EARTH'S FUTURE IS IN OUR HANDS

By Eric Kimberley, Chairman | November 15, 2021 | 0 | INDUSTRY, NEWS, TECH

Never before have the environmental issues facing the world presented a greater challenge to mankind than such a monumentally high profile. It is widely accepted that action urgently needs to be taken by the biggest industrialised nations to reduce the impact of their manufacturing processes on our planet and its inhabitants. Eric Kimberley, the Chairman of Shanghai-based Dunlop Conveyor Belting, looks at the issues facing everyone involved in the conveyor belt industry and the part we can play in helping to prevent catastrophe.

We all have a part to play

There has been enormous media interest surrounding the United Nations COP 26 meeting held in the UK this year. Unfortunately, the outcome was not as ambitious as many had hoped for and it remains to be seen how it will translate into the future of our planet and our way of life seriously. However, such a little scale of the problem that a concerted and genuine effort is needed, not only by world leaders but also by every industry, company and individual. In other words, we all have a part to play.

Photo courtesy: Industry and Technology Magazine

Conveyor belts derive their relevance and some of it has a responsibility to do whatever we can, not only for the benefit of the planet generally but also the generations to come. It is all the more pressing when we consider that our product lives to protect the environment. However, in our working lives we all have varying levels of influence. I am a manufacturer of conveyor belts and, as such, I have a responsibility to my employees, customers and also, as mentioned previously to Society to pursue environmentally friendly strategies. This focused on three key areas, prior to cycle, the environmental impact of our products and our production processes.

Product life cycle

There is no denying that manufacturing industrial conveyor belts uses a lot of energy and materials. Consequently, it produces a big carbon footprint. The impact on the environment caused by discarded industrial rubber belting is also a big issue. However, it is worth noting that, in the grand scheme of things, our product lasts a long time and has a excess of 500 million euros, in terms of the physical volumes involved, again very considerably, that replaces other products that would, if our product did not exist, need to be produced to do the same job. Our product gives efficiencies to the transport sector. Consequently, it also represents the single biggest opportunity where every single user of conveyor belting can make a contribution to reducing their carbon footprint. And every little bit helps as we all know.

The first step in reducing the carbon footprint of the cycle of rubber conveyor belts is to improve our understanding of the distinguish Rubber constituent at least 70% of the material mass of both multiply and steelcore belts. Rubber is an elastomeric, most of the rubber used in conveyor belting is a thermoset. Thermosets are cross-linked polymers, which means that they are not recyclable in the same way as thermoplastics. However, it is expected to be the leading cause of deforestation in mainland Southeast Asia in the near future.

The most commonly used type of conveyor belt are rubber multiply belts, which make up some 80% of industrial conveyor belt used in Europe. This type of belt has multiple layers of polyester Nylon (EP) fabric that are used to provide the strength. The rubber covers protect the fabric layers from the abrasive and corrosive effects of the bulk goods between two to four layers of fabric. This means that some 40,000 kilometers of non-biodegradable polyester and nylon fabric is being created and ultimately discarded every year, which is more than the circumference of our planet.

The raw materials such as polyester nylon fabrics and the compounds used to create synthetic rubber are pretty much all directly or indirectly derived from crude oil. In fact a typical conveyor belt is effectively 40% oil. Once out of scrap rubber will usually contain some 500 tons of oil.

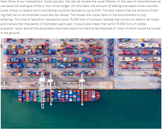
In Europe, nearly 95% of oil used can ignite are now recycled. By the way, conveyor belts are not the only product that uses oil in its manufacture. Tyres, for example, are 20% oil. Recycling synthetic rubber is an especially sticker, more complicated and expensive process. There is also much less demand for the polyester and nylon fabric inner ply and certainly no practical use for the metal cables found in steelcord reinforced belts.

Cover Story: Pipe or belt, rubber equipment

No matter how much we would like it to be different, the harsh reality is that under foreseeable market circumstances, recycling industrial conveyors is not only economically problematic, it is also not viable. This is particularly the reason why producing conveyor belts that have the longest possible working life is now more important than ever before.

Increase the life, reduce the waste

To be honest, from an environmental point of view it was a happy coincidence that historically, our conveyors depended to the market that has always been to supply conveyor belts that provide a much longer operational lifetime than those of our competitors. Quite typically, this can be double the usual lifetime. In the case of imported belt we have seen cases where the belt has been installed for over 20 years. This has been made possible by our ability to have some stock to replace worn out belting could be reduced to up to 50%. This also means that the amount of waste that has to be discarded could also be halved. The impact this could have on the environment is truly staggering. Let's take a typical example of a conveyor belt used in a cement factory. Such a belt may be 1 meter wide and expected thousands of kilometers each year. It could also mean that some 70,000 tons of carbon dioxide, sulphur and all the associated chemicals would not have to be disposed of in land, which would be buried or burnt in the ocean.



