Grower 101:

Reducing Materials Handling Costs

Top: *Belt conveyors help speed the movement of transplanted containers from the headhouse to the growing area.* ***Middle:*** *A belt conveyor on wheels that can be moved into a trailer reduces considerable walking when loading or unloading.* ***Bottom:*** *This 80-ft. sectional belt conveyor is powered by a single electric motor. (All photos courtesy of John Bartok, Jr.)*

Conveyors can speed materials handling and help control operating expenses.

By John Bartok, Jr.

The efficiency, capacity and versatility of most mechanized plant-handling systems depend on the right materials being in the right place at the right time. Whether supplying soil or pots to a filling machine or moving plants from the growing area to the loading area, a conveying system can be a vital link between the source of materials and the delivery point.

Conveying systems can be dedicated in that they are designed to move only one material, such as the pot conveyor on a potting machine. They also can provide versatility by handling a variety of materials, i.e., a gravity conveyor that handles boxes and bales.

To do the job properly, a conveyor should incorporate the correct principles for efficient movement of materials. It should be "capacity matched" to the input rate of your materials flow. If it isn't, it may cause a bottleneck, limiting the efficiency of your system. It also has to be installed and maintained properly.

Belt Conveyor

A belt conveyor works well for moving boxes, bags, bales, pots, flats and bulk materials. Most manufacturers have several styles, including trough, flight and flat belt conveyors. For most horticultural uses, a light- to medium-duty unit will provide good service and is available in widths from 4 to 24 inches and lengths to 100 ft.

A lightweight, self-contained unit with an enclosed bottom works well for loading a truck or moving a shipment of containers into an elevated storage area. These units will support 300-400 lbs. easily and are powered by an electric motor.

Narrow-belt folding units are popular for moving plants in the growing area, especially where movable benches are installed. The conveyor unit folds to a convenient length for transporting but can extend to 100 ft. or more. One motor powers the entire unit.

A variation of the folding conveyor is the extension conveyor. This conveyor type is made up of one section with a drive unit and a number of additional sections that can be added to provide the desired length. It works well for moving pots from one bench to another when they need to be spaced or for loading plants onto a long truck bed.

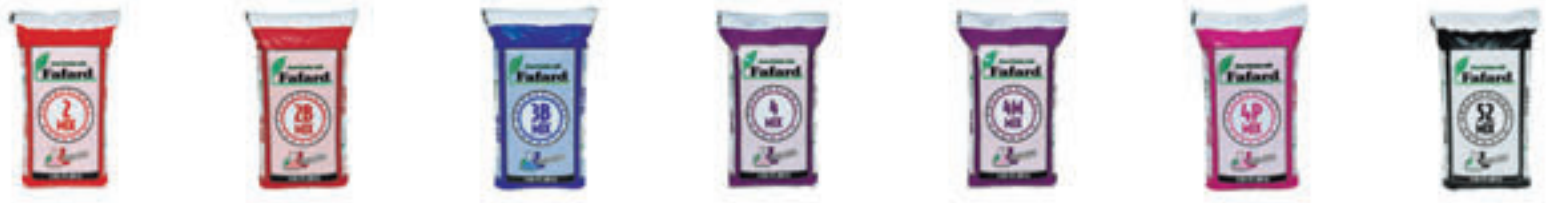
If bulk materials need to be handled, as when filling a potting machine, a belt conveyor can be fitted with flights or formed into a trough. This works well as long as the material is not too wet. Side rails and a hopper at the bottom can be added to increase capacity. If the conveyor needs to be moved frequently, a carriage with pneumatic tires and a winch will make the job easier. Where electric power is not readily available, a small gas engine can be used.

An assembly conveyor can be used for potting and transplanting. Filled containers are placed on one end of a slow-moving belt conveyor. Workers, standing or sitting beside the belt, stick plants as the container moves past. A variable-speed motor is needed to adjust the belt speed for different conditions. Production usually is greater than with most other methods because workers do not have to walk to get materials, and the belt paces the workers to keep up with the constant flow of flats or pots.

