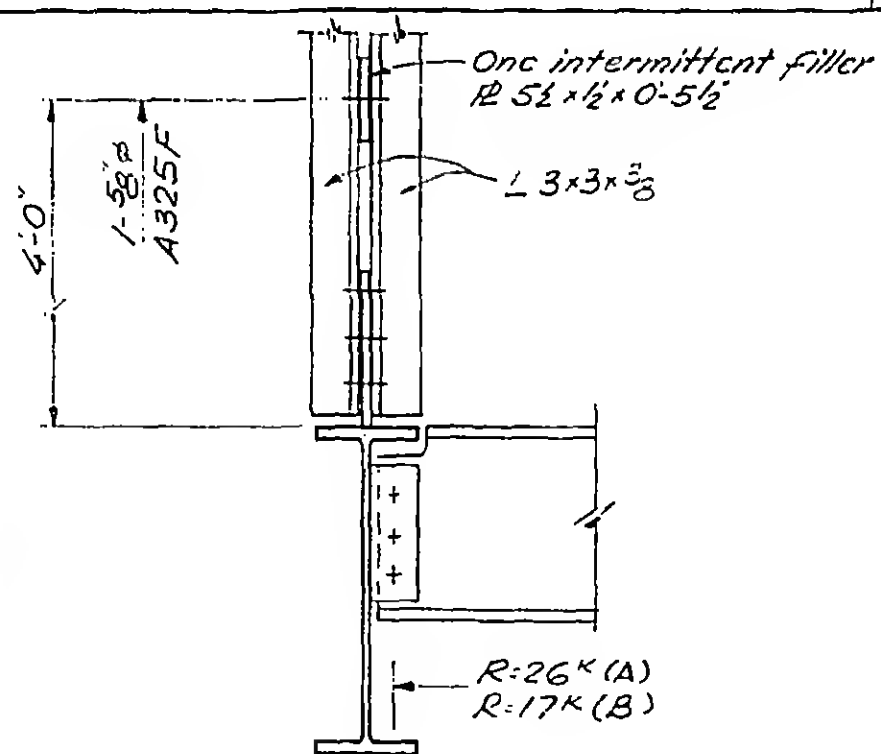
A

B

C



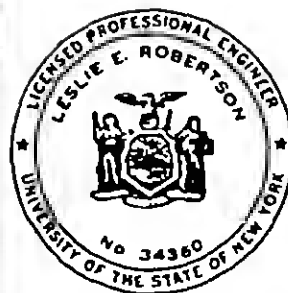
D



a

d

13-K12-2



DESIGNED

DRAWN

REVIEWED

WAB

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

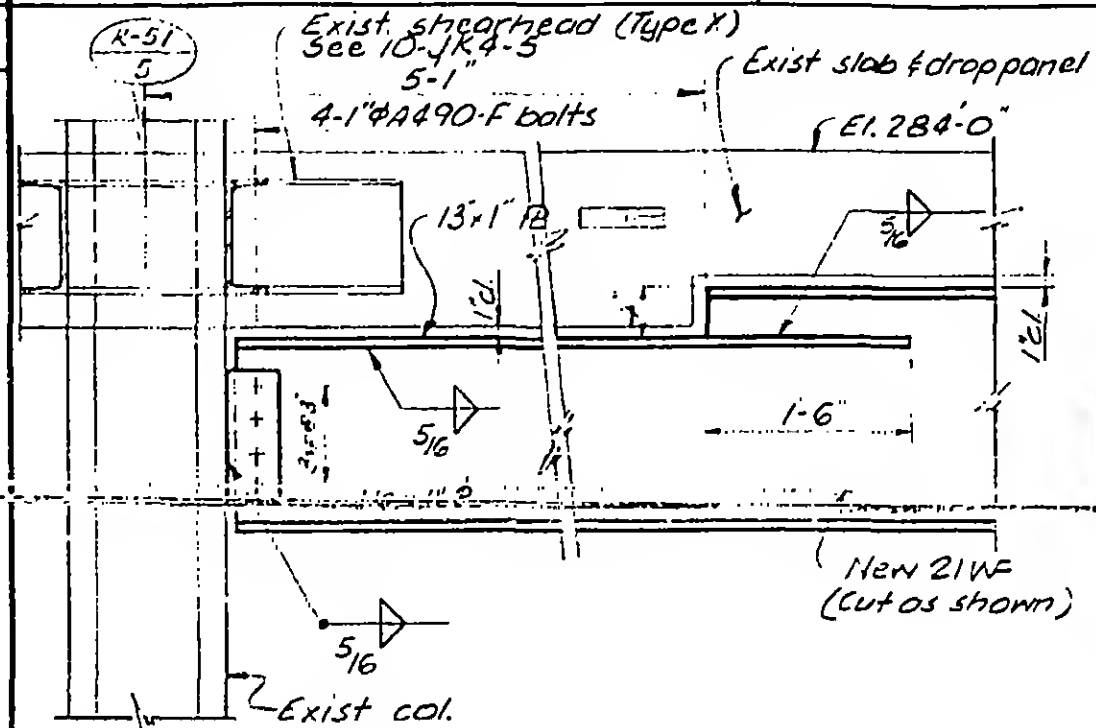
Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER

