BREAKING NEW GROUND

DUNLOP
CONVEYOR BELTING

The mobile machinery market is fiercely competitive. This means that the cost of the conveyor belt for machines equipped with them is a very significant factor in the price competitiveness of the machine as a whole.

Although reliability and durability are also very important considerations, especially for end-users, the fact is that finding a belt that is super-tough and genuinely good quality but which also competes on price might be regarded as the Holy Grail. Until now it seems, because a manufacturer unashamedly renowned as being "great on quality but highly priced, " believe that they have found just that.

Just over a year ago Dunlop Conveyor Belting in the Netherlands and their sister operation in North America (Fenner Dunlop Americas) rather quietly introduced a very new and unique design of belt that they claim is considerably more durable and tougher than conventional ply belting. They have branded their discovery Ultra X and they have their eyes firmly fixed on the OEM market

Here, Leslie David unearths more about an innovation that some believe will ultimately change conventional thinking about conveyor belting, especially belts used on mobile crushing and screening machinery.

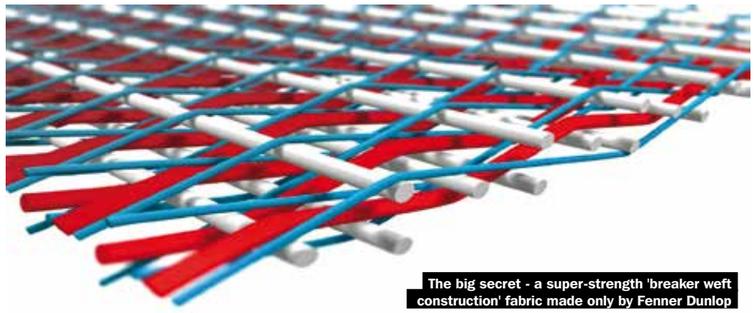
The conveyor belt market

In order to appreciate the significance of what Dunlop are doing it is important to first look at the market backdrop. The vast majority of rubber conveyor belts are only required to cope with abrasive wear (abrasion resistant). Certainly, the vast majority of mobile equipment OEM's fit wear resistant belts as standard and with so many manufacturers and traders competing for a share of the market they are spoilt for choice.

The market is dominated by 'economy' belting imported from South East Asia. If truth be told, the best that can be said for it is that "It does a job". This market dominance is actually much greater than many people might think because it is not uncommon for European belt manufacturers to import from Asia to supplement their own production thus enabling themselves to offer low price belting to their customers in Europe.

An age-old dilemma

Even the strongest, heaviest belts can be ripped, torn or punctured by heavy, sharp materials or foreign objects becoming trapped. "Accidental damage is something that virtually all conveyor operators have to contend with and it's an even more common problem on mobile equipment" says Dr. Michiel Eijpe, Dunlop's development director in the Netherlands. "Belts can often be destroyed within the blink of an eye. We estimate that about 80% of belts have to be prematurely placed because of damage. Using low grade 'sacrificial' belts invariably proves to be a false economy for the end-user for a lot of reasons including loss of production and high maintenance and the high cost of frequently having to fit replacement belts. It's an age-old dilemma".



The big secret - a super-strength 'breaker weft construction' fabric made only by Fenner Dunlop

According to Dr. Eijpe, the problem of rapid wear caused by abrasive materials was solved long ago. "Our belts are well-recognised as being the longest lasting belts on the market. For us, the rubber covers were the easy part. For now at least, all Ultra X belts are being produced with Dunlop AA anti-abrasion covers as standard because it has excellent resistance against the cutting and wearing and a resistance to abrasion that outperforms typical DIN Y requirements (average rubber loss of less than150mm^3) by as much as 20%"

