TIMBER BOX HEADER USING BAMCORE SIDE PANELS: A SENIOR PROJECT STUDY

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Abstract

The purpose of this study was to begin development of a composite box header that was able to span long openings with minimal deflection. The headers in study were comprised of BamCore side panels, nailed top and bottom each face to a 2x6 top plate, and a header of multiple specified sizes. The 2x6 top plate and headers ranging from a 6x6 to a 6x12 were made up of Douglas Fir-Larch, No.1. Analysis was performed assuming 10d common nailing at top and bottom of the BamCore side panels. Initial analysis of a composite box header was performed and analyzed as a transformed section. Testing ensued after findings from the initial analysis. Testing was performed by fabricating two (2) designed box headers at half scale. The headers that were tested were both analyzed as a 16" deep header with a 6x6 "bottom flange" and 2x6 top plate. At half scale, these headers were 8" deep, with headers and top plates ripped to half scale. The only difference between the two headers tested was that one header had a stiffener placed within the box at midspan—to mimic the splice of the BamCore Panels—and one header did not. The results from testing were compared to the initial analysis to find discrepancies and similarities between analysis and empirical results. This report contains findings from analysis and testing of these materials and sections in order to further develop long-span headers that are used in BamCore panel construction as a use of stronger and sustainable materials.

Introduction

The development of a timber box header using BamCore side panels began with the initial precedent of BamCore's "Dual BamCore Header". The purpose and advantage of the Dual BamCore Header is the same as the timber box headers in study: to span over a wall opening, while *maximizing* the header depth from the top of the window or door opening to the top of the wall. The BamCore On-Edge Header detail is shown below:



14 BamCore On-Edge Headers 1" = 1'-0" BamCore has developed span tables for The Dual BamCore Header, which consists of an overall header depth and span corresponding to a maximum uniform load in pounds per linear foot:

Bancore OS On Edge Header Onnohm Load (PLP) Table, L/ 240 Delection Criteria																
Header Depth (in)		6		8	1	10	1	12	1	L4	1	.6		20	2	!4
<u> </u>	Uniform	Bearing														
Span (ft)	Load (PLF)	Length (in)														
3	3095 b	1 3/4	4127 b	2 1/2	5159 b	3 1/4	6191 b	4	7223 b	4 3/4	8255 b	5 1/2	10319 b	7 1/2	12383 b	9 1/2
4	1683	1 1/4	3094 b	2 1/2	3868 b	3	4641 b	3 3/4	5415 b	4 1/2	6188 b	5 1/4	7736 b	6 3/4	9283 b	8 1/2
5	941	1	1976	2	3093 b	3	3711 b	3 3/4	4330 b	4 1/4	4948 b	5	6186 b	6 1/2	7423 b	8
6	572	3/4	1242	1 1/2	2170 a	2 1/2	3065 a	3 1/2	3606 b	4 1/4	4122 b	5	5152 b	6 1/4	6183 b	7 3/4
7	371	1/2	824	1 1/4	1483	2	2249 a	3	3012 a	4	3531 b	4 3/4	4414 b	6 1/4	5297 b	7 1/2
8	252	1/2	571	1	1046	1 1/2	1678	2 1/2	2304 a	3 1/2	2966 a	4 1/2	3861 b	6	4633 b	7 1/2
9	179	1/2	410	3/4	761	1 1/4	1239	2	1818 a	3	2341 a	4	3430 b	6	4116 b	7 1/4
9.75	141	1/4	326	3/4	611	1 1/4	1002	1 3/4	1500	2 3/4	1993 a	3 3/4	3042 a	5 3/4	3798 b	7 1/4

BamCore G3 On Edge Header Uniform Load (PLF) Table, L/240 Deflection Criteria

1. ^a means controlled by Bending Strength, ^b means controlled by Shear Strength, no superscript is controlled by deflection.

2. Values include 4% bending strength increase for repetitive members.

3. Values are for 2 members with equal loading. 2.5 inches of width total

However, the span tables only go up to 9.75' spans, as the longest BamCore panels available span 10' in length. A minimum bearing length is also included, because for these shorter spans below 10', the bearing length from panel to panel must meet the requirement, but for spans over 10' of the timber box headers in study, the ends will be bearing on posts or end studs that provide wholly adequate support. Therefore, bearing length was not included in the research of the timber box header.

The typical overall depths of the headers in study were 12", 16", and 24". The range of timber header sizes, or "bottom flange" of the timber box headers, were 6x6, 6x8, 6x10, and 6x12. The calculated spans of the timber box headers were 10', 12', 14', 16', 18', and 20'.

The governing factor in the design of the long span timber box headers was deemed to be the deflection criteria. This is because in BamCore panel building systems, one of the most common locations of long span wall openings are for multi-panel sliding glass doors, like ones shown below:



If the deflection is too large for the headers above the muli-panel sliding glass doors, the doors become highly dysfunctional and can become jammed. These doors must have a tight deflection limit to operate properly, otherwise the tracks of these doors do not allow adequate sliding and movement. Therefore, the deflection limit in the design of the timber box headers was set to L/800 in analysis, which ranges from 0.15" for the 10' span to 0.30" for the 20' span. Clearly, this is a very limiting deflection criteria for headers spanning this long, which is precisely why the development of timber box headers was initiated in this study.

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Precedent Research

Precedent research regarding similar areas of study were used to initiate research on timber box headers and their performance.

In "Strength of Plywood Web Box Beam" (Chu et al.), an approach following the laws of mechanics of materials offered insight into transformed sections acting compositely as a box beam. This study also offered insight into how side panels of a non-timber material affect the behavior of a beam. This study focused on strength with given design values tested against a given uniform load, whereas the study contained herein involves finding a maximum uniform load under a limiting deflection criteria.



In "Design and Fabrication of All-Plywood Beams" (APA), total load based on allowable web and flange bending stress gave direction to finding maximum allowable load in analysis. However, the analysis was performed as a symmetric cross-section, with the neutral axis located at half of the total header depth. In the analysis of the timber box headers in this study, however, the neutral axis was never located at exactly the midpoint of the header depth, due to the varying timber header size and overall header depth.



Lastly, an empirical study on box beams by the University of Michigan offered insight into testing procedure to be performed on a transformed section. The beam tested was a plywood box beam with a span of 8', 12" overall depth, 2x4 top and bottom flanges, and 8d common nails at 3" on center, a similar set up to the testing performed during the study of this report.



BamCore

As aforementioned, the panels in the timber box beams are BamCore panels. BamCore panels are heavily engineered hybrid structural panels comprised of a mixture of wood and bamboo.



This material is advertised as stronger, more insular, safer, and more environmentally friendly than traditionally used timber in construction. The BamCore sided timber box headers would be used in conjunction with the BamCore Prime Wall, a hollow wall made up of two parallel runs, outside and inside, that are filled with blown-in insulation. Without studs, there are no thermal bridges that displace insulation and negatively impact the thermal performance of the wall assembly. The BamCore Prime Wall is shown to be 51% stronger in vertical load bearing strength than conventional 2x6 framing, and 14% stronger than even conventional 2x8 framing. The raw material is purchased from sustainably harvested suppliers, and even in the process of manufacturing, there is no chemicals, water, heat, or stream used to mill, prepare, and manufacture the bamboo into panels. In contrast to other bamboo based construction products that start with high amounts of embodied energy because they start with small strips of squared and planed bamboo, BamCore preserves the full length of the bamboo based panel without cutting it into small strips that must all be glued together with adhesive. The adhesive BamCore is carefully selected to ensure minimum embodied carbon, and used to splice the full length panels at staggered locations on the panel with a finger joint. The material properties of BamCore provided in the technical evaluation report, TER 1507-03, were considered in the development and testing of the timber box header.

Analysis



The objective of this study was to begin development of a composite box header that was able to span long openings with minimal deflection, and to develop span tables with a tight L/800 deflection limit. The following analysis was performed to obtain maximum uniform load values, and an expanded calculation follows. For different header sizes, span lengths, and overall depths, the same process was carried out in a spreadsheet.

Elasticity

 $E_{Header} = 1,600,000 \ psi$ $E_{BamCore} = 1,420,000 \ psi$ $E_{2x6} = 1,700,000 \ psi$

Transformation to E_{Header}

 $\frac{EBamCore}{EHeader} = 0.89$ $\frac{E2x6}{EHeader} = 1.06$

Neutral Axis

 $N.A. = \frac{\Sigma yA}{\Sigma A} = 5.2 \quad (d = |5.2 - y|)$

Moment of Inertia

 $I = \Sigma I_{parts} + \Sigma A d^2 = 397.4 + 519.5 = 917 in^4$

Demand vs. Capacity

 $F'_{b} = .99(1200 \, psi) = 1200 \, psi$ $F'_{t} = 825 \, psi$ $F'_{c} = .57(1500 \, psi) = 852 \, psi$

6x6:

 $M_{allow} = \frac{F_t^{I}}{y} = 145485 \,\#in = 12123 \,\#ft$

$$w_{allow} = \frac{8M_{allow}}{L^2} = 1349 \, plf$$

SECTION BENDING:

$$M_{allow} = \frac{F_{b}^{'}I}{y} = 150246 \# in = 12520 \# ft$$
$$w_{allow} = \frac{8M_{allow}}{L^{2}} = 1001 \, plf$$

2x6:

 $M_{allow} = \frac{F_{c}^{I}}{y} = 145485 \# in = 12123 \# ft$ $w_{allow} = \frac{8M_{allow}}{L^{2}} = 1349 \, plf$

L/800 DEFLECTION LIMIT: $w_{allow} = \frac{384E_{Header}I(L/800)}{5L^4} = 81.5 \, plf$

MAX WEB SHEAR:

Horizontal Shear of BamCore = $F_v = 465 \ psi$

$$\begin{array}{l} t = 1.11" (transformed) \\ F_{v_{v_{v}}} = 516 \ \#/in \\ \\ V_{h} = \frac{(F_{v_{v}}t_{v})I(N_{webs})}{Q_{t}} \\ & \mbox{Statical Moment of Area:} \\ & \mbox{Area of Flange & Web Above N.A.} \\ Q_{top} = Q_{bottom} = Q \\ & Q_{2x6} = 1.5"x5.84"(h-.75"-y) = 1.5"x5.84"(12"-.75"-5.2") = 53 \ in^{3} \\ & Q_{BamCore} = 2x1.11(h-y)(\frac{h-y}{2}) = 2x1.11(12-5.2)(\frac{12-5.2}{2}) = 51.3 \ in^{3} \\ & Q = 53 \ + \ 51.3 \ = \ 104.3 \ in^{3} \\ & V_{h} = 9076 \ \# \\ & V = \frac{w_{allow}L}{2} \\ & w = \frac{2V}{L} = \ 1815 \ plf \end{array}$$

MAX NAIL SHEAR:

For analysis, use 10d nails; $t_s = 1 \frac{1}{4}$ "; G = .50

$$Z = 118 \#$$

$$q = \frac{2 \text{ nails}(118 \#/\text{nail})}{6"} = 39 \#/\text{in} = 472 \#/\text{ft}$$

$$q = \frac{VQ}{I}$$

$$39 \#/\text{in} = \frac{V(104.3 \text{ in}^3)}{917 \text{ in}^4} \rightarrow V = 342.9 \#$$

$$w = \frac{2V}{L} = 68.6 \text{ plf} \rightarrow try @ 4" \text{ o. c.}$$

$$q = \frac{2 \text{ nails}(118 \#/\text{nail})}{4"} = 59 \#/\text{in} \rightarrow 518.7 \#$$

$$w = \frac{2V}{L} = 104 \text{ plf} \ge 81.5 \text{ plf} \checkmark$$

Fabrication

Two specimens were tested under the Riehle Testing Machine in the High Bay at Cal Poly San Luis Obispo. Both specimens were timber box headers with BamCore side panels. The dimensions were to mimic a full scale timber box header that would be:

- 16' in length,
- 16" in depth,
- possess a 6x6 bottom flange,
- a 2x6 top plate, and
- two (2) panels on each side of 1 ¹/₄" thickness, as shown in the figure below:

In order to accommodate these proportions, both specimens needed to be fabricated at half scale. BamCore donated some of its material to this study, which was given as two panels, 8' in length, 8" in depth, and 1¼" in thickness. In order to construct two half scale specimens, each member of the overall section had to be appropriately proportioned. Each panel's thickness was cut in half down to 5/8".



The 2x6 was fabricated as 1x3 (truly dimensioned $\frac{3}{4}$ " x 2 $\frac{3}{4}$ "), and the 6x6 was fabricated as a 3x3 (truly dimensioned 2 $\frac{3}{4}$ " x 2 $\frac{3}{4}$ "). Nailing was a particular area of interest, since BamCore's typical details call out custom nailing of .131" diameter nails x 3 $\frac{1}{4}$ " long at 6" on center. For analysis, 10d common nails were used, with a .148" shank diameter 3" long. The shear capacity of these nails is 118 #/nail per NDS, and at 6" on center, the shear flow maximum uniform load would not always be sufficient enough to be greater than the L/800 deflection limit. So the analysis deemed 10d nails at 4" on center appropriate. At half scale, a nail size with half the shear capacity was needed. 6d common nails were found to have shear capacity of 64 #/nail per NDS (nearly half the value of 118 #/2 = 59 #). Since 4" on center was deemed appropriate at full scale, 2" on center was the nail spacing necessary for fabrication. The following photos show part of the fabrication process, with resawed material, pre-drilling holes with the CNC Router, nailing with palm nailer, and final product (predrilling and palm nailing only occurred due to university policy of no nail guns, otherwise nail gun would be used):













Testing

Each of the two specimens were placed in the Riehle Testing Machine, supported by two wood blocks on each end. The machine applied a point load to the header with its piston head, which contacted a steel section laying on top of the specimen. The steel section laid on top of the specimen atop wood blocks at each end, to limit deformation of the steel pressing into the timber header directly. The purpose of the steel section between the piston head and the timber header was to more accurately mimic a uniform load across the header and a constant maximum moment over the middle span, as opposed to a direct point load applied at the midspan.





Data was collected directly from the Riehle machine and recorded, as the dial on the machine registered load being applied in pounds, and additionally displayed the total "deflection" (distance traveled, in inches, by the piston head after being zeroed out at first contact with the steel section).

Supplemental data was collected by attaching strain gages to the top plate, one side panel, and the bottom flange. The strain gages were placed to measure the elongation or shrinkage of the material it was applied to, and use the strain to obtain the stresses at the different locations of the header.







The strain gages recorded strain by tracking electrical currents running through the gage out to exposed wires, then attaching the exposed wires to a solder pad. Then external wires were also attached to the solder pad on one end, and attached to a desktop on the other end to record strain on the screen. The strain gage on the top plate was placed on its top in hopes to capture shrinkage in compression, and the strain gage on the bottom flange was placed on its bottom in hopes to capture elongation. Traditionally, strain gages are not applied to wood or bamboo, since the materials are very fibrous compared to steel, the material that strain gages are normally applied to. Additionally, the electric current running through the gage had the potential to heat up the spot of application very quickly in comparison to steel, and wood reacts much more dramatically to the direct application of heat than steel at this scale. The potential for the strain gages not recording the correct strain was known prior to testing, and after analysis was deemed only supplemental data. The fabrication, set up, and testing for both specimens were exactly the same, with the exception of one specimen having a stiffener inside the header at midspan in order to mimic a splice of the BamCore panels along a span larger than 10'.

Results and Comparison

Upon the completion of fabrication, testing, and data collection, the empirical results were compared with the analytical results to note discrepancies. The first area of comparison was the L/800 deflection limit. During initial analysis, it was found to be that a timber box header spanning 16', with a 6x6, and 16" overall depth could support a uniform load of 43 plf before deflecting L/800 = .24". The half scale model, a timber box header spanning 8', with a 3x3, and 8" overall depth, was found to support a uniform load of 50 plf in Specimen 1, and 54 plf in Specimen 2. Ideally, the objective was to see if these values would align, because although the half scale specimens possessed a smaller section size, they simultaneously spanned a shorter distance. This would mean a 14% difference between expected value and actual value for Specimen 1, and a 20% difference between expected value and actual value for Specimen 2.

The specimens were also tested to fracture, as a means to observe design stress values compared to test stress values. Strain values were recorded using the strain gages, but during comparison, it was found that the "test stress values" would be off my multiple factors from design stress values, which is an indication that the strain gages likely did not record strain on the timber box header accurately.

However, the maximum allowable uniform loads for tension, compression, and bending were all found during analysis using design stress values, and the point load from the tests was converted to a uniform load, and compared to the maximum allowable uniform loads from analysis. Both specimens seemed to have elements of multiple failure modes. What was evident after both tests was a failure of a combination of bending of the section and tension in the BamCore panel.





There also seemed to be a failure plane in the BamCore panels along the nail lines, visibly "ripping" the wood along the 6d nails at 2" on center.



Many of the tension failure cracks in the BamCore panels occurred at the finger joints of the panels, where different strips of BamCore would be joined together.





When comparing the maximum load on Specimen 1 to maximum bending load, the test applied 873 plf compared to 934 plf maximum bending load—a 6.9% difference. When comparing the maximum load on Specimen 2 to maximum bending load, the test applied 700 plf compared to 934 plf maximum bending load—a 33% difference.

The development of timber box headers using BamCore side panels was a study that aimed to bring about new insight as to how BamCore and timber interact together when supporting a uniform load. The findings in this report have led to an initial span table, as shown below, along with maximum loads for different failure modes. BamCore panels provide an efficient use of material in a given cross section by providing more strength than typical plywood, and sustainability in practice and development.

Appendix & Spreadsheet Calculations

MOMENT OF INERTIA AND N.A. SPREADSHEET FOR 6X6: 12" TOTAL DEPTH

SET	ΔΤΔ
	DININ

Moduluses of Elasticity	psi
E _{Headers}	1600000
EBamcore	1420000
E _{2x6}	1700000

Transformation to E _{Header}	n
Ebamcore/Eheader=	0.89
E2x6/Eheader=	1.06

Header Depths (in)	
12	
16	
24	

Part Dimensions	b _{Original}	b _{Transformed}	h	Area	
6x6	5.5	5.5	5.5	30.25	76.26
(2) Bamcore Panels	2.5	2.22	12	26.63	319.50
2x6	5.5	5.84	1.5	8.77	1.64
			Σ(A)=	65.64	397.40

Centroid	in	distance from datum at y=0 (bottom of
y _{Header} =	2.75	header) to centroid of individual part
y _{Bamcore} =	6	
y _{2x6} =	11.25	

2(y*A)=	341.55 N.A. = Σ(y*A)/ΣA
N.A.	5.20 in from bottom

d _{Header} =	2.45 distance from centroid of
d _{Bamcore} =	0.80 individual part to section
$d_{2x6} =$	6.05 N.A.



Moment of Inertia	in"
Σ (I parts)	397.40
$\Sigma (Ad^2)$	519.46
Moment of Inertia	917

6.80 largest distance between extreme fiber and neutral axis Section Modulus (S **134.9** in³



10 101111001111					
Part Dimensions	b _{0riginal}	b _{Transformed}	h	Area	I
6x6	5.5	5.5	5.5	30.25	76.26
(2) Bamcore Panels	2.5	2.22	16	35.50	757.33
2x6	5.5	5.84	1.5	8.77	1.64
			$\Sigma(A) =$	74.52	835.23









Moment of Inertia	in [*]
Σ (I parts)	835.23
$\Sigma (Ad^2)$	1172.73
Moment of Inertia	2008

c=	9.28
Section Modulus (S	216.4 ii

Part Dimensions	b _{Original}	b _{Transformed}	h	Area	I
6x6	5.5	5.5	5.5	30.25	76.26
(2) Bamcore Panels	2.5	2.22	24	53.25	2556.00
2x6	5.5	5.84	1.5	8.77	1.64
			Σ(A)=	92.27	2633.90



$\Sigma(y^*A) =$	925.99	
N.A.	10.04	in

d _{Header} =	7.29
d _{Bamcore} =	1.90
d _{2x6} =	13.22

Ad ²	in
Bamcore	205.3
Header	1605.9
2x6	1530.5
Total	3341.8

Moment of Inertia	in"
Σ (I parts)	2633.90
$\Sigma (Ad^2)$	3341.81
Moment of Inertia	5976

13.96
427.9 in

MOMENT OF INERTIA AND N.A. SPREADSHEET FOR 6X8: 12" TOTAL DEPTH

SET DATA

Moduluses of Elasticity	psi
E _{Headers}	1600000
E _{Bamcore}	1420000
E _{2x6}	1700000

Transformation to E _{Header}	n
Ebamcore/Eheader=	0.89
E2x6/Eheader=	1.06

Header Depths (in)	
12	
16	
24	

Part Dimensions	b _{0riginal}	b _{Transformed}	h	Area	I
6x8	5.5	5.5	7.5	41.25	193.36
(2) Bamcore Panels	2.5	2.22	12	26.63	319.50
2x6	5.5	5.84	1.5	8.77	1.64
			Σ(A)=	76.64	514.50

entroid	in	distance from datum at y=0 (bottom of
Header=	3.75	header) to centroid of individual part
Bamcore =	6	
2x6 =	11.25	

Σ(y*A)=	413.05 N.A. = Σ(y*A)/ΣA
N.A.	5.39 in from bo	ttom

d _{Header} =	1.64 distance from centroid of
d _{Bamcore} =	0.61 individual part to section
d _{2×6} =	5.86 N.A.

