

Primary Industries Standing Committee
Model Code of Practice for the
Welfare of Animals
Cattle
2nd Edition
PISC Report 85



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PREFACE

This Australian Model Code of Practice for the Welfare of Animals has been prepared by the Animal Welfare Committee (AWC) within the Primary Industries Ministerial Council (PIMC) system.

Membership of the AWC comprises representatives from each of the State Departments with responsibility for agriculture, CSIRO, the Department of Agriculture, Fisheries and Forestry – Australia and other committees within the PIMC system. Extensive consultation has taken place with industry and welfare groups in the development of the code.

The Code is intended as a set of guidelines which provides detailed minimum standards for assisting people in understanding the standard of care required to meet their obligations under the laws that operate in Australia's States and Territories.

The following Model Codes of Practice have been endorsed by PIMC (and its predecessors, ARMCANZ and the Australian Agricultural Council):

Animals at Saleyards (1991)
Buffalo, Farmed (1995)
Camel, The (1997)
Cattle (1992)
Cattle, Land Transport of (1999)
Deer, Farming of (1991)
Emus, Husbandry of Captive-Bred (1999)
Feral Animals, Destruction or Capture, Handling and Marketing of (1991)
Goat, The (1991)
Horses, Land Transport of (1997)
Livestock, Air Transport of (1986)
Livestock, Rail Transport of (1983)
Livestock, Road Transport of (1983)
Livestock, Sea Transport of (1987)
Livestock at Slaughtering Establishments (2001)
Ostriches, Farming of (2003)
Pig, The (2nd Edition) (1998)
Pigs, Land Transport of (1997)
Poultry, The Domestic (4th Edition) (2002)
Poultry, Land Transport of (1998)
Rabbits, Intensive Husbandry of (1991)
Sheep, The (1991)

and by agreement with the National Health and Medical Research Council, the CSIRO, Australian Research Council and Australian Vice-Chancellors' Committee:

Australian Code of Practice for the Care and Use of Animals for Scientific Purposes (1997).

The following Code is based on current knowledge and technology. It will be further reviewed in 2010, although an earlier review will be implemented if technologies offering significant welfare benefits are available.

PRIMARY INDUSTRIES MINISTERIAL COUNCIL

In June 2001 the Australian Commonwealth and State/Territory governments created several new Ministerial Councils from the amalgamation and redirection of the work of several existing Councils.

These changes saw the winding up of the Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ) and the establishment of a new Council, the Primary Industries Ministerial Council (PIMC). The objective of this new Council is:

'to develop and promote sustainable, innovative, and profitable agriculture, fisheries/aquaculture, food and forestry industries'.

Membership of the Council consists of the Australian Federal, State/Territory and New Zealand Ministers responsible for primary industries matters.

The Council is supported by a permanent Standing Committee, the Primary Industries Standing Committee (PISC). Membership of Standing Committee comprises relevant Departmental Heads/CEOs of Commonwealth/State/Territory and New Zealand agencies.

INTRODUCTION

The aims of this Code are:

- to promote humane and considerate treatment of cattle, and the use of good husbandry practices to improve the welfare of cattle in all types of cattle farming enterprises
- to inform all people responsible for the care and management of cattle about their responsibilities
- to set a minimum industry standard by defining acceptable cattle management practices.

“Cattle” includes all domestic bovines, e.g. cows, bulls, steers, heifers and calves. Calves are under 6 months of age.

This Code should be read in conjunction with other codes of practice endorsed by the Agriculture and Resource Management Council of Australia and New Zealand (ARM-CANZ) and with State/Territory animal welfare legislation.

Assistance with specific management or disease control problems is available from State departments of agriculture, veterinarians in private practice and consultants.

1. BASIC WELFARE NEEDS

- 1.0.1 Cattle are raised in situations that vary from extensive grazing to closely confined and housed animals. Whatever the form of husbandry, owners and managers have a legal and moral responsibility to care for the welfare of the animals under their control.
- 1.0.2 The basic needs of cattle must be met, irrespective of the nature of the husbandry or farming system. These are:
- adequate quantity and quality of water, food and air to maintain good health
 - social contact with other cattle. Cattle adapt to the familiar surroundings in which they live, including other cattle. Separation from familiar cattle may cause stress, which may be magnified by mixing or crowding with unfamiliar stock. Individual cattle, such as house cows, may adapt to solitude, provided other welfare requirements are met
 - sufficient space to stand, lie down, turn around, stretch and groom, and to perform normal patterns of behaviour
 - protection from predation where possible
 - protection from disease or injury, and appropriate treatment if they occur
 - protection from the effects of extremes of climate or unseasonal changes in weather conditions, where possible
 - arrangement of reasonable precautions against the effects of natural disasters (e.g. implementation of drought mitigation strategies, provision of firebreaks)
 - protection from unnecessary or unreasonable pain, suffering or injury.
- 1.0.3 Animal welfare considerations should be included in quality assurance programs.
- 1.0.4 The importance of competent stockmanship in animal welfare cannot be over-emphasised. A competent stockman will be able to handle cattle to minimise stress, utilise their natural behaviour, recognise the early signs of distress or disease and initiate prompt remedial actions. Good stockmen are flexible in their approach to stock handling and adapt to changing seasonal, management and stock requirements.
- 1.0.5 Animals adapted for high levels of production are at increased risk of stress and metabolic and nutritional diseases. Special attention to ensure adequate management of nutrition and their environment is required to protect the welfare of these animals. High production animals developed for a particular environment may not be suitable for production in a less favourable environment.

1.1 Water

- 1.1.1 Cattle must have access to drinking water of suitable quality and quantity.
- 1.1.2 Healthy cattle should not be deprived of access to water for periods longer than 24 hours, unless in transit, in which case the codes of practice for transport of cattle apply. Lactating cattle or those in poor condition, should not be deprived of access to water for periods in excess of 12 hours. Pre-slaughter cattle in lairage should have access to potable water.
- 1.1.3 Sufficient water must be provided according to age, bodyweight, production level, air temperature, humidity and dry matter content of the feed eaten. (See Appendix 1 for approximate water consumption rates.)
- 1.1.4 In some areas of Australia, the salt content of drinking water (salinity) may limit consumption by cattle. Animals should be closely monitored while being gradually introduced to salty water. Animals accustomed to salty water may refuse fresh water and need to be monitored while a gradual change is made. (See Appendix 1.)
- 1.1.5 Water medications must be introduced gradually. Cattle must be monitored to ensure that they continue to drink adequate quantities of the medicated water. Those animals found not to be drinking sufficient quantities of medicated water should, where possible, be segregated and further efforts made to increase consumption. Under exceptional circumstances, where cattle fail to consume any medicated water, non-medicated water should be provided as per 1.1.2.

1.2 Air

Cattle must not be kept in, or exposed to, dust or noxious chemicals in the air at levels that may be harmful to their long-term welfare. Sprinklers or misters should be used to settle the dust in yards when they are extremely dusty.

