

Beef Cattle Handbook



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Cattle Behavior During Handling and Corral Design for Ranches

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Introduction

An understanding of cattle psychology combined with well designed facilities will reduce stress on both you and your cattle. Reducing stress is important because stress reduces the ability to fight disease and weight gain. It also increases weight loss, damages rumen function, and can interfere with reproduction.

An animal's previous experiences will affect its stress reaction to handling. Cattle have long memories. Animals which have been handled roughly will be more stressed and difficult to handle in the future. Animals which are handled gently and have become accustomed to handling procedures will have very little stress when handled. The basic principle is to prevent cattle from becoming excited. Cattle can become excited in just a few seconds, but it takes 20 to 30 minutes for the heart rate to return to normal in severely agitated cattle.

There is an old saying "You can tell what kind of a stock man a person is by looking at the behavior of his cattle." In one feedlot survey, cattle form yards which had a reputation for rough handling were wilder and more difficult to handle at the packer. They also had more bruises. The degree of stress which will be induced by handling and restraint can vary from almost no stress in a tame show animal to very severe stress in a wild range cow. The degree of stress is determined by three major factors — 1) amount of contact with people, 2) quality of handling (rough vs. gentle) and 3) genetics. Frequent, gentle handling will reduce stress. Genetics is also an important factor. Some genetic lines of cattle are calmer and less wild than others. Cattle with an excitable temperament will take longer to respond posi-

tively to gentle handling that cattle with a calm temperament. Most cattle will become less stressed and settle down when they are handled gently. However, there are a few individuals with a bad temperament that may never settle down and are dangerous to restrain and handle. Culling them is often advisable.

Although painful procedures cannot be avoided, a reduction of agitation and excitement will still reduce stress. Cattle remember painful restraint methods such as nose tongs. Handling will be easier in the future if you use a halter to hold the heads and keep electric prod usage to an absolute minimum. If tail twisting is used to move a cow up a chute, let go of the tail when the cow moves to reward her for moving. Breeding cattle will quickly learn to move when their tail is touched.

Behavior Principles

Cattle have wide angle vision, they can see behind themselves without turning their heads. However, there is a small blind spot behind their rear (Figure 1). When a group of cattle move, the animals maintain visual contact with each other. This enables the herd to stay together. An animal following another animal will tend to stay in Positions A and B on Figure 1. Moving together as a herd helps protect cattle from predators. The strongest dominant animals will be in the middle of the herd and the subordinate weaker animals will be on the outside. Since cattle are a prey species they are ever vigilant and fear novelty. For example, cattle moved to a new pasture may be fearful of cars passing by on the highway, but soon they learn to ignore them.

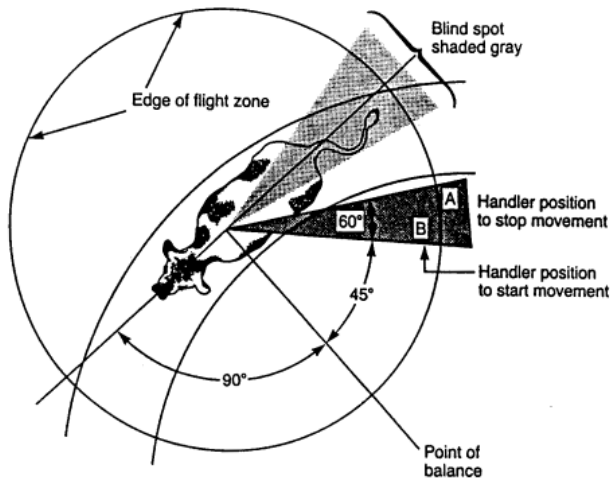


Figure 1. Flight Zone Diagram.

Understanding the flight zone is the key to easy, quiet handling. The flight zone is the cow's personal space. When you penetrate the flight zone the animals will move, and when you retreat from the flight zone the animals will stop moving. The size of the flight zone is determined by several factors, such as wildness or tameness, and the angle of the handler's approach. The flight zone will be larger when a handler approaches head on, and it will become smaller when the animal is confined inside a single file chute. A barrier in between the handler and the cattle reduces the flight distance. A cow passing by you will have a smaller flight zone that a cow coming directly at you. If a cow becomes excited the flight zone will increase. Cattle can be easily moved by working on the edge of the flight zone (Figure 1). The handler must be close enough to the animal to make it move, but not so close as to cause it to panic and flee. If the cattle start moving too fast, you must back off and get out of the flight zone.

If cows on pasture turn and look at you, you need to approach and put pressure on the edge of the flight zone. To keep the animals moving you alternately enter and retreat from the flight zone. When an animal moves for you, you reward her by relieving pressure on her flight zone, but in a few seconds you will invade her flight zone again to keep her going.

When cattle are worked in an enclosed space such as an alley or crowd pen, great care must be taken to avoid deeply penetrating the flight zone. This can result in panic, jumped fences and cattle turning back on the handler. If cattle in an alley start to turn back you must back up and get out of the flight zone; nine times out of ten, it will settle back down.

To move an animal forward you must be behind the point of balance shown on Figure 1. Moving in front of the point of balance at the shoulder will make the animal go backward. To start movement, approach just behind the point of balance and move back into Positions A and B. Avoid getting into the blind spot on pasture or in a large pen. Entering the blind spot will

cause the cattle to stop and turn and look at you. They want to know where you are at all times. In close quarters you may get kicked if you get in a cow's blind spot.

Break Old Habits

You must break old habits to fully master quiet gathering of cattle from pasture. The first habit to break is whooping, hollering, and running. It will require some time and patience, but your cattle will become quieter and easier to handle as you work with them. The second bad habit is chasing cattle from the rear of the group like a predator. Positioning yourself behind the cattle, puts you in their blind spot. This will cause them to turn and look at you, unless they are scared and fleeing from you. Cattle movements should be under the handler's control and the animals move at a slow walk. You have to concentrate on moving the leaders. You should spend time walking or riding among your cattle so they do not always associate you with either feeding or being taken to the corrals. The animals need to learn that you are neither predator or feed wagon. If cattle are fed from a truck, blow the horn as a signal for feeding. This will prevent the animals from chasing the truck every time you drive in the pasture. Cattle can be handled with horses, vehicle or people on foot. Since cattle are fearful of novelty, animals that have never seen a motorcycle will fear it. It is best to get cattle accustomed to different driving methods. Different vehicles and people should be used to train the animals to be less fearful of novelty.

