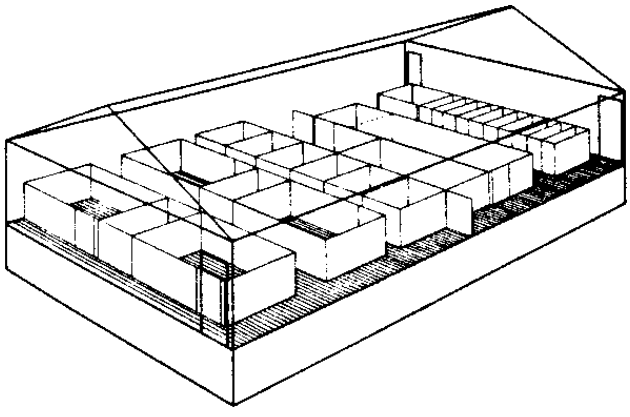
MWPS-72602

Swine Breeding Building

33’ x 60’ stud frame building with stimulus stalls 8 boar pens, a sow-gilt pool pen, a sow holding pen and seperate breeding areas. Year-round mechnical ventilation, totally slotted floors, and liquid manure storage are illustrated.

CAUTION!

Additional professional services will be required to tailor this plan to your situation, including but not limited to: assurance of compliance with codes and regulations; review of specifications for materials and equipment; supervision of site selection, bid letting and construction; and provision for utilities, waste management, roads or other access. **Furthermore, any deviation from the given specifications may result in structural failure, property damage, and personal injury including loss of life.**



MIDWEST PLAN SERVICE

Cooperative Extension Work in Agriculture and Home Economics and Agricultural Experiment Stations of North Central Region - USDA Cooperating

Swine Breeding Building

Title Page

MIDWEST PLAN NO. 72602

WARRANTY DISCLAIMER

This plan provides conceptual information only. **Neither midwest plan service nor any of the cooperating land-grant universities, or their respective agents or employees, have made, and do not hereby make, any representation, warranty or covenant with respect to the specifications in this plan.** Additional professional services will be required to tailor this plan to your situation, including but not limited to: assurance of compliance with codes and regulations; review of specifications for materials and equipment; supervision of site selection, bid letting and construction; and provision for utilities, waste management, roads or other access.

Plan MWPS -72602
SWINE BREEDING BUILDING
Totally Slotted Floor

This plan is for a 33'x60' stud-frame building housing stimulus stalls, a holding pen, a breeding area, boar pens, and gilt pens. The alternate floor plan shows gestation stalls in place of the gilt pens. Year-round mechanical ventilation, totally slotted floors, and liquid manure storage are provided.

General Specifications

Fans: Select exhaust fans for the stated capacity at ⅛" static pressure, especially pit fans, to prevent backdrafting when larger fans turn on. Air movement in summer can be increased with unrated fans mounted over the pens near the ends of the building and blowing parallel to the sidewalls.

Pits: Use 3500 psi concrete with 7% air entrainment. Use steel of at least 40,000 psi yield. Install steel and concrete carefully and accurately.

Pump pits to within 6" of the bottom at least once a year. Check for solids buildup; increase agitation and pump from port nearest to solids buildup at next pumping.

Heat: Provide 70,000 Btu/hr supplemental heat (1000 Btu/hr/animal).

Protecting Swine From Fan Failure

We know of no device that will successfully ventilate a hog house automatically in the case of failure of one or more fans or the whole electric supply system.

- Install a loud automatic warning system to alert anyone at or near the farmstead.
- Have someone baby-sit your animals if you are going to be away for more than a few hours, if there are storm warnings out, or if your herd is in an especially sensitive stage (a number of newborn litters, for example).
- Post instructions on what to do in hot weather, mild weather, cold weather, who to phone for additional advice, etc.
- Prepare walk doors and perhaps summer ventilation panels to be propped open part way or fully.
- Consider a stand-by generator to augment hand-opened doors; operate pit fans and, in hot weather, circulation fans.
- Consider automatic telephone that dials selected numbers when power fails.

Manure Storage Pit

Pit depth is based on 0.15 cu ft/day manure per sow, 0.19 cu ft/day manure per boar, 6" left in the pit after pumping, 10" of freeboard, and 12" additional clearance to improve underfloor ventilation.

Slat Designs

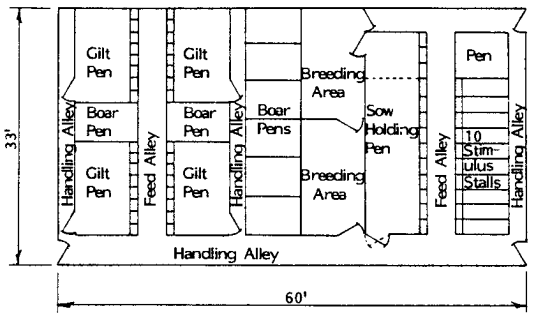
Dimensions in these plans assume concrete slats as listed below and may need to be adjusted for other design or materials. Allow about ½" at each end of a slat for construction variation and grouting.

Space slats ⅜" apart in farrowing stalls, with the slot widened to 1" behind the sows. For other swine buildings, use 1" slots.

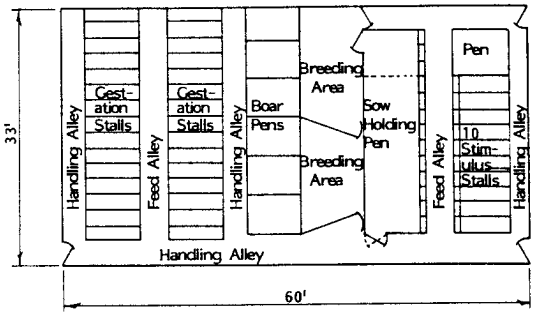
Use 4" wide slats spaced 1" apart in pen and stall areas. In breeding area, use roughened 4" wide slats spaced ⅜" apart.

