Grain Bin Monitoring

Mycotoxins, (fungal metabolites which are the most toxic substances known to man and capable of infecting all types of grains) are invisible, odorless and tasteless, and occur in “hot spots”, making sampling difficult throughout a grain store.

FreshSurety’s Gain Bin Monitoring System detects Mycotoxins and reduces stored grain shrink by: 1) increasing control precision of grain moisture content through generation of more accurate moisture profiling over the entire grain storage flow, 2) increasing grain volume measurement accuracy by more accurate pack factor estimation throughout the entire grain storage bin.

Airflow in the interior of grain storage bins represents a very challenging if not impossible to solve fluid dynamics problem due to the variable density of the grain under forced airflow and seasonal natural convection patterns. Because this is highly dynamic environment any mathematically based airflow prediction would be invalid within a few days.

Fixed cable mounted sensors and or sampling tubes suspended from the roof of the grain bin typically used in other systems cover only about 3-5% of the grain bin. These are at best a compromise dictated because they do not have FreshSurety’s Grain Bin Radio nor Software Defined Spectrometer technology. A key advantage of FreshSurety’s wireless temperature, grain moisture and gas grain sensing system is its ability to sense conditions throughout the whole grain storage process flow rather than a fixed location so the entire process can be optimized based on operator experience.

Unique Selling Points:
USP #1 - FreshSurety’s Software Defined Spectrometers are not limited to a fixed single observation point. Our sensors continually gather data throughout the entire grain storage process moving with the grain. Real-time actionable data is obtained using our proprietary radio telemetry inside of the grain storage bins.

USP #2 - FreshSurety’s proprietary radio telemetry inside of the grain bin is not designed for terrestrial communications but is a low-cost way of overcoming a) antenna de-tuning effects which result from the antenna radiator being embedded grain, b) radio wave absorption and dispersion due to bulk grains intrinsic dielectric properties and 3) extreme radio wave multipath propagation inside the steel grain bins.

USP #3 - In order to accurately gather grain profiles within the grain storage flow FreshSurety has developed a proprietary Sensor Positioning Algorithm based on Received Signal Strength Indication (RSSI) of the telemetry radio combined with precision differential altimeters to precisely locate a sensor within the grain bin. This real-time location correction method continually adjusts the reported location of the sensor when profiling the grain storage bin for temperature, moisture, VOCs, and (optionally packing factor).

The number of sensors varies by the size of the grain store and have a 5-year useful life. We only charge a subscription for the information which for 35 sensors, (typical for a 5,500-ton grain bin), a rate equal to $0.10 USD per ton of grain per month.

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