Ad ²	in
Bamcore	9.93
Header	110.87
2x6	301.06
Total	421.86

Moment of Inertia	in*
Σ (I parts)	514.50
$\Sigma (Ad^2)$	421.86
Moment of Inertia	936

6.61 largest distance between extreme fiber C= and neutral axis **141.6** in³

Section Modulus (S

16" TOTAL DEPTH

art Dimensions	b _{Original}	b _{Transformed}	h	Area	I
x8	5.5	5.5	7.5	41.25	193.36
2) Bamcore Panels	2.5	2.22	16	35.50	757.33
x6	5.5	5.84	1.5	8.77	1.64
			$\Sigma(A) =$	85.52	952.34









Moment of Inertia	in
Σ (I parts)	952.34
Σ (Ad ²)	1059.76
Moment of Inertia	2012

c=	9.31
Section Modulus (S	2162 i

24" TOTAL DEPTH

Part Dimensions	b _{Original}	b _{Transformed}	h	Area	I
6x8	5.5	5.5	7.5	41.25	193.36
(2) Bamcore Panels	2.5	2.22	24	53.25	2556.00
2x6	5.5	5.84	1.5	8.77	1.64
			Σ(A)=	103.27	2751.00

Centroid	in
y _{Header} =	3.75
y _{Bamcore} =	12
y _{2x6} =	23.25

Σ(y*A)=	997.49
N.A.	<mark>9.66</mark> i

d _{Header} =	5.91
d _{Bamcore} =	2.34
d _{2x6} =	13.59

Ad ²	in
Bamcore	291.7
Header	1440.5
2x6	1619.0
Total	3351.2

Moment of Inertia	in
Σ (I parts)	2751.00
$\Sigma (Ad^2)$	3351.27
Moment of Inertia	6102

C=	14.34	
Section Modulus (S	425.5	in

MOMENT OF INERTIA AND N.A. SPREADSHEET FOR 6X10: 12" TOTAL DEPTH

SET DATA

Moduluses of Elasticity	psi
E _{Headers}	1600000
E _{Bamcore}	1420000
E _{2x6}	1700000

Transformation to E _{Header}	n
Ebamcore/Eheader=	0.89
E2x6/Eheader=	1.06

Header Depths (in)	
12	
16	
24	

6x10	5.5	5.5	9.5	52.25	392.96
(2) Bamcore Panels	2.5	2.22	12	26.63	319.50
2x6	5.5	5.84	1.5	8.77	1.64
			Σ(A)=	87.64	714.11

Part Dimensions b_{Original} b_{Transformed} h Area

Centroid	in	distance from datum at y=0 (bottom of
/ _{Header} =	4.75	header) to centroid of individual part
v _{Bamcore} =	6	
v _{2x6} =	11.25	

Σ(y*A)=	506.55 N.A. = Σ(y*A)/ΣA
N.A.	5.78 in from bottom

d _{Header} =	1.03 distance from centroid of
d _{Bamcore} =	0.22 individual part to section
d _{2v6} =	5.47 N.A.

Ad ²	in
Bamcore	1.29
Header	55.42
2x6	262.29
Total	319.00

Moment of Inertia	in*
Σ (I parts)	714.11
$\Sigma (Ad^2)$	319.00
Moment of Inertia	1033

6.22 largest distance between extreme fiber C= and neutral axis Section Modulus (S **166.1** in³

16" TOTAL DEPTH

Part Dimensions	b _{Original}	b _{Transformed}	h	Area	I
5x10	5.5	5.5	9.5	52.25	392.96
2) Bamcore Panels	2.5	2.22	16	35.50	757.33
2x6	5.5	5.84	1.5	8.77	1.64
			$\Sigma(A) =$	96 52	1151 94









Moment of Inertia	in*
Σ (I parts)	1151.94
Σ (Ad ²)	895.64
Moment of Inertia	2048

c=	9.10
Section Modulus (S	225.0 i

24" TOTAL DEPTH

Part Dimensions	b _{Original}	b _{Transformed}	h	Area	I
6x10	5.5	5.5	9.5	52.25	392.96
(2) Bamcore Panels	2.5	2.22	24	53.25	2556.00
2x6	5.5	5.84	1.5	8.77	1.64
			Σ(A)=	114.27	2950.61



$\Sigma(\mathbf{y}^*\mathbf{A})=$	1090.99	
N.A.	9.55	in

d _{Header} =	4.80
d _{Bamcore} =	2.45
d _{2x6} =	13.70

Ad ²	in
Bamcore	320.20
Header	1202.75
2x6	1645.74
Total	3168.69

Moment of Inertia	in*
Σ (I parts)	2950.61
$\Sigma (Ad^2)$	3168.69
Moment of Inertia	6119

C=	14.45
Section Modulus (S	423.4 in

c=

MOMENT OF INERTIA AND N.A. SPREADSHEET FOR 6X12: 12" TOTAL DEPTH

Part Dimensions

SET DATA

Moduluses of Elasticity	psi
E _{Headers}	1600000
E _{Bamcore}	1420000
E _{2x6}	1700000

Transformation to E _{Header}	n
Ebamcore/Eheader=	0.89
E2x6/Eheader=	1.06

Header Depths (in)	
12	
16	
24	

6x12	5.5	5.5	11.5	63.25	697.0
(2) Bamcore Panels	2.5	2.22	12	26.63	319.5
2x6	5.5	5.84	1.5	8.77	1.6
			Σ(A)=	98.64	1018.2

b_{Original} b_{Transformed}

Area

h

Centroid	in	distance from datum at y=0 (bottom of
y _{Header} =	5.75	header) to centroid of individual part
y _{Bamcore} =	6	
y _{2x6} =	11.25	

Σ(y*A)=	622.05 N.A. = Σ(y*A)/ΣA
N.A.	6.31 in from bottom

d _{Header} =	0.56 distance from centroid of
d _{Bamcore} =	0.31 individual part to section
d _{2×6} =	4.94 N.A.



Moment of Inertia	in
Σ (I parts)	1018.21
$\Sigma (Ad^2)$	236.31
Moment of Inertia	1255

6.31 largest distance between extreme fiber C= and neutral axis Section Modulus (S **198.9** in³

16" TOTAL DEPTH

Part Dimensions	b _{Original}	b _{Transformed}	h	Area	I
5x12	5.5	5.5	11.5	63.25	697.07
2) Bamcore Panels	2.5	2.22	16	35.50	757.33
2x6	5.5	5.84	1.5	8.77	1.64
			Σ(A)=	107.52	1456.04









Moment of Inertia	in [*]
Σ (I parts)	1456.04
$\Sigma (Ad^2)$	723.25
Moment of Inertia	2179

c=	8.73
Section Modulus (S	249.6 i

24" TOTAL DEPTH

Part Dimensions	b _{0riginal}	b _{Transformed}	h	Area	I
6x12	5.5	5.5	11.5	63.25	697.07
(2) Bamcore Panels	2.5	2.22	24	53.25	2556.00
2x6	5.5	5.84	1.5	8.77	1.64
			Σ(A)=	125.27	3254.71



$\Sigma(\mathbf{y}^*\mathbf{A})=$	1206.49	
N.A.	9.63	in

d _{Header} =	3.88
d _{Bamcore} =	2.37
d _{2x6} =	13.62

Ad ²	in
Bamcore	298.74
Header	952.90
2x6	1625.72
Total	2877.35

Moment of Inertia	in*
Σ (I parts)	3254.71
$\Sigma (Ad^2)$	2877.35
Moment of Inertia	6132

c=	14.37
Section Modulus (S	426.8 in

c=

Inertia Summary Table

Header Section	Total Depth (in)	Moment of Inertia (in ⁴)	N.A. from bottom (in)	Q (in3)
	12	917	5.20	104.2
6x6	16	2008	6.72	148.5
	24	5976	10.04	269.3
	12	936	5.39	101.5
6x8	16	2012	6.69	149.1
	24	6102	9.66	281.1
	12	1033	5.78	95.9
6x10	16	2048	6.90	144.9
	24	6119	9.55	284.7
	12	1255	6.31	89.0
6x12	16	2179	7.27	137.6
	24	6132	9.63	282.0

<u>Cp Sample Calculation</u>

Strong Axis	l ₁ =	14	ft	168	inches
Stability Factor	K _E = c =	1.0 0.8			[Table G1, A Appendix G] [Sect. 3.7.1]

Section Properties and Allowable Stresses: Douglas Fir - Larch

Properties:					
E =	1.70E+06	psi	A =	11.58	in ²
Emin =	6.20E+05	psi	$F_c =$	1,500	psi
Adjustment	Factors:				
	$C_D =$	1	Load Duration	Factor	[Table 2.3.2]
	C _M =	1	Wet Service Fa	actor	
	$C_t =$	1	Temperature I	Factor	
	$C_F =$	1.00	Size Factor		
	$C_i =$	1	Incising Factor	r	
	C _T =	1	Buckling Stiffn	ess Facto	or

Determine Allowable Stress:

Maximum S						
Strong Axis:	l _{1e} =	168	d ₁ =	7.72	r* ₁ =	474
Weak Axis:	l _{2e} =	0	$d_2 =$	1.5	r* ₂ =	0
r_{MAX}^* =	474		A =	11.58	in ²	
Ratio of Cri	tical Stress	to Maxi	mum Stress:		in ²	
$F_{CE} =$	1,076	psi	[Sect. 3.7.1]	E'min =	620,000	psi
$F_{c}^{*} =$	1,500	psi	[Sect. 3.7.1]	le/d=	22	
Column Sta	bility Facto	or:				
$C_p =$	0.57		[EQ 3.7-1]			
Allowable S	Stress:					
$F'_{c}^{*} =$	852	psi				

