

Research **Report**

Kondinin Group

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Price: \$95

SMART SHEARING SHEDS

CLEVER DESIGNS SEE
SHEARING REFINED



Action: Shearing sheds are a hive of activity where sound shed design can make a significant difference in terms of productivity, safety and minimal stress for the animals and shearing team. Photo courtesy Peter Cochrane

Renewed investment in shearing infrastructure brings new ideas to the table

Very few shearing sheds are identical, as most sheep and wool producers have specific needs. Sheds are built to suit varying budgets, or adapted to suit a range of existing infrastructure. But all sheds can incorporate some sensible design ideas to ensure the investment in shearing infrastructure is a sound one. Kondinin Group researchers **Mark Saunders, Josh Giumelli, Macey Hill** and **Ben White** travelled extensively to inspect shearing sheds and meet owners to bring you this *Research Report*.

There is a high level of interest in building, modifying or just making subtle improvements to shearing shed infrastructure.

In almost every case, shearing sheds are tailored to requirement and budget so while some common themes prevail, particularly with a given shed builder, subtle differences can always be found.

The interest in shearing shed investment is illustrated by data from the 2020

Kondinin Group National Agricultural survey which asked sheep and wool producers if they had made an investment in the past 10 years.

Almost one in three from a national sample of 230 indicated that they had invested money into their shed. See figure 1.

Extensions with additional shearing stands accounted for many upgrades while replacing the flooring in sheds was also nominated by survey respondents as a popular upgrade.

Given many sheds were built in the 1940s and 50s, many floors and particularly timber footings have succumbed to rot, termites or the effects of reactive soils. So the need for an update is understandable but also presents wool growers with an opportunity to improve designs or use new materials. For example, the use of plastic composite flooring is popular and despite its appearance, clears manure very well and is impressively quiet under hoof.



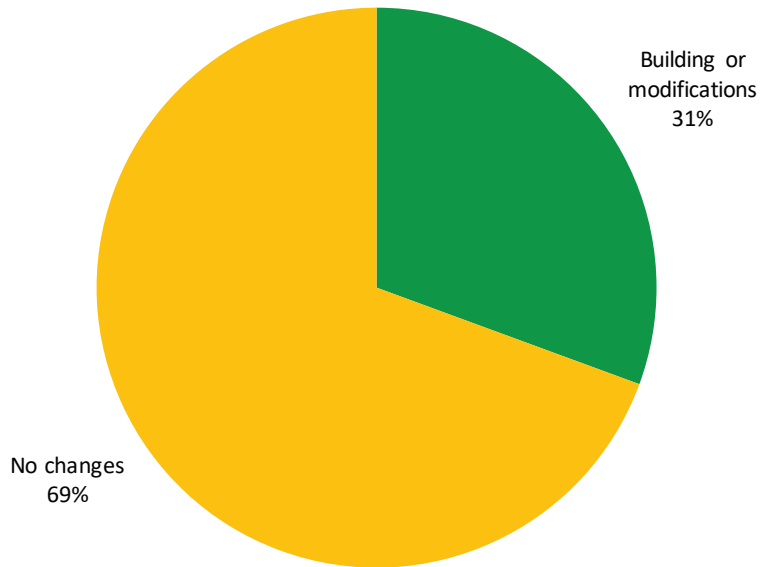
The interest in shearing shed investment has arguably been spurred by relatively strong wool prices in the past five years in particular. See figure 2.

Despite a COVID-19 driven 23 per cent drop in wool pricing through 2020, confidence is still high, possibly supported by record meat sheep prices. Shearing shed building contractors tell us they are solidly booked and according to some builders, bookings into 2022 are not uncommon.

Australian Wool Innovation (AWI) – endorsed shed design examples in Dubbo, New South Wales and Western Australia have also stimulated conversation and enthusiasm around options and ideas for improved wool harvesting infrastructure.

This report aims to inspire those looking to invest upgrades or a blank-sheet build approach to designing, building or modifying a shearing shed to suit their needs and budget. References are made to AWI shed designs and templates which are available to download from the AWI website. The AWI shed at Dubbo and other new builds were featured in the September 2019 edition of the *Farming Ahead* magazine.

Figure 1: Investment in building or modifying shearing sheds in the last 10 years (n=230)



Source: Kondinin Group 2020 NAS



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“ *ProWay were great to work with. They were very accommodating with our ideas and the process in terms of design and planning was fantastic. The ProWay contractors who built both the sheepyards and woolshed were very professional and did a great job.* ”

Tom Wilson, Farm Manager | Salt Creek Merinos | Woorndoo, VIC



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AWI and the WA Shearing Industry Association (WASIA) have also recently launched 'SafeSheds, The Shearing Shed Safety Program'. It is a national best practice guide and assessment resource specifically for shearing sheds.

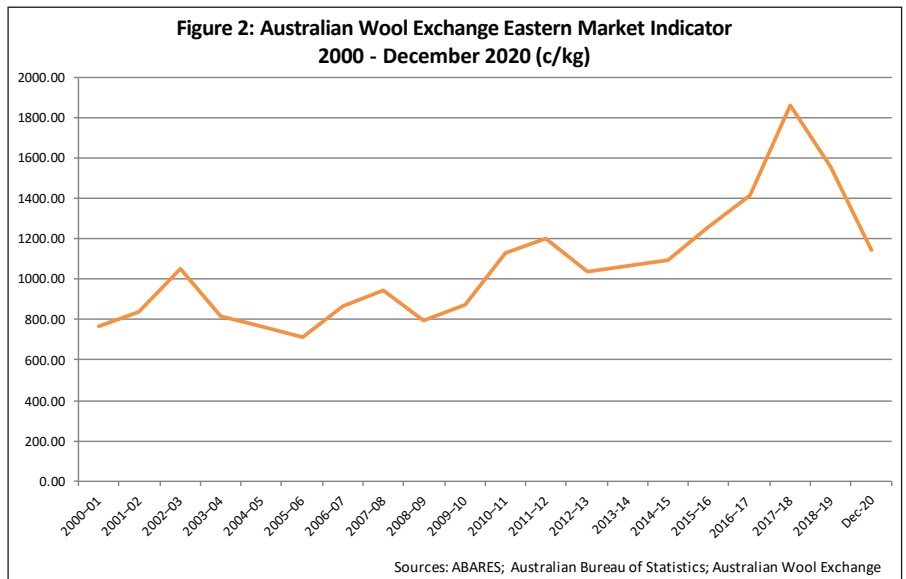
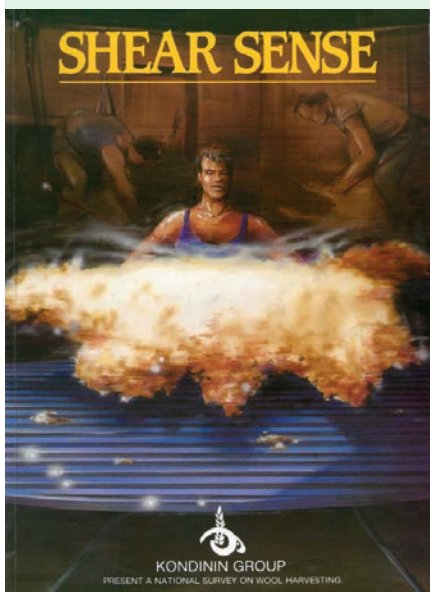
SafeSheds aims to improve workplace conditions by making them safer for all and allowing woolgrowers and shearing contractors to identify safety hazards or improvements in sheds. By planning and documenting improvements, this allows woolgrowers to keep better records of their efforts in managing risks and safety in their workplaces.

The Program is detailed on pages 4-5 of this magazine.

A handy resource for new shed builds in the Program is a safety signage kit. The kit only costs \$25 including GST and includes signs that meet Australian Standards and legislative requirements in all Australian states to help woolgrowers meet occupational health and safety obligations. The kit can be ordered here: <https://bit.ly/37byoSn>

FA

A useful, but now out of print resource, is the 1988 Kondinin Group *Shear Sense*. While it came well before wool industry technology developments like sheep EiD or plastic flooring, the manual includes ideas, layouts, example designs, tips and tricks for building a shearing shed. We have made it a freely available resource via this link: www.tinyurl.com/shearsense or simply point your phone camera at the QR code and open the link.



