Every year a few hay producers who have the unfortunate experience of having part or all of their hay destroyed by fire. There is no way to be absolutely certain that all possibility of a fire has been eliminated, but several precautions can be taken that are helpful in reducing the likelihood of a hay fire.

**External Source Fires**

Decisions pertaining to storage can have a big influence on the likelihood of accidental fires. Bale stackyards should not be located in places where a fire is most likely to occur. For example, they should not be adjacent to a wire fence or under a tree that might attract lightening. Similarly, they should not be at the edge of a grass field that might catch fire and burn. Keeping stackyards away from roads where a careless smoker might toss a cigarette is also a good idea.

It is best to have several bale stackyards rather than just one as this reduces the risk of a wildfire destroying all hay on the farm. The same principle applies to barn storage if one has the option of storing hay in more than one place.

If hay is stored in a barn, it is prudent to eliminate combustible vegetation and trash around the edge of the barn that could cause the structure and its contents to catch fire in the event of a wildfire in the vicinity. Likewise, spraying a nonselective herbicide to kill vegetation around the edge of a bale stackyard makes sense. Posting “No Smoking” signs around a barn is desirable, and use of fireworks in the vicinity of a hay barn or stackyard should never be permitted.

**Spontaneous Combustion**

Spontaneous combustion can occur in hay if it is baled at too high a moisture level. The general recommendation is that small rectangular bales should be baled at 20% moisture or less and that large round bales should be baled at 18% moisture or less. The exception to this is when a hay preservative such as propionic acid is applied to the hay prior to bailing. When this is done, hay may be safely baled at 25 percent moisture or higher.

Heating of hay is caused by the activity of microorganisms. Dry hay does not heat excessively because it lacks the necessary moisture to support any significant microbial growth.
Microorganisms that cause heating are naturally present on forage and they will become active if conditions are suitable.

Spontaneous combustion is more likely to occur in tightly baled hay as opposed to loosely baled hay, and packing newly made bales tightly together in a barn also makes it more difficult for heat to escape. However, there could be danger anytime the recommended moisture levels for baling are exceeded, although if the moisture level is no more than a few percent higher than recommended it is likely that the main negative result will be moldy hay. The higher above recommended levels that the moisture level goes, the greater the likelihood of extreme heating and fire.

**Monitoring Bale Temperature**

Anytime a producer suspects that there might be an overheating problem, monitoring of hay after baling will be a good idea. If large bales that are ultimately to be stored inside are heating excessively, delaying putting them in the barn for a few weeks may save the hay and a barn. Spacing suspect bales widely to allow heat and moisture to escape (as well as to reduce the likelihood of losing several bales instead of just one in the event one does catch fire) is advisable. Putting green hay against dry hay should always be avoided.

Several types of thermometers can be used to check temperature in hay, including laboratory thermometers, candy thermometers, or thermometers made for monitoring compost. However, it is not a good idea to insert glass thermometer directly in hay because it is likely to break. Spirit filled thermometers or electronic thermometers should be used rather than mercury filled thermometers that could contaminate hay if they break.

Hay temperature can be checked by making a probe. Such a probe can be made from a piece of 2-inch diameter pipe on which one end has been sealed with a sharpened plug. The pipe can then be driven into a stack or large bale of hay followed by lowering of a thermometer into the pipe. If there is concern about a cutting of hay, multiple readings should be taken at various locations and/or in different bales to determine the temperatures throughout the hay.

If a bale contains reasonably uniform moisture and density throughout the bale, the highest temperature is likely to be near the middle of the bale because this is where heat will remain for the longest period of time. Square (rectangular) bales should be probed from the side and round bales should be probed from the end.

A temperature probe should be long enough to reach the middle of the bale (normally 18 to 36 inches, depending on the size and type of bale). Checking every bale usually isn't feasible, so it makes sense to monitor bales that seem most likely to cause a problem. This would be bales that seem to contain the wettest hay.

When hay temperature remains below 120 degrees Fahrenheit it is considered safe. The range between 120 and 140 degrees is considered a caution zone in which the hay should be closely monitored. Even if the hay does not catch fire, heating to this level reduces the nutritional value of the hay. If the temperature rises to 160 or above, a fire is likely.

Research has shown that the maximum heating of hay usually occurs within one week of baling. Three weeks is normally considered the maximum length of time after baling that the highest temperature resulting from microorganism-induced heating would occur. Thus, putting hay into permanent storage after three weeks should be safe.
Sources of Thermometers

Thermometers that are suitable for checking temperature in hay can be found at many locations including farm supply stores, hardware stores, and heating and air conditioning suppliers. In addition, there are numerous catalog or internet sources.

Examples are as follows:

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<th>Company</th>
<th>Address</th>
<th>Phone</th>
<th>Fax</th>
<th>Website</th>
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<tbody>
<tr>
<td>Gempler's</td>
<td>P. O. Box 44993, Madison, WI 53744</td>
<td>(800) 382-8473</td>
<td></td>
<td><a href="http://www.gemplers.com">http://www.gemplers.com</a></td>
</tr>
<tr>
<td>Omega Engineering, Inc.</td>
<td>P.O. Box 4047, One Omega Drive, Stamford, CT 06907-0047</td>
<td>(800) 826-6342</td>
<td></td>
<td><a href="http://www.omega.com">http://www.omega.com</a></td>
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<tr>
<td>NASCO – Fort Atkinson</td>
<td>901 Janesville Avenue, P.O. Box 901, Fort Atkinson, WI 53538-0901</td>
<td>(800) 558-9595</td>
<td>(920) 563-8296</td>
<td><a href="http://www.nascofa.com/prod/home">http://www.nascofa.com/prod/home</a></td>
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Conclusion

Hay is a commodity that readily burns, and hay fires are costly. Hay production is difficult and stressful enough under the best of circumstances, but it is particularly tragic to see one's hay crop literally go up in smoke. A little knowledge, common sense, and simple precautions can go a long way toward reducing the likelihood of a hay fire.