

# SOLID NEWS

ISSUE 16

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

## AJAX'S BIGGEST YEAR YET

Ajax Equipment's 50th year is turning out to be our biggest, serving industries as diverse as Chemicals, Metal Powders, Waste to Energy and Food. We've made our largest quadruple screw feeder ever, highest capacity vertical screw blenders and supersized agitated screw feeders and lump breakers. All whilst achieving ISO9001 certification and developing our capabilities even further to supply the very best in solids handling equipment.



## AJAX IS THE 'GO-TO' FOR MATERIAL FLOW

Ajax's super-sized agitated screw feeders offer large holding capacity, often several tonnes which is actively stirred to ensure flow into an integral screw feeder which controls feed to downstream process. Eddie McGee said "Ajax's agitated screw feeders are designed to suit each customer's specific applications - whether that's different batch sizes, discharge rate or variability in material flow characteristics." Having installed one recently, Andrew McNally of T. Swan Co. said "When it came to selecting equipment for handling non free-flowing solids, Ajax is my go-to. The equipment they provide is well designed, robust and most importantly always ensures the material flows."



## AJAX DOUBLE FOR DISTILLERY

An Edinburgh Distillery has installed an Ajax grain pellet handling system. Eddie McGee said, "To improve flow from an existing silo, we supplied a new hopper bottom with steep, stainless steel walls and large twin screw feeder. The AJAX feeder offers increased extraction area for reliable flow"



## HEAVY METAL HIP HOPPERS

Recently Ajax supplied a metal powders manufacturer with fifteen storage hoppers, five blending hoppers and three mass flow screw feeders. The fifteen stainless steel intermediate bulk containers' (IBCs) geometry was designed for efficient discharge and repose fill of high density powder, while the five larger hopper's steep double cone shape promotes blending of metal powders.



# EFFICIENT WASTE HANDLING FOR A SUSTAINABLE FUTURE



Increasing need and desire are driving waste reduction, reuse and recycling. Conversion processes for energy, neutralisation or remediation demand that waste processing must be as efficient as possible; this means waste handling must be effective and reliable. Here we review how Ajax's solids handling knowledge has contributed to a variety of productive systems.

## Waste as a Material

Ajax has extensive experience handling a wide range of materials including waste streams, from chipped wood and shredded plastics through to fine ash and char. Knowing the material is the key to all solids handling projects as understanding how the material will behave is fundamental to producing suitable equipment. Very often waste materials are irregularly shaped and quality control is not stringently applied; to accommodate these varied solids a robust and tolerant design is required if reliability is to be ensured.



When a feeder's narrow inlet prevented system operation Rabbit Waste Management brought in Ajax. *"The original screw feeder provided by a different supplier was very problematic meaning our system was unusable. Ajax undertook tests on the material and came up with their recommended design; this is working very effectively,"* said Mick Adams, managing director, Rabbit Waste Management.

The existing feeder's narrow inlet caused arching in the supply hopper. Arching is a common issue and occurs when the strength of a material allows a stable structure to form over the hopper outlet. As a result of bench scale and practical equipment trials by Ajax the size of the hopper outlet was increased and a large twin screw feeder was supplied to serve the full width and length of the new hopper outlet with suitable tolerance to cover the variability in the infeed material flow condition.



Waste can be hard on machines so selection of equipment material and cleanability can be important for optimising service life and equipment reliability. Specialist waste services supplier, Castle Environmental, approached Ajax for a high specification ash conditioner for an Air Pollution Residue (APCr) recycling plant. APCr is abrasive and when conditioned with liquor forms a tough 'grinding paste'. Ajax recommended augers with Abrazo paddles, for wear resistance to increase the auger's service life. As conditioned ash can set hard, making cleaning at the end of a shift important, Ajax also suggested the conditioner include easy access.