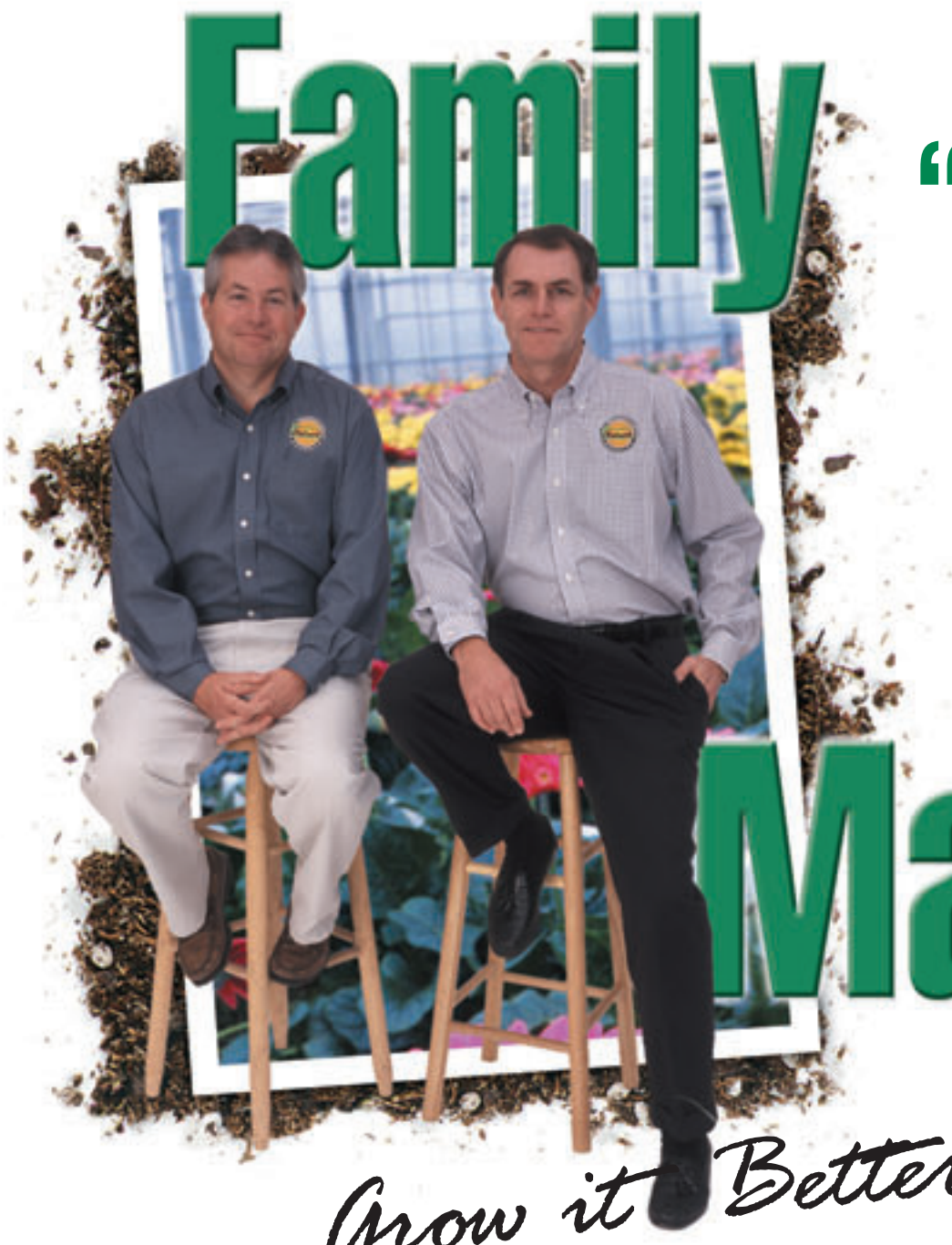
Gravity Conveyors

Gravity conveyors are ideal for moving boxes, bales and flats, either horizontally by manually pushing the material along or sloped down using the force of gravity. To work well, the items to be moved must have smooth, flat bottoms or else be placed on a pallet or piece of plywood.

The original investment in gravity conveyors is a fraction of that required for most other material-handling equipment. Used equipment frequently is available. ➧



Family Matters



"A family relationship is a commitment, and Fafard's commitment to you is consistent quality, value and excellent service. Just like family, Fafard is here for you, as we have been for over 80 years."

— Bob Fafard & Andy Fafard
Owners, Fafard
Agawam, Massachusetts

Grow it Better with Fafard!

For more than seven decades (three generations), Fafard peat and professional mixes have helped grow it better. It's simple really, our family helping yours. As a professional grower, you trust the tested and hands-on consistent quality of Fafard. You depend on our extraordinary service and our technical expertise. Fafard's family of mixes includes blends for every growing concern, plus custom mixes designed just for you.

