

Partial Depth Repairs



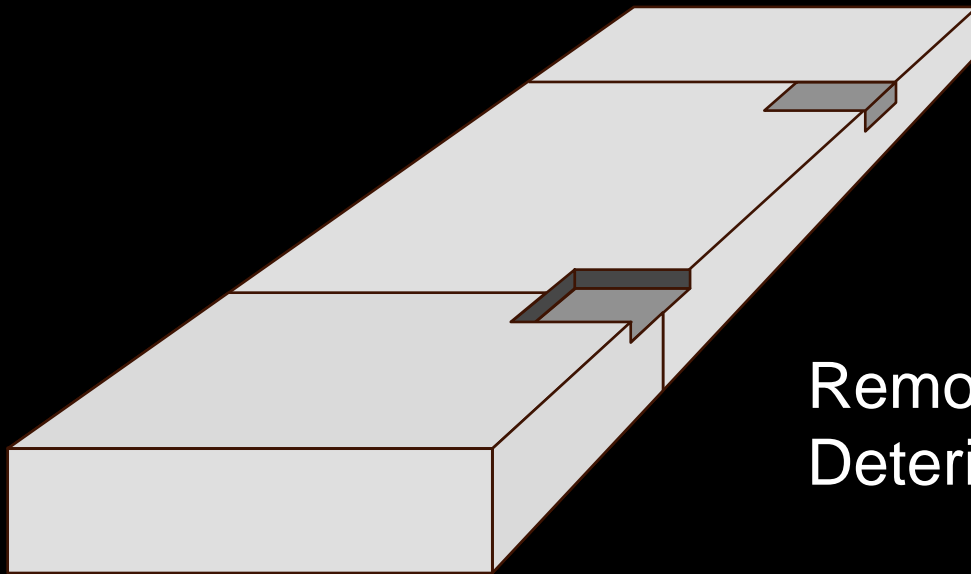
Presented by
Terry Kraemer



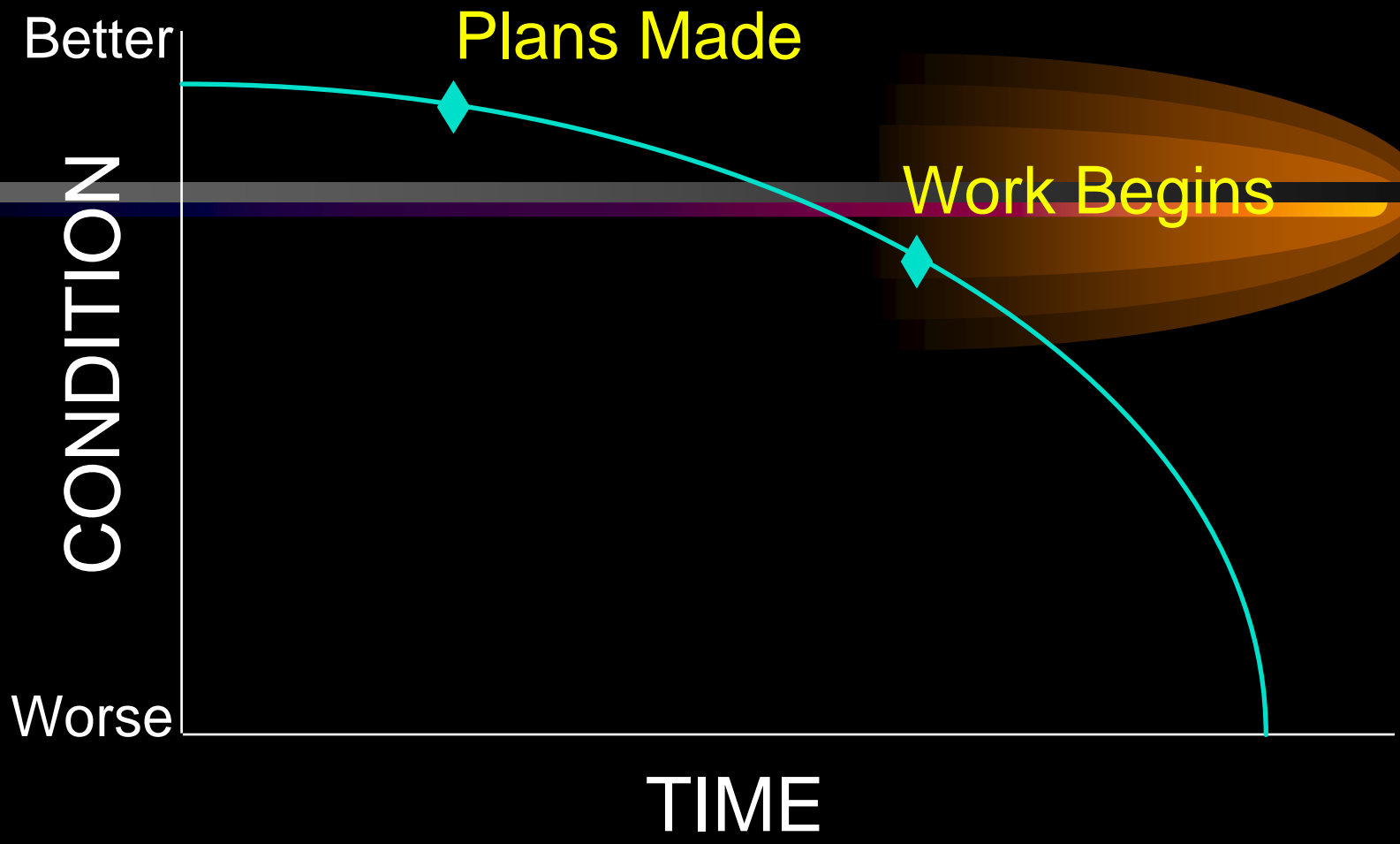
Partial-Depth Patching

- Purpose
 - Repair surface distresses
 - Reestablish joint reservoir
- Used for:
 - Midslab surface spalling
 - Joint spalling
 - Severe scaling

AKA ...Partial-Depth Repair



Remove and Replace
