

DEMONSTRATION OF ELECTRONIC MONITORING
AND MANAGEMENT OF STORED GRAIN

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In 1978, the grain industry in southeast Idaho requested assistance in determining the causes and in finding solutions to grain quality losses in farm-stored grain. The area had established a reputation for producing grain with quality problems and an automatic discount of several cents per bushel was common.

A series of meetings were held in various locations in the state. Elevator operators, company fieldmen, growers and university personnel were involved. Technical presentations were combined with general discussions on various aspects of grain storage.

As a result of these meetings, a research-documentation study was established in the summer of 1979 to determine the extent and kind of quality problems of farm stored grain. Solutions to the problems were also to be researched. A literature survey indicated that storage loss documentation was not available for the states of Utah, Idaho and Washington. The literature review also indicated that aeration could potentially alleviate some of the quality problems if specific kinds of deterioration could be documented (Christensen, 1974; Roberts, 1960; Sinha and Muir, 1973; Converse et al., 1977; Noyes, 1971).

For three storage seasons, thirty farmer-operated bins were monitored. Grain samples of 140 g were taken at twenty-day intervals and analyzed for moisture, insects, and germination. Additionally, three pairs of upright steel bins were instrumented to gather more detailed information. One bin of each pair was established as a control while the other bin was subjected to temperature management. Instrumentation included electronic monitoring of grain temperatures, fan operating time and ambient air conditions. Aeration systems and thermostatic fan controls were utilized to cool stored grain to 16°C or less by Nov. 1. Moisture, insects, mold and germination were monitored at ten-day intervals.

Results of the research-documentation study indicated most storage problems were associated with the advent of increased farm storage and newer, larger farm bins.

Weather conditions in southern Idaho tend to produce very dry, warm grain at harvest time. Moisture content of grain going into storage ranged from 8.5% to 11.5% (wet weight basis) and 21 to 35°C. Storage time or aeration time did not influence average grain moisture. No quality losses were detected in aerated, instrumented bins. Losses frequently occurred in control and survey bins from excessive grain moisture due to moisture migration.