



# PROBLEM SOLVED™ PAPER

**SOLUTION:** Martin® Air Cannon

**INDUSTRY:** Cement

**LOCATION:** Aggregate Industries, Edinburgh, Scotland

## PROBLEM

At its Ready-Mix Cement plant on the port of Edinburgh, Aggregate Industries was experiencing clogging sand in its 8-ton (7.25 metric ton) dual-spout pyramid hopper. To manufacture a specialized type of concrete specifically formulated for heated flooring projects, the process uses no aggregate, only sand, water and a proprietary chemical binder. Already damp from river transport, the sand is dropped from up to 18 feet (5.4 m) by conveyor into an open-air hopper, where it sticks to the metal walls, where it compacts and bridges across the chute. Vibrators were used to loosen material, but vibrating metal walls turned the hopper into a giant horn, which caused a loud, unpleasant sound throughout the work area.



*The positive-firing valve requires an air pulse signal from the solenoid to trigger discharge.*

## SOLUTION

Upon inspection, technicians at Martin UK suggested a Martin® Air Cannon with a split-manifold assembly, with two pipe nozzles placed along the slope of the hopper. Connected to the plant's existing compressed air line, the cannon is controlled by a 110-volt, positive-firing solenoid valve to avoid misfires. Triggered manually by a worker or from a bunker house, the tank fires a powerful shot of air that is split between two pipes and blasts out of the nozzles to disrupt adhered sand and promote descending material flow. Every 45 seconds, one chute door is opened at a time and a worker fires the cannon to start material flow. Once empty, the tank is refilled within seconds, ready to be fired again.



*The tank and valve can be replaced easily without removing the pipe or nozzles.*

## RESULTS

Immediately after installation, operators found the air cannons completely evacuated the sand from the hoppers, including buildup in the corners. While industrial vibrators used previously needed to be running constantly, creating noise throughout the process, the air cannons require only a few shots with no vibration at a considerably lower decibel output. "Along with the reduced noise level, the air cannons had a much lower impact on the structure of the hopper, which was another concern for us," said Craig Hamilton, plant Operations Manager. "We are very happy with the outcome." The company is now working with Martin Engineering on similar solutions in other facilities.



*The split manifold creates a powerful discharge with a low impact on the central compressed air system.*