NOTABLE TRENDS IN DESIGN

Some recurring themes were seen in the new sheds inspected and might be worth thinking about if designing a new shed.



Sloping catching pens: Aid the shearer to drag sheep onto the board and presents the sheep in a catching position but means the pens need to be front-filled for sheep to run uphill.



No light under board: Not necessarily a new trend but a concept that has become increasingly adopted. Blocking light out under the slat flooring improves the way sheep run in a shed without baulking at shadows.



Chute drop off the board: A 200-500mm drop off the board means the shearer doesn't need to push the sheep down the chute.



Front-fill catching pens: A 15-sheep capacity and a holding pen of equivalent size to fill the catching pen.



Slide swing gates: Used when flood-filling a shed and means gates can be closed without the wide clearing required for a simple swing gate. Available in prefabricated form in a range of widths.



Ridge cap vent and insulation: Vented top caps and insulated roof: Insulation minimises radiated heat from the roof on hot days and condensation dripping off roof sheeting on cold mornings while the vented top cap provides heat flow out of the shed and work well with pivoting windows. Air conditioning (evaporative) has also been installed in some sheds to supplement ventilation cooling.



Plastic floor grating: While it looks like it would clog up, it clears freely is quiet and the modular design can be cut to replace old slat flooring. Not to be used in the catching pens however where it is too grippy. Comes in 1200x400x40mm interlocking sheets costing around \$40/sheet or (\$83/m²).



INCORPORATING BASIC STOCK SENSE



"We are very happy with the handler. It probably goes better than we had hoped for." - Duncan King

A handler that is so **effective and versatile** it is often a **permanent fixture in the yards** and used each time sheep are in. This **improves stock flow** as sheep lack negative associations to the handler as a result of their experiences.

Designed by Wayne Coffey with 20 years of stock handling experience on board and further improved over 18 years of production to meet changing demands in farming.

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Facilities and signage: A good quality toilet and shower provision are good ideas and a clean mess area with hot water, a fridge and good seating areas is essential.



Ply and chipboards use: Ply and chipboard use is increasing including catching and holding yards.

Dual purpose: Because most shearing sheds are used infrequently, extracting additional value from the infrastructure investment by spending a little more to make a dual-purpose shed can be useful. If taking this approach, think about how wool might be out-loaded from it and whether machinery storage areas can be made drive-through for added convenience.



LED lighting: It is cheap, uses very little power and provides brilliant illumination.



Power: USB outlets for charging phones and plenty of power outlets for radios and accessories. Power cords for the wool press suspended from high wires or on swing-away arms to keep them out of the way and allow the press to be moved.

Acknowledgements: Kondinin Group researchers are grateful for the time generously afforded them by shearing shed owners and builders including: Steve and Rebecca Thompson, Michael Potter, Wade Robertson, Paul Broockmann, Don Boyle, Peter Cochrane, Tanya Mason, Scott Welke, Neville Welke, Graham Moir, Peter, Pauline and Narelle Bunker, Geoff and Linda Bilney, Emily and Digby Stretch, Robert Melchiorre, Chad Lavender, Bill and Will Day, Andrew Arbuckle, Tom James, Jon Price, Michael and Jane Smith, Henry Ridge and the team at AWI.



Manure mover manoeuvrability: With more than 60,000 sheep going over the board in the Glenpadden shed annually, easy manure removal using a skid-steer loader is an important functional feature and the reason for the 2.7m clearance under the shed.

Geoff and Linda Bilney

Location: Kojonup, Western Australia

Geoff and Linda Bilney from Kojonup, Western Australia, have incorporated elements of the AWI-designed shed at Dubbo into their newly completed six-stand wide horseshoe board shearing shed.

Geoff wanted buy-in from both builder and shearing contractor, so travelled with shed builder Chad Lavender, from Chippy Chad & Co and Darren Byrne, a Katanning-based shearing contractor to inspect the Dubbo shed.

The trio inspected and discussed the merits of the design, collectively incorporating components into the build at Broome Farms that would suit the specific purpose of the shed. One of the most notable differences is the height of the floor which accommodates a bobcat for cleanout underneath.

The galvanised sheet-metal chutes are relatively steep with a 500mm drop-off from the board initially but then have multiple planes to near horizontal. This acts to slow the sheep as it approaches the chute exit.

Geoff and Linda fatten more than 20,000 lambs in a feedlot over the road, shearing

the majority of these lambs as part of their journey through Broome Farms.

Last year, over 65,000 sheep were shorn and the shed is used for shearing for more than two-thirds of the year.

On the board level, the catching pens and chutes have a unique position and angle of entry and exit to ensure the shearer does not need to twist their body when pulling a sheep from the catching pen.

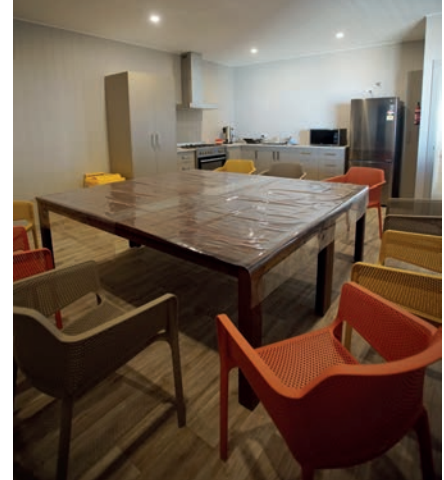
Construction is marine ply with a secret-nailed Jarrah board. The ply extends to the catching pens and holding yards also.

The front-fill catching pens have a 300mm fall over their length and feature traditional timber (Karri) slats, but the holding pens feeding the catching pens are level and are clad with plastic grating which is notably quiet.

The shed itself holds 900 lambs comfortably but if rough weather is forecast, another days-worth of shearing can be dry-shedded under the board and wool-storage area.

The shed has a first-class separate eating area with a pantry, fridge, oven, microwave, large table and quality plastic chair seating.

The shearing board room: Given the frequency of shearing at Broome Farms, Geoff and Linda Bilney have invested in a quality eating area for the shearing team.



Incorporated quarters are built beside the mess area which can be used for other purposes, for example, harvest accommodation or if one of the shearers or roustabouts become unwell. ▶



Western Australian AWI inspiration: Getting input for format and functionality from the shed builder and shearing contractor was important in the Bilney shed which references the AWI design.



Plyable: Use of marine ply is a signature feature of Chippy Chad & Co shed fitouts but the Bilney shed extends the use into the sloped catching and holding pens.



Ramped: Given the elevation of the floor, a long ramp is required to get sheep into the shed, but with blank walls and a parallel catwalk for personnel, the sheep flow up the ramp and flood the shed smoothly and quietly.

The new shed replaces one that was built many years ago and was a clean-sheet approach.

The Bilney's have used an AWI signage pack which was great value at \$25.

Lighting is all flood-LED in a pendant-style and there is a dedicated outdoor smoking area.

The wash-up trough is generous and perfect for filling up water bottles. A shower is provided as well as a separate men's and ladies toilet.

A bench for eskies, water bottles and a USB charger bank is planned as is evaporative air conditioning, although a recent 40-degree day demonstrated the value of the insulated roof and large pivot windows.

The entry ramp to the shed is long to match the 2.4m high main floor height, but videos show sheep happily running up the ramp which has blind sides and a cat-walk for those penning up and dogs.

One of the notable features of the shed that is well-suited to the Bilney's operation is the flat board. Beside the improved safety for shearers and roustabouts, the majority of sheep passing through the shed are lambs, so fleece off shears is simply swept into a pile for the presser. This means the roustabouts don't need to bend over in any case and are not at face-level to the handpiece action.

Wool storage is behind the pressing area at about 3.5m high to assist direct loading or transfer to ground level with the help of a telehandler and bale-grab.

An open day is planned for Thursday 4th February 2021 due to the levels of interest from other farmers. More details will be made available via the Kondinin Group online newsletter.

Scott and Odile Welke

Location: Coomalbidgup, Western Australia

When a South Australian shearing shed construction crew came across the border into Western Australia in late 2016 on a shed-building run, Scott Welke had them build a six-stand horseshoe design shed where their White Suffolk and Merino flocks could be shorn.

