TRIM LINE

UPPER BRIDGE AT SLATE RUN

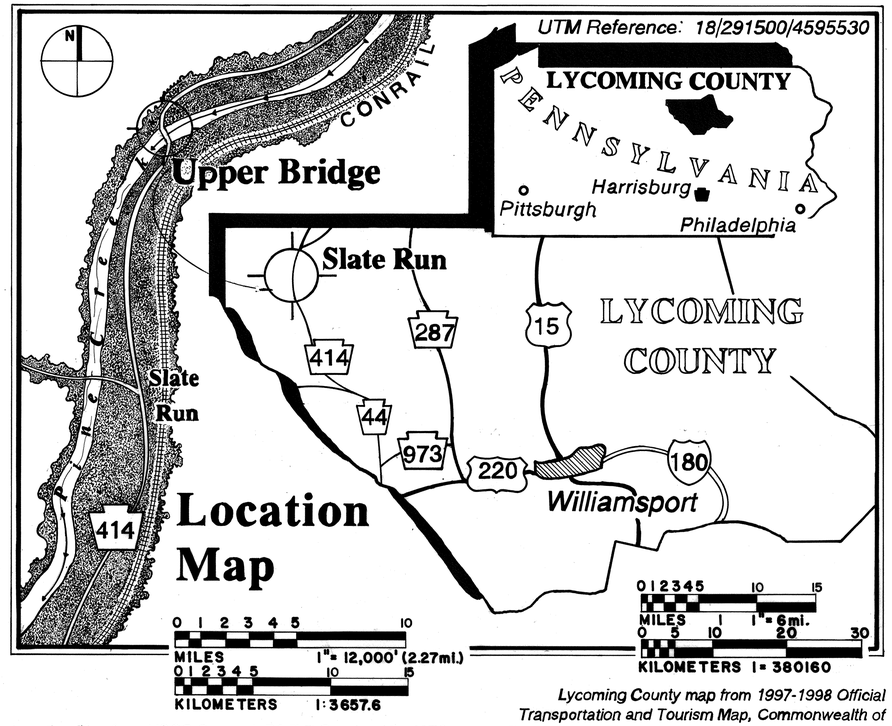
LYCOMING COUNTY, PENNSYLVANIA 1890

The Upper Bridge at Slate Run was built in 1890 by the Berlin Iron Bridge Company of East Berlin, Connecticut. This unusual truss type, which has been described as both a lattice and a Warren quintangular truss, is characterized by its lack of vertical members.

It is unclear why the Berlin Iron Bridge Company departed from their successful formula of constructing lenticular highway bridges for a remote location like the Pine Creek valley. Bridge building ideas brought in by the logging industry and the railroads that supported it may have influenced the county commissioners to choose a different type of bridge for this location, even though they contracted with Berlin for a lenticular bridge at nearby Waterville (HAER No. PA-462) the same year.

The metal lattice truss was uncommonly built in the U.S. because all of its connections are riveted. American builders typically preferred pin-connected bridges, which were statically determinate and easily assembled in the field. The statically indeterminate character of the lattice truss cannot be resolved mathematically, and it requires the additional expense and inconvenience of a field riveting apparatus.

The Upper Bridge at Slate Run was listed in the National Register of Historic Places in 1988 in recognition of its significance as a well-preserved example of a rare truss type.



Location Map from USGS Cammal, PA 7.5' Quadrangle, 1973.

Lycoming County map from 1997-1998 Official Transportation and Tourism Map, Commonwealth of Pennsylvania, Department of General Services, 1997.

The Pennsylvania Historic Bridges Recording Project - I is a part of the Historic American Engineering Record (HAER), a long-range program of documenting historically significant engineering, industrial, and maritime sites in the United States. The HAER program is administered by the National Park Service, U.S. Department of the Interior. The Pennsylvania Historic Bridges Recording Project - I was co-sponsored during the summer of 1997 by HABS/HAER under the general direction of E. Blaine Cliver, Chief; the Pennsylvania Department of Transportation, Bureau of Environmental Quality, Wayne W. Kober, Director; and the Pennsylvania Historical and Museum Commission, Brent D. Glass, Executive Director and State Historic Preservation Officer.

The fieldwork, measured drawings, historical reports, and photographs were prepared under the direction of Eric DeLony, Chief of HAER. The team consisted of Robert W. Grzywacz, Architectural Supervisor (Architect, New Haven, CT); Slavica Bubic (ICOMOS, Republic of Croatia), Jonathan Cherry (Rice University), Michael Falser (ICOMOS, Austria), and Elizabeth Milnarik (University of Illinois, Urbana - Champaign), Architects; Dr. Mark M. Brown (Pittsburgh, PA), Project Historian; J. Philip Gruen (University of California, Berkeley), Dr. David Rotenstein (Pittsburgh, PA), and Blythe Semmer (Middle Tennessee State University), Historians; Dr. Dario Gasparini, PE (Case Western University) and Stephen Buonopane (Cornell University), Engineers, and Joseph Elliott, Photographer.

