

Iron and steel

Ladle

Torpedo car

Rolling

- Difference in heat conductivity
- Poor heat insulation
- Heat insulation characteristic
- Damaged lining
- Excessive load current
- Increased contact resistance
- Increased power load
- Transmission mechanism failure

**Cement,
chemical plant**

Kiln

Sludge

**Heat insulatio
n**

Electric power facility

Motor power facility

- **Background**

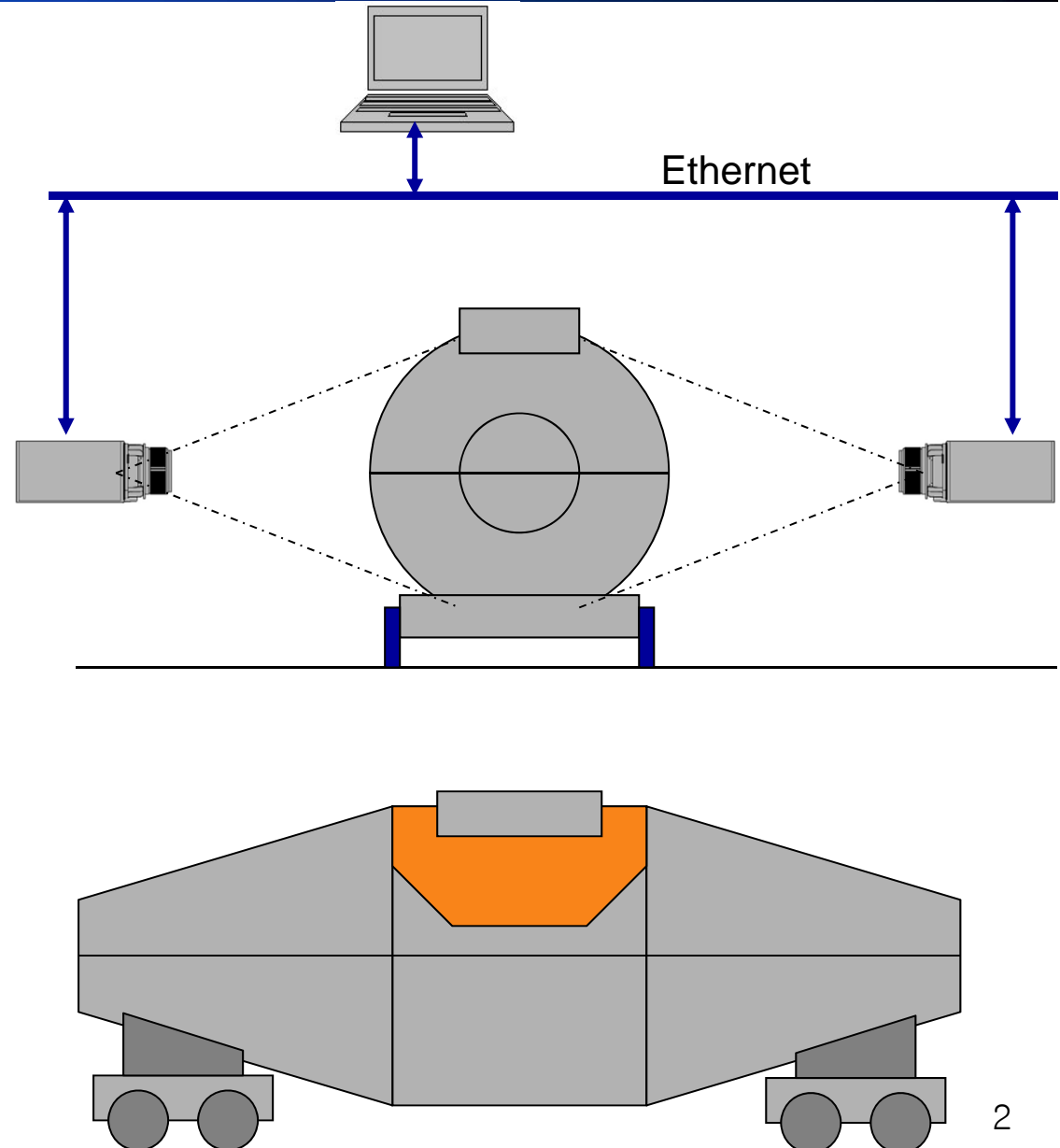
Torpedo car is a container to transport melted iron (pig iron), and its shell is protected by a fire-proof material. Degradation level of this fire-proof material is inspected to conduct appropriate repair.

- **Application example**

Temperature distribution of the shell surface is measured using a thermography to understand the degradation level.

If abnormality is found from the surface temperature, detailed inspection of the fire-proof material at the suspected area is conducted.

