# Instincts Just Won't Cut It

**Attempts to extinguish barn fires take a lot of effort. Many times, firefighters are simply trying to prevent the spread of the fire - this barn is totally involved. Firefighters will not be allowed to enter this structure to save anyone, including animals, and it will be a total loss. Photo courtesy of George Hagan**

*By Dr. Shea Porr*

Although much of this article is written with horses in mind, the principle points can be applied to almost any livestock operation where animals are kept in barns. Ultimately, you need to be proactive when it comes to emergency preparedness in general, and particularly where barn fires are concerned.

Animal owners can receive lots of training on topics like the proper use of equipment, nutrition and health care, and farm management. However, one area that is often lacking is education in emergency preparedness, and fire safety and response. To make matters worse, research has shown that instinctive reactions during a fire are usually not the ones that will lead to a successful outcome. And while no building is completely fireproof, farm owners and managers can take steps to minimize the chances of a fire occurring.

## From Spark to Flame

Fires need three things in order to take hold:

- Ignition – This is a heat source or something that will start the fire. It can include natural sources, such as lightning, or technological ones, such as fans, bucket heaters, and improper use of extension cords.
- Fuel – This is something that will burn. Barns are often filled with dry, flammable materials such as bedding, hay, grain, and wood. Liquid fuel sources are also prevalent, and may include liniments and hoof paints in addition to gasoline or propane.
- Oxygen – This is what allows the fire to continue to burn. You're probably not going to be able to control the oxygen around the fire, so focus on the other areas.

With this in mind, barns are often an optimal place for a fire – they contain ignition sources (heaters, coffee makers, fans), fuel (bedding, hay, gasoline), and oxygen.

Fires spread very quickly. Research has shown that most barns are fully involved in fire roughly 5-7 minutes after the fire breaks out. The time frame is similar (or shorter) to the amount of time it takes for many rural or volunteer fire departments to arrive. Often, barn owners and other personnel cannot reach animals fast enough to avoid being overcome by smoke or flames. It can easily take 1-2 minutes to get animals removed from a barn and release them, assuming they are cooperative during a fire. In a chaotic situation, herd animals like sheep, goats, and cattle are not trained for one-on-one handling like horses, and are therefore likely to be harder to manage.

Even worse, fires that start in an animal's stall can spread more rapidly.

In a stall, the animal is usually standing on dry bedding, often wood shavings or straw that is very flammable. Straw reaches a burning temperature of 300°F in 1-5 minutes and generates as much heat, at the same rate, as gasoline. It takes 2-3 minutes for a straw fire to burn an area 10 feet in diameter. Compare this to the size of a common horse's box stall that is 10 to 12 feet square. After a fire starts in a stall and spreads to only 4 feet in diameter, most horses are injured. By the time the fire reaches a 6-foot diameter, the horse's lungs are seared. With an 8-foot diameter fire, the horse will start to suffocate. By 10 feet, the horse is dead. Again, all of this occurs within 2-3 minutes. If a horse is to survive unharmed, he must be removed from the stall within 30 seconds.

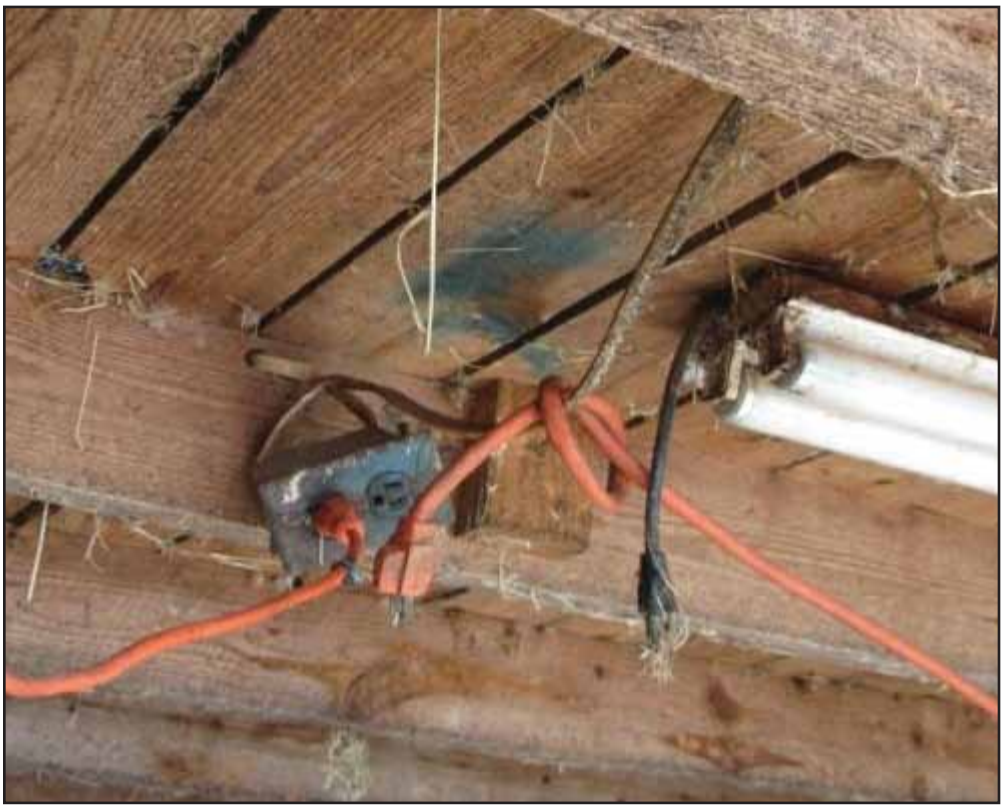
## What Causes the Fires?

