

CLIENT	Johor Bahru Flour Mill Sdn Bhd, Pasir Gudang, Johor Darul Takzim
COUNTRY	Malaysia
INTEGRATOR	Okura Flexible Automation Systems Pte Ltd (Singapore)

Flour - one of the highest produced food ingredients in the world. Commonly made from wheat, it is a key ingredient for bread, a staple food for many countries. Global production for wheat in 2007 was projected at 594.5 million tons, up by 1.4 million tons from March 2007¹.



As a part of this dynamic global industry, the FFM Group, a dominant group of companies in the Malaysian wheat flour industry had grown exponentially since its commencement of operations in the mid 1960s. One of its subsidiaries, Johor Bahru Flour Mill Sdn Bhd (JBFM) located at Pasir Gudang, Johor Darul Takzim, which commenced operations in the mid 1970s, started with a single flour mill. Today, it has expanded to 3 flour mills with a land area of approximately 10 acres.

A key contributing factor for this strong growth is their corporate emphasize in constantly upgrading its facilities and technologies. The advent of palletizing technologies prompted a major change and improvement in the backend of their production facilities. JBFM holds the prestigious record of being the first flour mill in South-East Asia to utilize a robot palletizer.

Manual Labour

In the past, JBFM relied on manual labour to place filled flour bags from the production line onto pallets for delivery & shipment. The manual palletizing process required **2 staff per palletizing station per shift & caused fatigue at a fast rate.**



Palletizing staff had to be trained and supervised on the carrying and loading of the 25 kg bags of flour to ensure that correct carrying postures are adopted. **Incorrect postures** can result in injuries to the neck and back, subsequently leading to high medical costs and absenteeism due to medical leave. The above factors **would reduce overall operation efficiency and palletizing capacity.**

Besides the workforce, the JBFM management also had concerns on the level of hygiene of the end product due to the **amount of body contact.**

¹ World Agricultural Supply and Demand Estimates, <http://usda.mannlib.cornell.edu/usda/waob/wasde//2000s/2007/wasde-04-10-2007.txt>, United States Department of Agriculture, Apr 10, 2007

Evaluation & Considerations

The JBFM management launched a detailed research and evaluation of various solutions to address the above issues. With rising labour costs, an automated solution with **minimal maintenance** is required to reduce the cost of the labour-intensive process drastically. The palletizing equipment must operate at high capacity and in dusty environment. A robust and reliable equipment is needed to reduce the rate of maintenance, repairs and subsequently, downtime and efficiency loss. **Expandability of palletizing capacity** is another crucial requirement for the long-term plans of the forward-thinking organization.

The company adopted the solution proposed by Okura Flexible Automation Systems Pte Ltd (OFAS), Singapore subsidiary of Okura Yusoki Co., Ltd., a Japanese industrial automation system manufacturer & integrator.

The Solution

OFAS proposed an automated palletizing system. A conveyor transports filled flour bags from the production line to the palletizing station, while the Okura A1600 robot palletizer does the rigorous work of palletizing filled flour bags accurately onto automatically-deployed pallets.



This system works at a palletizing capacity of 900 bags/hour and does not require staff for its operation. With a potential capacity of 1,200 bags/hour, the potential increment of 33% can be effected as and when JBFM requires it. The JBFM management recognized that the potential capacity increase and reduction in manpower ensures a fast ROI for this investment.



Filled bags are securely gripped by the dust-proof robot palletizer end effector, eliminating contact with humans in the palletizing process. All the equipment in the system meets HACCP² (international food safety standard) specifications. Custom-made seals for the end effector prevent flour and dust from entry to its internal parts.

A key area which differentiated OFAS from other solution providers was their specialty in the area of bag palletizing. The bags are quite fluid and soft in nature. Palletizing without consideration on shaping of the bags may result in deformed and unstable pallets. OFAS's solution consists of a bag flattener and "pressers" on the end effector to form and maintain the bags in a flat and stable shape.



² Hazard Analysis and Critical Control Points (HACCP) is a systematic preventative approach to food safety that addresses physical, chemical and biological hazards as a means of prevention rather than finished product inspection. It is used primarily in the food industry to identify potential food safety hazards, so that key actions, known as Critical Control Points (CCP's) can be taken to reduce or eliminate the risk of the hazards being realized. The system is used at all stages of food production and preparation processes. Please go to <http://www.cfsan.fda.gov/~lrd/haccp.html> for more information.

Installation of the entire system in JBFM took 2 weeks. Production was not interrupted during the installation period as it was meticulously planned and executed in phases. Programming of the robot palletizer was done off-site via OXPA, the Okura proprietary software. This user-friendly application allows the user to program the robot palletizer for all functions.

The Okura robot palletizer has the advantage of being deployable in a small area, compared to conventional palletizers. The floor space utilized by the entire system was about the same as previously used for manual palletizing.

The JBFM management commented that the key strength of the Okura robot palletizer is the low maintenance requirement. A major factor for its 2 years of trouble-free operation is the low number of moving parts in the Okura robot palletizer. The company was also impressed by OFAS's fast and efficient after-sales service.

With a 2nd robot palletizer already installed in another of JBFM's palletizing areas, the FFM Group is satisfied with its ace performance and are now looking forward to implement this palletizing method into every one of their plants in South-East Asia.

