For all districts

Department of Agriculture

AGNOTES

Modern three-stand shearing sheds

February, 1979

Order No. **484/79**

by Kieran Ransom, sheep industry officer

New ideas in the design of shearing sheds can make filling catching pens much easier and can save labor once the fleece has been removed from the sheep. The following floor plans of shearing sheds show how features such as front-fill catching pens and raised boards can be incorporated in three-stand shearing sheds.

These plans should be studied in conjunction with other agnotes on such things as dual-purpose sheds, raised boards, slide-and-swing-gates, let-go chutes, shed size, shed siting, lighting, ventilation and critical dimensions for pens and machinery installations.

Plan 1

This plan is an adaptation of an existing shed. Two of the catching pens are filled from the front. The U-shaped raised board gives the rousteabout easy access to all shearers with a minimum of walking. This U shape also allows the front-fill catching pens to be incorporated in the design.

The let-go chutes consist of solid tipping platforms which lower under the weight of the sheep. A locking pin can be used to prevent the platform from lowering and a gate at the end can be opened if the sheep are to be let back inside the shed. This converts the chute into a return race.

Plan 2

This plan, also based on an existing shed, features race-fill catching pens. The shedhand starts the sheep up the race and keeps the others following on with the help of a dog. The sheep run up the race and, on reaching the end, turn and run to the far back corner, drawing others after them. A sheep sometimes baulks in the race and may need prodding or manhandling. There is no need to wait until the pen is empty before re-filling it.

The doors and panels between the catching pens and shearing board are 1.6m high and are made from particle board coated with "Estapol". This helps to reduce noise and to shield the sheep from general movements which may stop them from flowing into the catching pens.

Small gates are fitted between the catching pens to enable sheep to be moved between pens at a mob cut-out after the forcing pens have been filled with the next mob. The chutes in this shed are very steep. They protrude only a short distance into the catching pen, allowing enough room for the small gates between catching pens.

Plan 3

This plan has been copied from the Bowley-Geddes catalogue of shearing shed plans. It features a raised board with front-fill catching pens. The floor of the wool room is a concrete slab on the ground. The curved shape of the board again reduces the distance that the shedhand has to walk to pick up pieces.

Summary

Getting sheep into catching pens is often one of the more difficult jobs in a shearing shed, but front-filled catching pens can make the job easier. These plans show how front-filled catching pens can be incorporated in three-stand sheds. Slide-and-swing or lift-and-swing gates in the sheep area will help to make these designs work efficiently. (see separate agnote).

