

How innovative roll handling equipment can increase safety and create energy savings in paper mills

Jonis Mahmutllari, Sales & Marketing Manager, MoveRoll Oy

INTRODUCTION:

Safety and energy saving are two of the most important considerations when it comes to efficient operations in a paper mill. Firstly, and most importantly, is the safety of employees, as working with moving products and machinery can lead to potentially hazardous situations. Every factory goal is to minimize the hazards and of course have zero accidents. Secondly, the safety of machinery and products produced at the location are also an extremely important consideration. Damaged equipment can lead to production downtime, which is highly costly in a paper mill; damage to paper rolls themselves are equally costly.

Energy savings have become an increasingly important aspect of profitability for any business, especially with the current energy crisis the world is facing. Therefore, managers in paper mills must make sure that when making new investments, the above aspects are taken into very careful consideration.

One company constantly developing innovative Roll Handling solutions, that offer increased safety and energy savings is MoveRoll Oy, a Finnish based company. The unique roll handling equipment of MoveRoll offers several benefits for system integrators and paper mills.

The innovative products can easily be integrated into current roll handling systems, and offer a simple and practical way to gently convey, kick, receive and slow down paper rolls. MoveRoll's conveyors, kickers, receivers and braking pads offer both easy installation and maintenance, resulting in savings for both system integrators and paper mills.

Increased safety in paper roll handling is of utmost importance for MoveRoll. When we are developing new products, one of our first questions is always how a new product can best improve roll handling and give maximum operator safety.



How do MoveRoll Conveyors increase safety in paper mills?

MoveRoll Conveyors are flat (40 mm) and have a modular built. It is easy to install them on a level factory floor. The conveyors use standard pressure elements to transport rolls in a simple rolling motion.

Ramps or sloped floors in the finishing area are a very often a risk to operator safety when rolling paper or cardboard rolls move freely on them. Usually, the rolls gain speed, move in an uncontrolled fashion and bounce back and forth heavily when they hit against steel stops. Consequently paper mill staff working near or on these ramps are at risk of getting hit by paper rolls or even getting crushed between them.

With MoveRoll Conveyor however, ramps are not needed anymore for moving rolling paper and cardboard rolls from point A to point B. No decline is needed to initiate the rolling motion. Instead, compressed air in the pressure elements actuates the rolling motion and the pressure elements transport the rolls safely and always at a controlled speed. That way changes in the rolling direction are also avoided. MoveRoll horizontal conveyors use only 2.5 Bar compressed air to move rolls up to 10.000 kg. Such low air consumption, and having no mechanical components, helps the paper mill to significantly reduce energy costs in the roll handling section.

MoveRoll Conveyors are safety engineered against power failure too. If the compressed air supply should fail and the MoveRoll Conveyor is mounted on level ground, the rolls stay where they are. In case they are rolling, the rolls lose power and normally stop within less than a 500mm distance.

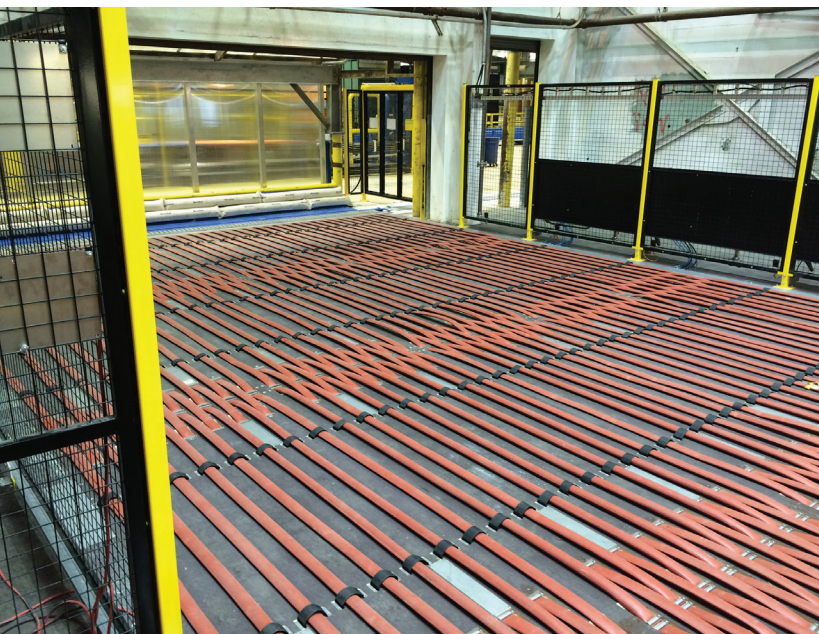




Figure 3: Braking Pad on winder deck.