HISTORIC AMERICAN ENGINEERING RECORD
PA-460

SHEET 1 of 5

PENNSYLVANIA

UPPER BRIDGE AT SLATE RUN – 1890
SPANNING PINE CREEK AT S.R. 414
LYCOMING COUNTY

SLATE RUN VIC.

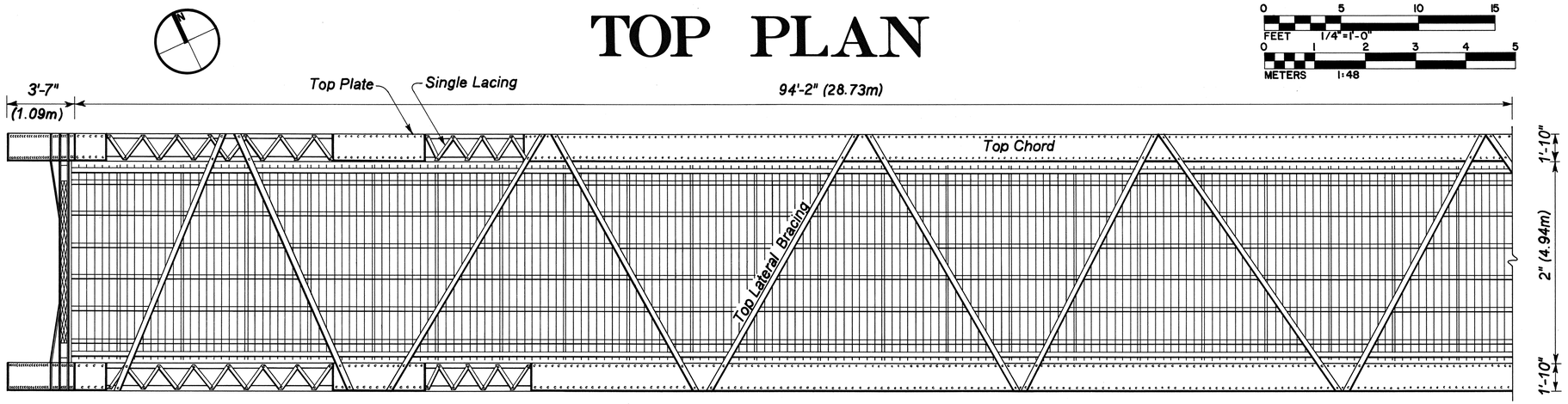
PENNSYLVANIA HISTORIC BRIDGES RECORDING PROJECT - I
UNITED STATES DEPARTMENT OF THE INTERIOR

