SHEEP CRC

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Walk Over Weighing –
Train sheep to weigh themselves

Weigh sheep daily without handling the mob

An animal's performance can be effectively monitored without moving it to the yards for conventional weighing. Walk Over Weighing (WOW) monitors the mob remotely by electronically capturing a sheep's radio frequency identification (RFID) tag and body weight as it walks through a race to reach water, feed or another attractant. Human help is not required.

Where is WOW valuable?

- In pastoral areas, to minimise sheep stress and reduce labour costs
- In cell grazing operations, to record growth rates and monitor health
- In prime lamb enterprises, to track growth rates accurately
- In breeding operations, to monitor ewe and lamb condition
- In feedlot enterprises, to identify weekly growth trends

How does WOW work?

- Sheep walk through a laneway or race to access feed, water or a lick block
- A panel reader records each animal's RFID tag
- Each sheep moves over an electronic weighing platform where its weight is estimated and sent to a data logger, together with RFID information
- Operates on 12-volt batteries, powered by solar panels
- Can be fixed or portable
- In pastoral conditions existing spear gates and trap yards can be used
- Sheep require training to use WOW
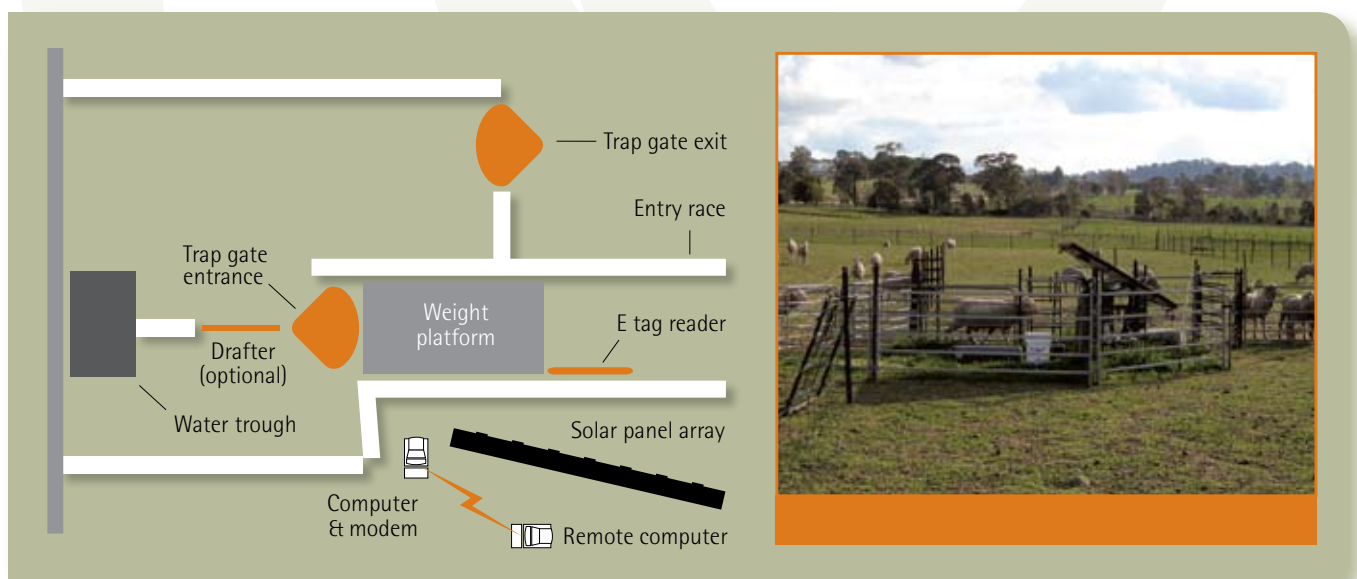
WOW design and operation

Figure 1. WOW system

Putting a WOW system together

The physical design of the WOW system is quite simple. Animals need a single point of entry and exit to direct them over the weighing platform (see Figure 1). The animals are entering the race by choice so a "force" area is not required. Animals should not have access to wires as they will chew them.

