



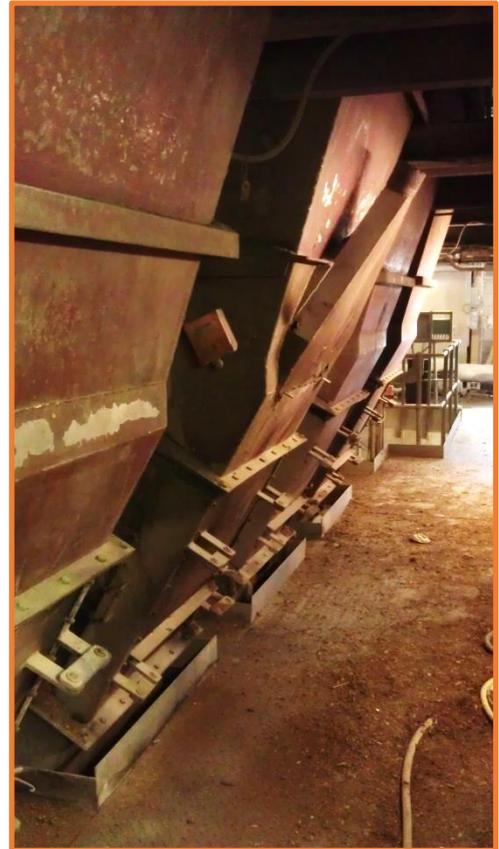
High-Temperature Blocked Chute Detection for Biomass Power Application



Hycontrol blocked chute detection systems ensure it's 'all systems flow' at biomass power station

High temperature **Microsense** blocked chute detection systems supplied by **Hycontrol** are playing a crucial role at a large UK biomass power station which is fuelled by poultry litter. The installation of the microwave-based systems followed successful trials on one of the six chutes feeding the poultry litter biomass into the main furnace.

Given the sticky characteristics of this type of biomass and high operating temperature environment which can reach of 220°C, measuring flow in the chutes poses a number of challenges. The original paddle switches tasked with this job were located inside the chutes in direct contact with the biomass. This resulted in the paddle blades regularly becoming coated in material, making them unreliable and prone to malfunction. As a direct consequence there were frequent blockages causing serious disruption to the power generation process. Any unchecked blockage could take several hours to clean up, at an approximate cost of £1 per second!

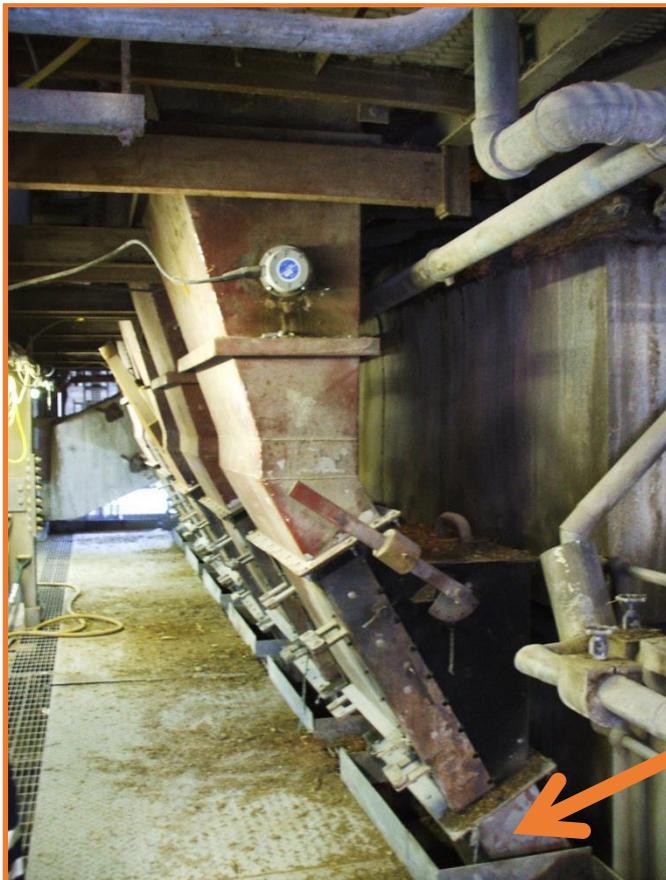


The plant operator required a measurement system that could monitor flow-no flow conditions in the chute and would also give them warning of an imminent blocked chute. Hycontrol have extensive experience in difficult blocked chute applications using their Microsense microwave based technology and were confident they could provide a long term reliable solution. To validate their claims, Hycontrol proposed a trial of their equipment on one of the chutes.

A key advantage of this low power microwave technology is that neither the transmit or receive sensors have to be mounted directly in the chute and so do not come into contact with the material. The sensors can be mounted opposite each other behind sacrificial microwave-transparent windows fitted into the sides of the chutes. These do not obstruct the material flow and the sensors continue to operate even when there is a build-up of material on the sides of the chute. During operation the transmitter emits a continuous, low power, microwave beam to the receiver and an output relay is energised or de-energised when this beam is obstructed by the material being monitored.

For this high-temperature application, PTFE windows were used, providing a maximum operating temperature of 240°C. The windows can easily be replaced if they become damaged or worn. Unlike expensive nucleonic technology used for blocked chute detection, the low power microwaves pose no danger to plant personnel. Systems are extremely easy to fit and have an operating range of up to 40 metres.

Hycontrol's UK Sales Manager **David Wadsworth** is clear on the benefits the Microsense systems have brought for day-to-day operation of the power station: "During the trial, the chute with the microwave switches and a neighbouring chute both experienced blockages. The chute with the Hycontrol switches took the customer less than ten minutes to unblock, whilst the chute that was relying on the old paddle switch took over an hour because the delay in triggering an alarm had allowed the blockage to escalate. As a direct consequence Hycontrol systems were purchased for use on the remaining five chutes. The complete system has now been integrated with the site PLC, and is configured so that in addition to an alarm highlighting the detection of a blockage, the 'no flow' detection will also trigger an alert indicating there may be material bridging further up the chute preventing material flow. This is just one of many examples, across a wide range of industries, which illustrate the flexibility and durability of our microwave technology."



The picture to the right shows the chute on which the trial was to be carried out. At the top you can see the outdated paddle switch. The Microsense blocked chute switches could be mounted further down as they could withstand the temperature closer to the main furnace (below), allowing it to detect blockages earlier.



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