The top 3 causes of barn fires include improper use of electrical appliances, smoking, and lightning. Electrical appliances should never be left running while located where an animal can reach them. Ideally, all electrical devices should be turned off while there is no human around to supervise. As a note, barn fires are more common in winter months, when unattended heating appliances are often left unsupervised. Even worse is the misuse of extension cords – "daisy chains", which includes linking multiple extension cords to reach distant locations, and "octopi", which includes jury-rigging or adapting the outlets to handle more devices than the cord or outlet is designed to power. Both of these set up dangerous situations in barn settings.

Smoking should never be allowed inside or near barns. It is simply too easy for someone to carelessly drop a match or a cigarette butt onto something flammable and walk away before they realize what they've done. Signs should be posted and a "No Smoking" policy should be strictly enforced.

Lightning can also cause barn fires. While lightning can't be prevented, lightning rods and proper grounding of electrical circuits can be installed in order to limit the danger. Lightning rods direct the energy from the strike through a heavy conducting cable that runs deep into the ground. Hire an expert when installing these types of systems.

Bacterial and chemical reactions, such as those that occur in recently baled hay, can also start fires (spontaneous hay combustion). If the hay is baled while it is too wet and then stacked tightly, either outside or in a confined space, the potential for spontaneous combustion occurs. This is a good reason why large quantities of hay should be stored away from the main barn where animals are housed. Also, bales can be stacked loosely and on their sides in order to allow more ventilation.



**Misuse of appliances or other electrical devices is a leading cause of fires in barns. In this photo, the hanging outlet box, dangling extension cords, and cobwebs on the end of the plug for the light are hazards. Photo courtesy of Rebecca Gimenez**

## Don't Get Them Started in the First Place

There are some obvious fire prevention steps that every barn owner can take. Reviewing the above discussion, every barn should have a strictly enforced no smoking rule and signs should be posted conspicuously around the buildings and property. Anyone who violates this rule should be asked to leave the premises. Electrical appliances installed in the barn, such as water heaters, pipe-heating tape, insect-control devices, and portable heating units, should be inspected regularly. All appliances should be appropriate for use in a barn setting, where dust and rodents can impact their function. Electrical wiring should be encased in metal or PVC conduit, and radios, clippers, extension cords, and similar portable electrical appliances should be disconnected and stored when not in use. Store extra hay and bedding in a shed separate from the barn.

Fuel sources, which could be inside or outside the barn, should be controlled. Other tips include:

- Keep grass mowed and control weeds, brush, and debris for 30-50 feet around the barn area. This not only keeps the area looking good, but also eliminates dried plant material that is a highly flammable fuel.
- Remove less-frequently used combustibles from the barn. Store all combustibles properly and be sure to provide appropriate receptacles to dispose of soiled rags.
- Keep the barn clean and free of cobwebs, chaff, dust, and loose straw and hay, which are all easily combustible and make excellent fuel sources.
- Ignition sources include the obvious cigarettes and heaters as well as those not-so-obvious, such as machinery exhaust systems. Trucks driven into hay/bedding

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storage areas have been known to ignite materials in contact with the hot exhaust and catalytic converters.

