ASCE-INDOT
STRUCTURAL SUBCOMMITTEE
MEETING NO. 57 MINUTES
November 8, 2012

The meeting was called to order at 9:00 a.m. by Anne Rearick. Those in attendance were:

Anne Rearick	INDOT, Structural Services
Elizabeth Phillips	INDOT, Structural Services
Naveed Burki	INDOT, Structural Services
Mahmoud Hailat	INDOT, Structural Services
Merril Dougherty	INDOT, Program Development
Celeste Spaans	Prestress Services, Inc.
Mike Wenning	GAI Consultants, Inc.
Mike McCool	Beam Longest & Neff, LLC.
Troy Jessop	R. W. Armstrong
Mike Halterman	USI Consultants, Inc.
Michael Eichenauer	Butler, Fairman and Seufert, Inc.

In addition to the attendees, these minutes will be sent to the following:

Keith Hoernschmeyer	Federal Highway Administration
Jason Yeager	Gohmann Asphalt Company
Jim Reilman	INDOT, Construction Management
Tom Harris	INDOT, Construction Management
Burleigh Law	HNTB Corp.

A meeting agenda had previously been distributed and the following items were discussed:

1. The August 9, 2012, meeting minutes were approved as written, and have been placed on the INDOT website.

2. It was decided that INDOT would like to update their specifications on PTFE plates used with elastometic bearings. They may also want to add some direction to designers in the Design Manual. A task committee consisting of Mike Wenning*, Mike Eichenauer and Mahmoud Hailat has been asked to investigate this and report back to the committee. Kenny Anderson will be included for input and material. Possible additions could include circular pads and recessed PTFE plates. A Florida DOT example was recommended and Mike McCool will provide an additional example.

3. Troy Jessop* and Celeste Spaans were asked to investigate whether elastomeric bearing pads need to be vulcanized to shim plates to keep the bearing assembly from “walking” and report back at the next meeting. Bevelled plates should be vulcanized per Randy Strain’s interpretation.

4. Prestressed notches are discouraged in the top of the beam per NCHRP 654. Although blockouts for flanges are not a problem, notches in webs always produce cracks. Some notches may be made by engineers trying to avoid the angled #6 bar shown in IDM Fig. 409-3A and others. Troy Jessop* and Celeste Spaans will investigate revising the details to show that the beam notch should not be the designers’ first choice.

5. It was decided in meetings 42-46 to modify the pavement ledge for the R.C. Bridge Approach from 6" to 9" width and the minimum integral end bent width from 2'-6" to 3'-0" but this was never carried through to the standards. Elizabeth Phillips will check with Jim Reilman to see if 599 bars at 2' spacing has been used in a test project and then revise standard drawings for approval..

6. On R.C. Bridge Approaches, it was determined that the hook on the top bar was unnecessary and the top steel should be changed to #5 @ 8" for crack control. Elizabeth Phillips will revise the design manual figures to reflect these changes.

7. INDOT would like to develop a standard beam detail sheet to be used in the plans similar to that used by Kentucky and other states. PSI prefers the Kentucky style. Mike McCool will develop a sample. Then INDOT can continue to develop these sheets. (See attachment 2.)

8. The committee would like to collect and share practice pointers dealing with commonly used design programs. Any known issues and their workarounds should be sent to Mike McCool. Burleigh Law and Elizabeth Phillips will help compile and distribute the items. (See example items in attachment 3.)

9. Mike Wenning presented a new evaluation form. It will be used for the 2013 INDOT Bridge conference. (See attachment 4.)

10. Stay-in-place metal form attachments need to be detailed in the plans since the ½" maximum projection of the support angle into the deck is only shown in the IDM and not the Standard Drawings. Elizabeth Phillips will check to see if 702.13(e) of the standard specifications could be modified to include this provision.

11. Steel Diaphragm details need to be updated to include Hybrid Girders. Elizabeth Phillips will provide details for review at the next meeting.

11. Horizontal drain pipes on bridges can no longer be made of PVC. These are considered closed systems and must be cast iron or FRC.

* indicates the person primarily responsible for the activity.

The next meeting for the INDOT Structural Committee is scheduled for 9:00 a.m. on March 1, 2013, in room N642. Mike McCool will distribute an agenda prior to the meeting.

This meeting was adjourned at 11:00 a.m.

Respectfully submitted,
American Structurepoint, Inc.

Michael Wenning, P.E.
m.wenning@gaiconsultants.com

Attachments

Attachment 1

Burleigh Law

From: Reilman, Jim <JREILMAN@indot.IN.gov>
Sent: Thursday, November 01, 2012 8:54 AM
To: Burleigh Law
Subject: RE: INDOT Structural Committee - Approach Slabs

Burleigh,
I have a doctor appointment and cannot attend the meeting on Nov 8. There are a few problems with cracking in approach slabs, most of them I believe unrelated. Cracking is the main theme, however there are three different cracking scenarios and they probably will end up being dealt with in three different manners.

1) Transverse crack parallel to the IA joint approximately 3"-6" into the approach slab from the IA joint. This is typically a result of the contractor not placing the longitudinal approach slab reinforcing bars according to the standard drawing, which shows them 2" from the IA joint. Unfortunately these standard drawings (609-RCBA-03 & -04) have been deleted and it is now up to the designers to show this detail on the plans.

2) Transverse cracks near the IA joint. These can be a little more varied than in 1) above, or can be almost identical to 1) above. These typically result from those bars that are installed in the pavement ledge. I do not like those bars installed in the pavement ledge. From my observations, they are rarely installed correctly. I believe it would be better to go back to the 6' straight bar to tie the approach to the deck.

3) Other random cracking in the approach slab.
   a) Sometimes this appears as regular-spaced cracks that are perpendicular to the IA joint when the bridge is on a skew
   b) Sometimes this can be a long meandering crack running longitudinal, on a 45, and transverse. This cracking is most often seen in large approach slabs, ie. those on bridges with larger skews and that are several lanes wide (the kind where the one end is 20'-6" long, but the other end is 100' or more due to the skew.) At one time, I believe Naveed Burki was working on a detail for these large approach slabs to help with cracking.

Not sure how this fits with the info from Mike Halterman, but I know this was the issues that we've repeatedly seen in construction and have had several discussions with contractors where they want to blame the design.

My thoughts on 1) were that the standard drawings maybe should not have been deleted, or at a minimum, the designers need to make sure that they show the clear cover on the plans. This problem is a construction issue and can be addressed through construction. The issues with 2) are bar placement and can be remedied by deleting the 599 bar (shown in standard drawing 609-RCBA-07) and replacing it with a 6' straight bar that ties the approach to the deck and not to the pavement ledge. For 3) it appears to be a large mass of concrete and even though it is reinforced, concrete will crack. Possibly indicating some tooled joints or something to "encourage" the concrete to crack where we want it to and then use silicon sealant to seal the tooled joint and crack. As I mentioned above, I believe Naveed or some designers had used something on a project or two here recently.

Let me know if you want to talk some time before the meeting.

Jim

From: Burleigh Law [mailto:blaw@HNTB.com]
Sent: Tuesday, October 30, 2012 12:11 PM
To: Reilman, Jim
Subject: FW: INDOT Structural Committee - Approach Slabs

Jim,

I completely forgot to include you on this correspondence regarding approach slabs. In our last meeting you were listed as one of the people that needed to be consulted.

