ELANCO ANIMAL HEALTH ™

Cattle Handling

Robert Borg

Take Home Message

✓ Animals coming into a feedlot are processed during the first 24 hours. The processing involves handling and sorting the cattle, measuring their temperature as a step in preventative health management, and performing a number of health and identification procedures.

✓ Understanding cattle behaviour is important for safe cattle handling and processing both to minimize stress that can cause injuries and bruising (quality defects), and to minimize stress contributing to performance problems. The operations involved with processing the cattle are:
- stress free handling;
- animal identification;
- checking temperature for health assessment;
- procedures that include parasite control, dehorning, branding, vaccinating, implanting, castrating, and other special treatments;
- area clean up after processing.

Cattle Behaviour

Effects of stress on cattle

- Reduced weight gain, performance problems;
- Reduced ability to fight disease;
- Possible quality defects - bruising and injuries.

Temple Grandin says,"Handling practices can be less stressful to the animals and safer for the handler if one understands the behavioural characteristics of livestock".

Genetics

Breed differences mean some cattle are more excitable (some European breeds).

Individual differences

Each animal is an individual and has a different reaction to stress. Heifers may be more subject to stress reactions.

Past experience

Animals have long memories. If they have been handled roughly in the past, they will be more stressed and difficult to handle in the future. Cattle judge situations based on their first experience. Choice is a factor in stress - feedlot cattle who will freely investigate a coat hanging on a fence will balk when forced to walk past the same coat hanging on a chute or flapping in the breeze. Cattle experienced at being handled by foot, horse, or 4-wheeler will experience less stress under novel handling situations.

Familiarity with the environment

New pens and facilities are stressful. Let the cattle get used to the corrals. Cattle also show signs of stress when they are isolated. A single animal left alone in a crowding pen or working chute will try to rejoin its herd mates and may charge the handler.

Disease

There is evidence that stress due to rough handling can affect cattle's immune response - they are more susceptible to disease.

Vision

Cattle have excellent wide angle vision, in excess of 300 degrees, due to the position of their eyes. Cattle can see behind themselves without turning their heads. This is a natural advantage for a creature that evolved as a 'prey animal' (**Figure 1**). Ruminants do have depth perception, but they have difficulty perceiving depth at ground level while they are moving with their heads raised. To see depth at the ground, the cow has to lower its head, perhaps explaining why cattle balk at shadows or distractions at ground level.

Worker safety

Cattle that are nervous or flighty are more difficult to handle safely. Worker safety is improved when cattle are handled quietly in good facilities using good handling practices.

The percentage of cattle that moo or bellow while being handled is a sensitive indicator of stress (Grandin). Over 10% vocalization indicates serious problem. 3% is used as a critical control point indicator of stress in processing plant.

Understanding the flight zone

The flight zone (**Figure 2**) is the animal's personal space. If you move inside the flight zone, the animal will move away. When you back off, the animal will stop moving. The size of the flight zone depends on wildness or tameness of the cattle, angle of handler approach and state of excitement of the cattle. Work at the edge of the flight zone at an angle of 45 to 60 degrees behind an animal's shoulder. The cattle will circle away from you. The flight zone radius may be 5 to 25 ft. for feedlot cattle and 300 ft. for range cattle. If you are behind the point of balance, the animal retreats. A technique that works well with cattle that are moving is not to approach cattle directly, but to work close to the point of balance, moving back and forth on a line parallel to the direction the animal is travelling.

Use the flight zone to move cattle. Paddles or rattles will encourage cattle movement, avoid stock prods or canes. (Use only when necessary in the tub or working chute). Stock whips are a safety hazard, they can cause eye injuries.

Curved chutes

Curved working chutes prevent the animal from seeing the truck, squeeze chute and people until it is almost in the truck or squeeze. A curved chute takes advantage of the animal's natural circling behaviour. As you enter a pen the animals will form a circle around you and face you. As you move through the pen, they will circle around you.

A catwalk along the inside of the chute will force the handler to stand in the best position for moving the animal and will let the animal circle away from the handler. Never have a catwalk overhead. Catwalks should be 18" wide and 36" to 42" below the top of the working chute (belt buckle height) (**Figure 3**).

The normal use of automatic, counter balanced back stops in a working chute is to have them all tied up out of cattle reach except one just before the squeeze.

Crowding tubs

Crowding tubs are simply small, variable sized pens. Filling them only ½ full at any time improves cattle handling.

Herd instinct

Cattle follow the leader. They are motivated to maintain visual contact with each other. Each animal should be able to see others ahead of it, at least two cattle lengths. Make single file chutes at least 20 ft. long, 30 to 50 ft. for larger facilities. Don't force an animal in a single file chute unless it has a place to go. If the cow balks, it will continue balking.

Blocking gates in a chute need to be 'see through' so cattle can see the animals ahead. If the cow sees a dead-end it will balk.

Handle small groups in crowding pens, 8 to 10 instead of 20. The cattle need room to turn. Use the cattle following behaviour to fill up the chute. Wait until the single file chute to the squeeze is almost empty before refilling. The crowd gate is used to follow the cattle, not to shove up against them. If a lone animal refuses to move, release it and bring it back with another group.

An animal left alone in a crowding pen will become agitated and may attempt to jump the fence to rejoin its herdmates. More cattle in at least pairs if possible.

Response to light

Uniform lighting is important. Cattle avoid shadows. Striped shadows and contrasting patterns will cause balking.

Cattle in the dark will move towards the light. If you are loading at night, use frosted light to shine into the truck. Avoid glare in their faces.

Livestock tend to balk if they have to look into the sun. Face your loading chute and squeeze north-south for summer handling.

Cattle may refuse to enter a dark, indoor working chute from a bright, outside crowding pen. Extend the chute outside the building or cover the crowding area.

Response to movement

Cattle balk at moving or flapping objects. Use solid sides for the construction of crowding pens, single file chutes and loading chutes. Stand back from the headgate so that the cattle cannot see you.

Some commercial squeeze chutes have adjustable blinds that block the cattle's view yet allow access for treatment.

Tips for easier cattle handling

- remove distractions;
- provide adequate light;
- reduce noise;
- handle in small groups;
- use other driving aids.

Handler Technique

Temple Grandin, noting methods used by Bud Williams (USA) and Ron Kilgour (New Zealand), outlines some principles of moving groups of cattle.

- Quite gathering of cattle from the pasture is the key -- no whistling, hollering, loud noises or running. The cattle become quieter and easier to handle.
- Do not chase cattle from the rear of the group. This puts you in their blind spot, and they will turn and look at you (unless they are scared and fleeing from you).

Prods vs paddles and flags

Use of electric prods is not necessary with good cattle handling techniques (only less than 1% use is acceptable. Paddles, ribbons or a small flag on the end of a stick will distract cattle and promote stress free handling.

Single handler (**Figure 4**)

Use the handler 2 position:

1. As the herd moves walk forward at an angle that relieves the pressure on the herd's flight zone.
2. As the animals slow down, increase the pressure on the flight zone by walking straight towards the cattle.
3. As the herd speeds up, turn and walk back opposite the direction of travel. A slight angle will increase the pressure on the flight zone.
4. Repeat the pattern to maintain movement. The pattern is important; walking parallel to the herd will split the herd.

Like a car, the group must be moving before you can steer it. Concentrate on moving the leaders.

Two handlers

With two handlers, one person walks in position 2; the other person walks with the leader. The lead handler stays just behind the lead cow's point of balance. Use the same handling pattern, alternating in and out of the flight zone. The two handlers stay close together so that cattle cannot escape between them. The herd instinct for following will pull the tail-enders along.

Stragglers (**Figure 5**)

Do not go behind and chase them! Approach to one side of their head and move just past the point of balance at their shoulder. As soon as the movement of the herd attracts the straggler, repeat the alternating herding pattern.

