

Economics of Using a Water Truck for Feedyard Dust Control

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BACKGROUND:

Large concentrated cattle-feeding operations located in the Texas Panhandle can create dust emissions due to the region's semi-arid conditions. This issue of dust emissions emanating from an open-lot feedyard can be a nuisance to neighbors and a health problem for the operation's cattle, (Figure 1). These nuisance and health issues can be somewhat negated by adapting a proactive approach to dust control by undertaking the use of various suppression methods. One way of controlling dust emissions is to maintain pen surfaces at 25 to 40 percent moisture to enhance rapid bacterial activity (Lorimar, 2003). The three common methods of applying water to feedlot surfaces are: a water truck, a solid-set sprinkler or a traveling gun sprinkler system.



Figure 1. Evening feedyard dust conditions.
Source: Dr. Brent Auvermann.

OBJECTIVE:

Identify the capital investment and operating costs associated with a water truck system to control feedyard dust emissions.

RESULTS:

The initial investment cost for a 4,000-gallon water truck system(s) in 10,000-, 30,000- and 50,000-head capacity feedyards was estimated at \$154,771, \$309,542 and \$464,313, respectively. The projected total annual cost per head capacity, including both fixed and operating costs, was estimated to be \$3.77, \$3.06 and \$2.90 (Table 1) for the three-sized feedyards, respectively.

An advantage of water truck ownership is a lower investment cost than a solid-set sprinkler. In the presence of high winds, spray patterns from trucks can be more easily adjusted, and particularly bothersome dusty areas of the feedyard can be treated without applying water to the entire feedyard. Disadvantages of the water truck include high labor and operating costs, difficulty in water application during peak periods and the time delay required to fill the water tank. Despite these disadvantages, it remains one of the most popular methods used for dust suppression in feedyards (Figure 2).



Figure 2. Water truck in operation.
Source: Dr. Brent Auvermann.

Table 1. Estimated fixed, operational and total costs (\$/head-capacity) for three-sized feedyards.

Head Capacity	Annualized Fixed Cost \$/Hd-Capacity	Operational Cost \$/Hd-Capacity	Total Cost \$/Hd-Capacity
10,000	\$1.97	\$1.80	\$3.77
30,000	\$1.32	\$1.74	\$3.06
50,000	\$1.18	\$1.72	\$2.90

Lorimar, J. 2003. "Open Feedlot Construction and Management for Water and Air Quality Protection." Retrieved on March 22, 2008 from: http://www.cals.ncsu.edu/waste_mgt/natlcenter/modules/Module%208.doc.

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