No.

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Steel Purlin

Provide C-150X50X20X3.20 mm. @ 1.00 m.

Unit Wieght = 6.96 kg/m

I_y = 280 cm^4 ; S_x = 37.40 cm^3

I_x = 28.3 " ; S_y = 8.19 cm^3

SW = 6.96 kg/m

Roof = 15.0 x 1.0 = 15 kg/m

LL = 30.0 x 1.0 = 30 "

ω_t = 59 "

$\omega_y = \omega_t \cos 20^\circ = 49$ kg/m

$\omega_x = \omega_t \sin 20^\circ = 18$ "

$M_x = \frac{1}{8} \times 49 \times 6.0^2 = 219$ kg.m

$M_y = \frac{1}{32} \times 18 \times 6.0^2 = 18$ "

$f_b = \frac{219 \times 100}{37.40} + \frac{18 \times 100}{(8.19/2)} = 1072$ ksc

$F_b = 0.60 f_y = 1440$ ksc > f_b ok

Check Deflection

$$\Delta = \frac{5 \times (49.0 \times 6.0) \times (600)^3}{384 \times 2 \times 10^6 \times 280} = 1.48 \text{ cm}$$

$\Delta_{all} = 600/240 = 2.50$ cm > Δ ok.

No.

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Truss T-1 (Span 20.00 m)

Provided: Top & Bot. Chord

C-125×65×13.4 kg/m

(A = 17.11 cm², r = 1.90 cm ; I = 424 cm⁴)

Diagonals & Vertical

2L-50×50×4

(A = 2×3.892 = 7.785 cm² ; r = 1.53 cm)

SW = (2×13.4 + 2×2.0×5.91 + 1.42×2×5.91)

= 68 kg/m

Purlin = (7.0+15.0)×6.00 = 132 kg/m

LL = 30×6.00 = 180 "

wt = 380 kg/m

$M = \frac{1}{8} \times 380 \times 20.0^2 = 19000$ kg.m

d = 0.96 m

C = T = 19000/0.96 = 19795 kg

V = 380×20/2 = 3800 kg.

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Top & Bottom Chord

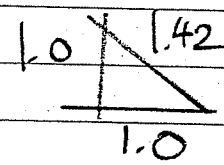
C-125x65x13.4 kg/m
(A = 17.11 cm^2 ; r_y = 1.90 cm)

$$kl/r = \frac{100}{1.90} = 53 \; ; \quad F_a = 1218 \text{ ksc}$$

P_a = 20840 kg > c.d

Diagonal & Vertical

2L-50x50x4 x3.06 kg/m
(A = 2x3.842 = 7.785 cm^2 ; r_y = 1.53 cm)

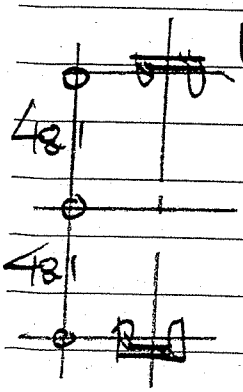


N = 3800 x 1.42
= 5396 kg

$$kl/r = \frac{142}{1.53} = 93 \; ; \quad F_a = 953 \text{ ksc}$$

P_a = 7418 kg > N.

Check Deflection



C-125x65x6x8
A = 17.11 cm^2
I = 61.8 cm^4

$$\Sigma I = 2[61.8 + (17.11 \times 48.1^2)]$$
$$= 79295 \text{ cm}^4$$

$$\Delta = \frac{5 \times (20 \times 380) \times (2000)^3}{384 \times 2 \times 10^6 \times 79295} = 5.00 \text{ cm}$$

$$\Delta_{all} = \frac{2000}{240} = 8.34 \text{ cm.} \quad \underline{OK}$$

No.

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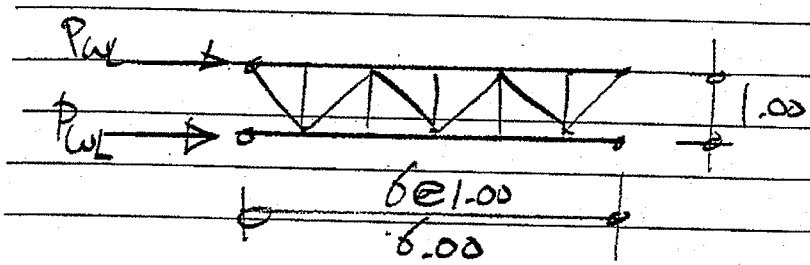
Bracing Truss - 3

Provide : Top & Bot.

