

SECTION D: 25 FT. 50 PSF L.L. TRUSS PURLIN

| <u>DESCRIPTION</u> | <u>PAGE</u> |
|--------------------------------------|-------------|
| GENERAL INFORMATION..... | 1 |
| COMPUTER ANALYSIS..... | 2-3 |
| COMPUTER ANALYSIS (DEAD+ LIVE)..... | 4 |
| COMPUTER ANALYSIS (DEAD+ WIND)..... | 5 |
| PURLIN BRACING..... | 6 |

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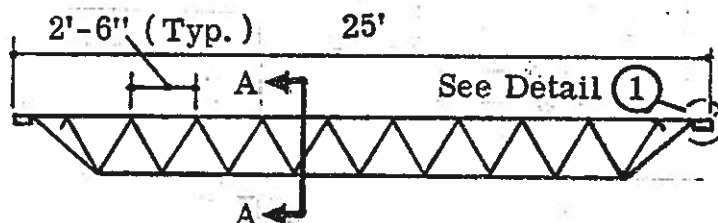
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| MADE BY | DATE | DIV / FILE NO. | |
| CHECKED BY | DATE | PAGE | OF |

TRUSS PURLINS

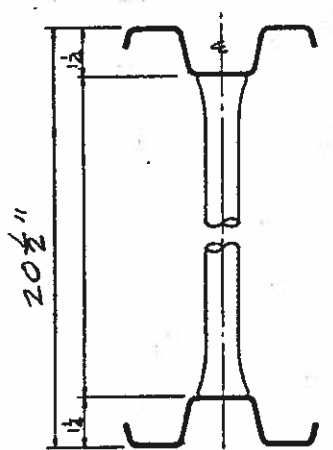
The Landmark truss purlins are composed of light-gage cold-formed hat section top and bottom chords with cold-formed hollow tube diagonals. All joints are resistance welded. These truss purlins are designed as simple span members with uniform dead + live load application and a continuous beam condition for the top chord. As a standard condition, all Landmark truss purlins are used on a 5' spacing.



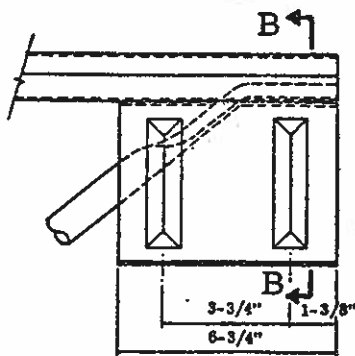
Design Load

Live Load = 50 psf
Dead Load = 3 psf
Wind Load = 20 psf
Uplift = 22 psf

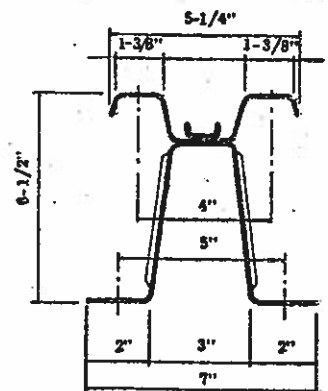
(Uplift design load = $1.25 \times \text{wind load} - 3.0 \text{ psf dead load}$)



SECTION A-A



DETAIL (1)



SECTION B-B

END SEAT DETAILS

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|----------------|-----------------|-------------------------|---------|
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| CHECKED BY | DATE | PAGE 1 | OF 6 |

BUTLER MFG CO
 LANDMARK TRUSS PURLIN REVIEW

*** DATE 05/09/75
 *** PART NO. 530196

1975.T/P..25'.50-20B0C

SPAN = 300.0 INCHES OR (25.0 FT)
 LIVE LOAD = 250.0 LBS/FT (50.0 PSF AT 5.0 FT SPACING)
 DEAD LOAD = 15.0 LBS/FT (3.0 PSF AT 5.0 FT SPACING)
 WIND LOAD = -125.0 LBS/FT (-25.0 PSF AT 5.0 FT SPACING)

