Facilities and Cattle Handling

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Lesson 5

Introduction

Important considerations in making backgrounding operations profitable are availability and proper utilization of facilities and working corrals and alleyways. Often times, facilities are not given proper attention when deciding to background cattle. This results in poor gains and feed efficiency in spite of careful preparation of diets, health and marketing plans. Thus, a producer who is already backgrounding cattle, or wishes to consider it, ought to spend some time evaluating facilities and working corrals to ensure that cattle will make fast and efficient gains, and cattle and people will operate in a safe environment. This lesson will focus on key, fundamental aspects of cattle facilities and handling. Special focus will be given to housing needs and design, water needs, and cattle handling and working facilities.

Housing Needs and Design

Although layout and materials vary considerably from one operation to the next, most facilities can be grouped into one of three designs: 1) open lot with shelter belt, 2) open lot with shed, and, rarely in backgrounding operations, 3) confinement lot with solid floor. The degree of sophistication and investment certainly increases from the design for the open lot with shelter belt to the confinement lot. This does not mean that cattle inherently perform better as the extent of confinement increases. Earlier work conducted at the University of Minnesota in the mid 1970s demonstrated that cattle performance during the summer is actually better in open lots with windbreaks while cattle performance during the winter is better in total confinement lots. Descriptions and layouts of each facility are provided in the following paragraphs:

Open lot with shelter belt. This design is the most open, and least confining of the three (Figure 1). It can even be adapted on a corner of a pasture or small pasture. However, features of importance are the presence of a shelter belt, orientation of the feed bunk so that it is protected by the shelter belt (typically facing north), and slope that drains away from eating and sleeping areas. The shelter belt may be formed by existing tree lines or windbreaks that should be at least 8' tall, or large round bales stacked on end. The shelterbelt should be at least 50' away from the lot on all sides. Surface area required by each animal varies depending on the surface type (partial concrete, gravel, dirt) and draining capabilities of the lot. The poorer the drainage on dirt surfaces, the greater the required area per animal (up to 500 square feet). In some cases, dirt mounds may be built to keep cattle clean and dry. A concrete pad behind the bunk is recommended even in open lots on dirt surfaces. This pad can be 6" thick and at least 12' wide. If the surface of the open lot is well drained (4% to 6% slope) and care is taken to provide hard surfacing materials on the higher areas of the lot (gravel, fly ash, clay), the lot can be stocked at the rate of 100 to 200 square feet per animal. Draining diversions should be dug within the fence line dividing lots to permit rain and runoff to drain away from the top side of the lot while maintaining the center of the lot dry. Lot surfaces and draining diversions must be maintained yearly. Concrete pad behind the bunk must be scraped at least once weekly during winter. The sleeping area, typically behind the bunk, must be bedded as needed. Bedding needs are increased by cold weather or precipitation, but bedding rates for corn stalks in a surfaced lot (concrete) with a high-density stocking rate were .3 lb/head/day in the summer (50 square feet/animal) and .7 lb/head/day in the winter (60 square feet/animal). Manure pack can be permitted to accumulate during the feeding period.

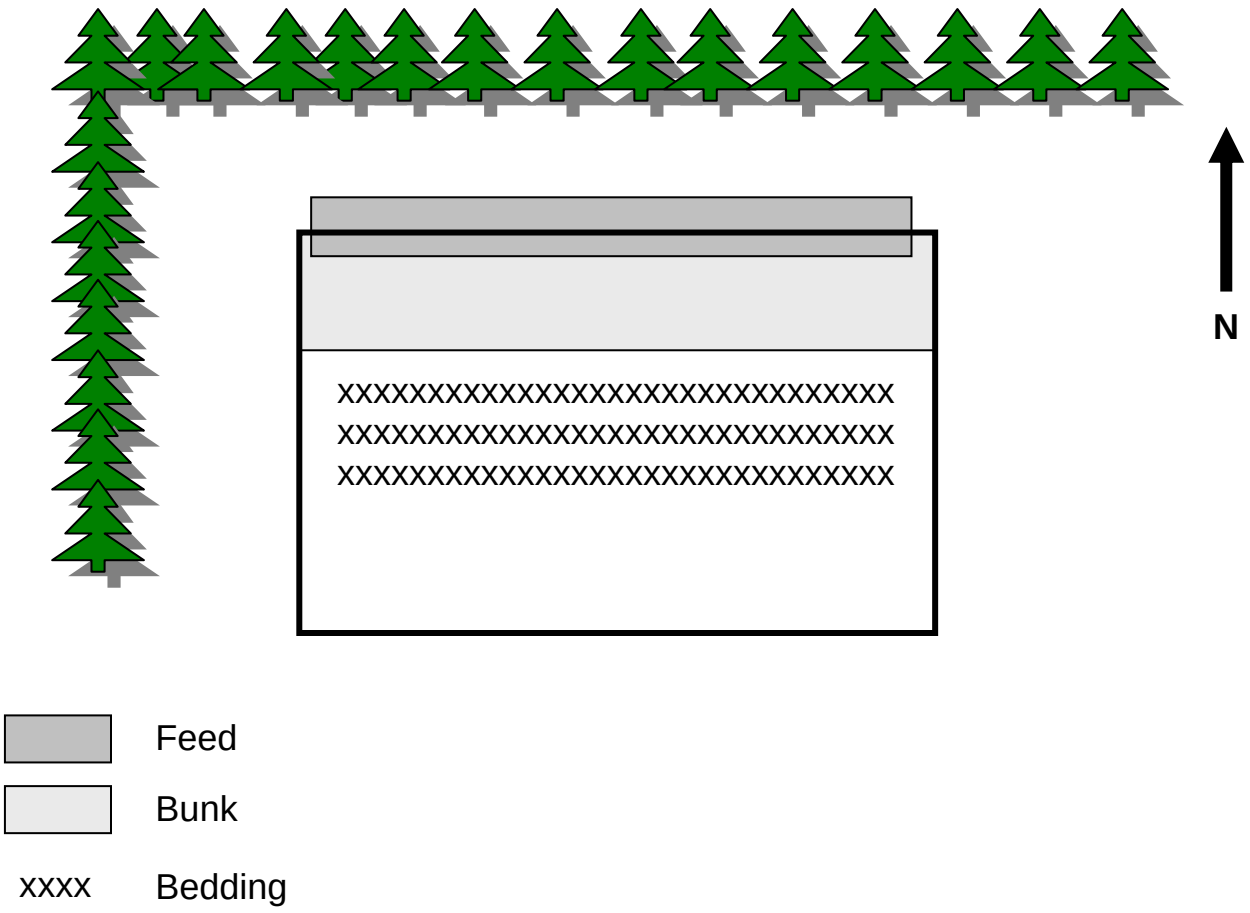


Figure 1. Open lot with shelter belt. Shelter belt should be at least 50' from lot. Windbreaks and mounds may also be built within the lot as needed. Lot should slope away from bunk at 4% to 6%. Drainage diversions should run away from the bunk, from N to S in this drawing.

Open lot with shed. This design affords a combination of open lot with a protected area for cattle to come in from the wind and precipitation (Figure 2). A shelter belt to protect the building may add wind protection to cattle and structures. Because bunk and sleeping area are protected in this design, stocking rates may be reduced to 70 to 100 square feet depending on surface. Concrete pads behind bunks within the shed will reduce problems with dirty or wet cattle. Requirements to build this pad are similar to those described before: 6" thick and 12'-15' wide. The surface behind this pad should be sloped away from it at 4% to 6% slope. Bed is either allowed to accumulate for the duration of the feeding program, or removed once a month. Areas behind the feed bunks, and between the bunk and waterers should be scraped at least once weekly. Drainage diversions may be needed as the lot extends away from the shed. A challenge of a shed that extends only so far into the lot is the need to establish an effective way to handle roof runoff, especially during snow melt off. Thus, an effective gutter system must be established that can handle melting snow or precipitation, and takes away the run-off from lot and/or fences.

