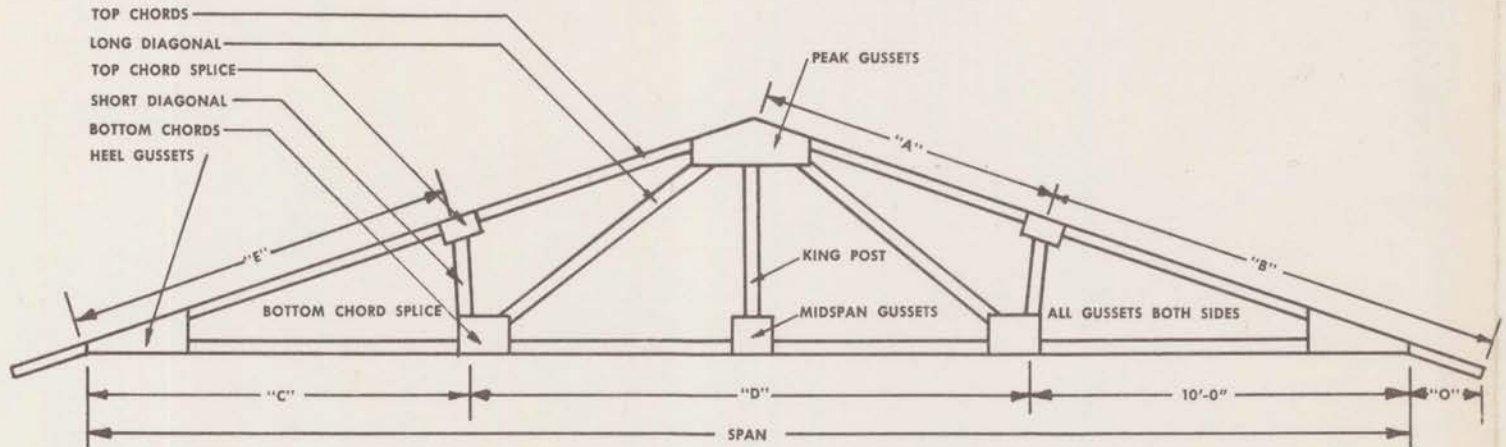


# 4/12 NAIL-GLUED ROOF TRUSS

2' ON CENTER, 29'-0" TO 34'-8"



## DESIGN AND PERFORMANCE DATA

### STRUCTURAL DESIGN DATA

The graphical methods of analysis are unreliable in calculating stresses in the nail-glued truss. They do not consider the combined stresses due to secondary bending caused by the extreme rigidity of the nail-glued joint. This truss design is based upon full-scale test results. Two tests were performed: load and recovery; and load-to-destruction.

For the load-and-recovery test, each of three trusses were positioned in a hydraulic testing facility with the cylinders applying loads at one-foot intervals along the top chords.

An initial load of 10 pounds per square foot, representing the dead load, was applied before beginning deflection readings. Live loads were applied in increments of 10 pounds per square foot and deflection readings were taken along the bottom chords of the trusses. After each increment was applied, the entire live load was removed and the residual deflections recorded. After removal of the design live load of 30 pounds per square foot, the residual deflection averaged .003 inches. The loads were increased until a live load of 100 pounds per square foot was recorded.

For the load-to-destruction test, load was applied to the trusses until failure occurred. An average failure load, for three trusses, was recorded at 115 psf.

Failure occurred in the 2 x 4 chord members at various locations. No glue-line connection failures were observed.

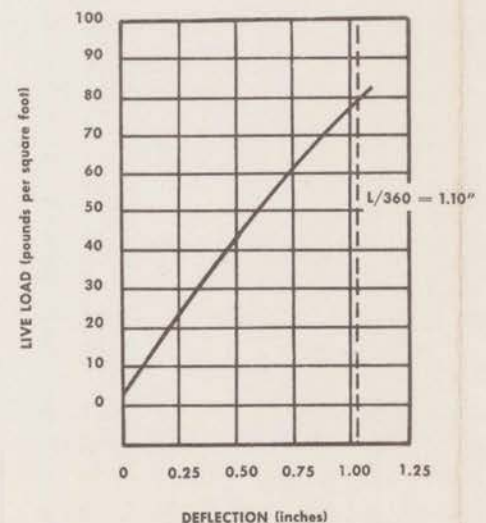
### DESIGN DATA

Span: 29'-0" to 34'-8"  
Slope: 4/12

Dead Load	10 psf
Live Load	30 psf
Total	40 psf

### ACTUAL TEST DATA (average of 3 trusses)

Deflection at 30 psf. live load	0.42"
Average residual set after release of 30 psf.	0.010"
Average residual set after release of 100 psf.	0.18"
TOTAL LOAD at Failure	115 psf