Deteriorated Surface Concrete



CONDITION THEN = CONDITION NOW

Partial-Depth Patching Operations



Partial-Depth Patching

Misuse of technique
Inadequate patch material
Careless installation
No communication

Open Communication

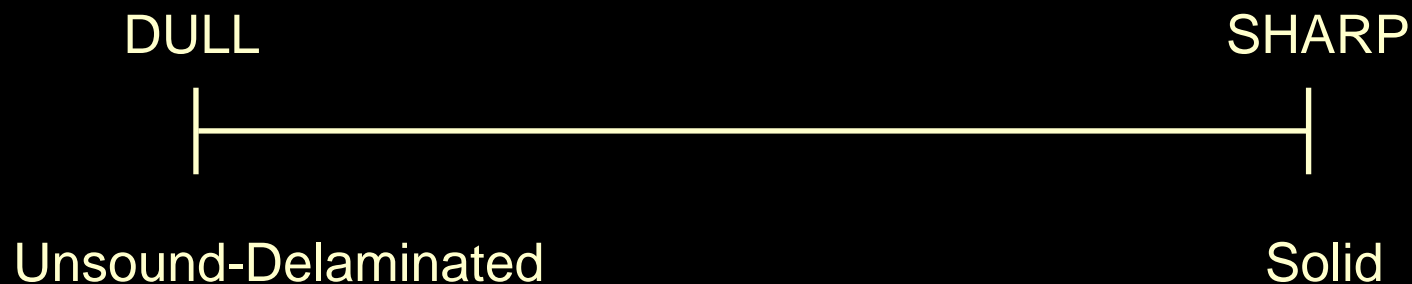
**BAD
PERFORMANCE**

**GOOD
PERFORMANCE**

Finding Unsound Concrete

Sounding the pavement:

- Hammer
- Steel rod
- Steel chain



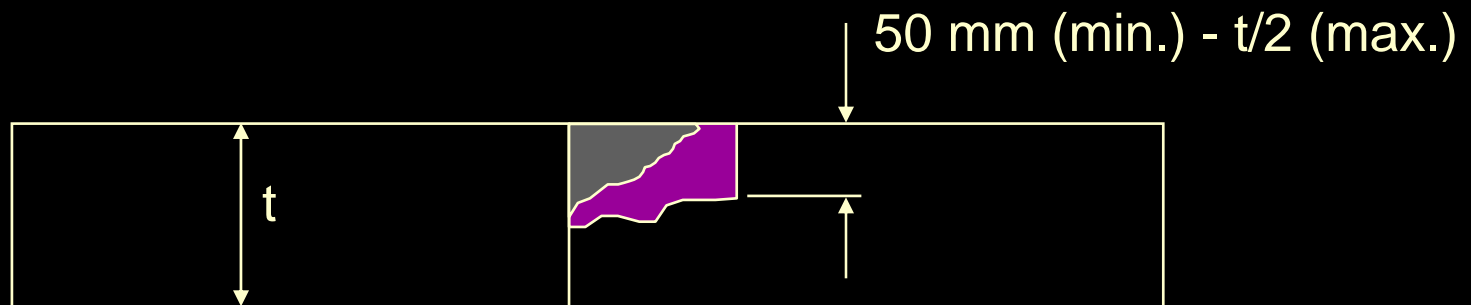
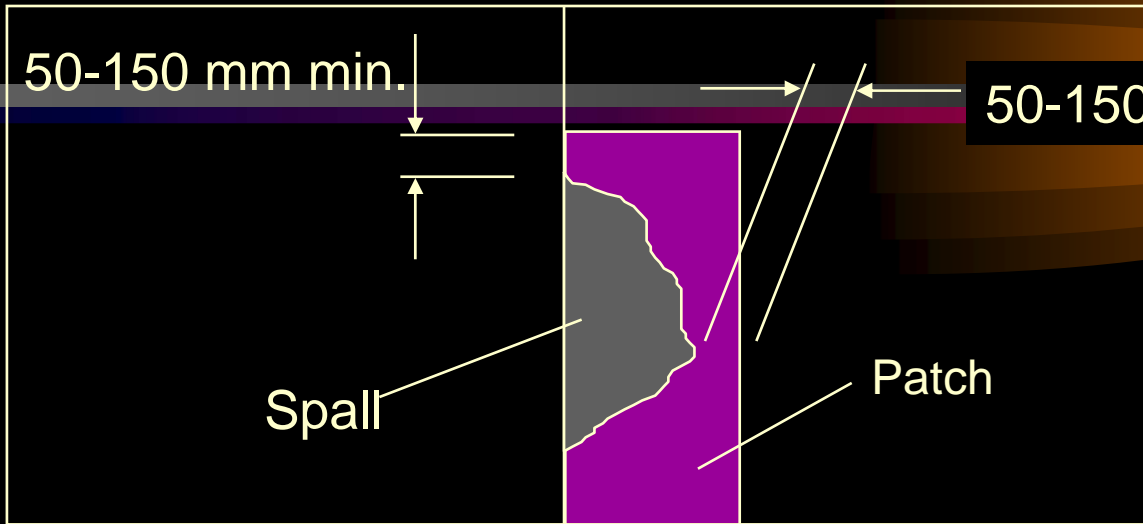






Defining Repair Boundaries

- Patch Dimensions
 - Minimum length 300 mm
 - Minimum width 100 mm
 - Go beyond problem by 50-100 mm
 - Patch must be tied into sound concrete
- Combine close patches (<0.6 m)
- Repair entire joint if more than 2 patches