1.3 Food

- 1.3.1 Cattle must have access to, or be provided with, feed (forage and/or fodder) at levels consistent with their well-being. Consideration should be given to the animal's age and bodyweight and the extra nutritional demands associated with growth, pregnancy, lactation, exercise and climatic extremes. They should not be deprived of access to food for periods longer than 48 hours, unless in transit, in which case the codes of practice for the transport of cattle apply. Animals in poor condition, in late pregnancy or early lactation, or calves less than one month of age, should not be deprived of access to food for periods longer than 24 hours. (For general recommendations, see Appendix 2).
- 1.3.2 In areas prone to severe feed shortages, whether they are a seasonal occurrence or the result of climatic extremes (e.g. drought), planning will include reasonable arrangements to ensure a continued supply of feed sufficient to maintain the well-being of cattle. Note that, in this context, cattle can draw on their body reserves, while they are adequate, to provide part of their requirements. Producers should familiarise themselves with

guidelines for drought feeding strategies and condition scoring of cattle via their State or Territory Department of Agriculture.

- 1.3.3 If the quality and/or quantity of pasture is limited and no supplements are being fed, the stocking rate must be reduced accordingly and the remaining animals monitored closely to ensure that they maintain satisfactory body condition.
- 1.3.4 Cattle should be protected as far as possible from toxic plants or other substances harmful to their health.
 - By-products fed to cattle must be treated to destroy potential pathogens or toxins, and cattle should be monitored while by-products are fed.
 - Care should be taken to ensure that residues of chemicals used to treat animals or crops are neither present in by-products, nor likely to cause contamination.
 - A person purchasing any product to feed to cattle should take every precaution to ensure the product is clean and wholesome, and suitable for the intended purpose. Such precautions include informing the seller of the intended use and asking what chemicals have been applied to the product and whether withholding periods have been observed.
 - Under national legislation, products derived from, or containing, mammalian tissue may not be fed to ruminants.
- 1.3.5 Dusty feeds may cause respiratory and eye problems. Supplementary fed rations should not be milled too finely and dusty feeds should be dampened.
- 1.3.6 If feed is provided in a form cattle are not accustomed to, appropriate measures should be used to encourage animals to eat. If cattle do not commence eating the new feed within 2 days, additional measures should be implemented, e.g. the provision of an alternative feed acceptable to the animals, the introduction of confident feeders and/or the introduction of highly palatable additives to the ration. Individual shy feeders should be removed and fed separately. Changes to diet (e.g. pasture to grain or pellets) should be introduced gradually if possible.
- 1.3.7 In many parts of Australia, cattle may require mineral supplementation. State agricultural departments can advise.

1.4 Precautions against drought

- 1.4.1 Drought occurs when a prolonged period of very low rainfall results in a severe shortage of feed and water. It is more than a normal seasonal decline in the quantity and quality of feed available. Management-induced droughts should be avoided by reducing stocking pressure.
- 1.4.2 Where minimal water and feed requirements cannot be met (whether or not drought conditions prevail), cattle must be agisted, or moved to a place with an adequate supply of feed and water, sold or humanely slaughtered, as soon as possible. If in good body condition initially, animals may be on

minimal feed for a considerable period without detriment to their health. However, it is unacceptable to allow animals to lose condition to the point where their strength is significantly impaired, or they starve to death.

- 1.4.3 Cattle being fed for survival must be attended to at least twice weekly. If possible, they should be separated into appropriate groups (e.g. by sex, age or body condition score) to avoid undue competition and to assist with feeding decisions. Shy feeders should be separated from the herd to ensure their feed requirements are met.
- 1.4.4 Weak and poorly conditioned cattle which go down after limited exercise are not fit to travel, and must not be permitted to do so. They must be fed and watered until they are fit to travel or promptly and humanely destroyed.
- 1.4.5 Weakened cattle that are required to be moved from the property should be strong enough to travel and should be transported to their destination by the least stressful method. Such stock should not be consigned on prolonged journeys. Weakened cattle should not be mixed with stronger animals or subjected to the stress of sale through saleyards.
- 1.4.6 As far as possible, weakened cattle should be given special protection against exposure to extremes of weather, especially when in transit.

1.5 Protection from climatic extremes and predation

- 1.5.1 As far as practicable, cattle should be protected from adverse weather conditions and the consequences of adverse weather, including climatic extremes, forage shortages, unseasonal changes and other factors causing cold stress or heat stress. Shade, or alternative means of cooling such as misters and sprays, must be provided where cattle would otherwise suffer from heat stress, particularly where summer feedlotting is practised (see 2.2.7.2).
- 1.5.2 Shelter (e.g. windbreaks) and additional fodder should be provided at times of cold stress, the effects of which are exacerbated by wind chill and wetting of the coat. Calves are particularly at risk.
- 1.5.3 Plans should be made, and reasonable steps taken, to ensure protection from the effects of natural disasters. In areas subject to flooding, care is necessary in paddock and facility design to allow access to some safe high ground, or to plan for stock evacuation to high ground. Adequate fire-breaks should be maintained. Cattle must be attended to after a natural disaster such as bushfire or flood. Animals should be assessed by a competent person. Immediate treatment or humane destruction may be required depending on the animals' condition.
- 1.5.4 All reasonable steps must be taken to protect stock from predators.

2. INTENSIVE CATTLE SYSTEMS

2.1 General

- 2.1.1 Tethering is not acceptable as a routine husbandry practice. Where collars, ropes or similar materials are used for temporary restraint of cattle, they must be used in a manner that avoids inflicting injury and/or pain. Where tethering is used (e.g. to restrain cattle at shows), animals must be accustomed to tethering before they are kept tethered for long periods. Tethered animals should be given adequate exercise each day.
- 2.1.2 In the case of housed cattle, mechanical or natural ventilation must remove excessive heat, moisture, carbon dioxide, dust, and other noxious gases from the environment, and ensure continual replacement with fresh air. The ventilation method used must be appropriate to the location of the cattle and the design of the building. There must be a backup system, or procedures in place for the evacuation of the animals, in the event of a power or mechanical failure.
- 2.1.3 The manager should always be on the lookout for shy feeders with any trough feeding system and must manage these animals appropriately (see 1.3.6).

2.2 Australian Code of Practice for the Welfare of Cattle in Beef Feedlots

- 2.2.1 Definition and environmental issues
 - 2.2.1.1 A beef feedlot is a confined yard area with watering and feeding facilities where cattle are completely hand or mechanically fed for the purpose of production.

This definition does not include the feeding or penning of cattle in this way for weaning, dipping or similar husbandry purposes or for drought or other emergency feeding, or at a slaughtering place or in recognised saleyards.
 - 2.2.1.2 The location, design and construction of a feedlot and/or a feed pad should take account of topography, climate, age and size of animals to be fed, space and feed requirements, and labour and management skills available. Adequate provision should be made for cleaning, drainage and waste disposal. Areas should be of a soil type which does not bog in wet weather, and be adequately graded and drained to provide proper water runoff and a firm and dry footing under normal feeding conditions. Effluent disposal should be arranged and monitored to ensure environmental safety. These issues are covered further in the *National Guidelines for Beef Cattle Feedlots in Australia*.
 - 2.2.1.3 The first and most important consideration for any feedlot manager is the well-being of all cattle under his/her control, whether on the feedlot or in transit. A feeding exercise should not be attempted unless the operator has the resources to comply with the *National Guidelines for Beef Cattle Feedlots in Australia* and

with this *Model Code of Practice* and the relevant State welfare code. Initial design, facility maintenance, cattle acquisition, health management and feeding control must all be co-ordinated and organised around cattle welfare requirements.

