

CASE ENCLOSED

Brandon Fultz, Sweet Manufacturing Company, outlines how the use of enclosed belt conveyors could help to minimise dust and reduce product loss in high capacity concrete facilities.

When it comes to concrete and fly ash material handling systems, a common question is, "How can we maintain the capacity of the facility while keeping dust to a minimum?" Able to handle large volumes while increasing both worker safety and product quality, an enclosed belt conveyor is an ideal piece of equipment for minimising dust and debris in the cement industry.



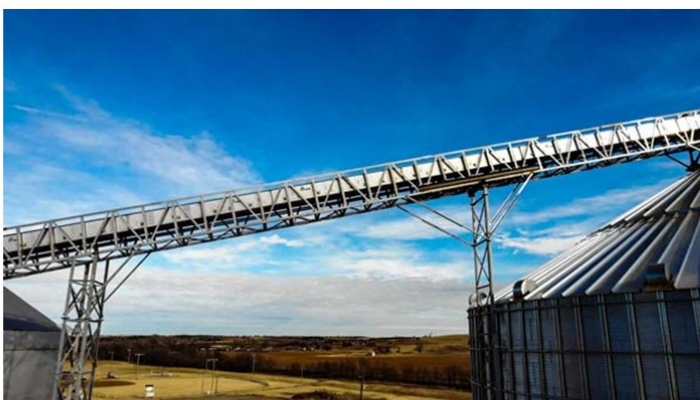
As is well known, the inhalation of cement dust has been linked to silicosis, a serious and sometimes deadly lung disease.¹ This is in addition to a number of other illnesses attributed to dust inhalation. The cleaner the facility's environment, the more the health of employees can be protected. With an outdoor facility, being able to cut down on dust emissions can decrease the negative health effects experienced by neighbouring residents. It can also decrease the common complaints from locals about soot and residue blanketing their homes. Furthermore, the importance of complying with the Occupational Safety and Health Administration's silica standard should not be forgotten.² Keeping silica within permissible exposure limits will help cement companies avoid hefty fines. Having fewer particles in the air also works to prevent fire and dust explosions.



Overhead view of the Sweet® enclosed belt conveyor.



Sweet® enclosed belt conveyor installed at Gunter Peanut Co. in Binger, OK.



This enclosed belt conveyor spans 100 ft between two bins.

The National Fire Protection Association has its own set of standards for combustible dust.³

The issue of dust containment is particularly significant to commercial, high-capacity construction and transloading facilities. High-volume conveying of any material can create a situation where dust emissions are a concern. Current open types of belt conveyors generate excessive dust or material spillage during the loading or discharge process.

Enclosed belt conveyors

Enclosed belt conveyors help to minimise this effect by containing the product within an enclosed load skirt system, and capturing much of the material in the discharge area to avoid pileups in the equipment below. This also prevents loss of product, along with belt scrapers in the head that reduce carryover towards the tail. Enclosed belt conveyors also typically include self-cleaning tails and wing pulleys with reclaim flaps for better clean-out in the tail. Most enclosed belt conveyors feature external rather than internal bearings, which help to contain product on the inside and extend the life of the bearings as well as certain wear parts. In addition, enclosed belt conveyors have the ability to move large volumes of material while simultaneously minimising product movement points, preventing unwanted aeration. Configuring the accompanying elevator for a continuous (gravity) discharge will also help ensure that the product is not aerated at the time of discharge.

Preventing product loss

Many in the concrete industry have the same concerns about product escaping from elevator legs as they do with conveyors. Unfortunately, it is not possible to have a piece of machinery that is 100% air-tight while still being able to access its parts for maintenance and repair. However, there are features that can be included on bucket elevators that can assist with containment of materials. One would be lip or cinch seals that protect the bearings and prevent product from leaking from the boot and head. This is particularly useful when handling finer materials. It is also recommended that elevator heads and boots are designed and fabricated with continuous welding to avoid material gaps that could allow fine materials to escape. Gasketing between connection points and between loading and discharging chutes will prevent product loss. Lastly, shovel hoppers can help operators reclaim material and put it back into the system.

Advantages of enclosed systems

Even beyond dust control and material retention, enclosed belt conveyors have myriad advantages

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over other belt conveyors. The construction of an enclosed belt conveyor lends itself to more adaptable system designs, as it can be horizontal or inclined and can have multiple discharge and loading points. Most enclosed belt conveyors feature CEMA C6 idlers, allowing users to move a wider range of products from the light (concrete and ready-mix) to the extremely heavy (sand and gravel mixtures). In addition, CEMA C6 idlers are a standard off-the-shelf part, available from a multitude of suppliers. Enclosed belt conveyors also generate much less noise than other belt conveyors. EBCs do not have exposed parts like open conveyors, and shafts that are exposed have the necessary guards to prevent catching points.

A solution

Sweet Manufacturing Company's enclosed belt conveyor is well-suited for the commercial and high-capacity industrial sectors, as maintenance can be performed with minimal use of tools and without entry. This solution was designed with plant maintenance and operation personnel in mind. Maintenance parts are on the outside of the company's enclosed belt conveyor. The design allows users to repair and replace the CEMA C6 troughing idlers and return rollers without having to remove the top or bottom panels and unsplice the belt. This greatly decreases the number of tools required and the amount of downtime in the unfortunate event of a breakdown. More importantly, it increases safety as the repairs can be done while maintenance personnel are standing on a platform or catwalk rather than climbing inside the machine. It is similarly easy to access the bearings for lubrication, removal, or replacement from the outside of the enclosed belt conveyor without dismantling the belt.

Holding up to harsh conditions

Built with 10-gauge steel, the Sweet® enclosed belt conveyor is a particularly heavy-duty piece of commercial-grade equipment. The conveyor utilises a design of US prime G140 galvanised steel construction, not only to hold up to harsh plant conditions, but also to allow for outdoor installations. The G140 steel will withstand rough working environments; it may be particularly advantageous to any facilities near ports, salt, and rough weather. The hip roof serves to further protect the conveyor from rain and snow. Inside the conveyor, loading and discharge points that are lined with polyurethane, AR, ceramic chip, or ceramic tile, allow for added equipment longevity. The EBC design also includes a heavy-duty horizontal pulley on the troughing or carrying side of the conveyor. A heavy duty pulley will allow a belt to carry the heaviest loads while the

thick-gauge material is more durable and thus long-lasting.

Hazard monitoring

The company's enclosed belt conveyor features built-in sensor ports that can be paired with a number of optional sensors, either selected separately, or integrated together with the 4B Watchdog™ Super Elite Hazard Monitoring System. This system incorporates shaft speed, bearing temperature, plug chute, and belt misalignment sensors. The ability to monitor equipment condition and performance is critical to ensuring timely repair of certain parts that may deteriorate over time. Sweet® elevators have similar hazard monitoring available. The company has several different elevator models; pairing an enclosed belt conveyor with the right infeed and takeaway equipment will allow for smoother and safer operation.

Conclusions

In summary, the major advantages of an enclosed belt conveyor over a standard belt conveyor are three-fold:

- ▶ Dust emissions are minimised, providing greater health and safety.
- ▶ Product is better contained, with less chance for unwanted aeration or leakage.
- ▶ Enclosed belt conveyors are more substantial, heavy-duty machines with longer life spans.

High-capacity concrete facilities could therefore benefit from incorporating enclosed belt conveyors into their systems. ■

References

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About the author

Brandon Fultz is the Business Development Specialist at Sweet Manufacturing Company. He has 10 years of OEM experience in industrial applications.

