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Shrinkage in Beef Cattle

Beef and Cow Management

Michigan State University Extension Service

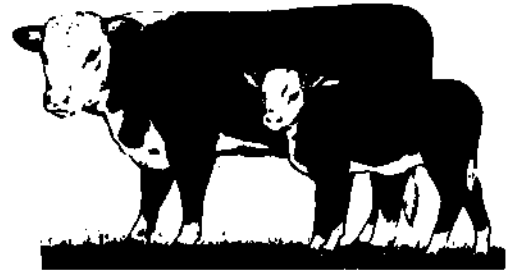
Roger Brownson, Montana State University in cooperation with extension specialists from Michigan, New York, Ohio, Virginia and West Virginia as part of a project sponsored by the Extension Service, USDA.

Issued March 1979

4 pages

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# MICHIGAN BEEF PRODUCTION

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## Shrinkage in Beef Cattle

Roger Brownson, Montana State University

When you are dealing with cattle sales, the highest price per pound does not necessarily mean the highest return per animal. The number of actual pounds involved may be more important, which is why shrinkage is a vital consideration.

### Types of Shrink

Weight loss in cattle can be classified according to two types of shrink:

**Excretory shrink** or loss of belly fill. Animals held off feed and water for a 12-hour stand usually have only excretory shrink. It takes a relatively short period on feed and water to refill the stomach and bring an animal's weight back to normal if shrinkage was due only to excretory shrink.

**Tissue Shrink.** Tissue shrink can be defined as a decrease in the carcass weight of the animal. Tissue shrink occurs on extended hauls or during long periods of fast. It takes longer for animals to recover from tissue shrink than from excretory shrink.

These two types of shrinkage probably do not occur as two distinct phases of the shrinkage process. In the early part of shipment only excretory shrinkage occurs. At an undefined stage in movement both excretory and tissue shrinkage occur simultaneously. During the latter part, in-transit tissue shrinkage is relatively more important.

### Price Adjustments for Shrink

Tables 1 and 2 are designed to make price adjustments to compensate for different shrinkage conditions.

### Conditions Affecting Shrink

The loss of weight from an overnight shrink, or a 12-hour stand, will vary because of the type of feed. Cattle on grass, wet beet pulp, or silage will generally shrink 4%, while fat cattle on concentrates will shrink from 2.5% to 3% if no feed or water is available. If feed and water are available

free choice, morning weights of fat cattle will be about 2% less than evening weights. Range cattle not familiar with enclosures often shrink more than 5% when held in drylot overnight. They are accustomed to running in the open and will be upset and nervous when penned up. This is especially true of calves cut off from their mothers and shut up for the first time. Also, cattle in a strange pen will shrink more than if they are in familiar surroundings.

In a recent study in Iowa involving 4,685 feeder cattle, it was found that an average shrink of 7.2% occurred with cattle purchased from a rancher as contrasted to 9.1% from those purchased from a sale yard. These cattle were shipped varying distances, from 150 to 1,133 miles. It was found that there was 0.61% shrink for each 100 miles in transit.

A controlled experiment at the University of Wyoming showed that a considerable difference occurs in the shrink of feeder steers, depending on the conditions to which they were subjected. Table 3 shows those differences.

There are also indications that a considerable difference exists in the amount of fill that individual animals will consume during different periods of the day. This explains, in part, the wide variation in shrinkage of individual animals.

Extreme hot and cold temperatures can affect shrinkage to a large extent, but things such as wind, rain, snow, humidity and other wet weather conditions have more influence than temperature alone.

Calves that are both weaned and shipped at the same time shrink more than those that are weaned and adjusted to hay before they are shipped. Calves brought in from the range, taken off their mothers, vaccinated and loaded for shipment all in the same operation have all those conditions of stress to make them shrink excessively.