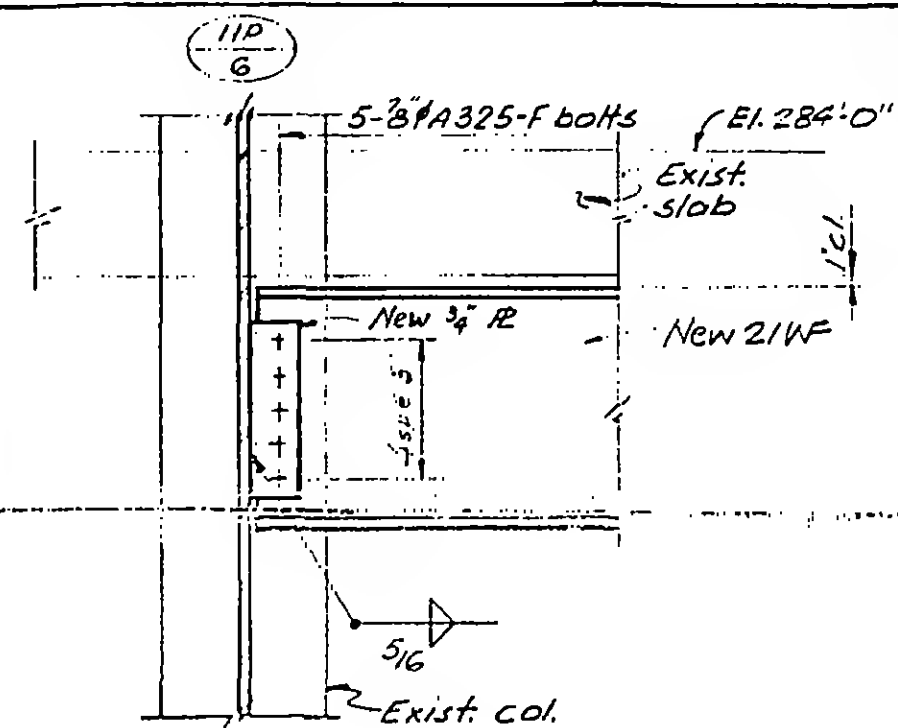
TITLE SECTIONS AT AUTO LIFT - EL. 284'-0"

