

SOLID NEWS

ISSUE 17

The newsletter of **AJAX EQUIPMENT** - the **BULK SOLID** performer



AWARDS DOUBLE FOR AJAX EQUIPMENT

Ajax Equipment has been awarded Company of the Year for 2021 by the Solids Handling and Processing Association (SHAPA) and Supplier of the Year by the Materials Handling Engineers Association (MHEA).

Mike Bradley, SHAPA chairman, said, *"Ajax has been around a long time, building a reputation for being able to supply equipment to deal with some of the trickier solids handling problems, in a sector where much of the business is a race to the bottom on price often resulting in disappointment of customers. For that reason alone, Ajax deserves approbation and encouragement."*

Commenting, MHEA President Roy Ball, said, *"We deliberated long and hard over the entries for Supplier of the Year, but we were unanimous that Ajax stood out for successfully navigating 50 years in the materials handling industry, gaining certification and achieving a reputation for producing quality equipment. On behalf of the MHEA, I wish Ajax every success in the future."*

QUADRUPLE SCREW FEEDERS FOR GREEN ENERGY

Enviropower, a leading biomass waste to energy provider, has installed two Ajax eleven-meter-long quadruple screw feeders for transporting shredded pre-sorted biomass waste as part of the process to generate green electricity.

As waste can be irregularly shaped, Ajax included several features to mitigate the effects including generous clearance between each heavy-duty screw's flights and the casing, and overload flap plates in the outlet section to significantly reduce the potential for disruption should there be a blockage.

In the event of maintenance, the feeder's design allows individual screws to be removed while the remaining screws maintain capacity via increased speed.

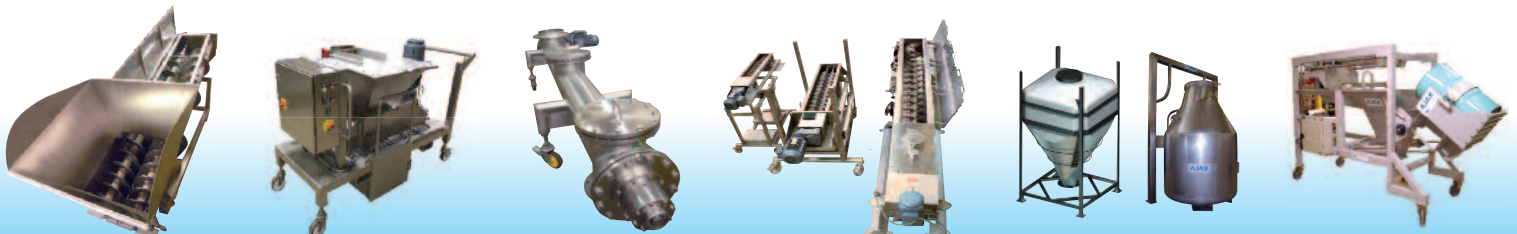
Commenting, Marc Linberry, operations director at Enviropower, said, *"We have worked with Ajax previously and were confident they could provide a solution that met our needs, and the new system works very well."*



SEARCHING FOR SUBATOMIC PARTICLES

Ajax Equipment has supplied the British Antarctic Survey with two screw augers, featuring a low friction Xylan coating, to drill holes for placement of neutrino detectors for the Radio Neutrino Observatory, a next generation ultra-high energy neutrino observatory being constructed at temperatures up to -40°C in Greenland.

"As well as manufacturing two screw augers Ajax have provided invaluable technical assistance and knowledge throughout the design stage of the project and we intend to continue to work with them as we further improve our drilling system," said Chris Kerr, mechanical engineer, British Antarctic Survey.



SCREW FEEDERS • LUMP BREAKERS • SCREW CONVEYORS • CONTINUOUS MIXERS • HOPPERS & IBCS • DRUM EMPTYING

BREAKING DOWN SIZE REDUCTION

The adaptability of design and ease of operation make lump breakers an ideal choice for breaking down a wide range of materials across many industries. Lump breakers can, continuously or in batches, handle a large range of particle sizes and produce material ideally sized for further processing without excessive dust and fines.

Processing equipment is designed to handle materials in specific conditions and within certain size tolerances. However, sometimes the effects of time, pressure, temperature, or moisture results in the aging, caking or the compaction of powders which have been stored in bags, sacks, intermediate bulk containers (IBCs) or other containers.

These processes result in the unintended agglomeration of the material into lumps. Lumps such as these can affect plant performance such as jamming or blockages in hoppers, chutes and conveyors, or impacting processes including dissolving or milling. As a result, any lumps that have accumulated need be broken down to the required size before further processing or handling.