Maximum Uniform Loads Tables

			TENSI	ON	COMPRES	SION	BENDI	NG	DEFLECTION	SHE/	AR	1			
	Header	Depth (in)	Mallow (#-ft) v	wallow (plf)	Mallow (#-ft) w	vallow (plf)	Mallow (#-ft) w	allow (plf)	wallow (plf)	∨(#) w	allow (plf)	MAX PLF	L/480	L/360	L/240
		12	12114	969	16862	1349	17621	1410	81.5	9076	1815	81	136	181	272
	6x6	16	20538	1643	27051	2164	29873	2390	178.5	13954	2791	178	297	397	595
		24	40935	3275	53493	4279	59542	4763	531.2	22898	4580	531	885	1180	1771
		12	11945	956	17706	1416	17374	1390	83.2	9522	1904	83	139	185	277
	6x8	16	20668	1653	27024	2162	30062	2405	178.9	13927	2785	178	298	397	596
10' SPAN		24	43432	3475	53191	4255	63174	5054	542.4	22400	4480	542	904	1205	1808
		12	10054	804	20761	1661	20108	1609	91.8	11115	2223	91	153	204	306
	6x10	16	16695	1336	28123	2250	33389	2671	182.0	14584	2917	182	303	404	607
		24	36051	2884	52927	4234	72102	5768	543.9	22181	4436	543	907	1209	1813
		12	11190	895	27541	2203	22380	1790	111 5	14553	2911	111	186	248	372
	6v12	16	16868	1349	31195	2205	33735	2699	193.7	16345	3269	193	323	430	646
	0/12	24	25912	2965	52246	12450	71626	5720	545.1	22/28	1/199	545	009	1211	1917
		24	55615	2005	55540	4200	71020	5750	545.1	22430	4400	545	500	1211	1017
			TENSI	ON	COMPRES	SION	RENDU	NG	DEFLECTION	SHE	ΔR	1			
	Header	Donth (in)	Mallow (#-ft) y	vallow (nlf)	Mallow (#-ft) w	vallow (nlf)	Mallow (#-ft) w	allow (nlf)	wallow (nlf)	V (#) W	allow (nlf)	MAX PLF			
	Header	Depth (In)	12114	672	16862		17621	070	47.2	9076	1512	101AA F LI 47	70	105	157
	<i>с</i>	12	20529	11/1	27051	1502	20072	1660	47.2	12054	1313	102	172	220	244
	0X0	24	20338	2274	27031	1505	29673	2200	207.4	13934	2016	207	1/2 E12	230	1025
		24	40955	2274	33493	2972	17074	3308	307.4	22898	1507	507	512	107	1025
	6.0	12	11945	1140	17706	984	1/3/4	905	48.2	9522	1587	48	80	107	101
	6X8	10	20668	1148	27024	1501	30062	1670	103.5	13927	2321	103	1/3	230	345
12' SPAN		24	43432	2413	53191	2955	63174	3510	313.9	22400	3/33	313	523	698	1046
		12	10054	559	20761	1153	20108	111/	53.1	11115	1852	53	89	118	1//
	6x10	16	16695	927	28123	1562	33389	1855	105.3	14584	2431	105	176	234	351
		24	36051	2003	52927	2940	72102	4006	314.8	22181	3697	314	525	700	1049
		12	11190	622	27541	1530	22380	1243	64.5	14553	2425	64	108	143	215
	6x12	16	16868	937	31195	1733	33735	1874	112.1	16345	2724	112	187	249	374
		24	35813	1990	53346	2964	71626	3979	315.4	22438	3740	315	526	701	1051
										-		-			
			TENSI	ON	COMPRESS	SION	BENDI	NG	DEFLECTION	SHE/	AR				
	Header	Depth (in)	Mallow (#-ft) v	wallow (plf)	Mallow (#-ft) w	vallow (plf)	Mallow (#-ft) w	allow (plf)	wallow (plf)	V (#) w	allow (plf)	MAX PLF			
		12	12114	494	16862	688	17621	719	29.7	9076	1297	29	50	66	99
	6x6	16	20538	838	27051	1104	29873	1219	65.0	13954	1993	65	108	145	217
		24	40935	1671	53493	2183	59542	2430	193.6	22898	3271	193	323	430	645
		12	11945	488	17706	723	17374	709	30.3	9522	1360	30	51	67	101
	6x8	16	20668	844	27024	1103	30062	1227	65.2	13927	1990	65	109	145	217
14' SDAN	0,10	24	43432	1773	53191	2171	63174	2579	197.7	22400	3200	197	329	439	659
14 JF AN		12	10054	410	20761	21/1	20108	2373	22.5	11115	1599	22	56	-33	112
	6.40	12	10034	410	20701	1140	20108	1262	55.5	11113	1300	55	111	147	221
	6X10	10	16695	100	28123	1148	33389	1303	66.3	14584	2083	00	111	147	221
		24	36051	14/1	52927	2160	/2102	2943	198.2	22181	3169	198	330	441	661
		12	11190	457	27541	1124	22380	913	40.6	14553	2079	40	68	90	135
	6x12	16	16868	688	31195	1273	33735	1377	70.6	16345	2335	70	118	157	235
		24	35813	1462	53346	2177	71626	2923	198.6	22438	3205	198	331	441	662
												-			
												_			
			TENSI	ON	COMPRES	SION	BENDI	NG	DEFLECTION	SHE	AR	1			
	Header	Depth (in)	TENSI Mallow (#-ft) v	ON wallow (plf)	COMPRES Mallow (#-ft) w	SION vallow (plf)	BENDII Mallow (#-ft) w	NG vallow (plf)	DEFLECTION wallow (plf)	SHE/ V (#) w	AR vallow (plf)	MAX PLF			
	Header	Depth (in) 12	TENSI Mallow (#-ft) v 12114	ON wallow (plf) 379	COMPRES Mallow (#-ft) w 16862	SION vallow (plf) 527	BENDII Mallow (#-ft) w 17621	NG vallow (plf) 551	DEFLECTION wallow (plf) 19.9	SHE/ V (#) w 9076	AR vallow (plf) 1135	MAX PLF 19	33	44	66
	Header 6x6	Depth (in) 12 16	TENSI Mallow (#-ft) v 12114 20538	ON wallow (plf) 379 642	COMPRES: Mallow (#-ft) w 16862 27051	SION vallow (plf) 527 845	BENDII Mallow (#-ft) w 17621 29873	NG vallow (plf) 551 934	DEFLECTION wallow (plf) 19.9 43.6	SHE/ V (#) w 9076 13954	AR vallow (plf) 1135 1744	MAX PLF 19 43	33 73	44	66 145
	Header 6x6	Depth (in) 12 16 24	TENSI Mallow (#-ft) v 12114 20538 40935	ON wallow (plf) 379 642 1279	COMPRESS Mallow (#-ft) w 16862 27051 53493	SION vallow (plf) 527 845 1672	BENDII Mallow (#-ft) w 17621 29873 59542	NG vallow (plf) 551 934 1861	DEFLECTION wallow (plf) 19.9 43.6 129.7	SHE/ V (#) w 9076 13954 22898	AR vallow (plf) 1135 1744 2862	MAX PLF 19 43 129	33 73 216	44 97 288	66 145 432
	Header 6x6	Depth (in) 12 16 24 12	TENSI Mallow (#-ft) v 12114 20538 40935 11945	ON wallow (plf) 379 642 1279 373	COMPRESS Mallow (#-ft) w 16862 27051 53493 17706	SION vallow (plf) 527 845 1672 553	BENDII Mallow (#-ft) w 17621 29873 59542 17374	NG vallow (plf) 551 934 1861 543	DEFLECTION wallow (plf) 19.9 43.6 129.7 20.3	SHE/ V (#) w 9076 13954 22898 9522	AR vallow (plf) 1135 1744 2862 1190	MAX PLF 19 43 129 20	33 73 216 34	44 97 288 45	66 145 432 68
	Header 6x6 6x8	Depth (in) 12 16 24 12 16	TENSI Mallow (#-ft) v 12114 20538 40935 11945 20668	ON wallow (plf) 379 642 1279 373 646	COMPRES Mallow (#-ft) w 16862 27051 53493 17706 27024	SION vallow (plf) 527 845 1672 553 845	BENDII Mallow (#-ft) w 17621 29873 59542 17374 30062	NG vallow (plf) 551 934 1861 543 939	DEFLECTION wallow (plf) 19.9 43.6 129.7 20.3 43.7	SHE/ V (#) w 9076 13954 22898 9522 13927	AR vallow (plf) 1135 1744 2862 1190 1741	MAX PLF 19 43 129 20 43	33 73 216 34 73	44 97 288 45 97	66 145 432 68 146
16' SPAN	Header 6x6 6x8	Depth (in) 12 16 24 12 16 24	TENSI Mallow (#-ft) v 12114 20538 40935 11945 20668 43432	ON wallow (plf) 379 642 1279 373 646 1357	COMPRES: Mallow (#-ft) w 16862 27051 53493 17706 27024 53191	SION vallow (plf) 527 845 1672 553 845 1662	BENDII Mallow (#-ft) w 29873 59542 17374 30062 63174	NG vallow (plf) 551 934 1861 543 939 1974	DEFLECTION wallow (plf) 19.9 43.6 129.7 20.3 43.7 132.4	SHE/ V (#) w 9076 13954 22898 9522 13927 22400	AR vallow (plf) 1135 1744 2862 1190 1741 2800	MAX PLF 19 43 129 20 43 132	33 73 216 34 73 221	44 97 288 45 97 294	66 145 432 68 146 441
16' SPAN	Header 6x6 6x8	Depth (in) 12 16 24 12 16 24 24 24 12	TENSI Mallow (#-ft) v 12114 20538 40935 11945 20668 43432 10054	ON wallow (plf) 379 642 1279 373 646 1357 314	COMPRES: Mallow (#-ft) v 16862 27051 53493 17706 27024 53191 20261	SION vallow (plf) 527 845 1672 553 845 1662 649	BENDII Mallow (#-ft) w 29873 59542 17374 30062 63174 20108	NG vallow (plf) 551 934 1861 543 939 1974 628	DEFLECTION wallow (plf) 19.9 43.6 129.7 20.3 43.7 132.4 22.4	SHE/ V (#) w 9076 13954 22898 9522 13927 22400 11115	AR vallow (plf) 1135 1744 2862 1190 1741 2800 1389	MAX PLF 19 43 129 20 43 132 22	33 73 216 34 73 221 37	44 97 288 45 97 294 50	66 145 432 68 146 441 75
16' SPAN	Header 6x6 6x8	Depth (in) 12 16 24 12 16 24 16 24 12 16	TENSI Mallow (#-ft) v 12114 20538 40935 11945 20668 43432 10054 16695	ON wallow (plf) 379 642 1279 373 646 1357 314 522	COMPRES: Mallow (#-ft) v 16862 27051 53493 17706 27024 53191 20761 28123	SION vallow (plf) 527 845 1672 553 845 1662 649 879	BENDII Mallow (#-ft) w 17621 29873 59542 17374 30062 63174 20108 33389	NG vallow (plf) 551 934 1861 543 939 1974 628 1043	DEFLECTION wallow (plf) 19.9 43.6 129.7 20.3 43.7 132.4 22.4 44.4	SHE/ V (#) w 9076 13954 22898 9522 13927 22400 11115 14584	AR rallow (plf) 1135 1744 2862 1190 1741 2800 1389 1823	MAX PLF 19 43 129 20 43 132 22 44	33 73 216 34 73 221 37 74	44 97 288 45 97 294 50 99	66 145 432 68 146 441 75 148
16' SPAN	Header 6x6 6x8 6x10	Depth (in) 12 16 24 12 16 24 16 24 12 16 24	TENSI Mallow (#-ft) v 12114 20538 40935 11945 20668 43432 10054 16695 26051	ON wallow (plf) 379 642 1279 373 646 1357 314 522 1137	COMPRES: Mallow (#-ft) w 16862 27051 53493 17706 27024 53191 20761 28123 53037	SION vallow (plf) 527 8455 1672 553 845 1662 649 879	BENDII Mallow (#-ft) w 29873 59542 17374 30062 63174 20108 33389 73102	NG vallow (plf) 551 934 1861 543 939 1974 628 1043 2252	DEFLECTION wallow (plf) 19.9 43.6 129.7 20.3 43.7 132.4 22.4 44.4	SHEJ V (#) w 9076 13954 13954 22898 9522 13927 22400 11115 14584 23191	AR vallow (plf) 1135 1744 2862 1190 1741 2800 1389 1823 2772	MAX PLF 19 43 129 20 43 132 22 44	33 73 216 34 73 221 37 74 231	44 97 288 45 97 294 50 99	66 145 432 68 146 441 75 148
16' SPAN	Header 6x6 6x8 6x10	Depth (in) 12 16 24 12 16 24 12 16 24 12 16 24 12	TENSI Mallow (#-ft) v 12114 20538 40935 11945 20668 43432 10054 16695 36051 11190	ON wallow (plf) 379 642 1279 373 646 1357 314 522 1127 250	COMPRES: Mallow (#-ft) w 16862 27051 33493 17706 27024 53191 20761 28123 52927 27544	SION vallow (plf) 527 845 1672 553 845 1662 649 879 1654 861	BENDII Mallow (#-ft) w 17621 29873 59542 17374 30062 63174 20108 33389 72102 23290	NG vallow (plf) 551 934 1861 543 939 1974 628 1043 2253 600	DEFLECTION wallow (plf) 19.9 43.6 129.7 20.3 43.7 132.4 22.4 44.4 44.4 132.8	SHEJ V (#) w 9076 13954 22898 9522 13927 22400 11115 14584 22181 14553	AR vallow (plf) 1135 1744 2862 1190 1741 2800 1389 1823 2773 1910	MAX PLF 19 43 129 20 43 132 22 44 132 27	33 73 216 34 73 221 37 74 221	44 97 288 45 97 294 50 99 99 295	66 145 432 68 146 441 75 148 443
16' SPAN	Header 6x6 6x8 6x10	Depth (in) 12 16 24 16 24 16 24 12 16 24 12 16 24	TENSI Mallow (#-ft) v 12114 20538 40935 11945 20668 43432 10054 16695 36051 11190	ON wallow (plf) 379 642 1279 373 646 1357 314 522 1127 350	COMPRES: Mallow (#-ft) w 16862 27051 33493 17706 27024 53191 20761 28123 52927 27541 24402	SION vallow (plf) 527 845 1672 553 845 1662 649 879 1654 861	BENDII Mallow (#-ft) w 17621 29873 59542 17374 30062 63174 20108 33389 72102 22380 33377	NG /allow (plf) 551 934 1861 543 939 1974 628 1043 2253 699	DEFLECTION wallow (plf) 19.9 43.6 129.7 20.3 43.7 132.4 22.4 44.4 132.8 27.2 27.2	SHEJ V (#) w 9076 13954 13954 22898 9522 13927 13927 22400 11115 14584 22181 14553 16545 16545	AR vallow (plf) 1135 1744 2862 1190 1741 2800 1389 1823 2773 1819 2042	MAX PLF 19 43 129 20 43 132 22 44 132 27 7	33 73 216 34 73 221 37 74 221 74 221 76	44 97 288 45 97 294 50 99 295 295 295 60	66 145 432 68 146 441 75 148 443 9 11
16' SPAN	Header 6x6 6x8 6x10 6x12	Depth (in) 12 16 24 16 24 16 24 16 24 12 16 24 12 16	TENSI Mallow (#-ft) v 12114 20538 40935 11945 20668 43432 10054 16695 36051 11190 16868	ON wallow (plf) 379 642 1279 373 646 1357 314 522 1127 350 527	COMPRES: Mallow (#-ft) w 16862 27051 53493 17706 27024 53191 20761 28123 52927 27541 31195 5025	SION vallow (plf) 527 845 1672 553 845 1662 649 879 1654 861 975	BENDII Mallow (#-ft) w 17621 29873 59542 17374 30062 63174 20108 33389 72102 22380 33389	NG rallow (plf) 551 934 1861 543 939 1974 628 1043 2253 699 1054	DEFLECTION wallow (plf) 19.9 43.6 129.7 20.3 43.7 132.4 22.4 44.4 132.8 27.2 47.3 47.3	SHE/ V (#) w 9076 13954 22898 9522 13927 22400 11115 14584 22181 14553 16345 22420	AR // allow (plf) 1135 1744 2862 1190 1741 2800 1389 1823 2773 1819 2043 2043	MAX PLF 19 43 129 20 43 132 22 44 132 27 47	33 73 216 34 73 221 37 74 221 45 79 9 222	44 97 288 45 97 294 50 99 295 60 105	66 145 432 68 146 441 75 148 443 91 158
16' SPAN	Header 6x6 6x8 6x10 6x12	Depth (in) 12 16 24 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 16 16 16 16 16 16 16 16 16	TENSI Mallow (#-ft) v 12114 20538 40935 11945 20668 43432 10054 16695 36051 11190 16868 35813	ON wallow (plf) 379 642 1279 373 646 1357 3314 522 1127 350 527 1119	COMPRES: Mallow (#-ft) w 16862 27051 53493 17706 27024 53191 20761 28123 52927 27541 31195 53346	SION vallow (plf) 527 845 1672 553 845 1662 649 879 1654 861 975 1667	BENDII Mallow (#+ft) w 17621 29873 59542 17374 30062 63174 20108 33389 72102 22380 33735 71626	NG iallow (plf) 551 934 1861 543 939 1974 628 1043 2253 699 1054 2238	DEFLECTION wallow (plf) 19.9 43.6 129.7 20.3 43.7 132.4 22.4 44.4 44.4 132.8 27.2 47.3 133.1	SHEJ V (#) w 9076 13954 22898 9522 13927 22400 11115 14584 22181 14553 16345 22438	AR allow (plf) 1135 1744 2862 1190 1741 2800 1389 1823 2773 1819 2043 2805	MAX PLF 19 43 129 20 43 132 22 24 44 132 27 47 133	33 73 216 34 73 221 37 74 221 45 79 222	44 97 288 45 97 294 50 99 295 60 105 296	666 145 432 688 146 441 755 1488 4443 91 1588 444
16' SPAN	Header 6x6 6x8 6x10 6x12	Depth (in) 12 16 24 12 16 24 12 16 24 12 16 24 12 2 16 24	TENSI Mallow (#-ft) v 20538 40935 11945 20668 43432 10054 16695 36051 11190 16868 35813	ON wallow (plf) 379 642 1279 373 646 646 1357 314 522 1127 3500 527 1119	COMPRES: Mallow (#-ft) w 16862 27051 53493 17706 27024 53191 20761 28123 52927 27541 31195 53346	SION vallow (plf) 527 845 1672 553 845 1662 649 879 1654 861 975 1667	BENDII Mallow (#-ft) w 17621 29873 59542 17374 30062 63174 20108 33389 72102 22380 33735 71626	NG allow (plf) 551 934 1861 543 939 1974 628 1043 2253 699 1054 2238	DEFLECTION wallow (plf) 19.9 43.6 129.7 20.3 43.7 132.4 43.7 132.4 44.4 132.8 132.8 132.8 133.1	SHE/ V (#) w 9076 13954 22898 9522 13927 22400 11115 14584 22181 14553 16345 22438	AR allow (plf) 1135 1744 2862 1190 1741 2800 1389 1823 2773 1819 2043 2805	MAX PLF 19 43 129 20 43 132 22 44 132 27 47 133	33 73 2166 34 73 221 37 74 221 45 79 222	44 97 288 45 97 294 50 99 295 60 0 105 296	666 145 432 688 146 441 75 148 444 91 158 444
16' SPAN	Header 6x6 6x8 6x10 6x12	Depth (in) 12 16 24 122 16 24 122 16 24 122 16 24 122 16 24 24 122 16 24 122 16 24 122 16 24 122 16 24 122 16 24 122 16 16 24 122 16 16 24 122 16 16 24 122 16 16 24 122 16 16 24 122 16 16 24 122 16 24 122 16 24 122 16 24 122 16 24 122 16 24 122 16 24 122 16 24 122 16 24 122 16 24 122 16 24 122 16 24 122 16 24 122 16 24 122 16 24 122 16 16 24 122 16 16 24 122 16 16 24 122 16 16 24 122 16 16 24 122 16 16 24 122 16 16 24 122 16 16 24 122 16 16 16 16 16 16 16 16 16 16	TENSI Mallow (#-ft) v 12114 20538 40935 11945 20668 43432 10054 16695 36051 11190 16868 35813 TENSI	ON wallow (pif) 379 642 1279 373 646 1357 3144 522 1127 350 527 1119 ON	COMPRES: Mallow (#-ft) w 16862 27051 33493 17706 27024 53191 20761 28123 52927 27541 31195 53346 COMPRES:	SION vallow (plf) 527 845 1672 553 845 1662 649 879 1654 861 975 1667 SION	BENDII Mallow (#-ft) w 17621 29873 59542 17374 30062 63174 20108 33389 72102 22380 33735 71626 BENDII	NG allow (plf) 551 934 1861 543 939 939 1974 628 1043 2253 699 1054 2238 NG	DEFLECTION wallow (plf) 19.9 43.6 129.7 20.3 43.7 132.4 22.4 44.4 132.8 27.2 47.3 133.1 DEFLECTION	SHE/ V (#) w 9076 13954 22898 9522 13927 22400 11115 14584 22181 14553 16345 22181 14553 16345 22481 2435 8 5345 22438	AR /allow (plf) 1135 1744 2862 1190 1741 2800 1389 1823 2773 2043 2805 AR	MAX PLF 19 43 129 20 43 132 22 44 132 27 47 133	33 73 2166 34 73 221 37 74 221 45 5 79 222	44 97 288 45 97 294 50 99 295 60 105 296	666 145 432 688 146 441 75 148 444 91 158 444
16' SPAN	Header 6x6 6x8 6x10 6x12 Header	Depth (in) 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 16 16 24 16 16 24 16 16 24 16 16 24 16 16 16 16 16 16 16 16 16 16	TENSI Mallow (#+ft) v 12114 20538 40935 11945 20668 43432 10054 16695 36051 11190 16868 35813 TENSI Mallow (#+ft) v 13314	ON wallow (plf) 379 642 1279 373 646 1357 314 522 1127 350 527 1119 ON ON	COMPRES: Mallow (#-ft) w 16862 27051 53493 17706 27024 53191 20761 28123 52927 27541 31195 53346 COMPRES: Mallow (#-ft) w 16663	SION vallow (plf) 527 845 1672 553 845 1662 649 879 1654 861 975 1667 5ION vallow (plf)	BENDII Mallow (#-ft) w 17621 29873 59542 17374 30062 63174 20108 33389 72102 22380 33375 71626 BENDII Mallow (#-ft) w 17653	NG rallow (plf) 551 934 1861 543 939 1974 628 1043 2253 699 1054 2238 NG	DEFLECTION wallow (plf) 19.9 43.6.6 129.7 20.3 43.7 132.4 22.4 44.4 22.4 44.4 132.8 27.2 47.3 133.1 DEFLECTION wallow (plf)	SHEA V (#) w 9076 13954 22898 9522 13927 22400 11115 14584 22181 14553 16345 22438 V (#) w	AR vallow (plf) 1135 1744 2860 1190 1741 2800 1889 1823 2773 1819 2043 2805 AR 40 1000 1000	MAX PLF 19 43 129 20 43 132 22 44 132 27 47 133 MAX PLF	33 73 216 34 73 221 37 74 221 45 79 222	44 97 288 45 97 294 500 99 295 60 105 296	66 145 432 68 146 441 75 148 443 91 158 444
16' SPAN	Header 6x6 6x8 6x10 6x12 Header	Depth (in) 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 16 24 12 16 24 16 24 12 16 16 24 12 16 16 24 12 16 16 24 12 16 16 24 12 16 16 24 12 16 16 24 12 16 16 16 16 16 16 16 16 16 16	TENSI Mallow (#-ft) v 12114 20538 40935 11945 20668 43432 10054 16695 36051 11190 16868 35813 TENSI Mallow (#-ft) v 12114	ON wallow (plf) 379 642 1279 373 6646 1357 314 522 1127 3500 527 1119 ON wallow (plf) 299	COMPRES: Mallow (#-ft) w 16862 27051 53493 17706 27024 53191 20761 28123 52927 27541 31195 53346 COMPRES: Mallow (#-ft) w 16862 27976	SION vallow (plf) 527 845 1672 553 845 1662 879 1654 861 975 1667 SION vallow (plf) 416	BENDII Mallow (#+ft) w 17621 29873 59542 17374 30062 63174 20108 33389 72102 22380 33735 71626 BENDII Mallow (#-ft) w 17621 20972	NG rallow (plf) 551 934 1861 543 939 1974 628 1043 2253 699 1054 2238 NG rallow (plf) 435 7300	DEFLECTION wallow (plf) 19.9 43.6 129.7 20.3 43.7 132.4 44.4 43.7 22.4 44.4 132.8 27.2 47.3 133.1 DEFLECTION wallow (plf) 14.0	SHE/V V (#) w 9076 13954 22898 9522 13927 22400 11115 14584 22181 14553 16345 22438 V (#) w V (#) w 9076 19264	AR rallow (pif) 1135 1744 2862 1190 1741 2800 1389 1823 2773 1819 2043 2805 2805 AR rallow (pif) 1008	MAX PLF 19 43 129 20 43 132 22 44 132 27 47 133 MAX PLF 13	33 73 216 34 73 221 37 74 221 37 79 222 222 222	44 97 288 45 97 294 50 99 295 60 105 296 0105 296	66 145 432 68 146 441 75 148 443 91 158 444 444
