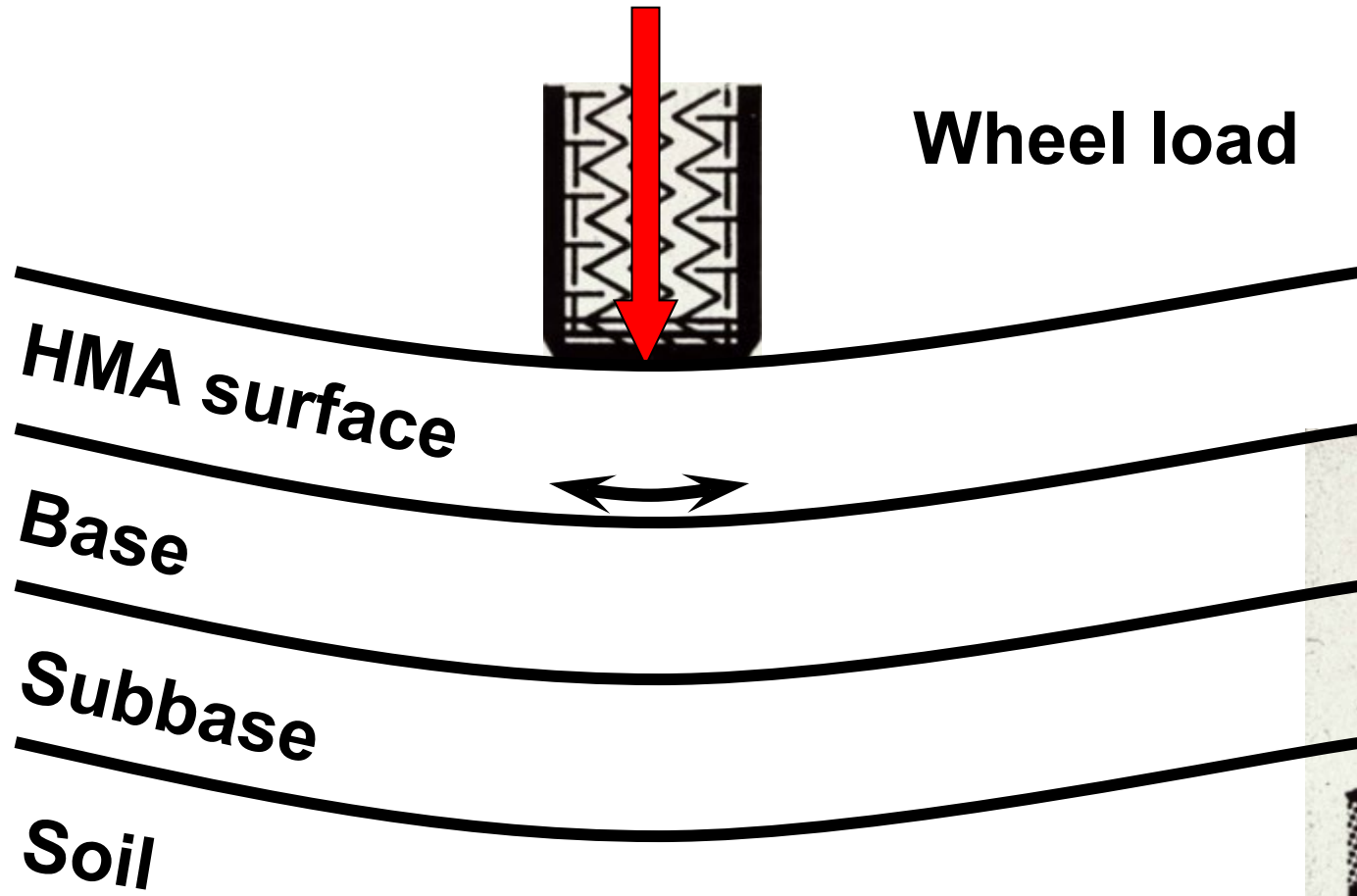


Distresses in Asphalt Pavement

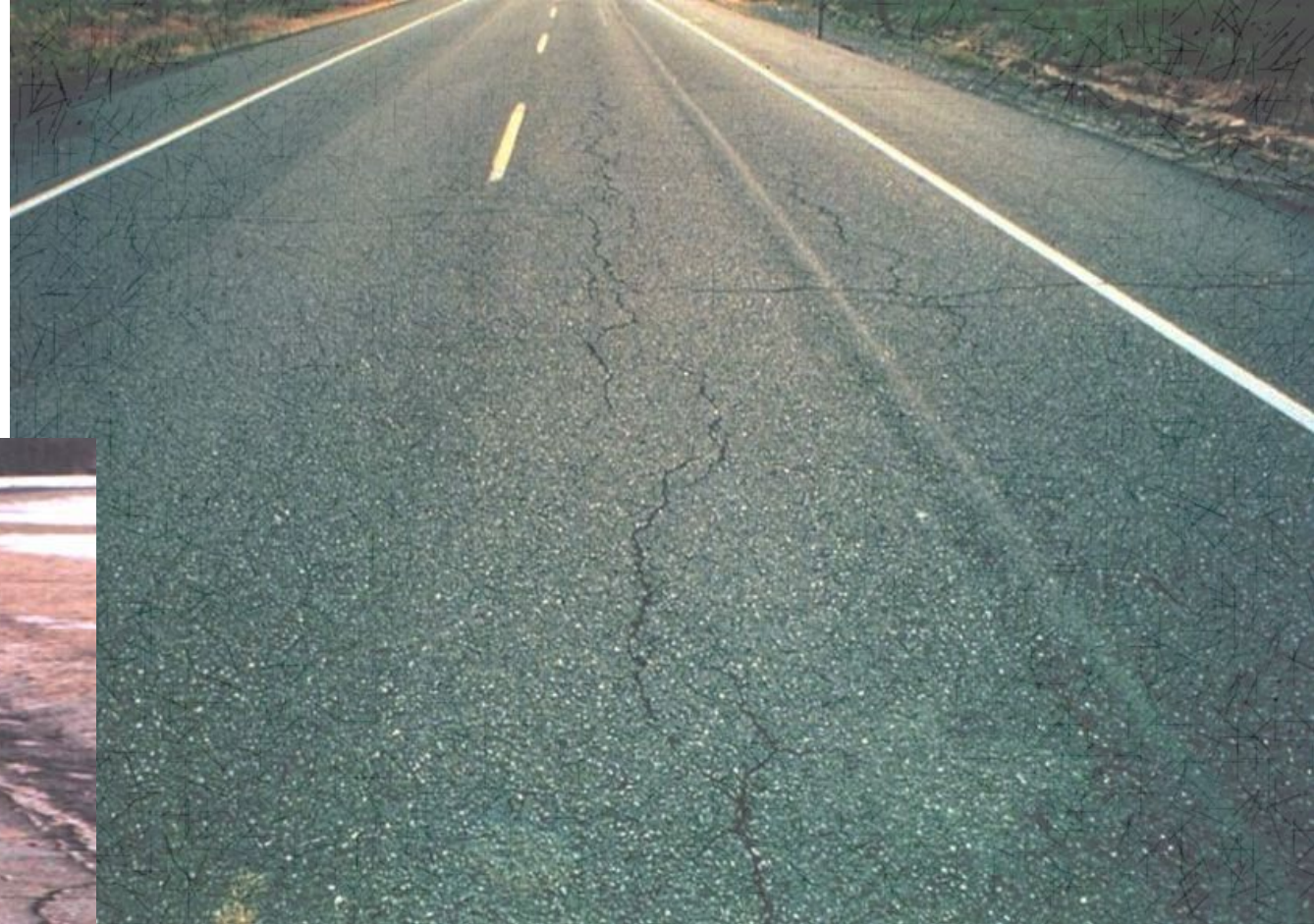
Types of Distresses

- Fatigue cracking
- Rutting
- Thermal cracking
- Block cracking
- Roughness
- Frost effect
- Poor drainage effect
- Water bleeding & pumping
- Stripping
- Raveling
- Bleeding/flushing
- Polished aggregate
- Slickness
- Shoving
- Slippage Cracking
- Depression
- Reflection cracking
- Etc.

