Don't be fooled by datasheets

LES WILLIAMS on the most important things to consider – and what to avoid – when buying rubber conveyor belts

Conveying waste material is a demanding task, even for the toughest of conveyor belts. Waste contains a multitude of elements that damage and destroy rubber.

Oils, fats and greases have a particularly detrimental effect. Throw some acids and chemicals into the mix, such as sodium hydroxide or potassium hydroxide, commonly found in soaps, and it is little wonder that the recycling industry gets through thousands of metres of conveyor belting a year. Most of it is being repeatedly repaired or replaced far too prematurely.

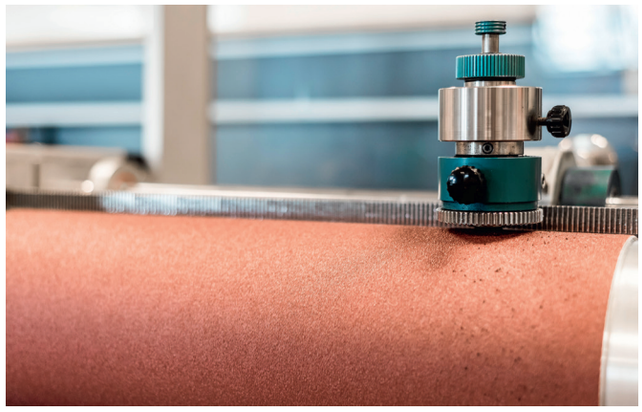
Despite this, the preoccupation still seems to be the price of the belt rather than its 'whole life cost'. This almost invariably means buying low-grade belts originating from Asia.

I have often shaken my head in disbelief when I come across buyers who are absolutely convinced that, first, all conveyor belts are much of a muchness; second, there is nothing that can handle the constant flow of waste material that devours belts at an alarming rate; and third, that they are getting a good deal because the price they have paid is significantly lower than other offers.

The fact that the business will have to use two, three or more 'economy' belts when one good-quality, hard-wearing one would ultimately cost considerably less, seems to be completely ignored.

There are three key 'belt killers' in recycling and waste handling: ripping and tearing; oils and chemicals; and abrasive wear and tear of the belt surface.

Despite increasingly sophisticated sorting and filtration technologies, an ever-present problem in recycling and waste handling is rogue material such as lumps of scrap metal becoming trapped and causing serious damage. Such foreign objects can even appear in cardboard and paper waste.



Badly damaged belt (*above*): Dunlop's abrasion testing (*below*)

On conveyors where belts frequently have to be repaired and replaced due to rips and tears, there is often the temptation to fit what are euphemistically termed 'sacrificial' belts. I have seen belts with so many clip repairs that they look like a badly stitched Frankenstein monster.

The only real answer to rips is to fit belts that have been specifically engineered to withstand the type of treatment. They may appear to cost a lot more but they are proven to run for years compared with conventional belts that may last only weeks or months.

Dunlop manufactures two types of specialist belting, UsFlex and Ultra X, which have a resistance to ripping and tearing that is several times greater than conventional multi-ply belts of a similar tensile strength.

Conveyor maintenance companies, especially those who also supply belting, may try to convince you that it is impossible for belts to have such resilience and that it is just an expensive rip off – but, of course, they have their reasons for saying this. Constantly repairing and replacing damaged conveyor belts can provide them with a nice, regular income indeed.

An absolute prerequisite for conveyor belts used in recycling plants is the ability to resist oil. When oil penetrates the rubber covers it causes them to soften, swell and distort.

This results in problems including a marked decrease in resistance against surface abrasion, cutting and gouging; a tendency to rip and tear more easily; and steering and handling problems. The effects also include a serious decrease in the amount of stretch before the belt snaps, together with a loss of tensile strength.

Oils and fats can be divided into two distinct sources: mineral and vegetable/animal. The former is composed mainly of alkanes and cycloalkanes, related to petroleum, with high deposits found in household and industrial waste.

There is a marked difference in the swelling caused by different mineral oils on synthetic rubber compounds. Vegetable oil is the predominate source in household waste.

There are two recognised test methods for oil resistance, both of which involve almost identical procedures. These are ISO 1817 and the comparable, slightly less elaborate but equally demanding, American ASTM 'D' 1460, which is the method used at Dunlop.

