

CONVEYOR BELTS

Reducing environmental impact and running costs

Bob Nelson, Conveyor Belt Specialist, proposes that a simple re-tuning of purchasing policy is all that is needed to make conveyor belt production more sustainable and cost-efficient.

Conveyors are a very environmentally efficient method of moving vast amounts of material. However, manufacturing conveyor belts uses an enormous amount of energy. To make matters worse, growth in conveyor belt consumption is increasing disproportionately due to an alarming decline in their life expectancy. Conveyor specialist Bob Nelson believes that an important opportunity to simultaneously reduce environmental impact and conveyor running costs is being missed.





Figure 1. Conveyor belt rubber is almost entirely synthetic.

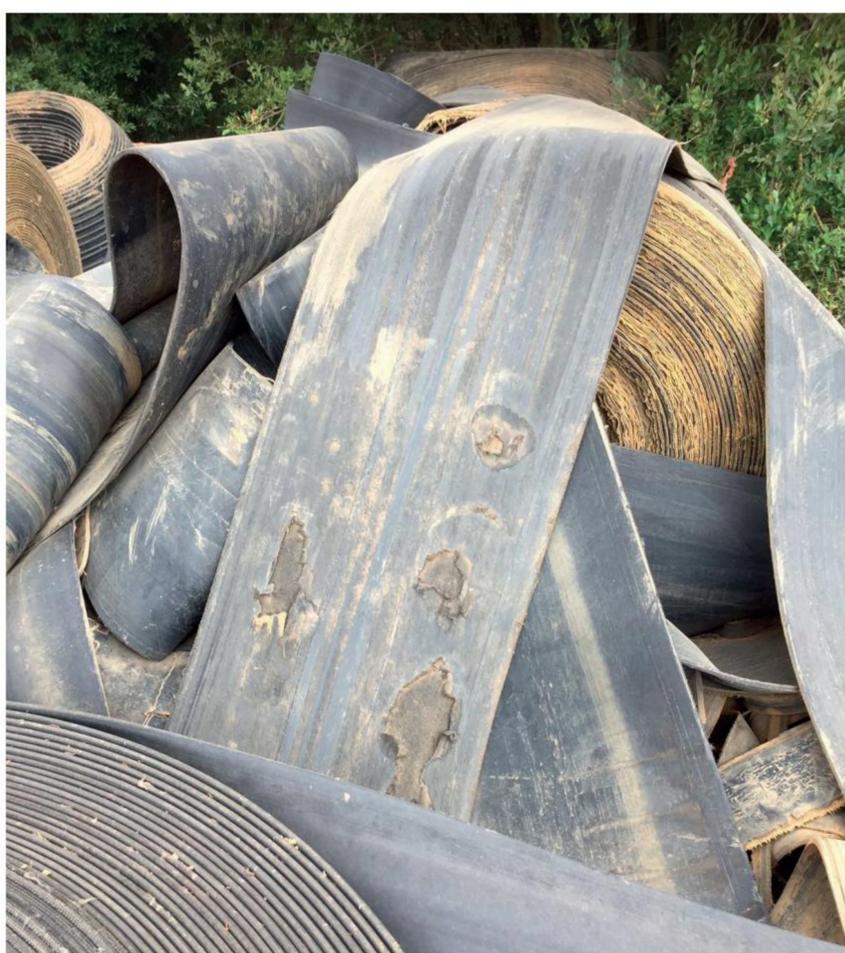


Figure 2. Less than 10% of rubber belts are recycled.



Figure 3. Reducing the amount of conveyor belting used and discarded each year represents a big opportunity to reduce the carbon footprint.

The challenges

The most commonly used type of conveyor belt are rubber ‘multi-ply’ belts which mostly have between two to four layers of synthetic fabric, usually a combination of polyester and nylon, which are used to create a sturdy carcass. Occasionally, mostly for long-haul applications, a carcass consisting of thick, strong steel cables is used. In both cases, the carcass is protected by a thick outer coating of rubber.

Because of its adaptability, most of the rubber is entirely synthetic. Very little natural rubber (NR) is used. The raw materials used to create the rubber and the inner ply fabrics are almost all directly or indirectly derived from crude oil. In fact, a typical conveyor belt is effectively 45% oil. Add to this a vast array of different chemical components such as anti-degradants, antiozonants, and accelerators.

Long-term impact

Ultimately, every conveyor belt has to be replaced and disposed of, which creates something of a double-edged sword. For example, in Europe, nearly 95% of all used car tyres are now recycled. By comparison, the amount of redundant conveyor belting being recycled is estimated to be less than 10%. There are many reasons for this disparity. Recycling conveyor belts is an appreciably slower, more complicated, and expensive process. There is also much less demand for the polyester and nylon fabric inner plies and certainly no practical use for the metal cables found in steel cord reinforced belts.

The harsh reality is that under foreseeable market circumstances, recycling industrial conveyor belts is both ecologically and economically problematic. Consequently, countless thousands of tonnes of rubber, polyester, nylon, and all the associated chemicals have to be disposed of, much of which will simply end up in landfill.

A fast-growing problem

The world market for industrial conveyor belts is huge and growing fast. From a level of US\$3700.22 million in 2021, it is projected to grow to US\$5745.98 million by 2032, representing a compound annual growth rate (CAGR) of 4.49% during the forecast period (2023 – 2032).¹

Although there seems to be no reliable data available to translate the monetary worth into physical volumes, the tonnages involved are undeniably mind-boggling.

