PCS Structural Solutions

Seattle 1011 Western Avenue, Suite 810 | Seattle, WA 98104 | 206.292.5076
Tacoma 1250 Pacific Avenue, Suite 701 | Tacoma, WA 98402 | 253.383.2797
Portland 101 SW Main Street, Suite 280 | Portland, OR 97204 | 503.232.3746

www.pcs-structural.com

Calculations required to be provided by the Permittee on site for all Inspections

May 15, 2024

PRCTI20241089

City of Puyallup
Development & Permitting Services
ISSUED PERMIT
Building | Planning
Engineering | Public Works
Fire | Traffic

City of Puyallup
Building
REVIEWED FOR COMPLIANCE
BSnowden
08/15/2024
10:53:28 AM

NW Ceiling Lifts
18389 S Norman Rd
Oregon City, OR 97045

ATTN: Sam Krause

RE: *MHS Good Samaritan – Rehab Retrofit Ceiling Lifts*
Puyallup, WA

Dear Sam:

At your request, we have reviewed the ceiling lift support details you sent on May 13, 2024. It is our understanding that the ceiling lifts at the rehab gym, room #36, and room #38 are rated for 1,000# capacity, and the ceiling lift at room #41 is rated for 700# capacity. Our review was limited to the threaded rod hangers, Unistrut bracing of the threaded rod hangers, connections of the threaded rod hangers and Unistrut bracing to the building structure, and evaluation of the existing building structure to support the ceiling lifts. Our review did not include design, stability, or attachment of the ceiling lift rail system.

Following our review, we have determined the ceiling lift support details are acceptable. Additionally, we have determined the existing building structure is acceptable to support the ceiling lifts without retrofit. Our analysis is included in the attached structural calculations.

Thank you for the opportunity to be of continued service. Please contact us if you have any questions.

Very truly yours,

PCS STRUCTURAL *SOLUTIONS*

Dan C. Tappel, S.E.
Associate

TODD PAUL PARKE
STATE OF WASHINGTON
48217
STRUCTURAL ENGINEER
PROFESSIONAL ENGINEER

Reviewed by:
Todd P. Parke, S.E.
Managing Principal

DCTdls
24-364

Attachments: Reference Drawings, Structural Calculations

24364 ltr 2024-05-15 dct

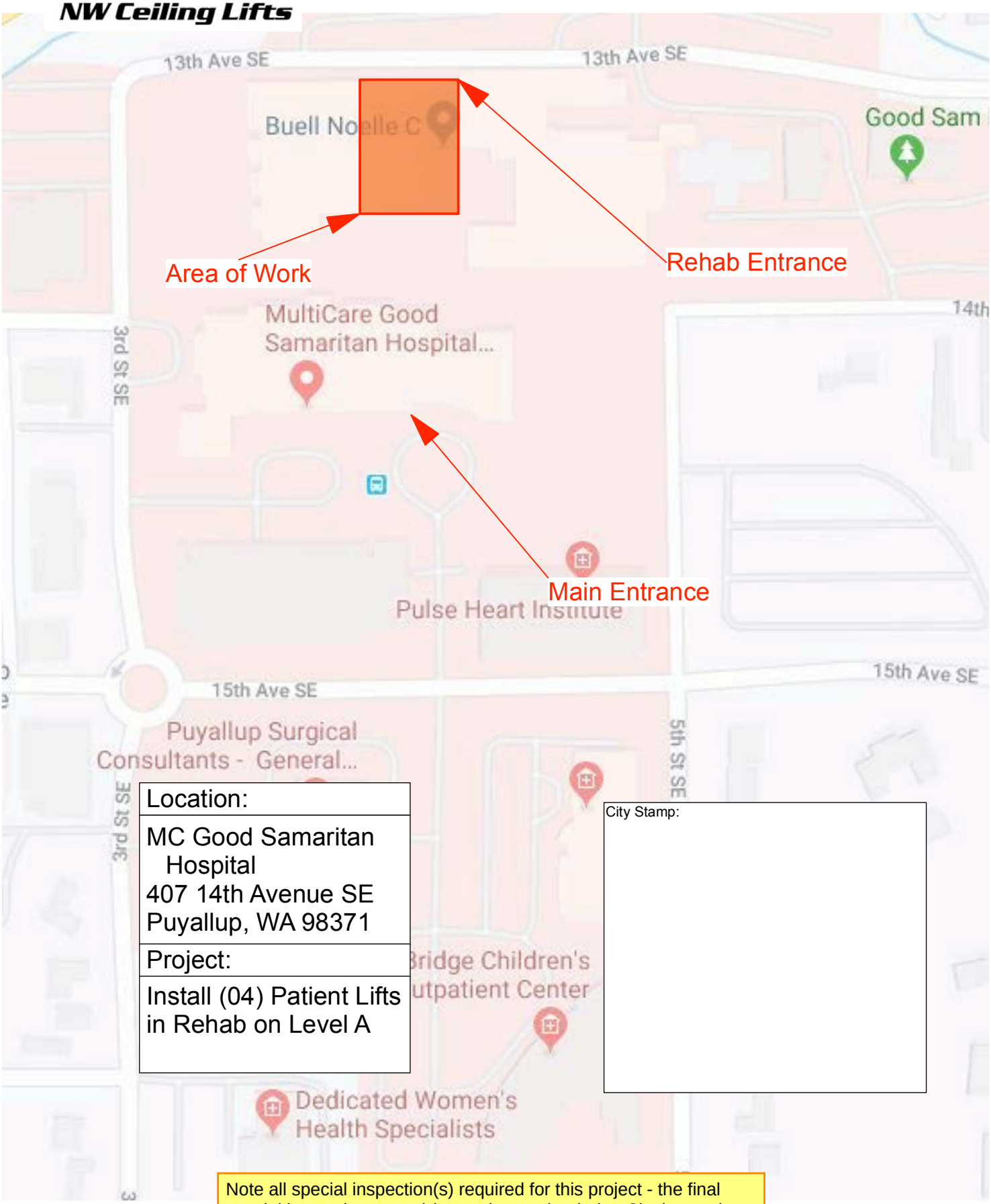
Note all special inspection(s) required for this project - the final special inspection report(s) must be on site during City inspections.

REFERENCE DRAWINGS

See City-stamped construction drawings for City notes.

Note all special inspection(s) required for this project - the final special inspection report(s) must be on site during City inspections.

Brown Industries, LLC
NW Ceiling Lifts

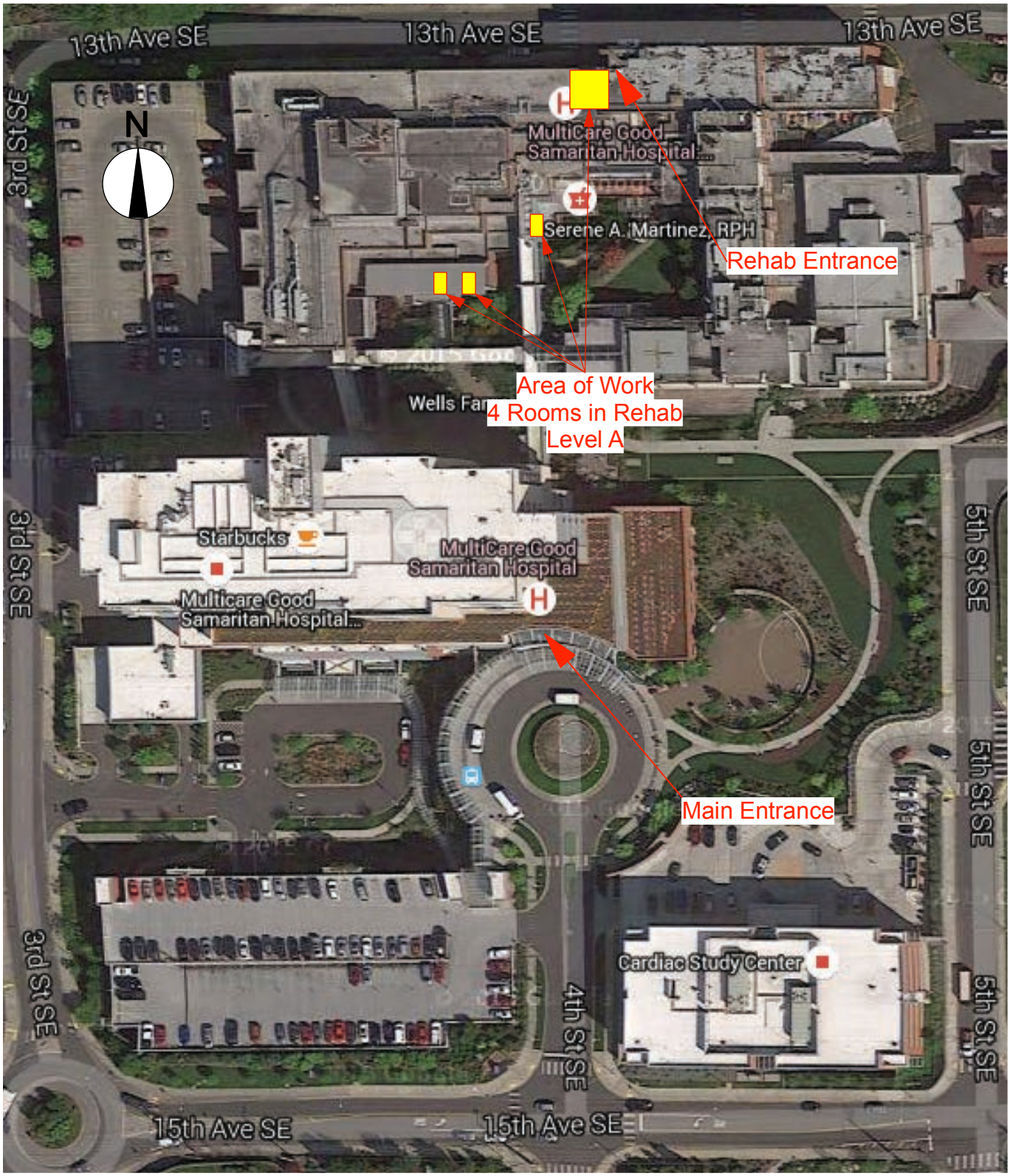


Location:
MC Good Samaritan Hospital 407 14th Avenue SE Puyallup, WA 98371
Project:
Install (04) Patient Lifts in Rehab on Level A

City Stamp:

Note all special inspection(s) required for this project - the final special inspection report(s) must be on site during City inspections.

Brown Industries, LLC NW Ceiling Lifts	Project: Rehab Retrofit	By: S. Krause	Sheet No.: Site Plan
	Location: Puyallup, WA	Date: 04/09/24	
	Client: MC Good Samaritan	Revised	Job No.: WO 2023-0028
	SWL 700#	Date	



Note all special inspection(s) required for this project - the final special inspection report(s) must be on site during City inspections.

File: MGSP-Level A-PT

Brown Industries, LLC NW Ceiling Lifts	Project: Rehab Retrofit	By: S. Krause	Sheet No.: LA-Floor A
	Location: Puyallup, WA	Date: 04/09/24	
	Client: MC Good Samaritan	Revised	Job No.: WO 2023-0028
	SWL 700#	Date	

Scope of Work

Previous Install

NORTH

LEVEL A FLOOR PLAN
GOOD SAMARITAN HOSPITAL
NOT TO SCALE

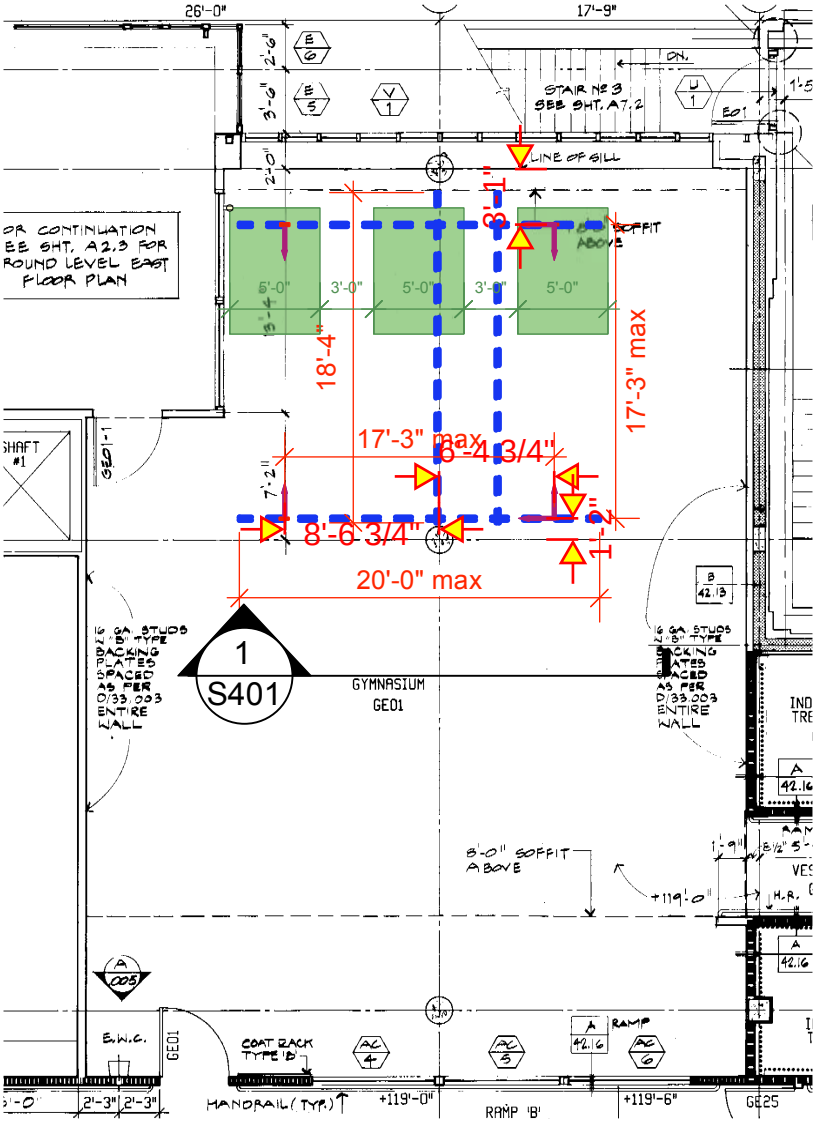
Note all special inspection(s) required for this project - the final special inspection report(s) must be on site during City inspections.

File: MGSP-Level A-PT

Brown Industries, LLC NW Ceiling Lifts	Project	Rehab Retrofit	By	S. Krause	Sheet No.	LA-PTGym
	Location	Puyallup, WA	Date	04/09/24		
	Client	MC Good Samaritan	Revised	S. Krause	Job No.	WO 2023-0028
		SWL 1000#	Date	05/13/24		

Ceiling Height: 9'-0"
Rails below ceiling - 1" clearance
Aligned to ceiling grid
Dims from FFW

Rails lined for continuous charge
Power outlet (regular service)
Preferred end of rail marked
Outlet 6-12" BFC, 12" from rail end



PT GYM LAYOUT

RmG

- Jumbo Rail
- Midi Rail
- Power Outlet
- Support Brace

Note all special inspection(s) required for this project - the final special inspection report(s) must be on site during City inspections.

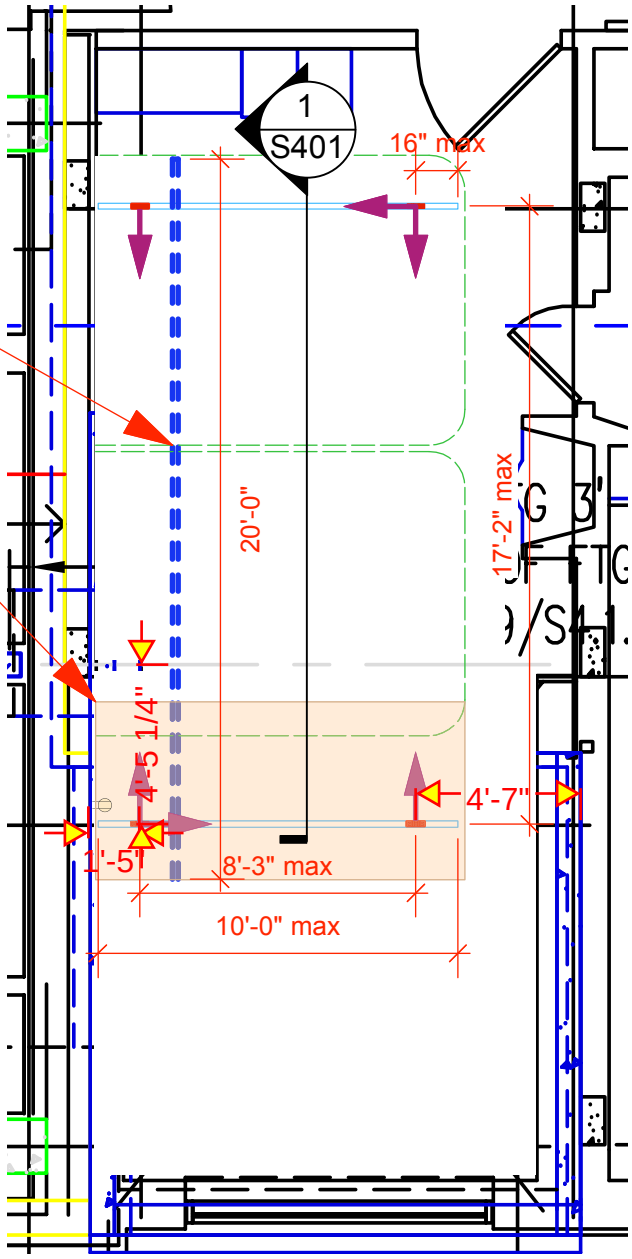
File: MGSP-Level A-PT

Brown Industries, LLC NW Ceiling Lifts	Project	Rehab Retrofit	By	S. Krause	Sheet No.	LA-Rm36
	Location	Puyallup, WA	Date	04/09/24		
	Client	MC Good Samaritan	Revised	S. Krause	Job No.	WO 2023-0028
		SWL 1000#	Date	05/13/24		

Ceiling Height: 8'-0"
Rails below ceiling - 1" clearance
Aligned to ceiling grid
Dims from FFW

Rails lined for continuous charge
Power outlet (regular service)
Preferred end of rail marked
Outlet 6-12" BFC, 12" from rail end

NOTES:
1. Separate Curtain panels on each side of traverse rail
2. Locate rails for optimal coverage of headwall units. Partial coverage near windows desired.
3. Braces may go in either direction
4. Long brace may be on either support



Rm36 ROOM 36 LAYOUT

Jumbo Rail
Midi Rail
Power Outlet
Support Brace

Note all special inspection(s) required for this project - the final special inspection report(s) must be on site during City inspections.

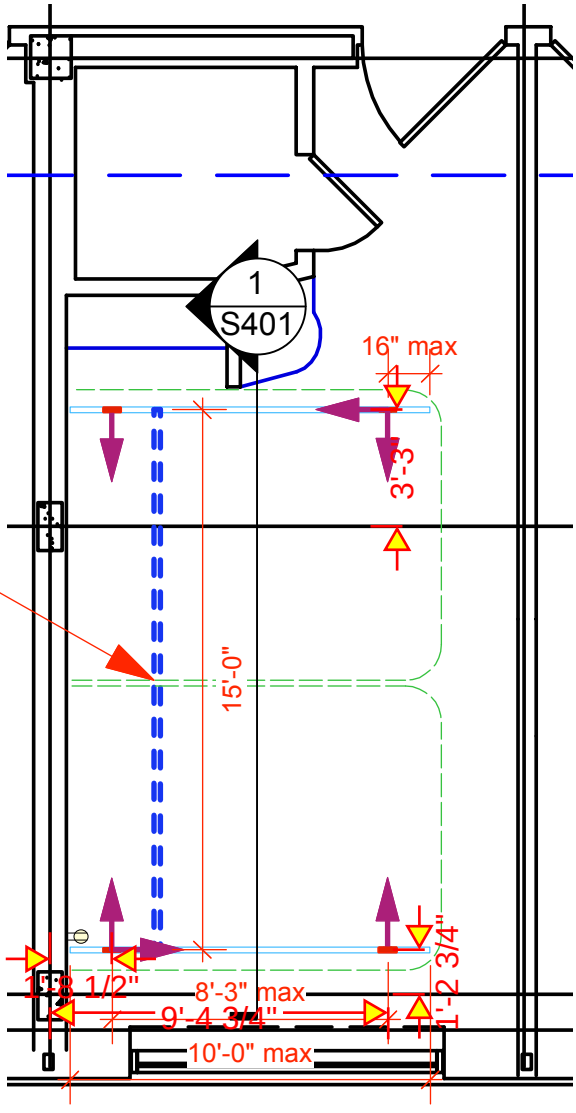
File: MGSP-Level A-PT

Brown Industries, LLC NW Ceiling Lifts	Project	Rehab Retrofit	By	S. Krause	Sheet No.	LA-Rm38
	Location	Puyallup, WA	Date	04/09/24		
	Client	MC Good Samaritan	Revised	S. Krause	Job No.	WO 2023-0028
		SWL 1000#	Date	05/13/24		

Ceiling Height: 8'-0"
Rails below ceiling - 1" clearance
Aligned to ceiling grid
Dims from FFW

Rails lined for continuous charge
Power outlet (regular service)
Preferred end of rail marked
Outlet 6-12" BFC, 12" from rail end

NOTES:
1. Separate Curtain panels on each side of traverse rail
2. Locate rails for optimal coverage of headwall units.
3. Braces may go in either direction
4. Long brace may be on either support



Jumbo Rail
Midi Rail
Power Outlet
Support Brace

Rm38 ROOM 38 LAYOUT

Note all special inspection(s) required for this project - the final special inspection report(s) must be on site during City inspections.

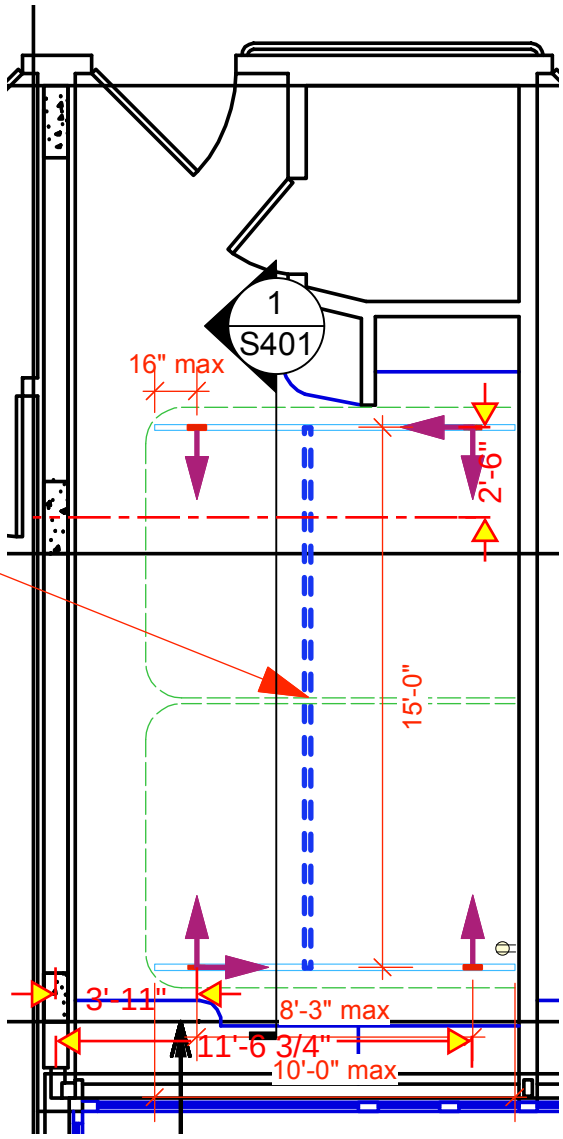
File: MGSP-Level A-PT

Brown Industries, LLC NW Ceiling Lifts	Project: Rehab Retrofit	By: S. Krause	Sheet No.: LA-Rm41
	Location: Puyallup, WA	Date: 04/09/24	
	Client: MC Good Samaritan	Revised: S. Krause	Job No.: WO 2023-0028
	SWL 700#	Date: 05/13/24	

Ceiling Height: 8'-0"
Rails below ceiling - 1" clearance
Aligned to ceiling grid
Dims from FFW

Rails lined for continuous charge
Power outlet (regular service)
Preferred end of rail marked
Outlet 6-12" BFC, 12" from rail end

NOTES:
1. Separate Curtain panels on each side of traverse rail
2. Locate rails for optimal coverage of headwall units.
3. Braces may go in either direction
4. Long brace may be on either support
5. Building analysis restricts room to SWL 700#



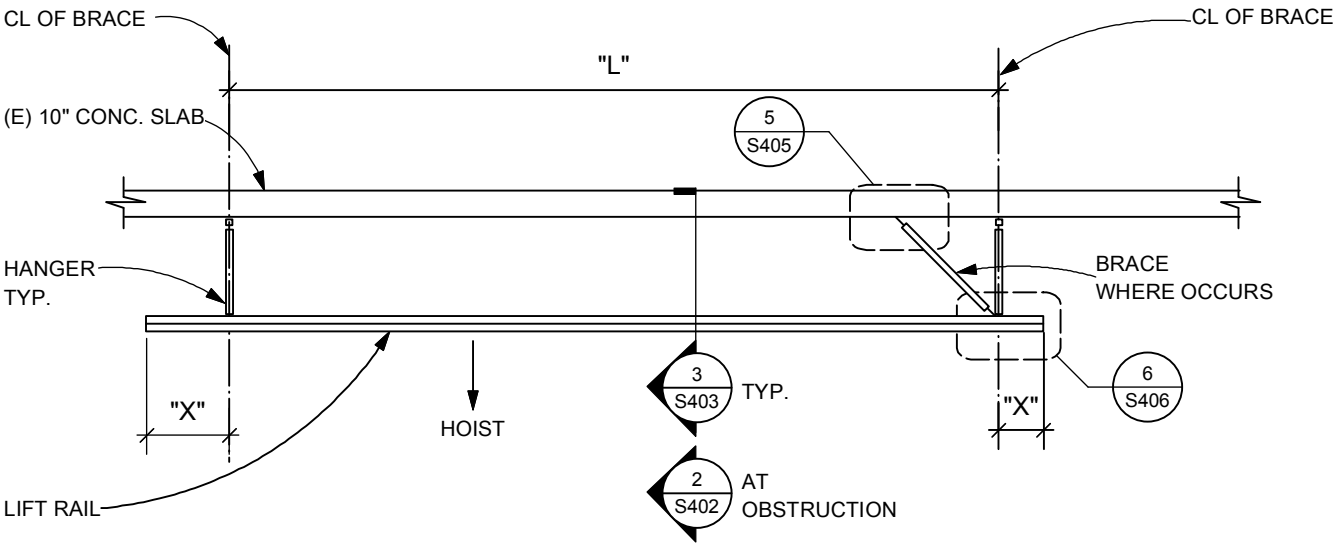
Rm41 ROOM 41 LAYOUT

Jumbo Rail
Midi Rail
Power Outlet
Support Brace

Note all special inspection(s) required for this project - the final special inspection report(s) must be on site during City inspections.

File: MGSP-Level A-PT

Brown Industries, LLC NW Ceiling Lifts	Project: Rehab Retrofit	By: S. Krause	Sheet No.: S401
	Location: Puyallup, WA	Date: 04/09/24	
	Client: MC Good Samaritan	Revised	Job No.: WO 2023-0028
	SWL 1000#	Date	



LIFT RAIL	SPAN "'L"	CANTILEVER "'X"
MIDI	99"	16"
JUMBO	206"	30"

RAIL INDICATES FIXED RAIL
L = MAX. SPAN BETWEEN HANGERS
X = MAX. CANTILEVER AT EITHER END BEYOND HANGER

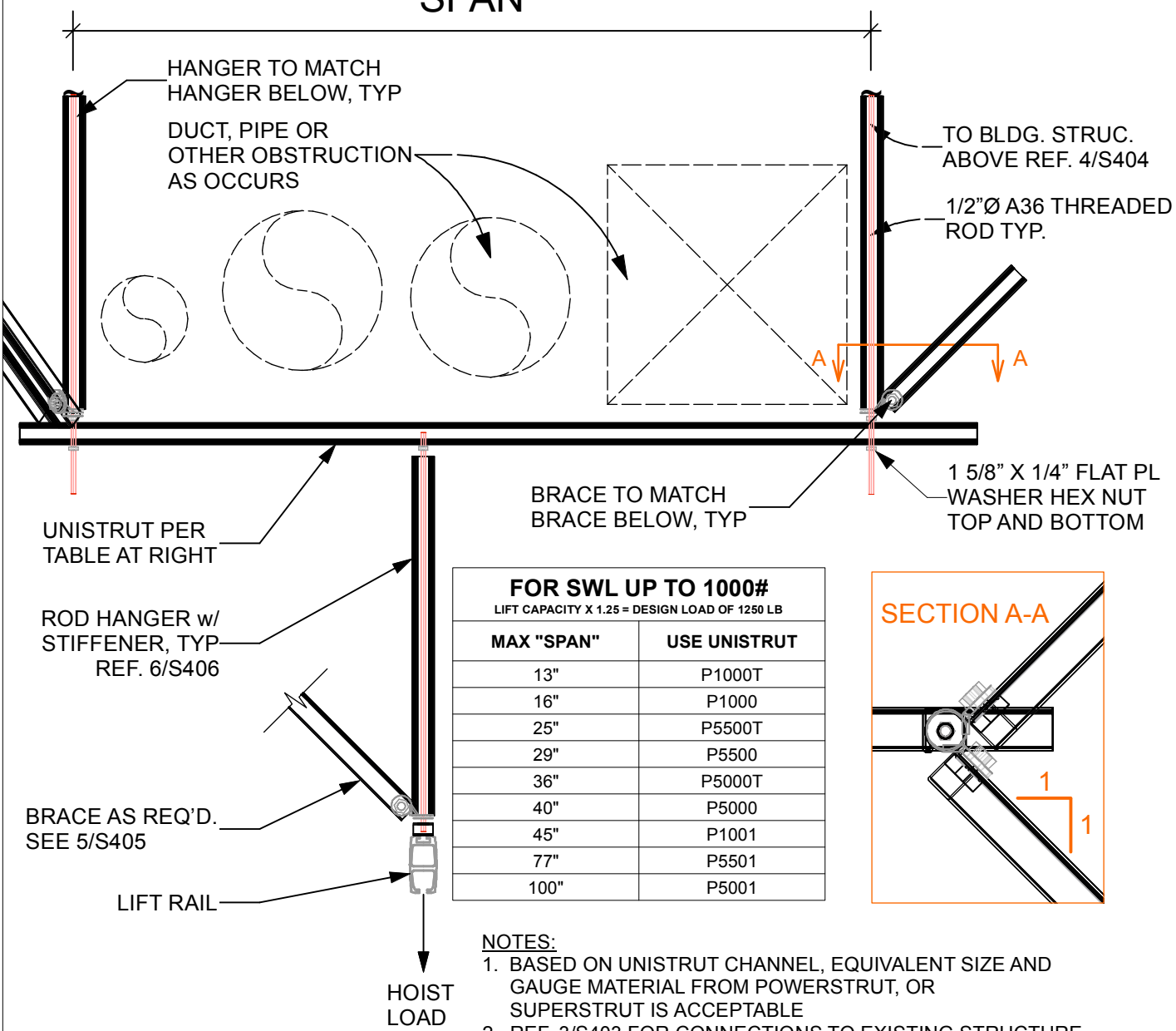
NOTE:
1. WHEN CANTILEVER IS USED, SPAN "L" MUST BE AT LEAST 6x CANTILEVER, TO ENSURE THAT THE MAXIMUM END REACTION AT HANGER IS ACCEPTABLE

1 ELEVATION OF FIXED RAILS

Note all special inspection(s) required for this project - the final special inspection report(s) must be on site during City inspections.

File: MGSP-PT Gym-ConcreteSlab-S400

Brown Industries, LLC NW Ceiling Lifts	Project: Rehab Retrofit	By: S. Krause	Sheet No.: S402
	Location: Puyallup, WA	Date: 04/09/24	
	Client: MC Good Samaritan	Revised	Job No.: WO 2023-0028
	SWL 1000#	Date	



FOR SWL UP TO 1000# LIFT CAPACITY X 1.25 = DESIGN LOAD OF 1250 LB	
MAX "SPAN"	**USE UNISTRUT**
13"	P1000T
16"	P1000
25"	P5500T
29"	P5500
36"	P5000T
40"	P5000
45"	P1001
77"	P5501
100"	P5001

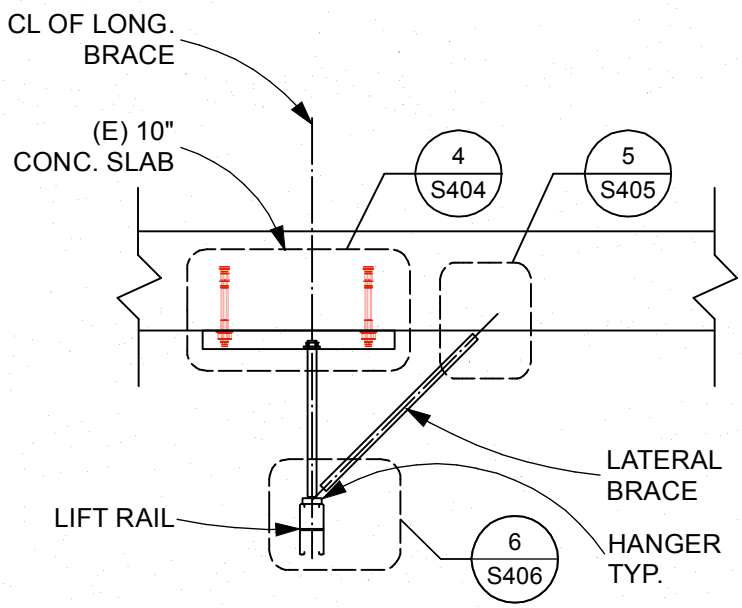
NOTES:
1. BASED ON UNISTRUT CHANNEL, EQUIVALENT SIZE AND GAUGE MATERIAL FROM POWERSTRUT, OR SUPERSTRUT IS ACCEPTABLE
2. REF. 3/S403 FOR CONNECTIONS TO EXISTING STRUCTURE

2 TYP. TRAPEZE FRAMING

Note all special inspection(s) required for this project - the final special inspection report(s) must be on site during City inspections.

File: MGSP-PT Gym-ConcreteSlab-S400

Brown Industries, LLC NW Ceiling Lifts	Project: Rehab Retrofit	By: S. Krause	Sheet No.: S403
	Location: Puyallup, WA	Date: 04/09/24	
	Client: MC Good Samaritan	Revised	Job No.: WO 2023-0028
	SWL 1000#	Date	



NOTES:

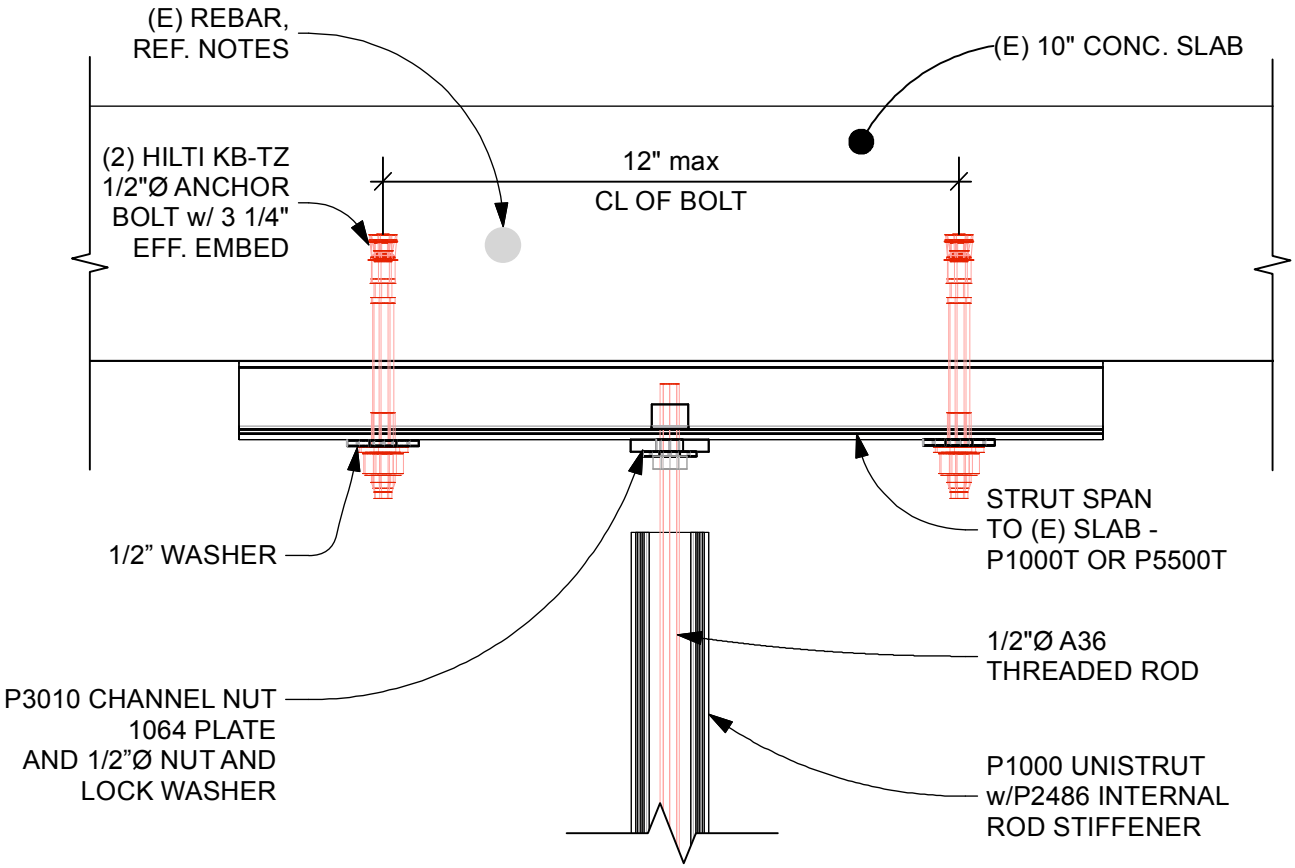
1. WHERE AN OBSTRUCTION IS IN THE WAY OF THE HANGER. REF. 2/S402.
2. BRACE MAY OCCUR TO EITHER SIDE

3 TYP. VERTICAL SUPPORT DETAIL

Note all special inspection(s) required for this project - the final special inspection report(s) must be on site during City inspections.

File: MGSP-PT Gym-ConcreteSlab-S400

Brown Industries, LLC NW Ceiling Lifts	Project: Rehab Retrofit	By: S. Krause	Sheet No.: S404
	Location: Puyallup, WA	Date: 04/09/24	
	Client: MC Good Samaritan	Revised	Job No.: WO 2023-0028
	SWL 1000#	Date	



NOTES:

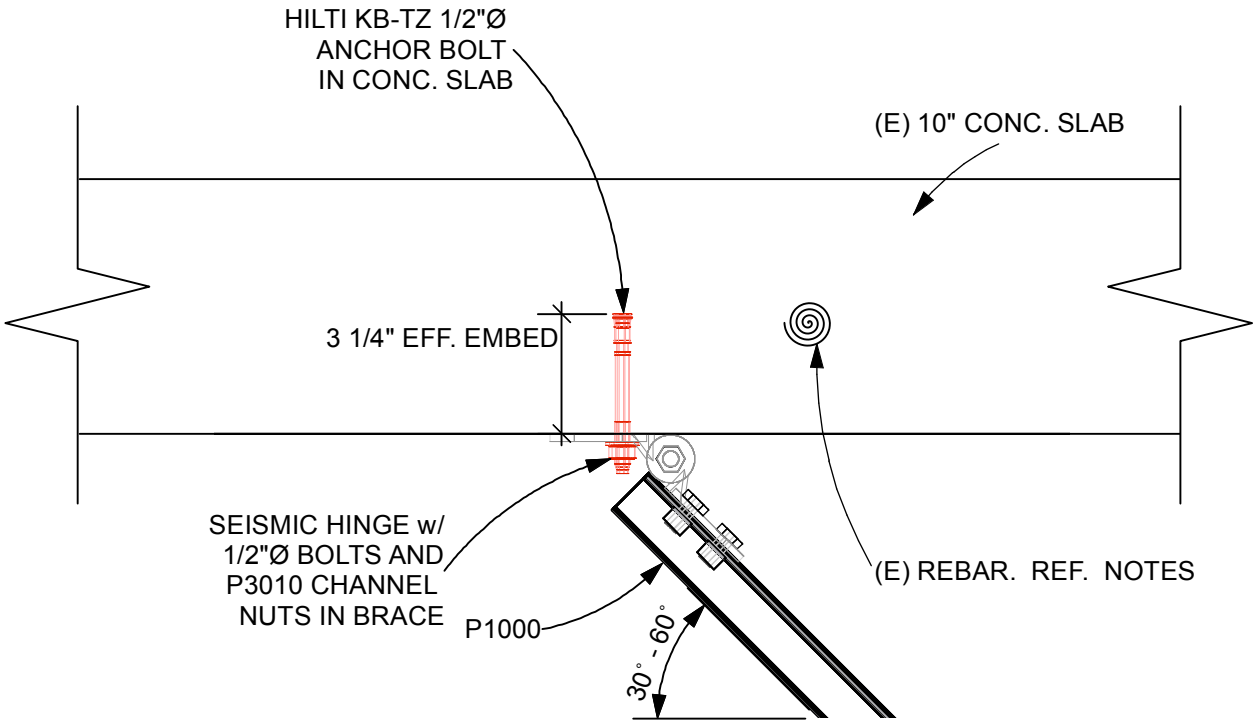
1. INSTALL ANCHORS IN ACCORDANCE W/ MANUFACTURERS INSTRUCTIONS.
2. OWNER/CONTRACTOR/ARCHITECT TO COORDINATE AND PROVIDE SPECIAL INSPECTION OF CONCRETE ANCHOR INSTALLATION AS REQUIRED BY THE GOVERNING CODE AND ESR-1917.
3. ROD STIFFENER REQUIRED IF ROD LONGER THAN 21". REF. 6/S406.
4. DO NOT DAMAGE REBAR IN (E) SLAB. RELOCATE ANCHORS TO AVOID (E) REBAR.

4 SUPPORT CONNECTION AT DECK

Note all special inspection(s) required for this project - the final special inspection report(s) must be on site during City inspections.

File: MGSP-PT Gym-ConcreteSlab-S400

Brown Industries, LLC NW Ceiling Lifts	Project: Rehab Retrofit	By: S. Krause	Sheet No.: S405
	Location: Puyallup, WA	Date: 04/09/24	
	Client: MC Good Samaritan	Revised	Job No.: WO 2023-0028
	SWL 1000#	Date	



NOTES:

1. INSTALL ANCHORS IN ACCORDANCE W/ MANUFACTURERS INSTRUCTIONS, ESR 1917, INCLUDING PERFORMING PERIODIC INSPECTIONS. INSPECTIONS TO BE COORDINATED BY OWNER/ARCHITECT/CONTRACTOR.

2. DO NOT DAMAGE REBAR IN (E) SLAB.

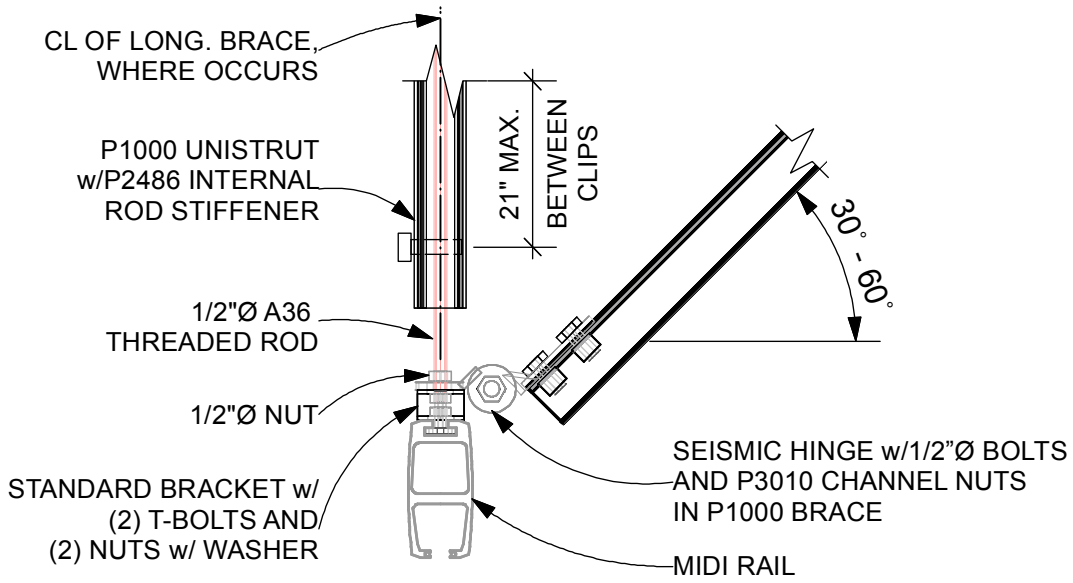
3. RELOCATE BOLT TO AVOID (E) REBAR.

5 BRACE CONNECTION AT DECK

Note all special inspection(s) required for this project - the final special inspection report(s) must be on site during City inspections.

File: MGSP-PT Gym-ConcreteSlab-S400

Brown Industries, LLC NW Ceiling Lifts	Project: Rehab Retrofit	By: S. Krause	Sheet No.: S406
	Location: Puyallup, WA	Date: 04/09/24	
	Client: MC Good Samaritan	Revised	Job No.: WO 2023-0028
	SWL 1000#	Date	



NOTES:

1. LATERAL BRACE PERPENDICULAR TO RAIL ON ALL SUPPORTS. SEE PLANS FOR LONGITUDINAL BRACE LOCATIONS
2. SEE DETAIL 4/S404 FOR DECK CONNECTION
3. ROD STIFFENER REQUIRED IF ROD LONGER THAN 21"

6 VERT. BOTTOM CONNECTION

Note all special inspection(s) required for this project - the final special inspection report(s) must be on site during City inspections.

File: MGSP-PT Gym-ConcreteSlab-S400

STRUCTURAL CALCULATIONS

PCS Structural Solutions

Project: MHS GOOD SAM REHAB CEILING LIFTS Job No: _____

Subject: _____ Sheet _____ Name: DCT

Originating Office: ☐ Seattle ☐ Tacoma ☐ Portland Date: 05/15/24

DESIGN APPROACH:

DESIGN CEILING LIFT HANGER SUPPORTS, BRACING, AND ANCHORAGE FOR 1,000# LIFT CAPACITY.

EVALUATE EXISTING STRUCTURE FOR 1,000# LIFT CAPACITY FOR THE CEILING LIFTS AT THE REHAB GYM, ROOM #36, AND ROOM #38.

EVALUATE EXISTING STRUCTURE FOR 700# LIFT CAPACITY FOR THE CEILING LIFT AT ROOM #41.

Design Criteria

Dead Load

Lift wt, $W_{Lift} := 40 \cdot lbf$

Track wt, $W_{Track} := 10 \cdot lbf$ Trib. to (1) hanger

Total wt, $W_D := W_{Lift} + W_{Track} = 50\ lbf$

Live Load

Lift capacity, $W_L := 1000 \cdot lbf$

Lateral Forces

During operation

Transverse, $V_{Trans} := 0.2 \cdot (W_D + W_L) = 210\ lbf$ 20% of gravity load

Longitudinal, $V_{Long} := 0.1 \cdot (W_D + W_L) = 105\ lbf$ 10% of gravity load

Seismic

$S_S := 1.267$ $S_{DS} := 1.013$

$S_1 := 0.436$ $S_{D1} := 0.542$

Seismic forces

$a_p := 2.5$

ASCE 7-16 T13.5-1 for flexible components w/ high deformability

$R_p := 3.5$

$\Omega_o := 2.5$

$I_p := 1.5$

$z := 11.08 \cdot ft$

$h := 35.25 \cdot ft$

$$F_{ph} := \frac{0.4 \cdot a_p \cdot S_{DS} \cdot W_D}{\frac{R_p}{I_p}} \cdot \left(1 + 2 \cdot \left(\frac{z}{h}\right)\right) = 35.4\ lbf$$

$F_{p\_min} := 0.3 \cdot S_{DS} \cdot I_p \cdot W_D = 22.8\ lbf$

$F_{p\_max} := 1.6 \cdot S_{DS} \cdot I_p \cdot W_D = 121.6\ lbf$

$$F_p := \left\| \begin{array}{l} \text{if } F_{p\_min} > F_{ph} \\ \quad \left\| F_{p\_min} \right. \\ \text{else if } F_{p\_max} < F_{ph} \\ \quad \left\| F_{p\_max} \right. \\ \text{else} \\ \quad \left\| F_{ph} \right. \end{array} \right\| = 35.4\ lbf$$

$F_{pv} := 0.2 \cdot S_{DS} \cdot W_D = 10.1\ lbf$

Threaded Rod Hanger

Load in tension

$$T_{R1} := W_D + W_L + 0.7 \cdot \left(F_{pv} + \frac{F_p \cdot \tan\left(\frac{60 \cdot \pi}{180}\right)}{2} \right) = 1078.5 \ lbf$$

$$T_{R2} := W_D + W_L + V_{Trans} \cdot \frac{\tan\left(\frac{60 \cdot \pi}{180}\right)}{2} = 1231.9 \ lbf$$

$$T_R := \max\left(T_{R1}, T_{R2}\right) = 1231.9 \ lbf$$

Try 1/2" dia. threaded rod

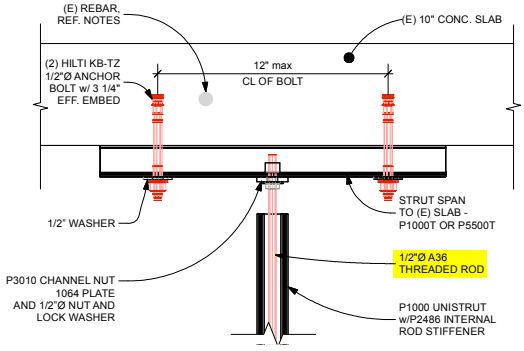
$F_y := 36 \ ksi$

$A_g := 0.126 \ in^2$ root area

$\Omega := 1.67$

$$T_a := \frac{F_y \cdot A_g}{\Omega} = 2716.2 \ lbf$$

$$Design := \left\| \begin{array}{l} \text{if } T_a > T_R \\ \quad \| \text{“OK”} \\ \text{else} \\ \quad \| \text{“NG”} \end{array} \right\| = \text{“OK”}$$



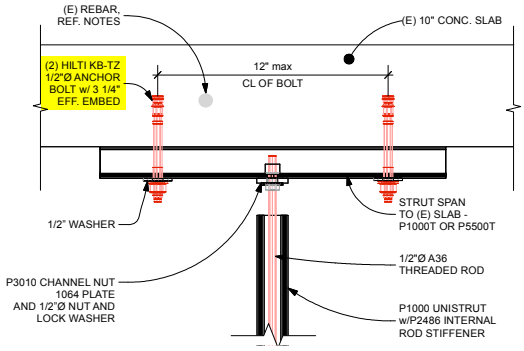
.:Use 1/2" dia. threaded rod

Try (2) 1/2" dia. Hilti KB-TZ to concrete deck - design each anchor for full tension load

$$T_{U1} := 1.2\ W_D + W_L + F_{pv} + \frac{F_p \cdot \Omega_o \cdot \tan\left(\frac{60 \cdot \pi}{180}\right)}{2} = 1146.7\ \textit{lbf}$$

$$T_{U2} := 1.2 \cdot W_D + 1.6\ W_L + \frac{1.6 \cdot V_{Trans} \cdot \tan\left(\frac{60 \cdot \pi}{180}\right)}{2} = 1951\ \textit{lbf}$$

$$T_U := \max\left(T_{U1}, T_{U2}\right) = 1951\ \textit{lbf}$$



Per Hilti Profis

$$DCR_{max} := 0.80$$

$$Design := \left\| \begin{array}{l} \text{if } DCR_{max} < 1 \\ \quad \text{“OK”} \\ \text{else} \\ \quad \text{“NG”} \end{array} \right\| = \text{“OK”}$$

.:Use (2) 1/2" dia. Hilti KB-TZ (2" embed min)

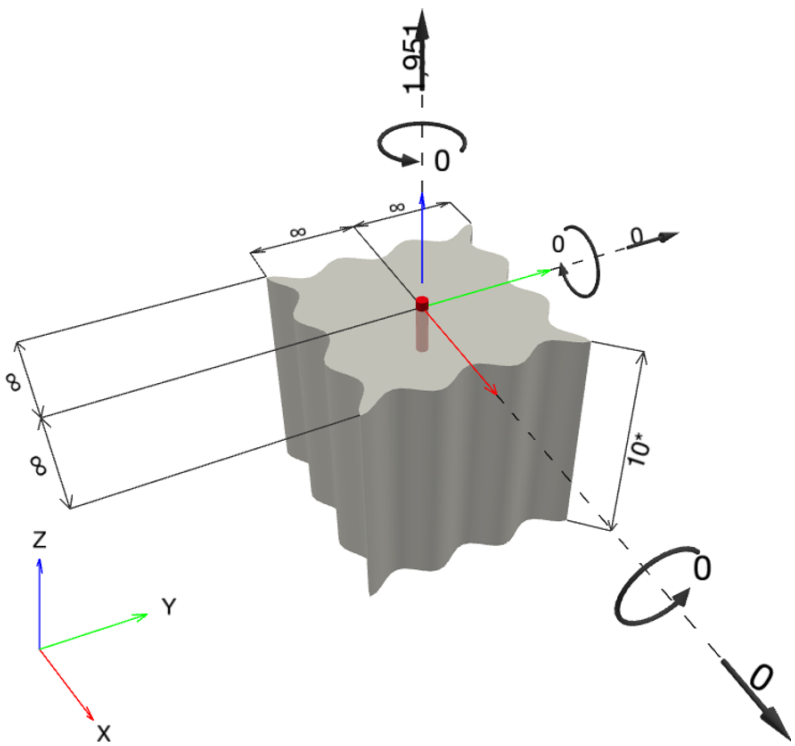
Company:		Page:	1
Address:		Specifier:	
Phone I Fax:	|	E-Mail:	
Design:	Hanger Anchorage	Date:	4/26/2024
Fastening point:			

Specifier's comments:

1 Input data

Anchor type and diameter:	**Kwik Bolt TZ2 - CS 1/2 (2) hnom2**
Item number:	2210254 KB-TZ2 1/2x3 3/4
Effective embedment depth:	$h_{ef,act}$ = 2.000 in., h_{nom} = 2.500 in.
Material:	Carbon Steel
Evaluation Service Report:	ESR-4266
Issued I Valid:	12/1/2023 | 12/1/2025
Proof:	Design Method ACI 318-19 / Mech
Stand-off installation:	
Profile:	
Base material:	cracked concrete, 4000, f_c' = 4,000 psi; h = 10.000 in.
Installation:	**hammer drilled hole, Installation condition: Dry**
Reinforcement:	tension: not present, shear: not present; no supplemental splitting reinforcement present edge reinforcement: none or < No. 4 bar

Geometry [in.] & Loading [lb, in.lb]



Company:		Page:	2
Address:		Specifier:	
Phone I Fax:	|	E-Mail:	
Design:	Hanger Anchorage	Date:	4/26/2024
Fastening point:			

1.1 Design results

Case	Description	Forces [lb] / Moments [in.lb]	Seismic	Max. Util. Anchor [%]
1	Combination 1	N = 1,951; V_x = 0; V_y = 0; M_x = 0; M_y = 0; M_z = 0;	no	80

2 Load case/Resulting anchor forces

Anchor reactions [lb]

Tension force: (+Tension, -Compression)

Anchor	Tension force	Shear force	Shear force x	Shear force y
1	1,951	0	0	0

3 Tension load

	Load N_{ua} [lb]	Capacity ϕ N_n [lb]	Utilization $\beta_N = N_{ua}/\phi$ N_n	Status
Steel Strength*	1,951	8,433	24	OK
Pullout Strength*	N/A	N/A	N/A	N/A
Concrete Breakout Failure**	1,951	2,442	80	OK

* highest loaded anchor **anchor group (anchors in tension)

Company:		Page:	3
Address:		Specifier:	
Phone I Fax:	|	E-Mail:	
Design:	Hanger Anchorage	Date:	4/26/2024
Fastening point:			

3.1 Steel Strength

N_{sa} = ESR value — refer to ICC-ES ESR-4266
$\phi\ N_{sa} \geq N_{ua}$ — ACI 318-19 Table 17.5.2

Variables

$A_{se,N}$ [in.^{2}]	f_{uta} [psi]
0.10	114,004

Calculations

N_{sa} [lb]
11,244

Results

N_{sa} [lb]	ϕ_{steel}	$\phi\ N_{sa}$ [lb]	N_{ua} [lb]
11,244	0.750	8,433	1,951

3.2 Concrete Breakout Failure

$N_{cb} = \left(\frac{A_{Nc}}{A_{Nc0}}\right) \psi_{ed,N}\ \psi_{c,N}\ \psi_{cp,N}\ N_b$ — ACI 318-19 Eq. (17.6.2.1a)
$\phi\ N_{cb} \geq N_{ua}$ — ACI 318-19 Table 17.5.2
A_{Nc} — see ACI 318-19, Section 17.6.2.1, Fig. R 17.6.2.1(b)
$A_{Nc0} = 9\ h_{ef}^2$ — ACI 318-19 Eq. (17.6.2.1.4)
$\psi_{ed,N} = 0.7 + 0.3 \left(\frac{c_{a,min}}{1.5h_{ef}}\right) \leq 1.0$ — ACI 318-19 Eq. (17.6.2.4.1b)
$\psi_{cp,N} = MAX\left(\frac{c_{a,min}}{c_{ac}}, \frac{1.5h_{ef}}{c_{ac}}\right) \leq 1.0$ — ACI 318-19 Eq. (17.6.2.6.1b)
$N_b = k_c\ \lambda_a\ \sqrt{f'_c}\ h_{ef}^{1.5}$ — ACI 318-19 Eq. (17.6.2.2.1)

Variables

h_{ef} [in.]	$c_{a,min}$ [in.]	$\psi_{c,N}$	c_{ac} [in.]	k_c	λ_a	f'_c [psi]
2.000	∞	1.000	5.500	21	1.000	4,000

Calculations

A_{Nc} [in.^{2}]	A_{Nc0} [in.^{2}]	$\psi_{ed,N}$	$\psi_{cp,N}$	N_b [lb]
36.00	36.00	1.000	1.000	3,757

Results

N_{cb} [lb]	$\phi_{concrete}$	$\phi\ N_{cb}$ [lb]	N_{ua} [lb]
3,757	0.650	2,442	1,951

Company:		Page:	4
Address:		Specifier:	
Phone I Fax:	|	E-Mail:	
Design:	Hanger Anchorage	Date:	4/26/2024
Fastening point:			

4 Shear load

	Load V_{ua} [lb]	Capacity ϕ V_n [lb]	Utilization $\beta_V = V_{ua}/\phi$ V_n	Status
Steel Strength*	N/A	N/A	N/A	N/A
Steel failure (with lever arm)*	N/A	N/A	N/A	N/A
Pryout Strength*	N/A	N/A	N/A	N/A
Concrete edge failure in direction **	N/A	N/A	N/A	N/A

* highest loaded anchor **anchor group (relevant anchors)

5 Warnings

- The anchor design methods in PROFIS Engineering require rigid anchor plates per current regulations (AS 5216:2021, ETAG 001/Annex C, EOTA TR029 etc.). This means load re-distribution on the anchors due to elastic deformations of the anchor plate are not considered - the anchor plate is assumed to be sufficiently stiff, in order not to be deformed when subjected to the design loading. PROFIS Engineering calculates the minimum required anchor plate thickness with CBFEM to limit the stress of the anchor plate based on the assumptions explained above. The proof if the rigid anchor plate assumption is valid is not carried out by PROFIS Engineering. Input data and results must be checked for agreement with the existing conditions and for plausibility!
- Condition A applies where the potential concrete failure surfaces are crossed by supplementary reinforcement proportioned to tie the potential concrete failure prism into the structural member. Condition B applies where such supplementary reinforcement is not provided, or where pullout or pryout strength governs.
- Refer to the manufacturer's product literature for cleaning and installation instructions.
- For additional information about ACI 318 strength design provisions, please go to https://submittals.us.hilti.com/PROFISAnchorDesignGuide/
- Hilti post-installed anchors shall be installed in accordance with the Hilti Manufacturer's Printed Installation Instructions (MPII). Reference ACI 318-19, Section 26.7.

Fastening meets the design criteria!

6 Installation data

Anchor type and diameter: Kwik Bolt TZ2 - CS 1/2 (2) hnom2

Profile: -

Item number: 2210254 KB-TZ2 1/2x3 3/4

Hole diameter in the fixture: -

Maximum installation torque: 602 in.lb

Plate thickness (input): -

Hole diameter in the base material: 0.500 in.

Hole depth in the base material: 2.750 in.