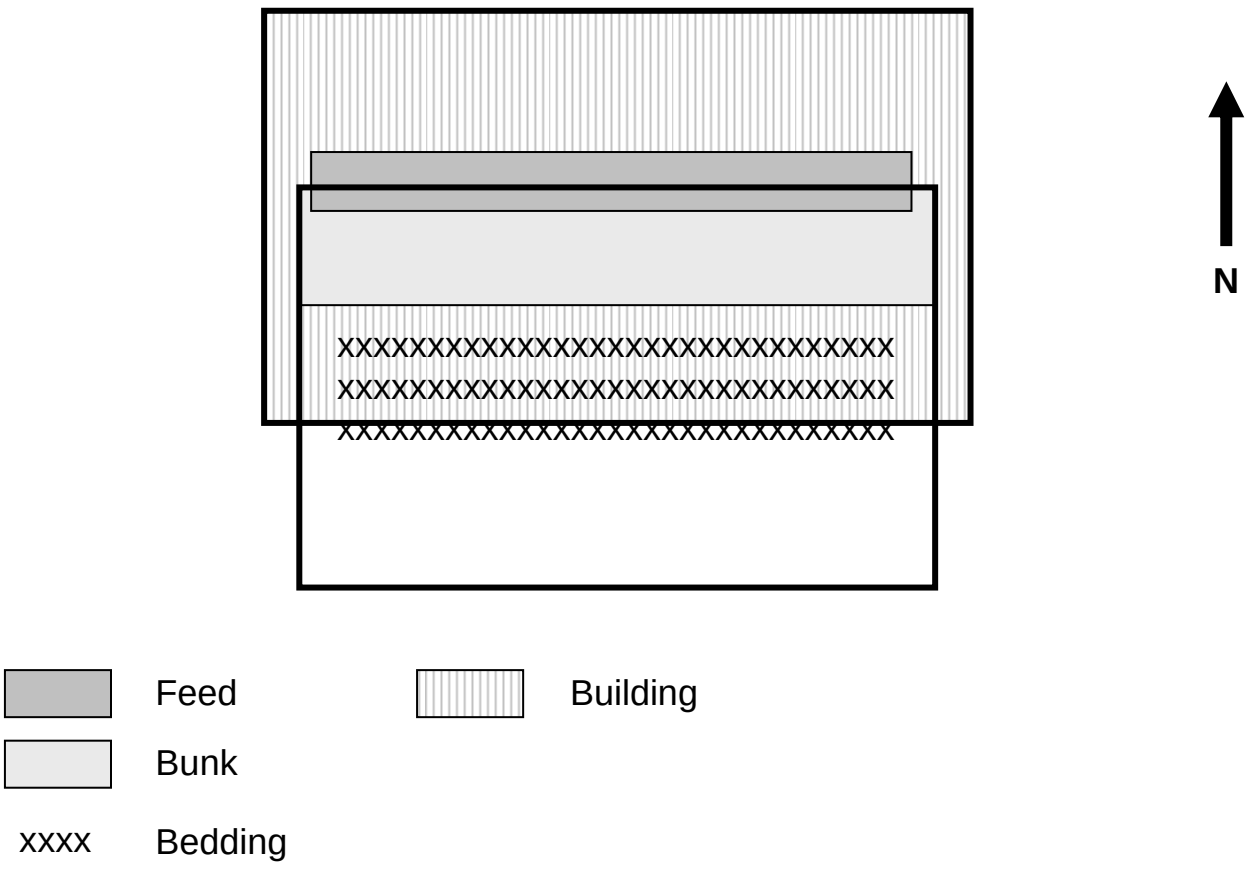


Figure 2. Open lot with shed. Lot should slope away from bunk at 4% to 6%. Drainage diversions should run away from the bunk, from N to S in this drawing. High-capacity gutters should be installed on eaves of the building, and drain run-off water away from outdoor lot and fences.

Confinement lot with solid floor. Confinement lots are perhaps used more in cattle finishing operations because of the initial cost and maintenance costs. This facility is comprised of a building that encompasses the whole lot, with walls protecting at least from the prevailing wind sides, and a driving alley in front of the bunk. A shelter belt to protect the building may add wind protection to cattle and structures. In spite of the fact that this building protects cattle, and provisions are made during building to promote drainage, confinement barns are typically built to protect cattle from prevailing winds. Concrete surfaces are typical for these lots, and are 6" thick. Lots are stocked at the rate of 35 to 50 square feet/animal. Producers will typically bed cattle in these facilities to provide comfort and warmth. Thus, the bedding area is approximately 30' to 60' behind the bunk. Bed is either allowed to accumulate for the duration of the feeding program, or removed once a month. Areas behind the feed bunks and between the bunk and waterers are scraped at least once weekly.

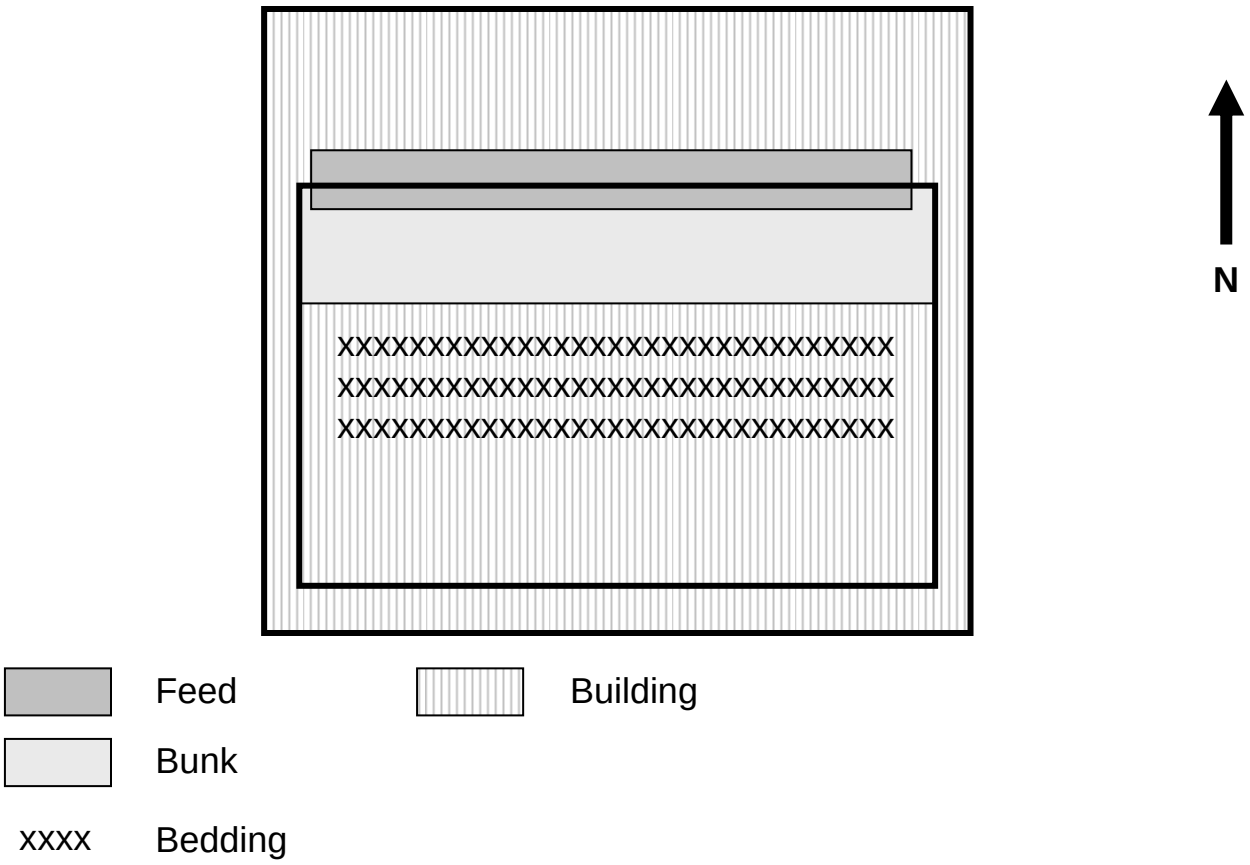


Figure 3. Confinement lot with solid floor. Cattle are under a building that is protected to the N, but may or may not have side walls. In spite of being indoors, it is recommended that cattle be bedded to keep clean and dry.

