

# Lightning Protection for the Farm<sup>1</sup>

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Lightning is the leading cause of farm fires. Plan 6368 illustrates some appropriate arrangements for lightning protection for farm buildings. A well-installed and maintained lightning protection system (see Figure 1) routes lightning along a known, controlled course between the air and moist earth with over 90 percent effectiveness in preventing damage. Such systems can prevent damage to a building or any loss of income related to this damage.

Lightning protection systems consist of five parts: 1) air terminals, 2) conductors, 3) ground connections, 4) bonding, and 5) arrestors.

1. Air terminals are rods or tubes of metal that are installed at every projecting high point of a building, such as roof peaks, chimneys, dormers, ventilators, gables, flagpoles, towers and water tanks. To be effective they must not be spaced too widely apart.
2. Conductors connect air terminals with grounds. Conductors are copper or aluminum cables. Galvanic action will occur between aluminum and copper; therefore, only one metal should be used for the system or direct contact between the two should be avoided.
3. Grounds and ground connections provide contact with the earth for dissipation of the lightning charge (see Figure 2). Usually, at least two ground connections are needed for any building -- more

with large or complex structures. They should be apart from building foundations and extend deeply enough to reach moist subsurface earth no matter how dry the weather.

4. Bonding is the interconnecting of metal parts to prevent sideflash.
5. Lightning arrestors guard against damage that might occur by way of the electric power lines. Properly designed lightning arrestors should be placed between the power circuit and ground where the circuit enters the building. Large trees need protection from lightning. In addition, trees that are taller than or within 10 feet of a building need protection to prevent flashover. Also, lightning may cause a tree to fall on a building.

Livestock often are killed when they are near a fence or tree that receives a lightning discharge. Wire fences need to be grounded. Use galvanized steel posts at 150-foot intervals along the fence. It also is recommended that long runs of wire fence be interrupted. Lone trees should be either fenced off to keep livestock away from them or be protected by a lightning protection system (see Figure 3).

In an approved lightning protection system the house, barns, sheds, silo and all other buildings are protected. All metal tracks, guys, lines and other

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1. This document was published in 1988 as Pennsylvania State University Fact Sheet Safety 29, Pennsylvania Cooperative Extension Service. For more information, contact Pennsylvania State University College of Agricultural Sciences, Agricultural Engineering Department, 246 Agricultural Engineering Building, University Park, PA 16802.
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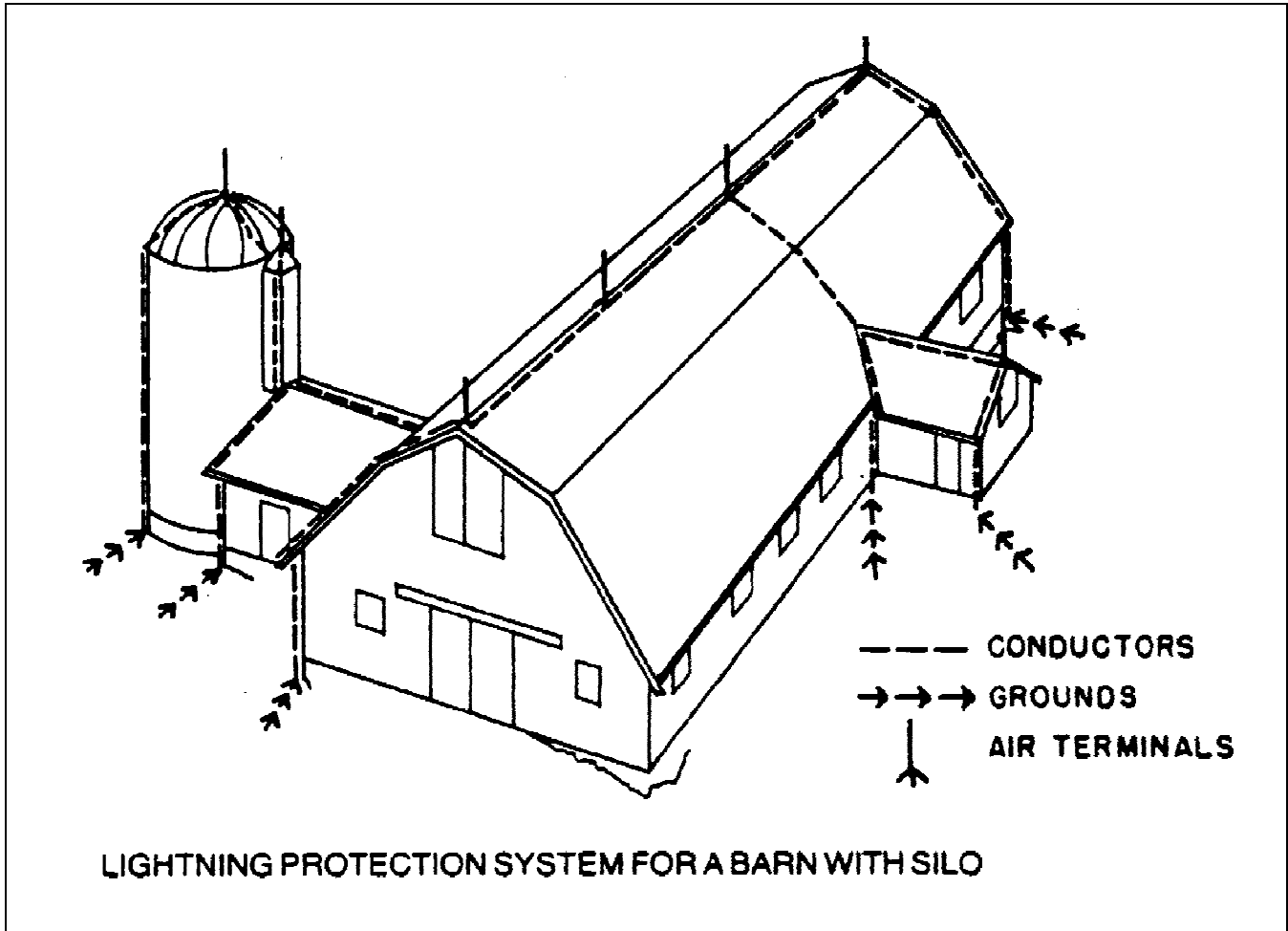


