Guidance on Construction, Repair and Maintenance

Note No: CGN 011

May 2002

THE USE OF COVERS ON CIRCULAR STEEL AND CONCRETE SLURRY STORES

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Funded by The Department for Environment, Food & Rural Affairs.



Figure 1. Circular steel slurry store with retro-fitted flexible tent cover

Environmental Benefits

Many environmental and practical benefits result from the use of covers on both new and some existing slurry stores. Odours from the store are significantly reduced and ammonia losses will also be reduced by 80% to 90%. Rainwater falling onto the store can be disposed of through a clean water system rather than being added to the store contents. This reduces the land area required for spreading, which further reduces the risks of causing water pollution and odour nuisance.

The saving in store size can be in the order of 15% to 25% depending on local rainfall and the volume of slurry to be stored. Covers can significantly reduce the environmental impact of both new and existing slurry stores. These factors are important in developing environmental assessments as part of an application for planning consent.

Financial Benefits

- In areas of medium to high rainfall, fitting a cover will significantly reduce the size of tank required. This will save some of the cost of adding the cover.
- If extra storage capacity is required, then fitting a cover can be an economic option rather than extending the existing store.
- The overall quantity of slurry to be spread is reduced but the quality in terms of nutrient content is increased. This results in significant savings in labour and equipment.
- Slurry management is easier as exceptionally high rainfall events have far less effect on slurry volume.
- Improved odour and ammonia control may allow sites to be developed that are otherwise unacceptable.
- There is the potential to collect and use the clean water run off from the cover to save on water costs.

Types of Cover

1. ***Lightweight rigid covers*** are available for most new circular steel and concrete tanks supplied in the UK. These will usually include a central supporting pole mounted onto the slurry store floor. From this pole a metal framework is constructed out to the perimeter of the tank. This framework carries lightweight, panel-roofing material such as fibreglass or lightweight metal.

2. ***Flexible, tent type covers*** (Figure 1) are often made from heavy gauge polyester with PVC coating and have been used in the UK. They are well suited to retro-fitting to

existing tanks. They have a central pole mounted on the floor of the store with straps or spokes out to the perimeter over which the flexible covering is stretched.

Retro-fitting Covers to an Existing Tank

- Discuss your requirements with the local planning authority and the Environment Agency. While the reductions in odour and ammonia are likely to be very welcome, the overall height of a tank is significantly increased. Covers are usually sloped at about 15^0 so that they 'sit' well with other modern farm buildings. For stores built prior to 1991 notification to the Agency of 'substantial' reconstruction[1] may be required.
- Discuss your proposal with the tank manufacturer. The original conditions of the tank guarantee and the tanks structural design will be changed when a cover is fitted.
- Consider the remaining life of the structure. To comply with the Control of Pollution Regulations 1991[1], slurry stores and their covers need to be designed with a 20-year life span (with maintenance).
- Select an experienced installer who will certify that the completed works are built to the required standard.
- A suitably qualified structural or civil engineer, preferably one with experience in agricultural design, must assess the tank. The condition of the tank should be checked paying particular attention to any mechanical damage and signs of corrosion around bolt holes and joints. Appropriate repairs may be recommended.
- It is vital that the new structural loads are properly calculated in accordance with the relevant structural standards. New loads on the tank will include the following:-
  i) Increased wind loads due to the increased height of the tank and cover
  ii) Increased wind loads due to the slope of the cover
  iii) Increased loads from snow which can settle on the cover
  iv) The weight of the cover and its supports

Loads can typically double and total structural failure can occur if this is ignored. Reinforcement to the top ring of steel tanks will normally be required. This can be in the form of increased panel thickness, and/or steel angle or tubing around the top of the tank. Suppliers of retro-fit covers may well have their own engineers to carry out these designs. Concrete circular slurry stores are inherently more rigid than steel stores so fewer structural modifications may be required.

All Covers

It is important to consider the disposal of rainwater run off from the cover. If the water is allowed to find its way back into the farm slurry or dirty water system then much of the benefit of the cover will be negated. The run off must be directed to a clean water system.

- Check that the proposed cover includes any access required to use slurry agitation and other equipment in and around the tank.
- Check that the cover has some ventilation to avoid the build up of pressure below it.
- Installation of a cover is best left to a specialist supplier/contractor.

Standards

Although covers are not yet in widespread use in the UK the relevant British Standards are being progressively updated to include them. In particular BS 5502 Part 50[2] will be revised.

Safety

- NEVER enter the space below a slurry store cover without suitable breathing apparatus or first confirming with suitable equipment that no dangerous gases are present. Access points should normally be kept locked or made inaccessible by other means.
- NEVER walk on covers, which are in effect, fragile roofs.
- Suitable signs MUST be displayed to warn of the dangers of confined spaces and fragile roofs.

References

1. The Control of Pollution (Silage, Slurry and Agricultural Fuel Oil) Regulations 1991 (as amended).
2. British Standard 5502 Part 50: Design construction and use of storage tanks and reception pits for livestock slurry.

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