



## PATCHING & CAULKING CRACKS

**Step 1:** Remove all loose concrete and debris from the crack and spalled area of concrete. Saw cut if necessary to remove debris and any contaminants.



Before



Concrete repair sawcut & cleaned up

**Step 2:** Do not allow patch to bridge crack (the patch will re-crack if there is any movement). Place a form such as cardboard to allow crack to continue thru the repair. This will allow movement, if any, to take place.



Cardboard form inserted ready for patching

**Step 3:** Patch concrete with Rapid Repair Mortar or Premium Patch, after the concrete cures remove the forming material.



Repair done with form in place



Form removed ready for sealant

**Step 4:** Place proper sized backer rod into the crack. The backer rod must be placed into the crack at a depth equal to the width of the crack up to a maximum of 1/2" below the surface. The proper size backer rod should be compressed between 25% to 50%. Never use a sharp tool that may puncture the backer rod during installation. The backer rod should not be stretched which may cause voids when the backer rod recovers.



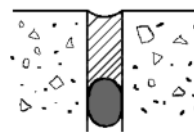
Backer rod inserted

**Step 5:** Caulk the Dymonic 100 into the crack filling joint from bottom to top then tool such that the sealant has a concave surface. Refer to Caulking Tips on other side.

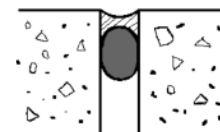


Finished Repair

### Proper Joint Design



WRONG: Joint too deep. Poor shape for movement.



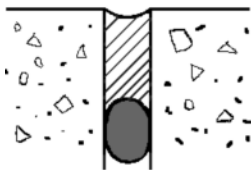
RIGHT: Good width to depth ratio. Depth equal to width. Max depth 1/2". Concave surface.

# Caulking Tips

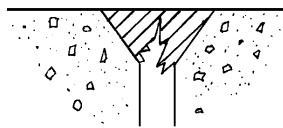
- 1) Make sure that the surface you are going to caulk is clean and well-prepared, it is essential to achieve good adhesion and a smooth bead.
- 2) Cut the tapered cartridge nozzle at a 45° degree angle, with the diameter of the opening equal to the size of the joint or crack.
- 3) Poke a hole through the tip with a piece of wire to break the internal seal.
- 4) Insert the cartridge into the caulking gun.
- 5) Place the gun at a 45-degree angle to the joint, with the tip of the nozzle touching both surfaces. Pull the nozzle along the joint.
- 6) Squeeze the trigger firmly, slowly and consistently until the sealant begins flowing from the opening. Ensure the bead is filling the joint from the bottom up and touching both sides.
- 7) Once it begins flowing, move the tip at an even pace along the joint. Remember that less is better. It's easier to apply more sealant than to remove too much.
- 8) As you move, carefully continue squeezing and re-squeezing the trigger to keep your bead uniform.
- 9) When you reach the end of the joint, quickly release the plunger to keep the sealant from seeping. Even if you stop squeezing the trigger, the sealant will continue to flow unless you release the plunger.
- 10) Smooth the bead with a wet spoon, a moistened finger or other "smoothing tool" along the sealant bead after applying. This will help the sealant adhere to the concrete surface and create the proper joint design.
- 11) For a neater result, masking or other tape may be applied along both edges of the crack or joint before the sealant is applied.

## Proper Joint Design

### Incorrect



WRONG: Joint too deep.  
Poor shape for movement.

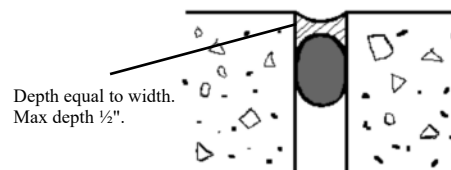


Sealant can only compensate for movement at the narrowest point. If the movement at the neck of the joint exceeds the sealant's limitation, a cohesive tear may develop



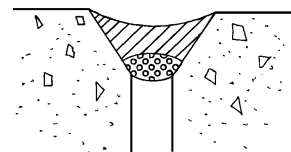
Irregular depth creates unequal stress on sealant when movement occurs. Continued cyclical movement creates a cohesive failure at this point. Concrete must be removed and backer rod or a bond breaker inserted

### Correct

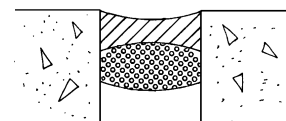


Depth equal to width.  
Max depth 1/2".

RIGHT: Good width to depth ratio. Concave surface.



Backer rod serves as bond breaker. Increased width at the base increases the sealant's ability to compensate for greater movement.