A herd of cattle is like a car, before you can steer, the car must be moving. Herd movement must be started before you attempt to change direction. Figure 2 shows the handler movement pattern which will keep a herd moving in an orderly manner. It will work both along a fence and in open pasture. If a single handler is moving the animals, use the Handler 2 Position of Figure 2. As the herd moves, you walk forward at an angle which gradually relieves pressure on the herd's collective flight zone. When the animals start to slow down, increase pressure on the flight zone by walking straight into the cattle. As they speed up, turn and walk back opposite the direction of travel. Walk at a slight angle to increase pressure on the flight zone. To maintain movement, keep repeating the pattern. It will require practice to determine the length of each movement pattern. It is important to use the pattern. If you just walk along parallel with the herd, the herd will tend to split.

When two people move a large herd of cattle, one person walks in the pattern shown on Figure 2, Handler Position 2, and the other handler stays with the leader. The lead handler should stay just behind the leader's point of balance. He should bear in and out of the flight zone in an alternating manner (Figure 2, Position 1). The lead handler and the rear handler should stay as close together as possible. It is important to not allow cattle to escape between them. The following instinct of the cattle will pull the tail ends along even though the rear handler is somewhat ahead of the rear of the group.

If a few cattle break away and straggle to the rear,

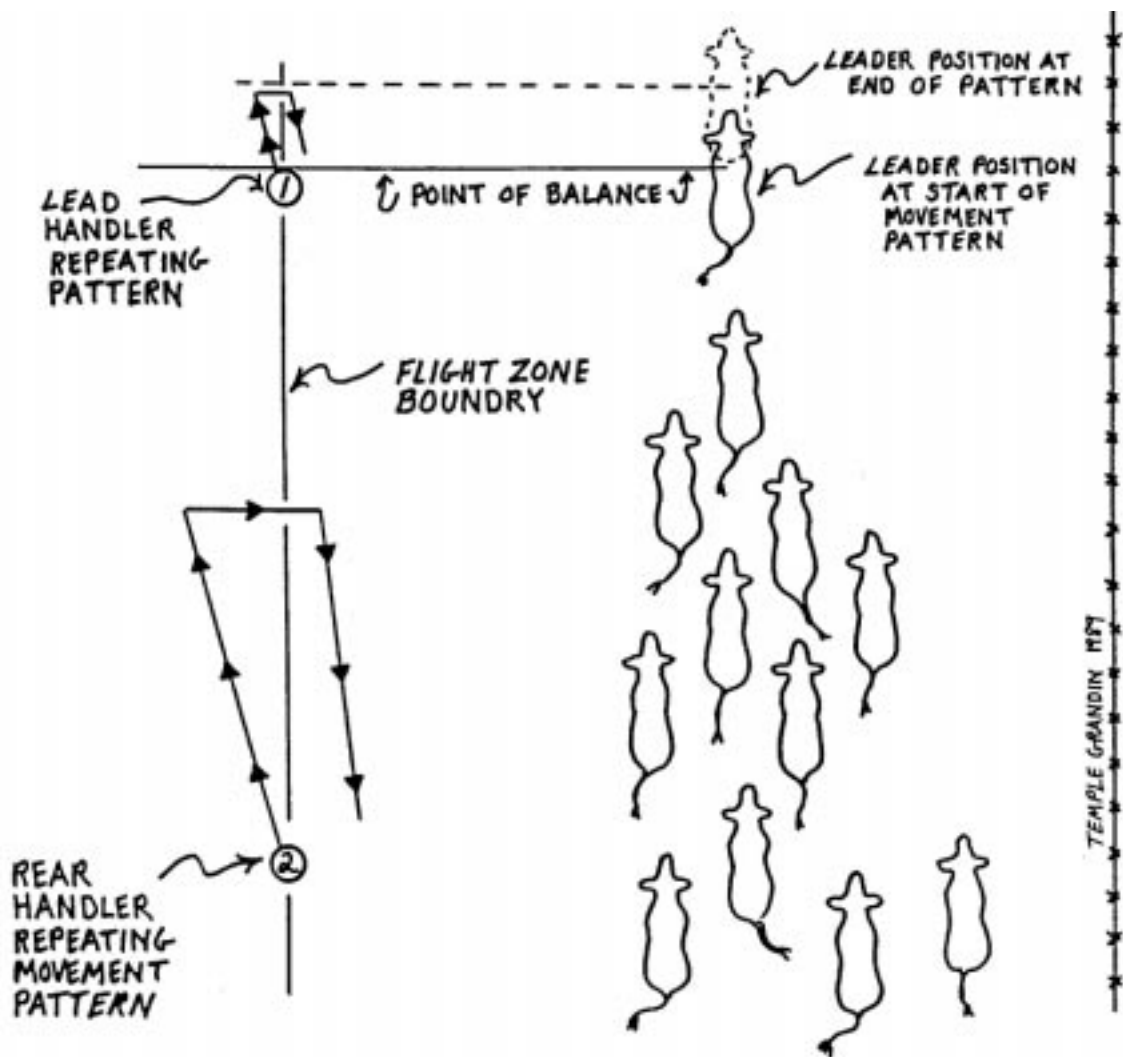


Figure 2. Handler Positions to Move Groups of cattle on Pasture.

don't go around behind them and chase them. Use the motion of the herd to draw them back as shown in Figure 3. At a walk, approach the stragglers at an angle which gradually increases pressure on their flight zone. Approach just to one side of their heads and move just past the point of balance at the shoulder. Do not go all the way to Positions A and B on Figure 1. As soon as the stragglers are attracted by the movement of the herd, start repeating the Handler 2 pattern on Figure 2. Be careful not to push the stragglers into the dominant cattle in the middle of the herd.