DELINEATED BY: ELIZABETH MILNARIK and SLAVICA BUBIC 1997

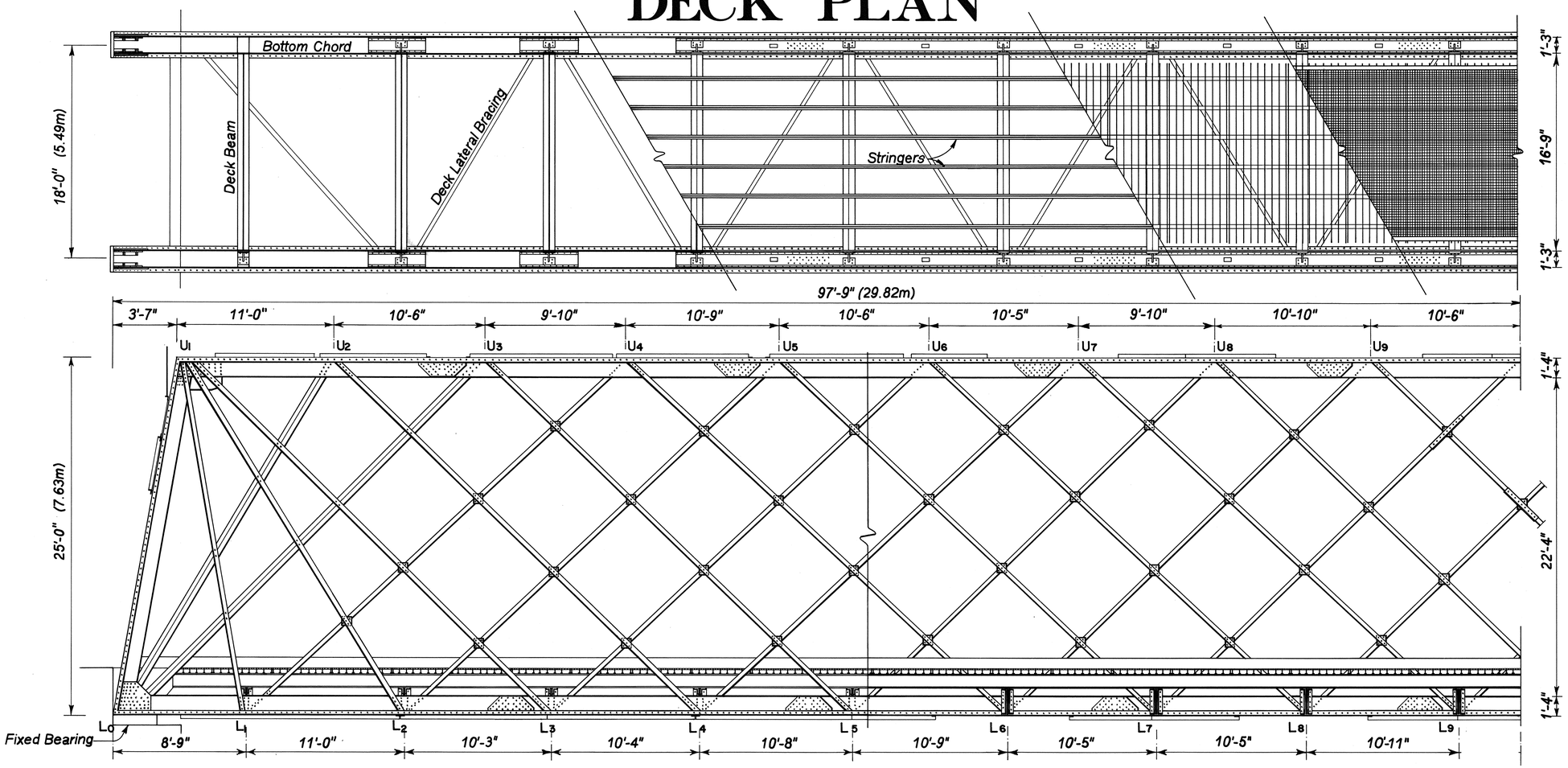
TRIM LINE

TRIM LINE

TOP PLAN



DECK PLAN



12" "I" stringer and 5" open grid steel floor are not original. Original deck system is unknown.

ELEVATION

SECTION

0 5 10 15
FEET 1/4"=1'-0"
0 1 2 3 4 5
METERS 1:48

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SHEET 2 OF 5

PENNSYLVANIA

UPPER BRIDGE AT SLATE RUN - 1890
SPANNING PINE CREEK AT S.R. 414
LYCOMING COUNTY

SLATE RUN VIC.

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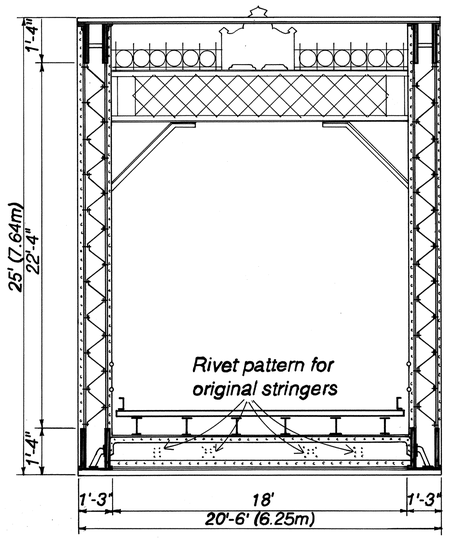
TRIM LINE

CROSS SECTION A-A



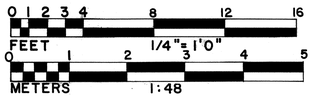


TABLE OF MEMBER SIZES

DIAGONAL COMPRESSION MEMBERS

U_4-L_1 U_{16}-L_{18}
U_5-L_2 U_{15}-L_{17}
U_6-L_3 U_{14}-L_{16}
U_7-L_4 U_{13}-L_{15}
U_8-L_5 U_{12}-L_{14}
U_9-L_6 U_{11}-L_{13}
U_{10}-L_7 U_{10}-L_{12}
U_{11}-L_8 U_9-L_{11}
U_{12}-L_9

(2) ANGLES 3" x 3" x 1/2"
2-1/4" x 1/2" SINGLE LACING

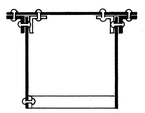
U_2-L_0
U_3-L_0
U_{17}-L_{19}

(4) ANGLES 3" x 3" x 1/2"
2-1/4" x 1/2" SINGLE LACING

TOP CHORD

U_1-U_{19}

(2) ANGLES 3" x 3" x 1/2"
(2) PLATES 16" x 1/2"
(2) ANGLES 3" x 3" x 1/2"
154' 2" long
(1) PLATE 128' 0" x 22" x 1/2"
(2) PLATES 6' 2" x 22" x 1/2"
(2) PLATES 2' 0" x 22" x 1/2"
2" x 1/2" SINGLE LACING (top)
2" x 1/2" SINGLE "Z" STRAPPING