Backer rod or bond breaker tape inserted. Concrete cut back to provide uniform and proper joint depth.



# REPAIR GUIDE FOR CONCRETE FLOORS

Con-Spec Industries is pleased to furnish you with this repair guide. This guide depicts a number of common floor problems and our recommended "common sense" repair systems. These field-proven methods and materials were developed through years of experience as restoration/repair specialists. By following this guide you can perform successful, durable, permanent repairs with a minimum of tools, expense and downtime.

## STEPS FOR SUCCESSFUL REPAIRS

Plan floor repairs by first treating the causes, then restore the floor back to its original condition. The following steps are essential:

### 1) Determine cause of problem.

Did slab movement cause or contribute to the problem? Can a change in your operation (different wheels or equipment etc.) ease future damage? Is the concrete itself adequate?

### 2) Determine traffic conditions and exposure of the repair area.

What kind of traffic and frequency is there. Is the traffic steel wheeled vehicles or pneumatic? Foot traffic or forklift? Heavy traffic areas or occasional traffic?

### 3) Determine repair conditions.

How long can the area be out of service? Will dry cutting create unacceptable dust? Will odour from a solvent based coating be a problem?

### 4) Match materials to problem and conditions.

Don't use high-strength epoxies in joints/cracks that are likely to move. Will the floor coating stand up to the traffic and abuse the floor is subject to? Does the cure time match the time limits you have? Will the material work if you wet saw cut the area, or must the repair area be totally dry?

### 5) Preparation is vital.

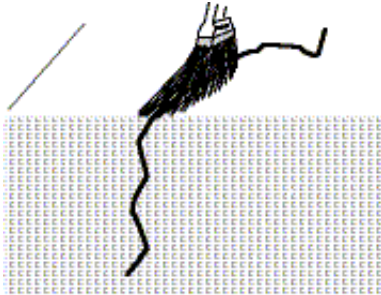
Never feather edge repairs. Always make a vertical edge at the end of the repair. Remove all foreign substances and unsound concrete to ensure best bonding. Because of the critical nature of preparing the repair area, specialized equipment may be warranted. Contact Con-Spec for information on equipment or contractors capable of assisting with the preparation and/or repair.

Seller warrants that the product described on the face hereof has been manufactured of selected raw materials by skilled technicians. Neither seller nor manufacturer shall be responsible for any claims resulting from the failure to utilize the product in the manner in which it was intended and in accordance with instructions provided for use of product. The only obligation of either the seller or manufacturer shall be to replace any quantity of this product which proved to be defective. Neither seller nor manufacture assumes any liability, loss, or damage resulting from use of this product.

## HAIRLINE RANDOM CRACKS

(Less than credit card width)

If a crack has no "islands," no edge chipping, and is less than credit card thickness, we recommend that it *not* be saw cut open. To do would merely increase its exposure to hard wheels. Brush apply a protective coating of our epoxy crack sealer on top of the crack.



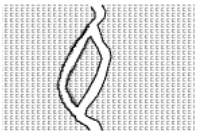
Fill or brush apply epoxy crack sealer to crack

## TYPICAL SPALLED JOINTS and CRACKS

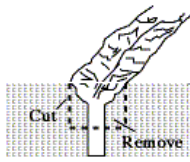
(For defects up to 1 1/4" wide)

This detail shows our standard method of dealing with all spalled joints or cracks. Never feather edge a repair!

1. Make cuts at the ends of spalls and remove as shown. Cuts should be a minimum of 1/2" deep (3/4" is preferred).



Close-up of crack with an island



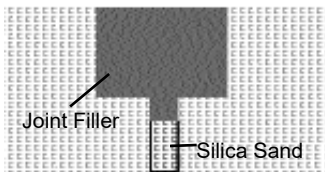
Close-up of Spalled crack



Close-up of crack Before filling

2. Clean out debris and loose elements with narrow tools. Vacuum or blow clear with compressed air.

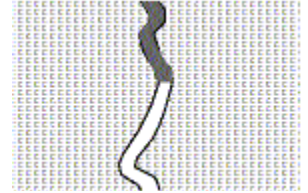
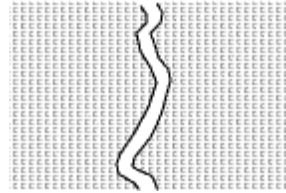
3. Fill joint base with silica sand. Install semi rigid epoxy or polyurea crack filler flush to the floor or slightly crowned. Shave smooth after initial set. Note: For wider repairs (over 1/2") mix crack filler with 2-3 parts of silica sand by volume to make a mortar.