Feed bunks and waterers

Feed bunk capacity is important when designing backgrounding facilities. A simple standard to use, especially when feeding high-forage diets, is to allow 1 linear foot per head. In situations where higher concentrate diets or multiple feedings are given daily, this allowance may drop to 9" per animal. Feed bunk design and placement in the pen is depicted in Figure 4. Setting the feed bunk on a step that extends 12" away from the back side of the bunk and it stands 6" to 8" higher than the surface of the pen will prevent soiled feed in the bunk. Bunk design is important, but it does not mean that producers cannot pour their own bunks, or use alternative materials. The bottom line is that the design of the inside of the bunk should permit feed to be reached, and not to accumulate in corners or crevices. Additionally, the walls and thickness of the bunk should permit cattle to reach feed without needing to adjust their heads or mouths in unnatural positions (Figure 4). On the farm, away from construction centers, other materials such as discarded mine conveyor belts or wooden structures lend

themselves well as feed bunks. However, constant care and evaluation of the structural soundness of these are required to avoid feed waste or reduced intake.

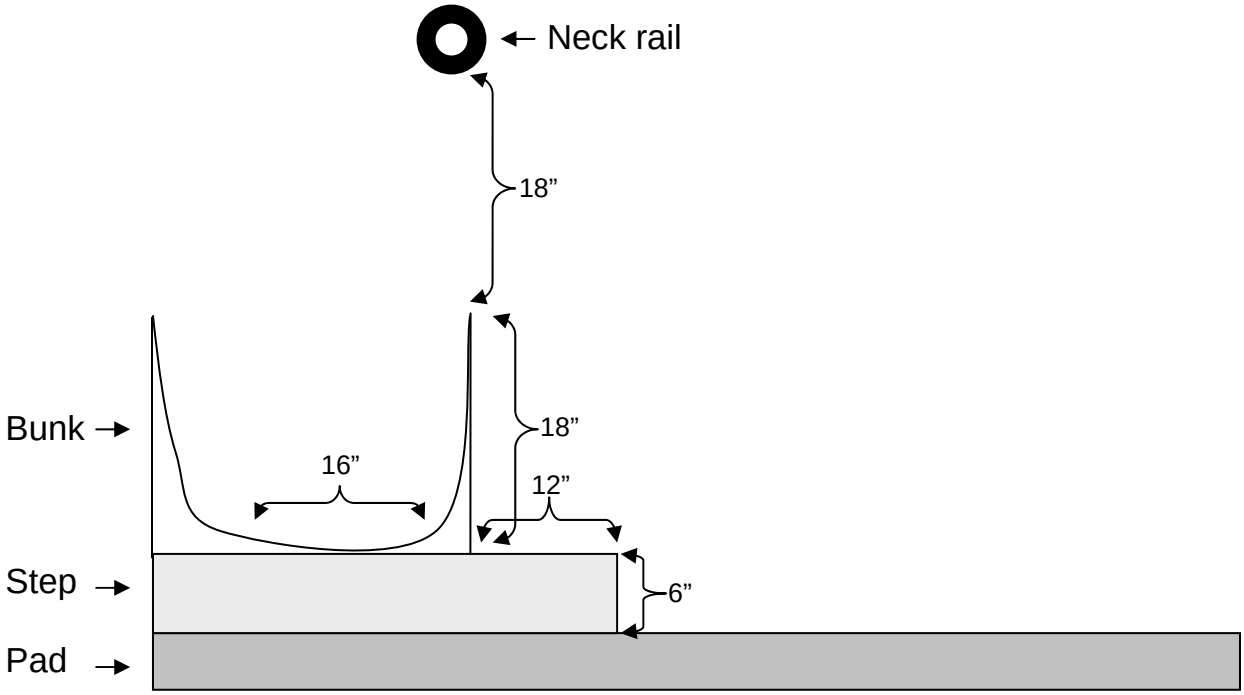


Figure 4: Recommended dimensions for feed bunk.

Water troughs and water needs are other important considerations when planning a backgrounding lot. Water troughs should permit at least 10% of the cattle population in the pen to drink at one time. That is that for every 100 head of cattle there should be at least 10’ of drinking space, or (1.2” water trough/animal). This is particularly true if cattle will be fed during warm weather. Water troughs should be set 6” from the ground using a concrete step that extends 12” away from the walls of the trough, similar to that recommended for use under feed bunks (Figure 4). Water flow and pressure must be taken into account to replenish waterer volume, especially during warm weather. A table (Table 1) describing water needs of growing cattle is provided for producers to determine water needs. However, water needs does not address water quality. Many areas of the country face conditions of poor water quality resulting from too many dissolved solids or high sulfur content. Efforts should be made to measure sulfur content and dissolved solids so that cattle are presented with no water quality issues that tend to reduce performance.

Table 1. Water requirements (gal/head/day) for growing and finishing cattle.								
Month	Avg. Max.	Growing cattle			Finishing cattle			
	Temp.	400 lb	600 lb	800 lb	600 lb	800 lb	1000 lb	1200 lb
	°F	Gal	Gal	Gal	Gal	Gal	Gal	Gal
January	36	3.5	5	6	5.5	7	8.5	9.5
February	40	4	5.5	6.5	6	7.5	9	10
March	50	4.5	6	7	6.5	8	9.5	10.5
April	64	5.5	7	8.5	8	9.5	11	12.5
May	73	6	8	9.5	9	11	13	14.5
June	78	6.5	8.5	10	9.5	12	14	16
July	90	9.5	13	15	14.5	17.5	20.5	23
August	88	9	12	14	14	17	20	22.5
September	78	6.5	8.5	10	9.5	12	14	16
October	68	5.5	7.5	9	8.5	10	12	14
November	52	4.5	6	7	6.5	8	10	10.5
December	38	4	5	6	6	7	8.5	9.5
NebGuide G77-372-A								

Regardless of the facility design and layout, another topic of extreme importance, which deserves attention beyond the scope of this paper, is manure management plans for various facilities and design layouts.
Also, because rules vary from county to county, and state to state, the reader is referred to their local resources to adapt manure management plans to their facilities. For Minnesota producers, a software program (Nutrient Management Planner for Minnesota Ver 2.1) exists to assist in developing field specific crop nutrient management plans for crop and livestock farms, and a wealth of other information can be found at www.extension.umn.edu/beef for further planning. Also, producers are encouraged to contact their local extension service to receive assistance in developing and implementing manure management plans.

Cattle Handling

You've heard of horse sense. Well, to get cattle to do what you want takes knowledge of animal behavior, access to good facilities, and proper handling techniques. All of this together adds up to cow sense! Animal-related injuries to employees can be due to preoccupation, impatience, or anger by the animal or the handler! During these moments, a livestock handler really needs to understand animal behavior. Well-designed facilities won't make up for a lack of cow sense at this point.

Not understanding how cattle perceive their world can make for a long day for you — and your cattle. For example, a styrofoam cup that has fallen into the working alley can make cattle balk. A shadow or a flapping shirt on a post or

some other distraction can prevent smooth cattle flow. If you are having trouble working a set of cattle, try looking at the world from their perspective.

