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QUEENSLAND STRAWBERRY INDUSTRY NEWSLETTER 35 SEPTEMBER 2014

## Improved Packing Shed Process Increases Strawberry Farm Profits

Gil Harkness, Department of State Development, Infrastructure and Planning



### Background

The Queensland Government's Department of State Development Infrastructure and Planning (DSDIP) and Department of Agriculture, Fisheries and Forestry (DAFF) have been working to evaluate precision agriculture methodologies and technologies and their application within the strawberry industry. DAFF activities in this field are predominantly concerned with improving soil and plant health while complimentary work has recently been undertaken by a DSDIP process specialist with a range of Queensland industries to introduce business best practice and improve competitiveness. This work has investigated improvements to packing systems.

Analysis of efficiencies in strawberry pack-

houses was recently considered as part of a project aimed at identifying whether there were opportunities for improvement in this area, particularly related to the accuracy of packed punnet weights.

The process flow at Coolhaven Farm's Beerwah pack-house consisted of two packing lines each with twelve packing stations and an end of line quality inspector (checking for: damage, ripeness, grade of berries and spot checks for weight). Packers used digital scales to pack punnets of fruit between 288g and 311g limits. Team leaders and management regularly briefed and reminded packers to pack within the designated limits. These two packing lines terminated in a carousel where personnel packed eighteen (250g) punnets into trays. Trays were then moved



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Terence Roy, Coolhaven Farms.

via gravity conveyor into a cold store prior to being road freighted in chilled containers to market. As the two packing lines were effectively identical, sample punnets were taken from the carousel for analysis.

Initial evaluation of the process revealed that a number of punnets were being packed with fruit above their upper limit, resulting in the need for more in-depth analysis.

## Results

Using a sample size of 344 punnets ( $n=344$ ), packed weights were recorded and plotted on a distribution graph shown in Fig. 1. Note how the mean weight (309.6g) is only ~2g below the upper limit and how the spread is much greater than that required by the upper and lower limits. It was found 38% of the punnets packed had some degree of over-packing. A follow up sample was taken ~4 weeks later confirming the initial sample results.

Analysis of these results showed that the current processes in place (verbal reinforcement of weight limits, 'numeric response only' digital scales and end of line quality inspection) was not statistically

capable of meeting the packing specifications, suggesting a need to reduce the spread of packed weights and better align the measured mean weight with the required mean weight.

## Corrective Action

The use of LOW, OK, HIGH scales (AND: SJ-30KWP) was identified as an option to improve packing efficiency. These scales are set with upper and lower specification limits and have the option to set warning limits. When a packed punnet weighs between the upper and lower warning limits the scales are illuminated by a green LED. If the weight reads between the warning limit and the upper or lower specification limit the scales register with an amber LED, and if the

weight reads outside the upper or lower specification limits a red LED is displayed and in this way packers are provided with a second reference check. (Fig 3.)

Statistical models were run to look at potential weight/cost savings based on a reduced spread and re-centred mean packing weight. The results generated identified significant savings, resulting in a recommendation to adopt the use of the scales into the pack-house process. Coolhaven Farms purchased 30 sets of these scales in July 2014, immediately integrating them into their packing process. Figure 2 shows how the spread of results has reduced and how the mean has moved towards the lower specification limit. When factored across Coolhaven Farms' yield profile, use of the scales prevents a 5.5% total crop weight giveaway.

## Conclusions

- Written and verbal reinforcement of upper and lower pack weight specification levels to pack-house employees has little effect on packing weight accuracy.
- Although the implementation of LOW,





OK, HIGH scales doesn't prevent non-conforming packed weights, it does significantly reduce the likelihood of their occurrence.

- For best results, the scales should be combined with an automated end-of-line check weigher.
- If an automated end-of-line check weigher were used without prior implementation of LOW, OK, HIGH scales it is envisaged the reject rate at the check weigher would be excessive, resulting in a substantial amount of rework.
- Use of these scales had no adverse effect on the capacity of packers meeting their daily requirements.
- At Coolhaven Farms, the payback period from investing in the LOW, OK, HIGH scales was one week.
- Over-packing has a direct adverse impact on bottom-line profitability.

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Fig. 1: Distribution graph for sample punnet weights (9/7/13).

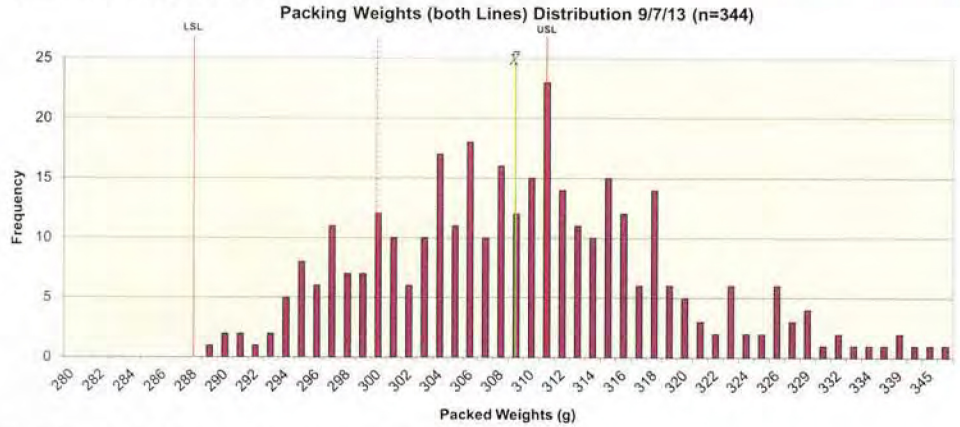
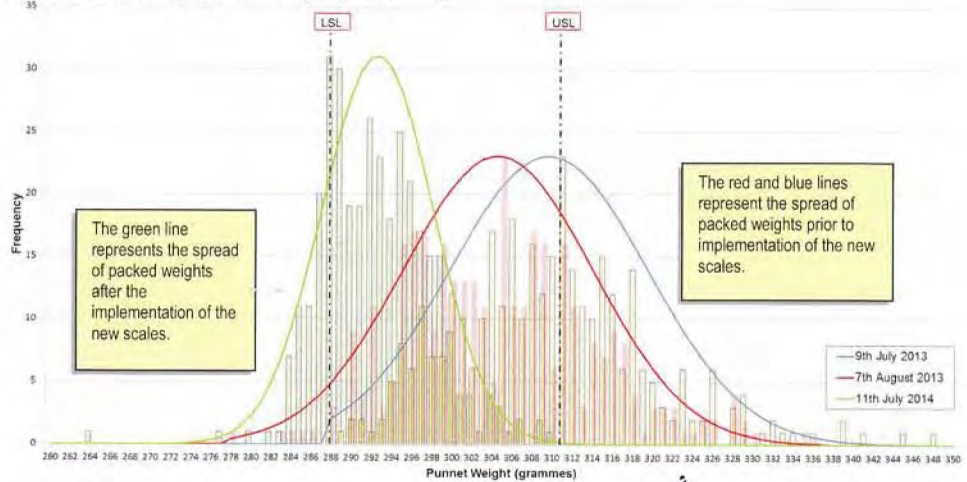


Fig. 2: Distribution graphs for sample punnet weights



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