

7/11/07 9-11am

	12 <sup>13</sup> / <sub>16</sub>	13 <sup>5</sup> / <sub>16</sub>	13 <sup>7</sup> / <sub>16</sub>	1.04 (12 <sup>3</sup> / <sub>8</sub> )
1.06	1.06	1.2	1.16	
	17 <sup>1</sup> / <sub>2</sub>	13 <sup>5</sup> / <sub>8</sub>	14 <sup>1</sup> / <sub>2</sub>	1.04
1.06	1.06	1.15	1.20	

Before (w/out loading)

60 <sup>7</sup>/<sub>16</sub> 65 <sup>5</sup>/<sub>16</sub> 68 <sup>15</sup>/<sub>16</sub>

After (w/ loading)

60 <sup>3</sup>/<sub>4</sub> 61 <sup>1</sup>/<sub>8</sub> 65 <sup>1</sup>/<sub>8</sub>  
~~61 <sup>1</sup>/<sub>8</sub> 62 <sup>7</sup>/<sub>16</sub> 65 <sup>7</sup>/<sub>16</sub>~~

△  
 1/4", 1/8", 3/16"

Steve S.  
 Mike  
 Led M. of Mr. Clure  
 McCumsey  
 F...  
 Down... (1/16")



Rod R. Blagojevich, Governor • Chuck Hartke, Director  
**METROLOGY STANDARDS LABORATORY**  
**NIST TRACEABLE REPORT OF TEST**

• P.O. Box 19281 • Springfield, IL 62794-9281 • 217/785-8480

Business Number: 801269  
 W&M Invoice Number: 334486  
 Purchase Order Number: N/A

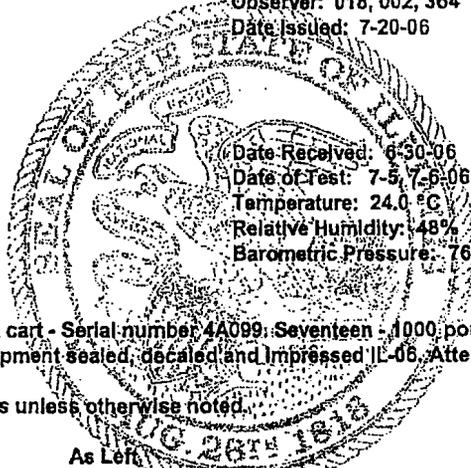
Report of Test Number: 06-222  
 Observer: 018, 002, 364  
 Date Issued: 7-20-06

Customer: Central Illinois Scale Company  
 Address: 2560 Parkway Court  
 City & State: Decatur IL 62524

Date of Primary Standard Calibration: N/A  
 Date of Working Standard Calibration: 2002, 2005

Test Method: SOP 8  
 Standards Used: Working Standards

Description of Test Items: 3000 pound test weight cart - Serial number 4A099; Seventeen - 1000 pound test weights. Two - 25 pound test weights, see below for Serial numbers. All equipment sealed, decaled and impressed IL-06. Attention Tom Hall.  
 Condition of Test Items: Acceptable  
 All corrections and uncertainties reported in pounds unless otherwise noted.



Date Received: 6-30-06  
 Date of Test: 7-5, 7-6-06  
 Temperature: 24.0 °C  
 Relative Humidity: 48%  
 Barometric Pressure: 767.06 mmhg

<u>Nominal Mass Value</u>	<u>As Found Conventional Mass</u>	<u>As Left Conventional Mass</u>	<u>Uncertainty</u>	<u>Tolerance Class F</u>
3000 lb	-1.745	0.013	+/-0.300	In
1000 lb-4A007	-0.081	0.000	+/-0.018	In
1000 lb-4A002	-0.055	0.013	+/-0.018	In
1000 lb-4A013	-0.085	0.006	+/-0.018	In
1000 lb-4A009	-0.090	0.015	+/-0.018	In
1000 lb-4A006	-0.072	0.000	+/-0.018	In
1000 lb-4A011	0.000	0.000	+/-0.018	In
1000 lb-4A008	0.004	0.004	+/-0.018	In
1000 lb-4A004	0.019	0.019	+/-0.018	In
1000 lb-4A016	0.015	0.015	+/-0.018	In
1000 lb-4A018	0.008	0.008	+/-0.018	In
1000 lb-4A010	0.006	0.006	+/-0.018	In
1000 lb-4A003	0.013	0.013	+/-0.018	In
1000 lb-4A001	0.015	0.015	+/-0.018	In
1000 lb-4A005	0.002	0.002	+/-0.018	In
1000 lb-4A014	0.002	0.002	+/-0.018	In
1000 lb-4A015	0.004	0.004	+/-0.018	In
1000 lb-4A017	0.002	0.002	+/-0.018	In
25 lb-4E001	-0.20 g	0.14 g	+/-0.11 g	In
25 lb-1E421	0.86 g	0.08 g	+/-0.11 g	In

