



Fire protection systems based on infrared technology offer significant advantages. The Austrian waste treatment company, ThermoTeam supplies a nearby cement production plant with refuse derived fuel (RDF), and now benefits from the use of thermal detection.

Cement is an important material for the production of concrete, screed and mortar. The cement manufacturing process requires a considerable amount of energy, often met with substitute fuels such as RDF.

RDF for cement works

ThermoTeam Alternativbrennstoffverwertungs operates a materials recovery facility (MRF) waste treatment plant near Graz in Austria.

The plant treats high calorific waste to produce alternative fuel. Sources comprise various types of plastic or commercial waste, e.g. from cellulose production and with considerable calorific value. The first step in the process involves crushing the input materials and then feeding them into the separator. Once impurities have been sorted out, the shredders crush the material further and the fully treated substitute fuel is moved to the output store. A tube belt conveyor transports the material directly into the nearby cement works.

"The cement works in Retznei use only our RDF," reports Josef Kulmer, director at ThermoTeam before adding: "We are already rapidly approaching our goal of largely replacing primary fuels in cement manufacture."

ThermoTeam currently processes almost 100,000t of input material annually, and also supplies other cement works with RDF.

Because of the highly flammable material being handled in the process, fire protection is of highest importance, and a major challenge. Metal sorting is a particular hazard.

Kulmer highlights one of the greatest dangers: "Batteries in the metal fraction can cause a short circuit, which may in turn lead to a fire."

The decision to improve fire protection measures was made after a fire in 2009 caused damage worth millions. Until then, a conventional fire alarm system based on an aspirating system had been in use.

"The smoke aspirating system is extremely high maintenance, especially in such a difficult environment like ours," explains Kulmer, referring to the dusty and polluted conditions. Moreover, in the 12-metre high halls the system does not respond until the fire is already well underway.

Because of this, and the fact that sometimes more than 10 minutes lapse between when the fire brigade is alerted and their arrival on the scene, a considerable amount of damage may be caused by the uncontrolled fire.

The aim was to find a solution which detects fire at an earlier stage, enabling a fast response, and ideally effective extinguishing.

"Our search paid off at the IFAT trade fair in Munich where we came across the PYROsmart solution by ORGLMEISTER Infrarot Systeme, an early fire detection system based on infrared technology," recalls Kulmer. "The option to combine the system with automatic extinguishing even gave us the opportunity to have the fire extinguished fully automatically," he adds.

In an ideal situation, it will no longer be necessary to alert the fire brigade.

Infrared technology detects fires early - sometimes before they have even started

The system operates with a special high precision pan/tilt drive and even very large areas can be monitored. Thanks to [infrared technology](#) (see Fact File), smoke and dust in the monitored area do not affect the measuring accuracy. To keep the two camera lenses dirt free, compressed-air is integrated in the housing, and flushes the system.

Along with a high resolution infrared camera, which constantly scans the area to be monitored, providing a panoramic image of the entire area, a video image is generated parallel by an IP camera, showing the same panoramic perspective.

The thermal image provides highly precise and accurate temperature information, and the panoramic video image ensures fast and clear identification of the area being scanned.

A monitor in the control room displays both images, and from the thermal image the operator can take a reading of the prevailing temperatures in the various areas in any spot at any time; the highest temperature is automatically shown. So he gets both a rapid overview and details about any hot spots.

Once the temperature exceeds a specified limit, an alarm is triggered - long before the smoke aspirating system would have been able to react to an already spreading fire.

Targeted fire fighting

"Thanks to the detection/extinguishing interface, fires can now be fought in a targeted manner, i.e. as soon or before they break out, spread and cause significant damage," says Kulmer, pointing to the major advantage of connecting the early fire detection system with automatic extinguishing.

The PYROsmart early fire detection system identifies the exact position of the fire, and shares this information with the water monitor to target the fire source directly.

This targeted fire-fighting method keeps both the quantity of water required to a minimum, along with the damage caused.

The integrated system control recognises whether a fire does indeed exist, or if another heat source within the monitored area displays alarm temperatures.

Often, the exhaust pipes of wheel loaders or delivery trucks used in the input hall become very hot and trigger a false alarm. Thanks to the intelligent software algorithms it is possible to define characteristics of disturbance variables within the system's control, and internal pre-alarms can be set up to highlight changing temperatures without immediately triggering the fire reporting process. Operating staff are informed of rising temperatures at an early stage, and while they are still below alarm level.

Once the system detects alarm temperatures, the automatic extinguishing process is immediately initiated.

Simultaneously, the whole production process comes to a halt and an alarm horn warns the ThermoTeam employees.

At weekends, for example, when the plant is not in operation, text messages can also be set up to notify employees. Should the alarm not be acknowledged by an employee, it is sent on to the fire brigade's regional warning/alarm centre. In the event of a fire, and upon arrival at the plant, the fire brigade manually takes over control of the water cannons with remote controls installed on the outside of the building. The joystick controls on the water monitors correspond to those used in modern fire engines.

Gaining approval

Kulmer says he is very happy with the PYROsmart new early fire detection system, which was commissioned in the summer of 2012, and has been in continuous operation ever since. The commissioning process involved setting up the system and gaining approval from the responsible authorities.

"So far, we've had three fires near the impurity sorter, which the system detected and extinguished in their early stages," says Kulmer. Apart from the annual inspection, maintenance or repair work has not yet been required.

"Overall," says Kulmer, "we are certain that the threat of large fires can be prevented with the new early fire detection system."

Fact File: Infrared technology

All objects emit electromagnetic radiation which lies primarily in the infrared range. The exact spectral distribution of this infrared radiation, first described by the German physicist Max Planck in 1900, depends on the temperature of the object. Measuring the infrared radiation enables a very precise temperature measurement. With modern infrared cameras, you can view an exact infrared image of the selected area; a so-called thermal image.

This technology is used typically in the building industry to expose weaknesses in building insulation, or when maintaining machines. Damaged ball bearings e.g. show excessive heat build-up, and can be classified as rejects. In terms of fire protection, [infrared technology](#) makes it possible to detect fires very early, when the temperature threshold is still below the ignition temperature.

10th International Energy from Waste Conference

ORGLMEISTER will be exhibiting at the 10th International Energy from Waste Conference that is being held in London on February 26-27.

For further details on the conference, visit www.efwlondon.eu or call 01722 717024