16' SPAN	Header 6x6 6x8 6x10 6x12 Header 6x6	Depth (in) 12 16 24 12 16 24 12 16 24 12 16 24 122 16 122 16 124 122 16 124 122 16 124 122 16 124 122 16 124 122 16 124 122 16 124 122 16 124 122 16 124 124 122 16 16 124 122 16 124 124 124 124 124 124 124 124	TENSI Mallow (#-ft) y 12114 20538 40935 11945 20668 43432 10054 16695 36051 11190 16868 35813 TENSI Mallow (#-ft) y 12114 20538	ON wallow (plf) 379 642 1279 373 646 1357 3144 522 1127 350 527 1119 ON wallow (plf) 299 507	COMPRES: Mallow (#-ft) w 16862 27051 53493 17706 27024 53191 20761 28123 52927 27541 31195 53346 COMPRES: Mallow (#-ft) w 16862 27051	SION vallow (plf) 527 845 553 845 1662 649 879 1654 861 975 1667 SION vallow (plf) 416 668	BENDII Mallow (#-ft) w 17621 29873 59542 17374 30062 63174 20108 33389 72102 22380 33735 71626 BENDII Mallow (#-ft) w 17621 29873 507 42	NG rallow (plf) 551 934 1861 543 939 1974 628 1043 2253 699 1054 2238 NG rallow (plf) 435 738	DEFLECTION wallow (plf) 19.9 43.6 129.7 20.3 43.7 132.4 44.4 44.4 132.8 27.2 47.3 133.1 133.1 DEFLECTION wallow (plf) 14.0 30.6 20.2	SHE/ V (#) w 9076 13954 22898 9522 13927 22400 11115 14584 22181 14553 16345 22438 V (#) w 9076 13954 23954	AR vallow (plf) 1135 1744 2860 1190 1741 2800 1823 2773 1819 2043 2805 AR vallow (plf) 1008 1550 2774	MAX PLF 19 43 129 20 43 132 22 44 132 27 47 133 MAX PLF 13 30 0 0	33 73 216 34 73 221 37 74 221 37 79 222 222 222 223 51	44 97 288 45 97 294 50 99 295 600 105 296 311 68	66 145 432 68 146 441 75 148 443 91 158 444 444 47 102
16' SPAN	Header 6x6 6x8 6x10 6x12 Header 6x6	Depth (in) 12 16 24 16 24 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 16 24 12 16 24 16 24 12 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 12 16 16 24 12 16 16 24 12 16 16 24 12 16 16 24 12 16 16 24 12 16 16 24 12 16 16 24 12 16 16 24 12 16 16 12 16 16 24 12 12 16 16 24 12 12 16 16 12 16 16 12 16 16 12 16 16 12 16 16 12 16 16 16 16 16 16 16 16 16 16	TENSI Mallow (#+ft) v 12114 20538 40935 11945 20668 43432 10054 16695 36051 11190 16868 35813 TENSI Mallow (#+ft) v 12114 40935 40935	ON wallow (plf) 379 642 1279 373 646 1357 3144 522 1127 330 527 1119 ON ON 0N 0N 0N 00 00 00 00 00 00 00 00 00 00	COMPRES: Mallow (#-ft) w 16862 27051 53493 17706 27024 53191 20761 28123 52927 27541 31195 53346 COMPRES: Mallow (#-ft) w 16862 27051 53493	SION vallow (plf) 527 845 527 553 845 1662 649 879 1654 861 975 1667 SION vallow (plf) 416 668 668	BENDII Mallow (#-ft) w 17621 29873 59542 17374 30062 63174 20108 33389 72102 22380 33735 71626 BENDII Mallow (#-ft) w 17621 29873 59542	NG rallow (plf) 551 934 1861 543 939 1974 628 1043 2253 699 1054 2238 NG rallow (plf) 435 738 1470	DEFLECTION wallow (plf) 19.9 43.6 129.7 20.3 43.7 132.4 44.4 432.4 44.4 132.8 27.2 47.3 133.1 DEFLECTION wallow (plf) 14.0 30.6 91.1	SHEAV V (#) w 9076 13954 22898 9522 13927 22400 11115 14584 22181 14553 16345 22438 V (#) w 9076 13954 22898	AR vallow (plf) 1135 1744 2862 1190 1741 2800 1823 2773 1819 2043 2043 2043 2043 2043 2043 2043 100 (plf) 1008 1550 2544	MAX PLF 19 43 129 20 43 132 22 44 132 27 47 133 MAX PLF 13 300 91	33 73 216 34 73 221 37 74 221 45 79 222 222 23 51 51 152	44 97 288 45 97 294 50 99 99 295 60 105 296 105 296 31 68 202	666 145 432 68 146 441 75 148 443 91 158 444 444 444 47 102 304
16' SPAN	Header 6x6 6x8 6x10 6x12 Header 6x6	Depth (in) 12 16 24 16 24 12 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 12 16 16 24 12 16 16 24 12 16 16 24 12 16 16 24 12 16 16 24 12 16 16 24 12 16 16 24 12 16 16 24 12 16 16 24 12 16 16 12 16 16 12 16 16 12 16 16 17 17 16 17 17 16 17 17 16 17 17 16 17 17 17 16 17 17 17 16 17 17 17 17 17 17 17 17 17 17	TENSI Mallow (#-ft) y 12114 20538 40935 11945 20668 43432 10054 16695 36051 11190 16868 35813 TENSI Mallow (#-ft) y 12114 20538 40935 11945	ON wallow (plf) 379 642 1279 373 646 1357 314 522 1127 3500 527 1119 ON wallow (plf) 299 507 1011	COMPRES: Mallow (#-ft) w 16862 27051 53493 17706 27024 53191 20761 28123 52927 27541 31195 53346 COMPRES: Mallow (#-ft) w 16862 27051 53493 17706	SION vallow (plf) 527 8453 1672 553 845 1662 649 879 1664 861 975 1667 SION vallow (plf) 416 6688 1321	BENDII Mallow (#+f) w 17621 29873 59542 17374 30062 63174 20108 33389 72102 22380 33735 71626 BENDII Mallow (#+f) w 17621 29873 59542 17374	NG rallow (plf) 551 934 1861 543 939 1974 628 1043 2253 699 1054 2238 NG rallow (plf) 435 7388 1470 429	DEFLECTION wallow (plf) 19.9 43.6.6 1129.7 20.3 43.7 132.4 22.4 44.4 22.4 44.4 132.8 27.2 47.3 133.1 DEFLECTION wallow (plf) 14.0 30.6 6 911.1 14.3 20.2	SHE/V V (#) w 9076 13954 22898 9522 13927 22400 11115 14584 22181 14553 16345 22438 V (#) w 9076 13954 22898 95522	AR /allow (plf) 1135 1744 2862 1190 1741 2800 1389 1823 2773 2805 AR /allow (plf) 1008 1550 2544 1058	MAX PLF 19 43 129 20 43 132 22 44 132 27 47 133 MAX PLF 13 30 91 14	33 73 216 34 73 221 37 74 221 45 79 222 23 51 1 52 224	44 97 288 45 97 294 50 99 295 60 105 296 105 296 311 68 202 32	66 145 432 68 146 441 75 148 443 91 158 444 47 102 304 48
16' SPAN	Header 6x6 6x8 6x10 6x12 Header 6x6 6x8	Depth (in) 12 16 24 12 16 16 24 12 16 16 24 12 16 16 24 12 16 16 16 12 16 16 16 16 17 16 16 16 16 16 16 16 16 16 16	TENSI Mallow (#-ft) v 12114 20538 40935 11945 20668 43432 10054 16695 36051 11190 16868 35813 TENSI Mallow (#-ft) v 12114 20538 40935 11945 20668	ON wallow (plf) 379 642 1279 373 646 1357 3144 522 1127 3500 527 1119 ON wallow (plf) 299 507 1011 295 510	COMPRES: Mallow (#-ft) w 16862 27051 33493 17706 27024 33191 20761 28123 52927 27541 31195 53346 COMPRES: Mallow (#-ft) w 16862 27051 53493 17706 27024	SION vallow (plf) 527 845 553 845 1662 649 879 1654 861 975 1667 SION vallow (plf) 416 668 1321 437	BENDII Mallow (#-ft) w 17621 29873 59542 17374 30062 63174 20108 33389 72102 22380 33735 71626 BENDII Mallow (#-ft) w 17621 29873 59542 17374 30062 2025	NG rallow (plf) 551 934 1861 543 939 1974 628 1043 2253 699 1054 2238 NG rallow (plf) 435 738 1470 429 742	DEFLECTION wallow (plf) 19.9 43.6 129.7 20.3 43.7 132.4 44.4 44.4 132.8 27.2 47.3 133.1 DEFLECTION wallow (plf) 14.0 30.6 911.1 14.3 30.7	SHE/ V (#) w 9076 13954 22898 9522 13927 22400 11115 14584 22438 16345 22438 16345 22438 V (#) w 9076 13954 22898 9522 13927 22456	AR vallow (plf) 1135 1744 2860 1190 1741 2800 1823 2805 2805 AR vallow (plf) 1008 1550 2544 1058 1547	MAX PLF 19 43 129 20 43 132 22 27 47 133 MAX PLF 13 30 91 14 30	33 73 216 34 73 221 37 74 221 37 79 222 23 51 152 22 24 51	44 97 288 45 97 294 50 99 99 295 60 105 296 105 296 31 60 8 202 296 32 60 296	66 145 432 68 146 441 75 148 443 91 158 444 47 102 304 48 102
16' SPAN	Header 6x6 6x8 6x10 6x12 Header 6x6 6x8	Depth (in) 12 16 24 16 24 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 16 24 16 24 12 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 16 24 12 16 24 16 24 12 16 16 24 16 24 16 24 16 24 16 24 16 24 16 16 24 16 16 24 16 16 24 16 16 24 16 16 24 16 16 24 16 16 16 16 16 16 16 16 16 16	TENSI Mallow (#+ft) v 12114 20538 40935 11945 20668 43432 10054 16695 36051 11190 16868 35813 TENSI Mallow (#+ft) v 12114 20538 40935 11945 20668	ON wallow (plf) 379 642 1279 373 646 1357 3144 522 1127 330 527 1119 ON wallow (plf) 299 507 1011 295 510	COMPRES: Mallow (#-ft) w 16862 27051 33493 17706 27024 53191 20761 28123 52927 27541 31195 53346 COMPRES: Mallow (#-ft) w 16862 27051 53493 17706 27024 53191	SION vallow (plf) 527 845 527 553 845 1662 649 879 1654 861 975 1667 SION 416 668 81321 437 667 667	BENDII Mallow (#-ft) w 17621 29873 59542 17374 30062 63174 20108 33389 72102 22380 33735 71626 BENDII Mallow (#-ft) w 17621 29873 59542 17374 30062 63174	NG rallow (plf) 551 934 1861 543 939 1974 628 1043 2253 699 1054 2238 NG rallow (plf) 435 738 1470 429 742	DEFLECTION wallow (plf) 19.9 43.6 129.7 20.3 43.7 22.4 43.7 132.4 44.4 44.4 132.8 27.2 47.3 133.1 133.1 DEFLECTION wallow (plf) 140.0 30.6 91.1 14.3 30.7 93.0 93.0	SHE/ V (#) w 9076 13954 22898 9522 13927 22400 11115 14584 22181 14553 16345 22438 SHE/ V (#) w 9076 13954 22898 9522 13927 22400	AR vallow (plf) 1135 1744 2860 1190 1741 2800 1823 2773 1819 2043 2805 AR vallow (plf) 1008 1550 2544 1058 1547 2489 2489	MAX PLF 19 43 129 20 43 132 22 44 132 27 47 133 MAX PLF 13 30 91 14 30 93	33 73 216 34 73 221 37 74 221 45 79 222 222 23 51 152 24 51 155	44 97 288 45 97 294 50 99 99 295 60 105 296 105 296 31 68 202 32 68 202	666 145 432 68 146 441 75 148 443 91 158 444 444 47 102 304 48 102 310
16' SPAN	Header 6x6 6x8 6x10 6x12 Header 6x6 6x8	Depth (in) 122 16 24 16 24 12 16 24 16 24 16 24 12 16 24 16 24 16 24 12 16 24 16 24 12 16 24 16 24 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 16 24 12 16 16 24 12 16 16 24 12 16 16 24 12 16 16 24 12 16 16 24 12 16 16 24 12 16 16 24 12 16 16 24 12 16 16 24 12 16 16 24 12 16 16 24 12 16 16 24 16 16 24 16 16 24 16 16 24 16 16 24 16 16 24 16 16 24 16 16 24 16 16 16 16 16 16 16 16 16 16	TENSI Mallow (#-ft) v 12114 20538 40935 11945 20668 43432 10054 16695 36051 11190 16868 35813 TENSI Mallow (#-ft) v 12114 20538 40935 11945 20668 43432 10054	ON wallow (plf) 379 642 1279 373 646 1357 314 522 1127 3500 527 1119 0N wallow (plf) 299 507 1011 295 507 1011	COMPRES: Mallow (#-ft) w 16862 27051 53493 17706 27024 53191 20761 28123 52927 27541 31195 53346 COMPRES: Mallow (#-ft) w 16862 27051 53493 17706 27024 53493	SION vallow (plf) 527 845 1672 553 845 1662 649 879 1654 975 1667 SION vallow (plf) 416 668 1321 437 667 513	BENDII Mallow (#-ft) w 17621 29873 59542 17374 30062 63174 20108 33389 72102 22380 33735 71626 BENDII Mallow (#-ft) w 17621 29873 59542 17374 30062 63174 20108	NG allow (plf) 551 934 1861 543 939 1974 628 1043 2253 699 1054 2238 1054 2238 NG rallow (plf) 435 7388 1470 429 742 1560 497	DEFLECTION wallow (plf) 19.9 43.6.6 1129.7 20.3 43.7 1322.4 22.4 44.4 132.8 27.2 47.3 133.1 133.1 DEFLECTION wallow (plf) 14.0 30.6 91.1 14.3 30.7 93.0.0 15.7	SHEA V (#) w 9076 13954 22898 9522 13927 22400 11115 14584 2248 16345 22438 V (#) w 9076 13954 22438 SHEA V (#) w 9076 13954 22898 9522 13927 22400 11115	AR vallow (plf) 1135 1744 2862 1190 1741 2800 1389 1823 2773 2805 2043 2805 AR vallow (plf) 1008 1550 2544 1058 1547 2849 1235	MAX PLF 19 43 129 20 43 132 22 44 132 27 47 133 MAX PLF 13 30 91 14 30 91 15	33 73 216 34 73 221 37 74 221 45 79 222 222 223 51 155 24 51 155 226	44 97 288 45 97 7 294 50 99 295 60 105 296 105 296 31 68 207 32 68 207 35	66 145 432 68 146 441 75 148 443 91 158 444 444 47 702 304 47 102 304 2304 52
16' SPAN	Header 6x6 6x8 6x10 6x12 Header 6x6 6x8 6x10	Depth (in) 12 16 24 12 16 16 24 12 16 16 24 12 16 16 24 12 16 16 24 12 16 16 24 12 16 16 24 12 16 16 16 12 16 16 16 16 16 16 16 16 16 16	TENSI Mallow (#-ft) v 12114 20538 40935 11945 20668 43432 10054 16695 36051 11190 16868 35813 TENSI Mallow (#-ft) v 12114 20538 40935 11945 20668 43432 10054 16695	ON wallow (plf) 379 642 1279 373 6646 1357 3144 522 1127 3500 527 1119 0N wallow (plf) 299 507 1011 295 510 1072 248 412	COMPRES: Mallow (#-ft) w 16862 27051 53493 17706 27024 33191 20761 28123 52927 27541 31195 53346 COMPRES: Mallow (#-ft) w 16862 27051 53493 17706 27024 53191 20761 20761 28123	SION vallow (plf) 527 8453 1672 553 845 1662 649 879 1654 975 1667 SION vallow (plf) 416 668 1321 437 667 1313 5133 694	BENDII Mallow (#-ft) w 17621 29873 59542 17374 30062 63174 20108 33389 72102 22380 33735 71626 BENDII Mallow (#-ft) w 17621 29873 59542 17374 30062 63174 30062 63174 20108 33389	NG rallow (plf) 551 934 1861 543 939 1974 628 1043 2253 699 91054 2238 NG rallow (plf) 435 738 1470 429 742 1560 497 824	DEFLECTION wallow (plf) 19.9 43.6 129.7 20.3 43.7 132.4 44.4 43.2 22.4 44.4 44.4 132.8 27.2 27.2 47.3 133.1 DEFLECTION wallow (plf) 14.0 30.6 91.1 14.3 30.7 93.0 93.0 15.7,7 31.2	SHE/ V (#) w 9076 13954 22898 9522 13927 22400 11115 14584 22181 14553 16345 22438 V (#) w 9076 13954 22898 9522 13927 22808 9522 13927 22400	AR vallow (plf) 1135 1744 2862 1190 11741 2800 11389 1823 2773 1889 2805 AR vallow (plf) 1008 1550 2544 1058 1547 2489 1235 1620	MAX PLF 19 43 129 20 43 132 22 44 132 27 47 133 MAX PLF 13 30 91 14 30 93 15 31	33 73 2216 34 73 2211 37 74 221 37 79 222 23 51 152 24 51 155 266 52	44 97 288 45 97 294 50 99 295 60 105 296 105 296 311 68 202 32 68 207 35 69	66 145 432 68 146 441 75 148 443 91 158 444 47 102 304 448 102 310 310 522 104
16' SPAN	Header 6x6 6x8 6x10 6x12 Header 6x6 6x8 6x8 6x8	Depth (in) 12 16 24 16 24 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 16 24 12 16 24 16 24 12 16 24 12 16 24 16 24 12 16 24 16 24 12 16 24 16 24 12 16 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 24 16 16 24 16 16 16 16 16 16 16 16 16 16	TENSI Mallow (#+ft) v 12114 20538 40935 11945 20668 43432 10054 16695 36051 11190 16868 35813 TENSI Mallow (#+ft) v 12114 20538 40935 11945 20668 43432 10054	ON wallow (plf) 379 642 1279 373 646 1357 3144 522 1127 350 527 1119 0N wallow (plf) 299 507 1011 295 510 1072 248 412 890	COMPRES: Mallow (#-ft) w 16862 27051 53493 17706 27024 53191 20761 28123 52927 27541 31195 53346 COMPRES: Mallow (#-ft) w 16862 27051 53493 17706 27024 53191 20761 27024 53191 20761 27024	SION vallow (plf) 527 845 1672 553 845 1662 649 879 1654 861 975 SION vallow (plf) 416 668 1321 4377 667 1313 513 694 1307	BENDII Mallow (#-ft) w 17621 29873 59542 17374 30062 63174 20108 33389 72102 22380 33735 71626 BENDII Mallow (#-ft) w 17621 29873 59542 17374 30062 63174 20108 33389 72102	NG rallow (plf) 551 934 1861 543 939 1974 628 1004 2253 699 1054 2238 NG rallow (plf) 435 738 1470 429 742 1560 429 742 1560 429 742	DEFLECTION wallow (plf) 19.9 43.6 129.7 20.3 43.7 132.4 43.7 132.4 44.4 44.4 132.8 27.2 47.3 133.1 133.1 DEFLECTION wallow (plf) 14.0 30.6 91.1 14.3 30.7 93.0 15.7 93.3	SHE/ V (#) w 9076 13954 22898 9522 13927 22400 11115 14584 22181 14553 12553 22438 V (#) w 9076 13954 22848 9522 13927 22400 11115 14584 22400	AR /allow (plf) 1135 1744 2862 2862 1190 1741 2880 1823 2773 1829 2433 2805 AR /allow (plf) 1008 1550 2544 1058 1547 2489 1235 1620 2465	MAX PLF 19 43 129 20 43 132 22 44 132 27 47 133 30 91 14 30 93 15 31	33 73 216 34 73 221 37 74 221 45 79 222 23 51 155 24 51 155 26 52 25 155	44 97 288 45 97 294 50 99 295 60 105 296 105 296 31 68 202 322 68 207 35 69 9 207	666 1455 4322 688 1466 4411 755 1488 4433 911 1588 444 477 1022 304 448 1022 3100 3100 3101 3111
16' SPAN	Header 6x6 6x8 6x10 6x12 Header 6x6 6x8 6x10	Depth (in) 122 166 244 122 126 167 167 174 174 175 175 175 175 175 175 175 175	TENSI Mallow (#-ft) v 12114 20538 40935 11945 20668 43432 10054 16695 36051 11190 16868 35813 TENSI Mallow (#-ft) v 12114 20538 40935 11945 20668 43432 10054 16695 36051 11190	ON wallow (plf) 379 6422 1279 373 646 1357 314 522 1127 3500 527 1119 0N wallow (plf) 299 507 1011 295 507 207 207 207 207 208 207 207 207 207 207 207 207 207	COMPRES: Mallow (#-ft) w 16862 27051 53493 17706 27024 53191 20761 28123 52927 27541 31195 53346 COMPRES: Mallow (#-ft) w 16862 27051 53493 17706 27054 53493 17706 27054 53493 17706	SION vallow (plf) \$27 845 1672 553 845 1662 649 879 1654 861 975 1667 SION vallow (plf) 416 6688 1321 437 667 1313 513 513 694 1307 680	BENDII Mallow (#-ft) w 17621 29873 59542 17374 30062 63174 20108 33389 72102 22380 33735 71626 BENDII Mallow (#-ft) w 17621 29873 59542 17374 30542 63174 20108 33389 72102 63174	NG allow (plf) 551 934 1861 543 939 1974 628 1043 2253 699 1054 2238 2253 699 1054 2238 1054 2238 1054 2238 1054 2238 1054 2238 1054 2238 1054 2238 1054 238 1470 435 7388 1470 435 7388 1470 435 738 1470 435 738 1470 435 738 1470 435 738 1470 435 738 1470 1470 1470 1470 1470 1470 1470 1470	DEFLECTION wallow (plf) 19.9 43.6.6 1129.7 20.3 43.7 1322.4 22.4 44.4 132.8 27.2 47.3 133.1 DEFLECTION wallow (plf) 14.0 30.6 91.1 14.3 30.7 93.0.7 93.0.7 93.12 93.3 12.2 93.3 12.2 93.3 9.3 12.2 9.3 12.2 9.3 12.2 9.3 12.2 9.3 12.2 12.2 12.2 12.2 12.2 12.2 12.2 12	SHEA V (#) w 9076 13954 22898 9522 13927 22400 11115 14584 22181 14553 16345 22438 SHEA V (#) w 9076 13954 22898 9522 13927 13927 22400 11115 14584 22281 14553	AR vallow (plf) 1135 1744 2862 1190 1741 2800 1389 1823 2773 1819 2043 2805 2805 48 1008 1550 2544 1058 1550 2544 1058 1558 1620 2445 1620 2465 1620 2465	MAX PLF 19 43 129 20 43 132 27 44 132 27 47 133 MAX PLF 13 30 91 14 30 93 15 31 93 19 93 19	33 73 2216 34 73 2211 37 74 2211 45 79 222 223 51 155 24 51 155 26 52 25 52 55 26 52 32	44 97 288 45 97 294 50 999 295 60 105 296 105 296 31 68 207 35 68 207 35 69 207 35 69	66 145 432 68 146 441 75 148 443 91 158 444 443 91 158 444 441 158 444 401 102 304 48 102 304 48 102 304 68 46 68 68 68 68 68 68 68 68 68 6