This has been somewhat of a lingering issue over the years with lots of potential fixes, but I don't know if much has been implemented. I recall there being a couple of trial bridges that fixes were being implemented on, but don't know the result of those. Any further thoughts or input from your end regarding how we can fix the cracking problems with approach slabs? If so, it would be great to be prepared to discuss those with the group on November 8. Please confirm.

This is e-mail 1 of 2. I'll forward you Mike Halterman's response to the below e-mail with USI's calculations.

Burleigh Law, P.E.
Sr. Bridge Engineer
HNTB Corporation, Inc.

From: Burleigh Law
Sent: Wednesday, August 29, 2012 9:14 AM
To: Mike Halterman (mhalterman@usiconsultants.com)
Cc: Michael McCool (mmccool@b-l-n.com); Anne Rearick
Subject: INDOT Structural Committee - Approach Slabs

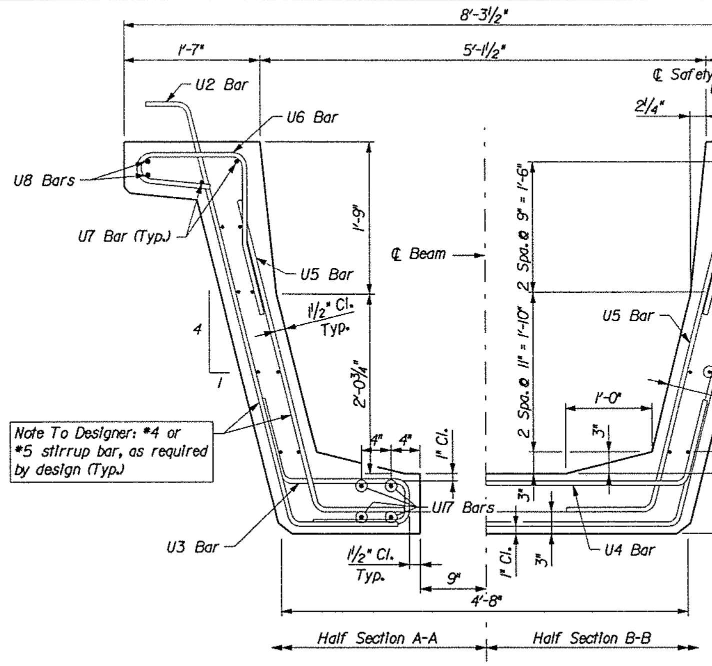
Mike,

Attached is the information I had previously gathered regarding approach slab details from other DOT's. I've also included a table where I did a comparison between each of the DOT's. Please send me the information that was developed by USI regarding the bent bars that stick out of the pavement ledge into the approach so that we can start the ball rolling on coordinating this information and developing recommendations for the group. Thanks for your help and I look forward to hearing from you soon.

Burleigh Law, P.E.
Sr. Bridge Engineer

HNTB Corporation, Inc.
111 Monument Circle, Suite 1200
Indianapolis, IN 46204

Tel (317) 636-4682
Fax (317) 917-5211
www.hntb.com

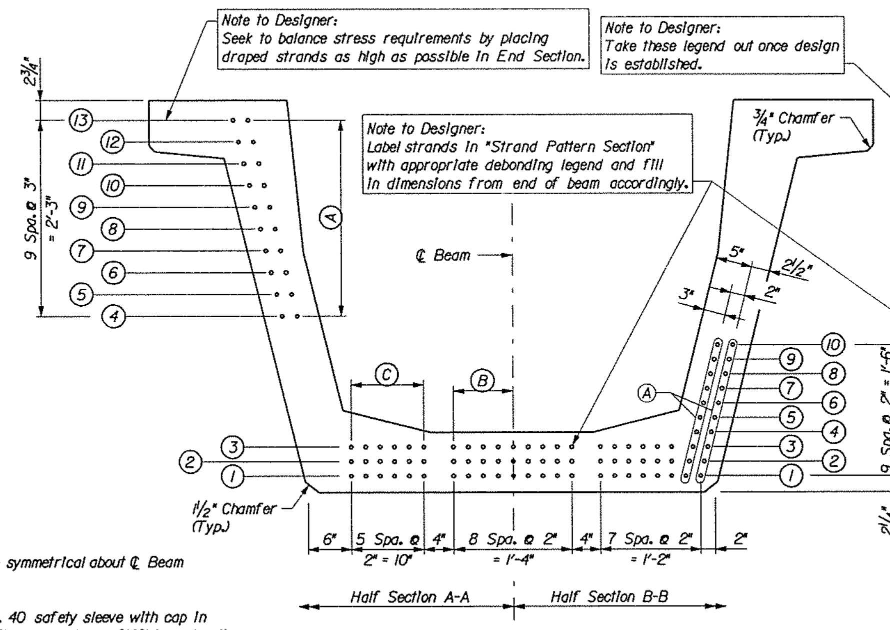


REINFORCEMENT SECTION

Scale: 1" = 1'-0"

NOTES:

1. Reinforcement and geometry are symmetrical about ℄ Beam for Half Sections A-A & B-B.
2. Place 2½" NPS x 5" PVC Sch. 40 safety sleeve with cap in both top flanges spaced at 8'-0" max. centers. Shift bars locally to allow placement. Holes shall be free of debris and water prior to casting deck.



STRAND PATTERN SECTION

Scale: 1" = 1'-0"

DEBONDING LEGEND:

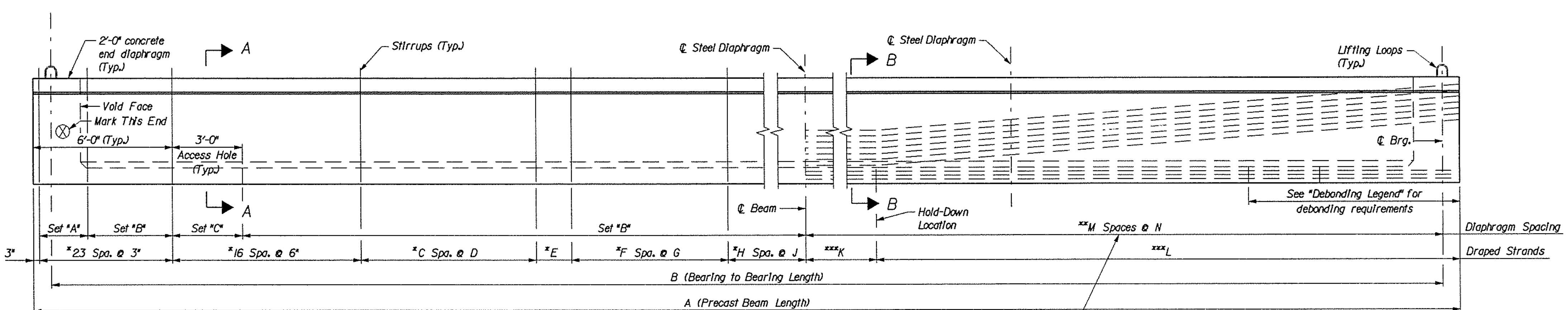
- (A) - No debonding is permitted in this region. Strands shall be bonded the full length of beam.
- (B) - These strands shall be debonded in a minimum of 3 subgroups, which are alternated but symmetrical about ℄ Beam. Group 1 shall be debonded a minimum of 9'-0" from the end of beam to cut-off location at access hole. Group 2 will be debonded a minimum of 12'-0" from the beam end, Group 3 will be debonded a minimum of 15'-0" from the beam end, and so forth in 3'-0" increments.
- (C) - Strands may be debonded in this region, per the design requirements.
- ○ - Fully bonded strands.
- ▣ - Strands debonded _'-_" from end of beam.
- ◎ - Strands debonded _'-_" from end of beam.
- △ - Strands debonded _'-_" from end of beam.
- ◇ - Strands debonded _'-_" from end of beam.