[- 100 x 50 x 20 x 3.20 mm

Diagonal & Vertical

2L - 40 x 40 x 3.00 mm.



$DL = (2 \times 10 + 2 \times 2 \times 3.06 + 1.64 \times 2 \times 3.06)$

$= 45$ kg/m

$WL = (0.50 \times (8.0 + 5.5) \times 8.0)(50)$

$= 2700$ kg

$P_{WL} = 1350$ kg/Joint

$M = \frac{1}{8} \times 45 \times 6.0^2 = 203$ kg.m

$C = T = 184$ kg

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Top & Bot Chord

$N = 1350 + 184 = 1534$ kg

$\square$ - 100x50x20x3.20 mm
($A = 7.067$ cm^2, $\gamma = 1.87$ cm)

$\ell/\gamma = \frac{100}{1.87} = 54$; $F_a = 1213$ kg

$P_a = 8599$ kg

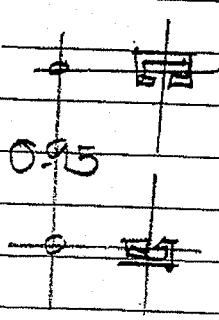
Diagonal & Vertical

2L-40x40x3.00 mm.
($A = 2 \times 2.336 = 4.692$ cm^2 ; $\gamma = 1.23$ cm)