Slat span	Pig nursery*	Finishing	Farrowing, Sow-pig Nursery, Gestation (stalls)**	Gestation (pens), Boar (pens)
	Width x depth, lower bar size			
4'	4"x4",#3	4"x4",#3	4"x4",#3	4"x4",#3
6'	4"x4",#3	4"x4½",#4	4"x4½",#4	4"x4½",#4
8'	4"x5",#3	5"x5",#4	4"x6",#4	6"x5",#5
10'	4"x5",#4	5"x5½",#5	4"x6",#5	6"x6½",#5
Design Loads				
Slats	Per foot of slat			
	50 plf	100 plf	150 plf	150 plf
Beams, columns	Per sq ft floor area			
	35 psf	50 psf	65 psf	65 psf

*Concrete slats are not recommended for pigs under 40 lb.
**For sows in stalls, use a maximum of 4" wide slats.



FLOOR PLAN



ALTERNATE FLOOR PLAN

Building Space and Production Cycles

Although many variations are successful, the following are typical meat hog production systems. Plan building capacity for some extra animals to allow for large litter size or slow growth rate.

Either:

a) Move sows and litters to sow-pig nursing pens at 1-3 weeks, depending on how soon the farrowing stalls are needed for the next sows. Wean pigs at 3-6 weeks, putting 2-3 litters/pen. Return sows to breeding and gestation facilities.

Or:

b) Wean pigs at 4-6 weeks (20-25 lb). Move pigs to nursery, putting 2-3 litters/pen. Return sows to breeding and gestation facilities.

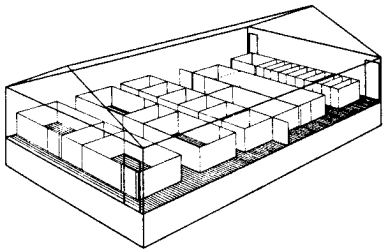
Or:

c) Wean pigs at 3-4 weeks (12-15 lb) to a prenursery, putting 1-2 litters/pen. At 6-8 weeks move pigs to a nursery, putting 2-3 litters/pen. Return sows to breeding and gestation facilities.

Move pigs to finishing unit at 10-12 weeks (60-75 lb). Move pigs to larger pens, or reduce number of pigs per pen, at about 20 weeks (150 lb).

As they approach market weight, and if the finishing unit is crowded, larger hogs may have to be marketed early.

Sows are rebred during the first or second heat period after weaning. They farrow about 16 weeks later.



Totally slotted floor over storage pit.

Lumber Specifications

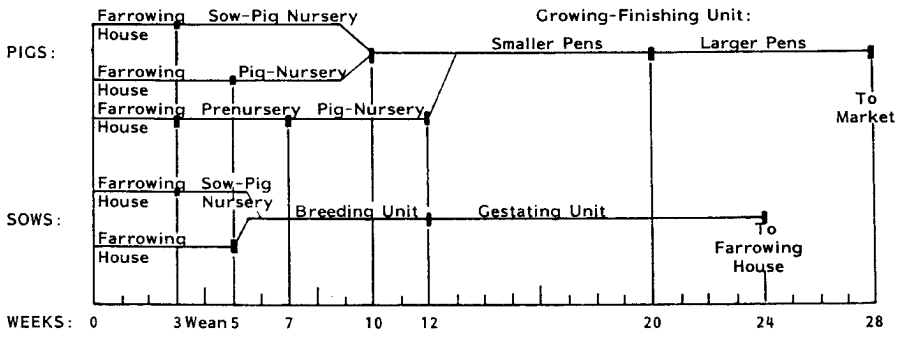
Roof Purlins and Studs
Construction Grade (Doug Fir, Southern Pine or Hem Fir)
Trusses
See Truss Page
Plywood
Roof Sheathing—⅜" c-c Ext ("Identification Index" = 20/0)
Siding and Wall Lining and Ceiling—⅜" or ½" c-c Ext with Medium Density Overlay

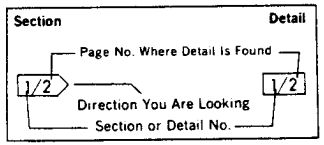
FRP Plywood is a composite material using plywood overlaid with plastic. It is moisture resistant and more durable and easier to clean than plywood.

Sills and Fascia
Pressure Preservative Treated (Southern Yellow Pine or equivalent) Creosote—10 pcf, Penta—0.50 pcf, ACC—0.50 pcf, ACA or CCA (Type A or B)—0.40 pcf.

