PLAN
M-9451

RODENT AND BIRD CONTROL IN FARM BUILDINGS

COMPLETE INSTRUCTIONS

Figure 1 Rats penetrated the walls of this swine finishing barn, completely destroying the insulation. It had been reinsulated only 2 years previously (Photo courtesy of National Hog Farmer magazine).

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RODENT AND BIRD CONTROL IN FARM BUILDINGS

PLAN M-9451 NEW 85:10

Rats, mice and birds eat and contaminate vast quantities of food and livestock feed, destroy buildings and property. They spread numerous diseases that affect humans, livestock and poultry. This leaflet outlines practical construction and maintenance principles that will minimize such damage and waste due to rodents and birds around the farmstead.

RODENT AND BIRD-PROOFING BUILDINGS

It is always better to build new buildings rodent- and bird-proof in the first place than it is to add screens, flashing and other barriers after the pests have moved in. Figures 5, 6 and 7 show construction designed to minimize rodent and bird problems in new barns. Many of these ideas also apply to retrofits on existing buildings.

Rodents will make greater efforts to get through new rodent-proofing during the 2 weeks following its installation. Those already inside must be eliminated by poison baiting or trapping.

RATS AND MICE

A female rat may have four to eight litters a year, with 4 to 12 (or more) young in each. She reaches sexual maturity in 3-4 months and has a gestation period of only 22-24 days. Mice reach sexual maturity at 6 weeks, gestate only 16-18 days and produce 5-8 young per litter. With these breeding characteristics, rats and mice can easily produce a formidable population explosion on any farm where they have sheltered nesting sites and tasty, nutritious foods. It is obviously easier to keep rodents out of buildings than to control large numbers after they have penetrated.

When planning new buildings or repairing existing ones, assume that rats can:

- gnaw through soft concrete, cinder blocks, aluminum cladding, etc. (their front incisor teeth are harder than mild steel);
- walk along horizontal wires, pipes or conduit;
- climb inside vertical pipes from 38 to 100 mm (1½ to 4 in.) size;
- climb the outside of vertical wires, pipes or conduits to 75 mm (3 in.) size;
- climb the outside of any pipe that is within 75 mm (3 in) of a wall;
- jump up 900 mm (3 ft) from a flat surface;
- jump 1.2 m (4 ft) between flat surfaces;
- jump across 2.4 m (8 ft) from a starting point 4.5 m (15 ft) higher;
- reach up about 325 mm (13 in.);
- drop 15 m (50 ft) and survive;
- burrow 1.2 m (4 ft) deep;
- swim up to 8 km (5 miles) in open water, and dive through plumbing and manure pipes (including water traps); and
- crawl through openings as small as 16 mm (5/8 in) square

Mice have many of the same characteristics but on a smaller scale. For example, they can flatten their bodies and crawl through a 6 mm (¼ in.) crack, but they are stopped by a 6 mm hole. A 6 mm (¼ in.) mesh is often used in building construction to stop mice; for rats and birds a 12 mm (½ in.) mesh is satisfactory

DAMAGE TO BUILDINGS

Figure 1 shows almost complete destruction of the insulation in a swine finishing barn. At first glance this building looked sound, but removal of the exterior siding revealed serious damage inside the walls. Part of the problem was that a layer of polystyrene foam insulation had been fastened inside the studs, presumably to increase the total insulation. Rodents found this soft foam allowed easy tunneling from one stud space to the next; once they had penetrated at one or more points, they could easily move concealed through the whole building.

Loss of insulation causes drafts, cold spots and condensation on walls and ceilings, and holes chewed through the vapor barrier let water vapor into the structure. This all leads to increased heating costs and premature deterioration of the building materials.

Rodents can also tunnel under floors and footings, chew plastic piping and damage equipment. Tunnels cause floor sagging and frost heaving because they let cold winter air penetrate.

