

expert ease

Spontaneous Combustion

Animal feed and spontaneous combustion

Many of you will be aware of the recent incidents involving the spontaneous combustion of palm kernel meal (PKM) and Broll. The fact that it occurred more than once in a relatively short period of time is a good reason to examine the storage conditions around which these events occur.

Used as cattle feed, PKM (a waste product of palm nuts) and Broll (wheat bran) are two of a number of free-flowing grain related products that are susceptible to spontaneous combustion. While the recent incidents of spontaneous combustion took place in warehouse situations, the same outcomes can occur when the product is being

transported if the product is destabilised.

The stability of PKM is maintained by low moisture and oil content. It is easier to maintain homogeneity in terms of moisture and oil content in smaller volumes, however it is difficult to do this when the volumes are large. The moisture can vary considerably due to such factors as original processing, preshipment storage, transport and subsequent storage.

This can lead to pockets of higher moisture content within a larger portion, and this is where self heating will tend to occur. If a single moisture content level figure is taken it doesn't provide meaningful information

on how the moisture content ranges within the stockpile. Once the moisture content is greater than 9.5% spontaneous combustion is more likely to occur.

Self heating can come about in two ways; mould growth and oxidation of oil.

Mould growth is capable of increasing the temperature to about 60 °C. Microbiological heating is limited to 60 °C because above 40 degrees the moulds producing the heat start to die.

Oxidation of oil occurs spontaneously at any temperature but more slowly at lower temperatures and does not require any biological assistance. Above 50 °C it can



Spontaneous Combustion

cause quite a rapid exothermic reaction which results in a spiraling increase in temperature that can easily result in combustion.

Given the factors that are at play here there are a number of risk management requirements that need to be followed:

- Moisture and temperature readings should be recorded prior to stowing any new shipment of the product.
- Use of thermal scanners or temperature probes every second day at a minimum of 500mm below the surface. These readings must be recorded in a graph. If any of the following temperature increases are detected remedial action is required:
 - the temperature reading a minimum of 500mm below the surface of the stack is 10 °C or more above the surface temperature of the stack; or
 - the surface temperature of the stack is 10 °C or more above the ambient temperature of the warehouse floor; or
 - the temperature readings of the stack's surface or 500mm below the stack's surface are more than 10 °C above the recorded readings from two days previous.
- In any of these situations the centre of the stack is to be exposed, checked, and re-stowed with the central section stowed last. As the introduction of oxygen will accelerate combustion, care needs to be taken when disturbing the stack. With this in mind a high volume fire hose reel is to be on hand prior to disturbing the stack.
- Storage buildings must be appropriate for the product, preferably purpose built, with no internal spouting, protection from surface water intrusion and 57 °C fusible link monitored heat sensors installed throughout.
- Security fences and a minimum of three nightly security patrols.
- CCTV to cover access points with external monitoring (advisable).
- Turn piles a minimum of every four months.
- Safety signage next to all entry points into the building – Hazchem Panel and class 4.2 Spontaneously Combustible sign.
- The insurer is to be notified of any change in product or new product to be stored including recording of any additives included in the product.

.....
If you have any questions, please call Lumley Property on 09 308 1100 and ask to discuss this cover with one of our experts.
.....