EFFECTIVE LENGTH FACTORS USED FOR BUCKLING

TOP CHORD K FOR KL/RX = 0.90
 K FOR KL/RX = 0.90
 BOT CHORD K FOR KL/RX = 0.90
 K FOR KL/RX = 1.00
 DIAGONALS K FOR KL/R = 1.00

MEMBER GEOMETRY USED FOR REVIEW

| TOP CHORD | | BOTTOM CHORD | | DIAGONALS |
|-----------|--------------|--------------|--------------|---------------|
| W1 | = 5.250 IN | W1 | = 5.250 IN | END |
| W2 | = 2.500 IN | W2 | = 2.500 IN | OD = 1.050 IN |
| W3 | = 2.000 IN | W3 | = 2.000 IN | T = 0.078 IN |
| LIP | = 0.500 IN | LIP | = 0.500 IN | FY = 55.0 KSI |
| LIP ANG | = 14.818 DEG | LIP ANG | = 14.818 DEG | INTERIOR |
| DEPTH | = 1.250 IN | DEPTH | = 1.250 IN | OD = 1.050 IN |
| T | = 0.078 IN | T | = 0.078 IN | T = 0.078 IN |
| FY | = 60.0 KSI | FY | = 60.0 KSI | FY = 55.0 KSI |
| UNBL 1 | = 105.0 IN | UNBL 1 | = 90.0 IN | |
| UNBL 2 | = 90.0 IN | UNBL 2 | = 120.0 IN | |
| UNBL 3 | = 105.0 IN | UNBL 3 | = 90.0 IN | |

PANEL POINT SPACING = 30.0 IN
 NO. OF SPACES = 9
 END DISTANCE = 12.5 IN
 TOTAL PURLIN DEPTH = 20.50 IN
 CENTROID-CENTROID DIST. = 19.43 IN
 WEB DEPTH-INSIDE CHORDS = 18.00 IN

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|----------------|-----------------|-------------------------|
| MADE BY RPL | DATE 5-13-75 | DIV./FILE NO. 75-002 |
| CHECKED BY | DATE | PAGE 2 OF 6 |

MEMBER SECTION PROPERTIES
TOP CHORD

FULL SECTION AREA = 0.595 IN² SXT = 0.261 IN³ SXB = 0.197 IN³
 IX = 0.140 IN⁴ RX = 0.486 IN
 IY = 1.528 IN⁴ RY = 1.603 IN
 WT = 50.88 LBS