Rodents (including squirrels) frequently chew the insulation from electrical wiring, causing short circuits that lead to fires in attics and walls. This is without doubt the most critical problem with rodents in buildings. Fortunately, the solution is easy enough - run all barn wiring on the exposed inside surfaces of ceilings and walls. Where circuits must pass through walls, protect the wiring inside rigid conduit, with the wall hole and the conduit itself both sealed rodent-proof.

CONTROL

The best way to control rodents is to eliminate areas that provide favorable living conditions. Rats and mice survive because we feed and water them. They do not range widely, but settle close to their food supply. If they can't get at the food they are less likely to move in.

POISONING, BAITING AND TRAPPING Use poisoning, baiting and trapping to rid buildings of existing rodents. Refer to Agriculture Canada publication 1370 Control of Rats and Mice for descriptions of rodenticides and instructions on their use.

SANITATION Good housekeeping is an important key. Garbage contributes to infestations by providing both food and water. Store it in covered containers with tight-fitting lids. Take garbage to a properly-supervised municipal dump where it is will be soon burned or buried deeply under compacted soil.

Bury animal carcasses with lime or deliver them to a rendering plant. You may have dead poultry and animals too small to justify trucking to the rendering plant; bag these in plastic and store frozen in a deep freeze until a worthwhile load accumulates.

YARD MAINTENANCE Keep grass and weeds cut. Trim tree branches and shrubs clear of the ground around barns and outbuildings. Clean up trash, old car bodies and machinery, and tear down old buildings. Implements parked on gravel or pavement are less likely to provide weedy, sheltered nesting sites. Both indoors and out, store firewood, lumber and implements well off the ground and away from walls.

FEED STORAGE Empty temporary feed bins within 20 days (before young rats and mice are old enough to leave the nest). Wooden granaries and bagged feed are difficult to make rodent proof but they can be raised high enough to let cats and dogs get underneath easily. Bagged feed can be stacked on raised pallets with clear walkways between rows and at the walls.

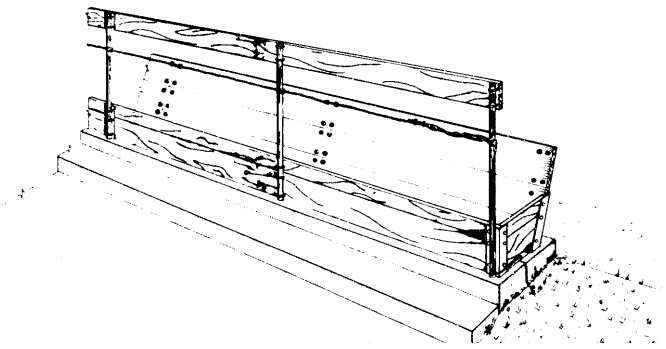

Figure 2 Feed bunks should be built on a concrete base to discourage rodents

Build corn cribs, steel bins, self-feeders and fenceline feed bunks on concrete slabs that don't leave a nesting-space underneath (Figures 2 and 31. A portable self-feeder like that in Figure 4 can't be fixed to a concrete base, but placing it on a concrete slab is helpful, especially if the space underneath is kept clear so cats and dogs can get underneath.

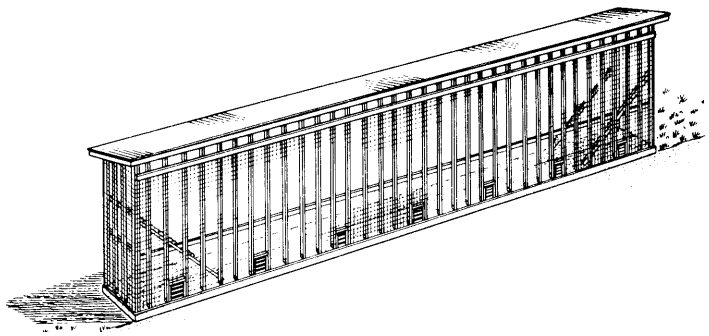

Figure 3 Corn cribs and grain bins should have a solid concrete base to discourage rodents

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Check horizontal silos regularly for rat colonies. Long term hay and straw storage is best separated from the livestock buildings, both for rodent control and fire prevention. Hay lofts are difficult to make rodent-proof, but at least empty them completely each year and check for rodents. Clean up feed spills whether indoors or out.