Removal

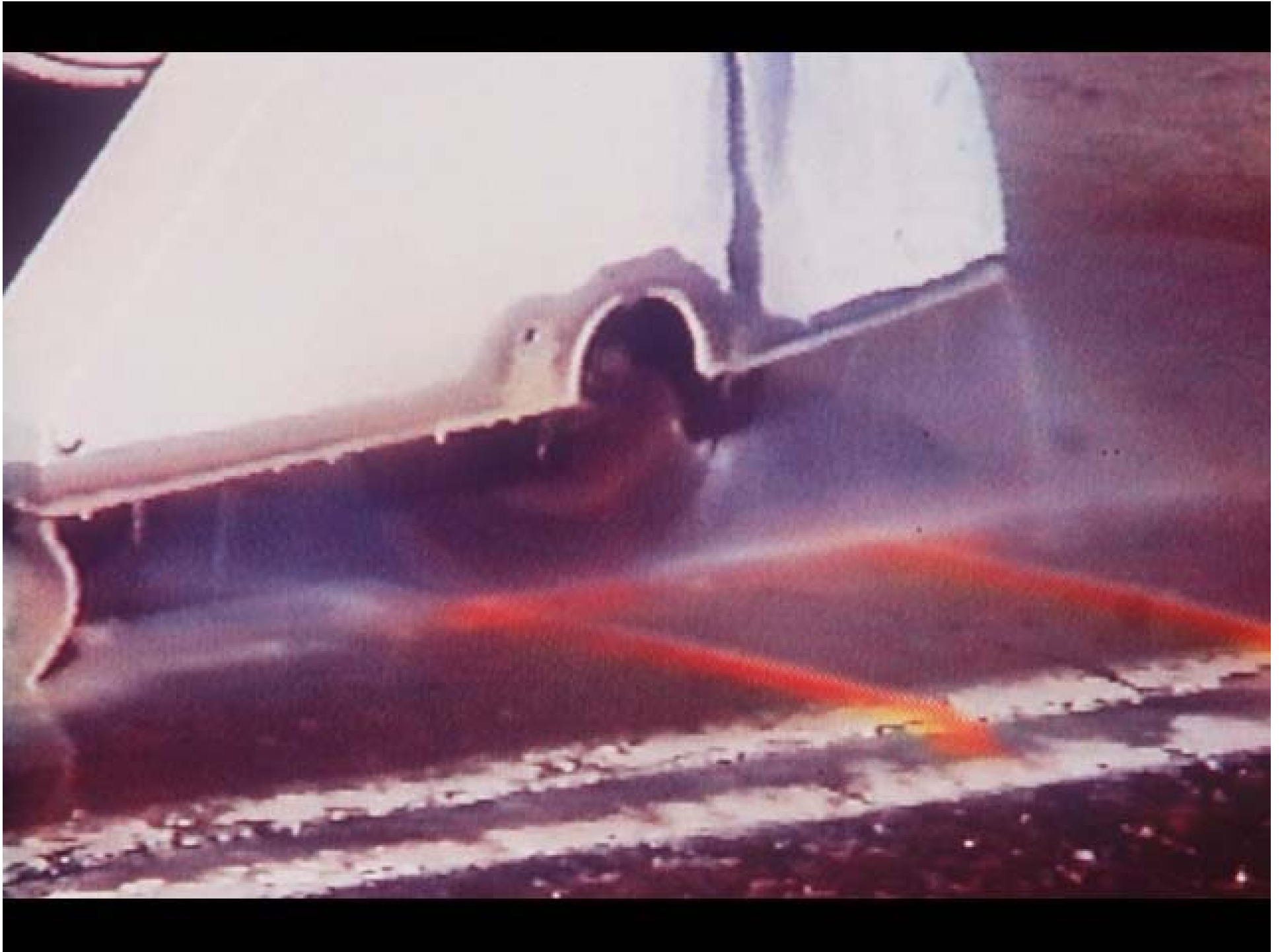


- Sawing and chipping
- Carbide milling



Sawing & Chipping

- Vertical cut at perimeters
- Diamond blade
- Depth to 50 mm
- Overcut slightly
- Sawed edges should be chipped off at a 45 degree angle





