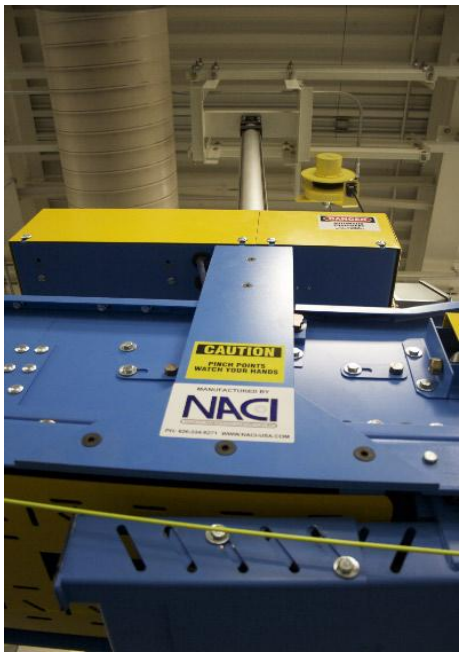
NORTH AMERICAN CONVEYOR INC.

Integrated Material Handling Solutions

Case Study: Benefits of an Elevating Conveyor

The United States Postal Service (USPS) faces an ongoing challenge of needing to create safe, multifunctional mail processing workspaces that address varying operational needs while maximizing the use of floor space. Mail processing includes many stages over varying times, and the ability to utilize the same work space for multiple functions saves floor space and man hours.



One floor space saving solution that has been implemented in numerous USPS facilities is the use of suspended overhead conveyor systems rather than floor mounted systems to transport processed mail between workstations. These suspended overhead systems utilize the vast volume of unused ceiling space, which allows for more direct, multilevel product transportation while leaving valuable floor space available for processes requiring human interaction. Overhead systems also reduce the amount of human interaction with the system resulting in less opportunity for accident and a safer work environment. However, efficiently transporting the product up to and down from the overhead system to operations located on the floor is a challenge that is constantly evaluated.

Incline/ decline conveyors and spiral conveyors were initially deployed to transport product to and from the overhead conveyors. After realizing the amount of floor space that was permanently taken up with the standard incline/ decline and spiral conveyors, the USPS decided to evaluate using elevating conveyors at the entry and exit points of the overhead system. The elevating conveyors are normally raised in-line with the overhead system, which are above the floor operations, and are pivoted down to an incline/ decline position only when needed to transport product. The use of the elevating conveyors allowed the floor space that would otherwise be occupied by a permanent incline/decline or spiral conveyor to be used for other processes part of the time.

The elevating conveyors were initially used to transport trays of mail from the Dual Pass Bar Code (DBCS) machines. These machines are eighty feet in length and are placed as closely together as possible to minimize the use of floor space. Mail processed by the DBCS machines is typically manually transported from the machine exit to the machine entrance, through the narrow aisle between machines, to be processed through the machine a second time. Once the processing is complete, the mail is transported to the dispatch area and feed into the overhead system. The combined use of overhead and elevating conveyors allows the narrow aisles between the machines dual functionality. While the mail is being processed, the elevating conveyors are raised allowing floor access from machine exit to entrance through the aisles. Once processing is complete, the elevating conveyors are lowered into the aisles allowing access to the overhead transportation

conveyor system for delivery to the dispatch area. Once the transportation function is complete, the elevating conveyors are raised to their normal position leaving the aisles clear.

Several models of elevating conveyors using cable hoists to lift and lower the conveyor were initially considered. These systems were insufficient in at least three areas. The cables could stretch with time under constant load resulting in creep when a conveyor is in the raised position for extended periods of time. Also, the hoist could continue to unwind creating slack in the cable if the conveyor path was obstructed in any way while lowering. If that obstruction was suddenly removed at any point after the cable was slacked, the conveyor would free fall a distance equal to the amount of slack in the cable. This obviously created a safety problem. Furthermore, the only resistance to lateral force when the conveyor was lowered was the friction caused by the gravitational force of the conveyor. The conveyor would move laterally with minimal force from personnel etc. creating greater opportunity for twisting, uneven belt tracking, or permanent damage.

NACI took into consideration the shortcomings of the initial systems and developed an elevating conveyor that used a pneumatic cylinder with integrated brake rather than a cable hoist. The brake is normally closed and requires 40 psi of air pressure to be released. The brake eliminates the chance of creep or stretching. While lowering, the pressure on the system remains constant. If an obstruction blocks the downward motion, the conveyor comes to rest without the risk of free fall and resumes constant downward motion once the obstruction is removed. Once in the lowered position the air cylinder provides downward force against the floor providing greater resistance to lateral force, which prevents twisting, improves belt tracking, and reduces risk of system damage.

The USPS worked closely with NACI over several months to define the parameters and approved the use of our elevating conveyor. Our solution has been successfully deployed in two (2) USPS facilities and has performed extremely well. The NACI elevating conveyor addressed all of the concerned the USPS had with the initial systems, and we continue to evaluate other opportunities to utilize the benefits of this solution.