Reducing Particle Size

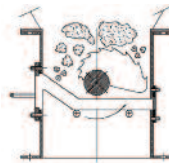
A material's characteristics will determine how to efficiently and effectively reduce the particle size to within the required range and therefore it is important to test the material.

For size reduction, the material characteristics and other factors which impact lump breaker design include: hardness / strength, pastiness, stickiness, wall friction, ATEX rating / explosive environment, sensitivity to work, temperature, whether and how abrasive the material is, the particle size input, the particle size required to be output and how wear resistant the material is.

All of these will inform how best to break down the material lumps. Size reduction is achieved under four mechanisms:

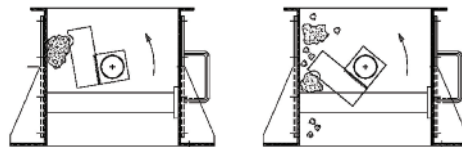
DYNAMIC IMPACT

The lump is impacted by the force applied by the rotor's profile. The high speed of the rotor impacts the lump with a specially designed profile to initiate a failure crack.



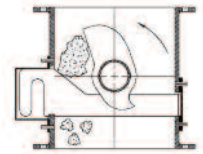
WEDGING / CRUSHING

The lump 'shatters' when wedged between two robust surfaces. The rotor is designed to capture the lump and progressively 'crack' against the lump breaker's casing. This mechanism is well-suited to brittle materials.



SHEARING / CUTTING

Lumps are cut between the edges of the moving surface of the rotor and fixed grille bars in a 'scissoring' action. A shearing / cutting action is well matched to filter cakes, wood and biomass. Cutting through the grille ensures self-clearing and defines the top size of the particle produced.



DEGRADATION

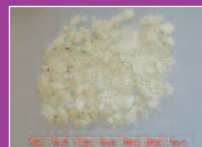
Particles rub against each other, steadily wearing each other down.

Case Studies...

Waste from Medical Device Production

Ajax supplied leading respiratory medical device producer, Intersurgical, with a medium speed mobile lump breaker and feed hopper for the batch processing of set lime and phosphorous. *"Filter cake and other set materials can be sensitive to the energy input, so care was taken with regards to clearances, dead zones, and profile of the lump breaker's rotor blades to provide a low energy efficient performance while maintaining high impact. To achieve this, Ajax carried out testing before production and extensive factory acceptance tests during which over a tonne of material was efficiently processed,"* said Eddie McGee.

Commenting, Daniel Rakauskas of Intersurgical said, *"Core to Intersurgical is the belief that high quality and consistency must be achieved in all aspects of our business - even in waste management. With increasingly higher volumes of product being manufactured weekly and the inevitable waste that is generated, a fast and effective method of dealing with it was essential. Ajax's lump breaker has proven to be consistent and reliable with a design that ensures the safety of our staff."*



Cassava Root for the World Food Programme

In order to produce cassava flour, the root must be dried and then milled. However, conventional milling equipment requires a small particle size. To reduce the whole cassava root to the required size, Ajax supplied the World Food Programme with a lump breaker for a refugee camp in Zambia.

Breaking Resin Blocks for Dissolver

The resin from Aloe Vera is a natural product and therefore its condition can be variable depending on the environmental factors, especially temperature. The resin is brittle and waxy and therefore can be best broken down with a wedging / crushing action.



ALLOY 22 AGITATED SCREW FEEDER

Ajax Equipment has supplied leading fine chemical manufacturer, Lianhetech Europe, with an Alloy 22, extremely corrosion resistant high nickel alloy, agitated screw feeder for Lianhetech Europe's Seal Sands production site near Middlesbrough, UK.

The feeder receives batches of product from a centrifuge into its horizontal cylindrical hopper section fitted with a multi-bladed agitator that sweeps the body internal diameter and along the full length to disturb time consolidation and sweep product into an integral LynFlow™ ribbon screw feeder that extracts along the full length to regulate feed into the site's dryer.

"Following initial meetings and the specification of Lianhetech's requirements, Ajax provided a bespoke design for the screw feeder and supplied the unit within the challenging timelines of the project. Ajax takes the time to understand the requirements of each specific process rather than supply a generic design and this is one of the key reasons that ensures the units can do the job from the start," said Imran Khaliq, engineering manager, Lianhetech Europe.