*"Ash conditioners are regularly requested from Ajax, so we are very familiar with the mixing duty and design features required for processing wetted ash,"* says Eddie McGee. *"Ash conditioners should be cleaned regularly so the machine includes useful design features like counterbalanced covers allowing easy access for inspection and washdown."*

Commenting, Thomas Evans, project manager at Castle Environmental, said, *"Installing the ash conditioner from Ajax allows us to divert more waste away from landfill and meet our target of recycling more APCr."*

## Converting Waste to Energy

Pyrolysis is an increasingly common process that converts waste and biomass to syngas, oil and carbon char. The syngas and oil are used to generate energy, while the carbon char can act as a fuel, or used in remediation processes. On the process, Eddie McGee said, *"Ajax has produced a wide range of equipment for pyrolysis systems. These range from cooling screws handling hot char at the back end to infeed systems where shredded extreme shaped particles often make for poor flow conditions. Hopper and feeder design are important, and we can aid process containment using our plug forming screws to feed fuel to ensure heat is not lost."*



Commenting, Matt Green, Recycling Technologies, said, *"Ajax's plug screw technology is well matched for pyrolysis as it allows continuous production and prevents by-products forming."*

Pyrolysis produces high temperature by-products. Ajax recently supplied a waste to energy system developer with a carbon steel cooling screw conveyor for rapidly reducing the temperature of hot char. Ajax's inclined screw conveyor, suitable for operation in an ATEX zone 2 environment, uses a water-cooled jacket and auger to cool char from up to 600°C to below 50°C. The conveyor's screw features full flights and robust centre tube ensuring reliability of processing and special features that avoid trapping and wedging with odd sized pieces.



## Breaking Down Waste

Often waste requires size reduction before further processing can take place. Lump breakers are efficient in processing granular materials as they combine the effects of dynamic impact, wedging and trapping actions at a rapid rate to produce an acceptable range of particulate fractions. To process increasingly high volumes of set lime and phosphorous Ajax supplied respiratory medical developer, Intersurgical, with a mobile lump breaker and feed hopper.



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. Ajax's lump breaker has proven to be consistent and reliable with a design that ensures the safety of our staff."*

# AJAX LOOKS FORWARD TO THE NEXT 50 YEARS

**50** years ago Ajax Equipment was formed to provide effective and efficient solids handling systems that make a difference to businesses. Today that same ambition is powering Ajax to meet the needs of a specialised and global marketplace. Advances in engineering combined with insights into materials performance enable Ajax to develop world leading solids handling equipment across varied industries.



Ajax twin screw mixers provide high quality production for food, confectionery and pharmaceuticals.

This diversity of solids handling challenges sees Ajax manufacturing its largest machines ever. Commenting, Eddie McGee said, "Scale is never an issue. Big or small the same principles apply to every project - understanding the material's flow properties and attention to detail in design and operation. For the aggro chemical sector, we are working on our largest agitated screw feeder comprising a barrel type hopper capable of holding 6m<sup>3</sup> of materials with an agitator that sweeps almost 2m diameter. In contrast, for precision dispensing of small volumes of fine powders we produce some of our smallest screws, some just 20mm diameter."

The capability to manufacture a broad range of solids handling systems is the result of extensive experience and continued in-house development of new techniques. Ajax's advances in equipment are underpinned by its commitment to manufacturing and quality standards, recently receiving ISO 9001 certification.

Currently enjoying its highest turnover to date amidst a global pandemic, Eddie McGee believes Ajax is well placed for the future. "Our culture makes us strong enough to deal with demanding projects and difficult times. Achieving ISO 9001 is just the latest milestone in our strategy of developing the business strengths needed to ensure Ajax's equipment and services satisfy or even exceed customers' needs now and in the future."



Production manager Matt Barnes supervises despatch of 8T Batch Blender as it begins journey from Bolton, UK to Ulsan, South Korea.

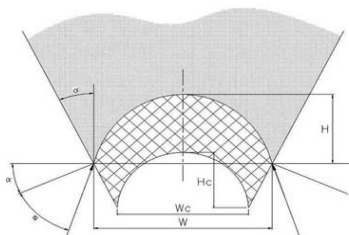


Eddie McGee and Mark Waters (right) delighted with Ajax ISO 9001 certificate.

