

STORAGE

HUMIDITY CURBS LOSSES

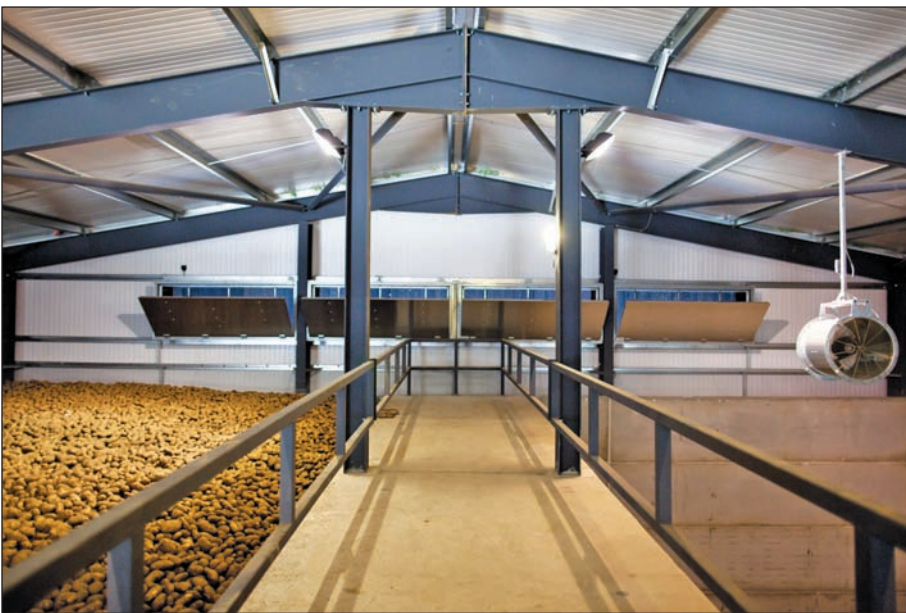
PHASE two of a major investment by Norfolk potato grower Ian Mason is a new storage complex at Gayton, near King's Lynn. The site is owned by J&C Farms, one of the three partners involved in setting up Heronhill Water to provide irrigation for 2500 acres last season (POTATO REVIEW, May/June 2011). This latest project gives the group 5000 tonnes of storage in two identical environmentally controlled buildings either side of a central loading and grading area.

Each store holds 2500 tonnes of processing potatoes and comprises two bulk units with a central ventilation tunnel and concrete laterals. Stack height is 5.1 metres and holding temperature for this season's crop was set at 8.5°C. A key design feature of the ventilation system is the adiabatic (evaporative) cooling. The controller is programmed to keep both stores at 98% humidity to minimize weight loss.

The entire structure, designed by Crop Systems and built by local contractor Chalcroft Ltd, King's Lynn, is clad with insulated composite panels and has additional load bearing concrete walls for each stack. There is no insulation foam visible anywhere and there is no wood which can rot or go mouldy.

Unusually, the area housing the fans and humidification matrices are located at the front of each building with four independently controlled louvres at the far end. Airflow in the tunnel is 40 cfm at 2" pressure and there are six roof fans in each store which run constantly to maintain air circulation above the crop to prevent condensation. Four of them are fitted with heaters to warm the roof space when sensors detect a drop in the temperature of the structure or the air above the stack.

Both stores were filled in mid-October and have required only one sprout suppressant treatment, CIPC being applied at just 9 grams/tonne by Frontier Agriculture in December. When POTATO REVIEW visited the site last month (February) one of the four 1250-tonne units had already been emptied and unloading had just begun from the second. According to Nick Glasspoole from Ian Mason Farms, Hillington, the condition of the crop was perfect.



Each store is arranged as two units separated by a central tunnel.

Crop Systems' Ray Andrews (pictured below) claimed that air flow through the laterals and gassing performance had been exactly as anticipated. 'As part of an energy use project, Sutton Bridge asked to come in and check the adiabatic cooling and they found that it was operating 5% better than the design specification and the airflow was balanced.

'Running costs to date have been £1.64 and £1.14 per tonne, respectively, and curing worked extremely well. We can't see any weight loss in the potatoes while tubers that were cut in half and left lying on top of the

tunnels when the stores were loaded do not appear to have shrunk at all.

'We inspect the stores every two to three days but we haven't had to do any firefighting,' he continued. 'We have seen a little bit of condensation here and there but the system has contained it. The temperature has varied by perhaps 0.2°C across the range and the CO₂ graph tells a similar story. It's been a very easy store to look after. We monitor the central controller every day from the office and we haven't had to run around sorting out problems – it makes the job look simple.

'We designed these stores to cope with the worst conditions. Sometimes that costs a bit more but it means that if we have any issues we can deal with them quickly. With the cost spread over 25 years the difference between building a good store and a poor one is probably no more than £40 per tonne or just £1.50 a year. That's peanuts.



QUOTING figures for air volume produced by a fan without also explaining design pressure in the tunnel and laterals can be misleading, says Ray Andrews. 'Specifying equipment which will produce more than the 40 cfm traditionally adopted in UK stores at low pressure could mean that fans are not capable of achieving storage requirements when under poor conditions.'