

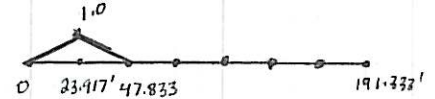
→ LARS Calculating HS-20 lane load for verticals incorrectly at symmetric points

• USE influence line from LARS TRUSS DETAIL MAIN.LIS

CHECK As-Built

SPANS 1 + 4

U1-L1 (U7-L7): Influence lines are symmetric ✓ → use U1-L1 for calcs



$$\begin{aligned} \text{LANE LOAD} &= A \times \overset{\text{uniform}}{.640 \text{ k/ft}} + 1.0 \times \overset{\text{concentrated}}{26 \text{ k}} \\ &= \frac{1}{2}(47.833')(1.0) \times .640 \text{ k/ft} + 26 \text{ k} \\ &= 41.31 \text{ k} \end{aligned}$$

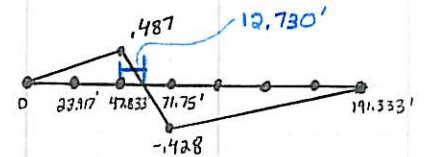
CN calcs 10/20/08 Distribution factor = 1.2787

Lane Load W/o Impact = $41.31 \text{ k} \times 1.27 = 52.46 \text{ k}$ ← Matches LARS U1-L1 not U7-L7

→ USE U1-L1 Values since they are being calculated correctly

$$.497 - \frac{.915}{23.917} \times 0$$

U2-L2 (U6-L6): Influence lines are symmetric ✓ → use U2-L2 line



$$\begin{aligned} \text{Tension LANE LOAD} &= \left[\frac{1}{2}(47.833')(.487) + \frac{1}{2}(12.730')(.487) \right] \times .640 + .487 \times 26 \text{ k} \\ &= 22.10 \text{ k} \end{aligned}$$

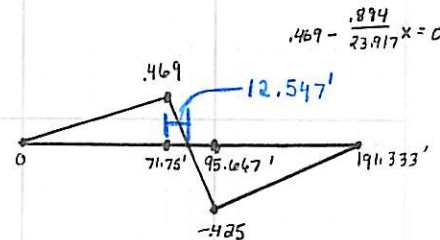
$$22.10 \text{ k} \times 1.27 = 28.07 \text{ k} \leftarrow \text{Matches LARS U2-L2 not U6-L6}$$

$$\text{Compression LANE LOAD} = \left[\frac{1}{2}(11.187')(-.428) + \frac{1}{2}(119.583')(-.428) \right] \times .640 + (-.428)(26 \text{ k}) = -29.04 \text{ k}$$

$$-29.04 \text{ k} \times 1.27 = -36.88 \text{ k} \leftarrow \text{Matches LARS U2-L2}$$

→ USE U2-L2 Values

U3-L3 (U5-L5): Influence lines symmetric ✓ → use U3-L3 line



$$\begin{aligned} \text{Tension LANE LOAD} &= \left[\frac{1}{2}(71.75')(.469) + \frac{1}{2}(12.547')(.469) \right] \times .640 + .469 \times 26 \text{ k} \\ &= 24.85 \text{ k} \\ &\times 1.27 \\ &= 31.56 \text{ k} \leftarrow \text{Matches U3-L3 + U5-L5} \end{aligned}$$

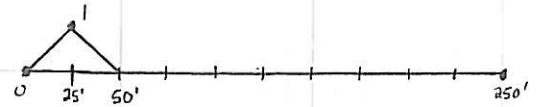
$$\begin{aligned} \text{Compression LANE LOAD} &= \left[\frac{1}{2}(11.37')(-.425) + \frac{1}{2}(95.666')(-.425) \right] \times .640 + (-.425)(26 \text{ k}) \\ &= -25.61 \text{ k} \\ &\times 1.27 \\ &= -32.52 \text{ k} \leftarrow \text{Matches U3-L3 + U5-L5} \end{aligned}$$

U4-L4 calculated previously by CN

AS-Built Continued

SPANS 2+3

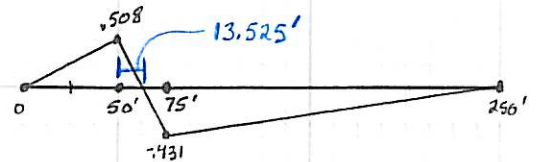
U1-L1 (U9-L9): Influence lines are symmetric ✓ → use U1-L1 formulas



$$\begin{aligned} \text{Tension Lane Load} &= \frac{1}{2}(50')(1) \times .64 \text{ k/ft} + 1.0 \times 26 \text{ k} \\ &= 42 \text{ k} \\ &\times 1.27 \\ &= 53.34 \text{ k} \leftarrow \text{Matches U1-L1} \end{aligned}$$