Working In Corrals

Applying and relieving pressure to the flight zone of the leaders will also make it easier to fill and empty corrals. Cattle movements are under your control at all times. It is important for your cattle to learn that you control their movements and they cannot escape from you. Never allow cattle to run wildly out of a corral. Make the animals walk past you at the exit gate. Wait for the cattle to turn and look at you before you walk away from the gate.

When a new set of corrals is first used, avoid doing painful procedures. It is advisable to "train" the cattle to the new system and do non-aversive procedures such as weighing or sorting the first time corrals are used.

Cattle will also enter a corral in a more orderly manner if they have to walk by you as they enter. Figure 4 illustrates the correct position for the lead handler as the cattle enter a corral. Do not move back and forth. Increase and decrease pressure on the flight zone by moving forward and back, straight into the herd. You must apply enough pressure to keep them from veering away from the fence but not so much as to cause panic.

When you move animals from a pen, do not let them race out. Work on the flight zone of the leaders. Figure 5 shows the movement pattern for emptying a pen and for sorting at a gate. To empty the pen in a controlled manner, move back and forth as shown in Figure 5. To control the movement of the cattle over a gate, move to the sorting position shown on Figure 5. To sort cattle, move forward and backward. Do not move sideways. If you move sideways they will get by you. By

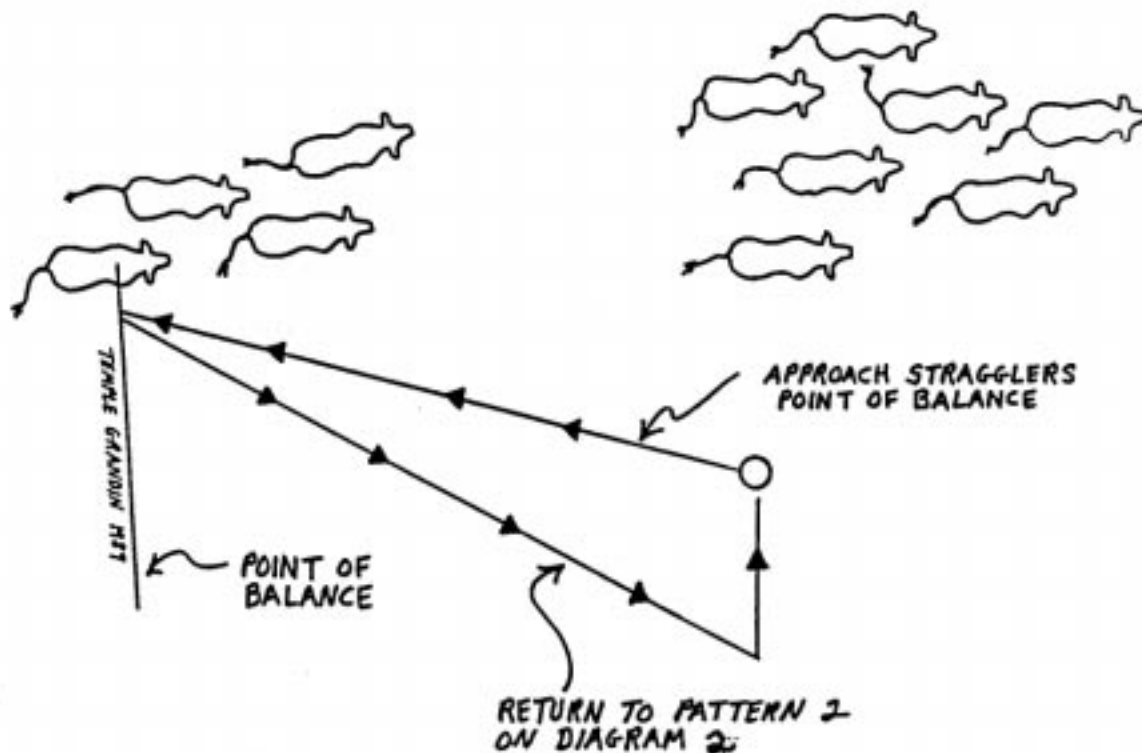


Figure 3. Handler Positions to Bring Stragglers Back into Herd.

moving forward and backward you can easily separate cows from calves. You increase pressure on the flight zone of the animal you want to hold back and decrease pressure on the flight zone of the animals you wish to let go by. This method can be used either in an alley or in a gate. A handy tool for sorting is a stick with a flag or a paddle on the end. Blocking the animal's vision on one side with paddle or flag will cause it to turn.

When cattle are being handled in a confined area such as a crowding pen or sorting alley, handle small groups. Bring eight or ten cattle into a crowding pen instead of twenty. Overloading the crown pen is a common handling mistake. The animals need room to turn. A stick or whip with plastic streamers or a garbage bag tied on the end is useful for turning cattle in the crowd pen. Shake the streamers on the right side of the head to turn left and vice versa. Use the animal's natural following behavior to assist with filling chutes. Wait until the single file to the squeeze is almost empty before refilling. Avoid the overuse of crowd gates. If the cattle are moving, do not shove the crowd gate up on them.

Problems with balking tend to come in bunches; when one animal balks, the tendency to balk seems to spread to the next animals in line. When an animal is being moved through a single-file chute, the animal must never be prodded until it has a place to go. Once it has balked, it will continue balking. The handler should wait until the tailgate on the squeeze chute is open before prodding the next animal. If the cattle become severely agitated due to excessive prodding, the agitation and frenzy can spread to the other cattle. Severely

agitated cattle may secrete a "smell of fear" substance that can be detected by other cattle.

An animal left alone in the crowding pen after the other animals have entered the single-file chute, may attempt to jump the fence to rejoin its herdmates. A lone steer or cow may become agitated and charge the handler. A large portion of the serious handler injuries occur when a steer or cow, departed from its herdmates, refuses to walk up the single-file chute. When a lone animal refuses to move, the handler should release it from the crowding pen and bring it back with another group of cattle.

