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Slip Resistant Concrete Floors

Purdue University Cooperative Extension Service

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Adm
New
yes

Introduction

Slippery concrete floors can result from concrete surfaces being finished with a steel trowel. Steel troweling brings fine aggregate and cement to the top, forming a glazed surface. Wood float and broom finished surfaces become smooth in time due to tractor scraping and constant animal traffic.

Select the degree of roughness based on the type of animal confined. Deep grooves make cleaning and disinfecting more difficult and may cause foot and leg problems with smaller animals.

New Floors

To roughen new floors, score the surface with a homemade tool or add aluminum oxide grit after floating. Be certain the surface is hard enough not to let the concrete flow into the grooves or cover the grit.

Rough Surfaces

Roughen the surface while the concrete is wet but firm. Make grooves diagonal to the direction of traffic. Fig 1 shows a roller/finisher of expanded metal lath that leaves a diamond shaped pattern. Fig 2 shows wood strips $\frac{3}{4}$ " thick nailed to a 2'x8' sheet of exterior plywood. The grooves are pressed into the concrete at a diagonal to avoid catching scraper blades. Fig 3 shows $\frac{1}{2}$ " smooth rods welded 6" apart on a curved plate. While the concrete is still wet but firm, push the plate across the concrete at a diagonal. Then push the plate across the grooves for a diamond shaped pattern.

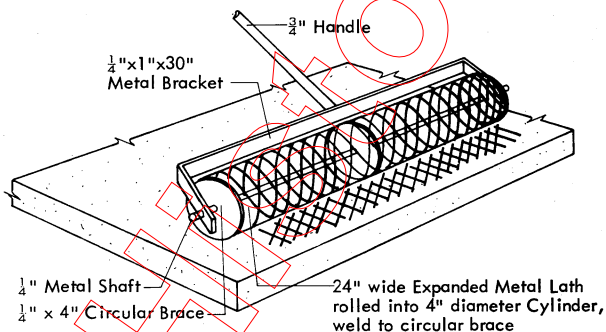


Fig 1. Expanded metal roller.

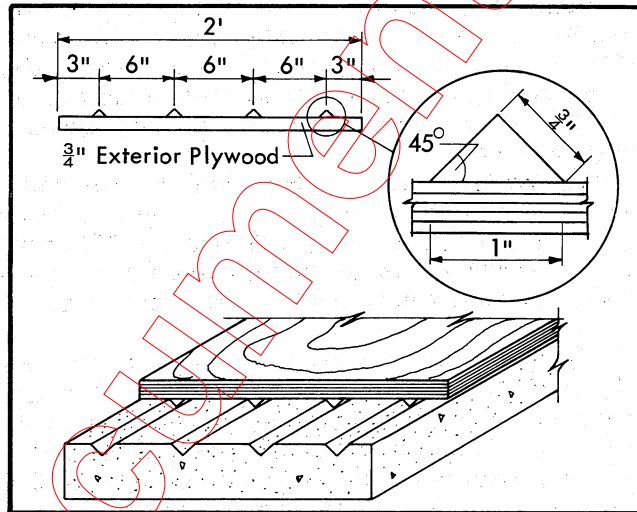


Fig 2. Wood grooves.

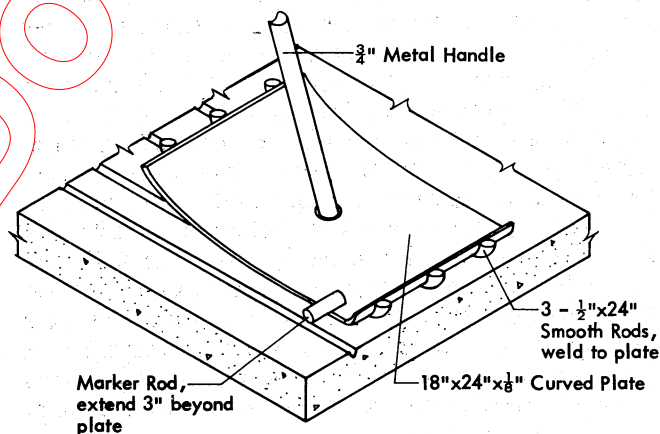


Fig 3. Steel grooves.

Gritty Surfaces

Develop gritty surfaces by applying aluminum oxide grit (as in sandpaper) at a rate of $\frac{1}{4}$ to $\frac{1}{2}$ lb. per square foot before the concrete sets. Two sizes of grit are generally available. The finer material is sized through a screen having 14 to 20 meshes per inch; the coarser is sized through a screen having 4 to 6 meshes per inch. The grit may pop out. The coarser grit is recommended because it is better anchored and less likely to pop out. The grit may cause extra wear on hoofs as less foot trimming has been experienced. Alley scraper blades wear faster when scraping a grit-surfaced alley.

Roughening Hardened Floors

There are several choices for roughening an existing concrete surface: chemical, mechanical, heat treatment, paint, or pouring a new 2" layer over the existing slab. Treat the surface before it becomes so slippery the animals have difficulty walking.

Chemical

Chemically roughen the slippery surface with commercial muriatic (hydrochloric) acid. It is available at concrete ready-mixed plants, area dairy supply, hardware, or drug stores. The acid attacks the lime in the concrete, removing the glaze and leaving a gritty surface.

Use extreme caution when handling acid. Wear protective gear such as goggles, rubber gloves, rubber boots, and a long sleeve shirt. Wash any acid off your skin immediately. Do not breathe the fumes. Use a granite pail or crock to hold the water and acid mixture.

Acid deteriorates concrete, so carefully measure the amount used to limit chemical action. Floor surfaces vary in texture and hardness, so experiment where the results can be easily observed. One gallon of commercial muriatic acid roughens between 200 and 300 square feet. Start with a solution of 1 part muriatic acid to 10 parts water. Work a liberal amount over the concrete with a long-handled scrub brush. The reaction between the cement and acid should cause the solution to fizz. If no fizzing occurs, gradually increase the acid to as high as 3 parts to 10 parts of water. Do not exceed a concentration greater than 3 parts acid to 10 parts water or excess deterioration of the concrete may result. Flush the surface with a generous amount of clean water after the fizzing stops—usually several hours. Carefully observe the amount of roughness you want, then treat the remaining area. Keep the acid out of sewer lines and liquid manure tanks—collect the drainage and haul it directly onto a field. In some areas, additional treatment may be necessary. Avoid excessive damage to the concrete.

Mechanical

Electric tools can be used to cut shallow grooves or chip the surface. It is usually more difficult and time consuming than the acid treatment. Rent the tools from a concrete contractor, highway maintenance department, or ready-mixed concrete supplier.

Pneumatic tools may be available with heads suitable for roughening, rather than breaking, the surface. A concrete saw or Carborundum wheel can be used to make shallow cuts at close intervals to provide additional traction. Any of these measures requires special equipment which may not be readily available.

Concrete floors often become slippery after several years of scraping with a steel blade. Weld beads of special hard-surfaced welding rods to the under edge of the blade. The beads, at about 2" intervals, score the concrete during scraping.

Chains on the cleaning tractor tires also help break the surface glaze.

Heat

Heat can cause concrete surfaces to flake, leaving a rough, pitted surface. Although the method is slow, all you need is a welding torch, blow torch, or a weed burner.

Paint

"Paint on" materials may not stick to existing concrete and the cost is relatively high, but are effective in areas of moderate human foot traffic.

Pouring a New 2" Layer

Where conditions permit, pour a new 2" layer of concrete over an existing floor. Thoroughly clean and dampen the surface before pouring. Use small aggregate. Follow the floor roughening techniques outlined in the New Floor section.