The dual-purpose shed also houses a machinery bay at one end with the shearing shed having a slightly lower roof pitched at 90-degrees to the machinery shed. Under an annex roof off the shearing shed is a sheep handling area kitted out with a Clipex handler where stud sheep work is conducted.

The shearing board area is largely ply construction but behind that, there are front-fill steel catching and holding pens which feature sliding/swinging gates. An RHS top rail over three K-rail style straps is featured through the yards and pens providing additional height to comfortably contain large frame sheep.

Catching pen floors are sloped towards the board with the entry gate at the lower end to help fill the catching pens with the sheep running up the slope. But the balance of the shed floor is level.

The vented top cap is supplemented by five pivot windows through the shed. **FA**



Sloped: Only the catching pens slope toward the board, rising up from the main floor level.



Front fill: Catching pens have a sloping floor and holding pens run parallel to the horseshoe design of the board.



Steel yards: Galvanized K-rail style panelling with an RHS top member provides plenty of height for large framed sheep.



Ply board: With a ply construction board including the floor, the pens and yards are all steel construction.



Modular build: A Commander AgQuip half horseshoe modular design in Jarrah provides Neville Welke with five stands in a dual-purpose shed.

Neville Welke

Location: Cascade, Western Australia

Just up the road from his brother Scott, Neville Welke has recently had the finishing touches put on a dual-purpose shearing shed with space for some cropping machinery and wool storage at one end. The shearing setup incorporates a half horseshoe board design which has been built inside a 30x60m Auspan shed using a modular drop-in design.

The five-stand shed has a 1800mm Jarrah tongue and groove board with the timber running along the length of the board as opposed to the usual front to rear orientation.

Plastic grate flooring features throughout the holding pens with timber slats in the front-fill catching pens. But a disadvantage of the modular design is that there is some floor joins in the catching pens which have some awkward sheet-metal cover strips. The ramp up into the shed is solidly built using treated pine sleepers in a galvanised steel frame.

Catching and holding pen construction is from RHS and oval sectional steel with slide and swing gates incorporated throughout. Sectional steel elements have plastic end-cap inserts and are neatly finished.

Catching pen doors are split 60/40 solid plastic sheet with pencil-rounded edges.

Back-aid support arms have a roller incorporated to allow front-to rear movement although catching pen doors have a full frame meaning shearers would need to get out of their harness before entering the catching pen.

Two personnel access doors for penning up are located in the middle and to one side of the board with slam-shut catches.

A lightweight removable handrail can be dropped into holes the front of the board should it be needed. Steps up to the board are also modular and can be shifted into any position around the board, a good idea if not all of the board is being used.

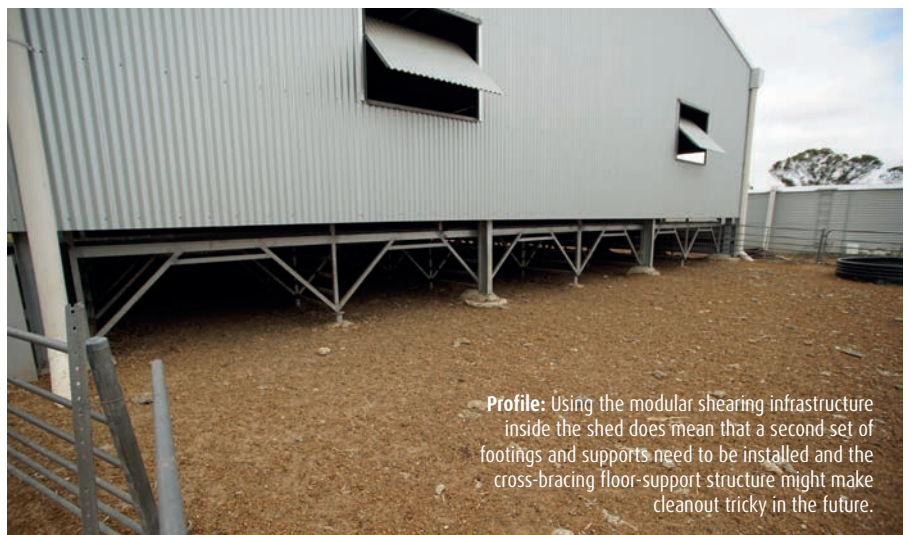
A modular ablation unit with two toilets and an outdoor wash-up area have been installed close by the shed. Power is supplied by a 15 KVA Blue Diamond diesel generator on the opposite side of the shed to the ablation unit. **FA**



Materials: Plastic flooring, with timber board and catching pens, plastic catching pen doors and galvanised steel pens and holding yards round out the materials list.



The end of the shed has room for wool storage and some farming machinery.



Profile: Using the modular shearing infrastructure inside the shed does mean that a second set of footings and supports need to be installed and the cross-bracing floor-support structure might make cleanout tricky in the future.

Mason Family

Location: Cascade, Western Australia

When Tanya Mason couldn't justify the cost of an all-new build for their flock of wethers at Cascade, WA, eyes turned towards repurposing an old machinery shed on the property.

With the ever-increasing size of machinery, the three-sided shed had long ago become too small, and had been used for bulk fertiliser storage. With the improved wool prices, it was decided to invest funds into adapting the building into a four-stand shed.

"It was just a really good use for what was an otherwise a fairly useless shed," Tanya commented.

Tanya runs wethers on the property, and some older yards are attached to the shed. Previously, the shed had been used for lamb marking, but the setup was not perfect.

Tanya engaged local shearing shed builder Chad Lavender to convert the shed into a shearing shed. This also entailed adding a wall and doors at the front of the shed to close it off.

The four-stand, straight board fits perfectly across the shed, with all dimensions fitting in with AWI guidelines.

"We could have had three stands and had bigger pens, but we wanted four because otherwise it just added extra days to shearing" Tanya said.

Catching pens are sloped at about six degrees and are a little larger than normal to hold about 15 wethers. Sheep enter the shed from the ramp into a rear raceway which runs across the back of the four catching pens. There are no forcing pens, with the sheep herded directly into the back-entry catching pens from the raceway.

The rear catching pen gates open across the raceway to meet the far wall of the shed. The shed can be filled pen-by-pen from the race, then the race itself can be filled. Although the design is very simple, it makes perfect use of the space available, and the workmanship is first rate.

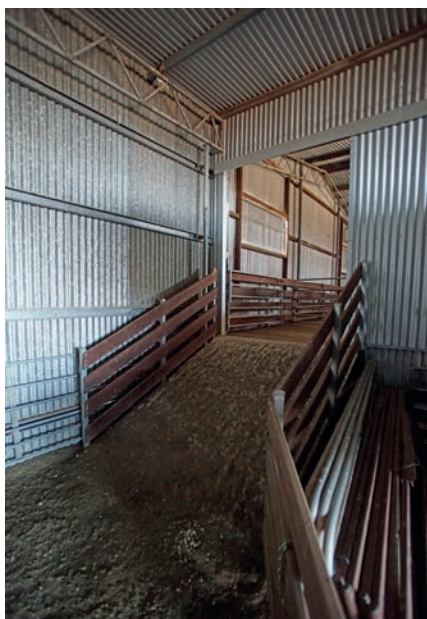
A lean-to attached to the rear of the shed is closed off with gates and sheep are run into this area, before entering the shed via a concrete ramp in the back corner. This space can also be used to keep sheep out of the weather before shearing. At shearing time, portable yard panels are used to direct sheep up the ramp, but later removed to leave the shed floor free.



The four-stand board fits across the shed, with the yards and board occupying half of the shed space, leaving plenty of room in the rest of the shed for bale storage. Windows have been cut into two sides of the shed to improve ventilation.

"We were going to put a new set of sheep yards out there at the same time but we ended up holding off. We wanted to design them to fit them around what we had here rather than use an off-the-shelf-design" Tanya said.

FA



Sheep have no trouble running up the steep entry ramp which is located inside an adjacent lean-to.



Sheep are forced directly from the raceway into the four catching pens. The catching pens have a sloped floor but the raceway is level. Sheep enter the raceway up a ramp from the right.