DIAGONAL TENSION MEMBERS

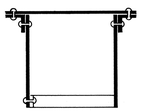
U_1-L_1 U_{19}-L_{18}
U_1-L_2 U_{19}-L_{17}
U_1-L_3 U_{19}-L_{16}
U_2-L_4 U_{18}-L_{15}
U_3-L_5 U_{17}-L_{14}
U_4-L_6 U_{16}-L_{13}
U_5-L_7 U_{15}-L_{12}
U_6-L_8 U_{14}-L_{11}
U_7-L_9 U_{13}-L_{10}
U_8-L_{10}

(2) ANGLES 3" x 3" x 1/2"

END POST

U_1-L_0
U_{19}-L_{19}

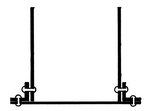
(2) ANGLES 3" x 3" x 1/2"
(2) PLATES 16" x 1/2"
(1) PLATE 22" x 1/2 "
2" x 1/2" SINGLE "Z" STRAPPING



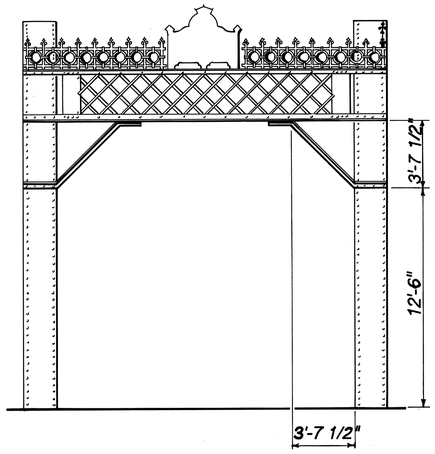
BOTTOM CHORD

L_0-L_{19}

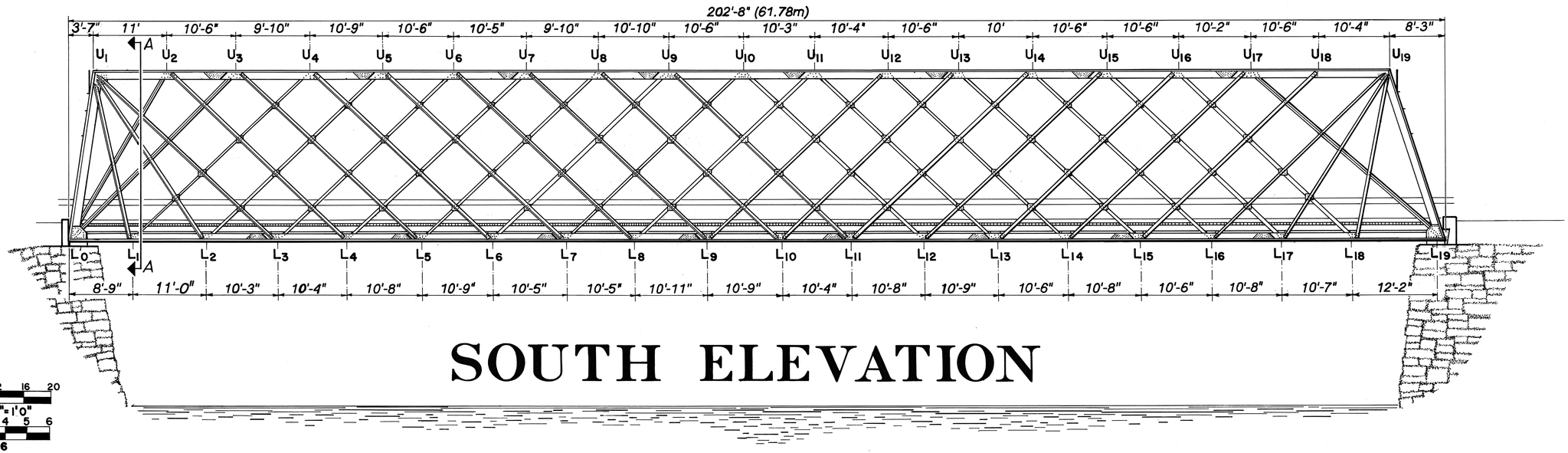
(2) ANGLES 3" x 3" x 1/2"
(2) PLATES 16" x 1/2"
(1) PLATE 117' 4" x 22" x 1/8"
(4) PLATES 4' 0" x 22" x 1/8"
(2) PLATES 1' 0" x 22" x 1/8"



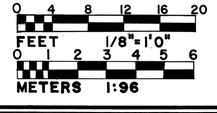
EAST ELEVATION



Slate Run is considered "quintangular" because it is composed of 5 overlapping Warren trusses. Each spans 5 chord panel points before reaching a point of repetition. Thus, the first truss starts at point L_0, rises to U_3 and falls back to L_5; the four other trusses can be thought of as starting at L_1, L_2, L_3, and L_4 respectively.