Basic WOW systems are commercially available. They can be enhanced by:

- ▪ A drafting capacity to preferentially feed or monitor different groups
- ▪ Telemetry to allow transfer of information from a remote location to a base station computer

Contact your service provider, or hardware provider, for further information.

Equipment required:

- – Two solar panels (minimum 80 watts)
- – Two deep cycle batteries (minimum 100 amp per hour)
- – 15 or 30 amp solar regulator (depending on number, size of solar panels)
- – Tru-Test XR3000 indicator with WOW software enabled
- – Tru-Test MP 600 load bars or Ruddweigh bars capable of connection to Tru-Test XR3000
- – RFID panel reader
- – Rack to hold solar panels
- – Weather-proof box to protect electronics
- – Weighing platform
- – Concrete paving blocks or similar to allow weighing platform to be set up on a firm, level surface
- – Terminal strips to join electrical wiring
- – Portable sheep yard panels
- – Two spear gates (if required)

Hardware

1. Entry race
- Portable yard panels
- Plywood to enclose the weighing platform to minimise interference from metal with the RFID tag reader
- Electronic components enclosed to exclude sheep

2. Weighing platform
- 1500mm (1200mm for lambs only) length of weighing platform (reinforced with 50mm X 25mm RHS or similar) prevents flexing
- Short platform to allow only one animal at a time to be on the system
- Solid timber platform – no baulking, echo or build up of manure

3. Tag reader
- Any panel (or similar) RFID reader system is suitable provided it can output the captured RFID tag number to the weighing system

4. Power
- 12 volt deep-cycle batteries are kept charged via a regulator from the solar panels
- If no drafting capabilities, two batteries and two solar panels required

5. Spear gates
- Pastoral areas with large mobs - Bettini gate is effective, using one trap gate as an entry and one as an exit.
- Less remote areas with smaller mobs – spear gates not necessary. Animals enter and exit the water or feed point over the same platform.

Electronic components

1. Tru-Test XR3000 indicator
- Centrepiece of WOW system
- WOW software allows an animal to be weighed as it walks over the platform without being restrained
- Collects and stores the individual RFID numbers and body weight data

2. Solar regulator
- Ensures that system is properly powered by regulating solar output to a useable 12 volt system

3. RFID tag reader control box
- An Allflex reader (or similar) that interprets the unique identity code from the tag & sends it to the XR3000 weighing indicator

4. Modem (optional could be via the 3G / NextG network or via UHF)
- Allows remote communication - data can be uploaded / downloaded and system settings changed from the office
- Camera facilities can be added to allow real time viewing of the site

Approximate cost

Item	Approximate cost
Weighing indicator (XR3000 –WOW enabled)	$4000
RFID reader	$2600
Weighing load bars	$1200
Solar panels & batteries	$3200

Setting up the electronic components

Step 1. Wire solar panels in parallel

Step 2. Connect panels into the appropriate terminal (ensure Positive to Positive and Negative to Negative) in the regulator

Step 3. Take power from the load output of the regulator to the batteries

Step 4. Take power for the weighing indicator and the tag reader directly from the batteries via the cables supplied (note: it is possible to take power directly from the regulator to the tag reader, but this can cause electrical interference and restrict the range of the reader)

Setting up the indicator

The most important thing is to ensure that WOW is activated on your indicator. If not speak to your Tru-Test representative. After turning on indicator, do the following:

Step 1. Press SETUP then LIFEDATA. Ensure that EID is ticked and has a length of 16. Other fields are not important ant this stage so just ignore them. Press ESC.

Step 2. Press SETUP. Ensure that EID is ticked in the right hand column and that no other fields are ticked in either left or right hand column. Press FILEDATA and activate DATE and TIME STAMPING. Press ESC.

Step 3. Press SETUP then SYSTEM.

Step 4. Make DAMP SYSTEM "Walk-Over".

Step 5. Make WEIGHT RECORDING "Auto."

Step 6. Make RESOLUTION "0.5".

Step 7. Ensure that ID ENTRY CREATES FILE RECORD and DISABLE POPUPS are ticked. Press ESC.

Step 8. Press ESC and SETUP together then DAMPING and set MIN WEIGH TIME to "0.5". Press ESC.