DATE 1-12-73

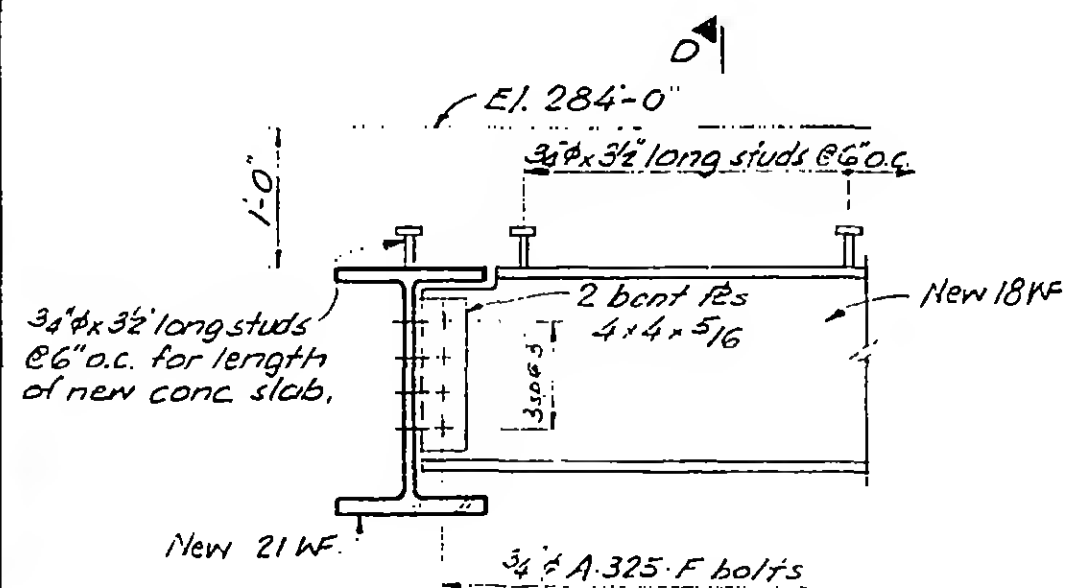
REVISIONS



A

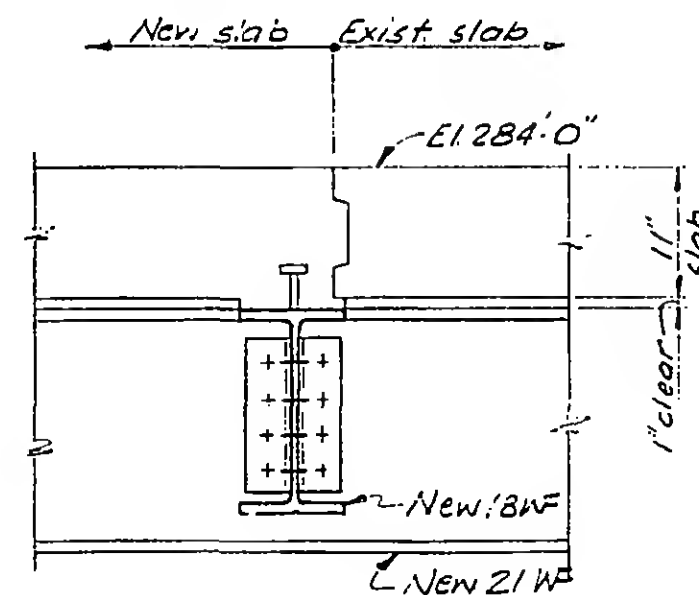


B



C

D



13-K13-1



DESIGNED

DS

DRAWN

TR

REVIEWED

Note:

Shear studs to be omitted if steel beams are installed after conc. slab is in place.

