BENEFITS FROM METHOD STUDY IN CUTTING PROPAGATION

GEOFF J.E. YATES

Merrist Wood Agricultural College
Worplesdon, Guildford, Surrey

Method Study as a branch of *Work Study* makes better use of time and energy by developing the most effective method of working. What I am about to describe is not how to work faster and faster but better.

Every job should really be observed and recorded on its own, since where I insert cuttings today may be entirely different to next week or where you root your own material. However, the principles that I have used in this example can be applied right through the complete range of propagation from cuttings.

I want you to ask yourselves and select what is the key *doing* operation required to root the more common material which is to be handled in large numbers? . . . To me, it is the insertion of the prepared cuttings to permit the best conditions for rooting to be applied quickly and effectively. Skill is required for selecting and making cuttings — though we might argue that one — but once our criteria are set others should be able to follow the example of what makes a suitable cutting. We can make a lot of good cuttings but the delays of insertion and poor after-care can waste a percentage of this skilled output.

A study of making the actual cuttings can also be of value, but there would be very many effective methods according to the time of year and the species to be handled. So this study concentrates on inserting cuttings. The location is outside in late summer under white polythene in what is often called the "strawberry tunnel." I have worked up the improvements on this over several years on my own ground cover nursery using my own labor, or that of untrained teenagers.

At Merrist Wood we allow nursery students to insert cuttings in such a bed and to develop their own improved methods. Almost 100% naturally work across the bed as shown at right angles to the length of the bed using marker boards, with or without spacings, or pre-forming the holes in the bed with nail dibbers, etc. The cutting material used is *Cotoneaster salicifolius* 'Saldam', purposely using soft shoots to demonstrate that even soft-stemmed material does not have to be dibbled into the rooting medium.

It is a hot day, the material must be protected, in this case in a polythene sack, but the operator wastes a lot of effort having to pick out the material which was thrown into the bag anyhow. You would have the material laid out in the same direction and would

probably take up a handful in the left hand and then push the individual cuttings in with the right hand, having dispensed with the dibber and making sure that each row is firmed up afterwards.

At this stage various minor improvements are made for the convenience and comfort of the operator. A lined box to store the cuttings, a box and board to sit on. In one study we found that as much time was taken to move these boards as was taken to insert a row of cuttings from the sack.

From the squat or crouching position we can observe that the person inserting cuttings, even when close to the work, has to make several trunk twisting movements, to replenish his hand with cuttings. He or she probably moves the store of cuttings every row and this study indicates an exceptionally short row. (14 cuttings per row across the bed).

A breakdown of all these movements, and *only one operation actually gets the cuttings into the bed,* in a *Man Type Flow Process Chart* reveals how complex and disjointed the insertion of a thousand cuttings per hour can really be. By examining our method we can reduce the time from 54 minutes down to about 30 minutes and have enough time to water-in and cover up more carefully than before.

By looking at repetitive jobs frequently and analytically, we can record what is happening by examining the essential DOING operations and reducing the MAKE READY and PUTTING AWAY operations and delays, we are able to develop an improved method. In our example, I can best quantify the benefits by recording on a STRING DIAGRAM to find out the distance travelled by a thousand cuttings being inserted, and then comparing any improvement against this. After all, you do not pay workers to 'travel' cuttings — only to insert for rooting. Even more critical would be the distance each hand travels, and to highlight the incredible waste we put our left hand to, if it is only used as another cutting store!

Present Recorded Method:

Distance: Cuttings travel from the box, each one inserted by the right hand at 14 cuttings per row. Distance travelled by cuttings for one row = 4.6m. Distance per 1000 cuttings = 1000/14 × 4.6m = 328.6m

Time: To insert one row, set up next row, move cutting store, boards, and seat = 0.75 minutes; 1000 cuttings take 1000/14 × 0.75 = 54 minutes

Proposed Improved Method:

Distance: Two-handed cutting insertion; cuttings taken from box store behind middle of long rows down bed, 25 cuttings per

row. Distance travelled by cuttings for one row = 6.6m. Distance per 1000 cuttings = 1000/25 × 6.6m = 264 m = 20% improvement.

Time: To insert one row of 25 cuttings with both hands and move store of cuttings and kneeling board every two rows, firm up and mark out = 0.75 minutes. 1000 cuttings take 1000/25 × 0.75 minutes = 30 minutes = 44% improvement.

Defects of the Existing Situation. Within the confines of the polythene tunnel, or any other cutting bed area, the reach and dexterity of the operator is not being used effectively. The rows are too short and time is wasted when moving back for each row. The hands and trunk are used in a discontinuous process with one valuable hand unproductive; it is either holding cuttings in a 'temporary store' or making separate holes with a dibber.

Both hands and cuttings travel unnecessary distances and delays are caused when prepared cuttings are not layed out all one way in a box or other rigid container. The delay is caused by looking for the tops and bottoms when the eyes should concentrate on the row being inserted.

Recommendations:

1. Use the full radius and span of arms and fingers as is comfortable to the operator and insert long rows of 25 cuttings.

2. Provide a central store of layed-out cuttings which can easily be picked up in both hands.

3. Place this box over the inserted rows directly in the front view of the operator, i.e. one box resting on an upturned tomato tray (peg box). In this position the supply of cuttings does not have to be moved for every row, so speeding up the work and reducing the distance the cuttings will travel.

4. Kneel on a soft padded board on the bed facing the row and cut a mark deep enough for the depth of the cuttings with a sharp edged board or angle iron.

5. Using both hands, pick up a cutting simultaneously in each hand.

6. Insert both cuttings working out from the centre of the row each time. Concentrate the eyes on the left or right, then the other end of the row can be inserted without looking from side to side! In this way a fast rhythm can be obtained.

7. Firm up complete rows with both hands using plenty of arms-outstretched pressure. Again the operation is completed with one simple continuous movement.

Advantages. Although the improved method is not by any means the final improvement, there is 20% improvement on travel that the cuttings make for insertion. Next the time is reduced to

give a 44% improvement, in the example studied. Given the motivation, it is not difficult to train ourselves to use both hands and although the kneeling position may sometimes be more tiring, the method allows more time for relaxation or other work, such as helping the cutting-makers to catch up!