How to fill a corral (**Figure 6**)

Cattle will be more orderly if they have to walk past you as they enter a corral. Move back and forth straight into the herd to increase and decrease pressure on the flight zone. Apply enough pressure to keep them from veering away from the fence, but not too much to cause panic.

How to empty a corral (**Figure 7**)

Make the animals walk past you. Wait for the animals to turn and look at you before you walk away from the gate.

To empty the pen, move back and forth as shown in Figure 5.

To sort animals in an alley or by a gate, move forward and backward, not sideways. Increase the pressure on the animals you wish to hold; decrease the pressure on the animals you wish to let go. Use this pattern to separate cows from calves.

Handle small groups.

Corral Layouts

Working area combinations

All handling systems consist of a series of individual components (Figures **8** and **9**). After the crowding, treatment and loading areas have been designed, they must be combined into a working unit that meets the requirements of the operation. Good working areas allow for a smooth flow of cattle and provide convenient access to the cattle for handlers. The proper combination of components in a working area can be the most important factor in the successful operation of handling corrals.

The first consideration in developing a working area is the limitations imposed by the site. The design must be suitable for the amount of space, the topography of the land, coordination with other buildings and facilities and vehicle access. Beyond the site considerations, the layout of the working area is largely governed by personal preference and the way cattle are handled on the particular operation.

Two possible working area combinations are shown in **Figure 10** (reverse working chute) and **Figure 11** (forward curved working chute. They illustrate the main factors in working area design.

The factors are listed below:
- Direction of cattle flow on entering and leaving the facility (Figures **12** and **13**);
- Crowding pen size, curvature and handler location;
- Working chute length, style (half-circle, quarter circle, 'S'-curve, straight), direction of curve and working side;
- Scale design (single or group, combination cattle and truck) and location (inside or adjacent to the working area);
- Loading chute and trailer loading designs and locations; unloading system (**Figure 14**).

Squeeze Chutes

The squeeze chute sides should move in and out together so that the cattle are not thrown off balance. Squeezes can have vertical or 'V' shaped sides. 'V' shaped sides support the cattle to prevent them from going down and choking.

Adjust the inside width at the bottom of a 'V' shaped squeeze to fit the cattle.
- six inches for 250 - 400 lb calves
- eight inches for 600 - 800 lb cattle
- 12 inches for heavy feeders and cows
- 14 inches to 16 inches for larger bulls

A hydraulically operated mechanism for adjusting the width is a big advantage here. Mechanical adjustments tend not to be used.

Palpation or vet gates

These gates swing back against the working chute to allow access to the rear of the cattle. Strong doors and good latches are important. Solid gates prevent cattle in the working chute from seeing the squeeze.

Noise

Cattle are stressed by loud and high frequency noises. Build gates with bumpers to minimize clanging. Locate noisy motors and pumps away from the squeeze chute.

Floors

Cattle can fall and injure themselves from falling on a smooth slippery concrete floor in front and inside a squeeze chute. The dairy industry uses grooved floors to prevent cattle from slipping. Other possibilities are floor grids or sand for footing. A hexagonal pattern 4" across allows the hoof to come in contact with a groove any time the animal takes a step.

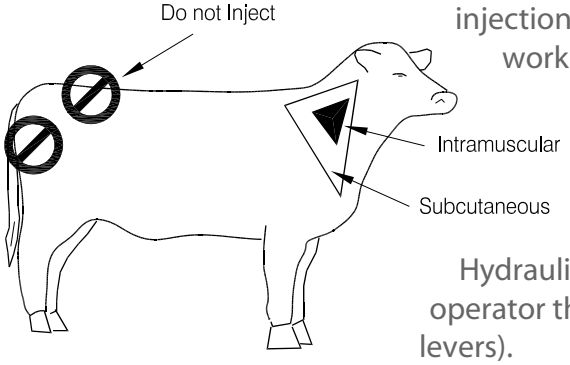
Head gates

Most commercial squeezes use curved bar stanchion head gates. When the stanchion is closed the distance from the bottom pivot point to the height where the stanchion neck opening is the widest should match the size of the cattle. The height where the neck opening is the widest is:

- 26" for small calves
- 32" or 34" medium and small breeds
- 36" for large breeds

Injection sites

Figure 15. Proper Injection Sites.



The squeeze or headgate should allow access to proper injection sites on cattle (Figure 15). Further development work on gate design will be an improvement.

An option for feedlots handling many small calves is having a second, smaller chute.

Hydraulic squeeze control

Hydraulic squeezes are faster, sturdier, and safer for the operator than manually operated squeezes (dangerous levers).

The most important point with hydraulic squeezes is not to use excessive hydraulic pressure which can injure the cattle.

Guidelines for pressure adjustment are:

- Cattle should be able to breath normally.
- Sufficient pressure to restrain the animals, not cause pain or bruising.
- If the animal is struggling, release the pressure. Excessive pressure causes struggling.

- If there is a tilt mechanism, operate the squeeze at a lower pressure to prevent excessive squeezing.

Maintenance

Check the hydraulic pressure every week. Grease, oil and repair every week or as required to maintain a quiet, smooth chute operation.

Summary

Temple Grandin, one of the world's leading experts on cattle behaviour, outlines five behavioural principles of low stress restraint:

"1. Solid sides and barriers to prevent the cattle from seeing people deep inside their flight zone.

2. Block the animal's view of an escape pathway with a barrier in front of the headgate.

3. The animal must be fully restrained before it is allowed to see a pathway of escape.

4. Slow, steady motions of a restraint device are calming. Sudden, jerky motion excites.

5. Concept of optimal pressure. Sufficient pressure must be applied to provide the feeling of restraint, but excessive pressure that causes pain and discomfort must be avoided."

Weigh Scales

As the marketing of cattle becomes more and more involved, it is becoming advantageous to have your own weigh scale on your farm. These scales can be either a 'group' or platform sale or the small individual scales (usually portable). Both sizes of scales can either be the mechanical, balance beam style or the more common electronic load cell style.

The group scale can be utilized for many purposes such as weighing groups of animals, weighing bales, feed wagons, trucks, grain, etc.

These platform scales are usually either 10' x 12', 10' x 20', or 10' x 30'. The load cells and monitor make up the basic package. The deck (steel and wood or concrete) can also be purchased or can be home made. The load cells and deck are installed on concrete pilings or grade beams above grade (no scale pit required). A livestock cage also has to be installed.

The electronic monitors can be either a low cost (about $600) unit that cannot be licensed for trade, or they can be the more expensive units (about $1200) that can be certified. Both types of monitors can be in a weatherproof case (NEMA) or a non-weatherproof case. These electronic monitors are usually remote from the scale and they need to operate in above freezing temperatures to ensure accuracy. Thus, they can be in a simple plywood box with a heat lamp or they can be in an insulated, heated building.

The costs of these group scales, installed on concrete with the deck, monitor and cage, run from about $6000 to $20,000, depending on size, custom options and the firm they were purchased from. If the scales are to be certified for legal trade, calibration, certification and a power surge protector will add about $750 to $1000 to the total cost. Certification is done through Canadian consumer and Corporate Affairs, Weights and Measures Device Inspections.

Individual scales are appropriate for those producers requiring a lot of single animal weighings. The electronic load cells will likely cost between $1700 to $2000. Monitors for individual scales are the same as the ones used for platform scales. An individual cage for the scale will probably cost between $500 - $1000.

