

Milking Parlour Floors

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Many farmers are contemplating parlour improvements over the coming months. Getting the floor right is very important. A milking parlour floor has to be constructed properly if it is to perform its functions properly. A good floor has to have a durable non-slip surface that is easy to clean. The floor must be at the correct height in relation to the surrounding yard, buildings and depth of the pit. The gradients must be adequate to provide effective drainage and the floor should ideally have a steel mesh to act as protection against the possibility of stray voltage.

Where a new parlour is being built every effort should be made to get the floor exactly right. This requires a lot of thought in some situations because of the contours of the site and its location in relation to existing buildings. Where an existing parlour is being upgraded or extended factors such as the depth of the pit, the direction of the falls in the cow standings and the elimination of steps or steep ramps come to mind.

Surface Durability

Form the foundation for the floor with 150mm of blinded and well compacted hardcore. Lay this to the falls required in the finished floor. Use concrete with a minimum strength of 30N/mm^2 and a cement content of 280kg/m^3 and lay it to a depth of 100-125mm. Using concrete with a strength of 40N/mm^2 and 350kg/m^3 of cement would give a more durable surface. It should be considered especially if a dry shake-on powder is not being used. More care is needed with 40-newton concrete because it is more inclined to crack and will go off more quickly. A wooden or plastic float finish will give a surface that's non-slip and easy to clean.

Curing is just as important as cement content when it comes to durability of concrete floors. This is especially true in milking parlours because a drying wind often tends to blow through them. If the water in the concrete dries out before it has a chance to react with the cement in the concrete, the concrete surface will be weak and significantly less durable. In severe drying conditions shrinkage cracks will be formed also. The simplest method of curing concrete is to cover it for about a week with a new sheet of polythene held in place with a shake of sand to prevent air blowing under it.

Dry Shake-on Powders

Incorporating a coloured, shake-on powder onto the top 5mm of the wet concrete will enhance the wearing surface of the floor. This can increase the abrasion resistance by over 800% compared to 40-newton concrete, while providing a bright, slip resistant surface for the cows to walk on. The powder is available in five colours, natural, tile red, mild grey, dark grey and mild green. The concrete is placed and levelled in the normal way. When any bleed water has evaporated, a 25kg bag of the dry powder is sprinkled by hand over an area of 10m^2 and left to soak up the water from the concrete. After about ten minutes the material should be rubbed with a wooden or plastic float before applying a second bag of powder to the same area. The final finish can be achieved by rubbing with a wooden or plastic float, giving a non-slip, easy to clean texture to the surface of the floor. Curing is also required. The manufacturer's instructions should be followed. The shake-on topping costs about €6.50 per square metre.

Good Drainage

Getting the falls right in and around a parlour is not easy. One of the main aims is to provide effective drainage. Good drainage means that wash water will flow freely to channels and pipes without you having to chase it all over the yard and without leaving any lodged water on the surface.

Other aims are to avoid having to use steps or steep ramps and to position the height or level of the parlour and associated yards correctly in relation to cow access routes to and from buildings and roadways. Don't be tempted to base the levels for the parlour at the most suitable level for the dairy floor. If necessary, well-designed steps can provide safe and easy access to and from the dairy.

Slope of the Cow Standing

The cow standing should fall in the same direction and ideally have the same slope as the milking line. This is usually towards the front of the pit. In this way the same height of milk lift is maintained for each unit. The height of milk lift (measured from the cow standing to the highest point of entry to the milking line, recording jar or meter) should not exceed 1.6 metres. If the milking line and the cow standing are sloping in opposite directions in long parlours the milk lift of the units at the back can be excessive.

The slope in the cow standing from entrance to exit should be about 1:60 to 1:80. In parlours up to about 8 units a slope in the standing to the back of the pit (from exit to entrance) shouldn't pose a problem. You can tolerate having the cow standing level along the length of the parlour up to about 14 units. However, wherever possible and for over 14 units the slope should be from entrance to exit and parallel to the milking line.

Channels

Sloping the cow standings towards the front of the parlour poses some problems for getting the wash water back to a tank if it's in the collecting yard behind the parlour. Keep the slope in the return yard (drafting area) to a minimum, relying on possibly a split drain (Diagram 2) at about 1:80 to 1:100 to bring the washings back to the tank. The split drain would run the full length of the return yard with a slope into it from both sides. Cows can walk over this type of channel. The split drain will help to cut down on washing time and can allow you to wash dirty sections without having to wash clean sections in the same yard. Other types of channels have merits also. The open channel (Diagram 1) is suitable under meal troughs and should be a bit easier to construct than the split drain. Yard gullies interconnected by 150mm sewer pipes can also be used to drain yards effectively. The open channel and the yard gully method can be used to convey washings at different gradients and in different directions to the slope on the surface.