Sawing & Chipping

- Break to minimum depth of 50 mm
(1/3 slab thickness maximum)
- 13.5 kg maximum hammer
- 7 kg hammer preferable for control
- Spade bits preferable to gouge bits
- If exposed dowels are misaligned cut off
remove if ok apply bond breaker



Spade Bit

Gouge Bit



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Carbide-Milling

- Efficient for large areas
- Leaves rough surface
- Avoids hand work



Milling Machine

- Requirements:
 - High kilowatt (horsepower) rating
 - 300-450 mm milling head width
 - Wheels preferable to tracks
- Transverse orientation
- Longitudinal orientation



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Cleaning

- Check removal by sounding before cleaning
- Sandblast bottom and vertical faces
- Sandblast overcuts
- Sandblast surface edge adjacent to patch area
- Acceptable waterblast:
 - 100-200 MPa pressure
 - Waiting period to dry



Cleaning

- Airblow to remove dust & debris
- Direct away from patches
 - Use 0.63 MPa minimum air pressure
 - Oil & moisture free air
 - Check with clean cloth
- Backpack blowers acceptable



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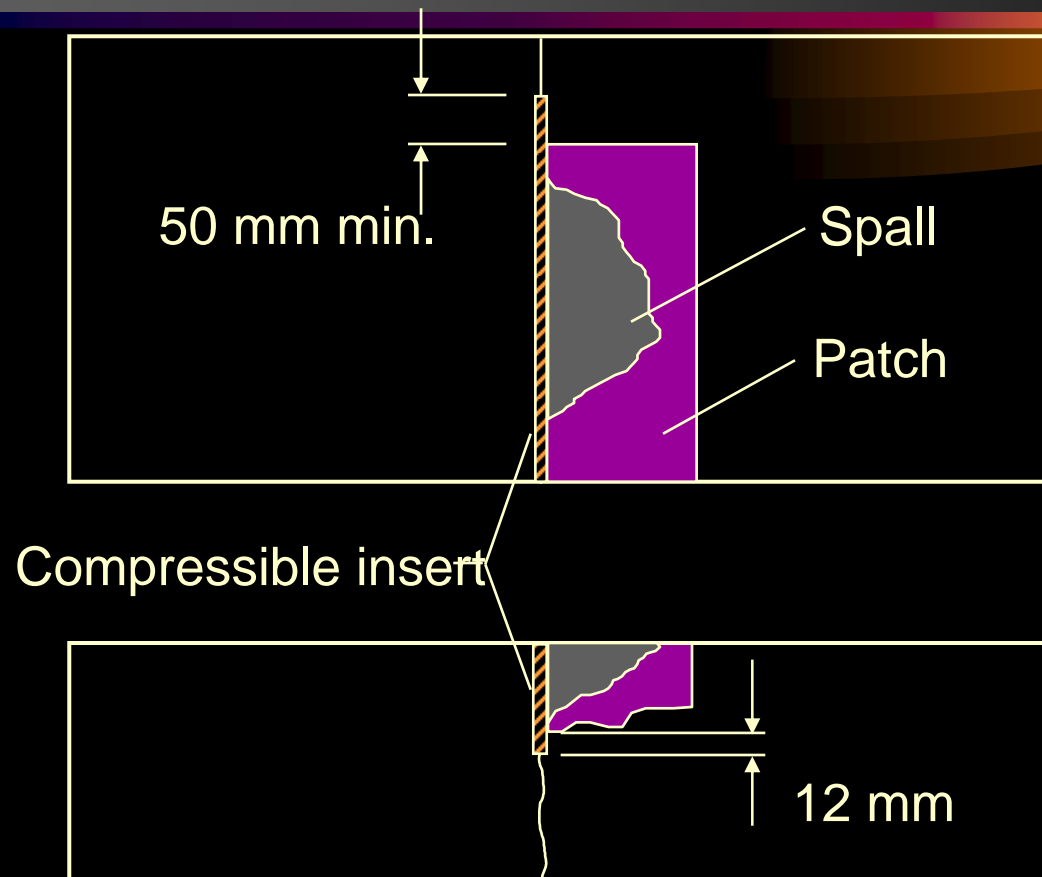