How do MoveRoll Braking Pads increase safety in paper mills?

Over 150 paper mills worldwide now use MoveRoll braking pads in many different applications, to reduce the speed of the rolls in the finishing line. The Braking Pad is a simple and innovative roll speed reduction solution.

The MoveRoll Braking Pad is designed on the basic principle of reducing kinetic energy of the incoming roll. The combination of soft material, air exhaustion, and absorption of kinetic energy can reduce roll speed up to 0,5m/s or can, under certain circumstances, even stop rolls completely. Reduced roll speed means minimal roll bouncing and significantly shorter settling times. Depending on the length, the portable Braking Pad consists of a certain number of cushions and can easily be placed on flat surfaces. The product design and soft special materials ensure gentle contact with the roll and no damage is incurred either on the roll or the roll handling equipment. Reduced roll speed and decreased roll bouncing significantly increases in operator safety, as well as the minimization of manual roll pushing. Notably, in high-speed applications such as Winder Decks, the combination of a MoveRoll Zero Energy Receiver and MoveRoll Braking Pad achieves the greatest increase in work safety.

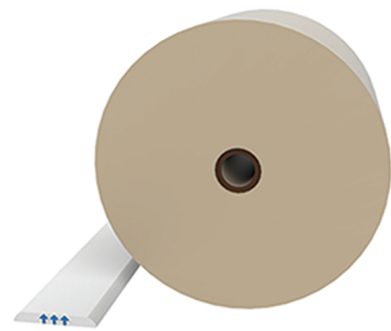
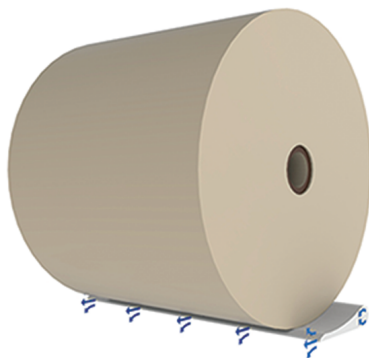
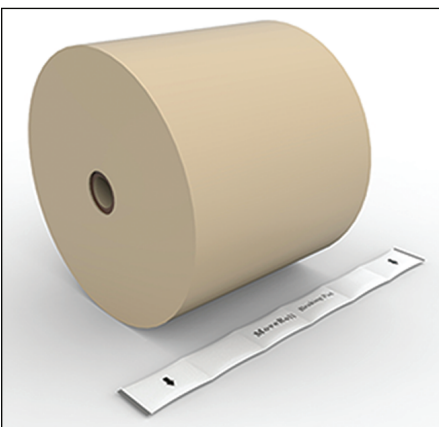
How does the MoveRoll Braking Pad work?

The Braking Pad is made of thin cushions which are designed to be positioned on the rolling surface and to stay in place without any attachment. The kinetic energy is reduced by special soft material placed inside the braking pad, and air that exhausts out of the braking pad as the roll weight squeezes.

The Braking Pad is placed on the floor as seen in (fig 1a.) acting as a barrier to reduce the speed of the paper roll. When reaching the Braking Pad, the paper roll goes over, initially collecting air on the front end of the pad which will later be realised from the exhaust ports on the back of the braking pad (fig 2b.) When the air exhausts from the pad's front, at the same time it causes counter pressure on the back which results in speed reduction or stopping of the roll. When the roll has left the surface of the pad, the inside special material returns to its previous form and is ready to handle the next roll (fig 3c.)

The MoveRoll Braking Pad is feasible for various roll handling applications. For example, paper mills can place Braking Pads in front of slat or chain conveyors to slow down roll speed and reduce roll settling time. Similarly, Braking Pads are useful on different sections of ramps, to slow down roll speed before the rolls

Figure 1a, 2b, & 3c left to right: Braking pad



impact on stoppers. In situations where the roll speed is high, e.g., on winder decks, the pads are most effective in two separate rows, for example, in front and behind separation stoppers.

