# SOLID NEWS

ISSUE 15

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


## PERFECT FROZEN POTATO PRODUCTION

Ajax has supplied leading European pre-fried and frozen potato product producer, Agristo, with two continuous mixers featuring an enhanced mirror polish finish. The stainless-steel, twin screw machines' paddle screw geometry efficiently mixes grated potato with various additives including flavourings to produce a range of potato products.

*"Our Ajax continuous mixers work extremely well, performing their job perfectly,"* said Dieter Raes, technical director, Agristo. *"We have worked with Ajax on several machines and would highly recommend them to other food producers."*

### Cleanability

The mixers' casing has a crack and crevice free finish to meet the strict hygiene standards for food manufacture as well as a profile designed to ensure there are no dead areas whilst still maintaining good cleanability of the machine.

As a further enhancement the mixers can also hold liquid, allowing machines to be filled during cleaning if desired.

## CARBON BLACK HANDLING SYSTEM **FOR HUBRON**

Ajax has supplied leading black masterbatch producer, Hubron International, with a system to supply a new extruding line with carbon black. The handling system consists of a screw feeder with Lynflow ribbon flights, hopper featuring Lynflow insert and accommodates the site's big bag hoist & discharger within an Ajax support gantry.

Commenting Craig Hodgkinson, Operations Director, Hubron International said *"Hubron made a rapid decision to invest in additional plant capacity following extended lead times in 2018. Ajax was known to Hubron as a preferred supplier from a previous major investment project. Following initial contact Ajax responded well and met the challenging timescales requested. The target date to commencing production from the new line was met despite some last-minute challenges. Overall an excellent effort from all with complete success."*

## HOPPER PERFORMANCE **TAKES OFF**

A Kansas based customer recently approached Ajax to enhance hopper performance. Ajax designed a stainless-steel insert to avoid segregation and help promote a homogenous mix of material fractions.

*"Hopper inserts are a good option when looking to improve the performance of an existing hopper. Inserts can address a number of issues including flow, reliability and segregation,"* says Eddie McGee.


**Also inside...** Using Screw Technology for Best Mixing • Improving on Mass Flow with Uniform Flow • Ask Lyn • Diary Dates • Mobile Integrated Hopper & Screw Feeders Increase Output • Nickel Handling System for Projex Solutions • Lunch & Learn with Ajax • Get the latest handling & processing news

We hope you find our newsletter informative and interesting, your feedback is appreciated.
Please call **+44 (0)1204 386 723**, send an email to **sales@ajax.co.uk** or visit **www.ajax.co.uk** for more information.

# USING SCREW TECHNOLOGY FOR **BEST MIXING**


Helical screws are a well-established means of feeding and transferring bulk solids. However, the action of progressively moving powders along the screws can also lend itself to processes such as mixing.

Continuous mixers use the multiple and progressive actions of the auger's paddles or ribbons to mix and positively combine components, efficiently producing a high-quality mix. Ajax's continuous mixers operate on a cross section of the bulk containing the correct ratio of materials required. The mixer then blends the material repeatedly as it travels along the screw; this progressively increases the degree of mixing until the required level of homogeneity is achieved.

There are a number of benefits to using continuous mixers including low work input, which results in low energy requirements and minimal particle attrition. In addition, product transfer is concurrent with the mixing process so the segregation and quality issues often associated with intermediate storage and separate, sequential operations can be avoided. Also, continuous mixing avoids the inconsistencies that can often arise from batch manufacture.

## Material Matters

Knowing your material is the key to success when using any solids handling equipment, including mixers. Where solids handling projects encounter problems this is usually due to a simple lack of understanding with regards to the material's behavioural characteristics.

When blending coarse powders that are not very cohesive it is usual to run the continuous mixer at a faster speed to induce a high degree of agitation. This action separates the particles and allows the different materials to diffuse in the bulk.