Because the thermography inspection is conducted during operation, thermal images are taken from the left and the right side of a torpedo car simultaneously, and the captured images are transferred to a computer via Ethernet. The images are stored and history controlled by the computer

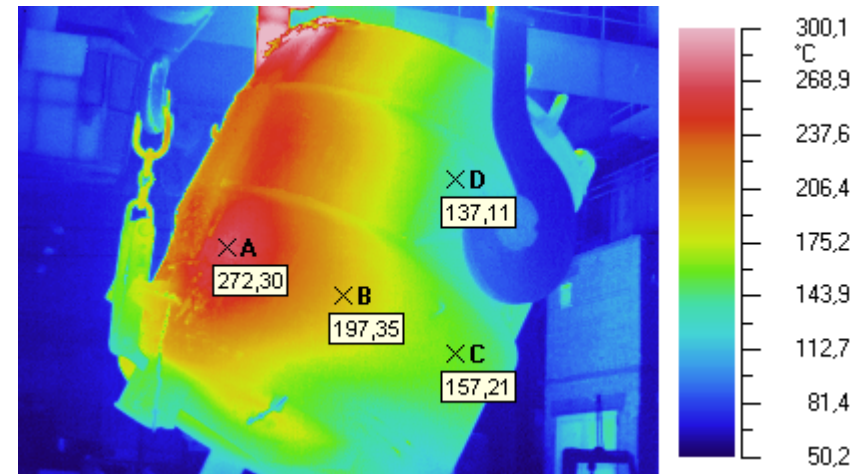


- **Background**

- Ladle is a container for melted iron (pig iron), and its shell is protected by a fire-proof material. Degradation level of this fire-proof material is inspected.

- **Application example**

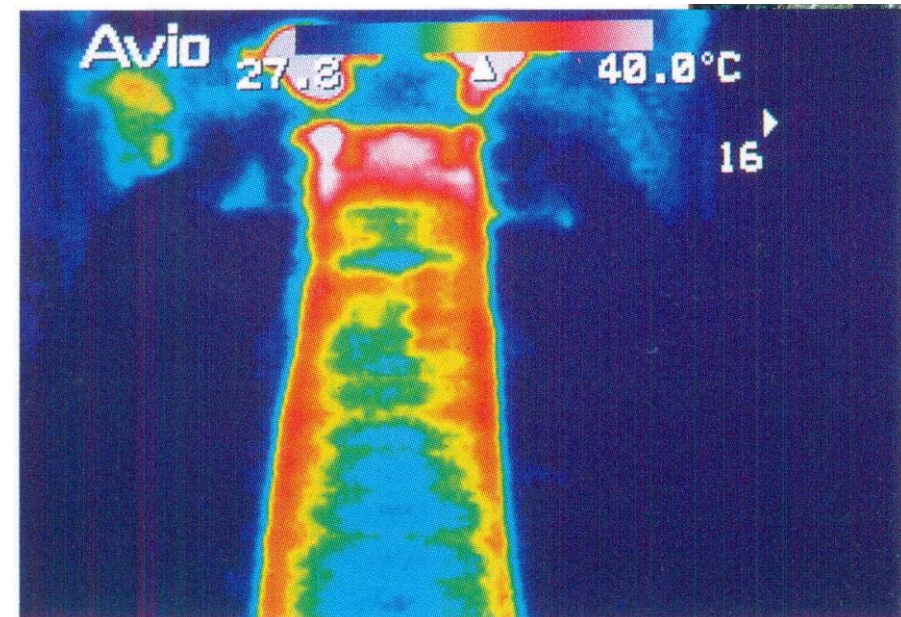
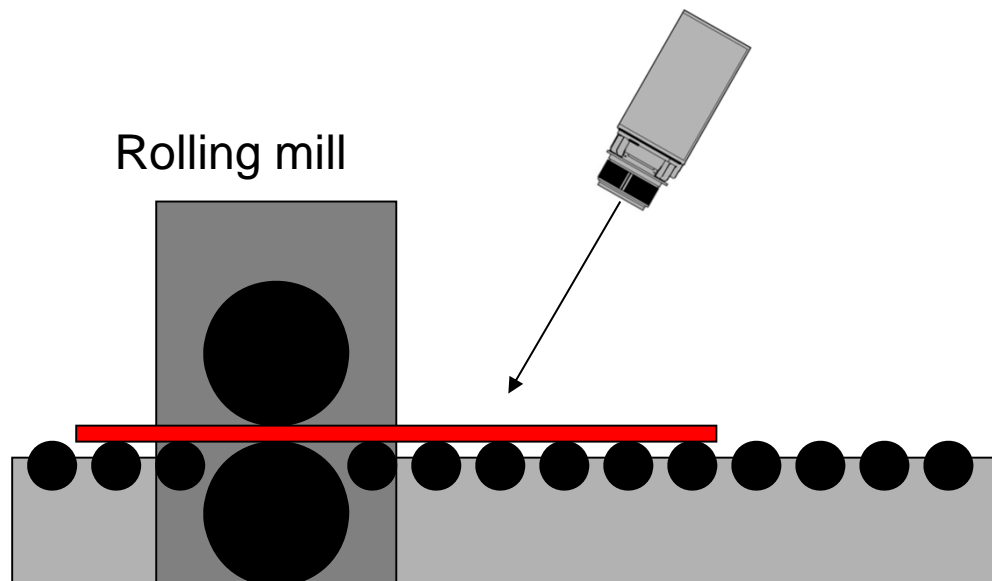
- Temperature distribution on the shell surface is captured by a thermography to understand the state of the fire-proof material.
- If abnormality is found from the surface temperature, detailed inspection of the fire-proof material at the suspected area is conducted.



