

# DRY CARGO

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*The world's leading and only monthly magazine for the dry bulk industry*

*A successful and fully completed  
Load-out installation.*



# Setting the standard

in dust control and loading  
solutions with DCL Inc.

Since 1981, DCL Inc. (Dust Control Loading Systems), based in Charlevoix, Michigan, USA, has developed advanced solutions to address complex loading challenges in diverse industries. Whether

supporting ground-based operations or large-scale barge and shiploading, DCL's technologies have set new benchmarks worldwide, delivering unmatched efficiency, safety, and reliability.

## **DCL INC. ENHANCES PORT SAFAGA WITH MODERN DUST CONTROL SOLUTIONS**

In 2015, Egypt's Ministry of Transportation awarded DCL a pivotal contract to modernize the load-out facilities at Port

Safaga on the Red Sea. The port's original shiploader, outfitted with a basic telescopic spout but lacking an effective dust-collection system, often left the area clouded in phosphate dust. DCL addressed this issue by designing and installing advanced equipment that not only met rigorous environmental standards but also vastly improved dust control and air quality throughout the port.

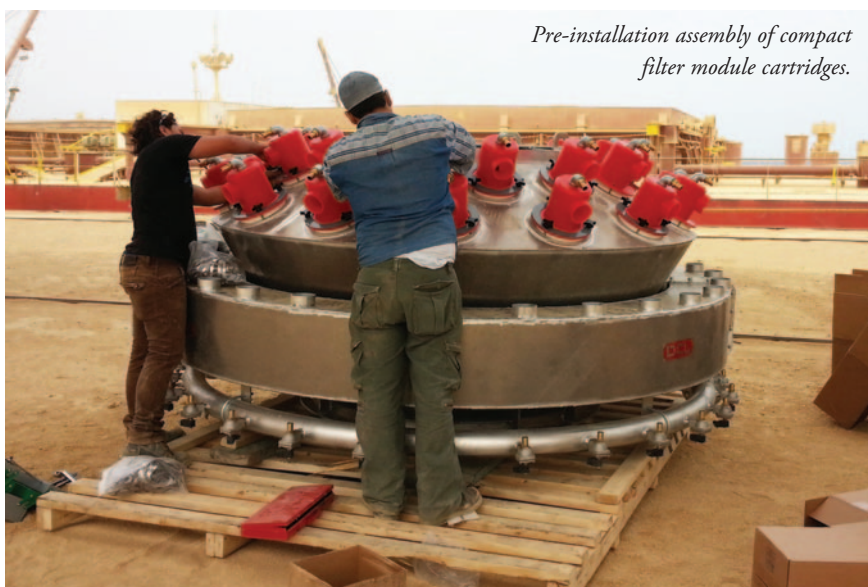
**DCL INC. ENHANCES FILTRATION AND LOADOUT EFFICIENCY FOR PHOSPHATE HANDLING AT PORT SAFAGA**

DCL Inc. was tasked with upgrading the filtration capacity and designing an efficient loadout system to handle pulverized phosphate rock at an impressive 1,000tph (metric tonnes per hour) for open shiploading at Port Safaga. This project aimed to address several critical goals:

- ❖ **Lightweight Equipment Design:** Keeping the new equipment lightweight was essential to maintain compatibility with the port's existing mounting structures, avoiding costly structural modifications.
- ❖ **EPA Compliance:** DCL's solution prioritized environmental standards, achieving compliance by significantly reducing visible dust emissions.
- ❖ **Seamless Integration:** Advanced technology enabled the new loadout system to integrate smoothly with the plant's existing control systems, enhancing operational efficiency



*Removal of an inefficient loading spout at Port Safaga.*



*Pre-installation assembly of compact filter module cartridges.*



*A compact filter module being hoisted into position.*





without disrupting established workflows.

**DCL'S DUST CONTROL SOLUTION WITH THE CFM1618 COMPACT FILTER MODULE**

To achieve superior dust control at Port Safaga, DCL implemented three essential

pieces of equipment, beginning with the CFM1618 compact filter module. This innovative module is designed to capture dust directly at its source and reintegrate it into the material flow, removing the need for manual dumping and increasing overall efficiency.

Working in tandem with the heavy-duty loading spout, the CFM1618's compact design eliminates the need for extensive ductwork, reducing both installation time and complexity. Constructed from lightweight aluminium, this module delivers high-performance filtration at 6,000 cubic feet per minute (CFM) with an optimized 5.68:1 air-to-cloth ratio, making it an ideal solution for demanding bulk material handling environments.