2.2.2 General livestock management issues

- 2.2.2.1 This code should be read in conjunction with the *National Guidelines for Beef Cattle Feedlots in Australia*, requirements of the appropriate State legislation and the Animal Care Statement in place at the individual feedlot.
- 2.2.2.2 Responsibility for the various main areas covered in this code will be assigned in the Animal Care Statement for the individual feedlot.
- 2.2.2.3 Each feedlot should, in consultation with an experienced veterinarian with specialist skills in feedlot medicine and in accordance with State laws, develop and operate its own specific health management programme which will provide for the particular needs of the feeding programmes proposed for the site. The programme will include policy on arrival procedures, drug use, feeding, general handling and record keeping. These issues will also be covered in the Animal Care Statement.
- 2.2.2.4 Livestock personnel should be thoroughly familiar with the management programme and trained accordingly. Feedlots are to maintain sufficient numbers of trained and experienced staff to cater adequately for all provisions of the established health management programme on a 7-day-a-week basis.
- 2.2.2.5 The transportation of cattle to and from the feedlot should be carried out in accordance with established State codes or the *Model Code of Practice for the Welfare of Animals: Land Transport of Cattle*. Special attention should be paid to recommendations relating to the standard of transport equipment, loading densities and rest stops for long distances.
- 2.2.2.6 Cattle should always be handled quietly and, to the extent possible, in the cool of the day, especially during shipment. However, in cooler climates procedures for shipment should address the effect of cold stress. With new arrivals, it is often better to rest cattle overnight with access to palatable hay and water before processing the next day. The rate at which cattle are delivered to the feedlot should never exceed the capability of handling facilities or staff. When handling cattle, avoid the use of excessive noise, whips, canes, etc. Laneways, races, entrances and exits should be designed to take advantage of the social behaviour and movement patterns of cattle.
- 2.2.2.7 Newly arrived cattle should be closely inspected for signs of illness or injury and treated as required. Access to quality hay and clean water should be provided on entry and, to the extent possible, arrival groups should be kept separate until processing is complete.

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- 2.2.2.8 Dehorning, particularly with mature cattle, is not recommended. Tipping, the removal of the sharp point of the horn (4 to 5 cm) where minimal bleeding may occur, is acceptable. Provision should be made for horned cattle in the allowance for feed trough space and transportation density.
 - 2.2.2.9 When cattle are being loaded onto trucks, great care must be taken to handle them as quietly as possible. They should be left on feed until loading commences.
- 2.2.3 Health inspection
- 2.2.3.1 Responsibilities for health inspection activities will be covered in the individual feedlot's Animal Care Statement.
 - 2.2.3.2 All cattle should be closely inspected on arrival to assess health status and treated as required.
 - 2.2.3.3 Entry processing treatments should be designed as far as possible to treat and/or prevent disease and parasite conditions which are known to occur in the area or particular cattle group. If the background of a group of feeder cattle is not known, cattle should be treated on arrival, assuming the worst about transport stress and disease exposure.
 - 2.2.3.4 Once cattle are penned out, all animals should be checked daily and, in the case of new arrivals, freshly weaned calves in particular, twice daily inspections are advised for the first few weeks of environmental adjustment and feed adaptation.
 - 2.2.3.5 Trained and experienced stock handlers must ride or walk all pens looking for any signs of poor health or injury using an established surveillance method. All cattle should be seen standing and moving.
 - 2.2.3.6 Surveillance should include water trough inspections and general features of the fencing and pen surface which may predispose cattle to injury.
 - 2.2.3.7 Sick cattle are to be removed promptly to the hospital area for closer attention by health staff or the consulting veterinarian, who should have specialist skills in feedlot medicine.
 - 2.2.3.8 Signs of feeding disorders should be reported immediately to the feeding supervisor and the feedlot manager.
- 2.2.4 Health management
- 2.2.4.1 The emphasis of the health management programme from the time cattle first arrive will be constant surveillance, particularly in the first 3 or 4 weeks after introduction, early detection of health problems and prompt, appropriate treatment.
 - 2.2.4.2 Sick or injured cattle are to be removed immediately from the feeding group and placed in appropriate sick bay facilities for treatment in accordance with the established protocol prepared by the consulting veterinarian. The treatment area should be away from,

but adjacent to the main feedlot facility. Stressed cattle must be allowed to recover on a high fibre diet, either hay or natural pasture, or be sold or destroyed. When prognosis for recovery is poor, immediate salvage should be undertaken or, where this is not possible, humane destruction must be effected immediately. Where doubt exists, a veterinarian's advice should be sought and followed.

2.2.4.3 Adequate records should be kept to monitor the incidence of disease and response to treatment. The Animal Care Statement for the individual feedlot will also refer to this issue. A record of mortality should also be maintained including necropsy reports to be used as a basis for refinement of health management programmes, feed management and the system of cattle purchasing and processing. Wherever practical, records should also detail the origin of feeder cattle.

2.2.4.4 If an illness or death is encountered without the cause being known or reasonably anticipated, it is the responsibility of management to carry out an appropriate investigation and, in the case of notifiable diseases, act in accordance with State regulations.

2.2.4.5 Should cows calve in a feedlot, special facilities must be provided for their handling and proper care. Facilities should be appropriate for both cows and calves, while either are held in confinement.

2.2.5 Feed management

2.2.5.1 Responsibilities for nutrition will be covered in the Animal Care Statement for the feedlot.

2.2.5.2 All diets formulated for use in cattle feedlots are to be nutritionally balanced and designed to provide sufficient nutrients and palatability for the production, maintenance and health of cattle, and to ensure that digestive upsets are minimised.

2.2.5.3 All cattle, excluding those fed by self feeders, must be fed with the feed being added to the troughs at least once daily and preferably twice to maintain feed freshness. Stale or spoiled feed must be removed from troughs. In wet weather more frequent feeding may have to be carried out to prevent spoilage. Feed troughs should not be allowed to be empty for more than 2–3 hours, if at all.

2.2.5.4 The use of any ingredient must be limited to acknowledged nutritionally safe levels in the ration. When grain is used in the diet it should be gradually introduced to avoid digestive problems. The first feeding should always be done early in the morning as this is when cattle start looking for food.

2.2.5.5 Ration changes must be made in gradual, safe steps to guard against digestive disorders. All cattle should be closely observed during a ration change and changes should not be made concurrently with other environmental changes such as weather or cattle movement.