Degradation diagnosis of fire-proof material



- Background
 - Temperature of rolled plate in the rolling process is controlled.
- Application example
 - Temperature distribution of rolled plate in the rolling process is maintained to be the same in the width direction for stable product quality.
 - Temperature distribution of rolled plates is measured by a thermography, and the result is fed back to the rolling process.

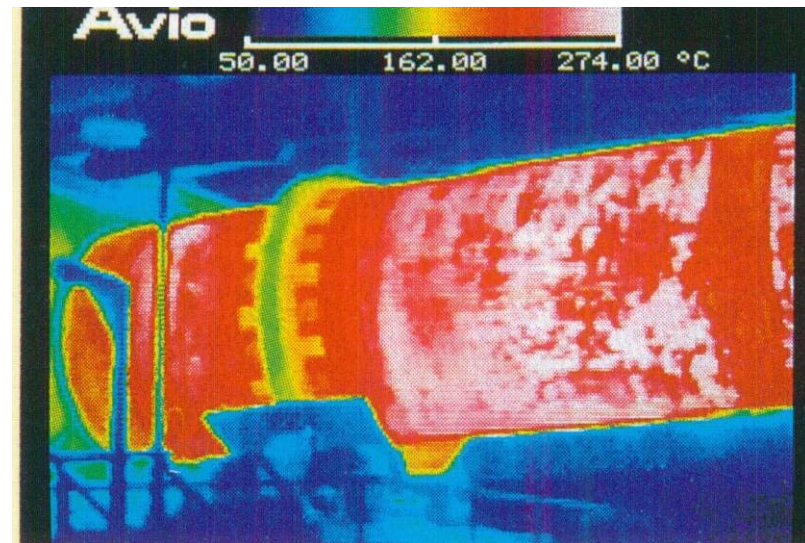


- **Background**

- Rotary kiln is a machine to bake blended raw material for cement.
- Fire-proof bricks are attached on the inner wall of the rotary kiln to protect the shell, and there is a need to understand the degradation level of the fire-proof bricks in the early stage.

- **Application example**

- Temperature distribution on the shell surface is measured using a thermography to understand the degradation level of the fire-proof material.
- If abnormality is found from the surface temperature, detailed inspection of the fire-proof material at the suspected area is conducted.

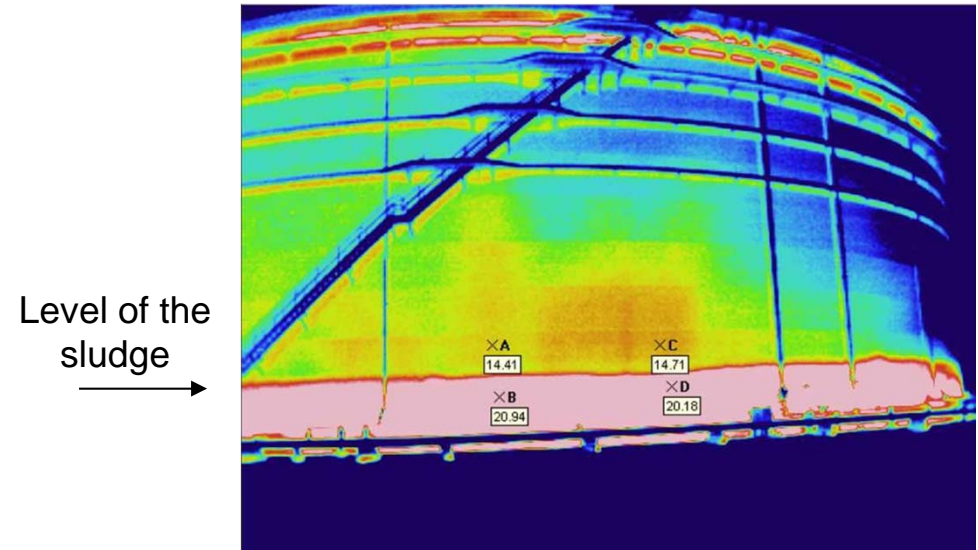


- **Background**

- The amount of sludge in oil tanks is measured.

- **Application example**

- Because the side wall of an oil tank is very thin comparing to the amount of oil inside and its thermal conductivity is good, the surface temperature of a tank is almost identical to the temperature of oil or sludge inside.
- If there is a temperature difference because of the sludge accumulated in the bottom of a tank, the height of sludge will appear on a thermography, and the amount of sludge can be estimated.