Throwaway culture

With such an enormously valuable and fast-growing market, it is hardly surprising that competition amongst conveyor belt manufacturers and traders is fierce. It is widely accepted that this level of competition is the root cause of growing environmental impact and declining quality standards.

In Europe, the biggest source of rubber belting is Southeast Asia, predominately China. As with virtually every other high-value market, the strategy employed is based on mass volume manufacturing at a barely acceptable (and often unacceptable) standard of quality at dramatically lower prices.

Over the past two decades, much of the European-based conveyor belt manufacturing capacity has disappeared, creating an unhealthy reliance on low-grade imports. Announcements of further conveyor belt manufacturing plants closures in Germany is therefore no surprise. Indeed, with Fenner Dunlop in The Netherlands being an exception, European manufacturers now supplement their production with imported belting. What has transpired is a throwaway culture fuelled by a willingness to replace conveyor belts at a frequency that is many times higher than it should be. This seems to be particularly prevalent in the mining industry where conveyor belts have to endure heavy, sharp, and aggressive materials, usually in very demanding environments.

Sacrificed on the price altar

Faced with their own budgetary challenges, a great many end-users seize the opportunity to apparently cut costs in the short term by buying low-priced imported belting, which can quite easily be more than 50% lower in price than their counterparts at the opposite end of the quality scale. In many cases, quality and longevity is knowingly sacrificed on the price altar, but, in just as many cases, the sacrifice is made unwittingly.

Anecdotal evidence strongly indicates that even when it becomes obvious that the low price really did reflect the quality, the opportunity to return to higher quality, more durable belts has been missed. Once the powers-that-be

who set the expenditure budgets and those who work in purchasing departments see the 'savings', those low prices become cast in stone.

Cost cutting - a price to be paid

It is important to understand how today's cut-throat prices are being achieved, because this has an equally big bearing not only on performance and longevity but also on environmental impact. Due to the high level of automation, labour costs account for as little as 5% of the production cost. The real reason for the enormous differences in price is that raw materials can make up to 70% of the cost of producing a conveyor belt. Consequently, the only way to manufacture a low-price belt is to cut material costs, such as using low-price (low grade), unregulated raw materials. There is simply no other way.

Practices include using cheap, low-grade polymers and chemical ingredients, the use of 'bulking fillers' such as clay and chalk, and using low-grade synthetic fabric plies. Yet another is the total omission of essential ingredients such as the antiozonants that prevent premature rubber degradation caused by exposure to ozone (O3) and ultraviolet light (UV). This is evidenced by the fact that a recent laboratory test survey showed that 78% of tested belts did not contain antiozonants.

There is no denying that the environmental challenges associated with rubber industrial conveyor belts are considerable. Fortunately, it is not a lost cause because a

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lot of positive actions have been, and are being, taken by some pioneering manufacturers. However, for these actions to bear fruit, much more understanding, coupled with a change of mindset, is needed from those responsible for buying them.

The environmental impact of conveyor belts

It is an inescapable fact that to make some rubber compounds it is necessary to use chemicals that can be dangerous in their own right and which potentially can have a lasting impact on the environment and human health. Fortunately, at least as far as Europe is concerned, very strong regulatory controls are in place that are designed to protect humans, wildlife, and the environment in the form of Registration, Evaluation, and Authorisation of Chemical substances (REACH) regulation



Figure 4. A throwaway culture.



Figure 5. No way back now – low prices become set in stone.

EC 1907/2006 and EU Regulation No. 2019/1021 Persistent Organic Pollutants (POPs).

Worryingly, many European manufacturers completely ignore the regulations because of the impact on production costs. Even more alarming is the fact that manufacturers located outside of EU member states and the UK are not subject to them at all, leaving them free to use much cheaper, unregulated raw materials even though they may be prohibited or at least have strict usage limitations within Europe.

The best advice is therefore to always ask for written confirmation from the manufacturer or supplier of the belt you are buying that it has been produced in compliance with REACH EC 1907/2006 and EU Regulation No. 2019/1021 POPs.

Product life cycle

The amount of conveyor belting used (and discarded) in the mining industry represents a very significant influence on the industry's overall carbon footprint. It also represents a big opportunity for every user to help reduce CO₂ emissions.

As explained earlier, the materials used to make conveyor belts are almost entirely synthetic and almost all are directly or indirectly derived from oil. Add to this the great many chemical agents used to create the rubber. Ultimately, up to 90% of these materials, in the form of worn-out, damaged conveyor belts, will not be recycled. This is precisely the reason why producing and using conveyor belts that have the longest possible working life is more important than ever.

Increase the life, reduce the waste

Good quality belts, especially those made in Europe, North America, and Australia, can quite easily achieve up to five times longer working life compared to low-grade imported belts of supposedly the exact same specification.

Buying good quality, longer lasting belt, albeit at a higher up-front price, instead of 'economy' low grade belt creates two extremely significant benefits. Firstly, it dramatically reduces the amount of replacement belting that needs to be manufactured in the first place, representing a corresponding reduction in the amount of chemicals, additives, and non-biodegradable synthetic fabric. Secondly, it reduces the 'whole life' cost of conveyor belts due to the substantial reduction in downtime caused by the need to carry out running repairs and fitting replacements.

A matter of policy

There cannot be many opportunities to enhance environmental credentials, while at the same time improving output by reducing downtime and reducing running costs, but basing your conveyor belt purchasing policy on the 'lowest lifetime cost' principle is a gift that will simply keep on giving. **GMR**

References

1. AKRE, S., 'Rubber Conveyor Belts Market', *Market Research Future*, (October 2025), <https://www.marketresearchfuture.com/reports/rubber-conveyor-belts-market-7732>