NOTES:

1. The maximum number of strands debonded shall be 50% per row and 25% total.
2. Strand protection at access hole cut-off location shall consist of a 2" deep recess formed around all strands or strand groups. After detensioning, cut strands ½" from recessed surface and fill recess with a Type F-2 epoxy compound in accordance with the Specifications.

GENERAL NOTES

1. Prestressed beam concrete shall be in accordance with these plans and the Specifications.
2. For prestressed beams: Fy = 60,000 psi F's = 270,000 psi
3. Strands shall be 0.6" diameter (0.217 sq.in.), uncoated seven-wire, low-relaxation conforming to AASHTO M203, Grade 270.
4. Pretension all beams. Concrete shall attain f'ci (shown in table) in standard test cylinders that are made and cured identically with the beams without bond stresses being transferred to the concrete or releasing the end anchors. Attain f'c (shown in table) at or prior to 28 days. Apply an initial force of 43,900 lbs. per low-relaxation strand to develop a stress of 202,500 psi. No beam will be accepted that is honeycombed to the extent that strength of the beam or resistance to deterioration has been affected. An allowance of 0.0005L is made for shortening of beams due to shrinkage and elastic change. Show a detensioning plan by sequential numbering of the strand pattern on the shop plans.
5. Detail lifting devices on the shop plans. Loads are to be distributed equally to each device.
6. Reinforcing steel shall have 1" min. clear cover unless noted otherwise.
7. All acute corners shall be chamfered for skews greater than 15 degrees. Any corner of the beam noted with "chamfer" shall be chamfered ¾" or rounded to a 1⅝" radius. Optional chamfers, if used shall likewise conform.
8. Horizontal construction joints (seams) shall not be permitted.
9. Fabrication tolerances shall be as required per the Special Provision for "Prestressed Concrete U-Beams".
10. Stay-in-place metal deck forms shall be used inside the beams. All construction materials and debris shall be removed from the interior of the U-Beams prior to the placement of deck forms.
11. Top of beams shall be scored transversely at about 3" on center with pointed tool.



STIRRUP LEGEND

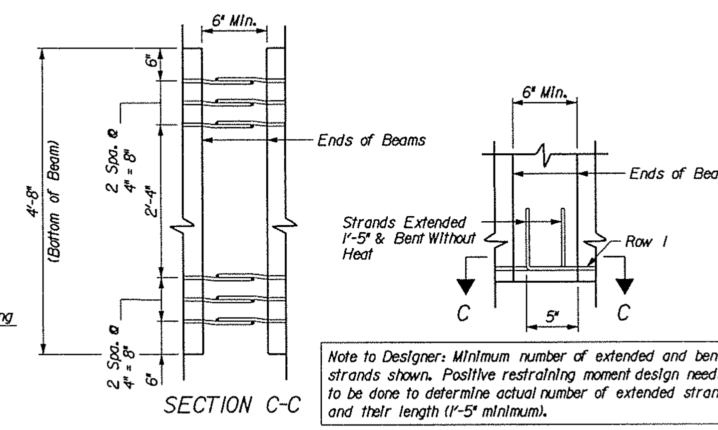
Set "A" = U1, U5, & U16
Set "B" = U1, U4, U5 & U6
Set "C" = U2, U3, U5 & U6

ELEVATION

Scale: ⅜" = 1'-0"

LEGEND

* - Stirrup spacing is symmetrical about ℄ beam.
** - Diaphragm spacing is symmetrical about ℄ beam.
*** - Strand geometry is symmetrical about ℄ beam.



STRAND SPLICE DETAIL

Scale: ¾" = 1'-0"

MARK	CONCRETE STRENGTHS (psi) RELEASE f'ci	28 DAY f'c	BEAM DATA (Measured Along Centerline) TOTAL NO.	DIMENSIONS A	B	C	D	E	F	G	H	J	K	L	M	N	APPROX. WEIGHT (lbs)
B1																	
B2																	
B3																	
B4																	
B5																	
B6																	
B7																	

MARK	STRAND DATA WITH NUMBER INDICATED IN ROWS — END (SECTION A-A) ①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬	MIDSPAN (SECTION B-B) ①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	TOTAL NO.	HOLD-DOWN CAPACITY (lbs)
B1																									
B2																									
B3																									
B4																									
B5																									
B6																									
B7																									

MARK	REINFORCING STEEL (NO. OF BARS) U1	U2	U3	U4	U5	U6	U7	U8	U9	U10	U11	U12	U13	U14	U15	U16	U17	U18
B1																		
B2																		
B3																		
B4																		
B5																		
B6																		
B7																		

RECOMMENDED FOR APPROVAL
DESIGN ENGINEER DATE

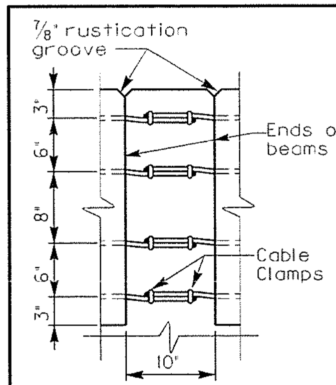
DESIGNED: DRAWN:
CHECKED: CHECKED:

INDIANA
DEPARTMENT OF TRANSPORTATION

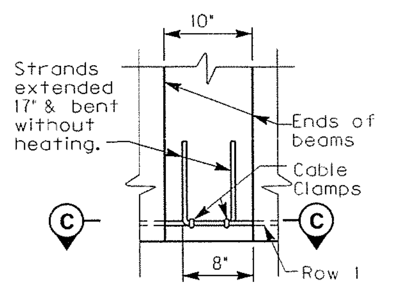
INDIANA 54" U-BEAM
DETAILS (1 OF 8)

HORIZONTAL SCALE	BRIDGE FILE
AS SHOWN	
VERTICAL SCALE	DESIGNATION
AS SHOWN	
SURVEY BOOK	DWG. NO. SHEET NO.
16851	1 of 8
CONTRACT	PROJECT

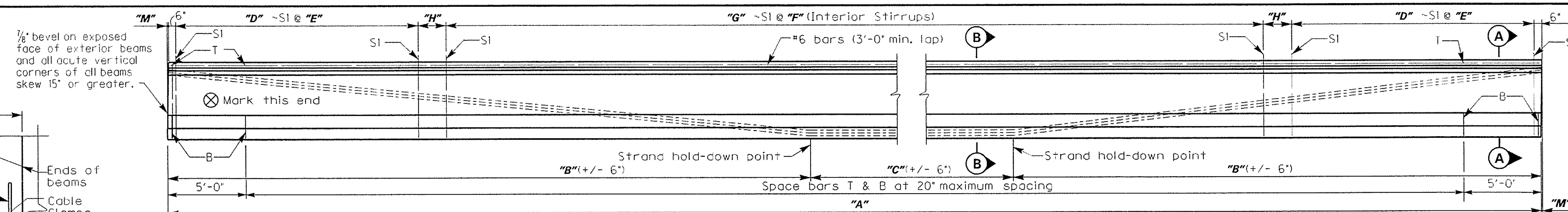
08.07
06-OCT-2010
IP_PWPdms\07324\54UBStdDwg1.dgn



