



RETAIL EXPANSION DEMANDS UNIQUE MOTION CONTROL SOLUTION FOR LANDMARK MANHATTAN STORE



Photography enthusiasts worldwide are familiar with the name of B&H Photo located at 34th Street and Ninth Avenue in New York. The 70,000 sq ft superstore has become something of a Manhattan landmark. This 'Aladdin's cave' of photography, video, audio, computer and home electronic equipment is famed for its huge product range, highly knowledgeable staff and competitive pricing.

According to Gary Eisenberger, Sales Manager at B&H, one of the biggest challenges for B&H is ensuring that any one of the 150,000 plus SKUs that they carry is available to customers and staff in a timely fashion. Displaying every SKU in a retail store is simply not an option.

Says Eisenberger, "B&H is one the world's largest retailers of imaging products and our philosophy is to ensure that we carry every significant brand, every product within that brand and every accessory made for that product. We do not cherry-pick products based on popular mass-market demand, like the big electronic chains. It's B&H's goal to ensure that customers are able to find whatever they need, no matter how specialized their interest or application may be."

"The challenge within such an old building with limited space (above us are residential apartments) is to find a way to house so many SKUs, while ensuring products can be quickly transported from the basement warehouse where they are stocked to a specific location on the sales floor for customers to examine them first hand."

"About 10 years ago we developed a lift system within the building that delivered products from the basement to specific sales desks located all around the store. Once customers have inspected the products, they are then either sent back down via the lift for re-stocking, or delivered by a conveyor system to the pick-up area where customers make the final transaction. The original development and installation of the system was no small feat and B&H made the decision to make it a 'feature' within the store."

In 2007, B&H decided to expand its retail space and moved the corporate offices from the second floor to a new location, thereby freeing up valuable real estate for retail sales. The expansion required a redesign of the famous but aging lift system. B&H approached United Sortation Solutions of Owings Mills, MD, for a new design.

The new system had to ensure that product could be delivered from the basement warehouse up to either the first or second floor in the same time period as the old system, or even faster, and with less maintenance and noise.

"This project really did present a unique set of challenges," reports Ed Hrehocik, Senior Engineer at United Sortation Solutions. "While B&H happily makes a feature of its product delivery system, it's imperative that it does not adversely affect the comfort of the customer in any way."



"Operating noise had to be kept to a minimum and B&H emphasized the need for reliability. The old system was a lubricated chain drive and due to the high throughput of products being delivered around the store, a tremendous amount of maintenance was required. That is simply not acceptable in a retail environment where the customer's comfort is paramount."

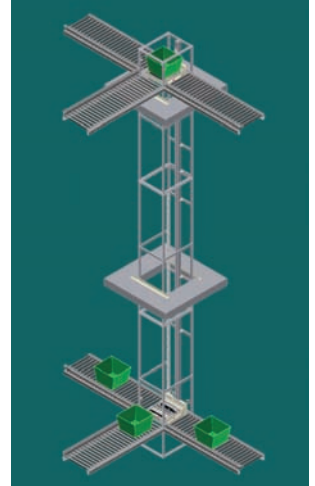
"B&H also wanted to reduce the size of the footprint of the system because retail space is extremely costly in Manhattan and any additional space that can be dedicated to displaying product is very valuable," notes Hrehocik.

"The old conveyor system was replaced with a low-voltage motorized roller conveyor which reduces fire issues and is much safer for use in a consumer environment because it's a lot easier to cable 24 volts. By using many small motors we were able to modulate the system to enable control of the conveyor in 'zones' around the store. This is particularly helpful when product traffic is very high because product can still be moved around the store even in the rare event of a back-up in the basement stock room."

The new system implemented by Bastian Material Handling required the installation of 29 lifts throughout the store - double the previous amount. One of the key issues was deciding where to drill the holes for the lifts because old buildings in Manhattan present their own challenges and there was no margin for error. Above B&H are many floors of offices and residential apartments so the building is full of

existing HVAC infrastructure and other equipment. In addition, the building is turn of the century so nothing is uniform and the codes requirements of New York City are extremely strict.

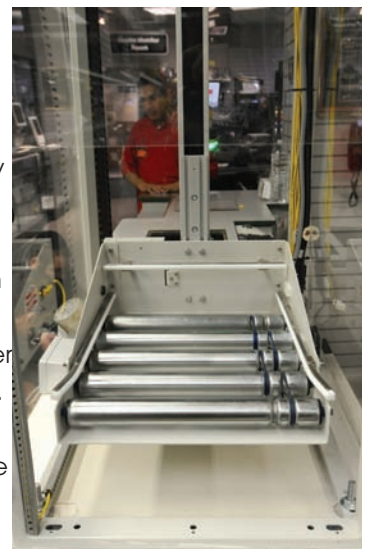
Hrehocik continues, "Typically, when we develop a lift system, products are coming in and out of the system in two directions north and south, or in and out of the same direction. However, because of the B&H's motion requirements, we had to custom design and develop a three-way lift system that could take products from one direction and then route them into a second or third direction. As far as we were aware at the time, nothing in the industry like this existed."



