History of Tree Spades

It's been only a generation – maybe 30 years or so – that the tree spade has been around. In that time, it has all but put an end to the old-fashioned hand or back-hoe dug procedure. However, as a "technology" (if we want to go that far in its description), the advent of the tree spade has made contributions not only to arborists who own them but also to the trees they transplant.

The spade initially was intended to make it easier to dig up, move or transplant larger specimen-size trees, commonly those larger than the balled and burlapped varieties found at the nursery. The objective was to find an easier (and therefore more profitable) method of taking and transplanting trees for "instant" shade or beauty.

Along the way, a second benefit became obvious: Higher survivability rates. How's that possible over the old hand-dug method? Two reasons. First, the compound form and angle of the spade – somewhat like a spoon – makes for a more compact root ball. Second, the precise cutting nature of the mechanism and the fact that the spade can carry the tree with minimal disturbance means the precious roots and root hairs remain contacted with the nutrient- and moisture-rich soil.

When Tree Care Industry magazine interviewed makers of tree spades, those two criteria – simplicity and survivability – kept coming up as the main motivations for the tree spade and its continuing evolution in terms of both design and root ball capacity.

Differences in tree spades are varied. Tree spades can be mounted on trucks, trailers or skidders – even farm tractors – meaning they can be used in tight nursery and residential areas or wide-open forest areas; for digging and hauling locally or over long distances. Some are designed for use on one machine in tight spaces and are re-mountable for transport over distances or difficult terrain.

Prices range from $8,000 to $80,000 or more for some built-to-order units. Whether the tree spade is on the small side (for nursery or light landscape use) or is the behemoth 100-inch that requires attention to DOT regulations to make them not only efficient but also legal for over-the-road portage, the objectives are the same: profitability and survivability.

A tool for profitability

¨ Long ROI – return on investment. Spades last a long time, assuming normal maintenance. They are simple in terms of moving mechanical components, driven by a proven hydraulic system. Not "destructive" by nature like a grinder or chipper, the calmer life and environment of a tree spade contributes to its longevity.

¨ Low maintenance costs. Large or small, with proper care, a spade will last 10, 15, 20 years or more moving from one owner to the next with the same level of productivity.

Simple valving connected to existing truck tractor or skidder hydraulics operates the dig, lift and tilt requirements from one operator station. Grease points need regular attention as do dedicated remote engines that run the hydraulics on portable trailer units. Spades themselves need little attention – other than blade point alignment adjustments and occasional sharpening. With the exception of a broken blade, the spades last the lifetime of the unit. (Most units are powered by a hydraulic lift cylinder. Some employ a chaindrive that requires normal chain lubricatoin and maintenance.)

¨ Tree transplanting can be lucrative. With a 50 percent margin common (100 percent markup on the cost of the tree if purchased, and more if the arborist has a private source), single, large-specimen trees can contribute $1,000 or more each to the bottom line. Given that the procedure often requires only one piece of equipment and one operator, profitability levels can be much higher than on other jobs.

Chris Nichols, product manager for the environmental division at Vermeer (one of the pioneers of the industry and holder of some of the original patents), says the tree transplant industry has changed in the past 10 to 15 years. The most recent trend has been toward units with bag and burlapping capabilities, augmenting a legacy in the mid- to larger-size spades, many of which remain in use in second and third ownership.

Nichols says a basically sound economy is good for the transplanting business, and efforts in the United States and Europe to control soil erosion and to make contractors and landscapers responsible to restore disturbed work sites make for a healthy demand for transplants, and, thus, for the tree spade.

Vermeer makes spade units ranging in ball capacity of from 20 to 52 inches. The TS 20 and 30 (with 20- and 30-inch capacities, respectively) are three-point mounts. The TS3300, a 33-incher, can be either three-point or skid-steer mounted. The TS50m, accommodating 48 to 52 inches, is a truck mount design capable of 1,900 pounds.

“We’re focusing on units like the TS44 models (TS44A trailer or TS44T truck),” explains Nichols. “These are popular, user-friendly smaller machines capable of transplanting up to 4-inch caliper, fairly mature trees with a ball diameter of 44 inches, ball depth of 40 inches, and they can manage a tree ball weight of 1,173 pounds.”

In recent months, Vermeer has found renewed interest in its larger diameter units, such as the TS 8000 and TS66. “These accommodate larger diameter and taller, much more mature trees – some up to 20 feet tall,” Nichols says. The demand, he adds, is for trees with leaves that can be moved right in. “We are seeing a lot more activity in this area where people don’t want to put in a seedling and wait for it to grow.”

A tool for survivability

Wayne Van Mersbergen is a trainer for Vermeer. A former product specialist and still owner of a tree care company, Fran-Way Tree Moving Inc. in Pella Iowa, he’s familiar with both ends of the industry. “I’ve been transplanting trees since 1965. In those days, it

was pretty much all by hand, even up to 5-inch diameter trees." he says. It's nicer, easier and more profitable to push a few levers.

Having experienced the transplant revolution, Van Mersbergen is convinced that tree spades make for trees that are better off.

