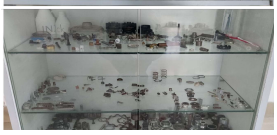
Components for which systems are available



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Elscint Ahead

Feeding In The Latest . . .

Monish Shete

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Welcome to the December edition of the Elscint Ahead Newsletter. The first news is about a recently completed project while the second is a comparison between Flexible Feeders & Vibratory bowl feeders. Flexible Feeders are getting popular in Europe, however, one has to understand their advantages / disadvantages before jumping onto the bandwagon. The second article will help understanding the same. As usual you can download the pdf version of this newsletter as also the back copies of the Elscint Ahead Newsletter.

Feeding of scoops

Elscint recently manufactured 4 vibratory bowl feeders for feeding of two types of plastic scoops. Two for a larger 30 ml scoop while 2 were for a smaller 10 ml scoop. The requirement was to feed them at a speed of just 20 parts per minute. Both were having the same diameter and height (dia 50 mm x 90 mm) while the thickness was different, 20 mm and 45 mm respectively. The bowls was designed in a such a way that almost all of the scoops were used, whatever way they came in. For this proper tooling was designed to get the scoops into the correct direction. This ensured that the required speed was surpassed easily. A feed rate of around 70 parts per minute was achieved, that too in Model 400 with a dia 650 mm stainless steel bowl having step / cascade design.

The advantage of this type of bowl is that at the end any required orientation can be provided to the customer. In this case, the requirement at the end was to have the scoops hanging with the tail down and open side away from the bowl centre. A 800 mm long linear track was provided ahead of the bowl feeder with a pneumatic escapement to release one scoop on receipt of a signal from the customer. The scoop was dropped in the carton of the customer which was moving on a conveyor.

You can watch the video of the bowl feeder here.

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Flexible Feeder vs Vibratory bowl feeder

A lot of people inquire and ask for quote for a flexible feeder. That is supposed to be the “in” thing in part feeding automation. Are there any advantages of the same? Lets look at the differences and advantages / disadvantages of a flexible feeder vis a vis a vibratory bowl feeder.

Vibratory bowl feeders and flexible feeders are both common choices for presenting small components to automated assembly lines.

The Unwavering Workhorse:

In the rapidly evolving landscape of industrial automation, part feeding systems form the critical link between bulk storage and the high-precision assembly process. While modern flexible feeders, often vision-guided and robot-integrated, offer impressive versatility for high-mix, low-volume production, the venerable vibratory bowl feeder remains the unchallenged champion for high-speed, high-volume, single-part applications. Its core advantages lie in a combination of superior throughput, profound reliability, predictable low cost of ownership, and a technology perfected over decades, cementing its status as the unwavering workhorse of dedicated manufacturing lines.

1. Unmatched Speed and Throughput

The single most compelling advantage of the vibratory bowl feeder is its ability to deliver parts at an exceptionally high and consistent rate, far surpassing the typical capabilities of a flexible feeder.

Dedicated Efficiency: A vibratory bowl is custom-tooled (often referred to as an engineered solution) to orient a single -part or a family of parts with near-perfect efficiency. This specialized tooling on the internal spiral track rapidly and mechanically guides parts into the required orientation. In contrast, a flexible feeder relies on a vision system and a robot, which must: 1) take an image, 2) process the image to locate and identify a correctly oriented part, 3) move the robot to the part, and 4) pick the part. This sequence introduces inherent latency.

Cycles Per Minute (CPM) Superiority: While a flexible feeder typically maxes out around 60 parts per minute (PPM) per unit, requiring multiple units to achieve higher rates—a well-tuned vibratory bowl feeder can often achieve rates from hundreds up to a thousand or more PPM, depending on the part size and complexity. For a production line running millions of units annually, this difference in throughput is transformative, directly translating to higher overall equipment effectiveness (OEE) and lower cost per part.

2. Superior Reliability and Operational Simplicity: Once a vibratory bowl feeder is properly tuned, its operation is remarkably simple and robust, leading to unparalleled long-term reliability.