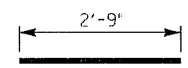
SECTION C–C



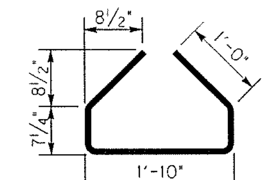
STRAND SPLICE DETAIL



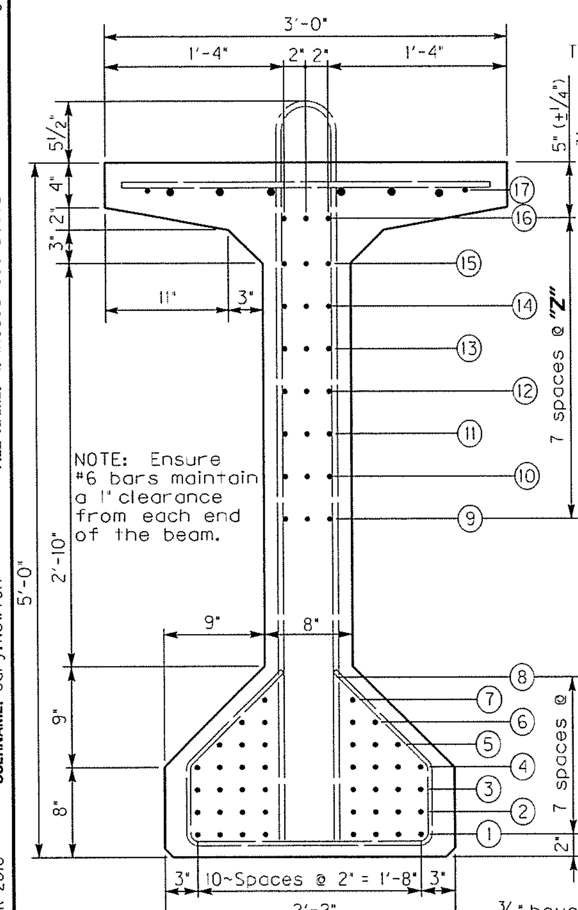
ELEVATION OF BEAM



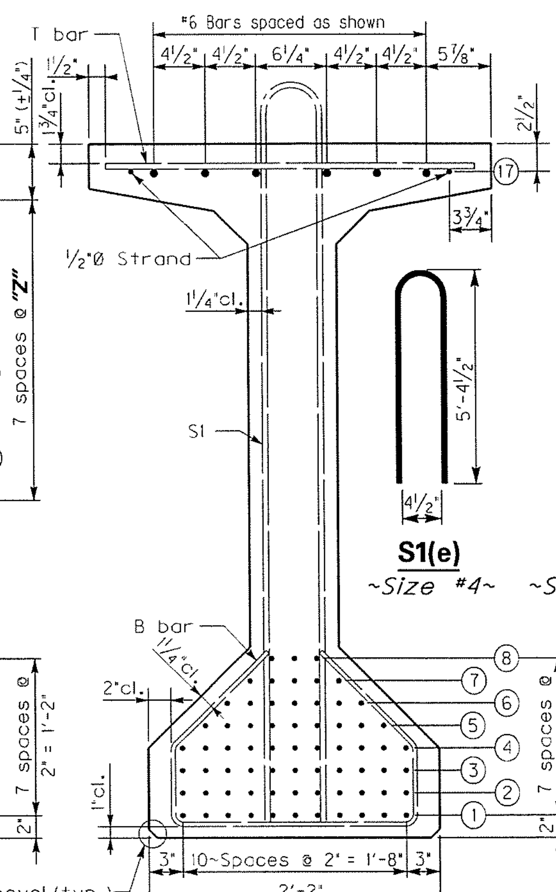
T Bar
~Size #4~



B Bar
~Size #3~

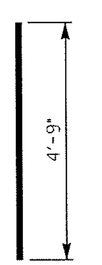


SECTION A–A

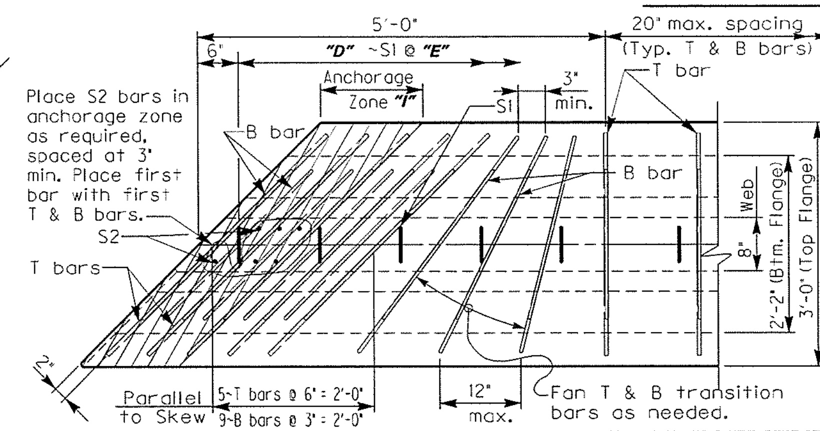


SECTION B–B

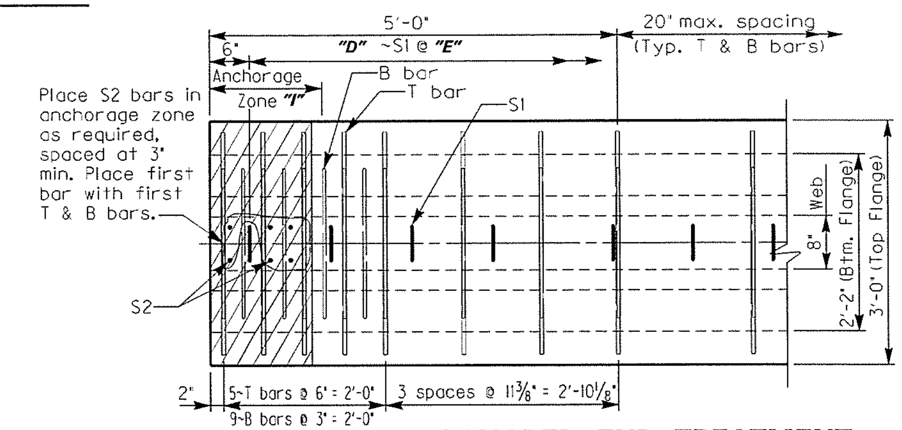
S1(e)
~Size #4~



S2
~Size #5~



TYPICAL SKEWED END TREATMENT



TYPICAL SQUARED END TREATMENT

General Notes

CONCRETE: Ensure prestressed girder concrete is in accordance with these plans and the specifications.

MATERIALS DESIGN SPECIFICATIONS: For prestressed beams:
FY = 60,000 psi F'S = 270,000 psi

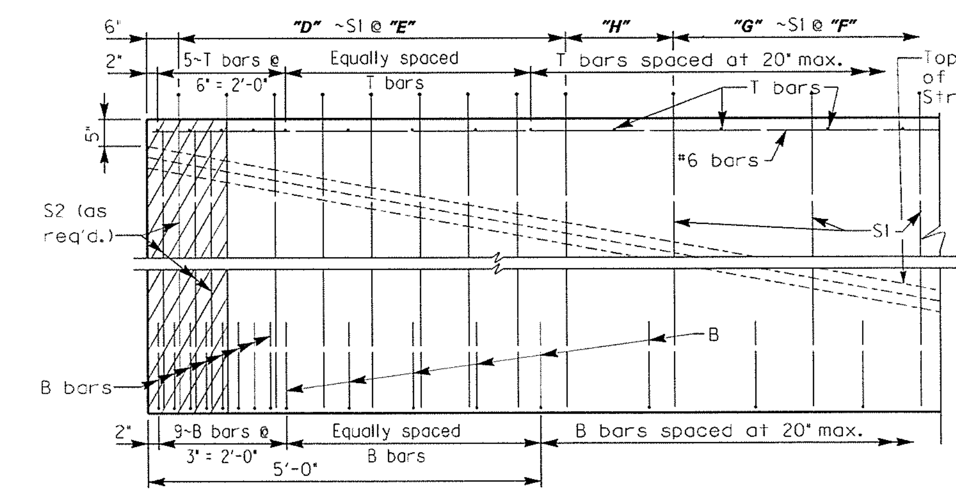
PRESTRESSING REINFORCEMENT: Ensure that strands are 1/2" (nominal diameter, 0.153 sq. in.), uncoated seven-wire stress relieved, low-relaxation conforming to AASHTO M 203, Grade 270. Billing of the cost for redesign of beam and subsequent plan modifications will be made for any request of alternate strand type or arrangement. The designer of the original plans is responsible for the billing and work.