Individual, group and/or truck scales are handled by the following firms:

• Accurate Scale	Edmonton, Calgary
• Ancoma Scales	Edmonton
• Ballard Scale	Calgary
• Calgary Scale Services	Calgary
• Dial Scale Co. Ltd.	Edmonton
• Elias Scale	North Battleford
• Giant Scale Ltd	Calgary
• Mettler-Toledo	Calgary
• Pacific Industrial Scale Co.	Edmonton, Calgary
• Prairie Systems & Equipment	Saskatoon
• Precision Scale Inc.	Edmonton
• Standard Scale Service Ltd.	Calgary

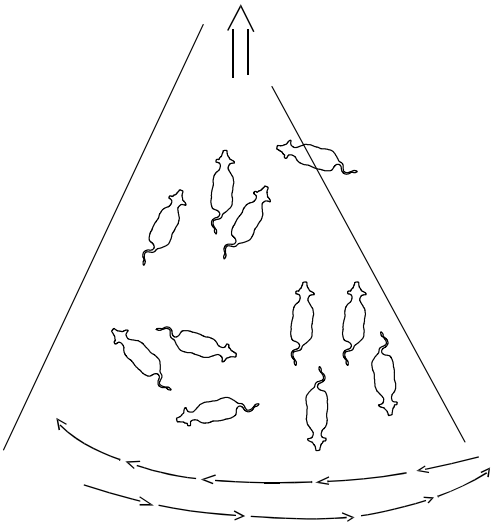
Figure 1. Low Stress Handling Using Predator-Prey Behaviour.

1. BUNCHING THE HERD

Create a slight anxiety by mimicking the stalking behaviour of a predator. Walking in the windshield wiper pattern shown will cause the cattle to come together. Use a slow walk. When most of the herd is in a loose bunch, increase the pressure on the collective flight zone to create movement in the desired direction.

This method works for cattle with a fairly large flight zone. Tame cattle may moved easier by leading them (Grandin).

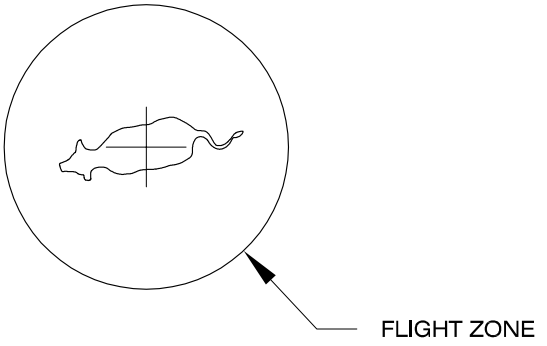
This procedure works best if you take your time and don't rush - slow and calm.



SLOW BUNCHING MOVEMENT

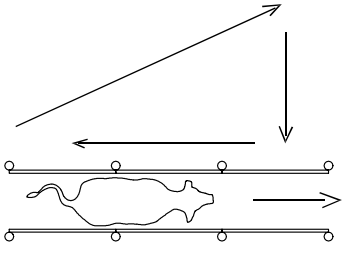
2. FLIGHT ZONE

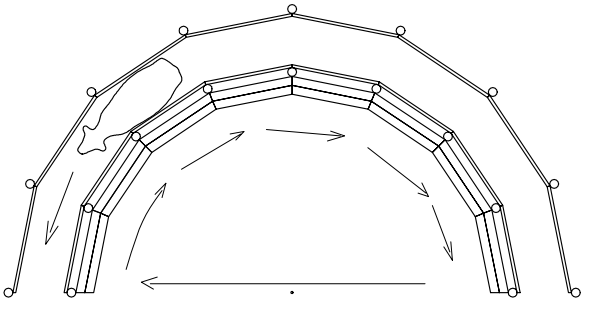
This reflects the tendency to turn and face people and other perceive threats and keep at a safe distance. This is greatly affected by the experience of the cattle.



3. POINT OF BALANCE

The natural behaviour for a prey animal to avoid a predator is to move in the opposite direction when the predator passes by its shoulder. To move an animal forward, pass by its shoulder in the opposite direction at a quick walk.





Source: grandin.com

MOVEMENT PATTERNS, QUICK WALK

Figure 2. The Flight Zone.

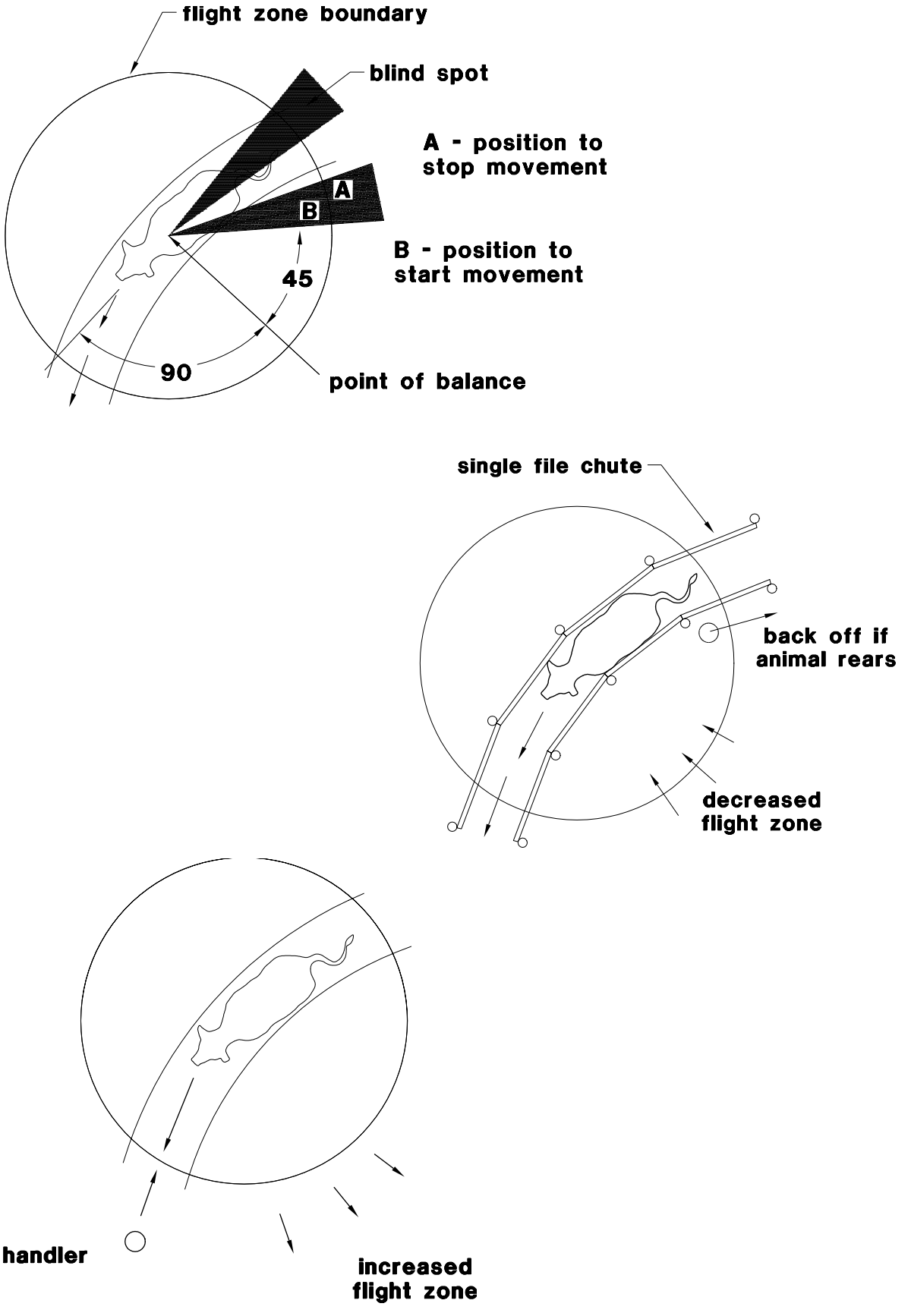
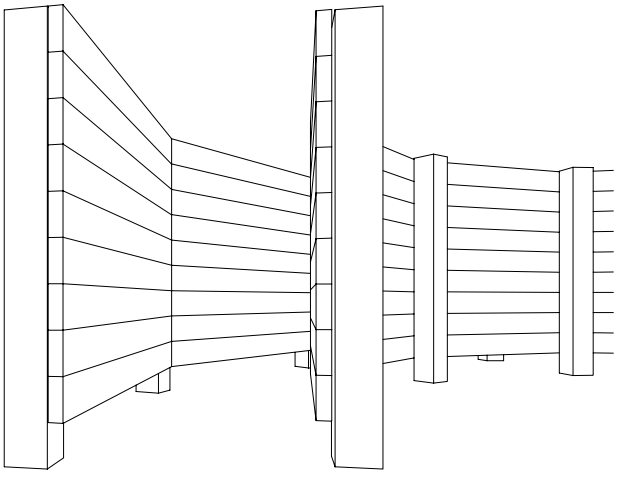
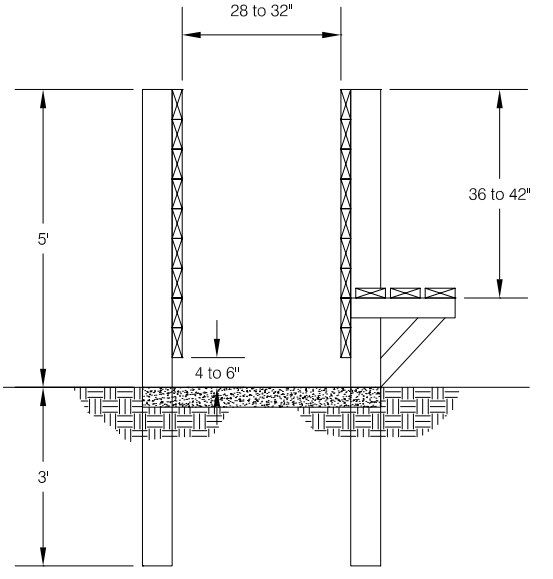
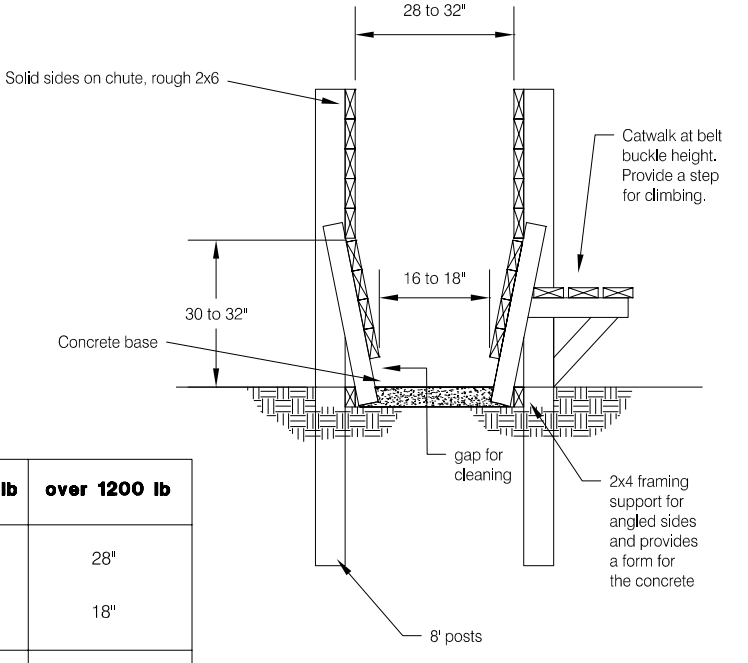


