



## SmartLoader Vision System

### OVERVIEW

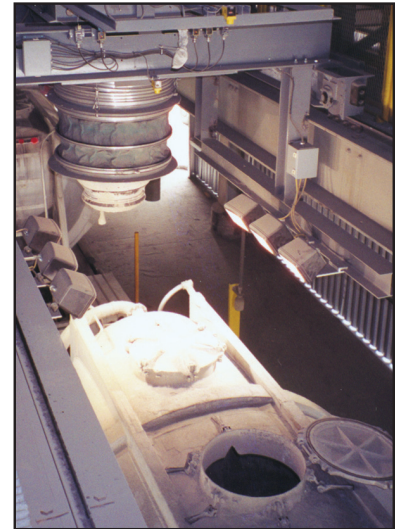
DCL is proud to announce its fully automatic, unattended bulk loading station for high speed filling of dry, dusty materials into enclosed vehicles.

The SmartLoader utilizes a patented vision system that scans the top of the vehicle. Any open hatch or series of open hatches are automatically located, measured, and qualified. The multi-speed positioner provides a fast scanning speed to minimize loading cycle times.

A unique articulating positioning arm is used to move the loading spout within a designed loading area. Dual direction positioners can also be utilized to keep costs down when similar truck trailers are being used in the same load out station.

### SMARTLOADER VISION SYSTEM

Fully automatic, unattended loading is accomplished by using the SmartLoader Vision System. The development of this system represents the final link to truly automatic loading. The top of the truck is scanned as the truck enters the station. As the open hatch is detected, a traffic light signals the driver to stop. The vision system then takes the final hatch coordinates and adjusts the loading spout positioner centering the spout to the hatch. The spout is then lowered into the hatch once the scale has captured the vehicle tare weight. When the filling cycle is complete, the spout raises. The traffic signal and exit gate then allow the driver to exit the station.



Articulating arm positioning system.



Dual direction positioning system.

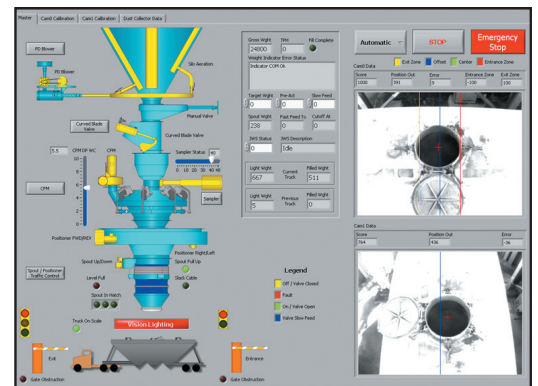
The Smart Loader Vision technology requires that the loading station be enclosed with no possibility of sunlight illuminating the vehicle either by direct sunlight or reflected sunlight. Past system performance has shown that the Vision system is capable of identifying 98 percent of hatches found on common bulk hauling trucks. Some error can be attributed to the driver's inability to understand the system operation. The user is responsible for notifying truck drivers of the new system operation, written driver instruction or instructional signs outside of the loading station. The system controls and operation scheme must accommodate manual intervention on occasion due to driver error or system malfunction. The manual operating scheme can include driver or plant personnel intervention.

The Loading Spout, Positioner and Vision System are shipped assembled in a steel cradle pre-wired to a positioner frame mounted control panel containing spout and positioner motor

controls and PLC. A single Ethernet connection is required from the equipment mounted control panel to the host control system in the control room.

Factory testing is conducted prior to shipping to check out all electrical components and to preset all limit switches. This procedure greatly reduces the amount of wiring and set up required in the field. Factory technicians need only deal with Vision calibration and handshake requirements with the host system.

For more detailed application information please see "Case History: Technology Breakthrough Fully Automated Loadout Terminal" DCL publication PUBc-0609-CH03.



PC display interface for dual direction positioning system utilizing SmartLoader Vision System.