

MOTOMAN ROBOTICS (UK) Ltd

a subsidiary of YASKAWA ELECTRIC Corporation



Premier International Foods

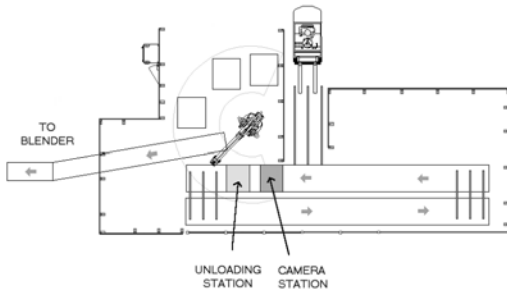
- Two SP160 Robots off load and feed 70kg sacks of tea into a blender.
- Machine vision guidance is used to locate the sacks prior to pickup.
- Vision system also checks each sack for tears, which could result in failure of the vacuum gripper during pickup.

System Overview

- Pallets indexed around conveyor.
- Image taken of pallet stack.
- Pallet indexed to unloading station.
- During this, vision processing finds the centre and orientation of each sack and checks for tears.
- If sack is damaged then operators are alerted to manually remove. Otherwise robot places each sack on the layer into the blender.



System Overview



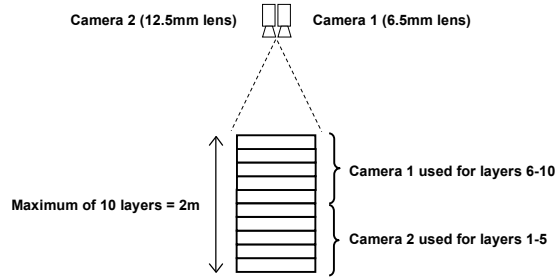
Robot at Unloading Station



Vision System Overview

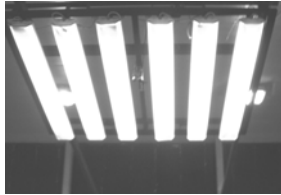
- Uses Univision's *ProInspect* vision system software.
- Based on the Cognex 8000 vision system and frame grabber.
- Uses two cameras, each with a different lens, to overcome the differences in focus and image size over a 2m stack height.

Camera Station Side Profile



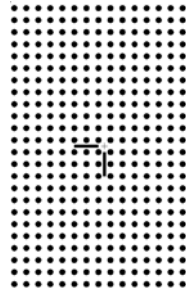
Vision System Lighting

- High frequency strip lights used above camera station.
- Factory windows in the area are blacked out to eliminate ambient light.



Vision System Calibration

- System calibrated at each layer to provide the pixel/mm ratio for each layer height.
- Calibration achieved using a A0 size calibration plate with 50mm dots.



Vision System Operation

- A PLC monitors the system and informs the robot and vision system of the current layer count.
- Vision system uses the Cognex *PatMax* algorithm with the corresponding pre-trained sack model for the current layer.
- Using the appropriate calibration ratio for the current layer, the positional results are transformed from pixel results into millimeters.

Vision System Operation

- A 'blob searching' vision tool checks the sack for dark patches, in order to highlight any tears.
- Position and orientation results for each sack are sent to the robot controller via serial comms.

Vision System Interface