In some cases, physical differences of animals also cause a difference in shrinkage. The difference in shrinkage between heifers and steers vary with conditions. Prediction of comparative shrink for heifers and steers is difficult. Bulls usually shrink substantially because of disturbing circumstances and the presence of strange animals in nearby pens. Calves also are heavy shrinkers, largely because they

**Table 1. Buying Cattle**  
Change in Price to Compensate for Shrinkage  
(Prices, \$ per cwt.)

Asking	2%	3%	4%	6%	8%
90.00	91.84	92.78	93.75	95.75	97.83
89.00	90.82	91.75	92.71	94.68	96.74
88.00	89.80	90.72	91.67	93.62	95.69
87.00	88.78	89.69	90.63	92.55	94.57
86.00	87.76	88.66	89.58	91.94	93.48
85.00	86.73	87.63	88.54	90.43	92.39
84.00	85.71	86.60	87.50	89.36	91.30
83.00	84.69	85.57	86.46	88.30	90.22
82.00	83.67	84.54	85.42	87.23	89.13
81.00	82.65	83.51	84.38	86.17	88.04
80.00	81.63	82.47	83.33	85.11	86.96
79.00	80.61	81.44	82.29	84.04	85.87
78.00	79.59	80.41	81.25	82.98	84.78
77.00	78.57	79.38	80.21	81.91	83.70
76.00	77.55	78.35	79.17	80.85	82.61
75.00	76.53	77.32	78.13	79.79	81.52
74.00	75.51	76.29	77.08	78.72	80.43
73.00	74.49	75.26	76.04	77.66	79.35
72.00	73.47	74.23	75.00	76.60	78.26
71.00	72.45	73.20	73.96	75.53	77.17
70.00	71.43	72.16	72.92	74.47	76.09
69.00	70.41	71.13	71.88	73.40	75.00
68.00	69.39	70.10	70.83	72.34	73.91
67.00	68.37	69.07	69.79	71.28	72.83
66.00	67.35	68.04	68.75	70.21	71.74
65.00	66.33	67.01	67.71	69.15	70.65
64.00	65.31	65.98	66.67	68.09	69.57
63.00	64.21	64.95	65.63	67.02	68.48
62.00	63.27	63.92	64.58	65.96	67.39
61.00	62.24	62.89	63.54	64.89	66.30
60.00	61.22	61.86	62.50	63.83	65.22
59.00	60.20	60.82	61.46	62.77	64.13
58.00	59.18	59.79	60.42	61.70	63.04
57.00	58.16	58.76	59.38	60.64	61.96
56.00	57.14	57.73	58.33	59.57	60.87
55.00	56.12	56.70	57.29	58.51	59.78
54.00	55.10	55.67	56.25	57.45	58.70
53.00	54.08	54.64	55.21	56.38	57.61
52.00	53.06	53.61	54.17	55.32	56.52
51.00	52.04	52.58	53.13	54.26	55.43
50.00	51.02	51.55	52.08	53.19	54.35
49.00	50.00	50.52	51.04	52.13	53.26
48.00	48.98	49.48	50.00	51.06	52.17
47.00	47.96	48.45	48.96	50.00	51.09
46.00	46.94	47.42	47.92	48.94	50.00
45.00	45.92	46.39	46.88	47.87	48.91
44.00	44.90	45.36	45.83	46.81	47.83
43.00	43.88	44.33	44.79	45.74	46.74
42.00	42.86	43.30	43.75	44.68	45.65
41.00	41.84	42.27	42.71	43.62	44.57
40.00	40.82	41.24	41.67	42.55	43.48
39.00	39.80	40.21	40.63	41.49	42.39
38.00	38.78	39.81	39.58	40.43	41.30
37.00	37.76	38.14	38.54	39.36	40.22
36.00	36.73	37.11	37.50	38.30	39.13
35.00	35.71	36.08	36.46	37.23	38.04
34.00	34.69	35.05	35.42	36.17	36.96
33.00	33.67	34.02	34.37	35.11	35.87
32.00	32.66	32.99	33.33	34.04	34.78
31.00	31.63	31.96	32.29	32.98	33.70
30.00	30.61	30.93	31.25	31.91	32.61

