No more dirty tricks and false economies

In the second of a two-part series, Dunlop Conveyor Belting's **Les Williams** reveals why profiled conveyor belts can be so notoriously unreliable and prone to damage, the truth about fire-resistance, and the dirty tricks used by unscrupulous suppliers

The Holy Grail for materials recovery facilities are conveyors that keep materials flowing and prevent items from getting jammed

Profiled conveyor belts, most commonly those with a chevron pattern, are an enormous help to recycling plants using conveyors with a fairly steep incline.

By preventing 'roll back' and slippage, a chevron-profiled belt reduces spillage and increases throughput. But, despite best efforts, there will always be objects that get jammed and end up ripping the profiles off the belt carcass.

Even without that happening, the profiles on conveyor belts have a habit of becoming detached due to the continuous flexing around the pulleys. The causes are actually simple to explain and the cures are just as simple.

The most common cause is that most manufacturers create the 'base belt' and then attach the profiles as a second phase of production, either by gluing or vulcanising. This is a low-cost method but it does not produce the strongest possible profiled belt.

A single unit

The real answer is to create a single 'homogenised' unit where the chevron profiles are produced in a single process, applying the rubber to the belt carcass using a mould plate fitted to the vulcanising press so that the cover and the profile are literally one continuous piece of rubber.

Many belt suppliers import what is known as 'the base belt', often from Asia, and then have the profiles added.

It makes the price of the belt seem nice and low but ultimately the cost is very high as the belts have a much shorter working life than they should. And during that working life the belt steadily loses its effectiveness as the profiles become detached. It's like having a set of dentures and, one by one, the teeth fall out.

Damage to profiles also occurs because the rubber is not sufficiently resistant to the oils, fats, greases and the myriad other chemicals found in household waste. So, if you are looking for a profiled belt, insist on it being one that is produced as a single homogenous entity with rubber that has a high level of resistance to oils, fats and chemicals.

Fire safety

Conveyors are a fantastically efficient method of moving all kinds of waste material in confined areas.

The trouble is they are just as efficient at carrying fire within that confined area.

The UK has a big problem with fire at recycling centres. Last year, the UK averaged one recycling centre fire per week, many of

them major incidents that took weeks to extinguish.

One fire stretched for seven acres and shut down roads and airspace around the facility. Household waste can include anything from highly flammable plastics to lithium ion batteries, and any number of other potentially hazardous materials. Piles often give off methane gas, and spontaneous combustions are not uncommon.

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Despite the problem, efforts to regulate the industry have been met with some stubbornness.

When it comes to conveyor belts there seems to be a belief that fire-resistance means an enormous increase in cost.

Actually, that is not so. In any event, insurers have certainly indicated that lower premiums would be available where the risk has been reduced by the fitting of fire-resistant belts.

Although commonly referred to as 'fire resistance' within the conveyor belt industry, in real terms it is the ability of the rubber to self-extinguish once the source of ignition is no longer present.

No fireproof conveyor belts

The first and most important thing to bear in mind is that conveyor belts cannot be totally fireproof.

Using special additives and chemicals, the rubber used in the top and bottom covers and the rubber skim between the fabric plies of the carcass can be engineered to resist fire, but the complete structure of the belt cannot be made fire-proof.

The fabrics used in the carcass of the belt most commonly contain polyester and nylon, which have little or no resistance to fire. In other words, every belt will burn when it is exposed to a naked flame for long enough.

The basis of most tests for testing the fire-resistant properties of belting used in industrial applications is EN/ISO 340, which involves exposing six individual samples of belt to a naked flame, causing them to burn.

The source of the flame is then removed and the combustion time (duration of flame) of the test pieces is recorded. A current of air is then applied to the test pieces for a specified time after the removal of the flame. The flame should not re-ignite.

The time it takes for the belt sample to self-extinguish after the flame has been removed is then measured.

The duration of continued burning (visible flame) should be less than 15 seconds for each sample, with a maximum cumulative duration of 45 seconds for each group of six tests.

