

## **WET HAY CAN = MOULD OR FIRE?**

### **Frank Mickan Vic DPI**

“It only needs the odd shower, even this year, to result in wet hay being baled and shedded,” says Frank Mickan, Pasture and Fodder Conservation Specialist, at DPI Ellinbank. Despite the dry conditions in most of Victoria, southern Victoria still seems to get the odd shower at haymaking time to make curing/drying to safe moisture levels difficult.

This can result in hay being too wet at baling, rainfall on the windrows or bales caught in the rain before shedding. THIS excess moisture (rain or plant sap) equals loss of dry matter/bulk and nutritive value AND probably mouldy bales AND possibly spontaneous combustion, i.e. FIRE!

Slightly moist material or rain wetted bales will cause mouldy hay but, in the right conditions, can result in a haystack fire. If “suspect” hay is shedded, what should I do?

From early in week one, inspect your haystacks regularly for signs of steam and/or heat rising from the stack(s). This heating may occur anytime up to about seven - eight weeks after harvest. If you notice either symptom, start to monitor the heating as the stack may cool down or, if conditions are right, could be a candidate for spontaneous combustion, i.e. the stack lights up!

Before catching alight, a heating stack will go through several stages. Firstly the stack will heat as a result of activity by plant respiration and bacteria but it MAY cool down after several days or weeks. However, if the baled material is reasonably wet, and air circulation is restricted, heating may continue to 43° - 66°C which then favours the growth of heat resistant fungi. This often results in even higher temperatures and once past about 70° - 77°C, chemical reactions take-over, killing off the living fungi, microbes, etc.

BEWARE! This stack is now in a very dangerous state and temperatures can quickly rise to the point of catching fire at about 200°C if oxygen is available. If the stack is tightly stacked and oxygen supply is limited, the temperature may rise to about 280°C before igniting. Flash point can occur anytime over the first 1- 8 weeks after harvest although more commonly will occur over a 2-5 week period.

My stack is seriously heating, what should I do?

Regularly monitor the stack temperature by inserting a crowbar as far as possible into the heating area of the stack. After about two hours, remove the crowbar and the heat in the bar felt by hand can indicate to you a rough guide of the internal stack temperatures.

Some sources suggest using an inserted pipe and then lowering a thermometer down its interior. This will provide you with a quick and an accurate reading of the internal stack temperatures. However, be very cautious of inserting a pipe into an extremely hot stack as the pipe. Doing so will now allow an oxygen-starved stack centre to get an instant supply of oxygen and actually cause a “fire explosion.”

If you can hold the bar without discomfort temperature will be up to about 50°C. It is up to 60°C if the bar can only be held for a short time. If the bar can only be touched briefly temperatures are heading to 70°C. If you can't hold the bar, temperature is above 70°C. NOW treat the stack with caution as fire is a real possibility!

Steam condensation on the roof, mould growth, acrid fumes, and hot, humid air between the roof and stack top are all indicators that the stack is heating. When building stacks with suspect 'wet' hay, stack the bales loosely to allow the heat to escape from the stack. Also spreading the stack over a wide area will reduce heat build-up.

If the stack needs to be pulled apart, do so as quickly as possible. However, do not walk on the top of the stack if possible because the extremely high temperatures may have charred the centre of the stack. This won't be seen from the outside. Your extra weight on top of the stack might be enough to cause the top of the stack, and you, to collapse into the extremely hot centre. Not a nice picture.

Be aware that as the bales are pulled out, especially in a tightly built stack, that oxygen can now get to the hot spot more freely and may actually instigate a fire. Always have a fire cart or brigard on hand.

Large round bales are prone to heating and should be baled 2-3 degrees drier compared to small squares. Large square bales are even more prone to heating due to their high density and large volume to relatively low surface area ratio, and should be at least 4-5 degrees drier than small squares at baling.

Think about using hay preservatives which are now more commonly available for when bales has to be baled "slightly" too wet.

Last but not least, NEVER keep machinery in a hayshed containing heating hay and shoots kids who play in a heating stack!