Figure 3. Working Chute Dimensions.





A plywood insert framed with 2x6's and hung inside the straight chute will reduce its width for calves.



MINIMUM WIDTH	under 600 lb	600-1200 lb	over 1200 lb
Width at 32" height equal to width of straight chute	18"	22"	28"
Bottom width	15"	16"	18"
	under 270 kg	**270-540 kg**	**over 540 kg**

Figure 4. Moving Groups on Pasture.

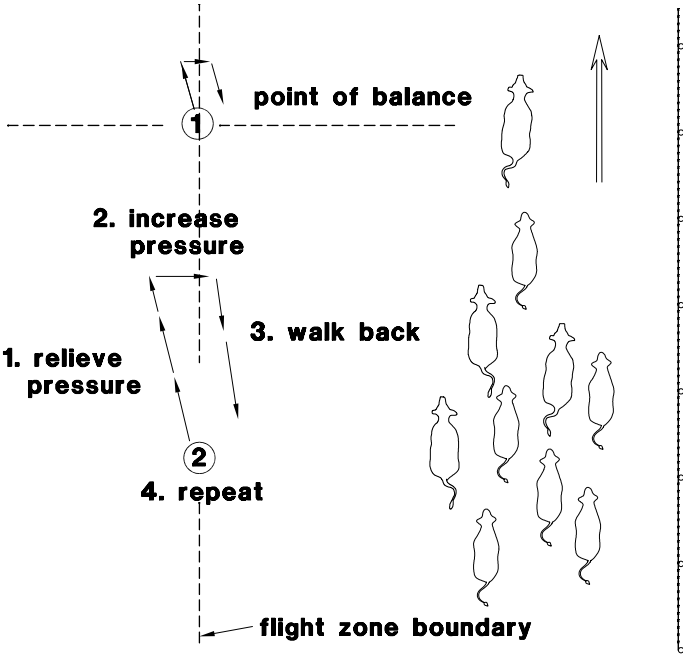


Figure 5. Moving Stragglers.

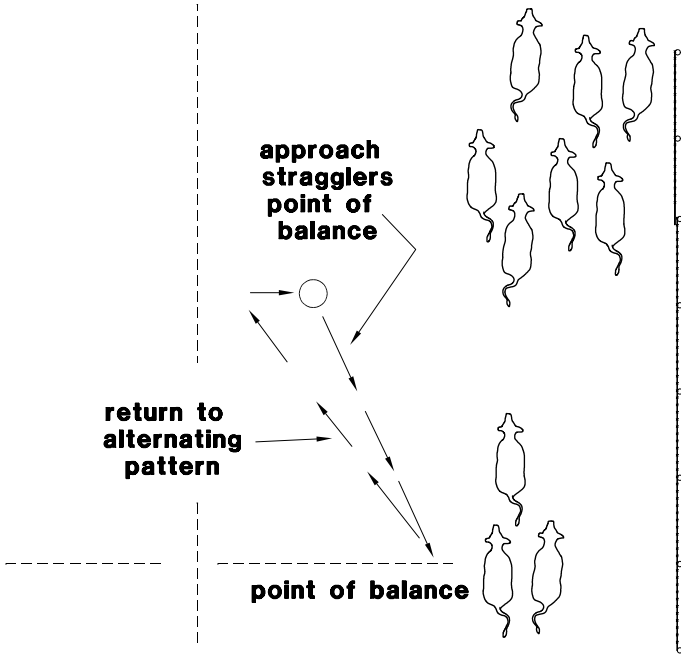


Figure 6. Filling a Corral.