P. T. means lumber pressure preservative treated against insect and fungus attack.

TYPICAL HOUSING CYCLES





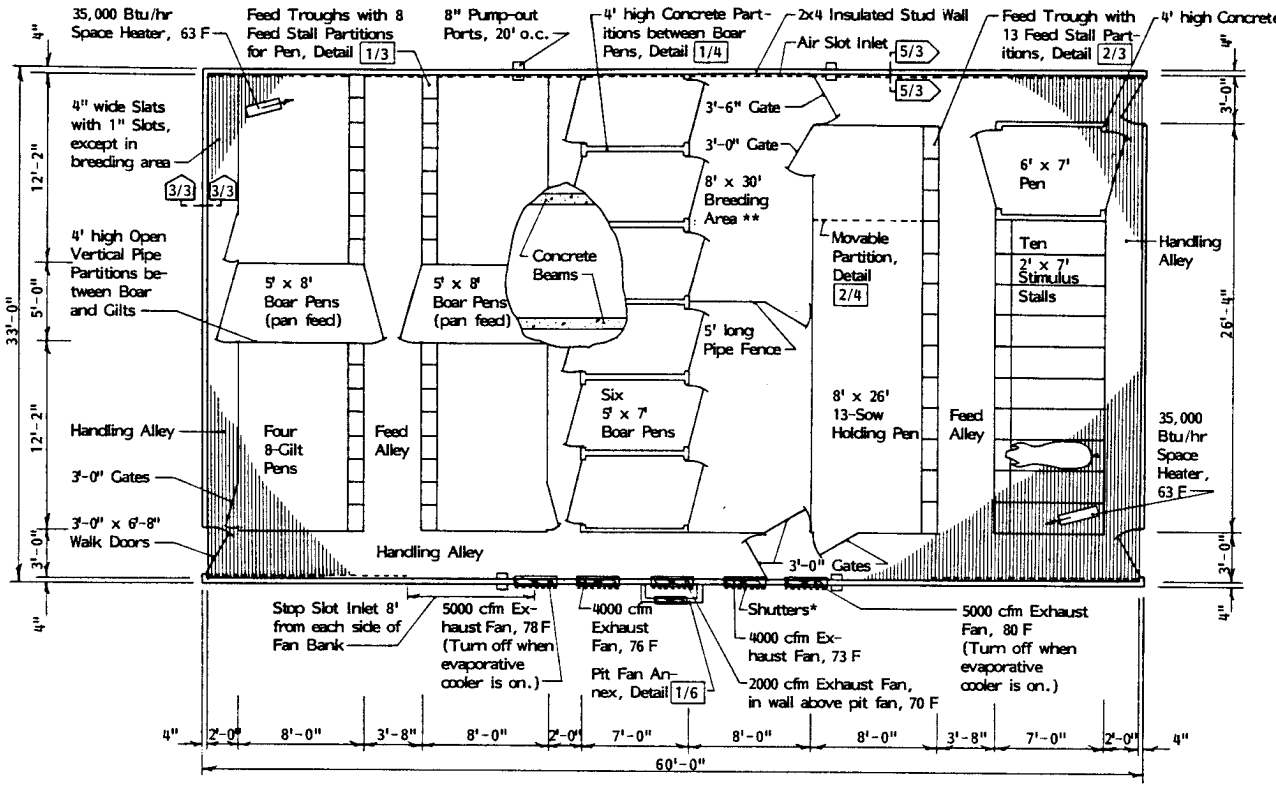
Section & Detail Indicator

MWPS MIDWEST PLAN SERVICE

Cooperative Extension & Research in Agriculture & Home Economics in the 12 North Central Universities—USDA Cooperating

SWINE BREEDING BUILDING
Totally Slotted Floor

6 Pages plus 34' Truss Sheet	Plan No. mwps- 72602	Page 1 of 8



FLOOR PLAN—1/2

Totally slotted floor over storage pit.

Summer:
Evaporative cooling recommended. Provide at least 72 sq ft of aspen pad or 44 sq ft of cellulose pad. Locate the evaporative cooling pads on the wall opposite the wall that the fans are in. Wire the controls to turn on the evaporative cooling system and shut off the two 5000 cfm exhaust fans at 85 F. Size the sump pump to deliver at least 36 gpm for aspen pads and 23 gpm for cellulose pads. The flow rate of water through the water distribution pipe should be at least ½ gpm per linear foot to ensure adequate wetting.

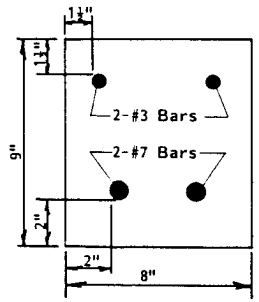
Winter:
Because there may be times when the building houses only a few animals in cold weather, provide outlets for electric heat lamps over the pens.

Note:
Wire each fan on a separate circuit. Use a fused switch at each fan location. Size fused switch at 25% over fan amperage.

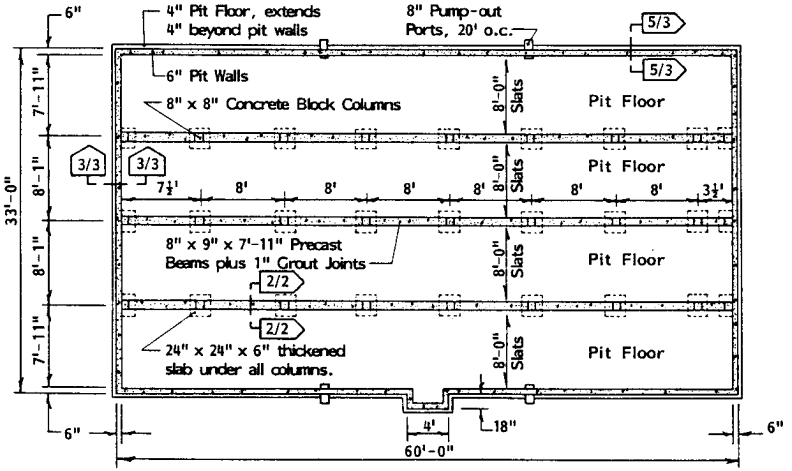
Note:
12" of clearance is needed between manure and bottom of concrete beams to operate pit fans.

*Note:
Shutters are required on all exhaust fans except for the continuous fan.

**Note:
Use 4" wide roughened slats with ⅜" slots in breeding area.



CONCRETE BEAM DETAIL—2/2



FOUNDATION PLAN—3/2

MIDWEST PLAN SERVICE

SWINE BREEDING BUILDING

Totally Slotted Floor

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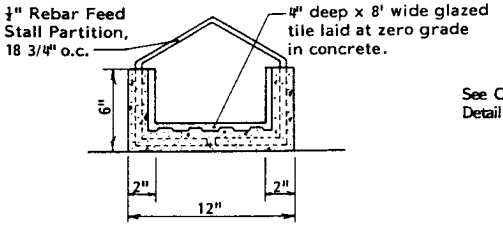
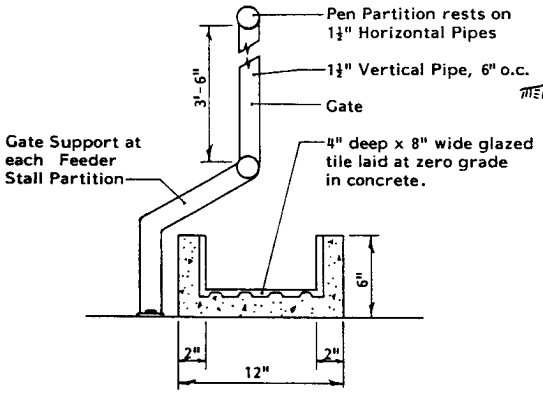
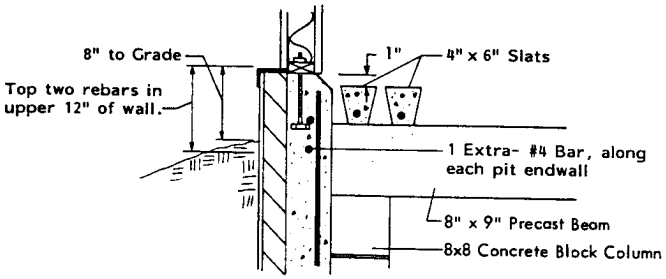