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- 2.2.5.6 Water must be clean, fresh and readily available with troughs cleaned regularly.
 - 2.2.5.7 The feed consumption of all pens of cattle should be monitored each day as any variation in consumption is an indication of their well-being.
 - 2.2.5.8 When using feed ingredients which carry a risk of disease outbreak due to infections, toxins or nutritional profile, safeguards must be put in place to ensure that processing is carried out correctly and consistently. Poultry litter must be treated and stored properly and should not contain any parts of dead birds.
 - 2.2.5.9 Note that the use of poultry litter is prohibited in some States by legislation.
- 2.2.6 General yard management including space requirements
- 2.2.6.1 Feedlot measurements will vary widely according to the type, age, sex and weight of cattle, ration composition, soil type, climate and season prevailing at each feedlot, and for each cattle group.
 - 2.2.6.2 The handling yards are to provide for efficient, quiet handling of cattle with non-slippery surfaces, and no projections into the yard or races which may bruise or injure cattle. There must be adequate holding yards with water available within the handling area. Handling is best done in the cool of the day.
 - 2.2.6.3 Cattle pens should be maintained such that they are well drained, provide a firm footing and have sufficient area for the cattle to move around freely. Concrete is recommended only for aprons to feed and water troughs. Pen management should ensure that the pen surface dries as quickly as possible after rainfall.
 - 2.2.6.4 The stocking density of pens or yards must take into account age, size, behavioural needs, movement and feeding patterns of cattle. In any event, an absolute minimum space requirement of 9 m must be provided. In the case of shedded animals, concrete flooring may be used, with a suitable bedding material, for example sawdust, of sufficient depth to minimise feet and leg problems and to provide for acceptable absorption of moisture. An absolute minimum area of 2.5 m must be provided for each animal.
 - 2.2.6.5 Fences and troughs must be maintained in good order.
 - 2.2.6.6 The fences should be made from materials which cannot injure animals and allow plenty of fresh air circulation.
 - 2.2.6.7 Water troughs should be large enough and designed in such a way that the cattle have easy access. Feed troughs should be designed with the same basic parameters in mind allowing sufficient space for all cattle to eat without competition. Actual space needed will vary with rations, cattle size and feeding frequency. A minimum space of 150 mm/head is recommended for young cattle and 180 mm/head for steers and bullocks.

- 2.2.6.8 A very important consideration is removal of manure from cattle pens and handling areas and maintenance of the pen surface. The National Feedlot Guidelines cover these issues. The frequency of cleaning must be such that cattle have sufficient area free of wet manure build-up for resting. Manure should not be allowed to accumulate to the point where reasonable surface drying is delayed after rainfall.
- 2.2.6.9 Pressure areas close to feed and water troughs, fence lines and drainage lines are to be maintained so that excessive manure accumulation is avoided.
- 2.2.6.10 In some feedlots mounds can be used effectively to provide dry resting areas. If a section of the pen area is used for the stockpiling of manure, stocking density should be adjusted accordingly.
- 2.2.6.11 Dry surface manure should be removed in accordance with the environmental guidelines to minimise dust in periods of still atmospheric conditions. Dust can be controlled by increased frequency of removal, and moisture application by way of increased stocking pressure or water sprays.

2.2.7 Protection from climatic extremes

- 2.2.7.1 Cattle should be protected from extreme adverse weather conditions causing cold stress or heat stress, as far as practicable. This is also important where cattle are moved from one climatic zone to a feedlot situation in a significantly different zone.
- 2.2.7.2 Feedlot management and staff must be aware of the climatic conditions and the clinical signs in cattle that are associated with heat stress. At the first instance of such climatic conditions and clinical signs, remedial action as stated in the individual feedlot's Animal Care Statement shall be implemented.

The provision of shade or alternative means of cooling, such as misters and sprays, may be required and should be considered particularly where:

- a) the duration of prolonged high temperature and high humidity with decreased air movement is likely; or
- b) the temperature exceeds 30°C for an annual period of 750 hours – see the Bureau of Meteorology Temperature Map in Appendix 2.2A.1 of the National Feedlot Guidelines.

Movement of cattle should not be attempted during extreme heat conditions.

- 2.2.7.3 Where cold stress predominates, shelter (e.g. windbreaks, mounding) and allowance for additional nutrient requirements should be considered.

3. ARTIFICIAL REARING OF CALVES

- 3.1 Housing for artificially reared calves should be hygienic, with adequate ventilation, climate control and lighting. Flooring should be well drained with adequate dry lying space for each calf. Flooring and internal surfaces should not cause injury and should allow easy cleaning. Floors should have a surface that minimises slipping. Appropriate bedding (e.g. straw) is recommended and should be changed at appropriate intervals.
- 3.2 In order to provide an environment which is adequate for exercise, exploration and free social interaction, calves should be kept in groups unless disease control measures require individual penning.
- 3.3 Careful attention should be given to group sizes, access to feed, milking shed location, ancillary accommodation, lighting, air inlets and outlets, handling facilities and stalls as these factors can contribute to health problems, stress or aggression. Calf rearing facilities should not be used for adult stock (particularly sick animals) and should be isolated from vermin, effluent, etc.
- 3.4 Where individual calf pens are used in multiple calf rearing systems, they should be constructed and located to allow each calf to see, hear and preferably touch other cattle (i.e. at least one other individual) unless there is a disease transmission problem. A floor area of 1.5 to 2.0 m² should be provided for each calf in group pens to permit self-grooming and prevent overcrowding. 2.0 m² should be provided for calves in individual pens. The total shed volume should provide at least 6 m³ for each calf.
- 3.5 In cold weather, adequate shelter or housing, and feeds with a high energy content should be provided.
- 3.6 Calves should receive at least two litres of fresh or preserved colostrum within the first 6 hours of birth. If a milk substitute is fed first, it may limit the calf's ability to absorb colostrum later. Thereafter, they should be fed on liquid milk, commercial milk replacer or colostrum, in sufficient quantities to provide essential requirements for maintenance and growth. High quality pasture, hay, pellets or suitable processed feed must be available to calves from no later than 3 weeks of age to help in development of their digestive tracts. Milk from diseased cows or those treated with antibiotics should not be fed to calves.

Where milk feeding, hygienic calf feeding practices, including thorough daily cleansing of all equipment (feeding units, lines, bottles, nipples, troughs, etc.), are essential to prevent diarrhoea (scours) or other health problems.

- 3.7 Milk replacers based on skim milk should not be fed to calves under three weeks of age, unless they are in a properly balanced mixture of protein, fat and vitamins. Milk replacers should be reconstituted according to the manufacturer's instructions. Milk and milk replacers should not be heated and fed at temperatures above body temperature (39°C).
- 3.8 Calves should be weaned off milk, milk replacer or colostrum onto rations providing all essential requirements, only when their ruminant digestive systems have developed sufficiently to enable them to maintain growth and well-being on non-milk-based diets. The process of weaning can occur as early as three weeks of age.

Restricted rations of the “white veal” type (i.e. iron-free diets which cause anaemia) must not be fed.

- 3.9 Where large numbers of calves are reared, they should be grouped by age and size to reduce competition for food and to allow closer observation and management.
- 3.10 Sick or injured calves should be isolated, to prevent transmission of disease or further injury by herd mates, and treatment provided. Appropriate standard protocols should be developed in consultation with a veterinarian with local knowledge to prevent and treat common conditions of calves (e.g. scours).