SOUTH ELEVATION



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SHEET 3 OF 5

PENNSYLVANIA

UPPER BRIDGE AT SLATE RUN – 1890
SPANNING PINE CREEK AT S. R. 414
LYCOMING COUNTY

SLATE RUN VIC.

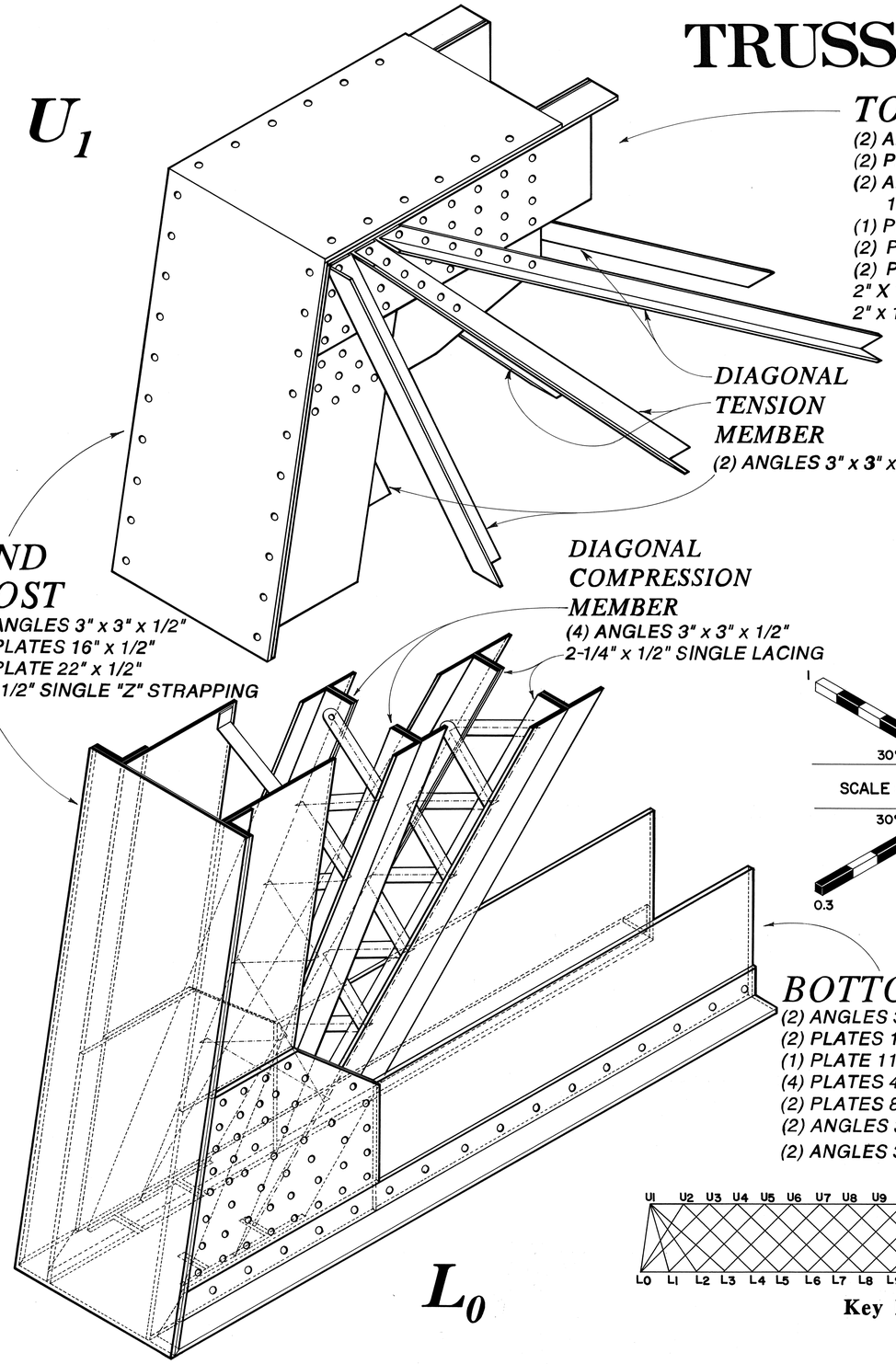
DELINEATED BY: ELIZABETH MILNARIK and SLAVICA BUBIC 1997

