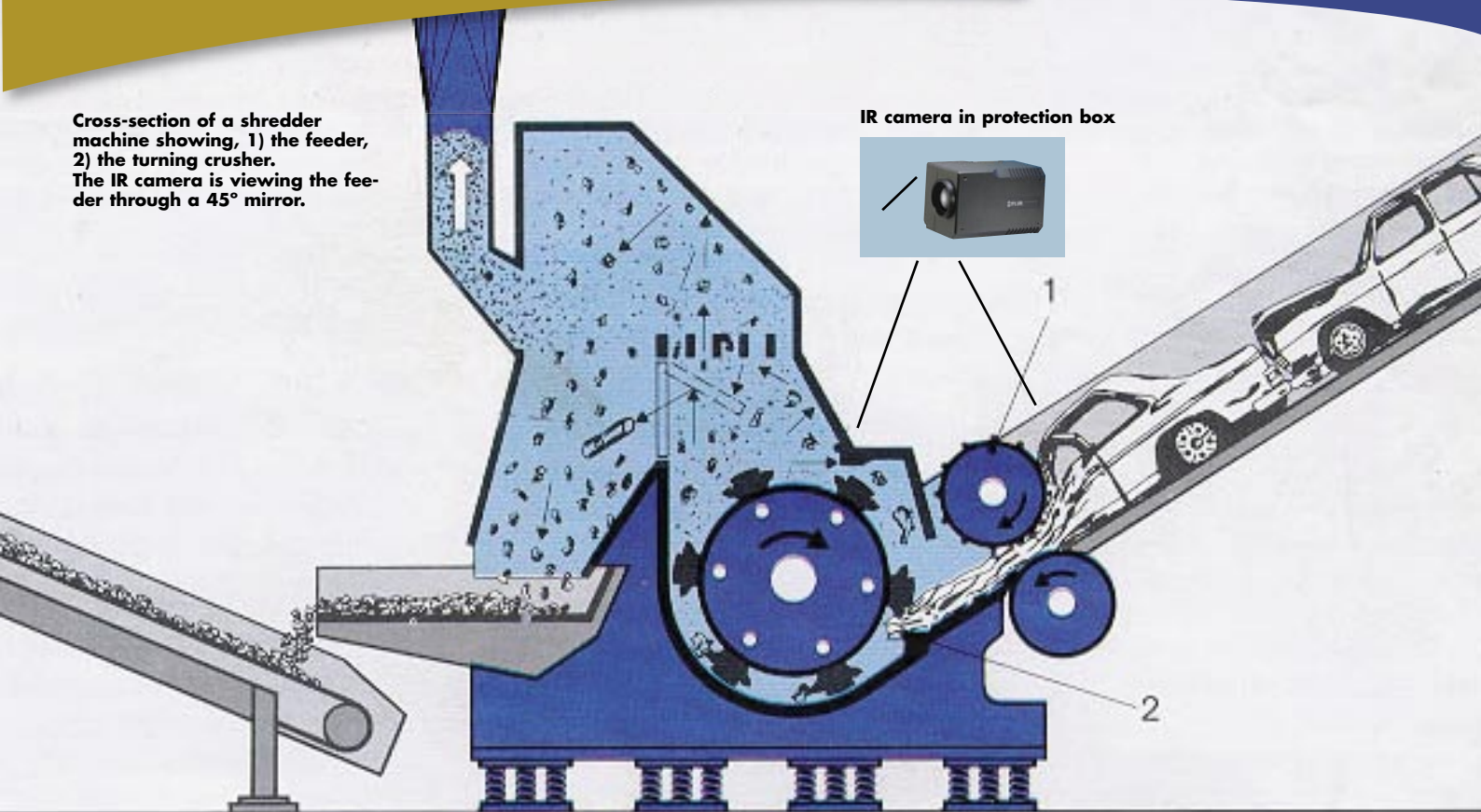


Cross-section of a shredder machine showing, 1) the feeder, 2) the turning crusher. The IR camera is viewing the feeder through a 45° mirror.

IR camera in protection box



## Infrared Camera increases output at shredder installation

Three FLIR Systems ThermoVision Infrared Cameras are being used to monitor the process of shredding scrap material at Stena Gotthard Fragmentering AB in Sweden. As a result, output at the installation has increased by more than 10%.

### THE PROCESS

Located in Sweden, Stena Gotthard Fragmentering AB is specialised in processing light to medium-heavy, mixed scrap, such as cars and household appliances. A shredder crushes the material into small chips. These chips are then sorted into three different categories – iron, non-magnetic metals, and organic materials – and sold for recycling.

The heart of the installation is the turning crusher. It crushes the scrap materials that are continuously loaded into the feeder.