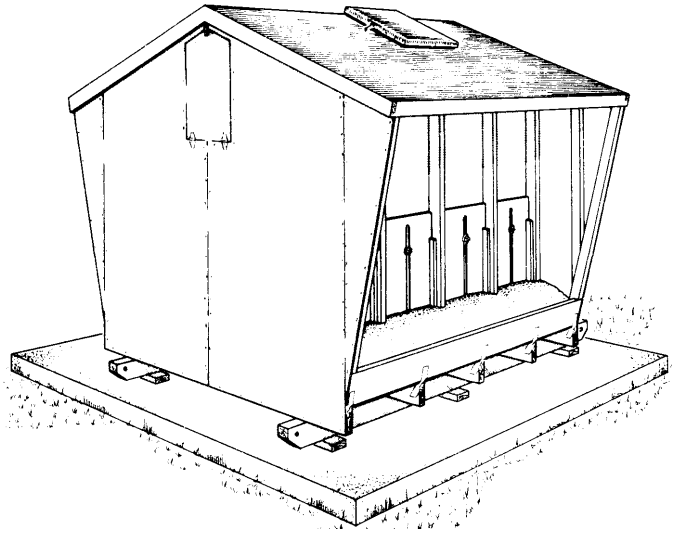

Figure 4 Portable self-feeders cannot be made rodent-proof, but they can be put on a concrete pad and blocked up to discourage nesting underneath

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BIRDS

Birds, like rodents, can do a lot of damage if allowed into buildings. Birds getting into attics and walls nest in the insulation, displacing it so that cold spots soon appear on the inside cladding. In silos, feed storages and livestock barns, birds eat and soil feed, increasing the risk of diseases from other farms near and far away.

Dairy, beef and sheep farmers with so-called 'cold' barns have tried various ways of controlling condensation on the underside of metal roofing. One popular method was to sandwich an inch of rigid plastic foam insulation between the roofing and the roof framing. This temporarily solved the condensation problem, but unfortunately birds perched on any support they could find within reach, and pecked away until most of the insulation disappeared. Builders found they had to protect the insulation board with harder material such as plywood, or find some way to keep birds out completely.

Attics above closed ceilings can be easily screened bird-proof, but this is not so easy with open ceilings and natural ventilation systems. Any doors left open for ventilation or access also allow access for the birds. And screened ventilation outlets for warm air exhaust will quickly block with frost in cold weather.