More intensive effort is required to mix cohesive powders and liquid/solids mixtures. In this case mixers should be run at a higher cross-sectional fill so that the blades shear the product in a confined state, inducing higher stresses to improve dispersion.

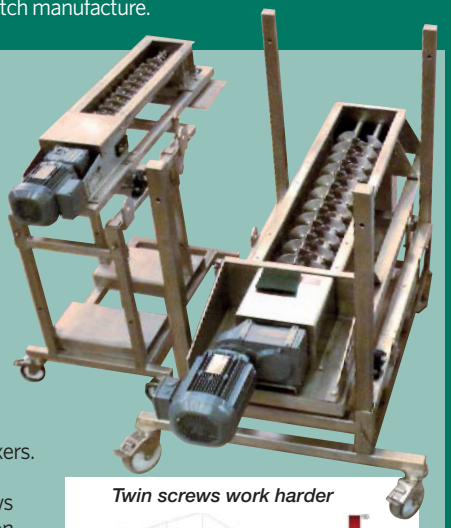
## How Many Screws?

Continuous mixers come in single and twin screw configurations. Single screw mixers are often used for simple applications, such as light blending. As there is only a single screw there is a lack of confining capacity, limiting the degree of mixing.

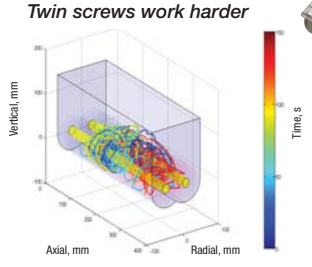
Twin screw mixers, on the other hand, are the 'workhorses' of continuous mixers. They are highly flexible and capable of high output rates. The twin overlapping screws rotate to bring the material into a compression zone in the centre of the mixer. This allows twin screws to input a larger amount of work than single screw mixers.

A good example of why a different number of screws is appropriate in various situations is food production.

Although continuous mixers are suited to producing both cereal bars and confectionery, they have very different handling requirements. When producing both chocolate and cereal bars it is desirable to minimise particle attrition and damage to the ingredients, this can be achieved by selecting the appropriate flights and rotational speed.



*Twin screws work harder*




## Mixing Chocolate

Chocolate production is usually suited to single screw mixers. Combining liquid chocolate paste with other liquors and / or other inclusions such as pieces of candy often only requires light blending to achieve a homogenous mix.

To maintain quality, and produce the required mix, it is also necessary to maintain a constant temperature throughout the liquid chocolate. This is possible by designing a mixer with a heated jacket as well as heated screw shaft. In the case of chocolate mixing the heating medium is usually water but others such as steam, oil and hot gases can be accommodated.

*A single screw mixer for chocolate production*

## Cereal Bar Production

In comparison to chocolate, the combination of ingredients often found in cereal bar production (puffed rice, oats, honey, syrups and pastes) form a far more cohesive mix and therefore require more work input to attain the distribution of materials wanted.

Sticky materials are also more likely to adhere to surfaces, so selecting the right flights makes a significant difference. The open form and geometry of ribbon flights inhibits the build-up of ingredients, ensuring they do not reside in the mixer any longer than desired without cleaning. A benefit often employed with Ajax continuous mixers is the ability to swiftly and easily change augers by using quick release screw assemblies c/w tail end plate. This allows the screws to be removed for cleaning, although clean-in-place is also possible, and product changeover or to switch between different mixing augers.

This article covers just a small proportion of the applications continuous mixing can benefit. Continuous mixers also ideal for ash conditioning, mixing pharmaceutical powders and coating particles.

# IMPROVING ON **MASS FLOW** WITH **UNIFORM FLOW**

Flow, how a material moves, largely determines on the quality of what comes after as it heavily influences the material's condition. In many applications mass flow, where all material moves together, is desirable and provides a reliable flow of material in the condition required. However, although all the material moves, it does not flow evenly.

