



FLIR APPLICATION STORY



Waste incineration plant in Böblingen, Germany

FLIR Systems ThermoVision A40 is preferred camera for fire prevention and fire detection in solid waste bunkers

Solid waste management is a crucial sector in our consumer society. It is a USD 43-billion industry and growing as more regions experience positive economic growth and prosperity and consequently produce more household waste. At the same time, legitimate environmental concerns push for an increasingly streamlined waste disposal, treatment, neutralization and recycling process. The waste has to be gathered, stored and processed. As supply (in this case places for storage or processing of waste) is scarce and demand is increasing, economic laws of market and efficiency increasingly apply to waste management.

In densely populated West-European countries, solid household waste is collected and

carried to a waste incineration plant, rather than dumped directly in landfill sites. The most advanced incineration plants use the combustion heat to fuel up an adjacent waste-to-energy system, which provides heating and power to nearby residential areas.

The waste is therefore stored in so-called waste bunkers, which contain thousands of metric tons of solid waste. This waste is potentially flammable when stored: self-combustion, heat development due to pressure, spontaneous chemical reactions between the disposals, methane gas-building, are potential fire creators. Waste bunker fires can be hazardous for both operator and environment: the heavily contaminated firefighting water, which hampers the further processing of the waste,



The infrared image shows hot-spots in the waste. This means a danger for spontaneous self-combustion and fire.



The ThermoVision™ A40 in its protective housing.



has to be disposed as well. And firefighting does not always reach potential fire spots still dangerously smouldering somewhere in the large and deep bunker. This is why the stored waste has to be permanently moved, mixed and turned by crane operators.

PREVENTING FIRES WITH INFRARED

The need for fire prevention becomes even more acute for installations with a waste shredder: sparks from shredding metal and other solid parts compound with methane gases, resulting in an explosive cocktail scattering around the entire waste bunker.

Consequently, fire prevention and fire detection are important issues for waste storage and management. While most national or regional legislators stipulate that fire prevention ought to be taken by the public or private plant operator, they generally do not clearly state how.

Infrared cameras are excellent tools for both fire prevention and fire detection, provided they offer some basic features that serve the purpose :

- the ability to detect and clearly visualize nascent hot spots through smoke and dust
- measure and indicate temperature
- control pre-defined areas on a permanent basis
- raise an alarm when a temperature threshold is passed.

Fire prevention systems are installed by specialized system integrators. One such leading integrator on the market is the high-tech company m.u.t GmbH, based near Hamburg, Germany. m.u.t. develops and markets photonics products for complex solutions in the medical, aerospace, security and other sectors, and has specialized, among other things, in early fire detection for air and land transportation carriers and waste incineration plants.

m.u.t. offers a complete solution including planning, installation, software, hardware, and maintenance. It has installed more than

forty infrared camera-based early fire detection systems in waste bunkers across Europe. "Preliminary planning is the hardest part of the job", says Werner Hagedorn, Account Manager for the early fire detection products, "we have to define the best place to install the camera, divide the entire waste bunker in zones and ensure that for example the minimum surface of 30x30 cm to detect hot spots that is advised by some regional legislators, is covered by the camera."

THERMOVISION™ A40 MONITORS WASTE BUNKERS CONSTANTLY

m.u.t has chosen the FLIR Systems ThermoVision A40-M fix-mounted camera for all its waste bunker installations. The A40 offers a spectral range of 7.5 to 13 μm , which allows to look through smoke and dust. Its 320x240 pixel uncooled microbolometer detector provides excellent thermal sensitivity and clear infrared imaging. Visual Basic/ C++ and LabView™ software development kits enable customers a smooth application integration. m.u.t has successfully made use of these facilities to integrate the A40 camera into ARTUS, its waste bunker early fire detection software suite.

One ThermoVision A40 camera, mounted on a pan stilt and placed in an appropriate protective housing, is able to inspect a surface of up to 2,000 sq m. The camera registers the surface temperature of the waste, comparing it to the maximum temperature defined by the waste bunker operator.

The m.u.t. engineers divide the bunker surface in zones which depend on the size of the waste bunker. The camera checks every zone subsequently and its FireWire output provides temperature information and infrared imaging to the crane operator's monitor screen in real-time. The operator is also able to steer the camera from his working place. Three alarm levels marked by visual as well as sound alarms warn the crane operator of substantial temperature differences on the waste surface in a particular zone. The waste is then mixed and turned, transferred to another zone, or carried directly to the oven for combustion.



The waste bunker surface is divided in zones. The ThermoVision™ A40 checks every zone subsequently.



The control room of a waste bunker. If the ThermoVision™ A40 detects a hot spot an alarm will go off.

Although every infrared camera detector pixel measures a temperature value, the m.u.t engineers have chosen a temperature measurement, based on a 3x3 pixel grid. They considered 2x2 pixels as inadequate and uncertain. "3x3 pixel secures additional measurement accuracy and consequently a clearer image contrast, while excluding false alarms", says Volker Meliss, Marketing Director at m.u.t.

"The ThermoVision A40 does all the measurements", says Hagedorn, "and its thermal sensitivity and measurement accuracy are excellent. But above all there is no need for a camera with a cooled detector for such applications as waste bunker inspections: the A40-M has an uncooled detector and needs virtually no specific maintenance. And that makes infrared monitoring of waste processing as well as in many other industrial applications affordable".

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