



Technical Article

Bulk Grain Silo Developments in Southern Africa

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The history of the development of the large diameter freestanding bin silo in South Africa is given explaining the advantages and highlighting some of the problems encountered, the solution of which resulted in the type of grain silo which is now being constructed throughout Southern Africa. Failures which occurred in the early stages are described and discussed. Construction techniques to suit conditions in developing countries are covered. Design standards commonly used for these bins are compared with Codes of Practice. Conclusions based on tests done on a full scale bin are presented which indicate the effect of loading, emptying and temperature on grain pressure in these bins.

1. Introduction.

South Africa has in the past 30 years developed a sophisticated industrial infrastructure. From the 1950s this has resulted in a general migration of labour from the rural areas to the towns and cities thereby leading to a shortage of labour in the rural areas. This, together with a general shortage of bags, resulted in a rapid swing towards the handling of grain in bulk.

Initially silos were constructed in Southern Africa based on European and American experience but it was found that these were too expensive to build and unnecessarily complicated to operate. The reasons for this were as follows:

1. Construction required too much plant and skilled labour.
2. The high rate of construction of these structures put a strain on local transport facilities to bring the required volume of material on site to meet the construction programme.
3. As only locally produced grain was stored, large numbers of compartments for different grain types were not in fact required.
4. Operator experience and difficulty of obtaining spare parts proved a problem and sophisticated machinery was soon replaced with simple plant although this was more labour intensive.
5. Electricity costs were high in areas in which grain silos were required and thus operations had to be planned to limit power consumption.

After much discussion with Co-operatives and Contractors, the large diameter free-standing silo bin was developed and found to be the most suitable. In fact, this type of silo has proved to be so successful that it has now been adopted as the basic standard for Southern Africa.