**DCL'S PIVOTING GIMBAL AND RETRACTABLE LOADING SPOUT: ENHANCING FLEXIBILITY AND PRECISION**

As part of its comprehensive solution for Port Safaga, DCL Inc. implemented a pivoting gimbal to enhance the load-out system's adaptability and maintain vertical alignment throughout operations. This

articulation point between the boom and the load-out equipment ensures that the load-out spout remains vertical even as the boom moves up and down, a critical feature for efficient, precise loading.

Connected to this pivoting gimbal is the robust OV66HD-45 retractable loading spout, designed with 45 feet of vertical travel capacity. This heavy-duty spout accommodates the high demands of open ship loading by delivering controlled material flow across significant distances while maintaining alignment to minimize dust and spillage.

Together, the pivoting gimbal and OV66HD-45 spout deliver flexibility, precision, and operational reliability, supporting a seamless loading process that aligns with the project's stringent dust control and efficiency goals.

The OV66HD-45 loading spout is equipped with advanced safety features, including two over-travel limit switches and three strain switches on the lifting cables. Engineered for capacities up to 1,000mtph (million tonnes per hour), the spout's internal components enhance material flow, while the outer sleeve effectively controls dust.

**ENHANCED DUST CONTROL WITH THE DEADFALL DISCHARGE SYSTEM**

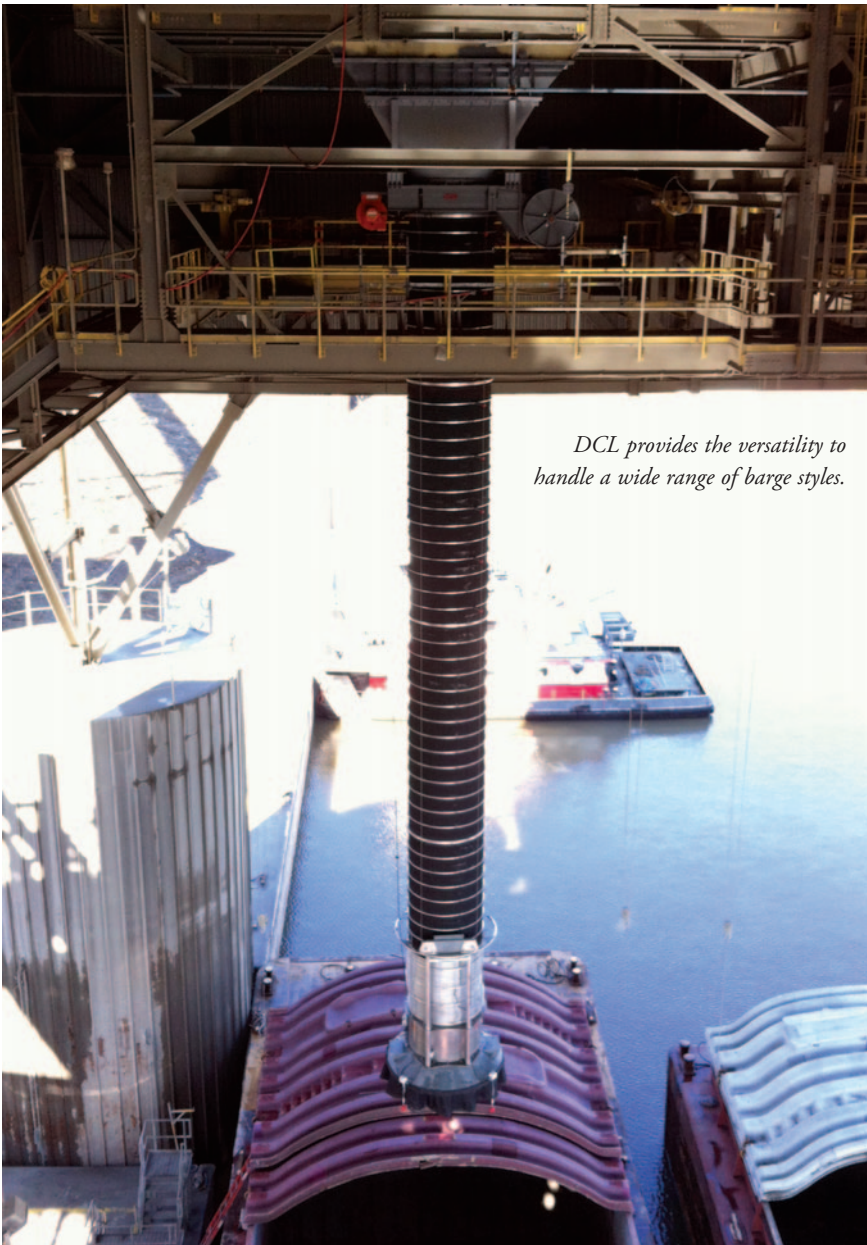
The spout also features a DeadFall dust suppressor — a specialized discharge attachment at the bottom of the loading spout. The DeadFall reduces product turbulence at the discharge point, effectively minimizing dust emissions during loading.

