

Hay Balers: A Hidden Fire Danger

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Each year we hear about hay stack fires in sheds and in paddocks and the financial loss of outside haystacks, sheds and unfortunately, equipment,” says Frank Mickan, Pasture and Fodder Conservation Specialist of DEPI, Ellinbank Centre. However, not so commonly known is that there are also many hay baler fires which start while baling. During every hay harvest, the Victorian Country Fire Authority (CFA) attends several baler fires, many of which could have been avoided or at least, with much reduced damage.

Not only are balers often burnt in these fires but sometimes the tractor is also partly or completely destroyed, neither cheap pieces of machinery. No doubt there are other unreported costs such as paddock fires caused by the baler fire spreading into nearby windrows and surrounding dry paddocks, especially if there is wind. And there is always the dangerous prospect of serious burns to the operator. Then there is the potential loss of animal production due to the delay in baling, until another baler is put into action and worse if it rains beforehand causing substantial loss in nutritive value of the hay.

Whilst having a chat with a local passionate CFA member who is also a farmer and with input from some other farmers at the same time, they mentioned many insights that I felt should be put out to the farming community. Some of these insights are well known but some are relatively unknown. Most baler (and tractor) fires are caused by over-heating of, usually, damaged bearings and often not noticed until the hay bale and baler are well alight, unless the operator just happened to turn around when fire first started.

What should be well known by farmers and contractors is that it is compulsory by law in Victoria for all tractors to have a water extinguisher with a minimum 9 litre capacity attached to the tractor during the fire restriction period. This can be either a pressurised water extinguisher (Figure 1) or a knapsack, although the latter are difficult to attach on many late model tractors. Unfortunately, this law is poorly enforced but this simple tool is a no brainer when operating equipment with hot bearings in hot dry, windy conditions in very dry flammable grass. It can potentially save very expensive machinery from burning. Cheap insurance, eh? An extinguisher could be critical to nipping a baler fire in the bud or at least delaying it spreading too much before the CFA arrives notwithstanding sparks caused by mowers etc. hitting stones or metal.

The CFA also recommended carrying a minimum two kg dry powder extinguisher for several reasons. These are useful for electrical and hydraulic oil fires, often starting as a result of the baler fire melting wires or hydraulic hoses. Embers often are blown into nooks and crannies around and under the tractor cabin and other hard-to-get-at places. Spraying water into these spots sometimes does not reach all crevices or deep enough where dust and loose dry material has built up. The water can sometimes evaporate before extinguishing the fire in some locations. However, a powder extinguisher will spread further and is more effective in these scenarios than water. Electrical shorts can also start fires and even though the electrics are usually automatically shut down on many of the latest model tractors, fires can sometimes short circuit this safety process. Water won't extinguish this fire.

Some other handy tips that the guys passed on were:

Clean the tractor each day to minimise build-up of flammable material, although this will occur during the day's harvest operation but less the build-up of loose, dry material the better. Over time dust and loose dry grass builds up in nooks and crannies and can lodge near hot tractor parts such as the engine manifold, exhaust and turbocharger.

Get a handle on the normal operating temperatures of the bearings once the baler reaches operating temperatures by using a thermal gun ranging in price from \$30 to \$100's (Figure 2). This is not fool proof and a bearing may give out suddenly without warning. Replace any bearings which are running hotter than normal. Be aware that the latest balers run at higher temperatures than the earlier models.

Seriously consider changing sets of bearings when one is showing signs of wearing out. The bearing in the opposite one end of the shaft to the worn bearing may not be far from wearing out itself and it is highly likely increased wearing may have been caused by its crook mate at the other end. Replacing bearings is much cheaper than replacing a baler (and/or tractor).

If you notice a fire in the bale chamber, or a smoking bearing, the CFA, based on many years of experience, strongly suggests NOT ejecting the bale from the chamber. While being ejected the bale becomes suddenly exposed to much more air and the loose material inside and around the baler can seemingly "explode" into flames once the baler is freed from its tight air-restricted confines. Also, depending on strength and direction of the wind, this newly inflamed material may be blown into the tractor and cabin crevices as explained above.

Do not speed up the tractor in the hope of extinguishing the flame as the flush of air actually fuels the flame and often just spreads the fire into the paddock itself.

The CFA strongly recommend separating the tractor from the baler as quickly as possible because baler fires more often than not get out of control quickly. This rapidly generates extreme heat so that approaching the drawbar is almost impossible (without severe risk of burns) and metal components heat quickly making uncoupling of hydraulic hose very difficult and extremely dangerous. If there is no extinguisher available, this is a must to avoid destroying the tractor as well. (Frank this needs clarifying because it doesn't seem to tell me how to uncouple)

The CFA site also recommends avoiding the overloading of electrical circuits by using the battery isolation switch, if fitted, whenever the harvester is parked. They also recommend the use of vermin deterrents during the down period as these blighters can chew through electrical insulation resulting in short outs.

Of course, I should not have to even mention care needed when driving vehicles with hot exhausts or even hotter catalytic converters over long dry grass or windrows, nor welding and/or grinding metal in the paddock on hot windy days.



Figure 1. Tractor water extinguisher



Figure 2 Thermal gun