Converting an old machinery shed into a shearing shed was a good use for a small shed which became too small to house larger machinery. Sheep exit the shed from a single opening. New yards are planned in a couple of years.



The five-stand shearing board is generous in size to cater for rams and features an access door for penning up.

Graham and Shirley Moir

Location: Amelup, Western Australia

Long-term plans to remain in the industry prompted Western Australian breeder Graham Moir to embark on an ambitious shearing shed build.

Graham and his wife Shirley run a SAMM/Merino stud at Amelup, at the foot of the Stirling ranges. With a flock of around 3000 ewes and a couple of hundred rams, it was time to update the shed which was built in 1966.

Plans were drawn up to construct a much larger shed joined onto the older shed, with

the sheep entering the old shed from the existing yards. The older shed would be converted into pens with a drenching race, with the five-stand, raised board catching pens, forcing race and count-out pens housed in the new section.

However, problems arose during the build when it was realised the structure of the original shed was in a bad way.

“Don’t renovate – don’t even contemplate it,” Graham said, explaining the old shed was in far worse shape than initially realised.

In the end, the existing shed needed new iron, restumping, new walls and significant structural work, as well as all-new grating on the floor. While this work led to a large, unexpected increase in costs, it did keep shed builder Chad Lavender engaged on the project while the structural build of the new shed could be completed. Ultimately, the pressure was on to get the work completed in time for shearing.

While expensive, the renovated older shed adds significant holding capacity to the new shed. A raceway runs across the rear of the shed from the entry ramp, although Graham believes he would delete it if he had his time over again, making the pens larger.

The shed is flood filled with internal gates open, and the process has proven easy.

“I can fill the shed on my own with one old dog in about half an hour,” Graham said. The older shed is light and breezy, with a pitched centre room, clear sheets in the roof and LED lighting. Side windows allow good breeze flow, and also significant light as they are clad in clear sheets rather than zincalume.

The straight board is at right-angles to the pen, with sheep entering across the back via a long raceway. There are no forcing pens, with sheep forced directly into the front-fill catching pens from the race. Graham reckons the catching pen floor is sloped too



Graham Moir admits considerable money was spent building the new shed and remodelling the old shed but is happy with the results. However, he would think twice about renovating an old shed in the future.

steeply, and some issues are experienced penning up. Catching pens hold 16-20 sheep depending on their size.

The count-out pens are behind the raceway at ground level, and inside the new shed, allowing them to double as additional pen space.

The shearing board is constructed of tongue-and-groove Jarrah, with hidden nails for a clean finish. The board is a little wider at 2m for shearing rams, and is lower than normal at 700mm so fleeces can be reached from ground level.

While the build was expensive, Graham is happy with the results.

"I plan to stay with sheep, hence the investment, and I can't fault the workmanship," he said. He also added the timber slats were all nailed into place, then countersunk screwed. "There were 37,500 screws used on the floor of the shed. It was like a production line. When the new shed was built, Chad set up a fabrication workshop in one end."

All steel stumps are painted in tar and sleeved in poly pipe for protection against urine. To stop rams jumping out, the yards are a little higher than normal, with a cattle rail placed on its side at the top raising the height to 1070mm. All gates in the shed are sliders, although Graham is quick to add "there are too many bloody gates."

The remaining space in the new shed is generous, offering plenty of room for wool handling and storage.

"It only cost something like another \$3000 to put an extra bay on the shed, so why wouldn't you?" Graham added. **FA**



There are no forcing pens, with the catching pens side-filled from the raceway. The shed entry ramp is at the far end of the raceway.



Sheep enter through the remodelled old shearing shed which has been converted into pens. A long raceway extends all the way to the rear of the catching pens.



Count-out pens are under cover and are also used as additional yarding. A ramp to the right of the picture allows sheep up onto the raceway behind the catching pens.

Bunker family

Location: Mt Barker, Western Australia

Kondinin Group inspected a similar shed to the Moir family which is owned by the Bunker family of Mt, Barker WA. Using the same builder as the Moir shed, Chad Lavender, many of the design features are the same.

Peter Bunker and daughter-in-law Narelle started off with a new Auspan shed as basis for the dual-purpose shearing and machinery shed. The shed houses the truck for most of the year, or sometimes the harvester.

The layout of the shed is quite similar to the Moir shed, with a five-stand, straight raised board at right angles to the pens. Sheep enter at the rear to flood fill the shed, and a long raceway travels behind the catching pens, with no dedicated forcing pens as such.

Peter commented that filling the catching pens didn't present a problem, provided there were sheep in the far pen to draw the others in. All catching pens are separated by side sliding gates, and the rear of the pens also opens up across the raceway. Pen capacity is about 15 head, and the entire shed can hold about 930 head.

Inside the shed, there is plenty of light thanks to three large shutters on each side, the large machinery access door, and LED lights. Airflow is more than adequate through the openings, and ceiling fans have also been fitted.

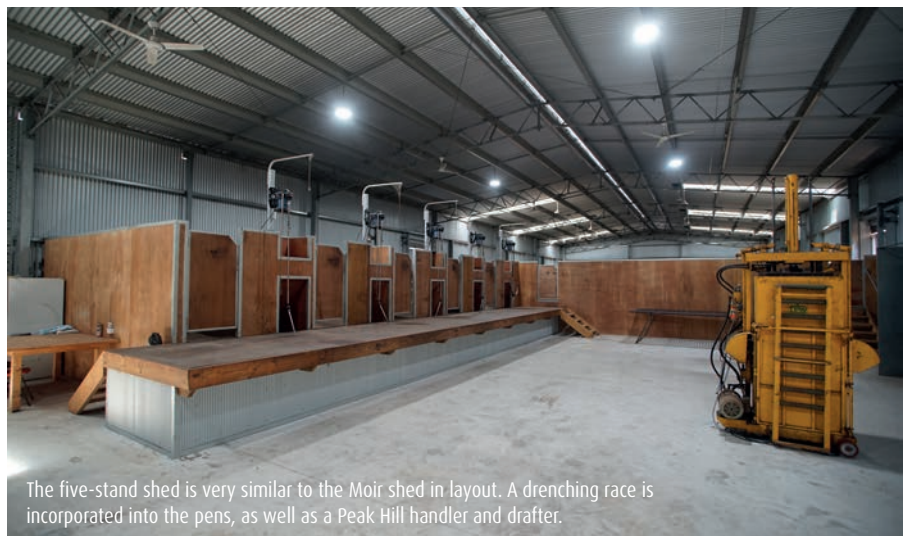
The shed is equipped with dual ramps for entry and exit when drenching in the shed. The main ramp is fully enclosed on the sides with sheet metal, and Narelle claims sheep flow really well into the shed as they can't see through the ramp sides. In the shed, there is minimal light from underneath the grating which aids movement through the shed. **FA**



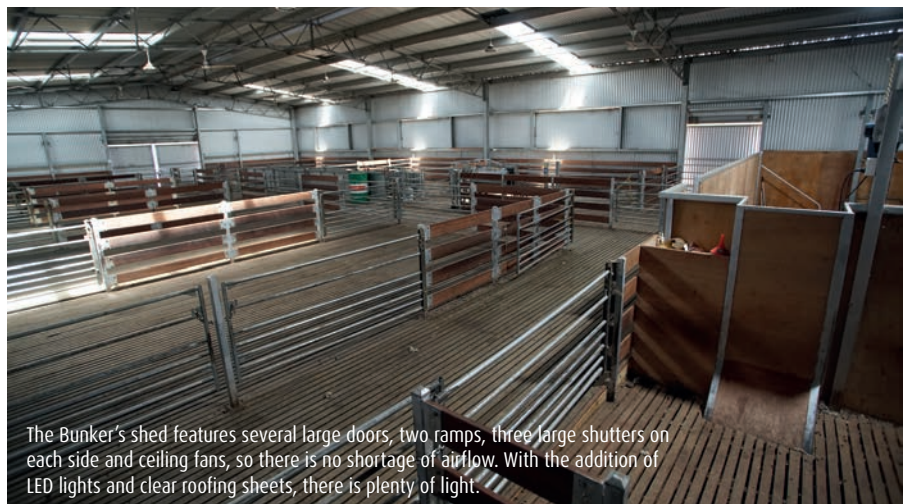
The wind tended to blow dust into the shed through the count-out doors, so rubber flaps were fitted over the openings. These are chained up for shearing.