Fatigue Cracking

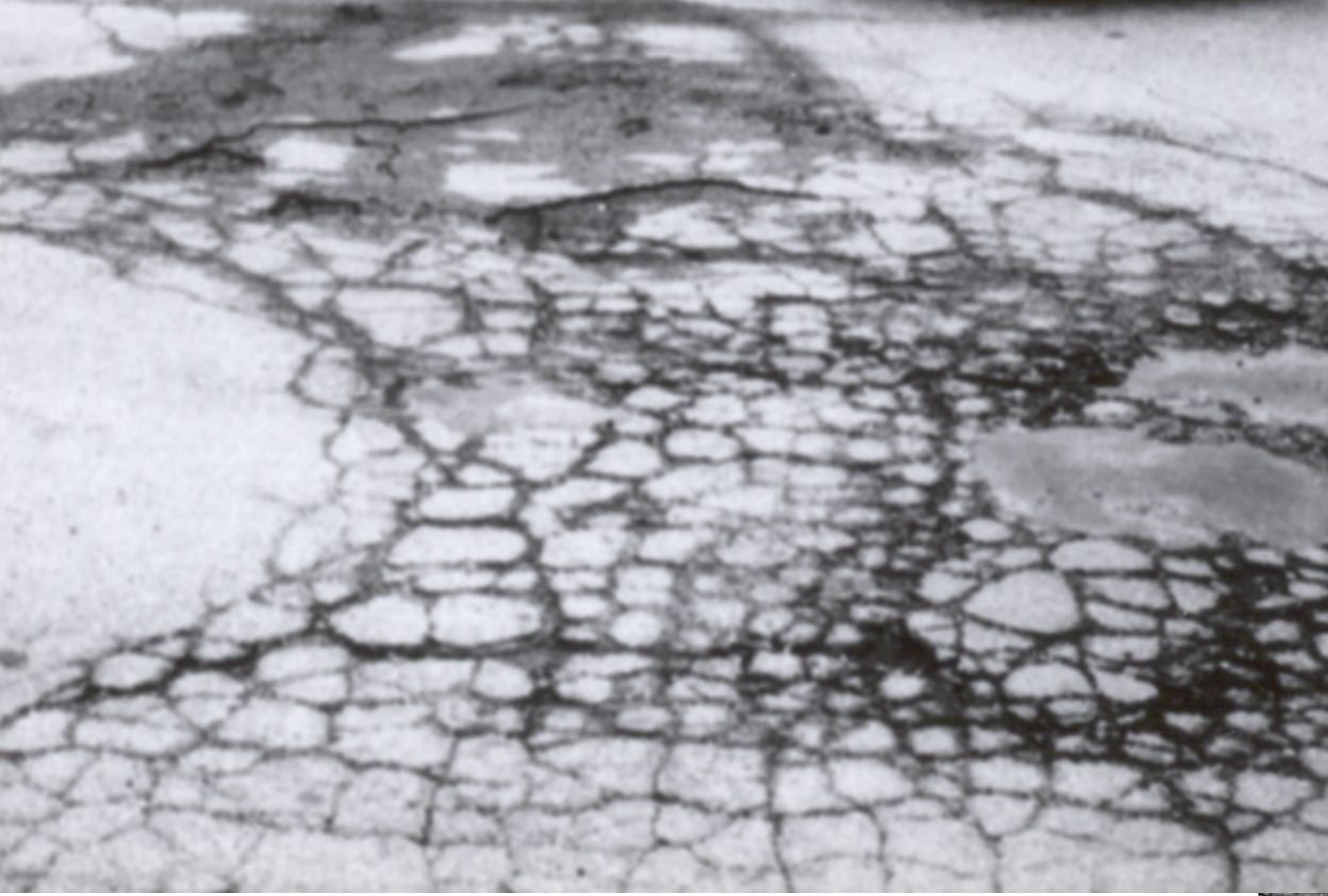


Early Stage of
Fatigue Cracking

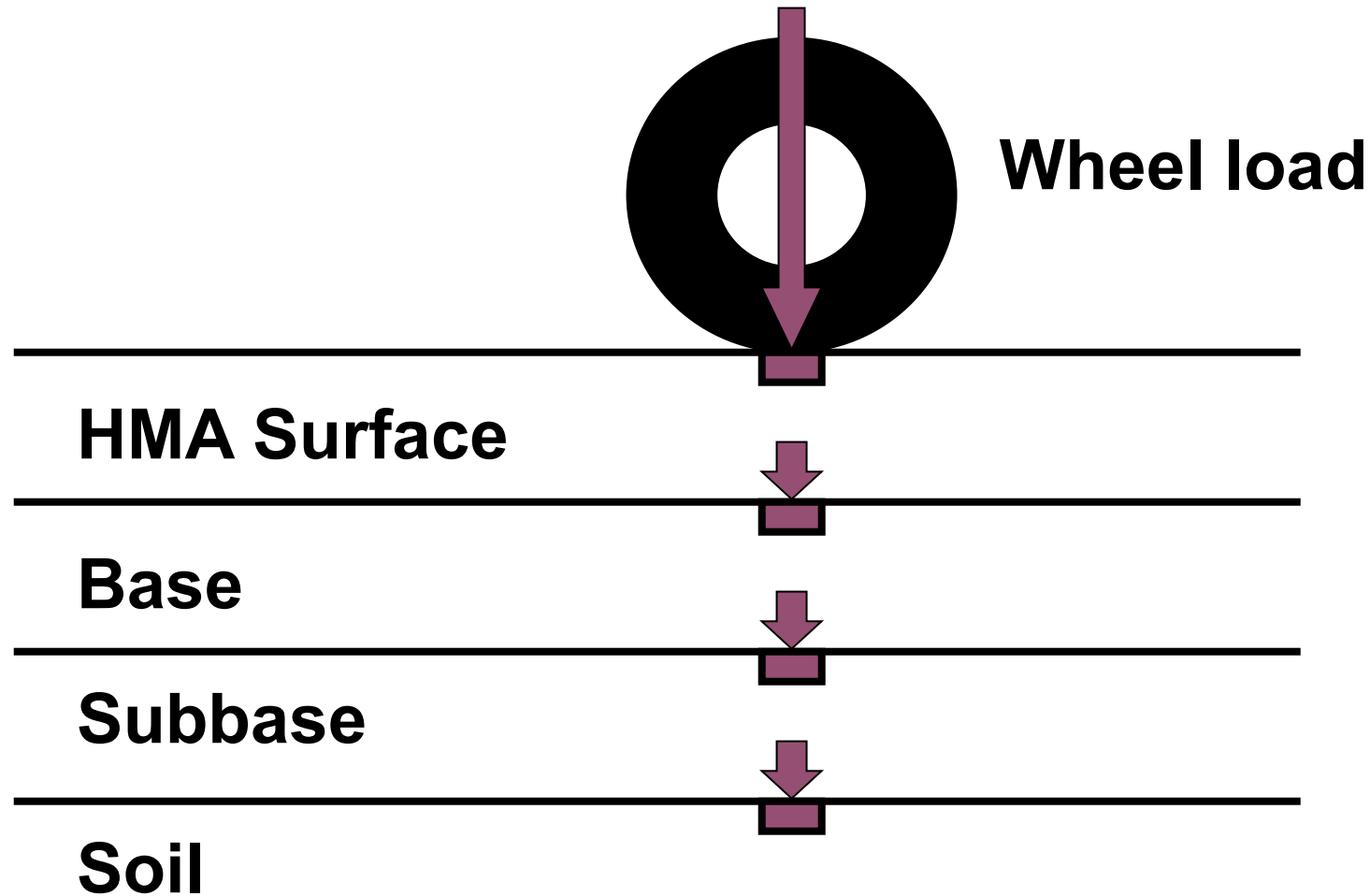


Advanced Stage of
Fatigue Cracking

Fatigue Cracking



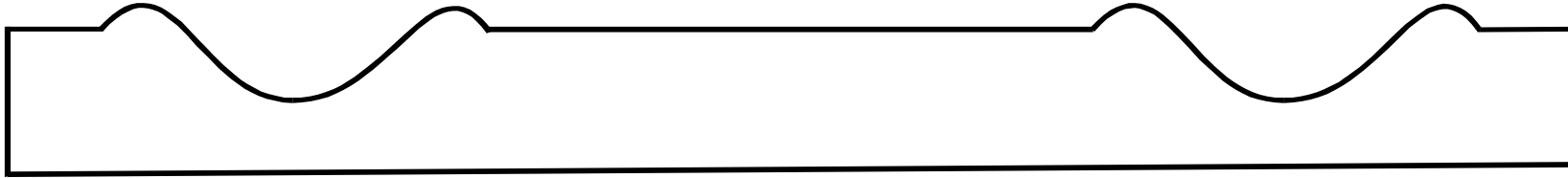
Rutting (Permanent Deformation)



