Benefit of Stability Part I

Problem: Sagging belt lines preventing effective sealing in the load zones
Solution: Increased belt tension

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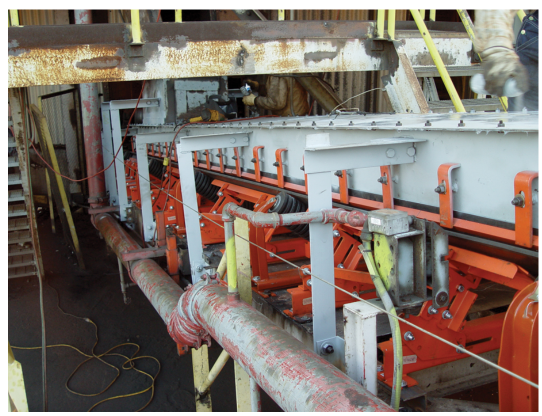

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Belt sag, when viewed from the side of the transfer point, is the vertical deflection of the belt from a straight line as drawn across the top of the two adjacent idlers. The shape of the sagging belt is assumed to be a catenary curve, a natural curve formed when a cable is suspended by its endpoints.

If the belt sags between idlers below the loading zone or flexes under the stress of loading, fines and lumps will work their way out the sides of the conveyor, dropping onto the floor as spillage or becoming airborne as a cloud of dust. Worse, these materials can wedge into entrapment points where they can gouge the belt or damage the sealing system and other components, worsening the spillage problem. A small amount of belt sag – sag that is barely apparent to the naked eye – is enough to permit fines to become entrapped, leading to abrasive wear on the skirtboard – sealing system and the belt surface. A groove cut into the belt cover along the entire length of the belt in the skirted area can usually be attributed to material captured in entrapment points. When belt sag is prevented, the number and size of entrapment points are reduced, therefore reducing the possibility of belt damage.

In order to prevent spillage and reduce the escape of dust particles, belt sag must be eliminated wherever practical to the extent possible. It is particularly important to control sag in the conveyor's loading zone, where the cargo constantly undergoes changes in weight. These changes in load carry fines and dust out of the sealing system and push particles into entrapment points between the wear liner or skirt seal and the belt.

Methods to Control Sag

One method for reducing belt sag along the entire length of the conveyor is to increase the belt tension. There are drawbacks to this, however, such as increased drive power consumption and additional stress on the belt, splice(s), and other components. When utilizing additional tension to reduce sag, the maximum rated tension of the belting should never be exceeded.

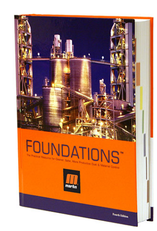
After achieving the belt tension required by the conveyor belt and the load on the system, the recommended method for reducing belt sag is to improve the conveyor's belt-support system.

Proper Belt Support

The key to a stable, sag-free line of belt travel is proper support. The amount of support needed is determined by the unique characteristics of each individual conveyor, its loading zone(s), and its material load. The factors to be assessed include the trough angle and speed of travel of the conveyor being loaded, the weight of the material, the largest lump size, the material drop height, and the angle and speed of material movement during loading

It is essential that the belt be stabilized throughout the entire length of the load zone. Support systems extended beyond what is minimally required will provide little harm other than an incidental increase in conveyor power requirements. A belt-support system that is left shorter than required can lead to fluctuations in the belt's stability at the end of the support system, potentially creating spillage problems that will render the installed belt-support system almost pointless. Belt support is like money: it is much better to have a little extra than to fall short.

More on stability can be found in Chapter 10 of FOUNDATIONS™ Fourth Edition by Martin Engineering.



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