CONSTRUCTION METHOD: Pretension all beams. Ensure concrete has attained f'ci (shown in the table) in standard test cylinders that are made and cured identically with the beams without bond stresses being transferred to the concrete or releasing the end anchors. Attain f'c (shown in the table) at or prior to 28 days. Apply an initial force of 31,003 lbs. per low-relaxation strand to develop a stress of 202,500 psi. No beam will be accepted that is honeycombed to the extent that strength of the beam or resistance to deterioration has been affected. An allowance of 0.0005L is made for shortening of beams due to shrinkage and elastic change. Show a detensioning plan by sequential numbering of the strand pattern on the shop plans.

LIFTING DEVICES: Detail lifting devices on the shop plans. Loads are to be distributed equally to each device.

BEARING DEVICES: Include the price for lead plates and/or bearing pads in the bid for precast beams.

FABRICATION: The "Maximum Allowable Camber" shown on the beam sheet is the amount of camber, measured prior to casting the deck, above which the beam will begin to encroach into the slab. If the measured camber is greater than the "Maximum Allowable Camber" the contractor will be responsible for any necessary adjustments to assure a minimum slab thickness of eight (8) inches as shown in the plans. This work will be considered incidental to the completion of the structure and have the approval of the Engineer.



PARTIAL SECTION ON CENTERLINE

Mark	Strand Data with number indicated in rows																									Concrete Stress (psi)		No. of S Bars		Hold-Down Capacity	Beam Data (measured along centerline)														Maximum Allowable Camber
	Midspan (SECTION B-B)								End (SECTION A-A)																Total						Total	Dimensions											Approximate Weight	
	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	No.	f'ci	f'c	S1	S2	lbs.	No.	A	B	C	D	E	F	G	H	I	Z	M		

ITEM NUMBER

REVISION	DATE
DATE:	CHECKED BY
DESIGNED BY:	
DETAILED BY:	

Commonwealth of Kentucky
DEPARTMENT OF HIGHWAYS

COUNTY

ROUTE | CROSSING

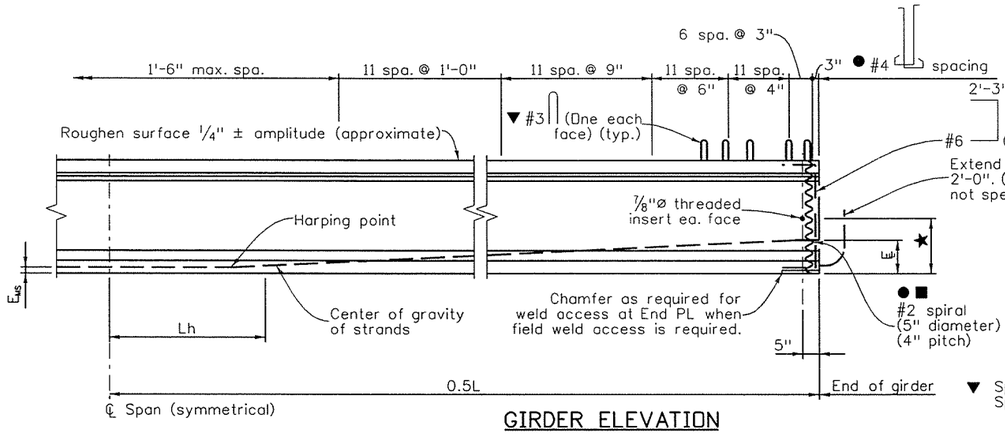
PPC I-BEAM, 60", DETAILS

PREPARED BY
Division of Structural Design

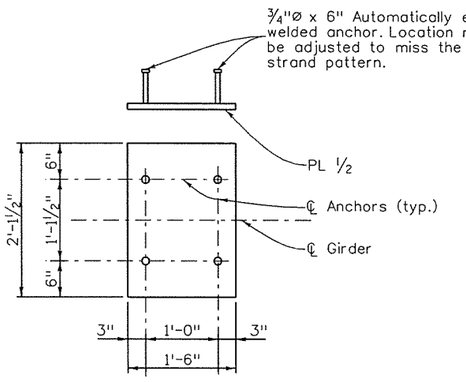
SHEET NO.

DRAWING NO.

FILE NAME: H:\Resources\Base_Sheets\PCIbeams\English\2010\pci_5.dgn
USERNAME: Gary.Newton
DATE: 01-APR-2010
SHEET LOCATION:



GIRDER ELEVATION



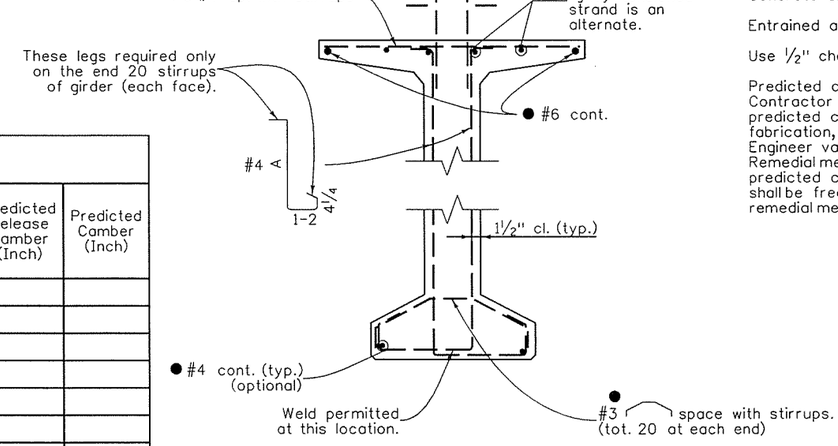
END PLATE DETAIL

Galvanize after fabrication.

■ The Contractor may submit an alternate cross tie arrangement, at the end of the web, for approval by the Engineer.

▼ Space with #4 ● for stirrup spacings of 9" or more. Space at 1'-0" for stirrup spacings less than 9".

● D20 wires may be used in lieu of #4. 2 - D20 wires may be used in lieu of #6. D11 or W10.9 wires may be used in lieu of #3. W5 wires my be used in lieu of #2.



TYPICAL GIRDER SECTION

A = girder depth - 3"

GIRDER SCHEDULE

Girder Type	Span No.	Girder No.	L (Feet)	Lh (Feet)	A_s* (Square Inch)	E_{ms} (Inch)	E_E (Inch)	F_j (KIPS)	F_f (KIPS)	Concrete Strength f'_{ci} (PSI)	Concrete Strength f'_c (PSI)	Δ (Inch)	Predicted Release Camber (Inch)	Predicted Camber (Inch)
				3.5										

NOTES:

B-618-BT

All work necessary to fabricate and install the integral parts of the girder (including the intermediate diaphragms, 7/8"ø threaded rods, and leveling pads), as shown on the plans, shall be included in the bid price for Item No. 618, Prestressed Concrete I (BT__), with a pay unit of Feet which shall be measured by dimension L.