Pit Slope and Depth

The slope along the pit should be the same as the slope in the cow standings. The slope from the edge of the pit to the sidewall of the parlour should be 1:40 leading to an open channel (Diagram 1) or into a split drain (Diagram 2). Where straight concrete troughs are used in side-by-side parlours good drainage is achieved if the channel is located a little under an overhang of the trough away from the cows' front feet.

In the pit a 1:40 slope from the centre towards the cow helps to reduce bending of the back when attaching clusters. The depth of the pit is always a taking point. The ideal depth varies from person to person. Obviously its much easier to reduce the depth than deepen it. The correct depth is the depth that allows one to stand straight while attaching a cluster. The correct depth is in the region of 800-900mm (32-36") for most people. Allow for the use of some sort of shock absorbing mat on the floor.

Pit Drainage

Where the pit cannot be drained by gravity into the soiled water tank it should be piped by gravity from the pit into a sump located in a suitable safe place outside the parlour. It can be pumped from this sump to the soiled water tank with a small float-switch controlled submersible pump.

Slope in the Collecting Yard

The slope just behind the parlour can slope back (1:40 to 1:60) to a soiled water tank and the slope from the back of the collecting yard should slope towards the parlour (about 1:60). Some people favour a continuous slope towards the parlour. You can have a continuous slope towards the parlour as long as it's no greater than about 1:60. Too much of a fall towards the parlour may cause the cows to crush forward as they enter the parlour. Excessive slipping is also likely in frosty conditions.

When you locate the soiled water tank in the collecting yard the slopes in the yard and the levels of the inflowing pipes will affect its capacity. The capacity lost when the inflowing pipes are 300-400mm below the slats can be allowed for and shouldn't be of too much concern if the falls are right.

The soiled water tank should be at least a metre from the edge of the pit for hygiene reasons, but from the point of view of future expansion it may need to be back much further.

Bonding Grid

In the interests of eliminating the possible effects of stray voltage it is recommended that a metal equipotential grid is located in the floors of milking parlours. The floor is a conducting surface and the metal grid allows it to be bonded to the rest of the equipment in the parlour.

In new parlours A142 steel reinforcing mesh 200mm x 200mm should be laid in the floor within 40-50mm of the surface (Diagram 1). The mesh should be laid in the cow standings, in front of and behind the pit and on the floor of the pit. Extend the mesh as far as possible into the yard to eliminate possible shocks as the cows move into the parlour. The mesh should be turned down into the ground at 45⁰ in the form of a ramp for about 1.8m at its extremities near the entrance and exit of the parlour.

In some countries 100mm x 100mm mesh is recommended. All sheets of mesh must be overlapped and welded together at several points and ideally welded to all uprights and pipes fixed into the floor. In this way, all metalwork in the parlour and dairy, including the milking machine is connected electrically via the upright pipes to the mesh in the floor. Thus, all surfaces in and around the parlour and dairy can be maintained at or very near the same potential.

The mesh will also lessen or eliminate the need for contraction joints in the floor.

In an existing parlour the mesh may be located in either a new floor or, where suitable, a screed on the existing floor. Another alternative is to lay copper bonding conductors in slots cut in the floor and grouted. This method should only be considered if the floor is in good condition.

Detailed information and specifications are contained in Section 705 (and supplements to it) of the ETCI (Electro Technical Council of Ireland) Wiring Rules. Your Teagasc adviser will get this information for you.

NB: I have modified my thoughts about the fall in the return yard. It's only a problem if a split drain is used. If it is put in at 1:100 the level near the tank will be very low. A fall of 1:500 would reduce this and still allow effective drainage (others might disagree). Diagram 3 shows the "correct" arrangement.

If a few yard gullies are used a 1:100 fall can be put in the underground sewer pipes and the yard left at 1:500 along the return yard. A slope of about 1:40 is needed from the sides towards the centre of the return yard.