## HAIRLINE RANDOM CRACKS

(Greater than credit card width)

If a crack is credit card thickness or wider, it should be repaired to prevent hard wheel damage. Clean out debris with a knife, wire brush, etc. then vacuum clean. Apply a semi rigid epoxy or polyurea crack filler and allow it to seep into crack. Re-apply until seepage stops. Allow to cure. Shave off excess.



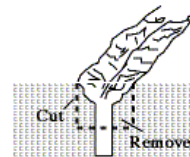
If edge chipping or islands are present, treat as shown in "Typical Spalled Joints and Cracks"

## SEVERE SPALLED JOINTS and CRACKS

(For defects over 1 1/4" wide)

This detail shows our standard method of dealing with all spalled joints or cracks. Never feather edge a repair!

1. Make cuts at the ends of spalls and remove as shown. Cuts should be a minimum of 3/4" to 1" deep.



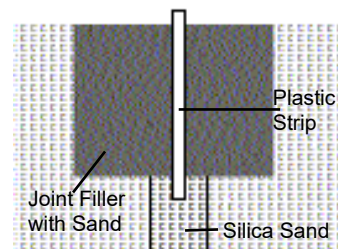
Close-up of Spalled crack



Close-up of crack Before filling

2. Clean out debris and loose elements with narrow tools. Vacuum or blow clear with compressed air.

3. Fill joint base with silica sand. Install epoxy patching material flush to the floor.

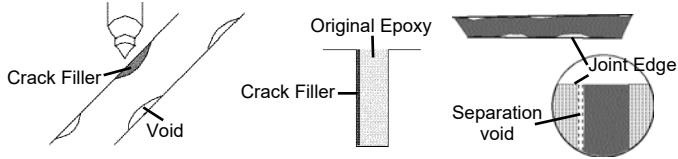


4. Insert expansion strip as shown, making sure the bottom of the strip extends lower than the epoxy.

5. Allow epoxy to cure then snap off exposed strip. Grind surface flush with floor if necessary.

## JOINT FILLER SEPARATION (Previously filled joints)

All joint fillers are installed long before a slab has completed its shrinkage. As a result of continued shrinkage, joints will open, usually causing the installed filler to separate adhesively.

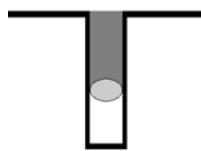


If the filler is still firmly in place (not loose to the touch) it can be salvaged by filling in the separation voids with an epoxy crack sealer. It can be used to fill voids next to almost any semi rigid epoxy filler.

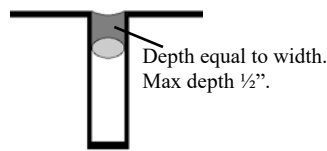
## MOVING or ISOLATION JOINTS and CRACKS

For joints or cracks subject to movement the use of an elastomeric sealant is recommended. Most elastomeric sealants are rated for  $\pm 50\%$  joint movement. Ideally the joint width should be 4 times the anticipated joint movement.

1. If joint width is less than  $\frac{1}{4}$ " , sawcut to a minimum width of  $\frac{1}{4}$ " by  $\frac{3}{4}$ " deep. Clean out debris with a knife, wire brush, etc. then vacuum clean.
2. Install the proper size backer rod; such that when installed the backer rod must be compressed between 25% to 50%. Do not puncture backer rod, use a dull blade to insert backer rod.
3. Use the backer rod to control depth of the sealant. In joints  $\frac{1}{4}$ " to  $\frac{1}{2}$ " wide install backer to same depth as width. For joints over  $\frac{1}{2}$ " wide install backer rod to a maximum depth of  $\frac{1}{2}$ ".
4. Fill joint from the deepest point to the surface by holding a properly sized nozzle against the backer rod.
5. Tool sealant to a concave shape.



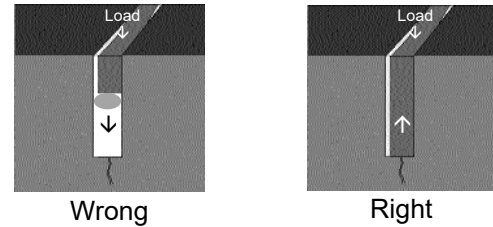
WRONG: Joint too deep. Poor shape for movement.



RIGHT: Good width to depth ratio. Concave surface.