Step 9. Press SETUP then SERIAL. Ensure that both CON 1 and CON 2 are activated for EID and that they are set for a minimum number of characters of 16 or less. Press ESC.

Training animals

In order for WOW systems to be effective, animals must be trained to use them independently. A non-threatening system for sheep movement is required. Recommendations include:

- Before the race is in place, leave it near the sheep for them to investigate.
- Never force animals through the system. They can become frightened and refuse to use it. Sheep are inquisitive animals and will explore new additions to their environment.
- Ensure that animals have a clear view through the system.
- If animals are reluctant to enter, incentives such as supplementary feeds may be used to entice them through the system.

Introducing WOW to sheep: a recommended approach

Given that the WOW system has several components, it is practical to build it over a few days so that the sheep can gradually get used to the new equipment.

① **Step 1.** Build race and yards so animals have free access to the water or feed point. Leave race and one panel open to allow unlimited access. When all sheep are watering or feeding, proceed to the next step.

② **Step 2.** Gradually close gates so that access is solely via the weighing platform. All equipment should be in place so animals get used to it, but initially no electronics turned on as reader beeping may distract some animals.
Note: These two steps may take five to 10 days, depending on the sheep. It is sometimes useful to offer an incentive in the form of hay or grain to encourage sheep through the system during the training phase.

③ **Step 3.** Activate system and commence collecting data. Do not worry about the number and quality of weights collected, but use the data as a "roll call" to confirm all animals are using the system. If some animals are not, open the gates wider or introduce extra incentives to encourage use.

④ **Step 4.** (optional) Add trap gates if required, but leave them fully open.

⑤ **Step 5.** When all animals are using the system freely, close gates and commence formal data collection.

Case study:
Kaludah Lamb Feedlot, Canowindra, NSW

The Kaludah Lamb Feedlot custom feeds about 10,000 sheep, mainly second-cross lambs. A WOW system trial demonstrated the potential to significantly improve efficiency, reduce labour, and provide valuable information to guide management decisions, according to feedlot principal Tony Grant.

Tony, who runs the feedlot with partner Sarah Cartright, has been custom feeding sheep for 14 years and says careful management is needed to ensure profit margins.

The WOW system has allowed accurate prediction of finishing weights and times, and identification of the potential of individual animals to reach optimal weights.

In the WOW trial, 207 Border-Leicester-Merino cross lambs were fitted with RFID tags and their initial live weight recorded over a Racewell auto-drafting platform. The animals walked over the platform to get to water and exited the water yard via a trap gate.

Initially the walk-over platform was 1500mm, which proved to be too long for the size of the lambs. It was shortened to 1200mm, to minimise the chance of two animals being on the platform at the same time.

The captured weight data was processed through the WeighMatrix software to filter the data and remove outliers, thereby giving a more accurate final weight.

Chart 1 shows the full range of weights (WOW and Racewell crate) over the period of the trial. The weights recorded by the WOW system followed the trend of the crate weights (except for the weights processed on 11 April, possibly associated with a build up of manure under the weigh crate leading to inaccurate readings). Heavier animals were removed from the group periodically when they reached a marketable target weight (44kg live weight), causing the group averages to decrease.