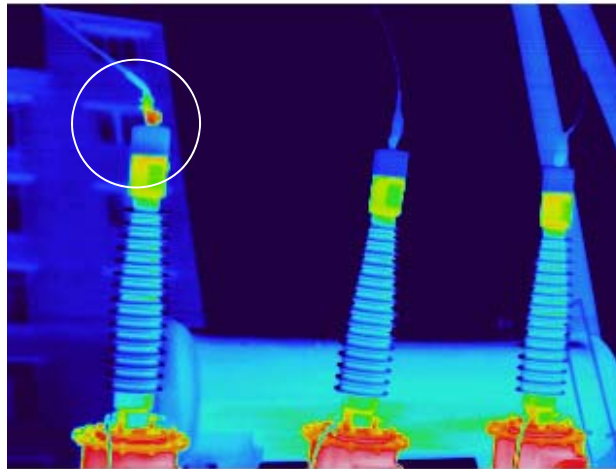
- **Background**

- Inspection of electric power facility which is operational with high voltage and located at a high elevation position is required to be conducted efficiently.

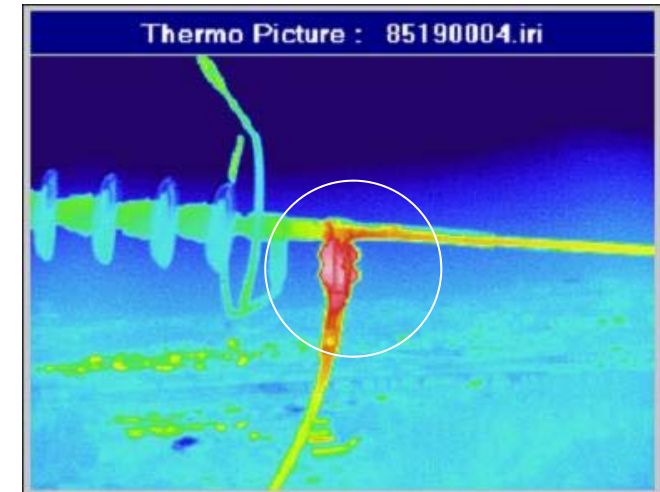
- **Application example**

- When electric current flows through a resistor, a heat will be generated.
- Abnormal heat is an evidence for excessive load-current or excessive resistance.
- If the load condition can be somehow verified, the reason can be identified.

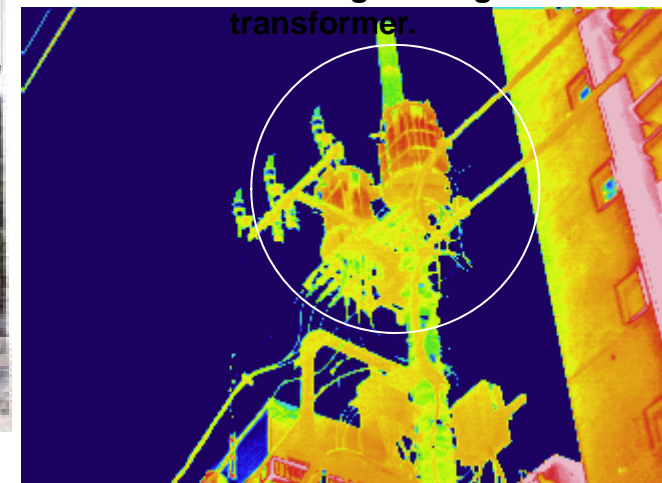
Abnormal overheating at a transformer facility

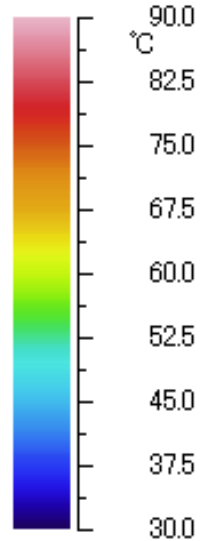
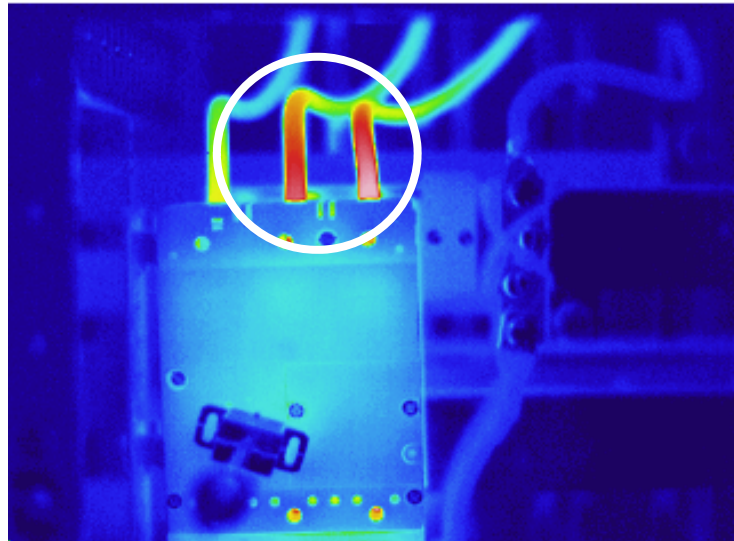
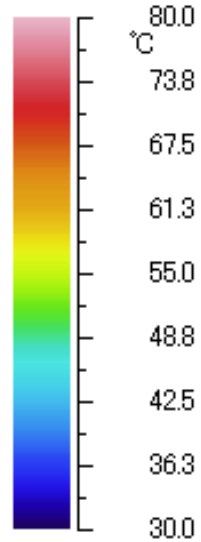
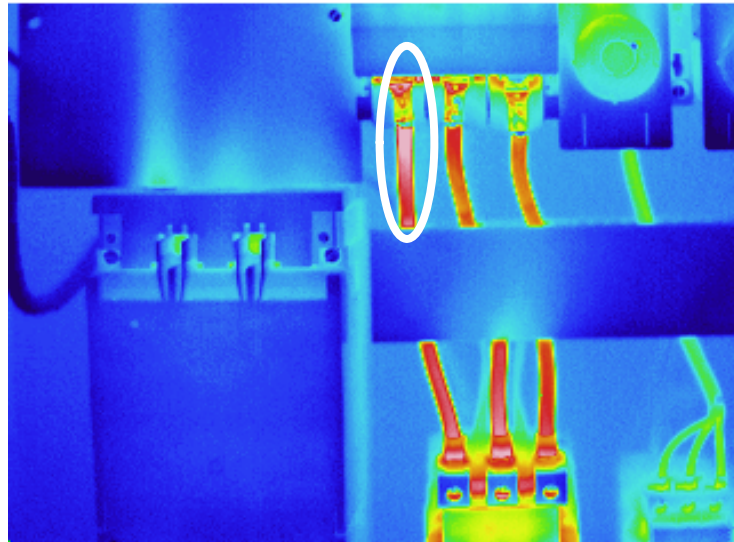


