

What type of mechanical conveyor will work best for my fragile material?

When conveying a fragile material, your primary goal should be limiting mechanical contact with the material. Transitions at each transfer point in the conveying line should also be monitored for mechanical contact.

A belt conveyor is an excellent solution for handling a fragile material. Typically, a belt conveyor for a fragile material is made from fabric, interwoven polyester with various covers, rubber, plastic, or steel. Material placed on the belt won't experience degradation because there are no forces acting on the material. A belt conveyor can be used for short or long transfers across a production facility and to make elevation changes while the material remains safely stable on the belt.

The most economical conveyor design is typically a narrow conveyor running at high speed. However, when handling a fragile material, you need a wider belt running at a slower speed to achieve the same capacity while protecting the material. Once you've determined the appropriate conveyor design, you should consider how the material transitions onto and off the conveyor. Obviously, the least abrupt transfer possible is best for your material. Rather than simply dropping material directly onto the next conveyor belt, the transition should be designed to present the material in the direction of belt travel and with a forward velocity nearly the same as the belt speed.

Steve Hartmann, project manager, Chantland-MHS, 515-332-4045

Often, where you see the most material damage during conveying is at the conveyor's infeed and discharge and at transfer points between conveyors. The gentlest horizontal and incline conveyors for fragile materials are:

1. **A flat, troughed, corrugated-wall, or cleated (inclined) belt conveyor.** These belt conveyors are gentle because free fall at the conveyors' infeed and discharge points can usually be minimized, and once the material is on the belt, no further relative motion is generated so material degradation can't occur. These conveyor types can run at a faster speed and still maintain the material's integrity.
2. **A long-amplitude, low-frequency vibratory conveyor.** This conveyor gently moves material forward on a horizontally oscillating tray with a slow forward stroke and a quick backward stroke. The material moves with the tray on the forward stroke but stays in

place on the backward stroke while the tray slides back. This conveyor can only be used horizontally. As with a belt conveyor, free fall at the infeed and discharge points can usually be minimized and controlled.

3. **An interlocking and pivoting bucket conveyor.** This conveyor type is available in a Z or C configuration and can horizontally and vertically convey material without transfers. In addition to the gentle infeed and discharge, the conveyor can achieve increased capacity with larger buckets. Once the material is in the bucket, no further relative motion is generated so material degradation can't occur during conveying. Reducing the conveyor speed will ensure minimal material damage.

*Bill Gorsline,
president,
UniTrak,
905-885-8168*

There is no perfect way to convey a fragile material as the method strongly depends on the material's characteristics and the conveyor's operating mechanics. Some dry materials, especially food items like cereal, will convey well on a vibratory or oscillating conveyor. A mechanical conveyor will usually work well as long as the conveyor speed is slow and the material enters and leaves the conveyor gently and without long free falls between conveyor sections. A pneumatic conveying system may also be appropriate depending on whether you use dense- or dilute-phase conveying and whether the conveying line has a lot of sharp turns or curves, which tend to damage material because of impact.

The best way to truly see if a particular conveyor style will work with your material is by contacting a supplier and requesting a material test. Most conveyor suppliers have in-house test conveyors and are usually willing to test at no charge, as they want to learn about material degradation as much as you do.

*Rich Washkevich,
sales manager,
Conveyor Components,
800-233-3233*

Equipment suppliers are a valuable source of information about equipment and processes. In light of this, each month we ask suppliers a question of concern to our readers. Answers reflect the suppliers' general expertise and don't promote the suppliers' equipment. If you have a question you'd like suppliers to answer, send it to Kayla Carrigan, Associate Editor, Powder and Bulk Engineering, 1155 Northland Drive, St. Paul, MN 55120; fax 651-287-5650 (kcarrigan@cscpub.com).