For handling extremely dusty materials like aerated cement, DCL created the 'H-style deadfall' discharge, a modification of the original deadfall design. The design of the H-style deadfall incorporates an inner slitted rubber skirt and an outer weighted barrier skirt, both attached to the discharge loading spout. This design enables velocity suppression, with the inner skirt containing material upon impact and the outer skirt providing secondary dust control to capture any material drifting from the spout.

The 'H-style deadfall' discharge is an ideal choice for open loading. It effectively minimizes dust emissions, ensuring a cleaner and safer working environment.

**DCL'S SUCCESS IN THE US MARKET: ADVANCED LOAD-OUT SOLUTIONS FOR HOLCIM'S STE. GENEVIEVE FACILITY**

DCL has established a strong foothold in the US market by providing advanced, tailored load-out solutions that meet the complex operational needs of large-scale



*DCL provides the versatility to handle a wide range of barge styles.*



*The DCL OV58HD loading spout ensures clean, efficient barge loading.*

facilities. One notable project took place at Holcim's Ste. Genevieve cement facility in Missouri. As one of the most advanced plants in the industry, Ste. Genevieve boasts an impressive production capacity and features its own Mississippi River port and barge loading facilities.

Holcim contracted DCL to evaluate and enhance the system requirements for its barge load-out area, ensuring that the setup could support their extensive operations along the river. DCL's expertise in bulk material handling and innovative load-out design helped optimize the facility's barge load-out capabilities and meet Holcim's high efficiency and environmental compliance standards.

**HOLCIM SPECIFIED THE FOLLOWING CRITERIA FOR THE BARGE LOAD-OUT AREA:**

- ❖ A load-out system that is capable of a 1,000tph loading rate of Type I cement for each of the four retractable loading spouts.
- ❖ Positioning capability for the four retractable loading spouts to accommodate various barge types.
- ❖ The loading spouts must be able to lower through the barge lid into the barge and maintain continuous contact with the product pile.
- ❖ The new barge load-out equipment must be EPA compliant, emit no visible dust emissions, and interface seamlessly with Holcim's existing

control system.

**HOLCIM'S LOAD-OUT FACED SEVERAL SITE-SPECIFIC CHALLENGES:**

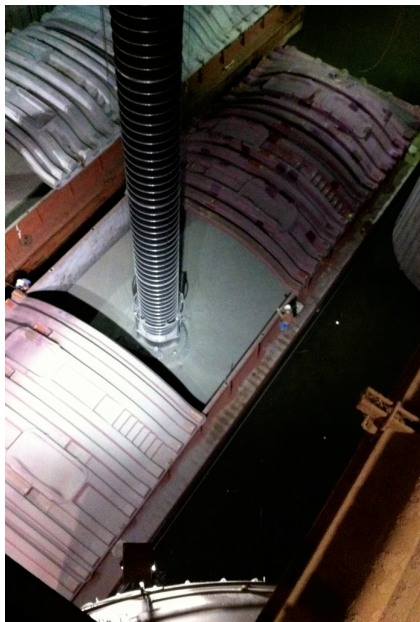
- ❖ Cement is highly aerated and inherently very dusty.
- ❖ At low water levels, there's a considerable drop from the fluidized conveyor to the loading spout discharge. When the river reaches its lowest point, the high volume of cement falls at high velocity, generating intense energy at the discharge point, resulting in substantial dust emissions.
- ❖ The equipment needed to be designed to accommodate 55-foot fluctuations in water level.

## DCL'S CUSTOM LOADOUT SYSTEM FOR BARGE REQUIREMENTS

Upon returning to Michigan, the DCL team designed a customized loadout system tailored to meet the unique requirements of barge loading.