REDUCED SECTION FOR DL + LL + CONC, NEG FLEXURE

IX = 0.140 IN⁴ SXT = 0.261 IN³ SXB = 0.197 IN³

REDUCED SECTION FOR DL + LL + CONC, POS FLEXURE

IX = 0.140 IN⁴ SXT = 0.261 IN³ SXB = 0.197 IN³

REDUCED SECTION FOR DL + WL + CONC, NEG FLEXURE

IX = 0.140 IN⁴ SXT = 0.261 IN³ SXB = 0.197 IN³

REDUCED SECTION FOR DL + WL + CONC, POS FLEXURE

IX = 0.140 IN⁴ SXT = 0.261 IN³ SXB = 0.197 IN³

REDUCED SECTION FOR DL + LL + CONC, AXIAL LOAD

AREA = 0.595 IN² GA = 1.0000

REDUCED SECTION FOR DL + WL + CONC, AXIAL LOAD

AREA = 0.595 IN² GA = 1.0000

FLEXURAL-TORSIONAL FACTORS- CW= 16.487 J=0.0012062
 XU=-0.6843 RO= 1.809 BETA= 0.857

REQD LIP I (ELS 1,5) = 0.00063 IN⁴

ACTUAL I (ELS 1,5) = 0.00095 IN⁴

BOTTOM CHORD

FULL SECTION AREA = 0.595 IN²
 IX = 0.140 IN⁴ RX = 0.486 IN
 IY = 1.528 IN⁴ RY = 1.603 IN
 WT = 41.57 LBS

REDUCED SECTION FOR DL + WL + CONC, AXIAL LOAD

AREA = 0.595 IN² GA = 1.000

FLEXURAL-TORSIONAL FACTORS- CW= 16.487 J=0.0012062
 XU=-0.6843 RO= 1.809 BETA= 0.857

REQD LIP I (ELS 1,5) = 0.00063 IN⁴

ACTUAL I (ELS 1,5) = 0.00095 IN⁴

END DIAGONAL AREA = 0.238 IN² R = 0.345 IN
 WT = 5.25 LBS

INTERIOR DIAGONAL AREA = 0.238 IN² R = 0.345 IN
 WT = 29.19 LBS

TOTAL WEIGHT = 126.89 LBS

DEFLECTION = 0.619 IN

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DATE
5-13-75

DIV./FILE NO.
75-002

CHECKED BY

DATE

PAGE

OF

3

6

FORCES IN EACH MEMBER FOR DEAD + LIVE + CONC.

POSITIVE VALUES INDICATE TENSION

UNITS ARE IN KIPS AND KIP-IN

| END REACTIONS | | LEFT = 3.257 | | RIGHT = 3.257 KIPS | | | |
|---------------|---------|--------------|-------|--------------------|--------|---------|----------|
| TOP CHORDS | THRUST | LEFT | RIGHT | LEFT | RIGHT | MAX | DIST. TO |
| | | SHEAR | SHEAR | MOMENT | MOMENT | PNL-MOM | PNL-MOM |
| T(1) = | -4.556 | 0.037 | 0.239 | 0.000 | -1.258 | 0.032 | 2 |
| T(2) = | -4.131 | 0.314 | 0.348 | -1.258 | -1.763 | 0.980 | 14 |
| T(3) = | -7.721 | 0.336 | 0.327 | -1.763 | -1.628 | 0.790 | 15 |
| T(4) = | -10.276 | 0.330 | 0.332 | -1.628 | -1.604 | 0.839 | 15 |
| T(5) = | -11.811 | 0.332 | 0.331 | -1.604 | -1.655 | 0.825 | 15 |
| T(6) = | -12.323 | 0.331 | 0.331 | -1.655 | -1.655 | 0.830 | 15 |
| T(7) = | -11.811 | 0.331 | 0.332 | -1.655 | -1.664 | 0.825 | 15 |
| T(8) = | -10.276 | 0.332 | 0.330 | -1.664 | -1.628 | 0.839 | 15 |
| T(9) = | -7.721 | 0.327 | 0.336 | -1.628 | -1.763 | 0.790 | 15 |
| T(10) = | -4.131 | 0.348 | 0.314 | -1.763 | -1.258 | 0.980 | 16 |
| T(11) = | -4.556 | 0.239 | 0.037 | -1.258 | 0.000 | 0.032 | 11 |

BOTTOM CHORDS THRUST (LEFT SIDE)

THRUST (RIGHT SIDE)

| | | |
|---------|-------------|-------------|
| B(1) = | 6.190 KIPS | 6.190 KIPS |
| B(2) = | 9.252 KIPS | 9.252 KIPS |
| B(3) = | 11.300 KIPS | 11.300 KIPS |
| B(4) = | 12.323 KIPS | 12.323 KIPS |

WEB MEMBERS THRUST (LEFT SIDE)

THRUST (RIGHT SIDE)

| | | |
|---------|-------------|-------------|
| W(0) = | 5.879 KIPS | 5.879 KIPS |
| W(1) = | -0.710 KIPS | -0.710 KIPS |
| W(2) = | -3.424 KIPS | -3.424 KIPS |
| W(3) = | 2.546 KIPS | 2.546 KIPS |
| W(4) = | -2.546 KIPS | -2.546 KIPS |
| W(5) = | 1.703 KIPS | 1.703 KIPS |
| W(6) = | -1.703 KIPS | -1.703 KIPS |
| W(7) = | 0.850 KIPS | 0.850 KIPS |
| W(8) = | -0.850 KIPS | -0.850 KIPS |
| W(9) = | -0.000 KIPS | 0.000 KIPS |

STRESS REVIEW OF EACH MEMBER FOR DEAD + LIVE + CONC.