Chart 1. Group weight change over trial period using WOW data
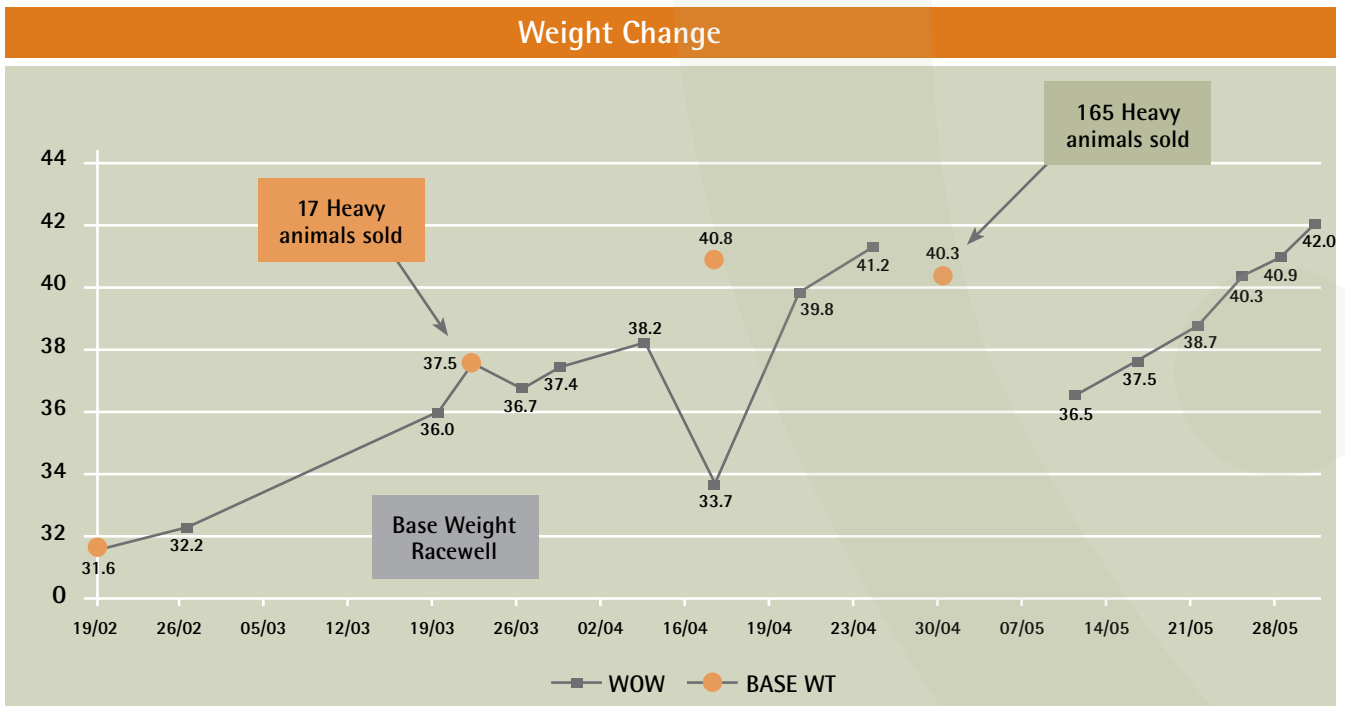
One of the aims of using the WOW system was to generate a steady stream of weight data that could then be used by Kaludah Lamb Feedlot to predict finished weights or predict the date that animals would achieve a desired sale/slaughter weight. After processing the WOW data through the WeighMatrix program, the result files were added to a "Lamb Growth Predictor" model (2006) to predict a future target weight.

Chart 2. Predicted weights 11 April
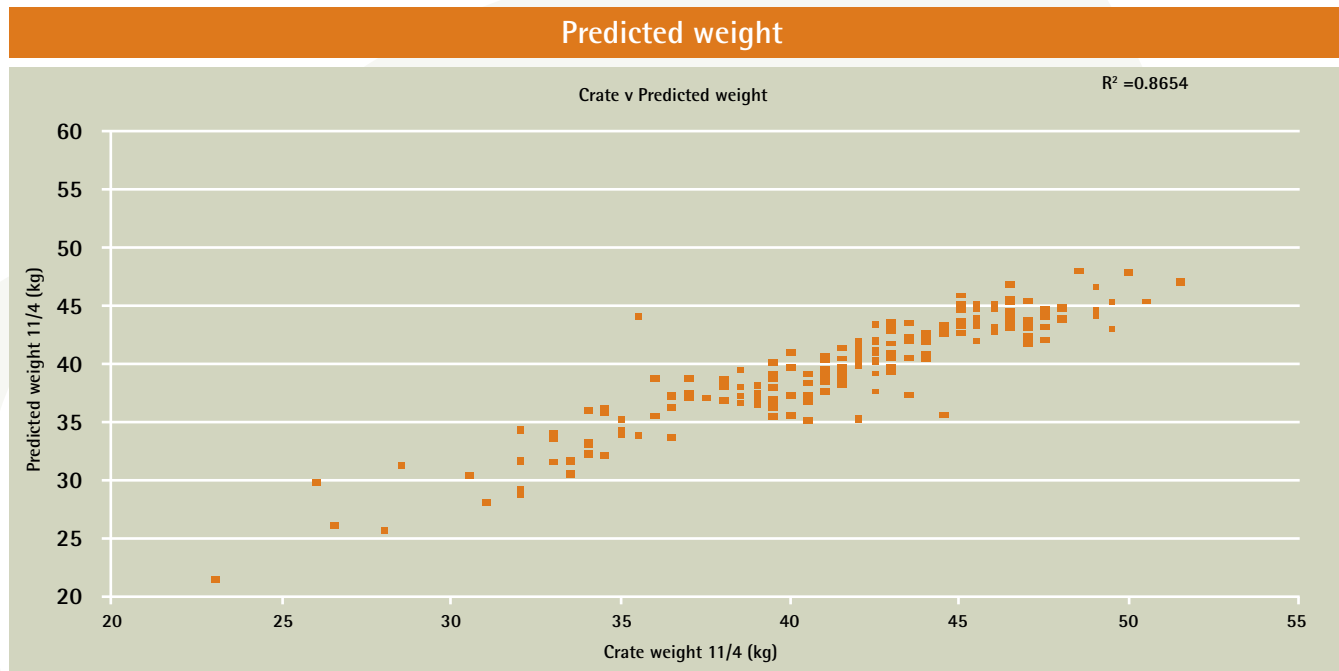
Predicted weight