4. CATTLE HANDLING FACILITIES, MUSTERING AND YARDING

- 4.1 Sheds, pens, yards, lanes, ramps and other areas where cattle are forced to congregate should be constructed and maintained to minimise stress, injury and disease. The design and construction of such areas should minimise dust and noise.

Yard design should avoid sudden changes in levels, poor lighting, narrow passages and awkward turns. Well-designed yards will take advantage of the natural behaviour of cattle and encourage the free movement of animals through the facility. Effective use of visual barriers and visible passageways and gateways will assist easy working of cattle.

Objects such as water and feed troughs, gate hinges and latches should be designed and located to avoid injury to cattle. Yard pens should be calf-proof unless there is an operator safety issue.

- 4.2 Floors of yards, sheds, pens and loading ramps should have a surface that minimises slipping and is easy to clean where appropriate.
- 4.3 Holding yards, except yards where cattle are held immediately prior to milking, loading or treatment, should be designed to minimise stress or injury and to allow all animals being held to exercise and lie down.
- 4.4 Yards should be constructed and maintained to avoid development of boggy areas. Yards should have sufficient slope to provide effective drainage, however uneven or steeply sloping surfaces which increase the risk of falling should be avoided. Surfaces or gratings which upset the smooth movement of cattle should be modified.
- 4.5 Depending on management requirements, cattle should be confined on concrete surfaces as briefly as possible. Prolonged physical contact with concrete floors may predispose cattle to lameness, particularly in wet conditions when the horn of the hoof is softened. Artificial floors should be non-slip, non-abrasive, and easy to clean and dry.

Gravel tracks to and from paddocks, sheds or dairies should be maintained adequately to avoid excessive hoof wear and consequent lameness. Cattle with worn hooves should not be forced to walk on rough tracks.

- 4.6 Restraint facilities should allow for safe inspection and treatment of cattle. The degree of restraint should be the minimum necessary to control the animal adequately without compromising operator safety. Races and crushes should be constructed to allow efficient handling of cattle without endangering animals or handlers. Head restraint facilities should allow for quick release and easy removal of the head. They should be clear to the ground to avoid choking. Walk-through bails are preferred; guillotine and V-shaped head bails are not recommended.
- 4.7 Loading ramp design should facilitate the free and safe flow of cattle onto the truck, taking particular care to avoid injury at the point where the animals step onto the truck. Ramps should be constructed so that they are appropriate to the transport being used. Ideally, there should be a flat platform at the top of the ramp, level with the deck of the transport vehicle. This should not be less than 1.5 m in length to aid the movement of animals.

- 4.8 Cattle being driven during hot and/or humid weather should be watched for signs of respiratory distress. If cattle begin salivating profusely (“tonguing”), they should be rested and allowed to recover before proceeding. Young calves should be given the chance to suckle if they become distressed. Weather conditions should be taken into account, and every attempt made to move cattle in cool conditions. It is not acceptable to drive cattle to the point of collapse.
- 4.9 Cattle should be handled quietly. The use of goads and dogs for the handling and moving of cattle should be limited to the minimum necessary to complete the procedures.
- 4.10 Shotguns must not be used on cattle as an aid to mustering (or for any other purpose).
- 4.11 Goads should be made of cane, leather, fibreglass or plastic. “Flappers” (leather straps attached to a cane) are acceptable. Metal or wooden pickets, pipes, strikers and fencing wire are not acceptable for use on animals.
- 4.12 Electric goads should be powered only by battery or hand dynamo. Use of electric goads on animals with no room to move, or on young animals in mixed age groups is unacceptable.
- 4.13 The use of unreasonable force in twisting an animal’s tail (i.e. force sufficient to cause breakage or dislocation of the tail) to cause it to move is unacceptable.
- 4.14 Specific guidelines for the transportation of cattle and other animals are in the Model Codes of Practice for the Welfare of Animals: Land Transport of Cattle; Animals at Saleyards; Livestock at Slaughtering Establishments; and Feral Livestock Animals.
- 4.15 Electric fences should be designed, maintained and used so that contact with them does not cause unnecessary pain or distress. When first exposed to electric fencing, cattle should have adequate time and space to become aware of it.
- 4.16 Cattle being transported should be kept in familiar groups wherever practical. It is best to keep the following classes of stock separate:
- horned and polled animals
 - bulls and cows
 - calves and unfamiliar older cattle.

5. MANAGEMENT PRACTICES

5.1 General

- 5.1.1 Restraint must be the minimum necessary to perform management procedures efficiently and safely.
- 5.1.2 Procedures and practices that cause pain should not be carried out if painless and practical methods of husbandry can be adopted to achieve the same result.
- 5.1.3 Procedures and practices applied to cattle must be competently performed.
- 5.1.4 Any injury, illness or distress observed must be treated appropriately and promptly if possible.
- 5.1.5 Appropriate hygienic precautions must be undertaken for all operations.

5.2 Supervision

- 5.2.1 The frequency and level of inspection should be related to the potential risks to the welfare of the cattle and their handlers.
- 5.2.2 Grazing cattle require supervision and the frequency of inspection should be modified according to the class of cattle, density of stocking, availability of suitable feed, reliability of the water supply, age, pregnancy status, climatic conditions and management practices. For example, if conditions are good, monthly inspection of adult stock may be adequate, but if water supplies are low, they may need to be checked every two days.
- 5.2.3 Cattle kept under intensive management in sheds, lots or yards should be inspected at least daily. They should have continual access to water and ready access to feed. Shy feeders should be fed separately.
- 5.2.4 Absentee landowners have a responsibility to ensure that cattle grazing on their land are inspected frequently enough to prevent welfare problems.
- 5.2.5 Where cattle are on agistment, an arrangement must be made, preferably in writing, between the parties concerned as to who is responsible for supervision. In most cases, the person providing the agistment should take most of the responsibility, and liaise with the owner of the cattle.

5.3 Milking practices

- 5.3.1 Dairy cows should be milked at regular times each day. Cows in full milk should be milked at least twice daily.
- 5.3.2 Careful management of the milking procedure and proper milking machine function are essential to the welfare of dairy cattle. Milking technique must minimise the risks of discomfort or injury to the cow and the development and/or transmission of disease.

5.4 Castration

- 5.4.1 Castration without local or general anaesthesia should be confined to calves at their first muster prior to weaning and preferably to calves under the age of 6 months. Only under exceptional circumstances (e.g. range management of older, previously unmustered bulls) should castration of older bulls be performed, and then preferably by a veterinarian. Castration of animals older than 6 months of age is illegal under some State and Territory legislation, unless undertaken by a veterinarian. Therefore operators should be aware of their legal responsibilities.
- 5.4.2 Castration with rubber rings is only recommended for calves up to 2 weeks of age.
- 5.4.3 Castration with burdizzo should be performed as young as possible.

5.5 Spaying

- 5.5.1 Surgical spaying is a routine and important husbandry practice in many extensive range operations. It enables cull females to survive and achieve marketable condition by preventing the stress and/or mortality of unmanaged pregnancy, calving and lactation, and assists in controlling the genetic quality of the herd. In the less extensive production systems, separation of male and female cattle is recommended.
- 5.5.2 Surgical spaying should be undertaken in dry weather and conducted by a skilled operator using hygienic materials and technique. Adequate restraint, such as a suitable squeeze crush, is essential. Spayed females should be returned to clean surroundings as soon as possible following the operation. Post-operative inspection (with or without mustering) is desirable.