GILT PEN FEED TROUGH—1/3

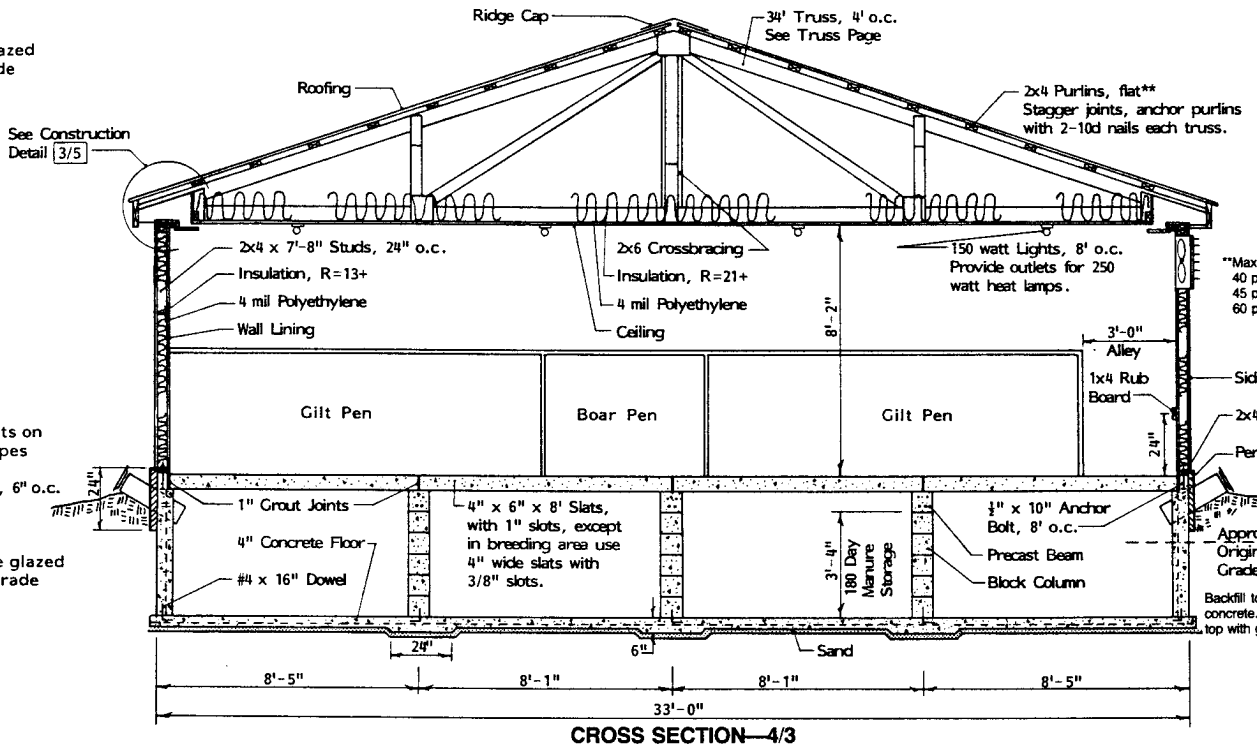


Note:
Provide a level trough, manual or float controlled water delivery and add feed to the water.

SOW HOLDING PEN FEED TROUGH—2/3

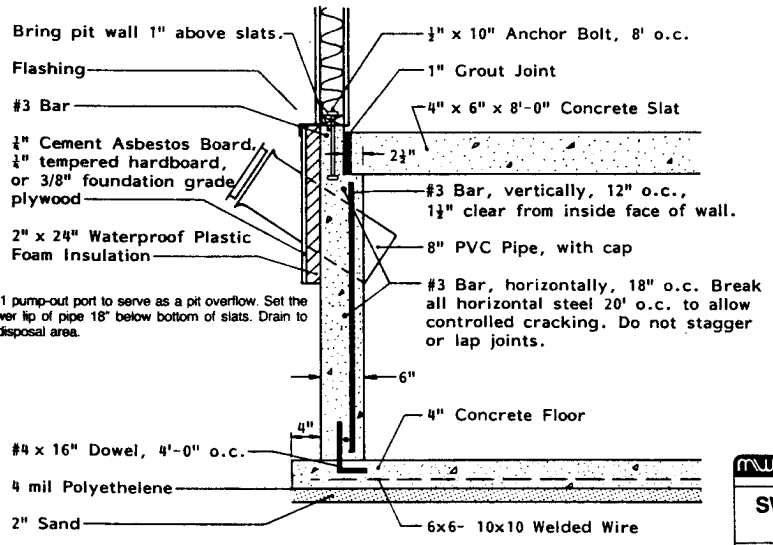


PIT ENDWALL DETAIL—3/3



**Maximum purlin spacing:
40 psf snow load, 24" o.c.
45 psf snow load, 20" o.c.
60 psf snow load, 16" o.c.

CROSS SECTION—4/3



PIT DETAIL—5/3

MIDWEST PLAN SERVICE

SWINE BREEDING BUILDING

Totally Slotted Floor

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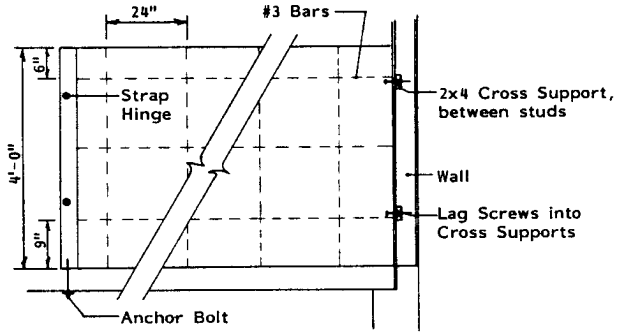
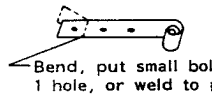
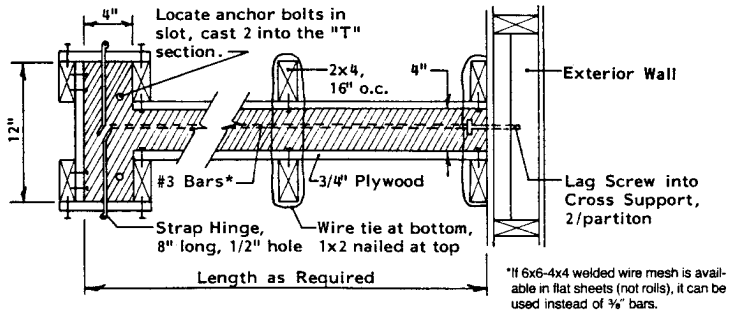