How cattle perceive their world. Cattle really see the world differently. A cow may see more than you see and is often distracted by motion off to the side. However, she doesn't see the world as clear and sharply focused as humans see it, and it takes her more time to process what she has seen. Cattle have panoramic vision in excess of 300 degrees and only have a blind spot directly in the back of their heads (Figure 5). Human vision, by comparison, is roughly 180 degrees, and we have a much larger blind spot.

Figure 5. Cattle can see 300 degrees around them, with a blind spot only directly in the back of their heads.

While their field of vision is practically unlimited, cattle have poor depth perception of nearby objects and have limited vertical vision. Cattle must lower their heads to focus on something on the ground because they only have about 60 degrees of vertical vision, compared to 140 degrees for humans. Due to their limitation in vertical vision and their lack of ability to focus quickly, a shadow on the ground appears to them to be a three-mile deep crevasse!
Handlers can help reduce distractions and shadowing by taking these limitations into consideration and using a solid-sided working alley. Also, uniformity in color of handling facilities will reduce balking. Curved, solidly enclosed, and well-lighted working facilities take advantage of these senses, along with the animal's strong desire to find an avenue of escape when confined.

Cattle also hear differently than humans. They can hear both lower volume and higher frequency sounds better than people. It may be the sound of your truck, with feed in it, more than the sight of the truck that makes those cows "come a runnin'." Cattle hear extremely well, but the trade-off is that they have less ability to locate the source of a sound. People can pinpoint where a sound came from within 5 degrees, whereas cattle can only isolate the source down to about 30 degrees. Be mindful of cattle with severe sight problems, such as an advanced case of cancer eye, as they will rely to a greater extent on their sense of hearing. Thus, they may suddenly swing around to investigate a noise.

Comfort/flight zone affects reactions. People and cattle have a comfort/flight zone that affects how we react. In many Western cultures, two feet

is considered the comfort zone for conversing with another person. In some other Eastern regions of the world, six inches is considered normal. At parties, you might observe Western speakers backing up to seek their comfort zone and Eastern speakers following them to maintain their comfort zone. Also, consider that we typically turn and face someone who is talking to us. Just as we have some predictable behaviors, so do cattle. Understanding this behavior can be very useful in designing cattle-handling facilities.

The flight zone (comfort zone) is the animal's personal space. The flight zone may be five to 25 feet for tame cattle or feedlot cattle and 300’ for some wild cattle. The flight zone increases when the approach is from the head, and the flight zone also increases when cattle are excited. The flight zone decreases when animals are in a single file chute.

Cattle will normally move effectively if the handler works on the edge of the flight zone. Deep invasion of the flight zone can cause animals to panic. In Figure 6, Position A is the location outside of the flight zone where animals will stop moving forward, and Position B, inside the flight zone, will cause the animal to move away from the handler.

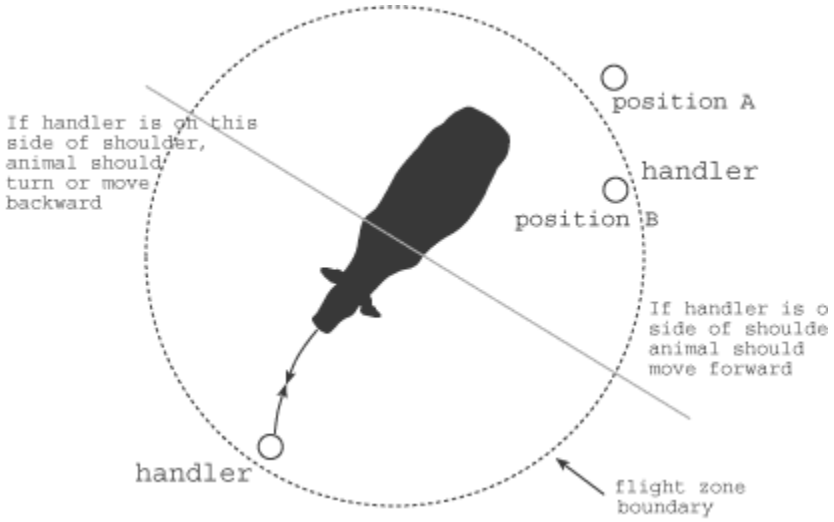


Figure 6. The handler can control the movement of cattle by taking a position in relation to the animal's flight zone. If the handler takes up a position at Point A, which is outside the flight zone, the cattle will stop moving forward. If the handler moves to Point B, which is inside the animal's flight zone, the animal will move away from the handler.

Livestock handlers need to understand the flight zone and the point of balance. The point of balance for cattle is typically at the shoulder. To make an animal move forward, the handler should stand behind the point of balance. To move the animal backward, the handler stands in front of the point of balance. The animal

may try to turn if the handler enters the animal's blind spot. Therefore, don't walk directly behind an animal, but off to the side so you can be seen.

Careful, quiet handling of cattle will help improve productivity. Stress imposed by handling and transport can have detrimental effects on weight gain, rumen function, reproductive function, and the immune system. Quiet handling reduces stress-related meat-quality problems such as dark cutters. The amount of stress imposed on an animal is an interaction involving previous experience and genetics. How quiet your cattle are is at least partially a function of how they are worked. Cattle can remember rough handling. While most cattle will calm down when they are handled quietly, a small percentage of them may remain excited. If an animal becomes very excited, 20 to 30 minutes are required for its heart rate to return to normal. For this reason, many packers have "standing" pens to allow cattle to calm down prior to harvest. Many practitioners of artificial insemination also try to sort cattle and let them relax prior to breeding.

Steps such as reduced yelling and minimized electric prod usage should therefore be considered. If a tool is needed, a stick with a plastic bag on the end or wands that rattle may be useful. Solid sides on chutes and crowd pens can help keep animals calmer. Solid sides typically provide the most advantage when wild cattle are worked and have generally less effect on tame animals. Livestock react differently to various situations of sound and sight.

Working with defensive animals takes additional time and care. Horses usually kick directly toward the rear. Where as cattle are "round-house" punchers, kicking forward and out to the side. Cows also have a tendency to kick toward the side of their pain. So, if a cow is suffering from mastitis in one quarter, consider approaching her from the opposite side of the affliction. Calves can kick directly backwards and can have a quick "round-house" punch as well.

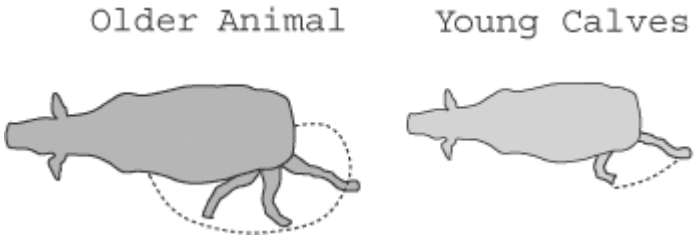


Figure 7. Cattle exhibit a "round-house" punch and kick forward and out to the side.

Cattle exhibiting maternal instincts are usually more defensive and difficult to handle. Removal from a familiar pasture or pen can cause animals to react unexpectedly. Shadows, yelling, and contrasts in lighting can further excite animals and make their behavior unpredictable. Similar problems occur when animals are moved away from feed, separated from the herd, or approached by

an unfamiliar person. It is usually easier to take two or three additional animals when you want to work only one of them.

Never prod an animal when it has no place to go. Cattle that become upset during handling and/or that have a bad disposition may adopt a "fight" rather than "flight" behavior. When entering an enclosed area with cattle, you should consider your escape routes — a fence, a tree, or a post.

Diseases

Handlers should also be concerned with disease transmission. Illnesses that can be transmitted back and forth between humans and animals include leptospirosis, rabies, brucellosis, salmonellosis, and ringworm. A livestock producer can contract some illnesses through animal bites, handling an infected animal, or disposing of infected tissues. To reduce exposure to disease, use basic hygiene and sanitation practices, such as washing your hands after working with any animals.