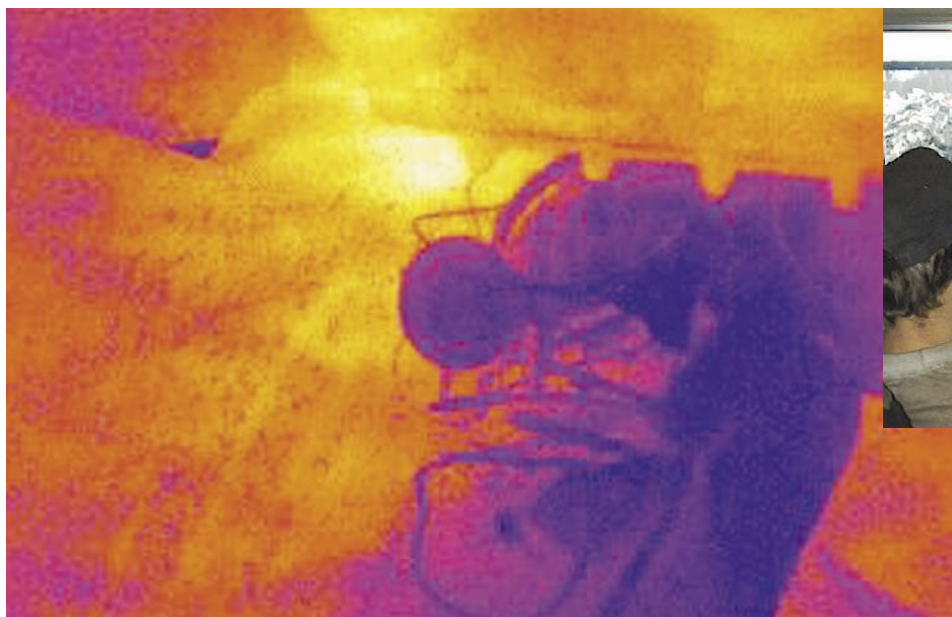
A huge 2.5 MW motor powers this crusher. Due to the high friction that occurs during the fragmentation process, a lot of dust, but also a great deal of heat is generated. Water is sprayed onto the crusher for reducing the dust, however, causing steam to develop. The processing of some materials can also produce smoke.

A cylindrical feeder, located above the crusher, loads the scrap into the shredder. In the control room, an operator manually controls the feeder to avoid the shredder



Loading scrap onto the conveyor belt.





1. The control room with the IR display shown below left.  
2. Bicycle being fed into the feeder.

from becoming choked. In the past, normal visual cameras were used to monitor the feeder. However, due to the smoke and steam, such cameras produced very poor image quality. The images were more or less useless to the operator.

**CREATING ADDED VALUE BY REPLACING A VISUAL CAMERA WITH AN INFRARED CAMERA**

By using an infrared camera, operating in the 8-12 μm spectral region, the operator is able to see through the smoke. A FLIR ThermoVision camera, installed above the feeder, gives the operator a real-time image that shows exactly what is going on inside the feeder.

At Stena Gotthard, the shredder operator can now view the IR image on the display in front of him while controlling the feeder

with a joystick. "Before, I had to rely on an amp-meter to measure the electric current of the crusher and to indicate when something was choking the feeder," says Ola Kilestad, one of the shredder operators at Stena. "Thanks to the infrared camera, I can now see what is blocking the feeder through the smoke and take the appropriate action immediately."

A crucial problem to solve was how to protect the camera. Smoke and dust coming out of the feeder are not the only problem; another is fragments of scrap that can sometimes be propelled at high, bullet-like velocity. In response, a local integrator, Informationssystem AB, helped Stena to build an adequate protection box. The bottom of the box is furnished with a 25mm-thick, steel plate, which is further

protected by a shock absorbing metal net. A 45° mirror is used to protect the front lens from direct exposure to the harsh environment. An air purger is connected to the enclosure to prevent dust from contaminating the mirror or camera optics.

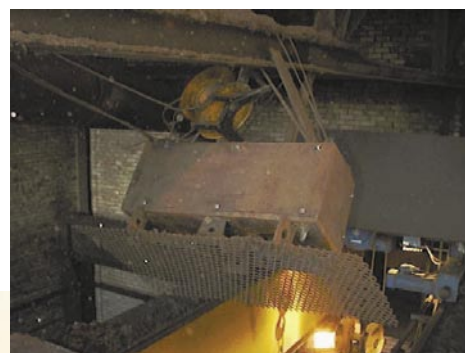
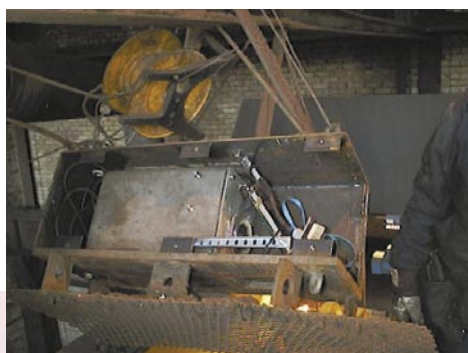
**RAPID RETURN ON INVESTMENT BY INCREASING OUTPUT**

As a result of the IR camera installation at Stena, production output has increased by more than 10%. "We now process approximately 1000 tonnes of scrap per shift, which is outstanding for our installation. This output would have been impossible without the IR-camera," says Håkan Norén, Technical Supervisor at Stena.

Three more shredder installations in Scandinavia have installed FLIR Systems IR-cameras, increasing the productivity of their installations in the process.

Convinced of the rapid return on the investment, shredders at various locations in the world have been showing interest in equipping their installations with infrared cameras.

*The heavy-duty box, with the FLIR Systems ThermoVision camera inside, shown both open and closed here. The 45° mirror is easy to replace. The shock absorbing metal net is mounted on spacers welded to the thick bottom plate.*



For further information contact:

**FLIR SYSTEMS AB**  
World Wide Thermography Center  
Rinkebyvägen 19  
SE-182 11 Danderyd  
Sweden  
Tel.: +46 (0)8 753 25 00  
Fax: +46 (0)8 753 23 64  
e-mail: sales@flir.se  
www.flir.com