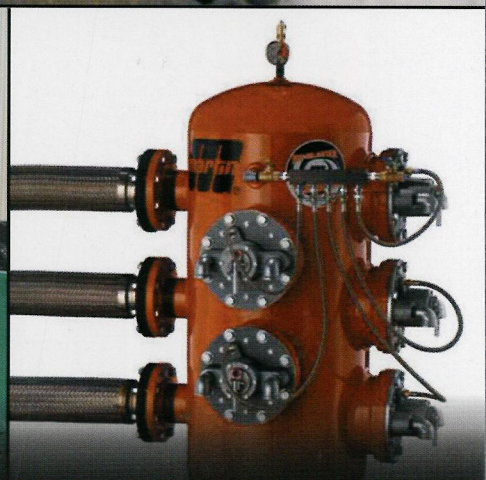
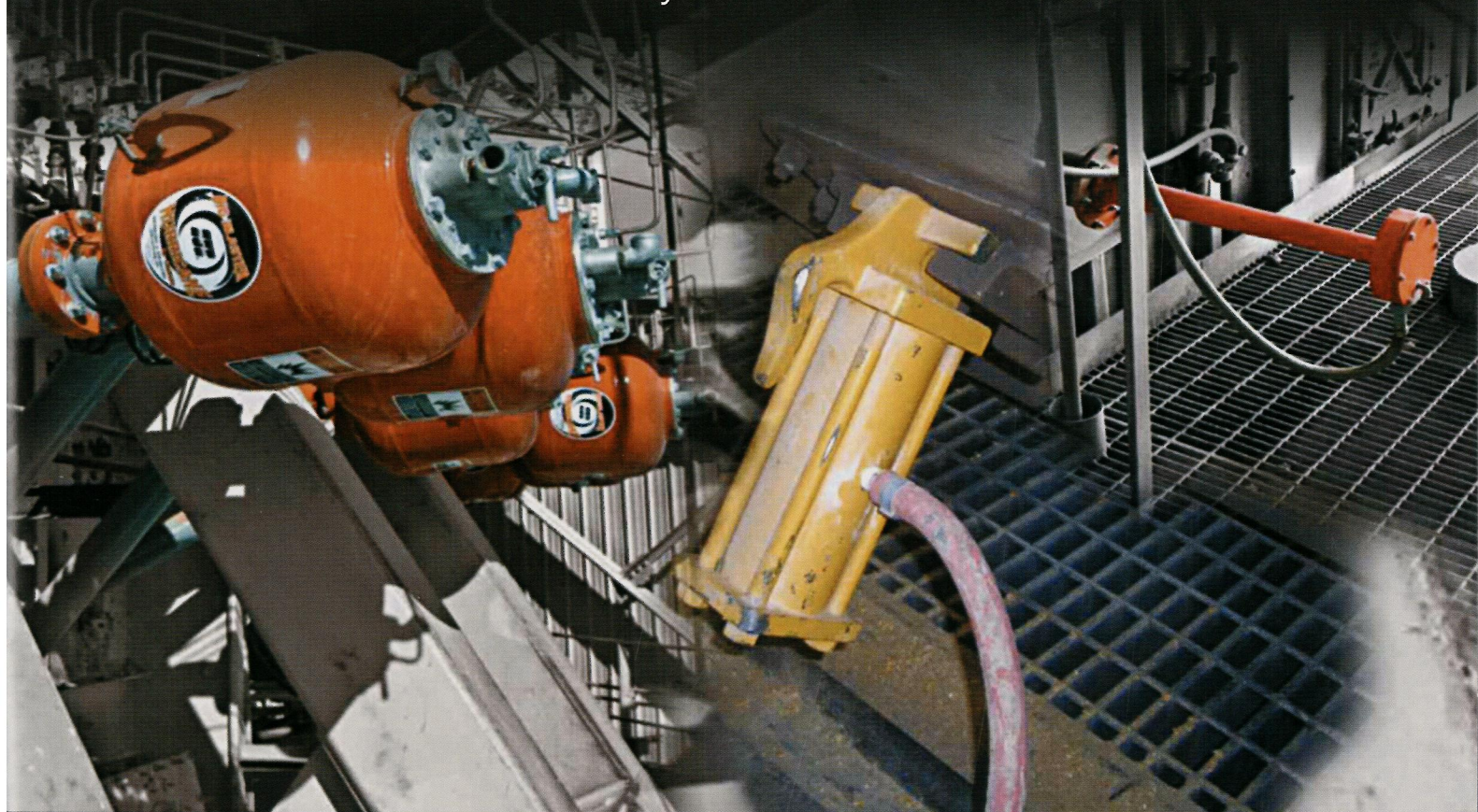


# BULK HANDLING

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| MILLIONS OF MANUFACTURING JOBS BEING VAPORISED |  
| WHO'S WHO IN CRUSHING |

# Solving Flow Problems

The efficiency of any bulk material handling process depends on consistent material flow throughout the system. Any build-up of material in chutes, hoppers, silos and loading staiths cause a bottleneck-effect, eventually halting the flow completely, bringing the entire system to a complete standstill as manual clearing takes place.



