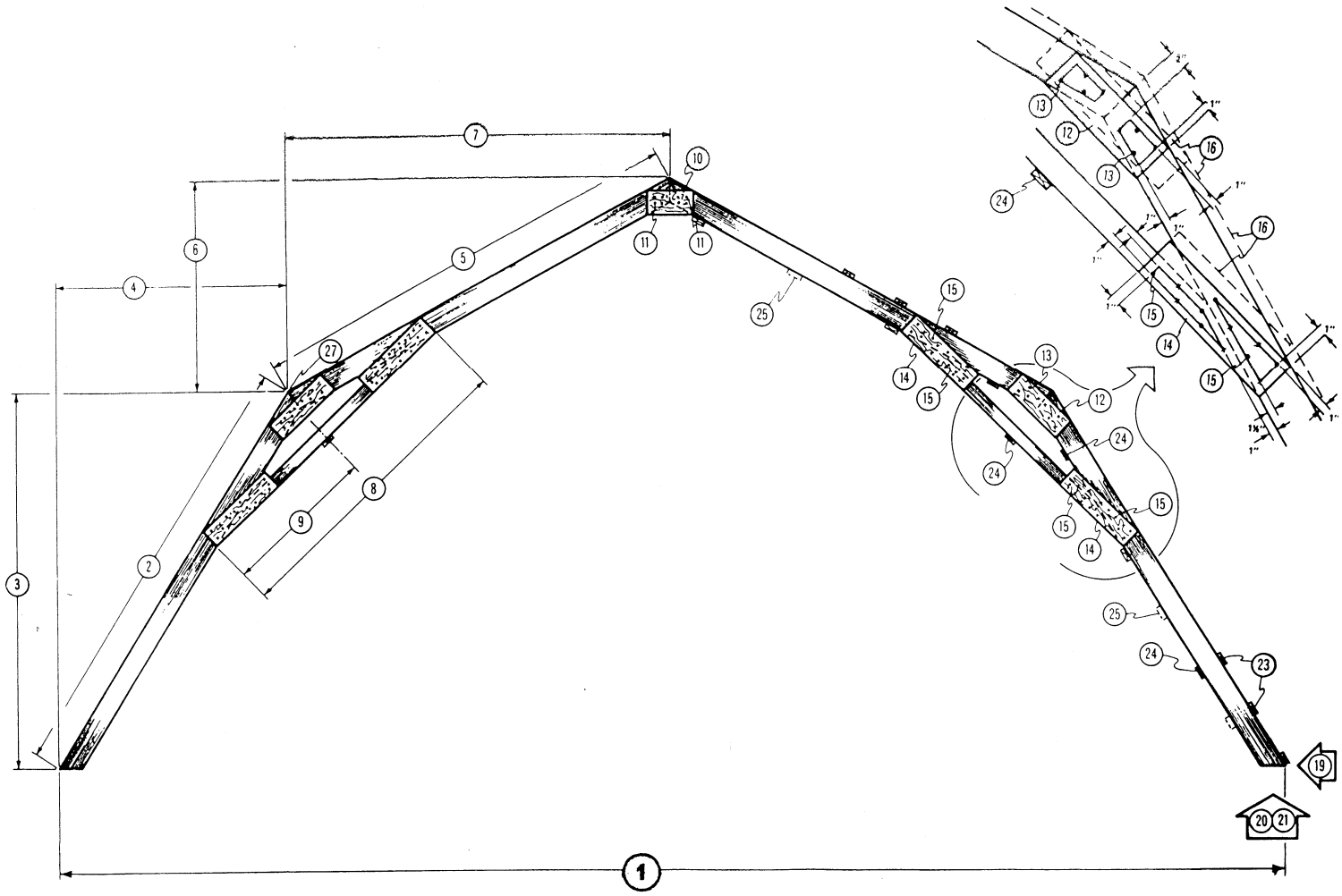

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(17)	(18)	(19)	(20)	(21)	(22)
36'	2"x8"x12'0"	9'10"	6'10½"	2"x8"x12'0"	4'6⅛"	11'1½"	2"x4"x9'0"	4'6"	4"x12"	2	6"x12"	4	6"x19"	6	52.0	15.2	1013	1428	-271	136
36'	2"x10"x12'0"	9'10"	6'10½"	2"x10"x12'0"	4'6⅛"	11'1½"	2"x6"x9'0"	4'6"	6"x12"	3	8"x16"	7	8"x24"	9	85.6	24.5	1564	2164	-614	212
38'	2"x10"x14'0"	11'5 5/8"	8'0 3/8"	2"x10"x12'0"	4'10 3/8"	10'11 5/8"	2"x4"x10'0"	5'0"	4"x12"	2	8"x12"	6	8"x24"	8	77.0	18.5	1369	2035	-328	184
40'	2"x10"x14'0"	11'7 3/8"	7'9 7/8"	2"x10"x14'0"	6'11 1/8"	12'2 1/8"	2"x6"x10'0"	5'0"	4"x12"	2	8"x16"	7	8"x24"	9	57.0	15.2	1048	1696	-125	208
40'	2"x12"x14'0"	11'7 3/8"	7'9 7/8"	2"x12"x14'0"	6'11 1/8"	12'2 1/8"	2"x6"x10'0"	5'0"	6"x12"	3	9½"x16"	10	8"x26"	13	85.4	22.3	1491	2375	-342	300
42'	2"x10"x14'0"	11'5 5/8"	8'0 3/8"	2"x10"x14'0"	5'3⅛"	12'11 5/8"	2"x4"x10'0"	5'0"	4"x12"	2	8"x12"	6	8"x24"	8	62.8	17.7	1388	1942	-425	184
44'	2"x12"x16'0"	13'1 3/8"	9'2 1/8"	2"x12"x14'0"	5'7 3/8"	12'9 7/8"	2"x6"x12'0"	6'0"	6"x12"	3	8"x16"	7	8"x24"	9	85.2	21.3	1757	2577	-507	212
46'	2"x12"x16'0"	13'3 1/8"	8'11 3/8"	2"x12"x16'0"	7'7 7/8"	14'0 5/8"	2"x6"x12'0"	6'0"	4"x12"	2	8"x16"	8	8"x24"	11	65.9	17.8	1390	2196	-274	248
48'	2"x12"x16'0"	13'1 3/8"	9'2 1/8"	2"x12"x16'0"	6'0⅛"	14'9 7/8"	2"x6"x12'0"	6'0"	6"x12"	3	8"x16"	7	8"x24"	10	70.9	20.5	1765	2457	-621	228
50'	2"x12"x18'0"	14'8 7/8"	10'3 7/8"	2"x12"x16'0"	6'4 3/8"	14'8 1/8"	2"x6"x13'0"	6'6"	6"x12"	3	8"x12"	6	8"x24"	9	65.1	16.5	1591	2342	-365	204

(1) Braced rafter spans (see table for dimensions and details). Tables are based on use of #2 Douglas Fir lumber protected from wetness, low human occupancy and other farm building conditions.

(2) Lower rafter. Wall and attachment to it must be strong enough to resist thrusts caused by wind in relation to dead load (roof weight) (21). It also must be strong enough to resist vertical and horizontal combinations of snow and dead load, (19) and (20). NOTE: If roof snow loads are adjusted by formula in 11th edition of Midwest Plan Service Structures and Environment Handbook, horizontal and vertical reactions at the heel of the rafter will be less than indicated in Table.

(3) Rise of lower roof rafter

(4) Run of lower roof rafter.

(5) Upper rafter