A lightening statistic

The average modern day container ship produces the equivalent of 15 kilograms of CO2 per metric ton of goods shipped per kilometer. The average distance between Asia and Europe is in excess of 20000 kilometers. This therefore means that some 150 kilos of CO2 is emitted into the atmosphere for every ton of imported conveyor belt.

What can you do?

ANSWER: Adopt a policy of buying belts that have been manufactured as physically close to your operation as possible.

If we can persuade people to buy lower quality, longer lasting belt, albeit at a higher upfront price, instead of buying 'big discounts' low grade belt then it will create two extremely significant benefits. Not only will it be an enormous boost to the economy of the country that is bringing conveyor belts for the user due to the substantial reductions in lost production. Such a policy will also help:

The environmental impact of our products

The second aspect that we focus on in Dunlop are the chemicals and ingredients used to create rubber and the belting environmental impact that they could have on the environment, both in the short term and in the long term. The rubber belt industry is a very specialised industry and requires a very specialised chemicals and accelerators. These include primary and secondary vulcanisers such as Hydrothiocyl Dimorpholinyl sulfide(MDS), and thiazoles, such as 2-mercaptobenzothiazole. It is an inescapable fact that to make some rubber compounds it is necessary to use some chemicals that are classified as toxic. However, in the EU there are very strict laws in place to ensure a controlled, control mechanisms are already in place because there are very strong regulations regarding such chemicals, such as the environmental law further of **REACH**.

What is REACH?

REACH was established to remove risks to human health and to improve the protection of human health and the environment through the better and earlier identification of the properties of chemical substances. To clarify, essentially, REACH Regulation places direct responsibility on industry to manage the risks from chemicals and to provide safety information on the substances they manufacture, import and market. Companies must register the properties of the chemical substances they use and regular the information is stored database in the European Chemicals Agency (ECHA) based in Helsinki.

Photo courtesy: Industry and Technology Magazine

The Regulation also calls for the progressive substitution of "substances of very high concern"(SVHC) when suitable alternatives are economically and technically feasible. Companies are required to apply for authorisation to use these SVHC's regarding SVHC have become increasingly stringent and demanding. For example, Article 57 of REACH's requirements for safety assessment demand that if a product contains SVHC that is more than 0.1% by weight, the manufacturer must provide information to the European Chemicals Agency (ECHA) to ensure the European Chemicals Agency and provide their customer with a safety assessment.

Because we manufacture our own rubber and make sure our customer always is aware for up to comply with these stipulations compared most other belt manufacturers because we have full control over everything that we do.

Accountability and responsibility

As far as I am aware, Dunlop Conveyor Belting were the first major manufacturer of conveyor belts to achieve REACH compliance. Sadly, many conveyor belt manufacturers have chosen to ignore the legal requirements of REACH, either completely or at least partially because of the impact on production costs.

Photo courtesy: Industry and Technology Magazine

What worries me most of all is that the majority of belt used in Europe nowadays is imported as it is virtually impossible to make belts in Europe economically. Unfortunately, the majority of belts imported into the EU are produced outside of EU member states and the UK are not subject to REACH regulations or even EU regulations concerning the use of Persistent Organic Pollutants (POPs). This means that they are free to use congenerated raw materials through those some materials may be entirely prohibited in at least have extra usage limitations within Europe.

What can you do?

ANSWER: Always ask for written confirmation that the salesperson or supplier of the belt you are buying that it has been manufactured in accordance with REACH / SVHC/POPS regulations. It costs is a cheap as chips.

Production processes

As I have already mentioned, manufacturing industrial conveyor belts uses a lot of energy and raw materials and therefore, it produces a big carbon footprint. However, there are many ways that we can reduce our carbon footprint. Here are four key strategies one of these should be fairly straightforward for anyone to implement in their manufacturing. Fortunately, they are not expensive to implement.

More efficient machinery

The most energy intensive machinery in manufacturing rubber industrial conveyor belts has not changed fundamentally for a great many years. Consequently, much of this machinery is old and not always as energy efficient as it could be. Particularly during the past decades, we have invested many millions of euros replacing outdated machines and equipment with more modern and efficient machinery. Although, this has been very expensive, it has also meant we have had an added incentive because anything that reduces our carbon footprint by increasing efficiency also improves the overall efficiency of our business. Our electrical production line is a good example of this because it has reduced our carbon footprint by increasing our production and also cost production process. Apart from the product quality benefits, this also means that it uses less energy.