UNITS ARE KIPS PER SQ-IN

CSR = CRITICAL COMBINED STRESS RATIO

| TOP CHORD | T/A | FA1 | FA2 | (T/A)/FA2 | LT-CSR | RT-CSR | PNM-CSR |
|-----------|--------|-------|-------|-----------|--------|--------|---------|
| T(1) = | -7.66 | 25.70 | 24.02 | 0.319 | 0.245 | 0.423 | 0.302 |
| T(2) = | -6.95 | 25.70 | 24.02 | 0.289 | 0.400 | 0.471 | 0.373 |
| T(3) = | -12.96 | 25.70 | 24.02 | 0.540 | 0.664 | 0.645 | 0.602 |
| T(4) = | -17.26 | 25.70 | 24.02 | 0.719 | 0.782 | 0.787 | 0.789 |
| T(5) = | -15.86 | 26.32 | 25.95 | 0.765 | 0.869 | 0.868 | 0.878 |
| T(6) = | -20.72 | 26.32 | 25.95 | 0.798 | 0.895 | 0.895 | 0.914 |
| T(7) = | -19.86 | 26.32 | 25.95 | 0.765 | 0.868 | 0.869 | 0.878 |
| T(8) = | -17.26 | 25.70 | 24.02 | 0.719 | 0.787 | 0.782 | 0.789 |
| T(9) = | -12.96 | 25.70 | 24.02 | 0.540 | 0.645 | 0.664 | 0.602 |
| T(10) = | -6.95 | 25.70 | 24.02 | 0.289 | 0.471 | 0.400 | 0.373 |
| T(11) = | -7.66 | 25.70 | 24.02 | 0.319 | 0.423 | 0.245 | 0.302 |

| BOTTOM CHORD | | LEFT SIDE | | | RIGHT SIDE | | | |
|--------------|-------|-----------|-------|-------|------------|-------|-------|-------|
| | T/A | FA1 | FA2 | CSR | T/A | FA1 | FA2 | CSR |
| B(1) = | 10.41 | 36.00 | 36.00 | 0.289 | 10.41 | 36.00 | 36.00 | 0.289 |
| B(2) = | 15.56 | 36.00 | 36.00 | 0.432 | 15.56 | 36.00 | 36.00 | 0.432 |
| B(3) = | 19.00 | 36.00 | 36.00 | 0.523 | 19.00 | 36.00 | 36.00 | 0.528 |
| B(4) = | 20.72 | 36.00 | 36.00 | 0.576 | 20.72 | 36.00 | 36.00 | 0.576 |

| WEB MEMBERS | | LEFT SIDE | | | RIGHT SIDE | | |
|-------------|--|-----------|-------|------|------------|-------|------|
| | | T/A | FA | CSR | T/A | FA | CSR |
| W(3) = | | 24.68 | 33.00 | 0.75 | 24.68 | 33.00 | 0.75 |
| W(1) = | | -2.98 | 24.06 | 0.12 | -2.98 | 24.06 | 0.12 |
| W(2) = | | -14.38 | 24.06 | 0.60 | -14.38 | 24.06 | 0.60 |
| W(3) = | | 10.69 | 33.00 | 0.32 | 10.69 | 33.00 | 0.32 |
| W(4) = | | -10.69 | 24.06 | 0.44 | -10.69 | 24.06 | 0.44 |
| W(5) = | | 7.15 | 33.00 | 0.22 | 7.15 | 33.00 | 0.22 |
| W(6) = | | -7.15 | 24.06 | 0.30 | -7.15 | 24.06 | 0.30 |
| W(7) = | | 3.57 | 33.00 | 0.11 | 3.57 | 33.00 | 0.11 |
| W(8) = | | -3.57 | 24.06 | 0.15 | -3.57 | 24.06 | 0.15 |
| W(9) = | | -0.00 | 24.06 | 0.00 | 0.00 | 24.06 | 0.00 |