Drilling method: Hammer drilled
Cleaning: Manual cleaning of the drilled hole according to instructions for use is required.

Minimum thickness of the base material: 4.000 in.

Hilti KB-TZ2 stud anchor with 2.5 in embedment, 1/2 (2) hnom2, Carbon steel, installation per ESR-4266

6.1 Recommended accessories

Drilling	Cleaning	Setting
• Suitable Rotary Hammer • Properly sized drill bit	• Manual blow-out pump	• Torque controlled cordless impact tool • Torque wrench • Hammer

Coordinates Anchor in.

Anchor	x	y	c_{-x}	c_{+x}	c_{-y}	c_{+y}
1	0.000	0.000	-	-	-	-

7 Remarks; Your Cooperation Duties

- Any and all information and data contained in the Software concern solely the use of Hilti products and are based on the principles, formulas and security regulations in accordance with Hilti's technical directions and operating, mounting and assembly instructions, etc., that must be strictly complied with by the user. All figures contained therein are average figures, and therefore use-specific tests are to be conducted prior to using the relevant Hilti product. The results of the calculations carried out by means of the Software are based essentially on the data you put in. Therefore, you bear the sole responsibility for the absence of errors, the completeness and the relevance of the data to be put in by you. Moreover, you bear sole responsibility for having the results of the calculation checked and cleared by an expert, particularly with regard to compliance with applicable norms and permits, prior to using them for your specific facility. The Software serves only as an aid to interpret norms and permits without any guarantee as to the absence of errors, the correctness and the relevance of the results or suitability for a specific application.
- You must take all necessary and reasonable steps to prevent or limit damage caused by the Software. In particular, you must arrange for the regular backup of programs and data and, if applicable, carry out the updates of the Software offered by Hilti on a regular basis. If you do not use the AutoUpdate function of the Software, you must ensure that you are using the current and thus up-to-date version of the Software in each case by carrying out manual updates via the Hilti Website. Hilti will not be liable for consequences, such as the recovery of lost or damaged data or programs, arising from a culpable breach of duty by you.

Load in compression

$$C_{R1} := 0.6 \cdot W_D - 0.7 \cdot \left(F_{pv} + \frac{F_p \cdot \tan\left(\frac{60 \cdot \pi}{180}\right)}{2} \right) = 1.5 \ lbf$$

$$C_{R2} := 0.6 \cdot W_D - V_{Trans} \cdot \frac{\tan\left(\frac{60 \cdot \pi}{180}\right)}{2} = -151.9 \ lbf$$

$$C_R := min\left(C_{R1}, C_{R2}\right) = -151.9 \ lbf$$

Try P1000 w/ P2486 @ 21" o.c.

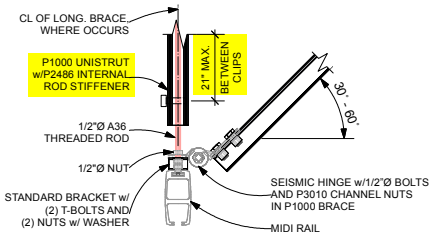
Per Unistrut

$f_a := 3745 \ psi$

$A_g := 0.126 \ in^2$ root area

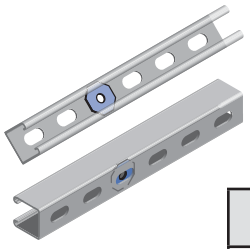
$C_a := f_a \cdot A_g = 471.87 \ lbf$

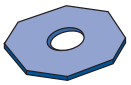
$$Design := \left\| \begin{array}{l} \text{if } C_a > |C_R| \\ \quad \text{“OK”} \\ \text{else} \\ \quad \text{“NG”} \end{array} \right\| = \text{“OK”}$$



.:Use 1/2" dia. threaded rod w/ P1000 & P2486 @ 21" o.c.

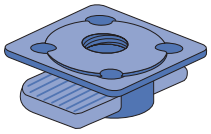
Slot Adapter™ EG



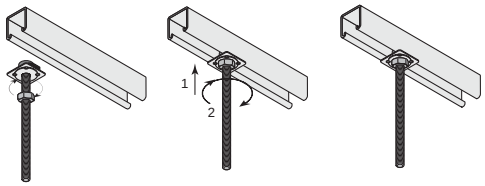


Part No.	Bolt Size	Wt/100 pcs Lbs (kg)
HOCW025	¼" (6.4)	1 (0.5)
HOCW037	⅜" (9.5)	1.5 (0.7)

Kwik Washer™ EG

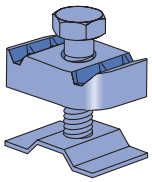


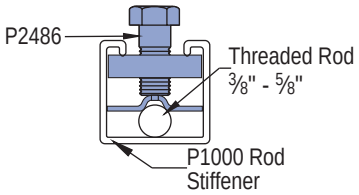
Overhead installation with one hand.
Available in zinc plated and hot dip galvanized



Part No.	Size In (mm)	Load Lbs (kN)	Wt/100 pcs Lbs (kg)
K1062	¼" (6.4)	250 (1.11)	1.2 (0.5)
K1063	⅜" (9.5)	610 (2.71)	2.6 (1.2)
K1064	½" (12.7)	1,130 (5.03)	9.3 (4.2)

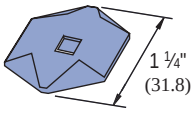
P2486 Seismic Rod Stiffener EG



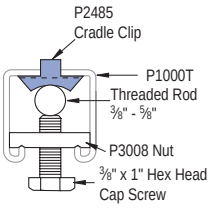


Wt/100 pcs: 16 Lbs (7.3 kg)

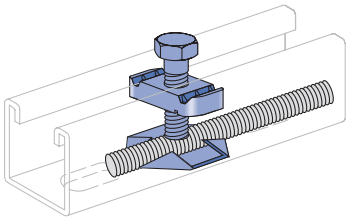
P2485 Cradle Clip EG

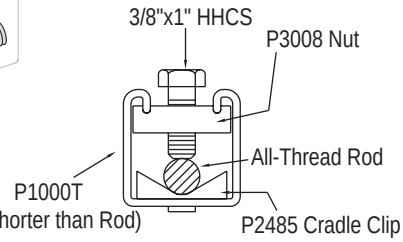


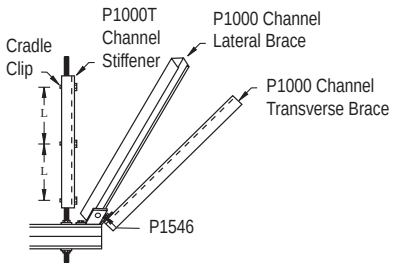
Cradle clip only, order other items seperately.



P2485K Seismic Cradle Clip Assembly







Wt/100 pcs: 3.0 Lbs (1.4 kg)

P2485 & P2486 – Spacing Chart

Rod Size In (mm)	Root Area In2 (mm2)	Radius of Gyration In (mm)	Design Load Lbs (kN)	.....Rod Stiffener Clip Spacing (L)..... Rod Stress @100% 10,700 PSI In (mm)	Rod Stress @75% 8,025 PSI In (mm)	Rod Stress @50% 5,350 PSI In (mm)	Rod Stress @35% 3,745 PSI In (mm)
⅜	0.068	0.074	730	9	11	13	15
9.5	49.5	1.99	3.25	228.6	279.4	330.2	381.0
½	0.126	0.100	1,350	12	14	17	21
12.7	72.4	2.40	6.01	304.8	355.6	431.8	533.4
⅝	0.202	0.127	2,160	15	18	22	26
15.9	138.3	3.32	9.61	381.0	457.2	558.8	660.4

Notes:
1. Minimum Tensile Stress is 50,000 psi (345MPa)
2. Working Stress is 10,700 psi (73.9 MPa) – Same as for Tension
3. Compression Will Only Occur During a Seismic Event
4. Compression Requires the Use of Rod Stiffeners
5. KL/r = 200 When Rod Stress is at 35%

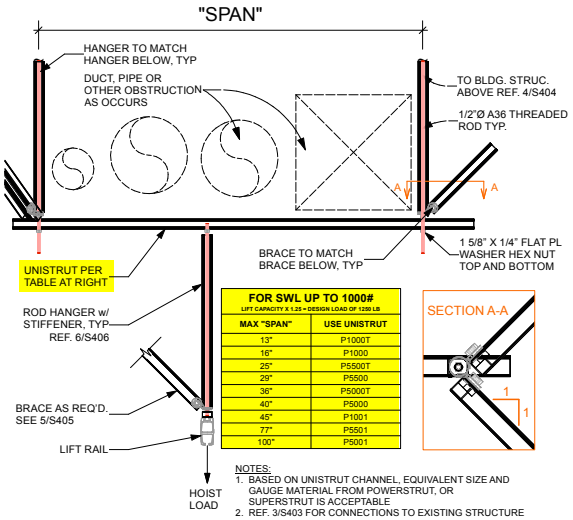
Refer to seismic bracing systems catalog for more detailed information.

Strut & Supply, Inc.
28005 W. Commercial Ave. Barrington, IL 60010
Ph: 847.756.4337 Fx: 847.304.1891
email: CustomerService@strutandsupply.com

Unistrut Trapeze

Loads (from previous calculations)

$$T_{R\_Trap} := \max\left(T_R, 1.25 \cdot W_L\right) = 1250\ \textit{lbf}$$



Try Unistrut channels

P1000T

$$M_{a\_Unfactored} := 5070\ \textit{in} \cdot \textit{lbf}$$

$$I_x := 0.185\ \textit{in}^4$$

$$E := 29 \cdot 10^6\ \textit{psi}$$

$L := 13 \cdot \textit{in}$ Maximum span

$C_{Unbr} := 1$ Unbraced length factor

$C_{Pierce} := 0.85$ Pierced channel factor

$$M_a := M_{a\_Unfactored} \cdot C_{Unbr} \cdot C_{Pierce} = 4309.5\ \textit{in} \cdot \textit{lbf}$$

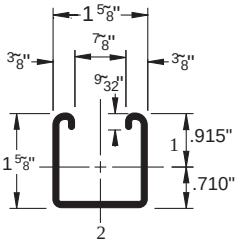
$$M_R := \frac{T_{R\_Trap} \cdot L}{4} = 4062.5\ \textit{in} \cdot \textit{lbf}$$

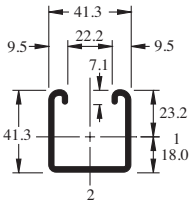
$$\Delta := \frac{T_{R\_Trap} \cdot L^3}{48 \cdot E \cdot I_x} = 0.01\ \textit{in}$$

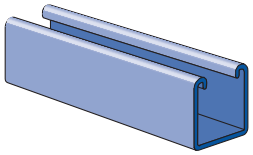
$$\Delta_{max} := 0.25 \cdot \textit{in}$$

P1000®

DF GR HG PG PL



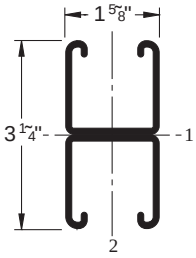


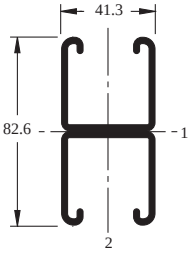


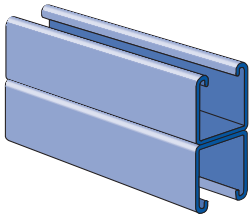
Wt/100 Ft:189 Lbs (281 kg/100 m)
Allowable Moment 5,070 In-Lbs (570 NŁm)
12 Gauge Nominal Thickness .105" (2.7mm)

P1001

DF GR HG PG PL



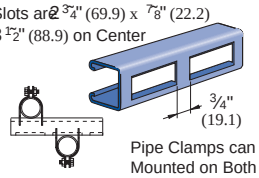




Wt/100 Ft: 378 Lbs (562 kg/100 m)
Allowable Moment 14,360 In-Lbs (1,620 NŁm)
12 Gauge Nominal Thickness .105" (2.7mm)

P1000 DS

Slots are 2 3/4" (69.9) x 7/8" (22.2)
3 1/2" (88.9) on Center



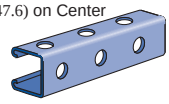
Pipe Clamps can be Mounted on Both S

Wt/100 Ft: 173 Lbs (257 kg/100 m)

P1000 H3

GR HG PG PL

9/16" (14.3) Dia. Holes
1 7/8" (47.6) on Center

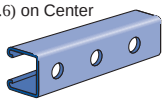


Wt/100 Ft: 175 Lbs (260 kg/100 m)

P1000 HS

GR HG PG PL

9/16" (14.3) Dia. Holes
1 7/8" (47.6) on Center

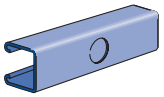


Wt/100 Ft: 190 Lbs (283 kg/100 m)

P1000 KO

GR PG

7/8" (22.2) Knockouts
6" (152.4) on Center

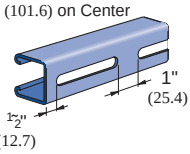


Wt/100 Ft:185 Lbs (275 kg/100 m)

P1000 SL

GR HG PG PL

Slots are
3" (76.2) x 13/32" (10.3)
4" (101.6) on Center

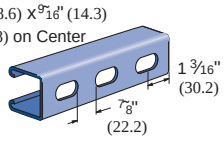


Wt/100 Ft: 185 Lbs (275 kg/100 m)

P1000 T

DF GR HG PG PL

Slots are
1 1/8" (28.6) x 9/16" (14.3)
2" (50.8) on Center

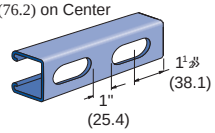


Wt/100 Ft: 185 Lbs (275 kg/100 m)

P1000 WT

DF GR HG PG PL

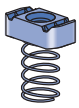
Slots are
2" (50.8) x 11/16" (17.5)
3" (76.2) on Center



Wt/100 Ft: 185 Lbs (275 kg/100 m)

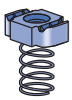
Channel Nuts (Refer to Pages 73,74 for Details)

See Page 73, 74



P1006-0832
P1006-1024
P1006-1420
P1007
P1008
P1009
P1010

P1008T
P1006T1420
P1010T



P1024
P1012S
P1023S

P1012
P1023
P1024S

P3006-0832
P3006-1024
P3006-1420
P3007
P3008
P3009
P3010

P3016-0632
P3016-0832
P3016-1024
P3016-1420

Channel Finishes: DF, PL, GR, HG, PG, ZD; Standard Lengths: 10' & 20'

Strut & Supply, Inc.
28005 W. Commercial Ave. Barrington, IL 60010
Ph: 847.756.4337 Fx: 847.304.1891
email: CustomerService@strutandsupply.com

P1000 - Beam Loading

Span In	Max. Allowable Uniform Load Lbs	Defl. at Uniform Load In	Uniform Loading at Deflection Span/180 Lbs	Span/240 Lbs	Span/360 Lbs
24	1,690	0.06	1,690	1,690	1,690
36	1,130	0.13	1,130	1,130	900
48	850	0.22	850	760	500
60	680	0.35	650	480	320
72	560	0.50	450	340	220
84	480	0.68	330	250	160
96	420	0.89	250	190	130
108	380	1.14	200	150	100
120	340	1.40	160	120	80
144	280	2.00	110	80	60
168	240	2.72	80	60	40
192	210	3.55	60	50	NR
216	190	4.58	50	40	NR
240	170	5.62	40	NR	NR

P1001 - Beam Loading

Span In	Max. Allowable Uniform Load Lbs	Defl. at Uniform Load In	Uniform Loading at Deflection Span/180 Lbs	Span/240 Lbs	Span/360 Lbs
24	3,500*	0.02	3,500*	3,500*	3,500*
36	3,190	0.07	3,190	3,190	3,190
48	2,390	0.13	2,390	2,390	2,390
60	1,910	0.20	1,910	1,910	1,620
72	1,600	0.28	1,600	1,600	1,130
84	1,370	0.39	1,370	1,240	830
96	1,200	0.51	1,200	950	630
108	1,060	0.64	1,000	750	500
120	960	0.79	810	610	410
144	800	1.14	560	420	280
168	680	1.53	410	310	210
192	600	2.02	320	240	160
216	530	2.54	250	190	130
240	480	3.16	200	150	100

P1000 - Column Loading

Unbraced Height In	Max. Allowable Load at Slot Face Lbs	Maximum Column Load Applied at C.G. K = 0.65 Lbs	K = 0.80 Lbs	K =1.0 Lbs	K = 1.2 Lbs
24	3,550	10,740	9,890	8,770	7,740
36	3,190	8,910	7,740	6,390	5,310
48	2,770	7,260	6,010	4,690	3,800
60	2,380	5,910	4,690	3,630	2,960
72	2,080	4,840	3,800	2,960	2,400
84	1,860	4,040	3,200	2,480	1,980
96	1,670	3,480	2,750	2,110	1,660
108	1,510	3,050	2,400	1,810	**
120	1,380	2,700	2,110	**	**
144	1,150	2,180	1,660	**	**

P1001 - Column Loading

Unbraced Height In	Max. Allowable Load at Slot Face Lbs	Maximum Column Load Applied at C.G. K = 0.65 Lbs	K = 0.80 Lbs	K =1.0 Lbs	K = 1.2 Lbs
24	6,430	24,280	23,610	22,700	21,820
36	6,290	22,810	21,820	20,650	19,670
48	6,160	21,410	20,300	18,670	16,160
60	6,000	20,210	18,670	15,520	12,390
72	5,620	18,970	16,160	12,390	8,950
84	5,170	16,950	13,630	9,470	6,580
96	4,690	14,890	11,190	7,250	5,040
108	4,170	12,850	8,950	5,730	3,980
120	3,690	10,900	7,250	4,640	**
144	2,930	7,630	5,040	**	**

P1000/P1001 - Elements of Section

Parameter	P1000		P1001	
Area of Section	0.555	In^2	1.111	In^2
Axis 1-1				
Moment of Inertia (I)	0.185	In^4	0.928	In^4
Section Modulus (S)	0.202	In^3	0.571	In^3
Radius of Gyration (r)	0.577	In	0.914	In
Axis 2-2				
Moment of Inertia (I)	0.236	In^4	0.471	In^4
Section Modulus (S)	0.290	In^3	0.580	In^3
Radius of Gyration (r)	0.651	In	0.651	In

Notes:

* Load limited by spot weld shear.

. / » U !

NR = Not Recommended.

1. Beam loads are given in total uniform load (W Lbs) not uniform load (w lbs/ft or w lbs/in).
2. Beam loads are based on a simple span and assumed to be adequately laterally braced. Unbraced spans can reduce beam load carrying capacity. Refer to Page for reduction factors for unbraced lengths.
3. For pierced channel, multiply beam loads by the following factor:

"KO" Series.....95% **"T" Series 85%**
"HS" Series .....90% **"SL" Series.....85%**
"H3" Series.....90% **"DS" Series.....70%**
"WT" Series.....85%

4. Deduct channel weight from the beam loads.
5. For concentrated midspan point loads, multiply beam loads by 50% and the corresponding deflection by 80%. For other load conditions refer to page 18.
6. All beam loads are for bending about Axis 1-1.

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$$Design := \left\| \begin{array}{l} \text{if } M_a > M_R \\ \quad \left\| \begin{array}{l} \text{if } \Delta < \Delta_{max} \\ \quad \left\| \text{"OK"} \right. \\ \text{else} \\ \quad \left\| \text{"NG"} \right. \end{array} \right. \\ \text{else} \\ \quad \left\| \text{"NG"} \right. \end{array} \right. = \text{"OK"}$$

.:Use P1000T for L=13in max

P1000

Same as P1000T, except

$L := 16 \cdot in$ Maximum span

$C_{Unbr} := 1$ Unbraced length factor

$C_{Pierce} := 1$ Pierced channel factor

$M_a := M_{a\_Unfactored} \cdot C_{Unbr} \cdot C_{Pierce} = 5070\ in \cdot lbf$

$M_R := \frac{T_{R\_Trap} \cdot L}{4} = 5000\ in \cdot lbf$

$\Delta := \frac{T_{R\_Trap} \cdot L^3}{48 \cdot E \cdot I_x} = 0.02\ in$

$\Delta_{max} := 0.25 \cdot in$

$Design :=$ if $M_a > M_R$ → (if $\Delta < \Delta_{max}$ → "OK" else → "NG") else → "NG" $=$ "OK"

.:Use P1000 for L=16in max

P5500T

$M_{a\_Unfactored} := 9820\ in \cdot lbf$

$I_x := 0.522\ in^4$

$L := 25 \cdot in$ Maximum span

$C_{Unbr} := 0.98$ Unbraced length factor

$C_{Pierce} := 0.85$ Pierced channel factor

$M_a := M_{a\_Unfactored} \cdot C_{Unbr} \cdot C_{Pierce} = 8180.1\ in \cdot lbf$

$M_R := \frac{T_{R\_Trap} \cdot L}{4} = 7812.5\ in \cdot lbf$

$\Delta := \frac{T_{R\_Trap} \cdot L^3}{48 \cdot E \cdot I_x} = 0.03\ in$

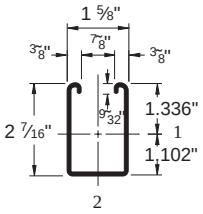
$\Delta_{max} := 0.25 \cdot in$

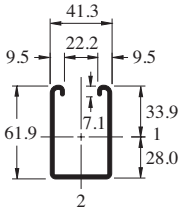
$Design := \left\| \begin{array}{l} \text{if } M_a > M_R \\ \quad \left\| \begin{array}{l} \text{if } \Delta < \Delta_{max} \\ \quad \left\| \text{"OK"} \right. \\ \text{else} \\ \quad \left\| \text{"NG"} \right. \end{array} \right. \\ \text{else} \\ \quad \left\| \text{"NG"} \right. \end{array} \right. = \text{"OK"}$

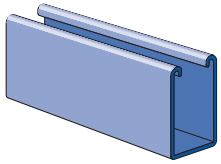
.:Use P5500T for L=25in max

P5500

GR PG



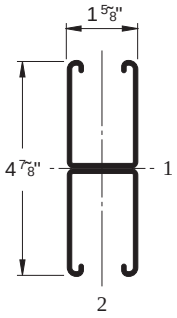


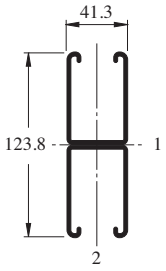


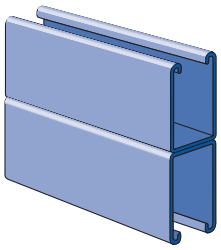
Wt/100 Ft: 247 Lbs (367 kg/100 m)
Allowable Moment 9,820 In-Lbs (1,110 NŁm)
12 Gauge Nominal Thickness .105" (2.7mm)

P5501

GR PG





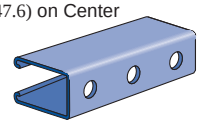


Wt/100 Ft: 494 Lbs (734 kg/100 m)
Allowable Moment 28,940 In-Lbs (3,270 NŁm)
12 Gauge Nominal Thickness .105" (2.7mm)

P5500 HS

GR PG

9/16" (14.3) Dia. Holes
1 7/8" (47.6) on Center

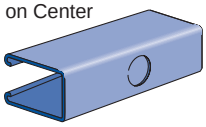


Wt/100 Ft: 242 Lbs (360 kg/100 m)

P5500 KO

GR PG

7/8" (22.2) Knockouts
6" (152.4) on Center

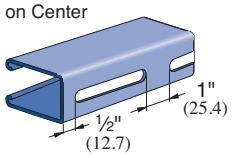


Wt/100 Ft: 247 Lbs (368 kg/100 m)

P5500 SL

GR PG

Slots are
3" (76.2) x 13/32" (10.3)
4" (101.6) on Center

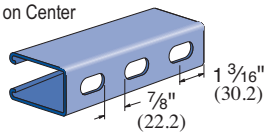


Wt/100 Ft: 242 Lbs (360 kg/100 m)

P5500 T

GR PG

Slots are
1 1/8" (28.6) x 9/16" (14.3)
2" (50.8) on Center

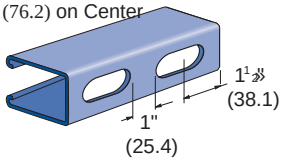


Wt/100 Ft: 242 Lbs (360 kg/100 m)

P5500 WT

DF GR HG PG PL

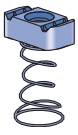
Slots are
2" (50.8) x 11/16" (17.5)
3" (76.2) on Center



Wt/100 Ft: 242 Lbs (360 kg/100 m)

Channel Nuts (Refer to Pages 73,74 for Details)

See Page 73, 74



P5506-0832
P5506-1024
P5506-1420
P5507
P5508
P5509
P5510

P1006T1420
P1008T
P1010T

P1012
P1023
P1024

P3006-0832
P3006-1024
P3006-1420
P3007
P3008
P3009
P3010

P3016-0632
P3016-0832
P3016-1024
P3016-1420

Channel Finishes: PL, GR, HG, PG, ZD; Standard Lengths: 10' & 20'

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P5500 - Beam Loading

Span In	Max Allowable Uniform Load Lbs	Defl. at Uniform Load In	Uniform Loading at Deflection Span/180 Lbs	Span/240 Lbs	Span/360 Lbs
24	3,270	0.04	3,270	3,270	3,270
36	2,180	0.09	2,180	2,180	2,180
48	1,640	0.15	1,640	1,640	1,420
60	1,310	0.24	1,310	1,310	910
72	1,090	0.34	1,090	950	630
84	940	0.47	930	700	470
96	820	0.61	710	530	360
108	730	0.78	560	420	280
120	650	0.95	460	340	230
144	550	1.39	320	240	160
168	470	1.89	230	170	120
192	410	2.46	180	130	90
216	360	3.07	140	110	70
240	330	3.86	110	90	60

P5501 - Beam Loading

Span In	Max Allowable Uniform Load Lbs	Defl. at Uniform Load In	Uniform Loading at Deflection Span/180 Lbs	Span/240 Lbs	Span/360 Lbs
24	5,220*	0.01	5,220*	5,220*	5,220*
36	5,220*	0.04	5,220*	5,220*	5,220*
48	4,820	0.08	4,820	4,820	4,820
60	3,860	0.13	3,860	3,860	3,860
72	3,220	0.19	3,220	3,220	3,220
84	2,760	0.26	2,760	2,760	2,500
96	2,410	0.34	2,410	2,410	1,920
108	2,140	0.42	2,140	2,140	1,510
120	1,930	0.52	1,930	1,840	1,230
144	1,610	0.76	1,610	1,280	850
168	1,380	1.03	1,250	940	630
192	1,210	1.35	960	720	480
216	1,070	1.70	760	570	380
240	960	2.09	610	460	310

P5500 - Column Loading

Unbraced Height In	Maximum Allowable Load at Slot Face Lbs	Maximum Column Load Applied at C.G. K = 0.65 Lbs	K = 0.80 Lbs	K =1.0 Lbs	K = 1.2 Lbs
24	4,640	13,840	12,570	10,840	9,190
36	3,970	11,050	9,190	7,030	5,370
48	3,180	8,420	6,390	4,620	3,630
60	2,550	6,250	4,620	3,450	2,780
72	2,120	4,790	3,630	2,780	2,260
84	1,810	3,890	3,010	2,330	1,910
96	1,580	3,290	2,580	2,020	1,650
108	1,400	2,860	2,260	1,770	1,440
120	1,270	2,530	2,020	1,580	**
144	1,060	2,070	1,650	**	**
168	920	1,750	1,380	**	**

P5501 - Column Loading

Unbraced Height In	Maximum Allowable Load at Slot Face Lbs	Maximum Column Load Applied at C.G. K = 0.65 Lbs	K = 0.80 Lbs	K =1.0 Lbs	K = 1.2 Lbs
24	8,580	31,810	30,880	29,520	28,100
36	8,350	29,700	28,100	26,000	24,070
48	8,080	27,390	25,330	22,910	20,940
60	7,720	25,170	22,910	20,510	17,170
72	7,270	23,190	20,940	17,170	12,700
84	6,780	21,510	18,740	13,430	9,330
96	6,130	20,110	15,630	10,290	7,150
108	5,450	17,750	12,700	8,130	5,650
120	4,800	15,260	10,290	6,590	**
144	3,760	10,830	7,150	**	**
168	2,970	7,950	5,250	**	**

P5500/P5501 - Elements of Section

Parameter	P5500		P5501	
Area of Section	0.726	In^2	1.452	In^2
Axis 1-1				
Moment of Inertia (I)	0.522	In^4	2.805	In^4
Section Modulus (S)	0.390	In^3	1.151	In^3
Radius of Gyration (r)	0.848	In	1.390	In
Axis 2-2				
Moment of Inertia (I)	0.334	In^4	0.669	In^4
Section Modulus (S)	0.411	In^3	0.823	In^3
Radius of Gyration (r)	0.679	In	0.679	In

Notes:

* Load limited by spot weld shear.

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NR = Not Recommended.

1. Beam loads are given in total uniform load (W Lbs) not uniform load (w lbs/ft or w lbs/in).
2. Beam loads are based on a simple span and assumed to be adequately laterally braced. Unbraced spans can reduce beam load carrying capacity. Refer to Page 62 for reduction factors for unbraced lengths.
3. For pierced channel, multiply beam loads by the following factor:

"KO" Series.....95% **"T" Series 85%**
"HS" Series .....90% **"SL" Series.....85%**
"WT" Series.....85%

4. Deduct channel weight from the beam loads.
5. For concentrated midspan point loads, multiply beam loads by 50% and the corresponding deflection by 80%. For other load conditions refer to page 18.
6. All beam loads are for bending about Axis 1-1.

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P5500

Same as P5500T, except

$L := 29 \cdot in$ Maximum span

$C_{Unbr} := 0.95$ Unbraced length factor

$C_{Pierce} := 1$ Pierced channel factor

$M_a := M_{a\_Unfactored} \cdot C_{Unbr} \cdot C_{Pierce} = 9329\ in \cdot lbf$

$M_R := \frac{T_{R\_Trap} \cdot L}{4} = 9062.5\ in \cdot lbf$

$\Delta := \frac{T_{R\_Trap} \cdot L^3}{48 \cdot E \cdot I_x} = 0.04\ in$

$\Delta_{max} := 0.25 \cdot in$

$Design := \left\| \begin{array}{l} \text{if } M_a > M_R \\ \quad \left\| \begin{array}{l} \text{if } \Delta < \Delta_{max} \\ \quad \left\| \text{"OK"} \right. \\ \text{else} \\ \quad \left\| \text{"NG"} \right. \end{array} \right. \\ \text{else} \\ \quad \left\| \text{"NG"} \right. \end{array} \right. = \text{"OK"}$

.:Use P5500 for L=29in max

P5000T

$M_{a\_Unfactored} := 15770\ in \cdot lbf$

$I_x := 1.098\ in^4$

$L := 36 \cdot in$ Maximum span

$C_{Unbr} := 0.85$ Unbraced length factor

$C_{Pierce} := 0.85$ Pierced channel factor

$M_a := M_{a\_Unfactored} \cdot C_{Unbr} \cdot C_{Pierce} = 11393.8\ in \cdot lbf$

$M_R := \frac{T_{R\_Trap} \cdot L}{4} = 11250\ in \cdot lbf$

$\Delta := \frac{T_{R\_Trap} \cdot L^3}{48 \cdot E \cdot I_x} = 0.04\ in$

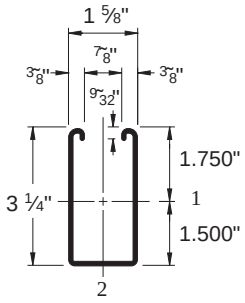
$\Delta_{max} := 0.25 \cdot in$

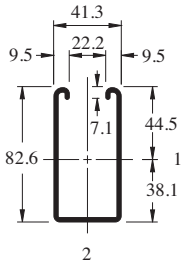
$$Design := \left\| \begin{array}{l} \text{if } M_a > M_R \\ \quad \left\| \begin{array}{l} \text{if } \Delta < \Delta_{max} \\ \quad \left\| \text{"OK"} \right. \\ \text{else} \\ \quad \left\| \text{"NG"} \right. \end{array} \right. \\ \text{else} \\ \quad \left\| \text{"NG"} \right. \end{array} \right. = \text{"OK"}$$

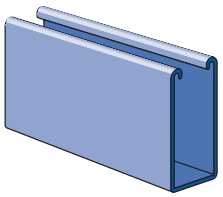
.:Use P5000T for L=36in max

P5000

DF GR PL PG



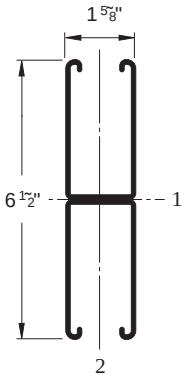


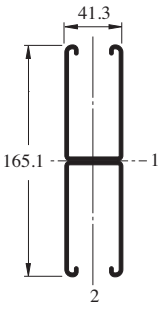


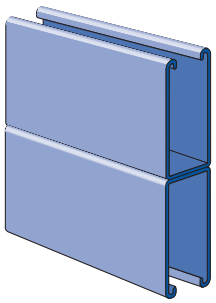
Wt/100 Ft: 305 Lbs (454 kg/100 m)
Allowable Moment 15,770 In-Lbs (1,780 NŁm)
12 Gauge Nominal Thickness .105" (2.7mm)

P5001

DF GR PG





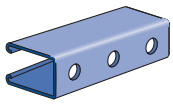


Wt/100 Ft: 610 Lbs (907 kg/100 m)
Allowable Moment 48,180 In-Lbs (5,440 NŁm)
12 Gauge Nominal Thickness .105" (2.7mm)

P5000 HS

GR PG

9/16" (14.3) Dia. Holes
1 7/8" (47.6) on Center

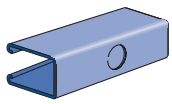


Wt/100 Ft: 300 Lbs (446 kg/100 m)

P5000 KO

GR PG

7/8" (22.2) Knockouts
6" (152.4) on Center

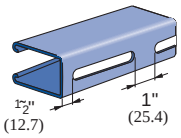


Wt/100 Ft: 305 Lbs (454 kg/100 m)

P5000 SL

GR PG

Slots are
3" (76.2) x 13/32" (10.3)
4" (101.6) on Center

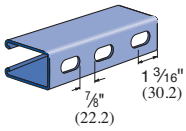


Wt/100 Ft: 300 Lbs (446 kg/100 m)

P5000 T

DF GR PG

Slots are
1⅛" (28.6) x 9/16" (14.3)
2" (50.8) on Center

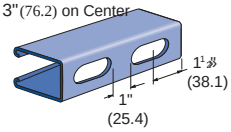


Wt/100 Ft: 300 Lbs (446 kg/100 m)

P5000 WT

DF GR HG PG PL

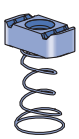
Slots are
2" (50.8) x 11/16" (17.5)
3" (76.2) on Center



Wt/100 Ft: 300 Lbs (446 kg/100 m)

Channel Nuts (Refer to Pages 73,74 for Details)

See Page 73, 74



P5506-0832
P5506-1024
P5506-1420
P5507
P5508
P5509
P5510

P1006T1420
P1008T
P1010T

P1012
P1023
P1024

P3006-0832
P3006-1024
P3006-1420
P3007
P3008
P3009
P3010

P3016-0632
P3016-0832
P3016-1024
P3016-1420

Channel Finishes: DF, PL, GR, HG, PG, ZD; Standard Lengths: 10' & 20'

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P5000 - Beam Loading

Span In	Max Allowable Uniform Load Lbs	Defl. at Uniform Load In	Uniform Loading at Deflection Span/180 Lbs	Span/240 Lbs	Span/360 Lbs
24	5,260	0.03	5,260	5,260	5,260
36	3,500	0.07	3,500	3,500	3,500
48	2,630	0.12	2,630	2,630	2,630
60	2,100	0.18	2,100	2,100	1,920
72	1,750	0.26	1,750	1,750	1,330
84	1,500	0.36	1,500	1,470	980
96	1,310	0.47	1,310	1,120	750
108	1,170	0.59	1,170	890	590
120	1,050	0.73	960	720	480
144	880	1.06	670	500	330
168	750	1.43	490	370	240
192	660	1.88	370	280	190
216	580	2.35	300	220	150
240	530	2.95	240	180	120

P5001 - Beam Loading

Span In	Max Allowable Uniform Load Lbs	Defl. at Uniform Load In	Uniform Loading at Deflection Span/180 Lbs	Span/240 Lbs	Span/360 Lbs
24	6,890*	0.01	6,890*	6,890*	6,890*
36	6,890*	0.02	6,890*	6,890*	6,890*
48	6,890*	0.05	6,890*	6,890*	6,890*
60	6,420	0.10	6,420	6,420	6,420
72	5,350	0.14	5,350	5,350	5,350
84	4,590	0.19	4,590	4,590	4,590
96	4,020	0.25	4,020	4,020	4,020
108	3,570	0.32	3,570	3,570	3,360
120	3,210	0.39	3,210	3,210	2,720
144	2,680	0.57	2,680	2,680	1,890
168	2,290	0.77	2,290	2,080	1,390
192	2,010	1.01	2,010	1,590	1,060
216	1,780	1.27	1,680	1,260	840
240	1,610	1.58	1,360	1,020	680

P5000 - Column Loading

Unbraced Height In	Maximum Allowable Load at Slot Face Lbs	Maximum Column Load Applied at C.G. K = 0.65 Lbs	K = 0.80 Lbs	K =1.0 Lbs	K = 1.2 Lbs
24	5,650	16,870	15,180	12,850	10,600
36	4,690	13,140	10,600	7,650	5,660
48	3,560	9,550	6,860	4,790	3,660
60	2,730	6,680	4,790	3,450	2,710
72	2,160	4,980	3,660	2,710	2,170
84	1,760	3,950	2,960	2,240	1,820
96	1,500	3,270	2,500	1,930	1,580
108	1,310	2,800	2,170	1,690	1,390
120	1,170	2,450	1,930	1,510	**
144	980	1,980	1,580	**	**
168	850	1,670	1,340	**	**

P5001 - Column Loading

Unbraced Height In	Maximum Allowable Load at Slot Face Lbs	Maximum Column Load Applied at C.G. K = 0.65 Lbs	K = 0.80 Lbs	K =1.0 Lbs	K = 1.2 Lbs
24	10,670	39,230	38,030	36,210	34,240
36	10,350	36,450	34,240	31,200	28,260
48	9,940	33,220	30,200	26,430	23,190
60	9,290	29,950	26,430	22,470	19,380
72	8,560	26,880	23,190	19,380	16,450
84	7,860	24,140	20,520	17,040	12,090
96	7,220	21,790	18,370	13,330	9,250
108	6,600	19,790	16,450	10,530	7,310
120	5,760	18,130	13,330	8,530	**
144	4,390	14,020	9,250	**	**
168	3,420	10,300	6,800	**	**

P5000/P5001 - Elements of Section

Parameter	P5000		P5001	
Area of Section	0.897	In^2	1.793	In^2
Axis 1-1				
Moment of Inertia (I)	1.098	In^4	6.227	In^4
Section Modulus (S)	0.627	In^3	1.916	In^3
Radius of Gyration (r)	1.107	In	1.864	In
Axis 2-2				
Moment of Inertia (I)	0.433	In^4	0.866	In^4
Section Modulus (S)	0.533	In^3	1.066	In^3
Radius of Gyration (r)	0.695	In	0.695	In

Notes:

* Load limited by spot weld shear.

. / » U !

NR = Not Recommended.

1. Beam loads are given as total uniform load (W Lbs) not uniform load (w lbs/ft or w lbs/in).
2. Beam loads are based on a simple span and assumed to be adequately laterally braced. Unbraced spans can reduce beam load carrying capacity. Refer to Page for reduction factors for unbraced lengths.
3. For pierced channel, multiply beam loads by the following factor:

"KO" Series.....95% **"T" Series 85%**
"HS" Series .....90% **"SL" Series.....85%**
"WT" Series.....85%

4. Deduct channel weight from the beam loads.
5. For concentrated midspan point loads, multiply beam loads by 50% and the corresponding deflection by 80%. For other load conditions refer to page 18.
6. All beam loads are for bending about Axis 1-1.

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P5000

Same as P5000T, except

$L := 40 \cdot in$ Maximum span

$C_{Unbr} := 0.80$ Unbraced length factor

$C_{Pierce} := 1$ Pierced channel factor

$M_a := M_{a\_Unfactored} \cdot C_{Unbr} \cdot C_{Pierce} = 12616\ in \cdot lbf$

$M_R := \frac{T_{R\_Trap} \cdot L}{4} = 12500\ in \cdot lbf$

$\Delta := \frac{T_{R\_Trap} \cdot L^3}{48 \cdot E \cdot I_x} = 0.05\ in$

$\Delta_{max} := 0.25 \cdot in$

$Design := \left\| \begin{array}{l} \text{if } M_a > M_R \\ \quad \left\| \begin{array}{l} \text{if } \Delta < \Delta_{max} \\ \quad \left\| \text{"OK"} \right. \\ \text{else} \\ \quad \left\| \text{"NG"} \right. \end{array} \right. \\ \text{else} \\ \quad \left\| \text{"NG"} \right. \end{array} \right. = \text{"OK"}$

.:Use P5000 for L=40in max

P1001

$M_{a\_Unfactored} := 14360\ in \cdot lbf$

$I_x := 0.928\ in^4$

$L := 45 \cdot in$ Maximum span

$C_{Unbr} := 1$ Unbraced length factor

$C_{Pierce} := 1$ Pierced channel factor

$M_a := M_{a\_Unfactored} \cdot C_{Unbr} \cdot C_{Pierce} = 14360\ in \cdot lbf$

$M_R := \frac{T_{R\_Trap} \cdot L}{4} = 14062.5\ in \cdot lbf$

$\Delta := \frac{T_{R\_Trap} \cdot L^3}{48 \cdot E \cdot I_x} = 0.09\ in$

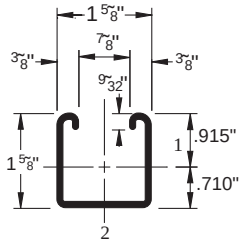
$\Delta_{max} := 0.25 \cdot in$

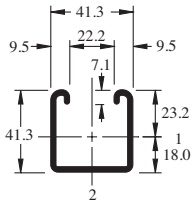
$Design := \left\| \begin{array}{l} \text{if } M_a > M_R \\ \quad \left\| \begin{array}{l} \text{if } \Delta < \Delta_{max} \\ \quad \left\| \text{"OK"} \right. \\ \text{else} \\ \quad \left\| \text{"NG"} \right. \end{array} \right. \\ \text{else} \\ \quad \left\| \text{"NG"} \right. \end{array} \right. = \text{"OK"}$

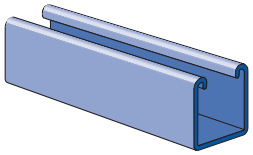
.:Use P1001 for L=45in max

P1000®

DF GR HG PG PL



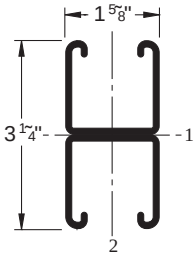


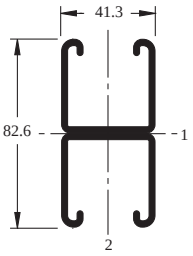


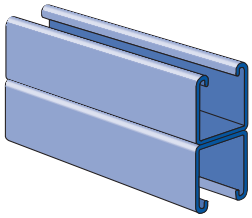
Wt/100 Ft:189 Lbs (281 kg/100 m)
Allowable Moment 5,070 In-Lbs (570 NŁm)
12 Gauge Nominal Thickness .105" (2.7mm)

P1001

DF GR HG PG PL

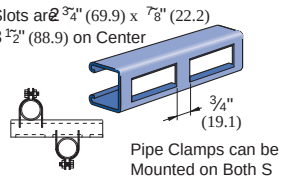






Wt/100 Ft: 378 Lbs (562 kg/100 m)
Allowable Moment 14,360 In-Lbs (1,620 NŁm)
12 Gauge Nominal Thickness .105" (2.7mm)

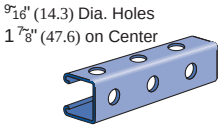
P1000 DS



Wt/100 Ft: 173 Lbs (257 kg/100 m)

P1000 H3

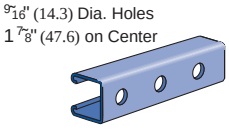
GR HG PG PL



Wt/100 Ft: 175 Lbs (260 kg/100 m)

P1000 HS

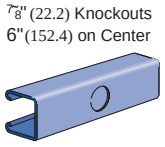
GR HG PG PL



Wt/100 Ft: 190 Lbs (283 kg/100 m)

P1000 KO

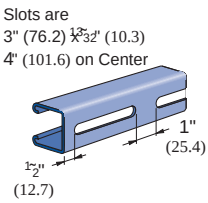
GR PG



Wt/100 Ft:185 Lbs (275 kg/100 m)

P1000 SL

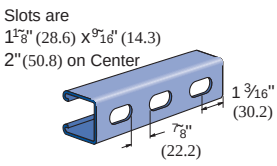
GR HG PG PL



Wt/100 Ft: 185 Lbs (275 kg/100 m)

P1000 T

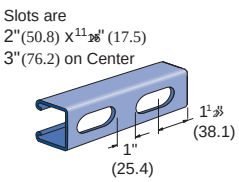
DF GR HG PG PL



Wt/100 Ft: 185 Lbs (275 kg/100 m)

P1000 WT

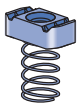
DF GR HG PG PL



Wt/100 Ft: 185 Lbs (275 kg/100 m)

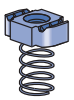
Channel Nuts (Refer to Pages 73,74 for Details)

See Page 73, 74



P1006-0832
P1006-1024
P1006-1420
P1007
P1008
P1009
P1010

P1008T
P1006T1420
P1010T



P1024
P1012S
P1023S

P1012
P1023
P1024S

P3006-0832
P3006-1024
P3006-1420
P3007
P3008
P3009
P3010

P3016-0632
P3016-0832
P3016-1024
P3016-1420

Channel Finishes: DF, PL, GR, HG, PG, ZD; Standard Lengths: 10' & 20'

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P1000 - Beam Loading

Span In	Max. Allowable Uniform Load Lbs	Defl. at Uniform Load In	Uniform Loading at Deflection Span/180 Lbs	Span/240 Lbs	Span/360 Lbs
24	1,690	0.06	1,690	1,690	1,690
36	1,130	0.13	1,130	1,130	900
48	850	0.22	850	760	500
60	680	0.35	650	480	320
72	560	0.50	450	340	220
84	480	0.68	330	250	160
96	420	0.89	250	190	130
108	380	1.14	200	150	100
120	340	1.40	160	120	80
144	280	2.00	110	80	60
168	240	2.72	80	60	40
192	210	3.55	60	50	NR
216	190	4.58	50	40	NR
240	170	5.62	40	NR	NR

P1001 - Beam Loading

Span In	Max. Allowable Uniform Load Lbs	Defl. at Uniform Load In	Uniform Loading at Deflection Span/180 Lbs	Span/240 Lbs	Span/360 Lbs
24	3,500*	0.02	3,500*	3,500*	3,500*
36	3,190	0.07	3,190	3,190	3,190
48	2,390	0.13	2,390	2,390	2,390
60	1,910	0.20	1,910	1,910	1,620
72	1,600	0.28	1,600	1,600	1,130
84	1,370	0.39	1,370	1,240	830
96	1,200	0.51	1,200	950	630
108	1,060	0.64	1,000	750	500
120	960	0.79	810	610	410
144	800	1.14	560	420	280
168	680	1.53	410	310	210
192	600	2.02	320	240	160
216	530	2.54	250	190	130
240	480	3.16	200	150	100

P1000 - Column Loading

Unbraced Height In	Max. Allowable Load at Slot Face Lbs	Maximum Column Load Applied at C.G. K = 0.65 Lbs	K = 0.80 Lbs	K =1.0 Lbs	K = 1.2 Lbs
24	3,550	10,740	9,890	8,770	7,740
36	3,190	8,910	7,740	6,390	5,310
48	2,770	7,260	6,010	4,690	3,800
60	2,380	5,910	4,690	3,630	2,960
72	2,080	4,840	3,800	2,960	2,400
84	1,860	4,040	3,200	2,480	1,980
96	1,670	3,480	2,750	2,110	1,660
108	1,510	3,050	2,400	1,810	**
120	1,380	2,700	2,110	**	**
144	1,150	2,180	1,660	**	**

P1001 - Column Loading

Unbraced Height In	Max. Allowable Load at Slot Face Lbs	Maximum Column Load Applied at C.G. K = 0.65 Lbs	K = 0.80 Lbs	K =1.0 Lbs	K = 1.2 Lbs
24	6,430	24,280	23,610	22,700	21,820
36	6,290	22,810	21,820	20,650	19,670
48	6,160	21,410	20,300	18,670	16,160
60	6,000	20,210	18,670	15,520	12,390
72	5,620	18,970	16,160	12,390	8,950
84	5,170	16,950	13,630	9,470	6,580
96	4,690	14,890	11,190	7,250	5,040
108	4,170	12,850	8,950	5,730	3,980
120	3,690	10,900	7,250	4,640	**
144	2,930	7,630	5,040	**	**

P1000/P1001 - Elements of Section

Parameter	P1000		P1001	
Area of Section	0.555	In^2	1.111	In^2
Axis 1-1				
Moment of Inertia (I)	0.185	In^4	0.928	In^4
Section Modulus (S)	0.262	In^3	0.571	In^3
Radius of Gyration (r)	0.577	In	0.914	In
Axis 2-2				
Moment of Inertia (I)	0.236	In^4	0.471	In^4
Section Modulus (S)	0.290	In^3	0.580	In^3
Radius of Gyration (r)	0.651	In	0.651	In

Notes:

* Load limited by spot weld shear.

. / » U !

NR = Not Recommended.

1. Beam loads are given in total uniform load (W Lbs) not uniform load (w lbs/ft or w lbs/in).
2. Beam loads are based on a simple span and assumed to be adequately laterally braced. Unbraced spans can reduce beam load carrying capacity. Refer to Page for reduction factors for unbraced lengths.
3. For pierced channel, multiply beam loads by the following factor:

"KO" Series.....95% **"T" Series 85%**
"HS" Series .....90% **"SL" Series.....85%**
"H3" Series.....90% **"DS" Series.....70%**
"WT" Series.....85%

4. Deduct channel weight from the beam loads.
5. For concentrated midspan point loads, multiply beam loads by 50% and the corresponding deflection by 80%. For other load conditions refer to page 18.
6. All beam loads are for bending about Axis 1-1.

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P5501

$M_{a\_Unfactored} := 28940\ in \cdot lbf$

$I_x := 2.805\ in^4$

$L := 77 \cdot in$ Maximum span

$C_{Unbr} := 0.85$ Unbraced length factor

$C_{Pierce} := 1$ Pierced channel factor

$M_a := M_{a\_Unfactored} \cdot C_{Unbr} \cdot C_{Pierce} = 24599\ in \cdot lbf$

$M_R := \frac{T_{R\_Trap} \cdot L}{4} = 24062.5\ in \cdot lbf$

$\Delta := \frac{T_{R\_Trap} \cdot L^3}{48 \cdot E \cdot I_x} = 0.15\ in$

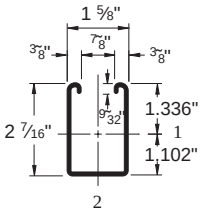
$\Delta_{max} := 0.25 \cdot in$

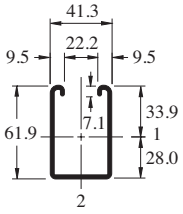
$Design := \left\| \begin{array}{l} \text{if } M_a > M_R \\ \quad \left\| \begin{array}{l} \text{if } \Delta < \Delta_{max} \\ \quad \left\| \text{"OK"} \right. \\ \text{else} \\ \quad \left\| \text{"NG"} \right. \end{array} \right. \\ \text{else} \\ \quad \left\| \text{"NG"} \right. \end{array} \right. = \text{"OK"}$

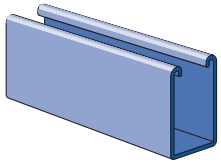
.:Use P5501 for L=77in max

P5500

GR PG



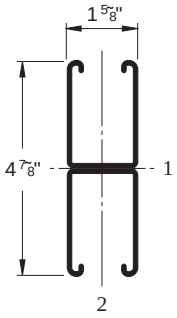


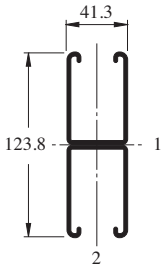


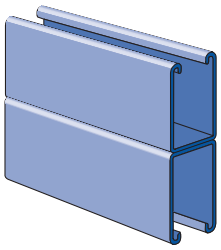
Wt/100 Ft: 247 Lbs (367 kg/100 m)
Allowable Moment 9,820 In-Lbs (1,110 NŁm)
12 Gauge Nominal Thickness .105" (2.7mm)

P5501

GR PG





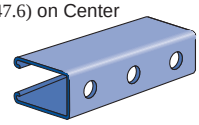


Wt/100 Ft: 494 Lbs (734 kg/100 m)
Allowable Moment 28,940 In-Lbs (3,270 NŁm)
12 Gauge Nominal Thickness .105" (2.7mm)

P5500 HS

GR PG

9/16" (14.3) Dia. Holes
1 7/8" (47.6) on Center

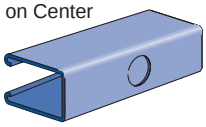


Wt/100 Ft: 242 Lbs (360 kg/100 m)

P5500 KO

GR PG

7/8" (22.2) Knockouts
6" (152.4) on Center

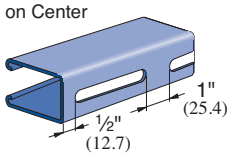


Wt/100 Ft: 247 Lbs (368 kg/100 m)

P5500 SL

GR PG

Slots are
3" (76.2) x 13/32" (10.3)
4" (101.6) on Center

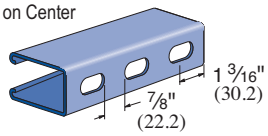


Wt/100 Ft: 242 Lbs (360 kg/100 m)

P5500 T

GR PG

Slots are
1 1/8" (28.6) x 9/16" (14.3)
2" (50.8) on Center

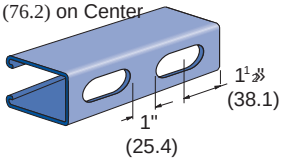


Wt/100 Ft: 242 Lbs (360 kg/100 m)

P5500 WT

DF GR HG PG PL

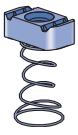
Slots are
2" (50.8) x 11/16" (17.5)
3" (76.2) on Center



Wt/100 Ft: 242 Lbs (360 kg/100 m)

Channel Nuts (Refer to Pages 73,74 for Details)

See Page 73, 74



P5506-0832
P5506-1024
P5506-1420
P5507
P5508
P5509
P5510

P1006T1420
P1008T
P1010T

P1012
P1023
P1024

P3006-0832
P3006-1024
P3006-1420
P3007
P3008
P3009
P3010

P3016-0632
P3016-0832
P3016-1024
P3016-1420

Channel Finishes: PL, GR, HG, PG, ZD; Standard Lengths: 10' & 20'

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email: CustomerService@strutandsupply.com

P5500 - Beam Loading

Span In	Max Allowable Uniform Load Lbs	Defl. at Uniform Load In	Uniform Loading at Deflection Span/180 Lbs	Span/240 Lbs	Span/360 Lbs
24	3,270	0.04	3,270	3,270	3,270
36	2,180	0.09	2,180	2,180	2,180
48	1,640	0.15	1,640	1,640	1,420
60	1,310	0.24	1,310	1,310	910
72	1,090	0.34	1,090	950	630
84	940	0.47	930	700	470
96	820	0.61	710	530	360
108	730	0.78	560	420	280
120	650	0.95	460	340	230
144	550	1.39	320	240	160
168	470	1.89	230	170	120
192	410	2.46	180	130	90
216	360	3.07	140	110	70
240	330	3.86	110	90	60

P5501 - Beam Loading

Span In	Max Allowable Uniform Load Lbs	Defl. at Uniform Load In	Uniform Loading at Deflection Span/180 Lbs	Span/240 Lbs	Span/360 Lbs
24	5,220*	0.01	5,220*	5,220*	5,220*
36	5,220*	0.04	5,220*	5,220*	5,220*
48	4,820	0.08	4,820	4,820	4,820
60	3,860	0.13	3,860	3,860	3,860
72	3,220	0.19	3,220	3,220	3,220
84	2,760	0.26	2,760	2,760	2,500
96	2,410	0.34	2,410	2,410	1,920
108	2,140	0.42	2,140	2,140	1,510
120	1,930	0.52	1,930	1,840	1,230
144	1,610	0.76	1,610	1,280	850
168	1,380	1.03	1,250	940	630
192	1,210	1.35	960	720	480
216	1,070	1.70	760	570	380
240	960	2.09	610	460	310

P5500 - Column Loading

Unbraced Height In	Maximum Allowable Load at Slot Face Lbs	Maximum Column Load Applied at C.G. K = 0.65 Lbs	K = 0.80 Lbs	K =1.0 Lbs	K = 1.2 Lbs
24	4,640	13,840	12,570	10,840	9,190
36	3,970	11,050	9,190	7,030	5,370
48	3,180	8,420	6,390	4,620	3,630
60	2,550	6,250	4,620	3,450	2,780
72	2,120	4,790	3,630	2,780	2,260
84	1,810	3,890	3,010	2,330	1,910
96	1,580	3,290	2,580	2,020	1,650
108	1,400	2,860	2,260	1,770	1,440
120	1,270	2,530	2,020	1,580	**
144	1,060	2,070	1,650	**	**
168	920	1,750	1,380	**	**

P5501 - Column Loading

Unbraced Height In	Maximum Allowable Load at Slot Face Lbs	Maximum Column Load Applied at C.G. K = 0.65 Lbs	K = 0.80 Lbs	K =1.0 Lbs	K = 1.2 Lbs
24	8,580	31,810	30,880	29,520	28,100
36	8,350	29,700	28,100	26,000	24,070
48	8,080	27,390	25,330	22,910	20,940
60	7,720	25,170	22,910	20,510	17,170
72	7,270	23,190	20,940	17,170	12,700
84	6,780	21,510	18,740	13,430	9,330
96	6,130	20,110	15,630	10,290	7,150
108	5,450	17,750	12,700	8,130	5,650
120	4,800	15,260	10,290	6,590	**
144	3,760	10,830	7,150	**	**
168	2,970	7,950	5,250	**	**

P5500/P5501 - Elements of Section

Parameter	P5500		P5501	
Area of Section	0.726	In^2	1.452	In^2
Axis 1-1				
Moment of Inertia (I)	0.522	In^4	2.805	In^4
Section Modulus (S)	0.390	In^3	1.151	In^3
Radius of Gyration (r)	0.848	In	1.390	In
Axis 2-2				
Moment of Inertia (I)	0.334	In^4	0.669	In^4
Section Modulus (S)	0.411	In^3	0.823	In^3
Radius of Gyration (r)	0.679	In	0.679	In

Notes:

* Load limited by spot weld shear.

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NR = Not Recommended.

1. Beam loads are given in total uniform load (W Lbs) not uniform load (w lbs/ft or w lbs/in).
2. Beam loads are based on a simple span and assumed to be adequately laterally braced. Unbraced spans can reduce beam load carrying capacity. Refer to Page 62 for reduction factors for unbraced lengths.
3. For pierced channel, multiply beam loads by the following factor:

"KO" Series.....95% **"T" Series 85%**
"HS" Series .....90% **"SL" Series.....85%**
"WT" Series.....85%

4. Deduct channel weight from the beam loads.
5. For concentrated midspan point loads, multiply beam loads by 50% and the corresponding deflection by 80%. For other load conditions refer to page 18.
6. All beam loads are for bending about Axis 1-1.