OUTSIDE BUILDINGS

Use high-quality concrete for floors and perimeter

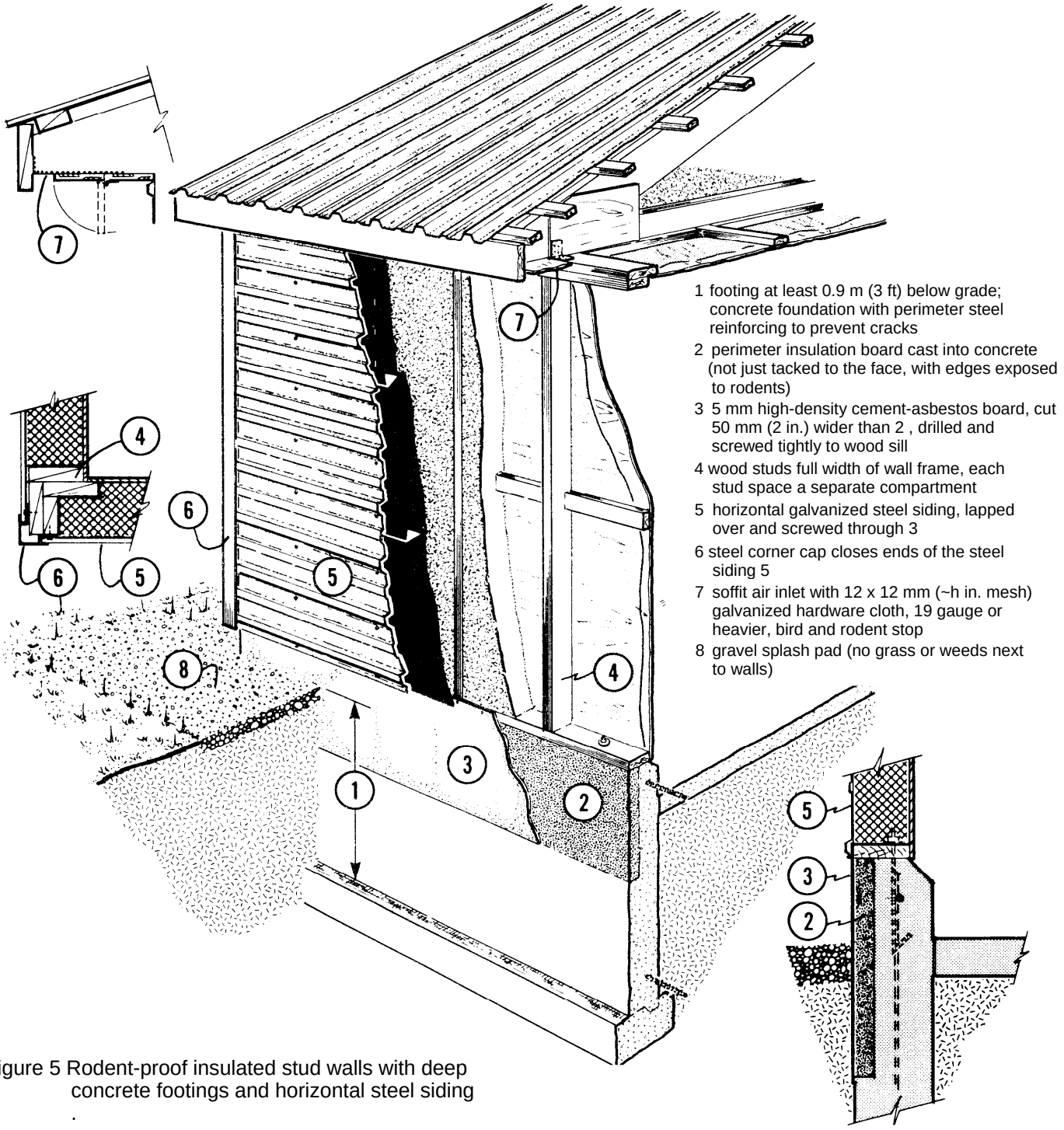

Figure 5 Rodent-proof insulated stud walls with deep concrete footings and horizontal steel siding

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foundations; a typical minimum ready-mix specification is 20 MPa (3000 psi). Use either a deep continuous foundation (Figure 5, item 1) or a shallow foundation with an L -shaped wire-mesh rodent stop (Figure 6, item 3). The last is effective because a rat will burrow down to an 'L' but is not quite smart enough to tunnel outwards to get around the horizontal part.

Protect the face and edges of the perimeter insulation. Figures 5 and 6 show the insulation board cast into the foundation (not just stuck to the surface) and completely covered with cement-asbestos board. Figure 7 shows perimeter insulation cast into the center of the foundation (insulated sandwich construction).