To Reduce Exposure to a Livestock Accident or Illness

- Understand animal behavior.
- Provide proper and safe facilities.
- Protect against diseases by using good sanitation practices.
- Wear appropriate attire.

Working Facilities

Curved Working Chutes

A curved working alley takes advantage of an animal's natural behavior to turn away from potential danger or unpleasant sites or sounds. Curved working facilities prevent the animal from seeing the squeeze chute or truck until they are almost upon it. A facility with solid sides is likely to require a catwalk.

Cattle like to follow each other. Each animal should be able to see the one ahead of it. Blocking gates in a chute need to be see-through gates, so cattle can see the animal ahead. If the animal views a dead-end, it will balk. Make single-file chutes at least 20 feet long.

Uniform lighting can help avoid shadows. Cattle in the dark will move toward the light. If you are loading at night, use a frosted light in the truck or shine your flashlight into the truck. Avoid glare in their faces. Livestock tend to balk if they are forced to look into the sun. Position loading and squeeze chutes north and south for summer handling.

A white Styrofoam cup in the bottom of the working chute will cause the entire herd to balk. Cattle also balk at moving or flapping objects. Therefore, do not place your jacket on a strategic fence post in the working area. Use solid sides for the construction of crowding pens, single-file chutes, and loading chutes. Stand back from the head gate so that the cattle cannot see you or at least think they can escape past you.

Bruises

Bruises cost the cattle industry millions of dollars each year. A large loin bruise is a significant economic loss per animal. Bruised meat has to be trimmed off and cannot be used for human consumption. When cattle become excited, they are more likely to bump into gates, truck doors, and each other. Moving cattle at a slow walk will reduce bruises. Overloading trucks will greatly increase bruising. Although over crowding can increase bruising, having too few cattle can also increase bruising. Truck-loading densities are provided in Table 2.

Table 2. Recommended truck-loading densities.

Fed steers or cows, average weight	Horned, tipped or more than 10% horned or tipped	Polled or dehorned
lb	square feet	square feet
800	10.9	10.4
1,000	12.8	12.0
1,200	15.3	14.5
1,400	19.0	18.0

From Grandin, T. *Reducing Bruising in Cattle.* BCH-4410.

Bumping into a flat, wide surface is less likely to cause bruises compared to bumping into an elevated or sharp edge. Broken boards, protruding gate latches, and slick surfaces that allow falling will increase bruising. Consider re-grooving concrete when it becomes too smooth. If you are getting reports of bruising, walk through your handling facility and look for the following situations:

Loin Bruises

Narrow gates, horns
Gates hitting the side of the animal
Protruding gate latches, boards, and sharp edges

Shoulder Bruises

Rough handling
Presence of horns
Broken flipper gates in runways
Protruding gate latches, boards, and sharp edges

Back Bruises

Improperly adjusted one-way gates
Vertical gates hitting the back (should be padded)
Tall cattle hitting their backs when exiting the bottom compartment of a semi-trailer

Many of these bruises can be prevented by repairing equipment and working cattle at their pace and not ours.

Basic Corral Design

Working facilities are needed to carry out basic management practices. Some small producers feel that working facilities are too expensive, but without proper facilities, basic management practices are not done. Not doing basic management practices such as dehorning and castration can lead to economic losses as a result of discounts on your calves. Handling facilities also increase the safety for humans when working animals.

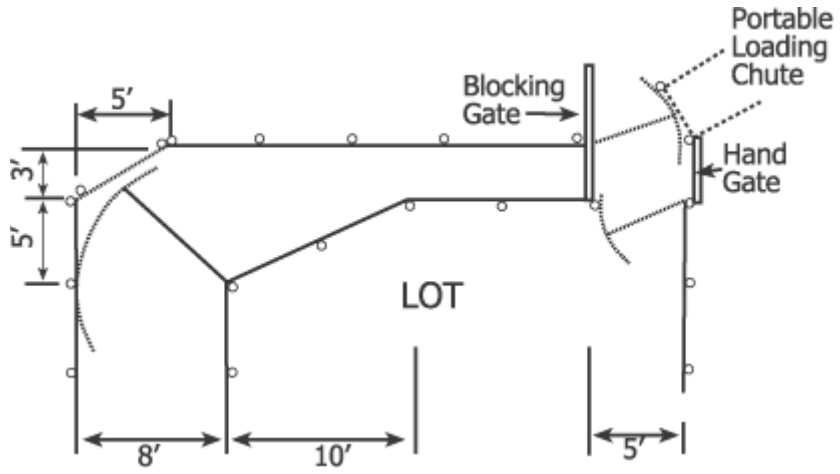


Figure 8. A basic working facility design is depicted with loading chute, and holding pens.

Planning

The goal is to develop a design that accommodates your cattle working needs while making safe and efficient use of available labor and reducing stress and bruising of animals.

Site selection

Accessibility by people, trucks, and trailers is paramount for a working corral. This accessibility must be convenient even in adverse weather. Normally, the easiest place to pen cattle is along the fence, especially in a corner of a pasture. Ideally, this location would be where several pastures converge. The pasture fence in proximity to the corral may get additional pressure from cattle pushing

on it. Therefore, larger posts and additional bracing may be needed in this part of the pasture fence.

Look for high, well-drained sites. Avoid locations with slopes of greater than 10 degrees (about two inches per foot). Build facilities near electricity and water, if possible. However, avoid building adjacent to residences where dust, flies, noise, and odor might be grounds for a nuisance suit. An inexpensive working facility can be built in the corner of an existing barn or lot. Some basic dimensions for building working facilities are provided in Table 3.

Table 3. Corral and working facility dimensions

	Up to 600 lb	600-1,200 lb	>1,200 and Cow-calf
Pen space, square feet/head	14	17	20
Crowding tub, square feet/head	6	10	12
Working chute-vertical sides			
Width, inches	18	20-24	26-30
Minimum length, feet	20	20	20
Working chute-sloping sides			
Width at bottom, inches	13	15	16
Width at top, inches	20	24	28
Minimum length, feet	20	20	20
Working chute fence			
Height—minimum	45	50	60
Depth of posts—minimum	30	30	30
Corral fence			
Height	60	60	60
Depth of posts—minimum	30	30	30
Corral fence			
Width, inches	26	26	26-30
Length minimum, feet	12	12	12
Rise, inches/feet	3½	3½	3½

Dimensions from *Corral and Working Facilities for Beef Cattle.* GPE-5002.

Basic Sections in a Well-Designed Working Facility

Regardless of size or type of operation, there are six basic sections in a well-designed working facility.

1. Holding pens
2. Alley from pens to working area
3. Crowding pen/tub
4. Working alley
5. Restraining area/squeeze chute
6. Loading area

Holding Pens. Keys to good holding-pen design are having enough pens to meet your needs, having them of sufficient size so animals cannot get past you, and having an easy animal flow to and from the working area. More than one pen will probably be needed so that you can sort cattle into groups. One of the most common flaws in existing corrals is having a holding pen that is too large. Cattle can easily get past you when you are trying to move them out. One of the easier "refits" to an existing corral is splitting this large pen into two pens. This helps to address the other most common design flaw of existing corrals — not having enough pens for sorting.