*Michael W. Rockford*  
 Michael W. Rockford  
 Metrologist

The Illinois Standards are traceable to NIST and the laboratory has demonstrated measurement proficiency. The laboratory calculates measurement uncertainties in accordance with NIST-OWM Standard Operating Procedure 29, which is in conformance with ISO "Guide to the Expression of Uncertainty in Measurement." The confidence level is 95% with a coverage factor of two, (K=2). This document shall not be reproduced, except in full, without the approval of the Illinois Laboratory.



# PRESTRESS ENGINEERING CORPORATION

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 Blackstone, Illinois 61313  
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 e-mail: prestres@ertelco.com

www.pre-stress.com

DATE: 6/28/07

## FACSIMILE COVER SHEET

PLEASE DELIVER THE FOLLOWING PAGES TO:

NAME: Jeff Torney

FAX NO: 414-616-4885

COMPANY: McClure

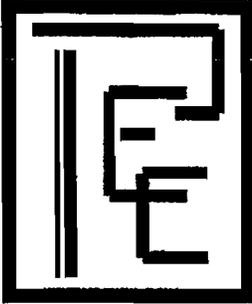
FROM: Steve Schwarz

TOTAL NUMBER OF PAGES INCLUDING THIS SHEET: 4

COMMENTS: Please review & comment before  
I start the formal submittal.

Thank You,  
Steve

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Civil Constructors Inc.  
1716 179<sup>th</sup> Street  
East Moline, IL 61244

June 28, 2007

ATTN: Mr. Eric Loomis

RE: Load testing of bridge beam in Buda IL.

Dear Mr. Loomis:

In response to our meeting two days ago in the Village of Buda, Illinois, Prestress Engineering Corporation will perform a load test on beam 4B to confirm the acceptability of this prestressed deck beam in the field. The deck beam in question is located in the center span, adjacent to the southern fascia beam and has less camber than the beams on either side of it. We believe that the reason for this reduced camber is due to the high release strength (6200+ psi) of the beam as compared with the 4029psi compressive release the other beams were at when the prestressing strands were released.

We propose to show that this beam has adequate strength by placing a load of known weight on the center of this beam and measure the deflection. When the measured deflection is less than the deflection calculated for a beam of design strength (5000 psi), then the beam is acceptable and may be grouted to the adjacent deck beams. A filler of grout will need to be added on top of this beam to even out the surface prior to the application of the waterproofing membrane and wearing surface. Calculations are included showing that this small additional dead load will not have an adverse effect on the structural integrity of this beam.

Please forward this letter and calculations to the proper authorities so that they can approve this procedure and we can begin the test. Please call Mike Johnson at our Blackstone facility to schedule this load test.

Sincerely,

Steven L Schwarz, S.E., P.E.

**PRESTRESS ENGINEERING CORPORATION**

2220 Route 176  
 Prairie Grove, Illinois 60012  
 (815) 459-4545 Fax (815) 459-5855

JOB 206370 BUDA BRIDGE

SHEET NO. 1 OF 2

CALCULATED BY SLS DATE 6/27/07

CHECKED BY \_\_\_\_\_ DATE \_\_\_\_\_

SCALE \_\_\_\_\_



$$\Delta = \frac{PL^3}{48EI}$$

SAY  $P = 1000 \text{ lb}$   
 $L = (75' - 10\frac{7}{8}'' ) - 14'' = 896.875''$  BEARING LENGTH  
 BM. LENGTH (2x7'')

$I = 809.8 \text{ in}^4$  (PER IDOT MANUAL)  
 $E = w^{1.5} 33\sqrt{f'_c} = 150^{1.5} 33\sqrt{5000} = 4,286,825 \text{ psi}$