**Table 2. Selling Cattle**  
Net Prices after Allowing for Shrinkage  
(Prices, per cwt.)

Offer	2%	3%	4%	6%	8%
90.00	88.20	87.30	86.40	84.60	82.80
89.00	87.22	86.33	85.44	83.66	81.88
88.00	86.24	85.36	84.48	82.72	80.98
87.00	85.26	84.39	83.52	81.78	80.04
86.00	84.28	83.42	82.56	80.84	79.12
85.00	83.30	82.45	81.60	79.90	78.20
84.00	82.32	81.48	80.64	78.96	77.28
83.00	81.34	80.51	79.68	78.02	76.36
82.00	80.36	79.54	78.72	77.08	75.44
81.00	79.38	78.57	77.76	76.14	74.52
80.00	78.40	77.60	76.80	75.20	73.60
79.00	77.42	76.63	75.84	74.26	72.68
78.00	76.44	75.66	74.88	73.32	71.76
77.00	75.46	74.69	73.92	72.38	70.84
76.00	74.48	73.72	72.96	71.44	69.92
75.00	73.50	72.75	72.00	70.50	69.00
74.00	72.52	71.78	71.04	69.56	68.08
73.00	71.54	70.81	70.08	68.62	67.16
72.00	70.56	69.84	69.12	67.68	66.24
71.00	69.58	68.87	68.16	66.74	65.32
70.00	68.60	67.90	67.20	65.80	64.40
69.00	67.62	66.93	66.24	64.86	63.48
68.00	66.64	65.96	65.28	63.92	62.56
67.00	65.66	64.99	64.32	62.98	61.64
66.00	64.68	64.02	63.36	62.04	60.72
65.00	63.70	63.05	62.40	61.10	59.80
64.00	62.72	62.08	61.44	60.16	58.88
63.00	61.74	61.11	60.48	59.22	57.96
62.00	60.76	60.14	59.52	58.28	57.04
61.00	59.78	59.17	58.56	57.34	56.12
60.00	58.80	58.20	57.60	56.40	55.20
59.00	57.82	57.23	56.64	55.46	54.28
58.00	56.84	56.26	55.68	54.52	53.36
57.00	55.86	55.29	54.72	53.58	52.44
56.00	54.88	54.32	53.76	52.64	51.52
55.00	53.90	53.35	52.80	51.70	50.60
54.00	52.92	52.38	51.84	50.76	49.68
53.00	51.94	51.41	50.88	49.82	48.76
52.00	50.96	50.44	49.92	48.88	47.84
51.00	49.98	49.47	48.96	47.94	46.92
50.00	49.00	48.50	48.00	47.00	46.00
49.00	48.02	47.53	47.04	46.06	45.08
48.00	47.04	46.56	46.08	45.12	44.16
47.00	46.06	45.59	45.12	44.18	43.24
46.00	45.08	44.62	44.16	43.24	42.32
45.00	44.10	43.65	43.20	42.30	41.40
44.00	43.12	42.68	42.24	41.36	40.48
43.00	42.14	41.71	41.28	40.42	39.56
42.00	41.16	40.74	40.32	39.48	38.64
41.00	40.18	39.77	39.36	38.54	37.72
40.00	39.20	38.80	38.40	37.60	36.80
39.00	38.22	37.83	37.44	36.66	35.88
38.00	37.24	36.86	36.48	35.72	34.96
37.00	36.26	35.89	35.52	34.78	34.04
36.00	35.28	34.92	34.56	33.84	33.12
35.00	34.30	33.95	33.60	32.90	32.20
34.00	33.32	32.98	32.64	31.96	31.28
33.00	32.34	32.01	31.68	31.02	30.36
32.00	31.36	31.04	30.72	30.08	29.44
31.00	30.38	30.07	29.76	29.14	28.52
30.00	29.40	29.10	28.80	28.20	27.60

**Table 3. Shrinkage Loss Due to Different Handling Conditions**

<i>Conditions</i>	<i>Percent Shrink</i>
8-hour drylot stand	3.3
16-hour drylot stand	6.2
24-hour drylot stand	6.6
8 hours in moving truck	5.5
16 hours in moving truck	7.9
24 hours in moving truck	8.9

are often weaned at market time. Studies have shown that there is not much difference, however, in shrinkage between the different breeds.

When it is necessary to haul cattle long distances to market or to the feeding area, there is not only a greater transportation cost, but also greater costs as the result of shrinkage. Figure 1 shows that cattle lose the most weight during the second or third hour in transit. After this, shrinkage continues but at a declining rate. On the average, shrink will increase up to about 9 or 10% by the time the first feed and rest stop is made. This stop usually cuts the shrink back to about 7.5%. Weight loss will then continue until animals have lost between 10 and 11% of their shipping weight by the second feeding and rest stop, which is about 80 hours after shipping.