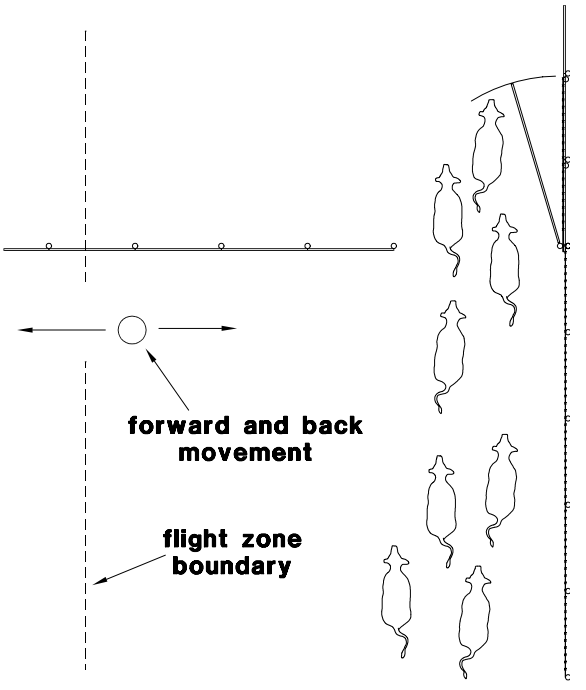


Figure 7. How to Empty a Corral.

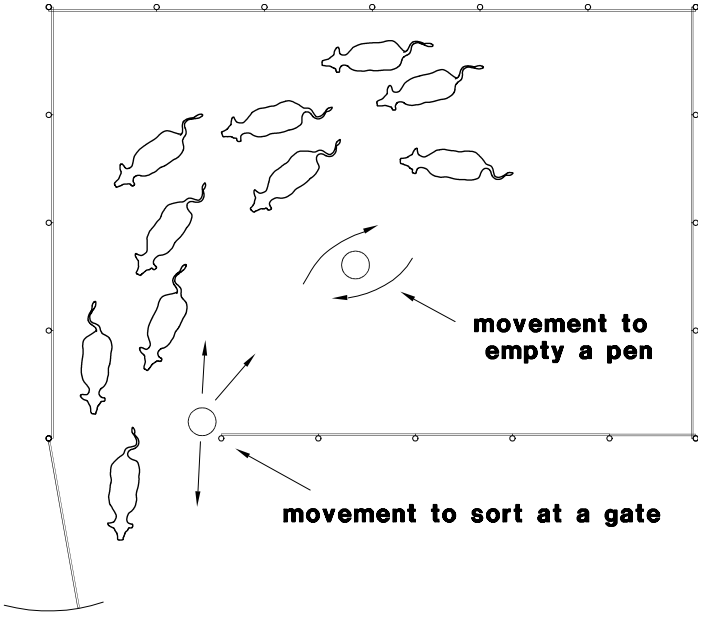


Figure 8. Cattle Handling Corral.

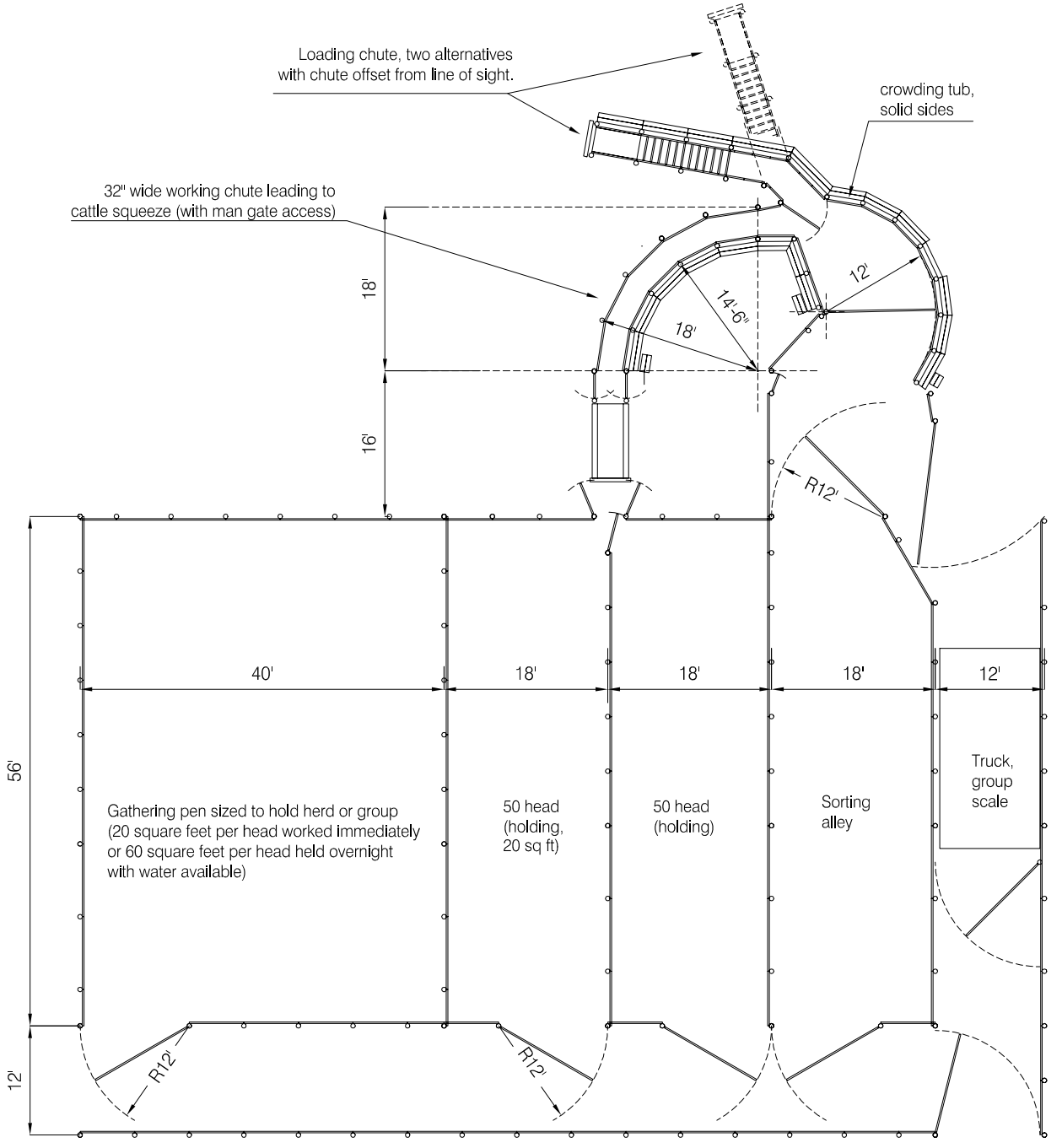


Figure 9. Large Handling/Processing Layout.