"Hand spading or back hoes often don't make cuts cleanly. Vibration from digging further damages roots," he adds, noting that the problem is compounded by the agitation required to wrap burlap, get the ball out of hole, move and drop it onto a truck or trailer where it can further deform, knock off precious soil or create open air pockets. With the old method, this can happen three times or more, he explains.

"Tree spades traumatize the tree once," Van Mersbergen relates. "With the blades down, the ball stays intact during transport and makes liveability better."

He also notes that some of the smaller units with single-process capability can dig, ball or wire-basket into a tight package that can be picked up and moved more easily with less impact on a tree.

From an entrepreneurial standpoint, Van Mersbergen says transplanting has been "pretty steady as a business all along, especially in the 8-inch and smaller trees." While they can grow up to 30 feet in a crowded timber environment and only 20 feet in a less competitive nursery environment, "I'm mostly concerned with the diameter of the trunk which, together with the root ball, dictates the tree spade requirement."

Looking back on economic effects over nearly 40 years, he concludes: "The economy affects what people transplant and the size of tree spades sold. A tree is a luxury. In a bad economy, they won't pay $400 to 500 to transplant a larger tree. They will plant a smaller one and wait for it to grow."

As a trainer, Van Mersbergen takes less than a day to teach basic operation, and after that, it's a matter of experience on setting the tree properly.

One of the most prolific brands in the industry is Big John, which is noted for its five truck-mounted tree transplanters capable of moving up to 12-inch caliper trees with balls in excess of five tons. Key features of Big John units are not only the capacity but also the single-operator station and near horizontal transport position even over rough terrain. Typical root ball configurations for its spoon-shape spades are 34, 42, 52, 62, 80 and 90 inches.

Will Humphreys, a vice president at Big John's, says that growing demand and interest in transplanting established specimens means the transplanting business is still in its infancy.

"Initially, the arborist didn't think much about mechanical tree spades, but survivability rates have helped gain their acceptance," Humphreys says.

“Big John’s spoon-shaped blade helps with getting more of the root system and a more containerized root ball,” he adds.
Long a leader in mid- to large-sized units, Humphreys says the company has developed an as-yet-unpriced model capable of digging up to a 100-inch root ball that is also within all legal width and height requirements for over-the-road transport. “That’s always been a kicker for spades of this size, but we’ve done it.”

Big John is also working to develop and deliver a line of production diggers for nursery use that includes balling and burlapping in the smaller-end 42-, 32-, and 28-inch units.

With an established technology in place, innovation is the name of the game in what is becoming a worldwide market.

Paul Bennett, one of the owners of Tenessee-based Bennett and Bennett Enterprises, the exclusive source of the German-made Optimal Tree Spades, says that continuing demand for larger trees is driving the market.

“Companies that produce larger truck-mounted machines have figured that out and are looking to build even larger (ones) that are efficient to use and economically feasible,” Bennett reports.

A forester by education and by trade before becoming a purveyor of tree spades, Bennett says tree movers are looking to move up in size. Unfortunately, highway restrictions have limited the larger units over the road.

“The Germans solved this problem over the years,” he explains. In Germany, he says, “demand was dictated more by an interest to preserve large trees.”

Optimal was started 30 years ago by someone in the tree moving business who got a contract to move large trees. Beginning the job by hand, he heard of a Swiss man who bought a large U.S.-made, truck-mounted tree spade and soon after hired the Swiss. When the operator had to stop at the first bridge and back around so as not to damage the branches, that’s when it became obvious that “he was carrying the tree the wrong way,” Bennett relates.

Recognizing opportunity, the inventor knew that two key factors had to be addressed – orienting the tree horizontally and in such a way that branches would not be damaged by wind, obstructions or power lines.

The result is an Optimal device now capable of 24- to 120-inch diameter root balls and transport of a 55-foot-tall tree down the highway.

Bennett stocks machines suitable for 16- to 120-inch diameter root balls. The company inventories up to 67 inch units. “After that, they are custom built. The 120-incher is

custom built and costs about $1 million, Bennett quips. “For a 1 million dollar tree spade, we will throw in the truck!”

Another leading supplier is Dutchman out of Canada and Nebraska, which began producing tree spades in the 1980s. A longtime major supplier of large-caliper trees to the commercial/industrial landscapes beginning a decade before, Dutchman leveraged its “moving experiences” into a healthy machine business.

Today, Dutchman supplies units ranging from the large truck-mounted 48-inch spade with a coned “clamshell” suitable for deep taproot species such as pecan, oak and pear. Like some of its competitors, Dutchman makes a quick-disconnect system that will swap over from a truck mount to skidsteer.

These multi-use designs are aimed at providing versatility to the arborist (you don’t have to tie up a truck for one piece of equipment) and flexibility (you can get into tight spaces such as nurseries and back yards with minimal damage by shifting back and forth from small to large transporters).

The current economic downturn may be repressing consumer desire for instant shade somewhat. Nevertheless, spade manufacturers predict a healthy future ahead – for their equipment sales and for the trees that will be moved with them.