tasked at a forthcoming executive meeting. Of course it is easy to construct a long list of things we would like to achieve, but that must be directly related to our resources of money and people, and we must make sure they are both expended on what we consider are the most important issues.

The FPANZ has been operating for 34 years during which time it has become more influential. The executive committee want to ensure that we continue to build on our strengths, and continue to be the respected and unified voice of the fire protection industry focused on reducing the impact of fire in New Zealand.

Bob Taylor
Executive Director

NZS4541 Second Public Comment Period

The Automatic Fire Sprinkler committee, in conjunction with Standards New Zealand, has decided that it is important to now invite a second public comment on those specific clauses of the draft Standard which have been updated to incorporate comments received during public comment release 1, and on those draft clauses which the committee consider are more technically significant than what was proposed in the initial draft release for public comment.

The two main areas that have been the subject of substantial discussion by the committee during the drafting of the latest edition of NZS 4541:2007 are:

1. Independence of a SSC for automatic fire sprinkler installation, including providing further clarity around roles and responsibilities of a SSC; and
2. Further clarity required for definitional issues for listed contractors.

If you or anyone in your organisation would like to take the opportunity to review the draft and provide comments, you can download it free from the Standards New Zealand website.

If you have any problems downloading either draft please call us on 0800 STANDARDS (0800 782 632).

You can either comment online by clicking on 'Enter Comments Online' or by downloading and completing a comment form and sending it to Vicky Allison at vicki.allison@standards.co.nz

The closing date for comments on this draft Standard is **23 July 2007**. ■

Causes of Fire - Mechanical Friction

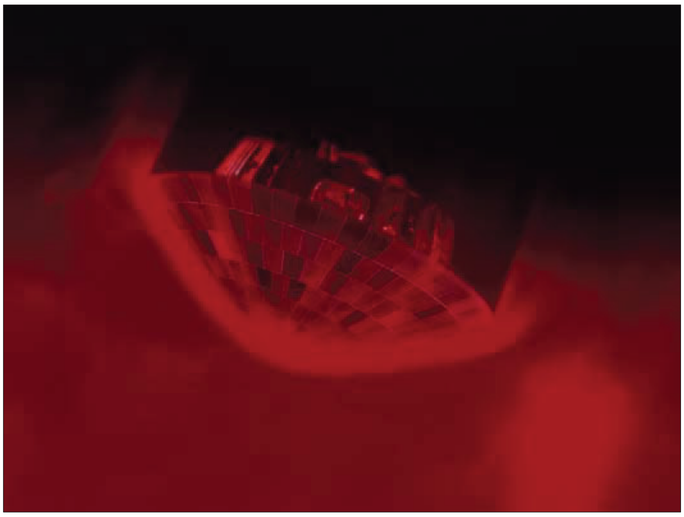
Author Tim O'Brien, VeriFire

This series of articles started back in 2006 with an overview of the significant causes of fire, and has progressed through each of these, looking at how these fires start and methods of prevention. This, the penultimate article in the series, discusses the last significant cause of fire – mechanical friction.

Mechanical Friction

When one object comes in contact with another, energy is dissipated in the form of heat, sound and/or light. On a cold morning one might instinctively rub ones hands together. The warming effect is, at least in part, due to friction. Most of us can envision aboriginals twirling a stick against a piece of wood to start a fire. If you have tried this you will realise that it is probably one of the most difficult methods to start fire, requiring considerable physical effort and, without the selection of the appropriate tools, it will be doomed to failure! Some hints to success include the use of a dry soft-wood V notched base-board, a drill of slightly harder wood, dry and finely divided tinder, and a loosely strung bow to spin the drill at a high speed while applying moderate downward pressure. The film Cast-Away (Tom Hanks) is an excellent training movie. Let us thank technological development for matches and lighters. Although these also involve friction in their modus operandi, they depend on chemical reaction and spark energy for their success.

The problem is that, as much as we might struggle to produce fire by rubbing two sticks together, mechanical processes often involve bearing surfaces in contact at relatively high speeds or with high coefficients of friction that can produce unintended fires. At very high relative velocities objects that we do not normally consider sources of friction can become problematic. Air friction during re-entry of a space craft results in searing hull temperatures of 1650° C. The failure of the carbon-carbon tiled heat shield on the shuttle Columbia in February 2003 caused the craft to break up and the tragic death of her crew.



Heat Shield (Artist's Impression)

Back on earth the main causes of excessive friction are bearings, equipment damage, imbalance, slippage and jamming.

Electric motors can be found in almost every building as part of building services, equipment, appliances and tools. Within motors and the equipment they drive are bearings which, unless in good order and appropriately lubricated, can generate excessive heat. While motors are generally regarded as extremely reliable they are subject to wear, changing environmental and load conditions. Eventually they will fail.