SIDE VIEW



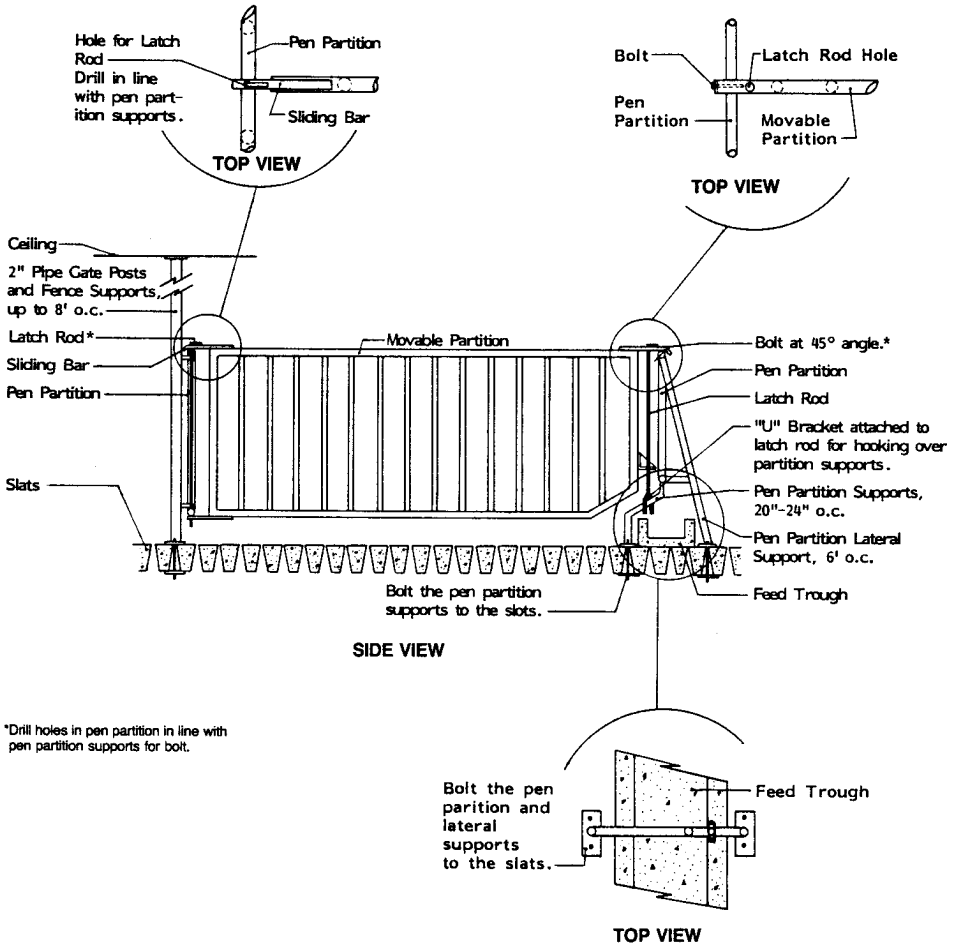
Strap Hinge



*If 6x6-4x4 welded wire mesh is available in flat sheets (not rolls), it can be used instead of ⅜" bars.

FORMING DETAIL

CONCRETE PARTITION—1/4



MOVABLE PARTITION—2/4

MIDWEST PLAN SERVICE		
SWINE BREEDING BUILDING Totally Slotted Floor		
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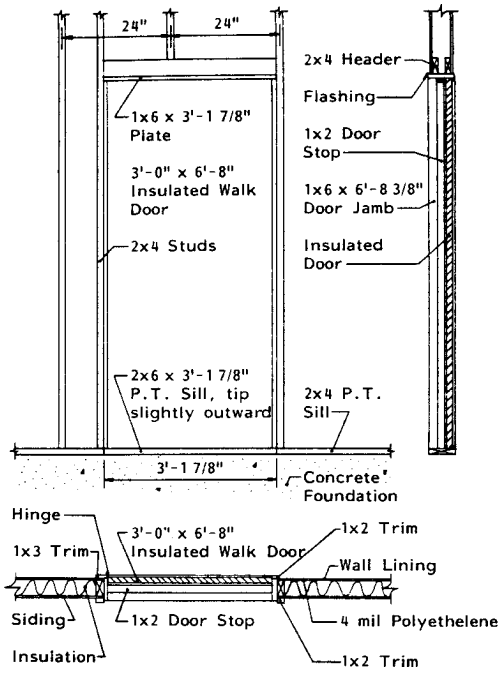
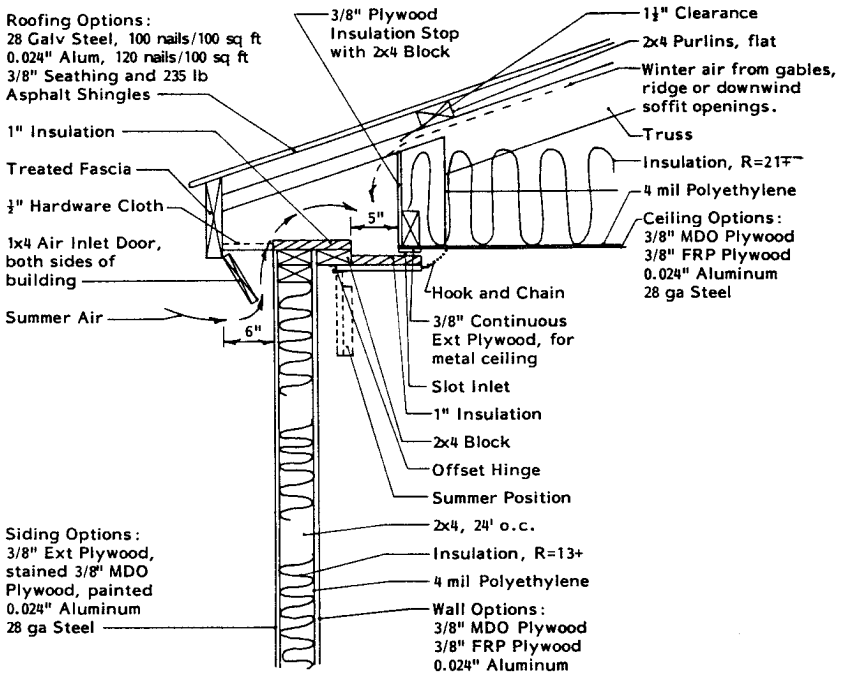