Peter Bunker and daughter-in-law Narelle inside their dual-purpose machinery and shearing shed which was built in 2018. This replaced the original two-stand shed from 1958. Peter added another stand when he finished school, and his son added another when he finished his schooling, taking it up to a four-stand shed, with no increase in grating or wool handling area size. Peter said shearing in this shed was "chaos".



The five-stand shed is very similar to the Moir shed in layout. A drenching race is incorporated into the pens, as well as a Peak Hill handler and drafter.



The Bunker's shed features several large doors, two ramps, three large shutters on each side and ceiling fans, so there is no shortage of airflow. With the addition of LED lights and clear roofing sheets, there is plenty of light.

Don Boyle

Location: Broomehill, Western Australia

Broomehill, WA farmer Don Boyle should know a thing or two about shearing sheds. With 55 years in the industry as a shearing contractor, woolgrower, shed builder and farmer, Don is passionate about wool harvesting efficiency and safety in the shearing shed.

Don is a certificate-four shed safety assessor and has also built four of his own shearing sheds over the years. Currently, Don runs about 20,000 sheep between two blocks with his sons Damian and Brendan.

While Don has used a lifetime's worth of experience to design and refine his shearing sheds, they are not built with a blank cheque. In fact, Don is at pains to point out that any farmer can build their own for a fraction of the price. Don took Kondinin Group on a tour of his latest two shearing sheds, pointing out that most of the materials were steel offcuts or timber milled on the property using a portable sawmill.

"I've worked in enough terrible sheds to know how to make a good one," he said.

Both of Don's sheds featured U-shaped raised boards, one with six stands and



Don built all of the gates from steel offcuts. Gates slide through to aid when penning-up.



Catching pen door placement and lack of overhead structure allows the shearer to enter the pen while still wearing their back-aid.



The four-stand shed has just been completed. Both sheds took Don about 12 months to build it in between other farm work.

the other with four. The larger shed has been built inside two prefabricated sheds joined together.

“I got them for \$15,000 each. I couldn’t build them myself for that price” he said.

The four-stand was built inside a shed that Don built himself, making all the structural steelwork from scratch. Don was able to source a large amount of treated pine decking, which was used for the board and backboard in the smaller shed.

The catching doors are split 70:30 with the smaller door towards the shearer which avoids the door hitting the handpiece, stops sheep’s feet becoming caught, and is also shorter distance to walk around.

A notable feature of both sheds is the placement of the catching doors, which allows the shearer to remain in their back-aid while catching a sheep.

The U-shape boards in both sheds are sized so that shed hands are only one step away from the table at all times. A yellow line painted on the edge of the board in the six-stand shed aids visibility for the shearer.

All pen floors in Don’s sheds are flat. While he understands why some sheds are



Don uses jarrah slats milled on the farm. The slats are wider than normal and are spaced at about 16mm.

built with sloping floor catching pens, he adds, “You don’t want too much slope – sheep won’t run in well and you don’t want to feel like you are falling over backwards as you are dragging a sheep out.

“The design is so efficient and cheap to build. Any farmer can do it. The sheep absolutely pour in here.” **FA**

DON’S TIPS FOR SAFE AND EFFICIENT SHEDS

- The height of the board should be no more than 750mm.
- The board should 1800mm wide, so long as the overhead gear faceplate is in line with the inner edge.
- Keep catching pens small – no more than about 2.4m by 3m. Keep it to a maximum of 15 sheep. You don’t need to be dragging sheep too far.
- Make your forcing pen the same size as the catching pen.
- Keep your shed as light as possible – the lighter it is, the less chance sheep will balk at any light from under the grate.
- Sheep will run well into the shed as long as they are not heading towards noise.
- Pens should get bigger the further they are away from the board.
- Chutes should cut into the board by 100mm, and there should be a straight drop of 100mm before the angled section. Sheep should fall in and be carried away by their momentum. There should be no pushing.
- Don uses Jarrah slats which are wider than normal, spaced at about 16mm (he uses a 5/8” bolt as a gauge). Lay six rows of slats then check for squareness and correct if needed.
- Backboards should be painted white to maximise light on the board.



The six-stand, U-shaped board is arranged so the shed hands are no more than one step from the table at all times. Note the yellow line to improve the visibility of the edge of the board.



Safety signage in the six-stand shed. Note the white back board which aids in visibility on the board.



Don Boyle is more than happy to share his experience and knowledge of efficient shed design with anyone looking to build their own. While he has shorn more than a few sheep in his lifetime, both his sons are also champion shearers. In 2008, Brendan set a world record for endurance shearing, taking the wool off 973 full-wool Merino ewes in a period of 24 hours.



Peter Cochrane's sheds follow a similar design principle and construction method with the flow of sheep and the workers in the shed in front of mind at all times.

Peter Cochrane

Location: Western Australia

Peter Cochrane is busy putting the finishing touches on his 135th shearing shed build at Woodyarrup Stud east of Broomehill, Western Australia.

The prolific shearing shed carpenter has made a life-long career out of building sheds all over his home state and usually camps on-site in a caravan in the shed as it is being built. The frequency of ducking home to Australind depends on the distance to the job to get supplies and spend time with his family.

Peter says a shed takes him and his leading hand, Ivan, about five weeks to build with the help of a young chippie, Brett.

A Cochrane shearing shed is easy to spot with a signature rough-pour ramp, usually leading straight up into the shed with a half-height fence down the middle to stop sheep turning around.



Ramp it up: Rough-pour concrete up-ramp into the shed with a half-height fence to stop sheep turning.



Corrosion protection: the bottom of support stumps are sleeved in PVC filled with brickies mortar to minimise the risk of corrosion.

The shed door at the top of the up-ramp also often has another door on the opposing side of the building which can be opened to provide a clear line of sight across the back of the shed. Peter says this allows the sheep to see outside and helps the flow into the shed and pens. It also provides good airflow through the back half of the structure.

Other Cochrane signatures are the lift and swing gates in the penning area and the white painted chipboard around the raised Jarrah board aimed at maintaining a light bright space.

Sloping catching pens at three degrees are standard and down below board level, galvanised steel support poles sleeved to 400mm in PVC filled with bricklayers mortar and domed on top to minimise any risk of corrosion at the ground level. **FA**



Chute transition: A recessed board and 200-300mm drop down into the chute.



Lift and swing gates: Space efficient assistance for the penner and an alternative to the slide and swing.

PETER COCHRANE'S TIPS WHEN PLANNING A SHEARING SHED BUILD

- Building on a level site is not ideal; a slope is needed to provide fall for the chutes and access underneath while also allowing water to flow away.
- Face sheds and grating east to west with entry doors on the north-south sides to help sheep run.
- Ventilated ridge caps are a must, it allows heat to escape on a hot day and helps the windows maintain a breeze through the shed.
- Light in the shed is important – keep the underside of sheds dark to prevent baulking.
- The additional cost of the horseshoe design (\$8-\$9000) is small over the lifespan of a shed if handling large numbers of sheep.
- Forcing pens slightly larger than the catching pen means three sheep can be left behind to bait the next pen fill into the forcing pen.
- Recess the board by 90mm at the chute transition with a 200-300mm drop to make it easier to get sheep off the board with minimal effort for the shearer.