(6) Rise of upper rafter

(7) Run of upper rafter

(8) Brace

(9) Position of brace (8)

(10) Ridge gusset; all gussets use ½" sheathing fir plywood nailed to front and back of rafters.

(11) Nails, ridge gusset; number in table is number of 2½" concrete nails from each side into each frame member, typical of all gusset joints.

(12) Hip gusset

(13) Nails, hip gusset

(14) Brace gusset

(15) Nails, brace gusset

(16) Shape and location of larger gusset (14) and larger rafters (2), (5) when required.

(17) Maximum ground snow load with rafters 2'0" oc, (psf). 65 psf ground snow load design is adequate for almost all of the U.S.

(18) Maximum 1/10 hourly wind pressure with rafters 2'0" oc, (psf). 15 psf should be adequate wind design for most areas of the U.S. A few small interior areas and some areas along the coast will require 20 psf. NOTE: The Southern tip of Florida and ocean islands may require as much as 30 psf. Generally, the higher wind load requirement can be attained with larger gusset plates and more nails/plate.

(19) Horizontal reaction (lb/rafter) based on snow load (17) + dead load (28).

(20) Vertical reaction (lb/rafter) based on snow load (17) + dead load (28).

(21) Vertical reaction (lb/rafter) based on wind (18) blowing perpendicular to long walls and dead load (28); when numbers are negative, net reaction is uplift.

(22) Total number of 2½" concrete nails per braced rafter (to order allow 74 nails/lb).

(23) Roof purlins not over 2'0" throughout, or use continuous sheathing.

(24) 1" x 3" brace stiffeners, continuous.

(25) For 2" x 10" and 2" x 12" rafters only, 1" x 3" stiffeners, not over 2'0" oc continuous.

(26) For wet service conditions, reduce allowable loads (17) to (21) inclusive by 25%.

(27) All joints must fit tight; fit all pieces together to assure the fit and dimensions are true, then use these pieces to pattern remaining members.

(28) Roof dead load assumed to be 6 psf roof surface.

COOPERATIVE EXTENSION SERVICE
AGRICULTURE AND HOME ECONOMICS
Agricultural Extension Service
University of Tennessee Institute of Agriculture
Agricultural Engineering Department
AND
UNITED STATES DEPARTMENT OF AGRICULTURE COOPERATING

BRACED RAFTER DESIGN DATA
36'-50' SPANS

C.P.S. '88 | 6411 | SHEET 1 OF 1