Straight talking – keeping your conveyor belts running straight and true

Especially in the world of dry bulk handling, conveyor belts that do not run straight can be extremely costly in terms of belt damage, spillage and lost throughput. Here, *Jeroen Kattouw*, one of the conveyor belt industry's most experienced and highly regarded application engineers, provides an invaluable insight on conveyor belt steering and handling.

Identifying the cause

When conveyor belts wander off track the first step is to identify whether it is the conveyor itself or the conveyor belt that is the root cause of the problem. The best approach is to use a process of elimination because the problem may be a combination of the two. There are several causes of misalignment due to conveyor set up including pulleys that are not mounted level and square to the centre line of conveyor; idlers not properly aligned and misalignment and wear of the drums or lagging. Other common causes are belts that loaded centrally, incorrect pre-tension and, very commonly indeed, dirty/unclean environments.

Belt problems that cause misalignment include inadequate troughing resulting in lack of contact with the horizontal centre idler of trough idlers; belts that are not straight and splice joints that are not square and true.

Worn drums or lagging can cause tracking problems.

Tracking problems associated with poor quality belts

Because all-polyester fabric (EE) costs some 30% less than EP (polyester/nylon mix) fabric, it is now quite common for manufacturers, traders and importers competing at the 'economy' end of the market supplying multi-ply belts that have

Not what they seem – 'cheap' belts are often supplied with totally polyester fabric plies in a belt claimed to be polyester/nylon (EP).

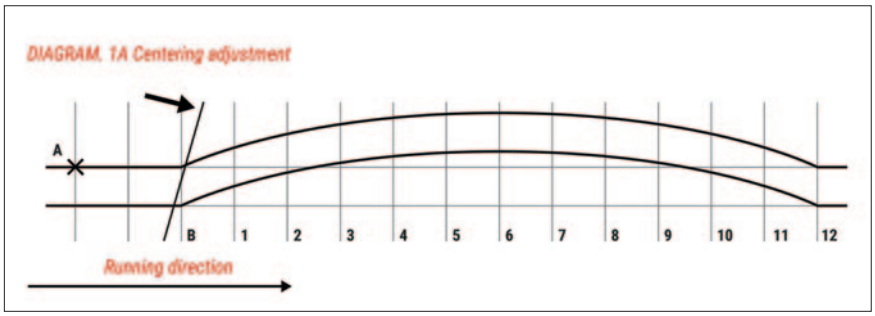
The carcass provides the innate strength of any conveyor belt.

Observe the effect for a sufficiently long period after each adjustment.

totally polyester fabric plies in belts declared to be EP (polyester/nylon mix) construction.

A mix of polyester and nylon has the best balance of mechanical properties including allowing a conveyor belt to run straight and to trough. Unless the weave pattern has been specifically designed, the use of totally polyester fabric compromises a number of essential mechanical properties. A polyester weft can cause low transverse elasticity, which reduces troughability while the strength under load both longitudinally and transversely can be inconsistent and therefore prone to steering and handling problems*

Although they may be the same basic specification, there can be very big differences in the quality of the fabric plies between one belt and another. In cheaper, lower quality fabrics, although the amount of material used in the longitudinal (polyester) strands of the fabric may be adequate, the amount of transversal weft material (nylon) is kept to a minimum in order to reduce cost.



Although the required tensile strength may be achieved, the longitudinal elasticity may be too low. This can cause problems with transition distances and a general inability to accommodate the contours of the conveyor and its drums and pulleys and ultimately lead to the premature failure of the belt.

(**The use of fabrics made entirely of polyester (EE) has its place in certain belt types and constructions. However, in those cases the declared specification of the belt should clearly be EE and not EP.*)

Training a belt when it is empty should mean it will also run true when loaded.

Misalignment due to inaccurate splice jointing

It is usually easy to identify when a poor connection joint is causing a belt to wander. Looking down the line of the conveyor, the belt will pass by running centrally for a time but then start to veer off centre for a period just before the joint arrives before re-centreing itself after the splice has passed. If the wandering is sufficiently serious, such as sections of the belt touching the conveyor frame for example, then the only solution is to have the joint re-made.

