

DPI&F note

Grain Storage - Underground pit storage of grain

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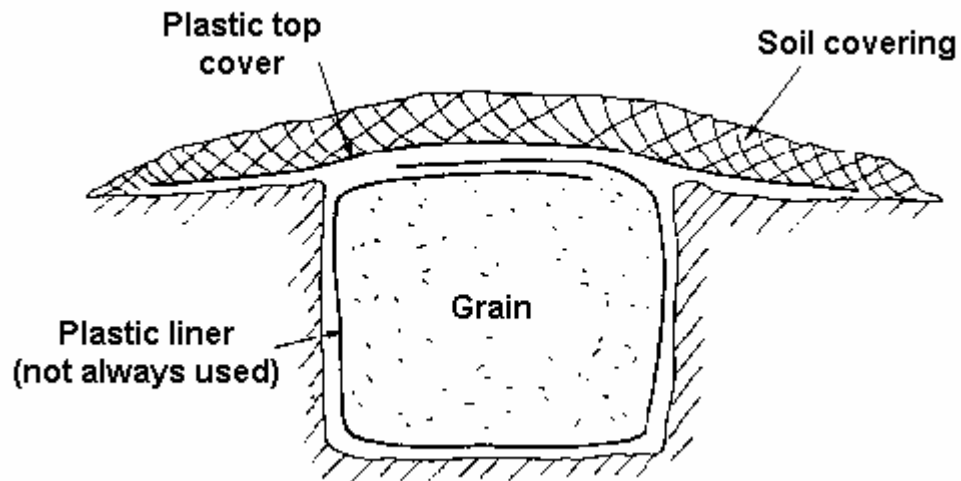


Figure 1: Cross section of underground pit storage

Underground pits (Figure 1) are an effective, low-cost method of long-term grain storage. Their most common use is for storing drought feed reserves on farms. Feed grain has been recovered in good condition after more than 10 years. The main drawback of underground storage is the difficulty of removing grain. The method is successful only if careful precautions are taken. Grain moisture content must be less than 12% to keep the risk of spoilage low.

Locate the pit on a well-drained site above the water table, with the immediate surrounds graded to prevent rainfall run-off collecting in the pit area. Water seepage through the side walls of the pit is a major concern. Keep pits at least 10 metres apart to prevent seepage from an empty pit to a full one.

The pit should not be more than three metres wide. This allows the covering soil to be placed and removed by a front-end loader without having to drive over the top of the grain. The depth will be determined by the unloading facilities. Match pit capacity to available silo and truck capacity so that the pit can be completely emptied once it is opened.

Filling can be done either by driving into the pit, or using an auger from the side. Be sure not to drive too close to the edges of the pit. Keep heavy machinery, such as trucks and tractors, away from the pit edge by a distance at least equal to the depth of the pit.

A pit may be unlined if the floor and walls can be made firm and clean. Plastic lining is often used and this should be laid at the starting end just before loading begins. The lining can be unrolled as filling progresses. Fill the pit until the grain forms a slight ridge along the centre.

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After filling a pit, the grain should be covered with plastic sheeting and soil. A layer of soil about 0.5 metres thick will provide good protection. An initial layer of sand will prevent rocks or hard clods from damaging the top cover. The soil should be shaped to aid run-off. Mark the location of the pit with a peg at each corner.

To unload the pit, it is necessary to be able to remove all the covering soil without contaminating the grain. This can be difficult and is the reason for using narrow pits. Always unload the entire contents once the pit is open, otherwise losses due to drainage problems are likely. Pneumatic conveyors are ideal for emptying pit storages, and allow much easier final clean-up of grain than other methods. Mobile augers or belt conveyors with fixed and guarded cross-sweeps, or a front-end loader can be used to empty the pit.

A well-constructed pit storage is air-tight and oxygen levels gradually reduce over time. The low oxygen levels prevent development of damaging numbers of grain insects. If in doubt about the gas-tightness of the pit, grain protectants can be applied to the grain when it is placed in storage. For information on choice of protectant insecticides see www.dpi.qld.gov.au/fieldcrops/3947.html

Further information

- This DP&FI Note is based on a section of the book “Storing, handling & drying grain: A management guide for farms” by Alan Andrews and Troy Jensen (QI 96081), which is available from DPI&F Client Service Centres and DPI&F’s Shop On-Line www.dpi.qld.gov.au/shop.
- More DPI&F Notes on insect control in stored grain, grain aeration and storage are available on:
 - ⇒ DPI&F’s PrimeNotes CD-ROM: www.dpi.qld.gov.au/shop
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