When approved by the Engineer, a minimum of tack welding will be permitted on ASTM A706 uncoated reinforcing steel.

Reinforcing projecting from the top of the girder and reinforcing within eight feet of an expansion device in the bridge deck shall be epoxy coated. Damaged coating on girder reinforcing need not be repaired. The minimum cover for reinforcing steel is 1".

At girder ends not embedded in concrete diaphragms, cut strands off 1" below the surface of the concrete and finish with an approved epoxy grout. At girder ends embedded in concrete diaphragms, cut strands to project 3", except as shown. Do not make cosmetic repairs (damage less than 1½" deep) to the parts of the girders embedded in concrete.

Use low relaxation strands meeting the requirements of ASTM A-416 Grade 270. The minimum clear distance between groups or individual strands shall be 2.3(d_s) but not less than 1¼". The minimum cover for prestressing steel is 1½".

A minimum of two harping points shall be used per girder. Harped strands shall be well distributed at the girder ends, starting within 4" of the top of the girder and distributed such that there is no space between strands greater than 1'-0" at the end of the girder. As an alternate the Contractor may place #4 ● x 10'-0" in the sides of the end of the web parallel to the harped strands such that there is no space greater than 1'-0".

A_s*= minimum area of the prestressing steel.
d_s = nominal strand diameter.
f'_s = ultimate strength of prestressing steel.
F_j = jacking force per girder.
F_f = final force per girder after all losses.
f'_{ci} = required concrete strength at release of prestress force.
f'_c = required concrete strength at 28 days of age.
L = length of girder along the grade of the girder.
Δ = deflection at centerline of span due to cast-in-place slab, diaphragms, asphalt, curbs, rails, and walks.

Concrete shall be Class PS.

Entrained air is not required for girder concrete.

Use ½" chamfer on all corners, except as noted.

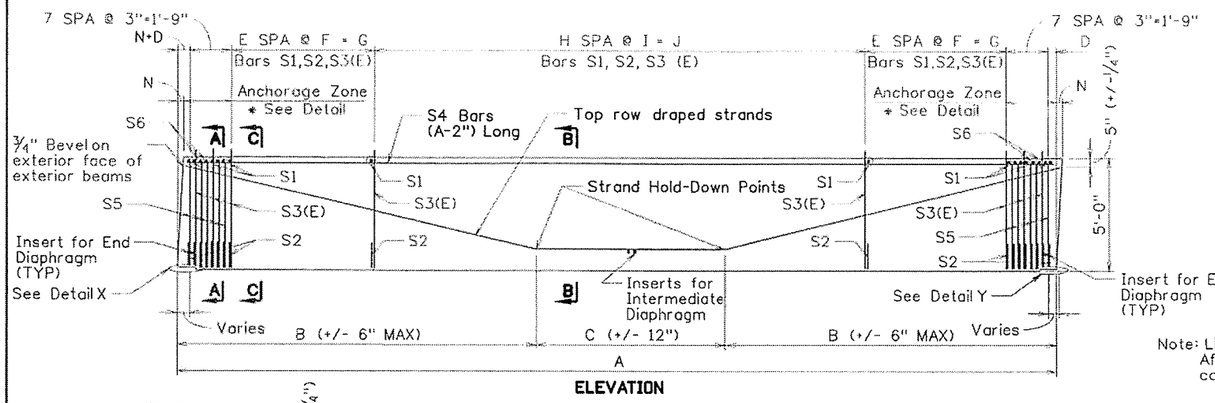
Predicted camber is the camber for the girder alone at 90 days. The Contractor shall limit the camber growth to a value not to exceed the predicted camber plus 1" prior to the deck pour by weighting, scheduling fabrication, post tensioning, or other means and must report to the Engineer values of camber which exceed the predicted camber plus 1". Remedial measures, as approved by the Engineer, shall be taken if the predicted camber plus 1" is exceeded. The approved remedial measures shall be free of any adverse impact. The costs associated with all remedial measures shall be borne by the Contractor.

Revision Dates (Preliminary Stage Only)	1/97	3/99	4/99	11/99	4/02	9/02	2/06	3/07

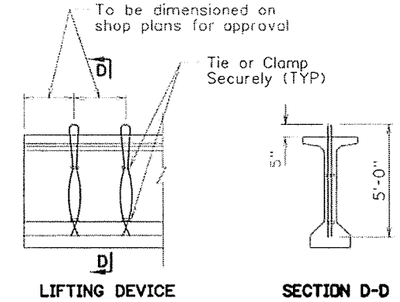
Design			Detail			Quantities		
	INITIAL	DATE		INITIAL	DATE		INITIAL	DATE
Designed By	XXX	MM/YY	Detailed By	XXX	MM/YY	Quantities By	XXX	MM/YY
Checked By	XXX	MM/YY	Checked By	XXX	MM/YY	Checked By		MM/YY

Print Date: 10/29/2007	Sheet Revisions			Colorado Department of Transportation	As Constructed	PRESTRESSED CONCRETE I		Project No./Code
Drawing File Name: Sheet_B-618-BT.dgn	Date:	Comments	Init.	4201 East Arkansas Avenue	No Revisions:			
Horiz. Scale: 1:1 Vert. Scale: As Noted				Room 107	Revised:	Designer: XXXXXXXX	Structure Numbers: X-XX-XX	
Unit Information Unit Leader Initials				Denver, CO 80222-3406		Detailer: XXXXXXXX		
				Phone: 303-757-9352 FAX: 303-757-9197	Void:	Sheet Subset: Bridge	Subset Sheets: B00 of	Sheet Number
				Staff Bridge Branch Initials				

PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				



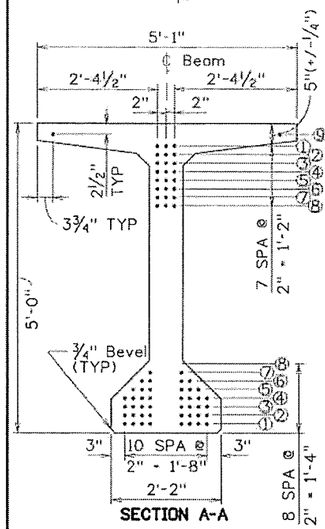
ELEVATION



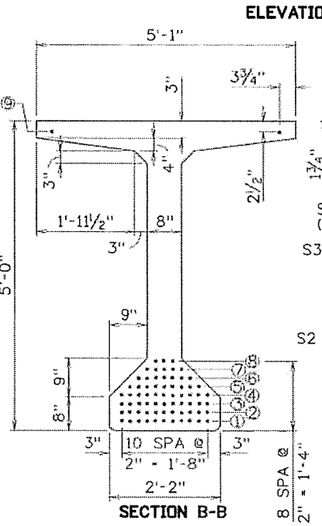
LIFTING DEVICE

SECTION D-D

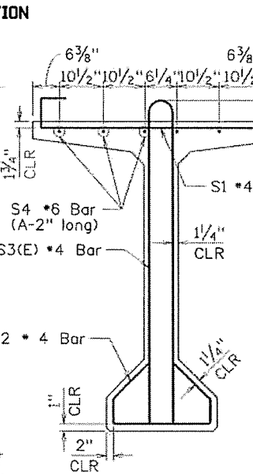
Note: Lifting shall be by equal loads to each pair of loops. After erection, the loops shall be cut flush, and ends coated with asphaltic material.



