Bruises on fed steers and heifers cost the beef industry $1.00 for every animal marketed according to the 1992 National Beef Quality Audit conducted by Colorado State University for the National Cattlemen’s Association. The audit was conducted at major packing plants all over the U.S. This adds up to a loss of $22 million per year for the fed beef industry. The really bad news is that bruises have stayed at the same level during the last twenty years. The Livestock Conservation Institute made a similar estimate twenty years ago. The reason the beef industry has failed to stop this shocking loss is due to a lack of accountability. As long as bruise losses can be passed on by the producer into the packing plant, there is no motivation to reduce them. Over ten years ago, I conducted a survey that showed that cattle sold liveweight had twice as many bruises compared to cattle sold in the carcass (Grandin, 1981a). When cattle are sold in the carcass, the producer has to pay for the bruises and this provides a great incentive to reduce them.

The 1993 Strategic Alliance Field Study indicated that cooperation between all segments of the industry can reduce bruises. Bruises were reduced by 15 percent when feeders and ranchers worked together to improve handling. This would add up to a savings of $2 million per year. Unfortunately, there was no reduction in severe bruises. The national average for severe bruises on fed cattle is 4.9 percent and the Strategic Alliance Field Study cattle had 4.2 percent.

(January 2000 Update)

The creation of marketing alliances which sell branded beef has helped to reduce bruising and damage to carcasses in fed cattle. Marketing alliances where cattle are traced from the ranch, feedlot and meat packing plant hold producers accountable for losses. There is some practical evidence that even old healed bruised areas may possibly be tougher. Research on injection site damage at Colorado State University has shown that there is an area of tougher meat around injection lesions.

## Bruises on U.S. fed cattle

<table>
<thead>
<tr>
<th>Bruises</th>
<th>1992 National Beef Quality Audit</th>
<th>1993 Strategic Alliance Field Study</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Averages for U.S. fed beef (%)</td>
<td>Reduction in bruises when all market segments work together (%)</td>
</tr>
</tbody>
</table>
Bruise Levels on Fed and Non-Fed Cattle

<table>
<thead>
<tr>
<th>Carcasses with no bruises</th>
<th>60.8</th>
<th>76.6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carcasses with superficial bruises</td>
<td>34.3</td>
<td>19.2</td>
</tr>
<tr>
<td>Carcasses with substantial which require extensive trimming</td>
<td>4.9</td>
<td>4.2</td>
</tr>
</tbody>
</table>

**BRUISE LOCATION:**

<table>
<thead>
<tr>
<th></th>
<th>Chuck</th>
<th>Rib</th>
<th>Loin</th>
<th>Round</th>
<th>Brisket</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fed</td>
<td>16.7</td>
<td>14.4</td>
<td>23.4</td>
<td>2.7</td>
<td>0.1</td>
</tr>
<tr>
<td>Non-Fed</td>
<td>14.6</td>
<td>6.1</td>
<td>13.4</td>
<td>1.1</td>
<td>0.0</td>
</tr>
</tbody>
</table>


Rough handling either at the packing plant or in the feedlot will double bruising (Grandin, 1981a, 1993). Contrary to popular belief, cattle can be bruised right up until the moment of slaughter. Bruising can occur after stunning and prior to bleeding (Meischke et al., 1976).

Australian research has shown that both overloading and underloading of trucks increases bruises (Eldridge et al., 1988). Their research indicated that there is an optimal density for loading cattle. The space guidelines in Grandin (1981b) were used for the optimal density loads in this study. Grandin (1981a) also found that one or two extra cattle on a load doubled bruising.

**Too Many Horns**

It is likely that many of the severe bruises on the Strategic Alliance Field Study cattle were due to horns. Australian research has shown that horned cattle will have twice as many bruises (Meischke et al, 1974, Shaw et al., 1976). Tipping horns (removing horn tips) will not reduce bruises (Wythes et al., 1979). Horns cause a high percentage of bruised loins. Deep bruises that penetrate all the way through the carcass are often caused by horns. The following table shows the incidence of horns on cattle in the U.S.

<table>
<thead>
<tr>
<th>Fed steers and heifers (%)</th>
<th>Beef cows and bulls (%)</th>
<th>Dairy cows and bulls (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>69</td>
<td>76</td>
</tr>
<tr>
<td>Scurs or horn stubs</td>
<td>----</td>
<td>8</td>
</tr>
<tr>
<td>Horns</td>
<td>31</td>
<td>16</td>
</tr>
</tbody>
</table>


Horns should be removed from baby calves before the horn buds grow. Cutting horns off of older animals will cause severe stress and setback in gains (Winks et al., 1977). There is no excuse for not dehorning very young calves. There are several very good heating devices which will destroy the horn button on a calf. These methods are more effective than paste. There have been a few...
in sensitive people who have suggested cutting horns off of cattle shortly before slaughter. This would be very cruel to the animals and it would also result in condemnation of most of the heads by the meat inspector due to hair and dirt entering the openings in the skulls. When cow heads are dehorned after slaughter, about 25 percent of the heads have to be condemned due to hair being pushed into the sinus. Condemnation of heads causes a significant loss because the tongue and cheek meat has to be thrown into rendering.

**Cow and Bull Audit**

The 1994 National Nonfed Beef Quality Audit, also conducted by Colorado State University and sponsored by the National Cattlemen's Association, showed that bruising is shockingly high in cows. Many packers and industry leaders interviewed for the survey stated that excessive bruises were a major problem facing the cow and bull processing industry. The third table shows that 31 percent of all cows slaughtered had major bruises.

