



A simulated engine compartment fire was demonstrated at Focus on Forestry. The fire source consisted of four trays filled with diesel. Diesel spray was then injected into the compartment at a rate of two litres per minute at a pressure of five bar to simulate spray fire. The temperature inside the engine compartment quickly rose to over 700 degrees C

Fogmaker mitigates forest machine engine fires

Forestry equipment such as feller-bunchers, loaders, forwarders, skidders and log handlers operate in extreme environments and it is impossible to avoid the accumulation of highly flammable saw dust, leaves, wood chips and other dry residues in the engine compartment. The heat of the engine or exhaust systems can easily ignite these dry materials.

In addition, the prohibitive cost of capital equipment is forcing machine owners to increase their machine utilisation periods, resulting in aging equipment with more electrical faults and mechanical failures that can cause fires. A leaking fuel injector, ruptured hydraulic fitting or burst oil feed near hot running engine parts or electrical components can result in an extremely hot, fast spreading fire. And, because timber and forestry equipment typically operate in remote or undeveloped areas where emergency fire services are not available, the need for effective fire protection becomes critical.

John Russell, managing director of Fogmaker South Africa, points out that, "The consequence of an engine fire in a forest machine is at best a production stop, and in the worst-case scenario the fire can quickly spread to other parts of the machine, endanger the lives of the operator and his colleagues, and even start a forest fire."

International standard

Russell explains that automatic fire detection and fire suppression systems for commercial and heavy-duty vehicle engines are accepted internationally as the standard way to mitigate engine compartment fires. "For example, in Europe legislation has been passed which requires all new coach buses to have automated



John Russell, MD of Fogmaker South Africa, describes how the fire detection and suppression system works at the Focus on Forestry field day in Howick earlier this year

detection and suppression equipment as from October 2017." He believes this legislative approach will eventually filter into the South African market, and be supported by insurance companies as they follow the international trend of offering discounted rates when the system is installed.

Fogmaker South Africa is the southern African distributor of Swedish company Fogmaker International's water mist fire protection system. The Swedish company is the market leader in vehicle fire suppression in Europe Australia and Middle East, with a proven track record with over 120 000 units installed worldwide since 1995. "The units have proven their reliability and durability in the demanding environments of buses, mines, marine applications, military, and forestry vehicles," says Russell.

Superior extinguishing performance

"The extinguishing performance of our suppression system is unique as it tackles all three elements of the fire triangle. Firstly it removes oxygen, which quickly chokes the fire. It also cools down the sources of heat, and at the same time a foam additive provides a cover to prevent hydrocarbon fuels from being available to burn. The cooling and foam are critical in preventing the fire from re-igniting. We call this the Triple Action of the Fogmaker system"

Russell describes how water mist, generated under high pressure through Fogmaker's patented specialised nozzles, has superior extinguishing capabilities in engine compartments compared to traditional low-pressure foam systems. The nozzles create micro-drops with an average size of 50 micrometres. One drop of water, typically one millimetre in diameter, is converted to 8000 micro-drops. This water mist quickly floods the entire engine compartment



The Fogmaker high pressure water mist system suppressed the simulated fire within 10 seconds and reduced the temperature to below 100 degrees C

and, when these drops come into contact with a hot surface or gas, they convert to steam. Through this process of water expanding into inert steam air, and with it oxygen, is forced from the fire area, thus choking the fire.

Due to the ability of water to absorb energy, the water mist has the added advantage of absorbing both radiant heat from the flames and latent heat from within the engine. The reduction of radiant heat helps protect wire harnesses and hydraulic piping, while cooling the engine compartment prevents re-ignition.

Fogmaker uses a "loss of pressure" detection tube, which is independent of electricity. This works even when the power supply is disconnected and no matter the orientation of the vehicle. "So, should the vehicle be involved in an accident and be lying on its side or up-side-down, the system will still be effective."

Fire re-ignition is prevented by the adding of a small amount of foam to the water mist. The foam lies over the entire motor compartment like a choking blanket. The extinguishing fluid that is generated from the water mist is environmentally-friendly and easy to wash away. "Re-setting a released suppression system is often simpler, easier, faster and much cheaper compared to powder or foam suppression systems."

Maintenance

Once a year, the fire suppression system should be inspected and the functions tested by a certified installer. Normally, this does not take more than an hour. Besides this annual inspection, as the cylinder is classified as a pressure vessel, South African regulations require the cylinder to undergo a visual assessment, wall thickness and pressure testing by a certified authorised inspection authority every three years, and Russell says Fogmaker's service technicians use this opportunity to replace the suppression fluids and seals.

The system is being offered as an optional extra by several OEMs, however it is easily retro-fitted on site in an engine compartment. Fogmaker South Africa has installed fire suppression systems on Hitachi, Volvo, Doosan, Tigercat, Bell, Timberpro, John Deere and AHWI forestry equipment,

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