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

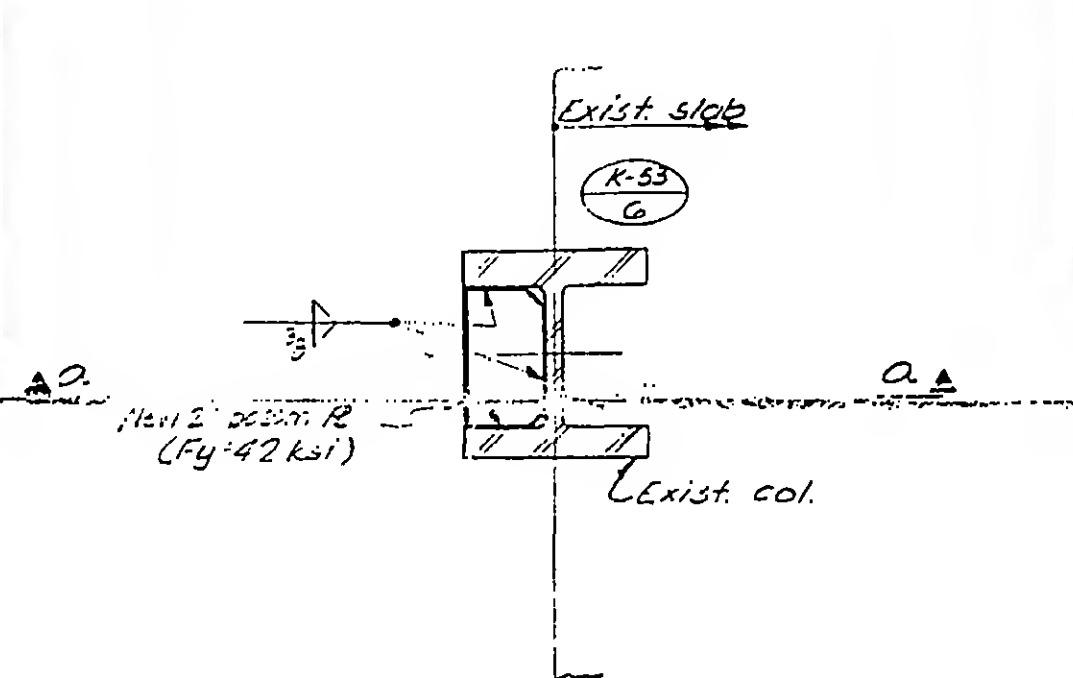
Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER

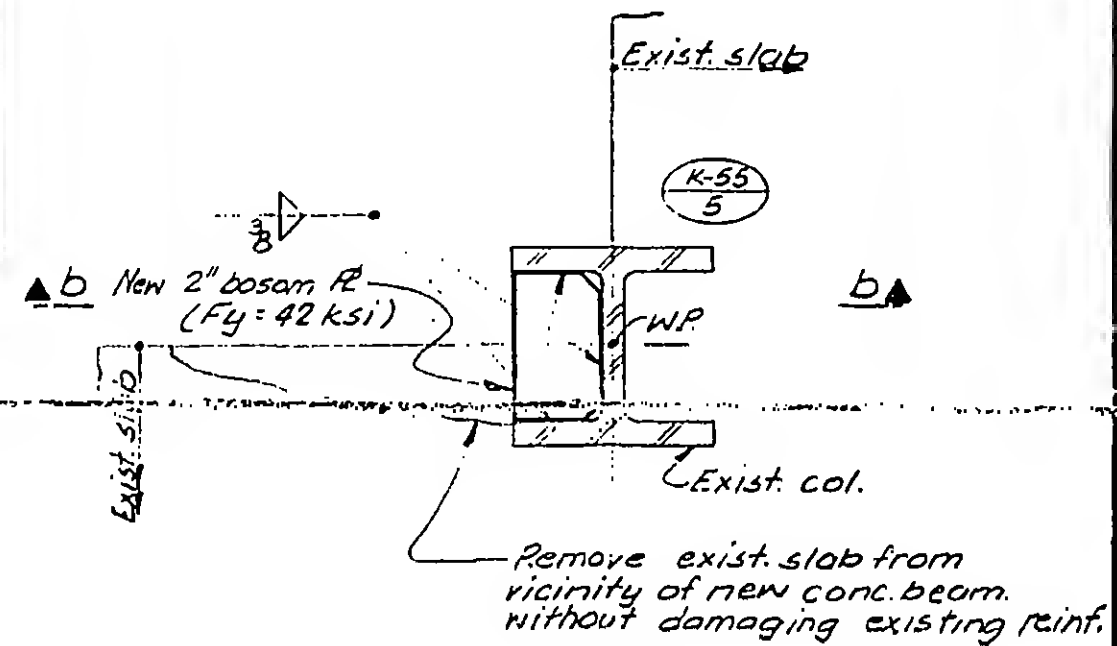
TITLE SECTIONS AT AUTO LIFT - EL. 284'-0"