Rutting



Rutting Reasons



Unstable HMA



Poor Compaction During Construction



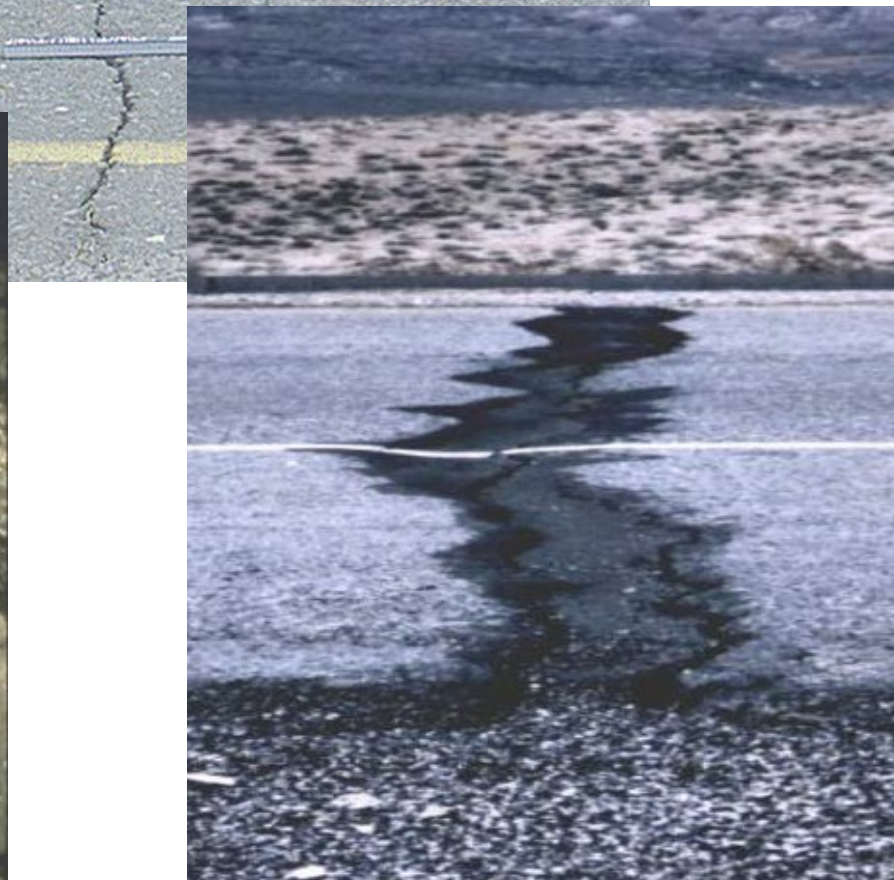
Poor Subgrade

Thermal Cracking



Friction on Underside of **HMA** Surface

Thermal Cracking



Block Cracking



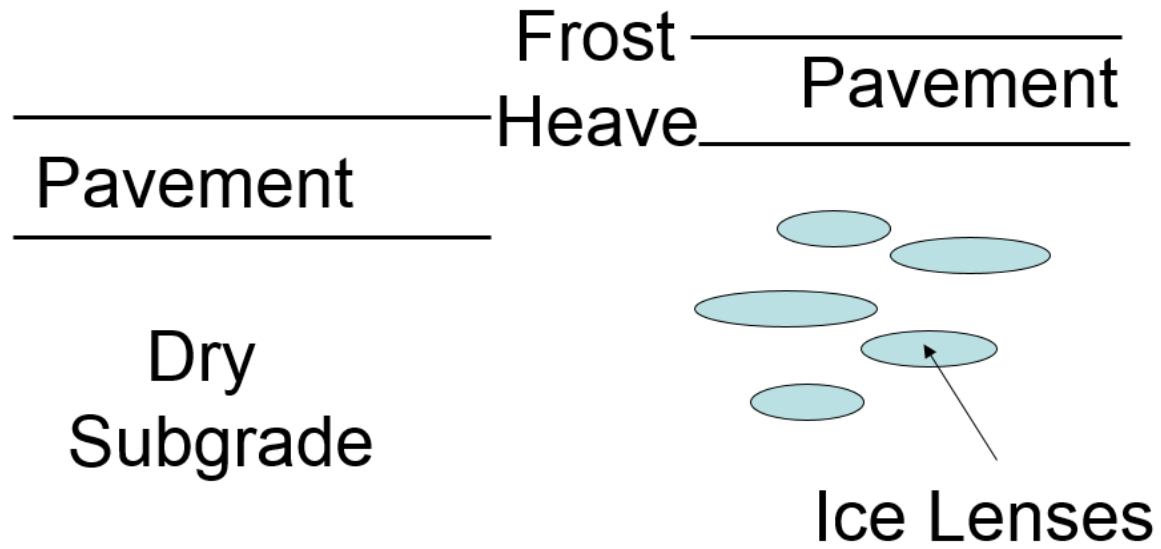
Roughness



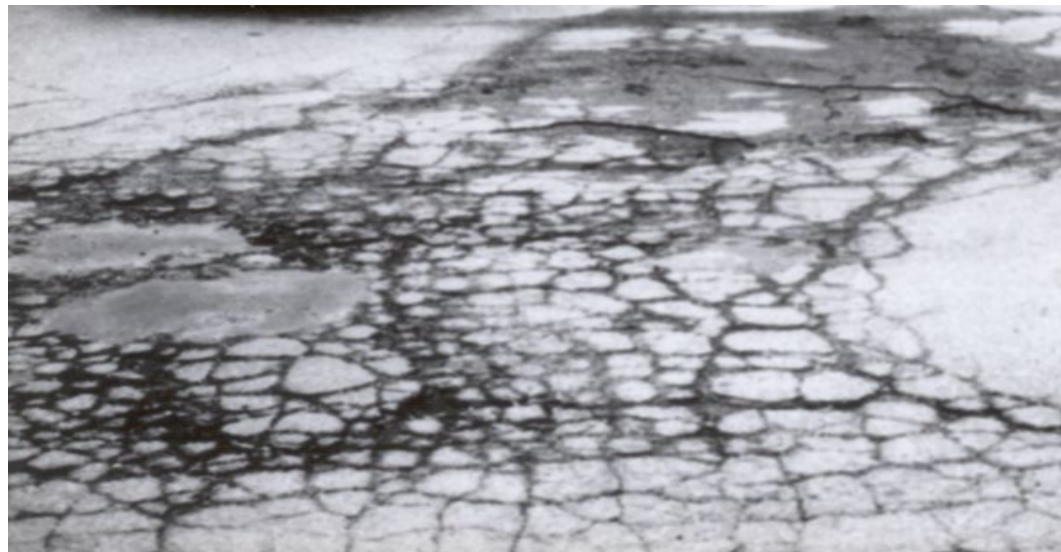
CAUTION
FAULT ZONE
WATCH FOR
CRACKS IN ROAD