Figure 1. Lightning protection system for a barn with silo

metal bodies are bonded to the system as required. Arrestors are installed where needed. Lone trees are protected. Metal fences are properly grounded. Electrical entrance services have Underwriters Laboratory (UL) approved arrestors.

Local fire officials should be contacted for conformance with local codes as may apply. Only reputable contractors should be used. The recommendation on the plan incorporates, with permission, the 1983 recommendations of the lightning Protection Institute (LPI), 46 North Ayer, Harvard, IL 60033. LPI has a lightning system certification program and certifies journeymen installers, master installers and professional designer inspectors.

For more copies of this plan, contact your county Extension agent or agricultural engineer at your landgrant university. If you do not know the location of your State university, send your request to Agricultural Engineer, Extension Service, U.S. Department of

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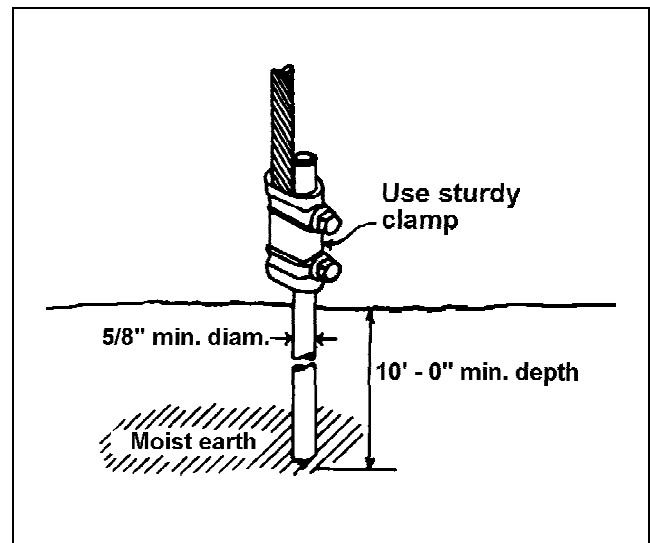


Figure 2. Ground connection

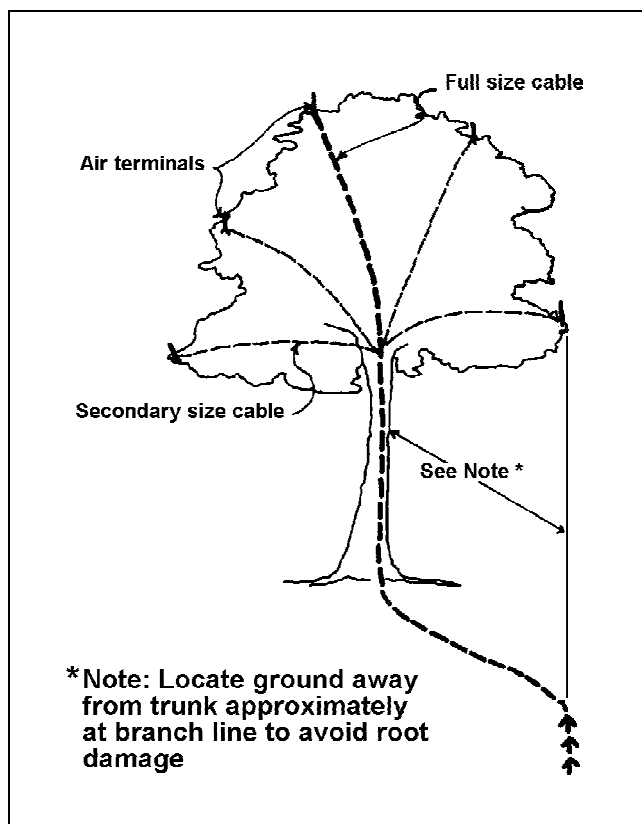


Figure 3. Lightning protection system for lone trees