For the convenience of different roll handling applications, MoveRoll Braking Pads are available in different standard lengths but can also be tailored to individual requirements. The Braking Pads are available in two different versions, Magnetic and Non-Magnetic Bottom. The Magnetic Braking Pad has a very thin layer of strong magnetic matting and is suitable for applications where the roll handling surface is metallic. In other applications, paper mills have used the Non-Magnetic version.

In some cases, the rolls are heavy and need to be stopped completely, the Braking Pad alone cannot achieve this alone, therefore another product is needed.

A mechanical Receiver has typically been the most common solution to this, however, Mechanical Receivers are often costly, require continuous maintenance, and in some applications can even damage the paper roll, even resulting in material loss. In more serious cases the safety of operators has been a challenge due to rolls bouncing back .

To resolve the above issues in such roll handling applications MoveRoll has created another patented innovative product called the MoveRoll Zero Energy Receiver.

How does MoveRoll Zero Energy Receiver increase safety in paper mills?

MoveRoll Zero Energy Receiver is the smart solution to cushion roll impact. Meant for low-frequency roll handling applications, the patented Zero Energy Receiver is equipped with special self-inflating roll handling cushions. The material of the cushions is flexible and prevents rolls from hitting the metal frame of the Zero Energy Receiver, hence roll damage is avoided. Notably, the Zero Energy Receiver does not need any energy sources to absorb the kinetic energy of paper or board rolls, therefore many problems common with traditional roll receivers are easily solved. As mentioned above, traditionally, paper mills use steel stops, pneumatic stoppers, or mechanical receivers to catch rolls that come down ramps or sloped floors. These rolls move in an uncontrolled fashion and gain speed before they hit such inflexible stopping equipment. The rolls can bounce back and forth heavily, again resulting in a potentially dangerous work environment, easily damaged rolls and longer roll settling times than necessary.

In contrast, the soft cushions of the patented Zero Energy Receiver reduce the kinetic energy on average by more than 75 %. Since the cushions absorb the kinetic energy of the rolls, they hardly bounce back and forth at all. Thus, the risk that paper mill staff could get hit by, or be crushed, between paper rolls is significantly lowered.



Figure 4: Zero energy receiver.

In applications where paper rolls are very heavy or have a high incoming speed , combining the MoveRoll Braking Pad and MoveRoll Zero Energy Receiver has been the best solution to ensure safe receiving of the roll.

Figure 5 (below) shows a typical installation where the combination of these two products is used to give optimum handling performance. The Braking Pad has two functions: Firstly, it reduces the kinetic energy of the roll before hitting the Receiver and, secondly, prevents the paper rolls from bouncing back to the winder deck area.

The Zero Energy Receiver will cushion the roll gently and stop it to the belt conveyor without any damage. All this is achieved with zero energy consumption, as the receiver does not require any air supply to function.

Figure 5: BP-Zero energy.