Key elements of this design included:

- ❖ **Fluidized conveyors (air slides):** DCL supplied short sections of fluidized conveying equipment to connect the existing conveyor system with the new DCL setup. The new fluidized conveyor included a hood with an adjustable blast gate for the venting of fluidized air into the dust collector.
- ❖ **Rotary positioners:** DCL designed loading spouts that could be lowered into barges without interfering with barge lids and could accommodate various barge styles. The vent-thru equipment was carefully engineered to control material velocity across its cross-sections, minimizing pressure loss and allowing released dust cake to fall through efficiently.
- ❖ **Dust collectors:** each loading point was equipped with a reverse pulse baghouse dust collector featuring a top-load design for easy maintenance. The dust collectors used Teflon-coated filter bags, providing excellent dust-shedding capability even in high-humidity conditions.
- ❖ **Retractable loading spouts:** DCL designed four OV58HD-85 retractable loading spouts for this project, one for each load-out. These spouts are built with a heavy-duty structural steel frame. Each spout offers 85 feet of vertical travel. A continuous cable system runs from one lifting pulley through a series of transfer sheaves to another pulley, ensuring the spout discharge remains level throughout its range.
- ❖ **Motor starter enclosures:** DCL provided control panels, one per load-out which simplified the equipment installation from an electrical standpoint. Starters and variable frequency drives for the motors and terminal strips for the I/O were included. With the addition of motor starters, Holcim only needed to provide a single-point power source for the high-voltage motors and label terminal strips to match the corresponding PLC I/O. Throughout commissioning, DCL collaborated closely with Holcim's electrical engineers to optimize the PLC programme, ensuring seamless integration and enhanced operational efficiency.



*An 85-foot loading spout built to accommodate 55 feet of water height variability.*

## DCL'S LARGEST SPOUT DESIGN AND ADVANCED LOADOUT SYSTEM FOR HOLCIM'S STE. GENEVIEVE FACILITY

For the Holcim Ste. Genevieve project, DCL designed one of its largest loading spouts to date, featuring an impressive 85 feet of vertical travel to meet the rigorous demands of open ship loading. The loadout system, engineered to handle cement at a capacity of 1,000tph, seamlessly fit into the existing mounting structure without adding weight, thus avoiding the need for structural modifications. Additionally, it met EPA standards by effectively minimizing dust emissions, aligning with strict environmental requirements.

DCL's advanced technology ensured smooth integration with the plant's control systems, allowing for efficient, dust-controlled loading that met all specified parameters.

Holcim's Ste. Genevieve facility exemplifies a forward-thinking approach to production, achieving impressive output while prioritizing environmental responsibility.

For decades, DCL has refined four key features that drive greater efficiency in loading operations.

## DCL'S TRAJECTORY STUDIES: MINIMIZING DUST AND MATERIAL LOSS IN LOADOUT SYSTEMS

When configuring a loadout system, DCL conducts a detailed trajectory study to ensure optimal performance. This study carefully examines the speed and weight of the product flow as it enters the head chute and transitions into the product inlet. Based on these calculations, DCL may

install a deflector shield at the end of the chute, if necessary, to redirect the product back into the inlet, minimizing material loss and enhancing efficiency.

## LEVEL-SENSING TECHNOLOGY

DCL's heavy-duty loading spouts are equipped with advanced level-sensing technology that monitors the product pile height in real-time. As the pile grows, these probes automatically signal the spout to adjust its height, ensuring an optimal loading distance while preventing overflow and spillage.

## DCL TILT PROBES: RELIABLE HEIGHT DETECTION IN MATERIAL LOADING

The DCL Tilt Probe is a durable and reliable tool engineered to monitor height levels in material loading piles. This straightforward yet highly effective solution helps optimize bulk material flow management. Mounted on the exterior of the skirt, the probe activates when tilted beyond 15°, sending a signal to the PLC to adjust the spout to a different location within the container, barge or ship, ensuring efficient and even loading.

## PNEUMATIC LEVEL SENSOR

Although not designed for ships or barges, the pneumatic level sensor is ideal for auto-level load sensing. It operates using an air supply suppressor: as the material rises, it exerts pressure on the tube, triggering a signal to the controls. When the air pressure reaches a preset threshold, the spout adjusts its position accordingly.

DCL's heavy-duty loading spouts with level-sensing technology offer a powerful solution for bulk material handlers looking to streamline their processes, reduce labour needs, and increase operational safety.

## CONCLUSION

Combining decades of industry expertise with cutting-edge technological innovations, DCL is an ideal choice for designing loadout systems. Its in-house team of skilled designers and engineers collaborates closely with customers to develop a loadout solution tailored to their exact specifications, ensuring it meets all operational needs.

DCL is committed to providing reliable, efficient, and precise systems. Its team is ready to bring its customers' visions to life with a custom-built loadout that enhances productivity and safety. It can design a loadout solution that optimizes its customers' operations and meets their unique requirements.