PENNSYLVANIA HISTORIC BRIDGES RECORDING PROJECT – 1
NATIONAL PARK SERVICE
UNITED STATES DEPARTMENT OF THE INTERIOR

TRIM LINE

TRUSS DETAILS

U_1



TOP CHORD
(2) ANGLES 3" x 3" x 1/2"
(2) PLATES 16" x 1/2"
(2) ANGLES 3" x 3" x 1/2"
154'-0" long
(1) PLATE 128'-0" x 22" x 1/2"
(2) PLATES 6'-2" x 22" x 1/2"
(2) PLATES 2'-0" x 22" x 1/2"
2" X 1/2" SINGLE LACING (top)
2" x 1/2" SINGLE "Z" STRAPPING

DIAGONAL TENSION MEMBER
(2) ANGLES 3" x 3" x 1/2"

END POST
(2) ANGLES 3" x 3" x 1/2"
(2) PLATES 16" x 1/2"
(1) PLATE 22" x 1/2"
2" x 1/2" SINGLE "Z" STRAPPING

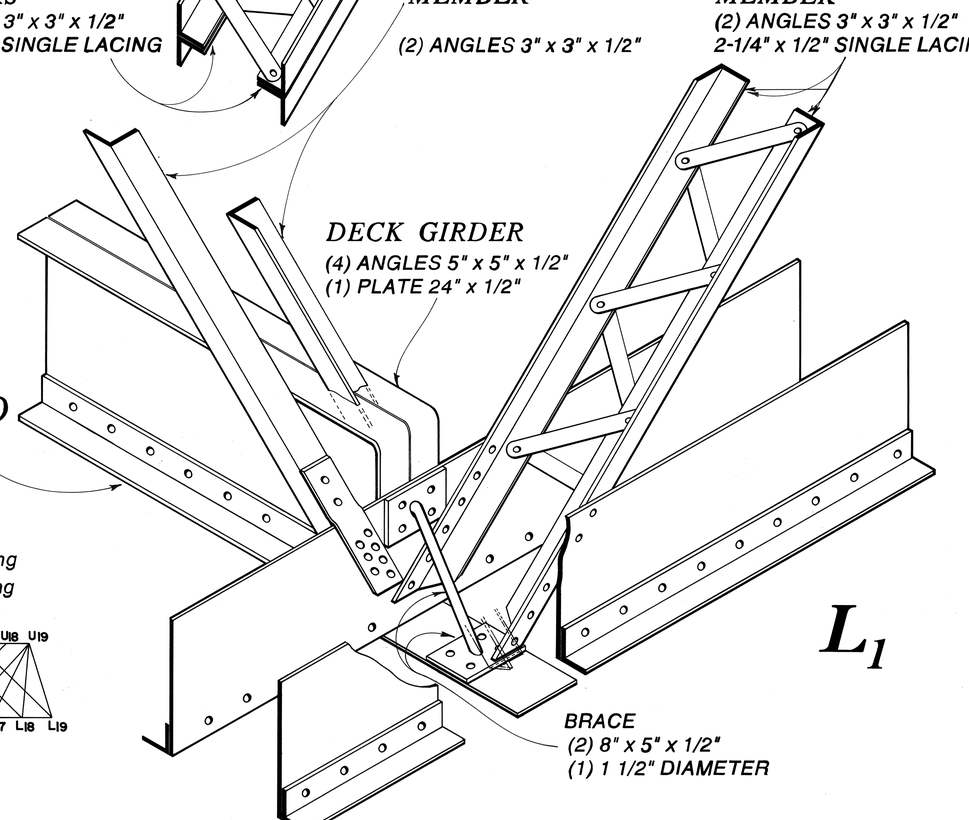
DIAGONAL COMPRESSION MEMBER
(4) ANGLES 3" x 3" x 1/2"
2-1/4" x 1/2" SINGLE LACING

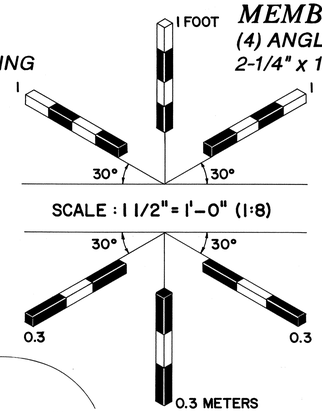
DIAGONAL COMPRESSION MEMBERS
(4) ANGLES 3" x 3" x 1/2"
2-1/4" x 1/2" SINGLE LACING

DIAGONAL TENSION MEMBER
(2) ANGLES 3" x 3" x 1/2"

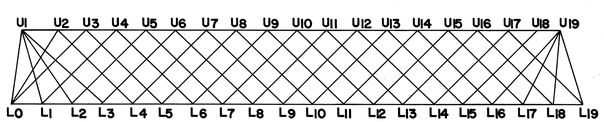
DIAGONAL COMPRESSION MEMBER
(2) ANGLES 3" x 3" x 1/2"
2-1/4" x 1/2" SINGLE LACING