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email: CustomerService@strutandsupply.com

P5001

$M_{a\_Unfactored} := 48180\ in \cdot lbf$

$I_x := 6.227\ in^4$

$L := 100 \cdot in$ Maximum span

$C_{Unbr} := 0.66$ Unbraced length factor

$C_{Pierce} := 1$ Pierced channel factor

$M_a := M_{a\_Unfactored} \cdot C_{Unbr} \cdot C_{Pierce} = 31798.8\ in \cdot lbf$

$M_R := \frac{T_{R\_Trap} \cdot L}{4} = 31250\ in \cdot lbf$

$\Delta := \frac{T_{R\_Trap} \cdot L^3}{48 \cdot E \cdot I_x} = 0.14\ in$

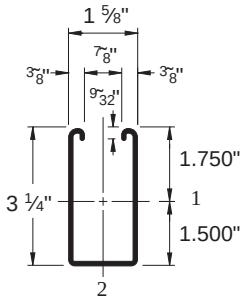
$\Delta_{max} := 0.25 \cdot in$

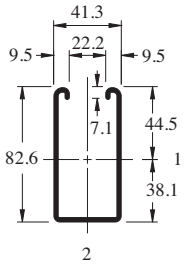
$$Design := \left\| \begin{array}{l} \text{if } M_a > M_R \\ \quad \left\| \begin{array}{l} \text{if } \Delta < \Delta_{max} \\ \quad \left\| \text{"OK"} \right. \\ \text{else} \\ \quad \left\| \text{"NG"} \right. \end{array} \right. \\ \text{else} \\ \quad \left\| \text{"NG"} \right. \end{array} \right. = \text{"OK"}$$

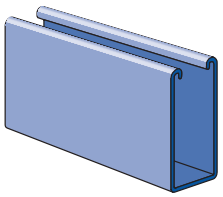
.:Use P5001 for L=100in max

P5000

DF GR PL PG



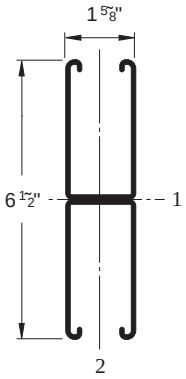


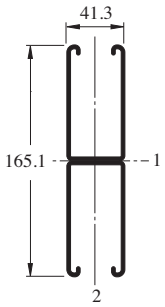


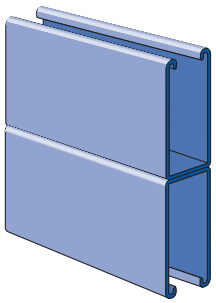
Wt/100 Ft: 305 Lbs (454 kg/100 m)
Allowable Moment 15,770 In-Lbs (1,780 NŁm)
12 Gauge Nominal Thickness .105" (2.7mm)

P5001

DF GR PG



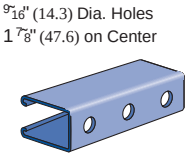




Wt/100 Ft: 610 Lbs (907 kg/100 m)
Allowable Moment 48,180 In-Lbs (5,440 NŁm)
12 Gauge Nominal Thickness .105" (2.7mm)

P5000 HS

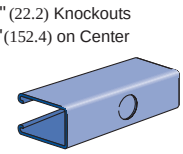
GR PG



Wt/100 Ft: 300 Lbs (446 kg/100 m)

P5000 KO

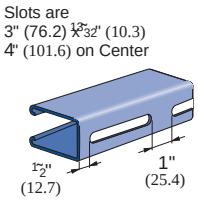
GR PG



Wt/100 Ft: 305 Lbs (454 kg/100 m)

P5000 SL

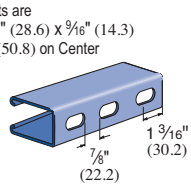
GR PG



Wt/100 Ft: 300 Lbs (446 kg/100 m)

P5000 T

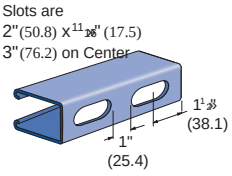
DF GR PG



Wt/100 Ft: 300 Lbs (446 kg/100 m)

P5000 WT

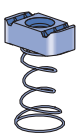
DF GR HG PG PL



Wt/100 Ft: 300 Lbs (446 kg/100 m)

Channel Nuts (Refer to Pages 73,74 for Details)

See Page 73, 74



P5506-0832
P5506-1024
P5506-1420
P5507
P5508
P5509
P5510

P1006T1420
P1008T
P1010T

P1012
P1023
P1024

P3006-0832
P3006-1024
P3006-1420
P3007
P3008
P3009
P3010

P3016-0632
P3016-0832
P3016-1024
P3016-1420

Channel Finishes: DF, PL, GR, HG, PG, ZD; Standard Lengths: 10' & 20'

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P5000 - Beam Loading

Span In	Max Allowable Uniform Load Lbs	Defl. at Uniform Load In	Uniform Loading at Deflection Span/180 Lbs	Span/240 Lbs	Span/360 Lbs
24	5,260	0.03	5,260	5,260	5,260
36	3,500	0.07	3,500	3,500	3,500
48	2,630	0.12	2,630	2,630	2,630
60	2,100	0.18	2,100	2,100	1,920
72	1,750	0.26	1,750	1,750	1,330
84	1,500	0.36	1,500	1,470	980
96	1,310	0.47	1,310	1,120	750
108	1,170	0.59	1,170	890	590
120	1,050	0.73	960	720	480
144	880	1.06	670	500	330
168	750	1.43	490	370	240
192	660	1.88	370	280	190
216	580	2.35	300	220	150
240	530	2.95	240	180	120

P5001 - Beam Loading

Span In	Max Allowable Uniform Load Lbs	Defl. at Uniform Load In	Uniform Loading at Deflection Span/180 Lbs	Span/240 Lbs	Span/360 Lbs
24	6,890*	0.01	6,890*	6,890*	6,890*
36	6,890*	0.02	6,890*	6,890*	6,890*
48	6,890*	0.05	6,890*	6,890*	6,890*
60	6,420	0.10	6,420	6,420	6,420
72	5,350	0.14	5,350	5,350	5,350
84	4,590	0.19	4,590	4,590	4,590
96	4,020	0.25	4,020	4,020	4,020
108	3,570	0.32	3,570	3,570	3,360
120	3,210	0.39	3,210	3,210	2,720
144	2,680	0.57	2,680	2,680	1,890
168	2,290	0.77	2,290	2,080	1,390
192	2,010	1.01	2,010	1,590	1,060
216	1,780	1.27	1,680	1,260	840
240	1,610	1.58	1,360	1,020	680

P5000 - Column Loading

Unbraced Height In	Maximum Allowable Load at Slot Face Lbs	Maximum Column Load Applied at C.G. K = 0.65 Lbs	K = 0.80 Lbs	K =1.0 Lbs	K = 1.2 Lbs
24	5,650	16,870	15,180	12,850	10,600
36	4,690	13,140	10,600	7,650	5,660
48	3,560	9,550	6,860	4,790	3,660
60	2,730	6,680	4,790	3,450	2,710
72	2,160	4,980	3,660	2,710	2,170
84	1,760	3,950	2,960	2,240	1,820
96	1,500	3,270	2,500	1,930	1,580
108	1,310	2,800	2,170	1,690	1,390
120	1,170	2,450	1,930	1,510	**
144	980	1,980	1,580	**	**
168	850	1,670	1,340	**	**

P5001 - Column Loading

Unbraced Height In	Maximum Allowable Load at Slot Face Lbs	Maximum Column Load Applied at C.G. K = 0.65 Lbs	K = 0.80 Lbs	K =1.0 Lbs	K = 1.2 Lbs
24	10,670	39,230	38,030	36,210	34,240
36	10,350	36,450	34,240	31,200	28,260
48	9,940	33,220	30,200	26,430	23,190
60	9,290	29,950	26,430	22,470	19,380
72	8,560	26,880	23,190	19,380	16,450
84	7,860	24,140	20,520	17,040	12,090
96	7,220	21,790	18,370	13,330	9,250
108	6,600	19,790	16,450	10,530	7,310
120	5,760	18,130	13,330	8,530	**
144	4,390	14,020	9,250	**	**
168	3,420	10,300	6,800	**	**

P5000/P5001 - Elements of Section

Parameter	P5000		P5001	
Area of Section	0.897	In^2	1.793	In^2
Axis 1-1				
Moment of Inertia (I)	1.098	In^4	6.227	In^4
Section Modulus (S)	0.627	In^3	1.916	In^3
Radius of Gyration (r)	1.107	In	1.864	In
Axis 2-2				
Moment of Inertia (I)	0.433	In^4	0.866	In^4
Section Modulus (S)	0.533	In^3	1.066	In^3
Radius of Gyration (r)	0.695	In	0.695	In

Notes:

* Load limited by spot weld shear.

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NR = Not Recommended.

1. Beam loads are given as total uniform load (W Lbs) not uniform load (w lbs/ft or w lbs/in).
2. Beam loads are based on a simple span and assumed to be adequately laterally braced. Unbraced spans can reduce beam load carrying capacity. Refer to Page for reduction factors for unbraced lengths.
3. For pierced channel, multiply beam loads by the following factor:

"KO" Series.....95% **"T" Series 85%**
"HS" Series .....90% **"SL" Series.....85%**
"WT" Series.....85%

4. Deduct channel weight from the beam loads.
5. For concentrated midspan point loads, multiply beam loads by 50% and the corresponding deflection by 80%. For other load conditions refer to page 18.
6. All beam loads are for bending about Axis 1-1.

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Brace

Load in tension/compression

$$P_{R1} := \frac{0.7 \cdot F_p}{\cos\left(\frac{60 \cdot \pi}{180}\right) \cdot 2} = 24.7 \ lbf$$

$$P_{R2} := \frac{V_{Trans}}{\cos\left(\frac{60 \cdot \pi}{180}\right) \cdot 2} = 210 \ lbf$$

$$P_R := \max\left(P_{R1}, P_{R2}\right) = 210 \ lbf$$

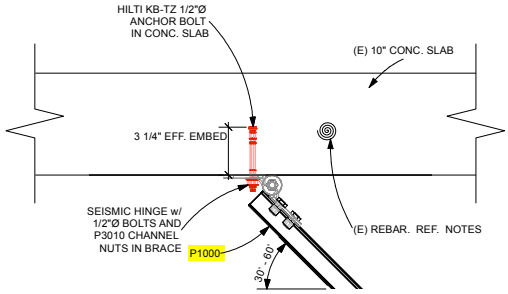
Check capacity at min brace angle = 30° as worst case

Try Unistrut P1000 for L=(3.08ft)/tan(30) = 7.3ft => use 6ft

Per Unistrut

$$P_a := 2080 \ lbf$$

$$Design := \left\| \begin{array}{l} \text{if } P_a > P_R \\ \quad \text{“OK”} \\ \text{else} \\ \quad \text{“NG”} \end{array} \right\| = \text{“OK”}$$



.:Use P1000 brace

P1000 - Beam Loading

Span In	Max. Allowable Uniform Load Lbs	Defl. at Uniform Load In	Uniform Loading at Deflection Span/180 Lbs	Span/240 Lbs	Span/360 Lbs
24	1,690	0.06	1,690	1,690	1,690
36	1,130	0.13	1,130	1,130	900
48	850	0.22	850	760	500
60	680	0.35	650	480	320
72	560	0.50	450	340	220
84	480	0.68	330	250	160
96	420	0.89	250	190	130
108	380	1.14	200	150	100
120	340	1.40	160	120	80
144	280	2.00	110	80	60
168	240	2.72	80	60	40
192	210	3.55	60	50	NR
216	190	4.58	50	40	NR
240	170	5.62	40	NR	NR

P1001 - Beam Loading

Span In	Max. Allowable Uniform Load Lbs	Defl. at Uniform Load In	Uniform Loading at Deflection Span/180 Lbs	Span/240 Lbs	Span/360 Lbs
24	3,500*	0.02	3,500*	3,500*	3,500*
36	3,190	0.07	3,190	3,190	3,190
48	2,390	0.13	2,390	2,390	2,390
60	1,910	0.20	1,910	1,910	1,620
72	1,600	0.28	1,600	1,600	1,130
84	1,370	0.39	1,370	1,240	830
96	1,200	0.51	1,200	950	630
108	1,060	0.64	1,000	750	500
120	960	0.79	810	610	410
144	800	1.14	560	420	280
168	680	1.53	410	310	210
192	600	2.02	320	240	160
216	530	2.54	250	190	130
240	480	3.16	200	150	100

P1000 - Column Loading

Unbraced Height In	Max. Allowable Load at Slot Face Lbs	Maximum Column Load Applied at C.G. K = 0.65 Lbs	K = 0.80 Lbs	K =1.0 Lbs	K = 1.2 Lbs
24	3,550	10,740	9,890	8,770	7,740
36	3,190	8,910	7,740	6,390	5,310
48	2,770	7,260	6,010	4,690	3,800
60	2,380	5,910	4,690	3,630	2,960
72	2,080	4,840	3,800	2,960	2,400
84	1,860	4,040	3,200	2,480	1,980
96	1,670	3,480	2,750	2,110	1,660
108	1,510	3,050	2,400	1,810	**
120	1,380	2,700	2,110	**	**
144	1,150	2,180	1,660	**	**

P1001 - Column Loading

Unbraced Height In	Max. Allowable Load at Slot Face Lbs	Maximum Column Load Applied at C.G. K = 0.65 Lbs	K = 0.80 Lbs	K =1.0 Lbs	K = 1.2 Lbs
24	6,430	24,280	23,610	22,700	21,820
36	6,290	22,810	21,820	20,650	19,670
48	6,160	21,410	20,300	18,670	16,160
60	6,000	20,210	18,670	15,520	12,390
72	5,620	18,970	16,160	12,390	8,950
84	5,170	16,950	13,630	9,470	6,580
96	4,690	14,890	11,190	7,250	5,040
108	4,170	12,850	8,950	5,730	3,980
120	3,690	10,900	7,250	4,640	**
144	2,930	7,630	5,040	**	**

P1000/P1001 - Elements of Section

Parameter	P1000		P1001	
Area of Section	0.555	In^2	1.111	In^2
Axis 1-1				
Moment of Inertia (I)	0.185	In^4	0.928	In^4
Section Modulus (S)	0.202	In^3	0.571	In^3
Radius of Gyration (r)	0.577	In	0.914	In
Axis 2-2				
Moment of Inertia (I)	0.236	In^4	0.471	In^4
Section Modulus (S)	0.290	In^3	0.580	In^3
Radius of Gyration (r)	0.651	In	0.651	In

Notes:

* Load limited by spot weld shear.

** KL/r > 200

NR = Not Recommended.

1. Beam loads are given in *total* uniform load (W Lbs) not uniform load (w lbs/ft or w lbs/in).
2. Beam loads are based on a simple span and assumed to be adequately laterally braced. Unbraced spans can reduce beam load carrying capacity. Refer to Page 62 for reduction factors for unbraced lengths.
3. For pierced channel, multiply beam loads by the following factor:

"KO" Series.....95%
"HS" Series 90%
"H3" Series.....90%
"WT" Series.....85%
"T" Series 85%
"SL" Series.....85%
"DS" Series.....70%

4. Deduct channel weight from the beam loads.
5. For concentrated midspan point loads, multiply beam loads by 50% and the corresponding deflection by 80%. For other load conditions refer to page 18.
6. All beam loads are for bending about Axis 1-1.

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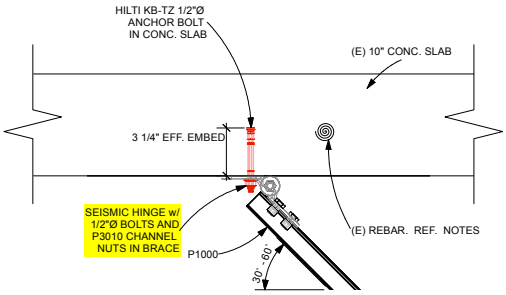
Check brace anchorage

$V_R := P_R = 210$ ***lbf***



Try Unistrut channel nut to brace

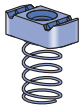
Per Unistrut

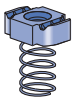
$V_a := 800$ ***lbf***

$$Design := \left\| \begin{array}{l} \text{if } V_a > V_R \\ \quad \| \text{“OK”} \\ \text{else} \\ \quad \| \text{“NG”} \end{array} \right\| = \text{“OK”}$$

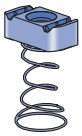
.:Use Unistrut channel nut

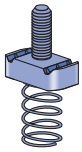
Channel Nuts With Spring


P1006 - P1010
Pg 73


P1012S - P1024S
Pg 73


P4006 - P4010
Pg 73


P5506 - P5510
Pg 73


P2378 - P2382
Pg 74

Channel Nuts Without Spring

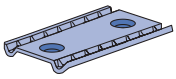

P3016
Pg 73


P3006 - P3013
Pg 73


P1012 - P1024
Pg 73


P4012 - P4023
Pg 73


P1006T - P1010T, P4010T
Pg 73


P4908
Pg 73


P1016
Pg 73

Hardware


HHCS
Pg 74


HFMS
Pg 74


HRMS
Pg 74


HSHS
Pg 74

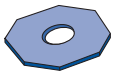

HCSS
Pg 74

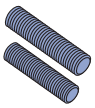

HSQN
Pg 75


HHXN
Pg 75


HFLW
Pg 75

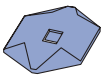

HLKW
Pg 75

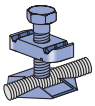

HOCW
Pg 76

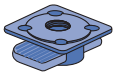

HTHR
Pg 75


HRCN
Pg 75


P2486
Pg 76


P2485
Pg 76


P2485K
Pg 76


K1062 - K1064
Pg 76

Maximum Allowable Pull-out And Slip Loads

Channel	Channel Nut Size-Thread	Gauge	Allowable Pull-Out Strength Lbs *(kN)*	Resistance to Slip Lbs *(kN)*	Torque Ft-Lbs *(N•m)*
P1000 P3000 P4400 P4526 P5000 P5500	⅞" - 9	12	2,500 *11.12*	1,700 *7.56*	*125 *170*
	¾" - 10	12	2,500 *11.12*	1,700 *7.56*	*125 *170*
	⅝" - 11	12	2,500 *11.12*	1,500 *6.67*	*100 *135*
	½" - 13	12	2,000 *8.90*	1,500 *6.67*	50 *70*
	7⁄16" - 14	12	1,400 *6.23*	1,000 *4.45*	35 *50*
	⅜" - 16	12	1,000 *4.45*	800 *3.56*	19 *25*
	5⁄16" - 18	12	800 *3.56*	500 *2.22*	11 *15*
	¼" - 20	12	600 *2.67*	300 *1.33*	6 *8*
P3300	½" - 13	12	1,500 *6.67*	1,500 *6.67*	50 *70*
	⅜" - 16	12	1,000 *4.45*	800 *3.56*	19 *25*
	5⁄16" - 18	12	800 *3.56*	500 *2.22*	11 *15*
	¼" - 20	12	600 *2.67*	300 *1.33*	6 *8*

Channel	Channel Nut Size-Thread	Gauge	Allowable Pull-Out Strength Lbs *(kN)*	Resistance to Slip Lbs *(kN)*	Torque Ft-Lbs *(N•m)*
P1100 & P4100	½" - 13	14	1,400 *6.23*	1,000 *4.45*	50 *70*
	⅜" - 16	14	1,000 *4.45*	750 *3.34*	19 *25*
	5⁄16" - 18	14	800 *3.56*	400 *1.78*	11 *15*
	¼" - 20	14	600 *2.67*	300 *1.33*	6 *8*
P2000 & P4000	½" - 13	16	1,000 *4.45*	1,000 *4.54*	50 *70*
	⅜" - 16	16	1,000 *4.45*	750 *3.34*	19 *25*
	5⁄16" - 18	16	800 *3.56*	400 *1.78*	11 *15*
	¼" - 20	16	600 *2.67*	300 *1.33*	6 *8*

* May require ⅜" or ½" thick fitting.

Nut design loads include a minimum safety factor of 3.

Note: Refer to the Channel Nut Selection Chart on the following two pages for the part number.

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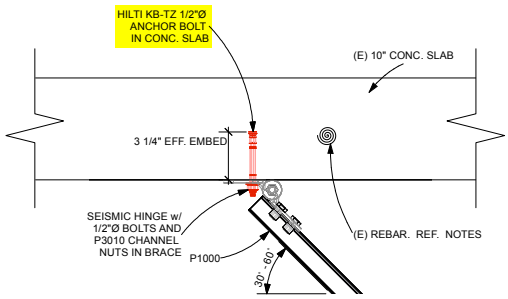
Try (1) 1/2" dia. Hilti KB-TZ to concrete deck

$$V_{U1} := \frac{F_p \cdot \Omega_o}{2} = 44.2 \ \textit{lbf}$$

$$V_{U2} := \frac{1.6 \cdot V_{Trans}}{2} = 168 \ \textit{lbf}$$

$$V_U := \max\left(V_{U1}, V_{U2}\right) = 168 \ \textit{lbf}$$

$$T_U := V_U \cdot \tan\left(\frac{60 \cdot \pi}{180}\right) = 291 \ \textit{lbf}$$



1/2" dia. Hilti KB-TZ2 ok by inspection due to lower tension load than threaded rod hanger

.:Use (1) 1/2" dia. Hilti KB-TZ (2" embed min)

PCS Structural Solutions

Project: 6000 SAM REHAB Job No:

Subject: Sheet Name: DCT

Originating Office: ☐ Seattle ☐ Tacoma ☐ Portland Date: 5/14/24

(E) FLOOR FRAMING

CONFIRM (E) FLOOR FRAMING CAN SUPPORT CEILING LIFTS

LOADS

$P_D = 150_{pcf}(10in/12) + 10 + 20_{psf} = 155_{psf}$

(10 = SUPERIMPOSED DL; 20 = PARTITION PER UBC)

$P_L = \begin{cases} 50\ psf & \text{AT ORIG BLDG} \\ 80\ psf & \text{AT ADDN} \end{cases}$

$P_D = 50^{\#}$

$P_L = \begin{cases} 1000^{\#} & \text{TYPICAL} \\ 700^{\#} & \text{LIFT W/ 4 LEGS} \end{cases}$ } CEILING LIFT

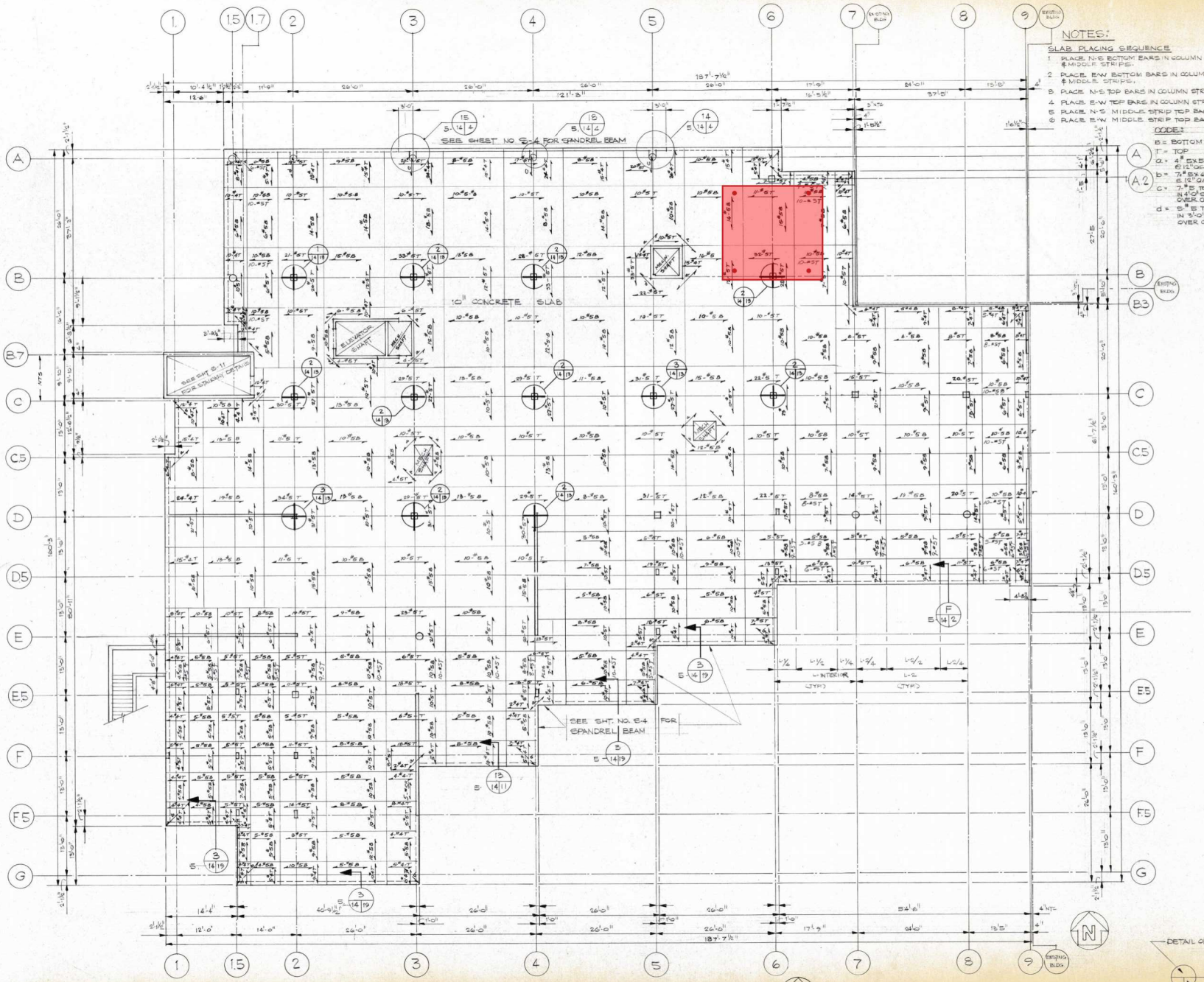
AT REHAB GYM

IN E/W

EXISTING

$V_u = \begin{cases} 21.91\ K & \text{SPAN 3, TYP} \\ 18.84\ K & \text{SPAN 4, TYP} \end{cases}$

$M_u = \begin{cases} 58.30'\text{-}K \\ 37.27'\text{-}K \end{cases}$



Kaplan/ McLaughlin/ Diaz
ARCHITECTS/PLANNERS
222 VALLEJO STREET
SAN FRANCISCO 94111
415-398-5191

BJSS
ARCHITECTS/PLANNERS
320 WEST BAY DRIVE
OLYMPIA, WASHINGTON
206-943-4650

STRUCTURAL ENGINEERS
HAROLD V. SARGENT & ASSOC
320 WEST BAY DRIVE
SUITE 218
OLYMPIA, WA. 98502
206-943-3590

MECHANICAL ENGINEERS
BENJAMIN S. NOTKIN & ASSOCIATES INC.
820 JOHN STREET
SEATTLE, WA. 98109
206-682-3611

ELECTRICAL ENGINEERS
SPARLING & ASSOC. INC.
1920 EASTLAKE AVE EAST
SEATTLE, WA. 98102
206-325-7770

GOOD SAMARITAN HOSPITAL

Puyallup, Washington

SHEET TITLE
LEVEL '1' FLAT SLAB PLAN

REVISIONS
NO. | DATE | DESCRIPTION

SCALE: NOTED
DATE: SEPT 5, 1980

SHEET: S-14

Project Title:
Engineer:
Project ID:
Project Descr:

General Beam Analysis

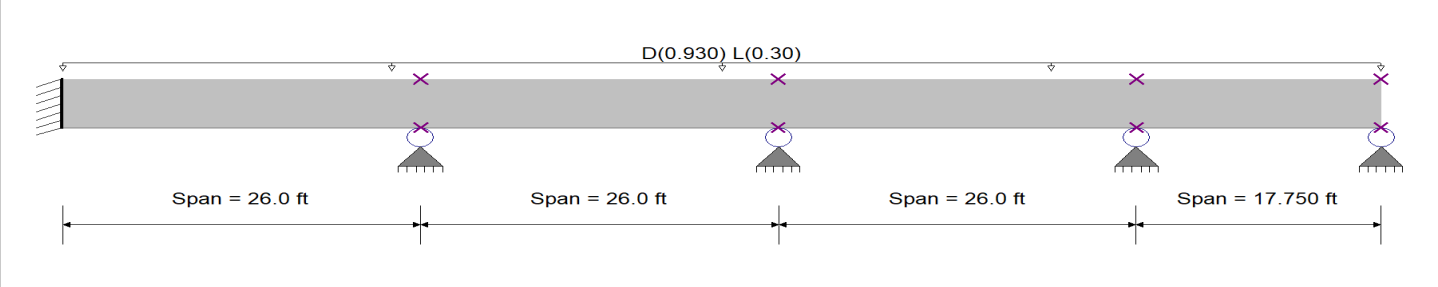
Project File: good sam rehab ceiling lifts.ec6

DESCRIPTION: PT Gym - E/W Existing 1000#

General Beam Properties

Elastic Modulus 29,000.0 ksi

Span #1	Span Length =	26.0 ft	Area =	10.0 in^2	Moment of Inertia =	100.0 in^4
Span #2	Span Length =	26.0 ft	Area =	10.0 in^2	Moment of Inertia =	100.0 in^4
Span #3	Span Length =	26.0 ft	Area =	10.0 in^2	Moment of Inertia =	100.0 in^4
Span #4	Span Length =	17.750 ft	Area =	10.0 in^2	Moment of Inertia =	100.0 in^4



Applied Loads

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

Loads on all spans...

Uniform Load on ALL spans : D = 0.1550, L = 0.050 k/ft, Tributary Width = 6.0 ft

DESIGN SUMMARY

Maximum Bending =	99.854 k-ft	Maximum Shear =	21.907 k
Load Combination	1.60L+0.50S+1.60H, LL Comb Run (L*L*)	Load Combination	1.60L+0.50S+1.60H, LL Comb Run (*LL*)
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 2
Location of maximum on span	0.000 ft	Location of maximum on span	26.000 ft

Maximum Deflection

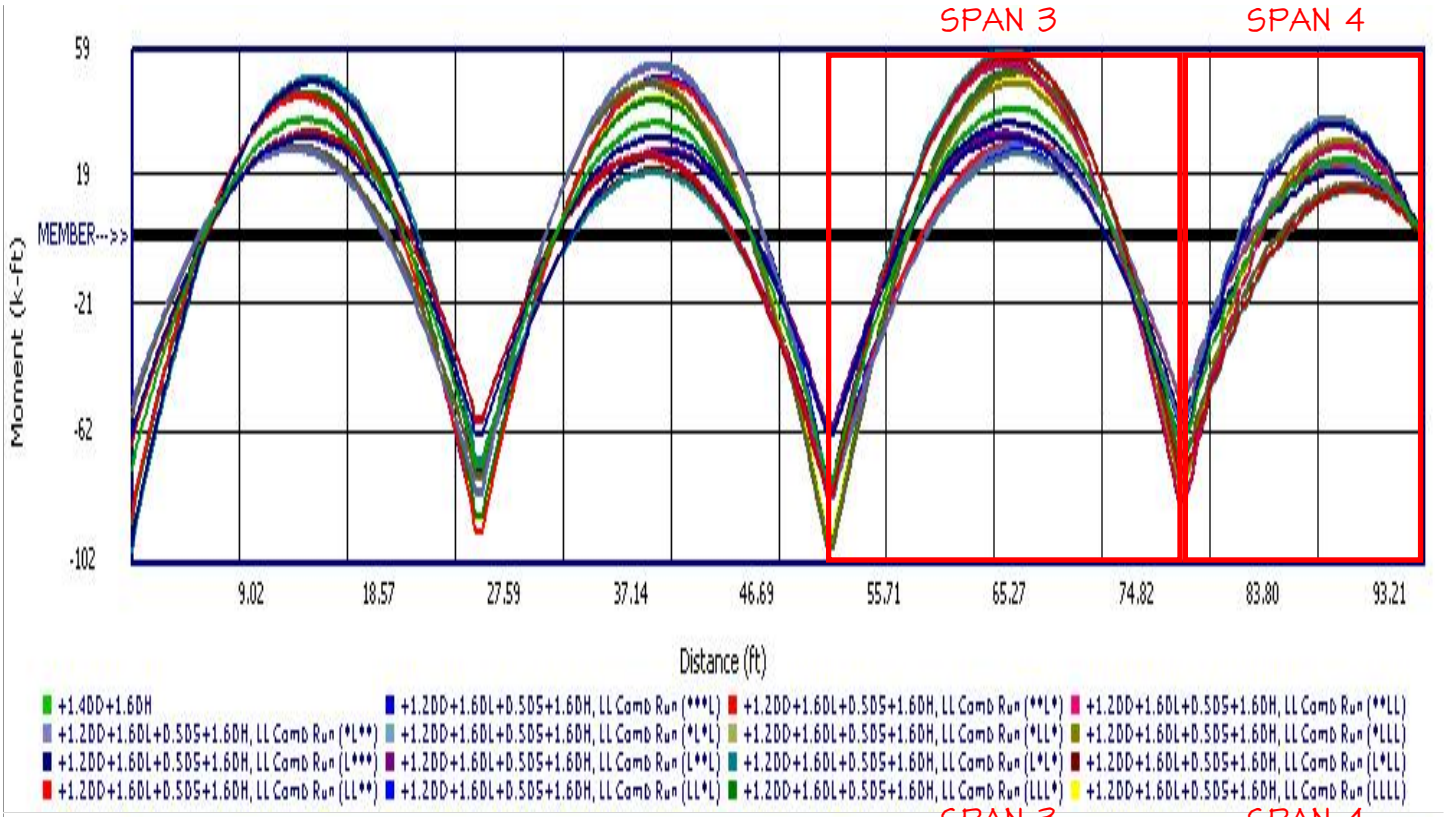
Max Downward Transient Deflection	1.343 in	232
Max Upward Transient Deflection	-0.345 in	904
Max Downward Total Deflection	1.343 in	232
Max Upward Total Deflection	-0.114 in	1869

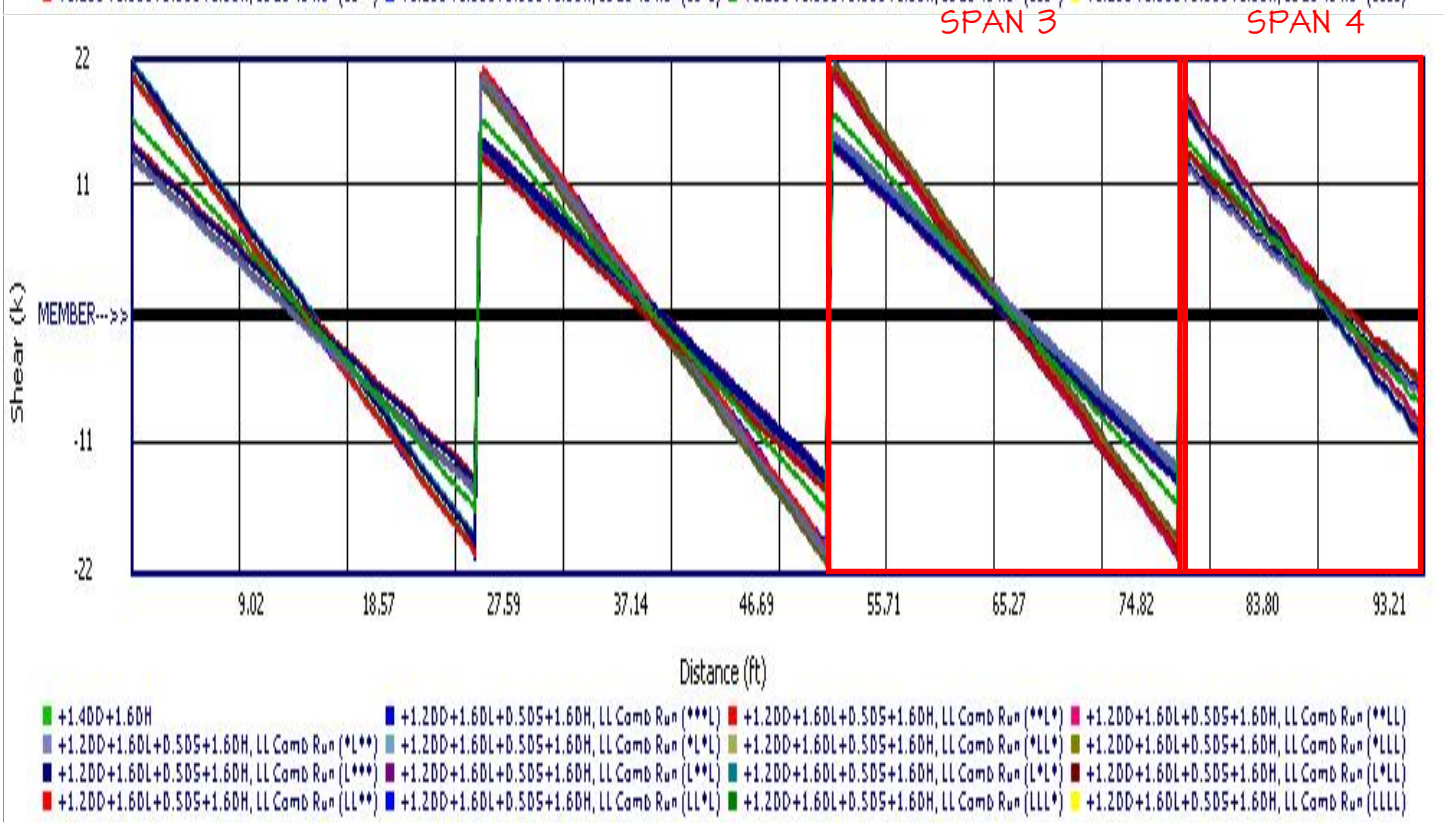
Project Title:
Engineer:
Project ID:
Project Descr:

General Beam Analysis

Project File: good sam rehab ceiling lifts.ec6

DESCRIPTION: PT Gym - E/W Existing 1000#



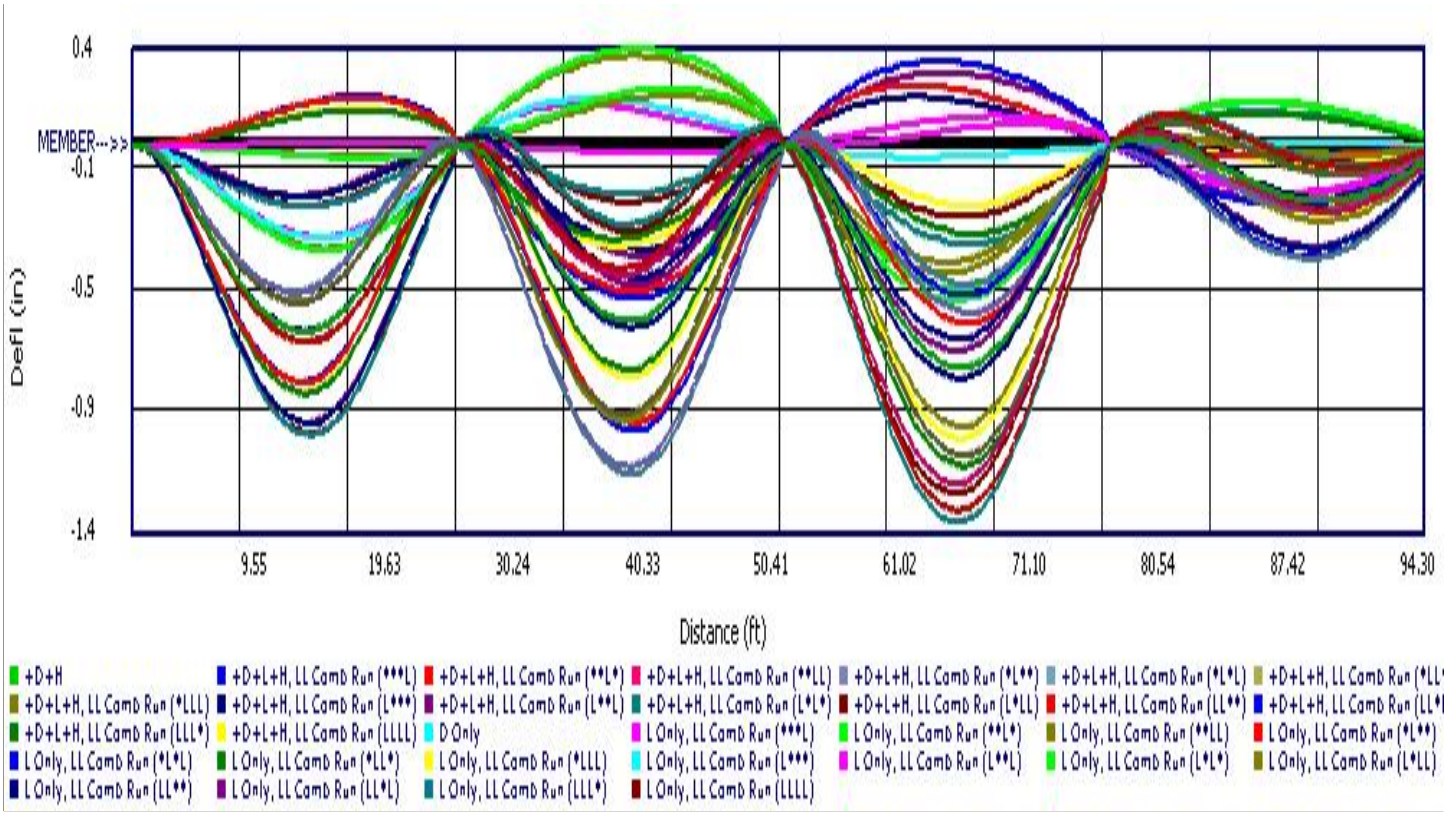


Project Title:
Engineer:
Project ID:
Project Descr:

General Beam Analysis

Project File: good sam rehab ceiling lifts.ec6

DESCRIPTION: PT Gym - E/W Existing 1000#



NEW

V_u = { 20.71k SPAN 3, TYP ≈ 5.5% DECREASE ∴ OK

NOTE: USE 75% OF LL AT FLR ABOVE FOR SPAN 3 ANALYSIS BECAUSE FULL LL PLUS FULL CEILING LIFT LOADING IS UNLIKELY

20.04k SPAN 4, TYP ≈ 6.4% INCREASE > 5% ∴ CHECK BY HAND }

M_u = { 56.67^{1-k} ≈ 2.8% DECREASE ∴ OK

40.48^{1-k} ≈ 8.6% INCREASE > 5% ∴ CHECK BY HAND }

CHECK SHEAR IN SPAN 4, ASSUME 6' WIDTH ENGAGED

$$\phi V_n = \phi\, 2\lambda \sqrt{f'_c}\, b_w d$$

WHERE $\phi = 0.75$

$f'_c = 4000\,psi$ PER GR 16 DWGS

$b_w = 72in$

$d = 10 - \underset{t_{COVER}}{3/4} - 1.5\underset{\pm\, \#5}{(5/8\,in)} = 8.31in$

$\therefore \phi V_n = 0.75(2)(1)\sqrt{4000\,psi}\,(72in)(8.31in)$

$= 56.76k > V_u$ ∴ OK

Project Title:
Engineer:
Project ID:
Project Descr:

General Beam Analysis

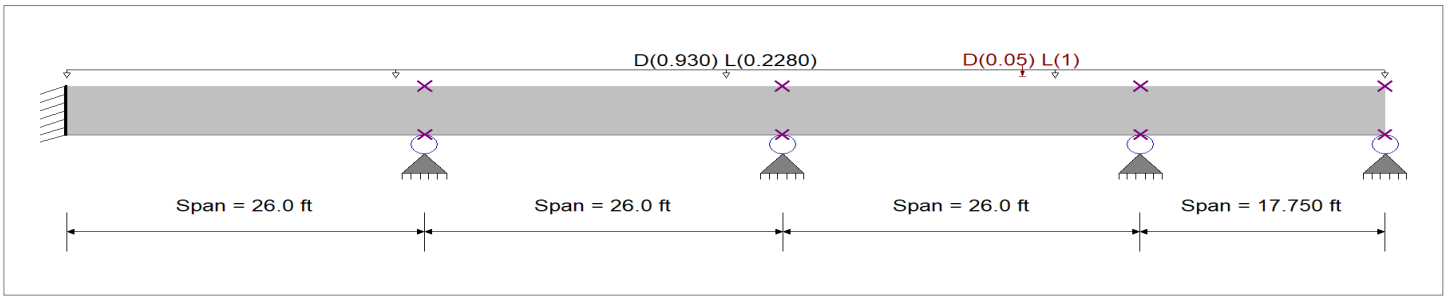
Project File: good sam rehab ceiling lifts.ec6

DESCRIPTION: PT Gym - E/W New 1000# Span 3

General Beam Properties

Elastic Modulus 29,000.0 ksi

Span #1	Span Length =	26.0 ft	Area =	10.0 in^2	Moment of Inertia =	100.0 in^4
Span #2	Span Length =	26.0 ft	Area =	10.0 in^2	Moment of Inertia =	100.0 in^4
Span #3	Span Length =	26.0 ft	Area =	10.0 in^2	Moment of Inertia =	100.0 in^4
Span #4	Span Length =	17.750 ft	Area =	10.0 in^2	Moment of Inertia =	100.0 in^4



Applied Loads

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

Loads on all spans...
Uniform Load on ALL spans : D = 0.1550, L = 0.0380 k/ft, Tributary Width = 6.0 ft

0.75*50psf

Load(s) for Span Number 3
Point Load : D = 0.050, L = 1.0 k @ 17.417 ft

DESIGN SUMMARY

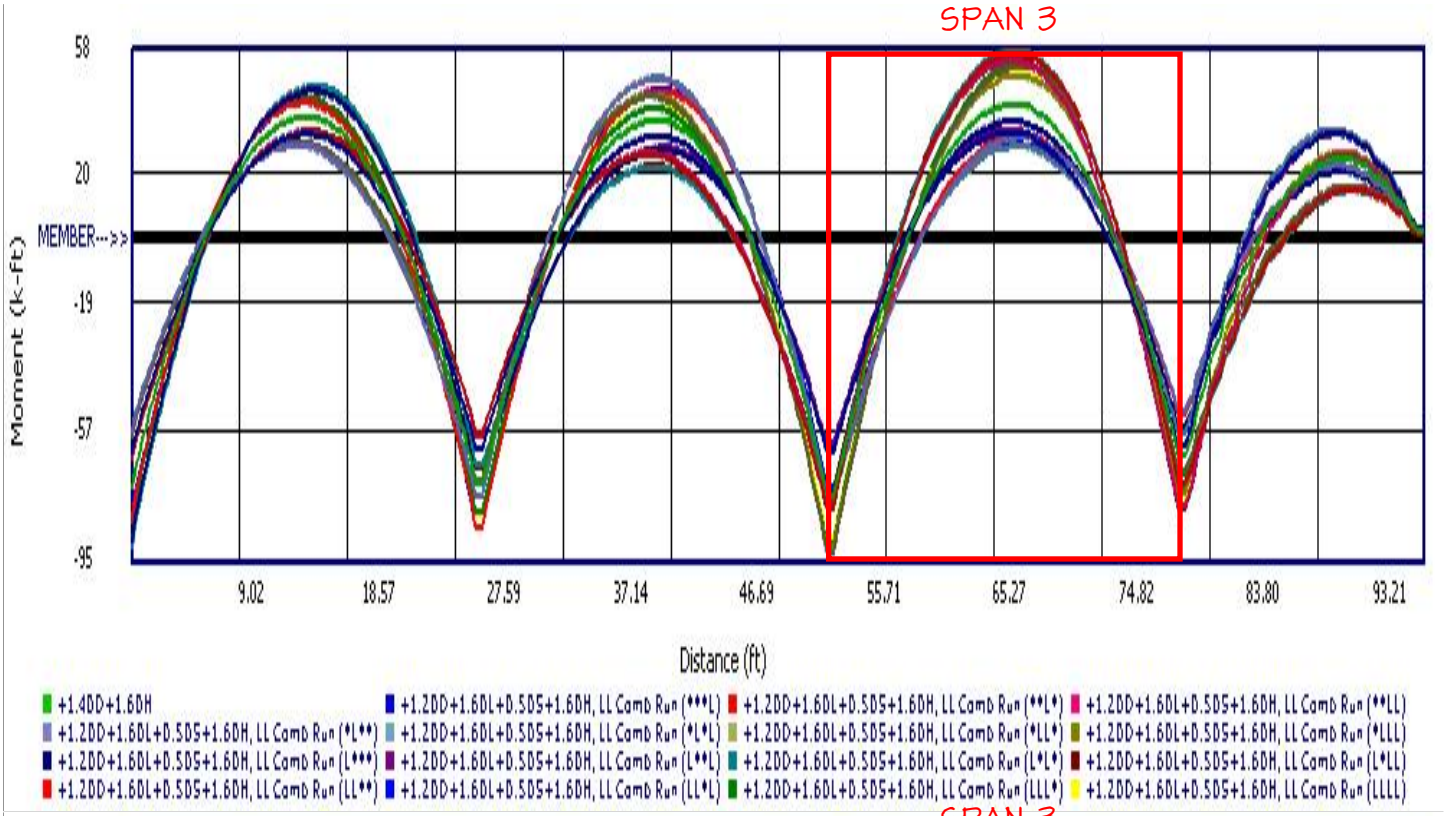
Maximum Bending =	93.011 k-ft	Maximum Shear =	20.711 k
Load Combination	1.60L+0.50S+1.60H, LL Comb Run (*LL*)	Load Combination	1.60L+0.50S+1.60H, LL Comb Run (*LL*)
Span # where maximum occurs	Span # 2	Span # where maximum occurs	Span # 2
Location of maximum on span	26.000 ft	Location of maximum on span	26.000 ft
Maximum Deflection			
Max Downward Transient Deflection	1.304 in	239	
Max Upward Transient Deflection	-0.288 in	1081	
Max Downward Total Deflection	1.304 in	239	
Max Upward Total Deflection	-0.110 in	1939	

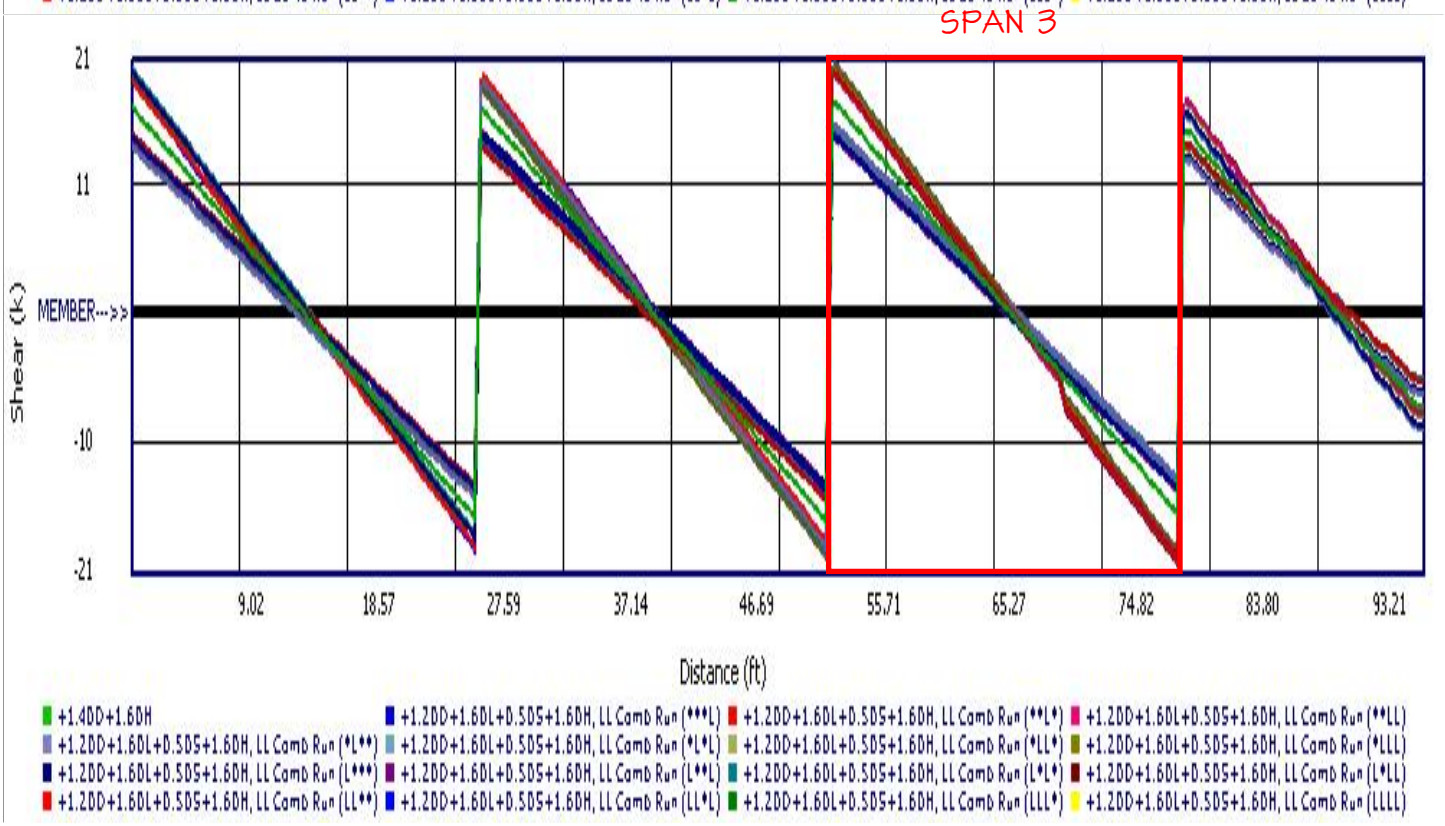
Project Title:
Engineer:
Project ID:
Project Descr:

General Beam Analysis

Project File: good sam rehab ceiling lifts.ec6

DESCRIPTION: PT Gym - E/W New 1000# Span 3



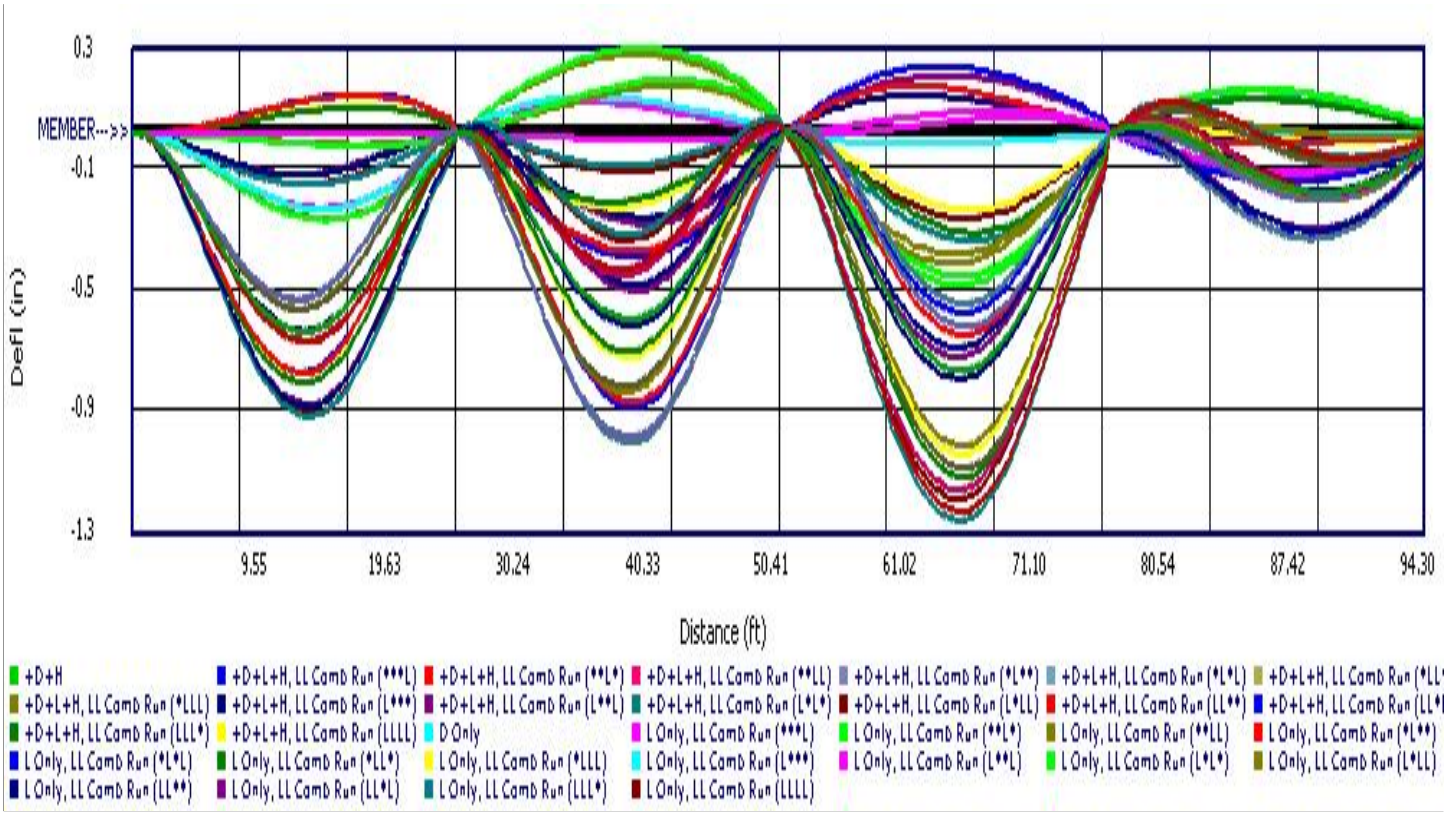


Project Title:
Engineer:
Project ID:
Project Descr:

General Beam Analysis

Project File: good sam rehab ceiling lifts.ec6

DESCRIPTION: PT Gym - E/W New 1000# Span 3



Project Title:
Engineer:
Project ID:
Project Descr:

General Beam Analysis

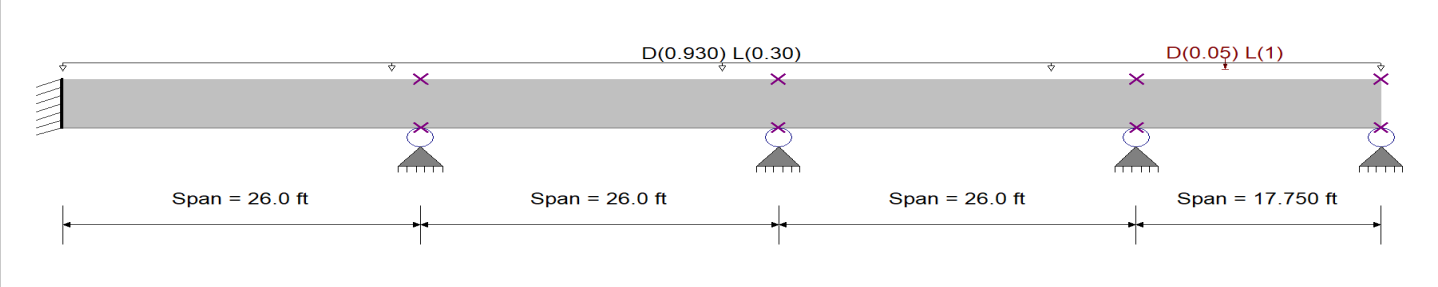
Project File: good sam rehab ceiling lifts.ec6

DESCRIPTION: PT Gym - E/W New 1000# Span 4

General Beam Properties

Elastic Modulus 29,000.0 ksi

Span #1	Span Length =	26.0 ft	Area =	10.0 in^2	Moment of Inertia =	100.0 in^4
Span #2	Span Length =	26.0 ft	Area =	10.0 in^2	Moment of Inertia =	100.0 in^4
Span #3	Span Length =	26.0 ft	Area =	10.0 in^2	Moment of Inertia =	100.0 in^4
Span #4	Span Length =	17.750 ft	Area =	10.0 in^2	Moment of Inertia =	100.0 in^4



Applied Loads

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

Loads on all spans...
Uniform Load on ALL spans : D = 0.1550, L = 0.050 k/ft, Tributary Width = 6.0 ft

Load(s) for Span Number 4
Point Load : D = 0.050, L = 1.0 k @ 6.417 ft

DESIGN SUMMARY

Maximum Bending =	99.850 k-ft	Maximum Shear =	21.902 k
Load Combination	1.40D+1.60L+0.50S+1.60H, LL Comb Run (L*L*)	Load Combination	1.40D+1.60L+0.50S+1.60H, LL Comb Run (*LL*)
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 2
Location of maximum on span	0.000 ft	Location of maximum on span	26.000 ft

