

Belt-Driven Conveyor

To begin, belt-conveyors – or conveyors in general – are not remnants from a by-gone era; in fact, as I prepare this letter, such equipment continues to be manufactured, sold and applied with application to material handling and manufacturing. **It is the concept**, not just of conveying something, but of using a belt-type device to do so, that I want to draw attention in this next writing of *Whatever happened to Slingshots...*

For the reader, the subject may seem initially boring or blasé; after all, would such a device or equipment qualify for the world’s greatest inventions”? Nope, it is too simple, inexpensive and commonplace to even vie for such a prominent place in technology. But again, let’s consider the concept; a belt used to drive or pull something. After that, we may consider the possible use of this old equipment at the adjoining – but now closed – textile mill.



To convey something is to move or transfer it: people are conveyed in cars, trains and planes – but more analogous to the belt conveyor – they are transferred by moving sidewalks and escalators. To convey a **discrete object**, you need a power source and/or gravity, and secondly, you need a surface or underpinning that is fluid or dynamic. Fluid substances, such as water, can be moved in part because it contains energy – that enables some self-propulsion given the right conditions; but discrete objects may not do anything but just sit there – unless moved by something else...like a set of wheels powered by a source.

Consider an automobile or truck: if only the “body” was available (and not the engine and wheels), the object would just sit there. Yes, you could sit in it, invite a few friends, and maybe have a small social; but unless you have the power and rollers, you aren’t going anywhere. Ok, a basic and mundane example of motors, but only to point out that a car is a discrete object with a conveyor built-in! But to the point, before it is joined to the chassis (at the assembly plant), it is transferred using some type of in-floor or overhead conveyance system and/or wire-guided platforms.

Another common example is a boat: it usually floats and it has a power source – whether manual or powered; but it goes nowhere without the fluid or water. When some discrete objects, such as coal or rock, are conveyed in a liquid substance, it is called **slurry**. Concrete is an example of slurry that

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that is commonly used for home, industry and all over. Consider a “slurppy” at the local drive-in or convenient store; it has both crystal ice (discrete) and a flavored liquid.

Conveyors come in all shapes, sizes and forms but again, the pictured belt conveyor is among the most basic in that it is a “**stand-alone**” or single unit. By stand-alone, it is not a piece of another conveyor – it is not integrated with other conveyance systems such that it cannot be operated as-is. Of course, it appears to be inoperable because of aging and rust, but if was operating, it could be used as an independent unit. Independent units like this one are usually less-expensive and more readily available from the manufacturer; moreover, the application or use is not restricted to other “pieces”, so the user or owner can use it or sell it relatively easy...as long as it works, that is...

This belt conveyor is only simplified because it does not have controls or mechanisms to activate the conveyor. The devices (called sensors or actuators) are generally incorporated into a **Programmable Logic Controller** (PLC) whereby the “system” is triggered or activated when a change occurs as recorded by the sensor. If the sensor’s light beam is interrupted, for example, the system may activate the conveyor belt to convey the arriving discrete unit. With some application to the basic computer or a trip to the grocery store, consider the scanning of a barcode or passing through an electrically-operated door.

In my past life, material handling and storage has been a common requirement whether for warehousing and/or manufacturing operations. In the assembly of products, some conveyance may be practical for the simple reason that the product is too heavy to convey and manipulate by hand (consider the example of automobiles for example). One of my most memorable experiences was the movement of large ships components are aircraft systems. In terms of volume, repetition and automation however, the warehouse can be very “**mechanized**” or integrated for rapid transfer of discrete items. Many examples of both environments could be offered in this writing, but let’s try to get back to the basic belt conveyor.

The belt has to do with the most effective surface to grip and pull the discrete item. Often belt-conveyors will be used on inclined surfaces (at some acute angle from horizontal) to transport the item to another level or elevation. The rubbery surface of the belt and the discrete item (sometimes cardboard or a plastic tote container) grips well with the unit’s surface – a basic principle called **friction**, of course. Most of us don’t really think about friction until the car slides on a wet or icy surface; but by then, the meaning and principle don’t really have any use...only the ability to recover!

Belt conveyors may have *gotten a start* in agriculture or mining. As illustrated to the right, a belt with slates is used to transfer **aggregate** whether that refined from mine or grown/processed on a farm. Obviously the slates have to do with the nature of the substances – or the size and other properties applicable to handling...conveyance. Using this same combination of belt and slate, my experience once included a similar application or equipment that removed “**sludge**” from an industrial waste basin or repository. One problem with a hazardous waste application however, is whether the substance is caustic or otherwise, can corrode the conveyor; it is better to determine this possibility beforehand, of course, rather than go to the expense with an early demise of the **capital**.



A domestic example of belt conveyors and “sludge” is the local college cafeteria. When the patrons finished their meals, they are suppose to take their trays to the belt conveyor; whereby, the tray is transferred into the kitchen for clean-up and disposal. The belt conveyor does not go into the clean-up area but stops short because of the requirement to use stainless steel and other non-corrosive surfaces for the actual clean-up. Again, the belt transfers the tray to the clean-up station; and from that point forward, a **more-conducive surface** and transfer method is used by the kitchen...

Moving to **parcel distribution**, belt conveyors will be found in large automated warehouses; not usually as a stand-alone, but as an integrated part of a system where many sections of types of conveyors are physically and systematically linked – such that units can literally be conveyed from the point of receiving to shipping – or from arrival to departure!

Think about sending a parcel – or some item that goes in a carton box. This last year, I sent a parcel to my son; a computer in a case enclosed in a carton. From the point of shipment, the item is transferred or conveyed by a vehicle to a distribution point (like a warehouse except with little or no storage). These distribution centers sometimes have automated conveyor systems that receive the item, electronically verify its destination, and route or **sort** it according to it’s labeled destination. Essentially, the carton is **consolidated** with other parcels arriving from other origins – all bound for Florida where my son lives.

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Usually such parcels are insured (in the event of damage during transit); in my example, the item was insured for the **replacement value** of the computer and other merchandise or contents. Should the parcel incur any damage during transit, the receiving party (my son) could file a claim and be compensated for any losses as a result of the damage, etc.



Organizations like the Postal Service, UPS and FedEx handling millions of parcels per day; and to efficiently service the world, they rely on automated distribution systems – to include automated conveyors...and belt conveyors. Conceivably a belt conveyor much like the one pictured on page 1 could be used in many of these international locations.

Yes, this old belt-conveyor has *seen its last days* – but as a concept, belt-conveyance will be around for the ages.