

# Ag engineering in action at Bourke

By Helen Fairweather

In early November, a small band of agricultural engineers from the Parkes–Dubbo area ventured out to Bourke to investigate some of the innovative ag-engineering solutions being developed in the region.

## Paddle wheeler

The first visit was not strictly agricultural — a trip on a stretch of the Darling River on the Jandra paddle boat. We were treated to a comprehensive tour of the vessel with a look inside the engine room.

Roger Lund has spent some time in the navy as an engine systems design draftsman and seemed to relish being in the cramped confines admiring the well constructed replica powered by modern electric motors.

The Jandra utilises variable frequency drives to provide individual control of the starboard and port side paddles wheels.

## Jobba harvester

Local ag-engineer Peter Kelly then showed us Mark I of his jobba harvester, which he began working on about three years ago.

This first prototype was fashioned around a street sweeper, which was purchased from a clearing sale. The budget for this first venture was a meagre \$20,000.

It did the job for two years, albeit a little slowly because of the number of passes required, so it was decided to start from a clean slate.

What Peter and his crew have come up with is truly a work of art. The harvester is PLC (programmable logic controller) controlled and is driven by AC electric motors and pneumatic actuators.

This provides incredible flexibility for operating the machine, but also ensures that the cosmetic-grade jojoba oil cannot be contaminated with hydraulic oil. To know more, you will have to visit Peter as it is a bit like the winged keel and needs to be kept under wraps!

## Citrus innovation

A tour of the nursery developed by Buster's farms to grow the young citrus and experiment with other plants was also very impressive. There are some exciting developments being planned for this ven-



The Jandra paddle wheeler.

ture with talk of installing micro meters around the trunks of the young trees to measure the water flow through the plant. Again this will be all PLC driven!

## Reverse osmosis

Next it was a demonstration of the Reverse Osmosis (RO) being used to provide water for the nursery. This water is being sourced from an artesian bore and is far too saline for the young plants in the nursery.

Since becoming involved in the operation of the RO plant, Peter Kelly indicated that it has been a very steep learning curve. He is now confident that they are gaining sufficient understanding of the science required to operate the plant effectively.

## PLC technology

At Back O' Bourke Fruits we saw how PLC technology from the industrial sector is being applied to agriculture. There are 12 PLCs around the farm connected by about 20 km of optic cable.

These control almost 20 irrigation pumps, eight filter stations, 80 plus valves in the irrigation area, two coolstore facilities and the fruit grading and packing shed.

BobF owner Phillip Mansell joined us for some interesting discussions and conveyed

some of the challenges he has faced over the last couple of years with the drought coinciding with water reforms.

To complete the tour we were shown through the fruit grading and packing facility that is a joint venture between the two main horticultural growers in then district.

Of course it is PLC controlled, but also uses state-of-the-art vision-based blemish grading for the citrus. This technology, developed in Australia, is able to analyse each individual fruit and sort it according to amount of blemish, size, shape, colour, weight and density at a rate of 30 fruit per second.

Another innovative piece of Australian technology is being used on the melon grading line that tests the NIR (near infra red) reflectance of each piece of fruit, which is calibrated to measure sugar content.

This allows the marketing of a “guaranteed sweet” line of fruit. It seems that Bourke may be keeping the electric motor and PLC companies afloat in Australia.

The work that Peter Kelly and others have done with a couple of hundred PLCs, photo eyes and electric motors is phenomenal. Bourke provides a tremendous example of agricultural engineering in action.