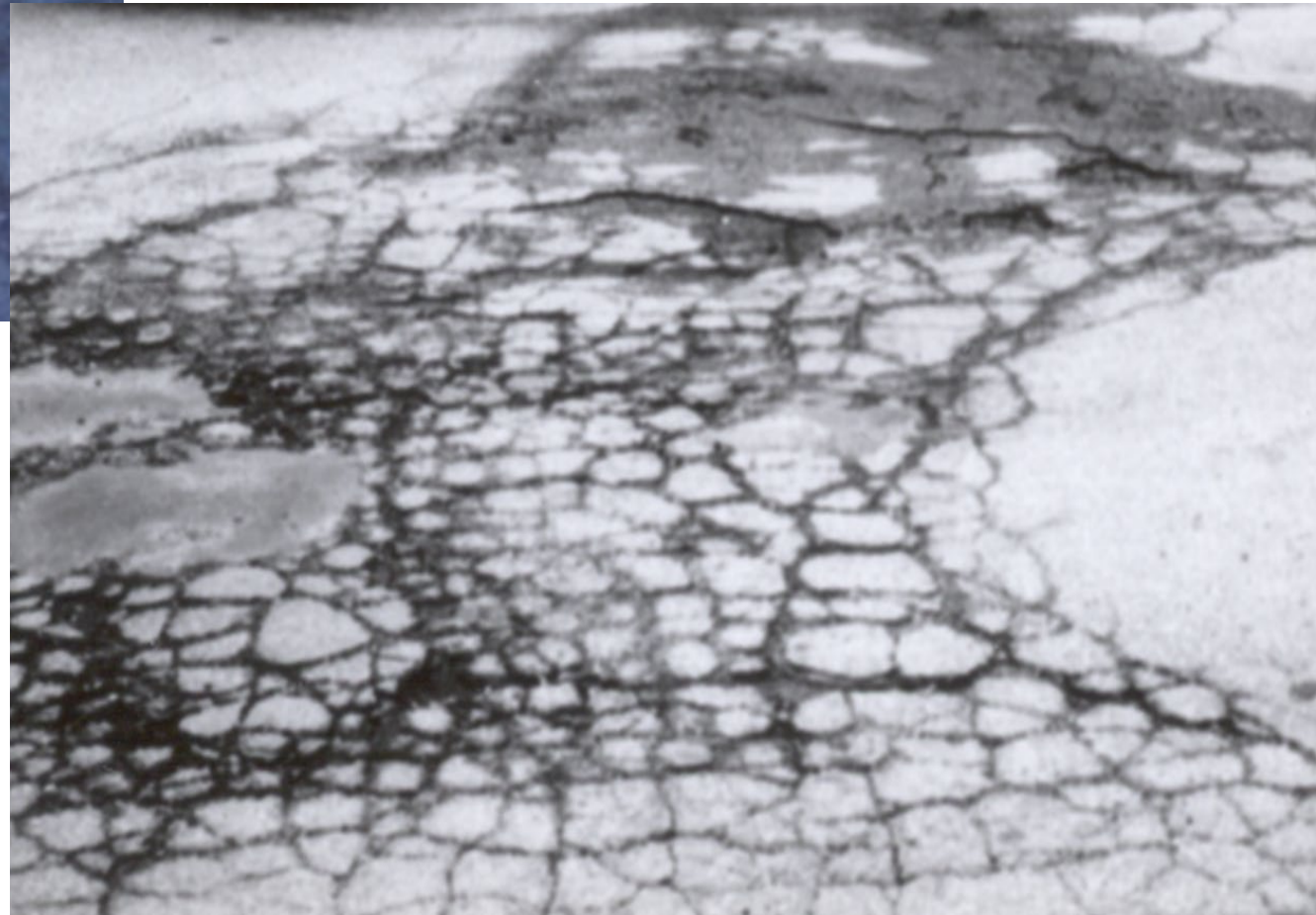
Frost Effect



Frost Heave



Poor Drainage





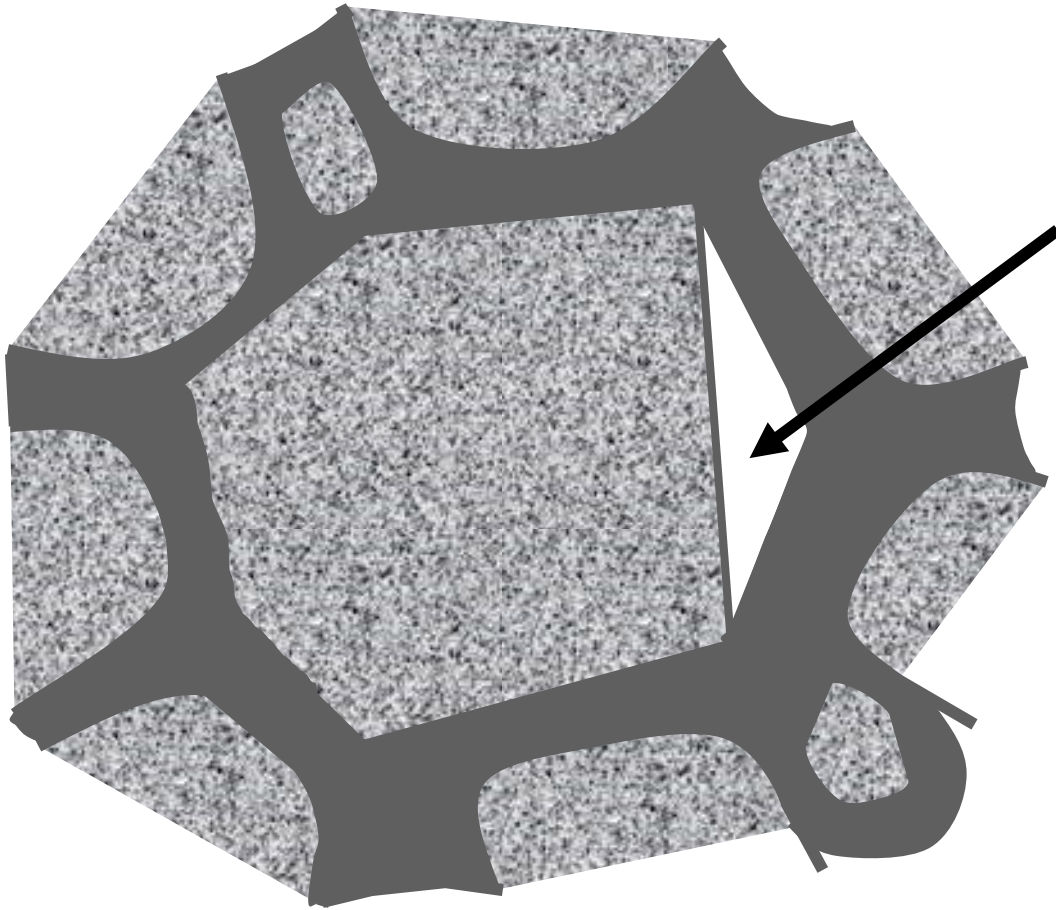