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| MADE BY RPL | DATE 5-13-75 | DIV./FILE NO. 75-002 | |
| CHECKED BY | DATE | PAGE 4 | OF 6 |

FORCES IN EACH MEMBER FOR DEAD + WIND + CONC.
 POSITIVE VALUES INDICATE TENSION
 UNITS ARE IN KIPS AND KIP-IN

| END REACTIONS | | LEFT = -1.352 | | RIGHT = -1.352 KIPS | | | |
|---------------|--------|---------------|--------|---------------------|--------|---------|----------|
| TOP CHORDS | THRUST | LEFT | RIGHT | LEFT | RIGHT | MAX | DIST. TO |
| | | SHEAR | SHEAR | MOMENT | MOMENT | PNL-MOM | PNL-MOM |
| T(1) = | 1.892 | -0.016 | -0.099 | 0.000 | 0.522 | -0.013 | 2 |
| T(2) = | 1.715 | -0.131 | -0.144 | 0.522 | 0.732 | -0.407 | 14 |
| T(3) = | 3.205 | -0.139 | -0.136 | 0.732 | 0.676 | -0.328 | 15 |
| T(4) = | 4.266 | -0.137 | -0.136 | 0.676 | 0.691 | -0.348 | 15 |
| T(5) = | 4.903 | -0.138 | -0.137 | 0.691 | 0.687 | -0.343 | 15 |
| T(6) = | 5.115 | -0.137 | -0.137 | 0.687 | 0.687 | -0.344 | 15 |
| T(7) = | 4.903 | -0.137 | -0.138 | 0.687 | 0.691 | -0.343 | 15 |
| T(8) = | 4.266 | -0.138 | -0.137 | 0.691 | 0.676 | -0.348 | 15 |
| T(9) = | 3.205 | -0.136 | -0.139 | 0.676 | 0.732 | -0.328 | 15 |
| T(10) = | 1.715 | -0.144 | -0.131 | 0.732 | 0.522 | -0.407 | 16 |
| T(11) = | 1.892 | -0.099 | -0.016 | 0.522 | 0.000 | -0.013 | 11 |

BOTTOM CHORDS THRUST (LEFT SIDE)

THRUST (RIGHT SIDE)

| | | |
|---------|-------------|-------------|
| B(1) = | -2.569 KIPS | -2.569 KIPS |
| B(2) = | -3.841 KIPS | -3.841 KIPS |
| B(3) = | -4.691 KIPS | -4.691 KIPS |
| B(4) = | -5.115 KIPS | -5.115 KIPS |

WEB MEMBERS THRUST (LEFT SIDE)

THRUST (RIGHT SIDE)

| | | |
|---------|-------------|-------------|
| W(0) = | -2.441 KIPS | -2.441 KIPS |
| W(1) = | 0.295 KIPS | 0.295 KIPS |
| W(2) = | 1.421 KIPS | 1.421 KIPS |
| W(3) = | -1.057 KIPS | -1.057 KIPS |
| W(4) = | 1.057 KIPS | 1.057 KIPS |
| W(5) = | -0.707 KIPS | -0.707 KIPS |
| W(6) = | 0.707 KIPS | 0.707 KIPS |
| W(7) = | -0.353 KIPS | -0.353 KIPS |
| W(8) = | 0.353 KIPS | 0.353 KIPS |
| W(9) = | 0.000 KIPS | -0.000 KIPS |

STRESS REVIEW OF EACH MEMBER FOR DEAD + WIND + CONC.