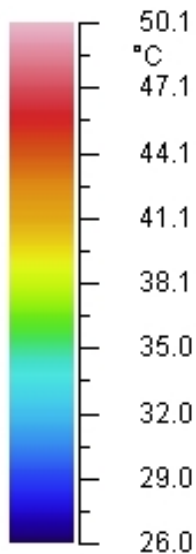
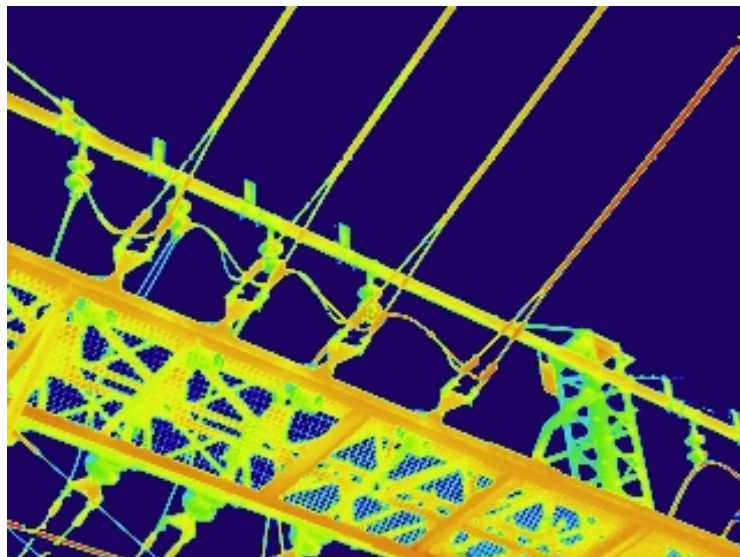
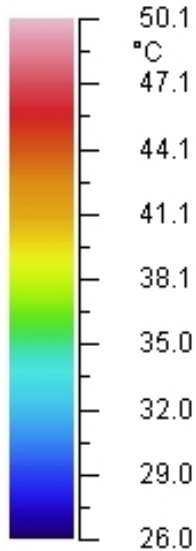
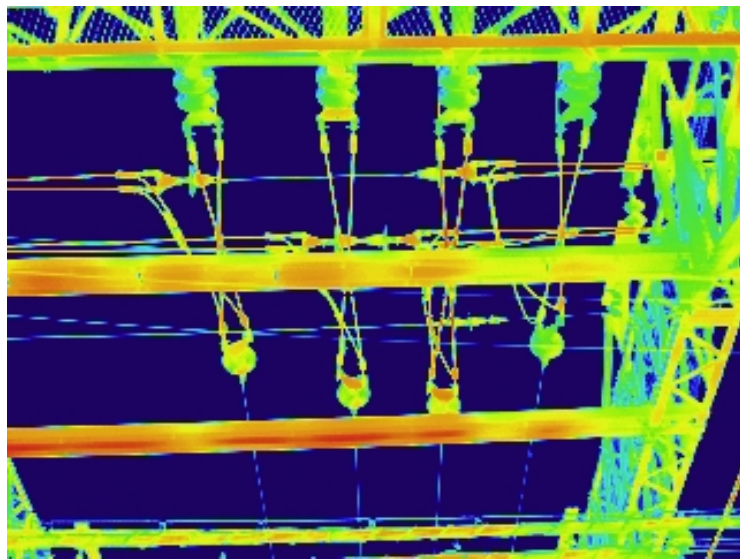
Overheating of a power line clamp/sleeve.