Maximum Deflection

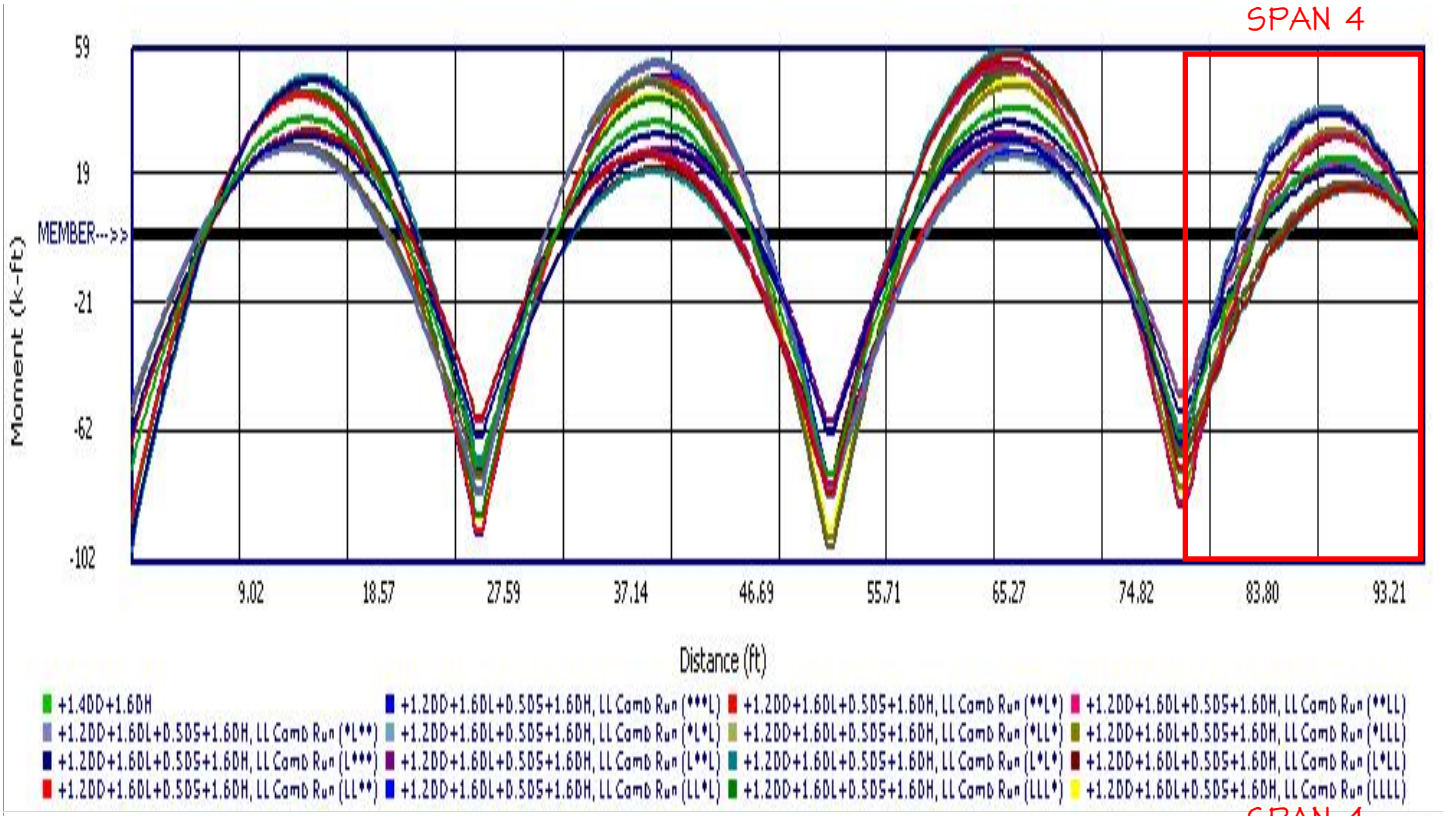
Max Downward Transient Deflection	1.341 in	232
Max Upward Transient Deflection	-0.345 in	904
Max Downward Total Deflection	1.341 in	232
Max Upward Total Deflection	-0.113 in	1889

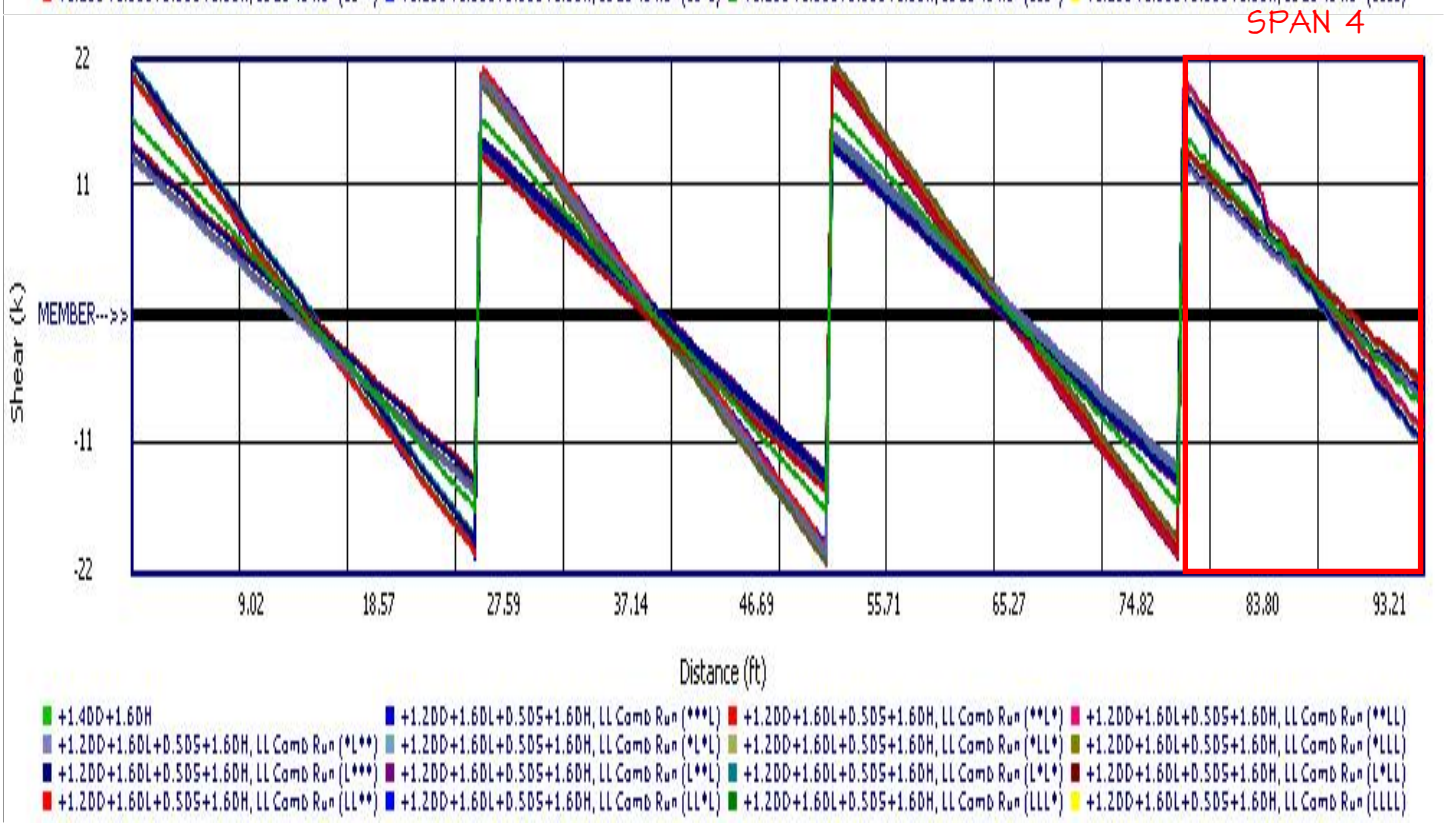
Project Title:
Engineer:
Project ID:
Project Descr:

General Beam Analysis

Project File: good sam rehab ceiling lifts.ec6

DESCRIPTION: PT Gym - E/W New 1000# Span 4



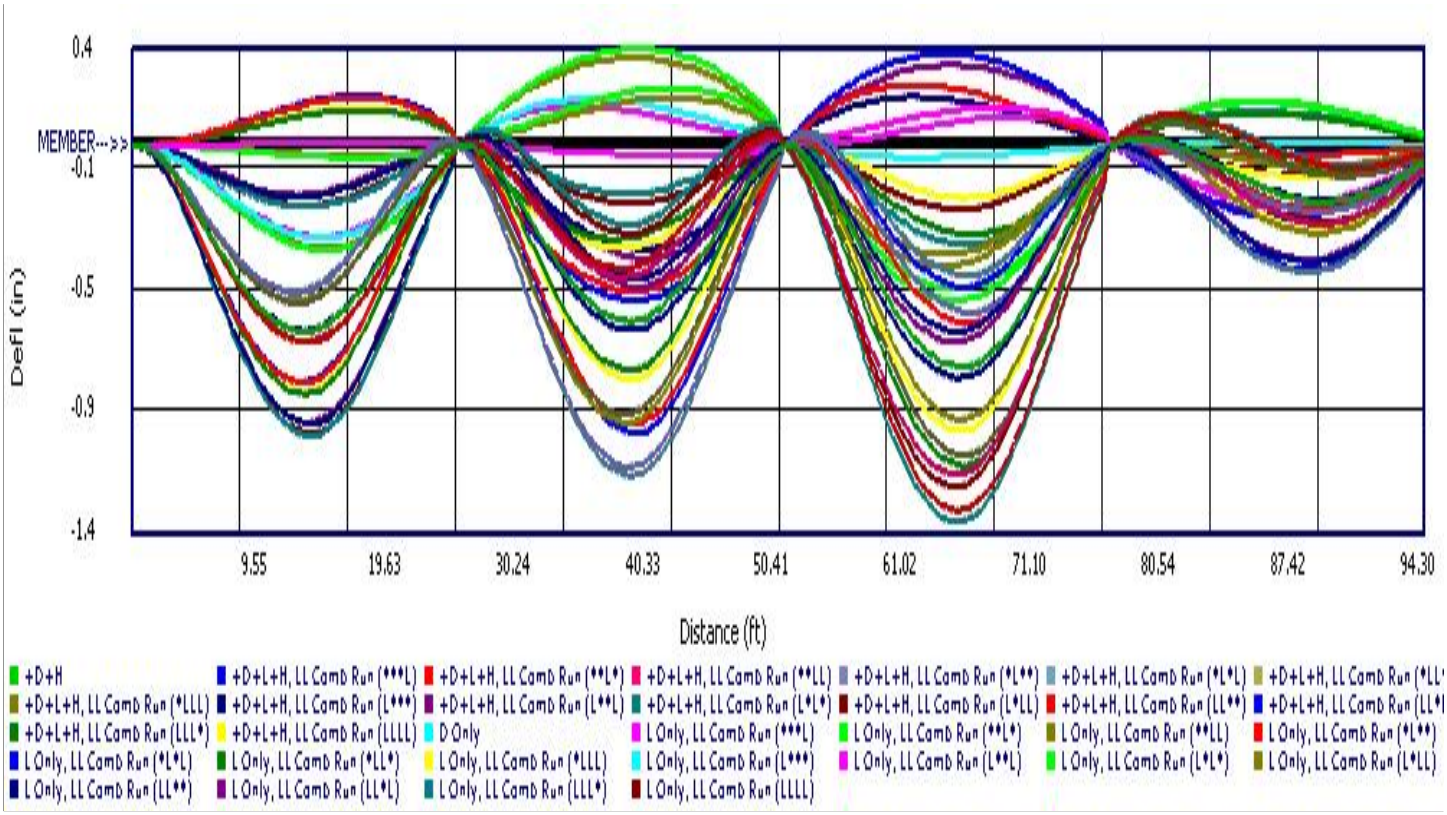


Project Title:
Engineer:
Project ID:
Project Descr:

General Beam Analysis

Project File: good sam rehab ceiling lifts.ec6

DESCRIPTION: PT Gym - E/W New 1000# Span 4



PCS Structural Solutions

Project: Good Sam Rehab Job No:

Subject: Sheet Name: DCT

Originating Office: ☐ Seattle ☐ Tacoma ☐ Portland Date: 5/14/24

CHECK FLEXURE IN SPAN 4, ASSUME 6' WIDTH ENGAGED

$\phi M_n = \phi A_s f_y (d - a/2)$

WHERE $\phi = 0.9$

$A_s = 0.31in^2 (10 BARS / 13 FT)(6 ft) = 1.43 in^2$

$f_y = 60 ksi$ PER DRAWINGS

$d = 8.31 in^2$

$a = \frac{1.43 in^2 (60 ksi)}{0.85(4 ksi)(72 in)} = 0.31 in$

$\therefore \phi M_n = 0.9(1.43 in^2)(60 ksi)(8.31 - 0.31 in/2)$

$= 628.2 in\text{-}k = 52.35 ft\text{-}k > M_u \therefore OK$

$\therefore$ (E) SLAB OK IN E/W

PCS Structural Solutions

Project: 6060 SAM REHAB Job No:

Subject: Sheet Name: DCT

Originating Office: ☐ Seattle ☐ Tacoma ☐ Portland Date: 5/14/24

IN N/S

EXISTING

$V_u = 20.83^k$

$M_u = 53.20^{'-k}$

NEW

$V_u = 22.44^k \simeq 7.7\%$ INCREASE $> 5\%$ ∴ CHECK BY HAND

$M_u = 55.86^{'-k} \simeq 5.0\%$ INCREASE ∴ OK

CHECK SHEAR

FROM PREV. CALCS, $\phi V_n = 56.76^k > V_u$ ∴ OK

∴ (E) SLAB OK IN N/S

Project Title:
Engineer:
Project ID:
Project Descr:

General Beam Analysis

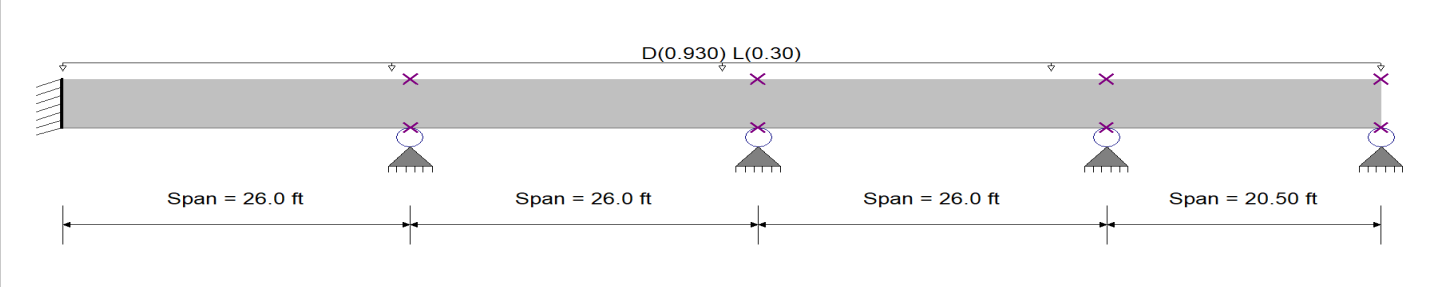
Project File: good sam rehab ceiling lifts.ec6

DESCRIPTION: PT Gym - N/S Existing 1000#

General Beam Properties

Elastic Modulus 29,000.0 ksi

Span #1	Span Length =	26.0 ft	Area =	10.0 in^2	Moment of Inertia =	100.0 in^4
Span #2	Span Length =	26.0 ft	Area =	10.0 in^2	Moment of Inertia =	100.0 in^4
Span #3	Span Length =	26.0 ft	Area =	10.0 in^2	Moment of Inertia =	100.0 in^4
Span #4	Span Length =	20.50 ft	Area =	10.0 in^2	Moment of Inertia =	100.0 in^4



Applied Loads

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

Loads on all spans...

Uniform Load on ALL spans : D = 0.1550, L = 0.050 k/ft, Tributary Width = 6.0 ft

DESIGN SUMMARY

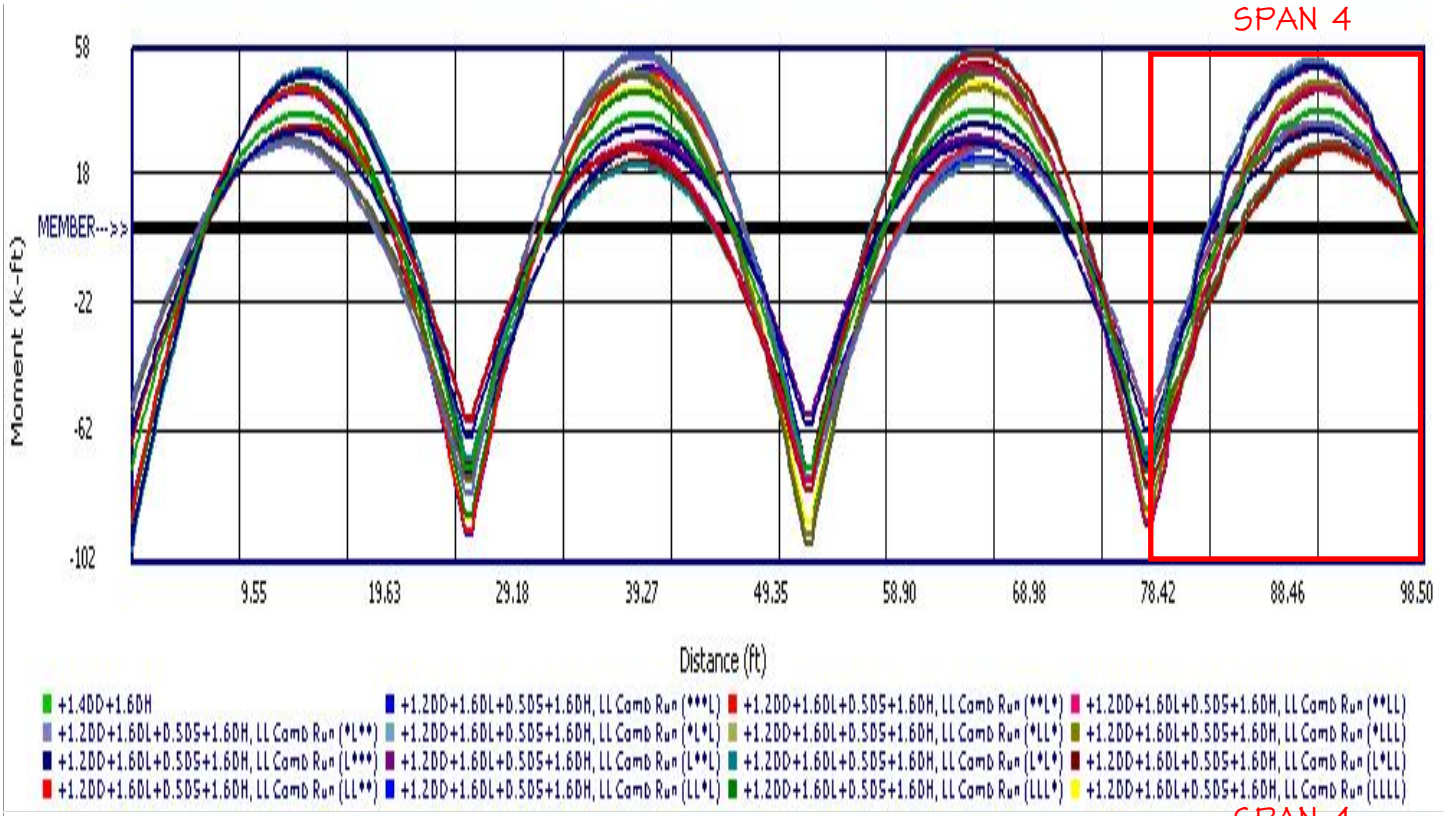
Maximum Bending =	99.660 k-ft	Maximum Shear =	21.873 k
Load Combination	1.60L+0.50S+1.60H, LL Comb Run (L*L*)	Load Combination	1.60L+0.50S+1.60H, LL Comb Run (L*L*)
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1
Location of maximum on span	0.000 ft	Location of maximum on span	0.000 ft
Maximum Deflection			
Max Downward Transient Deflection	1.259 in	247	
Max Upward Transient Deflection	-0.349 in	894	
Max Downward Total Deflection	1.259 in	247	
Max Upward Total Deflection	-0.059 in	4173	

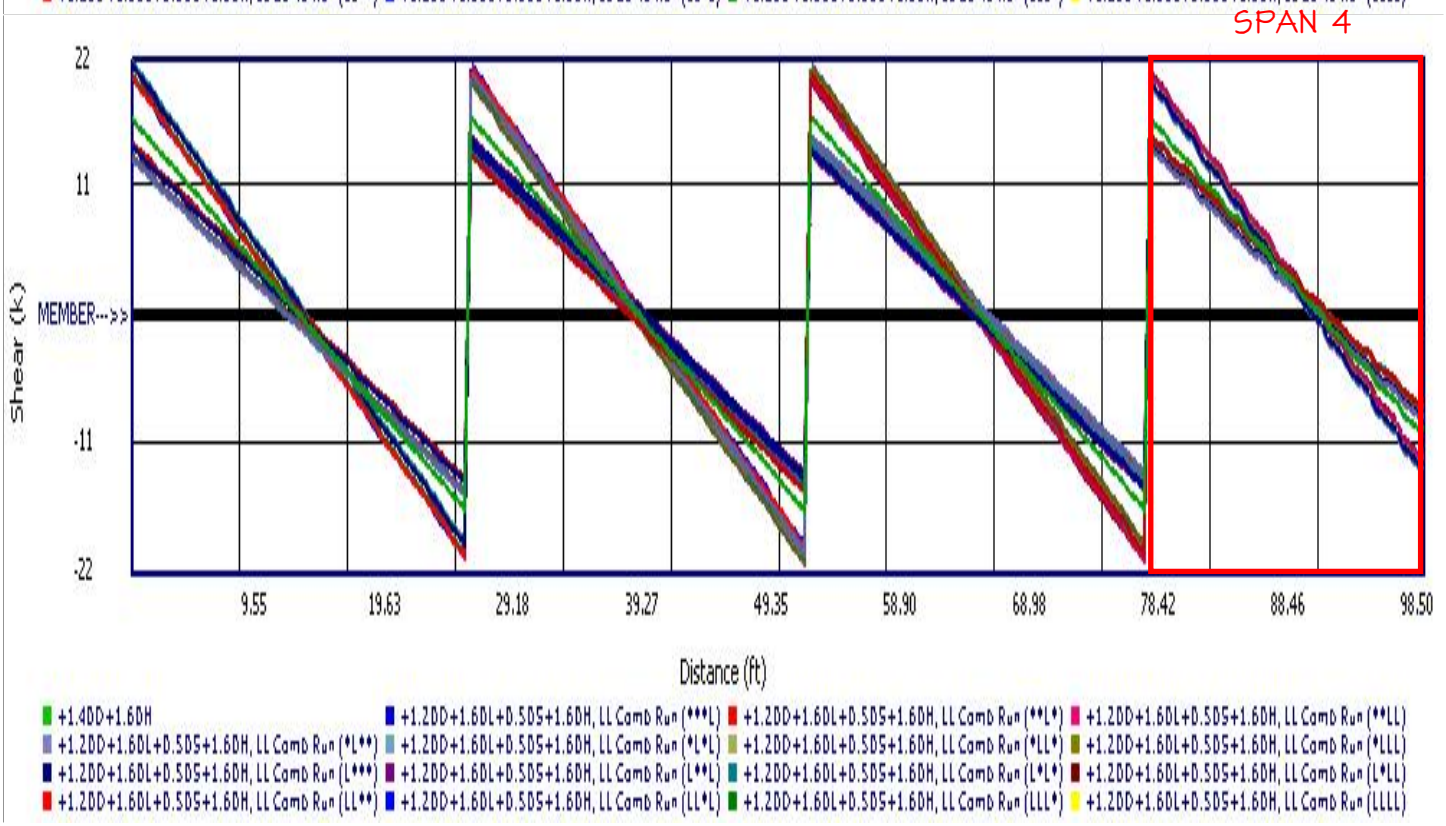
Project Title:
Engineer:
Project ID:
Project Descr:

General Beam Analysis

Project File: good sam rehab ceiling lifts.ec6

DESCRIPTION: PT Gym - N/S Existing 1000#



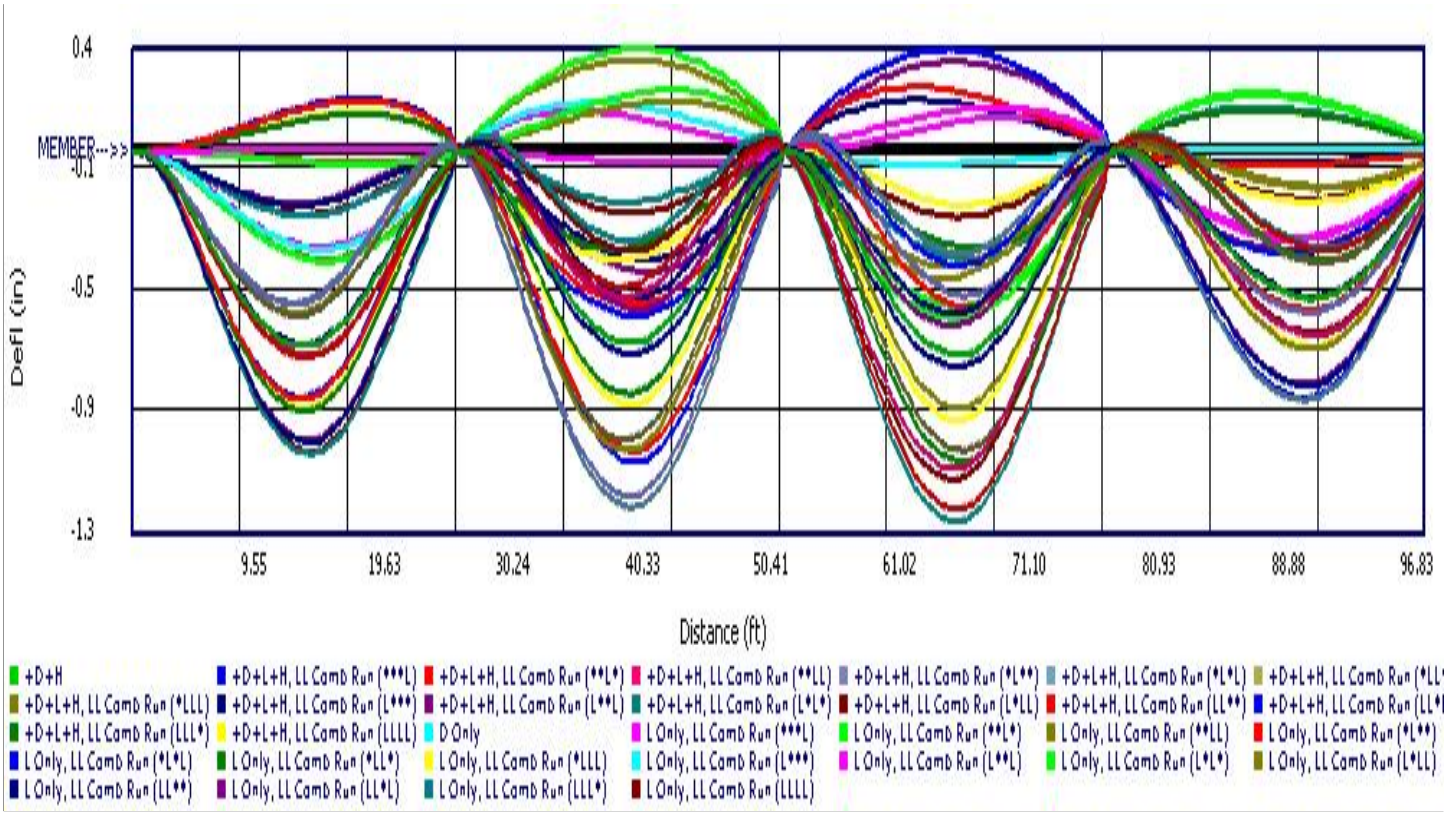


Project Title:
Engineer:
Project ID:
Project Descr:

General Beam Analysis

Project File: good sam rehab ceiling lifts.ec6

DESCRIPTION: PT Gym - N/S Existing 1000#



Project Title:
Engineer:
Project ID:
Project Descr:

General Beam Analysis

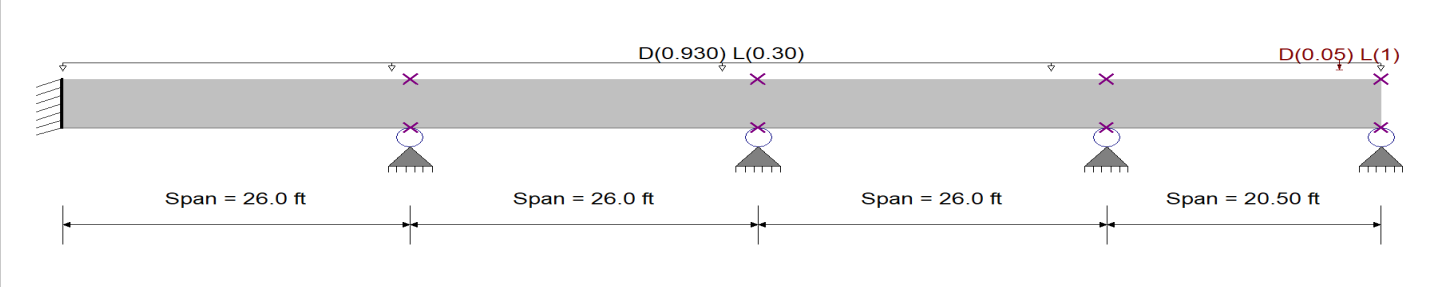
Project File: good sam rehab ceiling lifts.ec6

DESCRIPTION: PT Gym - N/S New 1000# Max Moment

General Beam Properties

Elastic Modulus 29,000.0 ksi

Span #1	Span Length =	26.0 ft	Area =	10.0 in^2	Moment of Inertia =	100.0 in^4
Span #2	Span Length =	26.0 ft	Area =	10.0 in^2	Moment of Inertia =	100.0 in^4
Span #3	Span Length =	26.0 ft	Area =	10.0 in^2	Moment of Inertia =	100.0 in^4
Span #4	Span Length =	20.50 ft	Area =	10.0 in^2	Moment of Inertia =	100.0 in^4



Applied Loads

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

Loads on all spans...
Uniform Load on ALL spans : D = 0.1550, L = 0.050 k/ft, Tributary Width = 6.0 ft

Load(s) for Span Number 4
Point Load : D = 0.050, L = 1.0 k @ 17.417 ft

DESIGN SUMMARY

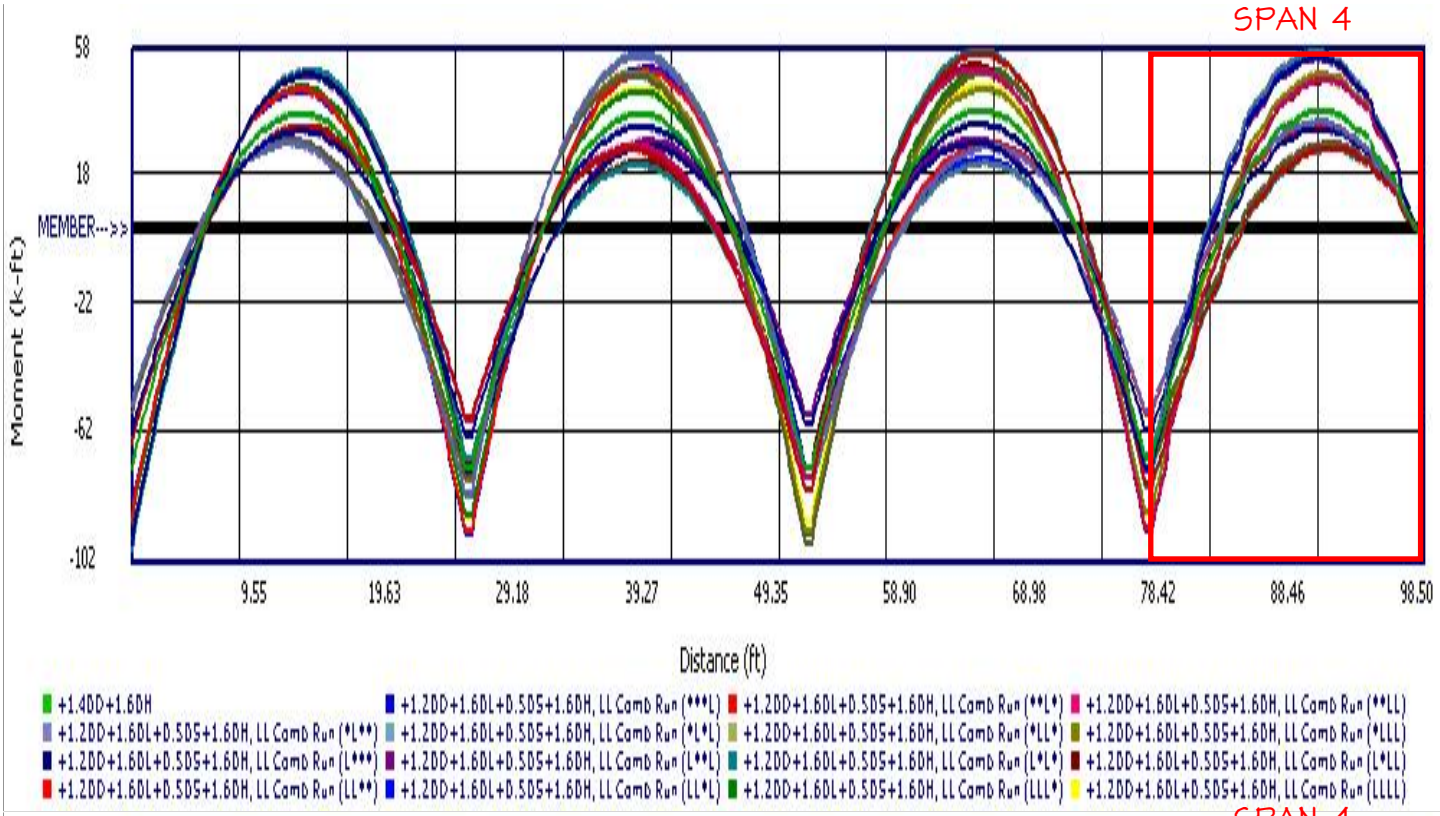
Maximum Bending =	99.659 k-ft	Maximum Shear =	21.873 k
Load Combination	1.60L+0.50S+1.60H, LL Comb Run (L*L*)	Load Combination	1.60L+0.50S+1.60H, LL Comb Run (L*L*)
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1
Location of maximum on span	0.000 ft	Location of maximum on span	0.000 ft
Maximum Deflection			
Max Downward Transient Deflection	1.258 in	247	
Max Upward Transient Deflection	-0.358 in	870	
Max Downward Total Deflection	1.258 in	247	
Max Upward Total Deflection	-0.059 in	4199	

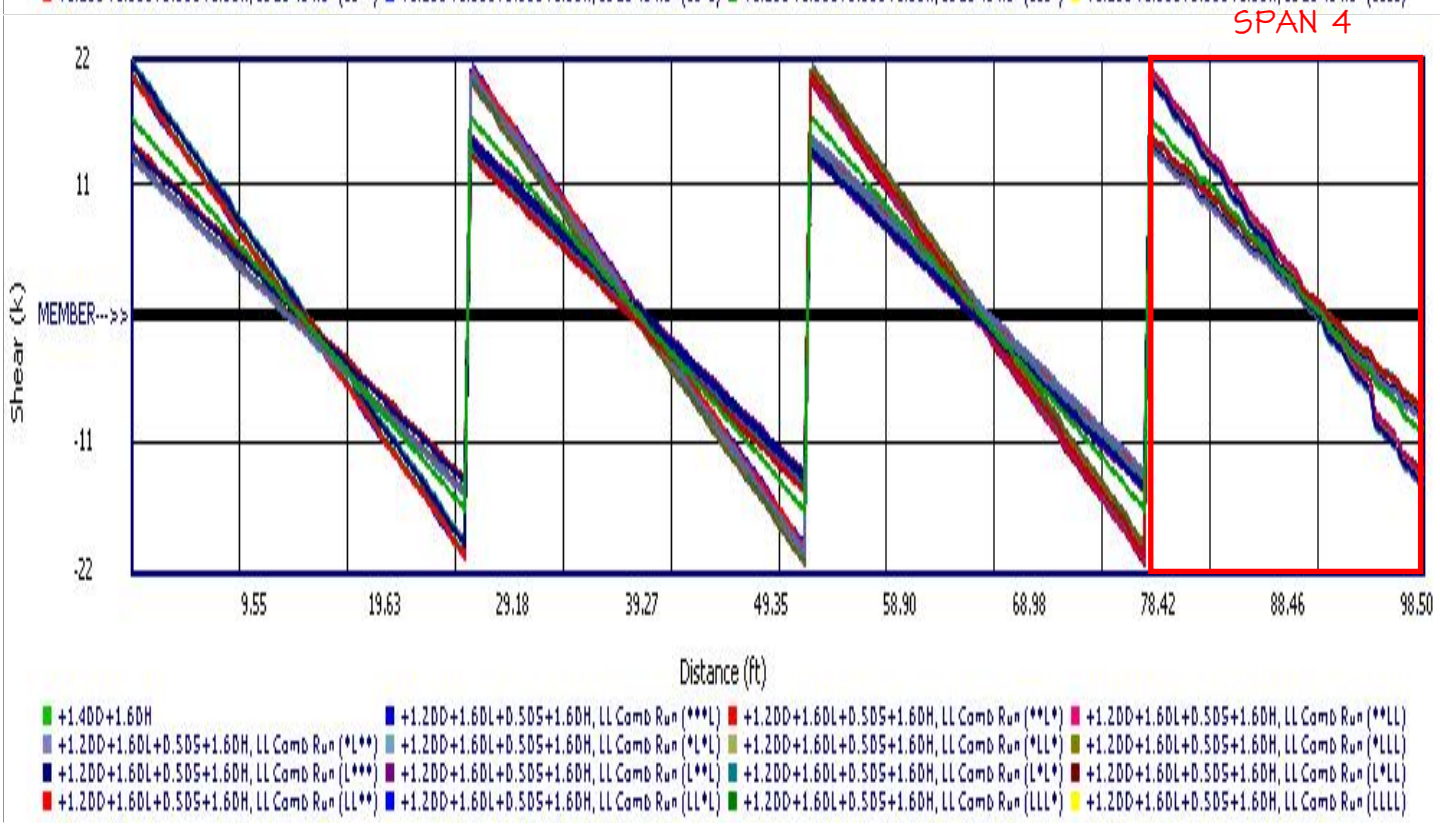
Project Title:
Engineer:
Project ID:
Project Descr:

General Beam Analysis

Project File: good sam rehab ceiling lifts.ec6

DESCRIPTION: PT Gym - N/S New 1000# Max Moment



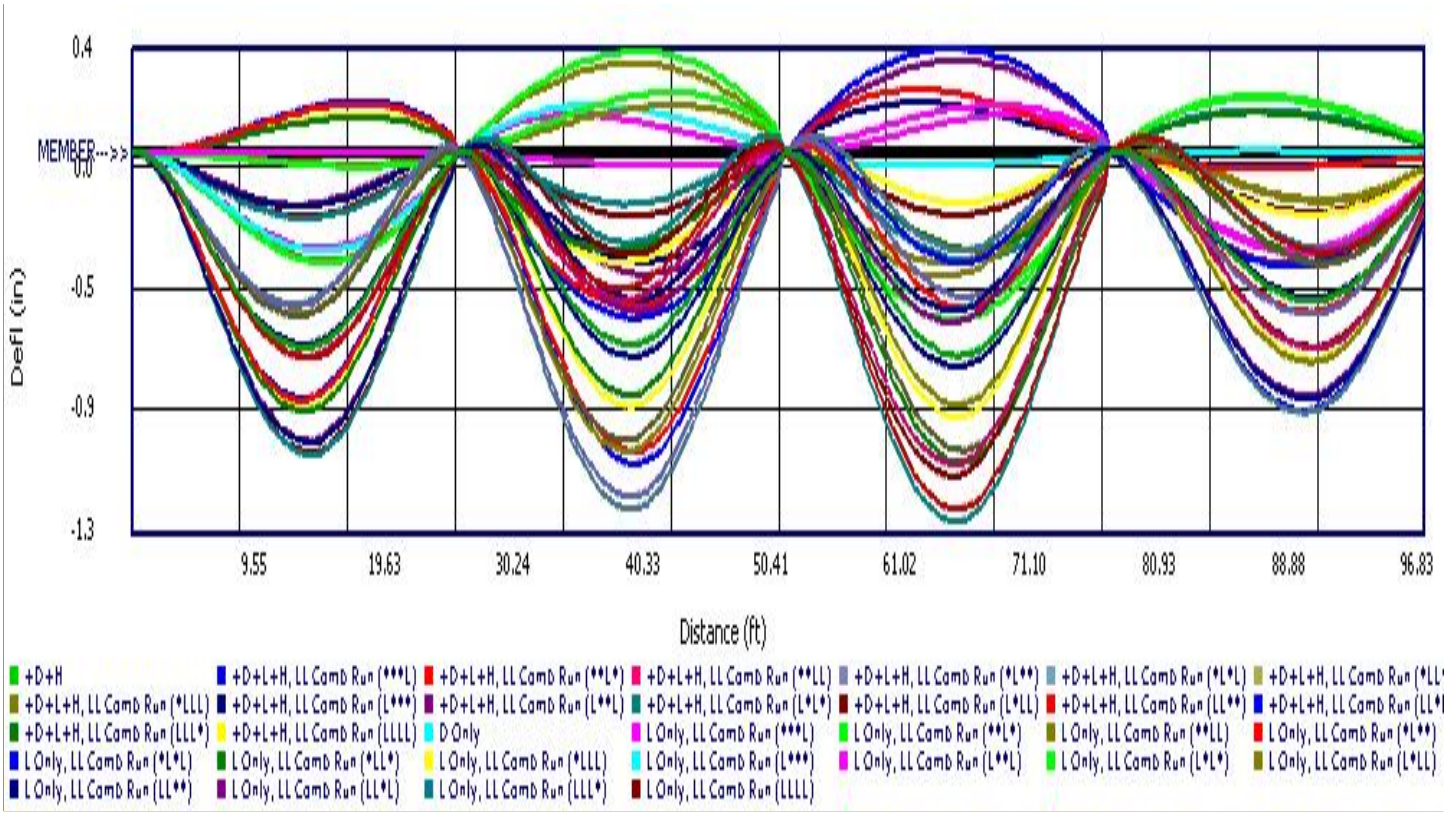


Project Title:
Engineer:
Project ID:
Project Descr:

General Beam Analysis

Project File: good sam rehab ceiling lifts.ec6

DESCRIPTION: PT Gym - N/S New 1000# Max Moment



Project Title:
Engineer:
Project ID:
Project Descr:

General Beam Analysis

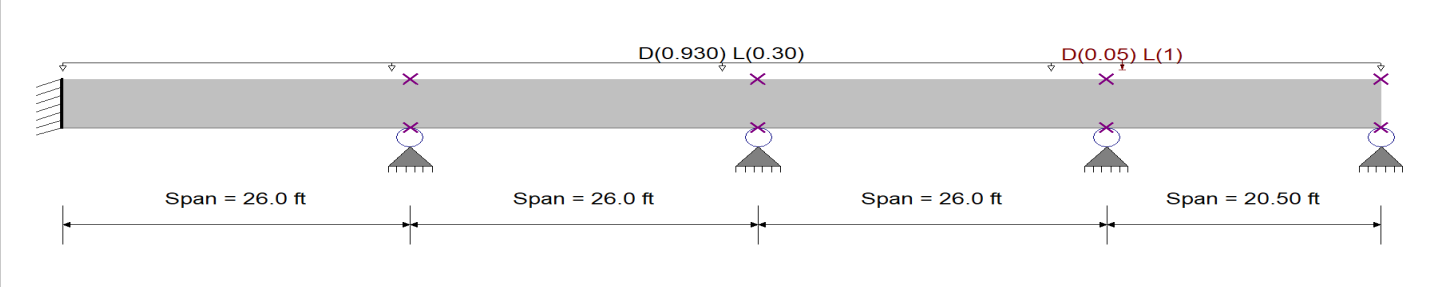
Project File: good sam rehab ceiling lifts.ec6

DESCRIPTION: PT Gym - N/S New 1000# Max Shear

General Beam Properties

Elastic Modulus 29,000.0 ksi

Span #1	Span Length =	26.0 ft	Area =	10.0 in^2	Moment of Inertia =	100.0 in^4
Span #2	Span Length =	26.0 ft	Area =	10.0 in^2	Moment of Inertia =	100.0 in^4
Span #3	Span Length =	26.0 ft	Area =	10.0 in^2	Moment of Inertia =	100.0 in^4
Span #4	Span Length =	20.50 ft	Area =	10.0 in^2	Moment of Inertia =	100.0 in^4



Applied Loads

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

Loads on all spans...
Uniform Load on ALL spans : D = 0.1550, L = 0.050 k/ft, Tributary Width = 6.0 ft

Load(s) for Span Number 4
Point Load : D = 0.050, L = 1.0 k @ 1.167 ft

DESIGN SUMMARY

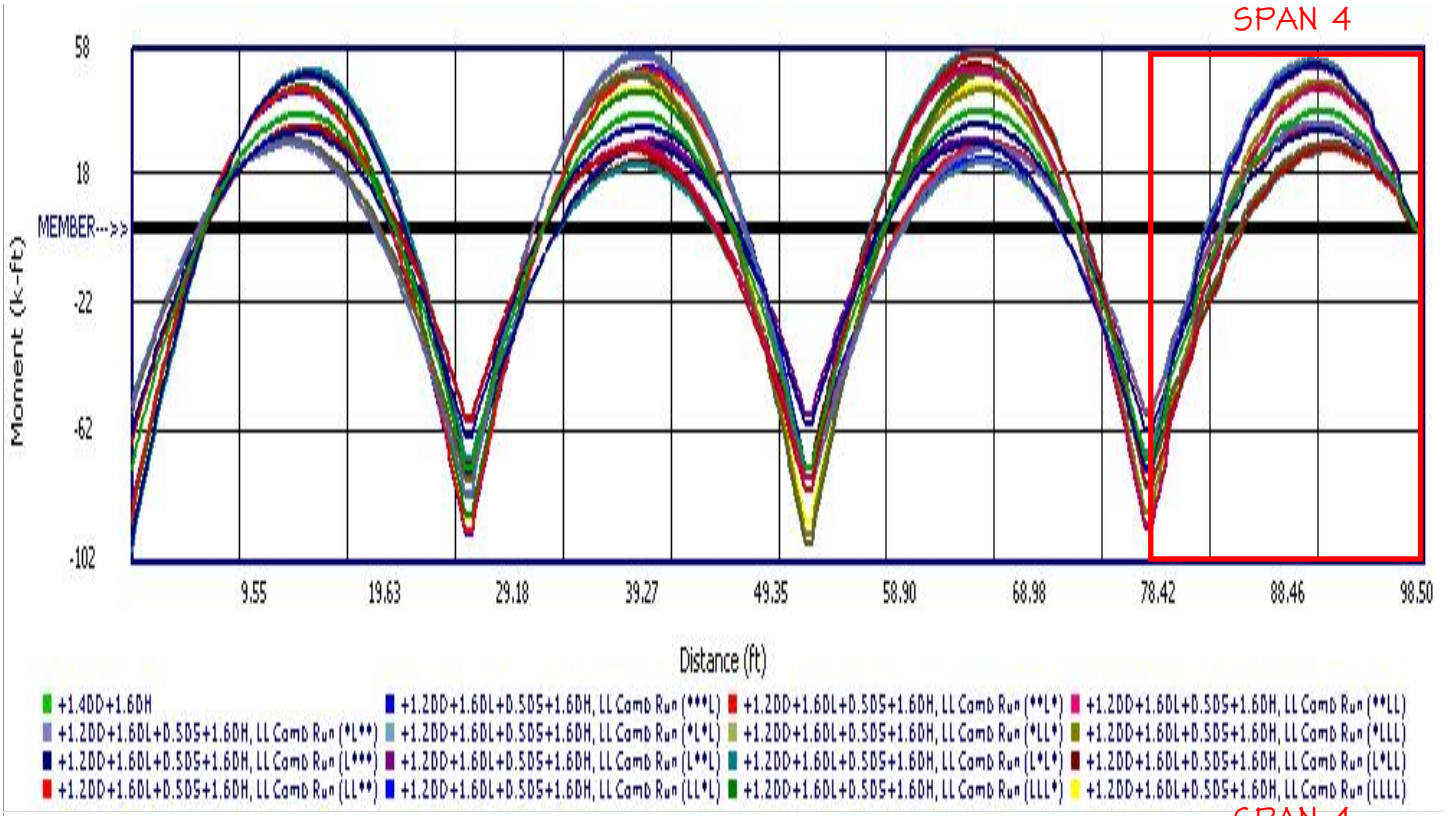
Maximum Bending =	99.659 k-ft	Maximum Shear =	22.440 k
Load Combination	1.60L+0.50S+1.60H, LL Comb Run (L*L*)	Load Combination	1.60L+0.50S+1.60H, LL Comb Run (L*LL)
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 3
Location of maximum on span	0.000 ft	Location of maximum on span	26.000 ft
Maximum Deflection			
Max Downward Transient Deflection	1.259 in	247	
Max Upward Transient Deflection	-0.355 in	880	
Max Downward Total Deflection	1.259 in	247	
Max Upward Total Deflection	-0.059 in	4190	

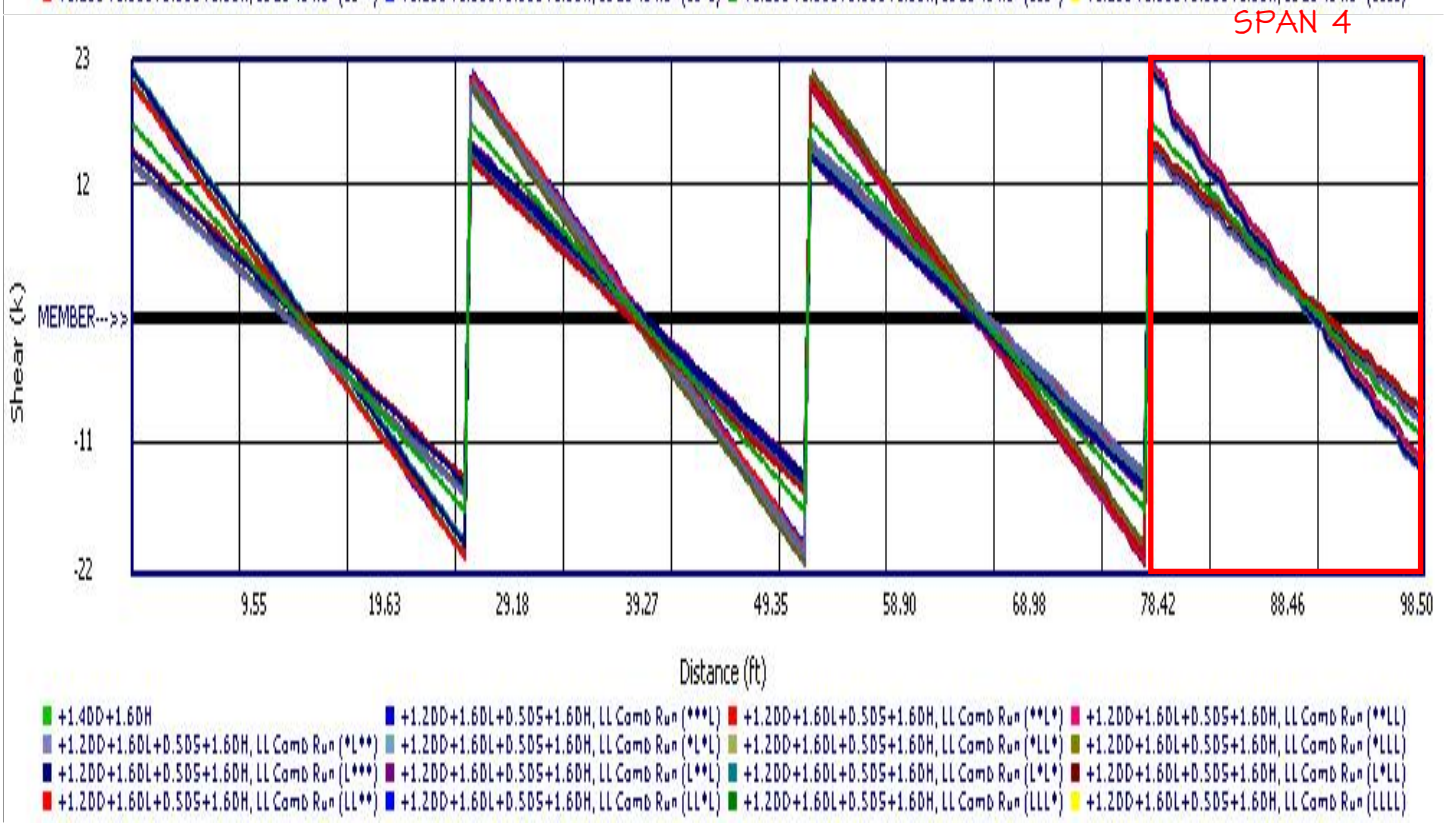
Project Title:
Engineer:
Project ID:
Project Descr:

General Beam Analysis

Project File: good sam rehab ceiling lifts.ec6

DESCRIPTION: PT Gym - N/S New 1000# Max Shear



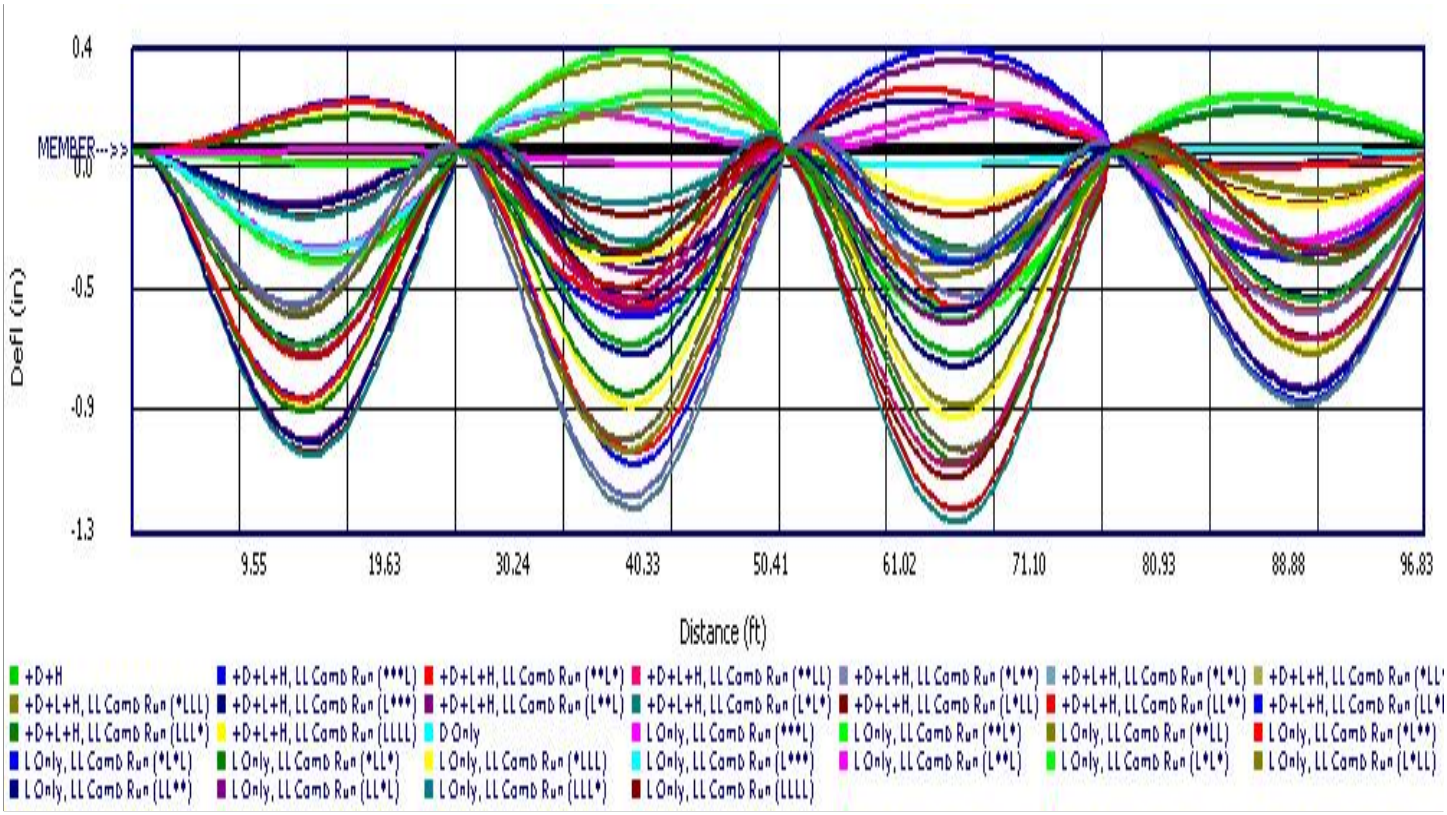


Project Title:
Engineer:
Project ID:
Project Descr:

General Beam Analysis

Project File: good sam rehab ceiling lifts.ec6

DESCRIPTION: PT Gym - N/S New 1000# Max Shear



PCS Structural Solutions

Project: Good Sam Rehab Job No:

Subject: Sheet Name: DCT

Originating Office: ☐ Seattle ☐ Tacoma ☐ Portland Date: 4/26/24

CEILING LIFT #36

IN E/W

EXISTING

V_u = { 13.52K ORIG BLDG, TYP
11.17K ADDN, TYP

M_u = { 26.94 $^{1-K}$
39.10 $^{1-K}$

NEW

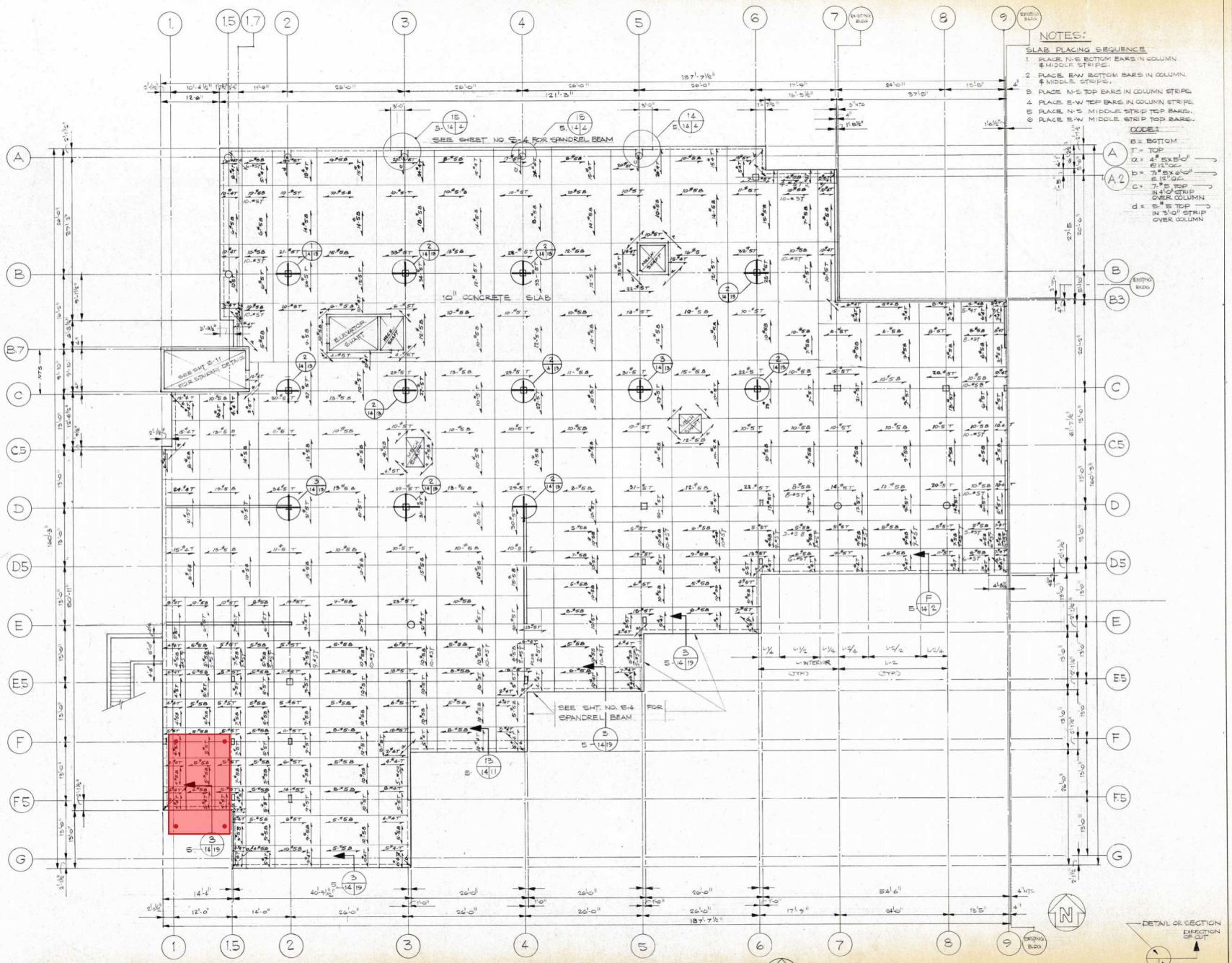
V_u = { 14.80K ORIG BLDG, TYP ≈ 9.5% INCREASE > 5% ∴ CHECK BY HAND
12.29K ADDN, TYP ≈ 10.0% INCREASE > 5% ∴ CHECK BY HAND

M_u = { 29.17 $^{1-K}$ ≈ 8.3% INCREASE > 5% ∴ CHECK BY HAND
43.00 $^{1-K}$ ≈ 10.0% INCREASE > 5% ∴ CHECK BY HAND

AT ORIG BLDG

CHECK SHEAR

FROM PREV CALCS, ϕV_n = 56.76K > V_u ∴ OK



Kaplan/ McLaughlin/ Diaz
ARCHITECTS/PLANNERS
222 VALLEJO STREET
SAN FRANCISCO 94111
415-398-5191

BJSS
ARCHITECTS/PLANNERS
320 WEST BAY DRIVE
OLYMPIA, WASHINGTON
206-943-4650

STRUCTURAL ENGINEERS
HAROLD V. SARGENT & ASSOC
320 WEST BAY DRIVE
SUITE 218
OLYMPIA, WA. 98502
206-943-3590

MECHANICAL ENGINEERS
BENJAMIN S. NOTKIN & ASSOCIATES INC.
820 JOHN STREET
SEATTLE, WA. 98109
206-682-3611

ELECTRICAL ENGINEERS
SPARLING & ASSOC. INC.
1920 EASTLAKE AVE EAST
SEATTLE, WA. 98102
206-325-7770

GOOD SAMARITAN HOSPITAL

Puyallup, Washington

SHEET TITLE
LEVEL '1' FLAT SLAB PLAN

REVISIONS
NO. | DATE | DESCRIPTION

SCALE NOTED

DATE SEPT 5, 1980

SHEET S-14

Project Title:
Engineer:
Project ID:
Project Descr:

General Beam Analysis

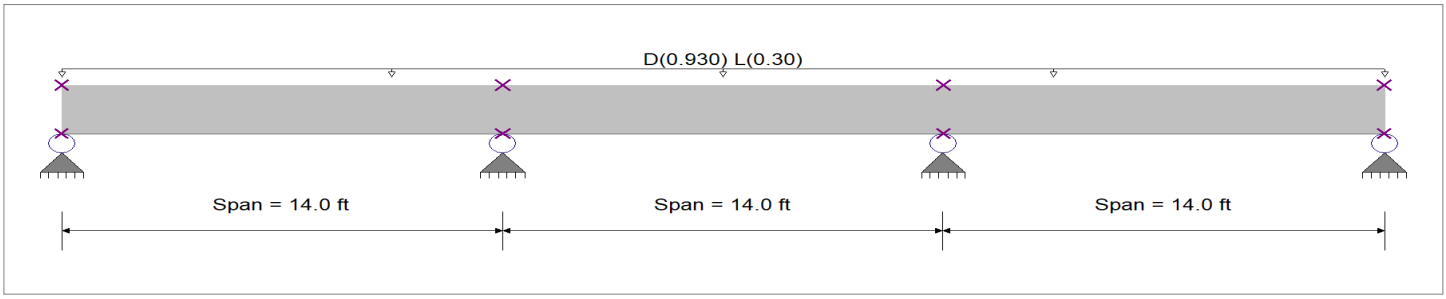
Project File: good sam rehab ceiling lifts.ec6

DESCRIPTION: Ceiling Lift #36 - E/W Existing 1000#

General Beam Properties

Elastic Modulus 29,000.0 ksi

Span #1	Span Length =	14.0 ft	Area =	10.0 in^2	Moment of Inertia =	100.0	in^4
Span #2	Span Length =	14.0 ft	Area =	10.0 in^2	Moment of Inertia =	100.0	in^4
Span #3	Span Length =	14.0 ft	Area =	10.0 in^2	Moment of Inertia =	100.0	in^4



Applied Loads

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

Loads on all spans...