UNITS ARE KIPS PER SQ-IN

CSR = CRITICAL COMBINED STRESS RATIO

| TOP CHORD | T/A | FA1 | FA2 | (T/A)/FA2 | LT-CSR | RT-CSR | PNM-CSR |
|-----------|------|-------|-------|-----------|--------|--------|---------|
| T(1) = | 3.16 | 48.00 | 48.00 | 0.066 | 0.066 | 0.108 | 0.067 |
| T(2) = | 2.86 | 48.00 | 48.00 | 0.060 | 0.102 | 0.116 | 0.092 |
| T(3) = | 5.39 | 48.00 | 48.00 | 0.112 | 0.171 | 0.166 | 0.138 |
| T(4) = | 7.17 | 48.00 | 48.00 | 0.149 | 0.203 | 0.204 | 0.177 |
| T(5) = | 3.24 | 48.00 | 48.00 | 0.172 | 0.227 | 0.226 | 0.199 |
| T(6) = | 8.60 | 48.00 | 48.00 | 0.179 | 0.234 | 0.234 | 0.207 |
| T(7) = | 8.24 | 48.00 | 48.00 | 0.172 | 0.226 | 0.227 | 0.199 |
| T(8) = | 7.17 | 48.00 | 48.00 | 0.149 | 0.204 | 0.203 | 0.177 |
| T(9) = | 5.39 | 48.00 | 48.00 | 0.112 | 0.166 | 0.171 | 0.138 |
| T(10) = | 2.86 | 48.00 | 48.00 | 0.060 | 0.118 | 0.102 | 0.092 |
| T(11) = | 3.16 | 48.00 | 48.00 | 0.066 | 0.103 | 0.066 | 0.067 |

| BOTTOM CHORD | | LEFT SIDE | | | RIGHT SIDE | | | |
|--------------|-------|-----------|-------|-------|------------|-------|-------|-------|
| | | T/A | FA1 | FA2 | CSR | T/A | FA1 | FA2 |
| B(1) = | -4.32 | 34.96 | 34.61 | 0.125 | -4.32 | 34.96 | 34.61 | 0.125 |
| B(2) = | -6.46 | 34.96 | 34.61 | 0.137 | -6.46 | 34.96 | 34.61 | 0.167 |
| B(3) = | -7.89 | 29.69 | 29.06 | 0.271 | -7.89 | 29.69 | 29.06 | 0.271 |
| B(4) = | -8.60 | 29.69 | 29.06 | 0.296 | -8.60 | 29.69 | 29.06 | 0.296 |

| WEB MEMBERS | | LEFT SIDE | | | RIGHT SIDE | | |
|-------------|--------|-----------|------|-----|------------|-------|------|
| | | T/A | FA | CSR | T/A | FA | CSR |
| W(0) = | -10.25 | 22.20 | 0.46 | | -10.25 | 22.20 | 0.46 |
| W(1) = | 1.24 | 44.00 | 0.03 | | 1.24 | 44.00 | 0.03 |
| W(2) = | 5.97 | 44.00 | 0.14 | | 5.97 | 44.00 | 0.14 |
| W(3) = | -4.44 | 32.07 | 0.14 | | -4.44 | 32.07 | 0.14 |
| W(4) = | 4.44 | 44.00 | 0.10 | | 4.44 | 44.00 | 0.10 |
| W(5) = | -2.97 | 32.07 | 0.09 | | -2.97 | 32.07 | 0.09 |
| W(6) = | 2.97 | 44.00 | 0.07 | | 2.97 | 44.00 | 0.07 |
| W(7) = | -1.48 | 32.07 | 0.05 | | -1.48 | 32.07 | 0.05 |
| W(8) = | 1.48 | 44.00 | 0.03 | | 1.48 | 44.00 | 0.03 |
| W(9) = | 0.00 | 44.00 | 0.00 | | -0.00 | 44.00 | 0.00 |

