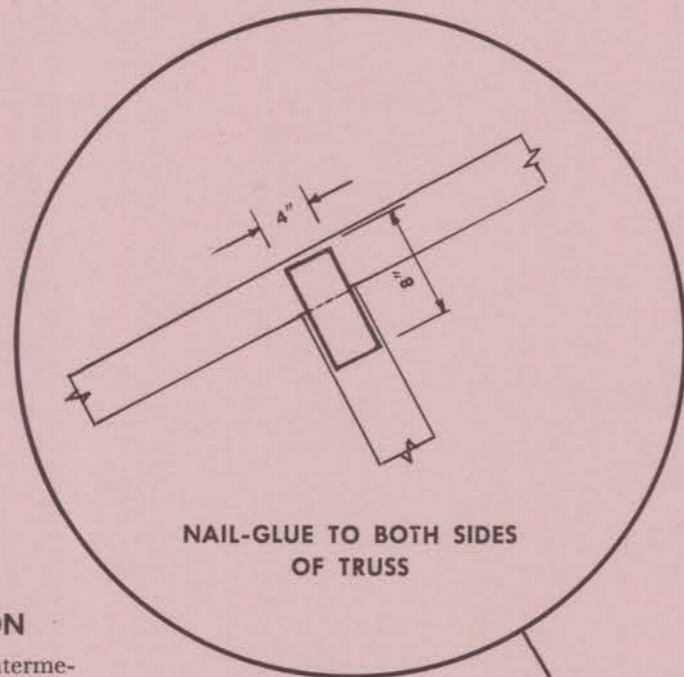


VARIATIONS FOR BUILDING THE NAIL-GLUED "W" ROOF TRUSS

TOP-CHORD SCAB DETAIL

Replace 1" x 4" solid wood scabs with plywood scabs.



NAIL-GLUE TO BOTH SIDES OF TRUSS

PEAK JOINT DETAIL

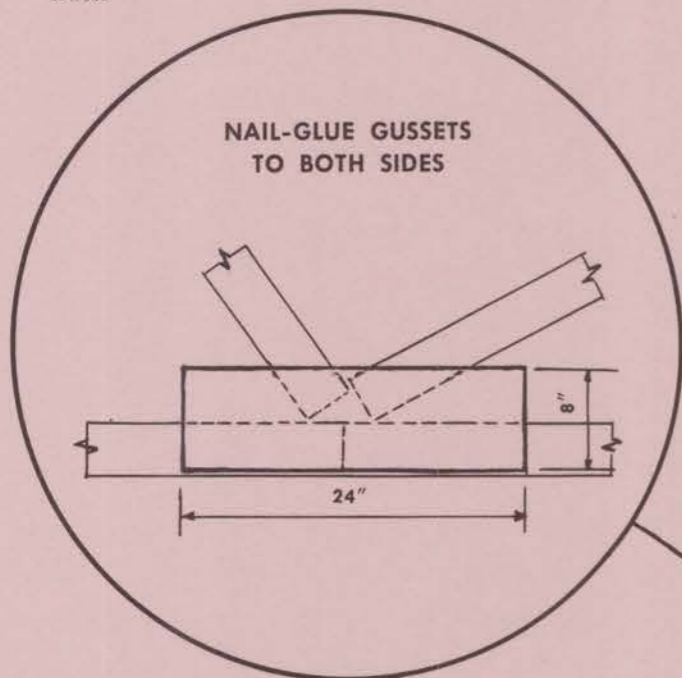
Replace 1" x 4" scab at peak with full-size peak gusset.



NAIL-GLUE PEAK GUSSET TO BOTH SIDES

INTERMEDIATE JOINT VARIATION

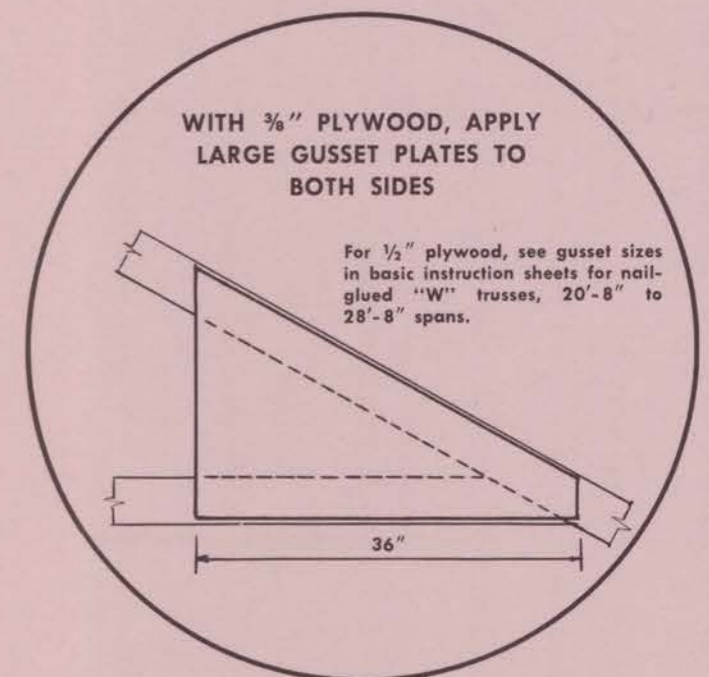
The bottom chord can be located at the intermediate locations by nail-gluing gusset plates to both sides.