Woodyarrup stud

Location: Broomehill, Western Australia

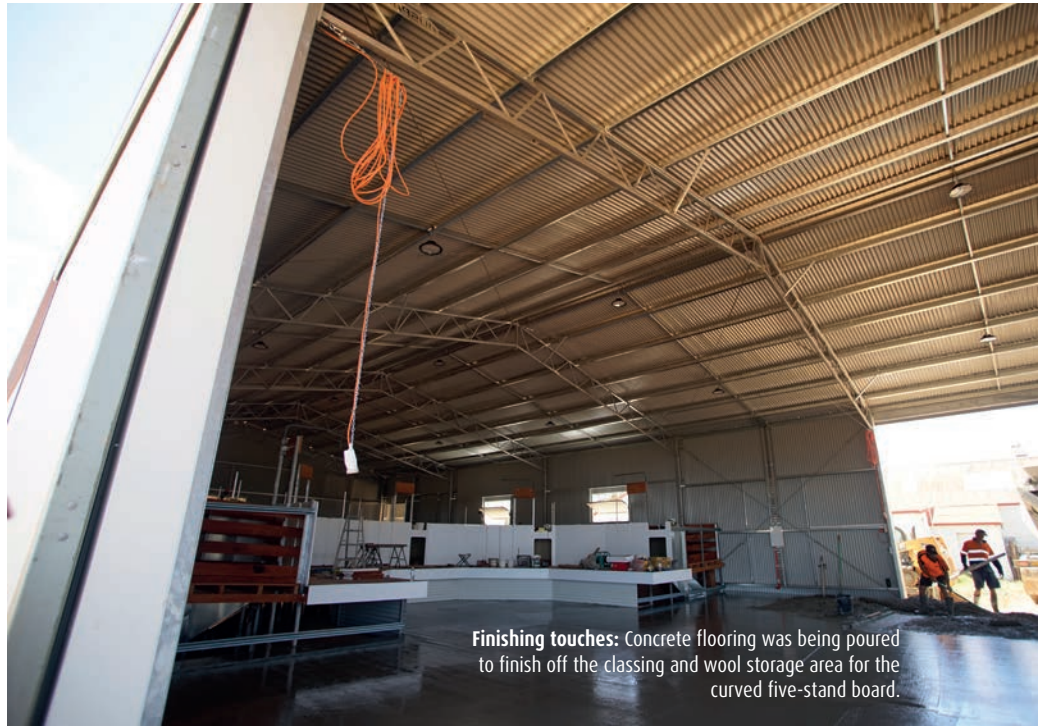
The Woodyarrup stud shed where Kondinin Group researchers met Peter Cochrane had some specialist stud requirements including a deeper (2m) board for shearing large rams (standard depth is 1.8m). Wider Karri timber slat flooring and skirting rails between the bottom timber rail and the flooring minimise even the slightest risk that stud rams may injure their feet.

The 30x60m shed was built by Auspan and had an enormous roofline extension out to around 90m covering a large set of Commander AgQuip yards.

Peter says that when he first started building sheds, a four metre column height was standard and adequate, but with a shift to dual-purpose sheds, an additional metre of shed frame height means machinery can be stored in the shed.

Peter normally uses hex-head fixings for the slat flooring, countersinking each one because the timber is green and will shrink over time. Timber bearers are used exclusively to prevent the risk of corrosion.

FA



Finishing touches: Concrete flooring was being poured to finish off the classing and wool storage area for the curved five-stand board.



Flooring: Wider than normal (40mm) Karri grating installed with counter-sunk hex-head fasteners.



Yard space: The shed has a large undercover set of Commander AgQuip yards under construction beside it.



Dual purpose: Steve and Rebecca Thompson extract plenty of value from their dual purpose shed.

Steve and Rebecca Thompson

Location: Boyup Brook, Western Australia

Steve Thompson is a shearer trainer, so knows a thing or two about shearing and had spent plenty of time thinking about the layout of his new shed with shed builder, Peter Cochrane.

Building the shed in stages, Steve said the 15x36m shed was built first with a half-concrete floor.

The shed is dual-purpose, with a vehicle hoist and workshop at one end and with a holding capacity of 400 ewes in the shearing end of the shed. The relatively small night pen in the shed is bolstered by a large set of undercover

yards adjoining the shed which were built first.

All but one of the catching pens is front-feed and all have a sloped floor. The roof is insulated to make working in the shed more comfortable.

Steve said he initially intended to build a four stand but decided to go to five-stand design instead after considering

the layout and geometry of the horseshoe build.

If lambs need a tidy-up crutch before going on a truck, Steve says they can be crutched over the board and circulated back through the shed to the loading ramp via a central personnel access door which is usually used for penning-up

FA



Loo with a view: Toilet and washstand facilities.



PA gate: A personnel access gate can also be used to feed sheep back into the shed after a quick tidy-up crutch if needed before trucking.



The new five-stand Peter Cochrane-built shed for the Rhodes Pastoral company can fill with 600 sheep in three minutes according to Michael Potter.



Rhodes Pastoral

Location: Boyup Brook, Western Australia

Michael Potter, Stud Principal, Boree Park White Suffolks, (one of the Rhodes Pastoral company farms at Boyup Brook), says that a 100-year-old shed couldn't be salvaged despite getting a number of inspections and opinions.

The shiny new five-stand, raised board Peter Cochrane-built shed on the same site is the newest of at least four shearing sheds the Rhodes Pastoral team work out of. It is flanked by a substantial set of undercover yards that hold 3500-4000 head which were built first to accommodate the White Suffolk stud sheep bred on-farm. Auto-weighing and drafting equipment can be dropped in at the end of the race and a loading ramp can be fed from any of the pens in the yards.

The shed built by Perth-based Grid Constructions, covering the yards is 30m x 60m with the shearing shed extending this

roofline further. To comprehend the size of the roof catchment, Michael says that two falls of rain filled a 375,000 litre tank.

Michael says Peter advised orienting the shed 180 degrees to what they had originally intended to ensure light didn't baulk sheep running into the shed in the afternoons and evenings.

A signature rough-pour ramp leads up into the shed. Michael says that the shed can be filled with 600 sheep in three minutes with the assistance of one dog.

The shearing shed will accommodate around 800 full-wool sheep and has an insulated roof and a vented ridge cap, essential additions for a February shearing schedule.

Construction is Karri slats with a Jarrah board and Michael says there is ample access underneath the slats for a small skid-steer, like a Dingo digger. Catching pens are all front-fill. There is a large wool

storage area to one side of the board that accommodates 75-100 bales and has a very wide-opening door for machinery access. The concrete floor has been painted with a non-slip sealant.

The shower and toilet has a generous and well-fitted-out dining room and kitchen. **FA**



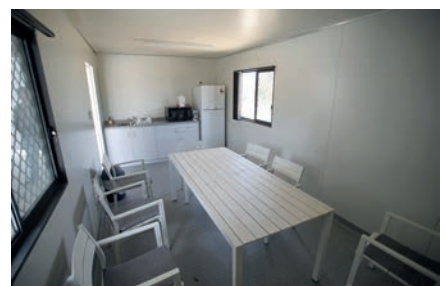
Cool feature: An insulated roof with vented ridge capping ensures temperatures in the shed during February are more comfortable.



Yards: The yards built prior to the shed hold 3500-4000 head.



Wool sorting: The wool sorting area can be set up to the team's preferences and wool storage is 75-100 bales.



Facilities: Dining quarters are clean and functional with a shower and toilet next door.

Wade Robertson

Location: Boyup Brook, Western Australia

Wade Robertson says his new dual-purpose shed is used in conjunction with sections of old shearing sheds, which are adapted to keep 1800 sheep comfortably undercover ready for shearing in the new Peter Cochrane-built shed.

The six-stand shed has a race along the wall which helps sheep flow from the old shed into the pens and as Wade points out, it is a lot easier to pen up smaller pens to capacity without the risk of smothering than large ones.

Wade reckons the five front fill pens (number six is a race fill) work well as do the lift gates but do take some getting used to so as not to pinch fingers. Wade says he has previously had slide-swing gates that also worked well but confused some roustabouts.

Wade currently has a folded seeding bar and cart and a large front-wheel-assist tractor in the front half of the shed at present and there is plenty more space to work with.

Wade says that the shearers all prefer to bring their own shearing plants but they have two Heiniger Evo plants of their own.

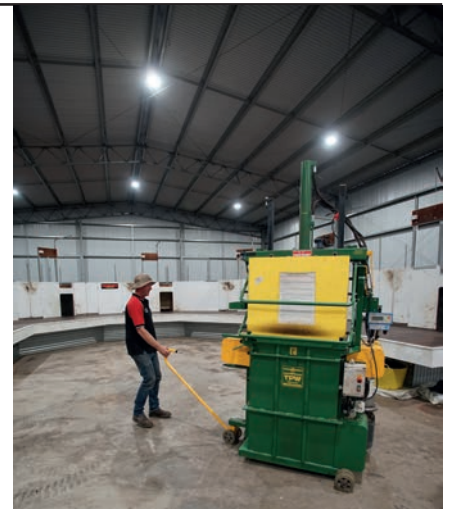


Ablution: A shower and toilet with a wash basin on the side wall is positioned to the side of the shed hardstand.