Water Bleeding & Pumping



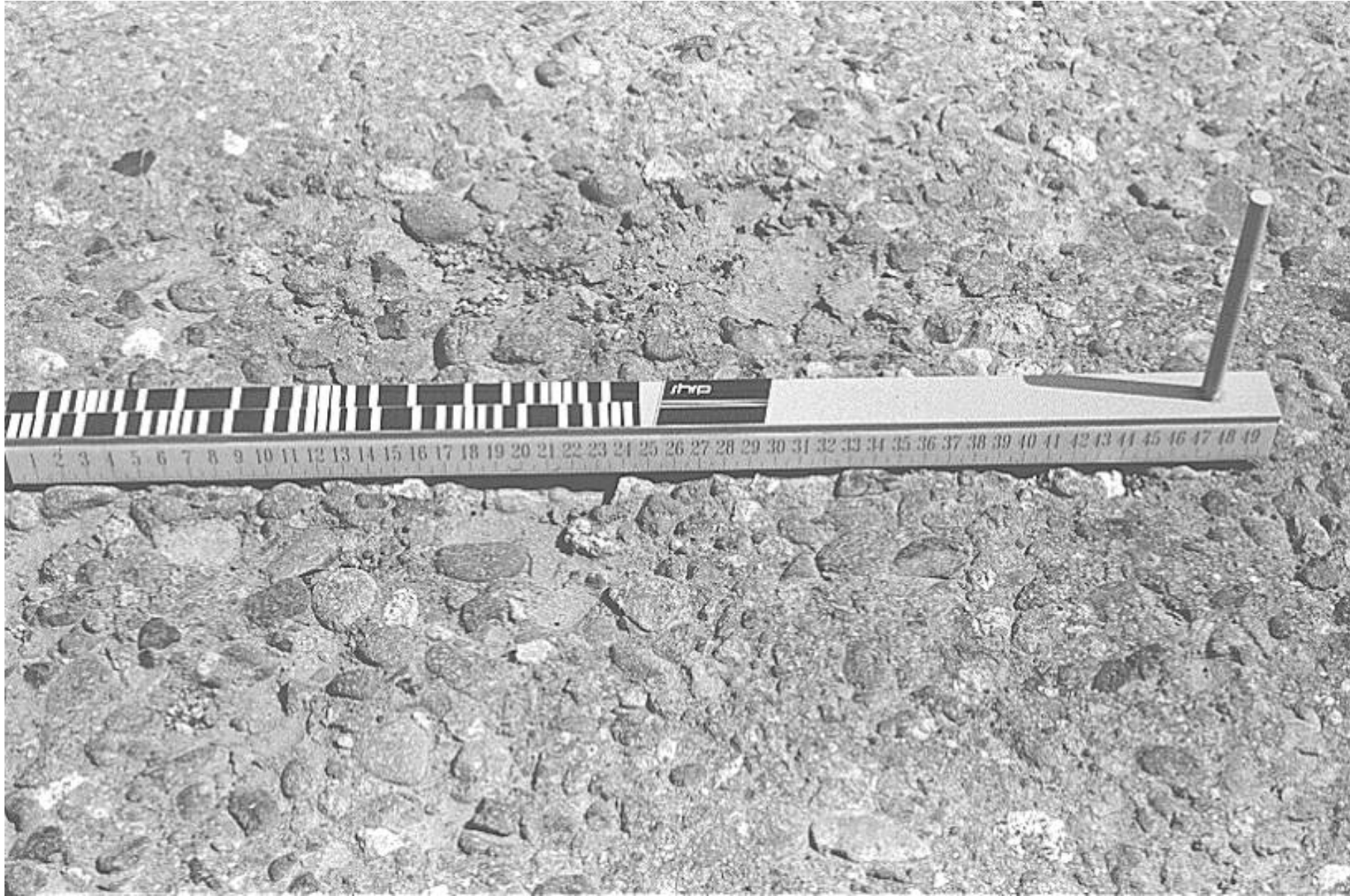
Depression due
to Pumping

Stripping

**Separation
of bitumen
from
aggregate**

