

## Solution

- Supervisory Control and Data Acquisition (SCADA) solution
  - ControlLogix® control platform enables automatic sequencing of multiple machines in the process
  - RSView®32™ monitors system for quick and easy detection of system faults and performs data and activity logging for trend analysis and reporting

## Results

- Increased productivity
  - Improved throughput by one ton per hour
  - Increased uptime by two hours each day
  - Cut time devoted to fault detection by 25%
- Reduced operating costs
  - Decreased number of operators in processing areas by 25% and reassigned them to other areas
- Enhanced operator safety
  - Eliminated accidents due to manual systems monitoring

## With rice mill upgrade, Amira Foods India Ltd. increases throughput by one ton per hour and uptime by two hours per day

Rockwell Automation® control and information solution, based on ControlLogix® and RSView®32™, enables plant-wide efficiency and helps ensure product quality.



## Background

Fed by the mighty Ganges River and generous monsoon rainfalls, the northern region of India is one of the most prolific rice-growing areas in the world. The highly productive northern states of Punjab, Haryana, Uttar Pradesh, Bihar and West Bengal account for more than 60 million metric tons of rice each year — nearly half of the country's typical annual production of about 125-130 million metric tons. And virtually all of one of India's most sought after varieties — Basmati — is grown in this northern region.

For more than 20 years, Amira Foods India Ltd. has been processing the rice

harvest from these fertile plains. During the past nine years, the company has grown to be one of India's leading rice exporters. Today, Amira exports more than 55,000 metric tons of Basmati and 200,000 metric tons of long grain rice annually.

Strategically located in Haryana, Amira's two rice mills are spread over an area of 650,000 square feet. The massive complex has a rice milling capacity of 350 metric tons of paddy per day and a rice processing capacity of 16 tons per hour. To reach these impressive productivity figures, Amira has consistently installed the most technologically advanced machinery available.

Amira Foods India Ltd. is the flagship company of the Amira Group. In addition to processing rice exports, the company's International Trading Division also facilitates exports of other Indian food products to its diverse clients across the globe. Amira's annual exports total US\$41 million. The company is a government recognized Super Star Trading House.

## Challenge

In mills the size of Amira's, different machines are used for each sequenced step in the conversion process. First, the dry, hull-covered grain or "paddy" enters the system from the silos via conveyers. After cleaning, the grain passes through the paddy husker, where the hull is removed. Through the next series of steps called polishing or whitening, the bran is removed from the grain. The resulting white rice is graded, sorted and packed for shipment.

The ultimate goal in any rice mill is twofold: maximize throughput and minimize quality problems, such as a high percentage of broken grains in the milled product. To increase throughput, each step in the rice conversion process must be precisely sequenced to ensure that the rice passes from one stage to the next as effortlessly as possible. Amira installed an electronic control system for sequencing in one of its mills in 1996. The other mill, however, still relied on manual machine control.

Manual sequencing of rice processing machines is difficult. At the Amira mill, as many as four operators were required to adjust the various controls on each machine in the process. To monitor the rice levels in the various storage tanks,

workers literally ran up and down the structure. Accidents could easily occur as operators rushed from one end of the machine to the other as quickly as possible. As Amira increased its productivity goals and the volume of grain entering the system grew, machinery jams and spillage due to improper sequencing increased.

The system was also extremely difficult to troubleshoot. Although a large mimic panel was used to monitor the process, it did not provide enough information to pinpoint the production difficulties quickly. As a result, excessive downtime was becoming a serious problem.

## Solution

To improve the efficiency in their mill, Amira contracted with a consultant to design a complete upgrade of the manual processing line in 2003. The selected solution called for replacing the existing equipment with new machinery from a leading manufacturer and upgrading the manual control system and mimic panel with a completely integrated control and information solution from Rockwell Automation®. Dyanamic Engineers, a Delhi-based, Rockwell Automation Engineering Solution Provider, was selected to design and integrate the control solution.

The new control and information solution, based on Allen-Bradley® ControlLogix® controllers, enables automatic sequencing of the complete process phase of the operation — from intake through sorting. A single ControlLogix processor was installed to perform the entire sequencing operation. The ControlLogix controller is connected through a ControlNet™ network to Flex™ I/O modules, which in turn are connected to the various field

devices used throughout the process. Since Flex I/O is a distributed I/O platform, compact Flex I/O modules can be located near the actual field devices, which reduces total system wiring costs. To lower costs even more, Dyanamic Engineers reused the existing Motor Control Centers (MCCs).

