



## Beef Landing Cradle

### Meat & Livestock Australia Technology Transfer Kits

*This Technology Transfer Kit is one in a series of Do-It-Yourself (DIY) resources prepared for the Australian meat industry to encourage the development of project engineering skills at meat processing sites while implementing simple but useful items of technology. This kit is designed to provide the essential information to allow processors to carry out suitable modifications and installations at their own sites to improve some aspects of their processing performance. As each processing site has unique design and construction features the information in this kit should be used as a guide only. Some modifications from this kit to ensure the successful application at individual sites are likely. No warranty is given on the outcome of the use of this kit or the information it contains.*

### DIY Kit # 2 - Beef Landing Cradle

The Beef Landing and Lifting Cradle is used in the beef sticking area to present the stunned beef carcass to the sticking operative in a suitable position to minimise Occupational Health & Safety problems. This equipment is designed for a knocking box situation where the stunned animal rolls from the knocking box onto the floor, or a low grid, with its legs facing the knocking box. The cradle elevates the carcass from the floor to approximately waist height while tipping the carcass into a favourable sticking position. The cradle is designed to have a cycle time of less than 30 seconds so that it is suitable for line speeds up to 120 carcasses per hour.

The cradle is fitted with an interlocking control system so that it can only be moved when both the sticking operative and shackling operative are safely away from the cradle. The cradle can be fitted with a low voltage contact plate in the region where the animal's rump lays on the cradle. This can be used to immobilise the carcass, after stunning, allowing shackling to be carried out safely.

This piece of equipment is the result of a collaborative effort by the management and operatives of two meat-processing companies.

Management and operatives from both abattoirs were directly involved in all stages of the development including the idea generation, concept design and production trials. The unit has been modified since its original development to improve the strength of the pivot bearings. The equipment has since been working effectively at the desired production rate in a domestic abattoir for over 2 years.

### Description

The Beef Landing and Lifting Cradle consists of two flat landing platforms constructed at right angles. The platform assembly is lifted, by two hydraulic rams, from floor level to a suitable working height as the platforms are pivoted through 90°. The prototype equipment is designed to lift carcasses of up to 1000-kg live weight safely from a "landing" level of 200-mm from the floor to a "lifted" level of 900-mm from the floor. Design specifications for carcass weight, "landing" level and "lifted" level can be modified to meet the requirements of individual plants by changes to the position of the pivot points and the stroke of the hydraulic rams. Photographs 1 and 2 show the "landed" and "lifted" positions.

The controls for the cradle consist of two sets of twin push buttons mounted remotely from the cradle. They are wired such that both 'up' buttons, or both 'down' buttons, must be pushed simultaneously for the cradle to be moved. If either button is released the cradle will remain in its current position. The buttons are positioned such that the operators must be out of reach of the moving platform during operation. Over-centre valves are fitted at the inlets and outlets of both rams to ensure that if a hydraulic line fracture occurs the cradle assembly will lock into its current position.

The equipment is designed such that the stunned animal rolls from the knocking box onto the lowered platform with its legs facing the knocking box, as shown in Photograph 3. The platform assembly is then raised and pivoted so that the carcass is rolled onto the second platform mounted at right angles to the first. The second platform ends up at approximately the operator's hip level with the carcass facing away from the knocking box, as shown in Photograph 4. The sticking operative can then carry out the necessary tasks for weasand occlusion

and ritual slaughter, if required. While the tasks are being performed on weasand occlusion and sticking, the hind leg is shackled for hoisting clear of the cradle. The cradle is then returned to the lowered position ready for the next carcass.

The equipment design is such that immobilisation bars, connected to an Extra Low Voltage Stimulator (ELVS) unit, can be fitted to the second platform so that the carcass can be immobilised during the shackling procedure. While not fitted to the prototype unit, the position for the immobiliser can be seen in Photograph 2.

The prototype unit has been designed for, and successfully operated on, a 30 second cycle consisting of:

- 5 seconds raising
- 10 seconds weasand occlusion (and ritual slaughter if required)
- 10 seconds hoisting clear
- 5 seconds lowering.

The speed of the hydraulic pump is such that these times can be varied if required.

### Modifications

The roller bearing mounts originally fitted were found to crack under the shock of the carcass falling onto the lowered cradle. To alleviate this problem the roller bearings were replaced with a simple lug and tube assembly with a steel pivot pin as shown in Photograph 5. The pivot pins are greased daily and have performed without problem for over 2 years.

