

# Concrete pavement maintenance activities

After identifying concrete pavement distress(es) that should be repaired, determine the best treatment(s). See table 1.

## Optimum timing and conditions

Some concrete pavement repairs can be made in any season. However, fresh concrete should never be placed on saturated or uncompacted subgrade. This would eventually cause support problems.

And fresh concrete should never be placed if the concrete is likely to freeze before it has gained its design strength. Practically speaking, this means that for a full-depth repair the subgrade, base, and adjacent concrete must not be frozen, and the air temperature must be above freezing. If the air temperature is expected to fall below 40°F in the 72 hours following paving, the American Concrete Pavement Association recommends covering the new pavement with insulating blankets, mats, or foam sheets.

## Routine maintenance

Routine maintenance for concrete pavements generally includes regular street sweeping and joint/crack sealing. Sweeping removes caked mud, abrasives, and other debris from the surface. Clean pavement surfaces help keep drains clean and make travel safer for bicyclists.

Regularly cleaning and sealing joints and random cracks keeps them free of water and sediment and protects the subgrade from water intrusion.

## Temporary (asphalt) repair

For areas experiencing scaling, faulting, pumping, or blowups, a temporary repair using asphalt may be appropriate:

1. Blow out joints with compressed air.
2. Remove broken concrete and square up the sides of the area.
3. Apply a tack coat.
4. Place an asphalt wedge and compact it.

## Joint repair

For corner breaks, spalling, and D cracking, repair the area using a concrete mix:

**Table 1. Distresses and maintenance activities for concrete pavement**

Distresses	Maintenance Activities					
	Routine Maintenance		Temporary Repair	Joint Repair	Mud Jacking	Full-Depth Repair
	Joint/Crack Sealing	Surface Patching				
Cracks	X					X
Joint Deterioration/Spalling	X			X		X
Blowups			X			X
Scaling		X	X			
Pavement Settlement			X		X	
Faulting			X		X	
Pumping				X		
Corner Breaks				X		X
Pavement Failure						X

1. Saw cut, break out, and remove loose material, leaving the faces of the removal vertical. Use a cutting torch or saw to cut pavement reinforcement. (Normally the steel network is not reestablished.)
2. Clean the hole with compressed air.
3. Fill the hole with concrete mix, normally delivered by a ready-mix operation.
4. Consolidate the mix with a vibrator.
5. Screed and finish the surface, but do not add water. (Adding water to the surface dilutes the cement paste, increasing chances of future surface scaling.)
6. Texture, then cure the concrete by covering with a liquid curing compound, plastic, and/or wet burlap. (The burlap should be kept wet until the initial concrete strength is developed.)

## Mud jacking

Mud jacking raises and adjusts a slab that has settled. Workable material is forced through holes drilled in the concrete slab, exerting pressure to raise the slab.

1. Examine the site and determine low spots.
2. Drill approximately 2-inch diameter core holes through the concrete slab at selected locations.
3. Starting at the downhill portion of the void and working up, begin pumping the mud jack mix into the holes. As the mixture raises the slab to the desired elevation or the void fills to capacity, move uphill to the next set of drill holes.

It's important to lift the slab uniformly to avoid cracking it.

4. After removing the hose, plug each hole temporarily with a plastic plug or a burlap bag until the mixture has cured.
5. After the entire slab area has been adjusted to grade, clean out each hole and refill with a fast-setting cement grout.
6. Reseal cracks and joints.

## Blowup repair

Temporary asphalt patches may be initially applied to blowups that occur late in the day. Later, perform a permanent, full-depth patch. Leave room for future pavement expansion to prevent another blowup at the same location.

## Surface Patching

Apply a surface patch to repair corner breaks, scaling, D cracking, and construction joint deterioration where the depth of deterioration is no more than 25 percent of the total pavement thickness. See figure 2.

1. Mark the area to be patched 2 to 3 inches outside the damaged area.
2. Remove surface concrete with light- to medium-weight hammers.
3. Sandblast exposed concrete and clean the area with compressed air.
4. For other than pre-cast, place a form for reestablishing the shoulder edge.
5. In reinforced pavement (except for pre-cast repair), reestablish the reinforcement

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by overlapping and tying or welding with either a double-face 4-inch weld or a single-face 8-inch weld.