$\ell/\gamma = 156/1.23 = 127$; $F_a = 668$ kg/cm^2

$P_a = 3121$ kg

Check Deflection

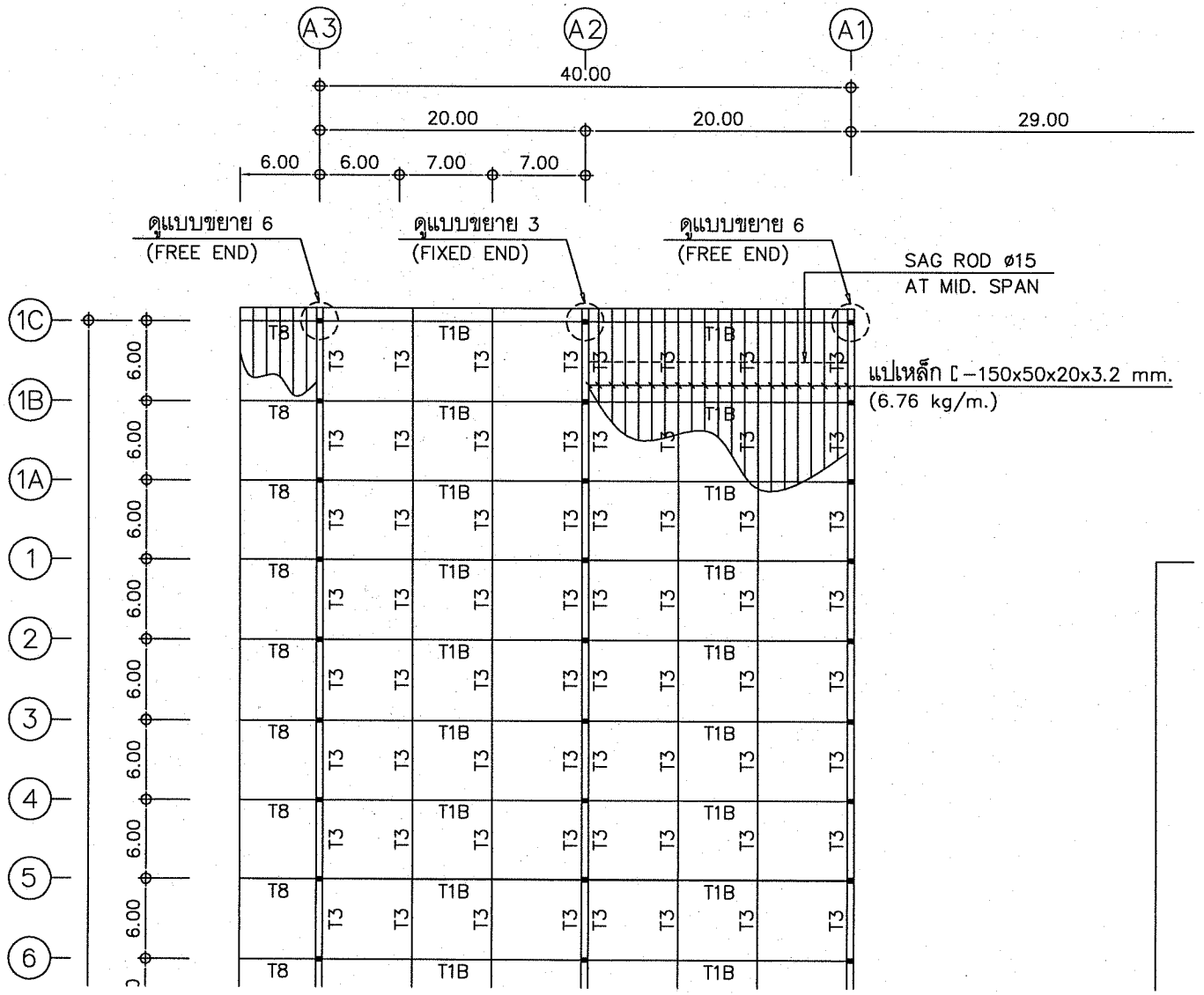


$A = 8.818$ cm^2
$I = 12.2$ cm

$I = 2[12.2 + 8.818(95/2)^2]$
$= 39813$ cm^4

$\Delta = \frac{5 \times (45 \times 6) \times (600)^3}{384 \times 2 \times 10^6 \times 39813} = 0.01$ cm

$\Delta_{all} = \frac{600}{240} = 2.50$ cm $> \Delta$ ok



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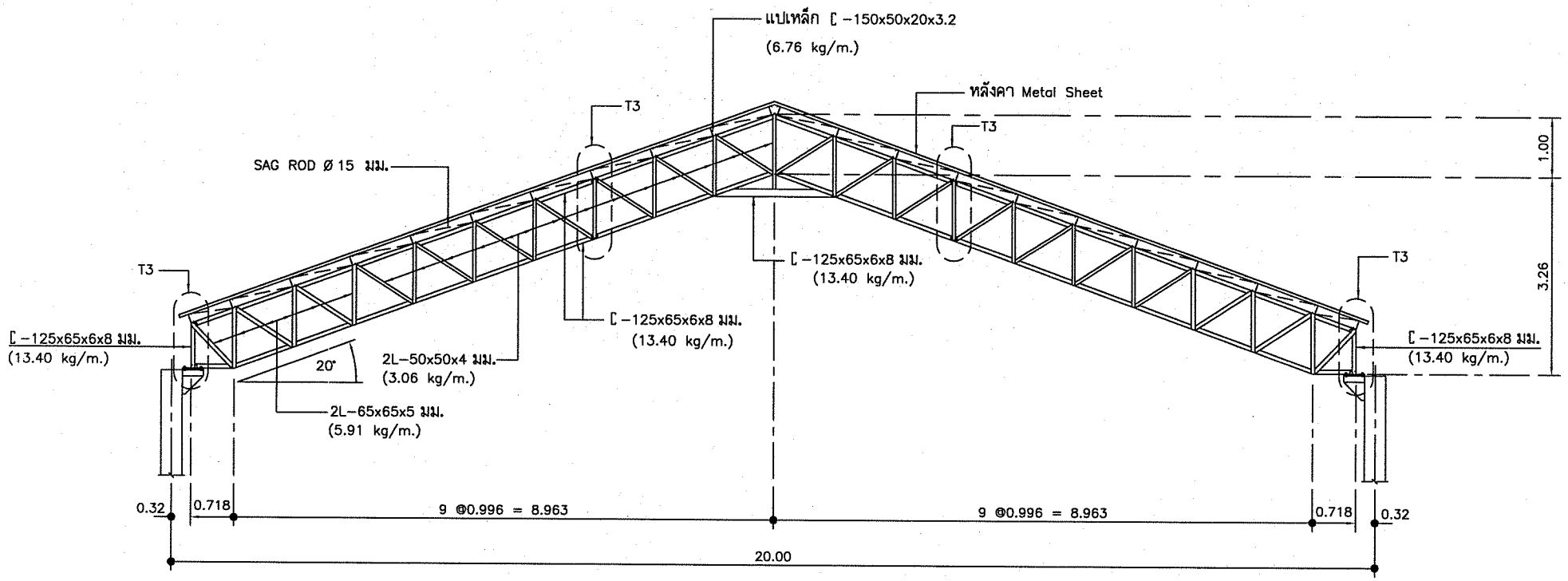

แบบขยาย T1B

มาตราส่วน 1 : 75

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