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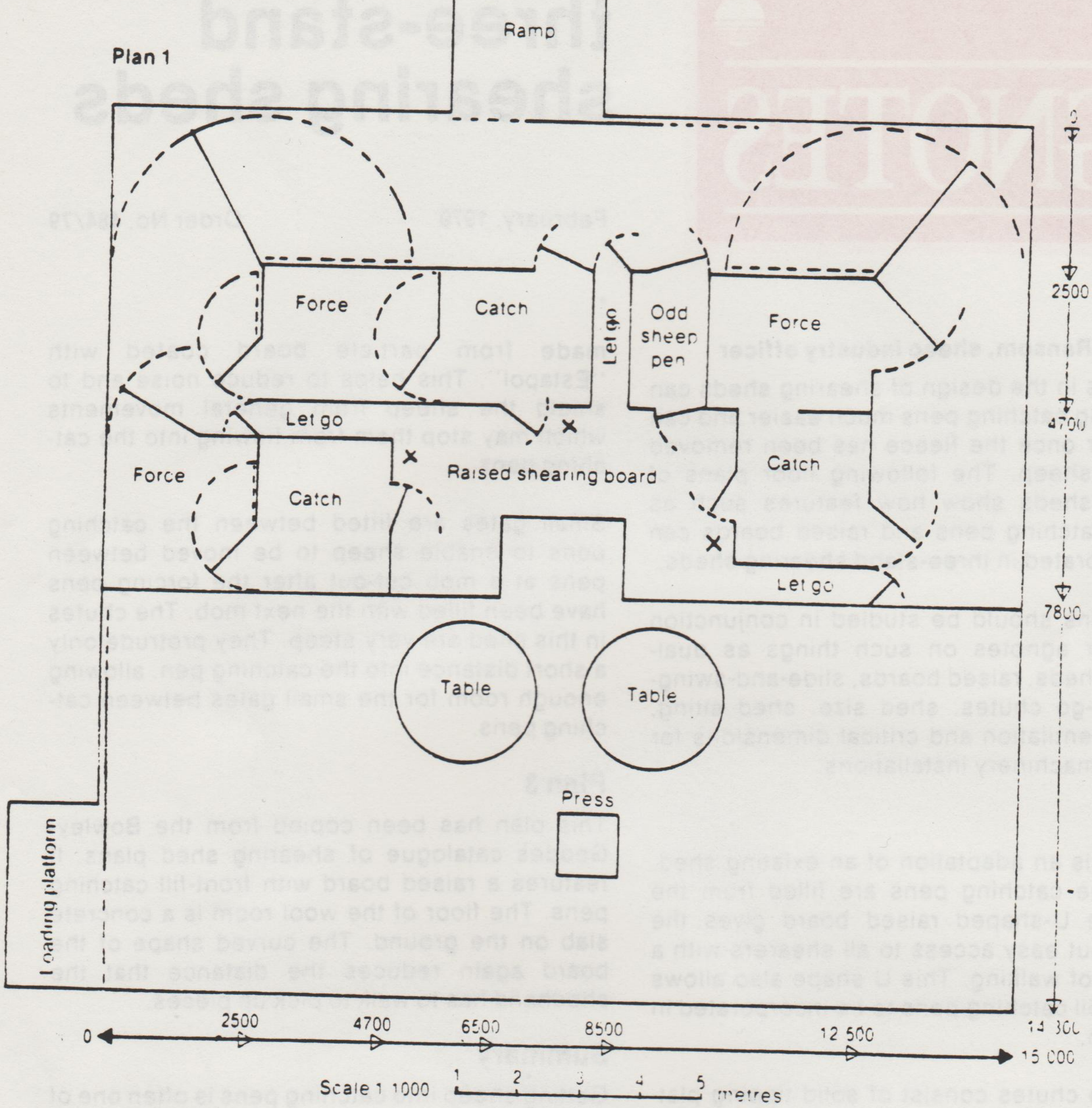
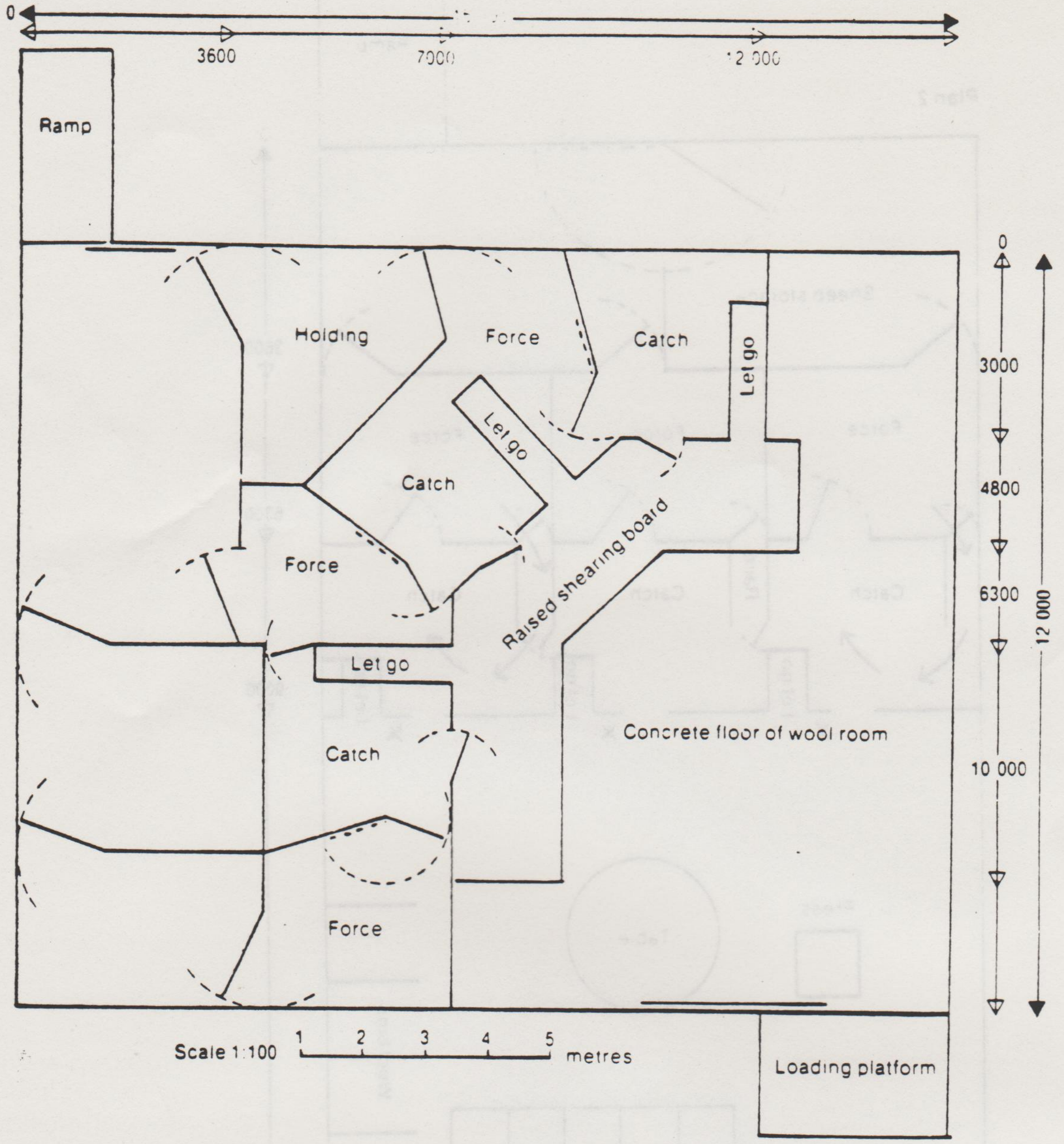
Plan 1