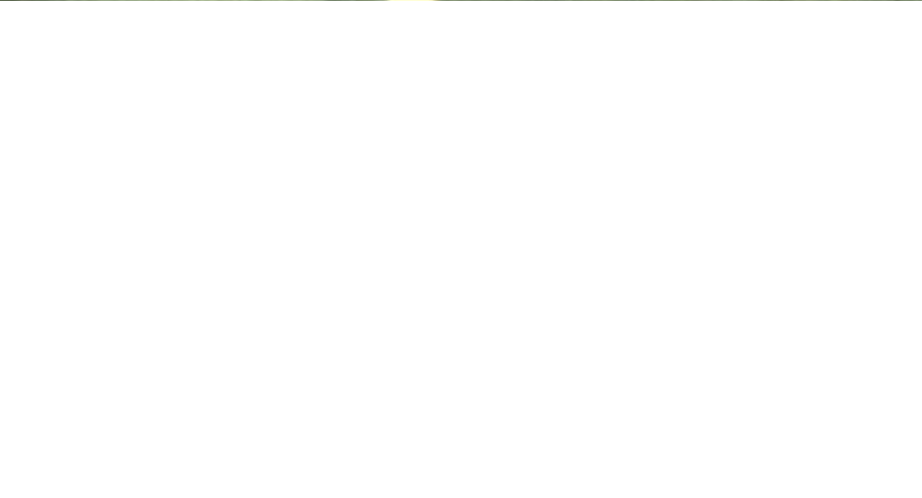


Raveling





Bleeding/ Flushing



Polished Aggregate



Shoving

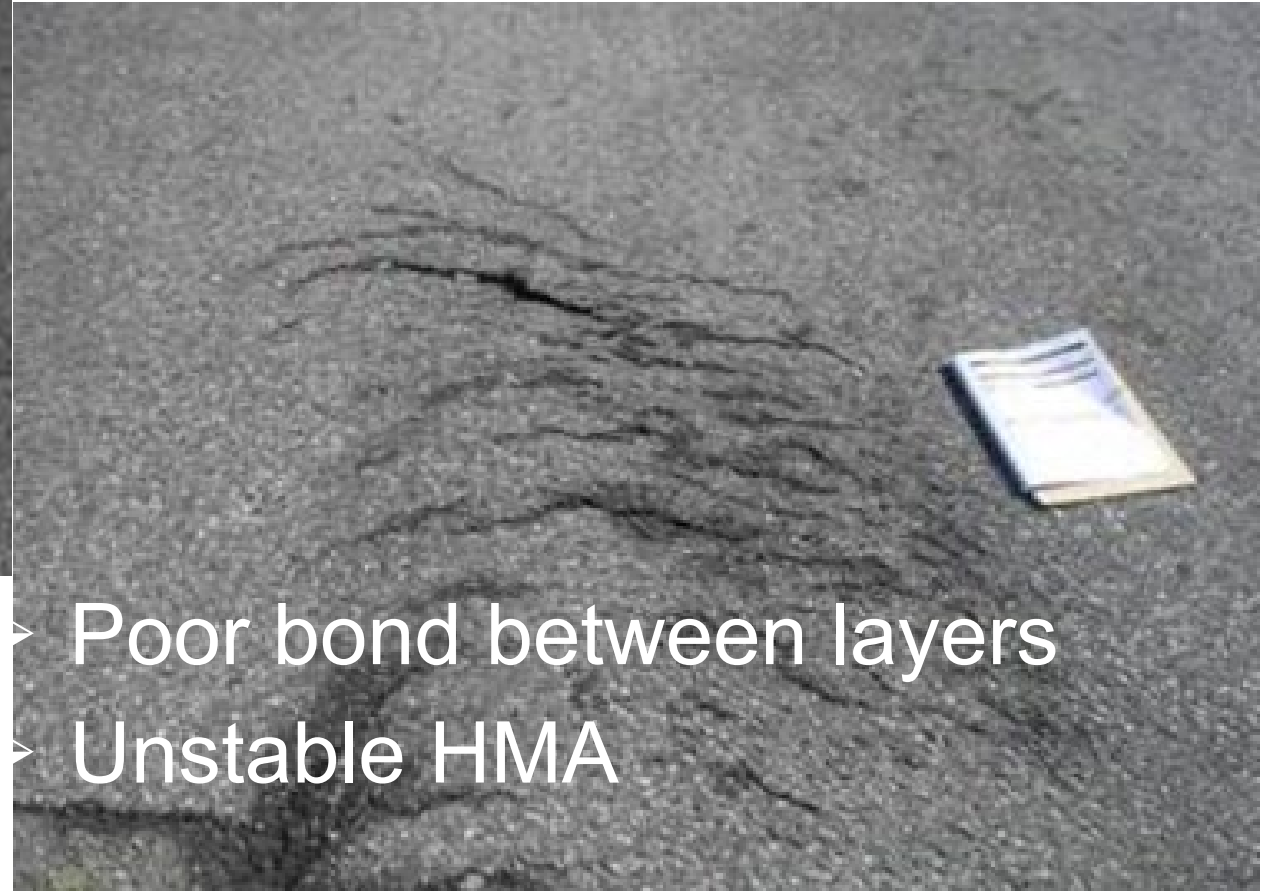