## ASK LYN...

### Q Will a hopper with a large outlet have issues with its feeder starting?

**A** It certainly could. Whilst some materials demand large outlets for flow it is wise to avoid over design, adopt smart design instead: use a plane flow hopper with a slot outlet as this is more effective than a large round outlet for flow (slot width can be half the diameter of that needed with a cone). With shear tests it's possible to specify a flow width (W) that exceeds critical arching span (Wc) by a comfortable margin only and a mass flow design will maximise effectiveness of the outlet and minimise load on the feeder. The outlet length/width ratio should exceed 3:1 and it's wise to run off a small amount at an early stage of fill to promote the best stress conditions. Make sure the feeder offers progressive extraction capability so as to avoid shearing against stationary layer of material above. The 'pull-out' force of a feeder from a hopper is sensitive to the conditions in the shear plane of flow as it translates from vertical to horizontal. An efficient interface design must incorporate dilatation of the bulk solid in the flow direction, particularly for materials that require the relative motion of larger particles and avoid jamming at the final exit point from the hopper.



## DIARY DATE



### Ajax's Golden Anniversary 2020-2021, Ajax Equipment, Bolton.

2020 is the 50th anniversary of Ajax's founding. To mark this and recognise the hard work of Ajax's team, past and present, we had big plans but to ensure everyone's safety we have been unable to do some of these. We still intend to celebrate just later than planned, so keep an eye on the Ajax e-newsletter and LinkedIn.



See [www.lynflow.com](http://www.lynflow.com) and [www.ajax.co.uk](http://www.ajax.co.uk) for more technological solutions

# 11 METRE QUADRUPLE SCREW FEEDER



"With four 11-metre-long screws in a casing 3.6 metres wide, Ajax's biggest multiscrew feeder truly is an impressive piece of solids handling machinery," said Eddie McGee. The mild steel feeder will transport refuse derived fuel from a hopper as part of a waste-to-energy process.

As waste can be irregularly shaped as well as poor flow, Ajax included a number of features to ensure reliable handling. Eddie commented, "The feeder's design pays special attention to screw geometry and clearances. While over the outlet section the feeder includes relief overload flap plates should the subsequent conveyor fail to take the product away. In the event of maintenance, the feeder's design allows one of the four screws to be removed and the machine to continue to operate at full plant rate."

# AJAX'S BIGGEST LUMP BREAKER

Designed to break down pieces of Ammonium Carbonate up to a metre long, this is the largest lump breaker Ajax has ever produced. The heavy duty LynFlow™ rotor and removable grille reduces the size of chemical 'candles' to under 40mm enabling easy packaging for supply to a wide range of industrial and food applications.

"Initially Ajax supplied a trial unit to prove performance and collect feedback to inform the lump breaker's design. Due to the process, the lump breaker is designed for ATEX Zone 2 hazard area use. To contain the strong gas atmosphere during production use and allow the introduction of an inert gas, Ajax designed the stainless-steel unit to include a multi-stage twin purge shaft seal arrangement," commented Eddie McGee.



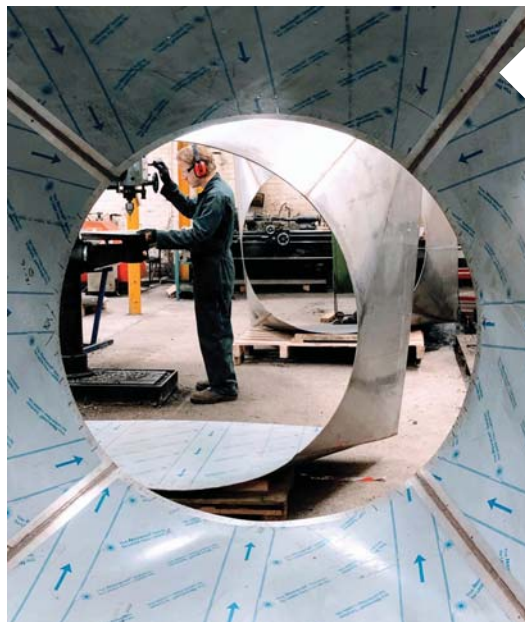
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Some nice FLT manoeuvring gets 11 IBCs, 3 blending bins and a screw feeder - all finely crafted in ...see more

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## TEAM AJAX GROWS

In 2020 Ajax added four new members to its production team. In addition to two new apprentices, John Emms joins Ajax as a semi-skilled engineer while Sam Gorton joins as a fitter.

Commenting, Ajax director Mark Waters said, "As Ajax produces a larger range of equipment to satisfy customer requirements, we have needed to expand our production resources. To do this Ajax has brought in a mix of experienced staff and apprentices to develop their skills."

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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