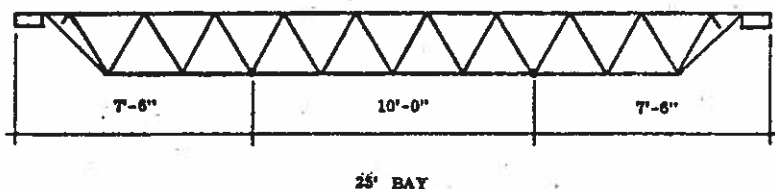
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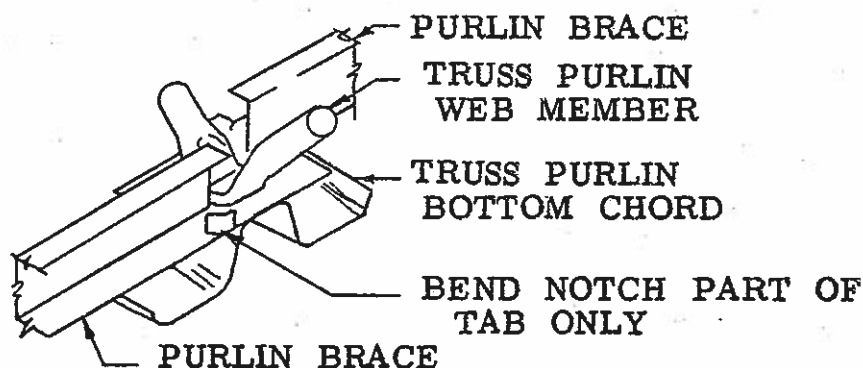
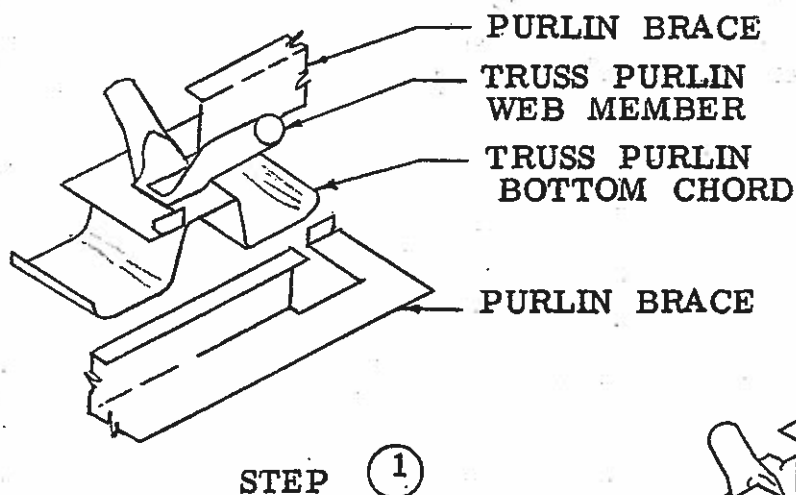
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|----------------|-----------------|-------------------------|
| MADE BY RPL | DATE 5-13-75 | DIV./FILE NO. 75-002 |
| CHECKED BY | DATE | PAGE 5 |
| | | OF 6 |

PURLIN BRACING

The Landmark Truss Purlins are braced laterally by cold-formed channel braces. These purlin braces bridge between the bottom chords in the locations shown below. These horizontal braces fasten around the purlin joint and require no fasteners. Each brace has a tab which locks the bracing in place when bent. This bracing is required to stabilize the bottom chord for compression load due to wind-uplift forces. Top chord stability is provided by the MR-24 roof system.



PURLIN BRACE LOCATIONS



STEP ②

TYPICAL PURLIN BRACE CONNECTION

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| | | |
|----------------|-----------------|---------------|
| MADE BY RPL | DATE 5-13-75 | DIV./FILE NO. |
| CHECKED BY | DATE | PAGE 6 OF 6 |