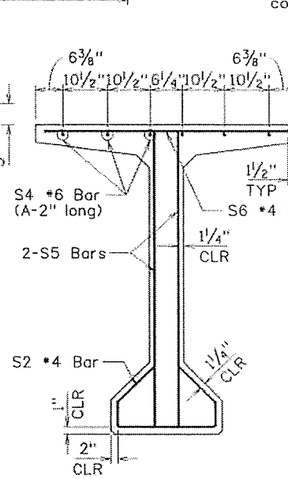
SECTION A-A



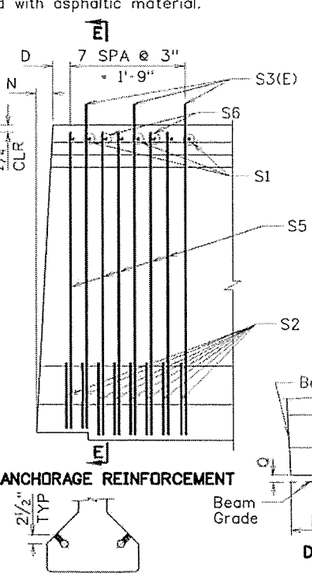
SECTION B-B



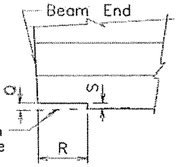
SECTION C-C
TYPICAL SECTION SHOWING STEEL REINFORCEMENT



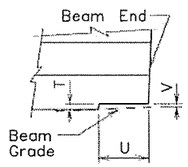
SECTION E-E
TYPICAL SECTION SHOWING STEEL REINFORCEMENT IN ANCHORAGE ZONE



ANCHORAGE REINFORCEMENT



DETAIL "X"



DETAIL "Y"

NOTES:
1. The concrete shall attain a compressive strength of at leost XXX psi, as shown by standard cylinders cured identically with the beams, before transferring bond stress to the concrete: or before releasing the end anchors. Cylinder strength shall be YYYY psi within 28 days.
2. The Department will reject the beams if the finished units contained honeycombed concrete to the extent that the Engineer determines the strength or deterioration resistance is reduced. Beam shortening due to shrinking and elastic changes is limited to 0.0005L.
3. Roughen the top surface of each beam to an amplitude of approximately ¼ inch and maintain clean and free of laitance.
4. Shop drawings shall show the detensioning plan by numbering the sequence of the strand pattern.
5. Prestressing strands shall be stabilized strand (1/2 inch nominal diameter) low relaxation uncoated seven wire strand in accordance with AASHTO M 203 grade 270. An initial stress of 202.5 psi shall be applied to the strand
6. Uncoated seven wire stress relieved strand may be substituted. However, if the Contractor chooses this alternate, he shall provide the design for the stress relieved strand and shall revise the original plans to reflect these changes. This design and plan modification shall be made at the Contractor's expense.
7. Deformed wire fabric is permitted instead of reinforcing steel bars provided an equal steel area is provided. Wire fabric must conform to the requirements of AASHTO Section M225.
8. The Elastomeric bearing pads under the prestressed beams shall conform to AASHTO Division 2, Section 18 Duro 60. Section 18.2.3.2 specifies laminate material to be:

   ASTM A245
   ASTM A570, Grade 36

9. Payment for Elastomeric bearing pads and any preformed joint material specified shall be included in Item 603-01. See pier & abutment sheets for details.
10. The threaded inserts shall have a minimum safe work load of 2500 lb in tension. All inserts shall be plugged to prevent concrete intrusion. Omit inserts on exterior face of exterior beams.
11. All threaded inserts and anchorage dowels are to be hot-dip galvanized after fabrication. Include the cost in Item 603-01.
12. S5 vertical reinforcing bars placed at the ends of the beam is designed for bursting resistance as per LRFD 5.10.10.1. Refer to S5 bar table.

REINFORCING BAR LIST				
MARK	SIZE	COUNT/BEAM	TOTAL	LENGTH
S1				
S2				
S3(E)				
S4				

REINFORCING BAR LIST			
MARK	SIZE	COUNT/BEAM	TOTAL
*S5			
S6			

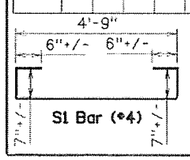
BEARING PADS		
NO.	DESCRIPTION	LOCATION

BEAM DIMENSIONS (MEASURED ALONG ℄ BEAM)

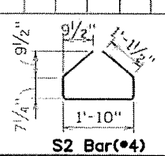
MARK	NO REQD	DIMENSIONS																				APPROX. WT EACH (LBS)
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	P	Q	R	S	T	U	V	

NUMBER OF ½" Dia.-- 7 WIRE STRANDS IN INDICATED ROW

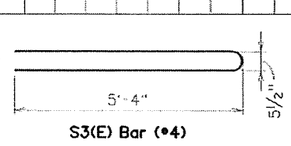
MARK	MIDSPAN (SECTION B-B)									END (SECTION A-A)										TOTAL NO. PER BEAM	CONCRETE STRENGTHS (PSI)		INITIAL PRESTRESS FORCE/STRAND (LBS)
	BOTTOM								TOP	BOTTOM								TOP					
	①	②	③	④	⑤	⑥	⑦	⑧	⑨	①	②	③	④	⑤	⑥	⑦	⑧	①	②	③	④	⑤	⑥	⑦	⑧	⑨		f'ci	f'c	



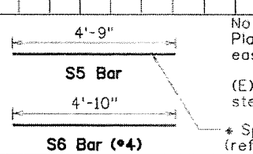
S1 Bar (#4)



S2 Bar(#4)



S3(E) Bar (#4)

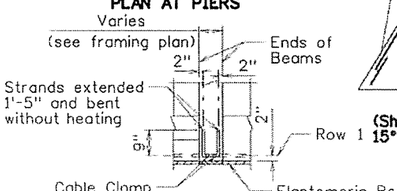


S6 Bar (#4)

Note:
Place S3(E) bar parallel to skew for ease of Deck rebar placement.

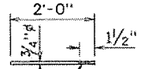
(E) denotes epoxy coated reinforcing steel bars

* Specify bar size (refer to S5 bar table)

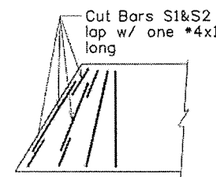


PLAN AT PIERS

ELEVATION
STRAND SPLICING DETAILS (TYP AT PIERS)



THREADED ANCHOR BAR DETAIL



PART PLAN
(Showing skewed end, 15° skew or greater)

INSERT DETAIL

NO.	REVISION	DATE:	BY:

C:\Users\V3 Addendum 07\new\BRD-IVJ 60X61.new.dgn 26-JAN-2007 10:37

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

DESIGNED	DATE 12/5/06
DRAWN	
CHECKED	
REVIEWED	

APPROVED Gregg Bailey DIRECTOR STRUCTURES DIVISION DATE 12/18/06

AASHTO TYPE IV - J PC BEAM
60" DEEP, 61" TOP FLANGE
BRD-IVJ 60X61

SHEET OF
BRIDGE NO.