NAIL-GLUE GUSSETS TO BOTH SIDES

BEVELED BOTTOM CHORD

The bottom chord can be beveled to lower roof line, and to simplify finish, trim, and placement on masonry and brick walls.

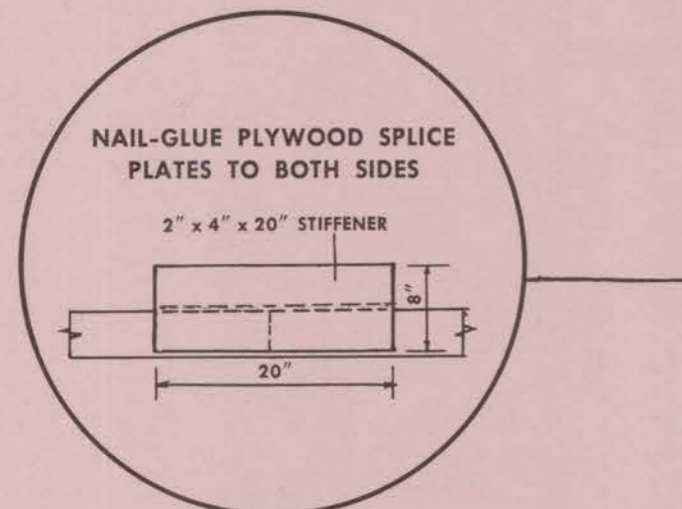


WITH 3/8" PLYWOOD, APPLY LARGE GUSSET PLATES TO BOTH SIDES

For 1/2" plywood, see gusset sizes in basic instruction sheets for nail-glued "W" trusses, 20'-8" to 28'-8" spans.

SPLICE JOINT FOR 3/8" PLYWOOD

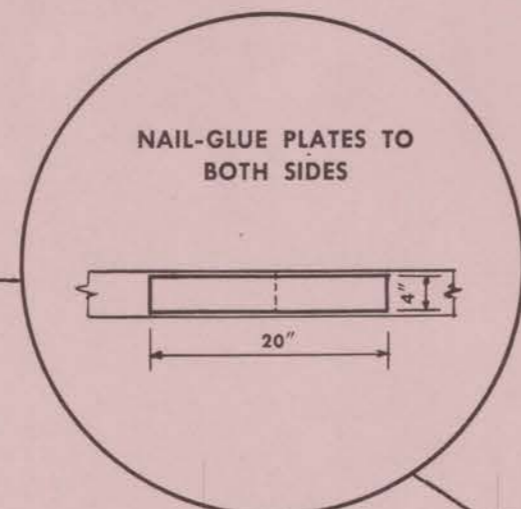
When using 3/8" plywood, replace 1" x 4" splice plates with plates as shown in detail below.



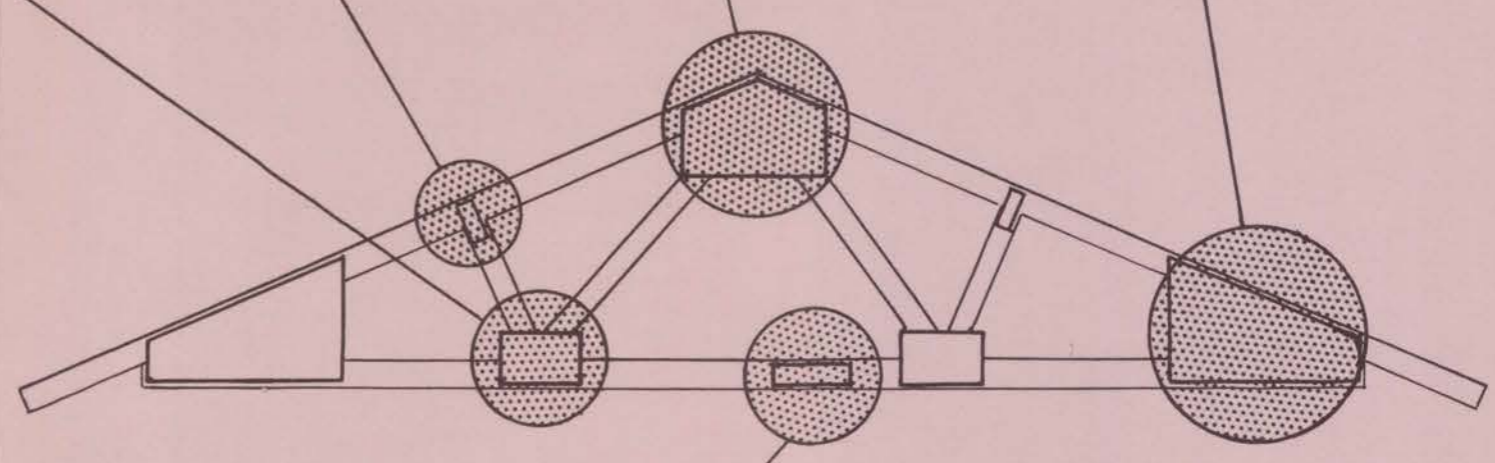
NAIL-GLUE PLYWOOD SPLICE PLATES TO BOTH SIDES