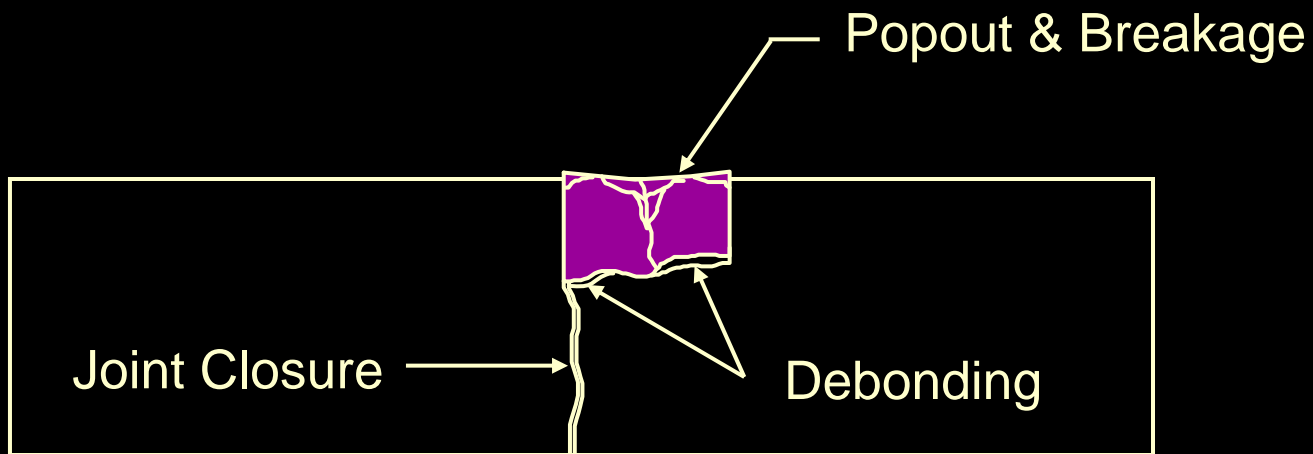
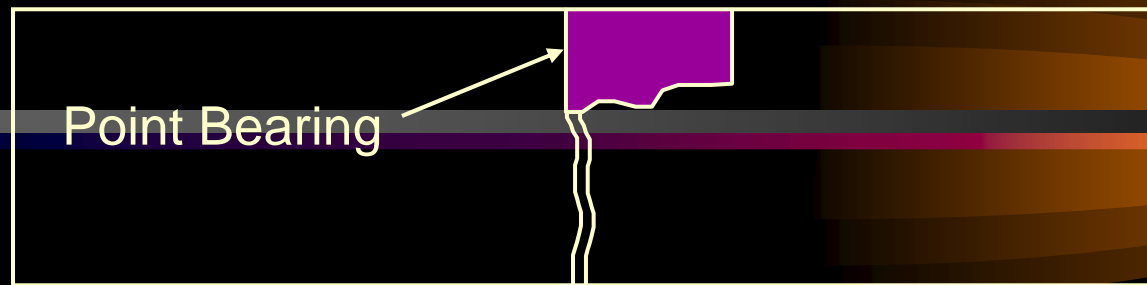
Joint Insert



- Separates patch from adjacent lane
- Reforms joint reservoir
- Provides uniform sealing reservoir
- Acceptable materials: (Minimum 5mm)
 - Styrofoam
 - Asphalt-impregnated fiberboard
 - Fiberboard
 - Waxed cardboard
 - Thickness dictated by rigidity of material

