

"Box stores are too constrained for processing as they are small, so bigger bulk stores will give you a cheaper storage cost a tonne, as new boxes aren't cheap and there is a cost for maintenance," explains Mr Cunningham.

In the fresh sector, enterprises tend to be smaller scale, so box stores are more suitable, but Mr Cunningham

warns if growers opt for a new box store, it must have enhanced ventilation for better airflow and even distribution of CIPC (chlorpropham).

STORE DESIGN

When confronted with building a new store, growers will be faced with an array of British companies – and an increasing number of European

firms – all offering their own variation on the same principle design, developed over a number of years.

Mr Cunningham explains there is no perfect store, but there are many good ones. He advises potential purchasers to visit some existing stores built by suitable designers.

This is particularly the case for the automation computer systems,

which can be complicated and difficult to use, so getting a handle on what they offer is crucial.

"I'm a great advocate of auto-control, as I have seen some disasters in manually controlled stores – without it you are just taking a punt," says Mr Cunningham.

Mr Andrews agrees that auto-control is crucial and is now the →p10

FRIDLINGTON FARMS, SUTTON-ON-THE-Forest, YORK

Yorkshire estate invests in state-of-the-art bulk store

The logistics and extra cost of renting third-party box storage encouraged North Yorkshire-based Fridlington Farms to invest in its own 3,000t bulk store three years ago.

The 1,200ha enterprise at Sutton-on-the-Forest, eight miles north of York, grows about 243ha of potatoes, with 4,000t on contract for processing giant McCain and the rest for Walkers crisps.

About 90% of the crop goes into storage annually, which is where the business tries to add value to its product, says arable manager Matthew Wallace.

"The contract price for green tops only just covers cost of production, so we try to make a margin by storing the crop for as long as possible," he explains.

Before the new store was built three years ago, the farm had its own storage and supplemented that with renting space, which incurred extra cost in rent and haulage.

Mr Wallace says the potatoes weren't storing well either, so they decided to bite the bullet and bring the whole process under their own control.

"We decided to go for bulk storage due to the initial and subsequent maintenance costs of boxes, but also because of better airflows, less weight loss and more efficient CIPC and energy use," he adds.

COOL CONCRETE

When deciding on a store, Mr Wallace looked at three different systems and settled on Norfolk storage specialist Crop Systems' design after looking at two of its stores and being impressed with build quality and finishing.

The farm also opted for an all-concrete construction, which will last much longer than less expensive wooden dividing walls.

"If you are going to invest all that money, relatively it isn't much more for concrete and you get a 50-year

store. With wood, one bad season can cause problems and it may only last 20 years.

"The concrete also acts as a heat sink – once it is cool, it stays cool – so you don't need a fridge, which keeps energy costs down," explains Mr Wallace.

ADIABATIC COOLING

When loading the store, it is crucial to have the fan and cooling capacity to dry, cure and pull down the crop temperature of about 7-8C for a processing crop.

Fan capacity in Fridlington Farms' store allows these processes to be carried out quickly to reduce dehydration and deal with wet years, maximising returns from the storage period.

This is combined with an adiabatic cooling system, which uses cold water to cool and humidify ambient air pulled into the store, before pushing it through the crop.

"Fridges are expensive to run and dry the air out, which increases weight loss when the fans are running, so adding humidity counters that."

He adds that weight loss from a box store would be in excess of 10%, but the new store has been down to 6-7%.

"It has also reduced compression bruising, which can happen in bulk stores and make the potatoes unmarketable," says Mr Wallace.

MINIMAL CIPC

A tapered plenum – the channel that runs between each bay – and laterals that distribute the air under the crop ensure an even distribution across the store, with airflow tests showing variation across the store is within 5%.

This not only ensures there are no rot trouble spots, but has also allowed Mr Wallace to use less CIPC.

"We've reduced CIPC use to just three fog applications of 9g/t,



Matthew Wallace says switching to a new 3,000t bulk store has resulted in better airflows, less weight loss and more efficient CIPC and energy use.

giving a total of 27g/t, whereas in their old box stores we hit the maximum allowable limit by April," he explains.

The even distribution achieves better sprouting control; lower rates reduce cost and residue risk and eases concerns about the imminent reduction in the maximal allowable CIPC limit to 36g/t by 2017.

FULL AUTOMATION

The icing on the cake in the store is the automation system, which uses an array of sensors inside and outside to monitor external air, roof and crop temperatures, store and outside humidity and CO₂ levels.

It then reacts to problems itself, such as purging the store of CO₂ when levels reach the set parameter,

while an energy-saving mode also ensures the store only cools when it absolutely needs to.

All the parameters and data readings are displayed on a touchscreen control unit at the store entrance.

Mr Wallace adds that in a time when margins are low, you need the best store possible to maximise returns.

"In our previous third-party bulk stores we were moving the crop in December to February, but now we are able to have a contract for April to June, which is more lucrative.

"Overall, cost a tonne hasn't gone down if you include the investment, but running costs have reduced by about £15/t compared with box storage," adds Mr Wallace.