Shoving at
Intersections

Shoving



Slippage Cracking

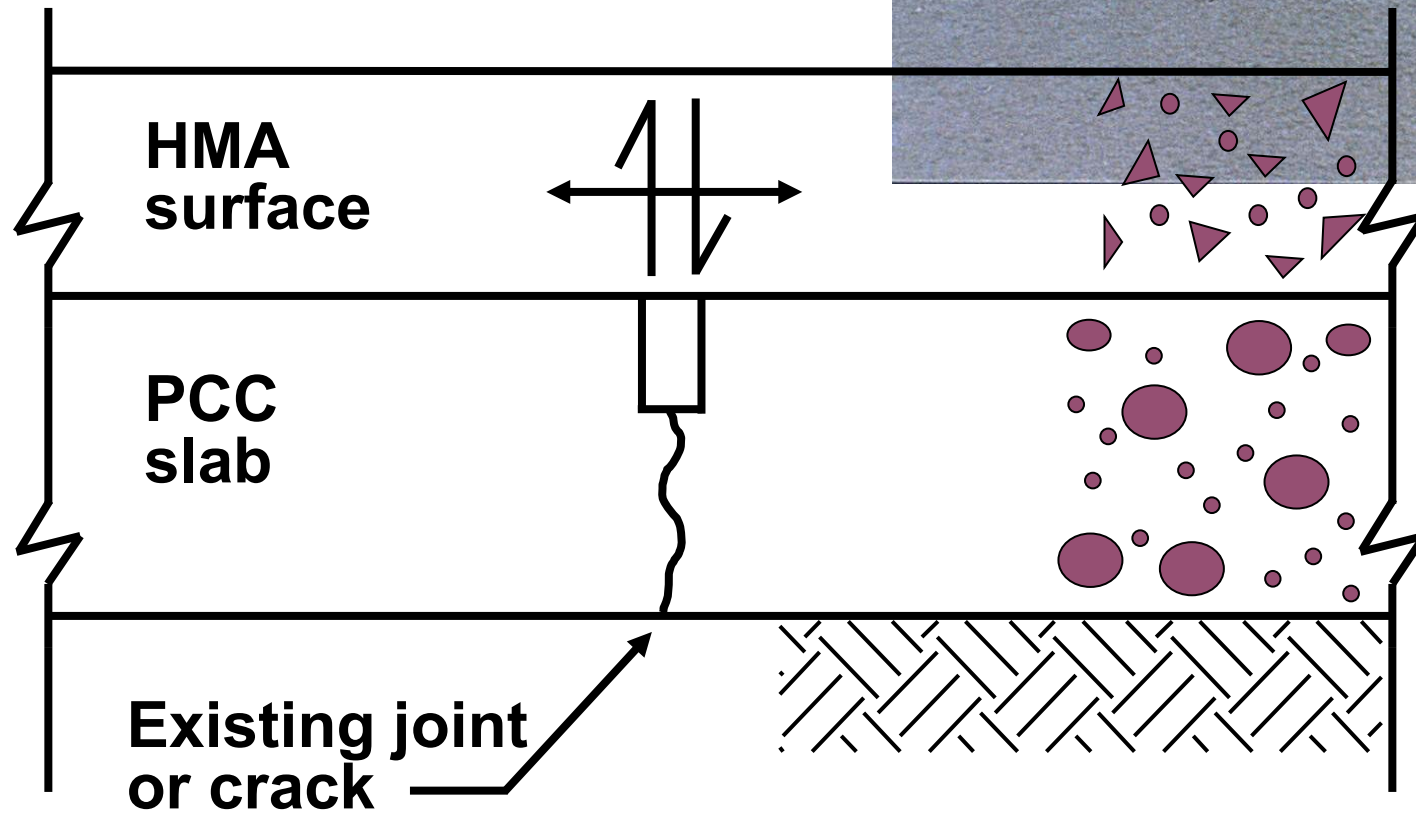
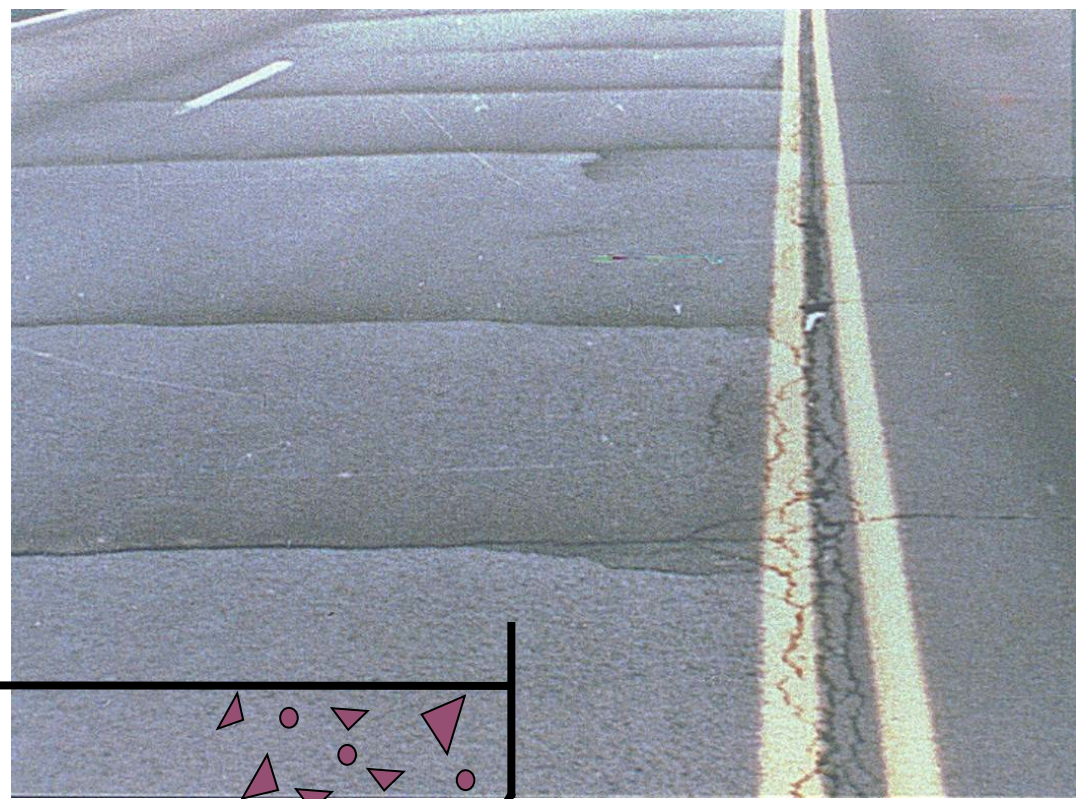