Common design flaws of existing corrals are:

1. Pens too large
2. Inadequate number of pens for sorting
3. Poor placement of gates
4. Not enough gates
5. Confusing animal flow to and from the working facility

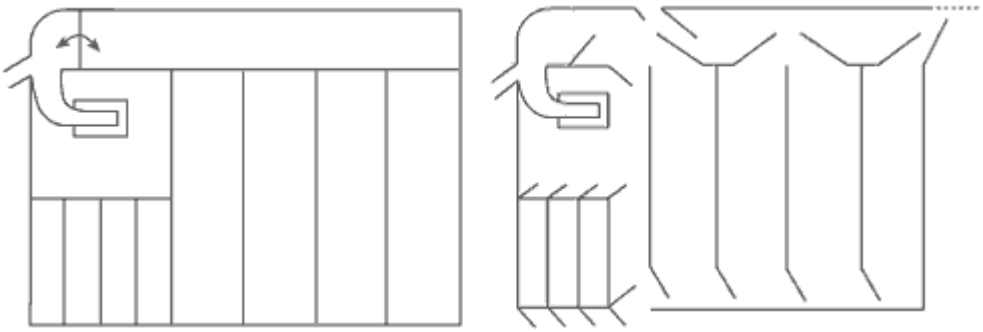
Smaller pens may be needed as hospital pens and to quarantine newly arrived animals. Provide a source of water and shade in one of the holding pens as a sick or quarantine area. You may want to take into account in what order you want to work cattle groups and thus this may affect pen placement. Keep in mind the fact that current pen placement affects possible corral expansion in the future.

Allow 18 square feet for each calf. The area of a square or rectangular pen is equal to the length times the width. For example, a pen with an area measuring 30 feet by 40 feet equals 1,200 square feet. This will accommodate about 67 calves.

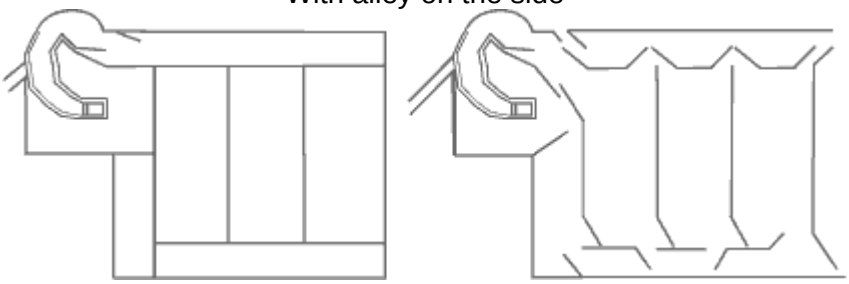
Alley from Pens to Working Area. Typically, cattle are moved to the working area through an alley. This can be a common alley for cattle going to or returning from the working area. In larger operations, a second alley allows a continuous flow of cattle from the holding pens to the working area and back to their pens. Evaluate your corral design and determine if animal flow to and from the working facility is simple or confusing.

Holding-pen gates should be equal to or greater in length than the width of the alley. Alleys should be 10 to 12 feet in width. Wide alleys can be like large pens and allow cattle to escape past you. Narrow alleys, less than 10 feet, may force animals to come through you, rather than go around you, if their desire to escape is great.

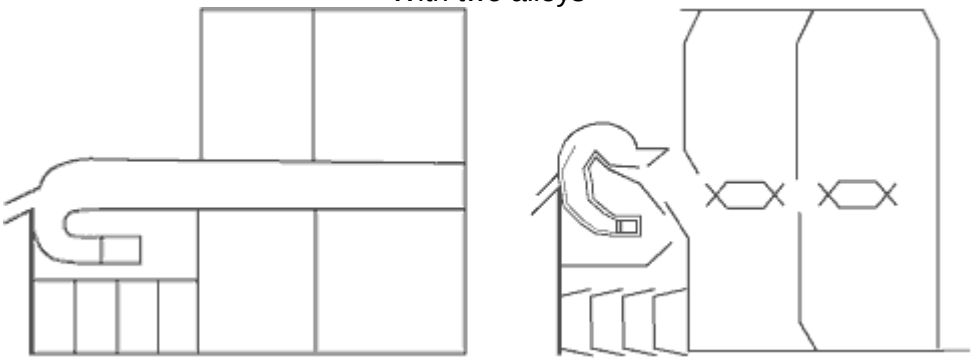
Notice in the examples here how the gates become a part of the fence and effectively direct flow of the animals to and from the working area. Cattle typically travel to corners. Therefore, gates should be located in corners rather than the middle part of a fence line.



With alley on the side



With two alleys



With a central alley

Figure 9. Examples of Holding Pen and Alley Designs

Crowding Pen or Crowding Tub. Use a crowding pen to funnel cattle into the working alley and chute. Handle small groups in crowding pens, eight to 10, instead of 20. For construction with straight fences, build one side of the crowding pen straight. The other side should be at an angle of about 30 degrees. Make the large end of the funnel 8 to 12 feet wide. Although it is harder to build, a circular crowding area with solid sides works best. Pre-built crowding pens can be purchased from cattle-handling equipment vendors.

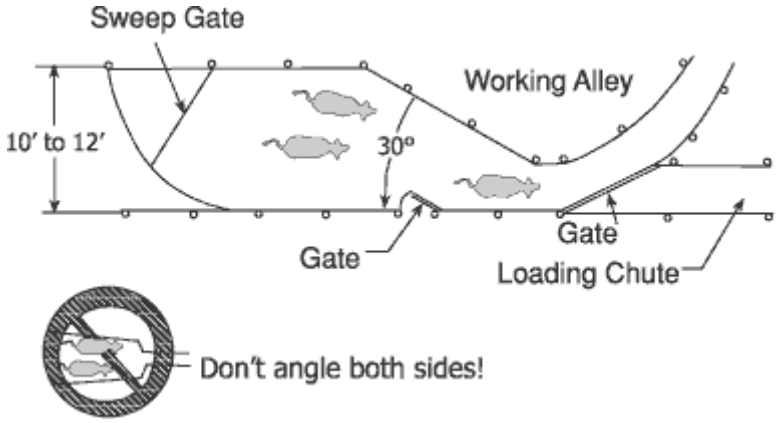
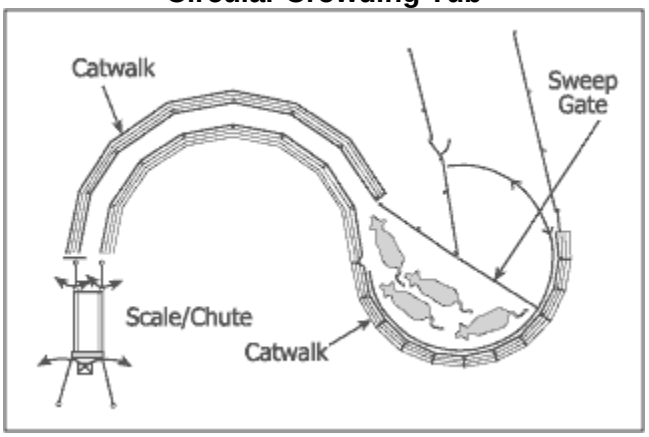


Figure 10. Straight-Sided Crowding Pen

Circular Crowding Tub



While there may be several gates in a corral that can benefit from being solid-sided, a gate in the crowding tub will benefit the most. A solid-sided gate will encourage animals to seek an alternative escape route — the working alley — rather than trying to turn around.

