Minnesota Mechanical Tree Baler

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During the early 60's Minnesota's nurseries developed the mechanical tree baler for four principal reasons.

1. Tremendous increase in volume of production

2. Short packing season

3. Increased labor costs

4. Need for a uniform and improved bale

The Federal Soil Bank program of the late 50's placed a sizeable demand for tree planting stock on our nurseries. Annual production increased in leaps and bounds, rising from 10 million trees to almost 45 million trees. Early in the program it was recognized that a mechanical means must be developed to package the large volume of trees which were destined to be moved out of the nurseries.

Our packing and shipping season is relatively short, approximately four weeks from the time the frost leaves the beds until bud break occurs. Out of this four week period we can generally count on 20--22 actual working days . Interruptions in lifting and packing schedules due to snow , freeze up and rains are the rule every spring.

Labor costs had been climbing upward at an alarming rate and as is so common with many agencies, operating funds were not provided in sufficient amounts. Each and every year, in spite of increased appropriations, we were faced with an actual reduction in man hours available to produce and ship our stock.

As hand packers were increased in number, the job of supervision became increasingly more difficult. Complaints on improper and poor packaging were common. It was felt that a mechanically packaged bale would provide the uniformity not attainable by hand packers.

Late in 1959 it was decided to experiment with the conventional Allis Chalmers hay baler which made the round bale. Trees were fed into the hay baler by hand along with moss and the outer wrap of paper. To our amazement we found we could make a bale of trees .

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The problem then was - how could we incorporate this hay baler into our system of packaging?

The first baler we designed had a short 12-15 ft, conveyor table. A layer of moss was spread on the table, the trees were spread out root to root on top of the moss then the load of trees and moss was fed into the baler, followed by the outer wrap. This worked fine, However, only one unit of trees could be prepared and baled at a time We soon decided that a longer conveyor table was needed whereby the operation could be in stages and continuous in operation. We decided on a 50 ft, table and work was started immediately. In the spring of 1961 we had it operational. Normally 12 employees are used on the baler. However, it can be operated with as few as 8 or less, depending on the press or volume of stock scheduled to be packaged.

We first started with men on the baler. However, we soon found out that women do a much better job and the work is not too strenuous, with the exception of removing the completed bale. Here we have a man. The package is of the jelly rool type. As the trees move down the belt they are spread by the workers into a uniform layer, upon which sphagnum moss is automatically discharged by a moss spreader activated by an electric eye as the trees pass under it. Each batch of trees moves along the belt as a separate entity followed by its own outer wrap of paper. Just prior to entry into the baler itself, a spray of water is injected on to the moss. The belt stops its forward progress while the unit bales the trees . At this moment a new batch of trees are placed on the far end of the belt and simultaneously the spreading is accomplished on the other batches of trees in place on the belt.

Trees at the General Andrews Nursery come to the packaging room and to the baler in tubs on automated conveyors. As a tub is picked up, a new tub of trees replaces the tub just removed. Empty tubs are carried away on another conveyor.

We now have mechanical balers in operation at all three of our nurseries . The first at General. Andrews in 1961, the second at Badoura in 1964, and the third at our Carlos Avery Nursery was placed in operation in 19670

Total number of trees packaged by means of mechanical baler to date is over 200,000,000. We average 2 1/2 bales per minute. This can be accelerated up to four bales per minute. At the higher rate, problems are encountered in keeping the packing room and machine supplied with trees Average production from the baler is generally around 500,000 to 750,000 trees per day.

To date we have packaged only conifers with our balers. Hardwoods and mixed orders are still hand baled.

Basically the mechanical baler consists of a conventional Allis Chalmers hay baler, a 50 ft. conveyor belt, automatic moss spreader, automated paper dispenser and paper cutter,

The belt and the baler are powered with a 5 H.P. electric motor. A truck transmission placed into the drive allows us to reverse the baler if a foul-up occurs . The belt is driven by engaging a slip clutch which has been made from a truck brake drum

The 50 ft. belt holds 3 loads of trees in varying stages of processing, with one load in the baler. Stop periods of the belt occur each time the baler is rolling a bale of trees 0 While this stop period of belt occurs , work is carried on at the 2 stages of processing and a new load of trees is added at the 1st stage. Stop period is approximately 15 seconds. Moss is spread on the trees in the 2nd stage, while the belt is in motion. During the 3rd stage and before the trees enter the baler, the moss is touched up and a stick 1" x 1 1/2 x 36" is laid on the outer wrap following the trees. This stick is the carrying stick for the bale, also the loose end of baling twine is stapled on to the stick when the bale emerges from the baler. Bales are stacked 10 to a pallet and removed with a fork lift to the coolers or to waiting trucks.