Fafard®
P.O. Box 790
Agawam, MA 01001
1-888-Grow Mix
Fax: 413-789-3425
Anderson, SC:
1-800-722-7645
Apopka, FL:
1-800-833-7645
sales@fafard.com
www.fafard.com

PROFESSIONAL QUALITY
Grow it better with Fafard
TM

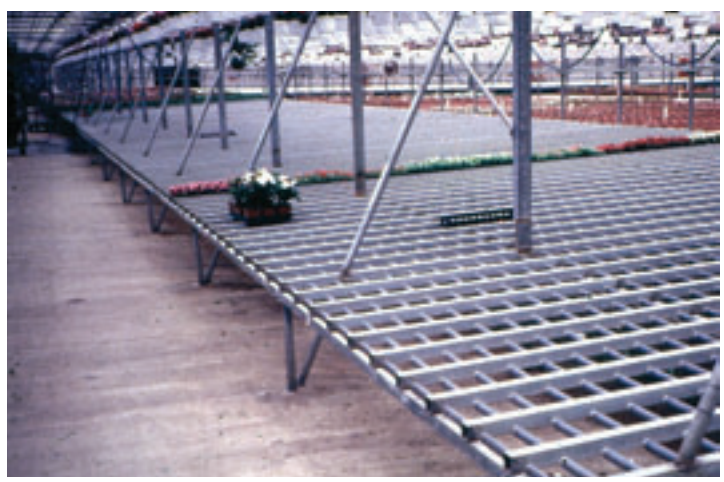
There are two basic types of gravity conveyors: wheel and roller. The rolling surface of a wheel conveyor has a series of small-diameter skate wheels supported by a metal frame. Light loads and items with solid bottoms work best on this type of conveyor. When moving heavier items, a roller conveyor should be used.

Spacing the rollers or wheels is important. A rule of thumb is to provide a minimum of three rollers or wheel axles under the shortest item to be conveyed. This gives good support and avoids excess vibration. Standard spacing is 1½, 3 and 4 inches. The closer the spacing, the more expensive the conveyor — but the smoother the operation.

Load capacity also varies. Light-duty equipment is designed to carry articles up to 50 lbs. Medium-duty will carry items to 300 lbs. Standard lengths are 5 and 10 ft. per section. Sections can be hooked together to form any total length.

Accessories that will make a permanent installation more versatile include curved sections, switches, carton stops, guides and turntables. Powered roller conveyors are available for use with heavy items.

If you have a flat filler or potting machine, you may want to use a roller conveyor at the output end to accumulate the containers until they can be loaded onto a pallet or cart. This helps to smooth out the flow.



Left: *Roller conveyors can be used to accumulate plants from a transplanter or transplanting conveyor prior to loading onto carts.* ***Middle:*** *Lightweight roller conveyors can be installed to hold plants for order picking. Conveyors are kept full by loading plants from the high end.* ***Right:*** *The low-cost trolley conveyor can move 10-30 flats at one time. Curved sections and switches allow movement between the headhouse and greenhouses.*

Overhead Conveyor

An overhead conveyor can be used to eliminate the time-consuming and backbreaking job of moving plants from the transplanting area to the growing area and on to the shipping area. Using this type of conveyor, one person can move 10-30 flats at a time.

This system consists of tubular or angle iron track suspended from the greenhouse frame and a trolley-mounted rack that is pushed along manually. Because the conveyor can move over benches and plants, no additional aisle space is required.

Before installing an overhead conveyor, you should inspect the greenhouse frame carefully to see if it can support the extra load. Curved sections of track can be used to get around corners, and switches are available to change from one track to another.

Auger Conveyors

Use an auger conveyor if you need to elevate granular materials such as growing mixes, peat, vermiculite, sawdust or chips. In these situations, augers are preferred to other types of conveyors because of their simplicity, low cost, durability and versatility. Operation can continue at any angle.

The delivery rates and power requirements of auger conveyors are affected by the type of material, angle of elevation, auger diameter, length, flight pitch and rotation speed. For most greenhouse applications a 6- or 8-inch-diameter auger works well if the material has a low moisture content. A 6-inch-diameter unit will handle up to 25 yards of mix per hour at a 45-degree angle. Power can be delivered by either an electric motor or gasoline engine.

Along with filling flat and pot fillers, augers can be used to keep potting benches filled with mix. The inlet is fitted with a hopper or connected to a bin, and the mix is conveyed horizontally along the back of the potting bench. Spouts located over each bench allow the mix to flow out until the bench is at the desired level.

When higher moisture content material such as peat or soil mixes needs to be conveyed horizontally, a U-trough auger should be used. Various feed and discharge systems are available.

Conclusion

Conveyors can speed materials handling, while helping keep your cost under control. They are available in many sizes to fit most needs and adapt to fit most horticultural operations. These conveyors can free employees for more skilled types of work.

John Bartok, Jr. is an agricultural engineer and extension professor emeritus in the Natural Resource Management and Engineering Department at the University of Connecticut, Storrs, Conn. He may be reached by E-mail at jbartok@rcn.com.

LearnMore
For more information related to this article, go to www.gpnmag.com/lm.cfm/gp030605