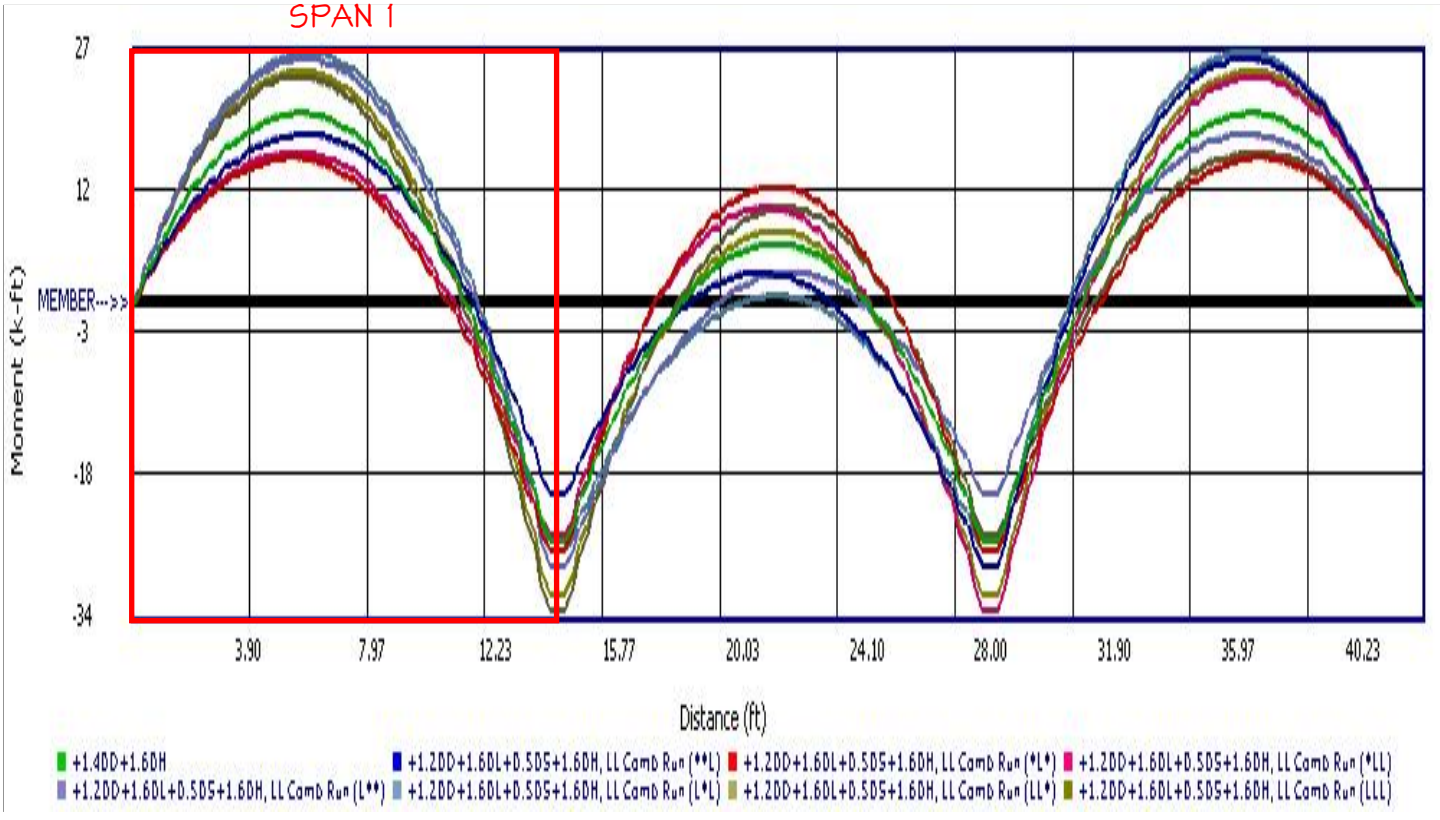
Uniform Load on ALL spans : D = 0.1550, L = 0.050 k/ft, Tributary Width = 6.0 ft

DESIGN SUMMARY

Maximum Bending =	32.850 k-ft	Maximum Shear =	13.518 k
Load Combination	+1.20D+1.60L+0.50S+1.60H, LL Comb Run (LL*)	Load Combination	+1.20D+1.60L+0.50S+1.60H, LL Comb Run (*LL)
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 2
Location of maximum on span	14.000 ft	Location of maximum on span	14.000 ft

Maximum Deflection

Max Downward Transient Deflection	0.219 in	766
Max Upward Transient Deflection	-0.044 in	3817
Max Downward Total Deflection	0.219 in	766
Max Upward Total Deflection	-0.037 in	4592

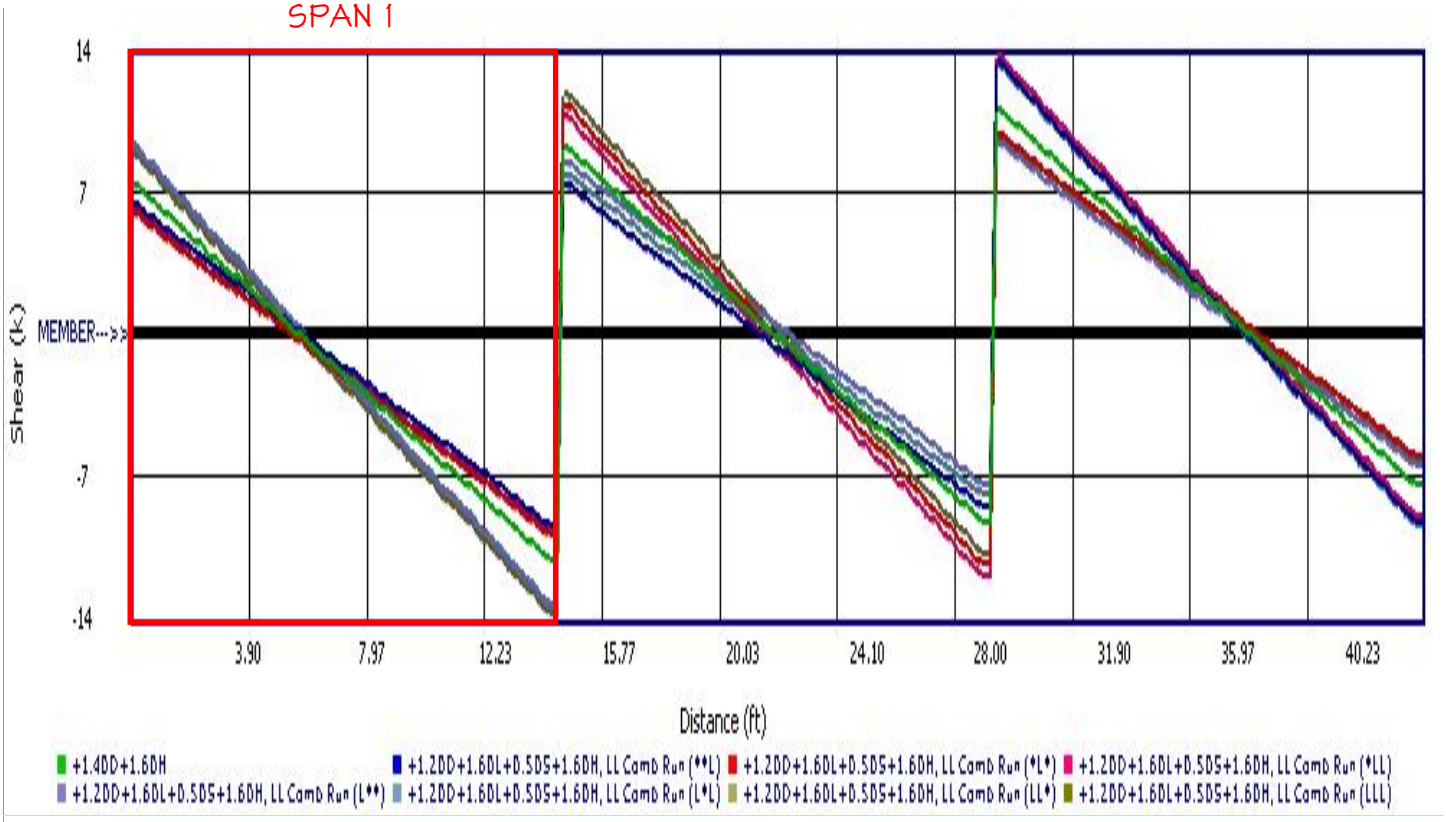


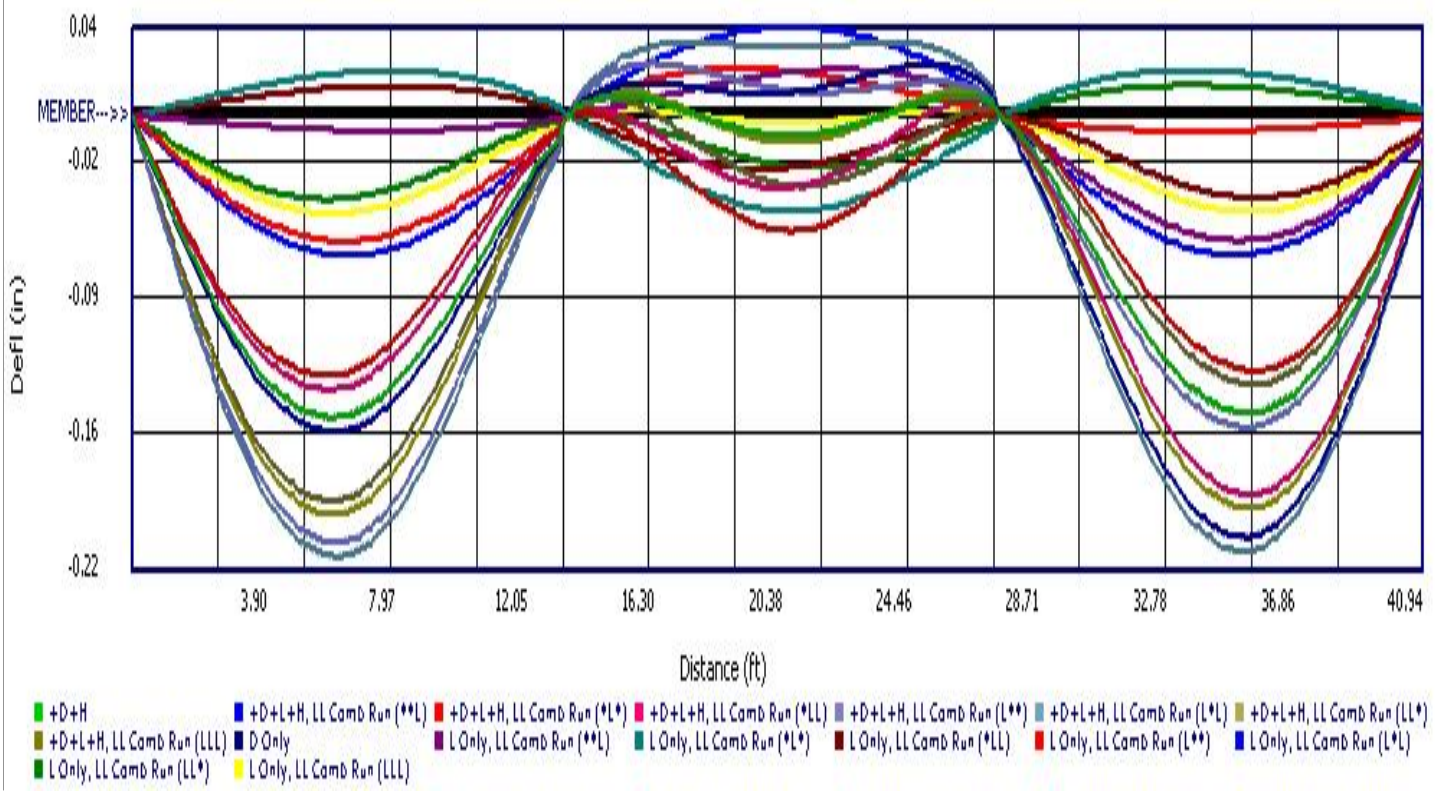
Project Title:
Engineer:
Project ID:
Project Descr:

General Beam Analysis

Project File: good sam rehab ceiling lifts.ec6

DESCRIPTION: Ceiling Lift #36 - E/W Existing 1000#





Project Title:
Engineer:
Project ID:
Project Descr:

General Beam Analysis

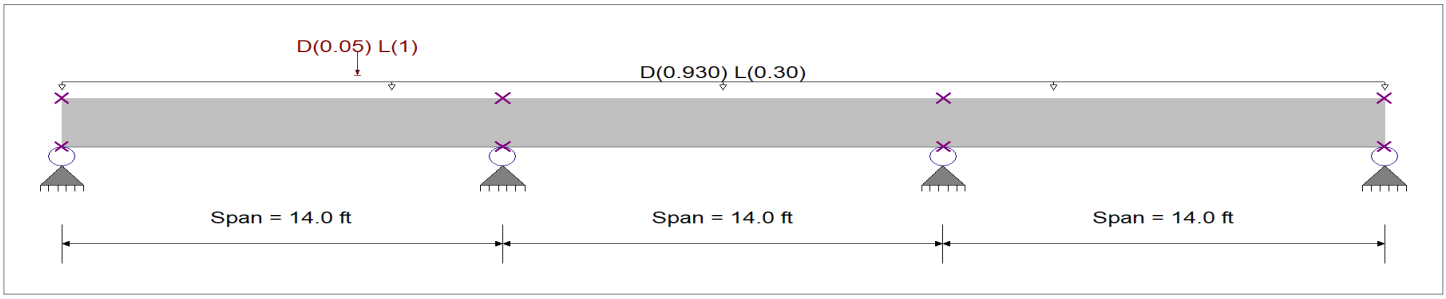
Project File: good sam rehab ceiling lifts.ec6

DESCRIPTION: Ceiling Lift #36 - E/W New 1000#

General Beam Properties

Elastic Modulus 29,000.0 ksi

Span #1	Span Length =	14.0 ft	Area =	10.0 in^2	Moment of Inertia =	100.0 in^4
Span #2	Span Length =	14.0 ft	Area =	10.0 in^2	Moment of Inertia =	100.0 in^4
Span #3	Span Length =	14.0 ft	Area =	10.0 in^2	Moment of Inertia =	100.0 in^4



Applied Loads

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

Loads on all spans...
Uniform Load on ALL spans : D = 0.1550, L = 0.050 k/ft, Tributary Width = 6.0 ft

Load(s) for Span Number 1
Point Load : D = 0.050, L = 1.0 k @ 9.417 ft

DESIGN SUMMARY

Maximum Bending =	35.132 k-ft	Maximum Shear =	14.798 k
Load Combination	1.00L+0.50S+1.60H, LL Comb Run (LL*)	Load Combination	1.00L+0.50S+1.60H, LL Comb Run (LL*)
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1
Location of maximum on span	14.000 ft	Location of maximum on span	14.000 ft

Maximum Deflection

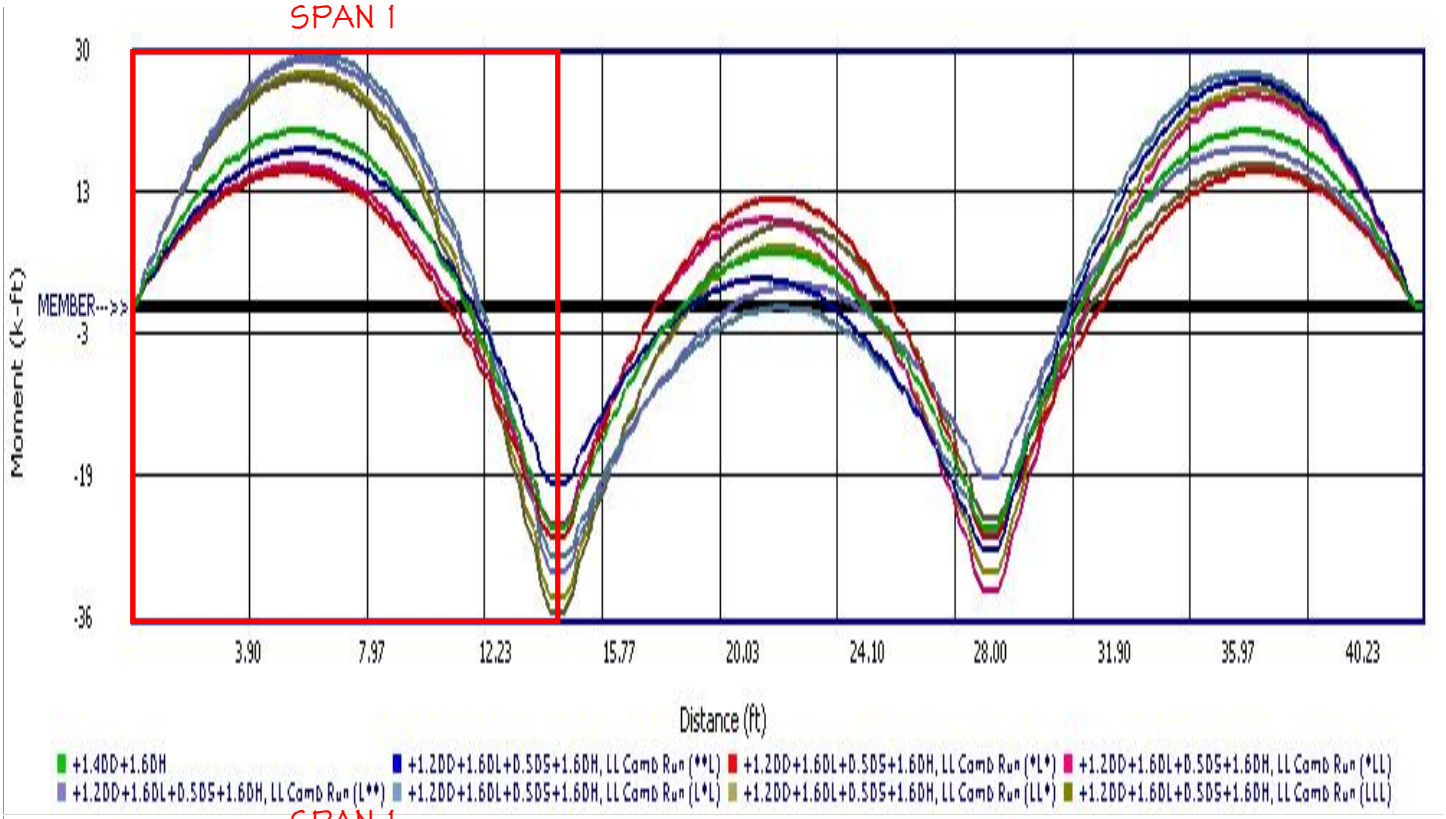
Max Downward Transient Deflection	0.239 in	703
Max Upward Transient Deflection	-0.052 in	3235
Max Downward Total Deflection	0.239 in	703
Max Upward Total Deflection	-0.045 in	3745

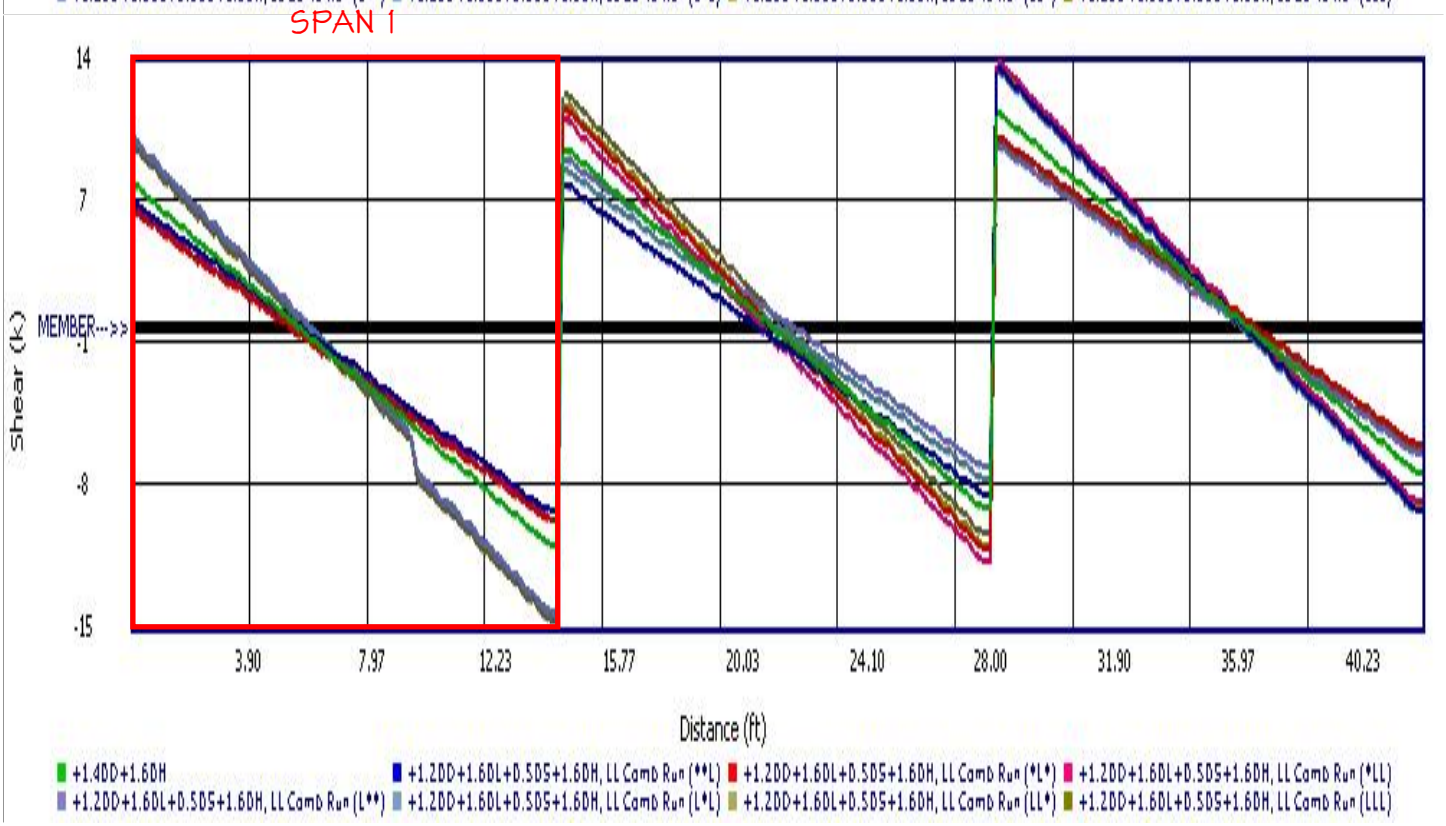
Project Title:
Engineer:
Project ID:
Project Descr:

General Beam Analysis

Project File: good sam rehab ceiling lifts.ec6

DESCRIPTION: Ceiling Lift #36 - E/W New 1000#



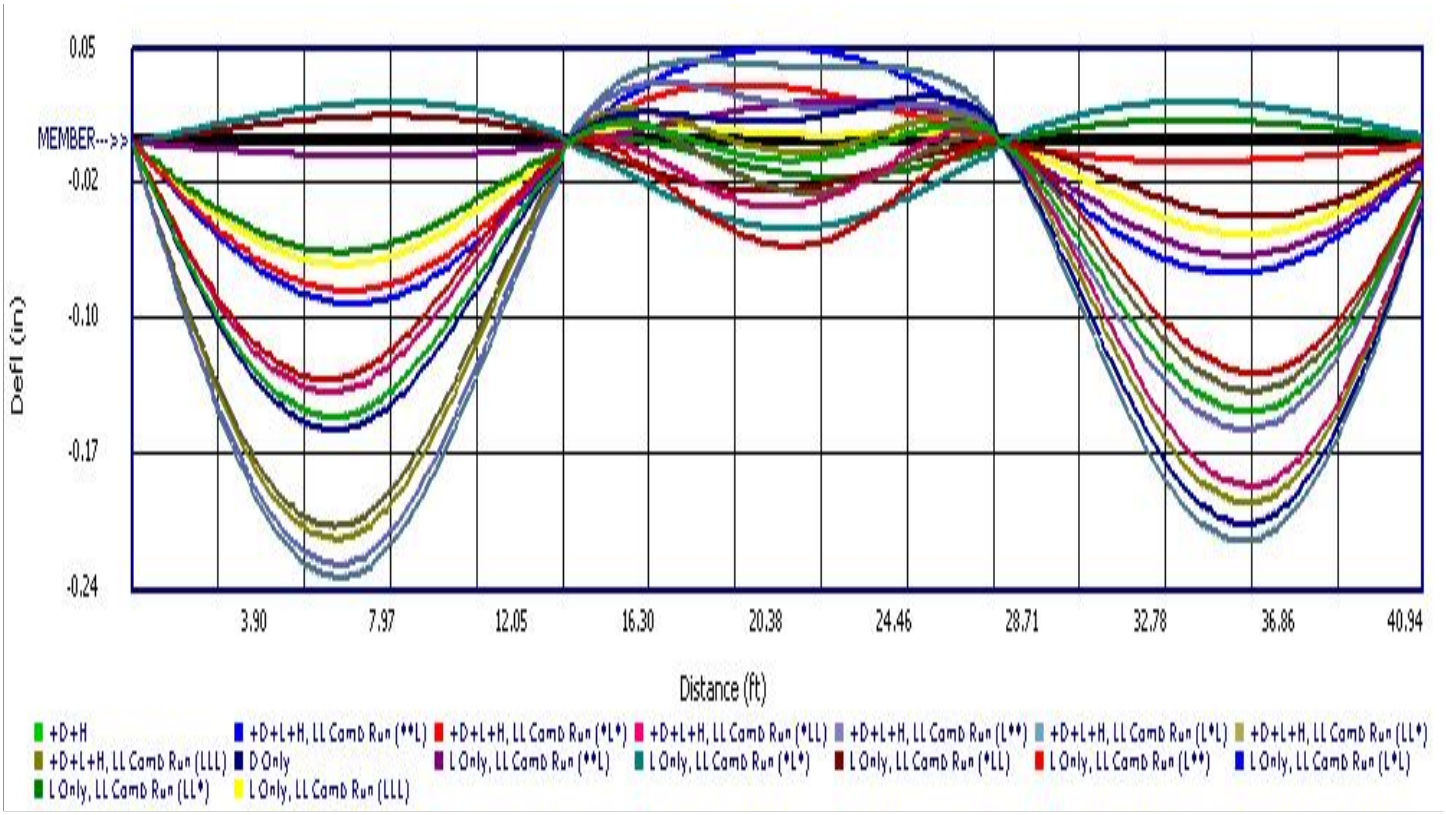


Project Title:
Engineer:
Project ID:
Project Descr:

General Beam Analysis

Project File: good sam rehab ceiling lifts.ec6

DESCRIPTION: Ceiling Lift #36 - E/W New 1000#



Project Title:
Engineer:
Project ID:
Project Descr:

General Beam Analysis

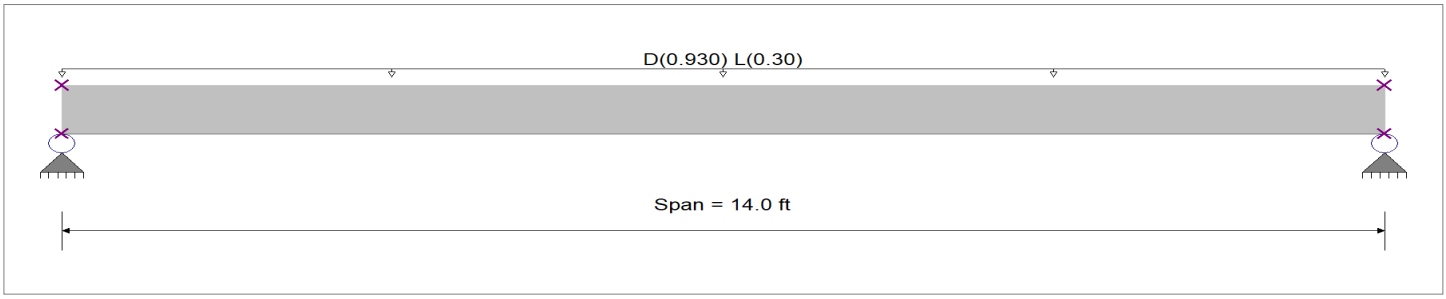
Project File: good sam rehab ceiling lifts.ec6

DESCRIPTION: Ceiling Lift #36 - E/W Existing Addn 1000#

General Beam Properties

Elastic Modulus 29,000.0 ksi

Span #1 Span Length = 14.0 ft Area = 10.0 in^2 Moment of Inertia = 100.0 in^4



Applied Loads

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

Loads on all spans...

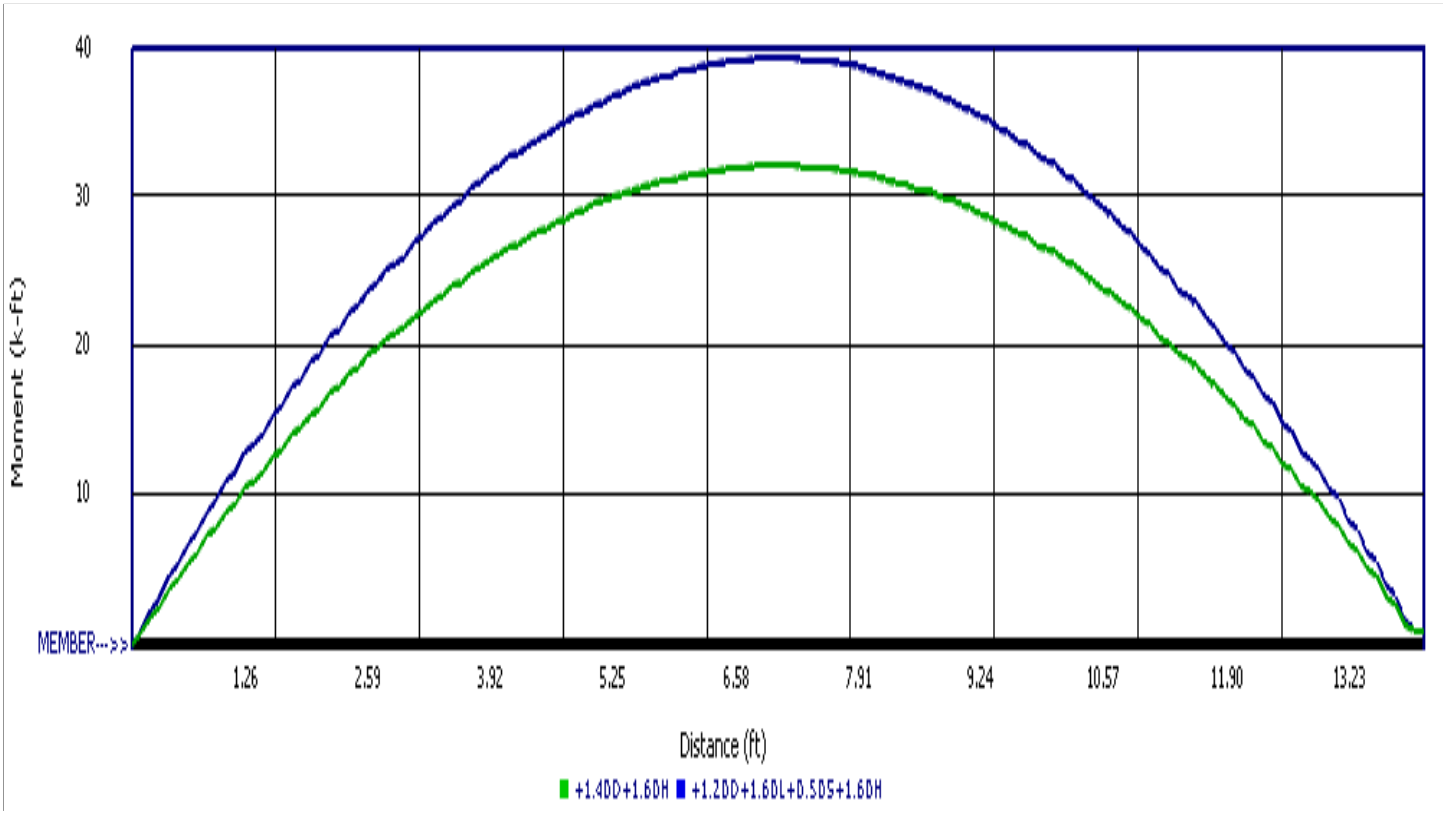
Uniform Load on ALL spans : D = 0.1550, L = 0.050 k/ft, Tributary Width = 6.0 ft

DESIGN SUMMARY

Maximum Bending =	39.102 k-ft	Maximum Shear =	11.172 k
Load Combination	+1.20D+1.60L+0.50S+1.60H	Load Combination	+1.20D+1.60L+0.50S+1.60H
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1
Location of maximum on span	7.000 ft	Location of maximum on span	0.000 ft

Maximum Deflection

Max Downward Transient Deflection	0.090 in	1863
Max Upward Transient Deflection	0.001 in	117427
Max Downward Total Deflection	0.370 in	454
Max Upward Total Deflection	0.004 in	37879

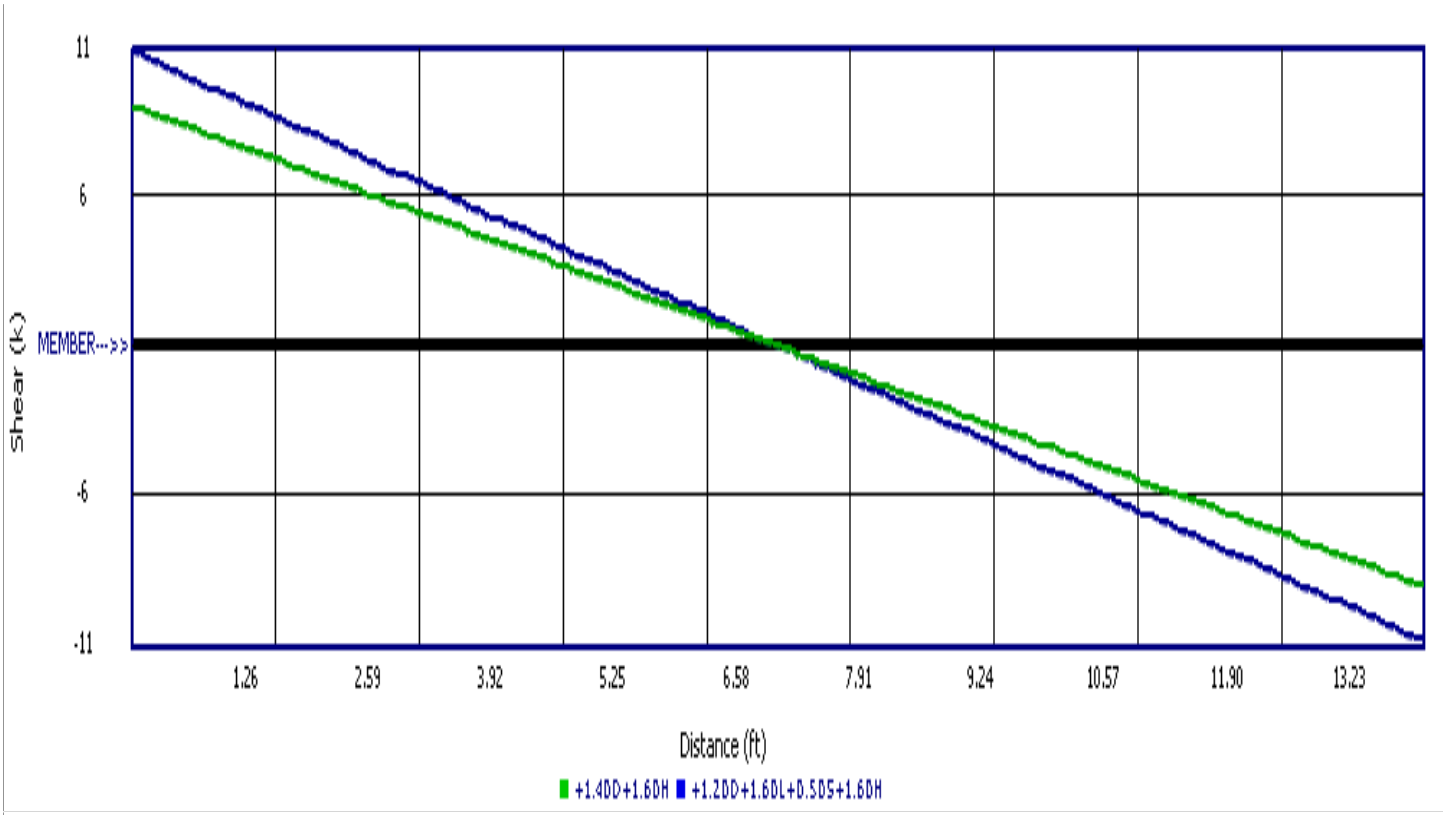


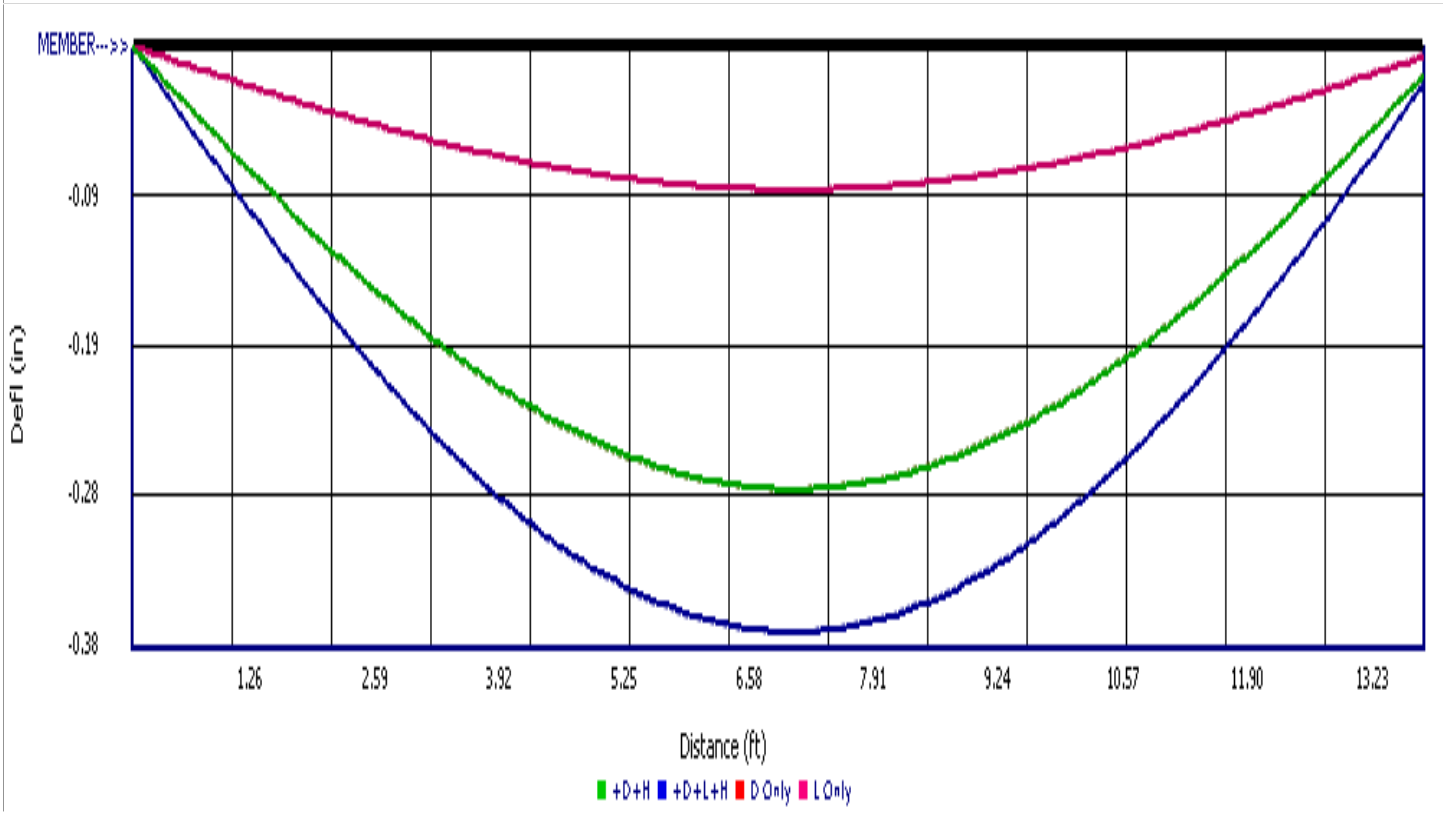
Project Title:
Engineer:
Project ID:
Project Descr:

General Beam Analysis

Project File: good sam rehab ceiling lifts.ec6

DESCRIPTION: Ceiling Lift #36 - E/W Existing Addn 1000#





Project Title:
Engineer:
Project ID:
Project Descr:

General Beam Analysis

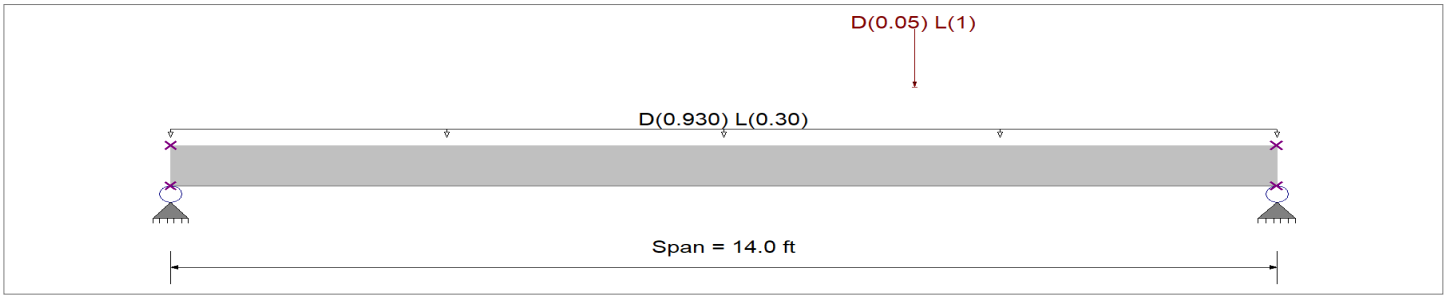
Project File: good sam rehab ceiling lifts.ec6

DESCRIPTION: Ceiling Lift #36 - E/W New 1000#

General Beam Properties

Elastic Modulus 29,000.0 ksi

Span #1 Span Length = 14.0 ft Area = 10.0 in^2 Moment of Inertia = 100.0 in^4



Applied Loads

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

Loads on all spans...
Uniform Load on ALL spans : D = 0.1550, L = 0.050 k/ft, Tributary Width = 6.0 ft

Load(s) for Span Number 1
Point Load : D = 0.050, L = 1.0 k @ 9.417 ft

DESIGN SUMMARY

Maximum Bending =	42.998	k-ft	Maximum Shear =	12.289	k
Load Combination	+1.20D+1.60L+0.50S+1.60H		Load Combination	+1.20D+1.60L+0.50S+1.60H	
Span # where maximum occurs	Span # 1		Span # where maximum occurs	Span # 1	
Location of maximum on span	7.350	ft	Location of maximum on span	14.000	ft

Maximum Deflection

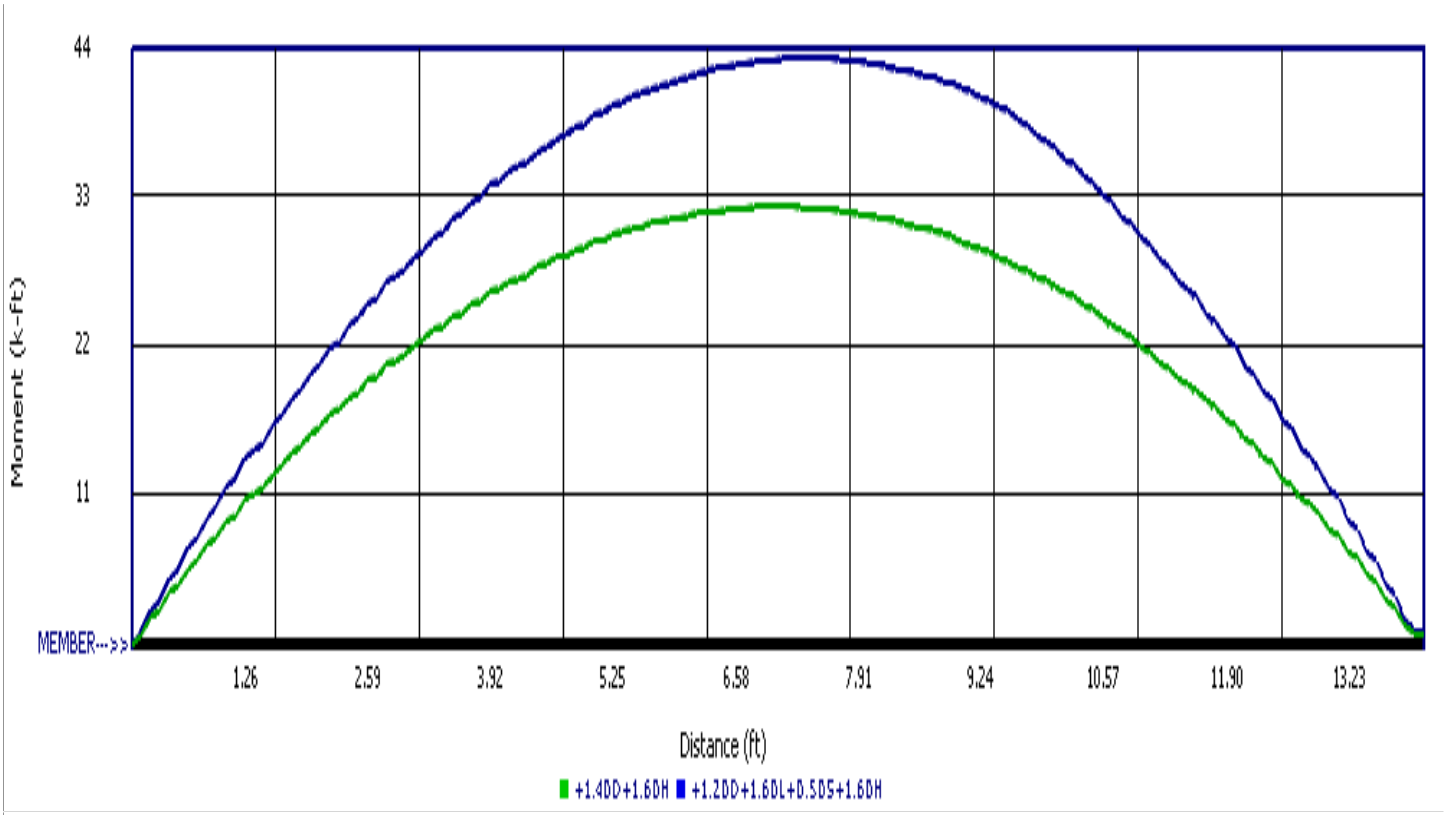
Max Downward Transient Deflection	0.119	in	1410
Max Upward Transient Deflection	0.002	in	91858
Max Downward Total Deflection	0.400	in	420
Max Upward Total Deflection	0.004	in	37710

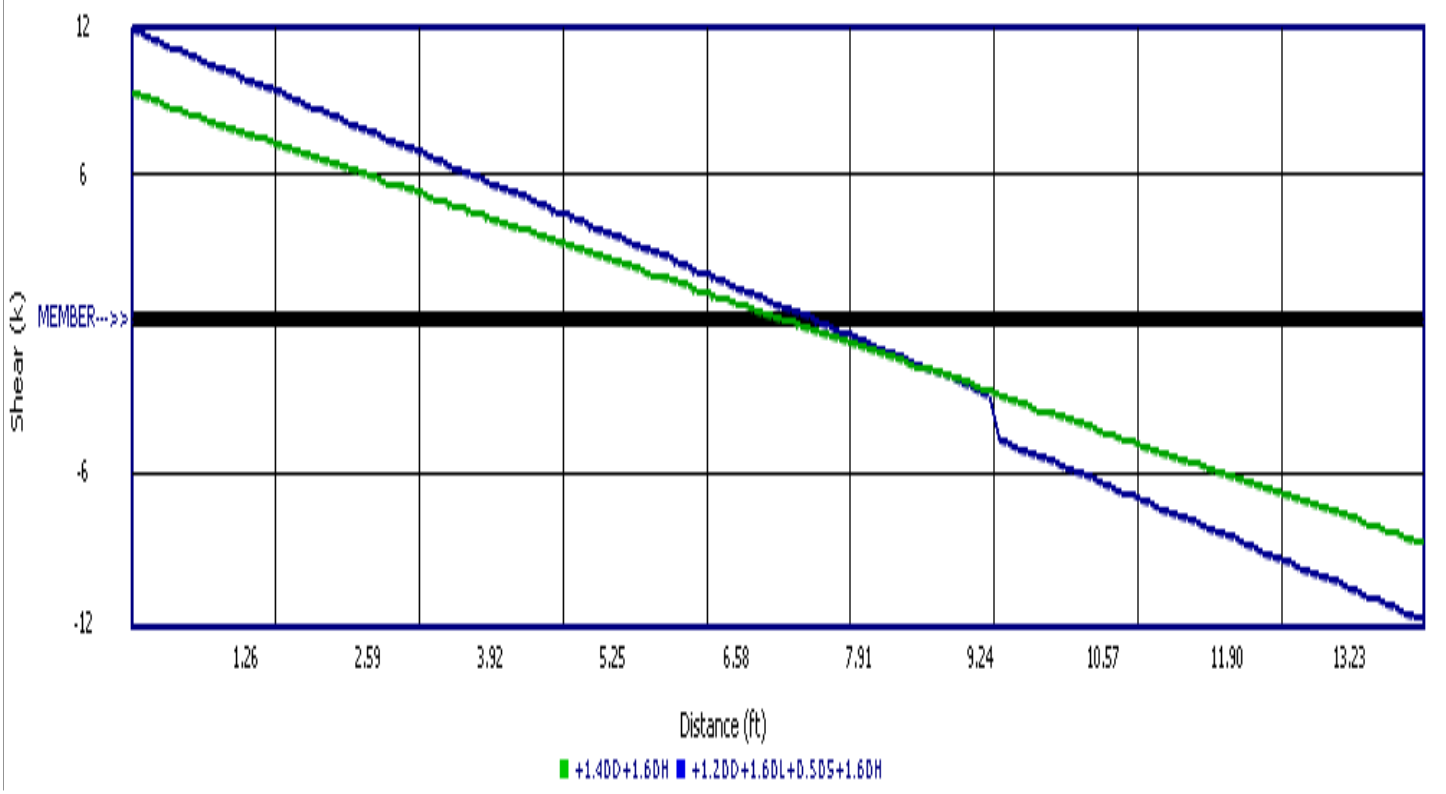
Project Title:
Engineer:
Project ID:
Project Descr:

General Beam Analysis

Project File: good sam rehab ceiling lifts.ec6

DESCRIPTION: Ceiling Lift #36 - E/W New 1000#



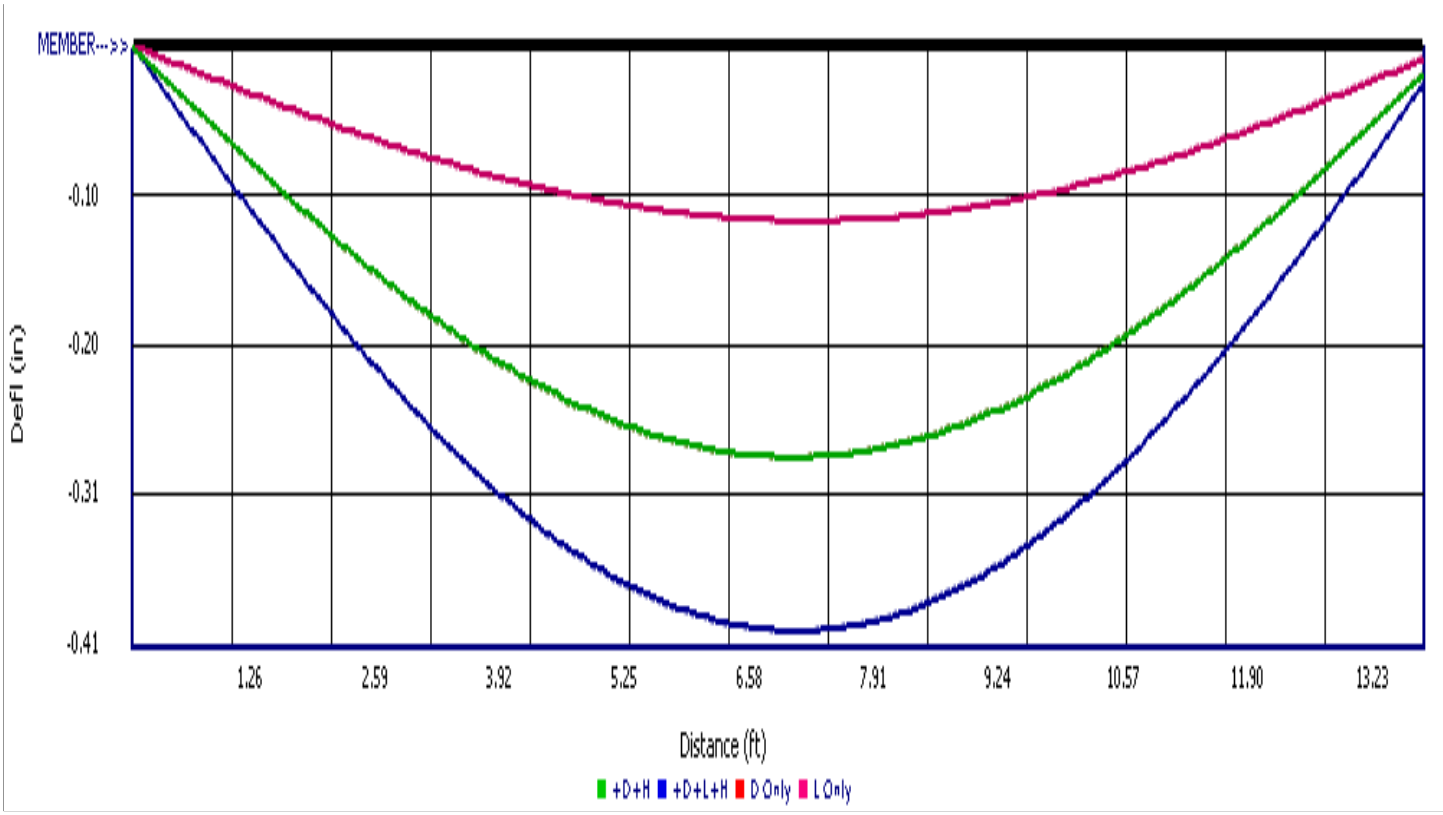


Project Title:
Engineer:
Project ID:
Project Descr:

General Beam Analysis

Project File: good sam rehab ceiling lifts.ec6

DESCRIPTION: Ceiling Lift #36 - E/W New 1000#



CHECK FLEXURE

FROM PREV CALCS, $\phi M_n = 57.35^{1-k} > M_u$ ∴ OK

AT BLDG ADDN

CHECK SHEAR

$\phi V_n = \phi 2\lambda \sqrt{f'_c}\, b_w d$

SAME AS ORIG BLDG, EXCEPT $f'_c = 5000 psi$

$\therefore \phi V_n = 0.75(2)(1)\sqrt{5000 psi}\,(72in)(8.31in)$

$= 63.46k > V_u$ ∴ OK

CHECK FLEXURE

$\phi M_n = \phi A_s f_y (d - a/2)$

SAME AS ORIG BLDG, EXCEPT

$A_s = 0.31in^2 (12in/16in)(6ft) = 1.40in^2$

$a = \frac{1.40in^2 (60ksi)}{0.75(51ksi)(72in)} = 0.31in$

$\therefore \phi M_n = 0.9(1.40in^2)(60ksi)(8.31 - 0.31in/2)$

$= 617^{11-k} = 51.38^{1-k} > M_u$ ∴ OK

∴ (E) SLAB OK IN E/W

PCS Structural Solutions

Project: Good Sam Rehab Job No:

Subject: Sheet Name: DCT

Originating Office: ☐ Seattle ☐ Tacoma ☐ Portland Date: 5/2/24

IN N/S

NOTES:

AT ORIG BLDG, CEILING LIFT HANGERS ALIGN W/ GRID & (E) COLS, MINIMAL INCREASE IN SHEAR/FLEXURE

AT BLDG ADDN, SLAB IS A ONE-WAY SLAB THAT SPANS EAST/WEST, CHECK IN NORTH/SOUTH NOT REQD

∴ (E) SLAB OK IN N/S

Seattle | 1011 Western Avenue, Suite 810 · Seattle, WA 98104 · tel: 206.292.5076
Tacoma | 1250 Pacific Avenue, Suite 701 · Tacoma, WA 98402 · tel: 253.383.2797
Portland | 101 SW Main Street, Suite 280 · Portland, OR 97204 · tel: 503.232.3746
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PCS Structural Solutions

Project: GOOD SAM REHAB Job No:

Subject: Sheet Name: DCT

Originating Office: ☐ Seattle ☐ Tacoma ☐ Portland Date: 5/14/24

CEILING LIFT #38

IN E/W

EXISTING

$V_u = 24.64^k$

$M_u = 90.41^{1-k}$

NEW

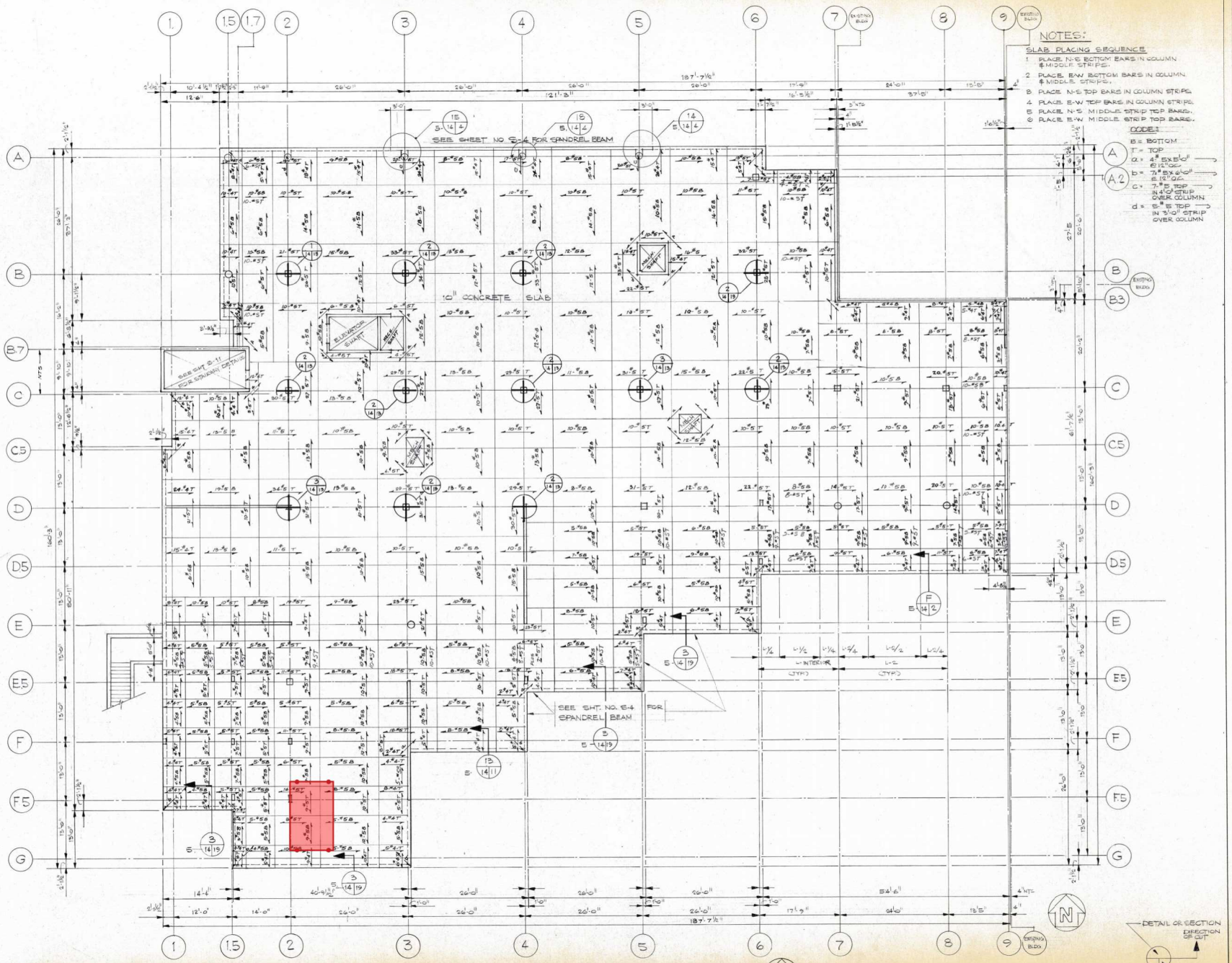
$V_u = 26.26^k \cong 6.6\%$ INCREASE $> 5\%$ ∴ CHECK BY HAND

$M_u = 94.62^{1-k} \cong 4.7\%$ INCREASE $< 5\%$ ∴ OK

CHECK SHEAR

FROM PREV CALCS, $\phi V_n = 56.76^k > V_u$ ∴ OK

∴ (E) SLAB OK IN E/W



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SAN FRANCISCO 94111
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320 WEST BAY DRIVE
SUITE 218
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SEATTLE, WA. 98109
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ELECTRICAL ENGINEERS
SPARLING & ASSOC. INC.
1920 EASTLAKE AVE EAST
SEATTLE, WA. 98102
206-325-7770

GOOD SAMARITAN HOSPITAL

Puyallup, Washington

SHEET TITLE
LEVEL '1' FLAT SLAB PLAN

REVISIONS
NO. | DATE | DESCRIPTION

SCALE: NOTED
DATE: SEPT 5, 1980

SHEET: S-14

Project Title:
Engineer:
Project ID:
Project Descr:

General Beam Analysis

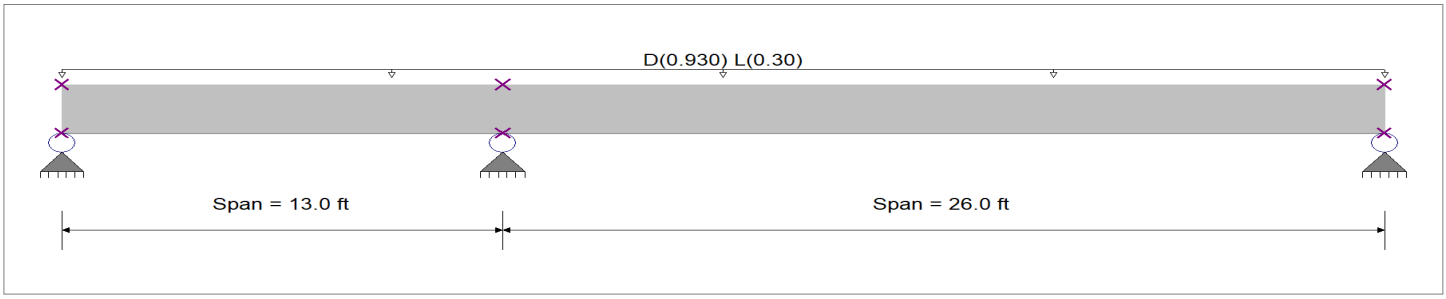
Project File: good sam rehab ceiling lifts.ec6

DESCRIPTION: Ceiling LIft #38 - E/W Existing 1000#

General Beam Properties

Elastic Modulus 29,000.0 ksi

Span #1	Span Length =	13.0 ft	Area =	10.0 in^2	Moment of Inertia =	100.0	in^4
Span #2	Span Length =	26.0 ft	Area =	10.0 in^2	Moment of Inertia =	100.0	in^4



Applied Loads

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

Loads on all spans...