Vision And Facility Design

Cattle have poor depth perception when they are moving with their heads up. To see depth they have to stop and put their heads down. This is why they balk at shadows and strange objects on the ground. A single shadow that falls across a scale or loading chute can disrupt handling. The lead animal will often balk and refuse to cross the shadow. If you are having problems with animals balking at one place, a shadow is a likely cause. Balking can also be caused by a small bright spot formed by the sun's rays coming through a hole in a roof. Patching the hole will often solve the problem. Shades constructed from snow fence should not be used over working areas. The zebra stripe shadows can cause balking.

Draining grates in the middle of the floor will make cattle balk. A good drainage design is to slope the concrete floor in the squeeze chute area toward an open drainage ditch located outside the fences. The open

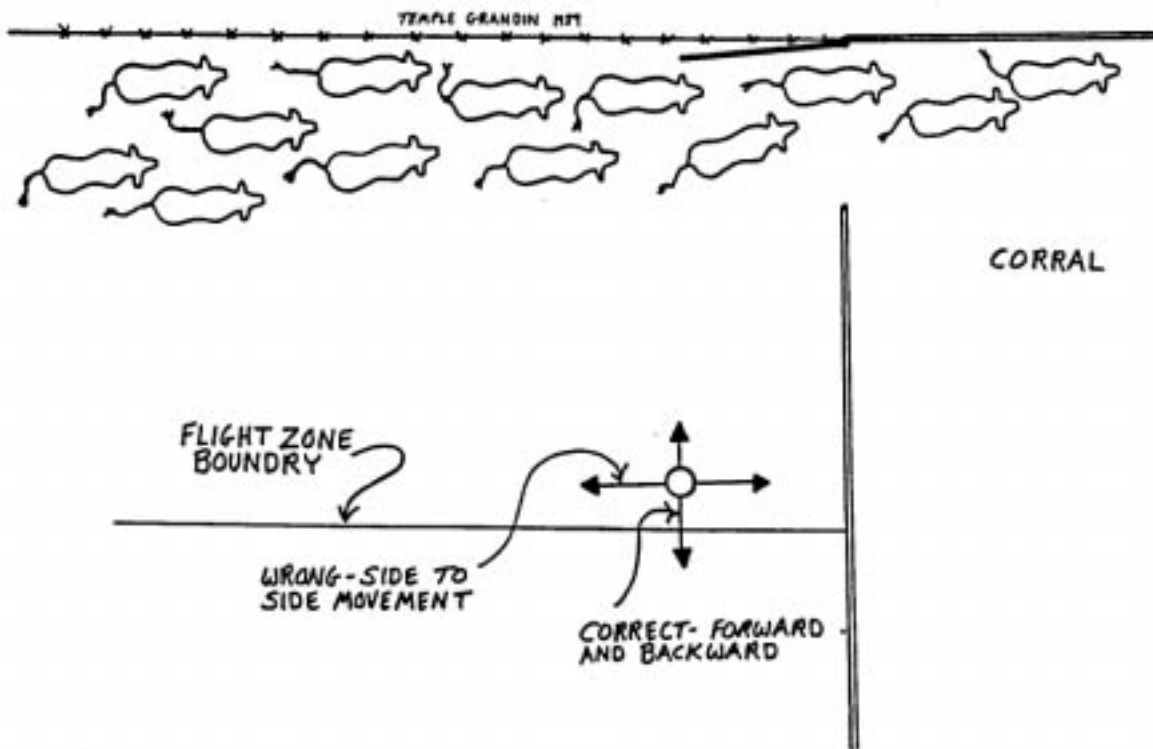


Figure 4. Leader Handler Position for Filling Corral.

drainage ditch outside the fences needs no cover and so it is easier to clean. Animals will also balk if they see a moving or flapping object. A coat flung over a chute fence or the shiny reflection off a car bumper will cause balking. Dairy cows that move through a facility every day will learn to walk over shadows and drains because they are no longer novel. However, a dairy cow will balk if she sees a strange piece of paper on the floor or a coat hung over a fence.

Cattle have a tendency to move toward the light. If you ever have to lead livestock at night, it is strongly recommended that frosted lamps that do not glare in the animal's face be positioned inside of the truck. However, loading chutes and squeeze chutes should face either north or south; livestock will balk if they have to look directly into the sun. Sometimes it is difficult to persuade cattle to enter a roofed working area. Persuading the animals to enter a dark, single-file chute from an outdoor crowding pen in bright sunlight is often difficult. Cattle are more easily driven into a shaded area from an outdoor pen if they are first lined up in single file.

Many people make the mistake of placing the single-file chute and squeeze chute entirely inside a building and the crowding pen outside. Balking will be reduced if the single-file chute is extended 10 to 15 feet outside the building. The animals will enter more easily if they are lined up single file before they enter the dark building. The wall of the building should NEVER be placed at the junction between the single-file chute and the crowding.

Do Not Dead End Your Chute

Livestock will balk if a chute appears to be a dead end. Sliding and one-way gates in the single-file chute must be constructed so that your animals can see through them, otherwise the animals will balk. This is especially important at the junction between the single-file chute and the crowd pen. The sides of the single-file chute and the crowding pen should be solid. The crowding pen gate also should be solid so that animals cannot see through and turn back towards herd mates they just left. Palpation gates, however, should be solid so that cattle do not see a person standing in the chute.

When a curved chute is used it must be laid out properly so that it does not appear to be a dead end. A cow standing in the crowd pen must be able to see a minimum of two body lengths up the chute. Cows will balk if the chute is bent too sharply at the junction between the crowd pen and the single-file chute. Figure 6 illustrates an efficient curved facility that is easy to lay out. It consists of three half circles laid out along a layout line. The radius points of all three half circles are in the layout line. A 16 (4.8m) ft. inside radius for the curved single-file chute is recommended. A 12 (3.5m) ft. radius is the absolute minimum unless a straight section is installed at the junction between the crowd pen and the chute.