Freddie Thompson, air cannon specialist at Martin Engineering      Jurgen Cneut, OEM vibration specialist at Martin Engineering

Instead of using the common method of physically agitating the area of blockage by manually pounding the silo or chute with large hammers, causing dimples in the steel which promotes even more blockage, an alternative solution such as vibration equipment, air cannons, or a sonic horn could have prevented any build-up in the first place.

"Bulk Handling Today" talks to the flow specialists

**The problem about bottlenecks and build-up of material is that they're usually only noticed when no material whatsoever comes out the other side**

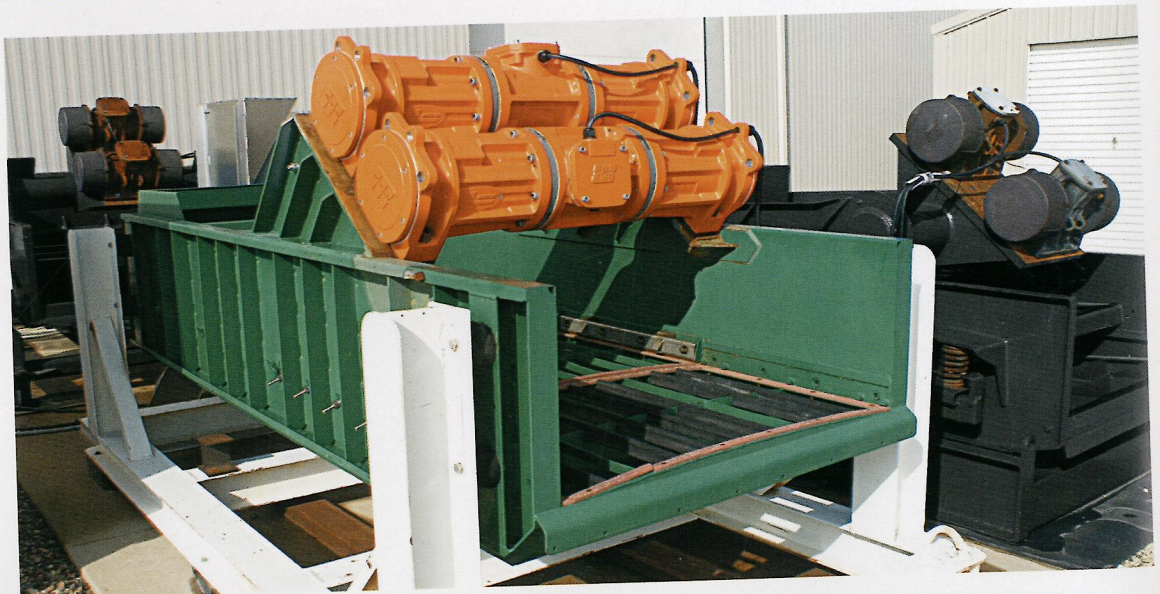
at Martin Engineering about the various material flow solutions this Witbank-based company has to offer. Analysing the material density and the moisture content, results in the correct solution being supplied. Martin air cannons are a dry material solution, with a low tolerance for wet material, whereby vibratory equipment can be used on dry, wet and sticky material.

"In other parts of the world this technology is widely used, so much so, that OEM's now design silos, hoppers and chutes with the necessary cut-outs for air cannon inlets just in case they are required later on," says Freddie Thompson, air cannon specialist at Martin Engineering.

