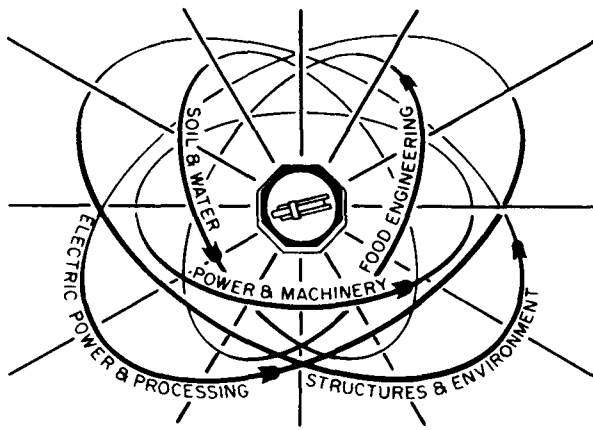


COOPERATIVE EXTENSION SERVICE
WEST VIRGINIA UNIVERSITY

Agricultural
Engineering

EPP - 2.0
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CONVEYING EQUIPMENT FOR AGRICULTURAL PRODUCTS

Conveyors play an important role in the handling of agricultural materials. The high productive capacity of modern farms has created a real need for handling agricultural products in a rapid and efficient manner. The pitchfork and shovel are being replaced by power conveying equipment. Proper selection of power conveying equipment will make it possible to integrate component parts into a smooth, efficient and functional materials handling system. Selection should be made so that maximum utilization of the equipment will be possible at the lowest possible cost. Maximum flexibility should be maintained without sacrificing too much efficiency.

TABLE 1 TYPES OF CONVEYORS USED IN AGRICULTURE

Type of Conveyor	Materials Handled	Length	Speed	Capacity
Belt	Packaged products, grain, sacks, most any material	Short to long	3 - 200 fpm ¹	High
Bucket	Bulk material, grain, fertilizers	Short	50 - 200 fpm	Medium
Chain	Packaged products, grain, roughage	Short to long	10 - 100 fpm	Medium
Flight	Bulk material, packaged products, forage feeds	Short to medium	50 - 250 fpm	Medium
Pneumatic	Bulk materials, chopped forage, grain	Short to medium	3000- 7000 fpm	Variable
Roller (live)	Packaged products, pallets, crates, drums	Short	10 - 100 fpm	Low
Screw or auger	Chopped forage, ground feeds, grains	Short to medium	100 - 800 rpm ²	Medium

¹Feet per minute

²Revolutions per minute

TABLE 2 ADVANTAGES AND DISADVANTAGES OF VARIOUS TYPES OF CONVEYORS

Type of Conveyor	Advantages	Disadvantages
Belt	Will handle most any material Low power requirement Can be used for long distances	Operate on incline only to about 28° High initial cost May need protection from weather
Bucket	Operates on any slope to vertical Efficient, requires minimum space High capacity for vertical lift Ideal for abrasive materials	Limited speed range Heavy, difficult to move Should have automatic brake Used for short distances only
Chain	Low in cost Can be used for many materials Fairly low power requirement	Noisy Heavy wear factor Chains may require frequent adjustment
Flight	Operates on slopes to 45° Discharge at end or at intermediate points	Not suitable for abrasive materials Not suitable for heavy cartons
Pneumatic	Low initial cost & maintenance Simple in construction Flexibility of installation Operating equipment in one location	High power requirement Dust problem excessive Operation varies with type of material
Roller (live)	Smooth in operation Integrated with other conveyors Low power requirement	High initial cost Cartons or packaged materials only Fairly low capacity
Screw or auger	Ideal for light bulky materials Compact, portable, any position Use for mixing or flow feeding	Can cause particle size reduction Not suitable for heavy bulk materials Sections limited in length

Motors for Conveying Equipment

Conveyors are usually powered by electric motors, gasoline engines or tractor PTO. Because of their wide range of application and ease of operation, electric motors are the major power source for conveyors. Selection of the motor will depend primarily on the type of electric power available, type and size of load, and conditions under which the motor will operate.

Totally enclosed motors are usually selected for conveyors used to handle feeds and other materials where dust and foreign particles are present. An open-drip-proof motor enclosure may be used for conveyors handling cartons, crates and other packaged materials where dust is not a problem. Explosion-proof motors are designed to prevent ignition of any explosive gases which may be present as well as exclude dust or dirt.

For many conveying operations a continuous duty capacitor or repulsion induction type motor should be selected. Such motors are capable of starting heavy loads with a low starting current and uninterrupted operation regardless of service. Single phase motors of this type are available in HP ranges from 1/8 to 10. Single phase motors up to 1/3 HP are usually operated on 120 volts. For larger single phase motors, 240 volts will give the best service.

When selecting a conveyor motor, consideration must also be given to the operating position of the motor—horizontal, vertical or slanted. Proper type bearings must be used to assure trouble-free service.

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