



...the Workhorse of Industry

Smart Automation

December, 2010

Industry Thoughts: The Physics of Part Feeding – it's not black magic

Stiffness: Fourth in a series of highlighted physical principles for part feeding.

Fortville's key to fast vibratory part feeders is a strong working knowledge of the associated physics. December's Smart Automation focuses on stiffness and its effects on part feeding.

Stiffness is a measure of the resistance offered by an elastic body to deformation



$$k = \frac{F}{\delta}$$

k = Stiffness
 F = applied force
 δ = displacement produced

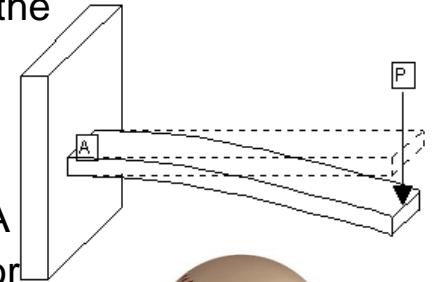


Basically, the greater the stiffness the more force you can apply or the less displacement will be produced with a force

High-speed Vibratory movement requires an understanding of the stiffness of the vibratory system, as well as, the stiffness of the parts being fed. In order to optimize speed, vibratory or harmonic forces input into the system must efficiently translate to the parts and not result in deflections of the system. A system that lacks stiffness will deflect the system and not “throw” the parts. A feeder bowl that is cracked or broken often does not feed parts efficiently – or maybe not at all - as the system stiffness has changed.

Part stiffness can also be a factor in the resulting output speed of a feeder bowl. Soft or flexible parts can absorb or flex under the vibratory forces, instead of being directly thrown or hit forward. An analogy of part stiffness is a squishy softball not travelling as far as a baseball when hit. Part stiffness can also be effected by the orientation of the part itself.

Fortville optimizes speed through mass efficient and stiff systems which are appropriate for the parts being fed – that's smart automation.



Look for future issues to learn more about how **Fortville masters physics** to provide world-class **part feeding solutions** and is among the leaders in **Smart Automation**.

Product Highlight:

Multiple part feeder with 180 degree Part Re-Orientation

Application: Feeder bowl designed to feed 10 unique sub-assemblies from a single bowl. Adjustable tooling allows for quick changeover. Part geometry and its' center of gravity location required the orienting and selecting of parts to be upside down from desired output orientation. A high precision and adjustable C-track was required to get the desired output orientation of parts.

Feed Rate: 50 PPM – single output lane

Fortville Products:

- 21" CW Vibratory feeder bowl
- C-Track & M5 Inline vibratory track



Overall Function:

System feeds electrical sub-assemblies of multiple configurations using adjustable tooling. System replaces manual assembly and resulted in significant cost savings for customer.

Company News:

Fortville produces Part Feeders for Johnson Controls' Lithium Ion Batteries

As the economy slowly returns, it is encouraging to see activities around clean energy being one of the growth engines. The development and production of new hybrid and battery powered vehicles, as well as, systems for wind, solar, and nuclear energy production all represent win-win solutions – both stimulating the economy and providing for a greener environment.

As one of the market leaders in part feeding for manufacturing, Fortville has been an active participant in many of these win-win solutions. Among many projects, Fortville is pleased to have recently delivered part feeding systems to support Johnson Controls' new lithium ion battery plant in Holland, MI. These systems, shown below, feed critical parts for the lithium ion battery assembly and include poke yoke's that sort out incorrect parts.

Fortville is passionately committed to re-energizing manufacturing in N. America and recognizes the need to do this with smart solutions – both in the type of product, as well as, the associated processes. We have the skills, capabilities, and experience to help deliver these win-win solutions. We would encourage you to engage Fortville for your manufacturing processes – that's smart automation.



Products and Services:

Part Feeder Systems:

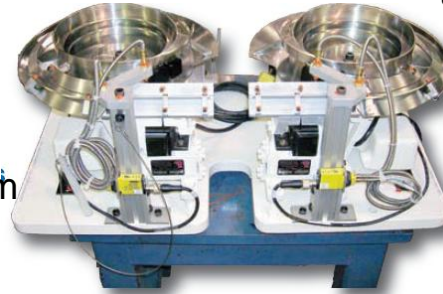


- **Vibratory Bowls:**
 - 6" to 70" in dia.
 - Feed rates to 600 pph
- **Centrifugal Bowls**

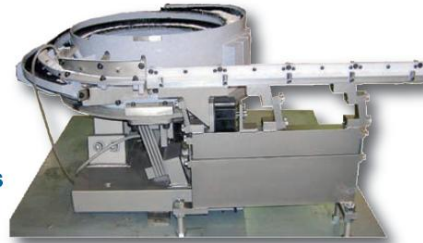
Fortville is the recognized industry leader in large, high-speed vibratory feeder bowls. Challenge us with your part.

- System design and development
- System build and validation
- System remanufacture & rework
- On-site service and support
- Service part sales

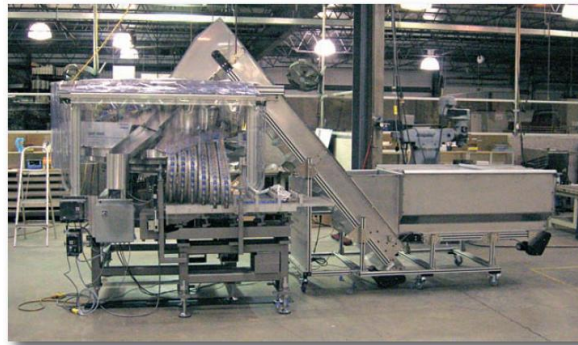
Material Handling Systems:



- **Track Feeding Systems:**
 - 6" to as long as required
 - In-line Vibratory Tracks
 - In-line Air Tracks
 - Conveyor Belt Tracks
 - Gravity Tracks



- **Automation Mechanisms:**
 - Isolation Escapements
 - Shuttle mechanisms
 - Sensor integration:
 - Vision and weight



- **Storage/ Transport Systems:**
 - Elevators and Gondolas
 - Bulk Storage Hoppers
 - Sound Enclosures

See: www.fortvillefeeders.com

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