The Willis dropped ovary technique is the preferred method of surgical spaying to reduce both stress and post-operative complications. Where surgical spaying techniques other than the Willis technique are used, they should be carried out by a veterinarian or lay operator trained and competent in the procedure, using appropriate analgesia.
- 5.5.3 Operators should be familiar with their responsibilities regarding the implementation of the spaying procedure and the use of analgesics and anaesthetics under individual State and Territory legislation.

5.6 Tail docking

- 5.6.1 Tail docking of dairy cows should be performed only where necessary for udder health or when otherwise prescribed by a registered veterinarian. Docking should be undertaken only on young female cattle, under 6 months of age.
- 5.6.2 Animals being docked surgically must receive analgesia or anaesthesia for tail docking.
- 5.6.3 The tail should be removed between, not through, the tail bones. Sufficient length of tail should remain to cover the vulva.
- 5.6.4 In some States, tail docking of cattle is prohibited, except where prescribed and performed by a registered veterinarian.

5.7 Identification

- 5.7.1 Ear-tagging, ear-marking, ear-notching, ear-tattooing, udder-tattooing, udder implanting, freeze-branding, photography and radio frequency identification devices (RFID – e.g. microchips) are the preferred methods of identifying cattle from a welfare viewpoint. In some situations, however fire branding may be the only practical method of permanently identifying cattle. As States/Territories may have differing regulatory requirements for cattle identification, these should be checked. Cheek (face) branding is illegal in some States.
- 5.7.2 Cattle must not be branded with corrosive chemicals.

5.8 Dehorning

- 5.8.1 To minimise pain and injury all horned cattle should be dehorned as young as possible, preferably prior to weaning, and at a suitable time to reduce fly worry. After dehorning, cattle should be inspected regularly for the first 10 days, and any infected wounds treated. In those situations where flies are a problem, a suitable fly repellent should be applied at the time of dehorning.
- 5.8.2 Dehorning domesticated cattle without local analgesics should be confined to animals at the first muster and preferably under 6 months of age. Older animals may be “tipped” (ends of horns removed without cutting into sensitive horn tissue) without anaesthetic. Dehorning of cattle over 12 months of age is not recommended, and is illegal under some State and Territory legislation, unless undertaken by a veterinarian.
- 5.8.3 The recommended methods for dehorning of calves are by scoop dehorning, gouging knife or heat cautery, as soon as the horn buds are detectable. The method of choice must be able to remove all horn-growing tissue in one action with minimal damage to adjacent tissues.
- 5.8.4 Cattle must not be dehorned with corrosive chemicals.
- 5.8.5 Inward growing horns likely to penetrate or contact facial features should be trimmed appropriately.
- 5.8.6 On-farm quality assurance programs, feedlots, live cattle exporters and many markets are moving to favour polled cattle to minimise bruising and enhance cattle welfare.

5.9 Mating

- 5.9.1 Testing bulls for serving capacity should be undertaken as per the guidelines drawn up by the Australian Association of Cattle Veterinarians (AACV). Implementation of the Serving Capacity test should, where possible, be undertaken by trained veterinarians. Where veterinary services are not readily available, the test should only be implemented by lay operators, accredited to a level of competency recognised by authoritative organisations such as the AACV.
- 5.9.2 Sires should be selected for joining with females, particularly heifers, according to the pelvic area of the female, and the sire's genetic potential for low birth weight and calving ease. Sires should also be selected for sexual dexterity.

- 5.9.3 It is recommended that no more than 5 bulls be mated per 100 females to prevent antagonistic behaviour between bulls and resultant injuries. In multiple sire matings, *Bos taurus* and *Bos indicus* bulls which are reproductively sound, joined at a rate of 2 to 2.5% of cycling females, will not jeopardise herd fertility in most breeding systems.
- 5.9.4 Artificial insemination of cattle must only be performed by trained artificial inseminators. Trainee artificial inseminators must practise the procedure only under the direct supervision of a trained and experienced artificial inseminator.
- 5.9.5 Semen collection, artificial insemination, embryo collection, embryo transfer, and associated operations must be performed in accordance with State legislation.

5.10 Calving and weaning practices

- 5.10.1 Care should be taken to minimise calving difficulties by the adoption of proper management practices, such as:
- selection of heifers for mating only when they have reached the minimum target weight for the breed
 - avoidance of over- or under-feeding of pregnant cows and heifers
 - avoidance of mating heifers to bulls known to sire large birth weight calves
 - supervision of cows and heifers close to calving where possible, and early intervention if required.
- 5.10.2 The diet of the pregnant or lactating female should be maintained at a level that will minimise calving difficulties, and favour calf survival. Late pregnant and lactating cows and heifers may need up to 2–2½ times as much food as a dry female, however care should be taken with the management of feed availability to heifers in the last trimester of pregnancy. Overfat heifers may have calving difficulties.
- 5.10.3 Calving females should be monitored frequently, where possible, but with minimal disturbance. Those having difficulty calving should be assisted by a competent operator as soon as possible after they are detected.
- 5.10.4 The manual removal of retained foetal membranes poses a risk to the operator, is seldom helpful to the animal and is therefore not recommended. This procedure should only be undertaken in exceptional circumstances, by a competent operator, and only after complete separation of the cotyledons.
- 5.10.5 Induction of birth must only take place under veterinary advice and supervision in accordance with relevant State or Territory legislation. Calves from induced births require extra attention. Calves which are intended for sale as bobby calves, and are not strong enough to meet the standards required by that trade, should be humanely euthanased as soon as possible (see section 9, Humane destruction of cattle) or kept until they are strong enough to meet those standards.

All calves being kept should receive a feed of colostrum milk within 6 hours of birth, be protected from adverse environmental impacts, and be kept separate from other calves. Induced calves are not as strong as full-term calves so extra care is needed to ensure that they receive 3–4 feeds of colostrum from normal term cows during the first 12 hours of life.

- 5.10.6 Calves should be weaned only when their ruminant digestive systems have developed sufficiently to enable them to maintain growth and well-being. Weaning may occur as early as 3 weeks of age if the calves are placed on high quality rations which contain all essential nutrients. In situations of drought and poor seasonal conditions, consideration should be given to weaning calves as early as possible and providing supplementary feed for them. Alternatively, supplementary feed may be provided for the mothers.
- 5.10.7 The dam's condition should be taken into account when deciding when to wean. A calf should be weaned from its dam at no later than 8 months of the dam's gestation.
- 5.10.8 Stock persons should use weaning time to familiarise weaners with routine management practices. This will make handling easier and reduce stress in later life. These practices may include handling and working through yards, races and crushes; feeding from troughs or feeders; drinking from troughs; trucking, even if only over short distances; familiarisation with electric fencing; and working with horses, dogs, vehicles or motor bikes.
- 5.10.9 Cows with cancer eye should preferably be culled, or treated as soon as possible following detection. Cancers must not be allowed to progress untreated simply to permit the cow to complete raising a calf or finish a lactation. Breeding for pigmentation around the eye is recommended in susceptible breeds.

