Getting the best out of concrete
GETTING THE BEST OUT OF CONCRETE

STEEL and concrete are two of the most widely-used materials in the world today but although most laymen know that the steel technologist uses various additives to give him steels that are especially suited for certain tasks, it is not generally realised that there are a number of preparations which, added to concrete, make it especially suitable for use under certain conditions.

Concrete, as known to the farmer and home-builder, may be briefly described as a synthetic stone made from Portland cement, sand, gravel, or other aggregates, mixed with water and allowed to "set." In this form, it possesses many good qualities, being durable and reasonably impermeable, but in recent years the scientists have evolved a number of additives and surface treatments which have greatly widened the scope of its usefulness.

NON-SLIP GRAINS

Dairy floors, concrete steps and pavements may be given a non-slip surface by treating them with special grains made from a mixture of carborundum and aluminium oxide.

On new work these are applied to the cement mortar topping which is usually applied within 48 hours of the laying of the basic concrete. The topping is usually made from a three to one mix of river sand and cement and within 15 minutes of the topping being screeded and compacted, the grains are broadcast on the surface at the rate of about 3 lb. per square yard, with an equal volume of dry cement. The surface is then compacted with a wooden float and trowelled to a dense finish with a steel float.

CASE-HARDENING

If your concrete is likely to encounter a lot of hard wear you can increase its normal resistance to abrasion by giving it two coats—at six-hour intervals—of a special case-hardening compound.

This treatment may be applied in addition to the non-slip grains—the first coat being applied not less than 48 hours after the trowelling of the non-slip surface. It may be sprayed on or applied with a hair broom.

You need not stop at this in your endeavour to create a perfect floor for a dairy or shearing shed for there is yet another dressing which will make the concrete still
more resistant to lactic acid, wool grease and urine. This may be applied on the day following the last coat of case-hardening fluid.

Old concrete can be successfully treated with case-hardening fluid and the oil and grease proof dressing.

**PROOFING AGAINST OIL**

For the floors of factories, garages and workshops there is a special dressing differing chemically from that used for dairy floors. It will proof the concrete against penetration by liquid fuels, solvents, lubricating oils and grease.

These substances stay on the surface instead of being absorbed by the concrete. Even if left for a considerable period they will wipe off cleanly and completely as if from a marble surface.

This treatment is being extensively used by the leading oil companies.

**WATERPROOFING**

An integral waterproofing substance which is mixed into the cement is proving very popular for many tasks. For making a waterproof mortar used in rendering walls or treating tanks or troughs, one-third of a gallon of the waterproofing compound is used with each bag of cement in the three to one sand and mortar mix.

**BONDING**

Another chemical aid for the concrete worker is a special bonding agent which provides the “flux” to make concrete adhere to older work or to metal. It is particularly useful when putting a new “topping” on an old floor or when lining an old rusted tank with concrete.

Before applying new topping, an old floor should be thoroughly scrubbed down. It should then be painted with the bonding agent and left for four to six hours after which the topping (a three to one mortar mix) is applied and floated. The topping should not be less than one inch thick. One or all of the non-slip grains, case-hardening and grease-proofing dressings may be applied as described earlier.

**CEMENTING TANKS**

The tank should first be inspected to ensure that no large cracks or corrosion failures are present. If so, these should be repaired before the actual lining is commenced.

First thoroughly scrub down the inside of the tank with a wire brush to remove all loose material and slime, and finish by washing and flushing with clean water. Allow to dry for one day and then apply the following treatment for lining.

A liberal coat of a bonding agent should be applied over the walls and bottom of the tank, paying particular attention to joints between plates and between the bottom and sides. The bonding agent may be brushed or sprayed on and a coverage of 400-500 square feet per gallon is usually obtained. Allow the bonding agent to dry to a tacky film, usually taking two to four hours.

A waterproof mortar, consisting of three parts sand to one part cement with one-third of a gallon of integral waterproofer for each bag of cement should then be mixed to a stiff mortar and applied evenly over the entire inside surface of the tank. For smooth surfaces, such as concrete or steel plate tanks, this should be applied to a minimum thickness of \( \frac{1}{8} \) in., and in case of corrugated iron tanks a minimum thickness of \( \frac{1}{4} \) in. over the ridges of the corrugations. It should be noted that if it is not possible to complete the job in one application, it will be necessary to apply the bonding agent to the joint between the old and new mortar to ensure a bond, as the waterproof mortar when dry has practically no “suction.”

The lining should be allowed to dry for four to six hours and should then be kept damp by hessian or water spray for several days. If necessary, the tank could be carefully filled on the second day and, by avoiding turbulence there would be no serious effect on the render.

Proceed similarly for troughs.

**APPROXIMATE QUANTITIES**

<table>
<thead>
<tr>
<th>Type of Tank</th>
<th>Sand (cu. ft.)</th>
<th>Cement (bags)</th>
<th>Bonding Agent (gal.)</th>
<th>Waterproofer (gal.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>500 gal. steel or concrete</td>
<td>4½</td>
<td>1½</td>
<td>¼</td>
<td>½</td>
</tr>
<tr>
<td>1,000</td>
<td>6</td>
<td>2</td>
<td>3 pints</td>
<td>3</td>
</tr>
<tr>
<td>2,000</td>
<td>10</td>
<td>3½</td>
<td>5 pints</td>
<td>1</td>
</tr>
<tr>
<td>5,000</td>
<td>18</td>
<td>6</td>
<td>1 gal.</td>
<td>2</td>
</tr>
</tbody>
</table>

Corrugated galvanised iron tanks require \( 1\frac{1}{4} \) times the above quantities.
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