Uneven drawdown from a hopper can lead to issues including collapse of the material, large density variations, 'flushing', segregated discharge and extended residence times. In the case of process applications, such as heating or cooling, the differing rates at which regions of material pass through a hopper can result in less efficient equipment performance.

### Uniform Flow

Uniform flow offers many benefits over mass flow including even drawdown and equal residence time. Equal residence time provides all of material with the same opportunity to settle to a consistent condition. However, uniform flow is not easy to achieve and requires very careful design of the hopper and the means used to extract the contents.

Introducing a screw feeder for extraction also extends the holding capacity of the hopper and with care can extract along the entire length of a long outlet slot. This is particularly useful when handling poorly flowing materials or even ones that contain lumps.

Uniform extraction reduces the chances an outlet will block through the formation of a cohesive 'arch' or presence of lumps; even flow / extraction also helps prevent the establishment of a 'rathole', where material clings to the walls and material only flows through the centre of the hopper.

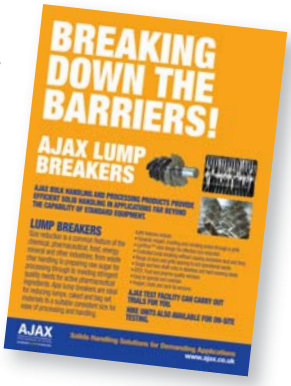
Crucially though uniform flow gives the most even flow drawdown profile from the hopper to establish a definitive residence time for the powder therein.

# ASK **LYN...**

## Q What is LynFlow™ Technology?

**A** **LynFlow™ Technology** describes the techniques used to develop powder and bulk technology based on the fundamental principles of mechanics and powder flow along with the best industrial practice that has developed at Ajax over the past five decades.

This strong combination results in innovation and ingenuity in the design of Ajax's novel IBC's, hopper inserts, continuous mixing paddles and clog-resisting flights for screws. It's the basis of our many registered design feeders and casings, two way and reversing feeders and ash conditioners. Our lump breakers for example benefit from **LynFlow™** features on rotor design and latest two stage size reduction techniques. The technology extends to innovative features in hopper design, density control, segregation, de-aeration, flow aids and powder testing devices.




To complete the picture, you should add the many technical articles published on the Ajax website and the bulk-online.com forums:- 'Solid Sense' and 'Ask Lyn'. The main feature of **LynFlow™ Technology** is that this technical approach is applied to all new enquiries to Ajax; we seek to provide optimum performance for the client, rather than sell standard quipment. Application needs are assessed with rigour, with our engineers applying a wide range of experience and expertise to provide the best innovations and solutions.

See **www.lynflow.com** and **www.ajax.co.uk** for more on the technological solutions we provide.

# **PRODUCTION** MATTERS

Ajax has increased production resources by appointing Stuart Robinson, mechanical fitter. On joining Ajax, Stuart said, *"I am delighted to join the Ajax team and looking forward to working on the wide variety of solids handling and processing machines that will need machining, fitting, assembly and testing."* Mark Waters added, *"Stuart brings key skills and broad experience to the business and I'm sure he will find the work both interesting and rewarding."*