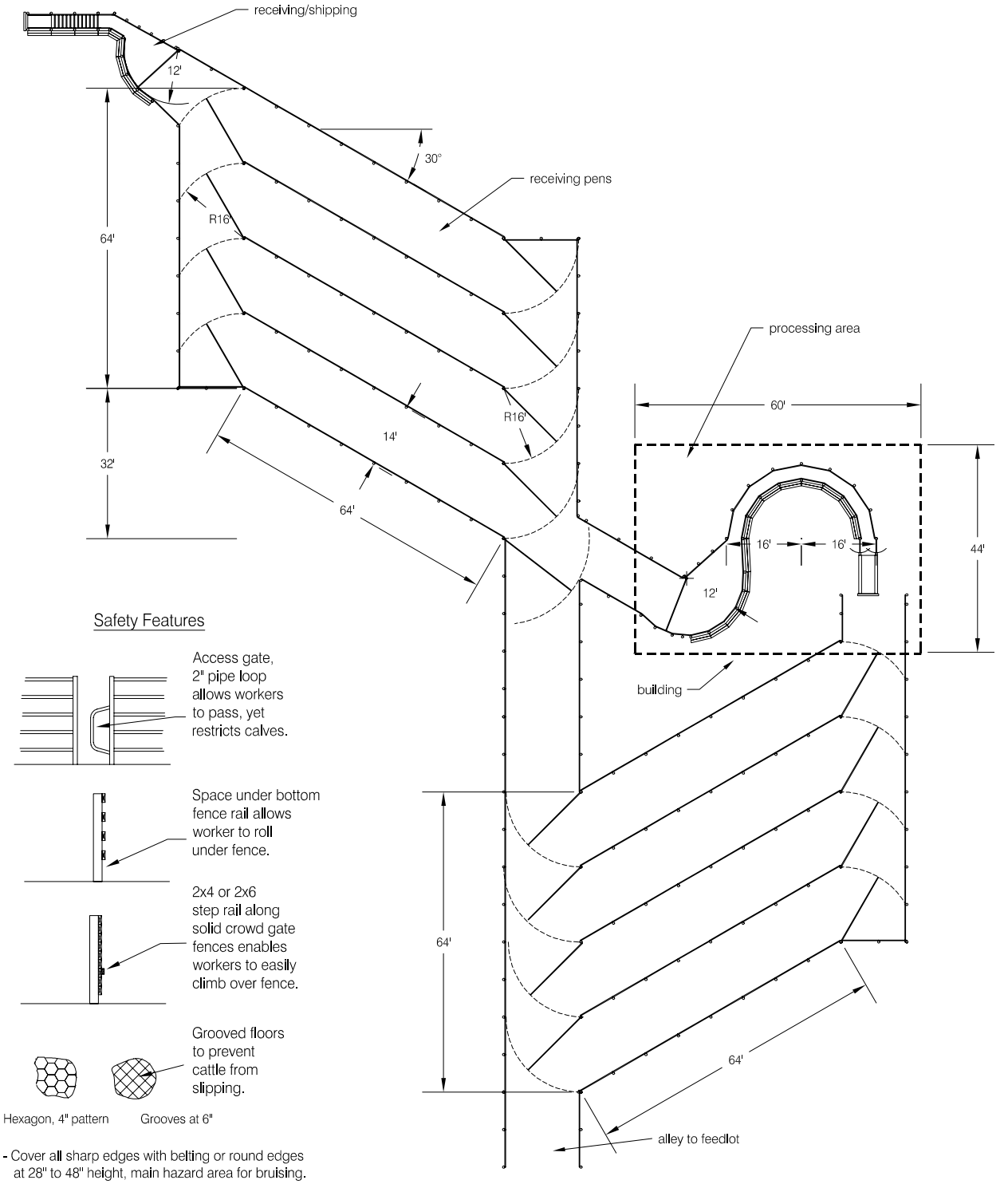


Figure 10. Reverse Working Chute.

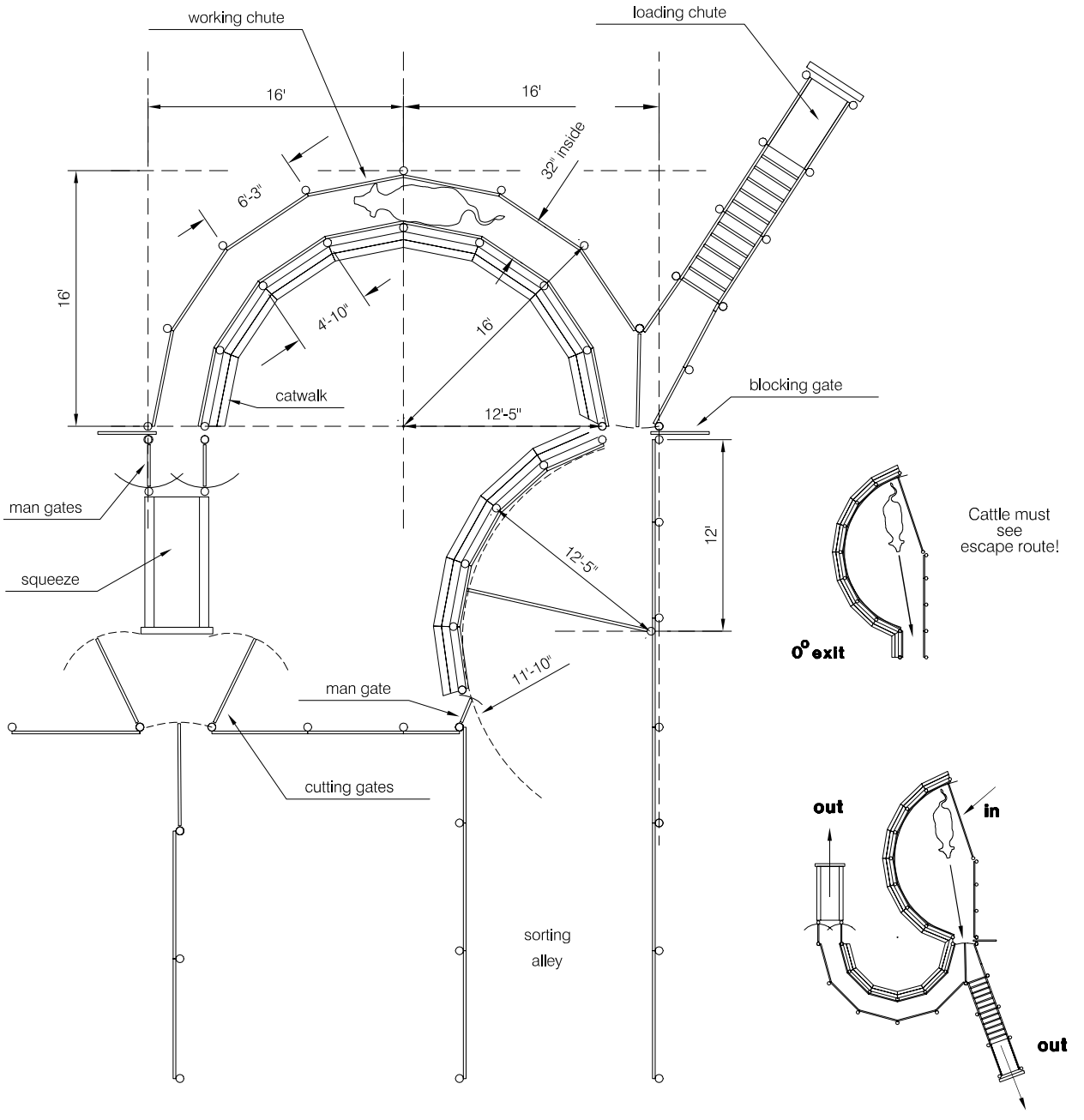


Figure 11. Forward Curved Working Chute.

