From Forest Nursery Notes, Summer 2009

81. Belt conveyors are a great labor saver. Bartok, J. W., Jr.. Greenhouse Management and Production 29(4):34-36. 2009.

Belt conveyors are a great labor saver

By John W. Bartok Jr.

Moving materials is one of the most labor intensive jobs in the production of plants. Although carts are becoming more popular as a method of moving container plants, belt conveyors are very versatile in that they can quickly move cartons, bags, bales, bulk soil as well as plants. They are also valuable for potting or transplanting and the assembly of orders.

Styles and sizes

The belt conveyor consists of a belt that rides on a flat steel bed or set of rollers. It may have legs or may be designed to be placed directly on the floor. A gear motor is used to power the belt. This is usually variable speed to adapt to the materials that are handled. Some conveyors can operate in either direction to help with loading or unloading.

Belt conveyors come in many styles and sizes. They can have a belt that is flat, troughed or with flights. For most horticultural uses, a light to medium duty unit will give good service. Belt widths of 4 to 24 inches and lengths to 200 feet are available.

One of the most popular types of conveyors is the multisection conveyor. It is made up of one section with a drive unit and a number of additional sec-

tions that can be added to provide the desired length. These sections are connected together with gears or belts so that the power unit drives all the sections up to 200 feet in length. These work well for moving pots from one bench to another when they need to be spaced or for loading plants onto a long truck bed. It takes about 5 to 10 minutes to set up a 75-foot unit.

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 is to be moved frequently, a carriage with pneumatic tires and a winch will make the job easier.

Potting, transplanting

A belt conveyor is often used for potting or transplanting operations. Filled containers are placed on one end of a slow-moving belt. Workers, standing or sitting beside the belt, stick cuttings or plugs as the containers move past. A variable-speed motor is needed to adjust the belt speed for different conditions.

Production is usually greater than with most other methods because workers do not have to walk to retrieve materials and the belt paces the workers to keep up with the constant flow of flats or pots. Working height of the top of the belt for operating standing is 32 to 40 inches depending on the height of the containers. Working height for operating while sitting is 28 to 33 inches.

Conveyor selection

When selecting a conveyor, consider the following:

- **Type of material.** A flat bed should be selected for moving boxes, pots, flats and hanging baskets. A concave bed should be selected for bulk materials.
- **Size of containers or rate of flow.** The width of the belt should be adequate to support the containers.

Eight-, 10- and 12-inch widths are common for handling pots, flats and small boxes. Growing media components and mixes are usually handled with 12- or 18-inch wide belts.

• **Weight of materials.** A flat bed for light loads, a roller beds for heavy loads.

• **Distance to be transported.** Lengths to 200 feet are available

• **Vertical distance (up or down).** Motor size may have to be increased for elevating materials.

• **Power unit.** Narrow, sectional conveyors to 100 feet in length are usually powered by a one horsepower electric motor. This requires a 20 amp duplex electric outlet. For outdoor operation, a two to five horsepower gas engine is common.

• **Variable speed.** This is desirable.

• **Belt material.** A PVC cover over polyester monofilament plies provides good lateral stability and excellent tracking and is used by most manufacturers. A rib may be incorporated as a guide to aid tracking. For growing media and other bulk materials, a polyurethane material is used.

• **Support for the conveyor.** Multi-section conveyors are designed so that they can be set on the ground or on the top of a bench. Legs can be added to raise it to working height. Wheels can be added to make a unit portable. Some growers have suspended sectional conveyors from overhead trusses or heating pipes.

• **Weight of conveyor sections.** Light-weight, multi-section conveyors are made from aluminum and weigh between 50 to 70 pounds. Steel conveyors weigh several hundred pounds and are usually mounted on wheels for transport.

• **Maintenance.** Frequent cleaning of soil and debris from rollers and belt surfaces is needed. Adjustment of belt tension and tracking may be required. Keep guards in place for safety. Purchase from a manufacturer that has repair parts readily available.

• **Accessories.** Side guides are used to keep containers from falling off the belt. Diverter bars are available to direct containers to different belts. Counters can be added to total up production. Electric eyes are used to stop flow. Right angle powered roller sections are available for turns. Roller conveyors are often used for accumulating containers at the end of the belt. Hoppers are available to feed bulk materials to the belt.

• **Cost.** Used conveyors are often available from equipment suppliers or at auction. New conveyors generally cost from $100 to $150 per linear foot.

Review your operations to see where belt conveyors can best fit in.

John Bartok Jr. is faculty emeritus, University of Connecticut, Department of Natural Resources Management and Engineering, jbartok@rcn.com.