DEAD LOAD =  $615 \text{ lb/ft}$  (PER IDOT MANUAL)

FOR  $P = 1000 \text{ lb}$ ,  $\Delta = \frac{1000 (896.875)^3}{48 (4,286,825) (809.8)}$   
 $= 0.04'' = 0.0036'$

THIS IS TOO SMALL TO MEASURE IN THE FIELD

A WEIGHT OF 10000 lb RESULTS IN A  $\Delta$  OF  $0.4'' (\pm \frac{3}{8}'')$

WHEEL LOAD OF 16,000 lb USED FOR HS-20 > 10,000 (OK)

$$M = \underbrace{wL^2/8}_{\text{DEAD}} + \underbrace{\frac{PL}{4}}_{\text{LIVE}} = 615 \frac{(74.74)^2}{8} + \frac{10000(74.74)}{4} = 429.4 \text{ k-ft} + 186.85$$

$$= 616.25 \text{ ft-k SERVICE}$$

SERVICE LOAD CAPACITY (FROM IDOT MANUAL, FIG 2.2-36)

$= 1017 \text{ ft-k} > 616 \text{ ft-k}$  (OK)

BEAM WILL BE LOADED TO 60% CAPACITY.

**PRESTRESS ENGINEERING CORPORATION**

2220 Route 176  
 Prairie Grove, Illinois 60012  
 (815) 459-4545 Fax (815) 459-6855

JOB 206370 BUDA BRIDGE

SHEET NO. 2 OF 2

CALCULATED BY \_\_\_\_\_ DATE \_\_\_\_\_

CHECKED BY \_\_\_\_\_ DATE \_\_\_\_\_

SCALE \_\_\_\_\_

CALCULATE STRESSES DUE TO ADDITIONAL DEAD LOAD FROM  
 EXTRA TOPPING

FROM BEAM SHOTS TAKEN IN FIELD

EXT. CAMBER = 2 3/8"

2<sup>ND</sup> BM = 1"

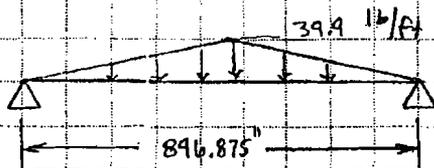
3<sup>RD</sup> BM CAMBER = 1 3/4"

$$\frac{1\frac{3}{4}'' + 2\frac{3}{8}''}{2} = 2\frac{1}{16}'' \text{ AVERAGE}$$

- 1" CAMBER OF BM. IN QUESTION  
 1 1/16" FILLER @ CENTER

$$\frac{1\frac{1}{16}''}{12''} \times 150 \frac{\text{lb}}{\text{ft}^3} = 13.3 \frac{\text{lb}}{\text{ft}^2} \text{ ADDITIONAL DEAD LOAD}$$

X 3' WIDE BEAM  
 39.9 lb/ft ADDL DEAD LOAD



$$M = \frac{wL^2}{6}$$

$$= \frac{1491 (896.875)^2}{6}$$

$$= 222,873 \text{ in-lb} = 18,573 \text{ ft-lb} = 18,573 \text{ ft-k} \times 1.3 = 24,144 \text{ ft-k}$$

$$f_b = \frac{M}{S} = \frac{222,873 \text{ in-lb}}{4964.6} = -44.9 \text{ psi bottom}$$

$$= \frac{222,873}{4845.1} = +46 \text{ psi top}$$

**MOMENT CHECK**

FROM DESIGN CALCS: CONTROLLING FACTORED MOMENT = 1429 ft-k + 24 = 1453 ft-k < 1581 (OK)

SHEET 7, DATED 10/6/05

FROM DOT MANUAL  
 FIGURE 2.2-36

\*\*\*\*\* -COMM. JOURNAL- \*\*\*\*\* DATE JUN-25-2007 \*\*\*\*\* TIME 15:17 \*\*\*\*\*

MODE = MEMORY TRANSMISSION

START=JUN-25 15:15 END=JUN-25 15:17

FILE NO. =476

STN NO.	COMM.	ABBR NO.	STATION NAME/TEL NO.	PAGES	DURATION
001	OK	*	18154337094	005/005	00:01:00

-MCCLURE OTTAWA DIV. -

\*\*\*\*\* -8154332080

- \*\*\*\*\* - 815 433 5930- \*\*\*\*\*



Civil Engineers • Structural Engineers • Land Surveyors • Planners  
1138 Columbus Street Ottawa Illinois 61350 (815) 433-2080