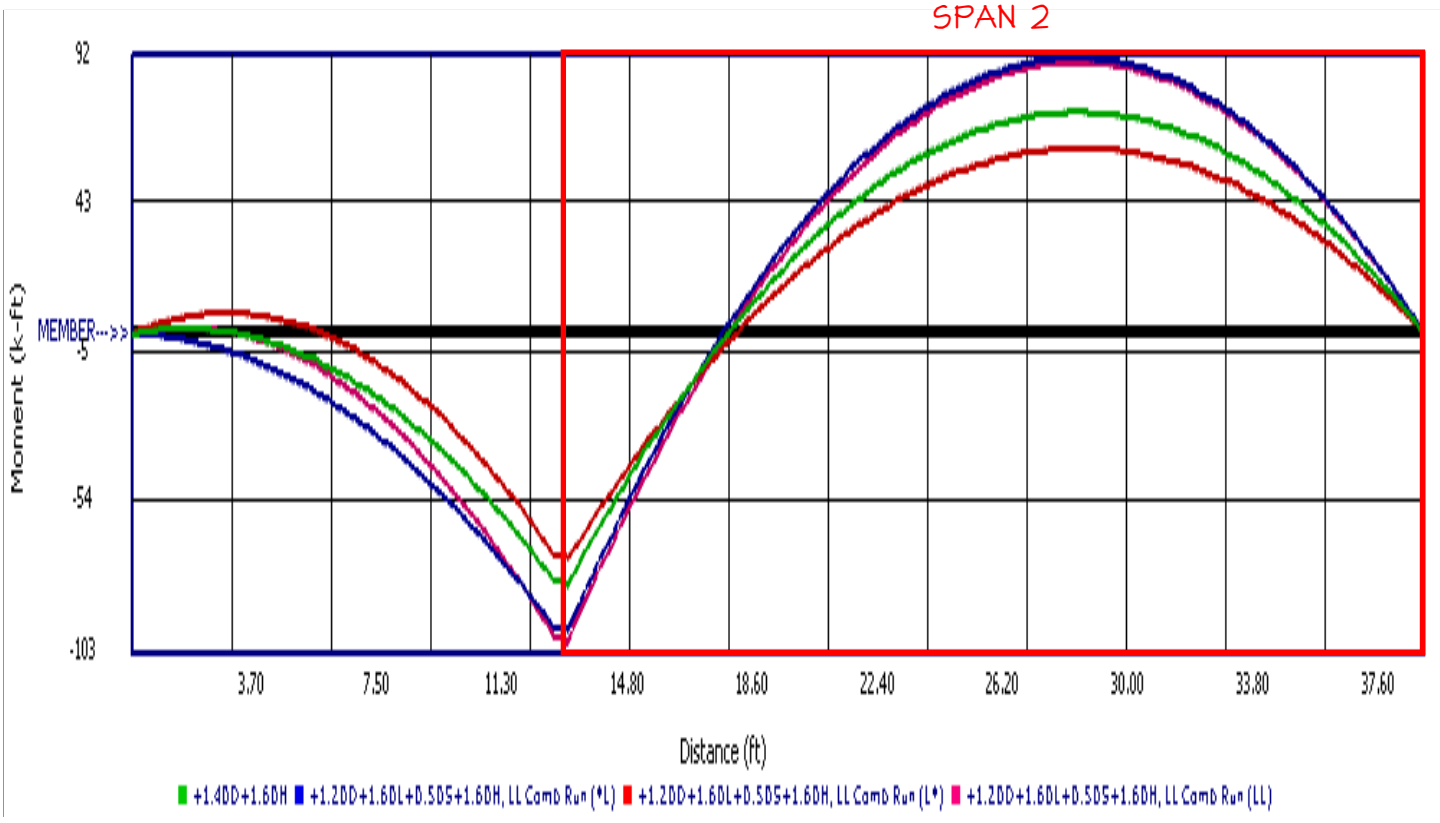
Uniform Load on ALL spans : D = 0.1550, L = 0.050 k/ft, Tributary Width = 6.0 ft

DESIGN SUMMARY

Maximum Bending =	101.146 k-ft	Maximum Shear =	24.638 k
Load Combination	1.40D+1.60L+0.50S+1.60H, LL Comb Run (LL)	Load Combination	1.40D+1.60L+0.50S+1.60H, LL Comb Run (LL)
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1
Location of maximum on span	13.000 ft	Location of maximum on span	13.000 ft

Maximum Deflection

Max Downward Transient Deflection	2.496 in	124
Max Upward Transient Deflection	-0.296 in	526
Max Downward Total Deflection	2.496 in	124
Max Upward Total Deflection	-0.296 in	526

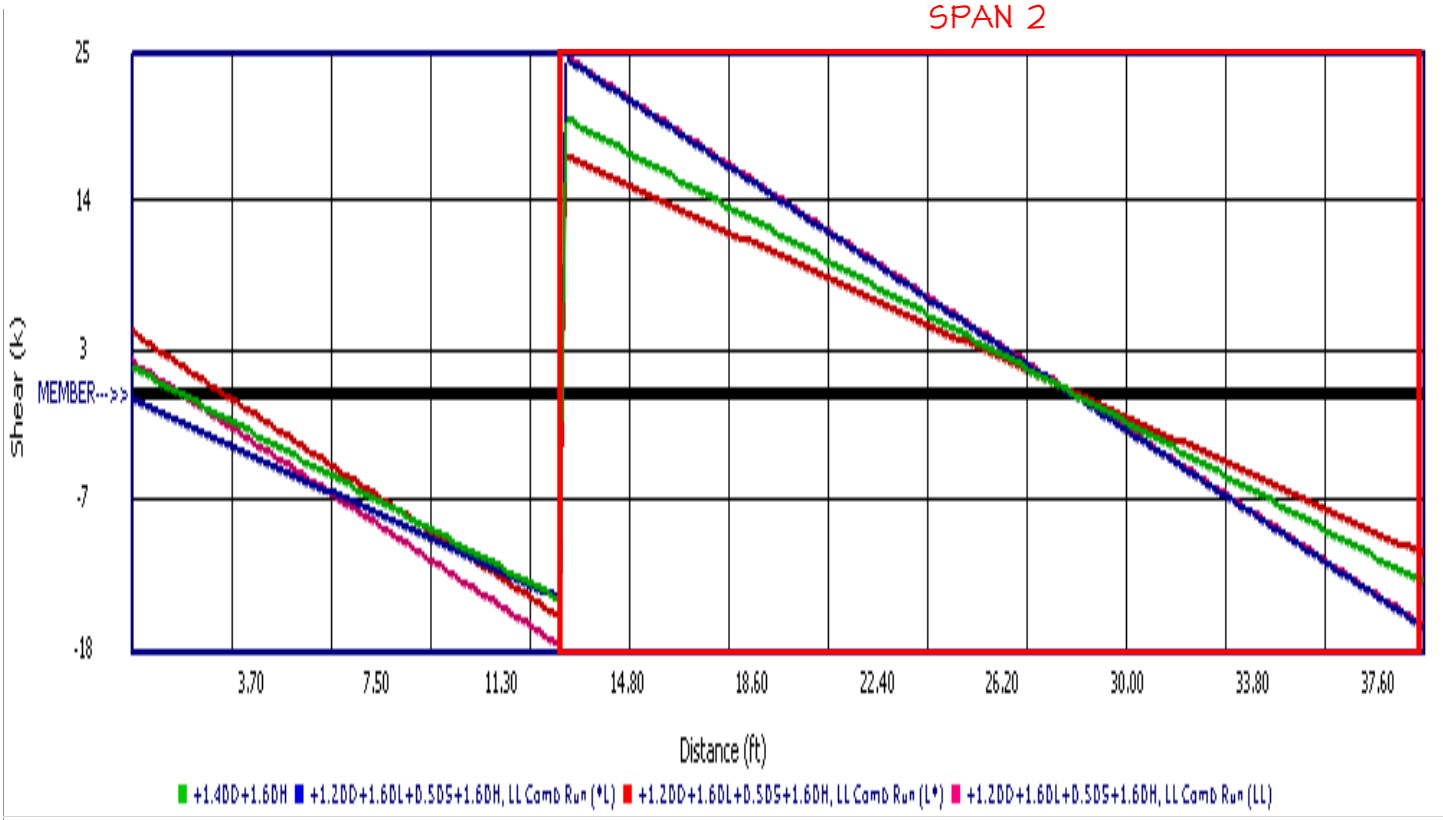


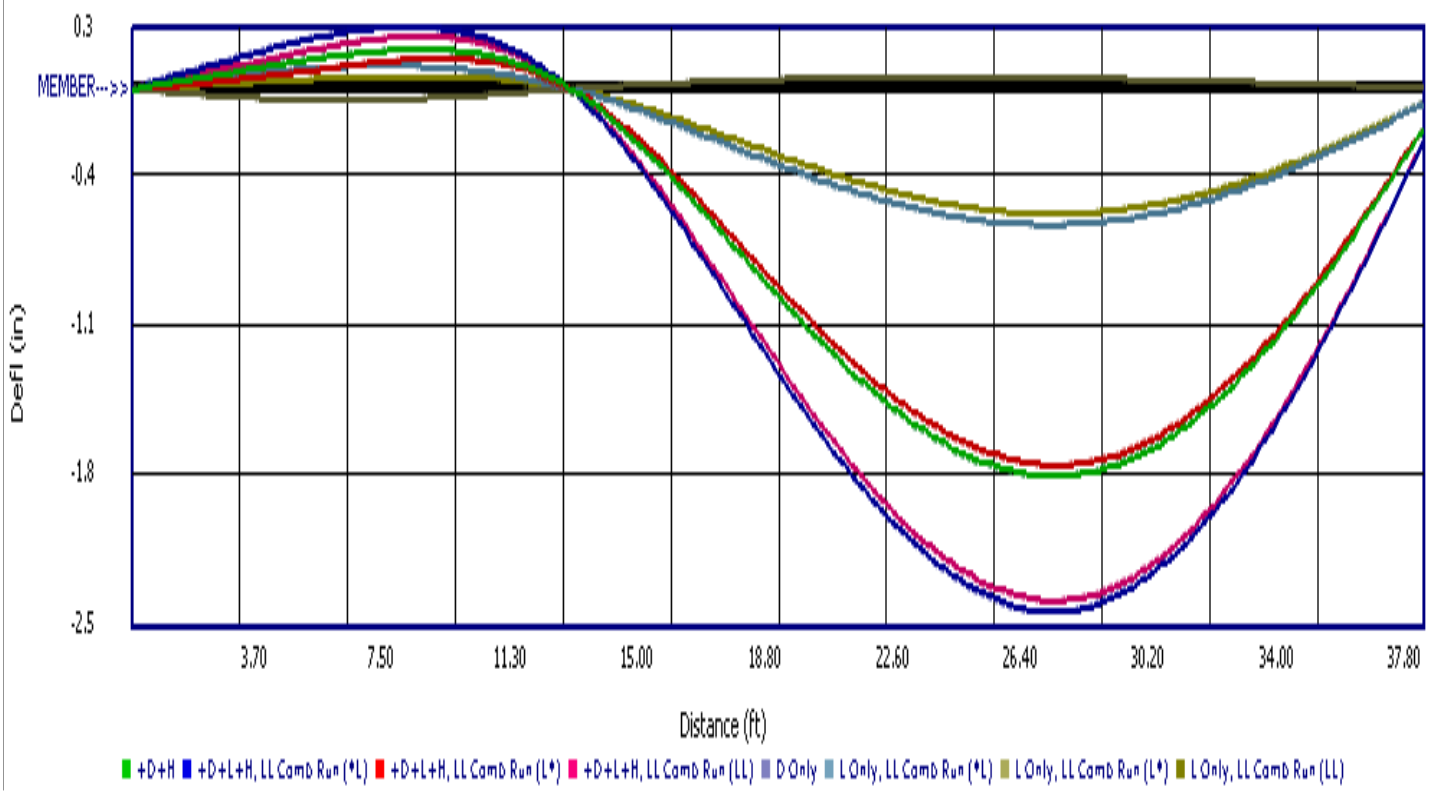
Project Title:
Engineer:
Project ID:
Project Descr:

General Beam Analysis

Project File: good sam rehab ceiling lifts.ec6

DESCRIPTION: Ceiling LIft #38 - E/W Existing 1000#





Project Title:
Engineer:
Project ID:
Project Descr:

General Beam Analysis

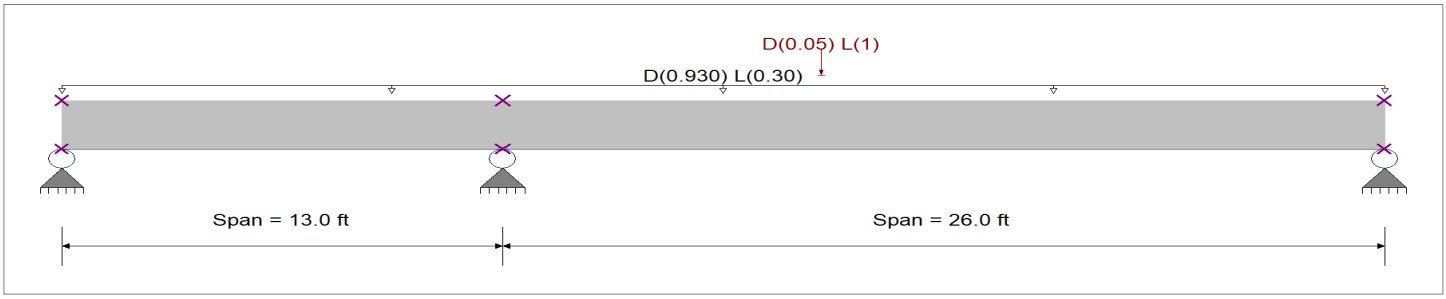
Project File: good sam rehab ceiling lifts.ec6

DESCRIPTION: Ceiling LIft #38 - E/W New 1000# Max Moment

General Beam Properties

Elastic Modulus 29,000.0 ksi

Span #1	Span Length =	13.0 ft	Area =	10.0 in^2	Moment of Inertia =	100.0 in^4
Span #2	Span Length =	26.0 ft	Area =	10.0 in^2	Moment of Inertia =	100.0 in^4



Applied Loads

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

Loads on all spans...
Uniform Load on ALL spans : D = 0.1550, L = 0.050 k/ft, Tributary Width = 6.0 ft

Load(s) for Span Number 2
Point Load : D = 0.050, L = 1.0 k @ 9.417 ft

DESIGN SUMMARY

Maximum Bending =	106.590 k-ft	Maximum Shear =	25.906 k
Load Combination	D+1.60L+0.50S+1.60H, LL Comb Run (LL)	Load Combination	D+1.60L+0.50S+1.60H, LL Comb Run (LL)
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1
Location of maximum on span	13.000 ft	Location of maximum on span	13.000 ft
Maximum Deflection			
Max Downward Transient Deflection	2.614 in	119	
Max Upward Transient Deflection	-0.319 in	489	
Max Downward Total Deflection	2.614 in	119	
Max Upward Total Deflection	-0.319 in	489	

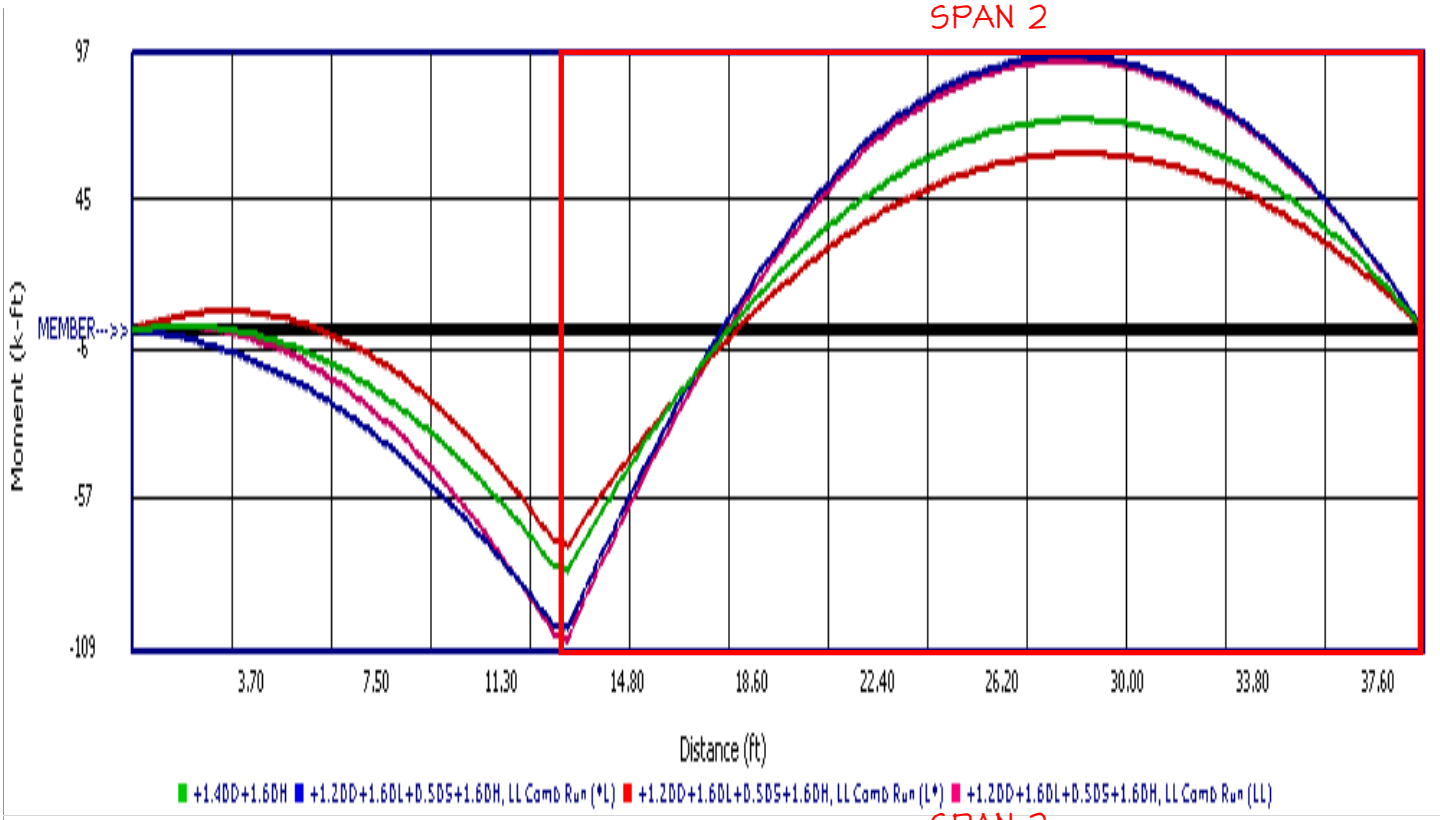
Project Title:
Engineer:
Project ID:
Project Descr:

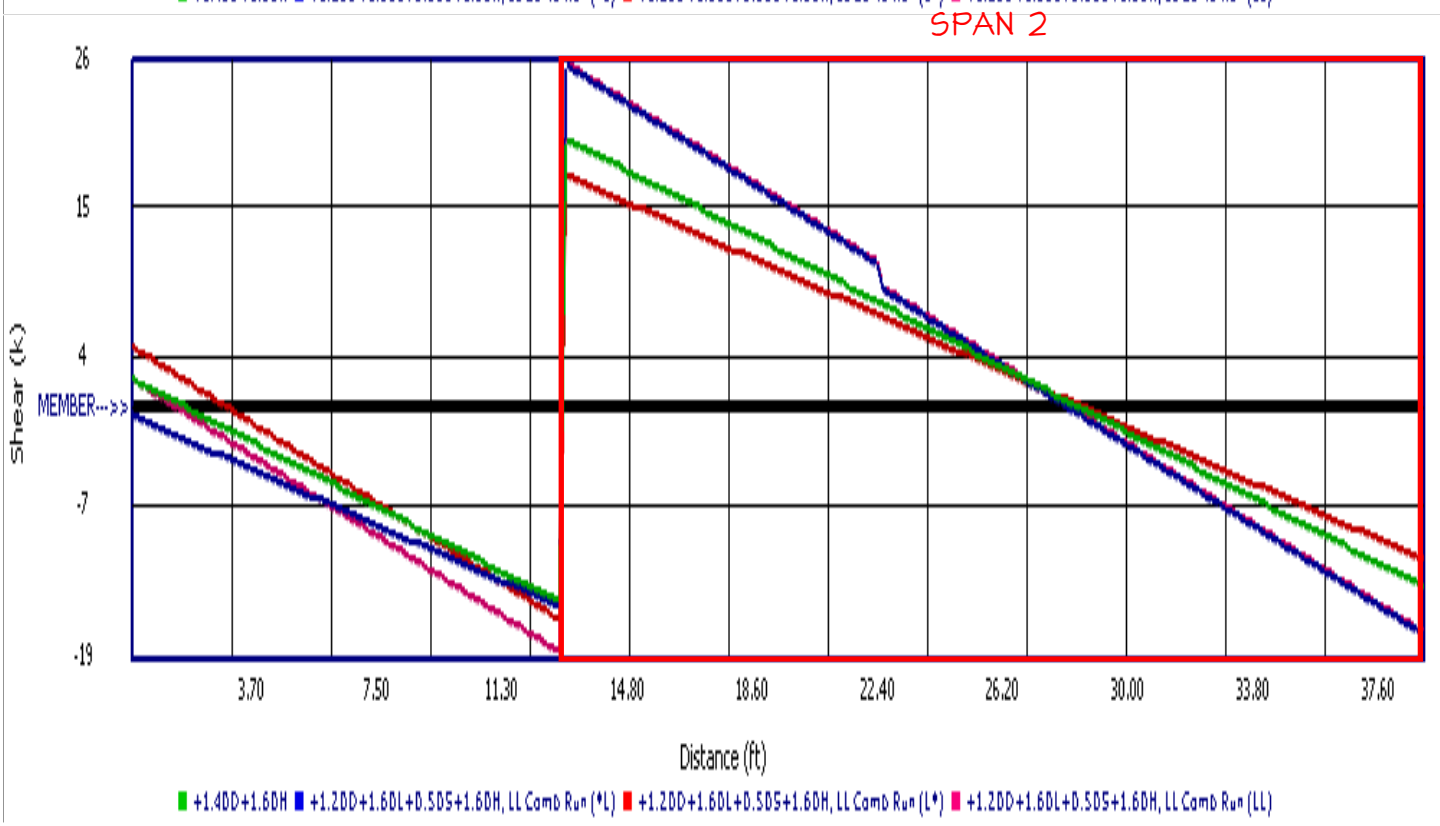
General Beam Analysis

Project File: good sam rehab ceiling lifts.ec6

LIC# : KW-06014122, Build:20.24.02.27 PCS STRUCTURAL SOLUTIONS (c) ENERCALC INC 1983-2023

DESCRIPTION: Ceiling LIft #38 - E/W New 1000# Max Moment



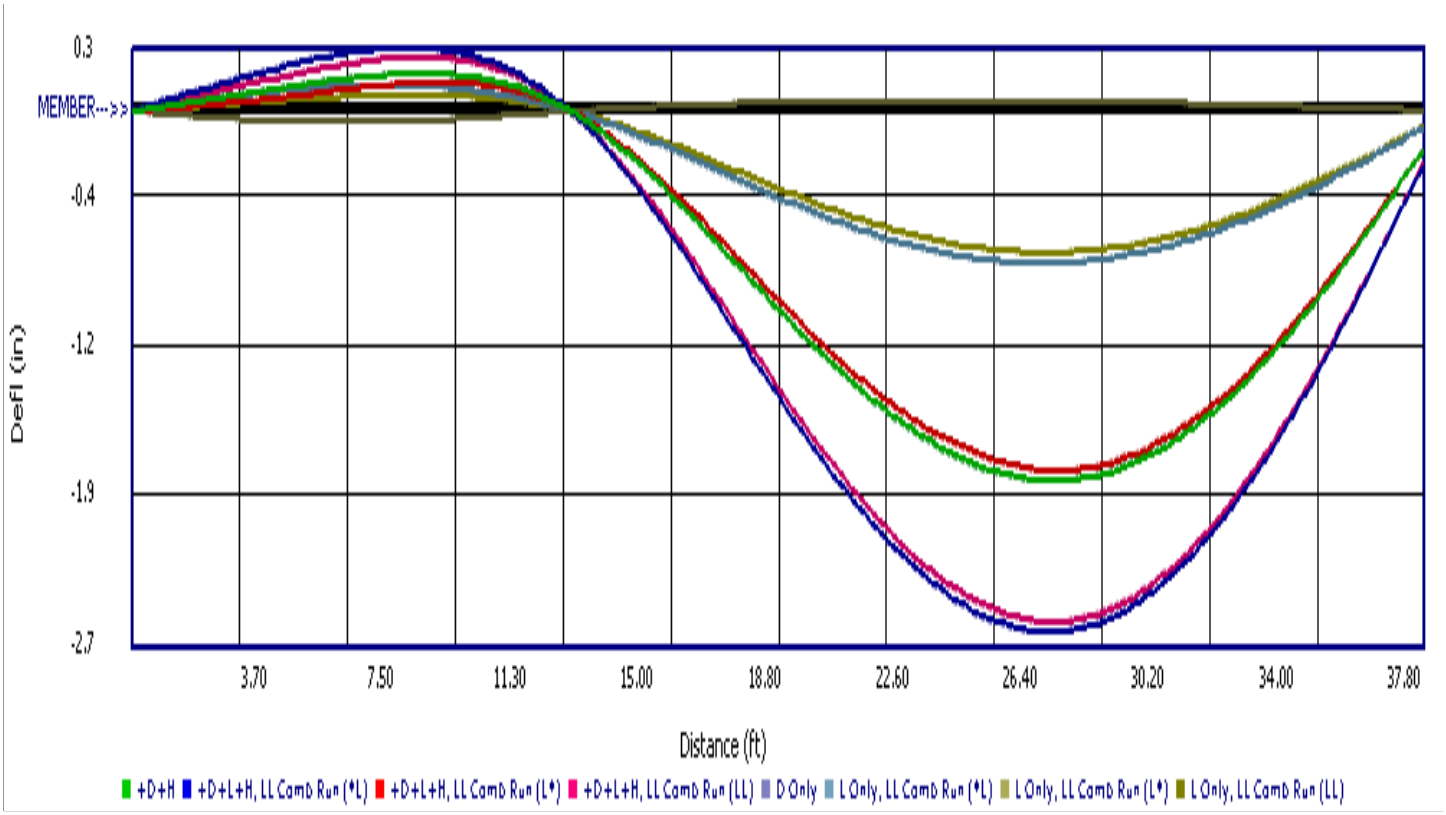


Project Title:
Engineer:
Project ID:
Project Descr:

General Beam Analysis

Project File: good sam rehab ceiling lifts.ec6

DESCRIPTION: Ceiling LIft #38 - E/W New 1000# Max Moment



Project Title:
Engineer:
Project ID:
Project Descr:

General Beam Analysis

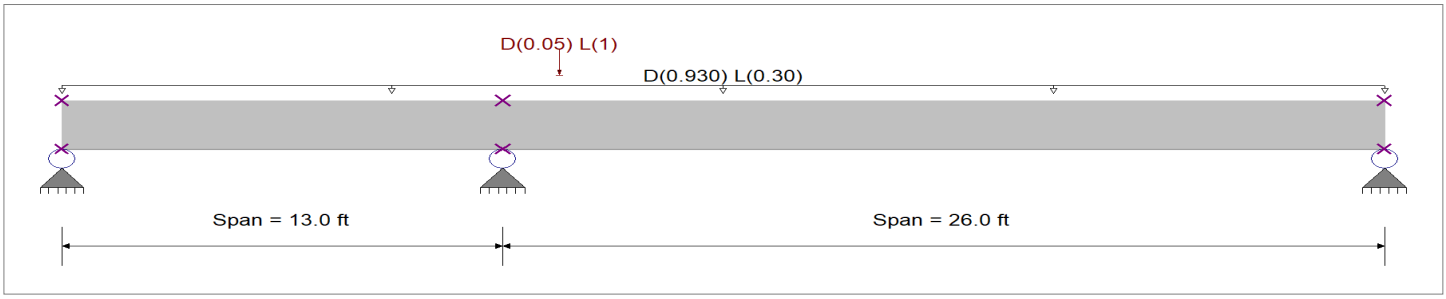
Project File: good sam rehab ceiling lifts.ec6

DESCRIPTION: Ceiling LIft #38 - E/W New 1000# Max Shear

General Beam Properties

Elastic Modulus 29,000.0 ksi

Span #1	Span Length =	13.0 ft	Area =	10.0 in^2	Moment of Inertia =	100.0	in^4
Span #2	Span Length =	26.0 ft	Area =	10.0 in^2	Moment of Inertia =	100.0	in^4



Applied Loads

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

Loads on all spans...
Uniform Load on ALL spans : D = 0.1550, L = 0.050 k/ft, Tributary Width = 6.0 ft

Load(s) for Span Number 2
Point Load : D = 0.050, L = 1.0 k @ 1.667 ft

DESIGN SUMMARY

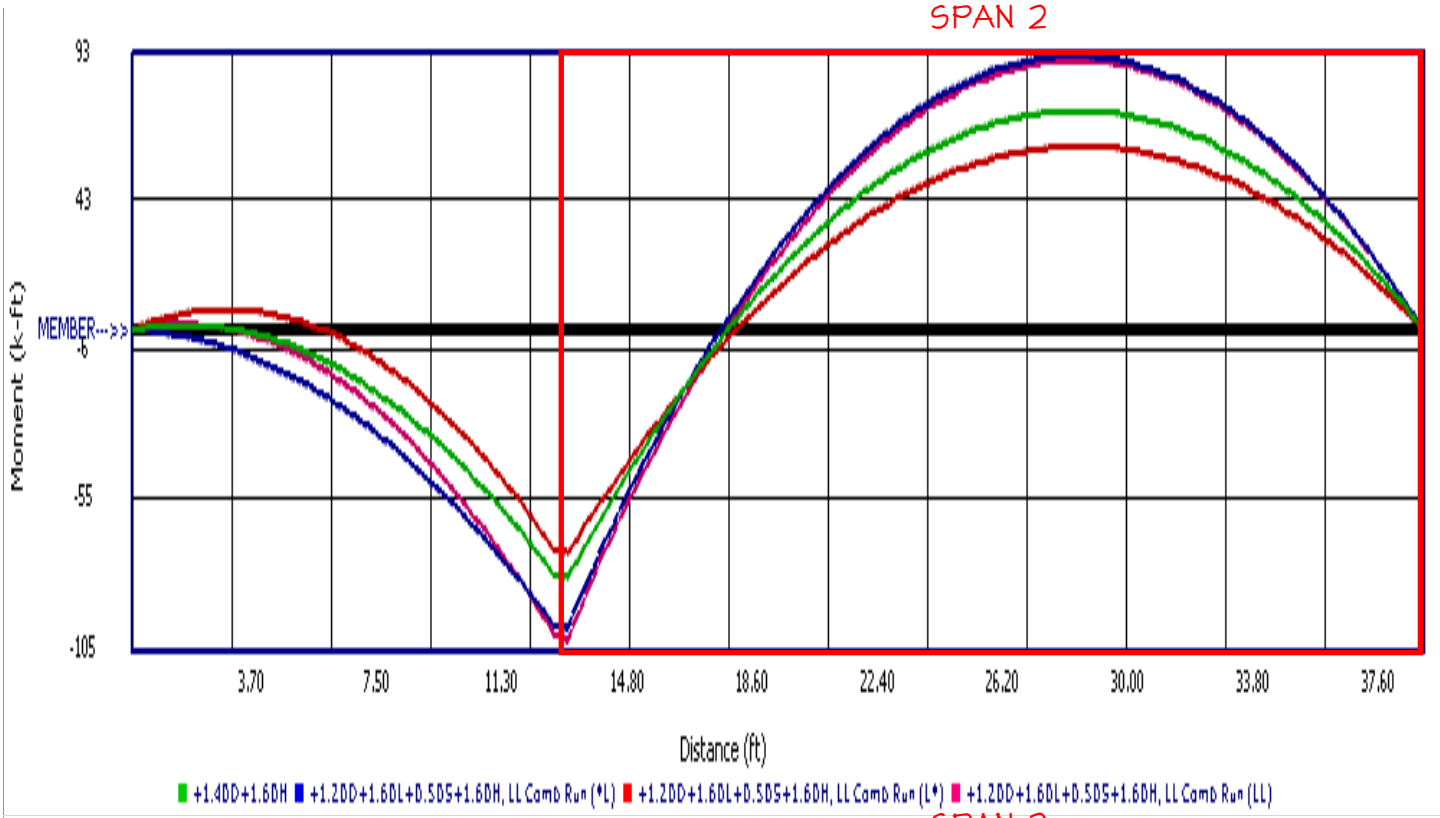
Maximum Bending =	102.818 k-ft	Maximum Shear =	26.256 k
Load Combination	D+1.60L+0.50S+1.60H, LL Comb Run (LL)	Load Combination	D+1.60L+0.50S+1.60H, LL Comb Run (LL)
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1
Location of maximum on span	13.000 ft	Location of maximum on span	13.000 ft
Maximum Deflection			
Max Downward Transient Deflection	2.513 in	124	
Max Upward Transient Deflection	-0.303 in	514	
Max Downward Total Deflection	2.513 in	124	
Max Upward Total Deflection	-0.303 in	514	

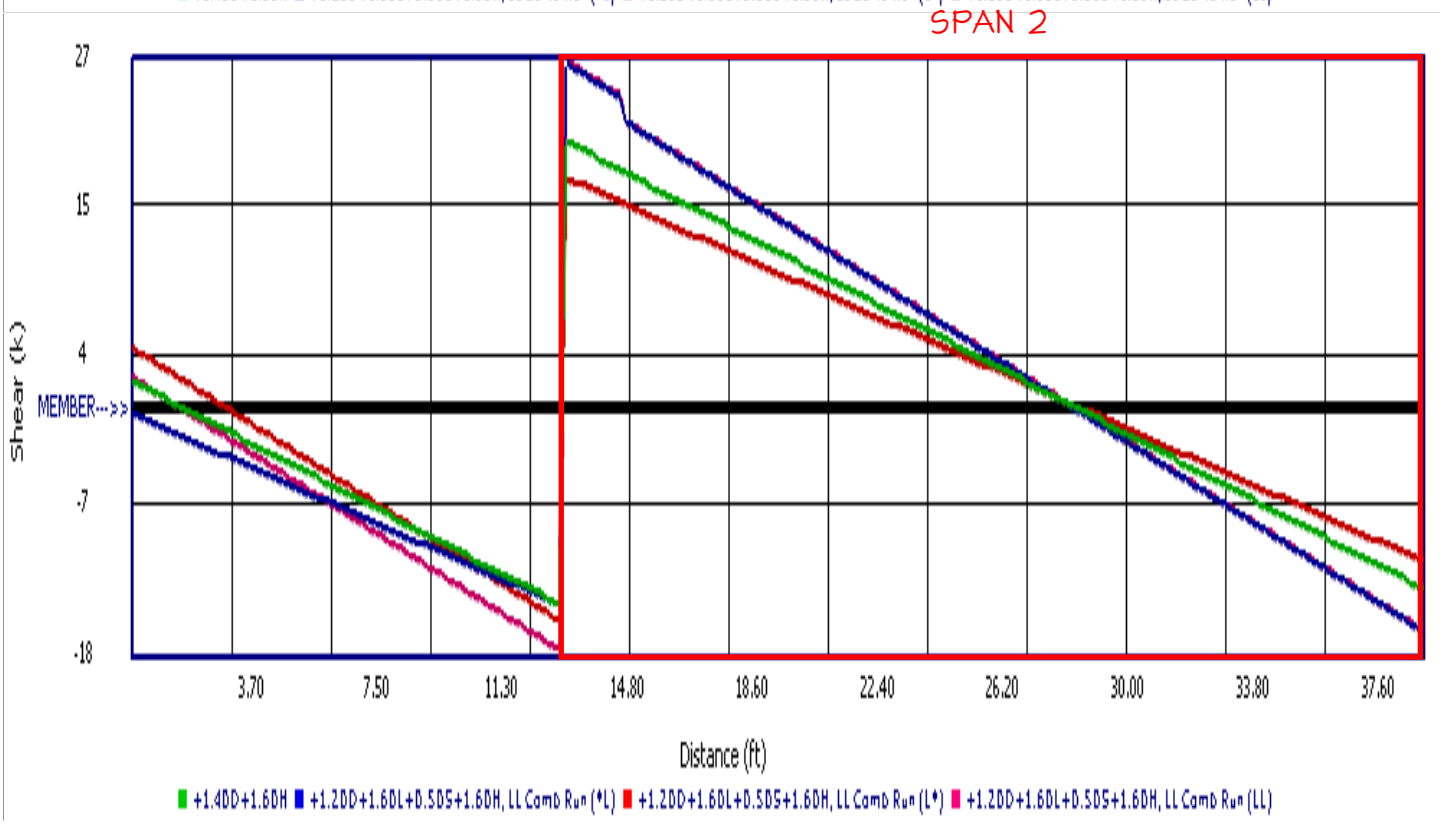
Project Title:
Engineer:
Project ID:
Project Descr:

General Beam Analysis

Project File: good sam rehab ceiling lifts.ec6

DESCRIPTION: Ceiling LIft #38 - E/W New 1000# Max Shear



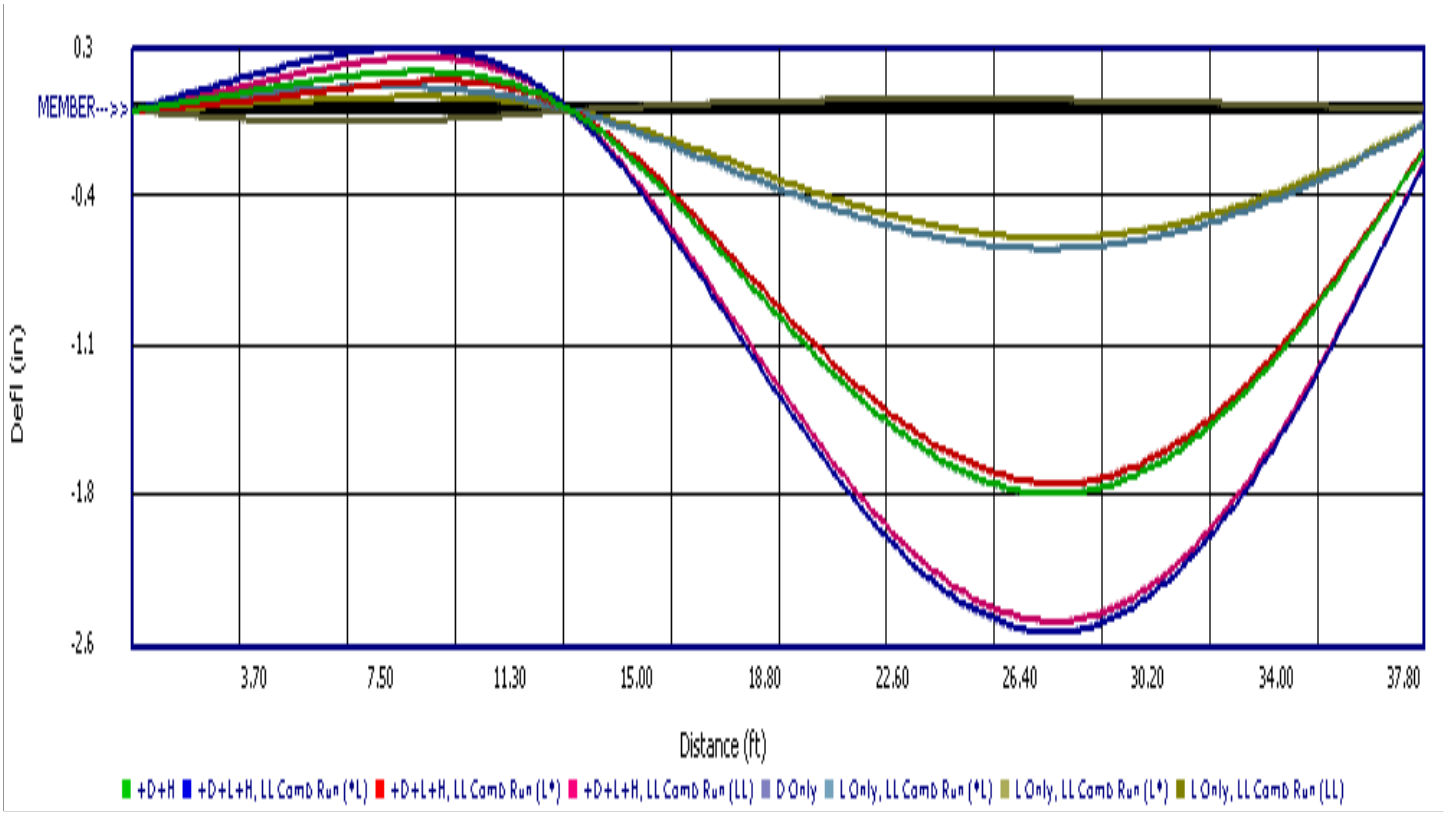


Project Title:
Engineer:
Project ID:
Project Descr:

General Beam Analysis

Project File: good sam rehab ceiling lifts.ec6

DESCRIPTION: Ceiling LIft #38 - E/W New 1000# Max Shear



IN N/S

EXISTING

$V_u = \begin{cases} 12.65\,K & \text{SPAN 1, TYP} \\ 11.36\,K & \text{SPAN 2, TYP} \end{cases}$

$M_u = \begin{cases} 22.65\,K \\ 12.65\,K \end{cases}$

NEW

$V_u = \begin{cases} 12.85\,K & \text{SPAN 1, TYP} \approx 1.6\% \text{ INCREASE} < 5\% \therefore \text{OK} \\ 12.65\,K & \text{SPAN 2, TYP} \approx 11.4\% \text{ INCREASE} > 5\% \therefore \text{CHECK BY HAND} \end{cases}$

$M_u = \begin{cases} 23.66^{1-K} \approx 4.5\% \text{ INCREASE} < 5\% \therefore \text{OK} \\ 14.05^{1-K} \approx 11.1\% \text{ INCREASE} > 5\% \therefore \text{OK} \end{cases}$

CHECK SHEAR

FROM PREV CALCS, $\phi V_n = 56.76k > V_u \therefore \text{OK}$

CHECK FLEXURE

FROM PREV CALCS, $\phi M_n = 52.35^{1-K} > M_u \therefore \text{OK}$

$\therefore$ (E) SLAB OK IN N/S

Project Title:
Engineer:
Project ID:
Project Descr:

General Beam Analysis

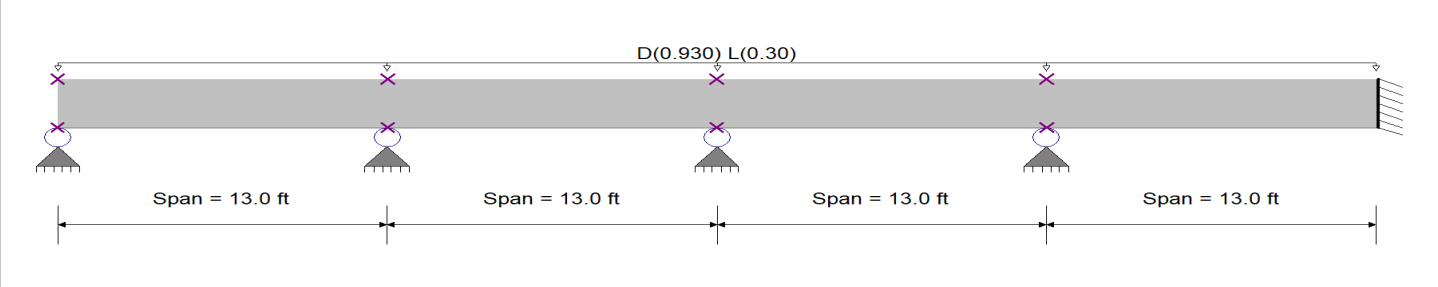
Project File: good sam rehab ceiling lifts.ec6

DESCRIPTION: Ceiling LIft #38 - N/S Existing 1000#

General Beam Properties

Elastic Modulus 29,000.0 ksi

Span #1	Span Length =	13.0 ft	Area =	10.0 in^2	Moment of Inertia =	100.0 in^4
Span #2	Span Length =	13.0 ft	Area =	10.0 in^2	Moment of Inertia =	100.0 in^4
Span #3	Span Length =	13.0 ft	Area =	10.0 in^2	Moment of Inertia =	100.0 in^4
Span #4	Span Length =	13.0 ft	Area =	10.0 in^2	Moment of Inertia =	100.0 in^4



Applied Loads

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

Loads on all spans...

Uniform Load on ALL spans : D = 0.1550, L = 0.050 k/ft, Tributary Width = 6.0 ft

DESIGN SUMMARY

Maximum Bending =	29.547 k-ft	Maximum Shear =	12.647 k
Load Combination	1.60L+0.50S+1.60H, LL Comb Run (LL*L)	Load Combination	1.60L+0.50S+1.60H, LL Comb Run (LL*L)
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1
Location of maximum on span	13.000 ft	Location of maximum on span	13.000 ft

Maximum Deflection

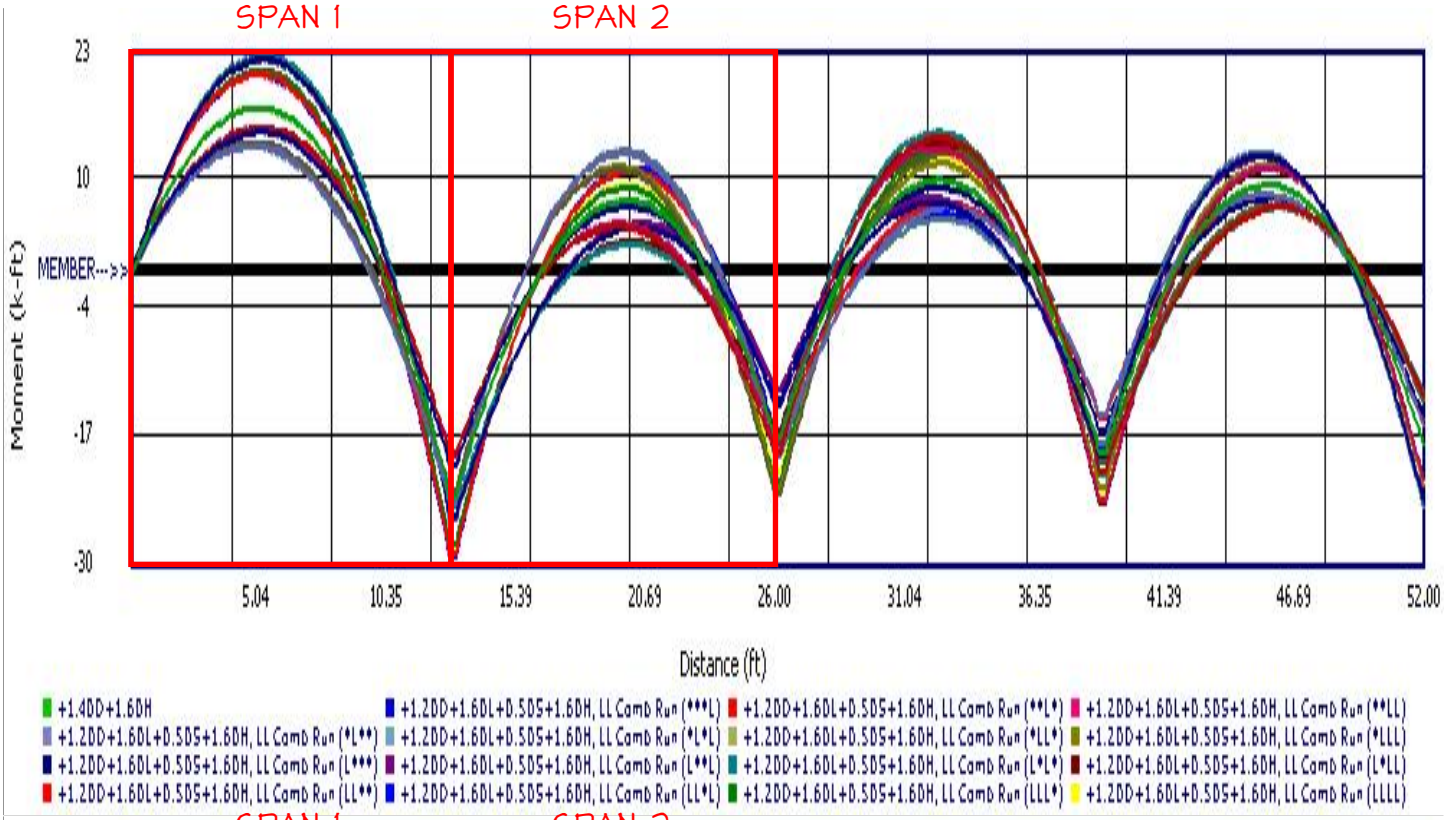
Max Downward Transient Deflection	0.158 in	984
Max Upward Transient Deflection	-0.029 in	5333
Max Downward Total Deflection	0.158 in	984
Max Upward Total Deflection	-0.018 in	8475

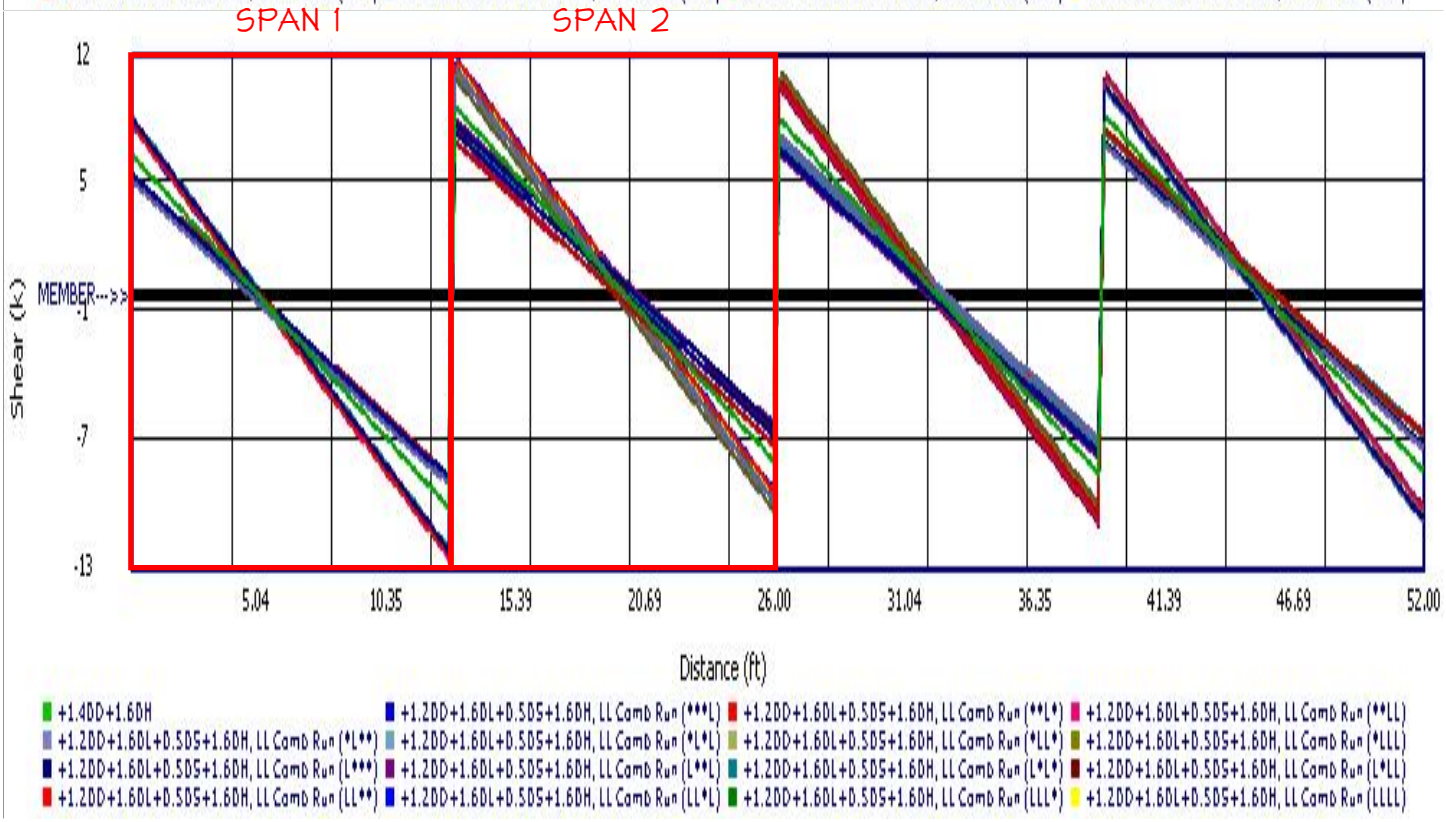
Project Title:
Engineer:
Project ID:
Project Descr:

General Beam Analysis

Project File: good sam rehab ceiling lifts.ec6

DESCRIPTION: Ceiling LIft #38 - N/S Existing 1000#



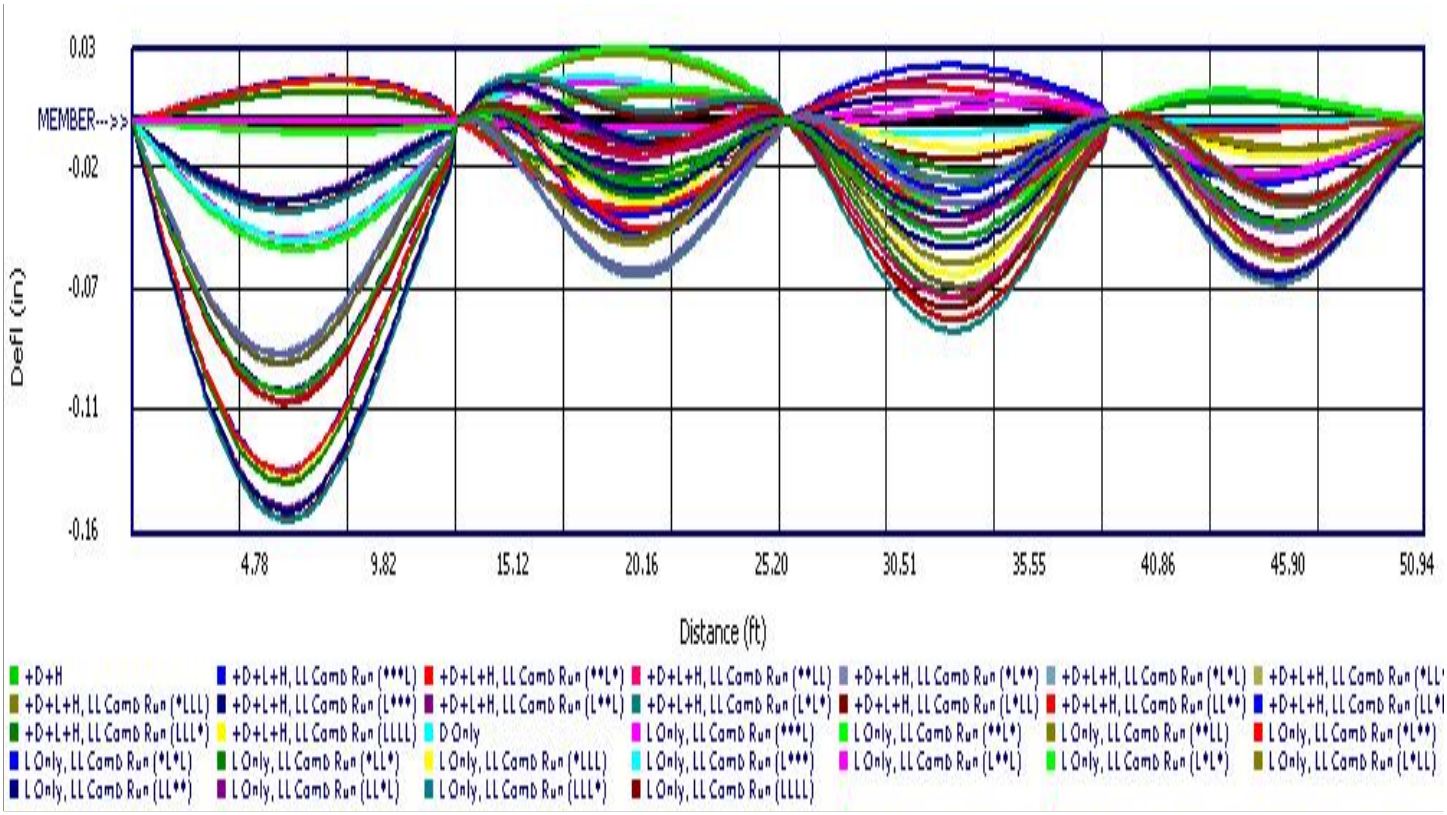


Project Title:
Engineer:
Project ID:
Project Descr:

General Beam Analysis

Project File: good sam rehab ceiling lifts.ec6

DESCRIPTION: Ceiling LIft #38 - N/S Existing 1000#



Project Title:
Engineer:
Project ID:
Project Descr:

General Beam Analysis

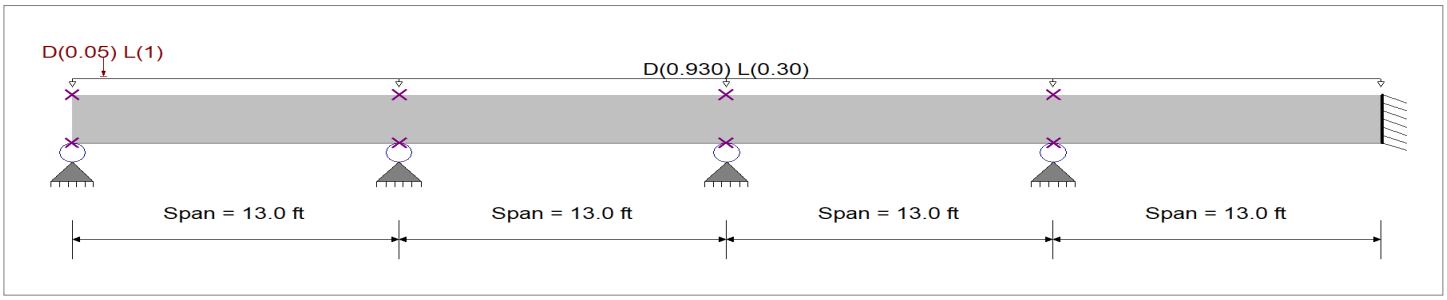
Project File: good sam rehab ceiling lifts.ec6

DESCRIPTION: Ceiling LIft #38 - N/S New 1000# Span 1

General Beam Properties

Elastic Modulus 29,000.0 ksi

Span #1	Span Length =	13.0 ft	Area =	10.0 in^2	Moment of Inertia =	100.0 in^4
Span #2	Span Length =	13.0 ft	Area =	10.0 in^2	Moment of Inertia =	100.0 in^4
Span #3	Span Length =	13.0 ft	Area =	10.0 in^2	Moment of Inertia =	100.0 in^4
Span #4	Span Length =	13.0 ft	Area =	10.0 in^2	Moment of Inertia =	100.0 in^4



Applied Loads

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

Loads on all spans...
Uniform Load on ALL spans : D = 0.1550, L = 0.050 k/ft, Tributary Width = 6.0 ft

Load(s) for Span Number 1
Point Load : D = 0.050, L = 1.0 k @ 1.250 ft

DESIGN SUMMARY

Maximum Bending =	30.098 k-ft	Maximum Shear =	12.849 k
Load Combination	1.60L+0.50S+1.60H, LL Comb Run (LL*L)	Load Combination	1.60L+0.50S+1.60H, LL Comb Run (LL*L)
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1
Location of maximum on span	13.000 ft	Location of maximum on span	13.000 ft

Maximum Deflection

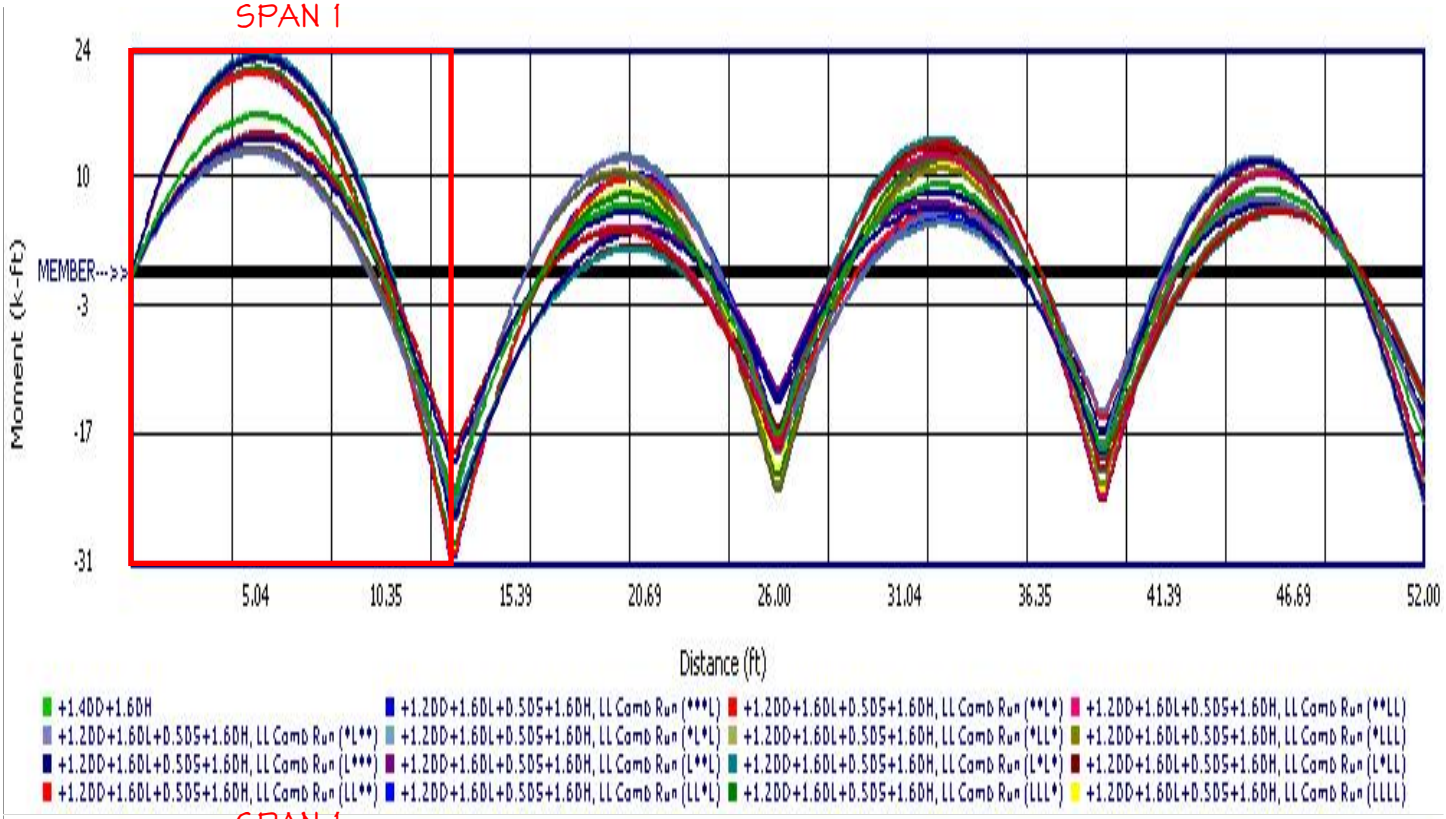
Max Downward Transient Deflection	0.165 in	945
Max Upward Transient Deflection	-0.031 in	5047
Max Downward Total Deflection	0.165 in	945
Max Upward Total Deflection	-0.020 in	7887

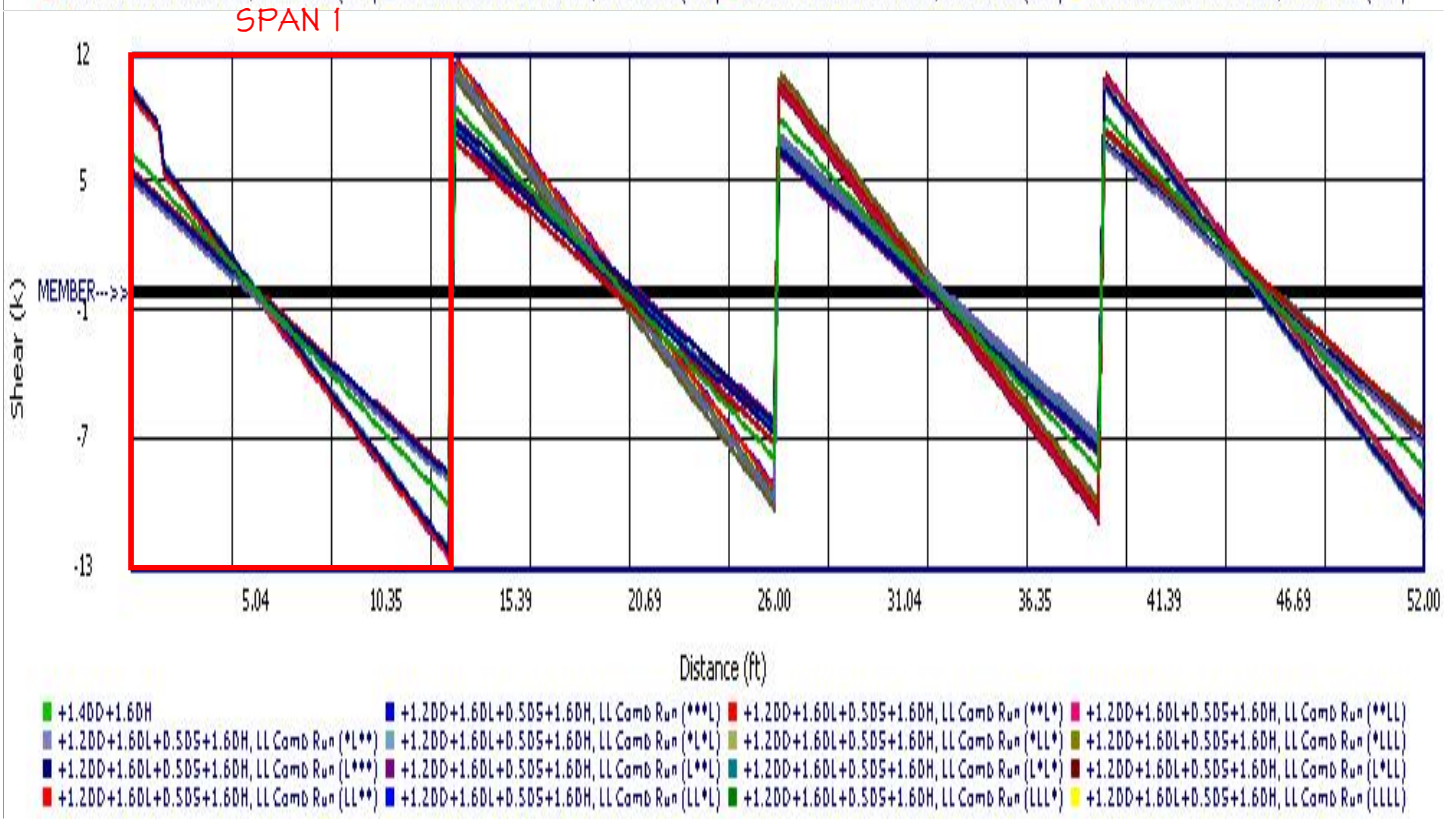
Project Title:
Engineer:
Project ID:
Project Descr:

General Beam Analysis

Project File: good sam rehab ceiling lifts.ec6

DESCRIPTION: Ceiling LIft #38 - N/S New 1000# Span 1



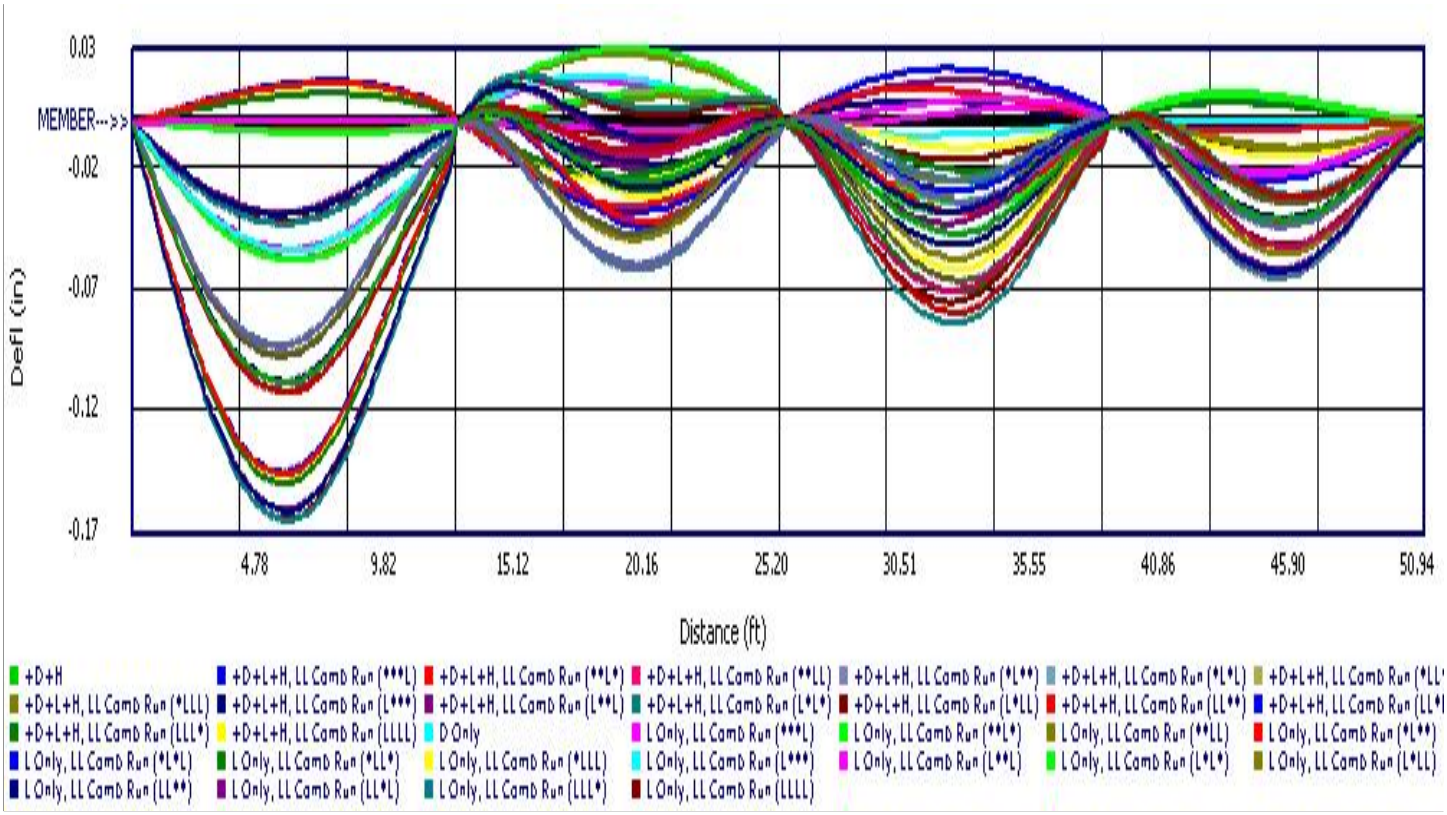


Project Title:
Engineer:
Project ID:
Project Descr:

General Beam Analysis

Project File: good sam rehab ceiling lifts.ec6

DESCRIPTION: Ceiling LIft #38 - N/S New 1000# Span 1



Project Title:
Engineer:
Project ID:
Project Descr:

General Beam Analysis

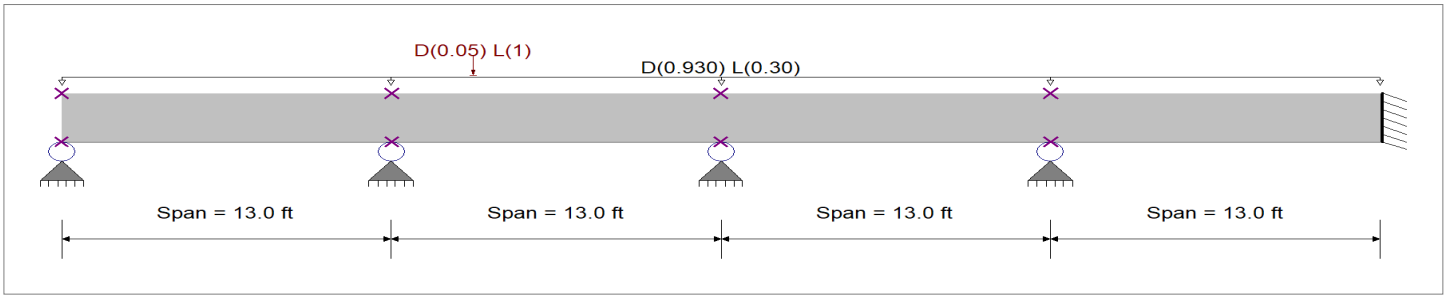
Project File: good sam rehab ceiling lifts.ec6

DESCRIPTION: Ceiling LIft #38 - N/S New 1000# Span 2

General Beam Properties

Elastic Modulus 29,000.0 ksi

Span #1	Span Length =	13.0 ft	Area =	10.0 in^2	Moment of Inertia =	100.0 in^4
Span #2	Span Length =	13.0 ft	Area =	10.0 in^2	Moment of Inertia =	100.0 in^4
Span #3	Span Length =	13.0 ft	Area =	10.0 in^2	Moment of Inertia =	100.0 in^4
Span #4	Span Length =	13.0 ft	Area =	10.0 in^2	Moment of Inertia =	100.0 in^4



Applied Loads

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

Loads on all spans...
Uniform Load on ALL spans : D = 0.1550, L = 0.050 k/ft, Tributary Width = 6.0 ft

Load(s) for Span Number 2
Point Load : D = 0.050, L = 1.0 k @ 3.250 ft

DESIGN SUMMARY

Maximum Bending =	31.080 k-ft	Maximum Shear =	12.765 k
Load Combination	1.60L+0.50S+1.60H, LL Comb Run (LL*L)	Load Combination	1.60L+0.50S+1.60H, LL Comb Run (LL*L)
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1
Location of maximum on span	13.000 ft	Location of maximum on span	13.000 ft

Maximum Deflection

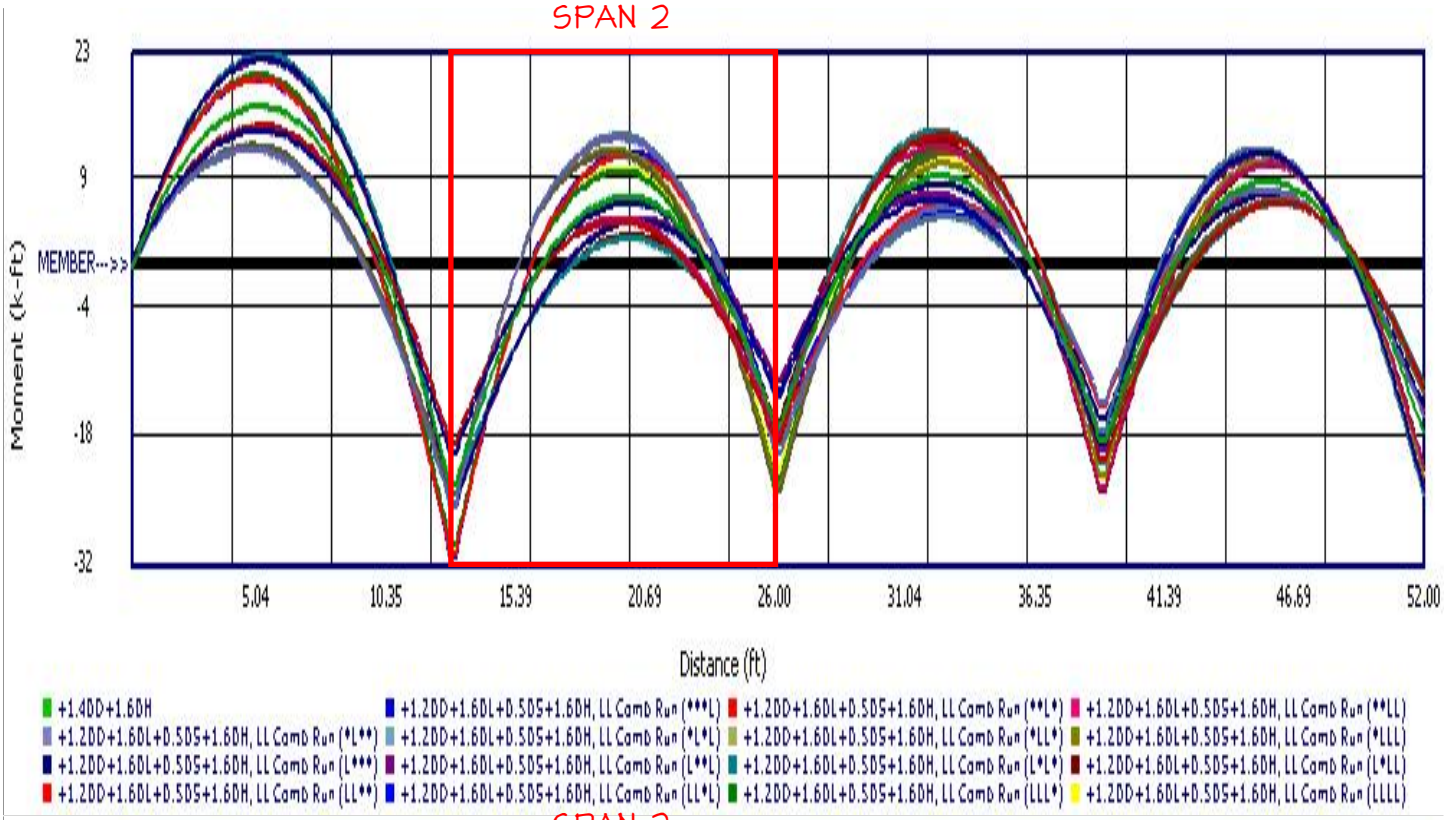
Max Downward Transient Deflection	0.158 in	986
Max Upward Transient Deflection	-0.029 in	5333
Max Downward Total Deflection	0.158 in	986
Max Upward Total Deflection	-0.018 in	8620

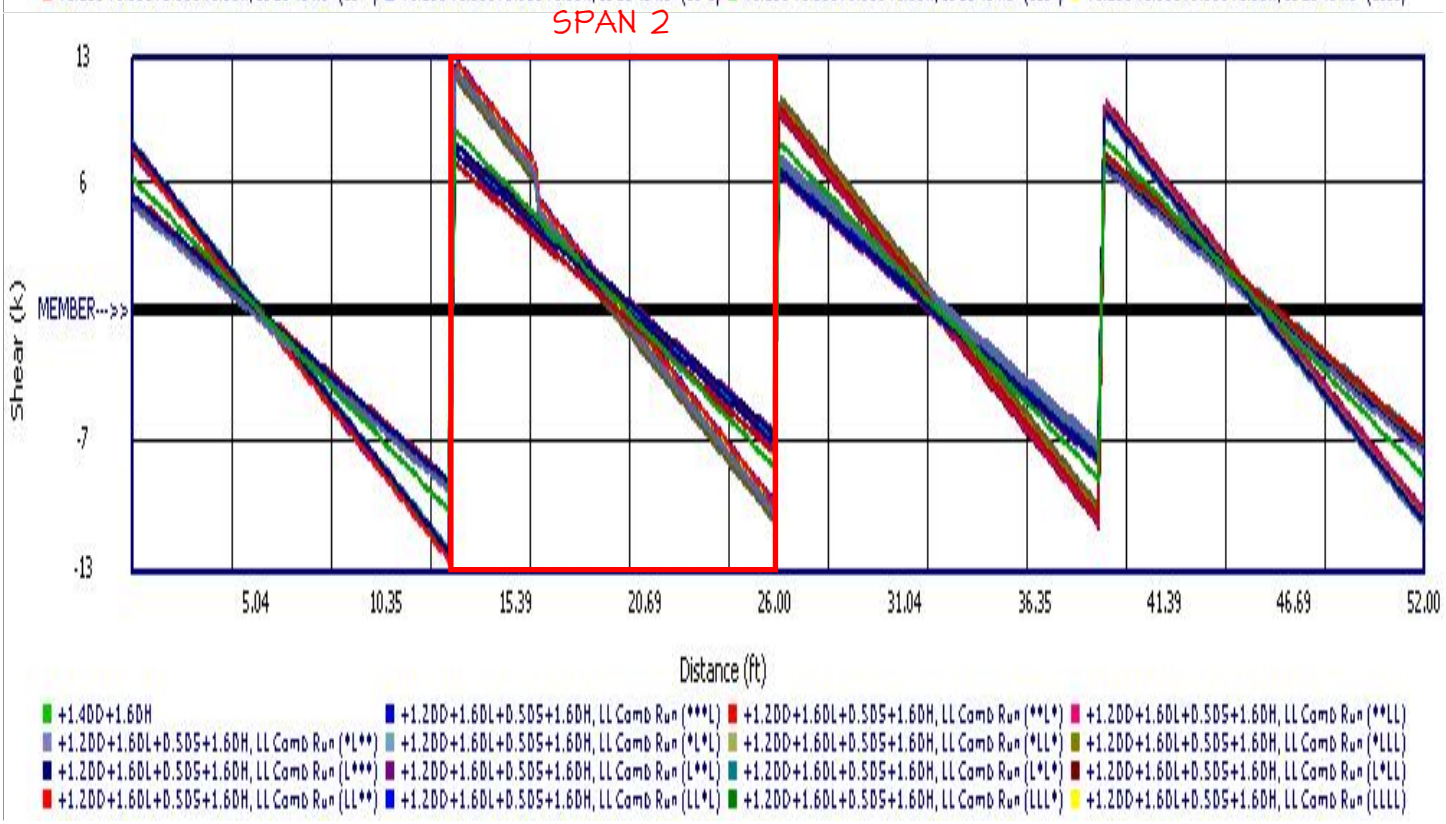
Project Title:
Engineer:
Project ID:
Project Descr:

General Beam Analysis

Project File: good sam rehab ceiling lifts.ec6

DESCRIPTION: Ceiling LIft #38 - N/S New 1000# Span 2



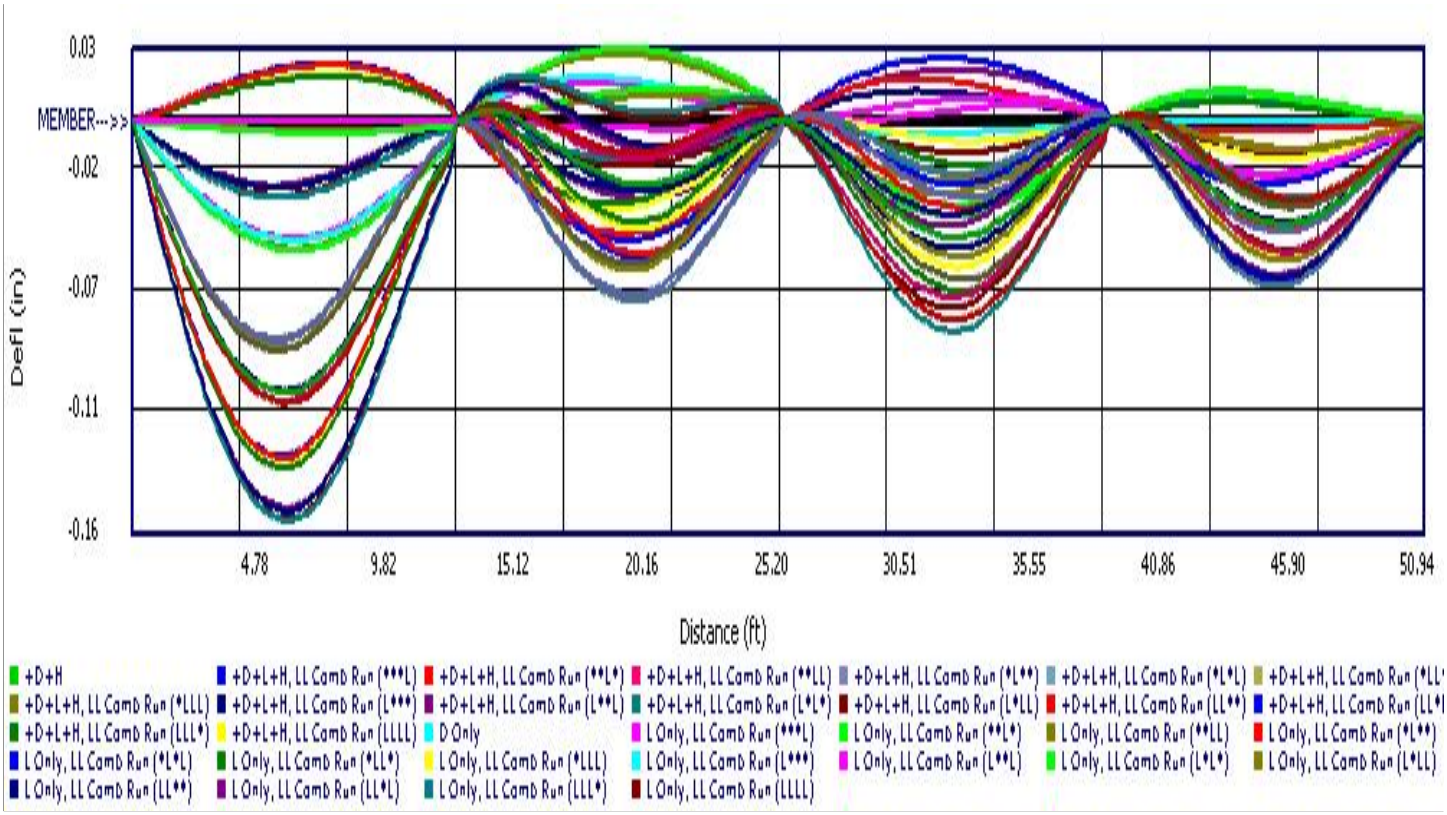


Project Title:
Engineer:
Project ID:
Project Descr:

General Beam Analysis

Project File: good sam rehab ceiling lifts.ec6

DESCRIPTION: Ceiling LIft #38 - N/S New 1000# Span 2



PCS Structural Solutions

Project: Good Sam Rehab Job No:

Subject: Sheet Name: DCT

Originating Office: ☐ Seattle ☐ Tacoma ☐ Portland Date: 5/2/24

Ceiling Lift #41 (700#)

In E/W

Existing

$V_u = 25.23^k$

$M_u = 90.82^{1-k}$

New

$V_u = 26.31^k \simeq 4.3\%$ increase $< 5\%$ ∴ OK

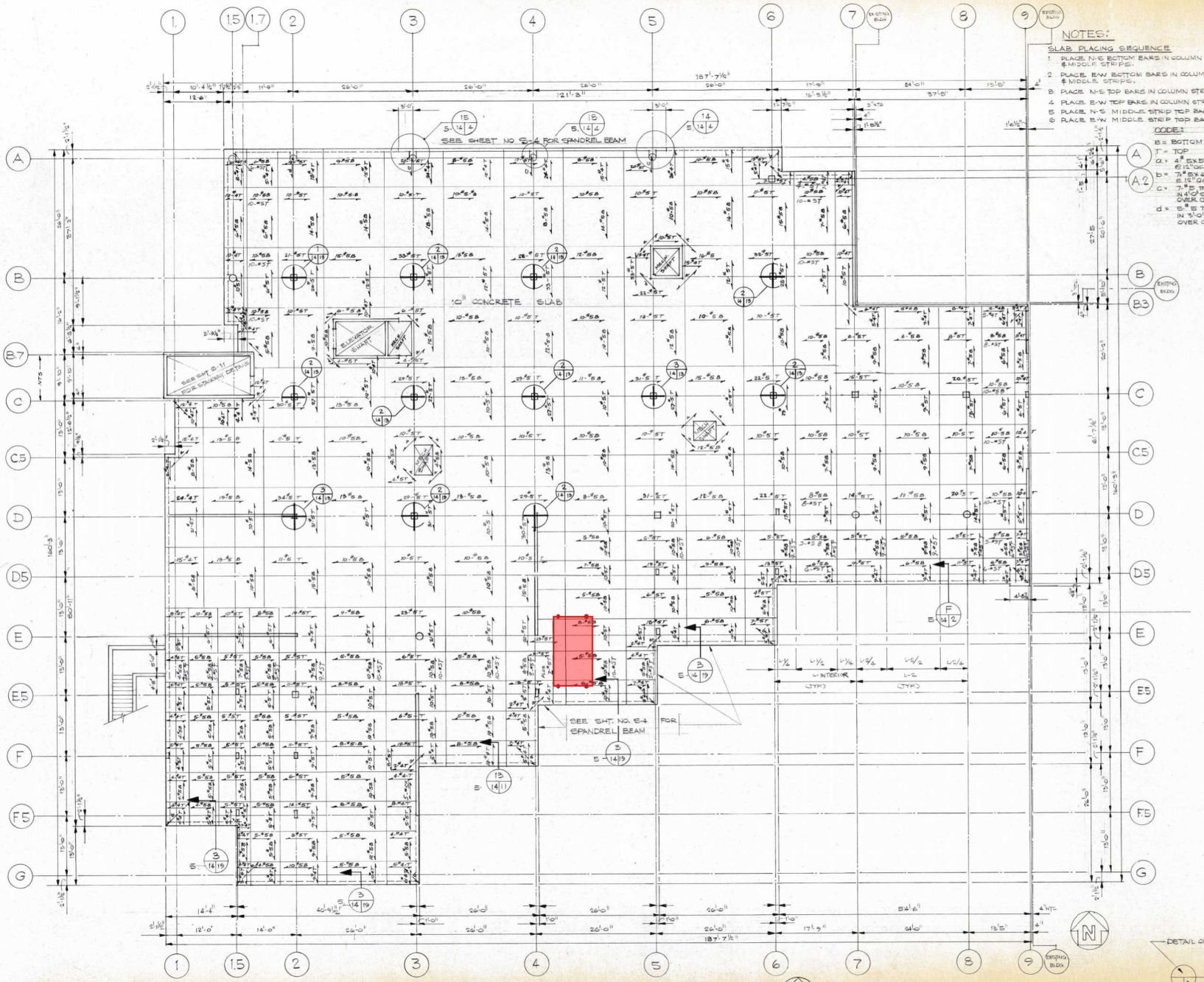
$M_u = 95.14^{1-k} \simeq 4.8\%$ increase $< 5\%$ ∴ OK

In N/S

Existing

$V_u = \begin{cases} 12.87^k & \text{span 1, typ} \\ 12.49^k & \text{span 2, typ} \end{cases}$

$M_u = \begin{cases} 21.88^{1-k} \\ 17.80^{1-k} \end{cases}$



Kaplan/ McLaughlin/ Diaz
ARCHITECTS/PLANNERS
222 VALLEJO STREET
SAN FRANCISCO 94111
415-398-5191

BJSS
ARCHITECTS/PLANNERS
320 WEST BAY DRIVE
OLYMPIA, WASHINGTON
206-943-4650

STRUCTURAL ENGINEERS
HAROLD V. SARGENT & ASSOC
320 WEST BAY DRIVE
SUITE 218
OLYMPIA, WA. 98502
206-943-3590

MECHANICAL ENGINEERS
BENJAMIN S. NOTKIN & ASSOCIATES INC.
820 JOHN STREET
SEATTLE, WA. 98109
206-682-3611

ELECTRICAL ENGINEERS
SPARLING & ASSOC. INC.
1920 EASTLAKE AVE EAST
SEATTLE, WA. 98102
206-325-7770

GOOD SAMARITAN HOSPITAL

Puyallup, Washington

SHEET TITLE
LEVEL '1' FLAT SLAB PLAN

REVISIONS
NO. | DATE | DESCRIPTION

SCALE: NOTED
DATE: SEPT 5, 1980

SHEET: S-14

Project Title:
Engineer:
Project ID:
Project Descr:

General Beam Analysis

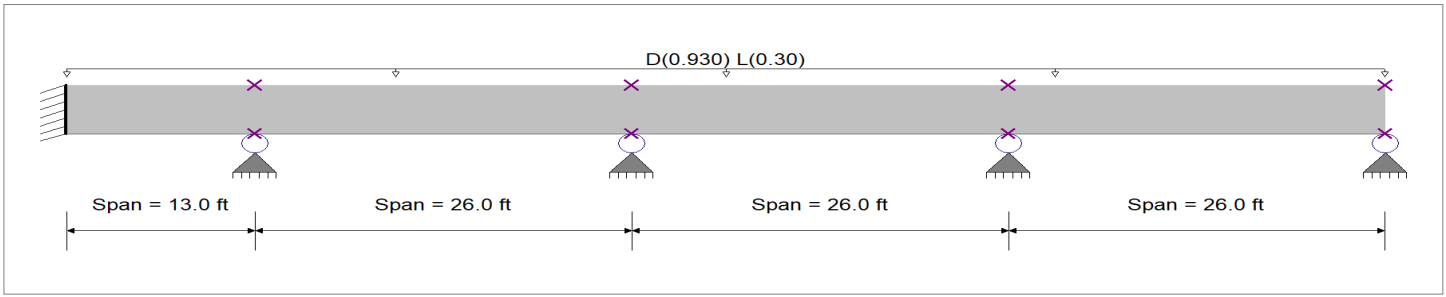
Project File: good sam rehab ceiling lifts.ec6

DESCRIPTION: Ceiling LIft #41 - E/W Existing 700#

General Beam Properties

Elastic Modulus 29,000.0 ksi

Span #1	Span Length =	13.0 ft	Area =	10.0 in^2	Moment of Inertia =	100.0	in^4
Span #2	Span Length =	26.0 ft	Area =	10.0 in^2	Moment of Inertia =	100.0	in^4
Span #3	Span Length =	26.0 ft	Area =	10.0 in^2	Moment of Inertia =	100.0	in^4
Span #4	Span Length =	26.0 ft	Area =	10.0 in^2	Moment of Inertia =	100.0	in^4



Applied Loads

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

Loads on all spans...

Uniform Load on ALL spans : D = 0.1550, L = 0.050 k/ft, Tributary Width = 6.0 ft

DESIGN SUMMARY

Maximum Bending =	116.498 k-ft	Maximum Shear =	25.229 k
Load Combination	1.60L+0.50S+1.60H, LL Comb Run (L*LL)	Load Combination	1.60L+0.50S+1.60H, LL Comb Run (L*LL)
Span # where maximum occurs	Span # 3	Span # where maximum occurs	Span # 3
Location of maximum on span	26.000 ft	Location of maximum on span	26.000 ft

Maximum Deflection

Max Downward Transient Deflection	2.494 in	125	
Max Upward Transient Deflection	-0.445 in	700	
Max Downward Total Deflection	2.494 in	125	
Max Upward Total Deflection	-0.293 in	1064	

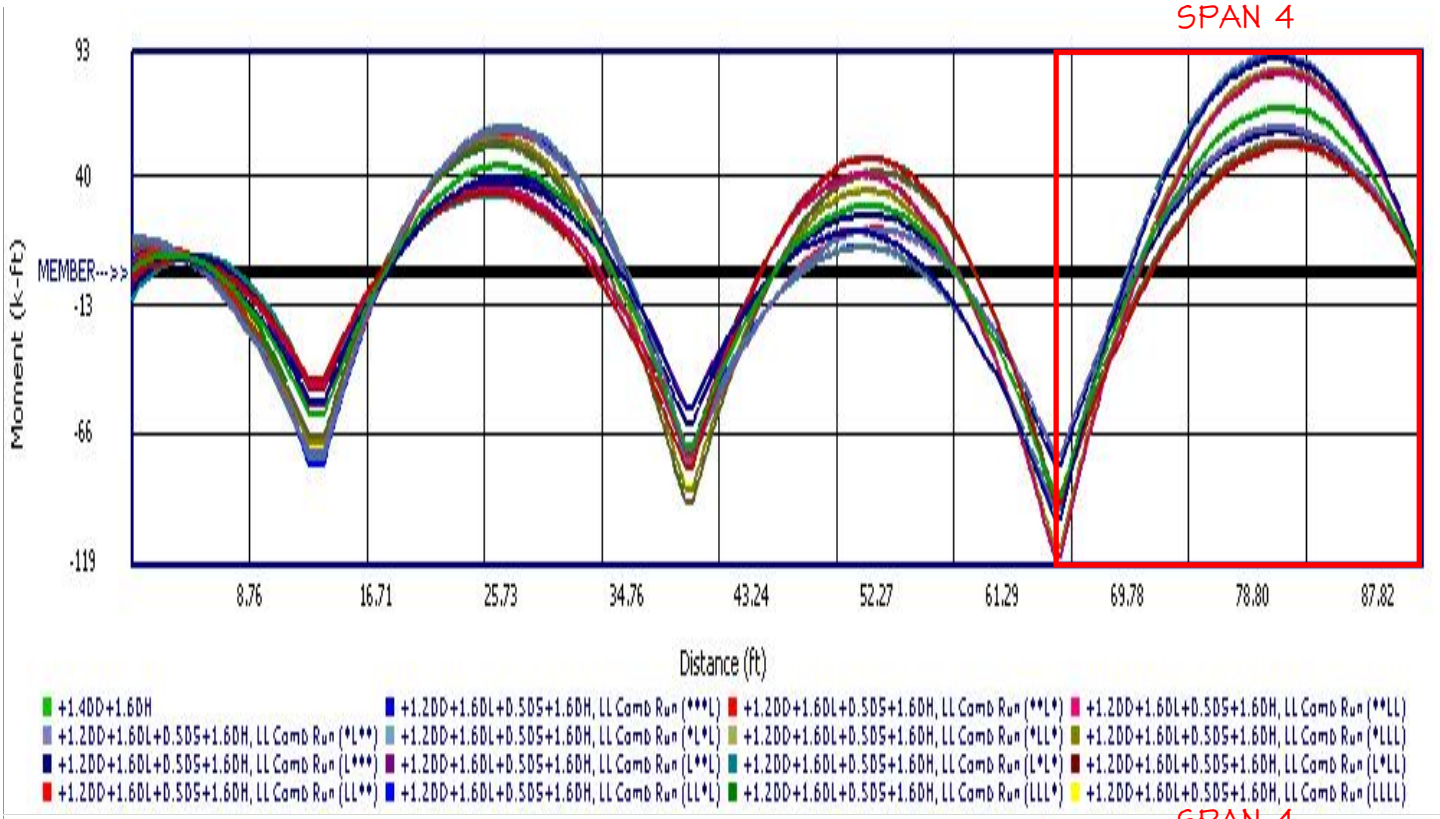
Project Title:
Engineer:
Project ID:
Project Descr:

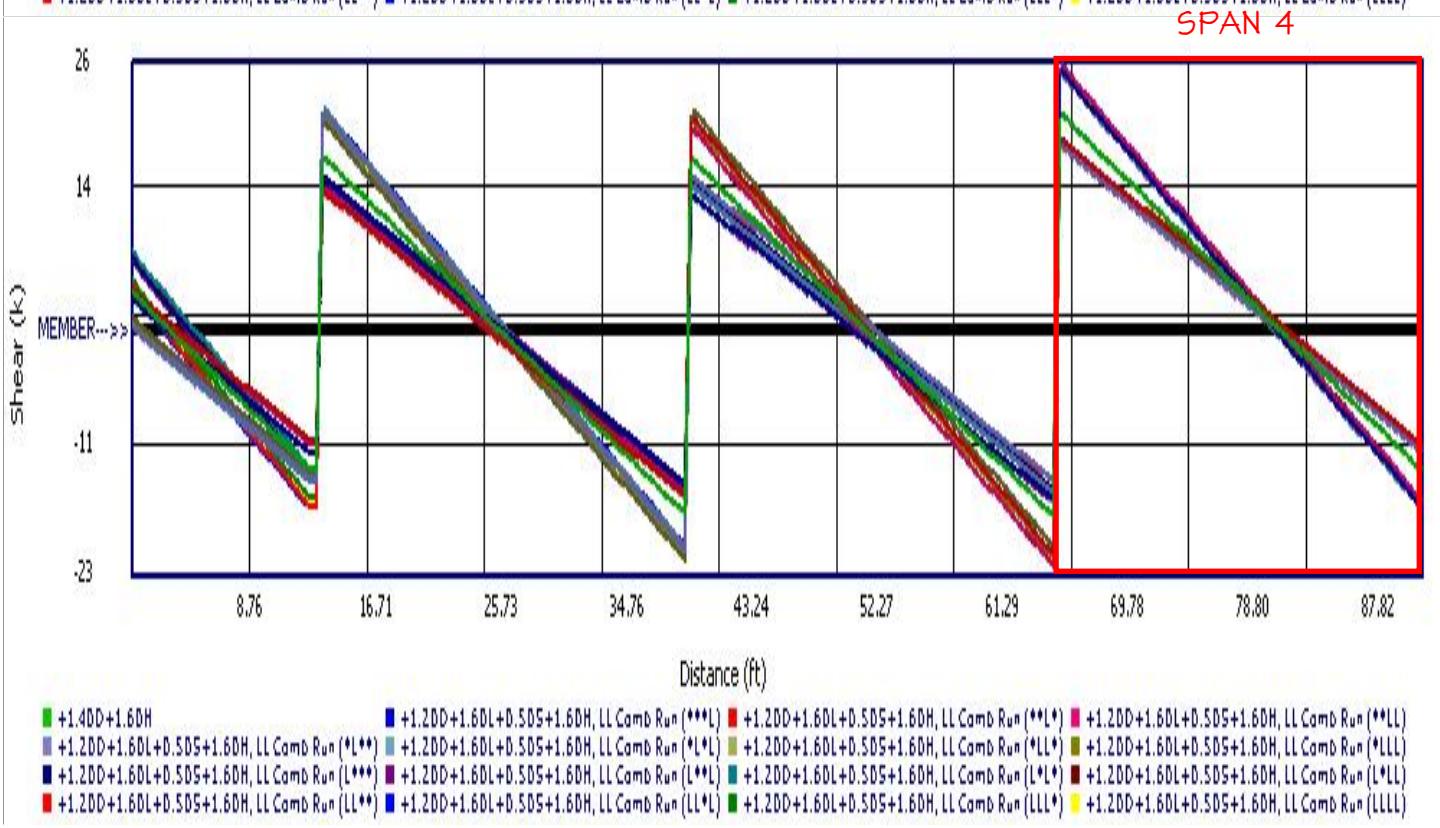
General Beam Analysis

Project File: good sam rehab ceiling lifts.ec6

LIC# : KW-06014122, Build:20.24.02.27 PCS STRUCTURAL SOLUTIONS (c) ENERCALC INC 1983-2023

DESCRIPTION: Ceiling LIft #41 - E/W Existing 700#



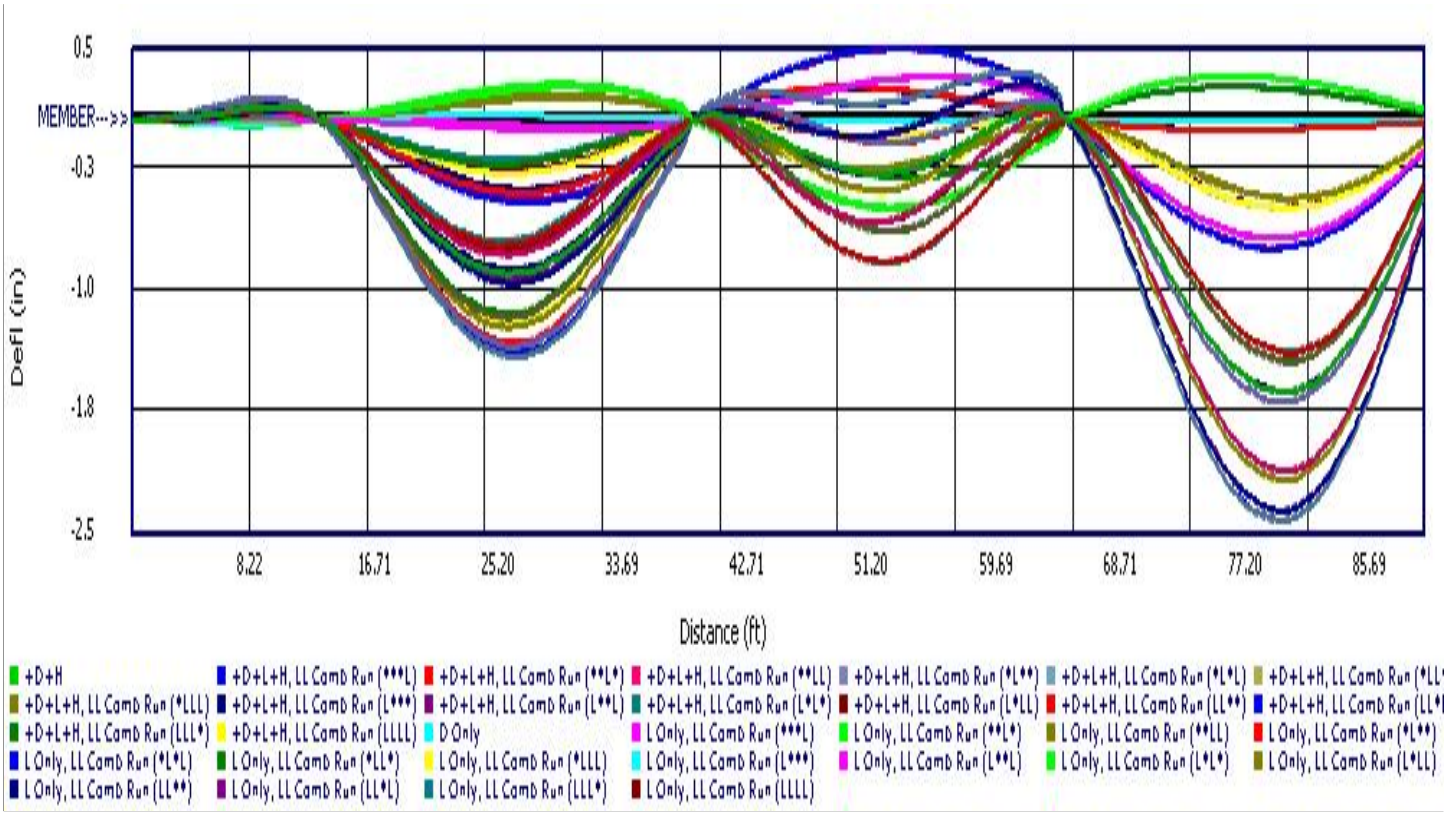


Project Title:
Engineer:
Project ID:
Project Descr:

General Beam Analysis

Project File: good sam rehab ceiling lifts.ec6

DESCRIPTION: Ceiling LIft #41 - E/W Existing 700#



Project Title:
Engineer:
Project ID:
Project Descr:

General Beam Analysis

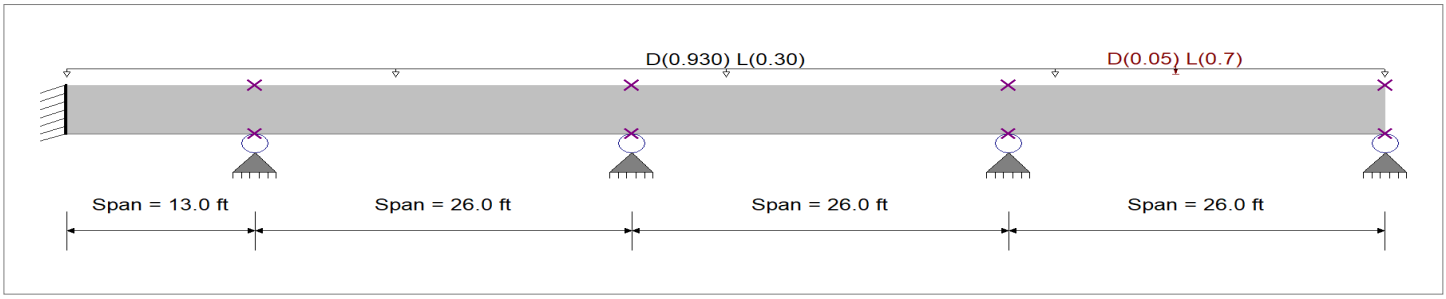
Project File: good sam rehab ceiling lifts.ec6

DESCRIPTION: Ceiling LIft #41 - E/W New 700# Max Moment

General Beam Properties

Elastic Modulus 29,000.0 ksi

Span #1	Span Length =	13.0 ft	Area =	10.0 in^2	Moment of Inertia =	100.0 in^4
Span #2	Span Length =	26.0 ft	Area =	10.0 in^2	Moment of Inertia =	100.0 in^4
Span #3	Span Length =	26.0 ft	Area =	10.0 in^2	Moment of Inertia =	100.0 in^4
Span #4	Span Length =	26.0 ft	Area =	10.0 in^2	Moment of Inertia =	100.0 in^4



Applied Loads

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

Loads on all spans...
Uniform Load on ALL spans : D = 0.1550, L = 0.050 k/ft, Tributary Width = 6.0 ft

Load(s) for Span Number 4
Point Load : D = 0.050, L = 0.70 k @ 11.583 ft

DESIGN SUMMARY

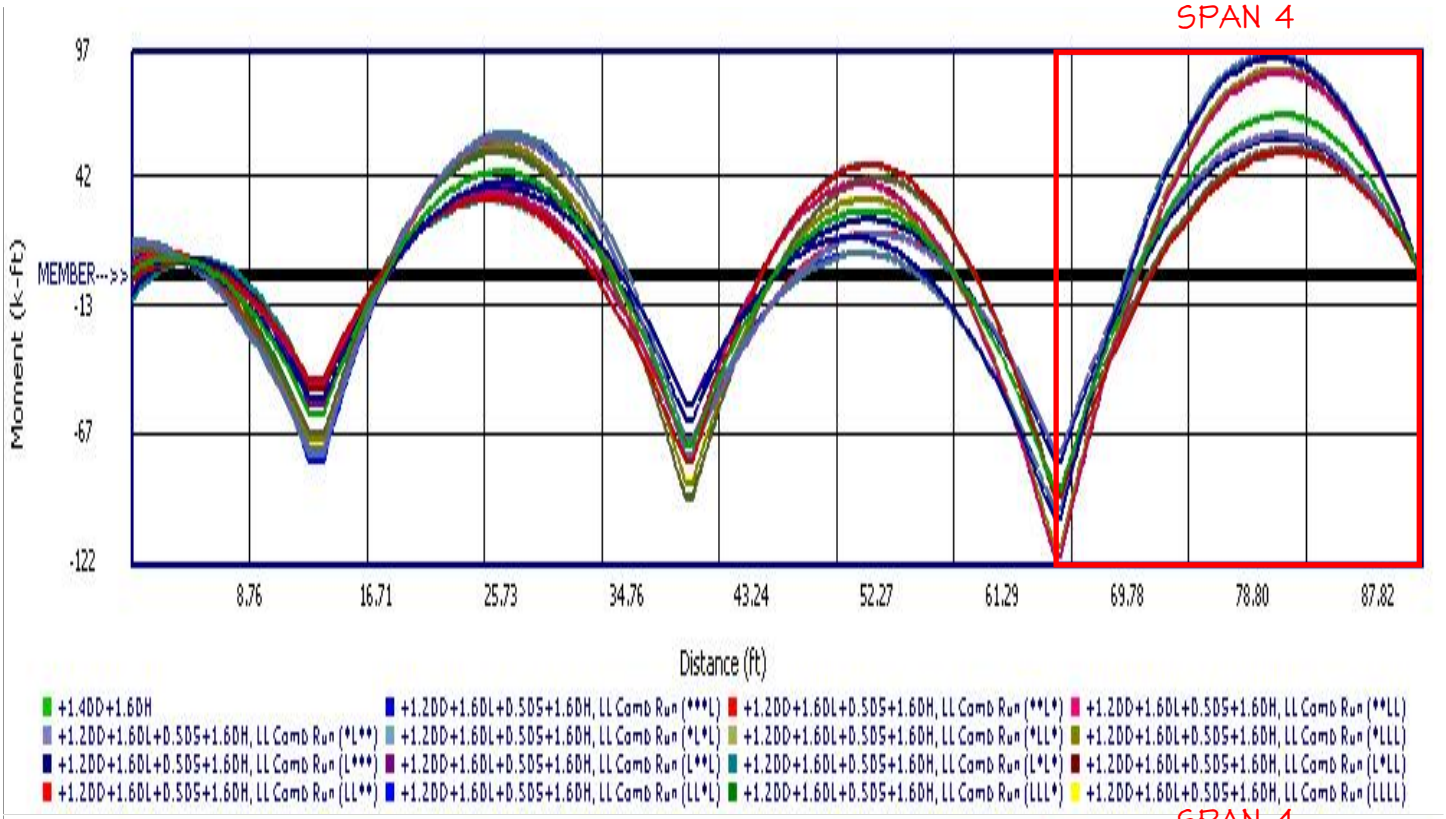
Maximum Bending =	119.660 k-ft	Maximum Shear =	26.005 k
Load Combination	1.60L+0.50S+1.60H, LL Comb Run (L*LL)	Load Combination	1.60L+0.50S+1.60H, LL Comb Run (L*LL)
Span # where maximum occurs	Span # 3	Span # where maximum occurs	Span # 3
Location of maximum on span	26.000 ft	Location of maximum on span	26.000 ft
Maximum Deflection			
Max Downward Transient Deflection	2.605 in	119	
Max Upward Transient Deflection	-0.481 in	648	
Max Downward Total Deflection	2.605 in	119	
Max Upward Total Deflection	-0.324 in	963	

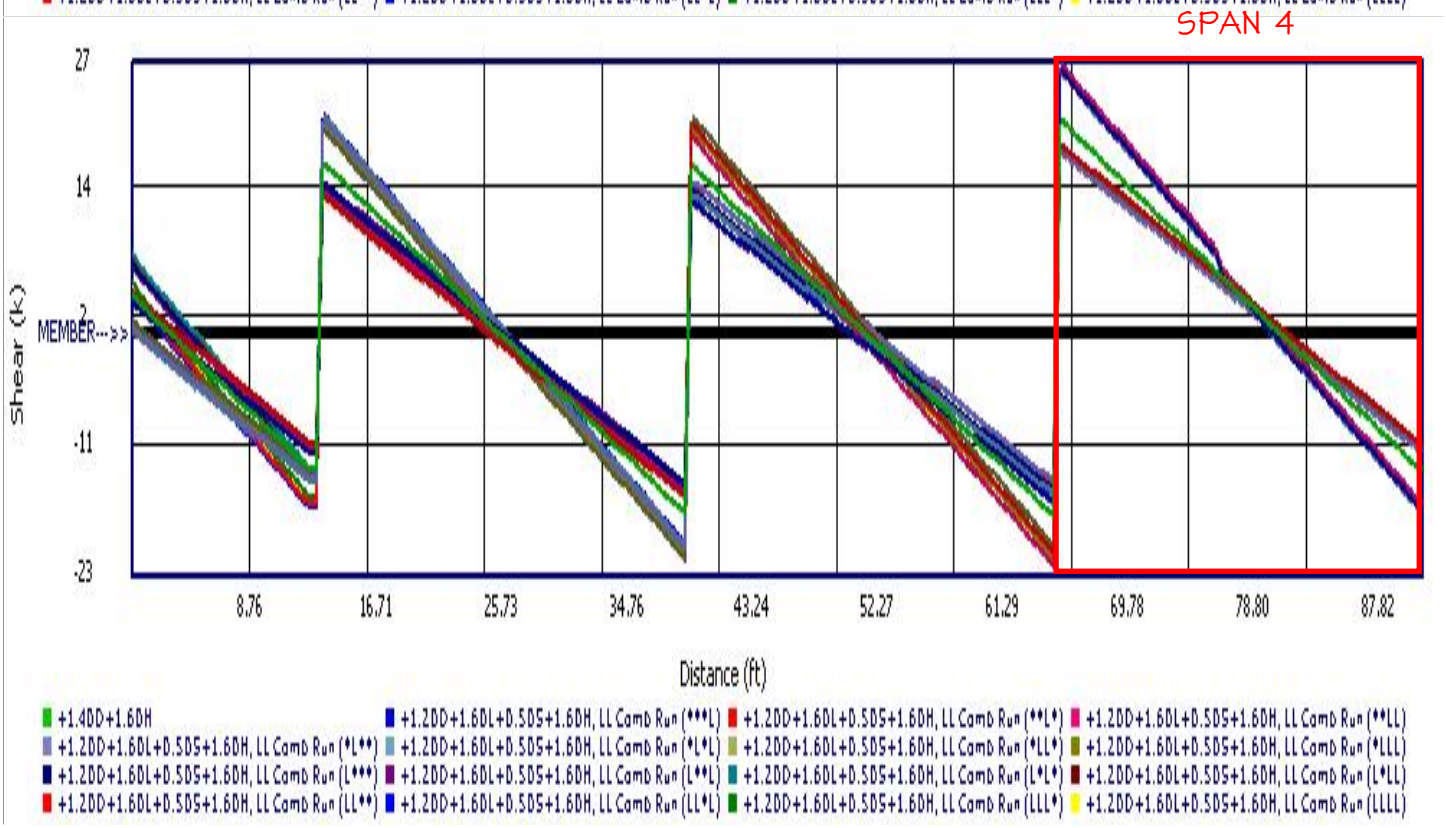
Project Title:
Engineer:
Project ID:
Project Descr:

General Beam Analysis

Project File: good sam rehab ceiling lifts.ec6

DESCRIPTION: Ceiling LIft #41 - E/W New 700# Max Moment



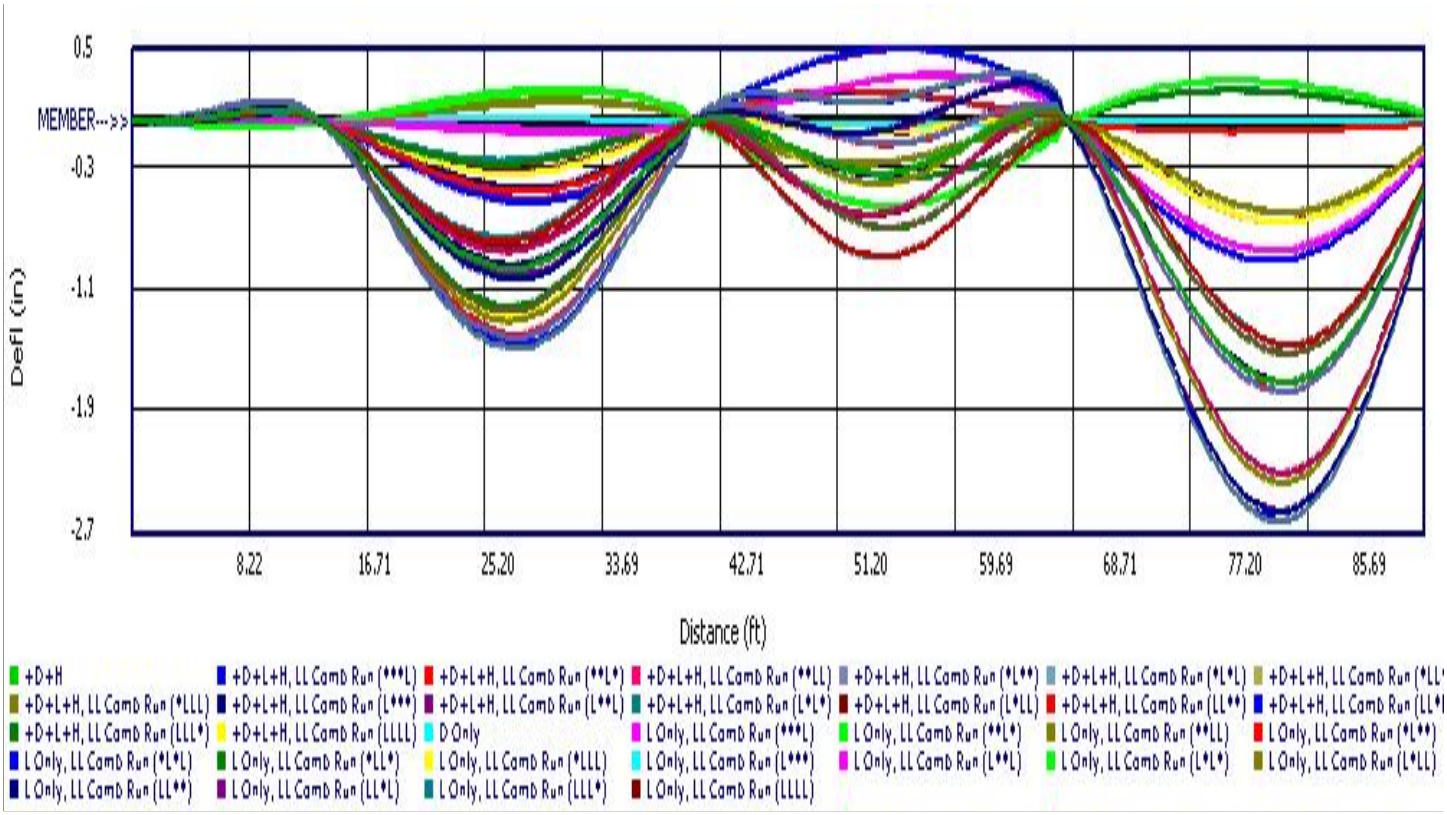


Project Title:
Engineer:
Project ID:
Project Descr:

General Beam Analysis

Project File: good sam rehab ceiling lifts.ec6

DESCRIPTION: Ceiling LIft #41 - E/W New 700# Max Moment



Project Title:
Engineer:
Project ID:
Project Descr:

General Beam Analysis

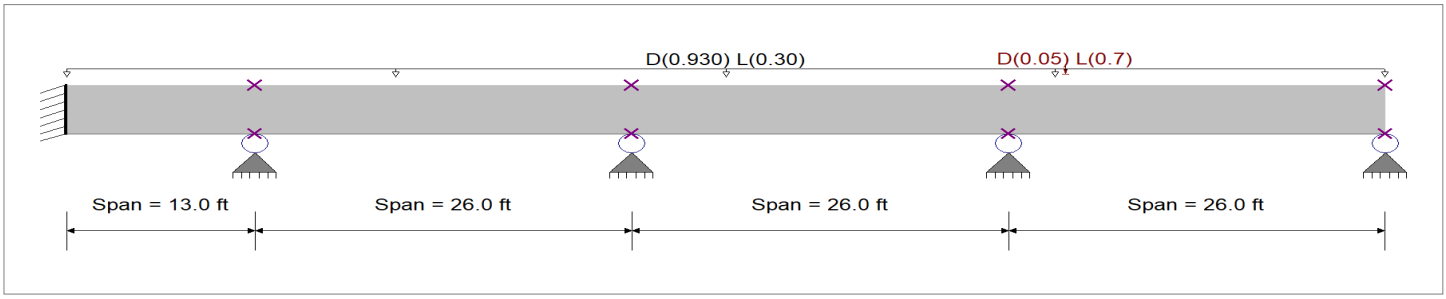
Project File: good sam rehab ceiling lifts.ec6

DESCRIPTION: Ceiling LIft #41 - E/W New 700# Max Shear

General Beam Properties

Elastic Modulus 29,000.0 ksi

Span #1	Span Length =	13.0 ft	Area =	10.0 in^2	Moment of Inertia =	100.0	in^4
Span #2	Span Length =	26.0 ft	Area =	10.0 in^2	Moment of Inertia =	100.0	in^4
Span #3	Span Length =	26.0 ft	Area =	10.0 in^2	Moment of Inertia =	100.0	in^4
Span #4	Span Length =	26.0 ft	Area =	10.0 in^2	Moment of Inertia =	100.0	in^4



Applied Loads

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

Loads on all spans...
Uniform Load on ALL spans : D = 0.1550, L = 0.050 k/ft, Tributary Width = 6.0 ft

Load(s) for Span Number 4
Point Load : D = 0.050, L = 0.70 k @ 3.917 ft

DESIGN SUMMARY

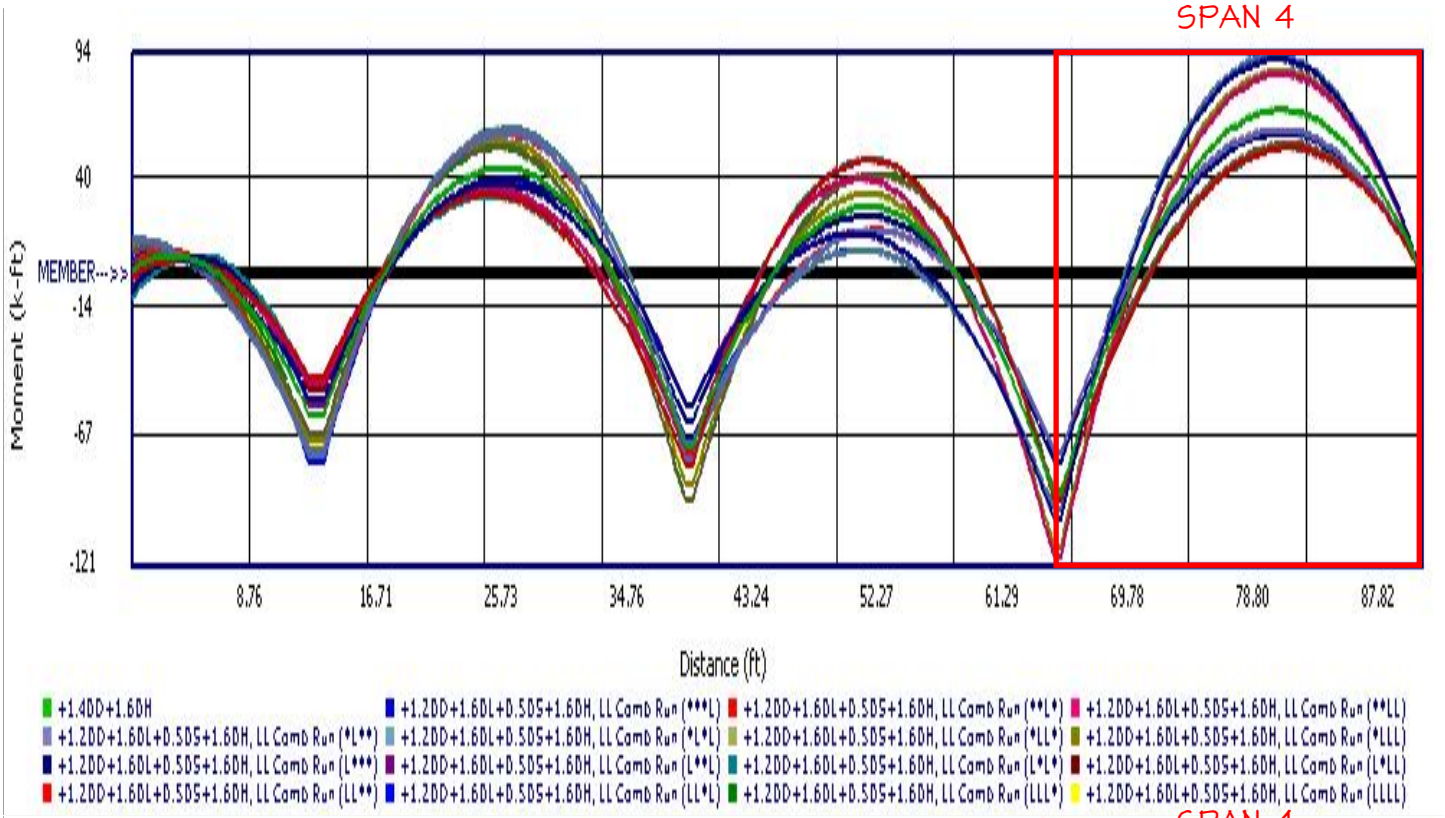
Maximum Bending =	118.447 k-ft	Maximum Shear =	26.306 k
Load Combination	1.60L+0.50S+1.60H, LL Comb Run (L*LL)	Load Combination	1.60L+0.50S+1.60H, LL Comb Run (L*LL)
Span # where maximum occurs	Span # 3	Span # where maximum occurs	Span # 3
Location of maximum on span	26.000 ft	Location of maximum on span	26.000 ft
Maximum Deflection			
Max Downward Transient Deflection	2.535 in	123	
Max Upward Transient Deflection	-0.467 in	667	
Max Downward Total Deflection	2.535 in	123	
Max Upward Total Deflection	-0.312 in	1000	

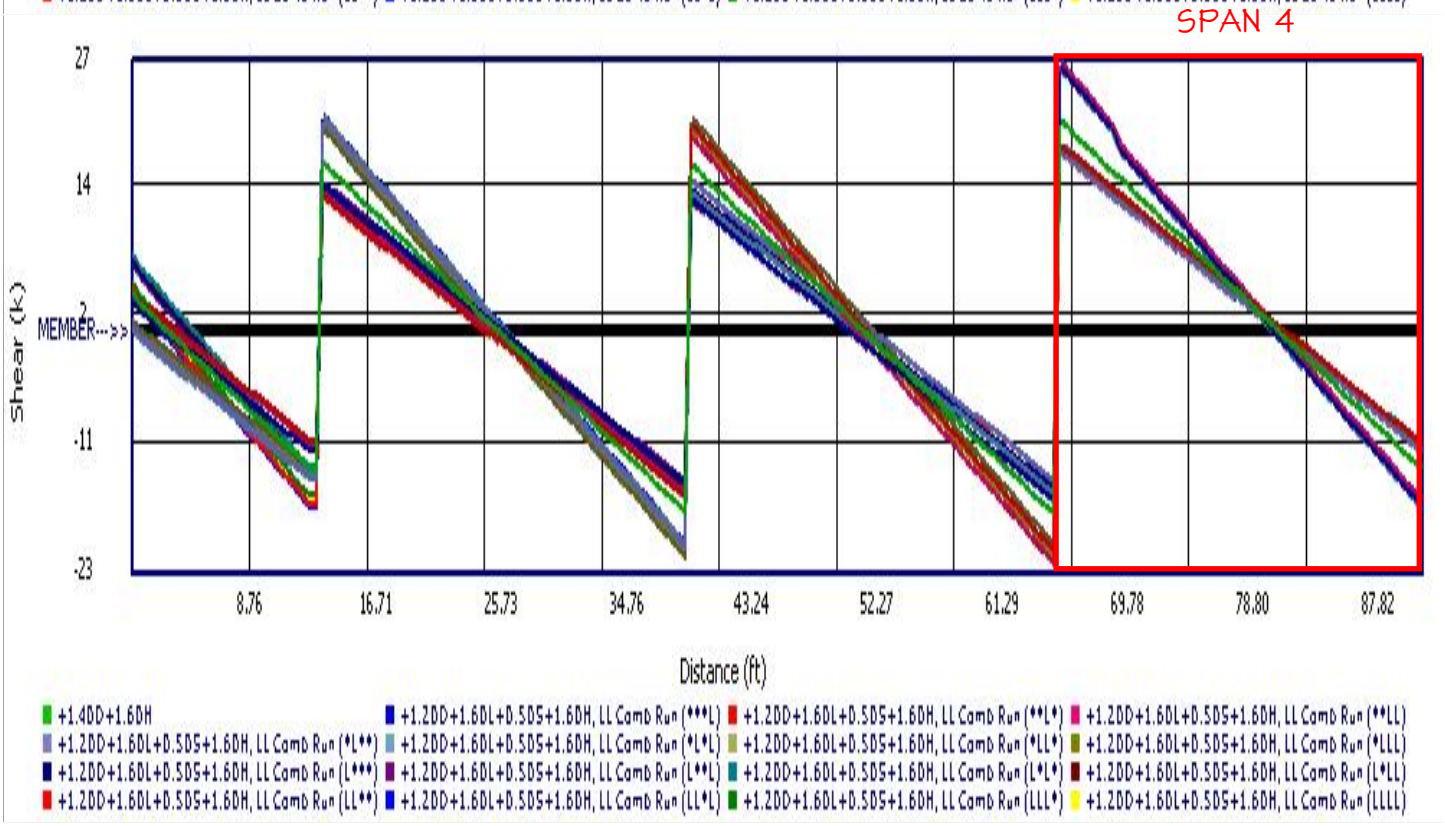
Project Title:
Engineer:
Project ID:
Project Descr:

General Beam Analysis

Project File: good sam rehab ceiling lifts.ec6

DESCRIPTION: Ceiling LIft #41 - E/W New 700# Max Shear



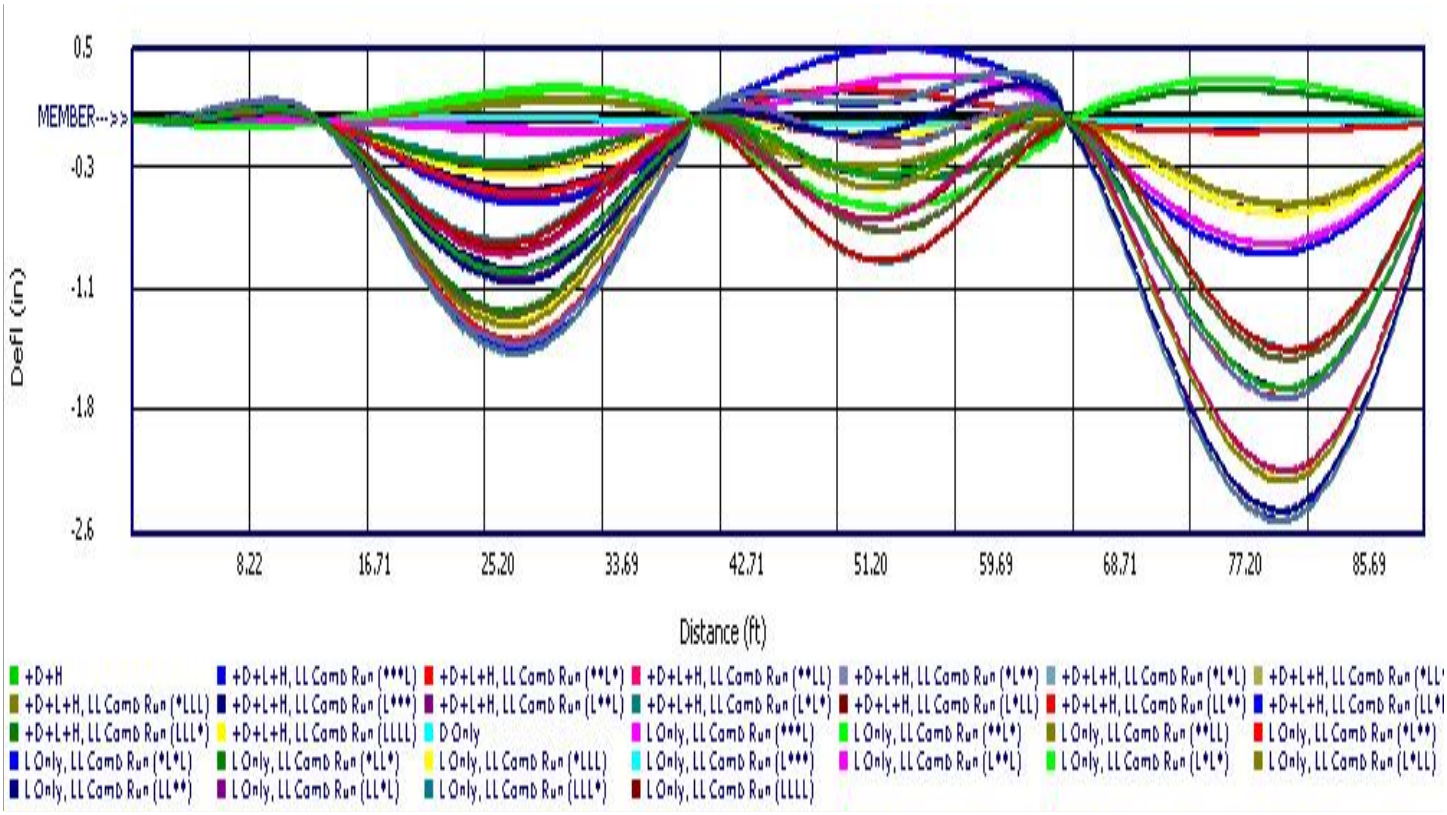


Project Title:
Engineer:
Project ID:
Project Descr:

General Beam Analysis

Project File: good sam rehab ceiling lifts.ec6

DESCRIPTION: Ceiling LIft #41 - E/W New 700# Max Shear



NEW

$V_u = \begin{cases} 12.97^k \text{ SPAN 1, TYP} \approx 0.8\% \text{ INCREASE} < 5\% \therefore \text{OK} \\ 13.48^k \text{ SPAN 2, TYP} \approx 7.9\% \text{ INCREASE} > 5\% \therefore \text{CHECK BY HAND} \end{cases}$

$M_u = \begin{cases} 22.36^{'-k} \approx 2.2\% \text{ INCREASE} < 5\% \therefore \text{OK} \\ 18.37^{'-k} \approx 3.2\% \text{ INCREASE} < 5\% \therefore \text{OK} \end{cases}$

CHECK SHEAR

FROM PREV CALCS, $\phi V_n = 56.76^k > V_u \therefore$ OK

$\therefore$ (E) SLAB OK IN N/S

Project Title:
Engineer:
Project ID:
Project Descr:

General Beam Analysis

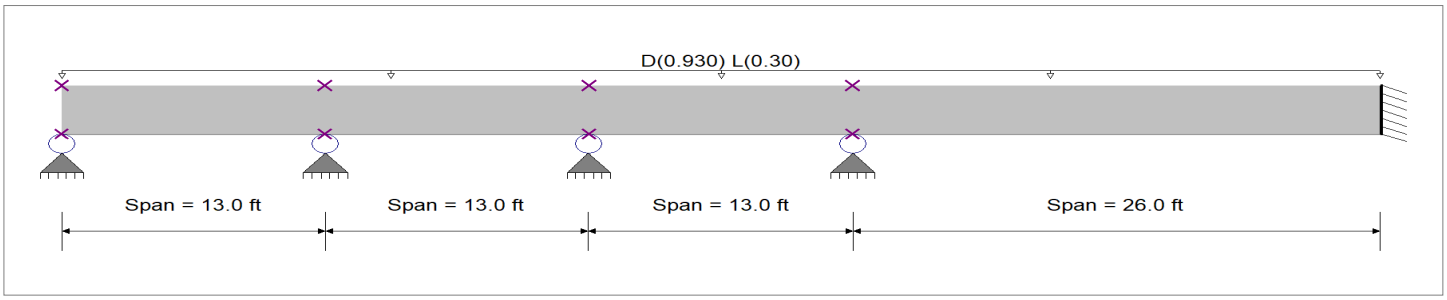
Project File: good sam rehab ceiling lifts.ec6

DESCRIPTION: Ceiling LIft #41 - N/S Existing 700#

General Beam Properties

Elastic Modulus 29,000.0 ksi

Span #1	Span Length =	13.0 ft	Area =	10.0 in^2	Moment of Inertia =	100.0 in^4
Span #2	Span Length =	13.0 ft	Area =	10.0 in^2	Moment of Inertia =	100.0 in^4
Span #3	Span Length =	13.0 ft	Area =	10.0 in^2	Moment of Inertia =	100.0 in^4
Span #4	Span Length =	26.0 ft	Area =	10.0 in^2	Moment of Inertia =	100.0 in^4



Applied Loads

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

Loads on all spans...

Uniform Load on ALL spans : D = 0.1550, L = 0.050 k/ft, Tributary Width = 6.0 ft

DESIGN SUMMARY

Maximum Bending =	103.810 k-ft	Maximum Shear =	22.352 k
Load Combination	1.60L+0.50S+1.60H, LL Comb Run (*L*L)	Load Combination	1.60L+0.50S+1.60H, LL Comb Run (*L*L)
Span # where maximum occurs	Span # 4	Span # where maximum occurs	Span # 4
Location of maximum on span	26.000 ft	Location of maximum on span	26.000 ft
Maximum Deflection			
Max Downward Transient Deflection	1.166 in	267	
Max Upward Transient Deflection	-0.151 in	1029	
Max Downward Total Deflection	1.166 in	267	
Max Upward Total Deflection	-0.151 in	1029	

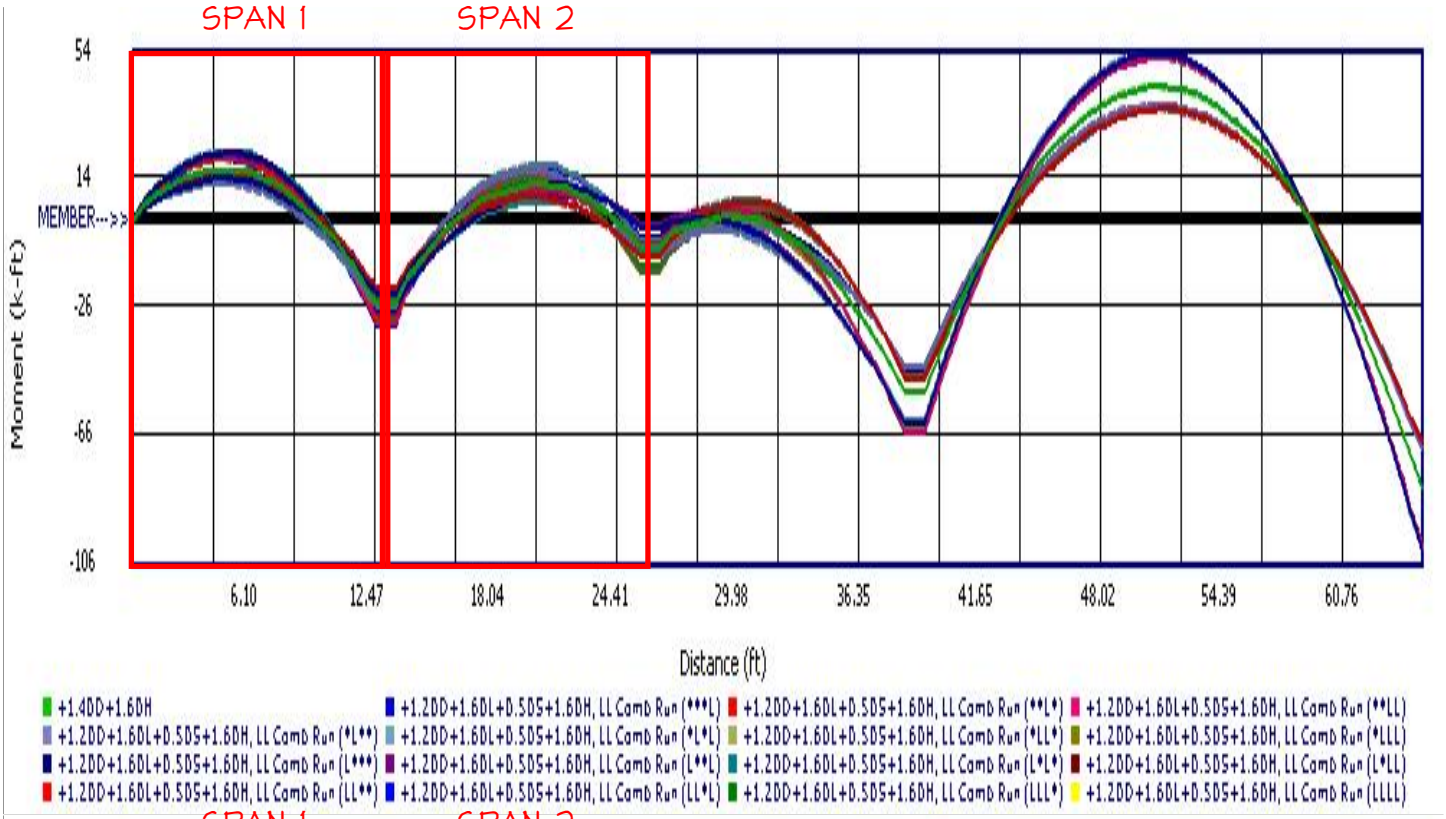
Project Title:
Engineer:
Project ID:
Project Descr:

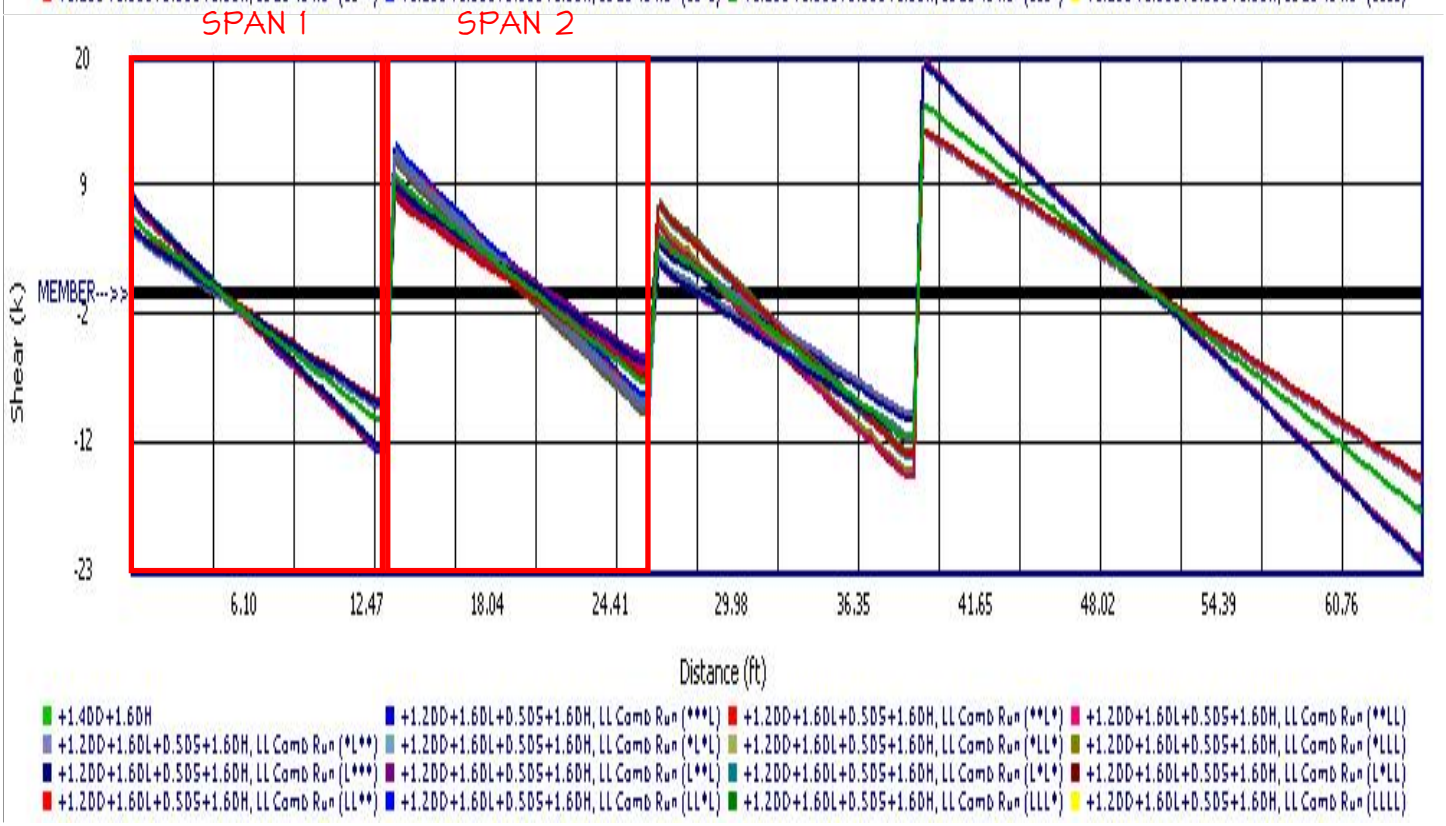
General Beam Analysis

Project File: good sam rehab ceiling lifts.ec6

LIC# : KW-06014122, Build:20.24.02.27 PCS STRUCTURAL SOLUTIONS (c) ENERCALC INC 1983-2023

DESCRIPTION: Ceiling LIft #41 - N/S Existing 700#



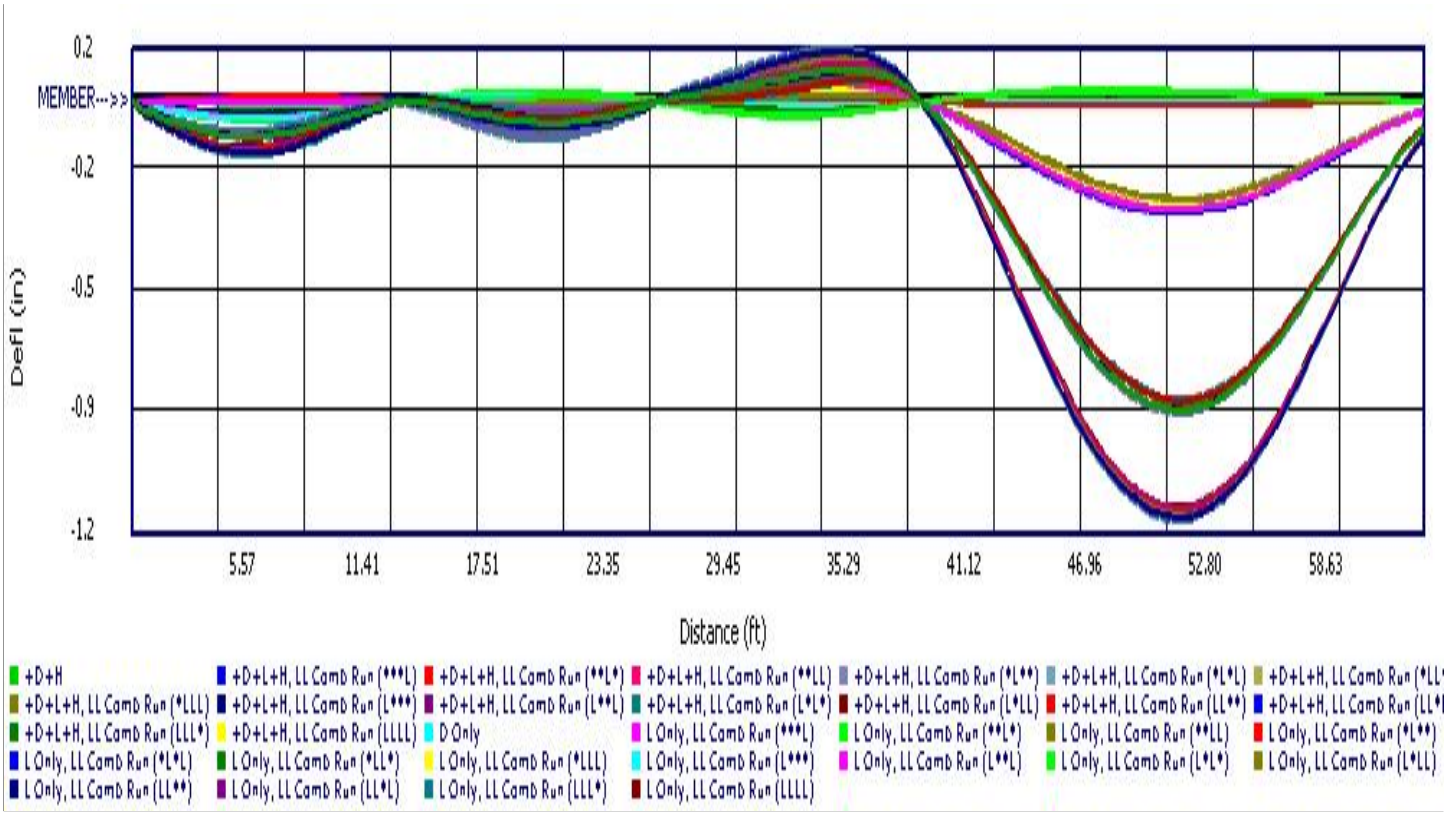


Project Title:
Engineer:
Project ID:
Project Descr:

General Beam Analysis

Project File: good sam rehab ceiling lifts.ec6

DESCRIPTION: Ceiling LIft #41 - N/S Existing 700#



Project Title:
Engineer:
Project ID:
Project Descr:

General Beam Analysis

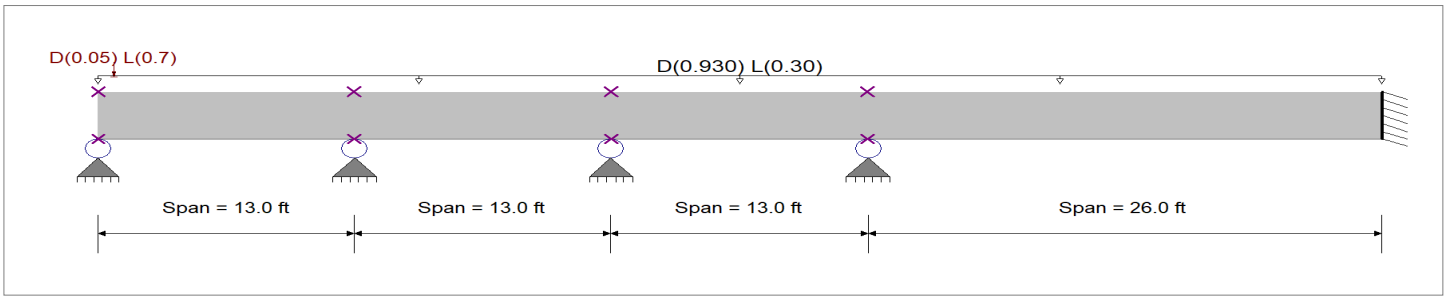
Project File: good sam rehab ceiling lifts.ec6

DESCRIPTION: Ceiling LIft #41 - N/S New 700# Span 1

General Beam Properties

Elastic Modulus 29,000.0 ksi

Span #1	Span Length =	13.0 ft	Area =	10.0 in^2	Moment of Inertia =	100.0 in^4
Span #2	Span Length =	13.0 ft	Area =	10.0 in^2	Moment of Inertia =	100.0 in^4
Span #3	Span Length =	13.0 ft	Area =	10.0 in^2	Moment of Inertia =	100.0 in^4
Span #4	Span Length =	26.0 ft	Area =	10.0 in^2	Moment of Inertia =	100.0 in^4



Applied Loads

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

Loads on all spans...
Uniform Load on ALL spans : D = 0.1550, L = 0.050 k/ft, Tributary Width = 6.0 ft

Load(s) for Span Number 1
Point Load : D = 0.050, L = 0.70 k @ 0.8330 ft

DESIGN SUMMARY

Maximum Bending =	103.810 k-ft	Maximum Shear =	22.352 k
Load Combination	1.40D+1.60L+0.50S+1.60H, LL Comb Run (*L*L)	Load Combination	1.40D+1.60L+0.50S+1.60H, LL Comb Run (*L*L)
Span # where maximum occurs	Span # 4	Span # where maximum occurs	Span # 4
Location of maximum on span	26.000 ft	Location of maximum on span	26.000 ft

Maximum Deflection

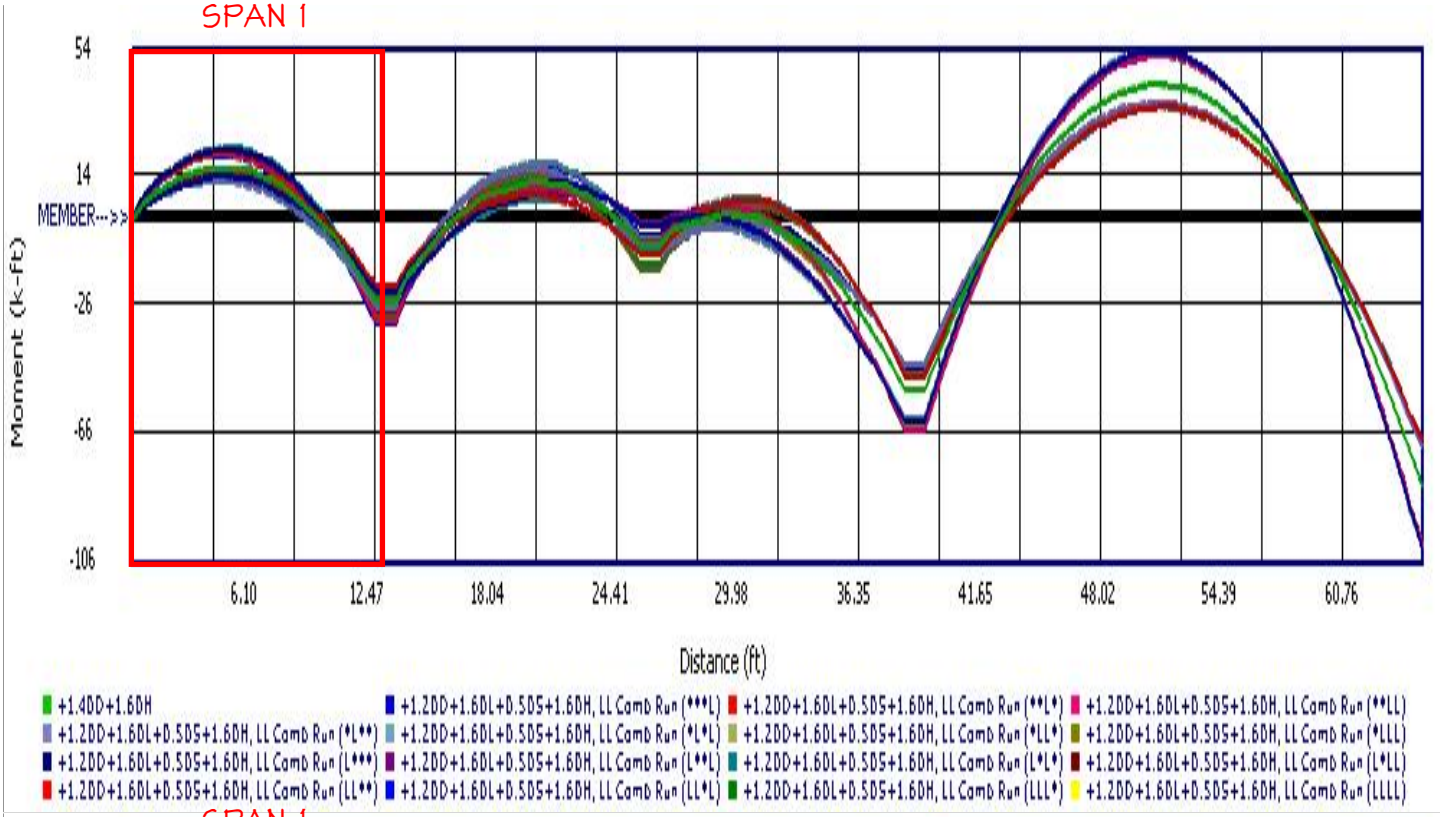
Max Downward Transient Deflection	1.166 in	267
Max Upward Transient Deflection	-0.151 in	1029
Max Downward Total Deflection	1.166 in	267
Max Upward Total Deflection	-0.151 in	1029

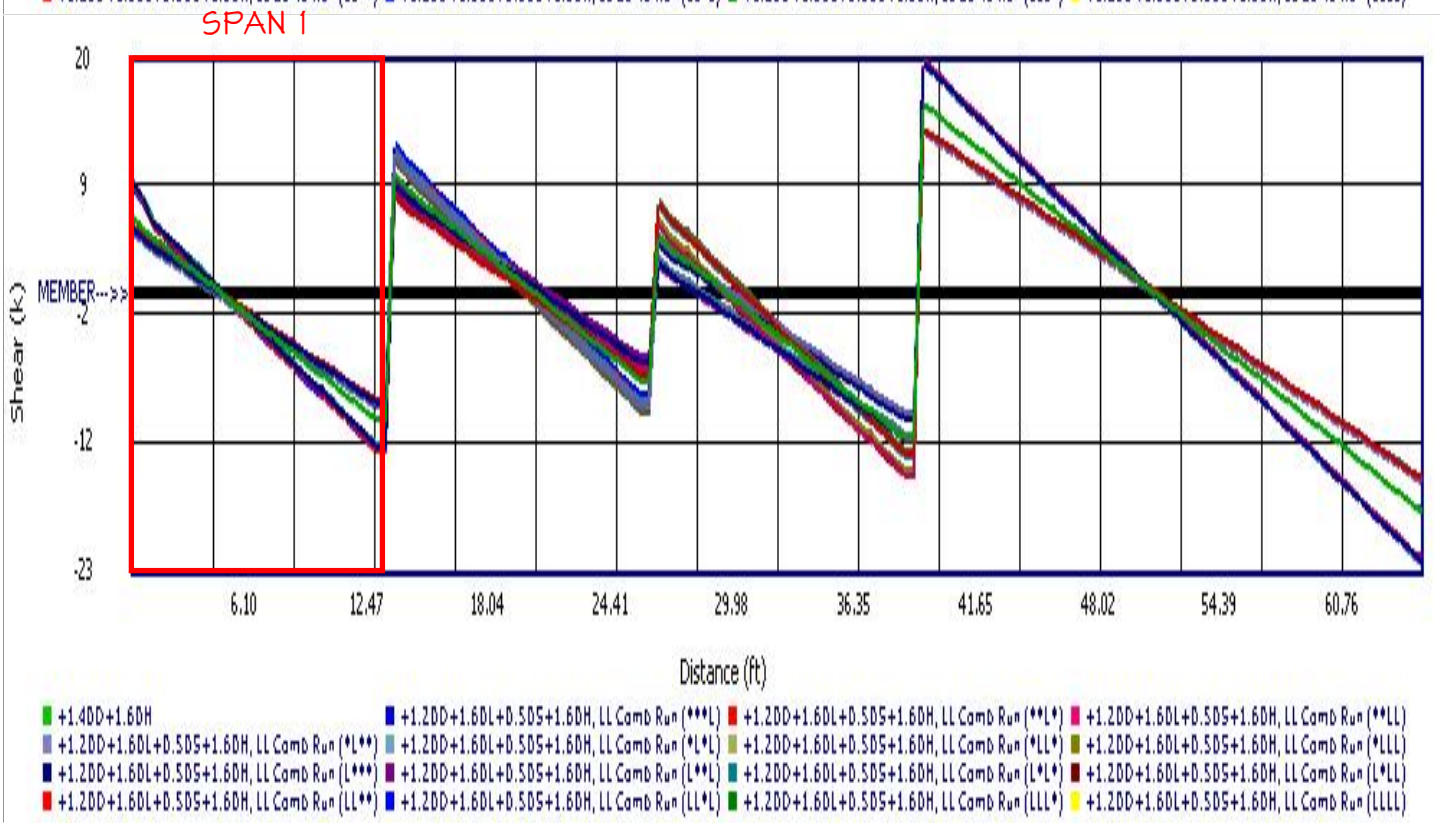
Project Title:
Engineer:
Project ID:
Project Descr:

General Beam Analysis

Project File: good sam rehab ceiling lifts.ec6

DESCRIPTION: Ceiling LIft #41 - N/S New 700# Span 1



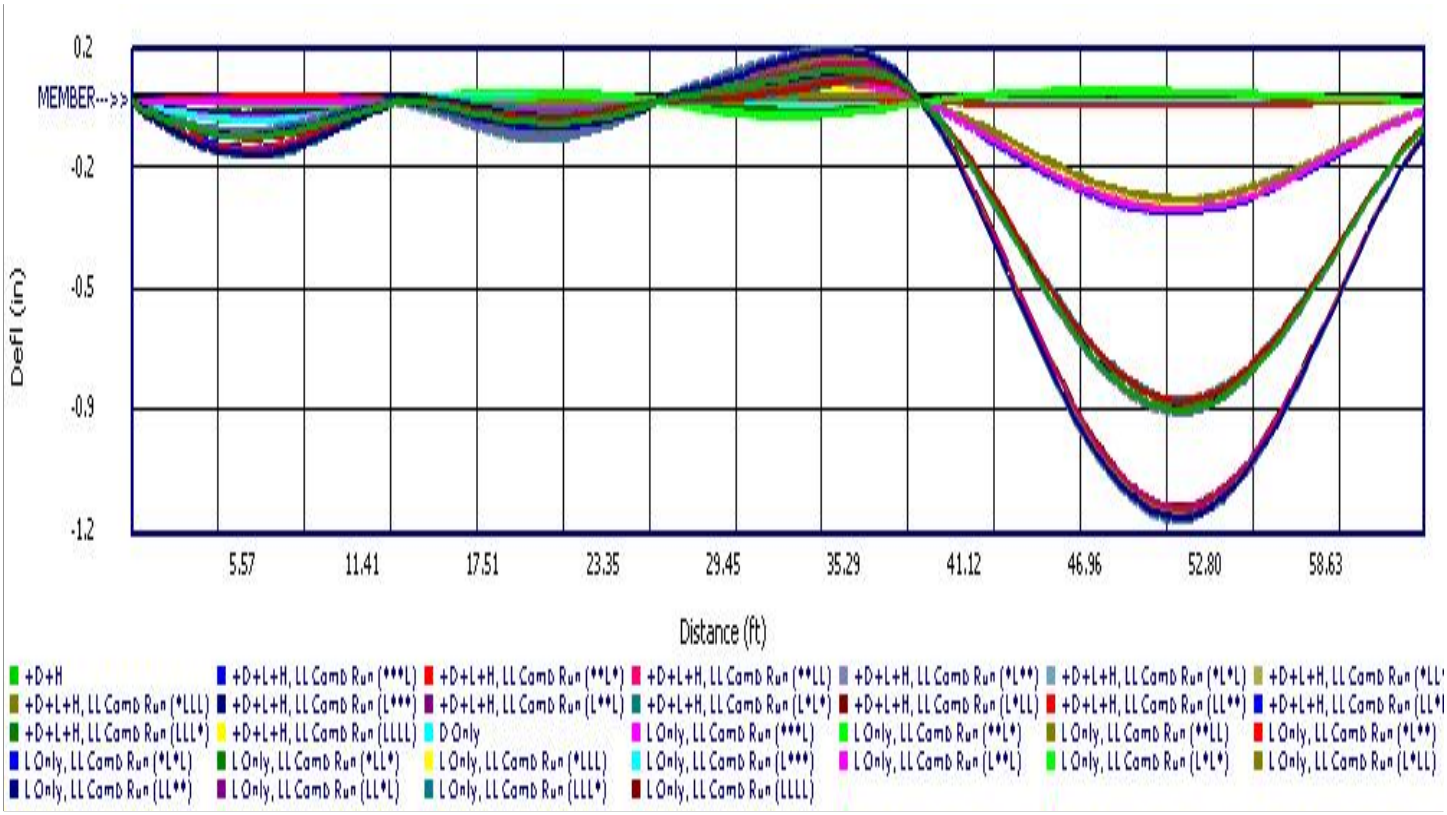


Project Title:
Engineer:
Project ID:
Project Descr:

General Beam Analysis

Project File: good sam rehab ceiling lifts.ec6

DESCRIPTION: Ceiling LIft #41 - N/S New 700# Span 1



Project Title:
Engineer:
Project ID:
Project Descr:

General Beam Analysis

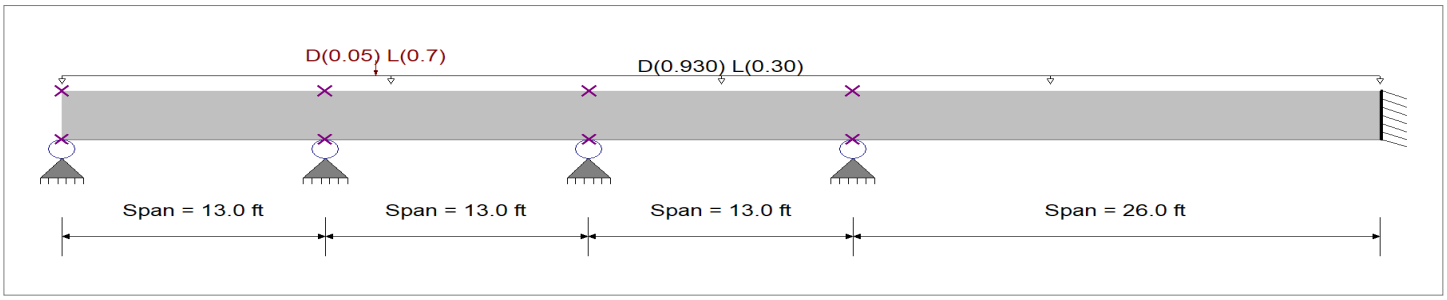
Project File: good sam rehab ceiling lifts.ec6

DESCRIPTION: Ceiling LIft #41 - N/S New 700# Span 2

General Beam Properties

Elastic Modulus 29,000.0 ksi

Span #1	Span Length =	13.0 ft	Area =	10.0 in^2	Moment of Inertia =	100.0 in^4
Span #2	Span Length =	13.0 ft	Area =	10.0 in^2	Moment of Inertia =	100.0 in^4
Span #3	Span Length =	13.0 ft	Area =	10.0 in^2	Moment of Inertia =	100.0 in^4
Span #4	Span Length =	26.0 ft	Area =	10.0 in^2	Moment of Inertia =	100.0 in^4



Applied Loads

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

Loads on all spans...
Uniform Load on ALL spans : D = 0.1550, L = 0.050 k/ft, Tributary Width = 6.0 ft

Load(s) for Span Number 2
Point Load : D = 0.050, L = 0.70 k @ 2.50 ft

DESIGN SUMMARY

Maximum Bending =	103.860 k-ft	Maximum Shear =	22.358 k
Load Combination	1.40D+1.60L+0.50S+1.60H, LL Comb Run (*L*L)	Load Combination	1.40D+1.60L+0.50S+1.60H, LL Comb Run (*L*L)
Span # where maximum occurs	Span # 4	Span # where maximum occurs	Span # 4
Location of maximum on span	26.000 ft	Location of maximum on span	26.000 ft

Maximum Deflection

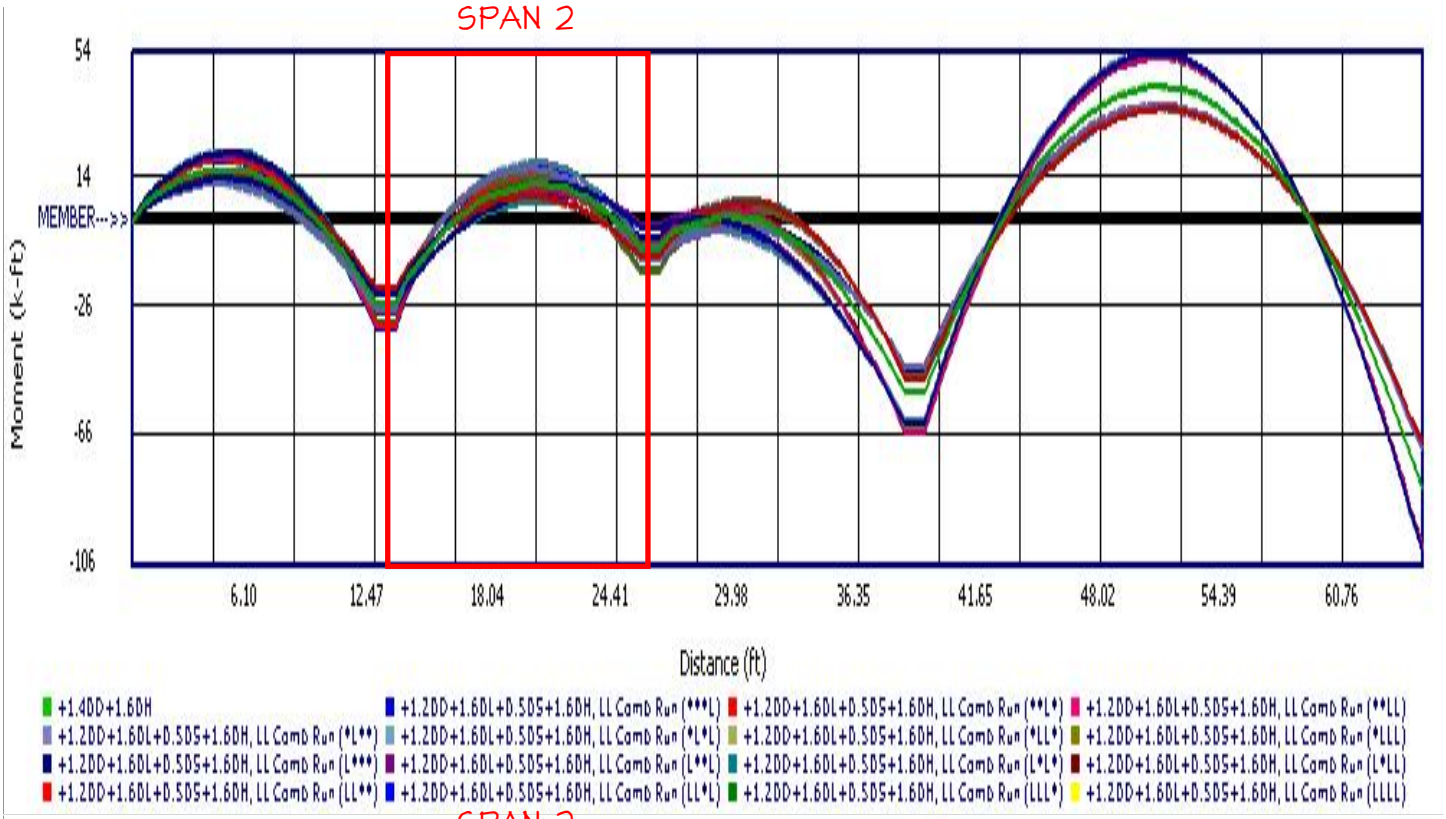
Max Downward Transient Deflection	1.167 in	267
Max Upward Transient Deflection	-0.153 in	1021
Max Downward Total Deflection	1.167 in	267
Max Upward Total Deflection	-0.153 in	1021

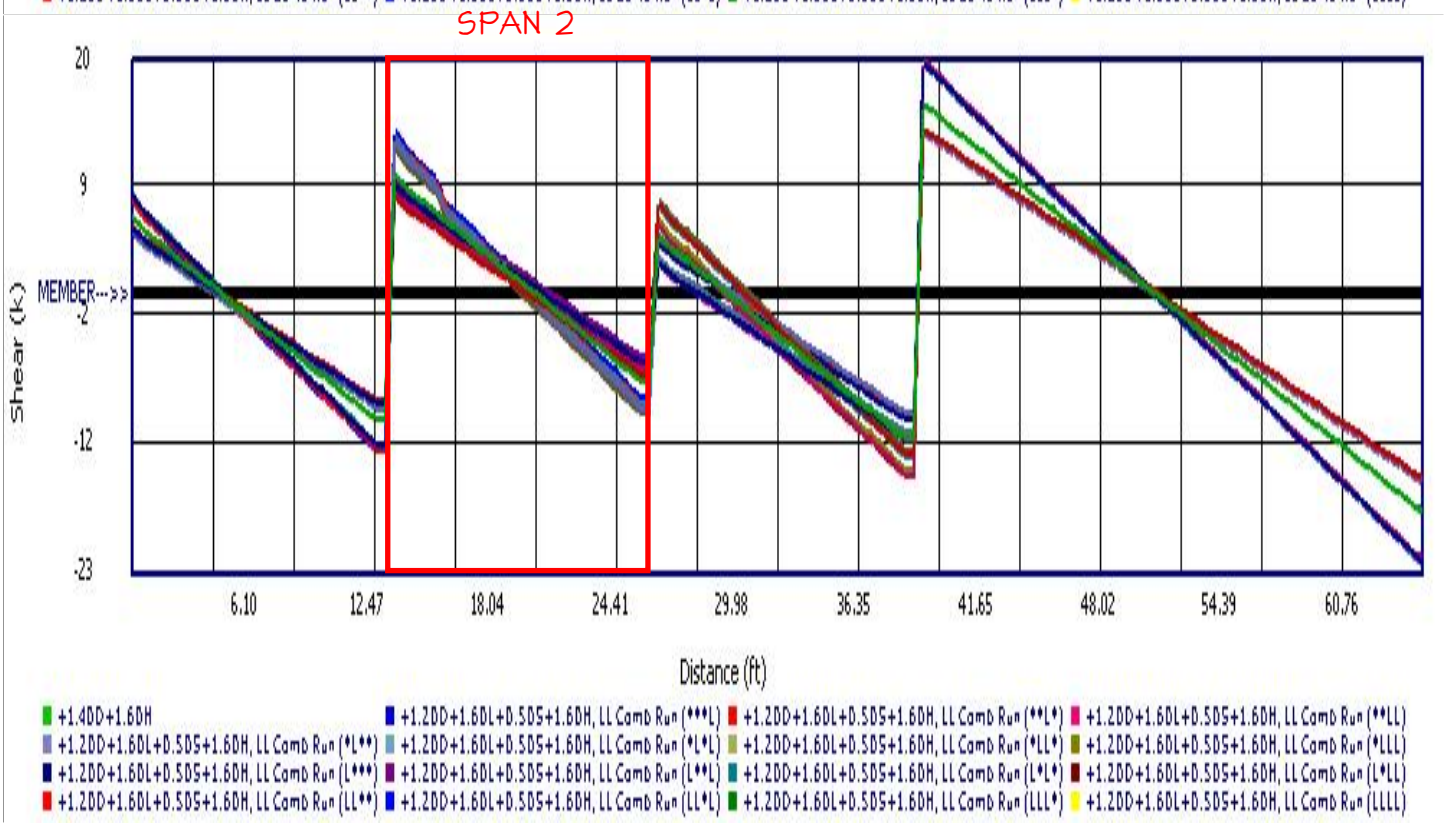
Project Title:
Engineer:
Project ID:
Project Descr:

General Beam Analysis

Project File: good sam rehab ceiling lifts.ec6

DESCRIPTION: Ceiling LIft #41 - N/S New 700# Span 2





Project Title:
Engineer:
Project ID:
Project Descr:

General Beam Analysis

Project File: good sam rehab ceiling lifts.ec6

DESCRIPTION: Ceiling LIft #41 - N/S New 700# Span 2