

Maintenance and Repair of Silage Pits

Tom Ryan, Teagasc, Kildalton College

Text of article for Today's Farm "Silage Pit Renovation" March/April 1995

Now is the time to examine the silage pit and ensure that it is in good condition. Where there are defects or problems these must be remedied before silage making commences. The objective is to ensure that all silage effluent is collected and safely conveyed to storage.

The condition of the silage pit is the most important factor in deciding what needs to be done. This can only be assessed by washing and thoroughly checking the pit for defects and problems.

Regular maintenance of the silage pit ensures that minor problems are attended to while still minor. Where problems are more serious, a decision must be made on the appropriate remedy. In some instances a short term solution may work and allow time to plan and organise more appropriate remedies.

Inspection

The first step is to thoroughly wash down the pit, especially the floor, to enable problems be fully assessed. Look out for cracks, porous patches, unsealed and eroded joints. The extent of the damage can be assessed by hacking away any unsound concrete. Structural failure, particularly subsidence and movement in the floor, should be watched for.

Repairs to Floors

The condition of the floor will determine the extent of the repairs that need to be carried out.

- In situations where the old floor is badly undermined, extensively cracked and worn, it will be necessary to remove the old floor and sub-base and proceed as for a new silage pit.

- Where the floor is structurally sound but eroded, has unsealed cracks and joints and has subsided in localised areas, the most practical and cost effective solution may be to lay a new slab over the old one. Subsided areas need to be made good and cracks/joints filled with a sand/cement mortar. Lay the new slab on 1000 gauge polythene; a leveling layer of sand must be used under the polythene.

Both the above options require advance planning and will usually require the services of a competent contractor. Follow the Farm Development Service specifications for concrete silos (S120, SI20X and SI28); they contain all the necessary information to do quality work.

Bonded Repairs

Thin floor screeds (12-20mm) can sometimes be useful where over-slabbing would severely upset existing levels and drainage, or where only parts of the floor require attention. The floor should be structurally sound, and thoroughly prepared to ensure successful bonding.

The resistance of concrete to effluent attack can be increased by the addition of a synthetic rubber or latex called styrene butadiene resin or SBR as it is commonly known.

In thin floor screeds it is essential to use it. It is used both in the repair mix and as a bonding agent. Wherever a repair mix is used it must be bonded to the existing concrete.

The repair mix consists of sand, cement and SBR, e.g. 150 kg sharp sand, 50 kg cement and 10 litres of SBR. The aim is to achieve a stiff mix, but some water may be added if necessary. The bonding coat, or slurry coat as it is called, consists of two parts cement and one, part SBR. These are mixed to form a slurry-type consistency. The slurry coat is brushed on to the prepared surface

followed by the repair mix, which must be placed and finished before the slurry coat dries (i.e. wet on wet). Curing is essential for all thin bonded repairs. The manufacturer's recommendations must be followed carefully, because formulations and procedures vary from manufacturer to manufacturer.

Joints/Cracks

Check joints to make sure the sealant is in place and doing its job. It must be replaced where it has been pulled out or where it is no longer bonded to the sides of the joint.

The appearance of the joint/crack after cleaning and cutting back to sound concrete will determine the type of repair that is required. Where the joint/crack is narrow and shallow, it is only necessary to prime the sides and use a sealant. Hot-poured rubberised bitumen is very suitable. Non-flexible blown bitumen (roof pitch) is brittle when cold and should not be used for sealing Joints/cracks in silage pits. Gun applied sealants, such as polyurethane, are also very effective. Where sealants are used in wall joints/cracks gun applied sealants must be used. Cracks/joints which initially look narrow will often double in width when cut back to sound concrete. Depth may extend to the sub-base (hardcore material). In these situations, the prepared joint may be filled with an SBR repair mix with a slurry coat used to form a bond.

Where the joint/crack is not too wide, fill to within 15-20mm of the surface. The track that is left may be primed and sealed after about a week.

Where the joint/crack is wide, the SBR repair mix should be brought to the surface. Ideally, in this case, a joint should be cut and sealed. This will allow for movement in the floor.

Holes in the floor may be repaired in a similar manner. The sub-base under the repair must be secure. Fill the hole with concrete, topping it off with the SBR repair mix and finish flush. Bond the repair at the edges with a slurry coat.

The success of these repairs depends on the structural stability of the floor and the attention to detail in carrying out the work.

Joints/Cracks in Walls

Cracks in silo walls can occur where contraction joints are omitted or incorrectly formed, where inadequate steel is used or where there was insufficient overlapping of the horizontal steel. The risk is greatest in long walls and where high strength concrete is used. Hairline cracks in new walls may be sealed with a protective coating. Wider more clearly defined cracks, or those that have eroded over time, will require more work. Basically the procedure is the same as that used for repairing joints/cracks in floors.

However, the SBR repair mix may have to be built up in layers.

In a free standing wall, it is only necessary to seal joints/cracks on the inside face but in a wall between two pits, both faces must be attended to.

Wall/Floor Joint

One approach to tackling this difficult problem is to replace concrete eroded with an SBR repair mix. This is bonded to the base of the wall and the floor area near the wall.

The joint is also filled. When this is cured, a joint may be cut using a concrete saw and sealed. Alternatively, if no crack appears in the joint it could be left until the following year. Usually a hairline crack develops which should be widened out with a concrete saw and sealed.

Other areas of the wall, if not badly damaged, may be protected with two SBR slurry coats followed by one or two protective coatings.

Safety

Care must be exercised in the use of concrete saws when cutting joints. A suitable dust mask as well as eye, ear and foot protection must be worn. When ready for pouring, the temperature of hot rubberised bitumen is 165-170⁰C -so, be sure to read the safety precautions on the product information.

Protective Coatings

Protective coatings tend to work well on new concrete and well cured repairs. Where walls are plastered they seem to adhere better to a wooden float finish than a steel trowel finish. Yearly touching up may be necessary to maintain effectiveness, e.g. machine damage. Consideration should be given to treating the most vulnerable areas in new or renovated silage pits, i.e. effluent channels and surrounding areas, and the environs of the wall floor joint.