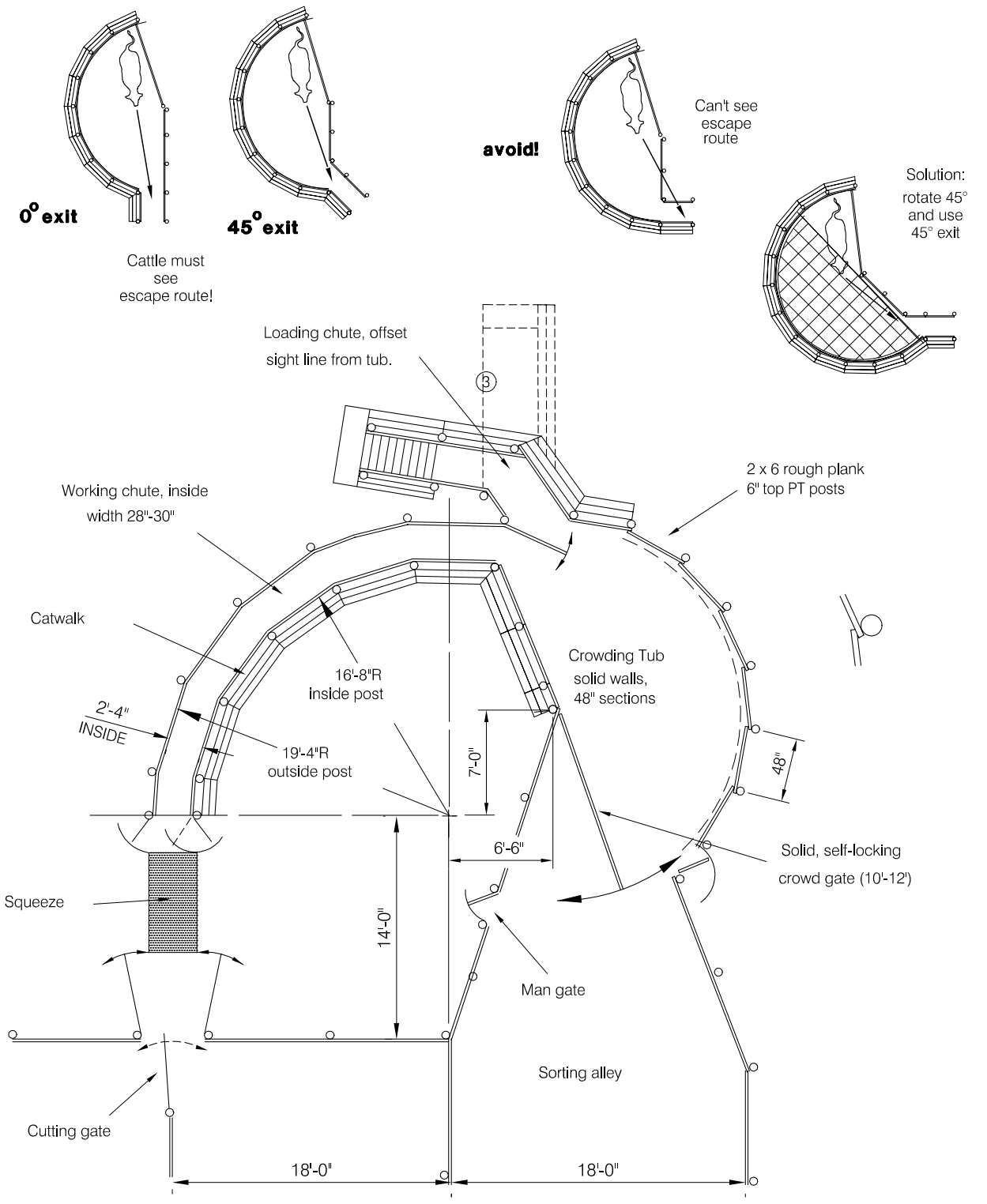
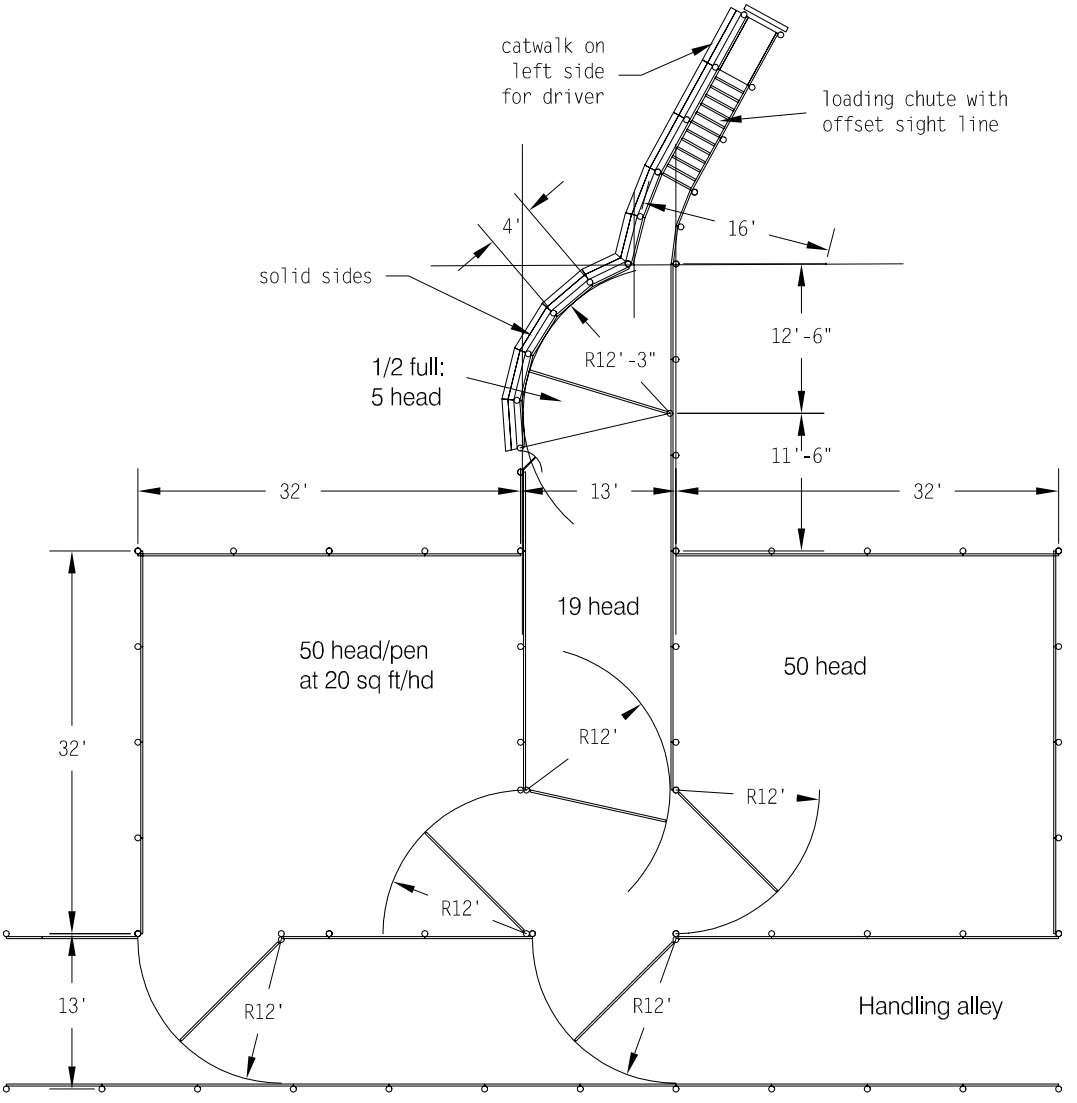


Figure 12. Loading System for Large Trucks.



Truck Space Requirements for Cattle

Average Weight, pounds	Cattle per running foot of truck floor	Square feet per head
300	1.7	4.5
400	1.3	6
500	1.1	7
600	.95	8
800	.75	10.4
1 000	.65	12
1 200	.55	14.5
1 400	.45	18

* based on 92" width

Example: 44 ft, 4 compartment liner; 10ft front, two middle at 25ft each, and one rear 9ft compartment for a total of 69 running feet.
The number of 1000 lb cattle that can be loaded at a medium density in this trailer is: 69' x 0.65 cattle/ft = 45 head.