# **DIARY** DATE

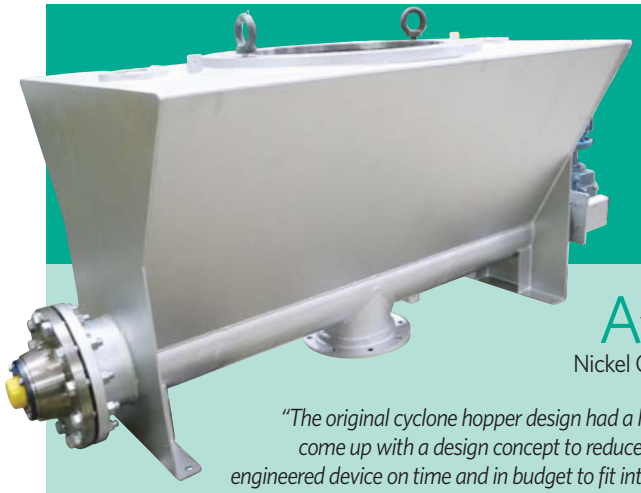
Institution of MECHANICAL ENGINEERS

## Compliance in Bulk Materials Handling 2019

**30 September 2019, Institution of Mechanical Engineers, London.**

Compliance in Bulk Materials Handling 2019 will provide an overview of a range of regulations that are especially relevant to the bulk solids handling sector, de-mystifying their meaning and the means of achieving compliance. The event will cover the procurement, design, operation, and maintenance stages.

**Find out more from:**
**https://events.imeche.org/ViewEvent?e=6962**

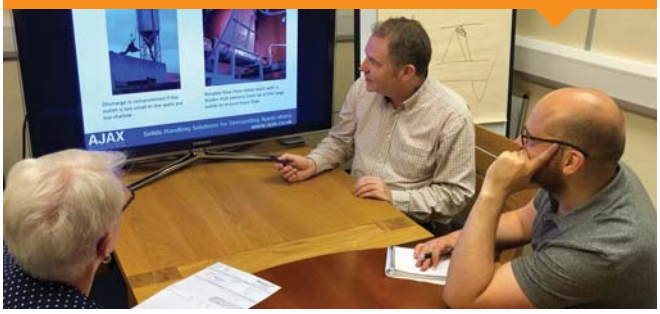


# NICKEL HANDLING SYSTEM FOR **PROJEX SOLUTIONS**

Ajax has supplied project engineering service provider, Projex Solutions, with a handling system comprising collecting hopper and screw conveyor for transferring Nickel and Nickel Oxide powder. The nickel handling system collects the powder from a kiln gas cyclone.

*"The original cyclone hopper design had a history of bridging which would cause production delays on the kiln. Projex were challenged to come up with a design concept to reduce the time delays. Ajax professionally turned the concept of this bridge breaking hopper into an engineered device on time and in budget to fit into a busy kiln refit programme,"* said Ian Lund, Principal Engineer, Projex Solutions Limited.

# LUNCH **& LEARN**




Ajax's Eddie McGee recently held a 'Lunch & Learn' session at engineering services provider GHD. Commenting on Eddie's presentation, Nnamdi Nwaokocha, Senior Process Engineer at GHD said, *"I really enjoyed and appreciated Eddie's presentation on solids handling. In particular, the information regarding hopper and silo designs. As a designer, the useful tools, equations and parameters to consider provided will definitely be beneficial for future projects."*
To book your Lunch & Learn with Ajax, email: **sales@ajax.co.uk**

# **GREEN** INVESTMENT

Ajax has recently installed a new heating system for our works. This significant investment provides a safe and comfortable environment for our employees, while helping to improve our carbon footprint. Mark Waters said, *"Greater efficiency, good thermal output and reducing our environmental impact has made our investment very worthwhile."*

# **GET THE NEWS**

Please sign up for latest solids handling and processing news from Ajax's e-newsletter and Top Tips series full of good advice and info on technology developments.

To sign up visit **Ajax.co.uk** or email: **sales@ajax.co.uk**

# MOBILE HOPPER & SCREW FEEDERS **INCREASE OUTPUT**

Pathway Intermediates has recently installed two Ajax stainless steel integrated hopper and inclined screw feeders, designed to significantly increase output of a mixed powder.

Commenting Mark BennettDoy, Works Engineer at Pathway Intermediates said *"We approached Ajax to supply a pair of augers and hoppers to receive bulk discharge of powder products from our mixing plant and to meter this through a sieving system to collection hoppers. There were a number of iterations from the initial design brief through to examination of the final build. As we had experienced previously, Ajax's support at every stage from initial design through to after sales support was exemplary; I can only thank them for their help."*


**AJAX**
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