Compressible Insert





Expansion → ← Expansion



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Types of Patching Materials

- Custom Designed Mixes
- Proprietary Mixes
- Some patching materials require the use of a bonding agent
- Conditions control the choice but these requirements must be met
 - Type I or III cement
 - Accelerators as required to minimum strength and opening conditions
 - Air content 6.5% +/- 1.5%
 - Slump 25mm to 75mm
 - Minimum/Maximum Air Temps 5 C to 30 C



Placing Patch Material

- Mix in small quantities(Match Manpower)
- Place from wheelbarrows, buggies
- Slightly overfill the patch area
- Fill Overcuts
- Use small spud vibrators (<25 mm)
 - Hold at 15-30 degrees
 - Do not drag!!



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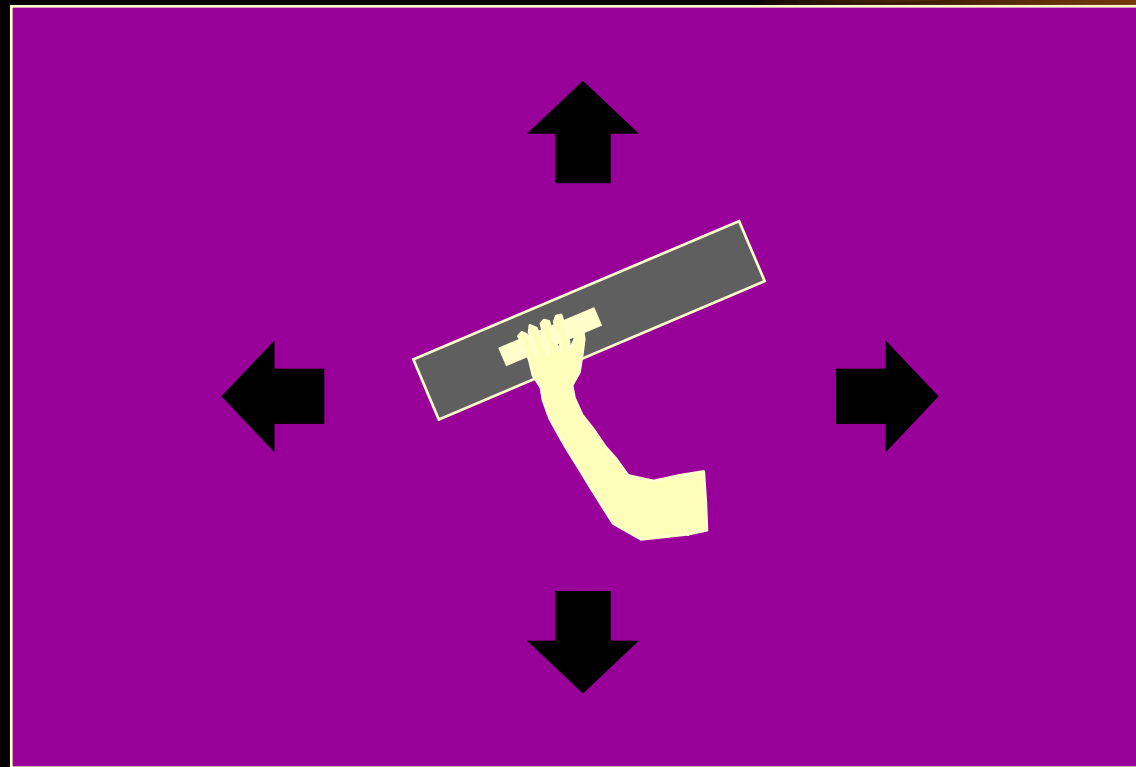
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Finishing

- Match surrounding elevation
- Work tool from center toward edges

Finishing patch from center to edges







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Curing Patch

- Liquid-membrane –forming compound that meets ASTM C 309
- Apply curing compound evenly
- Pigment is helpful to see coverage
- Insulation mats useful for:
 - Accelerating strength gain
 - Cold temperatures
- Place polyethylene between patch and insulation







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Questions ?