

# 40 Cattle Handling and Working Facilities Design

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## Objectives

- **Discuss important safety considerations for both humans and cattle.**
- **Identify the proper design, construction and operation of a cattle-handling facility.**

Facility design and effective stockmanship are key considerations in moving cattle efficiently through working chutes and alleyways. Not only is it important to reduce stress and increase the welfare of cattle from a consumer prospective, it is also important to maintain the safety and wellbeing of humans.

## The Human Element

For those who work in production agriculture, physical risks are inherent on a daily basis. In fact, agricultural occupations are consistently ranked as some of the most dangerous. A study conducted by researchers in the Department of Biosystems and Agricultural Engineering at OSU described conditions associated with 150 cattle-handling injury cases on 100 Oklahoma cow-calf operations. The study showed more than 50% of injuries in these situations were due to human error, while equipment and facilities accounted for about 25% of the perceived causes. In most cases, a better understanding of how an animal may respond to human interaction and to its immediate surroundings will help keep the worker from becoming an injury victim.

Human error is the primary cause of many types of accidents. These errors in judgment and action are due to a variety of reasons, but occur most often when people are tired, hurried, upset, preoccupied or careless. Remember, the human physical, psychological and physiological factors greatly affect the occurrence of life-threatening accidents. Using this information in combination with proper cattle-handling techniques can reduce the risk of injury.

## Animal Behavior

Understanding cattle behavior can help farm and ranch workers avoid dangerous situations. Dr. Temple Grandin, Colorado State University animal behavior specialist, says handling practices can be less stressful to the animals and safer for the handler if one understands the behavioral characteristics of livestock. An animal's physical structure, psychological makeup, environment and individual personalities can influence behavior.

An animal's senses function like those of a human; however, most animals detect and perceive their environments very differently compared to the way humans detect and perceive the same surroundings. While cattle have poor color recognition and poor depth perception, their hearing is extremely sensitive relative to humans. Knowing these characteristics can help to better understand why cattle are often skittish or balky in unfamiliar surroundings.

## Animal Vision

Cattle have panoramic vision, meaning they can see in all directions, except directly behind, without moving their head. Additionally, cattle have poor depth perception, especially when they are moving with their heads up. To see depth, they have to stop and put their heads down. For this reason, unfamiliar objects and shadows on the ground are the primary reasons for cattle balking and delaying the animals behind them. This is why handling and working facilities should be constructed to minimize shadows.

Cattle have a tendency to move toward the light. If working cattle at night, use frosted lamps that do not glare in the animals' faces. Position these lights in the area where you are moving cattle, such as a trailer or barn.

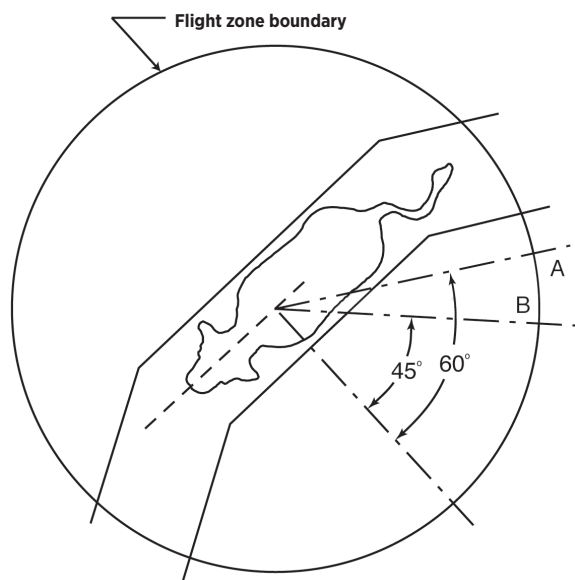
## Flight Zone

Moving a cattle herd takes some knowledge and understanding of the animals' flight zone. The flight zone is an animal's personal space. When a person penetrates

the flight zone, the animal will move, and conversely when a person retreats from the flight zone, the animal will stop moving. Understanding the flight zone is the key to easy, quiet handling of cattle.

The size of an animal's flight zone depends on its fearful or docile behavior, the angle of the handler's approach and the animal's state of excitement. Cattle handlers should work at the edge of the flight zone at a 45- to 60-degree angle behind the animal's shoulder (Figure 40.1). Cattle will circle away from the worker. The flight zone radius can range from 5 feet to more than 25 feet for feedlot cattle, and as far as 300 feet for range cattle. If a person is within the flight zone, the animal moves away or retreats.

When moving cattle, avoid approaching them directly. Try to work them close to the point of balance, moving back and forth on a line parallel to the direction the animal is traveling.



Animal movement **stops** if handler is in position "A." Handler moves to position "B" to start movement.

Figure 40.1. Flight Zone.