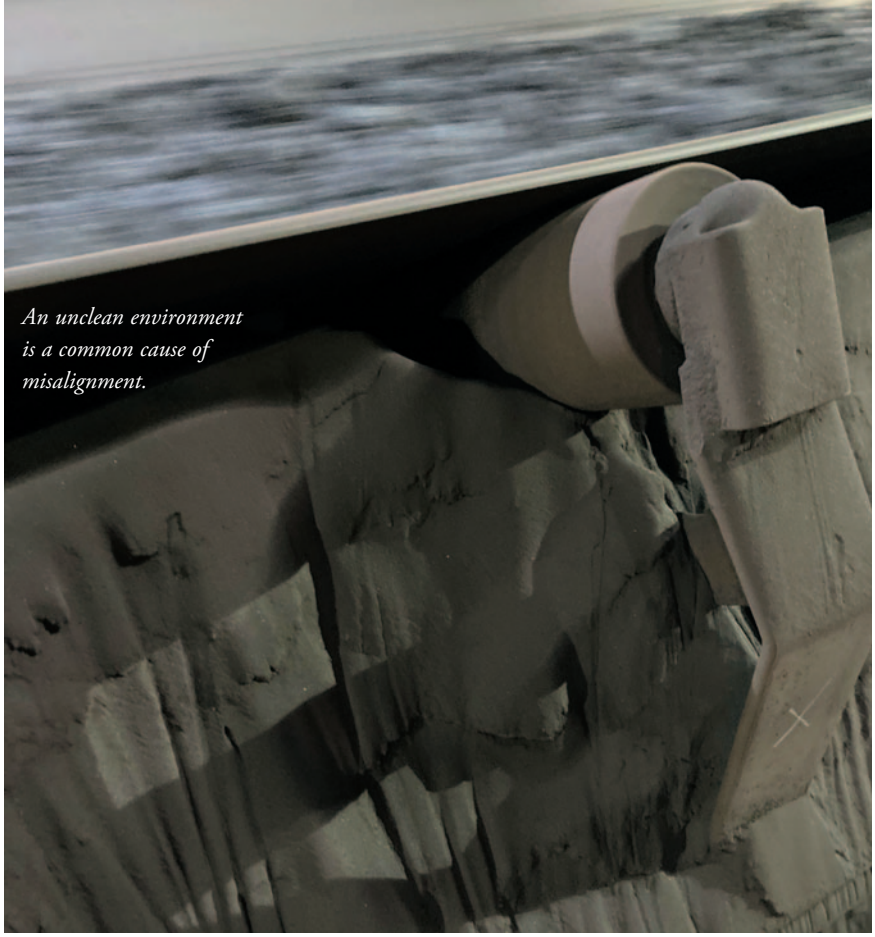
Gradual correction

Always re-align a belt gradually. It is important to observe the effect for a sufficiently long period after each adjustment by allowing the belt to travel at least once right round the conveyor before the next adjustment is made.

Few belts are perfectly straight, so there is always a certain amount of 'weaving' to be expected at each idler. The position of

the belt at any one idler position should be judged as the average position of the weaving motion. The easiest way to find out where correction needs to be made is simply to look along the edge of the travelling belt in the direction of travel and watch for curving due to the belt travelling off center. Having established where such curve exists, the adjustments can be made as follows.

Referring to diagram 1A, the observer at point A can watch in direction of belt travel along the belt edge and observe a definite outward curving between idlers marked 2 and 11. Such a curve may extend only over 3 or 4 idler spaces or over a much greater distance. It is a good idea to mark idlers 2 and 11 with chalk in order to definitely fix the extent of the curve. It is also necessary to mark several idlers between 2 and 11 and the belt edge in order to have a reference mark to judge the effect of the adjustments made. It is important to note that if the belt starts running off at idler 2 it means that the correction of the idler setting will need to be made one or two idlers forward of this point. In this case, idler 1 or even the idler at point B will require slewing.



An unclean environment is a common cause of misalignment.

Training a new belt

Training a belt should always begin on the return run beginning at the head or driving pulley, following the direction of the belt travel. Having centred the return belt, the top belt (carrying run) should then be trained, starting at the tail pulley and proceeding in the direction of belt travel towards the head or driving pulley. If the top belt runs so much out of center that it cannot be run for any length of time, it will be necessary to roughly train it before training the return belt. In this situation, the top belt should only be trained sufficiently so that it can be run without risk of damage to belt edges. The return belt can then be centred, followed by training the top belt as previously described.

Having trained the belt when it is empty should mean that the belt will also run true when it is loaded. If not, then the cause is almost certain to be that the material is not being fed centrally onto the belt. This can be corrected by modifying the feed chute.

A belt should only be trained by realigning idlers and snub pulleys. Head or driving pulleys and tail pulleys should never be set out of square. It is sometimes convenient to use the tail pulley for temporary adjustment if the belt is running off so much when first starting up that running is not possible. Once the return belt has been sufficiently centred the tail pulley should be set up square again before final training is completed.

Jeroen Kattouw.

Prevention is better than cure

Once a belt is correctly aligned and running straight and true the next objective is to keep it that way with the minimum of intervention. A simple programme of routine checking and preventative maintenance not only helps to prevent unnecessary stoppages for adjustment, it also helps to increase the operational lifetime of the belt. Regular checks should therefore be made on the state of all drums, pulleys and idlers. Failure to replace these components when they begin to show signs of wear is almost always a false economy.

Finally, always keep the working environment as clean as possible, particularly when the conveyed materials that are damp or sticky and have a tendency to build up on pulleys or return idlers because this will cause the belt to run out of line.

About the author

Jeroen Kattouw has worked in the conveyor belt industry for over 30 years and is one of the most experienced and highly respected application engineers in the industry.