DATE 1-12-73

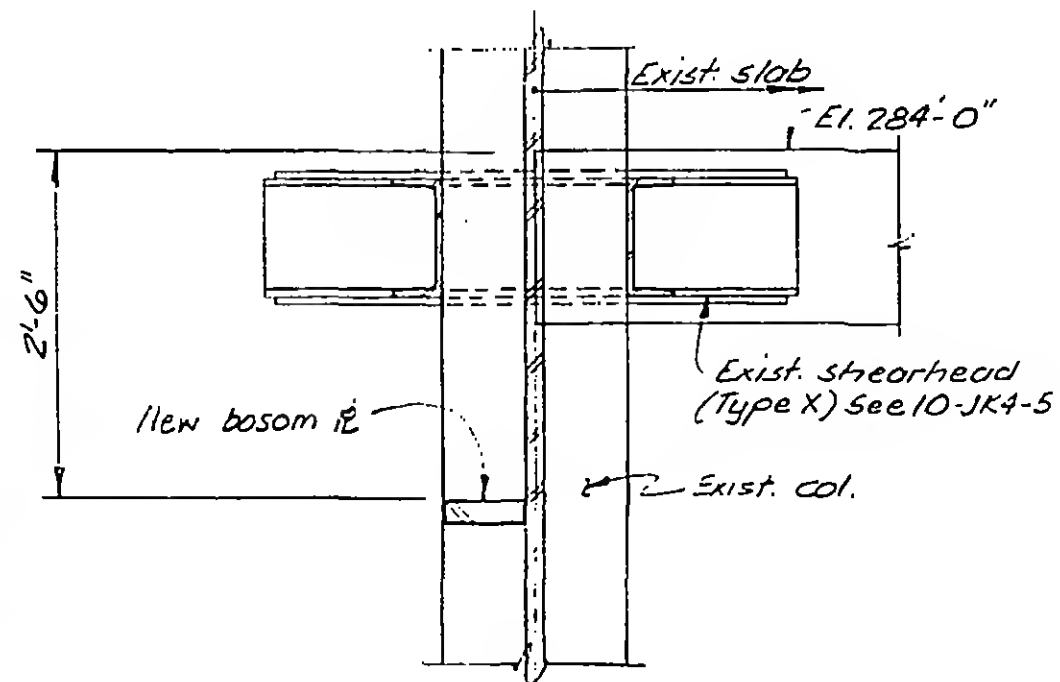
REVISIONS



A



B



a

b

13-K13-2



DESIGNED

23

DRAWN

TR

REVIEWED

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

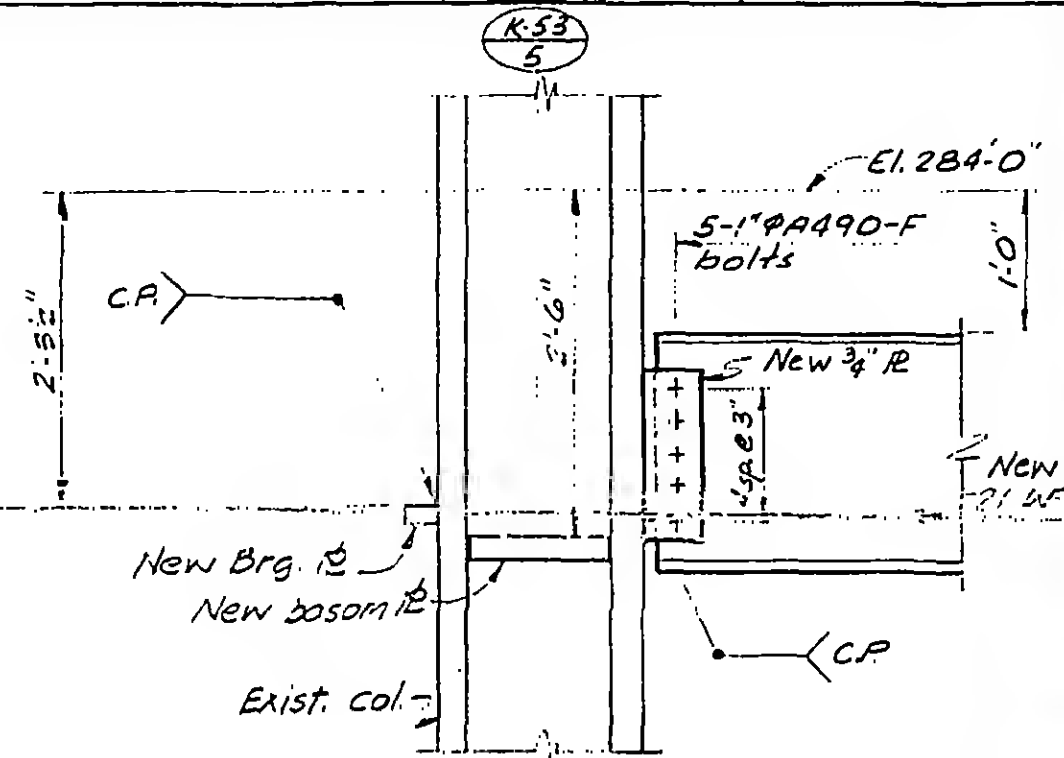