Use galvanized sheet-steel exterior siding, being careful to close all openings at the ends of the ribs, building corners, etc. Figure 6 shows vertical steel siding 8 screwed securely through a Z-shaped bottom flashing 7. Note that horizontal strapping is not used between the studs and the steel, as this would give rodents free access all around the building wall as soon as they found one access point! Instead, he steel siding is screwed to horizontal blocking 6 fitted between the studs, and the vertical edge-laps are stitch-screwed tightly together as well. Figure 5 shows horizontal steel siding, also screwed

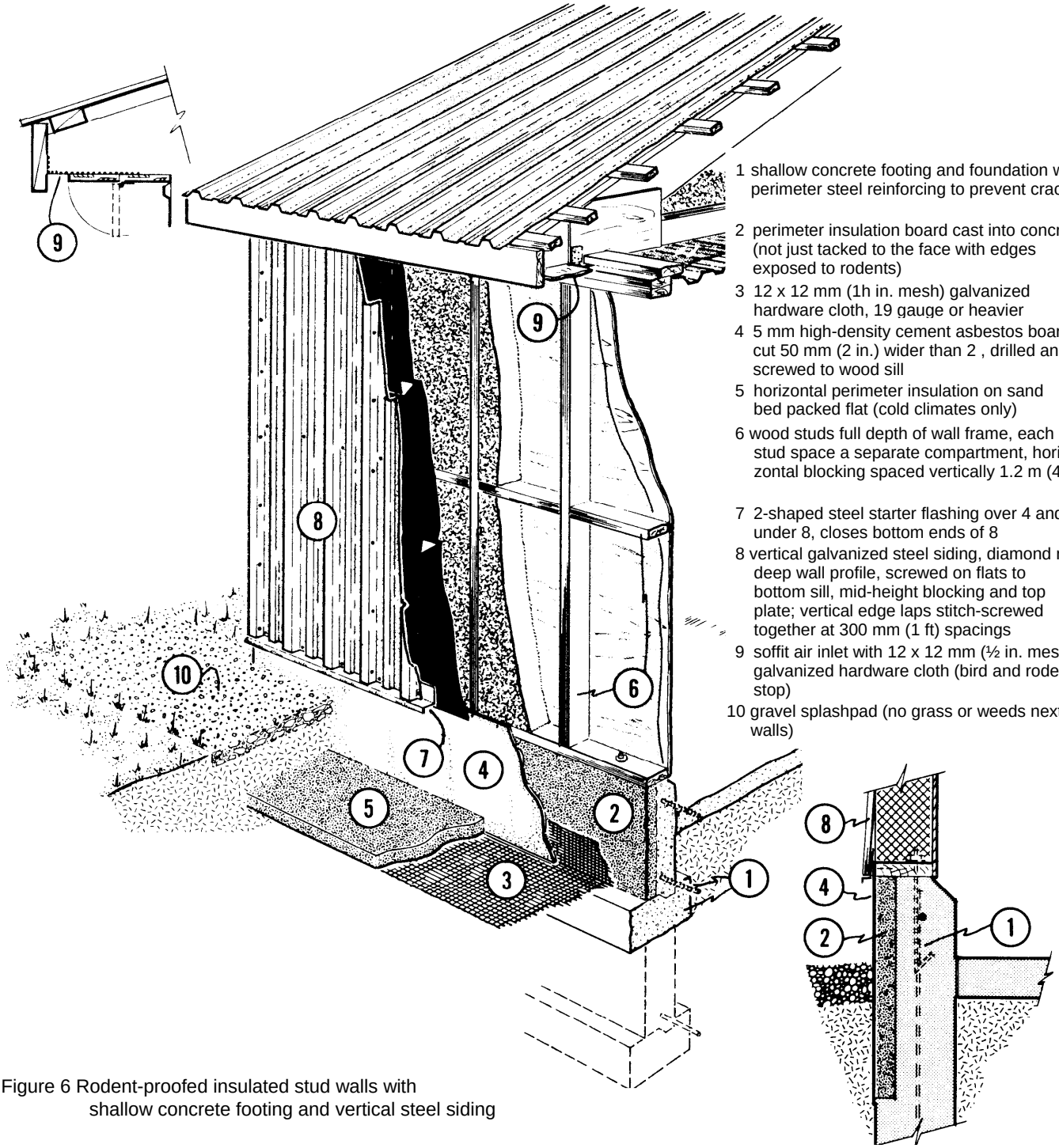

Figure 6 Rodent-proofed insulated stud walls with shallow concrete footing and vertical steel siding

directly to the bottom sill and the studs, using a special steel cornercap 6 to close off the ends of the ribs.

