

ENGLISH TECHNIQUES IN LARGE TREE TRANSPLANTING¹

by Chris J. Newman

Abstract. Increases in gas prices in England during 1974 induced Civic Tree Care Ltd. to develop mechanized transplanting of large trees in multiple loads for economy of transport. The Newman Tree-Porter system brought many other benefits; one small machine using a hydraulic hammer drives curved blades to dig 7 sizes of ball from 32" up to 80"; good performance in hard, stony or frosted ground; improved tree survival, and extension of planting season; low capital cost and low maintenance; versatility for digging and planting in awkward places. Tree-Porter augments Civic Tree Care's long established Newman Trailer transplanting of larger trees with 90", 100", 120" balls hand-dug and mechanically wrapped with Newman Frames.

Gas prices in England went up to the equivalent of \$1.50 per imperial gallon back in 1974. Seven years later the price equalled about \$3.00 per imperial gallon.

The shock of these gas price increases in 1974 caused my company, Civic Tree Care Ltd., Britain's largest tree transplanters, to review the whole structure of its operations. We concluded that mechanical transplanting with our six year old tree spades was no longer economical, and we sought new solutions to combat rising costs of fuel and wages. As a result of five years development, by 1979 we had evolved the Tree-Porter for excavating and balling large trees. This machine is now selling worldwide, including the USA, and is the subject of Patent Applications in UK, USA, Japan and other countries.

The new Tree-Porter[®] machine.

The Newman Tree-Porter system offers some very attractive alternatives to other transplanting machines. To start with there is only one size of Tree-Porter and it expands quite simply in a matter of 1-2 minutes to dig seven ball sizes of 32", 40", 48", 56", 64", 72" and 80" diameter using progressively more curved blades from 4 up to 10 to achieve this remarkable feat. Furthermore, Tree-Porter may employ many sets of digging blades to dig a number of trees per truck load. Using any standard truck and hoist or tractor, each

tree is then lifted out and transported within the same blades that dug it out. Multiple loads of such trees gives very valuable savings in fuel and transport time. Tree-Porter has the ability also to dig in hard, stony or frozen ground because the blades are hammered into the ground by a powerful hydraulic jack-hammer. This eliminates the tendency on hard ground where other diggers "lift-off." Hammering also permits Tree-Porter to be small and light. In the past, the convenience of mechanical transplanting has usually been achieved at some sacrifice of the tree's requirements. But with the Tree-Porter it was my company's determination that the design be compatible with the needs of the tree as well as being economical in capital and running costs.

Care of transplanted trees.

Putting the tree's needs first, might seem an obvious priority. But it has not always been observed, especially where these requirements may not have been appreciated fully by the designers. The needs of the transplanted tree may be summarized concisely together with Tree-Porter's solutions as follows:

1. Ball size should vary to suit the size, species and growing conditions of the particular tree. An experienced plantsman may judge the needs of each tree in this respect, and using Tree-Porter he can dig the appropriate ball size for optimum quality and economy.

2. The ball should, whenever possible, be undisturbed by 'double handling' into a basket or rewrapping after digging. Tree-Porter system enables transportation of multiple loads of large trees within the nests of blades that dig the balls.

3. The weight of heavy headed trees should be supported during transport, when laid over. Tree-Porter system provides padded tripods to support the trunks of trees in transit.

4. Balls should be protected from collapse

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Figure 1. Newman Tree-Porter transplanter digs by hammering in a ring of blades to contain a root ball. Seven sizes of root balls are dug by the same machine simply by increasing the number and length of blades.

throughout replanting. Tree-Porter blades remain as a supporting nest around the ball until the planting pit has been backfilled. The blades are then unlocked, lubricated with water and slid out from around the planted ball.

5. Planting pits should be at least 12" to 24" larger all round the ball to incorporate "improved" soil and drainage for enhanced new root growth. Tree-Porter system advocates use of standard excavators to dig generous planting pits at economical cost, prior to delivery of trees.

Commercial aspects of Tree-Porter concept

But of course, it was not enough for Tree-Porter to satisfy the essential needs of the tree without also being commercially economical to operate. In this respect we gave considerable care to Tree-



Figure 2. Extraction of Tree-Porter root balls in narrow nursery rows is done without maneuvering the truck off the row, since the boom-crane lifts from the side. Various sizes of root balls are being loaded for economical transportation.

Porter design features which may be summarized further.

1. Multiple loads of various sizes of ball permit economical truck deliveries across the city or over longer distances.

2. Tree-Porter is small, light and compact compared to its predecessors. It can work inside close grown plantations where the larger machines cannot maneuver. It can, for example, dig alternate trees to thin out plantations leaving the remainder to grow on. Two men can carry Tree-Porter.