16' SPAN	Header 6x6 6x8 6x10 6x12 Header 6x6 6x8 6x10	Depth (in) 12 16 24 12 16 16 24 12 16 16 16 16 16 16 16 16 16 16	TENSI Mallow (#-ft) v 12114 20538 40935 11945 20668 43432 10054 16695 36051 11190 16868 35813 TENSI Mallow (#-ft) v 12114 20538 40935 11945 20668 43432 10054 16695 36051 11190 16868	ON wallow (plf) 379 642 1279 373 646 1357 314 522 1127 3500 527 1119 ON wallow (plf) 299 507 1011 295 510 1072 248 412 890 2766 416 416	COMPRES: Mallow (#-ft) w 16862 27051 53493 17706 27024 53191 20761 28123 52927 27541 31195 53346 COMPRES: Mallow (#-ft) w 16862 27051 53493 17706 27054 1706 27024 53191 20761 28123 52927 27541 31195	SION vallow (plf) 527 8454 1672 553 845 1662 649 879 1654 861 975 1667 5ION vallow (plf) 416 668 1321 437 667 1333 513 513 694 1307	BENDII Mallow (#+ft) w 17621 29873 59542 17374 30062 63174 20108 33389 72102 22380 33735 71626 BENDII Mallow (#-ft) w 17621 29873 59542 17374 30062 63174 30062 63174 20108 33389 72102 63174	NG rallow (plf) 551 934 1861 543 939 1974 628 1043 2253 699 1054 2238 NG rallow (plf) 435 738 1470 429 742 1560 497 824 1470 553 83	DEFLECTION wallow (plf) 19.9 43.6 129.7 20.3 43.7 122.4 44.4 22.4 44.4 22.4 44.4 132.8 27.2 47.3 133.1 DEFLECTION wallow (plf) 14.0 30.6 911.1 14.3 30.7 93.0 15.7 31.2 33.3 19.1	SHE/ V (#) w 9076 13954 22898 9522 13927 22400 11115 14584 22181 14553 16345 22438 V (#) w 9076 13954 22898 9522 13927 22400 111115 14584 22898 9522	AR vallow (plf) 1135 1744 2862 1190 1190 1389 1823 2773 2805 2805 AR vallow (plf) 1008 1550 2544 1058 1557 2489 1235 1620 2455 1620 2455 1620 2455 1620 2455 1620 2455 1620 2455 1620 2455 1620 2455 1620 2455 1620 2455 1620 2455 1620 2455 1620 2455 1620 2455 1620 2455 1620 2455 1620 2455 1620 2455 1620 2455 1620	MAX PLF 19 43 129 20 43 132 27 44 132 27 47 133 MAX PLF 13 30 91 14 30 93 15 31 93 19 33	33 73 2216 34 73 2211 45 79 222 23 51 155 26 52 24 55 26 52 25 55	44 97 288 45 97 294 50 99 295 60 105 296 105 296 311 68 207 35 69 207 35 69 207 422 74	66 145 432 68 146 441 75 148 443 91 158 444 47 102 304 48 102 304 48 102 310 64 4 111 64
16' SPAN	Header 6x6 6x8 6x10 6x12 Header 6x6 6x8 6x10	Depth (in) 12 16 24 16 24 16 24 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 16 24 12 16 24 16 24 12 16 24 12 16 24 16 24 12 16 24 16 24 12 16 24 12 16 24 16 24 12 16 24 16 24 12 16 24 12 16 24 12 16 24 12 16 24 16 24 12 16 24 12 16 24 16 24 12 16 24 12 16 24 16 24 12 16 24 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 16 16 16 16 16 16 16 16 16 16	TENSI Mallow (#-ft) v 12114 20538 40935 11945 20668 43432 10054 16695 36051 11190 16868 35813 TENSI Mallow (#-ft) v 12114 20538 40935 11945 20668 43432 10054 16695 36051 11190 16868 35813	ON wallow (plf) 379 642 1279 373 646 1357 3144 522 1127 350 527 1119 0N wallow (plf) 299 507 1011 295 550 507 1011 295 550 507 1011 295 550 507 1011 295 550 507 1011 295 550 507 1011 295 550 507 1011 295 550 507 1011 295 550 507 1011 295 550 507 1011 295 550 507 1011 295 550 507 1011 295 507 1011 2015 507 1011 2015 100 1001 2015 100 100 100 100 100 100 100 100 100	COMPRES: Mallow (#-ft) w 16862 27051 37054 33191 20761 28123 52927 27541 31195 53346 COMPRES: Mallow (#-ft) w 16862 27051 53493 17706 27024 53493 17706 27024 53493 17706 27024 53493 17706 27024 53493 17706 27024 53493 17706 27024 53493 17706 27024 53493 17706 27024 53493 17706 27024 53493 17706 27024 53493 17706 27024 53493 17706 27024 53493 17706 27024 53493 17706 27024 53493 17706 27024 53493 17706 27024 53493 17706 27024 53493 17706 27024 53493 17706 27024 53493 27541 27541 27541 27541 27541 27521 27541 27521 27541 27541 27521 27521 27541 27521 27521 27541 27521 27541 27551 27541 27551 27541 275512 27551 27551 275512 275512 275512 27555551 275555555555	SION vallow (plf) 527 845 1672 553 845 1662 649 879 1654 975 1667 SION vallow (plf) 416 668 1321 437 667 1313 513 694 1307 680 7700 1317	BENDII Mallow (#-ft) w 17621 29873 59542 17374 30062 63174 20108 33389 72102 22380 33735 71626 BENDII Mallow (#-ft) w 17621 29873 59542 17374 30062 63174 20108 33389 72102 22380 33335 71626	NG rallow (plf) 551 934 1861 543 939 1974 628 1004 2253 699 1054 2238 1054 422 3699 1054 42238 NG 429 742 1560 429 742 1560 429 742 1560 429 742 1560 435 738 1479 742 1560 429 742 1560 429 742 1560 429 742 1560 429 742 1560 429 742 1560 429 742 1560 429 742 1560 429 742 1561 748 1561 748 1571 748 748 748 748 748 748 748 748 748 748	DEFLECTION wallow (plf) 19.9 43.6 129.7 20.3 43.7 132.4 44.4 44.4 132.8 27.2 47.3 133.1 133.1 DEFLECTION wallow (plf) 14.0 30.6 91.1 14.3 30.7 93.0 15.7 31.2 93.3 19.1 133.2 2 93.5	SHE/ V (#) w 9076 13954 22898 9522 13927 22400 11115 14584 22181 14553 16345 22438 V (#) w 9076 13954 22898 9522 13927 22400 11115 14584 22181 14584 22181 14553 16345 22438	AR vallow (plf) 1135 1744 2862 1190 1741 2800 1823 2773 1829 2805 2805 AR Vallow (plf) 1008 1550 2544 1058 1547 2489 1255 1620 2465 1617 1816	MAX PLF 19 43 129 20 43 132 22 44 132 27 47 133 30 91 14 30 91 14 30 93 15 31 93 33 93 33 93	33 73 2216 34 73 2211 45 79 2222 23 51 155 26 52 24 4 51 155 26 55 55 55 55 55 55	44 97 288 45 97 294 50 99 99 295 60 105 296 105 296 31 68 202 322 68 207 35 69 9 207 42 74 4 208	666 1455 4322 688 1466 4411 775 1488 443 911 1588 444 477 1002 3004 408 1002 3100 522 1004 4012 3101 522 1004 4012 1012 1012 1012 1012 1012 10
16' SPAN	Header 6x6 6x8 6x10 6x12 Header 6x6 6x8 6x10 6x6 6x6 6x7 6x8 6x10 6x12	Depth (in) 12 16 24 16 24 12 16 24 16 24 12 16 24 12 16 24 12 16 24 12 16 24 16 24 12 16 24 12 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 12 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 12 16 24 16 24 12 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 16 24 16 16 24 16 16 24 16 16 24 16 16 24 16 16 24 16 16 16 16 16 16 16 16 16 16	TENSI Mallow (#+ft) v 12114 20538 40935 11945 20668 43432 10054 16695 36051 11190 16868 35813 TENSI Mallow (#+ft) v 12114 20538 40935 11945 20668 43432 10054 16695 36051 11190 16868 35813	ON wallow (plf) 379 6422 1279 373 646 1357 314 522 1127 3500 527 1119 0N wallow (plf) 299 507 1011 299 507 1011 299 507 1011 295 5100 1072 248 412 8800 2776 416	COMPRES: Mallow (#-ft) w 16862 27051 53493 17706 27024 53191 20761 28123 52927 27541 31195 53346 COMPRES: Mallow (#-ft) w 16862 27051 53493 17706 27024 53191 20761 28123 52927 27541 31195 53346	SION vallow (plf) 527 845 1672 553 845 1662 649 879 1652 1667 SION vallow (plf) 416 668 1321 1313 513 694 770 680 770 1317	BENDII Mallow (#-ft) w 17621 29873 59542 17374 30062 63174 20108 33389 72102 22380 33735 71626 BENDII Mallow (#-ft) w 17621 29873 59542 17374 30062 63174 20108 33389 72102 22380 33735 71626	NG rallow (plf) 551 934 1861 543 939 1974 628 1043 2253 699 1054 2238 2238 1054 2238 1054 238 1054 238 1470 429 7422 1560 497 824 1780 553 833 1769	DEFLECTION wallow (plf) 19.9 43.6.6 1129.7 20.3 43.7 1322.4 44.4 22.4 44.4 1322.8 27.2 47.3 133.1 DEFLECTION wallow (plf) 14.0 30.6 91.1 14.3 30.7 93.3 19.1 13.2 93.3 19.1 33.2 93.5	SHEA V (#) w 9076 13954 22898 9522 13927 22400 11115 14584 22181 14553 16345 22438 V (#) w 9076 13954 22898 9522 13927 22400 11115 14584 22898 9522 13927 22400	AR vallow (plf) 1135 1744 2862 1190 1741 2800 1389 1823 2773 1819 2043 2805	MAX PLF 19 43 129 20 43 132 22 44 132 27 47 133 MAX PLF 13 30 91 14 30 93 15 31 93 93	33 73 216 34 73 221 45 79 222 23 51 152 24 51 155 26 52 25 53 22 55 322 55	44 97 288 45 977 294 50 99 9 295 60 105 296 105 296 31 68 202 32 68 207 35 69 207 42 74 208	666 145 432 68 146 441 75 148 443 91 158 444 444 444 47 102 304 48 102 310 52 104 3110 64 111
16' SPAN	Header 6x6 6x8 6x10 6x12 Header 6x6 6x8 6x10 6x6 6x10 6x2 6x3 6x4	Depth (in) 12 16 24 16 24 12 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 16 24 16 16 24 16 16 24 16 16 16 16 16 16 16 16 16 16	TENSI Mallow (#-ft) y 12114 20538 40935 11945 20668 43432 10054 16695 36051 11190 16868 35813 TENSI Mallow (#-ft) y 12114 20538 40935 11945 20668 43432 10054 16695 36051 11190 16868 35813	ON wallow (pff) 379 642 1279 373 646 1357 1350 527 1119 0N wallow (pff) 299 507 1011 295 510 1072 248 412 890 2766 416 884	COMPRES: Mallow (#-ft) w 16862 27051 53493 17706 27024 53191 20761 28123 52927 27541 31195 53346 COMPRES: Mallow (#-ft) w 16862 27051 53493 17706 27024 53191 20761 28123 52927 27054 33191 20761 28123 52927 27541 31195 53346	SION vallow (plf) 527 845 1672 553 845 1662 649 879 1654 861 975 1667 5ION vallow (plf) 416 668 1321 437 667 1313 513 694 1307 680 770 51317	BENDII Mallow (#-ft) w 17621 29873 59542 17374 30062 63174 20108 33389 72102 22380 33735 71626 BENDII Mallow (#-ft) w 17621 29873 59542 17374 30062 63174 20108 33389 72102 63174 20108 33389 72102 63174 20108	NG rallow (plf) 551 934 1861 543 939 1074 628 1043 2253 699 1054 2238 NG rallow (plf) 435 7388 1470 429 742 1560 497 824 1780 553 833 1769	DEFLECTION wallow (plf) 19.9 43.6.6 1129.7 20.3 43.7 132.4 22.4 44.4 22.4 44.4 132.8 27.2 47.3 133.1 133.1 DEFLECTION wallow (plf) 14.0 30.6 91.1 14.3 30.7 93.3 19.1 13.2 93.3 93.5 DEFLECTION	SHE/V V (#) w 9076 13954 22898 9522 13927 22400 11115 14584 22181 16345 22438 V (#) w 9076 13954 22438 9522 13927 22400 11115 14584 22898 9522 13927 13927 13954 22438 9522 13927 13954 22438 9522 13927 13954 13957 13954 135566 1355666 1355666 1355666 135566666666666666666666666666666666666	AR rallow (plf) 1135 1744 2862 1190 1741 2800 1389 1823 2773 1819 2043 2805 AR rallow (plf) 1008 1550 2544 1058 1547 2465 1617 1816 2493	MAX PLF 19 43 129 20 43 132 27 44 132 27 47 133 MAX PLF 13 30 91 14 30 93 15 31 93 19 33 93	33 73 216 34 73 221 37 74 221 45 79 222 23 51 51 55 26 52 26 55 26 55 32 55 55 55 55	44 97 288 45 977 294 50 999 295 60 105 296 105 296 31 68 207 35 68 207 35 69 207 35 69 207 42 274 208	66 145 432 68 146 441 75 148 443 91 158 444 47 102 304 48 102 310 52 104 311 64 411 312
16' SPAN	Header 6x6 6x8 6x10 6x12 Header 6x6 6x8 6x10 6x12	Depth (in) 12 16 24 12 16 16 24 12 16 24 16 24 12 16 24 16 16 24 16 16 16 16 16 16 16 16 16 16	TENSI Mallow (#+ft) y 12114 20538 40935 11945 20668 43432 10054 16695 36051 11190 16868 35813 TENSI Mallow (#-ft) y 12114 20538 40935 11945 20668 43432 10054 16695 36051 11190 16868 35813	ON wallow (plf) 379 642 1279 373 646 1357 3134 522 1127 3500 527 1119 0N wallow (plf) 299 507 1011 295 510 1072 2488 412 890 276 4166 884 0N	COMPRES: Mallow (#-ft) w 16862 27051 53493 17706 27024 53191 20761 28123 52927 27541 31195 53346 COMPRES: Mallow (#-ft) w 16862 27051 27024 53191 20761 28123 52927 27541 31195 53346 COMPRES: Mallow (#-ft) w	SION vallow (plf) 527 8453 1672 553 1662 649 879 1654 975 1667 SION vallow (plf) 416 668 1313 694 1307 680 7700 1317 SION	BENDII Mallow (#+ft) w 17621 29873 59542 17374 30062 63174 20108 33389 72102 22380 33735 71626 BENDII Mallow (#-ft) w 17621 29873 59542 17374 30062 63174 20108 33389 72102 22380 33735 71626 BENDII Mallow (#-ft) w	NG rallow (plf) 551 934 1861 543 939 1974 628 1043 2253 699 1054 2238 NG rallow (plf) 435 738 1470 429 742 1560 497 824 1780 553 833 1769	DEFLECTION wallow (plf) 19.9 43.6 129.7 20.3 43.7 132.4 44.4 43.2 22.4 44.4 132.8 27.2 47.3 133.1 DEFLECTION wallow (plf) 14.0 30.6 91.1 14.3 30.7 33.0 15.7 31.2 93.3 DEFLECTION wallow (plf) 93.5	SHE/ V (#) w 9076 13954 22898 9522 13927 22400 11115 14584 22181 14553 16345 22438 V (#) w 9076 13954 22838 9522 13927 22400 11115 14584 22181 14553 16345 22181 14553 16345 22438	AR vallow (plf) 1135 1744 2862 1190 11741 2800 11389 1823 2773 1823 2805 AR vallow (plf) 1008 1550 2544 1058 1557 1620 2465 1617 1816 2493 AR allow (plf)	MAX PLF 19 43 129 20 43 132 27 47 133 MAX PLF 13 30 91 14 30 93 15 31 93 19 33 93 MAX PLF	33 73 2216 34 77 2211 37 74 221 37 79 222 23 51 51 55 26 6 52 25 55 156	44 97 288 45 97 294 50 99 295 60 105 296 206 31 60 8 202 32 68 207 35 69 207 35 69 207 74 208	66 145 432 68 146 441 75 148 443 91 158 444 47 102 304 48 102 310 52 104 311 64 111 312
16' SPAN	Header 6x6 6x8 6x10 6x12 Header 6x6 6x8 6x10 6x12 Header 6x6 6x8 6x10 Header 6x6 6x8 6x10 6x12 Header	Depth (in) 12 16 24 16 24 16 24 12 16 24 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 16 24 12 16 24 16 24 12 16 24 24 12 16 24 24 12 16 24 24 12 16 24 24 12 16 24 24 12 16 24 24 12 16 24 24 12 16 24 16 16 24 16 16 24 16 16 16 16 16 16 16 16 16 16	TENSI Mallow (#+ft) v 12114 20538 40935 11945 20668 43432 10054 16695 36051 11190 16868 35813 TENSI Mallow (#+ft) v 12114	ON wallow (plf) 379 642 1279 373 666 1357 314 522 1127 350 527 1119 0N wallow (plf) 299 507 1011 295 510 1072 248 412 890 276 416 884 ON wallow (plf) 242	COMPRES: Mallow (#-ft) w 16862 27051 53493 17706 27024 53191 20761 28123 52927 27541 31195 53346 COMPRES: Mallow (#-ft) w 16862 27051 53493 17706 27024 53191 20761 28123 52927 27541 31195 53346 COMPRES: Mallow (#-ft) w 15862	SION vallow (plf) 527 845 1672 553 845 1662 649 879 1654 975 1667 SION vallow (plf) 416 668 1321 437 667 1313 513 694 1307 680 770 SION stion 770 5ION SION vallow (plf) 337	BENDII Mallow (#-ft) w 17621 29873 59542 17374 30062 63174 20108 33389 72102 22380 33735 71626 BENDII Mallow (#-ft) w 17621 29873 59542 17374 30062 63174 20108 33389 72102 22380 33735 71626 BENDII Mallow (#-ft) w 17621	NG rallow (plf) 551 934 1861 543 939 1974 628 1004 2253 699 1054 2238 NG 429 742 1554 738 1470 429 742 1560 497 824 1780 553 833 1769 NG	DEFLECTION wallow (plf) 19.9 43.6 129.7 20.3 43.7 20.3 43.7 132.4 44.4 4132.8 27.2 47.3 133.1 133.1 DEFLECTION wallow (plf) 14.0 30.6 91.1 14.3 30.7 93.3 19.1 33.2 93.3 DEFLECTION wallow (plf) 10.2 2 93.5 DEFLECTION wallow (plf) 10.2	SHEA V (#) w 9076 13954 13927 22898 9522 13927 13454 22181 14553 16345 22400 11115 13954 22898 9076 13954 22898 9522 13927 22400 11115 14553 14553 16345 22181 14553 16345 22438 V(#) w V(#) w	AR vallow (plf) 1135 1744 2862 1190 1741 2800 1823 2773 1823 2773 1819 2043 2805 AR allow (plf) 1058 1547 2489 1235 1620 2465 1617 1816 2493 AR AR AR AR	MAX PLF 19 43 129 20 43 132 22 44 132 27 47 133 0 91 14 30 93 15 31 93 19 33 93 MAX PLF 10	33 73 2216 34 73 2211 45 79 222 23 51 152 24 51 155 26 52 24 55 32 55 156	44 97 288 45 977 294 50 999 295 60 105 296 105 296 206 331 68 202 322 68 207 35 69 9 207 42 207 42 208	666 145 432 68 146 441 75 148 443 91 158 444 47 102 304 444 47 102 304 310 310 310 310 310 48 102 311 64 4111 312
16' SPAN	Header 6x6 6x8 6x10 6x12 Header 6x6 6x8 6x10 6x6 6x8 6x10 6x6 6x8 6x10 6x40 6x50 6x10 6x12	Depth (in) 122 166 244 122 166 124 124 126 166 124 124 126 166 124 124 126 166 124 124 126 126 126 126 126 126 126 126	TENSI Mallow (#-ft) y 12114 20538 40935 11945 20668 43432 10054 16695 36051 11190 16868 35813 TENSI Mallow (#-ft) y 12114 20538 40935 11945 20668 43432 10054 16695 36051 11190 16868 35813 TENSI Mallow (#-ft) y 16868 35813	ON wallow (plf) 379 642 1279 373 646 1357 314 522 1127 3500 527 1119 ON wallow (plf) 209 507 1011 295 5100 1072 248 840 884 ON wallow (plf) 242 411	COMPRES: Mallow (#-ft) w 16862 27051 53493 17706 27024 53191 20761 28123 52927 27541 31195 53346 COMPRES: Mallow (#-ft) w 16862 27051 53493 17706 27024 53493 17706 27051 53349 27051 31195 53346	SION vallow (plf) 527 845 1672 553 845 1672 649 879 1654 975 1667 SION vallow (plf) 416 668 1321 1313 513 694 1307 680 770 1317 SION vallow (plf) 1307 SION 301 513 513 513 513 513 513 513 513 513 513 513 513 513 513 513 513 513 513 513 514 <td>BENDII Mallow (#-ft) w 17621 29873 59542 17374 30062 63174 20108 33389 72102 22380 33735 71626 Mallow (#-ft) w 17621 29873 59542 17374 30062 63174 20108 33389 72102 22380 33735 71626 BENDII Mallow (#-ft) w 17621 20108 333389 71626 BENDII Mallow (#-ft) w 17621 29873</td> <td>NG rallow (plf) 551 934 1861 543 939 1974 628 1043 2253 699 1054 2238 NG r388 1470 429 742 1560 497 824 1780 553 833 1769 NG</td> <td>DEFLECTION wallow (plf) 19.9 43.6.6 1129.7 20.3 43.7 1322.4 22.4 44.4 132.8 27.2 47.3 133.1 133.1 DEFLECTION wallow (plf) 14.0 30.6 91.1 14.3 30.7 93.0 15.7 13.2 29.3 19.1 1.3 32.2 93.5 DEFLECTION wallow (plf) 10.2 20.3 20.5 20.5 20.5 20.5 20.5 20.5 20.5 20.5</td> <td>SHE/V (#) w 9076 13954 22898 9522 13927 22400 11115 14584 22183 16345 22438 SHE/V V(#) w 9076 13954 22898 9522 13927 22400 11115 14553 16345 22438 SHE/V 2448 SHE/V 2</td> <td>AR rallow (plf) 1135 1744 2862 1190 1741 2802 139 1823 2773 1819 2043 2805 AR 1008 1550 2544 1058 1557 1617 2465 1620 2465 1617 1816 2493 AR rallow (plf) 908 1395</td> <td>MAX PLF 19 43 129 20 43 132 27 44 132 27 47 133 MAX PLF 10 33 93 93 93 19 23 25 27 47 133 19 20 27 27 44 132 27 47 133 132 27 47 133 132 27 47 133 132 27 47 133 132 27 47 133 132 27 47 133 132 27 47 133 132 27 47 133 132 27 47 133 132 27 47 133 132 27 47 133 132 27 47 133 132 27 47 133 132 27 47 133 132 27 47 133 132 132 132 132 27 47 133 132 132 132 133 132 133 132 133 133</td> <td>33 73 2216 34 73 2211 37 74 2211 45 79 222 23 51 55 26 52 24 51 55 26 52 55 32 55 55 32 55 55 32 55 32 55 32 32 55 32 32 55 32 32 55 32 32 33 32 33 32 33 32 33 32 33 32 33 33</td> <td>44 97 288 45 977 294 50 999 295 60 105 296 105 296 105 296 105 296 105 296 105 296 105 296 105 296 105 207 35 69 207 35 69 207 42 74 208</td> <td>66 145 432 68 146 441 75 148 443 91 158 444 441 158 444 441 158 444 444 47 102 304 48 102 304 48 102 304 48 102 304 47 310 52 304 411 312 312 314 441 312 344 74 75 75 75 75 75 75 75 75 75 75</td>	BENDII Mallow (#-ft) w 17621 29873 59542 17374 30062 63174 20108 33389 72102 22380 33735 71626 Mallow (#-ft) w 17621 29873 59542 17374 30062 63174 20108 33389 72102 22380 33735 71626 BENDII Mallow (#-ft) w 17621 20108 333389 71626 BENDII Mallow (#-ft) w 17621 29873	NG rallow (plf) 551 934 1861 543 939 1974 628 1043 2253 699 1054 2238 NG r388 1470 429 742 1560 497 824 1780 553 833 1769 NG	DEFLECTION wallow (plf) 19.9 43.6.6 1129.7 20.3 43.7 1322.4 22.4 44.4 132.8 27.2 47.3 133.1 133.1 DEFLECTION wallow (plf) 14.0 30.6 91.1 14.3 30.7 93.0 15.7 13.2 29.3 19.1 1.3 32.2 93.5 DEFLECTION wallow (plf) 10.2 20.3 20.5 20.5 20.5 20.5 20.5 20.5 20.5 20.5	SHE/V (#) w 9076 13954 22898 9522 13927 22400 11115 14584 22183 16345 22438 SHE/V V(#) w 9076 13954 22898 9522 13927 22400 11115 14553 16345 22438 SHE/V 2448 SHE/V 2	AR rallow (plf) 1135 1744 2862 1190 1741 2802 139 1823 2773 1819 2043 2805 AR 1008 1550 2544 1058 1557 1617 2465 1620 2465 1617 1816 2493 AR rallow (plf) 908 1395	MAX PLF 19 43 129 20 43 132 27 44 132 27 47 133 MAX PLF 10 33 93 93 93 19 23 25 27 47 133 19 20 27 27 44 132 27 47 133 132 27 47 133 132 27 47 133 132 27 47 133 132 27 47 133 132 27 47 133 132 27 47 133 132 27 47 133 132 27 47 133 132 27 47 133 132 27 47 133 132 27 47 133 132 27 47 133 132 27 47 133 132 27 47 133 132 132 132 132 27 47 133 132 132 132 133 132 133 132 133 133	33 73 2216 34 73 2211 37 74 2211 45 79 222 23 51 55 26 52 24 51 55 26 52 55 32 55 55 32 55 55 32 55 32 55 32 32 55 32 32 55 32 32 55 32 32 33 32 33 32 33 32 33 32 33 32 33 33	44 97 288 45 977 294 50 999 295 60 105 296 105 296 105 296 105 296 105 296 105 296 105 296 105 296 105 207 35 69 207 35 69 207 42 74 208	66 145 432 68 146 441 75 148 443 91 158 444 441 158 444 441 158 444 444 47 102 304 48 102 304 48 102 304 48 102 304 47 310 52 304 411 312 312 314 441 312 344 74 75 75 75 75 75 75 75 75 75 75