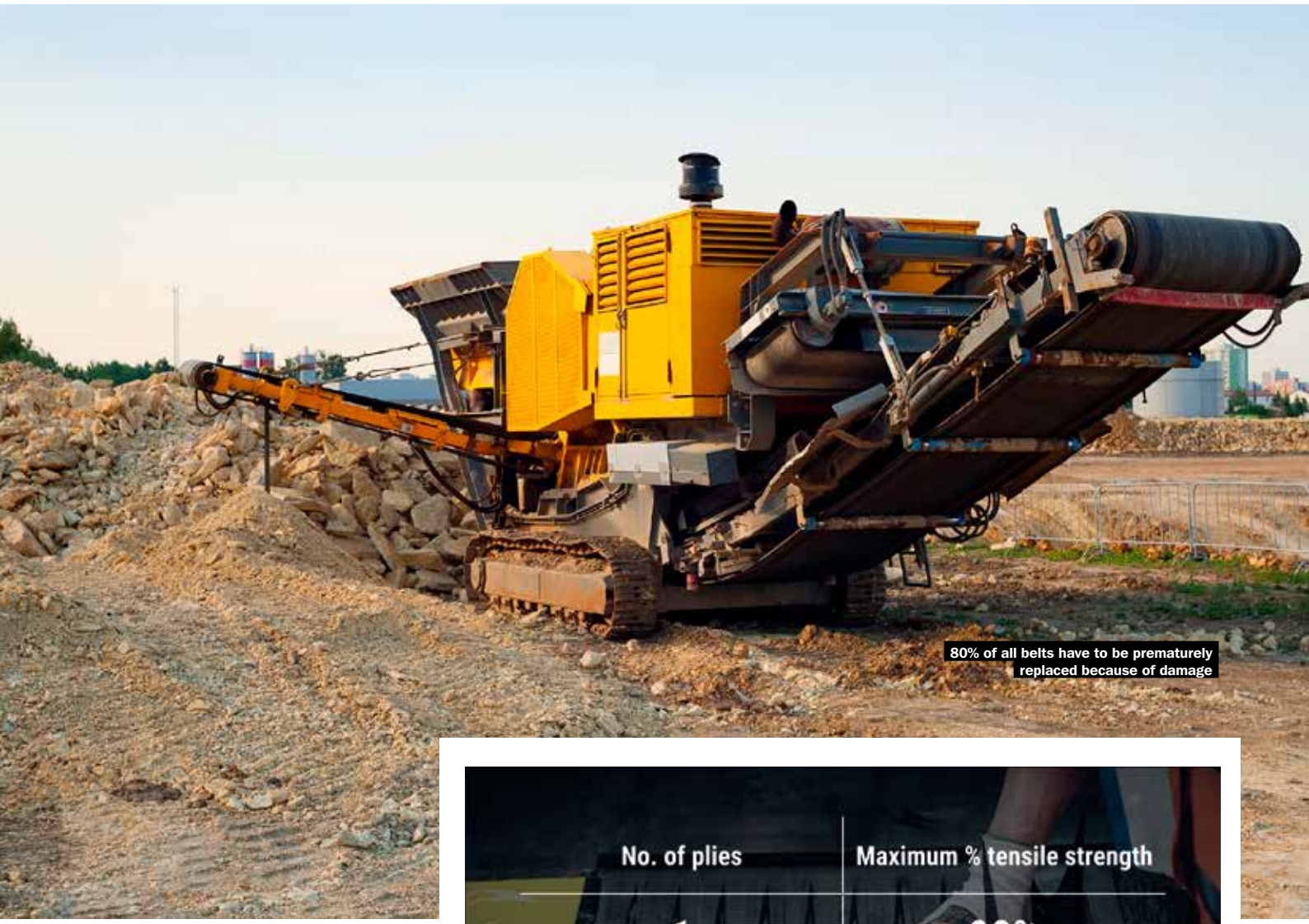
"The real challenge was to design a 'problem solver' belt that could really handle impact, ripping and tearing while at the same time creating a belt that could be priced competitively. To do that we focussed on the actual belt construction".

Thinking outside of the box

What the engineers and technicians of Dunlop on both sides of the Atlantic did was to forget convention and think outside of the box. They went back to the drawing board to design and develop a new and unique super-strength 'breaker weft construction' single-ply belt.

The basis of their concept is an amazingly

Ideally suited to run on mobile machinery despite small pulley diameters



80% of all belts have to be prematurely replaced because of damage

No. of plies	Maximum % tensile strength
1	90%
2	50%
3	67%
4	75%
5	80%

tough patented fabric that is exclusively made in their own in-house fabric weaving facility in the USA. Dunlop say that the fabric has more than 3 times greater longitudinal rip resistance and up to 5 times better tear resistance plus a far superior resistance to impact compared to traditional 3-ply or even 4-ply belting.

