Optimizing Check-In to Takeoff

SEW–Eurodrive offers drive solutions for airport baggage handling systems

SEW–Eurodrive

The SEW-Eurodrive MOVIGEAR features an IE4 motor, gear unit and electronics combined in a single drive unit.
(All photos: SEW-Eurodrive)

Airports where hundreds of airplanes take off and land around the clock require perfect planning and coordination—and the tailor-made drive technology to process thousands of passengers and their baggage securely, every day. The growing focus on capacity and security issues, as well as shorter ground times, are presenting major challenges for the airport industry.

Increasing competition among airports and stricter environmental regulations make the situation even more difficult. All of this means that in the future, airport operators will be expected to transport passengers and their baggage even more quickly and efficiently. One contributing factor will be the ability to keep airplane downtimes as short as possible.

Nearly 450 cutting-edge, decentralized mechatronic systems are now installed and duly performing their task—extremely reliably and with maximum efficiency.

Reliable, energy efficient automation solutions are critical for baggage handling and logistic operations. SEW–Eurodrive has experience in this area serving international airports including Frankfurt, London, Paris, Beijing, Hong Kong, Sydney and LAX in Los Angeles—the end goal being to improve drive technology with mechatronics.

Increasing Efficiency and Reducing Costs

Terminal 4 in the LAX airport needed a thorough upgrade to the baggage handling system (BHS) for both American Airlines and TSA operations. LAX's existing system used typical asynchronous motors that were oversized to handle large starting torque requirements. Unfortunately, that meant they operated well below their ideal efficiency after the load started.

Complying with strict California energy standards and reducing the load on the existing power station were both high priorities. Space constraints and flexibility for future expansion were also important.

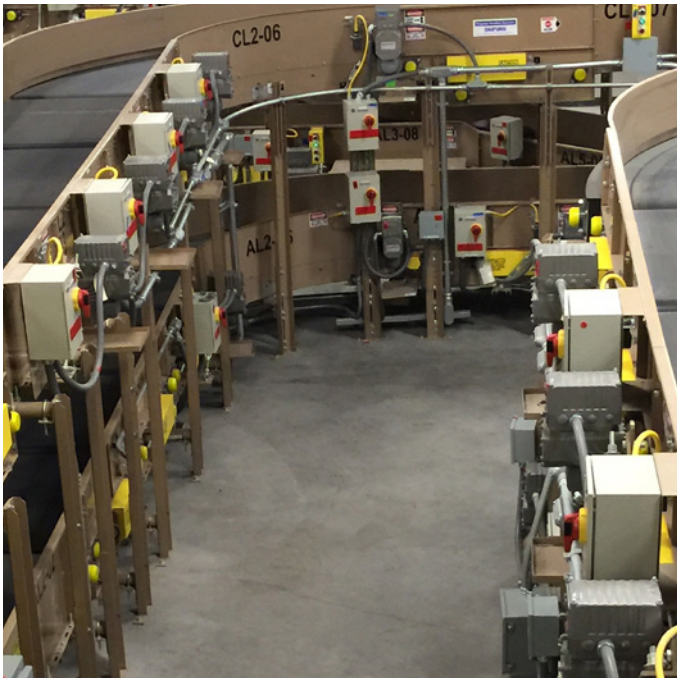
Upgrading to the SEW–Eurodrive MOVIGEAR and DRC mechatronic drive system has been highly reliable, efficient and accurate at screening bags. TSA employees appreciate that the new drives create less noise and radiate less heat due to their advanced electronics and ultra-high operating efficiency. By reducing incoming power, excess heat and extra cooling, the system decreased energy consumption by nearly 40 percent. The system requires fewer unique spares for inventory, and its flexible design can accommodate expansion for future growth.

Baggage handling systems at airports such as Los Angeles operate almost 24/7, but they do not run continuously. Time and again, they are brought to a halt and then need to be started up again. Sometimes a lot of baggage, and thus a heavier load, needs transporting on the conveyor belt; other times it's less—presenting a major challenge for the drive technology involved.