**FAX COVER SHEET**  
FAX: (815) 433-5930

TO: Roger Blakely DATE: 6/25/07

FIRM / LOCATION \_\_\_\_\_ NO. OF PAGES: 5  
(INCLUDING THIS SHEET)

FAX NO.: 433-7094

FROM: Steve Kunn ORIGINALS:   
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MESSAGE: \_\_\_\_\_

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ENGINEERING  
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FIRM / LOCATION \_\_\_\_\_

NO. OF PAGES: 5  
(INCLUDING THIS SHEET)

FAX NO.: 433-7094

FROM: Steve Kunn

ORIGINALS:  
WILL BE SENT TO YOU BY MAIL   
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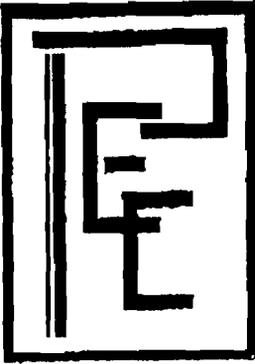
SUBJECT: Buda - High St.

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## **PRESTRESS ENGINEERING CORPORATION**

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June 25, 2007

Mr. Eric Loomis  
Civil Constructors, Inc.  
1716 179<sup>th</sup> Street  
East Moline, IL 61244

RE: Camber Issue – Beam 4B  
Bureau County – Village of Buda  
Section 01-00008-00-BR  
IDOT Project No.: C-92-082-04  
Contract No.: 85381  
Civil Job No. 8654  
PEC Job No.: 206370

Dear Mr. Loomis,

Prestress Engineering Corp. (PEC) is in receipt of your letter of June 21, 2007 regarding the above-referenced project that included the letter from McClure Engineering Associates, Inc. (McClure) dated June 20, 2007, which indicates that beam 4B has been rejected.

PEC has visited the jobsite two (2) times to inspect this issue and it was observed that there is a significant difference in the top of beam elevation at the center of span 2 for beam 4B and the two (2) adjacent beams (approximately 1-3/4" maximum.) Based on camber measurements taken on the top of the beams in-place it was confirmed that this difference is largely due to differential camber between these beams.

As I have discussed with you previously, PEC does measure beam cambers and ships the beams in a specific order to minimize the differential camber of adjacent beams. As we have learned, PEC utilizes the setting sequence indicated by the contractor to deliver the beams, however, PEC has not made it a practice to inform the contractor of these actions. As such, the contractor is unaware that changing the erection sequence may have an adverse affect on the fit of the beams, as was the case in this instance.

That being said, it should be noted that there is no tolerance given for camber or differential camber in any IDOT specifications. This is due to the nature of camber, which is a function of a large number of variables and cannot be directly controlled in the manufacturing process.

PEC understands that McClure, which is serving as the Resident Engineer on this project, has the right to reject the beam over concern from the camber despite the fact that there is no specification regarding this issue, however, PEC does take exception to the assertion that the camber issue implies that there is a structural deficiency in the beam. McClure states in their letter "Since reduced camber is often an indication of reduced strength, this beam is hereby rejected and shall be removed and replaced." I am interpreting that statement to mean that "reduced strength" means that the beam has a reduced load carrying capacity, as opposed to something more specific such as low concrete strength or reduced prestressing forces, etc.

Although relatively lower camber could be a sign of low prestressing forces and therefore a reduction in the load carrying capacity of the beam, a much more likely cause would be that the concrete had higher strength at the time of release. Not only is it well established that higher concrete strength at release will lead to less camber, but also, given the high level of inspection provided during stressing operations by PEC and IDOT and the uniformity of the prestressing strand, it is far less likely that there was any significant variation in the prestressing forces that were applied. A review of the compressive strength results for the beams in span 2 confirmed that beam 4B had the highest release strength, while the adjacent beams, 7B and 1W, had the lowest strengths at release.

Furthermore, the IDOT resident inspectors were fully aware of the variation in camber between the various beams cast for this structure and did not, and continue not to feel that this is any indication of a structural deficiency in any of the beams produced for this project. The camber of beam 4B has remained relatively consistent from initial post-pour measurements, pre-shipping measurements, and measurements taken on the beam in-place on the structure. McClure also sites lack of camber growth as justification for rejection of beam 4B. Again, there is no specification governing this criteria and I am unaware of a correlation between camber growth and structural integrity of the beam. There are a number of factors that affect camber in a short-term manner that could obscure any long-term variation (such as temperature, direct sunlight, etc.) and higher concrete strength would again minimize the tendency for camber to increase over time.