Chart 2 shows the correlation between crate weights taken on 11 April and predicted weights for this date using a crate weight from 19 February, and WOW weights from 26 February, 19 March and 5 April.

While it is important to be able to predict an animal's finishing date, it is equally important to predict late-finishing animals. They can then be removed from the feedlot, reducing feed costs for unprofitable animals.

Weight changes on the final 33 animals (i.e. those not suitable for sale by 30 April) were monitored. The data was re-processed through the Lamb Growth Predictor model to examine the predicted finishing time.

This was done by processing WOW weights from 19 February, 26 February, 19 March and 26 March and looking at the predicted weights on 1 May. The table below summarises the actual number of animals drafted into groups based on a crate weight on 30 April, and the predicted draft groups based on the four WOW weights.

Draft Range	Crate	WOW (growth predictor)
1. Up to 38 kg	34	35
2. 38.1 - 43.9 kg	68	77
3. Greater than 44 kg	97	87
Total	**199**	**199**

This demonstrates that even from a relatively early stage - about one month into the feeding process - finishing time can be accurately predicted by monitoring growth. More importantly, of the 34 animals that were in the final draft group, 21 were identified by the Lamb Growth Predictor model as being late finishers.

Tony Grant says the lambs are drafted, and then managed, in 5kg weight ranges. "We know that the genetically superior animals, if fed correctly, will put on 2.5kg a week, with the genetically inferior putting on 1.5kg a week.

Walk Over Weighing Report Service

To obtain a Walk Over Weighing (WOW) service report, you must provide:

- A file containing a base weight for the group of animals, this file is typically taken from a standard crate weighing system and must have all zero weights and duplicate tag numbers removed.
- One or more files containing the walkover raw data (RFIDs and body weights) as downloaded from the XR3000 weigh head. Do not attempt to combine or manipulate the files!

Your report options

1 **Standard report:**
This option will provide a report containing the average weight and number of records for each animal recorded, using the base weight as an initial filtering option.

2 **Additional standard reports:**
This option provides subsequent average weight reports, allowing the cumulative addition of records over time so that a record of weight gain can be established.

3 **Growth predictor reports:**
This option allows the use of 3 or 4 weight records over time, which are then used to give a linear prediction of (1) weight at a desired date or (2) predicted date to reach a desired weight.

Report format

A WOW service report can be delivered in three formats:
- e-mailed as an .xls (excel) file
- e-mailed as a .csv / .txt file
- mailed as a printed bound report with hard cover

Cost

Standard WOW service report (option 1) - $60
Additional standard WOW service report (option 2) - $40 each
Growth predictor report (option 3) - $40 each
Hard copy report - $15 (plus $5 for each additional hard copy report)

For more information

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