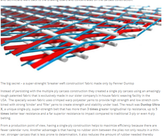
Where loss is more

The damaging energy placed on modern day conveyor belts, especially those used in "heavy industry" such as quarrying, mining, wood and waste for example, mean that belts have to be stronger and tougher than ever before. Unfortunately, this has meant that belts have to be more robust and, therefore, more rigid and less flexible. Moreover, however, conveyor belts contain a lot more rubber and fabric. There is therefore a greater increase in the carbon footprint and unfortunately, an increase in potentially unrecycled waste. However, at Dunlop we believe that this upward trajectory is avoidable. In fact, we do not just believe it – we know it.

The Holy Grail?

In the quest for ever lasting timber, inexpensive belts, is estimated that up to 80% of conveyor belts are scrapped prematurely due to breakage. The challenge presented to the Dunlop R & D team therefore consisted of two major obstacles. Firstly, its design a belt that was much more capable of resisting impact, ripping and tearing. Secondly, to make the belt lighter and more flexible without sacrificing its strength. The solution to the first challenge was relatively easy as the equivalent of joining the Holy Grail. Unfortunately, our engineers found that the answer to the pricing issue lay in the volume of raw materials needed and the complexity of the production process.

Because we had already developed extremely hard wearing, long lasting rubber cover compounds, our engineers concentrated on the second challenge and found the solution in a single ply conveyor belt.



The big secret – a super strength, breaker self-construction fabric made by Kevlar (Dunlop)

Although, the idea of using a single ply belt was not new, it was generally thought that it was not practical to manufacture belts in our rubber compound in Kevlar fabric covering facility in the USA. The obviously easier fabric was compared was compared polyester yarns to provide high strength and low stretch combined with Nylon 6 yarns to provide high impact resistance. The Kevlar fabric was a multi-ply fabric made of Kevlar. It is a unique single ply super strength belt that has more than 3 times greater longitudinal tip resistance, up to 5 times better wear resistance and 4 for superior resistance to impact compared to traditional 3 ply or even 4 ply belting.

From a production point of view, being a single ply construction helps to manufacture effectively because there are less layers to be bonded together and less rubber to be used. However, the main benefit is that it means that there are two stronger carcass that is one ply instead of two. It also means the amount of rubber needed to be used is much less. Yet another advantage was the ability to make longer production runs at maximum width, which means that the production process could minimise the amount of power consumed.

Single ply conveyor belts – the way forward

In Dunlop we sincerely believe that the development of a single ply conveyor belt that not only significantly outperforms its timber, heavier, multiply counterparts but also have a sensationally less impact in terms of its carbon footprint is a game-changer and a game-changer.

The Holy Grail? – single ply belt that outperforms its timber and multi-ply counterparts

Although some high-tension lines were up at the very strength of single ply belt, it should be remembered that single ply solid woven belting has been used in underground mines for several decades. I am advocating that the adoption of single ply belting would be a game-changer. Unfortunately, it would mean that many users would need other conveyor belt manufacturers from following the same path. Replacing thick, multiply belts with single ply belts that are much more durable and long lasting yet use so much less energy is certainly the best way forward in every respect.

What can you do?

ANSWER: The first step is to accept their thinner, heavier belts are not the solution for conveyors where belt design is a problem. As you no doubt expect, I am advocating going to recommend that you explore the possibility of using a single ply construction belt that provides the necessary tensile strength and resistance to accidental operation. Not only will it be better for the environment, it will also be better for your business. It will mean that you need a lesser amount of big goods lorry/truck traffic. This will lead to extended operational lifetimes and consequently less waste is every respect.

In our hands

Please trust me when I say that the actions I am proposing are not simply some kind of theoretical dream. To my knowledge, we have proved that it is possible to make a difference to our carbon footprint and to reduce our impact on our environment. The problem facing our planet today is of epidemic proportions and requires even more serious for our children and our children's children. Their future is in our hands. Thank you.

About the author

Andrew Simms is Sales & Marketing Director of Dunlop Conveyor Belting in The Netherlands. After completing his degree in Mechanical Engineering, Andrew joined Dunlop Conveyor Belting in Manchester, UK as a Sales Engineer and became one of the most experienced and highly regarded sales engineers in the conveyor belt industry.

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