Attachment 3

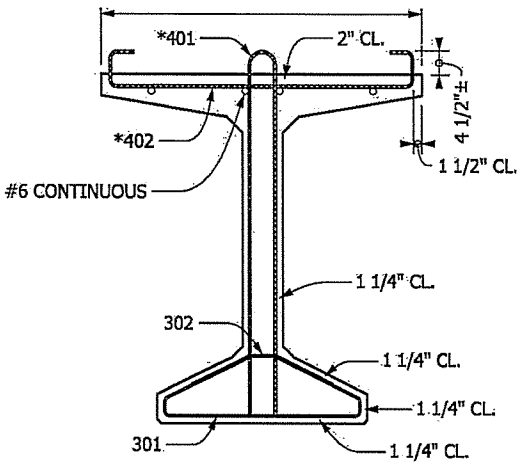
Practice Pointers – Conspan Beam Design Software

1. Do not include non-composite moment effects when calculating negative moment steel. Default is to include and must toggle to exclude: Analysis-Project Parameters-Moment/Shear

2. Flared beam analysis - After entering all the geometric data, if you go back and change any information in the "Layout" dialogue (like deck widths & offsets or abutment widths & offsets), then the beam analysis goes haywire. As a temporary solution, you just need to wipeout and reenter all the beam data in the "Cross Section" dialogue after you've made all changes to the "Layout". (Version 11.00.01.05)

3. There isn't a field to include 402E bars for shear.

4. Location of prestressing strands for odd height beams (e.g. 45"). Location must be manually set to achieve 2 inch clearance dimension for top strands



5. Eta factors default to one. State bridges require importance factor of 1.05

6. Humidity from 75% to 70% in time to release.

7. Deck thickness should be entered as the structural thickness (typically 7.5"). Sacrificial thickness (typically 1/2") should be added as a non-composite dead load.

Project: **By:** **Date:**
Subject: **Chk'd:** **Date:**

CONSPAN INPUT CHECKLIST - LRFD:
(THIS IS NOT A COMPREHENSIVE LIST, DESIGNER RESPONSIBLE FOR OTHER VARIABLES)

Geometry:

- ☐ Deck effective thickness (Client specification, AASHTO LRFD 9.7.1.1, Indiana Design Manual (IDM) 61-4.01)
- ☐ Deck sacrificial thickness (Client specification, AASHTO LRFD 2.5.2.4, IDM 61-4.01)
- ☐ Minimum haunch thickness (Client specification, IDM 61-4.02(03)) (Varies with camber, additional dead load should be added due to camber under loads tab)
- ☐ Beam section (Client specification, manufacturer specifications - (shape, strand locations, etc), IDM Chapter 63)

Materials:

- ☐ Tendon size/designation for beam type (Client specification, manufacturer specifications, IDM 63-3.02)
- ☐ Concrete strengths, release/final/deck (Client specification, AASTHTO LRFD 5.4.2.1, C5.4.2.1, Table C5.4.2.1-1, IDM 63-3.01 for beam, INDOT Class C Concrete IDM Fig. 62-1A for deck)
- ☐ Unit weight of concrete (Client specification, AASHTO LRFD Table 3.5.1-1, IDM Fig. 62-1A, a minimum of 150 pcf should be used to account for re-steel in concrete)
- ☐ Elasticity of concrete (Client specification, AASHTO LRFD 5.4.2.4, IDM Fig. 62-1A)
- ☐ Use of draped strands (Client specification, manufacturer requirements)
- ☐ Location of holddown points (draped strands)(Client specification, manufacturer recommendations-Prestress Services recommends 5' each side of centerline of beam)
- ☐ Debonding specifications (Client specification, AASHTO LRFD 5.11.4.3, IDM 63-3.05)

Loads:

- ☐ Sidewalk (AASHTO LRFD 3.6.1.6, Add Pedestrian Load and Sidewalk Dead Load as appropriate, if Sidewalk may be removed in future analyze with and without Sidewalk/Pedestrian Load)

Project:	**By:**	**Date:**
Subject:	**Chk'd:**	**Date:**

CONSPAN INPUT CHECKLIST – LRFD (Con't):

Loads (Con't.):

- ☐ Future sidewalk (AASHTO LRFD 3.6.1.6, Add Pedestrian Live Load and Sidewalk Dead Load as appropriate, analyze with and without Sidewalk/Pedestrian Load)
- ☐ Interior diaphragms (Client specification, AASHTO LRFD 5.13.2.2, (Add Dead Load, all spans), IDM 63-7.0)
- ☐ Live load (Client specification, AASHTO LRFD 3.6.1.2, INDOT requires Design Truck, Design Tandem and Design Lane as a minimum, Toll Road and Michigan Truck Train in some locations IDM 60-3.02, Double Truck and Double Tandem have to be included for a multi-span structure)
- ☐ Include LL deflection
- ☐ Bridge rail loading (Determine bridge rail load if placed entirely on outside beam using the lever rule and input on outside beams as a Composite DC line load and run analysis, remove bridge rail load and input via Conspan Load Wizard and run analysis as a comparison)

Analysis:

- ☐ Analysis factors-distribution (Revise ADTT (average daily truck traffic) to actual and click on Apply ADTT button.)
- ☐ Analysis factors-distribution-live load-girder (Beam-slab bridge has to meet the requirements of AASHTO LRFD 4.6.2.2 to use code equations, if it doesn't meet requirements-designer must compute)
- ☐ Analysis factors-modifier (Client specification, AASHTO LRFD 1.3.3, 1.3.4, 1.3.5, IDM 60-1.03)
- ☐ Project parameters-limiting stress (Client specification, AASHTO LRFD 5.9.4)
- ☐ Project parameters-restraining moments for multi-span structures (Analysis to be run with Full Continuity, Disregard Restraining Moments also to be run with PCA method Calculated Restraining Moment, age at which continuity established to be 28 days (AASHTO LRFD C5.4.2.1) unless client specified)
- ☐ Project parameters-resistance factor/losses-strength reduction factors (Client specification, AASHTO LRFD 5.5.4.2, IDM 63-6.01)

Project:	**By:**	**Date:**
Subject:	**Chk'd:**	**Date:**

CONSPAN INPUT CHECKLIST – LRFD (Con't.):

Analysis (Con't.):

- ☐ Project parameters-resistance factor/losses-relative humidity (Client specification or use link in Conspan, IDM 63-3.04(02))
- ☐ Project parameters-moment and shear provisions (Exclude Non-Composite Moments from Mu)

Deck:

- ☐ Do not use the deck design in Conspan.

Results:

- ☐ Determine controlling beam
- ☐ Live load deflection (Client specification, AASHTO LRFD 2.5.2.6.2)
- ☐ Holddown force (Client specification, manufacturer limitation, IDM 63-3.02)

INDOT Bridge Training Evaluation Form

(5 is best, 1 is least)

Topic 1

Value of topic

1 2 3 4 5

Presentation

1 2 3 4 5

Comments_____

_____

Topic 2

Value of topic

1 2 3 4 5

Presentation

1 2 3 4 5

Comments_____

_____

Topic 3

Value of topic

1 2 3 4 5

Presentation

1 2 3 4 5

Comments_____

_____

Topic 4

Value of topic

1 2 3 4 5

Presentation

1 2 3 4 5

Comments_____

_____

INDOT Bridge Training Evaluation Form

(5 is best, 1 is least)

Topic 5

Value of topic

1 2 3 4 5

Presentation

1 2 3 4 5

Comments_____

_____

Topic 6

Value of topic

1 2 3 4 5

Presentation

1 2 3 4 5

Comments_____

_____

Overall Program

Value of Seminar

1 2 3 4 5

Comments(Please include topics you would like to see presented.)

_____

_____

_____