

TRUSSES

A STUDY BY THE
HISTORIC AMERICAN ENGINEERING RECORD

A TRUSS IS COMPOSED OF STRUCTURAL TRIANGLES JOINED TOGETHER WITH PINNED OR WELDED CONNECTIONS. THE MAIN MEMBERS OF MEMBERS MAY BE EITHER STIFF HEAVY STRUTS OR THIN SKELETON BARS. IT IS THE ARRANGEMENT OF THESE MEMBERS THAT DETERMINES THE SPECIFIC TRUSS TYPE.

STRUCTURAL MEMBERS RESIST FORCES IN TWO PRIMARY WAYS — COMPRESSION AND TENSION. HEAVY RIGID MEMBERS MAY RESIST BOTH COMPRESSIVE AND TENSILE FORCES BUT THIN RODS CAN ONLY RESIST TENSION AND THESE CHARACTERISTICS MUST BE KEPT IN TRUSS IDENTIFICATION. NOTE THAT THE MAIN STRUCTURAL MEMBERS OF A TRUSS PANEL MAY BE SUBDIVIDED BY THIN JOINTING TIES. REINFORCING TRUSS TYPES ARE NOT DETERMINED BY THEIR MAIN STRUCTURAL MEMBERS THESE COUNTER MEMBERS (INDICATED BY DASHED LINES) MATCHING THE STRUCTURAL OUTLINE OF THE TRUSS IN QUESTION WITH THE DIAGRAM IT MOST RESEMBLES CHECK TO MAKE SURE THE ARRANGEMENT OF HEAVY COMPRESSION AND LIGHT TENSION MEMBERS IS COMPATIBLE WITH THE DIAGRAM. IF THERE IS AGREEMENT THEN

THE BASIC TRUSS TYPE IS IDENTIFIED.

THE SHEET OF TRUSS DIAGRAMS PRESENTS ONLY THE SYMMETRIC FORMS OF THE MOST COMMON TRUSSES. THERE ARE ALSO MANY SPECIAL TRUSSES THAT DO NOT FALL INTO EASILY DEFINED CATEGORIES. IN SUCH CASES IDENTIFICATION SHOULD BE MADE AS CLOSE AS POSSIBLE IN TERMS OF THE STANDARD DESIGN. ADDITIONALLY, TRUSSES SYSTEM ARE INVERTED, CREATING QUOTE DIFFERENT FROM THE ORIGINAL TENSION MEMBERS BECOMING COMPRESSION MEMBERS AND VICE VERSA BEING ASSUMING A TRUSS IS NOT REPRESENTED ON THE DIAGRAM, CHECK TO SEE IF IT IS AN INVERTED FORM.

NOT ALL BRIDGE TRUSSES ARE OF THESE BASIC TYPES. IF THE DECK AND FLOOR BEAMS ARE LEVEL WITH THE BOTTOM CHORDS, IT IS A THROUGH TRUSS. A DECK TRUSS IS A THROUGH TRUSS WITH NO LATERAL BRACING BETWEEN TOP CHORDS. A DECK TRUSS CARRIES ITS TRAFFIC LOAD LEVEL WITH THE TOP CHORDS.

TRUSS BRIDGES

LONGITUDINAL ELEVATION

LONGITUDINAL ELEVATION

LONGITUDINAL ELEVATION

TRANSVERSE SECTION
THROUGH TRUSS

TRANSVERSE SECTION
PONY TRUSS

TRANSVERSE SECTION
DECK TRUSS

ROOF TRUSSES

FINK
THIS IS A VARIATION OF THE FINK TRUSS SHOWN IN THE OPPOSITE DIAGRAM

PRATT
DIAGONALS IN TENSION

SAWTOOTH
USUALLY USED TO ALLOW NATURAL LEAKING OF LARGE FLOOD WATERS.

SCISSORS
USUALLY USED FOR LARGE WAT-ERED CEILING

BELGIAN
DIAGONALS PERPENDICULAR TO TOP CHORDS

HOWE
DIAGONALS IN COMPRESSION

HOWE
DIAGONALS IN COMPRESSION

THREE-HINGED ARCH
USED FOR EXCEPTIONALLY LONG SPANS

STRUCTURAL CONNECTIONS

PIN CONNECTION

RIVETED CONNECTION

The Historic American Engineering Record collects detailed information on metal truss bridges. This illustration shows how truss designs vary.