## JOINT FILLER DEPRESSION (Previously filled joints)

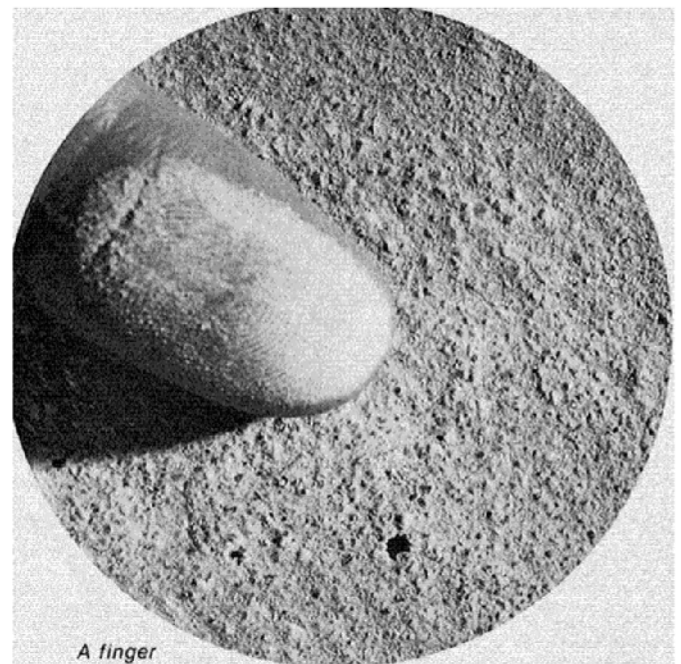
Joints not filled full depth will be driven down into the empty joint after separation occurs due to loads placed on the joint filler.



Remove deficient joint filler. Re-cut joint to remove all debris. Fill joint base with silica sand. Fill with semi rigid epoxy or polyurea joint filler to full depth.

## DUSTING FLOORS

Chalking or powdering at the surface of a concrete floor is called dusting. The characteristics of such surfaces are: They powder under any kind of traffic or can be easily scratched with a nail or even by sweeping. To minimize or eliminate dusting, apply a chemical floor hardener, normally a silicate based sealer. The products are normally applied to the surface in a flood coat then scrubbed into the surface.



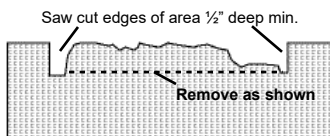
Dusting is evident by the fine powder that can be easily rubbed off the surface. Photo Portland Cement Association.

## SURFACE SPALLING or DETERIORATION

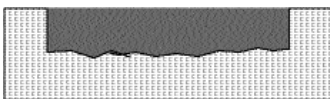
For spalled area repairs the choice of repair materials is largely dependent upon traffic exposure and possible floor abuse. Never feather edge a repair!

Traffic	Depth	Material Type
Light Foot	any	Cementitious
Light - Medium	<1/2"	Epoxy
Light - Medium	>1/2"	Cementitious
Heavy	<1 1/2"	Epoxy
Heavy	>1 1/2"	Cementitious
Very Heavy	any	Epoxy

1. Saw cut outer edges of spalled area 1/2" deep min. Remove all defective concrete down to sound material; or deepen the area to a minimum depth of 1/4" as shown with a bush hammer or other means. Remove all dust and debris.



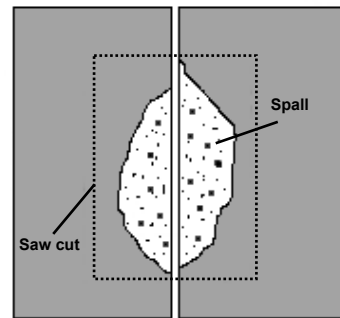
2a. When using a cementitious material pre-wet the surface to a saturated, surface dry condition; the concrete is darkened by the water but there is no pooling of water on the concrete. A bonding grout of one part latex adhesive with one part cement (or patching material) should be scrubbed into the surface of the prepared area. Before the bond coat can dry place the repair material; trowel the material against the edge, gradually working towards the centre of the spalled area. Trowel smooth or broom finish for a non-skid texture, cure material as per manufacturer's recommendation.



2b. If using an epoxy patching material scrub the epoxy onto the surface of the prepared area for best adhesion. Trowel the material against the edge and gradually work towards the centre of the repair area, trowel smooth or broom finish for a non-skid texture.