16' SPAN	Header 6x6 6x8 6x10 6x12 Header 6x6 6x8 6x10 6x6 6x8 6x10 6x6 6x8 6x10 6x12 Header 6x12	Depth (in) 12 16 24 12 16 16 24 12 16 16 24 12 16 16 24 12 16 16 24 12 16 16 24 12 16 16 24 12 16 16 24 12 16 16 24 12 16 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 12 16 24 16 24 12 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 12 16 24 12 16 24 12 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 16 16 16 16 16 16 16 16 16	TENSI Mallow (#-ft) y 12114 20538 40935 11945 20668 43432 10054 16695 36051 11190 16868 35813 TENSI Mallow (#-ft) y 12114 20538 40935 11945 20668 34342 10054 16695 36051 11190 16868 35813 TENSI Mallow (#-ft) y 12114 20538	ON wallow (plf) 379 642 1279 373 646 1357 314 522 1127 3500 527 1119 ON wallow (plf) 299 507 1011 295 510 1072 248 412 890 2766 416 884 ON wallow (plf) 242 890 276 416 884 884 ON	COMPRES: Mallow (#-ft) w 16862 27051 53493 17706 27024 53191 20761 28123 52927 27541 31195 53346 COMPRES: Mallow (#-ft) w 16862 27051 35493 17706 27024 35191 20761 28123 52927 27541 31195 53346 COMPRES: Mallow (#-ft) w 16862 27051 31195 53346	SION vallow (plf) 527 845 1672 553 845 1672 649 879 1654 975 1667 SION vallow (plf) 416 668 1321 437 664 700 1317 SION vallow (plf) 3137 5800 770 1313 694 1307 5800 770 3137 580N vallow (plf) 337 541 1070	BENDII Mallow (#+ft) w 17621 29873 59542 17374 30062 63174 20108 33389 72102 22380 33735 71626 BENDII Mallow (#-ft) w 17621 29873 59542 17374 30062 63174 20108 33389 72102 22380 33735 71626 BENDII Mallow (#-ft) w 17621 29873 59542	NG rallow (plf) 551 934 1861 543 939 1974 628 1043 2253 699 1054 2238 NG rallow (plf) 435 738 1470 429 742 1560 497 824 1470 553 833 1769 NG rallow (plf) 352 597 1191	DEFLECTION wallow (plf) 19.9 43.6 129.7 20.3 43.7 122.4 44.4 22.4 44.4 132.8 27.2 47.3 133.1 DEFLECTION wallow (plf) 14.0 30.6 91.1 14.3 30.7 31.2 93.3 93.3 DEFLECTION wallow (plf) 10.2 93.5 DEFLECTION wallow (plf) 10.2 22.3 66.4.4	SHE/V V (#) w 9076 13954 13954 22898 9522 13927 13940 11115 14584 22181 14553 16345 22430 W V (#) w 9076 13954 22898 9522 13927 22400 11115 14584 22898 9522 13927 22400 11115 14584 2181 14553 16345 22438 V (#) w 9076 13954 22898 9552	AR rallow (plf) 1135 1744 2862 1190 11741 2805 1899 2805 AR rallow (plf) 1008 1550 2544 1058 1557 1620 2465 1620 2465 1620 2465 1620 2469 1008 2493 AR rallow (plf) 908 1395 2290	MAX PLF 19 43 129 20 43 132 27 44 132 27 47 133 MAX PLF 13 30 91 14 30 93 15 31 93 19 33 93 MAX PLF 10 27 27 47 132 27 47 132 27 47 132 27 47 132 27 47 133 132 27 47 132 27 47 133 132 27 47 133 132 27 47 133 132 27 47 133 132 27 47 133 132 27 47 133 132 27 47 133 132 27 47 133 132 132 27 133 132 132 27 133 132 132 132 132 132 132 132	33 73 2216 34 73 2211 45 79 222 23 51 155 26 52 24 55 26 52 255 156 322 55 156	44 97 288 45 97 294 50 99 295 60 105 296 105 296 30 207 35 69 207 35 69 207 42 274 208	66 145 432 68 146 441 75 148 444 47 102 304 448 102 310 310 52 104 311 312 312 34 74 221
16' SPAN	Header 6x6 6x8 6x10 6x12 Header 6x6 6x8 6x10 6x12 Header 6x6 6x8 6x10 6x6 6x8 6x10 6x12 Header 6x6	Depth (in) 12 16 24 16 24 16 24 12 16 24 16 24 12 16 24 16 24 12 16 24 12 16 24 16 24 12 16 24 16 16 24 16 16 24 16 16 24 16 16 24 16 16 24 16 16 24 16 16 24 16 16 16 16 16 16 16 16 16 16	TENSI Mallow (#+ft) v 12114 20538 40935 11945 20668 43432 10054 16695 36051 11190 16868 35813 TENSI Mallow (#+ft) v 20668 43432 10054 11945 20668 43432 10054 16868 36051 11190 16868 36051 11190 16868 35813 TENSI Mallow (#+ft) v	ON wallow (plf) 379 642 1279 373 646 1357 3144 522 1127 350 527 1119 0N wallow (plf) 299 507 1011 209 507 1011 209 507 1011 209 507 1011 1012 248 402 242 401 884 412 884 412 884 412 884 412 884 412 884 412 884 412 884 412 884 412 884 412 884 412 884 90 276 884 412 884 90 276 884 90 276 884 90 276 884 90 276 884 90 276 884 90 276 884 90 276 884 90 276 884 90 276 90 276 90 276 90 277 90 278 90 278 90 278 90 278 90 278 90 278 90 278 90 278 90 278 90 278 90 278 90 278 90 278 90 278 90 278 90 278 90 278 90 278 90 276 90 276 90 276 90 276 90 276 90 277 90 277 90 277 90 277 90 90 90 90 90 90 90 90 90 90 90 90 90	COMPRES: Mallow (#-ft) w 16862 27051 53493 17706 27024 53191 20761 28123 52927 27541 31195 53346 COMPRES: Mallow (#-ft) w 16862 27051 53493 17706 27024 53191 20761 28123 52927 27541 31195 53346 COMPRES: Mallow (#-ft) w 16862 27051 33493	SION vallow (plf) 527 845 1672 553 845 1662 649 879 1654 975 1667 SION vallow (plf) 416 668 1321 437 667 1313 513 513 5137 SION SION SION 3127 513 513 513 513 5137 5101 317 5101 317 541 1070 354	BENDII Mallow (#-ft) w 17621 29873 59542 17374 30062 63174 20108 33389 72102 22380 33735 71626 BENDII Mallow (#-ft) w 17621 29873 59542 17374 30062 63174 20108 33389 72102 22380 33735 71626 BENDII Mallow (#-ft) w 17621 29873 359542 17374	NG rallow (plf) 551 934 1861 543 939 1974 628 1043 2253 699 1054 2238 1054 2238 NG rallow (plf) 435 738 1470 429 742 1560 497 742 1560 497 742 1560 497 742 1560 497 742 1560 497 742 1560 497 742 1560 497 742 1560 497 742 1560 497 742 1560 497 742 1560 497 742 1560 497 742 1560 497 742 1560 497 742 1560 757 757 757 757 757 757 757 757 757 75	DEFLECTION wallow (plf) 19.9 43.6 129.7 20.3 43.7 132.4 44.4 44.4 132.8 27.2 47.3 133.1 133.1 DEFLECTION wallow (plf) 14.0 30.6 91.1 14.3 30.7 31.2 93.3 19.1 13.2 2 93.5 DEFLECTION wallow (plf) 10.2 2 93.5 DEFLECTION wallow (plf) 10.2 10.2 10.2 10.2 10.2 10.2 10.2 10.2	SHEA V (#) w 9076 13954 13927 22898 9522 13927 1315 14584 22181 14553 16345 22438 V (#) w 9076 13954 22898 9552 13954 22480 11115 14553 16345 22438 22181 14553 16345 22438 V (#) w 9076 13954 22438 SHE/ V (#) w 9076 13954 22898 9522	AR vallow (plf) 1135 1744 2862 1190 1741 2800 1839 1823 2773 1819 2043 2805 AR allow (plf) 1088 1547 2489 1255 1620 2465 1617 1816 2493 1235 2290 908 1335 2290 952	MAX PLF 19 43 129 20 43 132 22 44 132 27 47 133 0 91 14 30 93 15 31 93 93 MAX PLF 10 22 44 132 27 47 133 132 27 47 133 132 27 47 133 132 27 47 133 132 27 47 133 132 27 47 133 132 27 47 133 132 27 47 133 132 27 47 133 132 27 47 133 132 27 47 133 132 27 47 133 132 27 47 133 132 133 132 133 133 133 133	33 73 2216 34 73 2211 45 79 222 23 51 152 24 55 155 32 55 156 52 255 156	44 97 288 45 977 294 50 999 295 60 105 296 105 296 207 331 68 202 322 68 207 35 69 9 207 42 207 35 69 9 207 42 74 208	666 145 432 68 146 441 75 148 443 91 158 444 47 102 304 444 47 102 304 310 310 310 310 310 311 64 4111 312 34 74 74 74 74 74 74 74 74 74 74 74 74 74
16' SPAN	Header 6x6 6x8 6x10 6x12 Header 6x6 6x8 6x10 6x6 6x8 6x10 6x6 6x7 6x8 6x10 6x12 Header 6x6 6x10 6x12	Depth (in) 122 166 244 122 166 124 124 124 124 124 124 124 124	TENSI Mallow (#-ft) y 12114 20538 40935 11945 20668 43432 10054 16695 36051 11190 16868 35813 TENSI Mallow (#-ft) y 12114 20538 40935 11945 20668 43432 10054 16695 36051 11190 16868 35813 TENSI Mallow (#-ft) y 12114 20538 40935 11945 20668	ON wallow (plf) 379 642 1279 373 646 1357 314 522 1127 3500 527 1119 0N wallow (plf) 299 507 1011 295 507 207 208 208 207 208 207 208 207 208 208 207 208 209 207 207 208 209 207 207 208 209 207 207 208 209 207 207 208 209 207 207 207 207 208 209 207 207 207 208 209 207 207 207 207 207 207 207 207	COMPRES: Mallow (#-ft) w 16862 27051 53493 17706 27024 53191 20761 28123 52927 27541 31195 53346 COMPRES: Mallow (#-ft) w 16862 27051 53493 17706 27051 28123 53493 17706 27054 53191 20761 28123 53297 27541 31195 53346 COMPRES: Mallow (#-ft) w 16862 27051 53349 17706	SION vallow (plf) \$27 845 1672 553 845 1662 649 879 1654 861 975 1667 SION vallow (plf) 416 668 1321 1313 513 694 1313 513 SION xallow (plf) 3137 513 513 513 513 513 513 513 513 513 513 513 513 513 513 514 1070 354 541 540	BENDII Mallow (#-ft) w 17621 29873 59542 17374 30062 63174 20108 33389 72102 22380 33735 71626 BENDII Mallow (#-ft) w 17621 29873 59542 17374 20108 33389 72102 63174 20108 33389 72102 63174 20108 33389 72102 63174 20108 33389 72102 63174 20108 33389 72102 63174 20188 33389 72102 63174 20188 33389 72102 63174 20188 33389 72102 63174 20188 33389 72102 63174 20188 33389 72102 63174 20188 33389 72102 63174 20188 33389 72102 22380 33735 71626 8 8 8 8 8 8 9 5 9 5 4 2 7 7774 2 7 8 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	NG rallow (plf) 551 934 1861 543 939 1074 628 1043 2253 699 1054 2238 1043 2253 699 1054 2238 NG rallow (plf) 429 7388 1470 429 742 1560 497 824 1769 742 1560 497 738 333 1769 NG	DEFLECTION wallow (plf) 19.9 43.6.6 1129.7 20.3 43.7 1322.4 44.4 132.8 27.2 47.3 133.1 DEFLECTION wallow (plf) 14.0 30.6 91.1 14.3 30.7 93.0 0 15.7 31.2 93.3 19.1 13.2 93.5 DEFLECTION wallow (plf) 10.2 23.3 66.4 10.4 27.2 22.3 66.4 10.4 27.2 27.2 3 27.2 27.2 3 27.2 27.2 3 27.2 27.2	SHE/ V (#) w 9076 13954 22898 9522 13927 22400 11115 14584 22181 14553 16345 22438 V (#) w 9076 13954 22898 9522 13927 13272 22400 11115 14584 22898 1522 13927 22400 11115 14553 16345 22438	AR rallow (plf) 1135 1744 2862 1190 1741 2802 1390 1389 1823 2773 1819 2043 2805 4R 1008 1550 2544 1058 1550 2544 1058 1555 1617 1816 2493 1430 2493 1395 2290 952 1303	MAX PLF 19 43 129 20 43 132 22 44 132 27 47 133 30 91 14 30 91 14 30 93 15 31 93 93 MAX PLF 10 22 66 10 27 27 47 13 13 27 47 13 13 27 13 27 13 27 13 13 27 13 13 27 13 13 27 13 13 27 13 13 27 13 13 13 13 27 13 13 13 13 13 13 13 13 13 13	33 73 2216 34 73 2211 45 79 222 23 51 152 24 55 155 26 52 255 155 32 55 156	44 97 288 45 977 294 50 999 295 60 105 296 105 296 105 296 105 296 207 35 60 9 207 35 60 9 207 42 74 208 207 35 60 148 203 50 0 148 23 50	66 145 432 68 146 441 75 148 443 91 158 444 443 91 158 444 444 47 102 304 48 102 304 47 310 310 312 312 312 312 312 312 312 312
16' SPAN	Header 6x6 6x8 6x10 6x12 Header 6x6 6x8 6x10 6x6 6x8 6x8 6x10 6x6 6x8 6x10 6x12 Header 6x6 6x8	Depth (in) 12 16 24 16 24 12 16 24 16 24 12 16 24 16 24 12 16 24 16 16 24 16 16 24 16 16 24 16 16 16 16 16 16 16 16 16 16	TENSI Mallow (#-ft) y 12114 20538 40935 11945 20668 43432 10054 16695 36051 11190 16868 35813 TENSI Mallow (#-ft) y 12114 20538 40935 11945 20668 35813 TENSI Mallow (#-ft) y 16865 36051 11190 16868 35813 TENSI Mallow (#-ft) y 12114 20538 40935 11945 20668 36051	ON wallow (plf) 379 642 1279 373 6646 1357 314 522 1127 3500 527 1119 299 507 1011 299 507 1011 299 507 1011 295 510 1072 2248 412 890 2766 416 884 0N wallow (plf) 242 488 412 2748 411 242 399 2748 411 242 411 819 243 413 819 243 413 819 243 413 243 244 244 244 244 244 244 244 244 24	COMPRES: Mallow (#-ft) w 16862 27051 53493 17706 27024 53191 20761 28123 52927 27541 31195 53346 COMPRES: Mallow (#-ft) w 16862 27051 33493 17706 27024 31195 53346 27051 28123 52927 27541 31195 53346 COMPRES: Mallow (#-ft) w 16862 27751 31195 53346	SION vallow (plf) 527 845 1672 553 845 1672 649 879 1654 975 1667 SION vallow (plf) 416 668 1321 437 664 770 1313 513 694 1327 513 594 1317 SION vallow (plf) 337 541 1070 354 1007 354	BENDII Mallow (#+ft) w 17621 29873 59542 17374 30062 63174 20108 33389 72102 22380 33735 71626 BENDII Mallow (#-ft) w 17621 29873 59542 17374 30062 63174 20108 33389 72102 63174 20108 33389 72102 22380 33735 71626 BENDII Mallow (#-ft) w 17621 29873 59542 17374 30062 17374 30062 17374 30062 17374	NG rallow (plf) 551 934 1861 543 939 1974 628 1043 2253 699 1054 2238 NG rallow (plf) 435 738 1470 429 742 1560 497 824 1470 553 833 1769 833 1769 835 833 1769	DEFLECTION wallow (plf) 19.9 43.6.6 1129.7 20.3 43.7 132.4 44.4 132.8 27.2 47.3 133.1 22.4 47.3 133.1 22.4 47.3 133.1 22.4 47.3 133.1 20.6 14.0 30.6 91.1 14.0 30.6 91.1 14.0 30.7 93.0 15.7 31.2 93.3 93.3 93.5 20.5 22.3 33.5 20.5 22.3 35.5 20.5 22.3 22.3 35.5 20.5 22.3 35.5 20.5 22.3 22.3 22.3 23.5 20.5 22.3 22.3 22.3 23.5 20.5 22.3 22.3 22.5 22.5 22.5 22.5 22.5 22	SHE/ V (#) w 9076 13954 22898 9522 13927 22400 11115 14584 22181 14553 16345 22438 V (#) w 9076 13954 22898 9522 13927 22400 11115 14584 22898 9522 13927 22400 11115 14584 22838 9522 13927 22400	AR rallow (plf) 1135 1744 2862 1190 11741 2805 1819 2043 2805 AR rallow (plf) 1008 1550 2544 1058 1550 2465 1620 2465 1620 2465 1620 2469 1088 1395 22900 952 1333 2324	MAX PLF 19 43 129 20 43 132 27 44 132 27 47 133 00 91 14 30 91 14 30 93 15 31 93 93 MAX PLF 10 27 47 133 10 27 27 47 133 10 27 27 47 133 10 27 27 47 133 10 27 27 47 133 10 27 27 47 133 10 27 27 47 133 10 27 27 47 133 10 27 27 47 133 10 27 27 47 133 10 27 133 10 27 133 10 27 133 10 27 133 10 27 133 10 27 133 10 10 10 10 10 10 10 10 10 10	33 73 216 34 73 221 37 74 221 45 79 222 23 51 155 26 52 24 51 155 26 52 255 156 322 55 156	44 97 288 45 97 294 50 99 295 60 105 296 105 296 30 207 35 69 207 35 69 207 42 74 208 207 42 74 208 207 42 50 0 148 207	66 145 432 68 146 441 75 148 444 41 158 444 47 102 304 48 102 310 52 104 48 102 310 52 104 311 312 34 74 75 75 75 75 75 75 75 75 75 75
16' SPAN	Header 6x6 6x8 6x10 6x12 Header 6x6 6x8 6x10 6x6 6x8 6x10 6x6 6x8 6x10 6x12 Header 6x6 6x8 6x12 Header 6x6 6x8	Depth (in) 12 16 24 16 24 12 16 24 16 24 12 16 24 16 16 24 16 16 24 16 16 24 17 16 16 24 17 16 16 16 16 16 16 16 16 16 16	TENSI Mallow (#+ft) v 12114 20538 40935 11945 20668 43432 10054 16695 36051 11190 16868 35813 TENSI Mallow (#+ft) v 12114 20538 40935 11945 20668 43432 10054 16869 36051 11190 16868 35813 TENSI Mallow (#+ft) v 12114 20538 40935 11945 20668	ON wallow (plf) 379 642 1279 373 646 1357 3134 522 1127 3500 527 1119 ON wallow (plf) 299 507 1011 295 5100 1072 248 412 8900 276 416 884 412 890 276 416 884 412 890 276 416 884 412 890 276 416 884 412 890 276 416 884 412 890 276 416 884 412 890 276 416 884 412 890 276 416 884 412 890 276 416 884 884 0N	COMPRES: Mallow (#-ft) w 16862 27051 53493 17706 27024 53191 20761 28123 52927 27541 31195 53346 COMPRES: Mallow (#-ft) w 16862 27051 53493 17706 27024 53191 20761 28123 52927 27541 31195 53346 COMPRES: Mallow (#-ft) w 16862 27051 33493 17706 27024 33191	SION vallow (plf) 527 845 1672 553 845 1662 649 879 1654 861 975 1667 SION vallow (plf) 416 668 1313 694 1313 694 1307 680 7700 1317 SION SION 3514 1070 3541 1070 3542 540 1064 540	BENDII Mallow (#-ft) w 17621 29873 59542 17374 30062 63174 20108 33389 72102 22380 33735 71626 BENDII Mallow (#-ft) w 17621 29873 59542 17374 30062 63174 20108 33389 72102 22380 33735 71626 BENDII Mallow (#-ft) w 17621 29873 59542 17374 30062 63174 2018	NG rallow (plf) 551 934 1861 543 939 1054 2253 699 1054 2238 NG rallow (plf) 435 738 1470 429 742 1560 429 742 1560 429 742 1560 433 1769 NG 833 1769 NG	DEFLECTION wallow (plf) 19.9 43.6 129.7 20.3 43.7 132.4 44.4 44.4 132.8 27.2 47.3 133.1 133.1 DEFLECTION wallow (plf) 14.0 30.6 91.1 14.3 30.7 31.2 93.3 19.1 19.1 19.1 10.2 22.2 3 3.6 6.4 10.4 22.4 4 22.4 10.4 10.4 10.4 10.4 10.4 10.4 10.4 10	SHEA V (#) w 9076 13954 22898 9522 13927 22400 11115 14584 22181 14553 16345 22438 V (#) w 9076 13954 22898 9522 13927 22400 11115 14553 16345 22438 V (#) w 9076 13954 22181 14553 16345 22438	AR vallow (plf) 1135 1744 2862 1190 1741 2809 1823 2773 1829 2832 2773 2805 2805 AR rallow (plf) 1008 1550 2544 1058 1557 1620 2465 1617 1816 2493 305 2290 952 1333 2240 511	MAX PLF 19 43 129 20 43 132 22 44 132 27 47 133 30 91 14 30 93 15 31 93 93 MAX PLF 10 22 66 10 22 66 10 22 67 7	33 73 2216 34 73 2211 45 79 222 23 51 152 24 55 155 32 255 156 52 255 156	44 97 288 45 97 294 50 999 295 60 105 296 206 31 68 202 322 68 207 35 69 9 9207 42 74 208 207 35 60 9207 42 74 208 207 35 60 9207 42 74 208 207 35 60 97 97 296 97 97 97 97 97 97 97 97 97 97 97 97 97	666 145 432 68 146 441 75 148 443 91 158 444 47 102 304 444 47 102 304 310 310 310 310 310 311 64 4111 312 34 75 575 226