A stainless steel cover has been fitted over the actuating ram assembly to eliminate the risk of damage to the hydraulic hose fittings at the ram. This cover, while not fitted when the video footage was prepared, can be seen in the photographs.

### Benefits

Several advantages have been identified from using the Beef Landing and Lifting Cradle.

- The operatives responsible for locating and occluding the weasand and for the ritual slaughter if required, are able to work at approximately waist level. Previously these procedures would have been done at floor level with considerable bending and associated risk of strain to the back muscles.
- As the tasks in this area are less physically demanding, the operatives are able to take more care resulting in improved weasand occlusion techniques and a resulting improvement in carcass hygiene in the neck area.
- Internal oesophagus sealing devices can be readily applied as the animal is in the correct position for use of these devices. Use of such devices can effectively improve the carcass hygiene of the neck area and reduce the losses due to trimming of the carcass neck meat and of the head meat. (The accompanying video shows manual occlusion only.)

### Materials

Required materials for construction of the Beef Landing and Lifting Cradle are shown on the engineering drawings. All base and cradle frame parts are made of mild steel, hot dipped galvanised before assembly. The cradle platform support surfaces are of stainless steel sheet for ease of cleaning. The immobilisation bars are mounted on a polypropylene block set into the cradle platform to ensure electrical isolation. The hydraulic unit used for the prototype Beef Landing and Lifting Cradle is as follows:

7.5 kW 415 v Applied Hydraulics power unit with

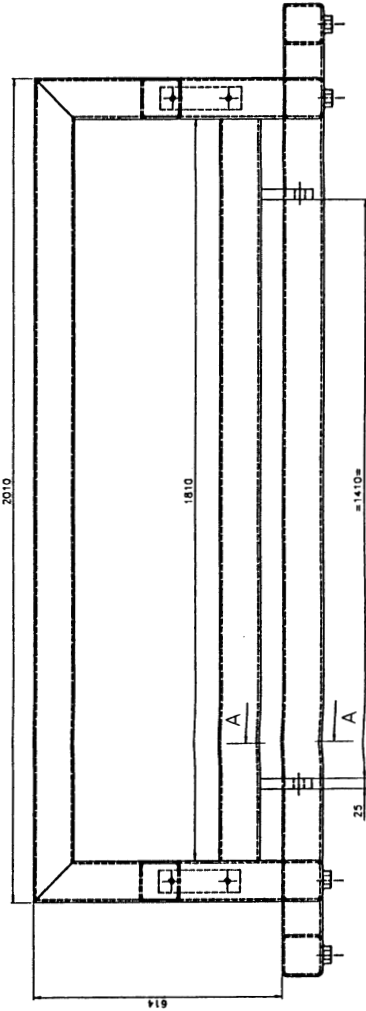
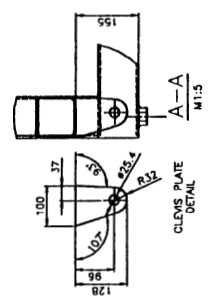
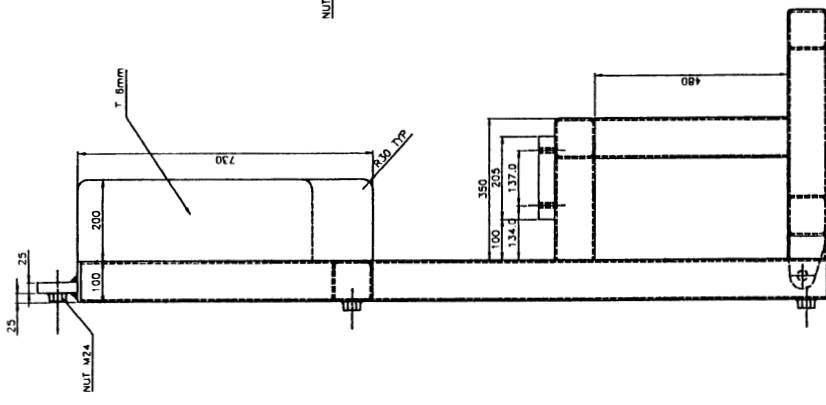
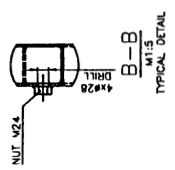
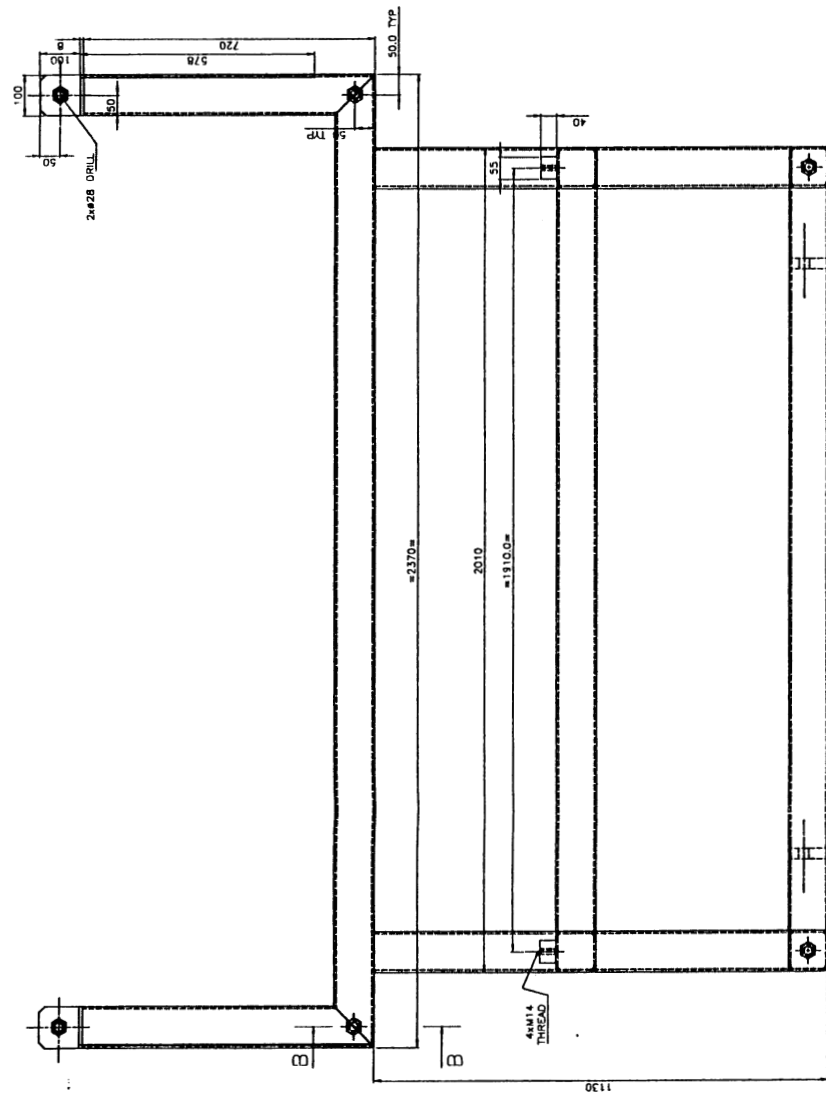
- 60 litre reservoir (epoxy lined)
- Parker Hannifin piston pump (load sensed)
- sight level gauge
- suction filter
- 10 micron return line filter
- filler breather with replaceable element

### Drawings

The appended engineering drawings show:

|             |  |
|-------------|--|
| KMS/8019-01 | Landing cradle & knocking area general arrangement |
| KMS/8019-02 | Base frame welding assembly                        |
| KMS/8019-03 | Head rest welding assembly                         |
| KMS/8019-04 | Cradle welding assembly                            |





