Catching Frame Development for a Citrus Harvest System

By

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In 1975, Florida citrus plantings totaled 330.8 thousand hectares (817.3 thousand acres), which produced 9.3 million metric tons (230.3 million boxes) of fruit. Approximately 85 percent of this production was processed into products (reference 4). The crop was harvested almost entirely by hand labor.

Florida citrus industry has been searching for several years for ways to avoid total dependency on seasonal labor for harvesting the crop. Mechanical systems have been developed for fruit destined to be processed into products, but have had very limited industry acceptance (Coppock 1969). The main reason has been the low economic justification obtained under a wide range of conditions.

Limb shaker-catching frame harvest systems similar to those sucesssful in other tree crop industries have shown considerable merit in citrus, especially when assisted by an abscission chemical to loosen the fruit (Coppock and Hedden 1968) (Wilson 1969). A problem in the acceptance of those systems has been in the development of a catching frame to fit a wide range of operating conditions without becoming too expensive, fragile, complex or bulky for effective performance. A "catch-dump" catching frame concept was conceived which showed promise of simplifying the frame design without limiting its function. A review of developments leading up to the "catch-dump" concept, the development of the concept into a harvest system and the system's performance are reported in this paper.

The main thrust of powered catching frame development began about 1960 when light-weight inertia shakers suitable for mounting on frames were developed. In 1968, Coppock and Hedden reported on an experimental shaker-catching frame harvest system. It employed two tractor-drawn frames, one for each side of a tree with a limb shaker mounted on each frame which swung into the tree diagonally across from each other. One frame contained fruit handling conveyors and the other permitted the fruit to move across a seal onto that frame. Fruit from both halves of the tree was temporarily stored in a wire basket located on the frame having the fruit handling conveyors. Coppock 1967, reported on another version of this harvest system where the shakers swung into the tree from one side of the tree rather than diagonally and where the fruit was stored in a bin located on one frame rather than in wire baskets. Later the frames were changed to incorporate a fruit conveyor in each frame with a crossover conveyor at one end. This enabled each frame to operate independently which eliminated the neces-

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