FOURTH POTATO MIXER EXPANDS CAPACITY

Agristo, a leading European pre-fried and frozen potato product producer, has expanded its production capacity with a further Ajax continuous mixer featuring an enhanced mirror polish finish. The stainless steel, twin screw mixer utilises a combination of Ajax's paddle and Lynflow™ ribbon screw geometry to provide efficient though gentle mixing to grated potato and various additives, to produce a range of potato products.

"Since commissioning Agristo's first Ajax continuous mixers almost five years ago they have performed very well. As a result, when Agristo looked to expand its production in 2018 and 2020 continuing to work with Ajax was the obvious choice," said Dieter Raes, technical director, Agristo.

ASK LYN...

Q My material flows well if kept moving but starting flow from a hopper, even after a short time at rest, is more difficult. Do you have any tips?

A Good hopper design includes many techniques that aid the commencement of flow. Vee shaped hoppers are better than cones as they provide an easier flow path and a slot outlet is a more effective at resisting arch formation if designed using the bulk solid's flow properties.

When flow has started it is easier to continue but as settled particles pack closer than when the material is flowing the bulk must expand for flow to begin. This needs waves of dilatation rising through the bulk when the valve or feeder operates at the hopper outlet. With fine powders low permeability restricts the entry of ambient air into the bulk so the void pressure difference imposes a compacting pressure on the mass. This can be eased by injecting a small amount of air slightly above the outlet to satisfy the needs for expansion.

Whilst the void air demand for coarse materials is more easily satisfied, expansion within even a porous bed of firm granules can generate strong passive resistance. In these cases local space for expansion on starting can be provided by suitable flow inserts which also shield the outlet from overpressures from the settled bulk in a hopper. The use of vibrator, air cannons and the like should be a last resort or expedient retrofit.



DIARY DATE

CHoPS 2022

**Grand Hotel Salerno,
Salerno, Italy
5-9 July 2022**



Ajax Equipment will be attending the 10th International Conference on Conveying and Handling of Particulate Solids, CHoPS 2022 will bring together over 200 particulate solids specialists, scientists and engineers from all over the world to discuss "New horizons for particle mechanics and solids handling in the smart manufacturing revolution". Industry professionals and academics will discuss ideas on a range of solids handling topics including material flow, mechanical behaviour of bulk materials, powder testing, mixing and segregation.

Find out more at www.chops2022.it





CARBON HANDLING WITH MERSEN

Ajax Equipment has supplied leading electrical power and advanced materials company, Mersen, with a hopper and screw feeder for reworked carbon fibre powder from a milling process.

Commenting, Scott Keil, manufacturing manager at Mersen, said, *"As one of several partners in this project, Ajax were a delight to deal with. They tested our unusual material in their lab to determine its flow characteristics, before designing and supplying the specified equipment within tight deadlines. They also coordinated and provided technical support to our other partners. In short, we are very pleased with Ajax's work and are working with them on follow-up projects."*

The hopper's steep walled vee shape and the screw's progressive geometry, including variable pitch and stepped shaft, ensures a reliable controlled flow of reworked fibre powder. In addition, the cover of the feeder is hinged to allow Mersen's manufacturing team to easily retrieve a powder sample and inspect the machine internally.



CHUTE TO THRILL

Ajax has supplied a leading European chemical producer with two stainless steel screw conveyors which combine at different elevations and offset angles into a shared discharge chute for damp powder handling. The screw conveyors feature LynFlow™ ribbon flights for excellent powder transfer and to allow process gas flow. *"The demanding process conditions required compliance with ASME 8 and PED category 4 module G. These standards meant that the conveyors' design and manufacture was independently verified by a Notified Body, demonstrating the abilities of Ajax's highly skilled team,"* commented Mark Waters.

APPRENTICES ASSEMBLE

Ajax Equipment continued its apprenticeship program with the addition of Mohammed and Connor in 2021. Commenting, Ajax finance director Mark Waters said, *"We are delighted to be able to welcome two new apprentices to Ajax's production team this year. It is a pleasure to see the skills and craftsmanship gained over decades experience passed on to the next generation. Good luck, Mohammed and Connor."*



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HAPPY 40TH BIRTHDAY SHAPA!



The Solids Handling and Processing Association (SHAPA), the UK's leading specialist association for the Solids Handling and Processing Industry, is celebrating its 40th anniversary. Commenting, Eddie McGee, said, *"Congratulations to SHAPA for supporting our industry for over four decades. Ajax Equipment was a founding member of the association in 1981 and we look forward to continuing to work with other members to promote solids handling and processing."*

We hope you find our newsletter informative and interesting. To provide feedback or find out more about Ajax's equipment and services contact Ajax today.



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