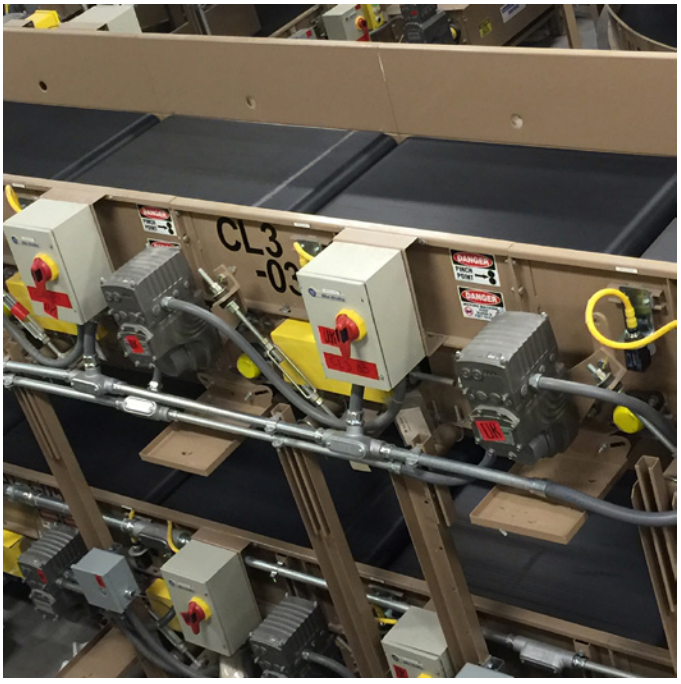
To cope with the high breakaway torque required the asynchronous motors used till then for operation and the far lower nominal torque after start-up were completely disproportionate and inefficient. The resulting accumulation of heat left the operators with no choice but to fit expensive external cooling alongside the drive technology. This measure also increased the noise level, which caused both a predicament for staff at the Los Angeles airport and spiraling costs for American Airlines.

Flexible Design

MOVIEGEAR mechatronic drive system from SEW-Eurodrive is designed for flexible use across various communication infrastructures.



The electronic motors combine an IE4 permanent magnet motor with powerful electronics. The MOVIGEAR drive system also features space-saving parallel-shaft helical gear unit technology in the shared housing.



The MOVIGEAR's unique design delivers high starting torque while halving the full-load amps, requiring much less incoming power.

This makes it ideal for decentralized applications in the field. With its compact design and optimal integration of components with permanent-field synchronous motor, gear unit, and integrated electronics, MOVIGEAR is especially tailored for efficient use in the general materials handling sector.

MOVIGEAR can achieve energy savings of up to 50 percent thanks to the seamless interplay between the IE4 efficiency class motor, the gear unit and integrated electronics. For reliability, long service life, and high system functionality, the drive system is suited for applications in stationary materials handling technology.

By increasing efficiency, the baggage handling industry can virtually double the size of the baggage system using their existing power station.

Results

LAX's existing system used typical asynchronous motors that were oversized to handle large starting torque requirements. Unfortunately, that meant they operated well below their ideal efficiency after the load started. Their high starting current and low operating efficiency created excess heat that required extra cooling. Therefore, the goal was to increase efficiency to reduce both operating costs and cooling costs.

SEW–Eurodrive, in collaboration with Cage, Inc., a U.S. consultancy firm for baggage handling systems, headquartered in Irving, TX, and Daifuku, a provider of automated material handling solutions from Farmington Hills, MI, developed a high performance, energy efficient and operations/maintenance friendly automated baggage handling system. The project aimed to thoroughly upgrade the baggage handling system in LAX Terminal 4 with permanent magnet motor drives (PMM drives). Through their combined efforts the goal became reality. They were able to size each application from scratch, allowing them to determine the most efficient selection.

Furthermore, by taking advantage of MOVIGEAR's unique breakaway torque characteristic, they were able to optimize inventory by using fewer spares to cover a wide range of speeds. Nearly 450 MOVIGEAR mechatronic drives and DRC motors were used in the new outbound installation. Both drives contain a permanent magnet IE4 motor. Their unique design delivers high starting torque while halving the full-load amps, requiring much less incoming power.

SEW–Eurodrive's experience as a system solutions partner with extensive knowledge of versatile drive technology can significantly cut energy consumption for the entire baggage processing system— from check-in and gentle transportation to sorting and reliable returns at the correct baggage claim point.

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