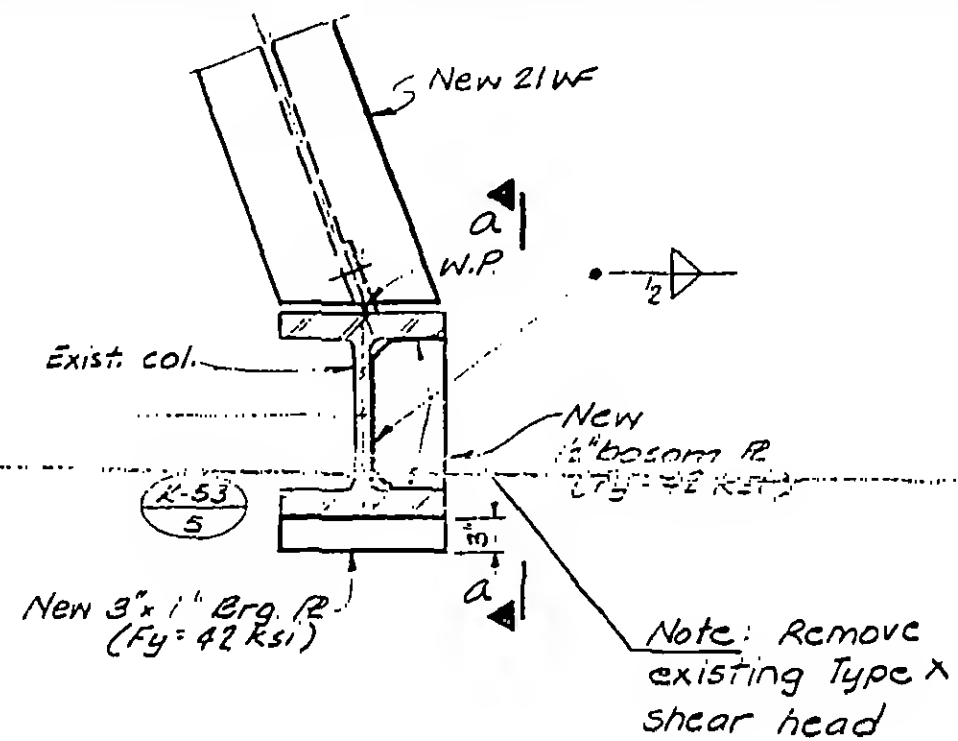
Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER

TITLE SECTIONS AT AUTO LIFT - EL. 284'-0"

DATE 1-12-73

REVISIONS



DESIGNED D.S.

DRAWN T.R.