Ramp
Force
Catch
Let go
Odd sheep pen
Force
Let go
Force
Catch
Raised shearing board
Catch
Let go
Table
Table
Press
Loading platform
2500
4700
7800
0
2500
4700
6500
8500
12 500
14 300
15 000
Scale 1:1000
1
2
3
4
5
metres

Plan 3



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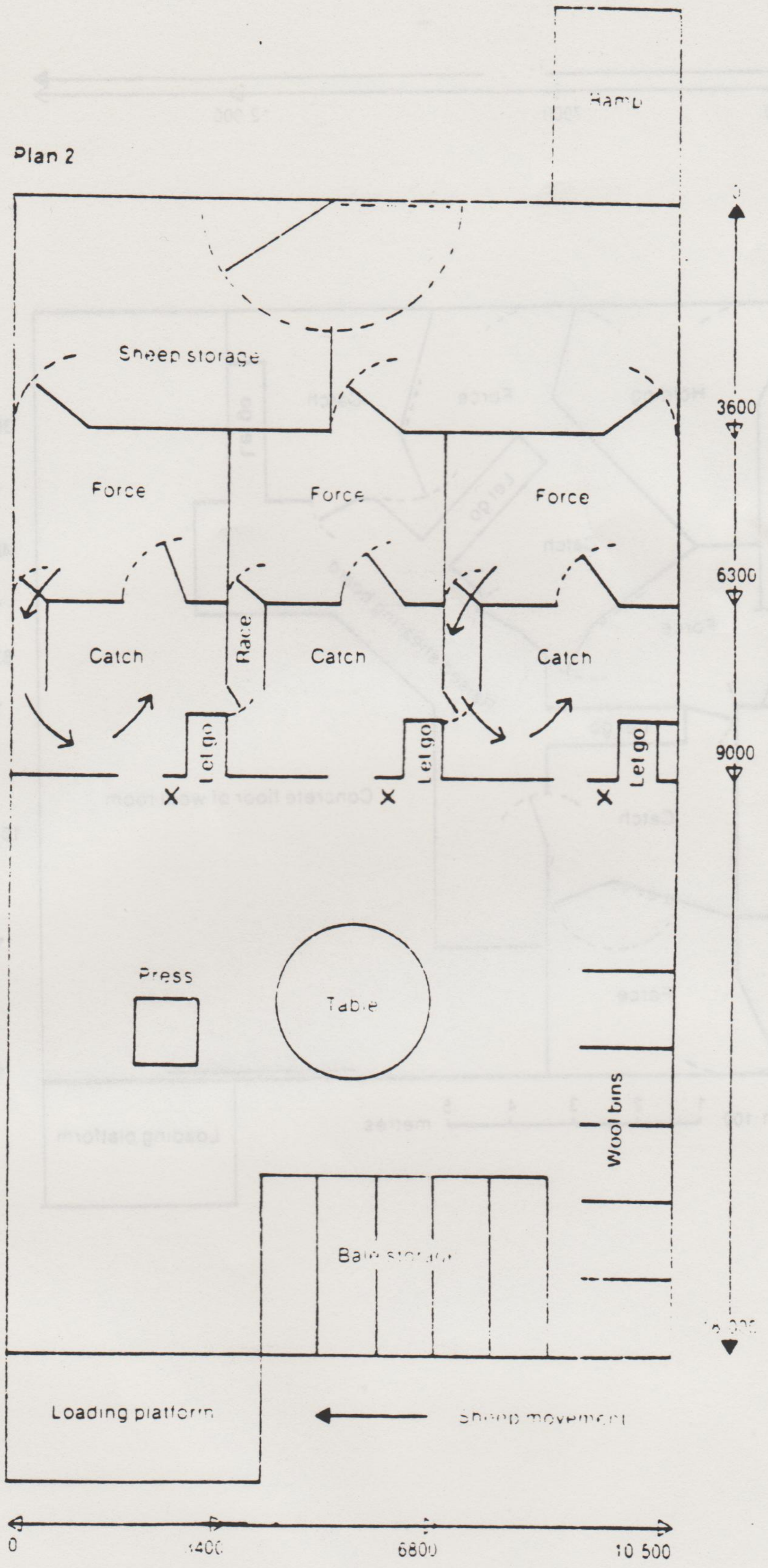
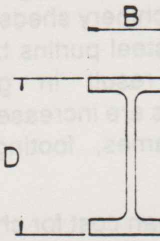
Plan 2