This factor is of paramount importance because it determines how fire can be effectively carried along a moving belt.

Even if a manufacturer states that its 'fire-resistant belt' has passed the ISO 340 test, the buyer should still exercise caution.

A typical conveyor belt can easily travel more than 40 metres within the 15 seconds sufficient for a sample to pass the test, but which would still allow the belt to carry flames over a potentially dangerous distance. For this reason our time limit standard in Dunlop is no more than one second. The special additives used to create a fire-resistant rubber compound generally have an adverse effect on its wear- (abrasion) resistant properties.

Consequently, fire-resistant belts tend to wear faster and, as the thickness of the rubber reduces so does the level of protection given to the inflammable carcass.

Value for money

To get the longest possible belt life (and thereby best value for money) buyers should always demand that the belt has an average abrasion resistance level of no more than 150mm^3.

Remember that, with abrasion resistance measurement, lower figures represent better wear resistance.

As mentioned earlier, the oils and fats and greases contained within household waste can quickly penetrate and destroy a rubber conveyor belt.

A conveyor belt should have an average abrasion resistance level of no more than 150mm^3

If a conveyor belt that is supplied as being fire-retardant catches fire, the consequences can be catastrophic

What is not commonly known is that rubber compounds have now been developed that are able to resist the effects of oil and, at the same time, be highly resistant to abrasion and fire, along with other, less well-known, 'belt killers' such as ozone.

The rubber technicians at Dunlop have invented a compound that is 'multi-talented' because it is resistant to fire, heat, oil, abrasion and ozone and can even work perfectly well at sub-zero temperatures.

Dirty tricks

In recent years there has been a growing trend of importing low-quality belts, often of very dubious origin, and selling them on as being manufactured by a big-name brand.

Large-scale 'dumping' of belting, primarily from Asia, has been taking place on an unprecedented scale.

And with the trading and fitting of conveyor belts to end-users worth many millions each year, it is hardly surprising to find some who are willing to deceive in order to earn bigger profits.

End-users are increasingly insisting that their belts should be made in Europe, but even this approach can be prone to malpractice, with belts imported into Europe, warehoused and then re-shipped to customers using certificates that state the country of origin as being European.

As a general rule, 80% of the cost of making a conveyor belt is in the raw materials.

When there is a big difference in price then you can be pretty certain that the difference is more than reflected in the quality and wear life of the belt. One of the problems is that, to the untrained eye, all conveyor belts look similar. But a good quality test is to take a sniff and, if the belt gives off a pungent smell then that is invariably a sign of poor quality and the use of questionable chemicals.

> "Rips and tears clipped together like some kind of Frankenstein monster just to eke out a few more precious weeks of life"

The recycling plant that thinks it has saved money by buying a belt at a low price invariably pays a much higher cost in the longer term because the belt stretches, rips too easily and wears out much faster than it should.

Apart from the disruption to output, the plant will end up fitting two or three belts when one good quality one should have sufficed.

And if a conveyor belt that is supplied as being fire-retardant catches fire but does not resist fire the way it should, the consequences can be catastrophic.

Industry monsters

I find it very frustrating when I visit recycling plants and see conveyor belts flapping around like a blackened bed sheet; stretched to the limit and with rips and tears clipped together like some kind of Frankenstein monster just to eke out a few more precious weeks of life from it.

Service companies that want to peddle cheap belts are getting the best of both worlds as they have frequent repeat sales plus a regular income from fitting charges and repairs. It certainly could be argued that it is not in their interests to supply long-life, low-maintenance belts. So, for the recycling plant it is a never-ending circle of cost.

It doesn't have to be like that

Belt technology has advanced enormously in recent years and there are belts available that will provide at least two or three times the working life of others on the market.

By fitting belts that are genuinely engineered to handle the demands placed on them, and carrying out simple, timely maintenance, it is perfectly possible to reduce your annual conveyor belt expenditure by 50% or more – meaning that no one has to resort to any more false economies. **RWW**