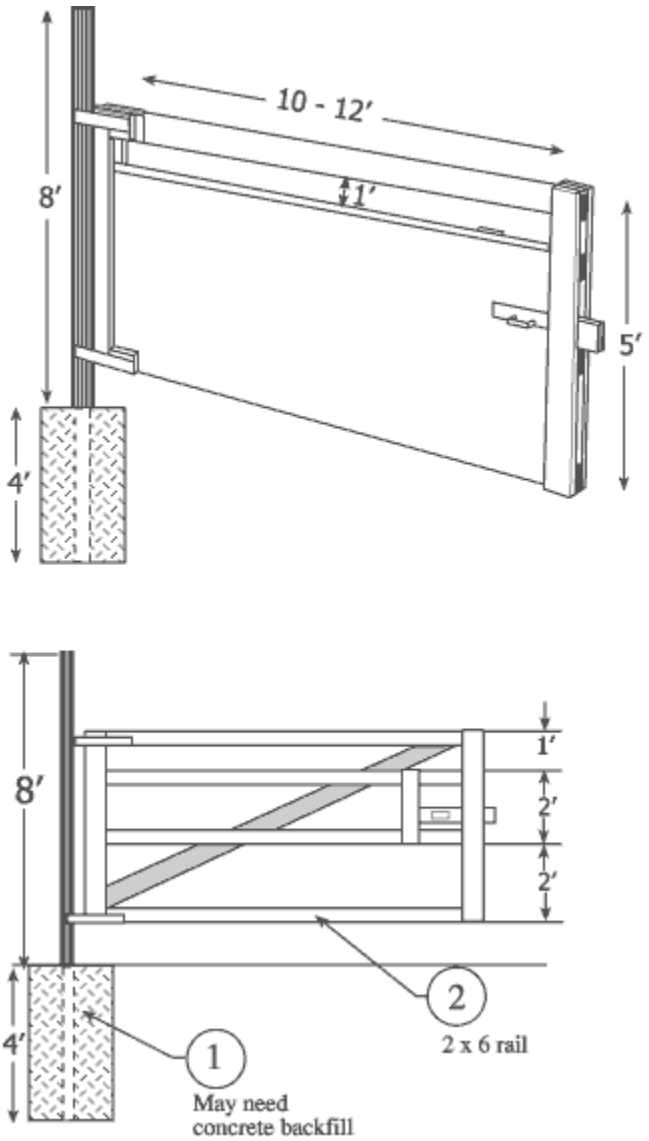


Figure 11. Example of a Solid-Sided Sweep Gate

Rough concrete surfaces throughout a corral are ideal but may not be economically feasible. However, consider using concrete in the crowding tub, working alley, and restraining area.

Working Alley/Chute. Build working alleys at least 20 feet long. Shorter alleys cause delays in getting cattle to the working area. If you normally work cattle by yourself, an alley should be able to hold at least three animals for efficient labor utilization. Longer chutes can certainly be used. You may find spring loaded, back-stop gates useful to prevent cattle from backing up.

The width depends on the size of the animal. Build alleys 22 to 26” wide for small- to medium-frame cows. Eighteen inches is wide enough for calves.

Commercial working alleys may be adjustable. One idea to consider for constricting the width of a "non-adjustable" alley is to hang a couple of plastic pipes in the alley when working calves.

Although they are harder to build, alleys with solid, sloping sides are better than those with vertical sides. A general recommendation is to build a five-foot-high alley 26” wide at the top and 16” wide at the bottom. Widths may need to be increased 2 to 4” for some large, exotic breeds.

Solid-sided working alleys can be built with wood or pipe frames covered with sheet metal or exterior plywood. Due to cost and ease of construction, straight alleys can be a reasonable choice for small herds. Emergency release panels or fences on hinges, could be considered if you are concerned about cattle going down or falling backward. Pre-constructed, metal working alleys/chutes can be purchased from handling equipment vendors. These can also offer the option of being somewhat mobile.

Posts in the working alley receive a lot of pressure from the cattle. Use overhead crossbars to keep the posts in place and prevent them from bowing out. Further construction of overhead restrainers running parallel over the working alley will discourage rearing up or falling over backward in the working alley. Evaluate the height of the tallest animal you will work through a facility if your corral is to have overhead crossbars and restrainers.

Cattle will move forward more easily in an alley with solid sides. Solid, curved chutes keep cattle from seeing the working area until they are a few feet away. Avoid sharp bends that look like a dead end to cattle.

Cattle tend to move uphill easier than downhill. If there is much slope, point the alley uphill. Cattle also tend to move best from dark areas to light areas. Facility layouts should be designed so that cattle do not look directly into the sun.

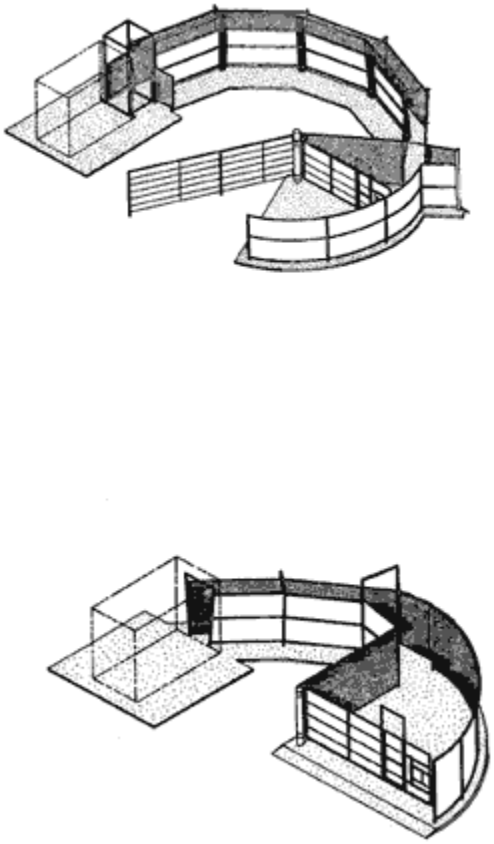


Figure 12. Examples of curved working alleys

Restraining Area/Squeeze Chute or Headgate. The simplest way to create a working area is to securely fasten a head gate to the end of the working chute. Insert pipes or posts behind animals to prevent backing. A squeeze chute is more expensive than a headgate but gives you more control over the animal. Many vendors sell head gates, squeeze chutes, and fence panels. While plans are available, it is difficult to build a head gate or chute that works as well as those that are commercially available. Some new designs allow easier access to the neck region. All injections should be in the neck region.

To save climbing over the fence, build an entrance gate behind the squeeze chute or at the rear of the animal. The gate should swing into the chute to block the next animal and create a cage to protect the person working the cattle. Ideally, utilize a separate chute or breeding box for artificial insemination; this reduces the stress of the cow from her previous experiences in the working chute and headgate.

The working chute is a common location for the use of electrical equipment. To avoid exposure to electric shocks:

- Use a ground fault circuit interrupter with water heaters, clippers, and other equipment.
- Use moisture-proof electrical outlets in wet or damp areas.

Portable battery systems can be used as well. Boat batteries may have the most storage capacity.

Loading Chute. Cattle can be loaded on stock trailers from the working chute. If pick-ups are used, a loading chute is required. Make sure the height of the chute fits your truck and that you can back the truck squarely against the chute. If you use more than one type of truck, build an adjustable loading chute. Do not exceed 3½ inches of rise per foot of length.

A flooring of packed earth or gravel provides the best footing but is not adjustable. On wooden floored chutes, use cleats that are 1" to 2" high. Space cleats 6" to 8" apart from edge to edge. Build loading chutes 30" wide for cow-calf operations.

