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Bulk shipment of apples ushers in new era

Unloading the loose-filled apples in the United Kingdom

A new era of low cost, bulk transport of some fruit and vegetables has been ushered in by a Department of Agriculture adviser, Mr Stan Hardisty. The proof was in a refrigerated shipping container of over 13 tonnes of Granny Smith apples sent to England last season.

Ninety per cent of the apples were sold in England as Class I fruit, with 10 per cent in Class II after being graded and stored for a month to observe their condition. Some of these apples topped the market, competing against Tasmanian and South African apples.

It was the first time fresh apples for the table were shipped loose in such a large container. This was made possible by a special loading apparatus built for the purpose, and unloading apparatus shipped to England ready for unloading the container on arrival.

Sea freight per carton of apples to England last season was $7.38 per carton and by sending the apples loose in a shipping container more apples could be stowed, representing a saving of about $2.50 a carton.

Mr Hardisty developed the Hardisty bulk bin several years ago into which 50 kg of apples were packed loose for shipment. These apples shipped well and bulk bins were cheaper to freight than cartons. The loose-filled shipping container is now about $1.75 cheaper per carton unit for sea freight than the bulk bins.

It is believed the new system could be used for pears, potatoes and onions.

Loading fruit into such a big container demands special care and this was achieved with a swinging delivery boom linked to a bulk bin tipper. The apples were tipped from an orchard bulk bin on to a series of belts which took them to the delivery boom. This 3.5 metre boom poured the apples gently and evenly into the container while a board across the floor of the container stacked the apples at a 30 degree slope. This process was repeated until the rear bulkhead was built up.

Apples were expected to withstand static pressure because they suffered no damage when consigned a metre deep piled on top of each other in a bulk bin. Bruising, it was thought, resulted from impact damage.

To successfully test this theory, apples were loaded loose into bins two metres high and driven by truck more than 300 kilometres over rough roads. It was already known from other trials that a suitable low temperature could be maintained throughout such a large bulk stow of apples.

Since some bruising normally occurs in packing shed operations, the trial consignment was not to achieve a totally bruise-free consignment but to see if the incidence of bruising had been significantly increased by bulk shipment. In fact bruising was less than with most other methods of commercial shipment.

The container was loaded on May 7 and reached England on June 3 with the apples in excellent condition. From the one container, 13.3 tonnes were packed for sale. There was little, if any, damage caused by transport in bulk.

The unloading system used is similar to the filling system in some Australian installations for re-binning graded apples, peaches and pears. The fruit left the container from a bottom outlet and a special chute discharged it on to a cross conveyor. A single, in-line bin filler transferred bins through and beneath the belt feed conveyor. During unloading, the container was tilted to almost 20 degrees to avoid the apples cascading and damaging themselves. To ensure an even rate of discharge without damaging the fruit, the apples must at all times maintain pressure against the bulkhead.

The loose-filled system makes the best use of the space available in a refrigerated shipping container. The freight charge is per shipping container so the more apples that can be put into a container the cheaper the freight per apple.

The maximum permissible payload with a container is 17.7 tonnes but apples do not weigh heavily enough to achieve this.

Loaded with apples in cartons, a filled shipping container held 518 cartons weighing about 9.3 tonnes of apples. In bulk bins, the equivalent of 580 cartons of 10.5 tonnes of apples could fit into a container. The new method, with all packaging costs eliminated and its space taken by apples increases the weight of apples by 3 tonnes more than bins and 4 tonnes more than cartons.

The trial shipment and preliminary trials towards it were financed by grants from the Reserve Bank of Australia, the Commonwealth Special Research Grants and the Australian Apple and Pear Corporation and generous support from the shipping industry (ACTA container shipping company).