Overheating of distribution line insulator or high voltage transformer.





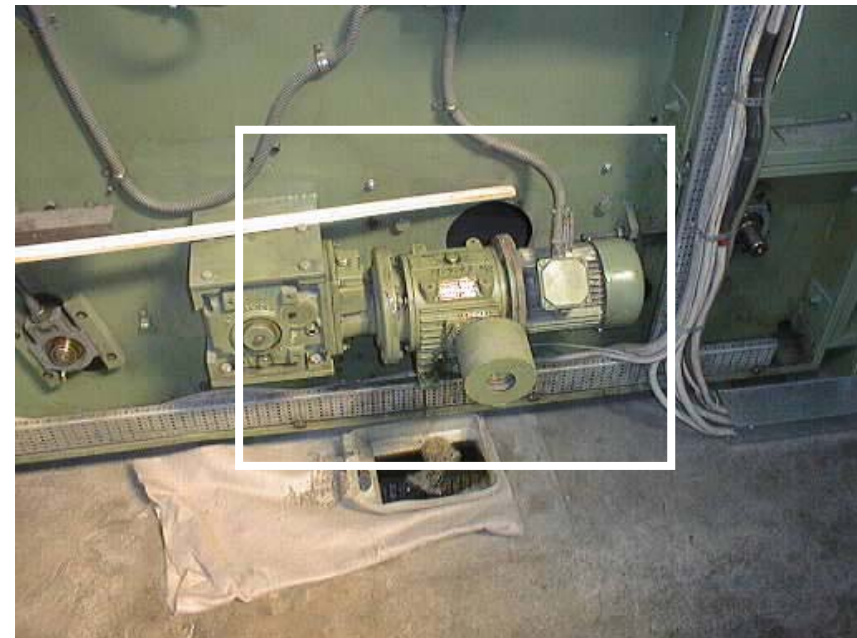
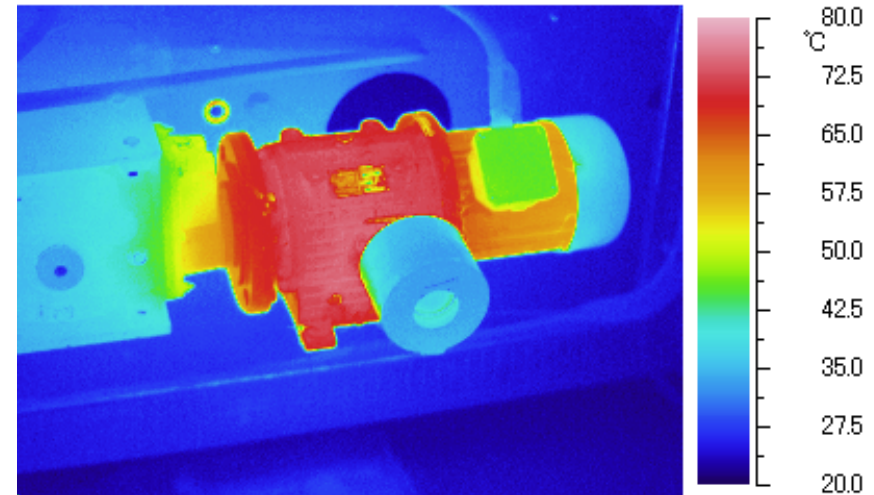


- **Background**

- Understand the state of a motor power facility.

- **Application example**

- Excessive load to a motor will result in heat generation.
- If there is an overload to the motor, naturally there will be a heat generation. There will also be a heat generation if there is a defect in the motor or if there is a defect in the transmission mechanism which takes out the load (such as the bearing).
- If the load status can be understood by some means, the reason for the heat generation at the motor can be identified.