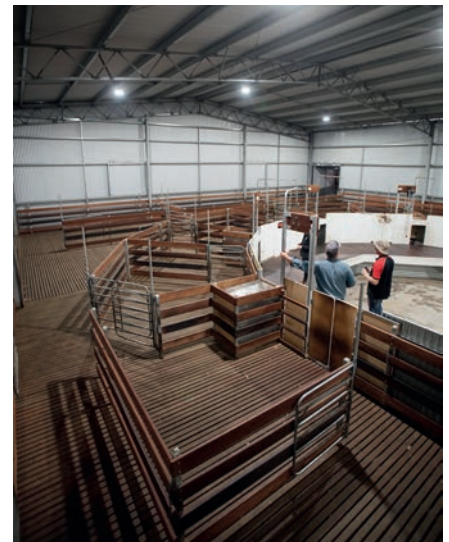


Count-out pens: Individual count-out pens empty into a laneway and provide separation for mob cut-out. Inside the shed, individual mobs are kept separate using a yellow chain on the gates between mobs to identify where the cut-out is.

FA



Not pressed for space: The wool press can be manoeuvred to position and tucked away when not in use. A swinging boom arm carries the power cord to the press and stows away against the wall.



Running race: Sheep flow from the older sheds to the right into the new shed and around a race into the front fill pens.



Dual purpose: Wade Robertson says his new dual purpose, six-stand shed makes shearing easier and keeps machinery in better condition.





Paul Broockmann says the ease of sheep movement through the shed is one of the main differences he has noticed with his new five-stand shearing shed.

Paul Broockmann

Location: Boyup Brook, Western Australia.

Paul Broockmann has a 30x15m shed with five stands and holding yards built by Peter Cochrane.

Paul says however that 30x16m would have provided the required space for a full five-stand shed with no compromises on the fifth-stand catching pen size.

Paul says that initially, they were going to build a four-stand shed but changed their mind to go for a five-stand after building the shed.

Peter says they did however elect to pay an additional \$3-\$4000 to go a metre higher

to 5m high walls with the shed to provide additional ventilation.

The shed has an annex out over a section of the yards where a Combi-Clamp sheep handler is positioned with a blind 180 degree lead-up race. Paul says they have used it exclusively for drenching and capsuling sheep and rates it highly.

A shower and toilet is in a separate building to the side of the shed with a well-finished Bunnings kitchen including an oven and fridge.



Three degrees: Sloped forcing and catching pens with lift-swing gates.



Connected: A Combi-Clamp handler is positioned undercover between the shed and the yards.



Raised board: A standard five-stand raised horseshoe board is squeezed into the 30x15m shed with the only compromise being the size of the fifth catching pen.



Happy: Andrew Arbuckle, St Arnaud, Victoria has installed a new four-stand, sawtooth design shed. Photos: Mark Saunders

Andrew Arbuckle

Location: St Arnaud, Victoria

Andrew Arbuckle runs a self-replacing Merino flock of about 1500 ewes just south-west of St Arnaud in Victoria.

He recently invested in a four-stand, sawtooth design ProWay shearing shed which is close to completion but will be ready for lamb shearing this month and the main shearing in May, just before the ewes lamb down. Average adult sheep micron is 20.5.

The four-stand shed has a raised board with the stands arranged in a horseshoe design.

Andrew said he probably only needed three stands but having four allowed for future expansion and if there was a shearer in training who needed a stand to learn on.

The new shed is built next to Andrew's existing shearing shed which will be retained

to use for undercover sheep yarding during shearing and as an upgraded dining and wash up area for the shearers and shed hands.

The new shed is basically a machinery shed design with clear span across the width. The shed measures 50m in length by 15m wide. The shearing part of the shed is 26m in length while the remainder will be used for undercover yards (yet to be installed).

Andrew said he will be able to comfortably fit 300 adult sheep in the new shed but one of the driving forces behind the new investment was the struggle to move and force sheep up to the shearers in the old shed.

"Penning up in the old shed was a nightmare but that will be a whole lot easier and stock flow in general will be dramatically improved with the new design," Andrew said.

He also has ensured some double use of the shed with a large, open area and sliding door at the front of the shed providing storage for vehicles and the like.

There's an emphasis on light and air flow with extensive use of clear laser light sheeting, LED downlights and large shutters have been installed on the north, south and eastern facing walls.

Ceiling fans have been installed above the shearing board area.

Catching pens have their floor sloped front to back and the catching pen and holding pen floors are made of more traditional timber slats.

Andrew is happy to talk to growers who may be contemplating new builds and can be contacted via email: traceyarbuckle@bigpond.com

FA



Room for improvement: Andrew has plans to build undercover yards at the rear of his new four-stand shed.



Well handled: The four-stand design has plenty of room for wool handling.

Tom James

Location: Redesdale, Victoria

Tom James runs 7500 superfine Merinos near Redesdale in central Victoria and has installed a new raised board, four-stand Proway build shearing shed.

When Kondinin Group visited the shed in November last year, shearing had been under way for about three weeks.

As well as the 7500 adult sheep, about 2500 lambs are shorn each year. Micron average for the flock is 17.

Tom said his new shed investment of about \$250,000 had been running very well and offered a range of dramatic improvements compared to the old shed which had elements built in the 1890s.

The new four-stand design is a sawtooth design with the stands in a line across the width of the shed.

The shed itself measures 18m wide by 30m in length and offers almost 2m of headroom underneath the holding pens to make clean out easy (with a small excavator for example). Floor to roof height in the shed is 5.5m and one end has a large concrete slab and sliding doors to provide easy access for vehicles to wool bales.

Tom said the large open space also doubles as storage for pencil augers and other farm vehicles and implements when not shearing.

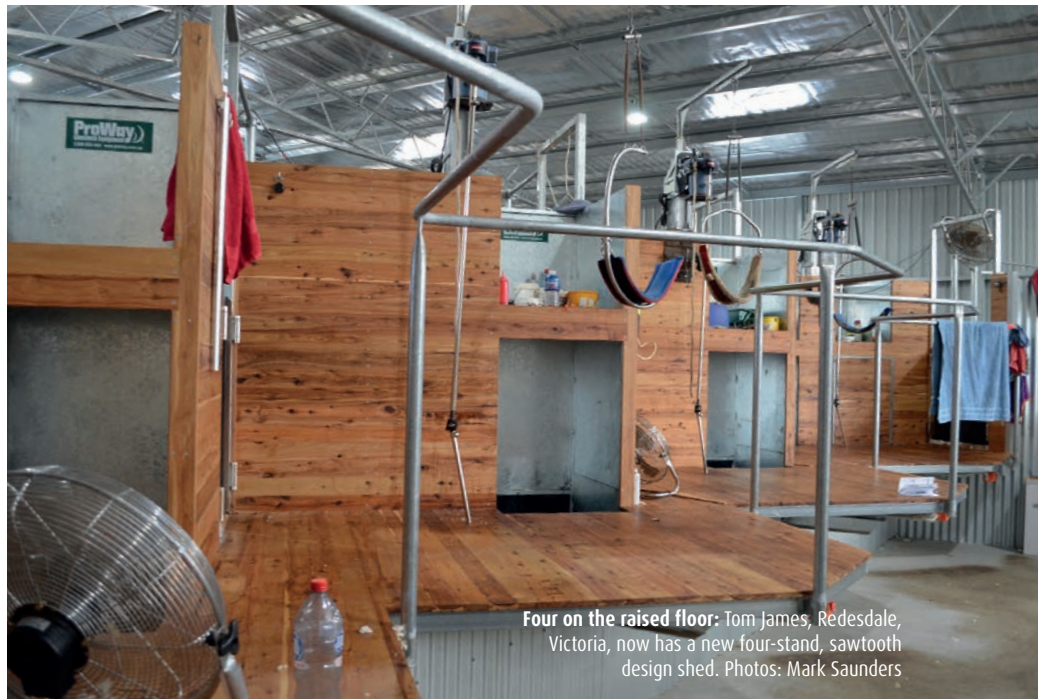
Wool bins are not on caster wheels but Tom plans to make them easy to slide so they can be moved as needed. The shearing team in operation when the shed was inspected was using just a single, large wool table for skirting and classing.

