



Levitating into the future

The transport system of tomorrow will be contactless, versatile and simplify processes. Bosch Rexroth is looking ahead to the future with a visionary technology study.

In the factory of the future, virtually everything will be aimed at achieving maximum mobility and flexibility. Given the limitations with conventional transport systems, the question is how agile planning and versatile operations can become reality. A fascinating study provides the first answers.

Are you levitating or still just transporting?

In the future, this question may very well arise in Bosch Rexroth's dealings with machine manufacturers and users. The outlook is both fascinating and captivating: products and materials will levitate autonomously through machines. Turning,

tipping, lifting, “flying” at variable heights – all degrees of freedom will be available. The basic standard tiles with integrated magnet technology can be combined in an ad hoc manner to create areas of any size where carriers can move around freely and autonomously. If this is not revolutionary enough for you, read on.

A transport system of this type is able to support processes actively. Simply transporting things from A to B was yesterday. The consequences? The boundaries of what was previously possible no longer apply. These five properties are responsible for this:

1. Free movement, clean and wear-free

The versatility of the transport system of the future is based on a number of pillars. The first one is unprecedented freedom of movement. The technology study from Bosch Rexroth offers users six degrees of freedom including a variable flying height of up to 20 mm. The carriers in the study can be rotated by 360° freely and endlessly on every tile and in every position and can also tip. For example, fluids can be accelerated and decelerated quickly and without splashing in

this way. Suitable
for use in clean rooms and vacuums, the contactless system
based on magnetic
levitation technology works without wear and abrasion.

2. Autonomous travel on flexible process routes

The second pillar of this groundbreaking flexibility is the tiles' internal intelligence. Like a traffic control system for autonomous driving, it not only guides the carriers to their next destinations along optimum routes and without collisions. It also allows the versatility needed to personalize products and produce a large number of different product versions in an economical manner. Whether the products involved are prototypes or mass-produced parts including the supply of materials, the transport system of the future will adapt to changing requirements extremely quickly. Movement is the result of control – and not the other way around as it was previously. Or in other words: the user defines the destination and the intelligent tiles produce the movement.



https://www.edge-cdn.net/video_1322073?playerskin=56632

3. Transport and processes are merging

It is not difficult to imagine the potential unlocked by connecting adjacent production areas seamlessly using M2M communication. Ultimately, however, the system must offer the right level of efficiency and cost-effectiveness. The low maintenance requirements of the wear-free system and its great flexibility and versatility along with new possibilities for process support play a crucial role here. For example, carriers in combination with simple devices can take over simple processes, replacing smaller work stations or even entire handling robots in

the process. Because transport and processes become more closely interlinked, it may even be possible to replace a number of conveyor belts in a production line with a single tile track. To ensure that the carriers can levitate in one place for long periods of time, no heat must be generated – even when under a permanent load.

4. Universal and safe

Transport systems of this type can be used in a very wide range of areas – from assembly and semiconductor production to the packaging industry. The semiconductor sector has used magnetic levitation technology for many years, albeit not with this new level of flexibility. This alone will lead to other exciting applications in the future. As the study points out, the universal approach with scalable carrier sizes will make it possible to transport goods of different weights.

Safety also plays a crucial role in future practicality and market acceptance. For example, it must be ensured that carriers operating vertically do not drop down even in the event of a power outage. The solution should also avoid strong permanent magnets to rule out the risk of crushing during manual

handling.

5. Quick engineering and simulation

Last but not least, the transport system for the factory of the future should offer seamlessly digital, straightforward plug-and-run engineering. After all, this is the only way to ensure that production with its entire tool chain starting with product development can react quickly enough to changing requirements. Put simply, the complete task should be solved digitally in an easy-to-use manner, i.e. intuitively and without time-consuming programming work, before any tile is moved. The Bosch Rexroth technology study takes into account this aspect through a user-friendly logic layer across the distributed control system which allows advance simulations and a straightforward setup with the help of digital assistants.

Conclusion

After recent innovations such as the flexible transport system FTS, Bosch Rexroth is now pressing ahead with the next evolutionary stage. On the basis of the technology study shown, the transport system

of the future impresses not only with its wear-free operation and adaptability.

The new possibilities which result from its enormous freedom of movement and

its ability to support processes are truly revolutionary too.

Finally, they

reduce the complexity from previous procedures – with the smallest of

footprints as well as maximum design freedom and cost-effectiveness. What

specific applications can you imagine as a result of the new degrees of

freedom?

Discuss further development with us and suggest specific use cases for

the transport system of the future. We look forward to hearing your views!