Finally, two Rockwell Software® RSView®32™ human machine interface (HMI) stations monitor the system. One RSView® station is installed in the production manager's office, while the other runs in the general manager's office. RSView32 provides easy-to-read graphic screens to monitor each stage of the rice conversion process. In addition, RSView32 enables data and activity logging for trend analysis and reporting.

## Results

The new, upgraded line has dramatically increased the productivity at the Amira mill. Since the new system was installed, Amira has increased uptime by two hours each day and throughput by one ton per hour. In particular, thanks to the precise, electronic sequencing of the machine controls, jams in the process — and related spillage and downtime — have been virtually eliminated. And thanks to RSView32, when there is a fault in the system, it can be easily detected. The company has cut the amount of time devoted to fault detection by 25%.

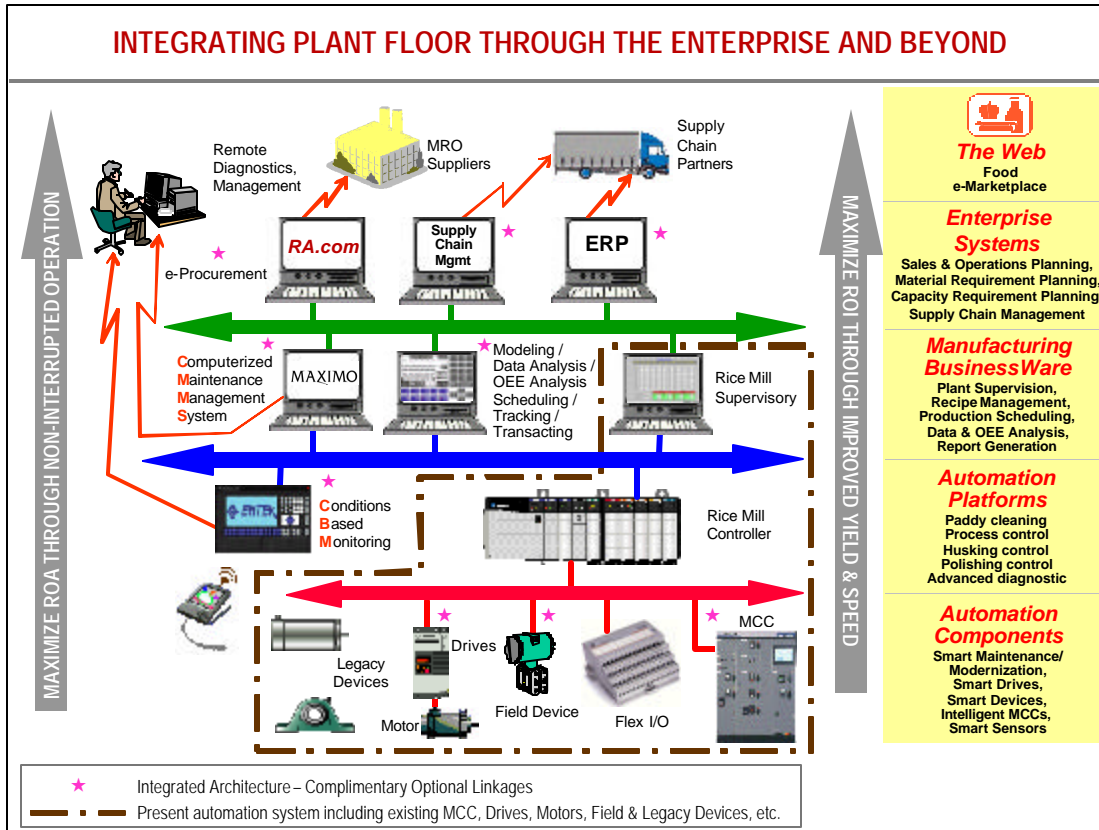
Since multiple operators are no longer needed to manually sequence the machines, Amira has been able to reduce manpower within the mill's processing areas by 25%, and reassigned them to other areas. And the accidents that frequently occurred due to operators rushing from one storage tank to the next are no longer an issue.

"As soon as the ControlLogix solution was commissioned, Amira began to achieve unprecedented levels of productivity," said Deepak Manmohan Singh, project leader, Dynamic Engineers. Mr. Mandhir Singh, GM, Amira Foods, added: "We are confident

the new control system will continue to help us meet our productivity goals for many years to come."

The architecture on the below depicts Rockwell Automation's concept of an Integrated Architecture. The area

outlined with a brown dash line represents the present automation level under discussion in this document. The remaining portion illustrates a host of solutions that Rockwell Automation can provide today to integrate the plant floor to the enterprise and beyond.



The foregoing results are specific to this Amira Foods India Ltd.'s use of Rockwell Automation products in conjunction with other products. Specific results will vary.

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