16' SPAN	Header 6x6 6x8 6x10 6x12 Header 6x6 6x8 6x10 6x6 6x8 6x10 6x6 6x8 6x10 6x12 Header 6x6 6x10 6x12 Header 6x6 6x8 6x8 6x8 6x8	Depth (in) 122 166 244 122 166 167 172 172 172 172 172 172 172 17	TENSI Mallow (#-ft) y 12114 20538 40935 11945 20668 43432 10054 16695 36051 11190 16868 35813 TENSI Mallow (#-ft) y 12114 20538 40935 11945 20668 43432 10054 16695 36051 11190 16868 35813 TENSI Mallow (#-ft) y 1219 1190 16868 35813	ON wallow (plf) 379 642 1279 373 646 1357 314 522 1127 3500 527 1119 0N wallow (plf) 299 507 1011 295 507 1011 205 207 208 800 276 416 884 801 209 207 207 207 208 800 207 207 207 207 207 207 207 2	COMPRES: Mallow (#-ft) w 16862 27051 53493 177706 27024 53191 20761 28123 52927 27541 31195 53346 COMPRES: Mallow (#-ft) w 16862 27051 53493 177706 27024 53191 20761 28123 532927 27541 31195 53346 COMPRES: Mallow (#-ft) w 16862 27051 53346	SION vallow (plf) \$27 845 1672 553 845 1662 649 879 1654 861 975 1667 SION vallow (plf) 416 668 1321 1313 5131 5133 694 1317 680 770 1317 SION SION 3137 541 1070 354 540 1064 415	BENDII Mallow (#-ft) w 17621 29873 59542 17374 30062 63174 20108 33389 72102 22380 33735 71626 BENDII Mallow (#-ft) w 17621 29873 59542 17374 20108 33389 72102 63174 20108 33389 72102 63174 20108 33389 72102 63174 20108 BENDII Mallow (#-ft) w 17621 29873 59542 771626 BENDII Mallow (#-ft) w 17621 2018 33389 72102 22380 33735 71626 8 BENDII Mallow (#-ft) w 17621 2018 33389 72102 22380 33735 71626 8 BENDII Mallow (#-ft) w 17621 2018 3339 72102 22380 33735 71626 71626 71627 71626 71627 71627 71627 71627 71627 71627 71627 71627 71627 71774 71774 71777 71777 71777 717777 717777 71777777	NG rallow (plf) 551 934 1861 543 939 1974 628 1043 2253 699 1054 2238 1054 2238 NG r3188 1470 429 7388 1470 429 742 1560 497 824 1780 497 738 1553 833 1769 NG NG NG NG NG 1769 NG 1769 NG 2557 1191 347 601 1263 402 2600	DEFLECTION wallow (plf) 19.9 43.6.6 1129.7 20.3 43.7 1322.4 22.4 44.4 132.8 27.4 44.4 132.8 132.1 133.1 DEFLECTION wallow (plf) 14.0 30.6 6 91.1 14.3 30.7 93.0 15.7 31.2 93.3 19.1 13.2 93.5 DEFLECTION wallow (plf) 10.2 23.3 66.4 10.4 22.4 4 67.8 15.5 15.7 15.7 15.7 15.7 15.7 15.7 15.7	SHE/ V (#) w 9076 13954 22898 9522 13927 22400 11115 14584 22181 14553 16345 22438 V (#) w 9076 13954 22898 9522 13927 22400 11115 14553 16345 22438 V (#) w 9076 13954 22888 9522 13927 22400 11115	AR vallow (plf) 1135 1744 2862 1190 1741 2800 1389 1823 2773 1819 2043 2805 2805 2805 2844 1008 1550 2544 1008 1550 2544 1058 1620 2544 1058 1620 2465 1617 1816 2493 2493 2493 2290 952 1393 2240 1111 1475 2490 2555 2290 2555 2193 2290 2555 2193 2290 2555 2193 2290 2555 2193 2290 2193 2290 21935 2193 2290 21955 2193 21955 21956 219577 219577 219577 219577 219577 2195777 2195777 21957777 219577777 219577777777 2195777777 2195777777777777777777777777777777777777	MAX PLF 19 43 129 20 43 132 22 44 132 27 47 133 30 91 14 30 91 14 30 93 15 31 93 93 MAX PLF 10 22 66 10 22 67 11 27 11 27 12 27 13 27 14 15 15 15 15 17 19 19 19 19 10 27 27 10 27 10 10 27 10 10 10 27 10 10 10 10 10 10 10 10 27 10 10 10 10 10 27 10 10 10 10 10 10 10 10 10 10	33 73 2216 34 73 2211 45 79 222 23 51 155 26 52 24 55 32 55 32 55 32 55 32 156 32 156 37 17 37 37 1111 17 37 77 1113	44 97 288 45 977 294 50 995 60 105 296 207 35 60 207 35 60 207 35 60 207 42 74 208 207 35 60 207 42 74 208 207 35 60 1148 207 207 207 207 207 207 207 207 207 207	66 145 432 68 146 441 75 148 443 91 158 444 443 91 158 444 443 91 158 444 441 304 444 407 102 304 47 102 304 310 310 312 312 312 312 312 312 312 312
16' SPAN 18' SPAN 20' SPAN	Header 6x6 6x8 6x10 6x12 Header 6x6 6x8 6x10 6x6 6x8 6x8 6x8 6x8 6x10 6x12 Header 6x6 6x8 6x10 6x12 Header 6x6 6x8 6x8 6x8	Depth (in) 12 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 16 24 16 16 24 16 16 24 16 16 24 16 16 16 16 16 16 16 16 16 16	TENSI Mallow (#-ft) y 12114 20538 40935 11945 20668 43432 10054 16695 36051 11190 16868 35813 TENSI Mallow (#-ft) y 12114 20538 40935 11945 20668 35813 TENSI Mallow (#-ft) y 12153 1190 16868 35813 TENSI Mallow (#-ft) y 12114 20538 40935 11945 20668 35813	ON wallow (plf) 379 642 1279 373 646 1357 314 522 1127 3500 527 1119 299 507 1011 295 510 1072 248 412 890 2766 416 884 ON wallow (plf) 242 411 889 0276 416 884 242 411 889 0276 416 884 884 242 389 248 242 389 248 242 248 248 248 248 248 248 248 248	COMPRES: Mallow (#-ft) w 16862 27051 53493 17706 27024 53191 20761 28123 52927 27541 31195 53346 COMPRES: Mallow (#-ft) w 16862 27024 33191 20761 28123 52927 27541 31195 53346 27024 33191 20761 28123 53346 COMPRES: Mallow (#-ft) w 16862 27051 31195 53346	SION vallow (plf) 527 845 1672 553 845 1662 649 879 1654 975 1667 SION vallow (plf) 416 668 1321 437 667 1313 513 694 1307 680 770 1317 SION vallow (plf) 337 541 1070 354 1000 354 1064 415 562	BENDII Mallow (#+ft) w 17621 29873 59542 17374 30062 63174 20108 33389 72102 22380 33735 71626 BENDII Mallow (#-ft) w 17621 29873 59542 17374 30062 63174 20108 33389 72102 63174 20108 33389 721626 BENDII Mallow (#-ft) w 17621 63174 20188 33375 71626 BENDII Mallow (#-ft) w 17621 29873 359542 17374 30062 20873 359542 17374	NG rallow (plf) 551 934 1861 543 939 1974 628 1043 2253 699 1054 2238 NG rallow (plf) 435 738 1470 429 742 1560 497 824 1470 429 742 1563 833 1769 824 1769 824 1769 824 1769 824 1769 824 1769 833 833 1769	DEFLECTION wallow (plf) 19.9 43.6.6 1129.7 20.3 43.7 132.4 44.4 132.8 27.2 47.3 133.1 DEFLECTION wallow (plf) 14.0 30.6 91.1.1 44.3 30.7 93.3 0.7 93.3 30.7 93.3 19.1 33.2 93.5 DEFLECTION wallow (plf) 10.2 22.3 35.5 DEFLECTION wallow (plf) 10.2 22.3 35.5 DEFLECTION wallow (plf) 10.2 22.3 35.5 DEFLECTION wallow (plf) 10.2 22.3 35.5 DEFLECTION 4.6 7.7 2.2 3.5 2.5 3.5 2.5 2.5 3.5 2.5 2.5 3.5 2.5 2.5 3.5 2.5 2.5 3.5 2.5 3.5 2.5 3.5 3.5 2.5 3.5 2.5 3.5 3.5 3.5 2.5 3.5 3.5 3.5 3.5 3.5 3.5 3.5 3.5 3.5 3	SHE/ V (#) w 9076 13954 22898 9522 13927 22400 11115 14584 22181 14553 16345 22438 V (#) w 9076 13954 22438 9522 13927 22400 11115 14584 22838 9522 22438 V (#) w 9076 13954 22438 16345 22438 16345 22438 16345 22438 16345 22438	AR rallow (plf) 1135 1744 2862 1190 11741 2800 1333 2773 1823 2773 2805 2805 4AR 1008 1550 2544 1008 1550 2489 1235 1620 2465 1627 1816 2493 408 908 1395 22200 952 1333 2240 1111 1458	MAX PLF 19 43 129 20 43 132 27 44 132 27 47 133 0 91 14 30 91 14 30 93 15 31 93 93 MAX PLF 10 27 47 133 10 27 27 47 133 10 27 27 47 133 10 27 27 47 133 10 27 27 47 133 10 27 27 47 133 10 27 27 47 133 10 27 27 47 133 10 27 27 47 133 10 27 27 47 133 10 27 27 47 133 10 20 27 47 133 10 20 27 47 133 10 20 27 133 10 20 27 47 133 20 27 133 10 20 10 27 133 10 20 10 10 20 10 10 20 10 10 20 10 10 10 20 10 20 10 20 10 10 20 10 10 20 10 10 20 10 10 20 10 10 20 10 20 10 10 20 10 10 20 10 10 20 10 10 20 10 10 20 10 10 20 10 10 20 10 10 20 10 10 20 10 10 20 10 10 20 10 10 20 10 10 20 10 10 10 20 10 10 10 10 20 10 10 10 10 22 10 10 10 10 22 10 10 10 10 10 10 10 10 10 10	33 73 216 34 73 221 37 74 221 37 79 222 23 51 55 26 55 26 55 26 55 55 155 26 55 155 355 155 355 156	44 97 288 45 97 294 50 99 295 60 105 296 105 296 206 32 68 207 35 69 207 207 207 207 207 207 207 207 207 207	666 145 432 68 146 441 75 148 444 47 158 444 444 47 47 47 40 52 304 48 102 310 310 52 104 311 312 312 312 312 312 312 312 312 312
16' SPAN	Header 6x6 6x8 6x10 6x12 Header 6x6 6x8 6x10 6x8 6x10 6x8 6x10 6x8 6x10 6x12 Header 6x6 6x8 6x10 6x12 Header 6x6 6x8 6x10	Depth (in) 12 16 24 16 24 16 24 12 16 24 16 24 12 16 24 16 24 12 16 24 16 24 16 24 16 24 12 16 24 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 16 24 16 16 16 16 16 16 16 16 16 16	TENSI Mallow (#+ft) v 12114 20538 40935 11945 20668 43432 10054 16695 36051 11190 16868 35813 TENSI Mallow (#+ft) v 12114 20538 40935 11945 20668 43432 10054 43695 36051 11190 16868 35813 TENSI Mallow (#-ft) v 12114 20538 40935 11945 20668 43432 10054	ON wallow (plf) 379 642 1279 373 646 1357 3144 522 1127 350 527 1119 0N wallow (plf) 299 507 1011 295 510 1072 248 412 890 276 416 884 412 890 276 416 884 412 899 201 0N	COMPRES: Mallow (#-ft) v 16862 27051 53493 17706 27024 53191 20761 28123 52927 27541 31195 53346 COMPRES: Mallow (#-ft) v 16862 27051 28123 52927 27541 17706 27024 53191 20761 28123 53346 COMPRES: Mallow (#-ft) v 16862 27051 53346 COMPRES: Mallow (#-ft) v 16862 27051 31195 53346	SION vallow (plf) 527 8453 1672 5533 8452 1662 649 879 1654 861 975 1667 SION vallow (plf) 416 668 1321 437 667 1313 694 1327 630 7700 1317 SION vallow (plf) 354 1070 354 540 1070 354 540 1064 542 562 1059	BENDII Mallow (#+ft) w 17621 29873 59542 17374 30062 63174 20108 33389 72102 22380 33735 71626 BENDII Mallow (#-ft) w 17621 29873 59542 17374 30062 63174 20108 33389 72102 22380 33735 71626 BENDII Mallow (#-ft) w 17621 29873 33735 71626 BENDII Mallow (#-ft) w 17621 29873 359542 17374 30062 63174 20108 33389 72102	NG rallow (plf) 551 934 1861 543 939 1054 628 1043 2253 699 1054 2238 NG rallow (plf) 435 738 1470 429 742 1560 429 742 1560 497 824 1780 553 833 1769 NG rallow (plf) 352 559 71191 3477 601 1263 402 557 1191 347 601 1263 402 557 1191	DEFLECTION wallow (plf) 19.9 43.6 129.7 20.3 43.7 132.4 44.4 132.8 27.2 47.3 133.1 22.4 44.4 132.8 27.2 47.3 133.1 22.4 47.3 133.1 DEFLECTION wallow (plf) 14.0 30.6 91.1 14.3 30.7 31.2 93.3 19.1 19.1 19.1 19.1 19.1 19.1 19.1	 SHE/V (#) w 9076 13954 22898 9522 13927 22400 11115 14584 21451 16345 22438 SHE/V V(#) w 9076 13954 22898 9522 13927 22400 11115 14584 22181 14534 16535 22438 SHE/V V(#) w 9076 13954 22838 9522 13927 22400 1115 14584 222181 14584 222400 111554 13954 222400 111554 13954 222400 111554 14584 22181 14584 22181 	AR vallow (plf) 1135 1744 2862 1190 11741 2805 2805 2805 AR vallow (plf) 1008 1500 2544 1058 1550 2620 2489 1235 1620 2465 1617 1816 2493 308 1395 2240 1303 2240 1111 1458 2218	MAX PLF 19 43 129 20 43 132 22 44 132 27 47 133 30 91 14 30 93 15 31 93 93 MAX PLF 10 22 66 10 22 67 11 22 67	33 73 2216 34 73 2211 45 79 222 23 51 152 24 55 155 26 55 156 52 255 156 156	44 97 288 45 97 294 50 995 60 105 296 207 325 68 202 322 68 207 35 69 9 207 42 74 208 207 35 69 9 207 42 74 208 207 35 60 9 105 111 208	666 1455 4322 688 1466 4411 755 1488 4433 911 1588 444 477 1022 304 444 477 102 304 444 477 102 304 444 477 102 304 444 477 52 52 52 52 52 52 52 52 52 52 52 52 52
16' SPAN	Header 6x6 6x8 6x10 6x12 Header 6x6 6x8 6x10 6x6 6x8 6x10 6x6 6x8 6x10 6x12 Header 6x6 6x10 6x12 Header 6x6 6x6 6x6 6x8 6x10	Depth (in) 122 166 244 122 166 124 122 166 124 122 166 124 122 126 126 126 126 126 126 126	TENSI Mallow (#-ft) y 12114 20538 40935 11945 20668 43432 10054 16695 36051 11190 16868 35813 TENSI Mallow (#-ft) y 12114 20538 40935 11945 20668 43432 10054 16695 36051 11190 16868 35813 TENSI Mallow (#-ft) y 1219 10054 16695 36051 11190	ON wallow (plf) 379 642 1279 373 646 1357 314 522 1117 3500 527 1119 299 507 1011 295 5102 248 412 8800 276 411 884 ON wallow (plf) 242 411 819 239 201 334 721 224	COMPRES: Mallow (#-ft) w 16862 27051 53493 17706 27024 53191 20761 28123 52927 27541 31195 53346 COMPRES: Mallow (#-ft) w 16862 27051 53493 17706 27051 23493 17706 27051 23349 17706 27051 31195 53346 COMPRES: Mallow (#-ft) w 16862 27051 53493 17706 27024 31195 53346	SION vallow (plf) \$27 845 1672 553 845 1662 649 879 1654 861 975 1667 SION vallow (plf) 416 668 1321 437 664 766 700 1313 513 513 513 513 513 513 511 1070 354 541 1070 354 540 1064 415 562 1059 551	BENDII Mallow (#-ft) w 17621 29873 59542 17374 30062 63174 20108 33389 72102 22380 33735 71626 BENDII Mallow (#-ft) w 17621 29873 59542 17374 20108 33389 72102 22380 33735 71626 BENDII Mallow (#-ft) w 17621 29873 59542 17374 20108 33389 72102 22380	NG rallow (plf) 551 934 1861 543 939 1074 628 1043 2253 699 1054 2238 1054 2238 NG r388 1470 429 742 1560 497 824 1780 405 553 833 1769 NG NG NG NG NG 1769 NG 1263 402 668 1442 448	DEFLECTION wallow (plf) 19.9 43.6.6 1129.7 20.3 43.7 1322.4 22.4 44.4 132.8 27.2 47.3 133.1 DEFLECTION wallow (plf) 14.0 30.6 91.1 14.3 30.7 93.0 0 15.7 31.2 93.3 19.1 13.2 93.3 19.1 13.2 93.5 DEFLECTION wallow (plf) 10.2 23.3 66.4 10.4 22.4 4.7 8 3.6 6 8 4.6 7 8 8 6 8 6 8 10.9 10.9 10.2 10.2 10.2 10.2 10.2 10.2 10.2 10.2	SHE/V V (#) w 9076 13954 13954 22898 9522 13927 13454 22400 11115 14553 16345 22438 V(#) w 9076 13954 22898 9522 13927 22400 11115 14554 22898 9522 13924 22438 V(#) w 9076 13954 22898 9522 13927 22400 11115 14554 22898 9522 13927 22400 11115 14584 22898 9522 13927 22400 11115 14584 22181 14553	AR rallow (plf) 1135 1744 2862 1190 1741 2802 1190 1339 1823 2773 1819 2043 2805 4R 1008 1550 2544 1058 1550 2544 1058 1620 2465 1617 1816 2493 1393 2290 952 1393 2240 1111 1458 2218	MAX PLF 19 43 129 20 43 1322 27 44 132 27 47 133 30 91 14 30 91 14 30 93 15 31 93 93 MAX PLF 10 22 66 10 22 67 11 22 67 13 30 23 15 25 27 15 27 13 20 27 27 47 13 20 27 47 13 20 27 47 13 20 27 47 13 20 20 27 47 13 20 20 27 47 13 20 20 20 20 20 20 20 20 20 20	33 73 2216 34 73 2211 45 79 222 23 51 155 26 52 24 55 32 255 32 55 156 32 55 156 32 37 111 117 37 1111 17 37 37 1113 19 38 3113 32 3	44 97 288 45 977 294 50 999 295 60 105 296 207 35 60 207 35 60 207 42 74 208 207 35 60 9 207 42 74 208 207 35 60 1151 208 207 35 50 1151 26 51 1151 1151	666 1455 4322 688 1466 4411 755 1488 4433 911 1588 444 444 444 444 444 444 47 1022 3304 448 1020 3100 522 3044 4111 3121 312 344 744 2211 355 755 2226 388 776 2227 466
16' SPAN 18' SPAN 20' SPAN	Header 6x6 6x8 6x10 6x12 Header 6x6 6x8 6x10 6x6 6x8 6x8 6x6 6x8 6x10 6x10 6x12 Header 6x6 6x8 6x6 6x8 6x8 6x10 6x8 6x10 6x10 6x10 6x10 6x10 6x10	Depth (in) 12 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 24 16 16 24 16 16 24 16 16 24 16 16 24 16 16 24 16 16 24 16 16 24 16 16 24 16 16 24 16 16 24 16 16 16 16 16 16 16 16 16 16	TENSI Mallow (#-ft) y 12114 20538 40935 11945 20668 43432 10054 16695 36051 11190 16868 35813 TENSI Mallow (#-ft) y 12114 20538 40935 11945 20668 43432 10054 16695 36051 11190 16868 35813 TENSI Mallow (#-ft) y 12114 20548 40935 11945 20668 35813	ON wallow (pff) 379 642 1279 373 646 1357 314 522 1127 3500 527 1119 0N wallow (pff) 299 507 1011 295 510 1072 2248 412 890 2766 416 884 412 890 2766 416 884 412 890 276 411 889 201 334 341 341 341 341 341 341 341 341 34	COMPRES: Mallow (#-ft) w 16862 27051 53493 17706 27024 53191 20761 28123 52927 27541 31195 53346 COMPRES: Mallow (#-ft) w 16862 27051 53493 17706 27024 33191 20761 28123 52927 27541 31195 53346 COMPRES: Mallow (#-ft) w 16862 27024 33191 20761 28123 53493 17706	SION vallow (plf) 527 845 1672 553 845 1662 649 879 1654 975 1667 SION vallow (plf) 416 668 1321 437 667 1313 513 694 1307 6800 7700 337 541 1070 354 10064 415 562 1059 551 624	BENDII Mallow (#+f) w 17621 29873 59542 17374 30062 63174 20108 33389 72102 22380 33735 71626 BENDII Mallow (#-f) w 17621 29873 59542 17374 30062 23389 71626 63174 20108 33389 71626 BENDII Mallow (#-f) w 17621 BENDII Mallow (#-f) w 17621 2873 59542 17374 30062 BENDII Mallow (#-f) w 17621 29873 59542 17374 30062 63174 20108 33389	NG rallow (pf) 551 934 1861 543 939 1974 628 1043 2253 699 1054 2238 NG rallow (pf) 435 738 1470 429 742 1560 497 824 1470 429 742 1560 497 824 1769 738 11769 833 1769 833 1769 833 1769 835 363 833 1769 844 845 845 845 845 845 845 845 845 845	DEFLECTION wallow (plf) 19.9 43.6.6 1129.7 20.3 43.7 132.4 22.4 44.4 132.8 27.2 47.3 133.1 27.2 47.3 133.1 27.2 47.3 133.1 27.2 47.3 133.1 27.2 47.3 133.1 27.2 47.3 133.1 27.2 47.3 133.1 27.2 47.3 133.1 27.2 47.3 133.1 27.2 47.3 133.1 27.2 47.3 133.1 27.2 47.3 133.1 27.2 47.3 133.1 27.2 47.3 133.1 27.2 47.3 133.1 27.2 27.3 37.2 27.2 37.3 37.2 27.2 37.3 37.2 27.2 37.3 37.2 27.2 37.3 37.2 27.2 37.3 37.2 27.2 37.3 37.2 27.2 37.3 37.2 27.2 37.3 37.2 27.2 37.3 37.2 27.2 37.3 37.2 27.2 37.3 37.2 37.2	SHE/ V (#) w 9076 13954 22898 9522 13927 22400 11115 14584 22181 14553 16345 22438 V (#) w 9076 13954 22438 9522 13927 22400 11115 14584 22898 9522 13927 22400 11115 14584 22438 V (#) w 9076 13954 22438 16345 22438	AR vallow (plf) 1135 1744 2862 1190 1714 2802 1190 1819 2003 2805 2805 2805 2805 2805 2805 1819 2043 2805 2805 2805 2805 2805 2805 2805 2805 2805 2805 2544 1058 1550 2646 21617 1816 2465 1610 908 1393 22400 952 1393 22400 952 1393 22400 1111 1458 2184 1455 <td>MAX PLF 19 43 129 20 43 132 22 44 132 27 47 133 MAX PLF 13 30 91 14 30 91 14 30 93 15 31 19 93 93 MAX PLF 10 27 15 31 19 27 10 27 13 15 15 15 15 15 15 15 15 15 15</td> <td>33 73 216 34 73 221 37 74 221 45 79 222 23 51 55 26 52 24 55 26 55 55 55 55 55 55 55 55 55 156 177 737 1111 177 37 1113 23 3 8 113 23 3 113 23 3 1152 16 177 177 177 177 177 177 177 177 177</td> <td>44 97 288 45 977 294 50 999 295 60 105 296 105 296 207 35 60 207 35 60 207 35 60 207 35 60 207 35 60 207 35 60 105 296 105 207 105 105 105 105 105 105 105 105 105 105</td> <td>666 145 432 68 146 441 75 148 443 91 158 444 444 444 444 444 444 102 304 448 102 304 448 102 304 448 102 304 444 43 102 304 444 43 102 304 444 444 444 444 444 444 444 444 444</td>	MAX PLF 19 43 129 20 43 132 22 44 132 27 47 133 MAX PLF 13 30 91 14 30 91 14 30 93 15 31 19 93 93 MAX PLF 10 27 15 31 19 27 10 27 13 15 15 15 15 15 15 15 15 15 15	33 73 216 34 73 221 37 74 221 45 79 222 23 51 55 26 52 24 55 26 55 55 55 55 55 55 55 55 55 156 177 737 1111 177 37 1113 23 3 8 113 23 3 113 23 3 1152 16 177 177 177 177 177 177 177 177 177	44 97 288 45 977 294 50 999 295 60 105 296 105 296 207 35 60 207 35 60 207 35 60 207 35 60 207 35 60 207 35 60 105 296 105 207 105 105 105 105 105 105 105 105 105 105	666 145 432 68 146 441 75 148 443 91 158 444 444 444 444 444 444 102 304 448 102 304 448 102 304 448 102 304 444 43 102 304 444 43 102 304 444 444 444 444 444 444 444 444 444