Time for "fill back" pays off most for cattle in transit over 10 hours, but it also decreases the shrink loss substantially if cattle have been in transit for only two hours.

The time required to regain the intransit weight loss will vary considerably. A study to determine this was done by Iowa workers on both feeder calves and yearlings. The yearlings weighed an average of 673 lbs and calves 504 lbs. The cattle were purchased in seven states and hauled an average 660 miles. During shipment the yearlings lost 9.62% of their preshipment weight. The calves lost 9.49%. The yearlings required an average 16 days and the calves 13 days to recover the weight loss. Another study by the same station was conducted to determine what type of shrink occurred during long shipments of feeder cattle. In this study, yearling steers were trucked from Texas to Iowa. The weight loss during transit was 8.83%. Approximately 47% of this loss was accounted for by loss of materials from the digestive tract or excretory shrink. The remaining 53% was from tissue weight loss.

Body weight losses during transit are also caused by the disturbances to the animals. Loading, unloading, jolting about on a moving truck or rail car, change of environment and different handlers produce nervous disturbances in animals, which cause not only belly shrink, but also tissue shrink.

Finished cattle have a lower shrinkage percentage than range cattle. Highly finished cattle shrink less than those with less finish. Shrinkage does not seem to be closely associated with weight of cattle except as the weight is correlated with degree of fatness.

## How to Prevent Shrinkage During Transit

Usually, you cannot do much about the price when you are selling or buying livestock, but there are some things you can do to eliminate shrinkage losses.

True, some conditions are beyond the control of shippers. However, you might have some control over other unusual conditions that might affect shrinkage if you plan carefully and manage the marketing job properly.

Look into weather forecasts when planning cattle shipments, and prevent rough handling, poor feed, dirty water, excessive delays enroute or at the market and avoid breakdown of equipment. Give attention to loading chutes, holding pens, scales, trucks and road conditions. This will often pay off with less shrink. Avoid overloading. Overcrowding causes uneasiness, nervousness and sometimes animals get down on the floor and are unable to get up. This causes bruising, crippling and occasionally smothering. Partitions will relieve overcrowding pressures in large trucks or rail cars. Underloading also causes excessive movement and banging around, which add to heavy shrinkage.

Keep shrinkage at a minimum by providing adequate protection from extremely cold, warm or wet weather. Covered trucks, weather stripped rail cars, proper bedding and shade all help.

Do not overfill cattle before hauling. Chances are they will be discounted for overfilled stock. Be sure animals have a good, dry hay ration before being shipped. Avoid extremely washy, lush feeds. Take full advantage of rest stops. Provide the cattle with good, fresh hay and water at rest stops.

Before shipping calves some ranchers go to considerable expense to prepare them for shipment to assure their top condition at destination. They wean, vaccinate, and condition them to hay over a period of several days or weeks. Unquestionably, calves will arrive at the market in better condition if they have been weaned and fed hay before shipment. The economic question is whether this cost is covered by higher prices paid by the buyer. Some tests have shown total shrink is the least when weaning and shipment occur at the same time. Calves are upset by both; the combined operation results in heavy shrinkage, but is over within a short period of time.

## Avoid Excessive Shrinkage

Producers or feeders are usually at a disadvantage when bargaining with buyers on shrinkage and weighing conditions. They usually make only few sales or purchases a year and in most cases have no records on the normal amounts of shrink to expect. The professional buyer on the other hand handles cattle constantly under conditions which allow him to learn much about shrinkage. Producers and feeders should have in mind what actual shrinkage losses do occur and under what conditions.

There are a number of ways in which shrinkage can become excessive. In many areas it is customary to hold cattle in drylot overnight and weigh them early in the morning. In other places, pencil shrink, a percentage discount from the weights to determine sale weights is used. Depending on the area, pencil shrink varies from 2% to occasionally 5%.

Many ranchers and feedlots do not have weight scales handy and must move stock to where they can weigh them. These short trips from ranch or feedlot to the scale also involve shrinkage.

If pencil shrink is applied on weights obtained at a point some distance away, a double shrink will occur. It has been found that the greater shrink occurs during loading, unloading and in the first hour of hauling. The shrink increases at a slower rate with additional miles. Thus, even though you may be a short distance from a scale, and if

animals must be loaded, unloaded and hauled, shrinkage will be significant.