Why A Curved Chute Works

A curved chute works better than a straight chute for two reasons. First, it prevents the animal from seeing the truck, the squeeze chute, or people until it is almost in the

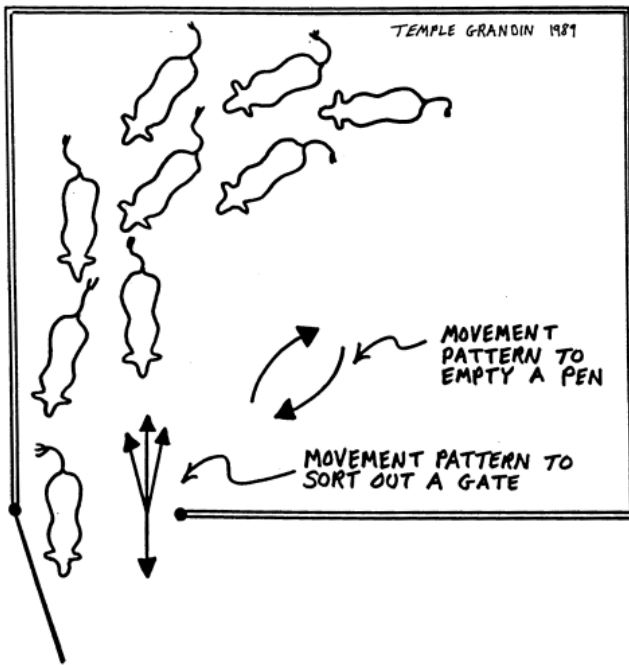


Figure 5. Handler Positions for Emptying a Pen and Sorting at a Gate.

truck or squeeze chute. Shields for handlers to hide behind and remote controlled gates can also be used to prevent cattle from seeing people up ahead. A curved chute also takes advantage of the animal's natural tendency to circle around the handler. When you enter a pen of cattle or sheep you have probably noticed that the animals will turn and face you, but maintain a safe distance. As you move through the pen, the animals will keep looking at you and circle around you as you move. A curved chute takes advantage of this natural circling behavior.

A well-designed, curved single-file chute has a catwalk for the handler to use along the inner radius. The handler should always work along the inner radius. The curved chute forces the handler to stand at the best angle and lets the animals circle around him. The solid sides block our visual distractions except for the handler on the catwalk. The catwalk should run alongside of the chute and NEVER be placed overhead. The distance from the catwalk platform to the top of the chute fence should be 42 (100 cm) inches. This brings the top of the fence to belt-buckle height on the average person.

Dark Box Ai Chute

For improved conception rates, cows should be handled gently for AI and not allowed to become agitated or overheated. The chute used for AI should not be the same chute used for branding, dehorning, or injections. The cow should not associate the AI chute with pain. Cows can be easily restrained for AI or pregnancy testing in a dark box chute that has no headgate or squeeze. Even the wildest cow can be restrained with a minimum of excitement. the dark box chute can be easily constructed from plywood or steel. It has solid sides, top and front. When the cow is inside the box, she is inside a

quiet, snug, dark enclosure. A chain is latched behind her rump to keep her in. After insemination the cow is released through a gate in either the front or the side of the dark box. If wild cows are being handled, an extra long, dark box can be constructed. A tame cow that is not in heat is used as a pacifier and is placed in the chute in front of the cow to be bred. Even a wild cow will stand quietly and place her head on the pacifier cow's rump. After breeding, the cow is allowed to exit through a side gate, while the pacifier cow remains in the chute.

Restraint Principles

Cattle sometimes become severely stressed in a conventional squeeze chute. This is probably due to deep invasion of the animal's flight zone by the operator and other people that can be seen through the open barred sides. Stress could be reduced by replacing the open barred sides with solid drop down panels for access to the animal. People that handle buffalo and deer have used solid sides on squeeze chutes for many years. They also use a solid gate located about 3 ft. (1m) to 4 ft. (1.2m) in front of the headgate. This gate prevents the cattle from attempting to run through the headgate. Many cattle sustain shoulder and neck injuries when they hit the headgate too hard. Even though a gate in front of the headgate would slow down cattle handling, it would probably pay for itself by reducing injuries and weight gain losses due to shoulder and neck pain. One large Colorado feedlot reported that sickness was greatly reduced when they handled animals more gently in the squeeze chute. Bruises and neck injuries also secrete "stress" substances onto the animal's system.

Observations of cattle handling at meat packing plants indicates that squeeze chutes on ranches and feedlots need to be modified. Blocking the animal's vision has a great calming effect. I spent 35 hours operating a restraining chute which is used for kosher slaughter. It consists of a box with completely solid sides and a small T shaped opening in the front for the animal's head. When an animal enters the box it can not see people. After it sticks its head through the front opening a metal shield prevents it from seeing people. A light over the head hole entices the animal to stick its head through. Most cattle walk in quietly and seldom attempt to lunge at the head opening. The cattle at this packing plant were calmer than cattle entering a conventional squeeze chute with open bar sides.

Since the animals did not attempt to run through the chute, squeeze pressure could be applied slowly instead of suddenly. Slow steady motion had a calming effect. Sudden jerky motion or sudden bumping of the animal with the apparatus caused agitation and excitement. When the animal's vision was blocked it would stand and allow its head and body to be positioned in the device. The cattle would seldom resist pressure from the apparatus if it was applied slowly and excessive pressure which would cause pain and discomfort was avoided. There is also the concept of optimum pressure. Sufficient pressure must be applied to make the animal

