

MODULAR SYSTEMS OF CONVEYORS FOR TRANSPORT AND WAREHOUSE OPERATIONS

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Modular systems of conveyors have become a popular solution for transport and warehouse operations due to their versatility and efficiency. These systems consist of standardized modules that can be easily assembled and reconfigured to fit a variety of layouts and transportation needs. This paper will examine the benefits of modular conveyors, their applications, and the various types available in the market.

One of the primary advantages of modular conveyors is their flexibility. Since the modules can be easily interchanged and reconfigured, they can be adapted to fit different layouts and transportation requirements. This allows businesses to optimize their operations and reduce costs by utilizing the same equipment for multiple purposes. Furthermore, modular conveyors can be easily modified or expanded as needed, making them a scalable solution for growing businesses.

Another benefit of modular conveyors is their efficiency. They can handle high volumes of goods and materials quickly and reliably, reducing the need for manual labor and minimizing the risk of errors or accidents. Additionally, modular conveyors can be equipped with advanced automation technologies, such as sensors and robotics, to further enhance their performance and reduce operational costs.

Modular conveyors are used in a wide range of industries, including manufacturing, logistics, and e-commerce. They are particularly well-suited for transporting goods within warehouses and distribution centers, where speed, accuracy, and flexibility are crucial. Modular conveyors can also be used in assembly lines and production facilities, where they can be configured to transport raw materials, finished products, and waste materials.

There are several types of modular conveyors available in the market, each with its own unique features and applications. Some of the most common types include:

Belt conveyors: These are the most common type of modular conveyor and are used to transport materials horizontally or at a slight incline. They are particularly useful for transporting small or lightweight items.

Roller conveyors: These conveyors use rollers instead of belts to move items along the conveyor. They are ideal for transporting larger or heavier items and can be used to accumulate materials or sort them into different lanes.

Chain conveyors: These conveyors use chains to move items along the conveyor. They are often used in high-temperature or harsh environments, such as in foundries or steel mills.

Slat conveyors: These conveyors use slats or plates to transport items along the conveyor. They are particularly useful for transporting items that require a stable and level surface, such as glass or ceramic products.

Some of the research topics on modular conveyors include:

- Traffic control of self-propelled modular conveyors (SPMCs), which are vehicles that can move heavy and oversized loads. The research focuses on the issues of directional stability control, electric traction drive systems, and subordinate regulation by a traction electric drive (Kolosov et al., 2022).

- Automated sortation conveyors (ASCs), which are systems that can sort and distribute large volumes of shipments under tight delivery schedules. The research covers the wide range of

applications and their different sorting systems, the joint decision problems to be solved when designing and operating a sorter, and the future research challenges (Boysen et al., 2019).

- Novel calculation method for chain conveyor systems, which are systems that use sideflexing plastic chains to convey materials with high flexibility. The research proposes a new method to calculate the chain tension and power consumption of chain conveyor systems, taking into account the dynamic behavior of the chains (Schulz et al., 2015).

The prospects for the development of new designs and possible areas of application of modular conveyors are:

- Improving the efficiency, reliability, and safety of SPMCs by developing advanced control algorithms, sensors, and communication technologies.

- Enhancing the performance, adaptability, and sustainability of ASCs by incorporating artificial intelligence, machine learning, and green logistics concepts.

- Expanding the use of chain conveyor systems to new domains, such as food processing, pharmaceuticals, and recycling, by optimizing the chain design, material selection, and layout configuration.

In conclusion, modular conveyors offer a flexible and efficient solution for transport and warehouse operations. Their versatility and scalability make them ideal for a wide range of applications, and their various types allow businesses to choose the best option for their specific needs. By utilizing modular conveyors, businesses can optimize their operations, reduce costs, and improve productivity.

References:

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