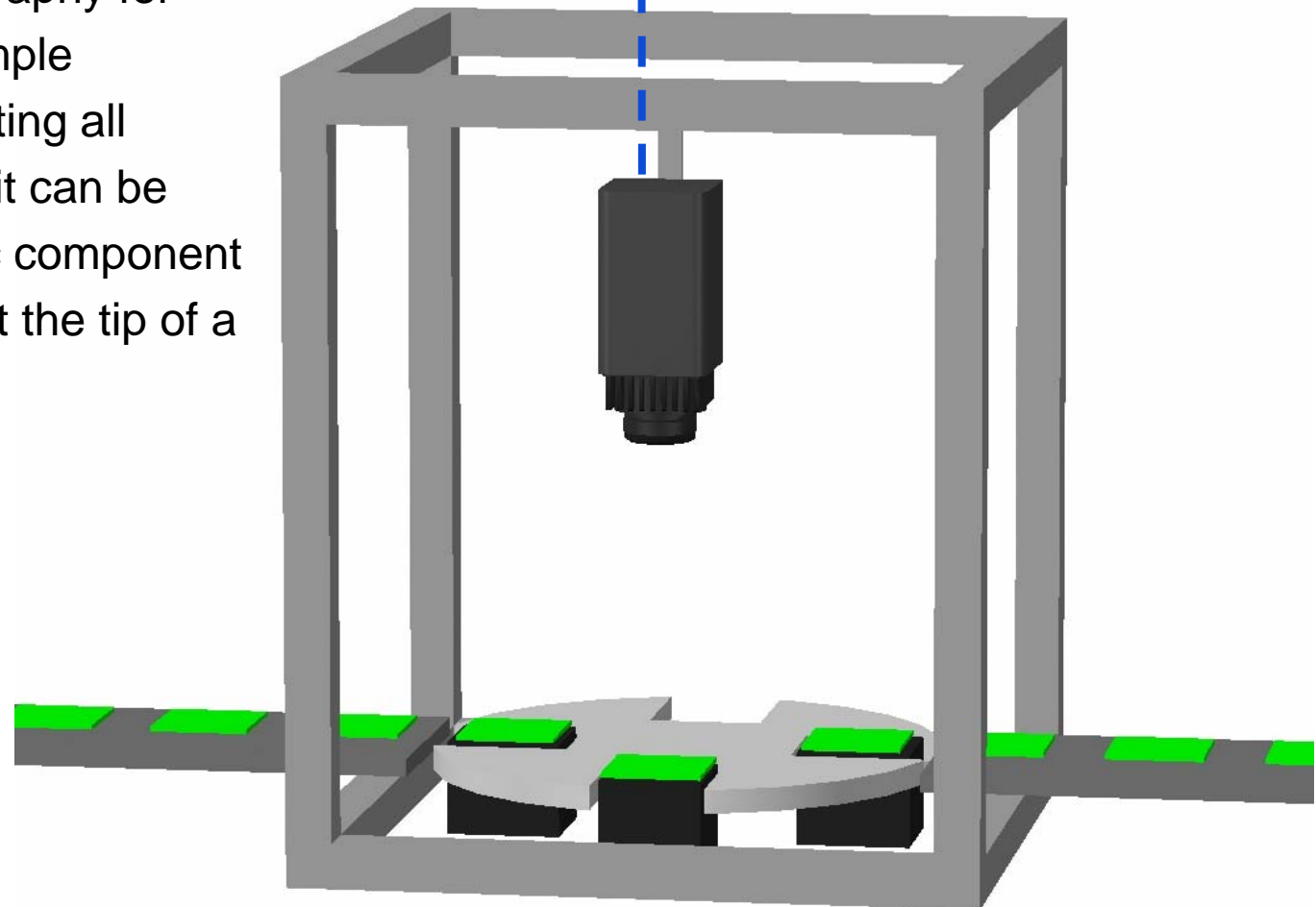


- **FA**

Because it is a thermography for monitoring control of simple configuration by eliminating all unnecessary functions, it can be installed in an electronic component inspection machine or at the tip of a robot arm.

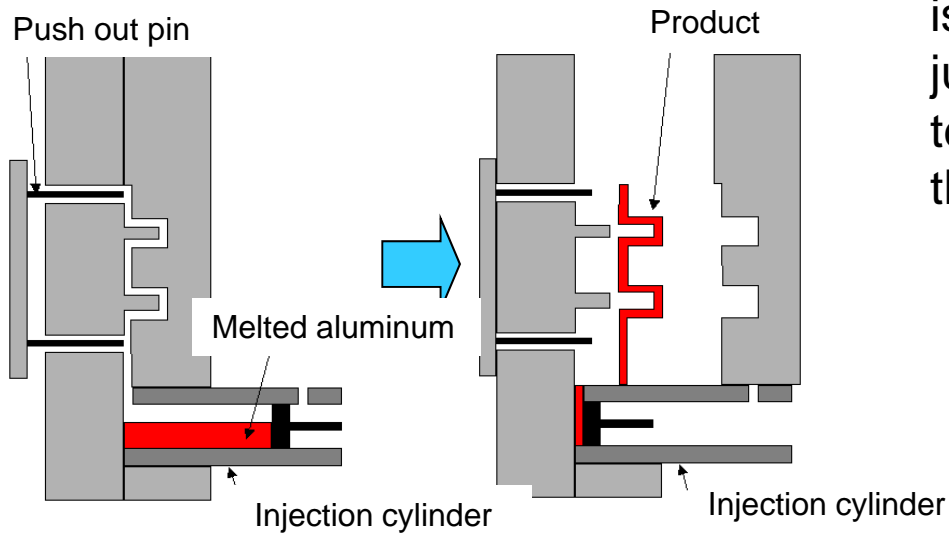
RS-232C, IEEE1394, Ethernet,
video signal, alarm contact signal,
remote control signal

Images can be transferred at the rate of 60 frames per second using IEEE1394.



