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drabidou@co.okanogan.wa.us

From: Fred Cooley [<mailto:flcbp@methownet.com>]

Sent: Saturday, February 25, 2012 9:22 AM

To: Dennis Rabidou

Cc: 'Mike'

Subject: Cracked Header Beam in Basement

Dennis:

Based on our review of the drawings (sheet S2 & section 3) and sheet 2 shows a 4-foot 8 inch opening;

Our calculations (attached) indicate there is no significant structural issue with the crack in the beam.

Please do not hesitate to contact us if there are questions.

Best regards,

Fred & Mike

F L Cooley & Associates

Consulting Engineers & Designers

P. O. Box 65

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Title :
 Dsgnr:
 Project Desc.:
 Project Notes :

Job #

Printed: 25 FEB 2012, 9:20AM

Concrete Beam

File: c:\Documents and Settings\Administrator\My Documents\ENERCALC Data Files\loc jdf header.ec5
 ENERCALC, INC. 1983-2011, Ver. 6.2.00, N.38545

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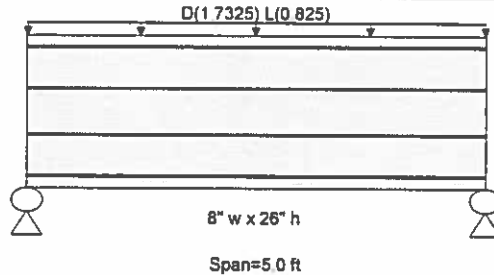
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Description : HEADER IN MECH ROOM

Material Properties

Calculations per ACI 318-08, IBC 2009, CBC 2010, ASCE 7-05

f_c = 3.0 ksi ϕ Phi Values Flexure : 0.90
 $f_r = f_c^{1/2} * 7.50 = 410.79$ psi Shear : 0.750
 ψ Density = 145.0 pcf $\beta_1 = 0.850$
 Elastic Modulus = 3,155.92 ksi
 Load Combination 2006 IBC & ASCE 7-05
 f_y - Main Rebar = 60.0 ksi F_y - Stirrups = 40.0 ksi
 E - Main Rebar = 29,000.0 ksi E - Stirrups = 29,000.0 ksi
 Stirrup Bar Size # # 3
 Number of Resisting Legs Per Stirrup = 2



Cross Section & Reinforcing Details

Rectangular Section, Width = 8.0 in, Height = 26.0 in

Span #1 Reinforcing....

1-#3 at 2.0 in from Top, from 0.0 to 5.0 ft in this span

1-#3 at 9.0 in from Bottom, from 0.0 to 5.0 ft in this span

1-#3 at 9.0 in from Top, from 0.0 to 5.0 ft in this span

1-#3 at 2.0 in from Bottom, from 0.0 to 5.0 ft in this span

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loads

Load for Span Number 1

Uniform Load : D = 0.1050, L = 0.050 ksf, Tributary Width = 16.50 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.469 : 1	Maximum Deflection	
Section used for this span	Typical Section	Max Downward L+Lr+S Deflection	0.000 in Ratio = 0 < 360
μ_u : Applied	11.407 k-ft	Max Upward L+Lr+S Deflection	0.000 in Ratio = 0 < 360
$M_n * \phi$: Allowable	24.323 k-ft	Max Downward Total Deflection	0.001 in Ratio = 57076
Load Combination	+1.20D+0.50Lr+1.60L+1.60H	Max Upward Total Deflection	0.000 in Ratio = 999 < 180
Location of maximum on span	2.500 ft		
Span # where maximum occurs	Span # 1		

Vertical Reactions - Unfactored

Support notation : Far left is #1

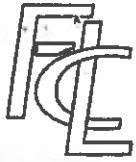
Load Combination	Support 1	Support 2
Overall MAXimum	6.917	6.917
D Only	4.855	4.855
L Only	2.062	2.062
D+L	6.917	6.917