Test Results: PLF vs. Deflection





Timber Box Header Span Tables

	Header	Depth (in)	Uniform Load (PLF)
		12	81
	6x6	16	178
		24	531
		12	83
	6x8	16	178
10' SPAN		24	542
		12	91
	6x10	16	182
		24	543
		12	111
	6x12	16	193
		24	545

	Header	Depth (in)	Uniform Load (PLF)
		12	47
	6x6	16	103
		24	307
		12	48
	6x8	16	103
12' SPAN		24	313
	6x10	12	53
		16	105
		24	314
		12	64
	6x12	16	112
		24	315

	Header	Depth (in)	Uniform Load (PLF)
		12	29
	6x6	16	65
		24	193
		12	30
	6x8	16	65
14' SPAN		24	197
	6x10	12	33
		16	66
		24	198
		12	40
	6x12	16	70
		24	198

	Header	Depth (in)	Uniform Load (PLF)
		12	19
	6x6	16	43
		24	129
		12	20
	6x8	16	43
16' SPAN		24	132
		12	22
	6x10	16	44
		24	132
		12	27
	6x12	16	47
		24	133

	Header	Depth (in)	Uniform Load (PLF)
		12	13
	6x6	16	30
		24	91
		12	14
	6x8	16	30
18' SPAN		24	93
		12	15
	6x10	16	31
		24	93
		12	19
	6x12	16	33
		24	93

	Header	Depth (in)	Uniform Load (PLF)
		12	10
	6x6	16	22
		24	66
		12	10
	6x8	16	22
20' SPAN		24	67
		12	11
	6x10	16	22
		24	67
		12	13
	6x12	16	24
		24	68

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Timber Box Header Using BamCore Side Panels

A Senior Project Study by Jonathan Herrera Project Advisor: Abby Lentz, PE California Polytechnic State University Winter 2023







Purpose: begin development of a composite box header that was able to span long openings with minimal deflection, and fabricate at half scale

Box header comprised of:

2x6 Top Plate (2) 1 ¼" BamCore Side Panels Bottom Header ranging from 6x6 to 6x12

Depth ranging from 12" to 24"

Span ranging from 10' to 20'

Introduction

Design: derived from design of "Dual BamCore Header", but currently insufficient for spans longer than 10'





Current BamCore Span Tables

Span Tables for Dual BamCore Header, only up to 9.75', no L/800 Deflection Criteria

BamCore G3	JamCore G3 On Edge Header Uniform Load (PLF) Table, L/240 Deflection Criteria															
Header Depth (in)		6		8	1	.0	1	.2	1	4	1	.6	2	20	2	24
	Uniform	Bearing	Uniform	Bearing	Uniform	Bearing	Uniform	Bearing	Uniform	Bearing	Uniform	Bearing	Uniform	Bearing	Uniform	Bearing
Span (ft)	Load (PLF)	Length (in)	Load (PLF)	Length (in)	Load (PLF)	Length (in)	Load (PLF)	Length (in)	Load (PLF)	Length (in)	Load (PLF)	Length (in)	Load (PLF)	Length (in)	Load (PLF)	Length (in
3	3095 b	1 3/4	4127 b	2 1/2	5159 b	3 1/4	6191 b	4	7223 b	4 3/4	8255 b	5 1/2	10319 b	7 1/2	12383 b	9 1/2
4	1683	1 1/4	3094 b	2 1/2	3868 b	3	4641 b	3 3/4	5415 b	4 1/2	6188 b	5 1/4	7736 b	6 3/4	9283 b	8 1/2
5	941	1	1976	2	3093 b	3	3711 b	3 3/4	4330 b	4 1/4	4948 b	5	6186 b	6 1/2	7423 b	8
6	572	3/4	1242	1 1/2	2170 a	2 1/2	3065 a	3 1/2	3606 b	4 1/4	4122 b	5	5152 b	6 1/4	6183 b	7 3/4
7	371	1/2	824	1 1/4	1483	2	2249 a	3	3012 a	4	3531 b	4 3/4	4414 b	6 1/4	5297 b	7 1/2
8	252	1/2	571	1	1046	1 1/2	1678	2 1/2	2304 a	3 1/2	2966 a	4 1/2	3861 b	6	4633 b	7 1/2
9	179	1/2	410	3/4	761	1 1/4	1239	2	1818 a	3	2341 a	4	3430 b	6	4116 b	7 1/4
9.75	141	1/4	326	3/4	611	1 1/4	1002	1 3/4	1500	2 3/4	1993 a	3 3/4	3042 a	5 3/4	3798 b	7 1/4

1. ^a means controlled by Bending Strength, ^b means controlled by Shear Strength, no superscript is controlled by deflection.

2. Values include 4% bending strength increase for repetitive members.

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3. Values are for 2 members with equal loading. 2.5 inches of width total

Common Usage





Precedent Studies

- "Strength of Plywood Web Box Beam" (Chu et al.)
- "Design and Fabrication of All-Plywood Beams" (APA)
- Empirical study on box beams by the University of Michigan



BamCore Installation





<u>Analysis</u>



The objective of this study was to begin development of a composite box header that was able to span long openings with minimal deflection, and to develop span tables with a tight L/800 deflection limit. The following analysis was performed to obtain maximum uniform load values, and an expanded calculation follows. For different header sizes, span lengths, and overall depths, the same process was carried out in a spreadsheet.

Elasticity

 $E_{Header} = 1,600,000 \ psi$ $E_{BamCore} = 1,420,000 \ psi$ $E_{2x6} = 1,700,000 \ psi$

Transformation to E_{Header}

 $\frac{EBamCore}{EHeader} = 0.89$ $\frac{E2x6}{EHeader} = 1.06$

<u>Neutral Axis</u> $N.A. = \frac{\Sigma yA}{\Sigma A} = 5.2 \quad (d = |5.2 - y|)$

 $\frac{\text{Moment of Inertia}}{I = \Sigma I_{parts} + \Sigma A d^2 = 397.4 + 519.5 = 917 in^4$

Demand vs. Capacity

 $F'_{b} = .99(1200 \, psi) = 1200 \, psi$ $F'_{t} = 825 \, psi$ $F'_{c} = .57(1500 \, psi) = 852 \, psi$

6x6:

$$M_{allow} = \frac{F_{i}^{l}}{y} = 145485 \#in = 12123 \#ft$$
$$w_{allow} = \frac{8M_{allow}}{L^{2}} = 1349 \, plf$$

SECTION BENDING:

$$\begin{split} M_{allow} &= \frac{F_b I}{y} = 150246 \ \text{\#in} = 12520 \ \text{\#ft} \\ w_{allow} &= \frac{8M_{allow}}{L^2} = 1001 \ \text{plf} \end{split}$$

2x6:

$$M_{allow} = \frac{F_{cl}^{e}}{y} = 145485 \ \text{#in} = 12123 \ \text{#ft}$$
$$w_{allow} = \frac{8M_{allow}}{L^2} = 1349 \ \text{plf}$$
$$L/800 \ \text{DEFLECTION LIMIT:}$$

$$w_{allow} = \frac{384E_{Header} I(L/800)}{5L^4} = 81.5 \, plf$$



MAX WEB SHEAR:

Horizontal Shear of BamCore = $F_v = 465 \, psi$ t = 1.11" (transformed) $F_v t_v = 516 \#/in$ $V_h = \frac{(F_v t_v) l(N_{web})}{q_v}$ Statical Moment of Area: Area of Flange & Web Above N.A. $Q_{top} = Q_{bottom} = Q$ $Q_{2x6} = 1.5"x5.84"(h - .75" - y) = 1.5"x5.84"(12" - .75" - 5.2") = 53 in^3$ $Q_{BamCore} = 2x1.11(h - y)(\frac{h-y}{2}) = 2x1.11(12 - 5.2)(\frac{12-5.2}{2}) = 51.3 in^3$ $Q = 53 + 51.3 = 104.3 in^3$ $V_h = 9076 \#$ $V = \frac{w_{allow}L}{2}$ $w = \frac{2V}{L} = 1815 \, plf$

MAX NAIL SHEAR:

For analysis, use 10d nails; $t_s = 1 \frac{1}{4}$ "; G = .50 Z = 118 # $q = \frac{2 \operatorname{nails}(118 \#/\operatorname{nail})}{6^*} = 39 \#/\operatorname{in} = 472 \#/\operatorname{ft}$ $q = \frac{VQ}{l}$ $39 \#/\operatorname{in} = \frac{V(104.3 \operatorname{in}^3)}{917 \operatorname{in}^4} \to V = 342.9 \#$ $w = \frac{2V}{L} = 68.6 \operatorname{plf} \to \operatorname{try} @ 4" o. c.$ $q = \frac{2 \operatorname{nails}(118 \#/\operatorname{nail})}{4^*} = 59 \#/\operatorname{in} \to 518.7 \#$ $w = \frac{2V}{L} = 104 \operatorname{plf} \ge 81.5 \operatorname{plf} \checkmark$



Fabrication





Nailing









Fracture



















Appendix & Spreadsheet Calculations

MOMENT OF INERTIA AND N.A. SPREADSHEET FOR 6X6:

Centroid

y_{Header}=

y_{Bamcore} =

y_{2x6} =

N.A.

SET DATA

Moduluses of Elasticity	psi
E _{Headers}	1600000
E _{Bamcore}	1420000
E _{2x6}	1700000

Γransformation to E _{Heade}	n
Ebamcore/Eheader=	0.89
E2x6/Eheader=	1.06

Header Depths (in)
12
16
24

2" TOTAL DEPTH	I				
Part Dimensions	b _{Original}	b _{Transformed}	h	Area	I
ix6	5.5	5.5	5.5	30.25	76.26
2) Bamcore Panels	2.5	2.22	12	26.63	319.50
2x6	5.5	5.84	1.5	8.77	1.64
			Σ(A)=	65.64	397.40

distance from datum at y=0 (bottom of eader) to centroid of individual part 2.75

11.25 $\Sigma(y^*A) =$ $341.55 \text{ N.A.} = \Sigma(y^*A)/\Sigma A$ 5.20 in from bottom







6.80 largest distance between extreme fiber and neutral axis Section Modulus (S 134.9 in³

Part Dimensions	b _{Original}	b _{Transformed}	h	Area	
6x6	5.5	5.5	5.5	30.25	76.2
(2) Bamcore Panel:	2.5	2.22	16	35.50	757.3
2x6	5.5	5.84	1.5	8.77	1.6
			Σ(A)=	74.52	835.2

Centroid y_{Header}= 2.7 $\mathbf{y}_{\text{Bamcore}}$ 15.2 $y_{2x6} =$

 $\Sigma(y^*A)=$ 500.86 6. N.A.

d _{Header} =	3.9
d _{Bamcore} =	1.2
$d_{2x6} =$	8.5

Ad ²	ir
Bamcore	58.0
Header	477.1
2x6	637.5
Total	1172.7

Moment of Inertia	in"
Σ (I parts)	835.23
$\Sigma (Ad^2)$	1172.73
Moment of Inertia	2008

Section Modulus (S **216.4**

9.28

24 TOTAL DEPTH	24"	TOTAL	DEPTH
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Part Dimensions	b _{Original}	b _{Transformed}	h	Area	I
6x6	5.5	5.5	5.5	30.25	76.26
(2) Bamcore Panels	2.5	2.22	24	53.25	2556.00
2x6	5.5	5.84	1.5	8.77	1.64
			Σ(A)=	92.27	2633.90





7.29
1.96
13.21

Ad ⁴	in
Bamcore	205.38
Header	1605.90
2x6	1530.54
Total	3341.81





Section Modulus (S 427.9



Inertia Summary Table

Header Section	Total Depth (in)	Moment of Inertia (in ⁴)	N.A. from bottom (in)	Q (in3)
	12	917	5.20	104.2
6x6	16	2008	6.72	148.5
	24	5976	10.04	269.3
	12	936	5.39	101.5
6x8	16	2012	6.69	149.1
	24	6102	9.66	281.1
	12	1033	5.78	95.9
6x10	16	2048	6.90	144.9
	24	6119	9.55	284.7
	12	1255	6.31	89.0
6x12	16	2179	7.27	137.6
	24	6132	9.63	282.0



Maximum Uniform Loads Tables

			TENS	SION	COMPRE	SSION	BEND	DING	DEFLECTION	SH	IEAR	
	Header	Depth (in)	Mallow (#-ft)	wallow (plf)	Mallow (#-ft)	wallow (plf)	Mallow (#-ft)	wallow (plf)	wallow (plf)	V (#)	wallow (plf)	MAX PLF
		12	12114	969	16862	1349	17621	1410	81.5	9076	1815	81
	6x6	16	20538	1643	27051	2164	29873	2390	178.5	13954	2791	178
		24	40935	3275	53493	4279	59542	4763	531.2	22898	4580	531
		12	11945	956	17706	1416	17374	1390	83.2	9522	1904	83
	6x8	16	20668	1653	27024	2162	30062	2405	178.9	13927	2785	178
10' SPAN		24	43432	3475	53191	4255	63174	5054	542.4	22400	4480	542
		12	10054	804	20761	1661	20108	1609	91.8	11115	2223	91
	6x10	16	16695	1336	28123	2250	33389	2671	182.0	14584	2917	182
		24	36051	2884	52927	4234	72102	5768	543.9	22181	4436	543
		12	11190	895	27541	2203	22380	1790	111.5	14553	2911	111
	6x12	16	16868	1349	31195	2496	33735	2699	193.7	16345	3269	193
		24	35813	2865	53346	4268	71626	5730	545.1	22438	4488	545

			TENS	SION	COMPR	ESSION	BENI	DING	DEFLECTION	SH	IEAR	1
	Header	Depth (in)	Mallow (#-ft)	wallow (plf)	Mallow (#-ft)	wallow (plf)	Mallow (#-ft)	wallow (plf)	wallow (plf)	V (#)	wallow (plf)	MAX PLF
		12	12114	673	16862	. 937	17621	979	47.2	9076	1513	4
	6x6	16	20538	1141	27051	. 1503	29873	1660	103.3	13954	2326	10
		24	40935	2274	53493	2972	59542	3308	307.4	22898	3816	30
		12	11945	664	17706	984	17374	965	48.2	9522	1587	4
	6x8	16	20668	1148	27024	1501	30062	1670	103.5	13927	2321	10
12' SPAN		24	43432	2413	53191	. 2955	63174	3510	313.9	22400	3733	31
		12	10054	559	20761	. 1153	20108	1117	53.1	11115	1852	5
	6x10	16	16695	927	28123	1562	33389	1855	105.3	14584	2431	10
		24	36051	2003	52927	2940	72102	4006	314.8	22181	3697	31
		12	11190	622	27541	. 1530	22380	1243	64.5	14553	2425	6
	6x12	16	16868	937	31195	1733	33735	1874	112.1	16345	2724	11
		24	35813	1990	53346	2964	71626	3979	315.4	22438	3740	31

			TENS	ION	COMPR	ESSION	BEND	DING	DEFLECTION	SH	EAR	
	Header	Depth (in)	Mallow (#-ft)	wallow (plf)	Mallow (#-ft)	wallow (plf)	Mallow (#-ft)	wallow (plf)	wallow (plf)	V (#)	wallow (plf)	MAX PLF
		12	12114	494	16862	688	17621	719	29.7	9076	1297	29
	6x6	16	20538	838	27051	. 1104	29873	1219	65.0	13954	1993	65
		24	40935	1671	53493	2183	59542	2430	193.6	22898	3271	193
		12	11945	488	17706	5 723	17374	709	30.3	9522	1360	30
	6x8	16	20668	844	27024	1103	30062	1227	65.2	13927	1990	65
14' SPAN		24	43432	1773	53191	. 2171	63174	2579	197.7	22400	3200	197
		12	10054	410	20761	. 847	20108	821	33.5	11115	1588	33
	6x10	16	16695	681	28123	1148	33389	1363	66.3	14584	2083	66
		24	36051	1471	52927	2160	72102	2943	198.2	22181	3169	198
		12	11190	457	27541	. 1124	22380	913	40.6	14553	2079	40
	6x12	16	16868	688	31195	1273	33735	1377	70.6	16345	2335	70
		24	35813	1462	53346	5 2177	71626	2923	198.6	22438	3205	198

			TENS	SION	COMPRE	ESSION	BENI	DING	DEFLECTION	SH	EAR	
	Header	Depth (in)	Mallow (#-ft)	wallow (plf)	Mallow (#-ft)	wallow (plf)	Mallow (#-ft)	wallow (plf)	wallow (plf)	V (#)	wallow (plf)	MAX PLF
		12	12114	379	16862	527	17621	551	19.9	9076	1135	19
	6x6	16	20538	642	27051	845	29873	934	43.6	13954	1744	43
		24	40935	1279	53493	1672	59542	1861	129.7	22898	2862	129
		12	11945	373	17706	553	17374	543	20.3	9522	1190	20
	6x8	16	20668	646	27024	845	30062	939	43.7	13927	1741	43
16' SPAN		24	43432	1357	53191	1662	63174	1974	132.4	22400	2800	132
		12	10054	314	20761	649	20108	628	22.4	11115	1389	22
	6x10	16	16695	522	28123	879	33389	1043	44.4	14584	1823	44
		24	36051	1127	52927	1654	72102	2253	132.8	22181	2773	132
		12	11190	350	27541	861	22380	699	27.2	14553	1819	27
	6x12	16	16868	527	31195	975	33735	1054	47.3	16345	2043	47
		24	35813	1119	53346	1667	71626	2238	133.1	22438	2805	133
		-			_							
			TENS	SION	COMPRE	ESSION	BENI	DING	DEFLECTION	SH	EAR	
	Header	Depth (in)	Mallow (#-ft)	wallow (plf)	Mallow (#-ft)	wallow (plf)	Mallow (#-ft)	wallow (plf)	wallow (plf)	V (#)	wallow (plf)	MAX PLF
		12	12114	299	16862	416	17621	435	14.0	9076	1008	13
	6x6	16	20538	507	27051	668	29873	738	30.6	13954	1550	30

		12	12114	299	16862	416	17621	435	14.0	9076	1008	13
	6x6	16	20538	507	27051	668	29873	738	30.6	13954	1550	30
		24	40935	1011	53493	1321	59542	1470	91.1	22898	2544	91
		12	11945	295	17706	437	17374	429	14.3	9522	1058	14
	6x8	16	20668	510	27024	667	30062	742	30.7	13927	1547	30
18' SPAN		24	43432	1072	53191	1313	63174	1560	93.0	22400	2489	93
		12	10054	248	20761	513	20108	497	15.7	11115	1235	15
	6x10	16	16695	412	28123	694	33389	824	31.2	14584	1620	31
		24	36051	890	52927	1307	72102	1780	93.3	22181	2465	93
		12	11190	276	27541	680	22380	553	19.1	14553	1617	19
	6x12	16	16868	416	31195	770	33735	833	33.2	16345	1816	33
		24	35813	884	53346	1317	71626	1769	93.5	22438	2493	93

			TENS	ION	COMPRE	SSION	BEND	DING	DEFLECTION	SH	EAR	1
	Header	Depth (in)	Mallow (#-ft)	wallow (plf)	Mallow (#-ft)	wallow (plf)	Mallow (#-ft)	wallow (plf)	wallow (plf)	V (#)	wallow (plf)	MAX PLF
		12	12114	242	16862	337	17621	352	10.2	9076	908	10
	6x6	16	20538	411	27051	541	29873	597	22.3	13954	1395	22
		24	40935	819	53493	1070	59542	1191	66.4	22898	2290	66
		12	11945	239	17706	354	17374	347	10.4	9522	952	10
	6x8	16	20668	413	27024	540	30062	601	22.4	13927	1393	22
20' SPAN		24	43432	869	53191	1064	63174	1263	67.8	22400	2240	67
		12	10054	201	20761	415	20108	402	11.5	11115	1111	11
	6x10	16	16695	334	28123	562	33389	668	22.8	14584	1458	22
		24	36051	721	52927	1059	72102	1442	68.0	22181	2218	67
		12	11190	224	27541	551	22380	448	13.9	14553	1455	13
	6x12	16	16868	337	31195	624	33735	675	24.2	16345	1634	24
		24	35813	716	53346	1067	71626	1433	68.1	22438	2244	68





Timber Box Header Span Tables

	Header	Depth (in)	Uniform Load (PLF)
		12	81
	6x6	16	178
		24	531
		12	83
	6x8	16	178
10' SPAN		24	542
		12	91
	6x10	16	182
		24	543
		12	111
	6x12	16	193
		24	545

	Header	Depth (in)	Uniform Load (PLF)
		12	47
	6x6	16	103
		24	307
		12	48
	6x8	16	103
12' SPAN		24	313
		12	53
	6x10	16	105
		24	314
		12	64
	6x12	16	112
		24	315

	Header	Depth (in)	Uniform Load (PLF)
		12	29
	6x6	16	65
		24	193
		12	30
	6x8	16	65
14' SPAN		24	197
		12	33
	6x10	16	66
		24	198
		12	40
	6x12	16	70
		24	198



	Header	Depth (in)	Uniform Load (PLF)
16' SPAN	6x6	12	19
		16	43
		24	129
	6x8	12	20
		16	43
		24	132
	6x10	12	22
		16	44
		24	132
	6x12	12	27
		16	47
		24	133

	Header	Depth (in)	Uniform Load (PLF)
18' SPAN	6x6	12	13
		16	30
		24	91
	6x8	12	14
		16	30
		24	93
	6x10	12	15
		16	31
		24	93
	6x12	12	19
		16	33
		24	93

	Header	Depth (in)	Uniform Load (PLF)
20' SPAN	6x6	12	10
		16	22
		24	66
		12	10
	6x8	16	22
		24	67
	6x10	12	11
		16	22
		24	67
	6x12	12	13
		16	24
		24	68



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