REVIEWED

13-K13-3

SKILLING, HELLE, CHRISTIANSEN, ROBERTSON

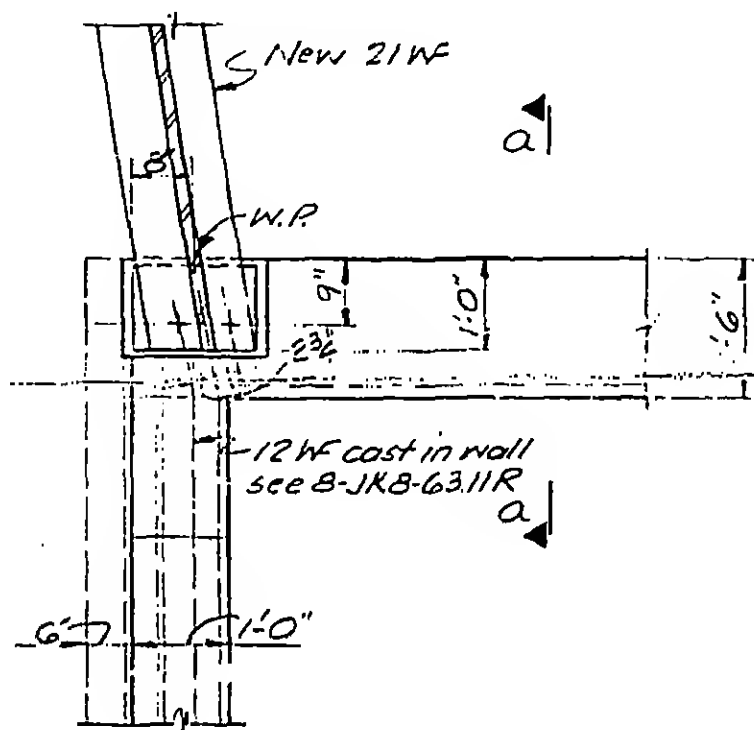
Structural & Civil Engineers

PROJECT THE WORLD TRADE CENTER

TITLE SECTIONS AT AUTO LIFT - EL. 284'-0"

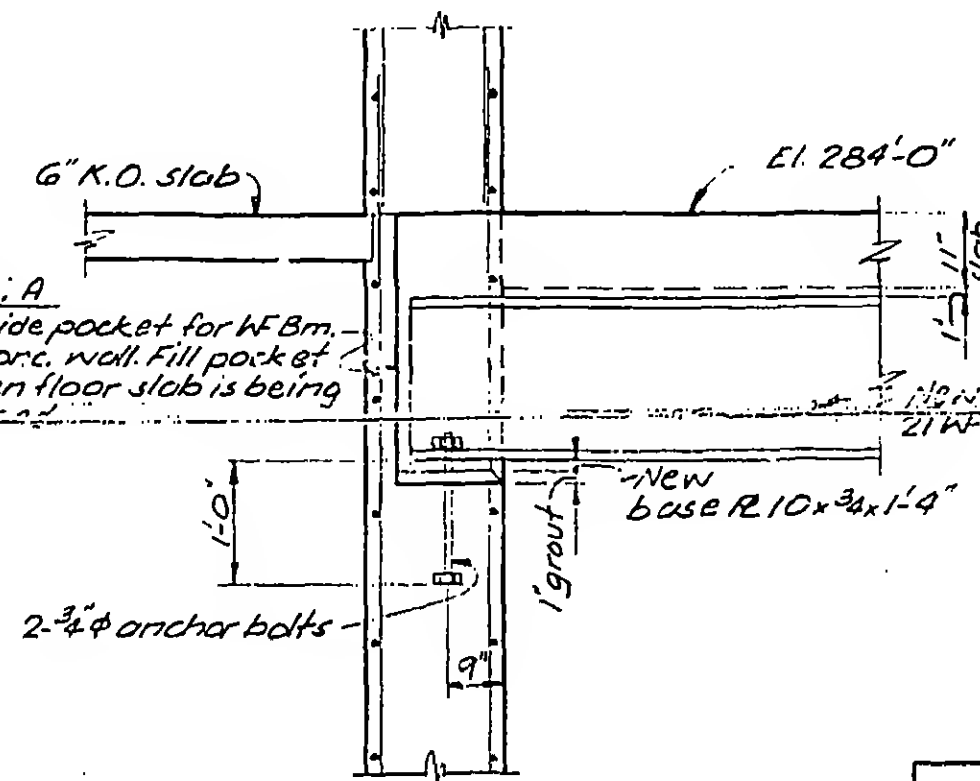
DATE 1-12-73

REVISIONS



Note: A

Provide pocket for W.F.Bm. in conc. wall. Fill pocket when floor slab is being placed.



DESIGNED

CS

DRAWN

TR

REVIEWED

13-K13-4

13-K13-4

