

MOISTURE MEASUREMENT IN SUGAR BEETS

The Requirement: A medium-sized sugar producer needed to control its drum dryer, so that exiting beet chips have uniform moisture content as near the maximum allowable 15%. Incoming beet chips range in moisture between 33% to 38%. To achieve these goals, the customer wanted to combine the outputs of an on-line moisture analyzer and a belt weigher, providing tons of water/hour. By delivering this signal to a controller, dryer temperature could be automatically adjusted so as to maintain uniform moisture of exiting product, at the desired moisture level.

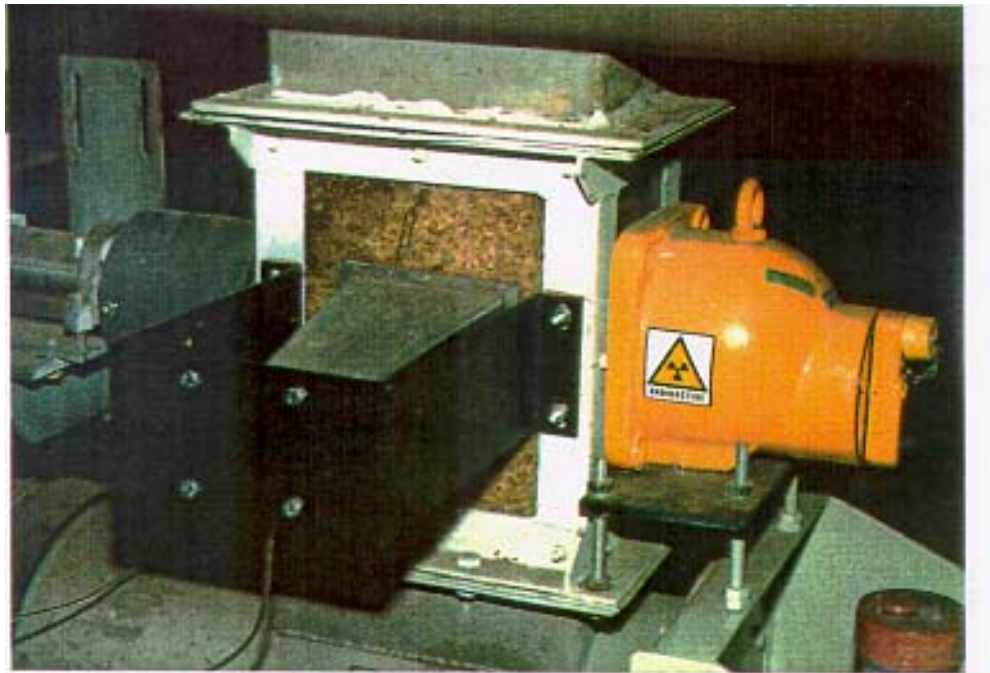
The Solution: Plant management purchased and installed a Berthold LB 354 Micro-Moist on-line moisture analyzer (**Now LB 456 MicroMoist**). This instrument is installed in a by-pass chute, and provides a continuous reading of beet chip moisture. Berthold technology relies on microwave frequencies penetrating the product every half-second, with the instrument basing its moisture reading on changes in microwave attenuation. Micro-Moist readings are independent of beet chip size and variation in cross-section, due to the addition by Berthold of radiometric mass compensation. Output signal for use by the dryer controller is 4-20 mA, with visual and RS-232 printer/computer outputs also available.

Implementation: Micro-Moist components were installed on a vertical chute, with components positioned as shown in the attached picture. Initial calibration was performed in a matter of hours, using several beet chip samples of known moisture. Follow-up or secondary calibration was performed over the following weeks, drawing samples from the stream for comparison with Micro-Moist readings. Plant management reports a Micro-Moist accuracy of 0.6% moisture (one sigma, RMS). Repeatability is excellent.

Summary Benefits:

1. Increased product moisture to nearly 15%, greatly reducing product cost while maintaining moisture specification.
2. Reduce drum dryer fuel costs, provided by automatic feedback adjustment of dryer burners.

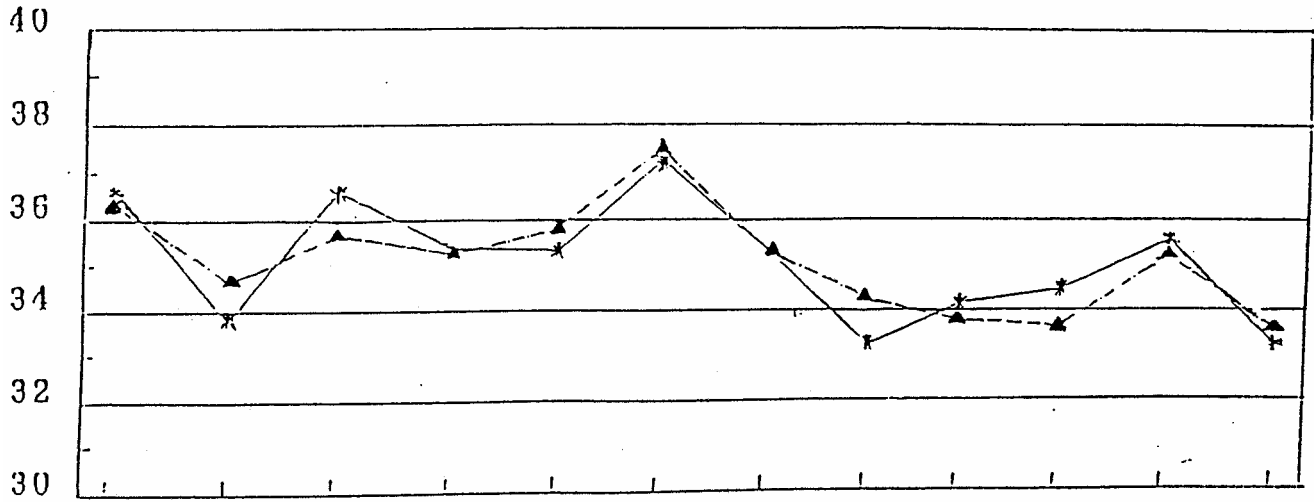
As a result, pre-tax payback is justified at well under one year.



MICRO-MOIST

Sugar Beet Moisture Determination

Moisture (weight %)



Individual Samples

Key: ▲ LB 354 Micro-Moist measurement

* Laboratory analysis