

# Stall Bases

## Are Your Cows Comfortable?

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Stall base choices for freestalls or tie-stalls are plentiful, but how do you know which one to choose? Freestall base options include concrete, rubber mats, rubber-filled mattresses, waterbeds, recycled manure solids, and deep-bedded sawdust or sand stalls. Cows need a clean, comfortable place to rest. Like people, cows have to budget their time throughout the day. If they have access to a comfortable bed, cows rest for 10 to 14 hours per day. Lying time and overall cow comfort are limited by uncomfortable stall bases. Cow comfort generally refers to minimizing animal stress in efforts to maximize milk production and animal well-being. Lying behavior plays a critical role in the production, profitability, and well-being of dairy cattle. Lying time per day can be a measure of cow comfort. The potential economic impact of increased production, reduced lameness, improved milk quality, reduced culling rates, and increased longevity are immense. Individual producers need to decide which options best fit their needs. Advantages and disadvantages of alternative stall bases are discussed below.

**Concrete** is the hardest freestall base and provides cows with virtually no comfort without a large amount of bedding material on top of it. Concrete is also very abrasive which can lead to body lesions. Claws exposed to concrete can increase hoof disorders. Lying times are also negatively impacted by concrete and will be shorter compared to cows on other bases. In colder climates, concrete provides no insulation for the cows. The only real advantage to a concrete base is that it will not need to be replaced as frequently as some other bases.

**Rubber mats** (Figure 1) are the second hardest stall base and provide only a little more cushion than concrete. Generally, rubber mats do not provide much “give” as the cows get up and down in the stall. They are also not comfortable or soft unless there is a large amount of bedding on top of them. Rubber mats cause more hock lesions than mattresses. The main reason producers invest in rubber mats is that they are relatively cheap and durable. However, the costs incurred from cow injuries and reduced cow comfort far outweigh any cost savings for purchasing rubber mats.



**Figure 1.** Rubber mats provide little cushion for cows in a freestall or tiestall barn.



**Rubber-filled mattresses** (Figure 2) are more comfortable than concrete or rubber mats. Mattresses should be well bedded to avoid hock abrasions. In a British Columbia study, cows spent 1.5 hours more lying down in mattress freestalls bedded with 16.5 pounds of sawdust than those with no sawdust. Thus, lying time can be improved considerably by providing cows with more bedding. While concrete is long lasting, rubber-filled mattresses will need to be replaced often, as they will become compacted over time. Cows may also not lie down as long on rubber-filled mattresses as they would in sand bedding. One study found that because the stall is uncomfortable, cows will stand longer on the rubber-filled mattresses instead of lying down. The new gel mats may offer some of the same benefits of conventional mattresses with improved resiliency and comfort. Long-term on-farm usefulness of these gel mats remains to be seen.

**Dual chamber cow waterbeds** (Figure 3) are a relatively new base and provide the cow with a comfortable area to rest that moves with her body as she rises and lies down. This stall base may have a longer adjustment period than other stall bases; however, cows adapt fairly quickly. During the cold weather cows may prefer to lie down on dual chamber cow waterbeds because water will retain heat from the cow’s body. Waterbeds may also provide some cow cooling in the summer. Dual chamber cow waterbeds result in fewer hock abrasions than rubber-filled mattresses. The curb is not exposed with dual chamber cow waterbeds, allowing the cow to have fewer hock abrasions on the back of her hocks when compared to sand. Because they are filled with water, waterbeds maintain their cushion much longer than mattresses. Bedding use may also be reduced with waterbeds. Manure handling is much less cumbersome with waterbeds compared to sand.

**Recycled manure solids** (Figure 4). Producers seek alternative bedding material that still provides the cow with a soft, cushioned stall base because of increased cost and reduced availability of bedding sources. Recycled manure solids are one of these alternative bedding sources. Recent work has shown that cows housed in deep-bedded stalls with recycled manure



**Figure 2.** Rubber-filled mattresses are a major improvement over concrete and rubber mats, particularly when well-bedded.



**Figure 3.** Dual chamber cow waterbeds provide a comfortable, long lasting resting surface for cows.



**Figure 4.** Manure solids provide a comfortable resting surface and reduce bedding costs.

solids have fewer hock lesions than cows housed on mattresses. Because recycled manure solids are a fluffy and light bedding material, curb exposure may occur. This exposure to the curb may create more hock lesions than deep-bedded sand stalls, but still less than mattresses. Also, research shows lameness in cows to be less frequent in cows housed on recycled manure solids compared to mattresses. Clinical mastitis rates may be higher, compromising udder health when bedding with recycled manure solids. Bacteria counts are highest in recycled manure solids when compared to other common bedding sources, and higher bacteria counts may lead to an increased risk of mastitis.

**Deep-bedded sawdust or straw** (Figure 5). Many producers choose to use deep-bedded sawdust or straw without a concrete base. The primary advantage of this option is reduced costs because less concrete is used in the barn. Well-maintained deep-bedded sawdust or straw can provide cows a comfortable resting space. However, it is difficult to maintain bedding to adequate levels. Some producers place rubber tires in the stalls to retain bedding in the stalls. If bedding levels are not maintained, these rubber tires actually impair rather than help with cow comfort. Additionally, bacteria growth in these stalls tends to be high, resulting in increased risk of environmental mastitis.

The gold standard for freestall bases is **deep-bedded sand stalls**. Bacterial growth is lower in sand than organic materials because sand provides fewer nutrients. Environmental mastitis risks are reduced when sand bedding is used and well

maintained. Sand conforms to the cow's body, making it a comfortable bed. During the summer, sand has a cow cooling effect. Lesions are observed less frequently with deep-bedded sand stalls than with mattresses. In addition to fewer lesions compared to mattresses, lameness is less prevalent with deep-bedded sand stalls. Overall, if cows have a choice between mattresses or a deep-bedded sand stall, they will prefer to use the deep-bedded sand stall. If stalls are not properly managed, curb exposure can occur causing damage to the back of hocks. Despite the advantages to the cow of sand bedding, manure management can be difficult with sand because it separates from manure, making it hard to handle. Specialized systems need to be in place in order to handle the amount of sand that is removed with the manure. It settles in storage ponds and can cause excessive wear on equipment. Land application can also be a limiting factor.

Stall base choice plays a major role in cow comfort; however, cow comfort also depends on stall dimensions and other factors. Stalls should be sized correctly and adequate, clean bedding must be maintained. When deciding which stall base to choose, many factors must be considered, including economics, cow comfort, manure handling, and maintenance. As with most housing options, the key to success is how stalls are managed after they are installed. Whichever stall base is chosen, cows will prefer a softer place to lie down and are more likely to lie down longer if they have a comfortable resting place.



**Figure 5.** Deep-bedded sawdust or straw can provide a comfortable resting surface, though maintaining bedding levels is difficult.



**Figure 6.** Sand-bedded freestalls provide a comfortable resting space for cows and limits bacterial growth.

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