5.11 Marketing of bobby calves

- 5.11.1 Young calves are very susceptible to stress and disease and should not be exposed to management procedures which aggravate this situation.
- 5.11.2 All bobby calves must be fed as close as possible to, and at least within 6 hours of, the time of transportation. Bobby calves being transported or awaiting sale or slaughter should not be deprived of appropriate liquid feed or water for more than 10 hours.
- 5.11.3 Young calves for slaughter should be transported directly to the abattoir, minimising exposure to cold or heat stress.
- 5.11.4 Marketing of immature calves is unacceptable. More mature calves can better handle the rigours of handling and transportation. All calves presented for sale should:
 - be in their 5th day of life or older
 - have dry withered navel cords
 - have been fed within 6 hours prior to delivery to the point of sale or collection

- be over 23 kg liveweight
- be fit and strong enough to be transported for sale or slaughter.

Calves which do not meet these criteria must not leave the farm.

- 5.11.5 Lethargic, listless or immature calves must not be presented for transport or sale. Calves should be bright and alert, robust and able to rise unassisted.
- 5.11.6 Sick or injured calves must be treated appropriately or humanely destroyed. They must not be presented for transport, sale or slaughter.
- 5.11.7 Calves must be handled in ways that avoid injury and unnecessary suffering. They must not be kicked, beaten, thrown, “dumped” or prodded with any sharp instrument. It is not acceptable to use electrical goading devices or unmuzzled dogs which are prone to bite, when handling, driving, drafting, weighing, loading or unloading calves.
- 5.11.8 Transportation of bobby calves from farms to abattoirs should take no longer than 10 hours unless unavoidable. Calves must be slaughtered on the day they arrive at the abattoir or fed at least once daily and given free access to quality drinking water until slaughter.
- 5.11.9 Facilities must be available for the safe handling, loading and unloading of calves.
- 5.11.10 Holding pens should be easily cleaned, well drained, have non-slip floors and provide adequate shelter for calves at all times.
- 5.11.11 Calves should be handled efficiently and humanely at sales and pick-up points.
- 5.11.12 The operation of calf-sales and calf pick-up points, and the transport of calves to saleyards or direct to an abattoir, should be coordinated to permit slaughter with the least possible delay.
- 5.11.13 Calves not collected from pick-up points on the day of presentation are the responsibility of the person owning them at that time, who should ensure they are cared for and fed. Calves should be fed at least once daily and given free access to quality drinking water until slaughter.

6. HEALTH

- 6.1 Appropriate preventive measures should be used for diseases that are known to be common in a district or are likely to occur in the herd. A suitable plan for vaccination and internal and external parasite control should be devised and followed for each farm where appropriate. Consideration should be given to selecting animals that are naturally resistant to parasites and diseases likely to occur in a herd, and culling those animals susceptible to these conditions.
- 6.2 Internal medications, such as vaccines and drenches, and external medications, such as dips and pour-on formulations, should be stored and used in strict accordance with the manufacturer's instructions and recommended methods of administration. Overdosing may harm cattle, while underdosing may result in failure to achieve the required effect, and may contribute to the development of resistance by the targeted parasite to the product used. Expiry dates and withholding periods must be strictly observed.
- 6.3 Sick or injured cattle should be treated promptly and appropriately, and preferably isolated from other cattle. Where emergency slaughter is indicated, this should be performed promptly and humanely.
- 6.4 Lamé animals should have their condition diagnosed and appropriate treatment provided. Where possible, movement of the animal should be limited.
- 6.5 Cattle with cancer eye should be managed according to standards endorsed by the relevant State/Territory Department of Agriculture or Primary Industries.

7. AGISTMENT

- 7.1 The responsibility for the welfare of agisted cattle must be defined by agreement, preferably in writing, between the owner of the land and the owner of the cattle.
- 7.2 The owner of the land must inform the owner of the cattle if he/she takes on additional cattle, resulting in an increase in stocking rate.

8. FERAL CATTLE

- 8.1 Control of feral cattle is essential to the welfare of the domestic herd because:
- feral cattle cause difficulties in mustering, handling, population control and disease control in domestic cattle herds
 - the presence of feral cattle makes it difficult to assess and manage stocking rates in specific areas
 - feral cattle compete for feed and can cause nutritional deficiencies
 - feral cattle contribute to land degradation, which worsens the above problems
 - feral cattle can act as reservoirs of disease-causing organisms and impede disease control in domestic herds
 - feral bulls may fight with, injure or kill domestic bulls and unnecessarily stress the female cattle.
- 8.2 Where physical, economic or welfare constraints prevent adequate control of feral stock and the health and welfare of controllable stock is threatened, removal or humane destruction of feral stock is necessary. (Refer to the *Model Code of Practice for the Welfare of Animals: Feral Livestock Animals*.)
- 8.3 In the situation where domestication of feral cattle is to be attempted, dehorning of adult cattle (which is outside the normal guidelines) is undertaken to minimise stress and injury to the domesticated group into which they are introduced. Dehorning of cattle over 12 months of age is not recommended, and is illegal under some State and Territory legislation, unless undertaken by a veterinarian. Only under exceptional circumstances (e.g. range management of older, previously unmustered cattle in extensive operations) should this practice be implemented without analgesics on animals older than 6 months of age (see 5.8.2).
- 8.4 Castration of bulls older than 6 months of age is undesirable, and illegal under some State and Territory legislation, unless undertaken by a veterinarian using appropriate analgesia (see 5.4.1). Under exceptional circumstances (e.g. range management of older, previously unmustered bulls), and where legislation permits the practice, castration of bulls up to 18 months of age can be undertaken using appropriate procedures. Beyond this age, and in the absence of analgesia, this practice is unacceptable.

9. HUMANE DESTRUCTION OF CATTLE

- 9.1 Previous sections of this Code have drawn attention to circumstances in which cattle may need to be humanely killed.
- 9.2 Where euthanasia is necessary, the person responsible for the animals must ensure it is carried out as soon as possible, humanely and results in immediate death. Assistance may be sought from a veterinary practitioner, authorised inspector or the police.
- 9.3 The animal to be euthanased should be handled quietly to ensure it is not unnecessarily distressed or alarmed.

9.4 Use of firearms

- 9.4.1 The most efficient, safe and widely available method of humanely destroying cattle is to shoot the animal through the brain at close range. Firearms should only be used by competent marksmen who are familiar with the landmarks for cattle euthanasia. Legal considerations regarding the use of firearms must be observed.
- 9.4.2 A .22 calibre firearm is adequate for humane euthanasia of most cattle at close range only. However a high-powered rifle is recommended for the euthanasia of bulls and older bullocks or if the calibre of the rifle does not match the skull thickness of the animal. Use of a .22 calibre firearm must be followed by immediate bleeding out (see 9.5.3).
- 9.4.3 Any use of firearms is potentially hazardous.
- 9.4.4 Persons other than the person firing the weapon should be cleared from the area or should stand well behind the marksman.
- 9.4.5 Never fire while the animal is moving its head. Wait patiently for the animal to be still before firing.
- 9.4.6 To provide maximum impact and the least possibility of misdirection, the gun should be fired at a range that is as short as circumstances permit, but not in contact with the animal's head.