Motors and Bearings are Everywhere – and so is Fuel for Fire

Shaft or load imbalance on rotating machinery can cause excessive bearing loading resulting in bearing heating. Misaligned or damaged parts can bridge clearances resulting in friction. Fan blades can become unbalanced due to mechanical damage due to impact or dirt. This can lead to bearing heating and contact between the blades and the case.

Jamming is another common cause of friction resulting in fire. Conveyors, belt sanders and other transport systems can jam through material becoming trapped between the moving and stationary parts. In the case of conveyors it could be the material being transported. Jamming can be caused in machinery by parts coming loose or becoming miss-aligned or by product getting into places where it aught not.

Belt Conveyor

A seized hot bearing will not start a fire by itself. There needs to be combustible material available to burn. The combustible material could be lubricant; equipment parts (rubber conveyor belts burn readily); the material being processed or transported; or dirt, dust or fly; thermal insulation; or materials of construction such as timber and polystyrene cored sandwich panel.

Two real losses are presented that demonstrate fire caused by friction.

The first involved an air conditioning and ventilation plant on the roof of a manufacturing and warehousing facility. No one thought much about this equipment until after the fire. The first sign of trouble was smoke coming into the building through the ventilation. The air conditioning compressor motor had seized and heat from the motor had set fire to the motor winding. Thankfully the fire was contained above the roof and was extinguished by the Fire Brigade. However the acrid smoke required a significant clean-up operation. Had the plant been manufacturing food or pharmaceuticals much of the product could have been destined for the tip.

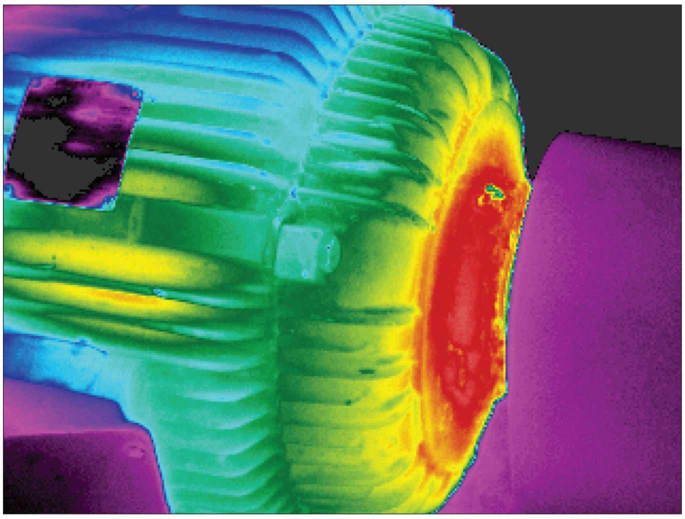
Typical Roof-Mounted HVAC

The second loss involved a high speed automated sander. A guide blade became miss-aligned dropping onto the belt and causing the product to jam. The misaligned blade and the jammed product caused sparks that were drawn into the dust extraction system. The concentration of dust being transported in the duct was above the lower explosion limit. The ensuing explosion caused a secondary explosion damaging the cyclone separator, destroying the bag house and causing a fire. The power of friction!

A Typical High Speed Automated Sander

Effective prevention of friction fires can range from low-tech routine inspections to complex scheduled analysis depending on the hazard. Start with routine inspection, cleaning, maintenance and, when necessary replacement. Taking appropriate precautions for electrical, moving machinery and stored energy hazards one can readily detect unusual sounds, heating or vibration. These are precursors for equipment failure. Check the condition of equipment from time to time ensuring that critical tolerances are maintained, components are not wearing, points needing lubrication are being lubricated, and that bolts and other fasteners are tight. On lubrication – too much or the wrong sort can be just as bad as too little. Equipment manuals can give excellent guidance on maintenance requirements and inspection intervals.

For more critical or expensive equipment special techniques might be required. Ultrasonic analysis can detect unusual noise. Passive infrared analysis can find localised hot-spots. Lube oil analysis can detect changes in oil composition and the presence of metal particles. Vibration analysis can detect changes in mechanical conditions. Electrical power analysis can identify changes in load. All of these techniques can give early warning that a friction problem is on the horizon. Many of these techniques become increasingly powerful when a history of normal operation is built up over time.



Electric Motor Infrared Image

Encourage a culture of 'do something about it' when a problem is first identified. If a belt is rubbing on a guard, or the cross-cut saw has started making an unusual noise, if the thermal trip on a piece of equipment has activated for the third time this week then it is time to identify and correct the problem. Often times in our drive to be productive, in fear of being discredited, or in a false sense of economy, we persist with defective equipment or processes. Even worse we may fix the symptoms and not the cause. The fan started squealing so the