## Additional Handling Tips

Effective stockmanship has become an important term to the cattle industry, and many ranches are training employees. Effective stockmanship gives consideration to five basic principles of cattle behavior.

1. Cattle want to see you.
2. Cattle want to go around you.
3. Cattle want to be with, and will go to other cattle.
4. Cattle want to remove pressure.
5. Cattle can only have one main thought at a time.

Understanding herd instinct is important. Cattle follow the leader, and are motivated to follow each other. Each animal should be able to see others ahead of it. Make single-file chutes at least 20 feet long; 30 feet to 50 feet for larger facilities. Do not force an animal in a single chute unless it has a place to go. If the cow balks, it will continue balking.

In crowding pens, consider handling cattle in small groups of up to 10 head. The cattle need room to turn. Use their instinctive following behavior to fill the chute. Wait until the single-file chute is almost empty before refilling. A crowding gate is used to follow the cattle, not to shove 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 may become agitated and attempt to jump the fence to rejoin the herd.

## Corral Systems Design

Corral and working facilities are constructed to confine cattle safely and efficiently for close observation and to perform routine health and management procedures. Good cattle-handling systems make working livestock easier with limited manpower. The operation of any cattle facility depends on cattle behavior, corral design and the skill and technique of the handler.

## Holding and Sorting Cattle

### Pens

Pens serve several purposes, including catching and holding cattle being worked, sorting cattle into groups and holding cattle being quarantined. When designing and constructing pens for working facilities, consider the following:

- Provide at least 20 square feet per head for mature cattle.
- Size pens for a maximum of about 50 head of mature cattle.
- Larger, wider pens can make effective sorting difficult for a single worker.
- Pens too small or narrow can result in workers entering the animal's flight zone. The smallest pen dimensions should be no less than 16 feet.
- Too few pens can make separating animals difficult. This also can put workers at risk, as they must physically enter pens with large numbers of agitated animals. Consider adding a 14-inch wide pass-through for worker escape in pen corners.
- Use proper gate placement to facilitate animal movement from pen to pen and to other areas. Poor animal movement puts workers at risk by having to force the movement. If there are too few gates, some animals can become separated. Thus, when animals enter the alley, separated herd mates will follow along the inside of the pen. This is often referred to as backwash. There may be problems guiding these pen-bound animals back to the exit gate as their herd mates move away from them down the alley. Separated animals can become confused or agitated, putting workers at further risk.

### Sorting Facilities and Alleyways

Keep the design of sorting facilities and alleyways simple. They should provide adequate catch pen space to accommodate cattle being moved to and from holding areas.

## Working Facilities

Several pens are usually preferred rather than one large holding pen. More pens allow larger groups to be sorted into smaller, more manageable sized groups. For most small operations, a single alley is used for sorting as well as moving cattle to and from the working area. Depending on the number of holding pens, an additional return alley may be beneficial. This return alley allows for a continuous flow of cattle from holding to working areas and back to their original pen.

Alley width should be 12 feet to 14 feet with a 10-foot minimum. Wider alleys can make it easier for cattle to escape around you. Alleys that are too narrow fail to give the animals room enough to maneuver. The double-gate system allows the movement of cattle out of holding pens and into the sorting alley with cattle headed in the desired direction (Figure 40.2). This greatly reduces sorting time and prevents animal backwash.