Keep birds, squirrels and rats out of the attic by screening all the attic air inlets (Figure 5 item 7 , Figure 6 item 9). Note that coarse 12 x 12 mm ½ x ½½ in.) hardware cloth made with 19 gauge or heavier wire is preferred here, as a finer mesh is too easily blocked with thistle-down and other airborne debris. Perforated metal ventilating soffit (designed for houses) is not suitable; it has openings much too small for the airflow needed for livestock building ventilation.

Doors, windows and screens should be close-fitting, with gaps reduced to 3 mm (1/8 in.) or less. Fit doors with steel kick-plates or steel edge-caps to discourage gnawing at the bottom edges and corners. Use a concrete or steel pipe threshold under doors. Consider adding automatic door closers to doors frequently used.

Use screens, grills or tight metal covers over the outside ventilation openings, building drains, manure pumpout ports and similar openings.

Use concrete, mortar or steel flashing to seal openings

1 50 mm (2 in.) insulation board (Dow SM, or equal) to at least 300 mm (12 in.) below grade

2 special 250 mm (10 in.) form-ties with steel tabs bent over to hold 1O at center of forms

3 steel reinforcing wired-in-place

4 concrete poured to both sides of 1O at same time (use a splitter box on top of forms to divide the concrete equally)

5 anchor bolts to secure wood framing above

6 may use block wall reinforcing at 600 mm (2 ft) oc for vertical and shear reinforcing