9.5 Use of a captive-bolt pistol

- 9.5.1 When used with care this alternative is safer than the use of a firearm.
- 9.5.2 The operator does not have to be an experienced marksman as the instrument's muzzle is firmly pressed against the skull before firing. However, the operator must have some knowledge of anatomy and the most effective position for the captive-bolt.
- 9.5.3 A captive-bolt pistol only stuns the animal and, to ensure death, it is necessary to bleed out the animal by severing the major blood vessels of the neck with a sharp knife when it collapses to the ground. To avoid injury due to the animal's involuntary movements, the operator should stand behind the neck.

- 9.5.4 Blank cartridges for the captive-bolt pistol are colour-coded according to the amount of charge they contain. The manufacturer's recommendations should be followed on the most appropriate cartridges to be used for different classes of cattle.
- 9.5.5 Regular maintenance of the captive-bolt pistol is essential for efficient stunning and avoidance of malfunctions.

Frontal method

The captive-bolt pistol or firearm should be directed at the point of intersection of lines taken from the base of each ear to the opposite eye (as in figure 1).

Temporal method

This is only suitable for firearms. The animal is shot from the side so that the bullet enters the skull midway between the eye and the base of the ear on the same side of the head. The bullet should be directed square on to the side of the head.

Captive-bolt pre-stunning in calves is recommended because an additional blood supply to the brain enables the animal to remain conscious for a considerable time after the throat is cut.

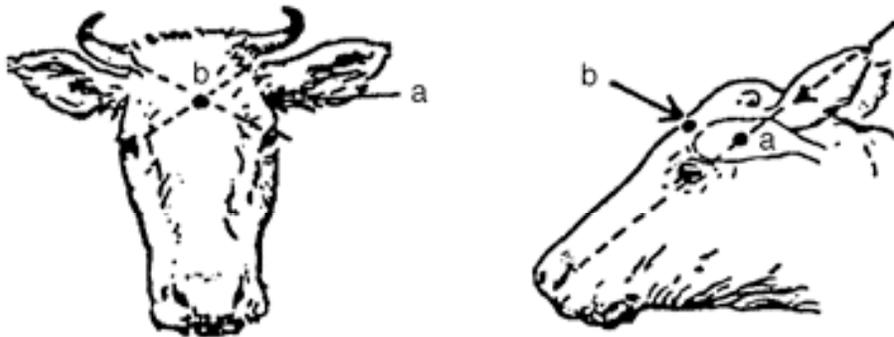


Figure 1: Humane euthanasia of cattle. 'a' indicates recommended position for temporal method (suitable for firearms only). 'b' indicates recommended position for frontal method (suitable for firearm or captive-bolt pistol).

APPENDIX 1 – WATER FOR LIVESTOCK

1. Guidelines to consumption

- 1.1 The amount of water consumed by stock is affected by a number of factors including:
- temperature. Animals require more water in hot weather. In normal conditions, with good quality water, consumption will be about 40% higher in summer than in winter. In extreme conditions, it may be up to 78% higher. With salty water, summer intake may be 50–80% higher than that of winter.
 - drought. During drought, animals require more water as they are forced to eat more fibrous and less digestible feed. Feeding salt or salt-based licks or blocks during dry periods increases water intake.
 - pasture composition. Good, green pasture can supply a significant proportion of an animal's water needs, however stock on dry pasture need to consume more water to utilise the less digestible fodder.
 - breed differences. Cattle of the *Bos indicus* breeds or their crosses drink less water under hot conditions than do *Bos taurus* (British or European breeds).

Table of water consumption

Class of stock	Consumption per head per day (L)
Lactating cows	
– grassland	40–100
– saltbush	70–140
Young stock	25–50
Dry stock (400 kg)	35–80

Note: When planning water supply requirements, allow for evaporation losses and consumption by native and feral animals.

- 1.2 The quality of water is broadly defined as its fitness for consumption by livestock to maintain satisfactory production. The principal factors affecting water quality are:
- the concentration of mineral salts (see 2 below)
 - acidity or alkalinity
 - toxic elements and compounds
 - algal growth or bloom.

2. Mineral salts in drinking water

- 2.1 Where salinity of water may be high, it should be tested for its suitability as stock drinking water. Testing services are available through most State/Territory Departments of Agriculture or Primary Industries. This assessment of quality for cattle consumption is made on the basis of mineral content (salinity) only and does not consider other possible contaminants or harmful organisms.
- 2.2 Water requirements and the maximum advisable levels of salinity vary widely according to the type of stock and the source of feed. Lactating females are more sensitive to dissolved salts. Seek advice from local State/Territory Departments of Agriculture or Primary Industries.
- 2.3 Salty water can cause gastrointestinal symptoms, wasting and sometimes death. The severity of the symptoms can depend on other factors which must be taken into account with a knowledge of local conditions. Factors to consider include:
 - tolerance to salinity varies from high to low in: sheep, cattle and buffalo, horses, pigs, poultry
 - climate – e.g. animals are less tolerant to salty waters during hot, dry periods
 - age and condition – lactating, growing and weak animals require better quality water
 - composition of pastures – higher salinity water is tolerated better if cattle are on green pastures
 - habituation – stock not accustomed to salty water can suffer ill effects or refuse to drink, but adjust if introduced gradually
 - composition of feed – salt content of prepared feed should be reduced if water is salty. In summer and during dry periods, the salinity of water in dams, rivers and troughs increases due to evaporation, and therefore drinking troughs should be flushed regularly.

APPENDIX 2 – FEED REQUIREMENT GUIDELINES

General recommendations

1. Cattle should have their energy requirements satisfied. Feed mixtures should contain sufficient digestible energy, protein and minerals to allow for the health of different classes of stock.
2. Requirements vary with age, growth rate, pregnancy, lactation, and management intentions (i.e. whether feeding for survival, maintenance or production), so the quality and digestibility of the ration must be adjusted to supply the needs of the animals within the limits of appetite. Diets should be formulated with reference to tables of nutritional data on feeds and tables showing the requirements of different classes of livestock. Late pregnant and lactating stock require significantly more feed than dry stock.
3. With grazing animals, remember that pasture or forage crops will vary seasonally in terms of digestibility and quantity available, dry matter and quality. On lush pasture or forage crop, grazing animals may be unable, at some times, to obtain their dry matter requirements, unless alternative sources are available.
4. Feeding cattle in feedlots is nearly always production feeding. Feedlot nutrition is addressed in section 2.2 of this code.
5. The most important feed characteristic is its energy content, which must be matched to the needs of the particular class of animals. Various units are used to measure digestible energy values in formulating feeds, for example, megajoules (MJ) of metabolisable energy (ME) per kg of feed.
6. Particular advice on feeding should be sought from various publications on feed requirements, from State/Territory Departments of Agriculture or Primary Industries' advisers, or private consultants. Computer programs are also available to assist in feed formulation.