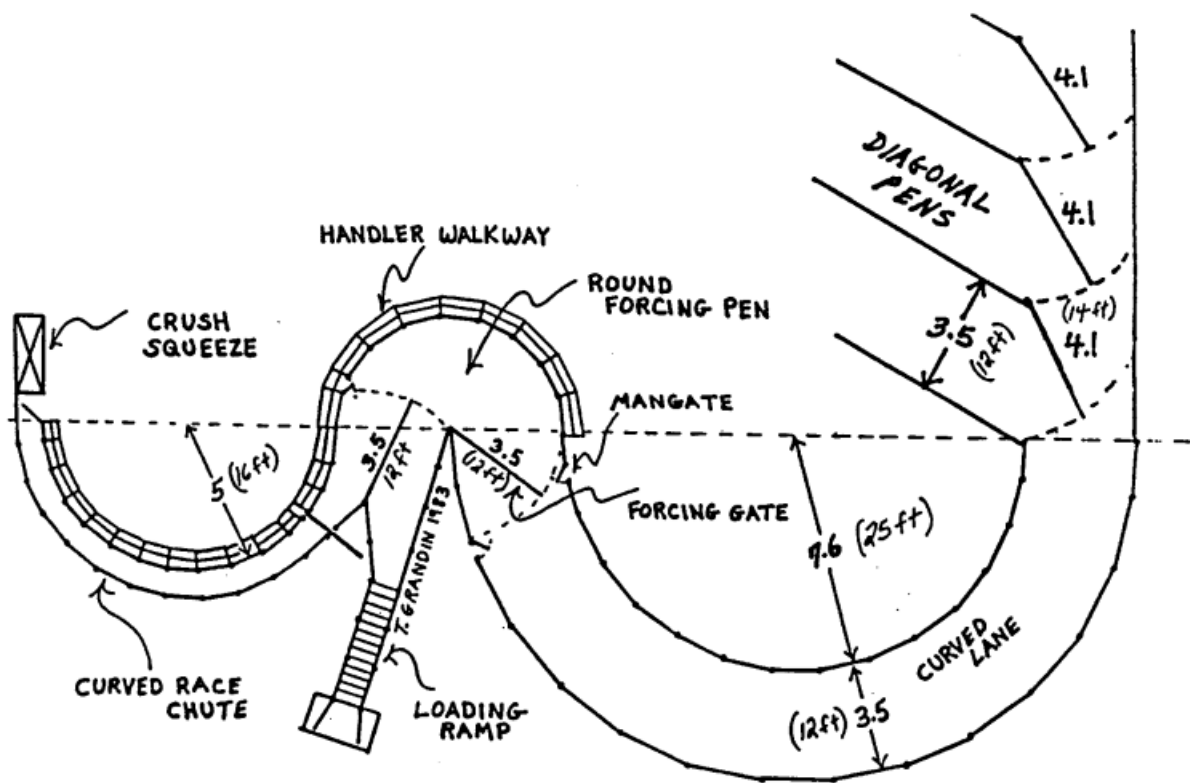


Figure 6. basic Curved Handling Facility.

“feel restrained” but excessive pressure which would cause pain must be avoided. Many people make the mistake of applying more pressure when an animal struggles. The animal will often stop struggling if the pressure is reduced slightly. Excess pressure must be slowly backed. A sudden release of the pressure will cause the animal to become excited.

Adjustment Of Squeeze Chutes

The use of a complete squeeze chute is strongly recommended for wild cattle that are not trained to head restraint. Restraint of the body will prevent the animal from fighting the headgate. On hydraulic chutes the pressure relief valve must be adjusted to prevent excessive squeeze pressure. Excessive pressure can cause severe injuries such as a ruptured diaphragm or broken bones. On most hydraulic chutes the proper setting 555 PSI. The operator should be trained to slow the animal down in the squeeze before it reaches the headgate. To prevent shoulder and neck injuries, animals should enter the chute at a walk.

To prevent choking in a headgate with curved stanchion bars, the squeeze sides must be adjusted so that the V shape of the sides prevents the animal from lying down. Pressure exerted by the headgate on the carotid arteries can kill the animal. Some veterinarians prefer a chute which does not pinch the feet together at the bottom. If a squeeze chute with straight sides is used it

must be equipped with a straight bar stanchion headgate to prevent choking. An animal can safely lie down in a straight bar stanchion. Care must be taken with self catching headgates. Cattle can be injured if they run into the self catcher at a high speed. Selfcatchers should not be used with wild horned cattle. It is also essential to adjust the self catcher for the size of the cattle. Several injuries can occur if a self catcher is adjusted too wide and the animal’s shoulder pass part way through the closed gate.

Latches and ratchet locks must be kept well maintained to prevent accidents to people. If a ratchet device becomes worn, replace it immediately. Friction type latches must never be oiled. Oiling will destroy the ability of a friction latch to hold. On self catching headgates the mechanism must be kept maintained to prevent an animal from getting stuck part way through a closed gate.

Loading Chute Design

Loading chutes should be equipped with telescoping side panels and a self-aligning dock bumper. these devices will help prevent foot and leg injuries caused by an animal stepping down between the truck and the chute. The side panels will prevent animals from jumping out the gap between the chute and the truck.

A well designed loading ramp has a level landing at the top. This provides the animals with a level surface to walk on when they first get off the truck. The landing

