



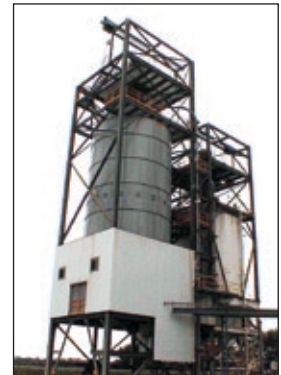
# Application Case Study

## Fly Ash Silo Level Detection

### The Application

All coal-fired power plants require an ash handling system. The most difficult type of ash to detect is fly ash – the fine particles carried out of the boiler in the exhaust. This ash is as fine as talcum powder, its physical properties change based on the coal used, and it is abrasive. Fly ash is collected in precipitators and conveyed to storage silos.

Ash is a very inert material, so any technology that relies on the characteristics of the material will have difficulty measuring. Contact level devices (RF, capacitance, etc.) have problems due to abrasion and changing dielectric. Non-contact technologies do not have abrasion problems with inert materials. Ultrasonic devices can read the surface well, but the dust usually absorbs too much sound energy to get reliable measurement.



### The Solution

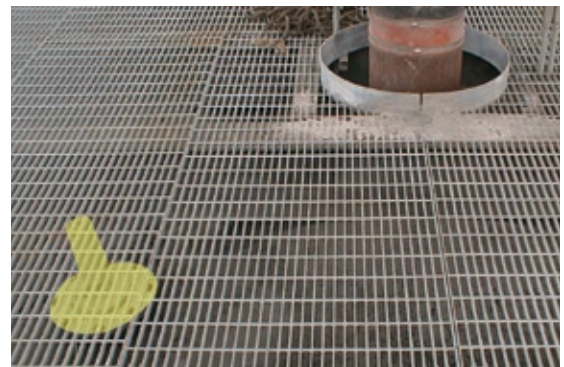


The SOR® Model U73/RBP echOsonix transmitter solves fly ash problems with three features: rugged polypropylene construction, low-frequency sound and high-power transmit pulse. The polypropylene construction of the sensor reduces the abrasive affects of fly ash, providing a sensor with longer service life.

The dust in a fly ash silo absorbs sound, preventing good echoes. The U73/RBP has a 10 kHz sensor – lower frequency sound than other ultrasonic/sonic devices. Low frequency sound has better penetration properties than higher frequencies (this is why foghorns on ships are such a low tone). The U73/RBP combines low frequency sound with a very powerful transmit pulse (140 dB) for the penetration power required in this application.

A model U73/RBP was installed on the fly ash silo shown above. In the top part of the silo, it tracked the process accurately and consistently. However, when the level dropped to about 70%, the signal locked and would not read any lower. The unit seemed to think that it had a good, valid target at 70%.

Upon investigation, it was discovered that the unit had been mounted at an angle, close to the center in-feed (see photo with transducer highlighted). The sensing signal intersected the fill stream at about eight feet from the transducer and was locking onto that target.



### The Results

The customer had mounted the transducer at an angle to be able to read into the bottom of the out feed cone. The customer wanted to read right down into the bottom of the chute, so he mounted it to point at the center bottom of the silo.

We changed the mounting of the unit so it was vertical. This moved the sensing signal out of the stream, but the unit was not pointed directly at the out feed. After some thought, we determined that doing this would lose only two feet on the low end of the measurement range. That was acceptable, so the mounting was updated.

The final result – the unit is operating very reliably. The level easurements have been verified by a drop-line. The unit is very stable in all conditions. The U73/RBP is well suited for this difficult application and can solve a wide variety of solids with dust applications.

### Ordering Information

Electronics model **U73-FL7J-00-10**  
Remote 110VAC/24VDC Line-powered transmitter  
4 x SPDT Relays adjustable over entire range  
NEMA 4X Remote mounted electronics housing

Sensor model **RBP-GC-00-50**  
10 kHz Transducer for remote unit  
10" 150# FF Mounting flange/focusing cone  
50-foot cable (can be changed in the field up to 334 ft.)