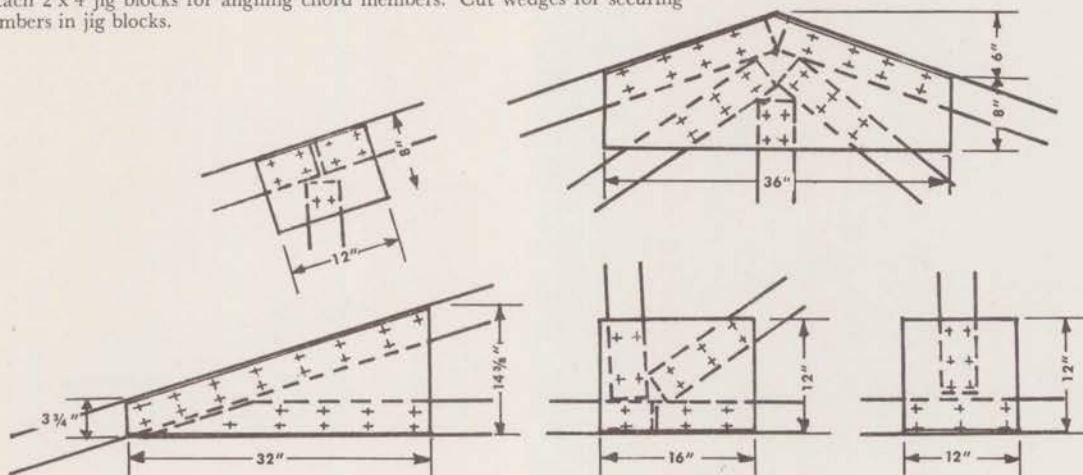
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# " SPANS

## FASTEN GUSSETS

Use 6d nails 4" o.c., or 1 $\frac{1}{4}$ " power driven fasteners 3" o.c., for attaching the gussets to the framing members.

Attach 2 x 4 jig blocks for aligning chord members. Cut wedges for securing members in jig blocks.



## MATERIALS AND NAIL-GLUING

The quality of material and workmanship is important to the ultimate strength of the truss. Good judgment in the selection of materials must be used and the simple rules for nail-gluing and truss handling, as set forth in Small Homes Council Instruction Sheet #1, *Nail-Gluing of Roof Trusses and Frames and Other Structural Components*, must be followed.

Lumber for the trusses should be "1500P" stress-rated (rated by visual inspection or machine). In all cases, the moisture content of the lumber should be between 12 to 18 per cent.

Use unsanded plywood, structural interior type, 1/2" thick, but for humid areas use plywood with an exterior glue line. The plywood must meet Commercial Standard CS45-60 as certified by an approved testing laboratory.

**Glue:** The Test Trusses were fabricated with Phenol-resorcinol adhesives (Federal Specification Mil-A-397B). This is recommended for

trusses to be used in structures where high humidity is expected. Casein glue (Federal Specification MMM-A-125, Type II) is suitable for nail-gluing when high humidity is not expected. Mix the glue according to the manufacturers instructions. After assembly, stack the units and do not handle them during the curing period. Do not stack the units outside, unprotected from the rain.

Use 6d nails 4" o.c., or 1 $\frac{1}{4}$ " power driven fasteners 3" o.c., for attaching the gussets to the framing members. Nail in two rows and space 3/4" from the edges.

Fabricate and cure the trusses above 50° F. When the temperature is between 50° F and 70° F, a 16-hour curing period is necessary; when the temperature is 70° F or above, an 8-hour curing period is needed. A minimum curing temperature of 70° F is required for waterproof adhesives.

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Responsibility for roof trusses built from these plans shall rest with the user of these plans and in no wise on the University of Illinois. When variations from the original plans are incorporated by the user, the roof trusses so built shall not be represented as having been built from a design developed by the University of Illinois.