What's the big secret?

Dunlop engineers say that Ultra X owes its outstanding strength to its specially woven carcass which comprises of a crimped warp polyester yarns to provide high strength and low stretch. These are combined with strong 'binder' and 'filler' yarns to create strength and stability under load and to give exceptional rip, tear and impact resistance.

Throughout its development, sections of belt were repeatedly tested to destruction. The tear resistance of Ultra X is strictly measured according to the international EN ISO 505 standard.

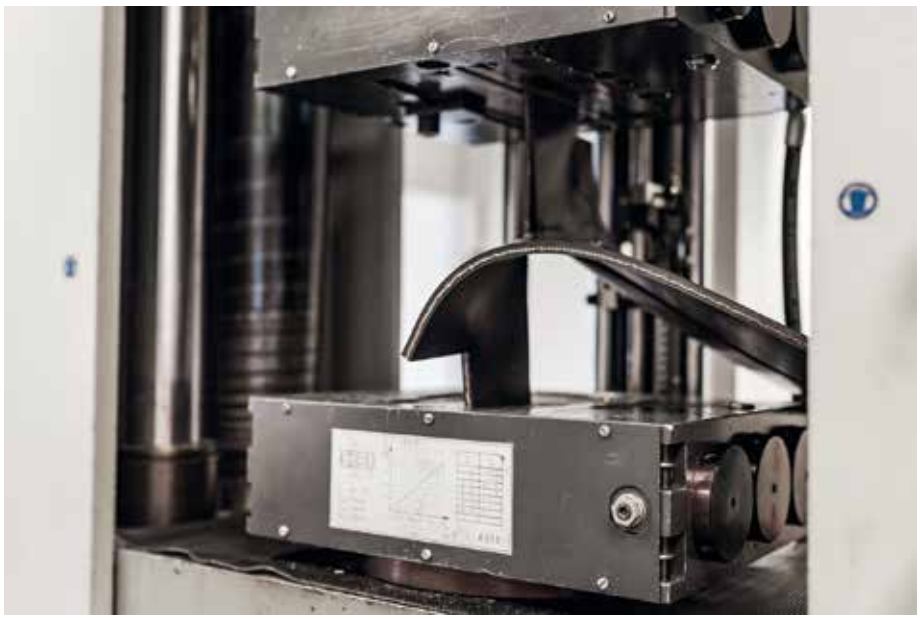
Endless opportunities

The OEM market is a specific target for Dunlop because Ultra X is flexible enough to be used on smaller drive pulley diameters. Sales & marketing director Andries Smilda says that they are already seeing a growing number of orders from OEM's for endless belts and belts with pre-prepared ends. "The X1 drive pulley diameter for over 60% rated tension can be as small as 315mm and the X3 drive pulley diameter, again for over 60% rated tension, can be as small as 400mm. This means that Ultra X is ideally suited to run on mobile conveyors, crushers and road machinery that are notorious for having small pulley diameters. Up until now it has been almost impossible to use high-impact, rip resistant belt because conventional ply belt has to be pretty thick to be able to take the punishment. The problem is the stress placed on the inner carcass and the splice joint by continual flexing over small diameter pulleys seriously limits what can be fitted but Ultra X overcomes that problem".

A question of strength

There certainly does not appear to be any question mark against the overall strength of Ultra X because, as their promotional film proudly states, an Ultra X3 single ply belt is able to pull up to 56 tonnes in weight.

Ultra X is available in abrasion resistant rubber and in two strengths - Ultra X1 (Type 330), which is designed for users of EP315/2 and 400/3 conventional ply belts and Ultra



X3 (Type 550), which is designed to replace EP500/3, 500/4, 630/3 and 630/4 ply belts.

The first question that seems to be on everyone's lips is how on earth can a single-ply belt provide sufficient tensile strength and yet still have such high levels of rip, tear and impact resistance? Rob van Oijen is manager of application engineering in Dunlop's Drachten headquarters and is clearly well-versed in explaining the technicalities and their not inconsiderable additional benefits!