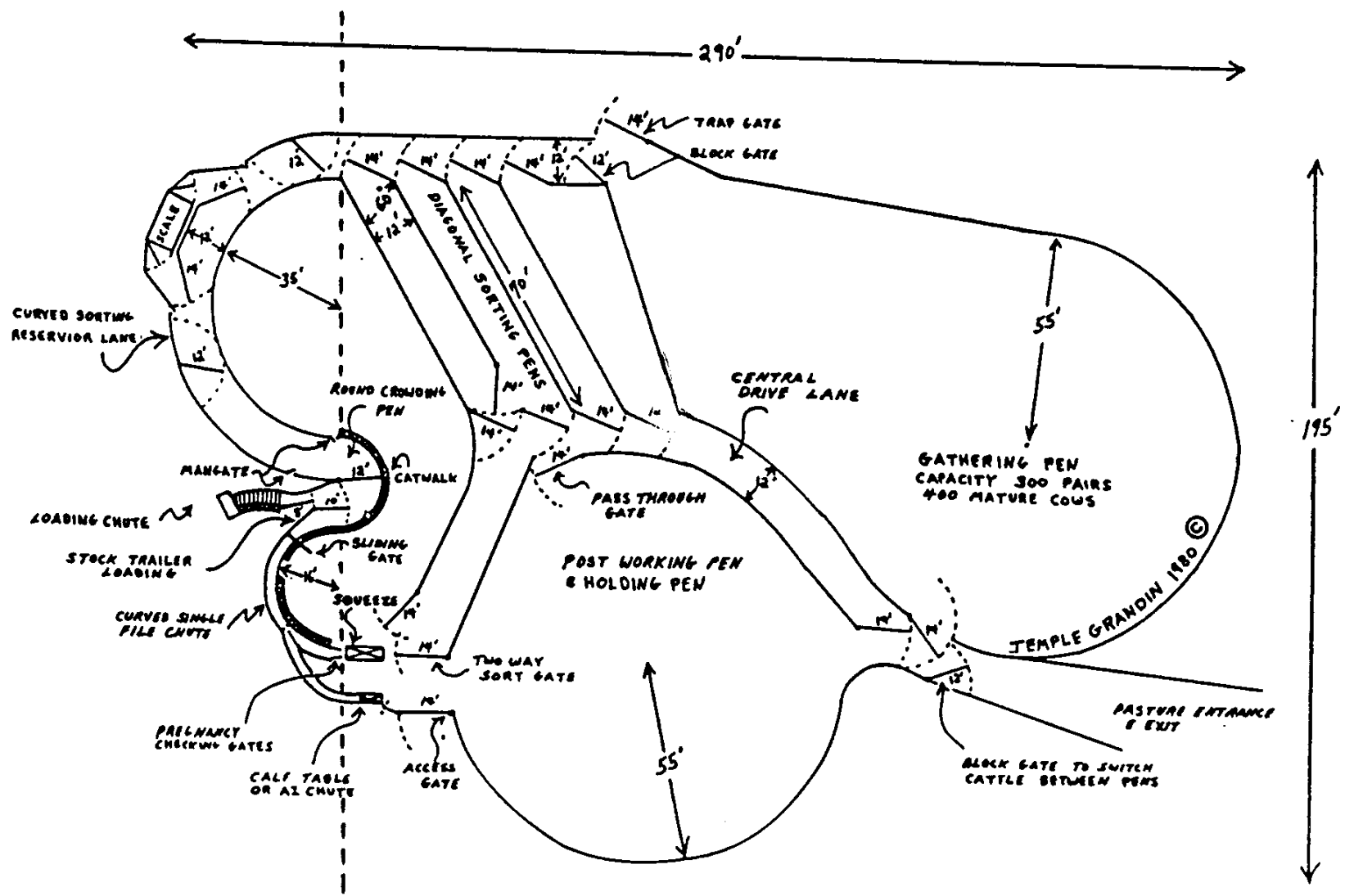


Figure 7. Corral System for a Large Ranch.

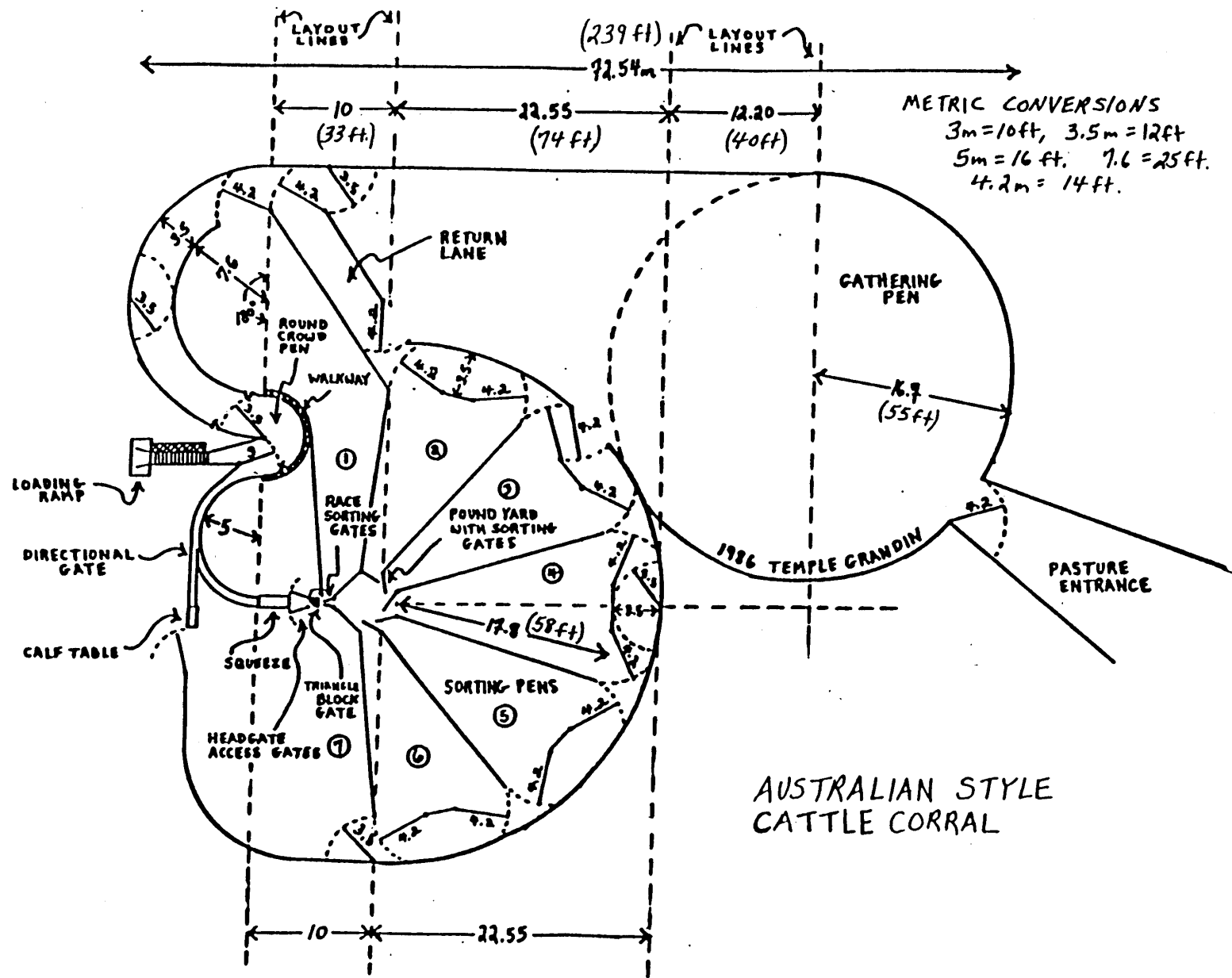


Figure 8. Corral for Sorting and Individual Evaluation of Cattle. Can be Used with Electronic Sorting Systems.