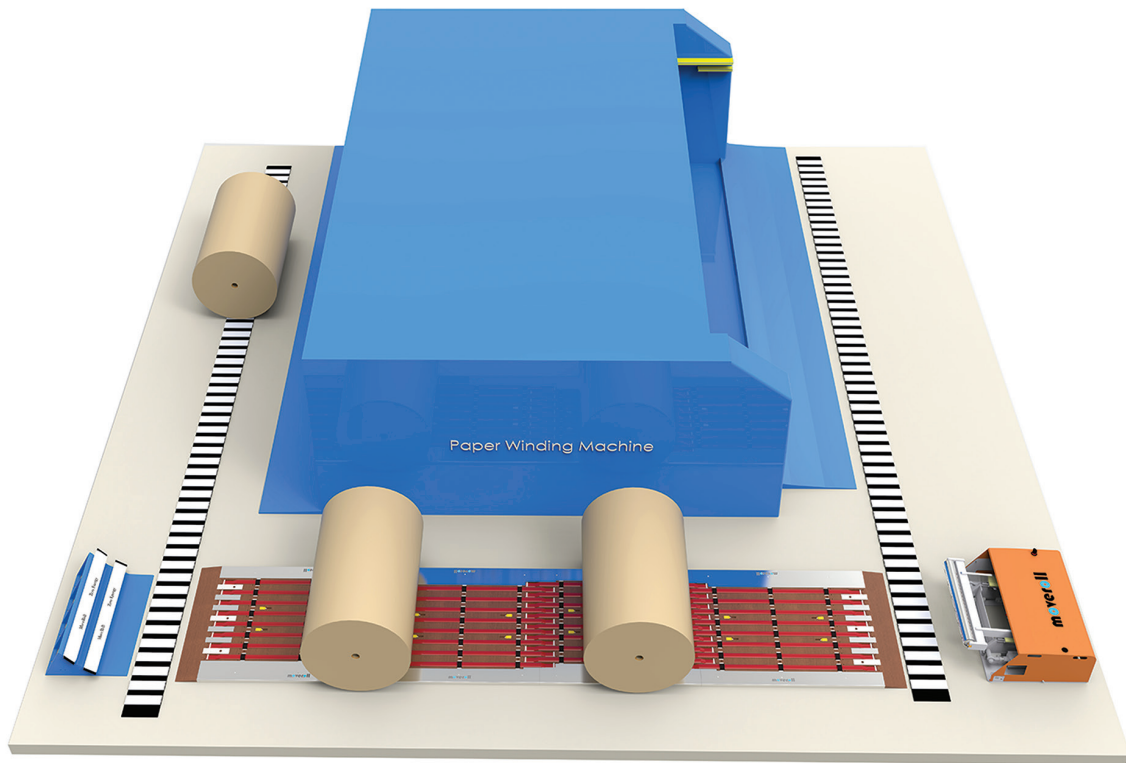


Figure 6: Horizontal conveyor application.

System Integrators use MoveRoll products to benefit their customers.

MoveRoll has delivered innovative solutions to the paper industry for nearly 14 years. The delivery of MoveRoll products across The World is done by a network of leading roll-handling suppliers that integrate MoveRoll products in their roll handling projects.

One of MoveRoll’s European Handling Partners is SCM Handling, based in Somerset, UK.

Says Mike Crarer, Sales Manager at SCM Handling: “SCM Handling have partnered with MoveRoll for over five years and have completed several projects that have utilized their cutting-edge technology. Their range of innovative roll handling equipment is

unparalleled in its design and a favorite amongst our customer base across the world. The ease in which we can integrate elements, such as their market leading Horizontal Conveyor, Kickers & Zero Energy Receivers into our roll handling systems makes our life as a system builder that much easier!”

“We have supplied MoveRoll’s Horizontal Conveyor & Zero Energy Receivers to customers across North America and the United Kingdom, which have added real value to their operations especially when it comes to the safety of people and equipment” adds Mike.

MoveRoll will continue to develop innovative ways to make roll handling easier, safer and more cost efficient for both system integrators and paper mills. Cooperating with our Roll Handling Partners internationally has helped us to focus on what we do best, and further develop MoveRoll solutions of next generation roll handling.

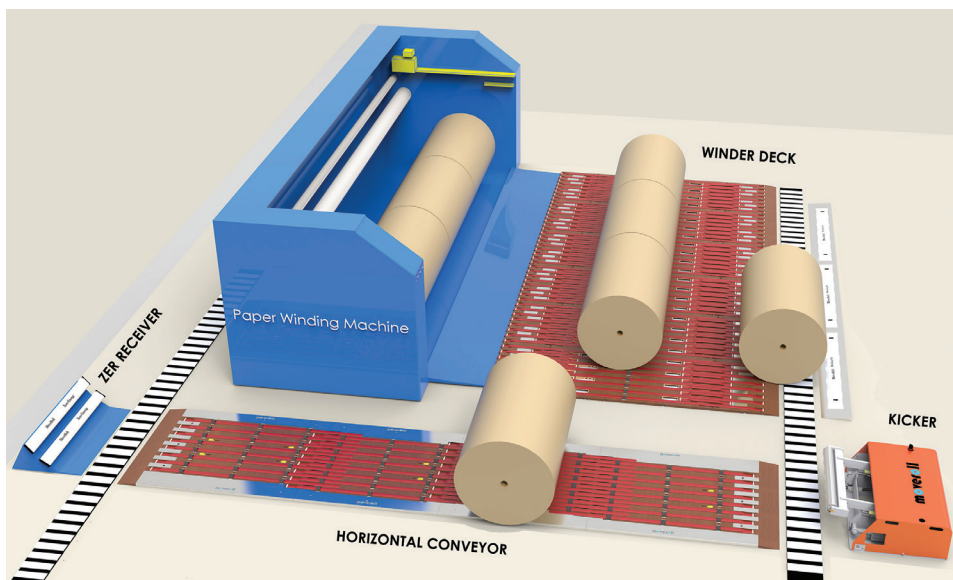


Figure 7: Winder deck.