- Space heaters should only be used according to manufacturers' guidelines and should not be left unattended.

## Figuring Out Something's Wrong and Fixing It

Despite your best efforts, fires may still occur in your barn. Some fires smolder for varying lengths of time before erupting into flames. Barns equipped with smoke detectors may get advanced warning of the problem. However, most residential and commercial smoke detectors aren't effective in barns due to dust that clogs the mechanisms. Contact a company that specializes in smoke detection systems for agricultural facilities.

If a fire is discovered in the smoldering stage (no live flame) there is a chance it can be put out. Fires can smolder for hours. However, once flames are spotted, it is usually too late. A rule of thumb is that if the fire is larger than a small trash can, do not attempt to put it out; exit the building immediately.

**This depicts a well-designed barn. Stalls are made of pipe and fire retardant materials, electrical systems are in conduit (along the ceiling), aisles are wide and clear, exits are clearly marked, and there are fire extinguishers strategically placed throughout. Photo courtesy of Klaire Tardiff**

Depending on the size of the fire, putting it out may be easily done using a portable, multipurpose ABC type fire extinguisher. Fire extinguishers should be placed in easily reached, visible spots every 50 feet along the aisle. Keep in mind that fire extinguishers should be checked regularly to ensure they are

properly charged and ready for use. Contact your local fire department for practice on how to properly use a fire extinguisher. Also consider inviting your local fire department out to your facility. This will give the firefighters a chance to familiarize themselves with the layout of the barn, surrounding buildings and pastures, and gain some familiarity with the everyday equipment that livestock owners take for granted, and give you valuable insight to issues they see. They're in the fire-fighting business; take their advice seriously.

Sprinkler systems can suppress a fire until firefighters arrive, possibly saving the animals' lives. The cost is not significant compared to the price of the animals, the facility, and the emotional impact of losing beloved animals to a fire. Additionally, you can often get a lower premium on your insurance.

Finally, every facility should have a fire evacuation plan of action and rules aimed at preventing fires. Phone numbers for the fire department and other emergency personnel should be posted where they are readily accessible, near the phone. Also include the address and directions to the facility – many people panic and cannot remember the address or how to get to the barn during an emergency. Barn personnel should be trained in how to use an extinguisher correctly. Everyone on the farm should know exactly what to do if a fire breaks out. Design the plan to protect human life first and foremost, and keep in mind that if a human is in danger, emergency personnel will rescue the person before any animals.

Keep the barn aisles clean and clear of carts, tack, and other items that would accelerate a fire or hinder a rescue attempt. Lightly moisten dirt aisle ways on a regular basis to keep dust down and reduce fire risk. Remove cobwebs from the barn and surrounding buildings regularly. Cobwebs are flammable and allow fire to spread very rapidly.

Stall construction can help or hinder the evacuation of horses and other animals. Stall doors should open outward into the aisle or slide open so that handlers can free animals more quickly and easily. Stall doorways on the exterior of the barn are also helpful. If a fire has involved the barn structure to a certain degree, firefighters will not enter the building because it will be too unsafe. Outside doors can still allow them to access the animals. Latches should be easy to operate with one hand, and both halters and lead ropes should be available at each stall door for animals that are trained for individual handling.

If you can, build barn structures to include a fire lane to establish an escape route for removing the animals from the barn more quickly during fire emergencies. Ideally, fire lanes should link from the outside doors of the animals' stalls to paddock spaces or pastures well away from the barn. Chasing the livestock down a fire lane is much easier than catching them individually, and it also keeps them confined so they do not run back into the barn or get in the way of incoming emergency vehicles.

There should also be water sources available near the barn so the fire department can quickly access them. This could include ponds or streams as well as installed fire hydrants (depending on your location). Finally, approaches to the barn should be wide and high enough to accommodate a large fire engine. This may mean widening the drive or trimming trees.

## In The End, Planning Is Essential

While a quick rescue is key, fire prevention is far more effective and less costly. Implement policies and practices that minimize the potential for a fire to start. Have a plan in case one does happen. Call on experts to help you review your plan. If a fire happens, follow your plan. Although you may never need to call your local fire department, it is important to be prepared in order to give you and your animals the best chance for survival if a fire does occur. Make a plan – even if you never use it, it's the best "waste of time" you've ever engaged in.

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