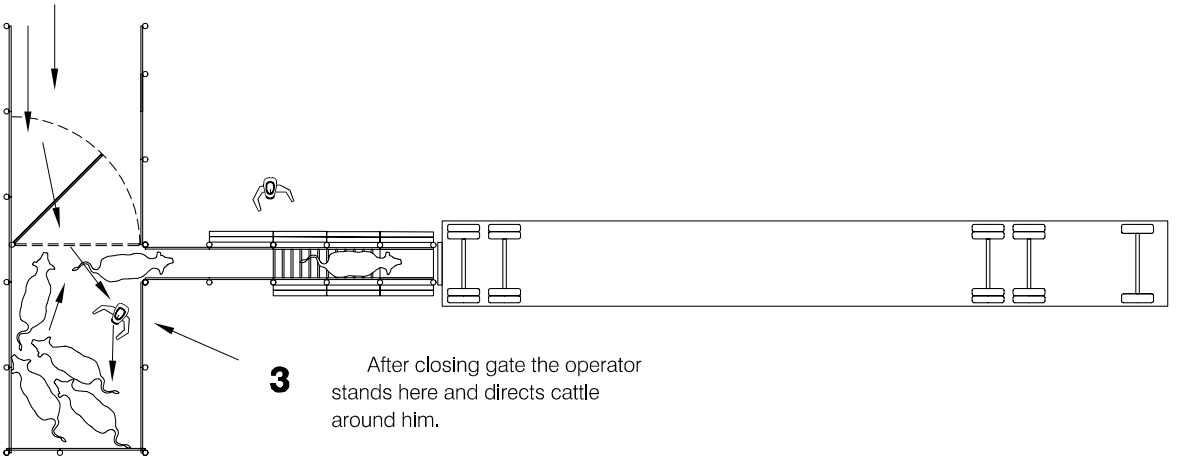
System Features

The loading densities are for medium density loads. The incidence of bruising and carcass damage are significantly higher at both high and low denisity loading. Cattle cannot move freely to maintain balance while crowded. Decrease the load by 5% for horned cattle.

The handling system allows various group sizes to be sorted prior to loading in a multi-compartment trailer. This lowers stress levels at loading time.

Figure 13. Facilities Using Williams' Animal Movement Principles.

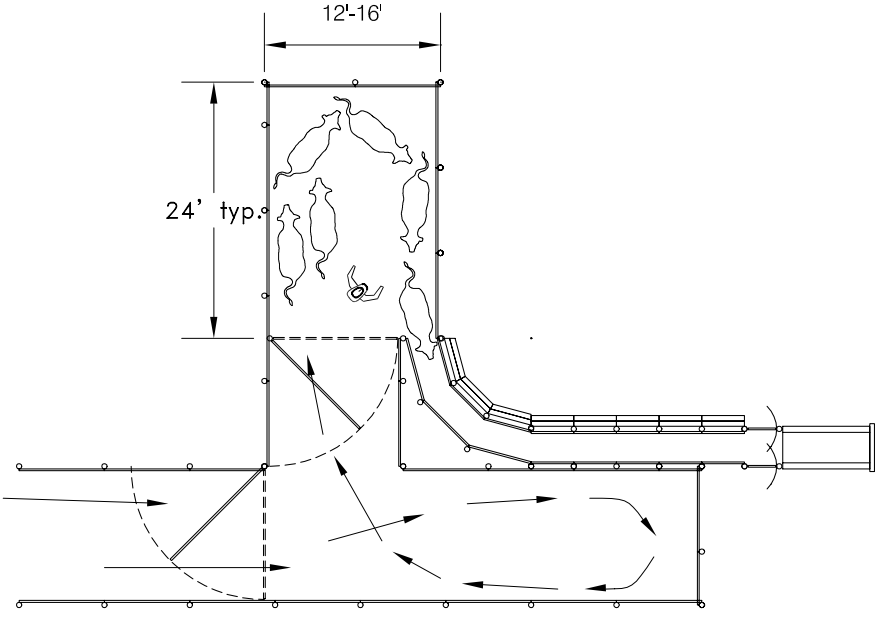
1 Cattle come down alley towards dead end pen.



3 After closing gate the operator stands here and directs cattle around him.

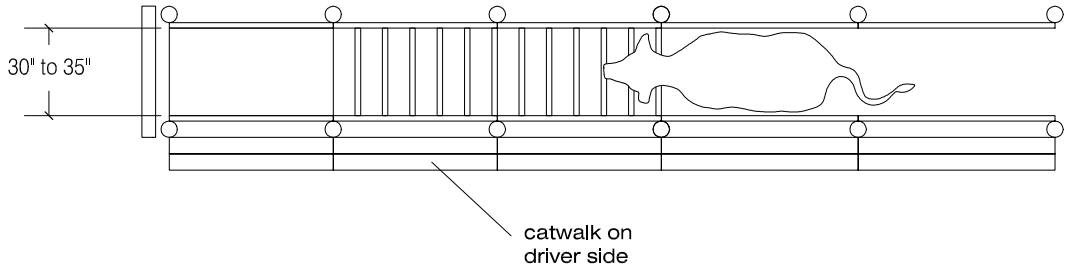
2 Cattle go back to where they think they came from.

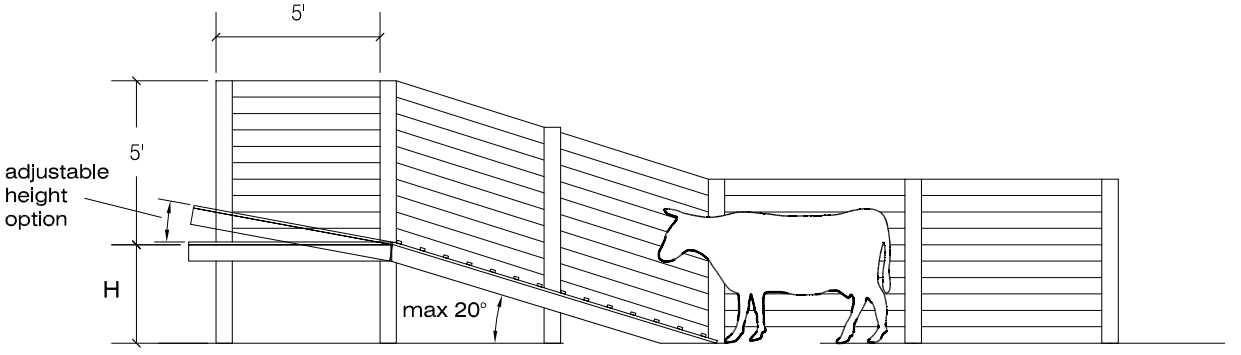
4 Angle the chute so that the inside curve is on driver's side of truck.



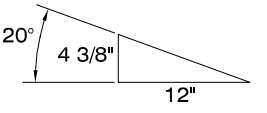
Source: Bud Williams Stockmanship School, Box 2220, Lloydminster

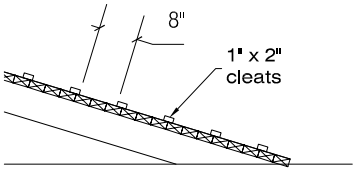
Figure 14. Loading Chute Specifications.



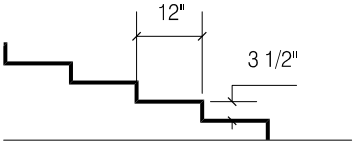


Ramp Options

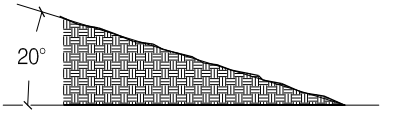




Wood cleats

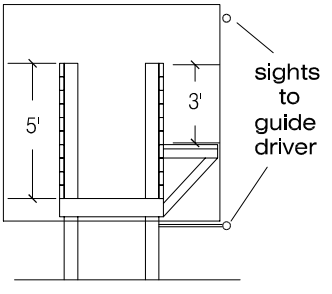


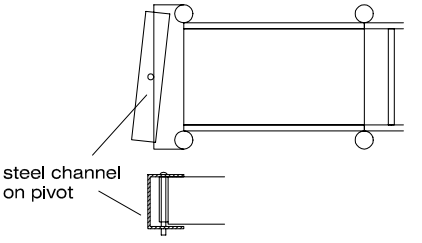
Concrete Steps



Earth with gravel top

Chute Height - H	
stock trailer -	15"
pickup truck -	28"
stock truck -	40"
tractor trailer -	48"
double deck -	100"





Self-aligning dock bumper