Shear Stirrup Requirements

Between 0.00 to 0.33 ft, $\phi V_c/2 < V_u \leq \phi V_c$, Req'd $V_s = \text{Min } 11.5.5.1$, use stirrups spaced at 12.000 in
 Between 0.34 to 4.66 ft, $V_u < \phi V_c/2$, Req'd $V_s = \text{Not Req'd}$, use stirrups spaced at 0.000 in
 Between 4.67 to 4.99 ft, $\phi V_c/2 < V_u \leq \phi V_c$, Req'd $V_s = \text{Min } 11.5.5.1$, use stirrups spaced at 12.000 in

Maximum Forces & Stresses for Load Combinations

Load Combination	Segment Length	Span #	Location (ft) in Span	Bending Stress Results (k-ft)		
				μ_u : Max	ϕM_n	Stress Ratio
MAXimum BENDING Envelope						
Span # 1		1	2.500	11.41	24.32	0.47
+1.40D						
Span # 1		1	2.500	8.50	24.32	0.35
+1.20D+0.50Lr+1.60L+1.60H						



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Description: HEADER IN MECH ROOM

Load Combination	Segment Length	Span #	Location (ft) in Span	Bending Stress Results (k-ft)		
				Mu : Max	Phi*Mnx	Stress Ratio
Span # 1		1	2.500	11.41	24.32	0.47
+1.20D+1.60L+0.50S+1.60H		1	2.500	11.41	24.32	0.47
+1.20D+1.60Lr+0.50L		1	2.500	8.57	24.32	0.35
+1.20D+0.50L+1.60S		1	2.500	8.57	24.32	0.35
+1.20D+0.50Lr+0.50L+1.60W		1	2.500	8.57	24.32	0.35
+1.20D+0.50L+0.50S+1.60W		1	2.500	8.57	24.32	0.35
+1.20D+0.50L+0.20S+E		1	2.500	8.57	24.32	0.35

Overall Maximum Deflections - Unfactored Loads

Load Combination	Span	Max. "+" Defl	Location in Span	Load Combination	Max. "-" Defl	Location in Span
D+L	1	0.0011	2.450		0.0000	0.000

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drabidou@co.okanogan.wa.us

From: Fred Cooley [<mailto:flcbp@methownet.com>]
Sent: Monday, February 27, 2012 8:05 AM
To: Dennis Rabidou
Subject: RE: Cracked Header Beam in Basement

Dennis,

I will review and comment regarding code compliance.

Fred

From: Dennis Rabidou [<mailto:drabidou@co.okanogan.wa.us>]
Sent: Monday, February 27, 2012 7:45 AM
To: Fred Cooley
Cc: Nanette Kallunki
Subject: RE: Cracked Header Beam in Basement

Fred,

Thanks for the analysis. After reviewing the original drawings, could you tell us if the center was built to code correctly for the time period when it was constructed in 73'-74'.

Dennis T. Rabidou

Juvenile Court Administrator

Okanogan County Juvenile Department

PO Box 432

237 4th North

Dennis Rabidou

From: Fred Cooley <flcbp@methownet.com>
Sent: Tuesday, March 13, 2012 12:56 PM
To: Dennis Rabidou
Subject: RE: Cracked Header Beam in Basement

Dennis,

I reviewed most of the sections showing temperature and shrinkage reinforcement.

All the sections I reviewed contained code required temp and shrink reinforcement.

The ACI 318 requirement is 0.18% of the gross concrete area for grade 60 (ksi) steel which is what was specified in the structurals.

I did not see a detail for the precast floor and roof panels so I could not verify them.

Regards,

Fred

From: Dennis Rabidou [<mailto:drabidou@co.okanogan.wa.us>]
Sent: Monday, March 12, 2012 10:07 AM
To: Fred Cooley
Subject: RE: Cracked Header Beam in Basement

Fred,

Any analysis yet on the code compliance issue? I meet with the Commissioners tomorrow and was hoping to provide some answers for them.

Dennis T. Rabidou

Juvenile Court Administrator

Okanogan County Juvenile Department

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237 4th North

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