6. Brush in cement or epoxy grout.
7. Place low-slump concrete with mechanical vibratory screeds.
8. Texture and cure the concrete.
9. Apply a double application of white pigmented curing compound.

### Full-depth repair

Apply a full-depth repair for corner breaks, scaling, D cracking, construction joint deterioration, and localized distresses where the depth of the deterioration is greater than 25 percent of the total pavement thickness or covers a large area. See figure 3.

1. Mark the area to be patched 2 to 3 inches outside the damaged area.
2. Saw cut and remove full depth of concrete slab in the marked area.
3. Remove any unsound base or subbase. If a pre-cast slab is to be used, the base or subbase needs to be restored and compacted. Correct serious drainage problems with a lateral subdrain, etc.
4. Other than pre-cast, place a form for reestablishing shoulder edge.
5. Sandblast exposed concrete and clean area with compressed air.
6. Use coated dowel bars and deformed rebars for load transfer in all full-depth repairs.
7. Place low-slump concrete with mechanical vibratory screeds.
8. Texture and cure the concrete.

### For more information

To borrow a copy of the maintenance manual, contact Jim Hogan, Iowa LTAP librarian, 515-294-9481, [hoganj@iastate.edu](mailto:hoganj@iastate.edu). You can download a printable copy, [www.ctre.iastate.edu/pubs/maint\\_worker](http://www.ctre.iastate.edu/pubs/maint_worker). ■

## Rule of Thumb

If deterioration is 25 percent or less of the total concrete pavement thickness, apply a surface patch.

If deterioration is more than 25 percent of the total concrete pavement thickness, apply a full-depth repair.

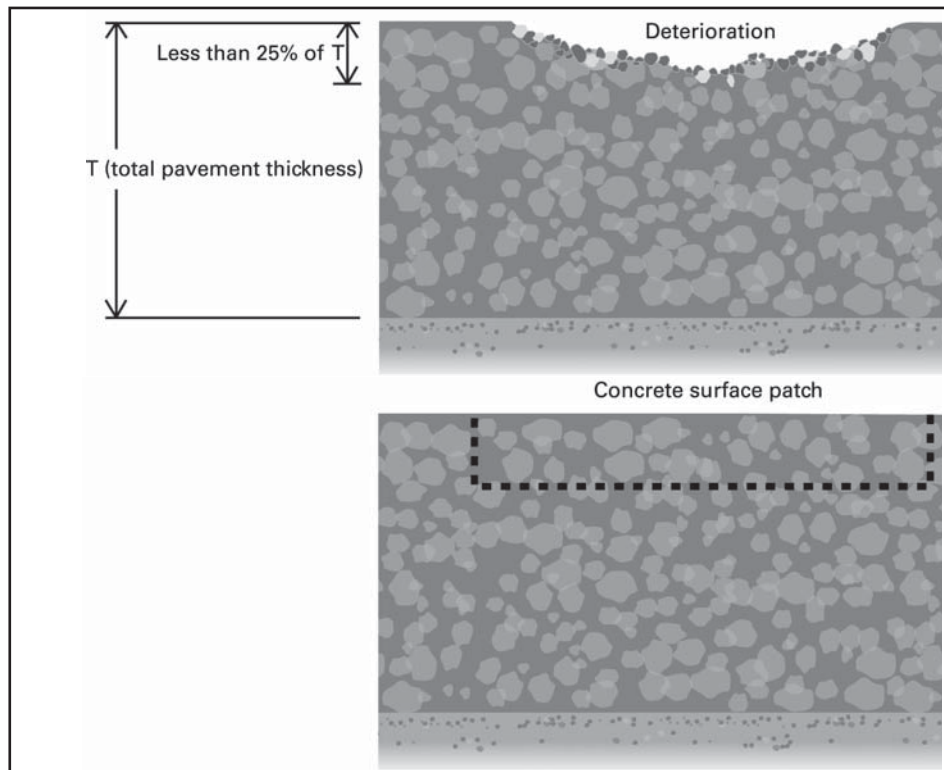


Figure 2. Concrete surface patching