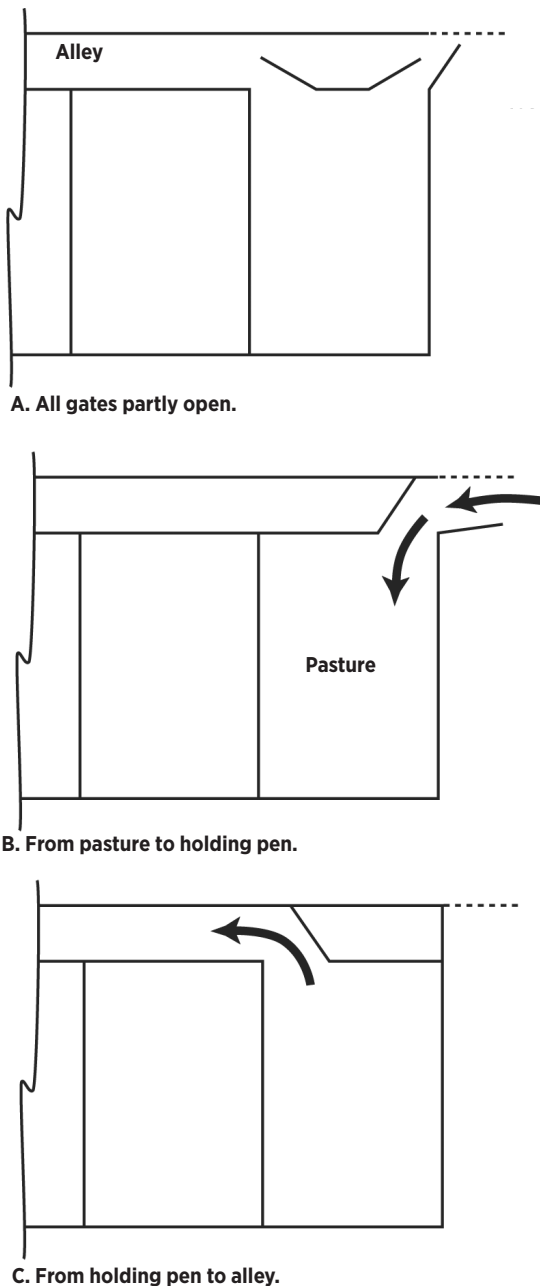


Figure 40.2. Double-gate system.

### Crowding Area

The most popular option in the design of a crowding area is the circular tub design. The crowding area should be designed and located so cattle can be easily moved into this area from a common sorting alley that is fed by adjacent holding pens. A circular crowding area with totally enclosed sides and crowding gate is effective because the only escape route visible to the cattle is through where the working or loading chute exits. This facilitates animal flow and worker safety. For safest results in cattle movement and ease of cleaning, use a roughened, broom-finish concrete floor to provide an all-weather surface.

The crowding gate also should be solid and designed to prevent animals from reversing the gate's direction. Do not overload the crowding area. Too many animals make the process more difficult on the handlers because animals can block the chute entrance. Do not enter a crowding area with animals if they become bunched. Release pressure from the gate to allow for some movement to free the bottleneck.

A catwalk around the outside of the crowding pen allows workers to maneuver animals toward the chute, while avoiding direct animal contact. Position the catwalk about 36 inches below the top of the fence.

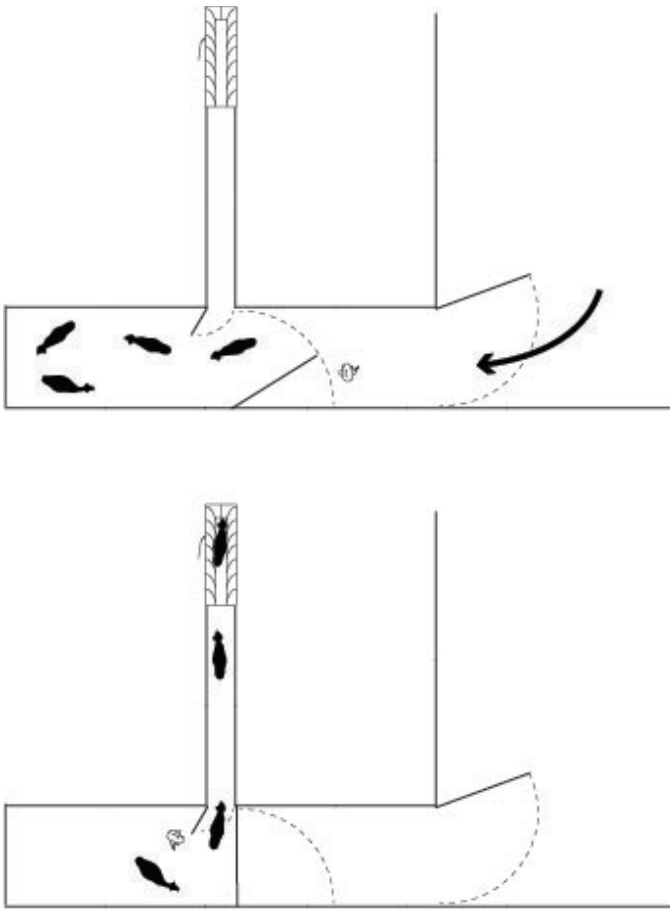
Another option that works well to maneuver cattle into the working chute is a "Bud Box." The concept is named after its designer, the late Bud Williams. The idea, like curved allies and crowding tubs, is to use the animal's natural instinct on itself. Cattle naturally like to return to larger spaces or, more specifically, use their flight instinct to remove themselves from dangerous situations. This perceived "dangerous" situation is created in working facilities by putting "pressure" on cattle due to confined areas and human interaction.

Figure 40.3 demonstrates the design of the "Bud Box." Cattle are moved into the sorting alley from the adjacent holding pens. They are then simply driven past the working chute into the box and a gate is closed adjacent to the working chute. As cattle slowly turn around to exit the box they easily find the opening to the working chute and enter single file. One major difference between a tub system and the Bud Box system is that the Bud Box requires the handler to be in the small pen with the cattle, whereas in the tub system, the handler does not enter the tub and remains behind the crowding gate. Consequently, successful use of the Bud Box system is especially dependent on not overcrowding the small Bud Box pen. The positioning and movement of the handler also is more critical with the use of the Bud Box system.