Mechanical Predictability: The bowl feeder operates on a simple principle of controlled vibration and gravity, guided by robust physical tooling. There are virtually no complex moving parts involved in the sorting and orienting process, minimizing mechanical failure points. The primary moving components are the springs and the drive unit, which are highly durable.

Vision-Free Operation: Flexible feeders are fundamentally dependent on advanced vision systems and robotics. These sophisticated components require complex calibration, can be affected by ambient lighting changes, dust, and part surface variations (e.g., reflections, oil residue). A vibratory feeder, being entirely mechanical in its sorting logic, is immune to these vision-related complications, ensuring continuous feeding even in harsher manufacturing environments.

Low Maintenance and Support: The vibratory feeder’s simplicity means maintenance is typically limited to occasional tuning and cleaning. A flexible system, involving robots, vision cameras, and software, requires a higher level of technical expertise for setup, troubleshooting, and ongoing support, increasing reliance on specialized personnel.

3. Lower Total Cost of Ownership (TCO)

Even the initial cost of a custom-tooled vibratory bowl is reasonable when purchased from a quality manufacturer in India like Elscint and additionally its total cost of ownership is often significantly lower than a flexible feeder system, particularly for high-volume, long-running applications.

Lower Initial Hardware Cost: A flexible feeder system must include the cost of a high-resolution vision system, a complex light source, and a high-speed industrial or collaborative robot, along with the feeder platform itself. A vibratory system, by contrast, is an electro-mechanical device, often resulting in a lower initial equipment price when excluding the robot required for both systems for part assembly/placement.

Energy Efficiency: Vibratory feeders consume less power than a flexible system that requires constant power for the high-speed camera, intensive image processing, and the robot's drive system.

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Amortization Over Volume: Because the bowl feeder can run at a significantly higher throughput rate and requires minimal human intervention or specialized software updates, the fixed cost of the machine is amortized over a far greater volume of parts. For a dedicated product line, this makes the vibratory bowl the clear most cost-effective solution per assembled unit.

4. Superior Part Containment and Dedicated Control

The design of the vibratory bowl naturally lends itself to better part handling for certain geometries and materials.

Deep Capacity: The bowl design inherently provides a higher capacity and a continuous recirculation path for parts that fail to orient correctly. This recirculation is highly efficient and happens automatically. Flexible feeders typically use flat trays, requiring an external mechanism (like a bulk hopper or conveyor) to re-introduce mis-picked or unpicked parts, which adds complexity and risk of jamming.

Better Handling of Difficult Parts: Bowl feeders are excellent at handling small, lightweight parts, such as screws, O-rings, pins, and caps. The controlled, low-amplitude vibration is gentle enough for many components, and the system is especially well-suited for parts that tend to tangle, clump, or stack in a flat-tray environment. The three-dimensional tooling on the spiral track effectively separates these parts.

Noise Control Solutions: While traditional vibratory bowls were notorious for noise, modern designs, especially from Elscint with specialized coatings, sound-dampening enclosures, and linear drive mechanisms have significantly mitigated this drawback, ensuring compliance with modern industrial safety standards.

Conclusion: The Right Tool for the Right Job

The choice between a vibratory bowl feeder and a flexible feeder ultimately hinges on the manufacturer's production strategy. For environments that prioritize flexibility, rapid changeovers, and a high mix of parts, the vision-guided flexible feeder might be a solution, though it would be highly costly.

However, for the vast majority of high-volume manufacturing, where a product design is locked in for years, such as in the automotive, pharmaceutical, consumer electronics, and fastener industries, the vibratory bowl feeder remains the undisputed king. Its unmatched speed, mechanical reliability, robust operation in harsh environments, and lower operating cost per part solidify its position. It is the best choice when the application demands continuous, ultra-high-speed, and ultra-reliable feeding of a dedicated component, providing the foundational efficiency that drives modern mass production. The vibratory bowl feeder is not an outdated technology; it is a perfectly optimized mechanical solution that continues to deliver the highest throughput possible for dedicated assembly tasks.

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