

Dole Fresh Vegetables

Upgraded ASRM controls improve reliability and flexibility.



**Dole Fresh Vegetables
Cooling and Distribution Center
Marina, CA**

About Dole Fresh Vegetables:

Dole Fresh Vegetables is a division of Dole Food Company, Inc., the world's largest producer of high-quality fresh fruit and fresh vegetables. Dole Food Company markets a growing line of packaged and frozen foods. Dole does business in more than 90 countries and employs on average, 36,000 full-time regular employees and 23,000 full-time seasonal or temporary employees, worldwide. The Marina, California Cooling and Distribution Center houses a highly automated cooler that Retrotech is upgrading in a phased method for Dole. To date, Retrotech has updated the controls on seven of the Automated Storage and Retrieval Machines (ASRM's).

Business Challenges:

- ▶ The Marina facility has a nine-aisle Eaton-Kenway Unit Load Automated Storage and Retrieval System (ASRS). Due to the age of the installation and original equipment, elements of the system were outdated, unreliable and causing downtime that conflicted with one of Dole's corporate objectives of providing the freshest produce to the marketplace.
- ▶ Proprietary controls were becoming more difficult to maintain and caused severe limitations on future system capability.
- ▶ Maintenance groups were spending an inordinate amount of time and money troubleshooting equipment problems, including maintaining the DC motors and obsolete DC drives.
- ▶ Potential upgrades were complicated, required operational interruptions and perceived as costly because only limited vendors had the ability to perform them.

Highlights of the Project:

To reduce the impact on daily production and to spread the financial expenditures over time, Retrotech is upgrading the controls by incorporating a multi-phased approach. This work scope included the ASRM controls, motor and communications replacement along with removing the obsolete maintenance computers at the end of each aisle.

Retrotech installed an End-of-Aisle (EOA) PLC system to act as a communication translator from the ASRS host computers to the ASRM controller(s) along with providing semi-automatic control, diagnostics and aisle I/O interface that replaces the three (3) existing MADC EOA controllers. A tablet PC with an Allen-Bradley based HMI application was provided. The tablet communicates to the EOA via an RF wireless connection allowing Dole personnel freedom of movement along with reducing the amount of hardware (monitors) in the aisle.

After removing each ASRM's sub-panel and all old control equipment, Retrotech provided a new sub-panel with all new components including fuses, power supplies, relays and VF drives (VFD). The Kenway crane controller was replaced with an Allen-Bradley CompactLogix PLC and I/O.

The existing 40 Hp horizontal and vertical DC motors and drives were converted to 40 Hp SEW Eurodrive AC gear motors controlled by Allen-Bradley PowerFlex 700 AC VFDs on DeviceNet interfaces, input line reactors and dynamic braking resistors. The new SEW gear motors included integral brakes and encoders for speed feedback to the VFDs. The existing 180 in/lb DC shuttle motor and drive was replaced with a 5 Hp SEW Eurodrive AC gear motor controlled by an Allen-Bradley PowerFlex 40 AC VFD on a DeviceNet interface, input line reactors and dynamic braking resistors. The new gear motor included an integral brake that interfaces to the VFD.

The vertical and horizontal positioning systems were updated with SICK DME 5000 laser positioning systems. The DME positioning system is an absolute positioning system that communicates the actual position of the axis it is measuring, in real time, to within a +/- 5mm accuracy.

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The shuttle positioning system was replaced with a Dynapar absolute encoder. The encoder communicates with the new on-board PLC via a DeviceNet interface. The new encoder positioning system is an absolute positioning system that communicates the actual position of the shuttle, in real time, providing better speed and positioning control.

Retrotech provided a SICK ISD 300 IR communications module to allow the new on-board PLC to communicate with the new EOA controller via Ethernet, replacing the existing serial connection. Ethernet communication between the EOA and ASRMs allows Dole to monitor any ASRM while on-line to their host computer system, in real time. In addition, the EOA system provides more extensive diagnostic features than the original system included.

An Allen-Bradley PanelView 600 color touch screen was added to each ASRM for diagnostic and maintenance functions. It was mounted to the existing door of the ASRM enclosure and communicates to the on-board PLC over a DF1 serial interface.

Results:

- ▶ Retrotech utilized current, off-the-shelf technology that is non-proprietary, proven and reliable. This makes future modifications and/or upgrade requirements easier and less costly to implement.
- ▶ Maintenance costs were reduced, while improving Dole's ability to maintain the ASRS independently.
- ▶ Increased reliability and uptime due to reduced positioning errors and easy access to real-time information on product flow and troubleshooting issues.
- ▶ Improved ASRM flexibility and positioning accuracy gave Dole the ability to perform semi-automatic moves to a horizontal and vertical position, plus the ability to fine-tune individual storage locations.
- ▶ The serviceable life of the ASRM equipment, components and overall system was extended.

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