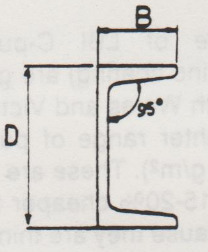
Ramp
Sheep storage
Force
Force
Force
Catch
Race
Catch
Catch
Let go
Let go
Let go
Press
Table
Wool bins
Bale storage
Loading platform
Sheep movement
0
3600
6300
9000
0
4400
6800
10 500

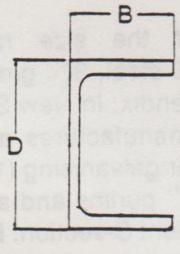
The most widely used and most commonly available UBs are the lightest section in each nominal size group. Details of selected sizes are given in the appendix.



UBs and TFBs are designed to achieve maximum resistance to bending forces from the amount of steel used. They are therefore used as beams in steel structures. In lightweight steel-framed buildings, the columns carry only small compressive forces and are mainly stressed in bending by wind forces. Thus UBs and TFBs find wide application as columns and portal frames in farm buildings.

Channels are designated in the same way as TFBs by stating depth and breadth. They are available in 10 sizes with depths ranging from 76 to 380 mm. Channels were previously manufactured with tapered flanges but the seven largest channels are now produced with parallel flanges. This simplifies bolted connections and allows channels to be more simply welded together to form a box. Details of the range are given in the appendix.

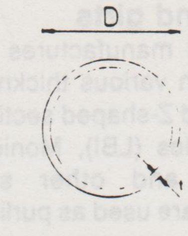




Rails. These are not usually regarded as structural sections, but are sometimes bought at disposal sales for use in farm building construction. Rails are rolled in a large range of sizes (to suit trains, trams and overhead cranes) and are used as columns and lifting beams. A rail used as a beam will be more stable if fixed upside down, that is, with the head downwards. Rails are manufactured from wear-resistant high strength steel; welding calls for special equipment and procedures.

Tubular steel products
These products are circular hollow sections (pipes) manufactured mainly by Tubemakers of Australia Ltd, and rectangular hollow sections. In general, structural hollow sections are more expensive per kilogram than hot-rolled sections.

Circular hollow sections (CHS) include the familiar range of pipes used for water reticulation and are available in black (untreated) or galvanised surface finish condition. Pipes with outside diameters up to 165 mm are made from Grade 200 steel; larger sizes are Grade 350.



For water supply the pipe is usually supplied with taper-screwed ends for joining with sockets. It can be supplied with plain ends for welded connections or for joining by proprietary compression fittings.

When CHS is sold as waterpipe it is available in two grades, medium and heavy. Medium-walled pipe is identified by a painted blue band near the end of each length, heavy pipe by a red band. When ordering waterpipe, state the nominal bore (NB) in millimetres and wall thickness; for example, "50 NB medium galvanised pipe".