Another situation which might increase shrinkage is when the animals are loaded and delivered as early as possible in the morning, before they are fed. An overnight stand could cause an additional 2% shrinkage. Consider the hypothetical situation in which a rancher or feeder loads his cattle early in the morning after an overnight stand and hauls them six miles to a scale. He could expect a 2 to 3% shrink loss because of hauling them those six miles and loading and unloading them. He could also expect a 2% shrink loss because of the overnight stand. If a 3% pencil shrink is added to this, it becomes obvious how shrinkage can become excessive. Consequently, the seller should plan his selling and shipping program carefully. The custom of specifying a pencil shrink was developed in lieu of the overnight stand without feed and water.

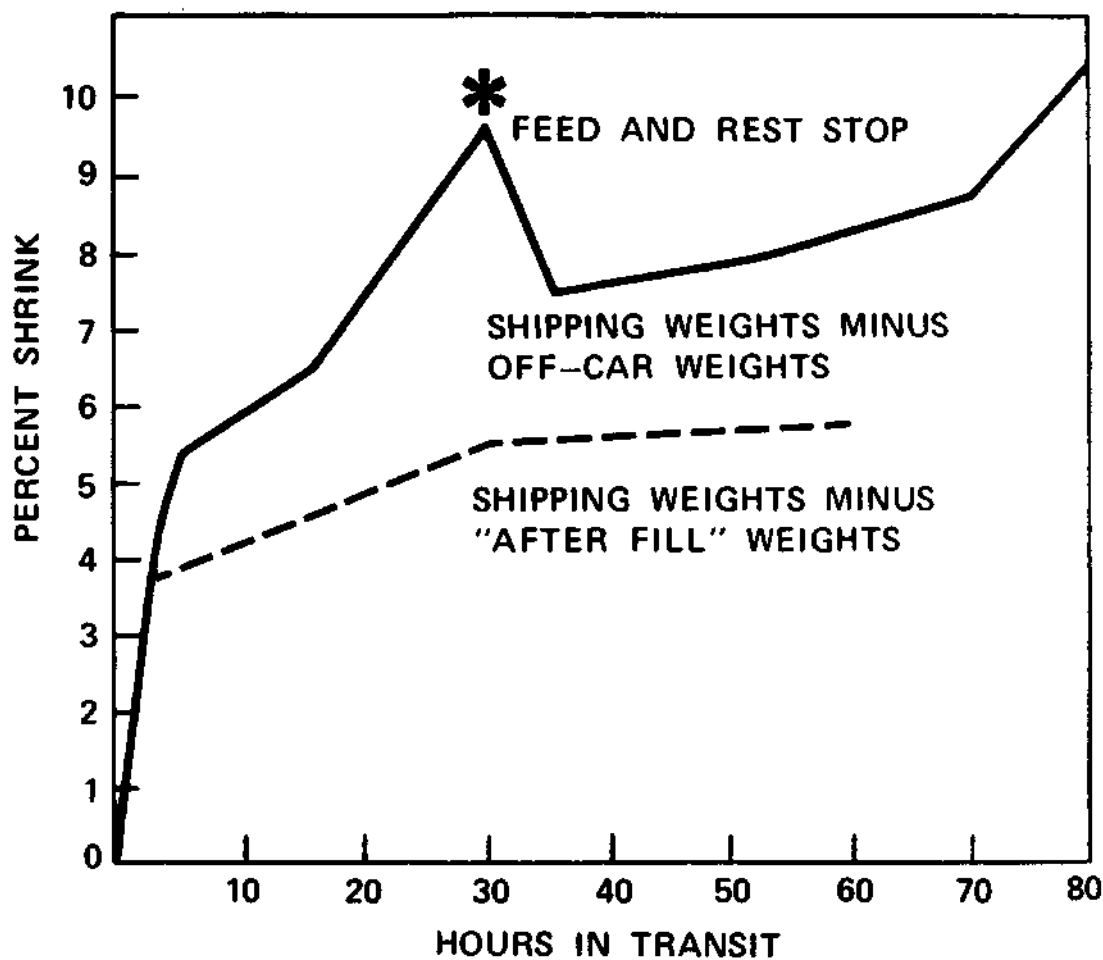


Figure 1. Shrinkage increases as hours in transit increase (fat cattle).

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