TECHNOLOGY AND AUTOMATION – CAN IT DECREASE WAREHOUSE COSTS/IMPROVE GROWER RETURNS?

Hans van Someren Gréve
Stemilt Growers
Hans.Greve@Stemilt.com

PURPOSE OF AUTOMATION

The purpose of automation can be a number of things. In most cases it is to decrease costs and improve efficiencies through labor savings. Another reason could be to improve quality and consistency of the pack. Improving safety and decrease the risk of injuries can play a large role as well and can bring about substantial savings in reduced claims. Finally the possibility to run 24/7 (with a reduced labor force) can be another motivator to automate warehouse processes.

WAREHOUSE AUTOMATION

When looking at automation in the warehouse, the single biggest impact comes from having a **Presize line**. It not only reduces the costs of packing substantially it also gives the marketing department a lot more flexibility. With the increased complexity of packaging forms, packing for inventory can lead to expensive repackaging and transferring. Pack-to-order is almost a must now that many customers require their own box/package. This can be best accomplished through presizing the fruit first.

So presizing not only reduces warehouse costs, it creates the best possibilities for the higher grower returns as well, through reduced shrink and optimal product/customer combinations.

With a Presize operation come '**automatic tray-fill lines**'. These lines are very efficient and are part of the reduced costs of a presize operation. The tray-fill lines can be equipped with **tray denestors**. Instead of people placing the trays on the belts, this is done automatically with the denestors. This often will reduce the labor costs of the line by as much as ten percent. Recently also **tray inserters** are becoming available. By having a machine putting the trays in a box, another substantial cost savings in labor can be accomplished.

Several years ago **'automatic box fillers'** were introduced. These machines take over the full task of a packer and put the apples in the trays and in the box. Although these machines can bring substantial labor savings, lengthy switch-over times to other box types make them relatively inflexible. With the before mentioned increased complexity in packaging types, the automatic box fillers have not found a wide spread application.

Defect sorting is another form of warehouse automation that has been recently introduced. Instead of human sorters, the defect and grade sorting is done by cameras. This process is very complicated and although it could lead to big savings through a reduction in the number of sorters, the process is still far from perfect. Improved resolution of cameras, faster computers and more sophisticated software will make this process more feasible in the future. It lends itself best to a Presize operation, as there is a second chance to look at the fruit as it goes over the tray-fill lines.

Other processes in the warehouse that lend themselves to automation are segregation and palletizing. **Automatic segregators and palletizers** are very costly and the warehouse has to have sufficient volume to have a reasonable pay-back on the investment. However, the benefits are not just in labor savings. The process of segregation and palletizing in the fruit industry is done in cold rooms and can easily lead to injuries.

The appearance of the pallet in most cases is a lot better from an automatic palletizer vs. human palletizing.

Probably the most common form of an automatic process in a warehouse is box making. **Box machines** are a must for quality and costs.

TECHNOLOGY THAT ADDS VALUE

Apart from warehouse automation to reduce costs, new technologies are being introduced that address the eating quality of the fruit. These technologies are not a substitute for labor and introduce processes to the warehouse that could not have been done before.

NIR or **Near Infra Red** sorting for sweetness of apples is now commercially available. Originally this technology was only available at very high costs from a Japanese company, but recently other sorting equipment manufacturers have brought less expensive easier to use equipment to the market.

The process enables the warehouse to sort apples for sweetness so that a certain brix level can be guaranteed. Presently the most common technology is through 'reflectance', which allows the NIR sensors to only look at a relatively shallow part of the apple. Although that is sufficient to test for sweetness, it does not allow for other measurements. In the future also NIR with 'transmittance' will be available. In that case not only sweetness can be measured, but also water core and internal breakdown can then be detected. Possibly another future dimension that will be looked at with this technology is the specific acid level of apples, since taste often is determined by a combination of sweetness and acidity.

NIR can best be applied to a presize operation. It will give the warehouse more flexibility and apples do not loose their sweetness if they sit in storage for a while.

By guaranteeing the sweetness of apples, a better eating experience for the consumer can be achieved. This in turn can be marketed at a better FOB level to the retailer, thereby increasing the returns to the grower.

Firmness testing falls in the same category of added value technologies. Although this process is not yet commercially available, it will be here in the near future. Already prototypes are being tested. Our present method of testing firmness is with the penetrometer and as the name already suggest, it is a penetrating/destructive method of firmness testing. Moreover, since the penetrometer only measures the outside of the apple it is questionable whether it is an accurate way of measuring firmness of apples.

Presently several equipment manufacturers are testing different technologies for non-destructive firmness testing. Tapping the fruit and sensing the resonance, similar to tapping the fruit with your finger and listening to the sound, is one method. Another method is based on measuring the elasticity of the 'bounce' when tapping the fruit. It will become clear in the next two years which method will produce the best results.

The goal is again to produce a better eating experience for the consumer by eliminating soft apples. With a guaranteed crunch and sweet taste from NIR testing, the apple industry not only can demand a higher price for their product, it should lead to increased consumption as well.

Firmness testing can be applied to a presize operation so that soft fruit is eliminated early on in the packing process. However, since presized fruit can sit in a cold room for some time and apples do loose their firmness in storage, it is best applied on the packing line.

INFORMATION TECHNOLOGY

Warehouses/shippers do not only benefit from technology in the warehouse. An **Enterprise Resource Planning (ERP) System** is necessary to integrate processes and related data throughout the organization.

Having real-time accurate data for the entire organization allows for the sales team to have a real-time inventory on their screens. It can be combined with **Radio Frequency (RF) Systems** to have a better inventory control and trace fruit from bin to box throughout the storage and packing process.

With **Vendor Managed Inventory (VMI)** and **Category Management** becoming requirements from the retail industry, a web-based system is becoming a must. It will also allow for supplying the growers with pack-out and cull analysis information over the internet.

Finally an ERP system can be a great tool to measure performance throughout the organization.

HOW TO CHOOSE

With all the available technologies, how do you pick what is right for your operation?

First of all, you have to decide where you want to be in five years from now.

Is your mode of operation strictly based on cost control or are you focused on quality and added value?

If cost control is what you are after, than warehouse savings make more sense than to look a grower returns through value-added processes. Is your company production driven or are you customer driven?

All forms of automation and technology require capital investments. Although you may want to reduce your labor costs, your cash position and/or lending facilities may not enable you to make the necessary investments. In any case a careful analysis of return on investment needs to take place to prioritize the processes you want to automate.

With the quickly changing requirements from the market place, you have to ask yourself if it is productivity or flexibility that you are after.

Finally, if you are operating your business today with the tools and equipment from yesterday, will you still be in business tomorrow?