BASE FRAME IT. No. 1 ON DWG 8019-01

1:5  
1REQ'D  
MAYL MILD STEEL  
HOT DIP GALVANIZED

LAST EDIT:  
CAD FILEKMS/8019-02

| NO.   DATE  |  | REVISION                   |  | BY       |  |
|---|--|----------------------------|--|----------|--|
|   |  |                            |  |          |  |
| <p>The drawing remains the property of Australian Meat Technology (AMT).<br/>           It is to be used only for the project for which it was prepared.<br/>           Part or whole, or its contents, may not be used or reproduced without prior<br/>           written approval from AMT.</p> |  |                            |  |          |  |
| DRAWN   |  | NAME                       |  | DATE     |  |
| MS  |  | MS                         |  | 15.04.98 |  |
| DRN. CHK  |  | ENGINEER                   |  |          |  |
| ENG. CHK  |  |                            |  |          |  |
|   |  | TOLERANCES                 |  |          |  |
|   |  | GENERAL FABRICATION ±1mm   |  |          |  |
|   |  | NO PLACE DECIMAL ±0.5mm    |  |          |  |
|   |  | ONE PLACE DECIMAL ±0.1mm   |  |          |  |
|   |  | TWO PLACE DECIMAL ±0.05mm  |  |          |  |
|   |  | 3RD ANGLE PROJECTION       |  |          |  |
|   |  | U.N.O.                     |  |          |  |
|   |  | ALL DIMENSIONS IN          |  |          |  |
|   |  | MILLIMETRES U.N.O.         |  |          |  |
|   |  | DO NOT SCALE               |  |          |  |
|   |  | TITLE                      |  |          |  |
|   |  | AUSTRALIAN MEAT TECHNOLOGY |  |          |  |
|   |  | BASE FRAME                 |  |          |  |
|   |  | WELDING ASSEMBLY           |  |          |  |
| DRAWING No.   |  | KMS/8019-02                |  | REV      |  |
|   |  |                            |  |          |  |
| SCALE   |  |                            |  | B1       |  |





## Photographs

Photograph 1. The landing cradle in the lowered position.



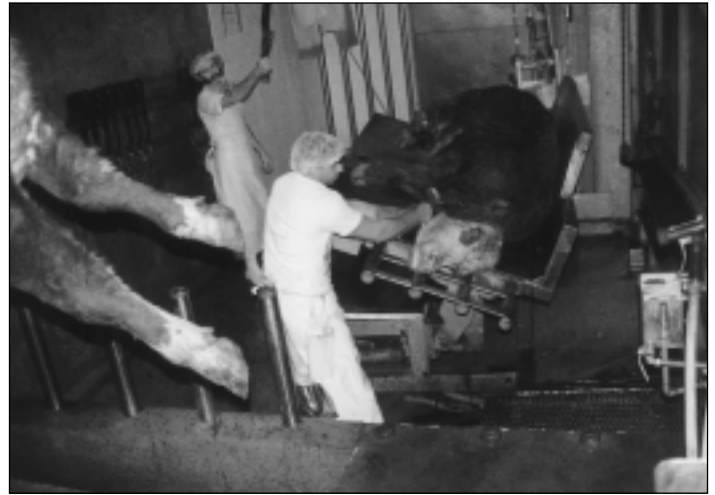
Photograph 2. The landing cradle in the raised position.



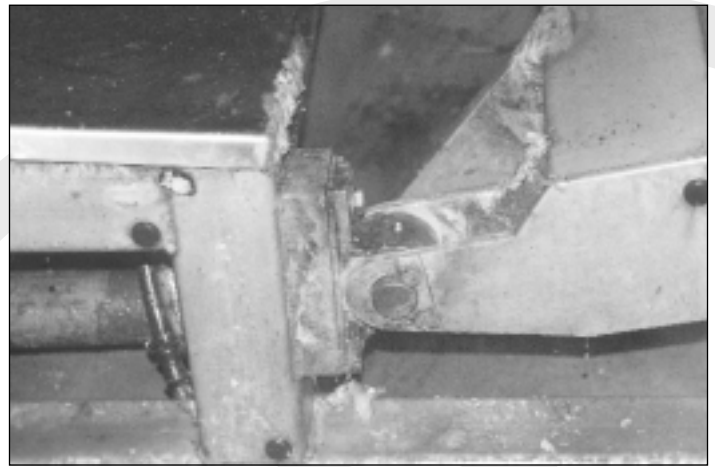
Photograph 3. A beef carcass in the "landed" position.



Photograph 4. A beef carcass in the "lifted" position.



Photograph 5. One of the two modified support bearings.



## Video presentation

Approximately 3 minutes of the landing cradle unit in operation showing the important features of design, construction and operation are provided on the Meat and Livestock Australia Technology Transfer DIY Kits' Support Video. Footage relevant to the Beef Landing Cradle DIY Kit is approximately located between VCR real time counter units 10:25 to 13:20.

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Lobethal Abattoir - Lobethal, SA

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