U_4





BOTTOM CHORD
(2) ANGLES 3" x 3" x 1/2"
(2) PLATES 16" x 1/2"
(1) PLATE 117'-4" x 22" x 1/8"
(4) PLATES 4'-0" x 22" x 1/8"
(2) PLATES 8" x 22" x 1/8"
(2) ANGLES 3" x 3" x 1/2", 117'-4" long
(2) ANGLES 3" x 3" x 1/2", 4'-0" long



Key Elevation

DECK GIRDER
(4) ANGLES 5" x 5" x 1/2"
(1) PLATE 24" x 1/2"

BRACE
(2) 8" x 5" x 1/2"
(1) 1 1/2" DIAMETER

L_0

L_1

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PENNSYLVANIA HISTORIC BRIDGES RECORDING PROJECT – 1
CONDUCTED FOR THE HISTORIC AMERICAN ENGINEERING RECORD
UNITED STATES DEPARTMENT OF THE INTERIOR

UPPER BRIDGE AT SLATE RUN – 1890
SPANNING PINE CREEK AT S.R. 414
LYCOMING COUNTY PENNSYLVANIA
SLATE RUN VIC.

HISTORIC AMERICAN ENGINEERING RECORD PA-460

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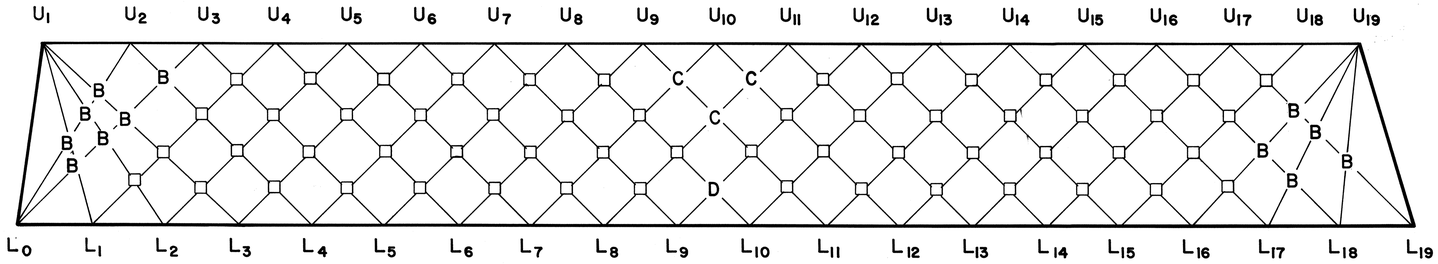
TRUSS WEB INTERSECTION DETAILS



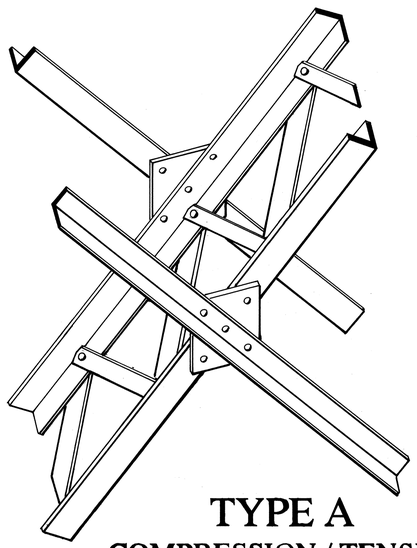
KEY PLAN

DIAGONAL INTERSECTIONS

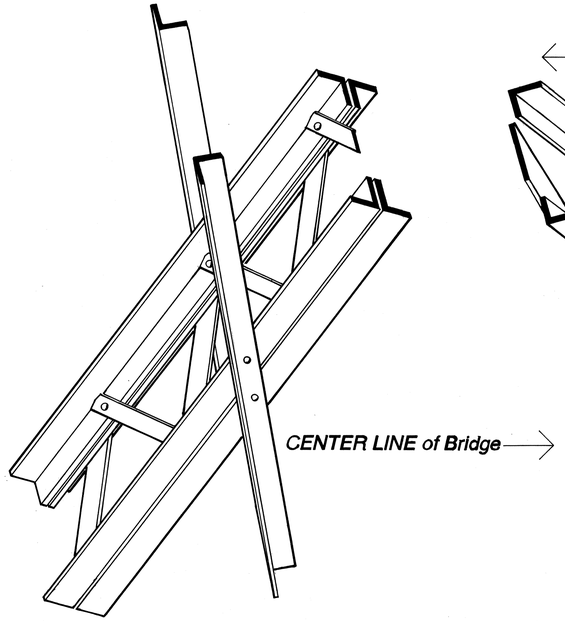
Compression / Tension	*(Type A)*	*(2) 8" x 8" x 1/2" GUSSET PLATES*
Oblique / Double Angle	*(Type B)*	*RIVETS without GUSSET PLATE*
Compression / Compression	*(Type C)*	*(2) 8" x 8" x 1/2" GUSSET PLATES*
		(2) 3" x 3" x 1/2" SPLICE ANGLES
Tension / Tension	*(Type D)*	*(2) 3" x 3" x 1/2" SPLICE ANGLES*

Please consult KEY PLAN for the location of each Intersection.