The open end of the shed has a large table, small sink, chairs and instant hot water service in one corner for the shearing team to use for eating and wash up. Porta-loos are used for toilets.

Shearers are offered some protection with a bent-pipe railing at the front of the raised board in case of slipping or falling and sudden sheep movements.

There is an emergency stop button located under the bottom front edge of the raised board at each stand.

LED down-lighting is used which Tom said was doing a great job in terms of providing an even light for the classers and shearers. The southern-facing wall of the shed incorporates laser light sheeting and Tom said that means you don't need the lights on all the time in the shed when not shearing.



Four on the raised floor: Tom James, Redesdale, Victoria, now has a new four-stand, sawtooth design shed. Photos: Mark Saunders

Air flow in the shed can be managed using two large sliding doors (nine metre opening) at the front of the shed and a 5m span sliding door on a side wall.

There is also a large sliding door on the wall closest to the 'smoko' area for the shearers (and on the same side of the shed as the outside yards).

Adjustable steel louvers are also incorporated into the walls to promote air flow and the roof is insulated.

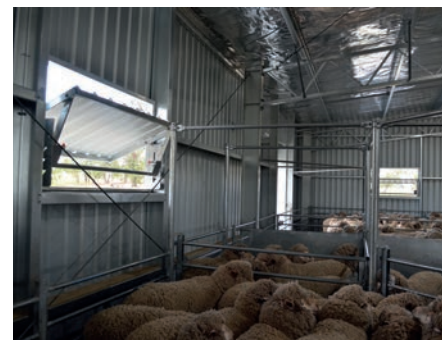
A left-hander's stand is one of the four on the raised board and the catching pens are sloped front to back (a height difference of 150mm).

Flooring in the catching pens is timber slats while a fibre reinforced plastic grating is used in the holding pens. The grating has a textured surface for grip and the grating pattern is squares which measure about 30mm x 30mm. Tom said the plastic grating is very quiet and 'self-cleaning' and should last a lifetime.

Gates in the holding pens can be swung through the hinge point allowing flexibility and the sheep feed into the shed via a new ramp and roller door in the rear corner. **FA**



Easy clean: There is ample room under the shed for clean out.



Breezy: Shutters provide plenty of air flow and light.



Fancy floor: Flooring has a mix of timber slats and plastic square grating.



Open ended: The shed includes a large bay which can be used for general storage.



Improvement: Bill Day, Nagambie, Victoria, has built his own new shearing shed using an Australian Wool Innovation four-stand template. Photos: Mark Saunders

Bill and Will Day

Location: Nagambie, Victoria

Bill Day and his son Will have built a new four-stand, non-raised board shearing shed north-west of Nagambie in Victoria where he runs about 1500 Merino ewes in a self-replacing flock.

Bill used an Australian Wool Innovation (AWI) shed template which has the four stands in a curved layout.

The external structure is a clear span shed (24m in length by 18m in width) which he also erected and he reckons the build to date has cost around \$120,000 (with the shed taking up almost \$50,000 of that amount).

The AWI design aims to allow the shearer to drag sheep in a straight line onto the boards, minimising the need to twist or turn.

Standard features include “short” catching pen doors, an 800mm wide chute with a 200mm recess of the top of the chute.

Catching pen floors slope upwards from the front to the back with a 300mm rise over 2.5m in length.

The self-build included milling the timber floor battens (from grey box and yellow box), all construction and re-using some timber from the old shearing shed.

Bill also chose to use yellow tongue manufactured timber panels for the catching and holding pens and made all the gates and sheet metal capping for the timber panels.

The new shed can be filled with sheep from the old shed which is linked by a short crossover and sliding doors. The rear of the new shed where the sheep feed into has a

curved pen wall – similar to a bugle yard – within the shed structure.

Bill has also renovated a part of the old shed using a W pattern plastic flooring



Flow on effect: Curved fencing helps sheep flow to the holding pens.

where he intends to install a sheep handler to allow for husbandry under cover.

The same flooring is used in the holding pens of the new shed.

LED downlights are used and the southern facing wall of the new shed has a run of opaque plastic corrugated sheet running the length of the wall and extending about one metre down from the roof.

The non-pen end of the shed has a bay with a concrete floor to allow for storage (it is a neat fit for the family's 41-foot semi-trailer).

The area in front of the shearing boards is open and Bill's wool presses and bins all can be wheeled around to suit a given shearing task.

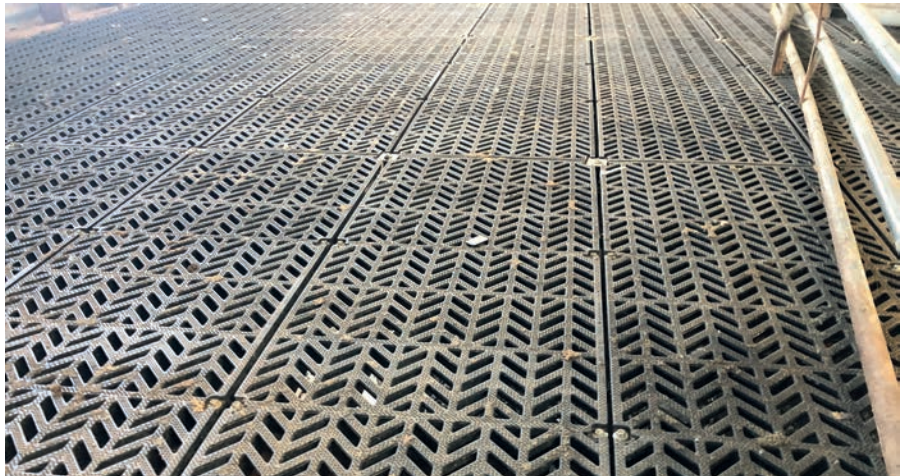
The main build was completed in September last year and Bill said he still has wall shutters to install to help air flow and will eventually put an evaporative air conditioning system in as the main shearing in in January or February.

"We still have to finish off the smoko area but we have had sheep shorn in here and there were no complaints from the shearers whatsoever," Bill said.

"There's no doubt it was a challenge to build by ourselves with a lot of weird angles in the construction, but it works well.

"Shearers will only be harder to get in the future and we need to have a shed and facilities they want to come to."

The non-raised board design was primarily for safety as Bill believes there is some risk of falling injury for the shearers.



Plastic fantastic: Plastic flooring is used in the holding pens.



FA

Let there be light: The new shed includes clear plastic sheeting to improve lighting conditions in the shed.

OTHER SHEDS

For more information on the following sheds, see the sheep infrastructure *Research Report* September 2019 No. 116 (Stretch and Melchiorre) and *Farming Ahead* April 2020 No. 339 page 26 for details of the Smith shed.



DIGBY STRETCH

Kondinin Group researchers saw Digby Stretch's shed at Kojonup, Western Australia when looking at yards and sheep infrastructure. The Cochrane-built shed is a five-stand, raised-board horseshoe arrangement. Power for the wool-press hangs from a door track rail making it easy to shift but also keeping it out of the way.



ROBERT AND JASON MELCHIORRE

The Commander Ag-Quip built shed in Narrogin, Western Australia, is a work of art. The dual-purpose shed has swing-slide gates, a large entry ramp and a large opening with triple sliding doors at the front of the shed.

One of the more unique features is a large lever which can be pulled to open all the let-out gates simultaneously.



MICHAEL AND JANE SMITH

Built by Williams, Western Australia shed builder, Jon Price, Michael and Jane Smith's shed is a curved sawtooth design with sloping catching pens and a board craftily built using Jarrah. The catching pens are side fill with slide-swing gates and diamond pens in the holding area. A central staircase leads up through the centre of the board to the penning area.

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