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Brazilian Sugar Cane Processing Refined with RF/ID

Sugar has always been one of Brazil's major agricultural products. In fact, 9.3 million metric tons of sugar are produced annually, making Brazil one of the largest sugar producers in the world. Brazil also annually produces 11 billion liters of alcohol that is derived from sugar.

During the oil crisis of the late Seventies, Brazil began fueling many fleet vehicles with alcohol derived from sugar cane. But today, with the government considering reductions in subsidies for such vehicles, sugar producers are seeking ways to offset losses from decreased demand for alcohol.

Sugar Producers Discover TIRIS

Recently sugar producers have discovered one very successful solution that uses TIRIS™ technology from Texas Instruments. In the state of São Paulo, the richest state in the federation, five sugar cane mills recently automated their operations using TIRIS transponders and antennas. Already they show impressive results. Each mill is experiencing a 30% gain in productivity and a 100% increase in reliability without large capital outlays.

According to Claudio Roberto Viana, sales manager of Aeroeletronica, a TIRIS systems integrator, "The TIRIS system also offers sugar cane mills the potential for good cost reductions."

Because the harvesting season is so short, the sugar cane mills have an unusual production cycle. For six months the mills run 24 hours a day, seven days a week to process the sugar cane. The remaining six months are dedicated to maintenance and new project implementation. Structured in this fashion, the processing cycle is extremely intense. "The gigantic volume of raw material and the high number of trucks circulating within the mill demand that any automated system provide fast throughput and reliable data processing. TIRIS gives us exactly that," Viana proclaims. Other mills, fast catching on to TIRIS' unparalleled benefits, are installing TIRIS to increase their productivity and reliability.

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Unforgiving Environment

Before using TIRIS, collecting and transmitting data about the harvest was never easy. Whatever the method, data must be collected in the field, at the weighing station, and during unloading. Ideally, even under environmentally controlled conditions, manually collecting data cannot possibly yield error-free data. But when factoring in the unfavorable conditions characteristic of a sugar cane harvest, it is easy to comprehend how impossible it is to collect error-free, reliable data.

The harvesting environment is unforgiving: The fields are dirty and humid, and rain often falls. The product itself is sticky and clogs most machinery easily. Automating under these conditions demands that systems be robust and waterproof. The less the product has to be handled the better. Finally, since the primarily itinerant and analphabetic labor force tends to fluctuate with the harvesting season, the ideal system requires no re-education of the workforce.

To increase productivity and reliability, some mills first tried using barcode labels attached to a sheet of paper. At the scales, the paper was scanned and processed. Precious time ticked on as the paper was printed, delivered and scanned. As trucks were loaded in the field, they moved into the line to be processed. Drivers could do nothing but keep their motors running and expend fuel, while waiting for the line to move.

Scanning barcodes, often corrupted by dirt and humidity, frequently created bad data. “Clearly, the use of barcoding is not the recommended solution,” according to Viana. For some of the mills, the barcode system was so troublesome that they switched to the TIRIS technology after only one harvest.

In comparison, the hands-free, RFID-based TIRIS system comprehensively collects data at all stages and transmits this information in real time without the problems incurred by the barcode-based system.

The Way it Works with TIRIS

In the field, the loader-lorry has a TIRIS transponder attached that contains information about the load. The data is passed to the trucks that carry the sugar cane from the field to the weighing station. The trucks are equipped with a TIRIS read-only transponder that is integrated with a reader and an electronic scale. When the trucks cross over an in-ground antenna, the weight is automatically registered and transmitted to the controlling computer. Because this process requires no intervention from the driver or the scale operator, the mills found they could reduce the number of people involved in the weighing process.

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The transponder data also includes load origin, tractor number, ID of the operator handling the raw material in the field, and the ID of the truck and driver conveying the sugar to the plant. The quality and ready availability of data to track jobs gives the mills much more versatility in controlling costs.

At the beginning of his shift, the loader driver identifies himself and the area in which he works. This information, which remains with the driver and is collected repeatedly throughout the day, is retained in a card transponder. Using a mobile reader, the truck reads the driver's card reader. The loader operator just pushes a button to transfer the data from the loader to the truck that is affixed with a multipage transponder.

At the entrance to the plant, an antenna and reader are located next to the scale. As the truck travels at a normal speed over the scales, all pages of the transponder are read by the reader and antenna. During the unloading process, each piece of equipment writes its code into a page of the multipage transponder. As the truck exits the plant at the end of the unloading process, a reader located at the plant exit reads the multipage transponder.

Imagine this process repeated 600 to a 1000 times a day. Trucks leaving the field take about two hours to reach the plant. After being on the road for so long, the last thing drivers want to do is sit in a line at the mill entrance. And, from a management point of view, the fuel expended while idling becomes a big ticket item with so many trucks involved.

Cost Benefits of the TIRIS-based System

By incorporating TIRIS products into the existing system and using the existing weighstations and PCs, the cost was relatively low. Initially, the main task for the systems integrator was to develop software to integrate all pieces of the system. Now, it takes the systems integrator five to 10 days to install a TIRIS system in a sugar cane mill.

But the savings in capital equipment costs is only one aspect of the relatively low-cost TIRIS system. For those mills upgrading from a bar code system to the TIRIS RFID system, six bar code labels were eliminated with each load of sugar. That's about 9000 labels a day that do not have to be printed and attached to sheets of paper. Indeed, the need for the department printing the labels was also eliminated.

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Time Savings Yield Productivity Increases

Producers have found that productivity increases are especially high at the weighing station. Time spent here was cut by two-thirds for a 70% time savings. Before TIRIS, it took 10 minutes to process each truck as six coded labels were scanned and the ID number was manually inputted. Today, the process takes less than three minutes.

Using TIRIS, human intervention is minimized. All data is passed to the database error-free and hands-free for the fastest possible reliable throughput.

TIRIS provides Brazil's sugar cane producers with the most efficient, reliable, and profitable method for processing sugar cane.

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