3. Tree-Porter's hammering action enables it to dig in heavy clay, or dry, frosted and stony ground where its predecessors, that dig by pushing, tend to "lift-off" instead of penetrating.

4. Balls dug by Tree-Porter may be lifted by a

crane over obstacles where the dig machines cannot reach. Tree-Porter Eco-4 version weighs only 132 lbs and it can be lifted over obstacles to dig inaccessible trees.

5. Tree-Porter is not attached to a vehicle thereby tying up an expensive capital asset. Tree-Porter can dig a whole load of trees even before the truck comes on site to load.

6. Operating Tree-Porter requires 2 men. At the outset we conceded that for safety and social reasons, 2 men are a minimum and also an optimum team. The second man's time is all used productively, but training to work methodically is important.

7. Rate of output of Tree-Porter versus existing machines can be misleading. Tree-Porter normally takes 1-2 minutes to drive each blade with ½-1 minute in between to index the machine and re-

load a blade. The only true test of Tree-Porter's output is to plan and time complete typical transplanting operations.

Benefits of Tree-Porter merit a complete re-think of operations.

1. Although Tree-Porter blades are intended to act as a 'container' from digging to planting, users might wish to de-blade and burlap wrap root-balls of cohesive soils. But in UK we have to work in all types of soil so we have increased our business by undertaking all planting of 'bladed' Tree-Porter trees within about 200 miles of plantations. We use our own fleet of transport and gangs for this replanting. We virtually double our turn-over and our profits by exploiting this aspect.

2. Surely therefore the constructive approach to evaluating Tree-Porter should be to assess Tree-Porter's special capabilities and if necessary



Figure 3. Tree-Porter dug root ball of 80" on 7" caliper *Ficus* is lifted by a nursery fork-lift unit that also loads trucks. Tree-Porter (background) takes hydraulic power from a small nursery tractor. Hydraulic jack-hammer keeps digging in hard and stony ground.

re-plan operations to maximize the benefits available through the new techniques.

3. For example, by digging ahead of delivery and storing in a Show Area in order to publicize product.

4. Or by expanding summer business to include 'in-leaf' planting, achieved by digging oversize root-balls and offering follow-up maintenance on such trees. For summer planting, trees can be partly dug several days early, or else they can be lifted and hardened in a shady part of the Sales Area.

5. Or again Tree-Porter can be used to haul in a load of specialty trees from say 200 miles away.

6. Another money earning accessory of Tree-Porter is a small tipping trailer on which to man-handle 4 ft and 5 ft root-balls into back-yards. Planting pits in back-yards can be dug by Tree-Porter and the tipping trailer removes the core plug in one piece.

7. Truck beds can be extended by a 3 ft shelf to

carry Tree-Porter or tipping trailer to avoid taking up valuable pay-load space.

Low cost and low maintenance

Tree-Porter digs seven sizes from 32" up to 80" yet is considerably cheaper than any one of its large predecessors digging just one size. As an example of its economy a user can start with as few as 15 blades to cover ball sizes up to 80" for under \$9,000 (May 1981 price delivered US customer, excluding taxes). As business increases, more blades may be added to suit a particular pattern of operations.

Tree-Porter employs the established technology of hydraulic jack-hammers that are serviced by existing local facilities. Hydraulic power may be piped from a tractor's hydraulic system or from a portable power-pack.

Flat bed trucks and trailers transport the large trees dug by Tree-Porter. There is no extra investment in special vehicles to do just one job as with other hydraulic transplanter.

Conclusions

Tree-Porters' low cost, simplicity and economy offers big savings to established tree transplanter. It also makes large tree transplanting an attractive economical operation for a wide variety of organizations that hitherto may not have considered it. Potential new users of Tree-Porter, in addition to landscape and nursery companies would embrace county and city parks departments; national park authorities; military bases; utility companies; mining companies; estate developers; ranches; leisure complexes; golf courses; country clubs; cemeteries. The low cost and versatility of Tree-Porter could make it a standard piece of equipment for any organization managing land and trees. It would become attractive for these organizations to plant tree 'banks' as part of their long term planning. Tree-Porter's flexibility of root-ball size would permit the transplanting of these trees for between 5 to 15 years.



Figure 4. Flat-bed truck with knuckle-boom hoist loads 64" root balls for summer transplanting. Three 5-6" caliper birches are an economical load. Unloading and planting into awkward city sites is made simple by using the boom-crane.

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