Ideally, PEC feels that McClure should accept the approval of beam 4B by the material inspection district (District 3) without requiring any further testing given that there is no evidence that there is a structural deficiency in the beam. The issue of differential camber can be resolved by field adjustments. There are several options for making these adjustments. The simplest method would be to simply make up the difference in the thickness of the asphalt overlay that is already planned for the deck. This may require an additional course over only the affected area to minimize surface variation due to variable compaction of the overlay and would involve additional asphalt. If this option were utilized, PEC would pay the additional costs associated with the added overlay and could provide calculations regarding the affect of the added dead weight, if necessary. Similarly, a faring course of grout could be applied prior to the overlay to eliminate the differential camber. Again, PEC would cover the added cost of placing the faring course and provide any necessary calculations.

Another option for minimizing variations in the surface elevation of the deck would be to shim beam 4B at the ends to "split the difference" in elevation between the center of the span and the ends of the beam. I would only recommend this option if there is a concern over the effect of the added dead weight from utilizing either of the two options listed previously. This option will reduce the amount beam 4B is low at center span but will also make the ends stick up above the adjacent beams a corresponding amount at the ends. This option would also require removal of some grout at one end of the beam and possibly removal of the transverse tie rod. Additionally, the dowel rods, which have already been drilled into the piers and grouted in to the beams, would have to be core drilled so that the beam could be raised sufficiently to place the necessary shims.

If McClure and/or the IDOT Bureau or Bridges and Structures (BBS) are unwilling to accept the approval of the material inspection district, PEC recommends that beam 4B be load tested in-place to determine its current strength. To accomplish this, incremental, known amounts of weight would be applied to the beam and the load-to-deflection response would be monitored. This response would then be compared to the anticipated response as determined by calculations made prior to conducting the test. If this option is desired, PEC will begin immediately to formalize the load testing procedure so that it may be submitted for review by McClure and/or BBS. The load testing procedure would also include the criteria for acceptance or rejection and would need to be review and agreed upon before testing.

If the load testing is performed and the beam is found to be acceptable the same options for correcting the differential camber that were discussed previously would apply.

Finally, if none of the options given above are acceptable to McClure or BBS, or if load testing should confirm that beam 4B is structurally inadequate, the only remaining option would be to remove and replace the affected beam. Although this process is fairly straightforward there are some issues that should be considered before this option is implemented.

First, the time frame for removal and replacement would necessarily include the IDOT minimum required age of the beam, which would allow the beam to ship on the 5<sup>th</sup> calendar day (4 days after the beam was cast.)

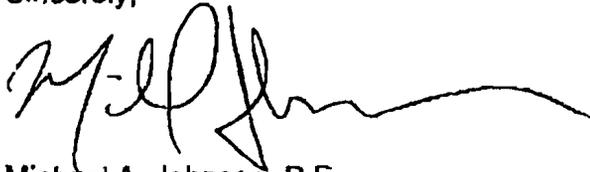
The second consideration is that the camber of the replacement beam could be the same as the beam to be replaced, or even less. As indicated previously, many variables affect camber and it cannot be directly controlled in the manufacturing process. If the camber of the replacement beam was 1-1/2" or less but the inspection district approved the beam, would this beam again be rejected in the field or would one of the remedies for correcting for the differential camber be utilized?

*How  
Reed?*

PEC is also aware of the time sensitive nature of completing the structure as McClure has indicated that working days will continue to be charged as we work to resolve this issue. PEC suggests that you seek relief from this requirement given that the beam in question was delivered to the project site and erected on April 12, 2007 and that no notice was given regarding the product being deficient until the initial letter from McClure on June 15, 2007. The two months that the beam was on-site prior to notification would have allowed ample time to resolve this issue.

Please feel free to contact me at your convenience if you wish to discuss the proposed options to remedy this issue or if you feel that more information is needed. You may also forward this information to McClure and/or BBS for consideration, as you see fit.

Sincerely,



Michael A. Johnson, P.E.  
Prestress Engineering Corp.