→ Use U1-L1 Values

U2-L2 (U8-L8): Influence lines symmetric ✓ → use U2-L2 formulas

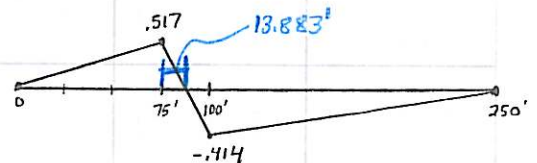


$$\begin{aligned} \text{Tension Lane Load} &= \left[\frac{1}{2}(50')(.508) + \frac{1}{2}(13.525')(.508) \right] \times .64 \text{ k/ft} + .508 (26 \text{ k}) \\ &= 23.53 \text{ k} \\ &\times 1.27 \\ &= 29.88 \text{ k} \leftarrow \text{Matches U2-L2} \end{aligned}$$

$$\begin{aligned} \text{Compression Lane Load} &= \left[\frac{1}{2}(11.475')(-.431) + \frac{1}{2}(175')(-.431) \right] \times .64 \text{ k/ft} + (-.431)(26 \text{ k}) \\ &= -36.92 \text{ k} \\ &\times 1.27 \\ &= -46.89 \text{ k} \leftarrow \text{Matches U2-L2} \end{aligned}$$

→ Use U2-L2 Values

U3-L3 (U7-L7): Influence lines are symmetric ✓ → use U3-L3 formulas



$$\begin{aligned} \text{Tension Lane Load} &= \left[\frac{1}{2}(75')(.517) + \frac{1}{2}(13.883')(.517) \right] \times .64 \text{ k/ft} + .517 (26 \text{ k}) \\ &= 28.15 \text{ k} \\ &\times 1.27 \\ &= 35.75 \text{ k} \leftarrow \text{Matches U3-L3} \end{aligned}$$

$$\begin{aligned} \text{Compression Lane Load} &= \left[\frac{1}{2}(11.117')(-.414) + \frac{1}{2}(150')(-.414) \right] \times .64 \text{ k/ft} + (-.414)(26 \text{ k}) \\ &= -32.11 \text{ k} \\ &\times 1.27 \\ &= -40.78 \text{ k} \leftarrow \text{Matches U3-L3} \end{aligned}$$

→ Use U3-L3 Values

U4-L4 and U6-L6 have completely matching values → OK ✓

U5-L5 calculated previously by CN

⇒ LARS is incorrectly calculating U6-L6 + U7-L7 of spans 1+4, U7-L7, U8-L8, U9-L9 at spans 2+3, so make calcs for AS-inspected at these

AS- Inspected Lane Loading

Verticals to be calc'd (ones with loss):

Span 1 North Truss: —

Span 1 South Truss: —

Span 2 North Truss: U7-L7, U9-L9

Span 2 South Truss: —

Span 3 North Truss: U7-L7, U8-L8, U9-L9

Span 3 South Truss: U7-L7, U8-L8, U9-L9

Span 4 North Truss: U6-L6, U7-L7

Span 4 South Truss: U7-L7

Lane Load should only control at circled values based upon their symmetric panel point results
It will control for compression

SPAN 2 North Truss U7-L7

From U3-L3 $\xrightarrow{\text{HS20}}$ Lane Load w/ Impact = -47.88 k } unfactored

DL = -36.3

U7-L7 AI Capacity = 170.9 k (op) -102.5 k (Inv) ← uses applies factors

∴

$$RF_{\text{HS20 op}} = \frac{-170.9 \text{ k} - (-36.3 \text{ k})}{-47.88 \text{ k}} = 2.81$$

$$RF_{\text{HS20 Inv}} = \frac{2.81}{1.67} = 1.68$$

↑ For Inv.

SPAN 3 North Truss U7-L7

From U3-L3 HS20 Lane w/ Impact = -47.88 k

DL = -36.3 k

AI Capacity = -155.9 k (op)

$$\therefore RF_{\text{HS20 op}} = 2.50$$

$$RF_{\text{HS20 Inv}} = 1.50$$

SPAN 3 South Truss U7-L7

see North for LL, DL

AI capacity = -155.9 k

$$\therefore RF_{\text{HS20 op}} = 2.50$$

$$RF_{\text{HS20 Inv}} = 1.50$$

SPAN 3 North Truss U8-L8

From U2-L2 HS20 Lane w/ Impact = -54.38 k

DL = -75.3 k

AI Capacity = -227.8 k op

$$\therefore RF_{\text{HS20 op}} = 2.80$$

$$RF_{\text{HS20 Inv}} = 1.68$$

SPAN 3 South Truss U8-L8

see North for LL DL

AI capacity = -230.5 k

$$\therefore RF_{\text{HS20 op}} = 2.85$$

$$RF_{\text{HS20 Inv}} = 1.71$$

SPAN 4 NORTH TRUSS U6-L6

From U2-L2 HS20 Lane w/ Impact = -44.05 k

DL = 43 k

AI Capacity = -243 k

$$\therefore RF_{\text{HS20 op}} = 4.54$$

$$RF_{\text{HS20 Inv}} = 2.72$$