

# **Owned Pickup and Trailer and Contract Freight Cost Calculator**

## **Objective**

The purpose of this decision aid is to facilitate the cost calculation of a ranch pickup and/or a livestock trailer. The decision aid user can choose which analysis to do by selecting the appropriate sheet in the decision aid. The decision aid calculates the per mile and annual costs of pickup or trailer, the cost of making a trip with cattle. This decision aid is useful for enterprise budgeting, estimating transportation costs and evaluating purchasing and marketing alternatives. The contract cost calculator facilitates comparing ownership to contract services. These alternatives are readily available to ranchers. Appendix A shows trailer capacity by trailer size and cattle weight. Appendix B addresses the issue of cattle shrink based hours spent hauling cattle.

## **Input**

There are a number of variables in blue used to describe the vehicle or pickup and trailer. These can be observed in the attached decision aid example. Current market value can be the purchased value on a new vehicle, pickup or trailer or the market value (net) for a used one. Total miles used should equal remaining miles of use for a new vehicle, pickup or trailer. Remaining miles of use would reflect miles left for use for used vehicle or pickup or trailer. A term loan payment schedule calculator is provided in sheet 3.

## **Output**

There are three sections of output for the decision aid: per mile and annual costs, trip costs and allocated costs. The trip cost or allocated cost section can be ignored if they are not desired. The pickup cost can be calculated without the trailer; however, to calculate the combined pickup and trailer cost, the pickup must be included to generate these costs. It is best to use the vehicle cost sheet if only the pickup is under consideration. See the example for a clear illustration of output.

Alternative contract freight services cost calculator is in sheet 2. of this decision aid.

## **Definition of Terms Used in this Analysis**

**Variable Cost** - Variable costs are those costs that vary directly with the amount the vehicle is used. If the vehicle is not used, these costs are eliminated. Variable costs include fuel, tires, and maintenance costs.

**Fixed Costs** - Fixed costs are those costs that continue whether the vehicle is used or not. Fixed costs include depreciation, insurance, and interest costs.

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**Interest Costs** - Interest costs include actual financial charges on the loan required to purchase the vehicle or the interest that could be earned on the money in an income producing investment. See calculated loan payment schedule in sheet 3.

This is often referred to as the “opportunity cost of capital.” The input data requests annual loan payments to determine cash costs, but uses the interest rate specified to determine the interest opportunity cost of capital investment. This is a non-cash cost.

If the vehicle is being financed then the annual payment should be entered and this is used as cash cost which would be reflected in cash costs.

**Depreciation** - Depreciation is a measure of the actual loss of value in the pickup or trailer occurring in the current year. Thus, it may be different from depreciation used for tax purposes. The formula takes the fraction of remaining life used in the current year and multiplies it by the current market value of the auto or truck less salvage value. Depreciation is a non-cash cost of a depreciable asset with a life of more than one year.

### **Equations and Formulas**

The key formulas used in the analysis are as follows:

**Interest Cost Per Mile** = ((Market Value – Depreciation)/2) \* (Interest Rate x .01)/Annual Miles Use  
Based on Average Investment

**Depreciation Cost per Mile** = (((Annual Use (Mi)) \* (Current Market Value- Salvage Value)  
(Remaining Life (Miles))/Annual Miles of Use)

**Remaining Life** = (Useful life - Current Mileage)

**Total Cost per Trip** = ((Miles for Trip \* (Total Costs / Mi) + (Drive Labor Hours \* Drive Labor Cost  
per Hour) + (Additional Labor Hours \* Additional Labor Cost per Hour))

**Cost Per Unit Hauled** = (Total Cost per Trip / Number of Units Hauled)

For the Vehicle trip motel and other trip costs can be included to calculate the total trip cost.

## Appendix A: Trailer Capacity

BQA Recommended Maximum Number of Cattle for Trailers of Various Lengths

Trailer Size	Weight of cattle in pounds per Head							Total Weight*
	400	600	800	1,000	1,200	1,400	1,600	
Inside Dimen- sions in Feet	Number of Head							
<b>16x6</b>	18	12	9	7	6	5	5	<7,400
<b>18x6</b>	21	14	10	8	7	6	5	<8,400
<b>20x6</b>	23	15	12	9	8	7	6	<9,300
<b>24x6</b>	28	18	14	11	9	8	7	<11,100
<b>20x7</b>	27	18	13	11	9	8	7	<10,800
<b>24x7</b>	32	22	16	13	11	9	8	<13,000
<b>32x7</b>	43	29	22	17	14	12	11	<17,300

\*Do not exceed the Gross Vehicle Weight Rating for the truck of trailer.  
To estimate weight, multiply length time's width times 77.

Source: NCBA Beef Quality Assurance (BQA) 2008

## Appendix B: Cattle Hauling Shrink

**Significance of Shrink** - [Steve Boyles](#), OSU Extension Beef Specialist

During this time of year cattle are being placed on grass. A better understanding of factors affecting shrink should help buyers and sellers of cattle to arrive at a fair pencil shrink under specific marketing conditions.

Types of Shrink: There are two types of shrink. One is excretory which is the loss of urine and feces. Excretory shrink is the initial loss of belly fill. Much of this loss is replaced when cattle are again allowed to eat and drink. The second type is loss is tissue loss. It is the loss of fluid from the cells. Tissue loss is more critical.

The proportion of shrink from urine, feces, and other sources varies depending on environmental conditions. When ambient temperatures are low (below freezing, urine and fecal output can comprise 30-35% of shrink. When temperatures are hot, urine and fecal losses account for about 15-20% of shrink. Therefore, actual tissue loss may account for a significant proportion of the total shrink that must be replaced during a subsequent feeding period.

Time and Distance-Rules of Thumb: A very important factor is time in transit. In many cases, three-fourths of the variation is due to time. This explains why truckers should deliver cattle as soon as possible. The following are some estimates.

Hours in moving Truck	% Shrink	Days required to Recover Payweight
1	2	0
2-8	4-6	4-8
8-16	6-8	8-16
16-24	8-10	16-24
24-32	10-12	24-30

Distance is included as a factor because some people think in terms of distance rather than time. One estimate is a 3% shrink for the first 100 miles.

Cattle Handling, Equipment & Facilities: Anything that reduces stress in the hauling process will reduce shrink. Good loading and holding facilities, easy handling during the loading process and minimizing quick starts and stops in the hauling process can reduce shrinkage. Here are some links to information on hauling, handling and facilities.

Transporting Cattle: <http://beef.osu.edu/beef/beefMarc23.html#linka>

Cattle Handling and Working Facilities: <http://ohioline.osu.edu/b906/index.html>

It is believed that cattle disposition also may have an impact on shrink. In a study conducted at Kansas State University, two cattle sources were used. Cattle from one source were calm and handled easily, whereas cattle from the other source were easily excitable and difficult to handle. During an 11-day period following an overnight shrink, the excitable cattle recovered less body weight than the calm cattle.

Letting cattle have their breakfast: The time of the morning that cattle are removed from pasture before weighing can have an impact on both their body weight and the amount of shrink, they incur. Cows grazing were 2.5% heavier in late morning than in early morning. In another grazing study steers that were allowed to graze 3 hours before gathering were 1.9% heavier than those gathered at daybreak. Rate of cattle shrink throughout the day was also affected by length of morning grazing before removal from pasture. Steers allowed to graze for 3 hours before removal from pasture shrank at a rate of 0.86%/h less during the first 2-3 hours following removal from pasture than those steers removed as grazing began at daybreak. Therefore, allowing cattle to graze for an extended period before shipping not only allows them to gain additional body weight, but also reduces their rate of shrink during the early shrink period.