My advice is always to ask belt suppliers for details of the oil resistance test methods they ››

have used to support their claim. But a word of warning. Many belt manufacturers and traders use the DIN reference 22102 G when referring to oil resistant belting. This can be misleading because the letter 'G' is simply used to denote oil (or grease)-resistant belting. But the fact is that DIN 22102 G does not actually contain any requirements, test methods or limits specific to oil-resistant belting.

This is a classic example of how simply indicating a test method reference number is used to provide reassurance to the buyer but in reality is meaningless in terms of actual performance.

Despite the different characteristics and effects of mineral and vegetable oils, most conveyor belt manufacturers produce only one oil-resistant rubber compound. Dunlop has two to provide the best possible protection against the different effects.

The first and generally most commonly used is a synthetic rubber compound Dunlop ROM, which is based on a combination of styrene butadiene rubber (SBR) and nitrile butadiene rubber (NBR). This is specifically designed to resist the penetration of vegetable and animal oils, fats and wood oils and resins.

A good quality SBR should have excellent resistance to abrasion combined with very good tensile strength. Those two characteristics will ensure durability and longer belt life.

Mineral oils tend to be aggressive. For this reason, Dunlop engineers developed the successful Dunlop ROS compound, which is an NBR-based synthetic rubber. Although nitrile butadiene is more expensive than styrene butadiene, it does have a very high resistance to oil, fuel and a wide range of chemicals. The more nitrile there is within the polymer, the higher the resistance.

In situations that also involve chemicals such as sodium hydroxide, potassium hydroxide and sulphuric acid, we advise the use of the superior resistance provided by the Dunlop ROS grade.

Metal recycling: rogue lumps can cause tearing

> "THE RECYCLING INDUSTRY GETS THROUGH THOUSANDS OF METRES OF CONVEYOR BELTING A YEAR. MOST OF IT IS BEING REPEATEDLY REPAIRED OR REPLACED PREMATURELY."

One of the usual downsides of having rubber that has good resistance to oil is that the ingredients used to create the resistance generally have an adverse effect on the wear-resistant properties of the rubber. In other words, oil-resistant belts tend to wear out faster.

At Dunlop, however, the oil-resistant rubber compounds have an abrasion resistance that is superior to most abrasion-only rubber covers. Buyers should always request a technical datasheet that shows the level of wear, and never accept an abrasion resistance figure of more than 150cu mm.

Provided that a conveyor belt is not being ripped to shreds or destroyed by oil, it is the wear resistance quality that will ultimately determine the belt's working lifetime and consequently its cost-effectiveness.

Most conveyor belts used in recycling are relatively short, with a centre distance of less than 25m. This results in a faster rate of attrition because material passes the loading and discharge points more frequently compared with long belts. Sharp objects such as rubble, metal and glass that cut and gouge the belt surface also need to be factored in.

There are two internationally recognised sets of standards for abrasion: DIN and ISO. In Europe it is the longer-established DIN 22102 (Y, W and X) standards that are most common.

Generally speaking, DIN Y (ISO 14890 L) relates to 'normal' service conditions and DIN W (ISO 14890 D) for particularly high levels of abrasive wear. However, DIN X (ISO 14890 H) is regarded as the most versatile because in addition to resisting abrasive wear, it also has good resistance to cutting, impact (from high drop heights) and gouging, usually caused by heavy, sharp materials.

The most important thing to remember when looking at abrasion test results is that higher figures represent a greater loss of surface rubber, which means that there is a lower resistance to abrasion. Conversely, the lower the figure, the better the wear resistance.

Another word of warning here, because the technical datasheets provided by manufacturers and traders will almost invariably show only the minimum standard demanded by a particular test.

Unless stated otherwise, the data does not reflect the actual performance achieved during testing – in other words, it does not demonstrate the level of performance the user can necessarily expect. This fact applies to the data shown within the vast majority of technical datasheets provided by suppliers.

When conveyor belts have to be repaired and replaced frequently there is, of course, the temptation to accept the inevitable and fit the cheapest belts possible. What some conveyor operators do not realise is that there are belts available that do not cost the earth which are considerably more durable and resilient, and will outperform low-grade belting many times over.

Despite the claims of manufacturers, Dunlop has found that more than 50% of belts are found to be significantly below the specified minimum standards. As often as not, the quality of a belt is reflected by its price. That 'irresistible' offer will almost certainly prove to be a false economy.

● *Les Williams is general manager for sales and marketing at Dunlop Conveyor Belting*