"We keep coming back to the genuinely unique fabric that we are using. Besides being able to withstand the kind of punishment that would destroy a normal belt, Ultra X has amazing tensile strength. The longitudinal tensile strength of the X1 is 330N/mm and the X3 has a longitudinal strength of 550N/mm. The fact is that we stepped away from the conventional multi-layer belt range for good reason. A single-ply construction requires a finger-splice joint to be made and the big advantage of finger splice joints is that they retain up to 90% of the belt's tensile strength whereas a 2-ply step splice only retains a maximum of 50% and a 3-ply step joint can only achieve a maximum tensile strength of 67%".

"When such a high level of splice efficiency is combined with the X1 and X3 tensile strength then at the very least it effectively creates equivalent tensile strengths and belt safety factors that would be expected from comparable 3 or 4 layer conventional belting. Belt safety factors are one of the prime selection criteria so this is a really important advantage."

Rob is convinced that with a little help and encouragement the reluctance to use finger splicing can be overcome. "The technical and economic arguments in favour of finger splicing are unquestionable. Finger splice joints are immensely strong and durable and when you consider the fact that Ultra X has an appreciably better performance compared to conventional ply belt it means that the need to repair and re-splice joints is much less frequent". "The beauty of Ultra X as far as those involved with mobile equipment are concerned is that Ultra X also has excellent mechanical fastener retention. We recommend the Superscrew 63 but people have their own preferences so it's up to them".

Dunlop also supply Ultra X pre-prepared for finger splicing and in endless format. In fact they are so confident that Ultra X will prove to be a game changer in the OEM market that they have geared up their endless belt production capacity in Drachten and in their service facilities in Poland and Italy.

Under the radar

The introduction of Ultra X to the market was deliberately kept under the radar of most of the market. Andries Smilda explains that they had many reasons for such a cautious approach. "We knew that we were onto something special with Ultra X but Dunlop being Dunlop we still wanted to prove it in the field so we worked with tried and trusted end-users and OEM's". One of Dunlop's many successes so far is that Ultra x is now the belt of choice in the biggest quarry in Europe while at least one OEM has found that using Ultra x has more than doubled the average belt lifetime . "The past year has confirmed that Ultra X is all that we thought it would be and more. Although we have several thousands of meters in use we have not had one single complaint or technical issue so now we are ready to shout about it from the rooftops".

When talking to Smilda he makes no secret of the next steps that he wants to take. "We are escalating the sales and marketing activity with a special focus on OEM's because Ultra X is particularly well-suited to mobile conveyor equipment. In fact we are actively seeking partners who are progressively minded enough to see the enormous advantages of Ultra X and who are looking to gain a competitive edge over their competitors. This is where we see the potential to sell the kind of volumes needed to achieve sufficient economy of scale in the production process".

Competing on quality and price?

There is a surprising openness about the need to be able to "slug it out on price" in the 'economy belt' market and why and how they are able to offer prices that are at least comparable with all but the lowest grade of belt being imported from Asia. "It goes without saying that we would never compromise on quality but there are actually several good reasons why we can price Ultra X so competitively".

"Firstly, we manufacture the fabric in-house. That's a big advantage in terms of both quality and cost. A single-ply construction also allows for maximum efficiency of production because there are fewer calender runs. Secondly, having no rubber skim between the plies not only results in a thinner, stronger carcass, it also keeps the cost down". Dunlop are making longer production runs at a maximum width of 2000mm and are only selling Ultra X in full roll lengths of 300 meters. Endless and 'pre-prepared' belts need to be ordered in multiples. "Selling and shipping short lengths creates additional costs that impact on the selling price but for all customers starting out with Ultra X for the first time we are of course trying to be as flexible as possible. We know for from experience that once they see what Ultra X can do then they will be coming back for more!"

A cultural change

There is no doubting the belief and enthusiasm that everyone at Dunlop Conveyor Belting seems to have for Ultra X. They are clearly looking for something of a cultural change and that change needs to come not only from OEM's and vulcanising companies but ultimately the end-user market as a whole. To many, the very notion that single-ply construction belt can provide the necessary tensile strength together with considerably more resistance to ripping, tearing and impact; have a much greater splice strength, require fewer repairs and run for much longer all at the same time is difficult to comprehend. Remember, this is Dunlop we are talking about so to do all of this while also competing on price is an even bigger ask. But if the market can perhaps take off its blinkers and look just a little beyond its long-held beliefs and preferences then I strongly suspect that Ultra X really could be a game changer.

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