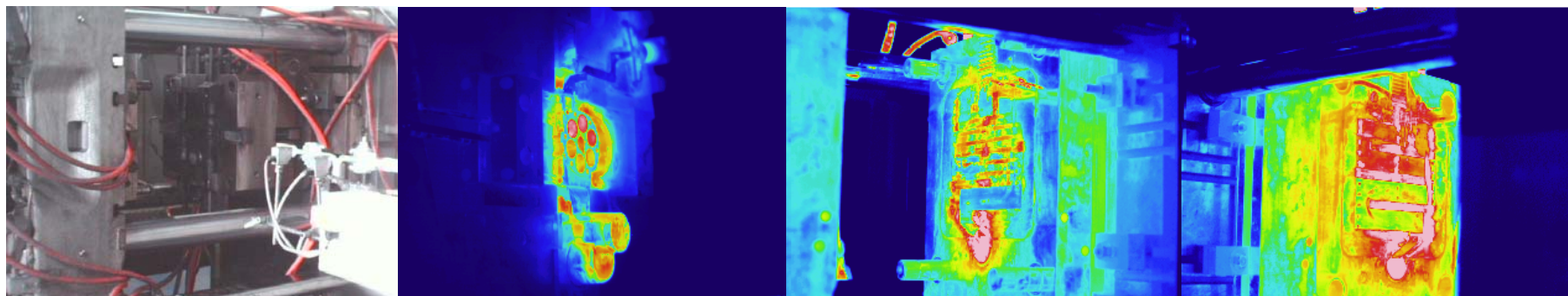
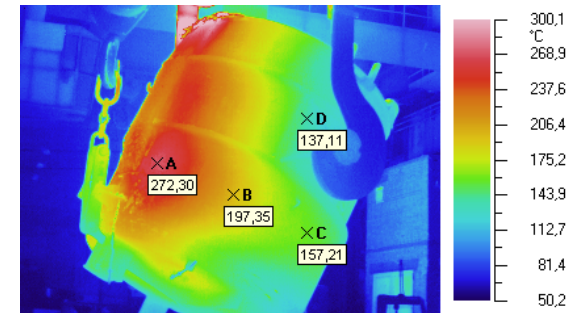
- Temperature control of die casting metal mold

For improved product quality and longer life of the metal mold



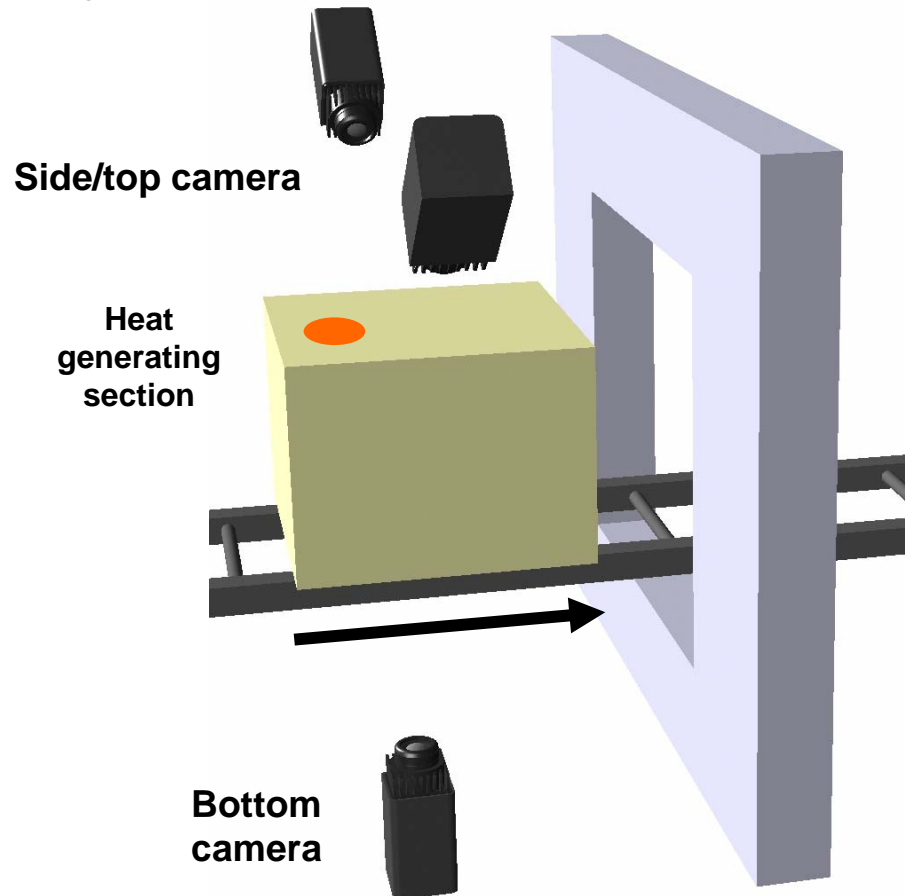
- Monitoring for degraded fireproof roof material of a ladle

Degradation of fireproof material is monitored and judged by the temperature of the shell.



Automated warehouse

- Goods are measured by three monitoring control thermographies before entering the automated warehouse.
- Alarm is sent out when the temperature of the goods exceeds the preset temperature.



Garbage pit

- Natural fire on garbage is detected, and water is sprinkled.