"A right-angle transfer had to be integrated into each lift. This is a fairly typical bulk handling part, but a smaller, lighter version had to be developed so that it could be integrated into each lift. Typically, right angle transfers are driven by pneumatics but we wanted to avoid this so a brushless DC motor was integrated for a quieter, safer consumer retail environment."

Once the multi-directional lifts had been developed, United Sortation Solutions' biggest issue was the linear motion between the lifts on all three floors. The huge distance between floors meant that parts of the linear motion system would have to be up to 27 feet long.

"27 feet is a huge distance and many linear actuator manufacturers are unable to provide products this long," reports Hrehocik. "Fortunately the Uniline linear actuator system from Rollon can be specified in lengths of 10 mm increments and assembled on site for lengths even longer than B&H's 27 ft requirement. While the length was critical, the ability to assemble on site was also significant because access to Manhattan



building is difficult and many of the items had to be broken down before they could fit through the narrow entrances.”

The Uniline range of actuators is built on Rollon’s Compact Rail linear rail, which is mounted in an extruded aluminum-alloy profile and is compatible with standard mounting accessories. Says Hrehocik, “Uniline is extremely versatile and many configurations and sizes are available, including versions with extra long and/or multiple trolleys. And because the linear rail and slide are placed inside the extrusion, the units are very safe for use in a high-traffic consumer environments such as B&H.”

Rick Wood of Rollon Corporation, reports that B&H’s life and reliability requirements were the greatest challenge.

“The B&H installation required multiple systems capable of performing long vertical strokes, up to 26 feet, in a short interval of up to 4 cycles per minutes over a life span of five years of continuous operation.”

“The application was not particularly complicated in terms of layout configuration and pure load capacity – the maximum load we needed to support was only 145 lbs, offset 15 inches. However, the speed, length and acceleration rates were quite demanding.”

B&H specified a target number of products that could be delivered per minute. For short distances a speed of eight product deliveries per minute was required, while for multi-floor deliveries, three deliveries per minute was needed.



“This is a challenging throughput for a linear motion system,” adds Wood. “When lifespan calculations were made we worked out that at an average rate of four deliveries per minute (assuming an eight hour day over seven days a week) over five years, the Uniline would have to operate

3,494,400 cycles. In addition, it’s quite a high speed application and the speed of the linear movement required was 2m/s with an acceleration of 5m/s² because of the distance from the basement to the second floor.”

“We are very confident that the Uniline actuators will comfortably meet the rigorous requirements without need for maintenance because the estimated life of the Uniline products far exceeds the requirements demonstrated by the calculations. In fact, the 26-foot long actuators should work for a minimum of six years, based on the initial cycle requirement, without any need for maintenance. The shorter distance actuators should go on for ten years.”



Wood believes a couple of different factors contribute to the long lifespan of the Uniline actuator. “The Uniline actuators incorporate our Compact Rail linear bearing system and the double ‘T+U’ rail combination maximizes the moment reaction to the 15” offset cantilevered load.”

“And considering the vertical configuration,” he adds, “our RPP parabolic profile belt and pulley system provides a remarkable advantage over traditional T and AT systems in terms of belt-pulley grip. The pulley plus belt design allows the engagement of a higher number of teeth which significantly reduces the belt slipping risk.”

“In addition, our belt is reinforced with an entire line of twenty (Ø1 mm each) steel wires uniformly distributed over the whole width of the belt capable of ensuring maximum rigidity and extreme levels of repeatability (0.1mm over a 2000mm stroke.)”

According to Ed Hrehocik of United Sortation Solutions the final piece of the puzzle was the utilization of a servomotor in the system.

“Normally we would have specified a three phase AC motor with a variable frequency drive but the servo provides B&H with much greater control over the system. The movement of

products can be easily stopped and started which is critical when there is a back up. It also eliminated the need for a mechanical brake, which therefore needs less maintenance, and is nice and compact for use in a retail environment.”



Sam Klein, Director of Facilities at B&H, agrees. “Because the building is so old and there are very few uniform distances in old Manhattan buildings it was great that we have the ability to make fine tune adjustments to the movements of product with the servo motor.”

“This also contributed to the overall size of the units. The footprint of the new lift system is 30 percent smaller than the old lifts, which provides valuable real estate for product display in a city where real estate is extremely costly.”

Klein concludes, “The system was installed just in time for the Holiday rush and so far everything has operated very smoothly. The new system is still a talking point for customers but, most importantly, it delivers the products into the customers’ hands in a secure and timely fashion without affecting the enjoyable atmosphere of the store.”

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