WALK DOOR DETAIL—1/5



EAVE INLET **SLOT INLET**

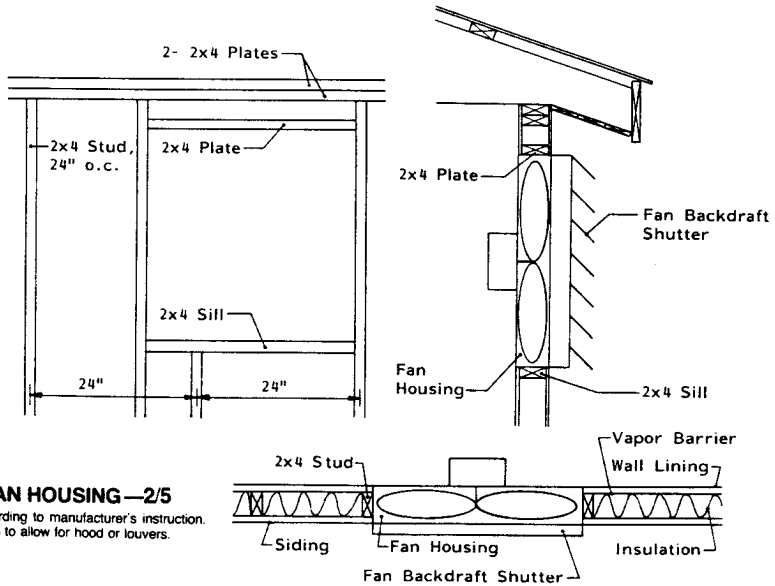
CONSTRUCTION DETAIL—3/5

Install eave inlet and slot inlet along both long walls. Install fans in the long wall opposite winter prevailing winds. Do not install slot inlet at fans or 8' from fans.

Winter: Close eave upwind soffit doors so all the air is drawn in from the ridge, gable, or downwind soffit ventilation openings. (14 sq ft total opening to attic is needed). Fasten all the slot inlet baffles in "up" position to force cold air across the ceiling. Minimum Slot Opening: 3/16".

Mild Weather: Open all eave inlets. Open slot inlet baffles 5/8".

Summer: Open slot inlet baffles to 5".



FAN HOUSING—2/5

Install according to manufacturer's instruction. Position fan to allow for hood or louvers.

MIDWEST PLAN SERVICE

SWINE BREEDING BUILDING

Totally Slotted Floor

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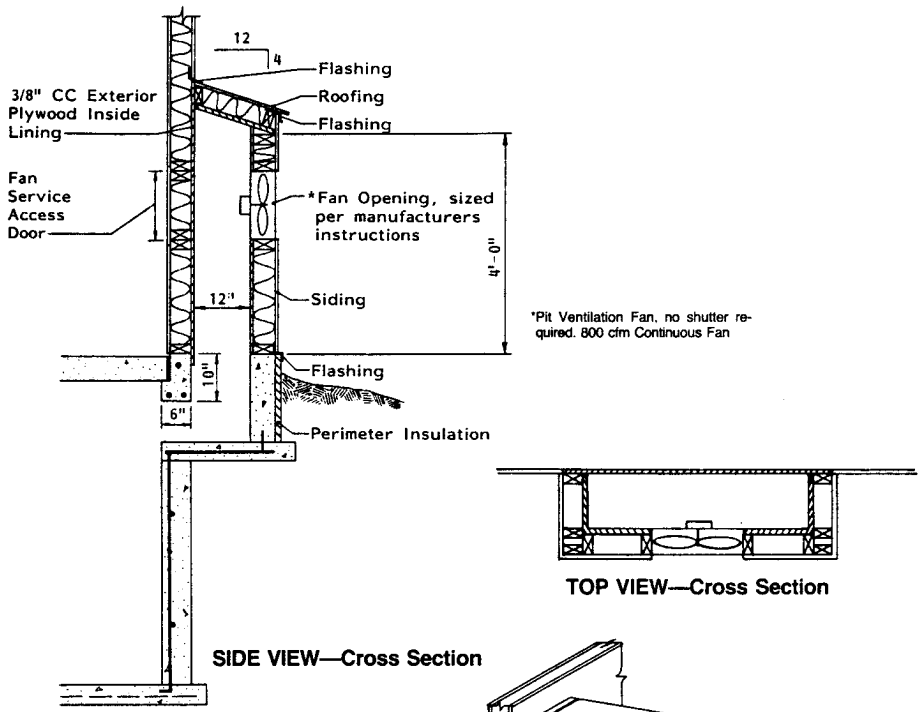
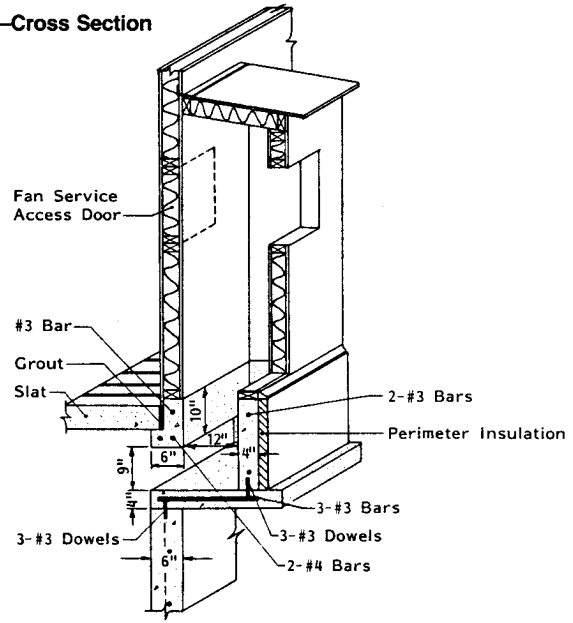
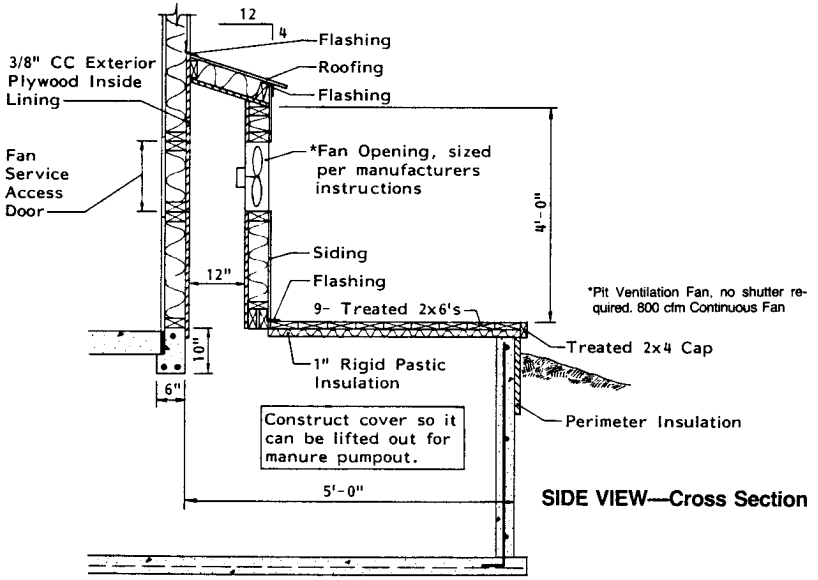