SPLICE JOINT FOR 1/2" PLYWOOD

If 1/2" plywood is used, replace 1" x 4" splice plates with 1/2" plywood splice plates nail-glued to both sides. Joint detail at left can also be used.



NAIL-GLUE PLATES TO BOTH SIDES



TRUSS DESIGN — CIRCLES INDICATE WHERE VARIATIONS MAY BE USED

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. The "W" nail-glued truss designs are based upon full-scale test results. Three types of tests were performed: load-and-recover, long-duration, and load-to-destruction. A combined load of 40 psf. was used for the load-and-recovery test. The deflections for trusses built with the variations shown on this sheet are given here. Residual set was recorded for 100 psf. combined loading.

In the long-duration test, creep or relaxation of the trusses under loading resulted from excessive stress on the 2" x 4" members. No glue-line failure was observed.

Destruction tests were employed to determine the maximum load capacity of the trusses. Failures were structural-chord failures and plywood-shear failures. No glue-line failure was observed.

DESIGN AND PERFORMANCE DATA FOR THE "W" TRUSS, USING VARIATIONS

DESIGN DATA	DESIGN LOAD
Span: 20'-8" to 28'-8"	Dead load 15 psf.
Slopes: 2/12, 3/12, 4/12, 5/12, 6/12	Live load 25 psf.
	Total 40 psf.

PERFORMANCE REQUIREMENTS	ACTUAL TEST DATA
Maximum allowable deflections at mid-point of bottom chord:	Deflections at 40 psf., mid-points 0.72"
Plaster (1/360) 0.95"	
Drywall (1/240) 1.42"	
Maximum allowable residual set: 25% of the total deflection under 100 psf. roof load.	Residual set after release of 100 psf. 0.14"
	Total load at failure 243 psf.
	2/12

MATERIALS AND NAIL-GLUING

The quality of material and workmanship is important to the ultimate strength of the truss. The builder must use good judgment in the selection of materials and must follow 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*.

- Each structural member should have a moisture content of 19% or less.
- Structural lumber for the chords must be No. 1 southern yellow pine (1500 psi., stress grade) or reselected construction grade Douglas fir or western hemlock. (See reselection procedure given in Small Homes Council Instruction Sheet #12, *Reselection of Lumber for Roof Trusses*.) The lumber reselected by this process is equivalent to 1500 psi., stress grade, throughout its entire length.
- Use unsanded grade plywood, 3/8" or 1/2" thick. The plywood must meet Commercial Standards CS45-55 as certified by an approved testing laboratory.
- The surface grain of the plywood should run parallel to the bottom chord for all plates.
- Use 4d common nails or 1 1/2" staples for nail-gluing the plywood gusset plates; 6d common nails for 1" solid wood splice plates. Space the fasteners 4 inches apart in two rows and 3/4 inch from the edges.
- The casein glue must meet Federal Specification MMM-A-125, Type I or II. Mix the glue according to the manufacturer's instructions. Protect the trusses from rain. After nailing, stack the trusses and do not handle them during the curing period.
- 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.

VARIATIONS FOR BUILDING THE NAIL-GLUED "W" ROOF TRUSS —

2" x 4" Truss, 2' on Center, 20'-8" to 28'-8" Spans

INSTRUCTION SHEET #13

UNIVERSITY OF ILLINOIS · SMALL HOMES COUNCIL · URBANA, ILLINOIS

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Endorsement by the UNIVERSITY OF ILLINOIS SMALL HOMES COUNCIL of any manufactured product shall not be claimed on the basis of these plans or related information thereon. Responsibility for roof trusses built from these plans shall rest with the user of the plans and in no wise on the University of Illinois. When variations from these plans are incorporated by the user, the roof trusses so built shall not be represented as having been built from a design developed at the University of Illinois.

Price: 50 cents