**Bruises on cows and bulls**

<table>
<thead>
<tr>
<th>Weight of meat removed (lb)</th>
<th>Incidence in Bulls (%)</th>
<th>Incidence in Cows (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No bruises</td>
<td>0.00</td>
<td>63.8</td>
</tr>
<tr>
<td>Minor bruises</td>
<td>0.66</td>
<td>25.3</td>
</tr>
<tr>
<td>Average bruises</td>
<td>1.54</td>
<td>19.5</td>
</tr>
<tr>
<td>Major Bruises</td>
<td>3.19</td>
<td>7.4</td>
</tr>
</tbody>
</table>

The survey was done at 21 major cow and bull slaughter plants. Bruises on cows and bulls cost the beef industry $3.91 for each animal marketed. Today, cows are made into much more than hamburger. Much of the loss is due to devaluation of the primal cuts. For non-fed animals, the loss adds up to almost $30 million each year.

The audit also showed that downer cattle which were unable to walk were 1 percent of the beef cows and 0.8 percent of the beef bulls. Non-ambulatory dairy cattle were about the same, with 1.1 percent of the cows and 2.6 percent of the bulls. The final conclusion is that the dairy and beef industries are equally responsible for downers. The audit team encourages on-farm euthanasia of downers. The audit team also tabulated the percentage of severely lame cattle to be 2.9 percent of beef cows and 4.7 percent of dairy cows. Among bulls, 7.1 percent of the beef bulls were severely lame and 10.5 percent of the dairy bulls. A survey done in Canada indicated that the vast majority of lame or downer cattle were in very bad physical condition before they left the farm or ranch of origin.

A total of 1.6 percent of all beef cow carcasses were condemned due to severe necrotic cancer eye. Very skinny bone rack emaciated cows were also a problem. Three and one-half percent of the beef cows and 4.6 percent of the dairy cows had poor body condition scores. The audit team concluded that the number one problem facing the cow and bull beef industry is the failure of some producers to market their animals in a timely manner. Cows and bulls must be marketed before they become debilitated and physically unfit. Whole carcass condemnation costs the beef industry $11.99 for every cow or bull marketed.

(January 2000 Update)

**Percentages of carcasses with a minor, medium, major, extreme, or no bruises (data are for all primal cuts combined)**

<table>
<thead>
<tr>
<th>Severity of Bruise</th>
<th>Cows and Bulls</th>
<th>Cows</th>
<th>Bulls</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extreme</td>
<td>2.2</td>
<td>2.4</td>
<td>1.0</td>
</tr>
<tr>
<td>Major</td>
<td>19.4</td>
<td>21.6</td>
<td>6.9</td>
</tr>
</tbody>
</table>
Bruise Levels on Fed and Non-Fed Cattle

<table>
<thead>
<tr>
<th>Level</th>
<th>Fed</th>
<th>Non-Fed</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medium</td>
<td>38.0</td>
<td>41.7</td>
<td>16.7</td>
</tr>
<tr>
<td>Minor</td>
<td>72.4</td>
<td>77.2</td>
<td>44.4</td>
</tr>
<tr>
<td>No Bruises</td>
<td>16.8</td>
<td>11.8</td>
<td>47.1</td>
</tr>
</tbody>
</table>

* Percentages in a column may total more than 100% because carcasses may have exhibited bruises in more than one of the severity classes. National Market Cow and Bull Beef Quality Audit (NCBA/CSU, 1999)*

The 1999 audit was done using the same methods as the 1994 audit. Other studies on cattle bruising have found that 15% of the cattle in Canada had severe bruises (Van Donkersgoed et al. 1997) and cows which went through auctions had more bruises (Hoffman et al. 1998). Bruising was highest if the cows had been worked in chutes for veterinary checks at the auctions.

The percentage of non-ambulatory downer cattle has become worse in dairy cows and slightly better in beef cows. There is a certain segment of the dairy industry that has serious animal welfare problems. Informal interviews indicate that about 10% of the dairies are responsible for some of the worse downer cow problems. Seventy three percent of the beef cows were sound and had normal legs, but only 60% of the dairy cows were sound. In dairy cows 1.5% were downers and in beef cows only 0.7% were downers (Colorado State University 1999).

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**Preventing Bruising**

Gentle handling during all phases of the marketing process and removal of horns from baby calves will greatly reduce bruises. Back bruises were a problem on tall bulls and cows. Some truck compartments are too low for the taller types of animals. There are new truck trailers available that provide an extra few inches of space by building the belly compartment a few inches closer to the ground. Another innovation in truck design that reduces bruises is semitrailers with a full width opening rear end. The trailer is loaded through the standard 30 inch door, but during unloading, a second door can be opened to give the cattle an 8-foot-wide opening. These trailers will quickly pay for themselves.

Broken fences and gates can bruise cattle. Metal chutes worn through by cattle can have sharp edges which will bruise shoulders. Edges with a small diameter are more likely to bruise than striking a round four-inch pipe. Rubbing against a smooth wall will not cause a bruise. One of the reasons cows have more bruises is due to a lack of fat cover. Thin animals bruise more easily than fat animals. Another major contributor to the increased levels of cow bruising compared to steers and heifers is increased handling on the way to market. Steers and heifers are usually brought directly from the feedlot to the plant, whereas cows and bulls usually pass through an auction market. Another major cause of both downers and bruising is bulls riding on cows in the pens at the packing plant. These bruises can be reduced by penning bulls separately from cows until they enter the single file stunning chute.

Plants that have stunning boxes must train their employees to be careful with vertical slide gates. Cattle will sustain severe back bruises if the gate is closed on their backs.

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- **Strategic Alliances Field Study.**
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Colorado State University (1999)

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