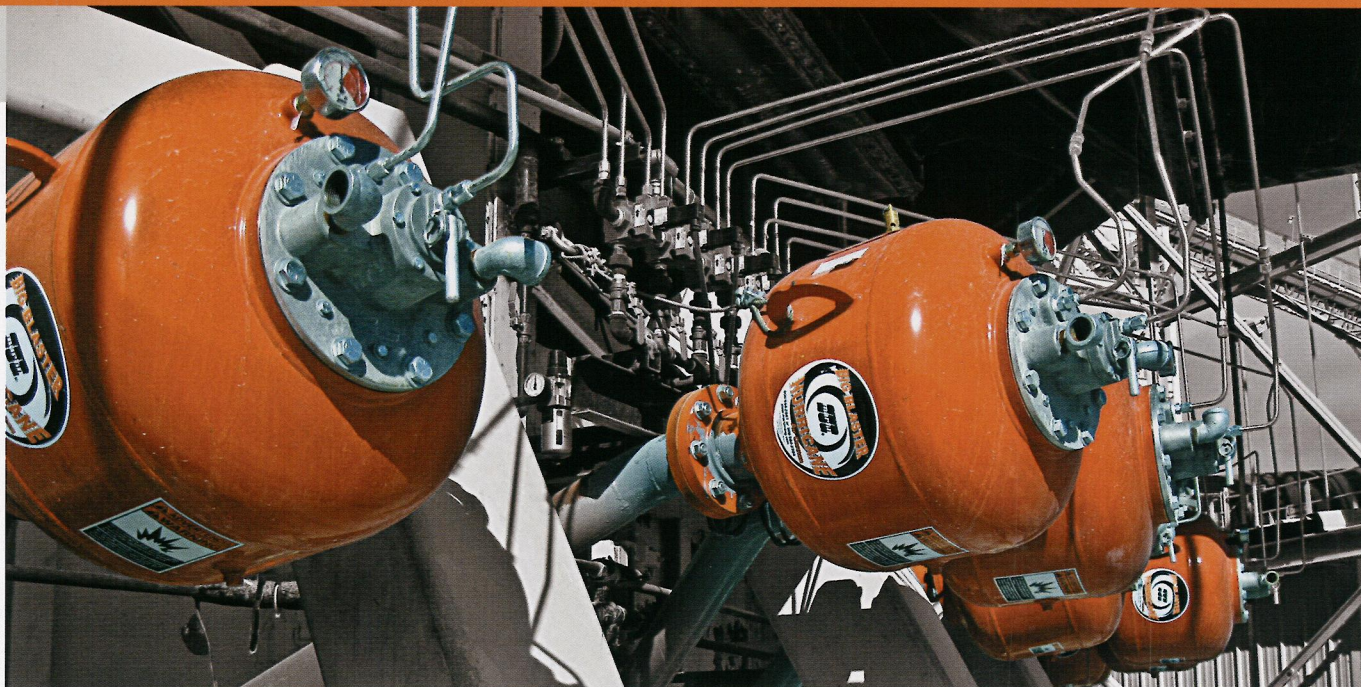
## Flow solutions

In South Africa, the company has retrofitted several installations to date. In fact, several corporates in the cement industry, for instance, now plan to standardise on air cannons as part and parcel of their materials handling systems. In all Martin Engineering installations the huge costs involved in plant downtime, purely to clean out blockages, have been eliminated, as well as the safety risk operators run by having to clamber into confined spaces to clear out material.

"The problem about bottlenecks and build-up of material is that they're usually only noticed when no material whatsoever comes out the other side," explains Freddie. "We recently came across an installation where the coal loading staiths were so blocked up that they had to actually break down concrete structures to get inside to clear the blockage. Apart from being out of commission for months, the costs escalated even more as broken-down structures had to be rebuilt."



Vibrating screens



Air cannons

### How it works

At the heart of an air cannon is a valve which discharges a blast of air that has been compressed to around 8 bar in pressure vessel tanks ranging anything from 9 to 300 litres in volume capacity. This discharge of air travels down a short length of pipe to an outlet inside the material flow channel and is directed at the area prone to build-up, literally blowing the material along before it settles into a build-up.

The traditional valve design is well-established utilising negative-pressure firing. This external valve design offers a proven and reliable record of effective performance in challenging applications across a broad range of industries. The valves are mounted externally to the tanks and require minimal plumbing because only one line of air is needed to fill the tank and trigger the valve.

"Our advanced valve design is a positive-pressure firing valve which is centrally positioned to make modern air cannons not only safer and easier to install and service, but also more efficient and more forceful," adds Freddie. "The positive-pressure firing valves provide improved safety due to a second air line used to deliver a positive pulse of air from the solenoid to trigger the discharge, eliminating unintentional firings due to drops in pressure."

### Compact design

There's also a compact central valve design which houses the entire valve assembly within the air cannon tank, providing the most direct air path for maximum force output and minimal air consumption. "This compact, powerful and efficient valve assembly also offers the smallest footprint, simple installation and easy, one-step maintenance," says Freddie. "In addition, we have multiple valve and multiple-port air cannon systems which utilise a single air reservoir and one valve to discharge compressed air through multiple hoses or pipes to various locations on a materials handling system."

"Freddie and I usually tackle a material flow problem together, to arrive at a recommended solution either in vibration or air cannons," adds Jurgen Cneut, OEM vibration specialist at Martin. The company offers a very wide range of options in terms of vibrators, both electric, pneumatic and hydraulic. A range of Martin screen vibrators, electric vibrators, truck vibrators, ball vibrators, ring vibrators, portable pneumatics, turbine vibrators and piston vibrators, are also available.

**The coal loading staithe were so blocked up that they had to actually break down concrete structures to get inside to clear the blockage**

### Sound blasting

Last, but not the least, there is yet another pneumatic solution on offer to solve flow problems. "Sonic horns are acoustic cleaners which produce a low-frequency, high-pressure sound wave," explains Jurgen. The sound wave is produced when compressed air flexes a titanium diaphragm in the sound generator. This sound wave is then magnified as it's emitted through the horn of the system. The sound pressure causes dry particulate deposits to resonate and become fluidised, dislodging it from the build-up.

"Material flow is affected by so many factors that almost every situation we encounter is unique. Therefore it is critical that we undertake a professional analysis of the material handling operation in order to come up with a specific solution for any given application and its unique operating conditions," Freddie says in conclusion. "We're fortunate in South Africa that we have the backing of a global network of engineers within the company who have experienced most of the flow problems that we come across today."

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