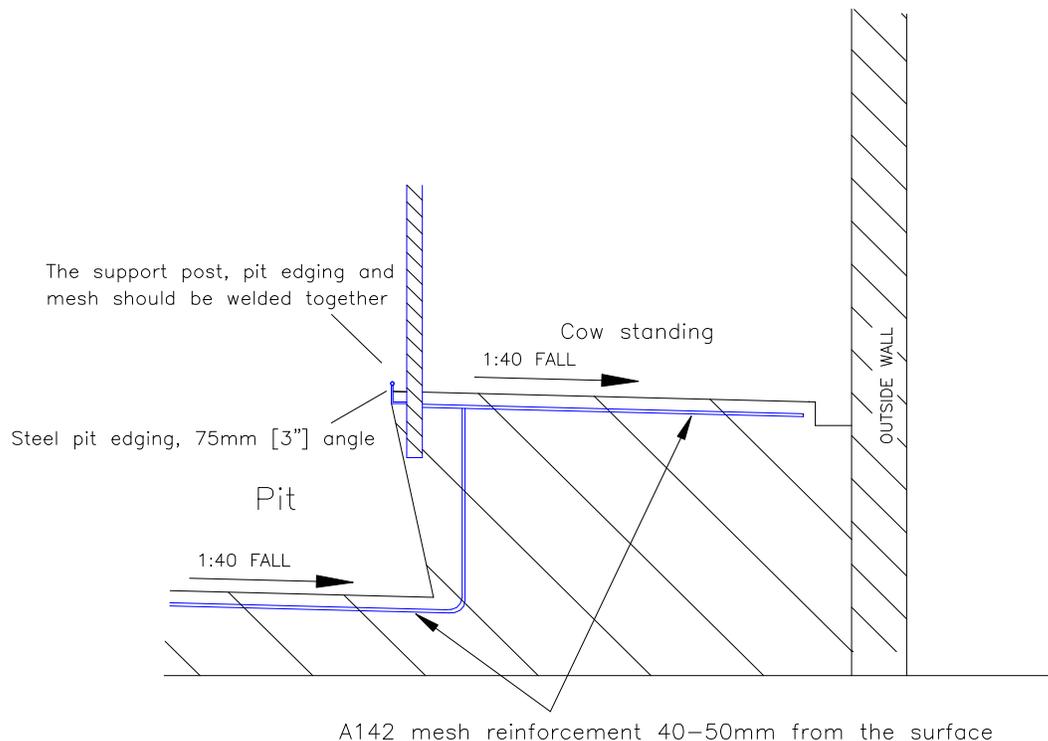


Diagram 1: Cross section of one side of 2' 6" (762mm) parlour with steel mangers (mangers not shown) showing crossfalls, pit edge detail, mesh and channel

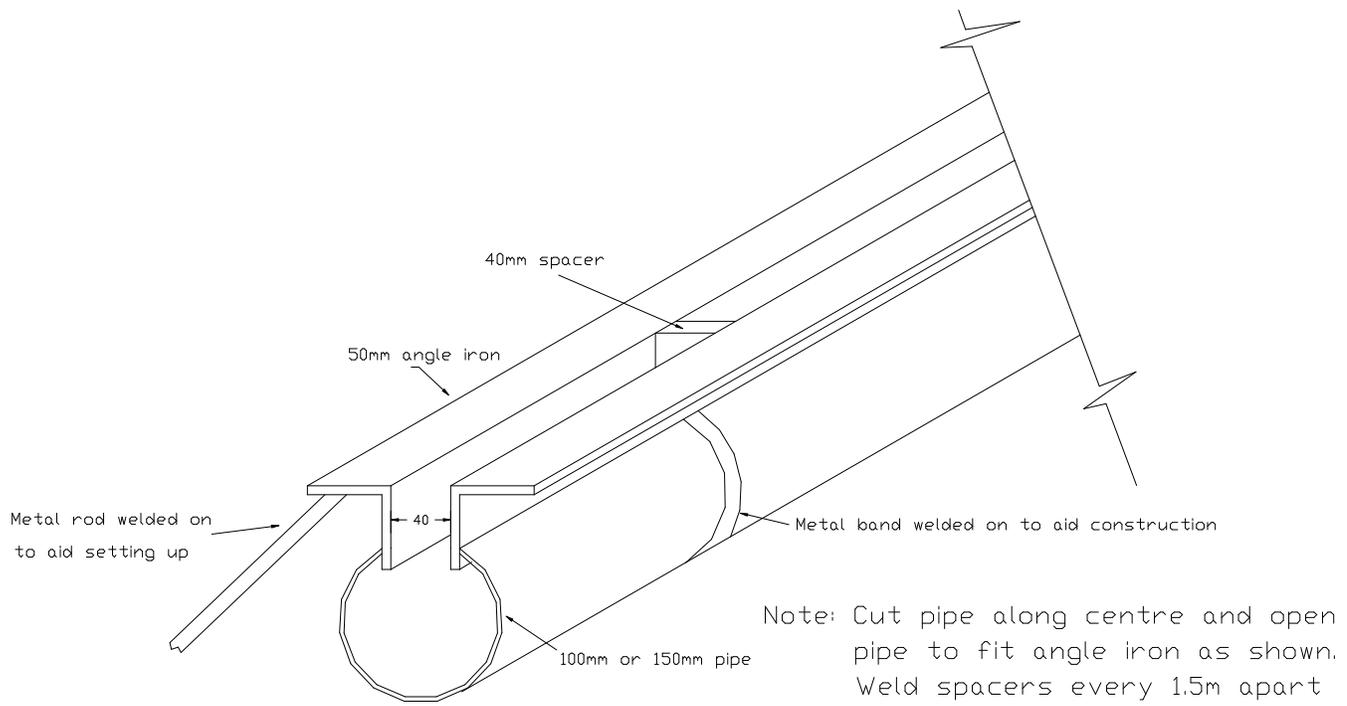


Diagram 2. Split drain