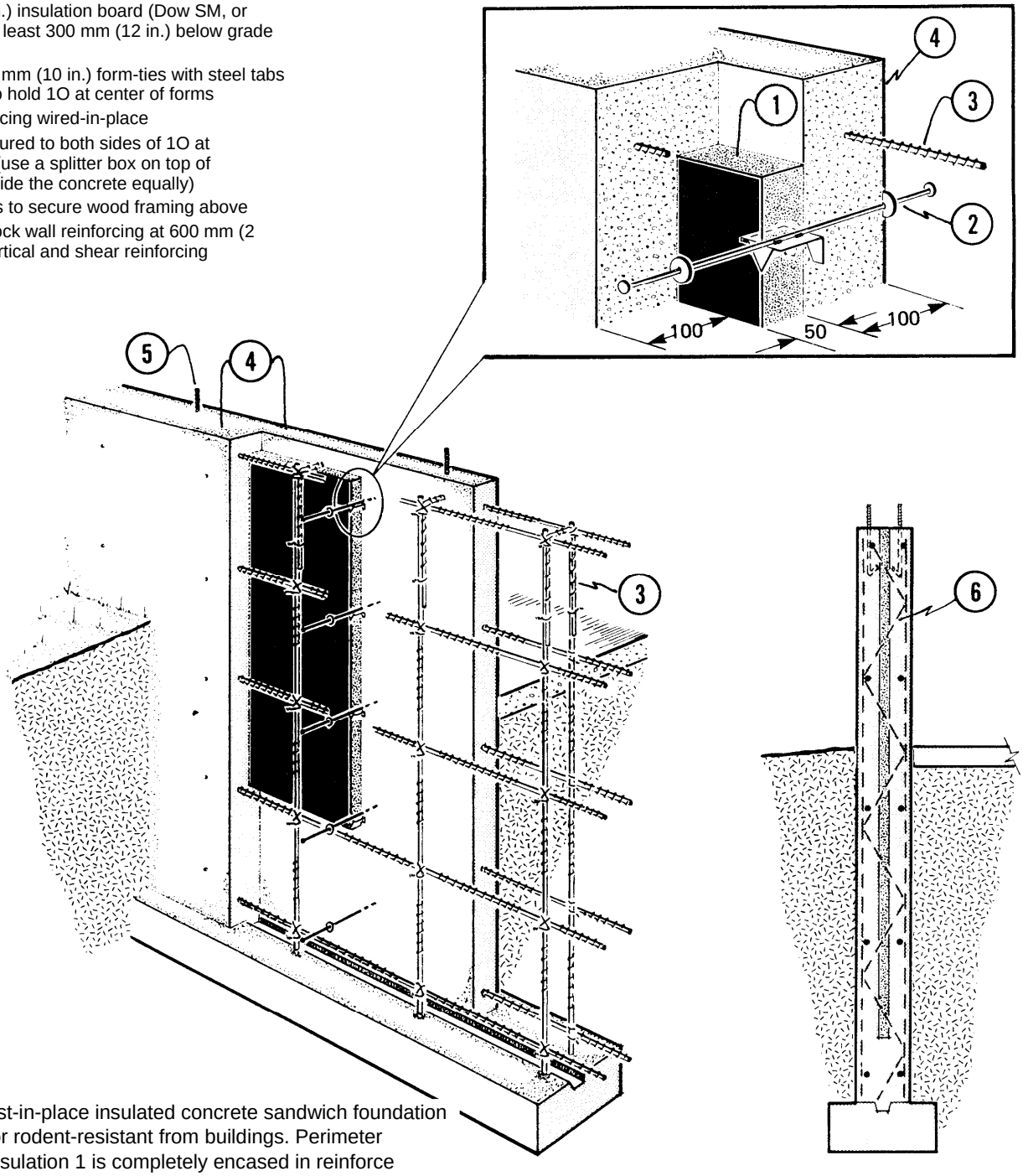

Figure 7 Cast-in-place insulated concrete sandwich foundation for rodent-resistant from buildings. Perimeter insulation 1 is completely encased in reinforce concrete to prevent rodent penetration.

around water pipes, electrical conduits and other services where they enter the building.

INSIDE BUILDINGS

Fill or cover all potential nesting holes with rodent-proof materials (concrete, sheet steel).

Eliminate hiding places, such as those under stairways.

Fill openings around pipes and conduits with hard masonry, sheet steel or hardware cloth.

Run wiring exposed on the ceiling, whenever possible.

To discourage rodents from climbing a pipe (or conduit), attach a stop to the wall or ceilings where the utility is to pass through. Make this of smooth sheet steel, with a hole punched out that will give a close fit when the pipe is inserted.

SUMMARY OF SPECIFICATIONS FOR RODENT AND BIRD BARRIERS

Material	Application	Typical specification
Sheet metal	corrugated exterior siding, prebent flashings	0.30 mm (30 gauge) galvanized sheet steel
	door kick plates	0.91 mm (20 gauge) galvanized sheet steel
	stops around service pipes and conduits.	0.45 mm (26 gauge) galvanized or stainless steel.
Expanded metal		1.21 mm (18 gauge) steel, galvanized, or rustproof painted: openings not over 12 mm ('/z in.) for rats and birds, or 6 mm (¼ in.) for mice
Perforated metal		0.61 mm (24 gauge) steel, galvanized, rustproof painted or stainless steel: perforations not over 12 mm ('/z in.) for rats and birds, or 6 mm (¼ in.) for mice
Hardware cloth	ventilation air inlets, attic ventilators, ventilation ducts.	1.04 mm (19 gauge) wire, 12 x 12 mm(½ x ½ in.) mesh, galvanized after weaving, for rats and birds; for mice use 6 x 6 mm (¼ x ¼in.) mesh
Concrete	footings, foundations and floors.	1:2:4 mixture or stronger; 20 MPa (3000 psi) or stronger, if ordering ready-mix
Cement-sand mortar	sealing holes for service pipe and conduit in masonry.	1:3 mixture or stronger