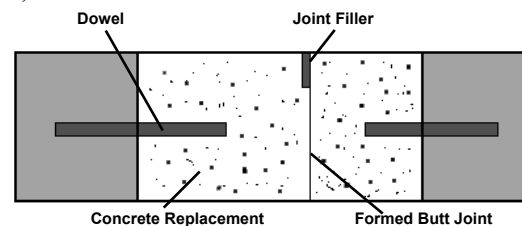
## FULL DEPTH SLAB REPAIR

Full depth repairs are necessary when the concrete has deteriorated to less than half the slab thickness. Floor wear can be caused by several factors; abrasive materials under forklift wheels, chemical attack, impact forces from dropping heavy objects onto the floor. If the repair area spans a joint, make sure that joint is reconstructed in the repair.



Saw cut around spall to full depth. If less than half floor thickness then saw cut 1/2" deep minimum.

Saw cut the deteriorated area to full depth and remove the concrete. Recompact and level the subgrade. Load transfer dowels, if required, they should be installed at 12 inches apart at slab mid-depth, drilled a minimum of 6" deep. Dowel diameter should be 1/8" for each inch of floor thickness (6" floor requires 3/4" dowels).



Replace the spalled area with 35 Mpa (5000 psi) concrete or suitable patching material. If repaired area includes a joint place in two sections along joint. If using concrete allow 24 hours cure before placing the other side. This will create a plane of weakness at the joint, ensuring that subsequent slab contractions do not cause random cracking.

If spanning a joint saw cut the joint 25% of the thickness of the new patch or a minimum of 1" deep. Install the proper joint filler; if outdoor or a moving joint use an elastomeric sealant. If indoors and a construction joint use a 100% solids semi rigid epoxy filled to full depth.

## CHOOSING A PROPER FLOOR COATING

There are many reasons for coating your concrete floor; decoration, chemical protection, waterproofing, prevent dusting, non-skid surface, warning strips, better light reflection. No one type of coating (paint) will serve all purposes. This is just a partial list of the more popular types of coatings and their applications.

Acrylics give good service, low cost but the wear resistance is not as good as epoxies or urethanes. Use for residential or in low foot traffic areas only.

Epoxies make good wear resistant and excellent chemical resistant coatings. High solids based epoxies are generally more cost effective but don't have the chemical resistance or wear resistance of 100% solids.

Polyurethanes and polyurea's have excellent wear resistance and good chemical resistance. They normally have better wear and UV resistance than epoxies but may not bond as well. One component materials are easy to apply but don't have the hardness and durability that the two component materials provide.

Most coating or topping failures are caused by poor surface preparation methods. We prefer to grind or shotblast surfaces before coating them, but some contractors may use chemical cleaning methods. Whichever method is used must remove all dirt, oil, chemicals, and weak concrete to ensure a good bond.

The number of choices within each class is large. Contact Con-Spec Industries for help in making the final selection based on performance required, ease of application, life expectancy, price, project conditions and down time.

## MATERIALS DISCUSSED

### Joint Fillers

Dural 340 & 340NS  
Euco 700 & Euco 800  
Euco QwikJoint UVR  
Euco QwikJoint 300

100% solids semi rigid epoxy joint filler for control joints  
100% solids semi rigid epoxy joint filler for control joints  
Rapid setting 100% solids polyurea joint filler for crack and joint repairs  
Rapid setting 100% solids polyurea joint filler for crack and joint repairs

### Epoxy Crack Sealer

Dural 335  
Dural 50LM

100% solids crack sealer for sealing hairline cracks and joint filler separation  
100% solids crack sealer for sealing hairline cracks and joint filler separation

### Epoxy Patching Material

Duralflex Fast Patch  
Flexolith  
Epoxy-Flex

Pre-packaged fast setting epoxy patching and repair system for quick turnover  
Low modulus, low temperature epoxy surfacing, repair mortar or overlay  
Low modulus overlay and mortar binder

### Cementitious Repair Materials

Rapid Repair Mortar  
Premium Patch  
Blue-Line Rapid Repair Grout

Fast setting cementitious repair and patching material  
Fast setting polymer modified patching material, feather edge to 1 inch  
Pre-mixed fast setting non-shrink patching material

### Elastomeric Sealant

Ruscoe Sealants  
Tremco Sealants  
Backer Rod

One part nitrile rubber with a 15 minute tack free time (self-levelling & non sag)  
One and two part urethane sealants (self-levelling and non sag formulations)  
Non-gassing ethafoam rod from 1/4" to 3" diameter

For additional information please call:

***Con-Spec Industries Ltd.***

9525 - 63 Avenue NW, Edmonton, AB T6E 0G2  
Ph (780) 437-6136; (800) 295-5569 or Fax (780) 437-5242  
[www.conspecindustries.com](http://www.conspecindustries.com)