Stray voltage

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being a production problem within the past five years. Shenk, who claims to be the first dealer in Lancaster County and the eastern U.S. to be aware of the problem, contends that 50 to 60 percent of the dairy farms are affected by stray voltage (others say only 20 percent).

"Stray voltage is unpredictable," he says. "Barns may experience it for an hour, and then it will be gone for a day or two. The problem seems to be related to the load demand on power lines and weather conditions."

When asked if stray voltage seems to flare up more on humid days, Shenk replies stray voltage crops up in any kind of weather "We can get zero readings on damp, dreary days."

According to Fairbank , and Craine, stray voltage problems "seem to occur most often in areas where soil conductivity is low and low-resistance grounds are difficult to attain, and under extended drought conditions when all surrounding soil is unusually dry."

In a technical explanation of what possible electrical problems may exist to create the stray voltage situation, the researchers stated:

"A voltage potential — semi-continuous but sometimes transient — may exist between dairy metallic structures or equipment and cow standing surface The voltages may be alternating current, direct current, or both, superimposed."

The researchers noted even milking parlors that are properly wired to meet modern electrical code requirements still can have small voltages that annoy animals.

"These voltages exist between the metal structures that are bonded to electical neutral and earth. Feeders, stalls, pipes, framework and other metal objects are normally connected to the electricl neutral.

"Although the neutral is required by code to be properly grounded, it may not be at 'earth' potential elsewhere due to grounding resistance. The parlor concrete floor and floor grates are normally at local earth potential. A 'grounded' neutral may have a voltage sensed by an animal standing on concrete or steel 'earth'."

Fairbank and Craine pointed out research has shown electric stress will stop dairy heifers from drinking water for eight hours on a hot summer day. Since milk is 86 percent water, cows that aren't drinking won't be producing their potential.

Reports also indicate voltages as low as 0.3 volts are felt to cause anxiety in cows during milking.

The pair of researchers explained the primary source of stray current is voltage differentials.

When water systems, electical conduits, machinery frames, metal walls and dairy parlor stall hardware are connected to the electrical neutral, there will be no voltage difference between them, thus insuring safety. However, Fairbank and Craine stressed there may be a neutral-to-earth voltage.

"Different voltages may be

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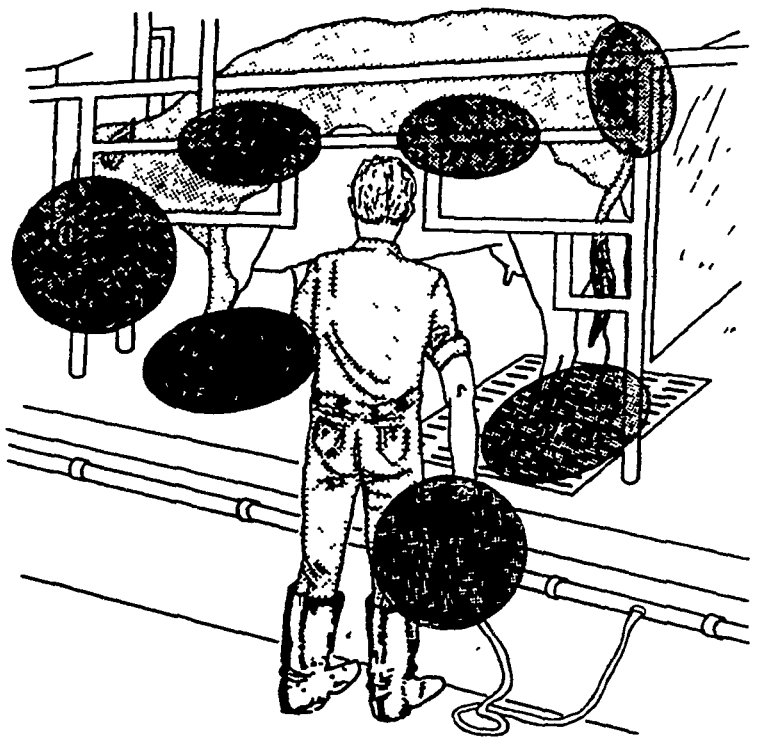
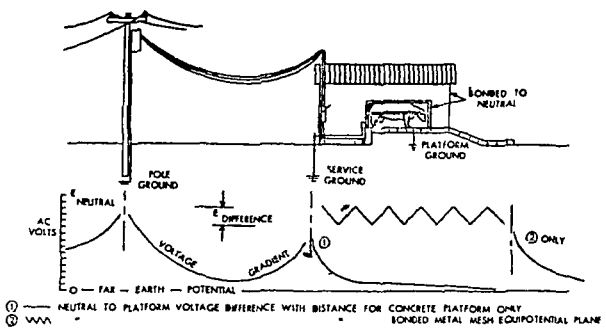
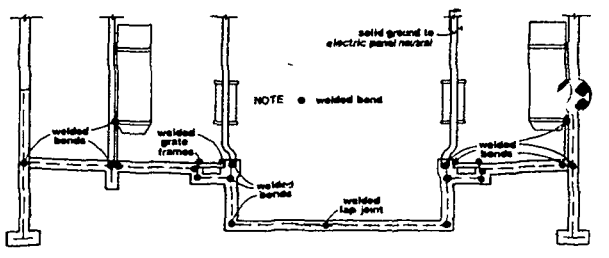


Cows can be subjected to the annoying affects of stray voltage while standing in or around the milking parlor or in milking stalls, making the milking experience an unhappy one. The shaded areas show the most common contact points carrying the misguided current to the cow, as depicted by the Western Regional Agricultural Engineering Services circular, Milking Parlor Metal Structures-to-Earth Voltages.





Researchers indicate the best solution to stray voltage/current problems in the milking parlor is the creation of an "equipotential plane" by electrically bonding metal components, steel posts, framing and concrete reinforcing. Reinforcing lap joints and grate frames should be welded, too.