



Tom Visser demonstrates how the Pic Rig operates in a Highlands County grove.

Engineer develops Pic Rig mechanical harvester

In a 4,000-square-foot Sebring warehouse, Tom Visser and several helpers move quickly. This is the setting where nine Pic Rigs have been constructed and field-testing is ongoing.

Visser, an agricultural engineer with Agricultural Engineering, P.A., analyzed the citrus market in November of 1993 when prices began plummeting. This prompted him to tackle the problem that he considers the single biggest cost to citrus growers: harvesting.

Visser graduated as an agricultural engineer in 1978 from the University of Pretoria, South Africa. After that, he spent most of his time either developing specialized agricultural equipment or managing subtropical fruit production units. Two years ago, he and his family came to Florida where he joined an agricultural consulting firm in an effort, as he says, "...to open my horizons and to find more challenges."

The challenge at hand is to demonstrate that his newly-invented mechanical harvesting system will do the job. "My goals were to build a harvester that is tree-friendly, simple to operate and economical to run," Visser advises.

For fruit removal, the Pic Rig mechanical harvester utilizes 59 PVC

rods that are 74 inches long and 1 1/2 inches wide. The rods have mounted, spring-loaded fingers which penetrate citrus trees, catching the fruit, removing it from the tree and dropping it to the ground.

Visser says, "We are in the process of producing collapsible fingers. The initial ones did not collapse, and I think they may have reduced the picking rate of the machine. Possibly they scarred the trees in some instances. With the new version, if the fingers receive a minimal force, they will collapse. Upon withdrawal the fingers, set in a position ready to pick, will extend and extract the fruit as they move outward."

The flexible PVC probes are mounted with front end cones. These lead the way into the citrus trees. They can swing as much as two feet to the left or right in their forward thrust through the tree's structure.

Visser remarks, "I have made provisions should anything happen that the picking unit cannot penetrate beyond a certain point. The unit, driven by a hydraulic motor, has very low hydraulic pressure. If it requires any more effort than the preset value, which is adjustable, the penetration action will simply stop. It will not tear the tree apart or break the

machine. The two hydraulic wheel motors at the back of the Pic Rig can free-wheel. If the machine penetrates the tree and hits something solid, it will simply roll back."

Visser claims the machine's capacity is 30 to 60 boxes per hour, depending on fruit density and fruit size.

"According to figures that I have seen, 55 percent of all trees in the state of Florida are younger than five years. The Pic Rig, designed especially to fit into the smaller tree, higher density grove situation, is six by seven feet. This is all the space that is needed to turn it or move it anyway I want," says Visser. "It has a zero turning radius. I can run one wheel forward while I'm running the other one in reverse. It's hydrostatic, and that's the way you can move it around."

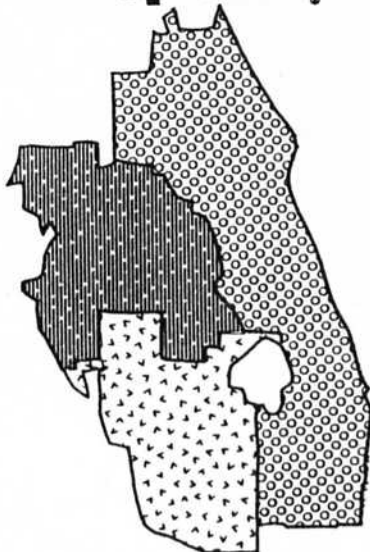
One modification already incorporated into the Pic Rig design is the addition of springs which have increased tension. The springs alleviate excessive penetrations into the tree, cutting down on mechanical damage and speeding up the machine's capacity.

"This is very important," Visser comments. "We have to have the maximum possible capacity with the machine. It saves money. The faster it


Jerry Bateman demonstrates flexibility of the PVC rods which penetrate the tree.





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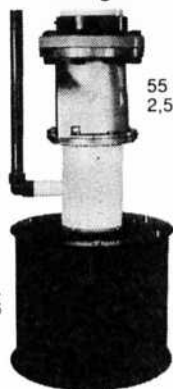
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can work, the more savings the grower realizes."

Economics is his driving force. "In one model I built, all of the fruit could be caught and never touch the ground, but in order to keep it as simple as possible, my current model drops the fruit within a circular band around the tree's canopy. This concentrated drop area keeps the fruit out of the way of any grove traffic and from underneath the tree.

"My aim is the juice fruit market. I've watched pickers drop much fruit to the ground, and I've talked to growers about this issue. It appears to me that their biggest concern is getting the fruit economically picked."

Other modifications already in place include developing a four-wheel drive version of the Pic Rig. "In situations, like on the Ridge, where it is very, very sandy and also in bedded groves, there are some limitations with the two-wheel drive," Visser comments. "I believe in the future I will produce all of these units with four-wheel drives."

An available option with the machines will be a bolt-on extension kit. This attachment, designed for taller trees, extends the picking unit potential to approximately 14 feet. Also, Visser has adapted the original version so that the picking unit can go lower and reach fruit only 12 inches above the ground.

Other features include a quiet, two-cylinder engine, a high-speed trailer and lights for nighttime operation. Adjustable deflectors have been placed around the wheels to prevent fruit damage. Shields keep fruit from flying back into the machine. Four high flotation type, knobby tires make it effective in sandy conditions.

Visser notes, "The tires at the back are bigger because that is where traction is needed. The front ones were kept small because the picker unit sits on top of them. The larger the front wheels are, the higher the picker unit is going to be above the ground. My intent is to keep it low in order not to miss lower-hanging fruit.

"For picking in groves with furrows, I've put a pivoting axle in front — just like an ordinary agricultural tractor. In order to keep the low caster wheels from becoming locked into small furrows, I have increased the distance between them."

Since this machine is driven by a 16 hp gas engine, it has very low fuel consumption. The engine drives one hydraulic pump that supplies oil to feed the left and right rear wheels, the cylinder to raise and lower the picking unit and the hydraulic motor which drives the picking unit into the tree and back.

Many demonstrations have been performed for growers. In Raymond Royce's Highlands County grove, southeast of Lake Placid, Royce's son points out that the machine's versatility. It is simple to operate, and the picking unit could be taken off to be used as a herbicider.

"That's how the picking unit is," says Visser, "it just comes right off. You add a tank and a boom, and there you go. You can use it off-season."

At this point, Visser is not quoting prices for the machines. "My strategy," he advises, "is to initially demonstrate the Pic Rig at no charge. After the client is satisfied with what it can do, we'll sit down and discuss an arrangement. I don't want to sell the machine until it is proven. I don't want anybody to buy a machine until the machine is proven."

Visser projects that one Pic Rig will be capable of harvesting between 150 to 200 acres per season.

"I've concentrated mainly on picking Valencias," he said. Field testing began at the end of last season. When you pick late season Valencias, a new crop of immature fruit may be on the tree at the same time you are picking mature fruit. The Pic Rig is selective. Anything smaller than a certain size will simply slip through the fingers and not be picked."

Visser has already invented a second machine to work in conjunction with the Pic Rig. It will immediately vacuum the fruit after it is removed from the tree. "I plan to offer a complete system which will totally mechanize the harvesting operation. This second component will soon be available," he stated.

In thinking of the future, Visser says, "The problems related to mechanical harvesting are not solely those of the inventor of the machine. To be successful grove owners in the future must help to create grove conditions conducive to optimum mechanical harvesting practices."

For additional information, contact Tom Visser at 813-385-6598. ■