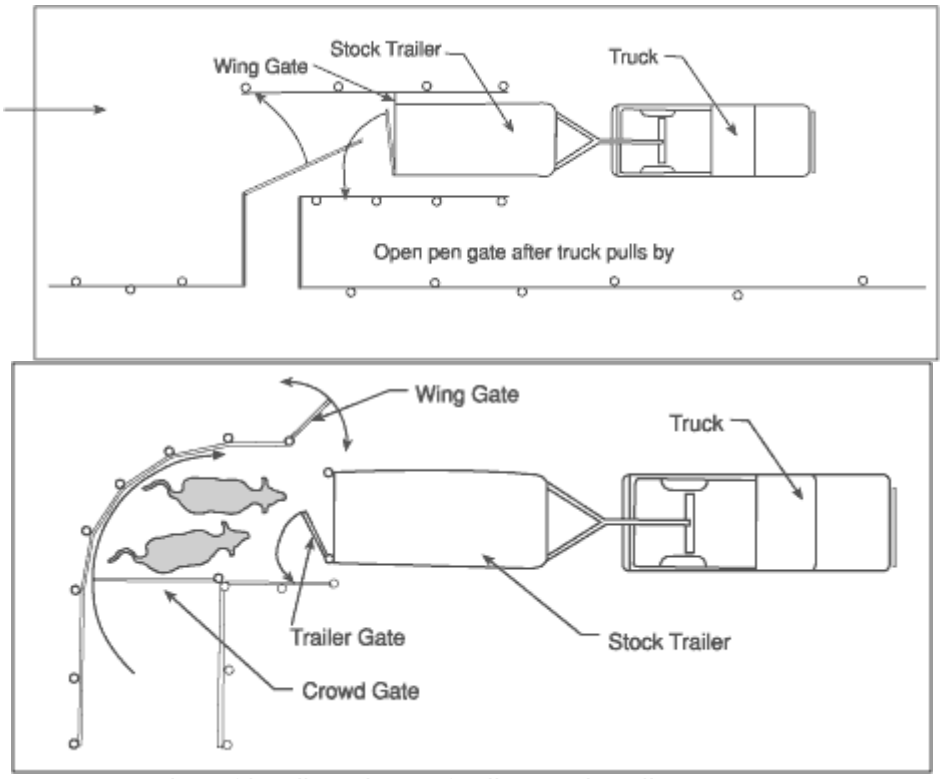


Figure 13. Some examples of loading chutes for livestock trailers

Materials

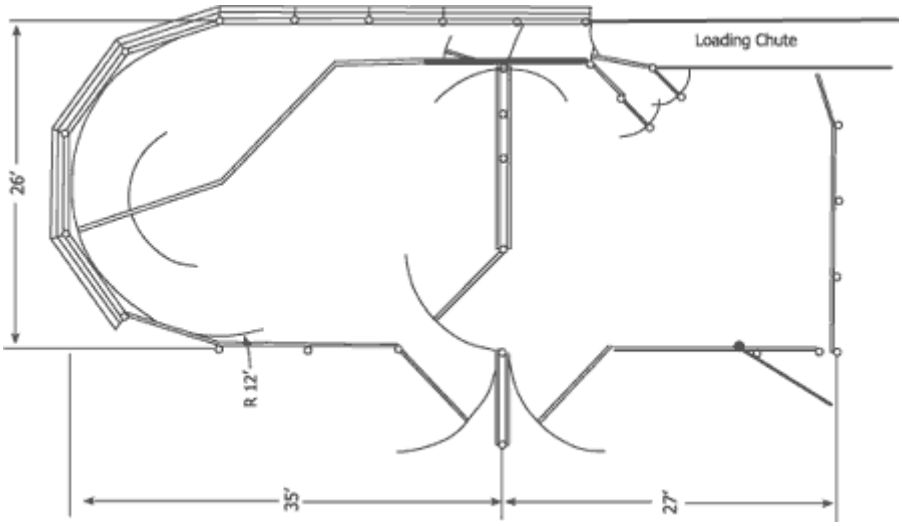
A layer of gravel in crowding and working chutes can prevent mud from becoming a problem. Concrete in heavy traffic areas is a good idea but only if it has a rough surface. Grooves one-inch deep and in an eight-inch diamond pattern improve footing.

Use pipe or wooden gates that will not easily bend or break. Hang gates 6” to 8” from the ground so they swing freely. Use latches that can be operated from either side. Plywood on some sorting and crowding tub gates can help prevent turning.

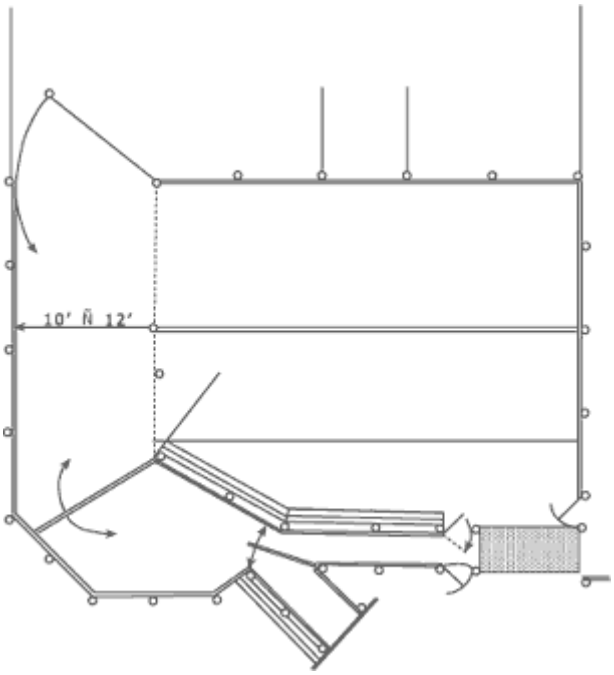
Build fence five-feet high for most cattle. Fences for holding pens do not have to be as strong as those in working areas. Wire panels are available from most farm supply centers. Install two-inch by six-inch rails on the inside at the top of the posts, bottom and middle. This type of fence is not strong enough for the crowding area and working chutes.

Designs

The following are some simplified designs for smaller cow herds and backgrounding lots.



Example 1



Example 2

Appendix

Lot and working facility designs

Canada Plan Service. Beef Facilities and Design.
http://www.cps.gov.on.ca/english/bc1000/beef.htm

Midwest Plan Service (1-800-562-3618 or http://www.mwpshq.org/).

Dr. Temple Grandin materials on corral design and animal behavior at http://www.grandin.com/.

Commercially available designs and facilities

Elk River Cattle Handling Equipment at http://www.applegatesteel.com/Elk%20River.htm

For-Most Livestock Equipment at http://www.for-most.com/

Hi-Qual USA at http://www.hi-qual.com/index.html

Luco, Inc. at http://www.lucoinc.com/

Pearson Livestock Equipment at http://www.pearsonlivestockeq.com/

Powder River at http://www.powderriver.com/index.cfm

Priefert Ranch Equipment at http://www.priefert.com/priefert/

Additional Reading

Beef cattle housing and equipment. Canada Plan Service. Plan 1000.
http://www.cps.gov.on.ca/english/bc1000/bc1000.htm

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Lesson 5
Facilities and Handling

1. Name three basic backgrounding lot designs discussed. Based on what you learned, describe one advantage, and one disadvantage of each.
    a.
    b.
    c.

2. What would be the bunk space capacity for a lot 300' long and 250' wide, if the bunk is lined up with the length of the lot?

3. Describe the flight zone.

4. Where is the "point of balance"? (choose one)
    a. the head
    b. the shoulder
    c. the hooks
    d. the pins

5. If an animal becomes very excited, _____ are required for it's heart rate to return to normal.

6. Describe how cows and calves kick.

7. List four ways to reduce exposure to a livestock accident or illness.
    a.
    b.
    c.
    d.

8. What are the basic sections in a well-developed working facility?

9. List some common design flaws we see in existing corrals.

10. Which is the best design for a crowding tub among these choices (choose one):
    a. both sides have 30 degree angle
    b. one side is a 90 degree angle
    c. both sides have a 90 degree angle
    d. one side has a 30 degree angle

11. Why consider making a circular working alley (choose one):
    a. making a curved alley is easier than making a straight alley
    b. a curved alley is cheaper than a straight alley
    c. to take advantage of an animal's natural behavior to turn
    d. A straight alley will not work

True or False

12. Shelter belts should be about 30 feet or less from facilities.	T	F
13. Bedding use during winter should be about 140 lb/head.	T	F
14. Cattle have 360 degree field of vision.	T	F
15. Humans have 180 degree field of vision.	T	F
16. The flight zone is the area where cattle run to.	T	F

Name_____Phone_____

Address_____

Fax Optional)_____Email_____

Facilities and Cattle Handling Supplemental Reading

1. Frequently Asked Questions:
Manure Management Plans

2. Nutrient Management Planner for Minnesota

3. Beef Cattle Handbook:
Livestock Psychology and Handling-Facility Design