should be at least 5 ft. (1.5m) wide for cattle. Many animals are injured on ramps that are too steep. The slope of a permanently installed cattle ramp should not exceed 20%. On concrete ramps, stairsteps are recommended because they are easier for cattle to walk on when they become wet or worn. The recommended dimensions for stair steps are a 3 1/2 in. (10cm) rise and a 12 in. (30cm) to 18 in. (45cm) tread length.

Chutes for both loading and unloading cattle should have solid sides and a gradual curve. If the curve is too sharp, the chute will look like a dead end when the animals are being unloaded. A curved single-file chute is most efficient for forcing cattle to enter a truck or a squeeze chute. A chute used for loading and unloading cattle should have an inside radius of 12 ft. (3.5m) to 17 ft. (5m), the bigger radius is the best. A loading chute for cattle should be 30 in. (76cm) wide and no wider. The largest bulls will fit through a 30 in. wide chute.

Corrals

A corral constructed with round holding pens, diagonal sorting pens, and curved drive lanes will enable you to handle cattle more efficiently because there is a minimum of square corners for the cattle to bunch up in. The principle of the corral layout in Figure 7 is that the animals are gathered into the big round pen and then directed to the curved sorting reservoir lane for sorting and handling. The curved sorting lane serves two functions: it holds cattle which will be sorted back into diagonal pens and it holds cattle waiting to go to the squeeze chute, AI chute, or calf table. When cows and calves are being separated, the calves are held in the diagonal pens into the large post-working pen.

Large Corral

The corral shown in Figure 7 is a general purpose system for shipping calves, working calves, sorting, pregnancy checking, and AI. It can handle 300 cow-calf pairs or 400 mature cows. For smaller ranches the large gathering and holding pens can be reduced in size. Gathering pen space can be figured at 20 sq. ft. (1.8 sq.m) per cow and 35 sq. ft. (3.3 sq.m) per cow and calf pair. Sorting pens should be designed to hold one truck load which works out to 840 sq. ft. (78 sq.m). If cattle will be held overnight in a sorting pen, increase the size to 900 sq. ft. (84 sq.m). It is equipped with a two day sorting gate in front of the squeeze chute for separating the cows that are pregnant from cows that are open. Depending upon your needs, you can position either the squeeze chute for separating the cows that are pregnant from cows that are open. Depending upon your needs, you can position either the squeeze chute, AI chute, or calf table at the sorting gate. If the cattle are watered in the large gathering pen, they will become accustomed to coming and going in and out of the trap gate. When you need to catch an animal, you merely shut the trap gate and direct her up the curved reservoir lane to the chutes. This is an especially handy feature for AI. If more than one corral is built on the same ranch, they should both be laid out in the same direction.

The mirror image of the designs will work.

The curved sorting reservoir terminates in a round crowding pen and curved single-file chute. The crowding gate had a ratchet latch that locks automatically as the gate is advanced behind the cattle. To load low stock trailers, open an 8 ft. (2.5m) gate that is alongside the regular loading chute. This provides you with the advantage of the round crowding pen for stock trailers. This design can also be modified for pasture rotation. The large gathering pens are eliminated and the main working parts of the corral such as the curved lane, curved chutes, and diagonal pens are retained.

Corral Construction Tips

Five foot (1.5m) high fences are usually sufficient for cattle such as Hereford and Angus. For Brahman cross and exotics a 5 1/2 ft. (1.6m) to 6 ft. (1.8m) fence is recommended. Solid fencing should be used in the crowding pen, single-file chute, and loading chute. If your budget permits, solid fencing should be used in the curved reservoir lane. If solid fencing is too expensive, then a wide belly rail should be installed. This is especially important if the corral is constructed from ucker rod. An 18 in. (45cm) wide solid belly rail can also be installed on gates to prevent animals from hitting gates during sorting.

If a V-shaped chute is built, it should be 16 (41cm) to 18 (45cm) in. wide at the bottom and 32 (81cm) to 36 (90cm) in. wide at the top. The top measurement is taken at the 5 ft. level. If the single-file chute has straight sides it should be 26 (66cm) in. wide for the cows and 18 (46cm) to 20 (51cm) in. wide for calves. When a funnel type crowding pen is built, make one side straight and the other side on a 30° angle. This design will prevent bunching and jamming. The crowding pen should be 10 (20cm) to 12 (3.5m) ft. wide. The recommended radius for a round crowd pen is 12 ft. (3.5m). Larger crowd pens are not recommended. The minimum radius is 10 ft. (3m). Recommended cattle alley dimensions are 10 ft. (3m) for people on foot, 12 ft. (3.5m) for people on foot and horses, and 14 ft. (4.2m) to 16 ft. (4.8m) for horses only.

To prevent animals from slipping in areas paved with concrete, the concrete should be scored with deep grooves. The grooves should be 1 in. (2.5cm) to 1 1/2 in. (3.8cm) in an 8 in. (20cm) diamond pattern. A diamond pattern should be used because it is easier to wash.

In areas with solid fence, small man-gates must be installed so that people can get away from charging cattle. The best type of man-gate is an 18 in. (46cm) wide, spring-loaded steel flap. The gate opens inward toward the cattle and is held shut by a spring. A person can quickly escape because there is no latch to fool with. The man-gates can be constructed from 10 gauge steel with a rim of 1/2 in. (1.3cm) rod.

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