

Technical Bulletin DTB01

ABRASION RESISTANCE

INCREASING THE WORKING LIFE OF YOUR CONVEYOR BELTS

MAKING THE RIGHT CHOICE

The wear resistance qualities of a conveyor belt are one of the major factors that determine its life expectancy and ultimately the truest test of its cost-effectiveness. Selecting the best type and quality of abrasion resistant outer cover will largely determine the effectiveness and operational lifetime of conveyor belts.

It is a common misconception that a belt specified by a supplier as being 'abrasion resistant' should naturally be expected not to wear quickly. Different causes of wear and abrasion require different kinds of abrasion resistant covers. For example, belts that transport heavy and/or sharp objects such as rocks, timber or glass that cause cutting and gouging of the belt surface need different resistance properties compared to belts carrying 'fine' materials such as aggregate, sand and gravel, which literally act like sandpaper constantly scouring the rubber cover.

As a general rule, 80% of conveyor belt surface wear occurs on the top cover of the belt with approximately 20% of wear on the bottom cover. Wear on the top cover is primarily caused by the abrasive action of the materials being carried, especially at the loading point or 'station' where the belt is exposed to impact by the bulk material and at the discharge point where the material is effectively 'accelerated' by the belt surface.

Contrary to popular belief, short belts (below 50 metres) usually wear at a faster rate because they pass the loading and discharge points more frequently compared to long belts. For this reason, the selection of the correct type of cover quality and the thickness of shorter length belts becomes even more important than usual.

Wear on the bottom cover of the belt is mainly caused by the friction contact with the drum surface and idlers. The rate and uniformity of this type of wear can be adversely affected by many other factors such as misaligned or worn drums and idlers set at incorrect angles.

Factors such as ozone penetration or an unclean environment where there is a build up of waste material can accelerate wear. Belt cleaning systems, especially steel edged scrapers, can also cause wear to the top cover surface.



Misaligned drums and idlers cause extra wear

THICKER IS NOT ALWAYS BETTER

The actual thickness of the cover is an important consideration. Generally speaking, the more abrasive the material and the shorter the conveyor, the thicker the cover should be. In principle, the difference in thickness between the top cover and the bottom cover should not exceed a ratio of more than 3 to 1.

In an effort to extend operational lifetime, many conveyor belt users resort to fitting belts with increasingly thicker covers. However, covers that are too thick can potentially cause other problems. In reality, the single most important factor is the actual abrasion resistance of the belt cover.

INTERNATIONAL QUALITY STANDARDS

There are two internationally recognised sets of standards for abrasion, ISO 10247 (H, D and L) and DIN 22102 (Y, W and X). The longer-established DIN standards are most generally recognised and accepted. Generally speaking, DIN Y relates to 'normal' service conditions; DIN W for more abrasive materials and DIN X for resistance to cutting, impact (from high drop heights), abrasion and gouging resulting from large lump sizes of heavy and sharp materials.

Each manufacturer uses its own mix or 'recipe' of polymers to create cover compounds that have different abrasion (wear) resistance qualities. The main polymers used are SBR (Styrene-Butadiene-Rubber), which is a synthetic rubber and NR (Natural Rubber). In basic terms, SBR has good general resistance to abrasion while natural rubber, although appreciably more expensive, has greater resistance to cutting, ripping and gouging. Many manufacturers try to avoid the use of natural rubber wherever possible in order to keep costs (prices) low, despite it having what can ultimately be a negative effect on the operational lifetime of the belt.

BUYER BEWARE!

Even wear resistant covers that conform to international standards often have to be replaced after unacceptably short periods. It is important that buyers of conveyor belts remember that DIN and ISO standards are only the *minimum* benchmark of acceptability. Even then, tests reveal that despite the claims of the manufacturers, more than 50% are found to be significantly *below* those minimum standards.

Dunlop's approach has been to develop a range of abrasion resistant covers specifically designed to deal with both specific and combined causes of wear. To provide a longer lasting and therefore more cost-effective solution, Dunlop covers exceed international quality standards by a significant margin.

An excellent example of this is Dunlop's RA 'standard' abrasion resistant cover, which exceeds the DIN Y standard by more than 30%.



ISO/DIN Abrasion testing machine

For extremely abrasive materials, or simply to achieve an even more extended working life, Dunlop have developed their RS cover, which exceeds the highest abrasion standard (DIN W) by nearly 30% and the equivalent ISO 'D' standard by more than 40%.

SEEK ADVICE

As often as not, the quality of a belt (including its ability to resist wear) is reflected in its price. It is always worth the effort to check the original manufacturers specifications very carefully and ask for documented evidence of tested performance compared to the relevant international standard before placing your order.

WE ARE HERE TO HELP

For more information on this subject please contact your local Dunlop Sales representative or Dunlop's Application Engineering team on +31 (0) 512 585 555

All information and recommendations in this bulletin have been supplied to the best of our knowledge, as accurately as possible and updated to reflect the most recent technological developments. We cannot accept any responsibility for recommendations based solely on this document.

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