SIDE VIEW—Cross Section

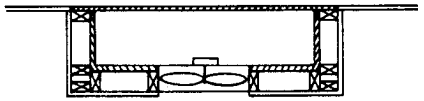
TOP VIEW—Cross Section



PIT FAN ANNEX DETAIL—1/6
Annex is about 4' wide inside.



SIDE VIEW—Cross Section



TOP VIEW—Cross Section

OPTIONAL PIT FAN AND CHOPPER PUMP ANNEX—2/6
Annex is about 4' wide inside.

MWPS MIDWEST PLAN SERVICE

SWINE BREEDING BUILDING

Totally Slotted Floor

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TRUSSES

July, 1984

Dear Customer:

When this plan was released, the last sheet had details for glue-nailed truss selection. Most buildings are erected with purchased trusses. The truss sheet did not have space enough to present all that was needed to build glue-nailed trusses.

Therefore, the sheet has been dropped. The plan has not yet been revised to include the following notes:

TRUSS NOTES

If you buy trusses:

Specify the span, slope, and spacing shown on the plan. Specify the roof and ceiling types. Require strength adequate for the wind and snow loads for your locality.

Require installation details specifying anchorage, bracing, and roofing and ceiling framing and attachment. If you buy glue-nailed trusses:

Have them built and installed to the recommendations in MWPS-9, *Designs for Glued Trusses*, Fourth Edition.

If you build your own trusses:

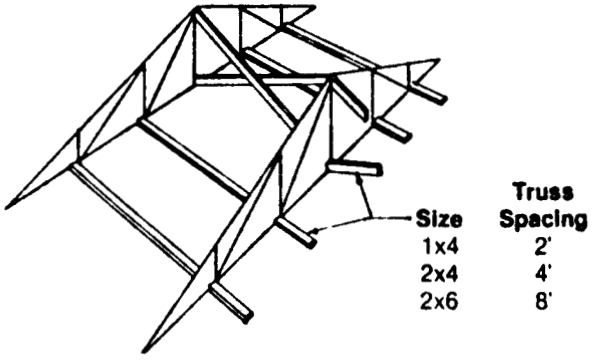
Get a copy of MWPS-9 and follow its recommendations.

Send $5.00 for *Designs for Glued Trusses, MWPS-9* to:

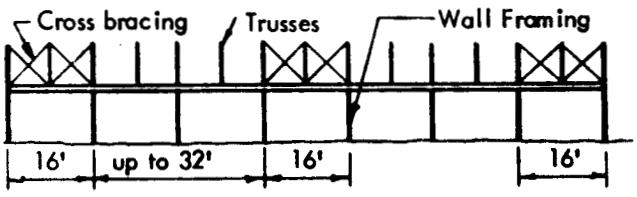
Midwest Plan Service, 122 Davidson Hall, Iowa State University, Ames, IA 50011

Windbracing

Brace and anchor the trusses as they are placed. Bottom chord stiffeners are required at panel points unless a rigid ceiling is to be installed. Use king post crossbracing in all buildings.



Size	Truss Spacing
1x4	2'
2x4	4'
2x6	8'



Wind Anchorage

Minimum fasteners for wind anchorage, both ends of each truss.

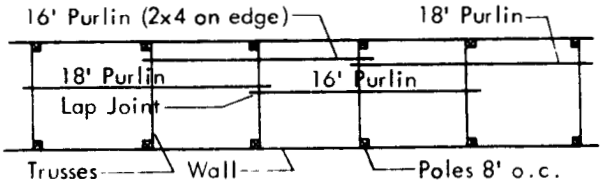
Truss span	Truss spacing 2'	4'	8'
20'-24'	1A or 1B	1A or 1B	2A or 1B
26'-30'	1A or 1B	1A or 1B	2A or 2B
32'-46'	1A or 1B	2A or 1B	3A or 2B
48'-50'	1A or 1B	2A or 1B	4A or 2B
52'-60'	1A or 1B	2A or 2B	4A or 3B

A - metal framing anchor
4-30d ring-shank nails - ½" bolt
B - ½" bolt

Roof Purlins

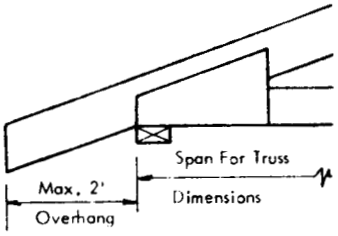
Stagger purlin joints for continuity across the trusses. Purlins may be laid flat with 2' and 4' truss spacings and butt joints used.

Alternating purlin lengths may be used in pole buildings where the poles are spaced evenly and the trusses are not. For poles 8' o.c. they may be of alternating 16' and 18' lengths with staggered and lapped end joints if pairs of trusses are mounted on alternate sides of the poles.