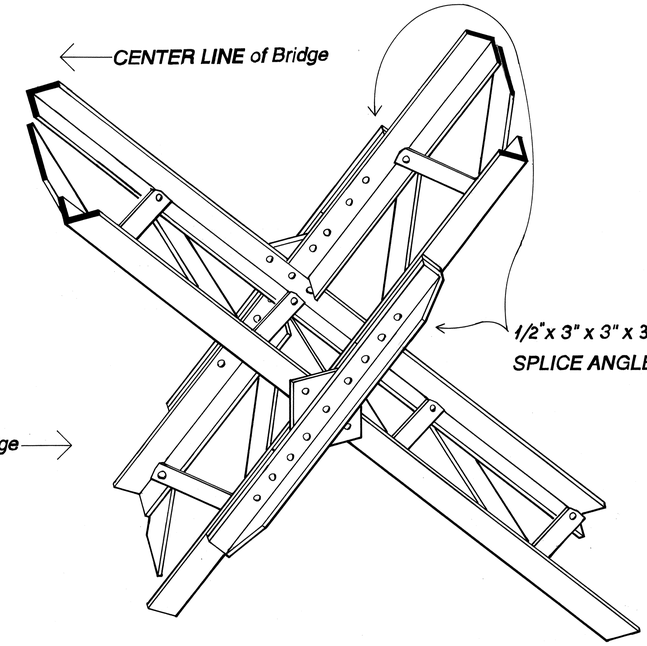
Square intersection symbols indicate INTERSECTION TYPE A (Typical).



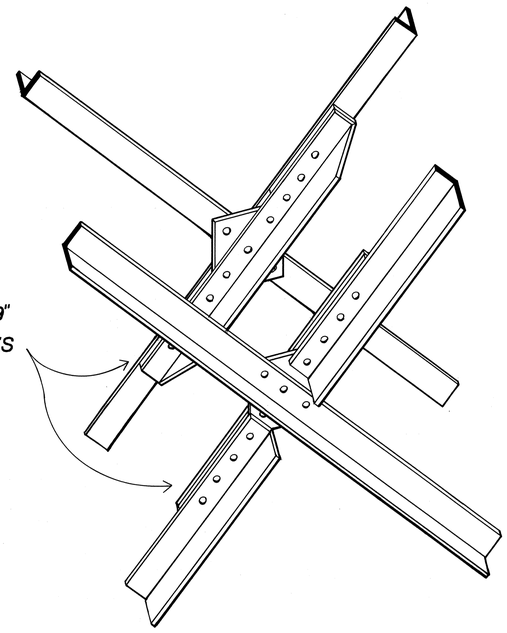
TYPE A
COMPRESSION / TENSION INTERSECTION



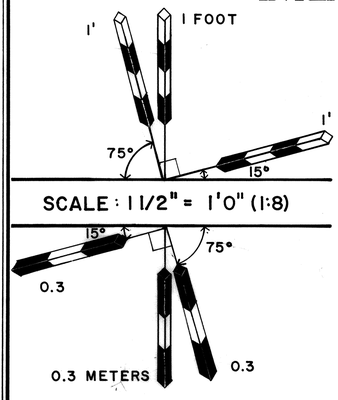
TYPE B
OBLIQUE / DOUBLE ANGLE INTERSECTION



TYPE C
COMPRESSION / COMPRESSION INTERSECTION

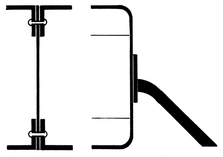


TYPE D
TENSION / TENSION INTERSECTION



DECK GIRDERS

AT PANEL POINTS *(4) ANGLES 5" x 5" x 1/2"*
(1) PLATE 24" x 1/2"
(1) BRACE (each girder end)
(2) PLATE 8" x 5" x 1/2"
(1) 1 1/2" DIAMETER STRUT



LATERAL BRACING

$U_{1\ SOUTH}$ *to* $U_{19\ SOUTH}$	*(1) ANGLE 3" x 3" x 3/8" (single laced)*
$L_{1\ SOUTH}$ *to* $L_{18\ NORTH}$	*(1) ANGLE 3" x 3" x 3/8" (single laced)*

PORTAL BRACES

BOTH ENDS *(2) ANGLES 3" x 3" x 1/2"*
(1) ANGLE BRACE 61" x 3" x 3" x 1/2" (angled fastening returns)

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HISTORIC AMERICAN ENGINEERING RECORD
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SHEET 5 OF 5

PENNSYLVANIA

UPPER BRIDGE AT SLATE RUN - 1890
SPANNING PINE CREEK AT S.R. 414
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SLATE RUN VIC.