### Working Chute

The working chute should be curved with totally enclosed sides. Cattle move more freely because they cannot view the handlers or squeeze chute until they approach the palpation cage or rear gate of the squeeze chute.

Sloped sides in the working chute restrict the animal's feet and legs to a narrow path, which reduces balking and



**Figure 40.3** The design of the Bud Box. Gates should be the full width of their respective alley.

helps prevent an animal from turning around. Sloping sides work well in most cow-calf operations because different sizes of cattle can be worked efficiently in the same chute.

Recommended width for the bottom of the chute is 16 inches, while the top should be about 28 inches (Table 40.1). For large-framed cattle, the top width dimension for cattle more than 1,200 pounds should be increased 2 inches. To accommodate large-framed bulls, it may be necessary to increase the top width by 4 inches or more.

Another chute type consists of straight sides. Many chutes are designed to have adjustable widths to fit both cows and calves. Straight-sided chutes often have open sides that work extremely well with trained employees. Whether using a curved or straight chute, the handler must leave the flight zone of the animal and walk past the point of balance before re-entering the flight zone to move them forward.

Overhead restrainers prevent cattle from rearing up, turning around or falling backward in the chute. Restrainers are generally located 60 inches above the floor of the chute. Some restrainers can be adjusted to accommodate different cattle heights. Restrainers are more effective if adjusted to keep an animal's head down. Emergency release panels are highly recommended with or without the use of overhead restrainers. Release panels can be constructed as movable crowding chute side panels that can be opened to release animals that have fallen in the chute and become lodged.

Solid side panels on working chutes hamper the use of the traditional scotch pole to prevent cattle from backing up. With solid-sided chutes, backstops are normally suspended or mounted from above. All backstops work on the same principle. The metal tee pipe is hinged, so it releases in the direction of the flow toward the squeeze chute, but will not hinge back beyond vertical in reverse. Most pipe backstops are telescoped so they can be adjusted up or down to accommodate cattle of different heights. Backstops should be adjusted to block an animal 6 inches to 8 inches below the top of the tailhead. Backstops are normally held in a vertical position using chains or rubber bumpers. Bumpers have the advantage of holding down the noise when the stop falls back into position. A noisy stop can cause cattle to balk.

Inserting pipes through the sides to the working chute to prevent animals from backing up can be hazardous to workers. If backstops are not installed, and pipes must be used, be sure the pipe is between the cattle and worker. If not, a worker can be caught between the pipe and the chute or fence if the person is not properly positioned and the animal backs up before the pipe is extended through the chute. Also, avoid standing on the fence or rails or extending arms and hands between or over fencing.

**Table 40.1. Working chute dimensions.**

Type of working chute	Animal size		
	To 600 pounds	600 to 1,200 pounds	More than 1,200 pounds
Vertical sides			
Width	18 inches	20 to 24 inches	26 to 30 inches
Length (minimum)	20 feet	20 feet	20 feet
Sloping sides			
Width at bottom, inside clear	13 inches	15 inches	16 inches
Width at top, inside clear	20 inches	24 inches	28 inches
Length (minimum)	20 feet	20 feet	20 feet
Fence			
Height (minimum)	45 inches	50 inches	60 inches
Depth of posts in ground (minimum)	30 inches	30 inches	30 inches

## Squeeze Chute

Squeeze chutes are used extensively throughout Oklahoma. All chutes, whether manual or hydraulic, consist of the same basic components: headgate, squeeze section, tailgate and, most importantly, a side escape to allow animals to be removed quickly if they are in distress. At times, cattle tend to kneel or lay down in a chute, which can cause the animal to choke. Many newer chutes include a breast bar that prevents cattle from laying down. Some chutes also include a neck extender to restrain the head for animal and operator safety. Another useful option is a scale under the chute. This allows for proper dosage when administering antibiotics and wormers when measuring performance and weight gain.

Whether using a manual or hydraulic chute, it must be well maintained. Lubricating chute components, inspecting and replacing any worn or broken parts, plus regular cleaning will help prevent the spread of diseases and maintain animal footing. Make sure workers are familiar with possible pinch points on the chute. It is important to be aware of the positioning of handles that open and close the headgate, sides and tailgate in case quick action is needed to remove an animal. Also, inspect the rope in rope-and-pulley devices and replace it if there are any signs of fraying. Finally, avoid contact with animals if they are not properly restrained.

If an animal is not properly caught and restrained by the squeeze chute, release the animal and bring it through the chute again. Never attempt to keep the animal from flailing or try to push it into proper position.

## Conclusion

The proper design, construction and operation of a cattle-handling facility is important to ensure safe working conditions for animals and humans. Understanding the inherent behavior of cattle, plus working them slowly and quietly, will reduce injuries and help make the operation run more smoothly and efficiently.

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