Overhang

For a 2' to 4' overhang, use the top chord and heel gusset design for a ⅓ larger snow load.



Loads

Install trusses to withstand the loads.

- Required by any applicable building code.
- Recommended by an engineer familiar with farm buildings in your area.
- Or, if necessary, estimated from the material below.

Ceiling Dead Load

- 0 psf allows for no materials in addition to the truss, bracing, and stiffeners.
- 5 psf ceiling dead load allows for a metal or plywood ceiling with insulation (warm livestock buildings).
- 8 psf ceiling dead load allows for a gypsum board ceiling with insulation (residential or light commercial buildings).

Roof Dead Load

Add the weights of the truss, purlins or decking, roofing, and roof insulation to get the dead load on the top chord.

Approximate weights of trusses, psf

Example: a 4-web truss for 4′ spacing with 2x8 top chord and 2x6 bottom chord weighs about 1.3 + 0.7 = 2.0 psf. Dashed lines in table indicate example.

Chord size		Truss spacing 2′	4′	8′
Top	Bottom	Truss dead weight, psf		
2x4	2x4	1.6	0.8	0.4
2x6	2x4	2.0	1.0	0.5
2x6	2x6	2.4	1.2	0.6
2x8	2x6	2.7	1.3	0.7
2x10	2x4 + 2x4	3.3	1.6	0.8
2x12	2x4 + 2x6	4.0	2.0	1.0
2x12	2x6 + 2x6	4.4	2.2	1.1
Add the following for:				
2-&4-Web Truss	1.4	0.7	0.4	
6 Web Truss	2.1	1.2	0.6	

Recommended snow loads

For roofs up to about 5/12 slope for buildings outside the jurisdiction of a building code. Farm buildings: 50-yr map load x 0.9 for 25-yr x 0.8 for snow on roof. Other buildings: 50-yr map load x 0.8 to convert from snow on ground to snow on roof.

Minimum recommended load is 12 psf. In areas where all of the maximum snow load results from a single storm without significant wind, the maximum roof load may equal the ground snow load.

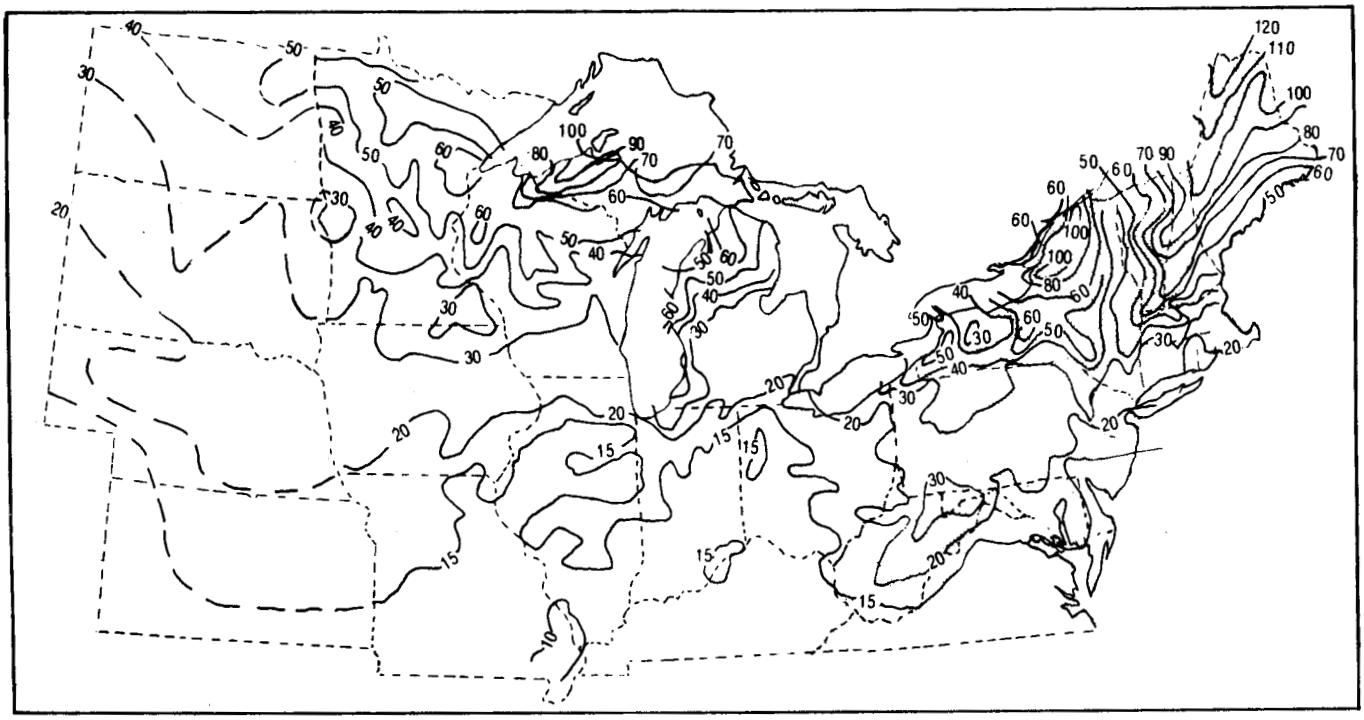
Map load	Roof snow load Farm	Other
	- - - - psf - - - -	
15	12.0	12
20	14.4	16
30	21.6	24
40	28.8	32
50	36.0	40
60	43.2	48
70	50.4	56
80	57.6	64
90	64.8	72
100	72.0	80
110	79.2	88
120	86.4	96

Weights of roofing and ceiling materials

2x4s, 2′ o.c.	0.7 psf
2x6s, 2′ o.c.	1.1
1″ lumber, solid	2.2 psf
1x3s, 16″ o.c.	0.4
3/8″ plywood	1.1
1/2″ plywood	1.4
0.024″ aluminum	0.4
28 ga steel	0.9
Asphalt shingles	2.6
Insulation, per inch of thickness	0.1-0.4

Wind Loads

For most areas of the U.S., trusses are designed to withstand winds of 80 mph on a building less than 30′ high.



Snow load on the ground, 50-yr recurrence interval