Time for Technology

Conveyors and Track Systems Deliver Bedding Automation

Jack Rodenburg, DairyLogix

As labour costs in the developed world continue to rise, every chore on the dairy farm will be scrutinized to see if there is a cost effective way to minimize it. When it comes to bedding freestalls and pens, innovators in Europe and now also in Canada, are developing some interesting solutions. Driving in among the cows in robotic milking barns with big equipment is very disruptive, so this is one area where further automation, especially for bringing bedding into the stalls, is highly desirable. Almost every company that makes feeding or manure handling equipment is getting interested in this, so new development should happen fairly quickly.

So far I have seen two different approaches used with varied success here and in Europe. In Holland, one large dairy fills a bin mounted high above the feed alley with very fine sawdust. The bin has four flex augers in the bottom, and each auger delivers sawdust along the length of a 180 foot long row of freestalls. Drop pipes fastened to the bottom of the flex augur extend down to about 14 inches above the stall platform, at the junction of four head to head freestalls. In this way, the system delivers a 14 inch high conical pile of sawdust that can be easily raked over the four stalls when they are being cleaned. The drop pipes hold more sawdust in reserve and make this system virtually dust free. According to owner, it works well as long as the sawdust is dry and fine. I also saw a similar system at a research farm in Lelystad Holland, using chopped straw in a tubular chain and paddle style material handling system. The message we heard there was “learn from our experience and find another way !” A third variation, using a continuous conveyor system is in use right here in Canada at Bill VanderKooi’s Bakerview Ecodairy in Abbotsford British Columbia. Developed by Bill in cooperation with the Artex company, this system uses a Jamesway belt conveyor mounted just below neckrail height in the center of a head to head freestall platform. A cross conveyor at the end of the barn drops shavings onto the belt and a reversing plow pushes it off into the front of the free stalls on both sides along the entire row of stalls. Because it is mounted low, there is not much dust. This system has the flexibility to handle a wider range of bedding materials. You can see this barn and the bedding delivery system on the web on webcam #5 at http://www.ecodairy.ca/ .

The other approach which has been developed commercially is the use of track mounted bins or platforms that deliver bedding along specified sections of their route.

The most common applications involve platform mounted bale shredders for square or round bales that travel around the barn on a roof mounted track and chop straw directly into the pen. Companies like Altec, Mullerup and others have systems running on many farms in Europe now. A search of the internet leads one to video clips, on sites such as http://www.altec.fr/en/videosusp.html and http://www.mullerup.com/indexENG.htm . A Danish company, Jorgen Hyldgard has a variety of track mounted systems in operation on Scandinavian farms. This company uses rails mounted on posts extending from the freestalls, so no additional load is added to the roof construction. They also offer a sand option as described at http://www.jhstaldservice.dk/ . Norwell Dairy Systems has recently taken on this line of equipment and their first system is now being installed in a new robotic milking barn at Castledale Farms, in Caledon Ontario.

When the bedding is straw or shavings, track mounted systems running above the stall and animals can be very dusty. They deposit bedding everywhere including on the animals themselves. While this is not ideal over bedding packs, it is even more problematic in freestalls. When cows are laying in the stalls get up bedding on their backs ends up under the partitions and in the manure alley rather than where it is needed. Although I have not seen it done, perhaps a large “sock” attached to the discharge opening, extending to just above the stall surface would reduce dust. Since it would close when dragged over a partition or over the back of a cow, more bedding might end up in the middle of the stalls. Since these track systems look and act almost identical to automated track feeding systems, I am very surprised that no one has found a way to deliver both feed and bedding with the same cart at different times of the day. One piece of add on equipment that could make these systems better would be a sensor that recognizes when there is a cow in the stall and that simply shuts off the bedding delivery if the stall is occupied.

In terms of future development, applying some precision technology and robotics could open up many different options for stall and bedding management. The Dutch have a prototype robot suspended from a set of rails like those used for warehouse cranes, which roams around above a bedding pack looking for black spots in the yellow straw. When it finds one it sends down a grabber that picks up the manure paddy and carries it to a “manure drop” from where it is moved to the manure storage. They also have plans to experiment with this in sand bedded pens. While this seems like science fiction, this kind of technology could someday hover over the freestall area, locate the empty stall, determine if there is manure in it and send down a scraper to clean it, followed by gentle application of just the right amount of clean bedding. Something to think about while we do it the old way with a fork and shovel !