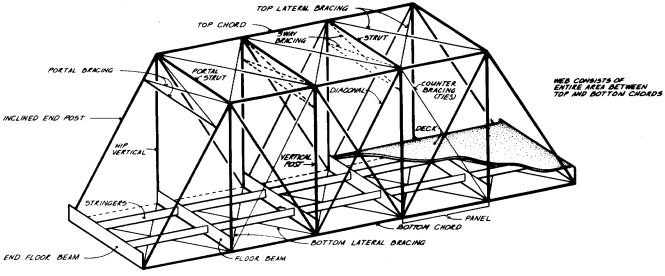


TRUSSES

A STUDY BY THE

HISTORIC AMERICAN ENGINEERING RECORD

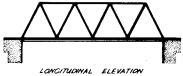
A TRUSS IS COMPOSED OF STRUCTURAL TRIANGLES JOINED TOGETHER WITH PINNED OR RIVETED CONNECTIONS. THE MAIN PIECES OR MEMBERS MAY BE EITHER STIFF HEAVY STRUTS, POSTS OR THIN FLEXIBLE RODS. IT IS THE ARRANGEMENT OF THESE MEMBERS THAT DETERMINES THE SPECIFIC TRUSS TYPE.

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 ARE MAJOR CLUES IN TRUSS IDENTIFICATION. NOTE THAT THE MAIN STRUCTURAL MEMBER OF A TRUSS CAN ONLY BE SUPPLEMENTED BY THIN DIAGONAL TIES. BECAUSE THE TRUSS IS ALSO DEFINED BY THE MAIN STRUCTURAL MEMBERS THESE CRITICAL ASPECTS ARE INDICATED AS A GUIDE TO THE IDENTIFICATION SHEETS. MAY BE IGNORED AFTER 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.

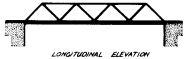
THE SHEET OF TRUSS DIAGRAMS PRESENTS ONLY THE STANDARD FORMS OF THE MOST COMMON TRUSSES. THERE ARE ALSO MANY "HYBRID" TRUSSES THAT DO NOT FALL INTO EASILY DEFINED CATEGORIES. IN SUCH CASES IDENTIFICATION SHOULD BE MADE AS CLOSELY AS POSSIBLE IN TERMS OF THE STANDARD DESIGNS. ADDITIONALLY TRUSSES OFTEN ARE INVERTED, CREATING OUTLINES QUITE DIFFERENT FROM THE ORIGINAL — TENSION MEMBERS BECOMING COMPRESSION MEMBERS AND VICE VERSA. BEWARE ASSUMING A TRUSS IS NOT REPRESENTED ON THE DIAGRAM. CHECK TO SEE IF IT IS AN INVERTED FORM.

MOST BRIDGE TRUSSES ARE OF THREE BASIC TYPES. IF THE DECK AND FOOTPATHS ARE LEVEL WITH THE BOTTOM CHORDS, IT IS A "THROUGH" TRUSS. A "PONY" 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



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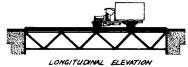


LONGITUDINAL ELEVATION

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 BRIDGE DIAGRAM

PRATT

DIAGONALS IN TENSION

SAWTOOTH

USUALLY USED TO ALLOW NATURAL LIGHTING OF LARGE FLOOR AREAS.

SCISSORS

USUALLY USED FOR LARGE VAULTED CEILINGS

BELGIAN

DIAGONALS PERPENDICULAR TO TOP CHORDS

HOWE

DIAGONALS IN COMPRESSION

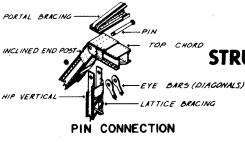
HOWE

DIAGONALS IN COMPRESSION

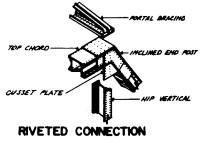
THREE-HINGED ARCH

USED FOR EXCEPTIONALLY LONG SPANS.

STRUCTURAL CONNECTIONS



PIN CONNECTION



RIVETED CONNECTION