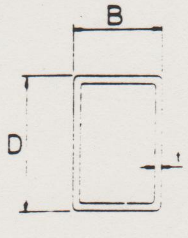
For structural use, CHS is available in a variety of wall thicknesses. The extra-heavy grade (refrigerant pipe) is probably uneconomic for farm building construction. When ordering CHS, engineers specify outside diameter and wall thickness in millimetres; for example, "60.3 x 4.5 CHS galvanised".

Pipe sections are efficient in resisting bending, compression and torsion (twisting) forces and so find widespread use for columns and truss chords and webs. The major disadvantage of pipe sections is in the difficulty of making economical connections: profiling one CHS member to fit against another is expensive and time-consuming. Cheaper but less reliable connections are made by flattening or notching the pipe ends.

The range of CHS available ex-stock and those sections designated as waterpipe are shown in the appendix.

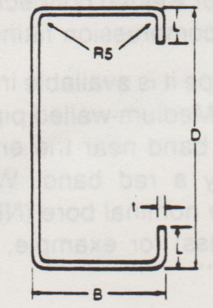
Rectangular hollow sections (RHS) are made from Grade 350 steel and include hollow squares ranging from 13 x 13 mm to 254 x 254 mm in a variety of wall thicknesses. RHS is available in black, primer-painted or galvanised finishes. When ordering specify outside dimensions and wall thicknesses in millimetres; for example, "76 x 38 x 3.2 RHS primer-painted". Since RHS has a 40% higher yield strength than pipe, substantial economies can often be made when RHS is substituted for pipe.

RHS can be used to avoid the task of profiling of CHS members. For instance the use of RHS as the chords of an open-web roof truss enables straight cuts to be made on the CHS webbing. Details of the range are given in the appendix.

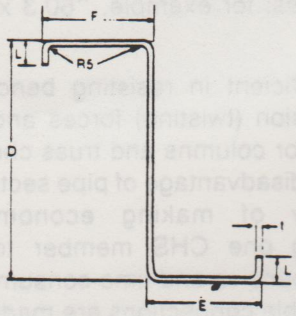


Cold-formed purlins and girts

John Lysaght Australia Ltd manufactures Grade 450 galvanised steel strip in various thicknesses. This is cold-rolled into C- and Z-shaped sections by Lysaght Brownbuilt Industries (LBI), Monier, KH Consolidated Industries and other smaller companies. These sections are used as purlins and girts in industrial buildings.



C-sections are used for single or double spans.



Z-sections, which have flanges of different width, may be lapped over supports to increase strength and allow thinner sections to be used for economy. This requires careful organisation and is not worthwhile on small buildings.

As a direct substitute, steel purlins are more expensive than timber purlins for typical farm-building applications (up to 4.5 m bay length, 1.2 m purlin spacing). For larger bay lengths and spacings or for open-front machinery sheds, which have large wind uplift loads, steel purlins become competitive. Steel purlins result in greatest economy when frame spacings are increased, thus reducing the number of frames, footings and connections in a building.

There may be reasons other than cost for choosing steel purlins. They do not suffer the long-term sagging that happens with unseasoned timber purlins. Often reasonable quality timber in suitable lengths or sizes may simply not be available.

Steel purlins are very strong under downward loads when restrained by a steel roof. However, like roof trusses, they are prone to twisting and sideways buckling when the roof is loaded upwards by wind uplift. For this reason, steel purlins are installed with sag rods and bridging pieces (see figure 1). The ridge purlins are tied together with a threaded sag rod and then sag rods and bridging pieces are alternated down each roof slope. The sag rods prevent sideways movement and the bridging pieces prevent rotation of the purlins. Usually one row of bridging is used per bay; for long-span purlins, two rows of bridging may be necessary so that the outward load capacity is similar to the inward load capacity. Most manufacturers supply a "snap-on" bridging system which speeds erection time.

Details of the size range of LBI C-purlins (Grade 450 steel, 300 g/m² zinc coating) are given in the appendix. In New South Wales and Victoria, LBI also manufactures a lighter range of purlins with thinner galvanising (100 g/m²). These are sold as "Lytgal" purlins and are 15-20% cheaper than the equivalent C-section. Because they are thinner, they have a reduced load capacity compared to the equivalent "standard" C-section. Details of the range are given in the appendix.

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