- Poor bond between layers
- Unstable HMA

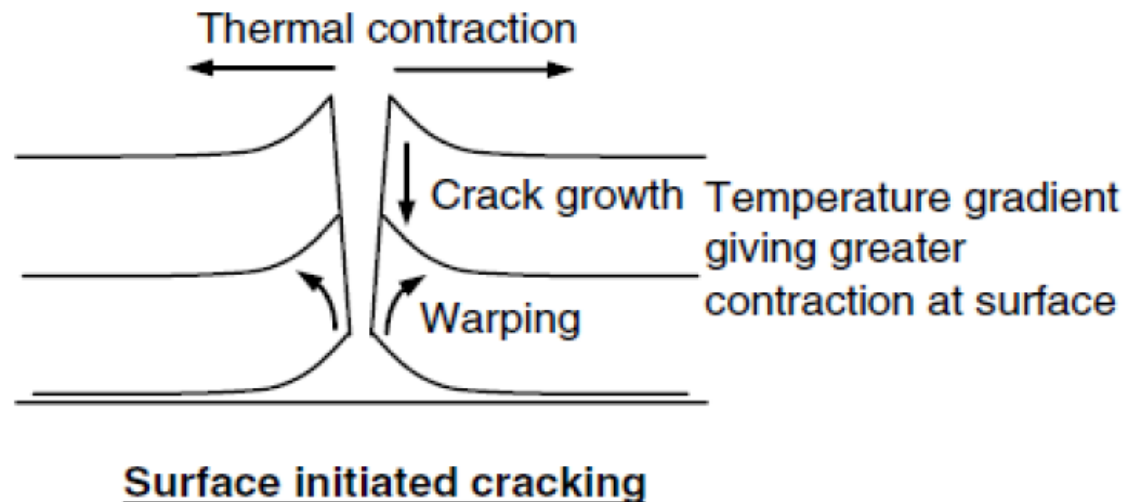
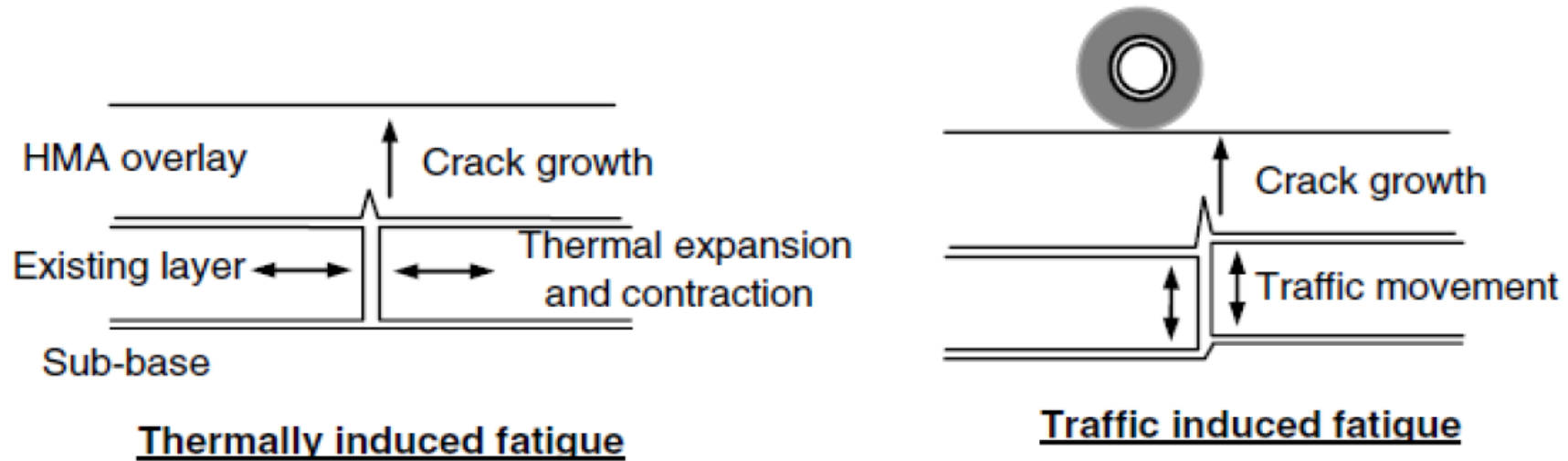
Depression



Reflective Cracking



Reflective Cracking Mechanism

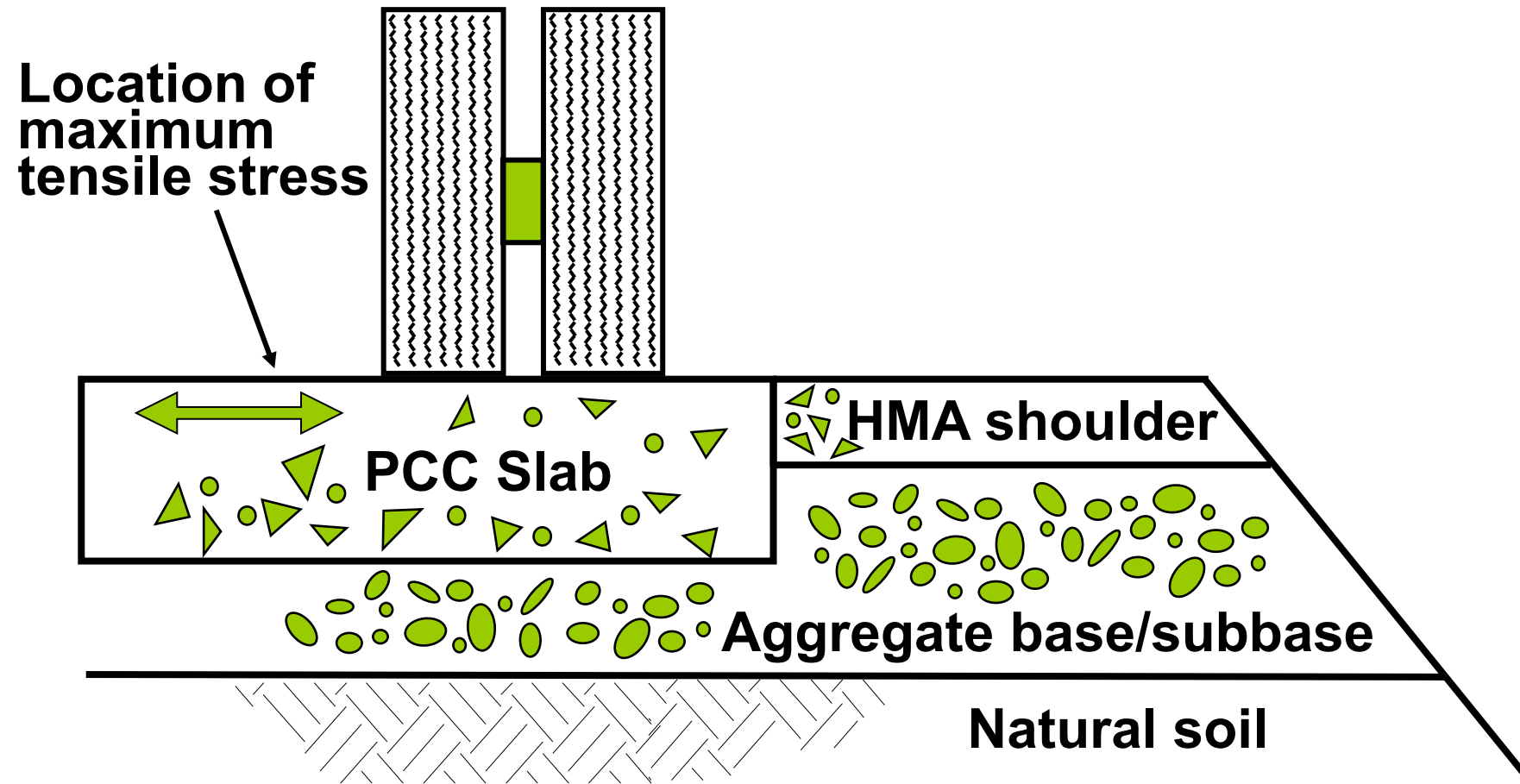


Distresses in Concrete Pavement

Basic Distress Mechanisms

- Load-related
 - Fatigue
 - Faulting
- Temperature-related
 - Low-temp. mid-slab cracking
 - High-temp. joint / crack distress
- Moisture-related
 - Pumping
 - D - Cracking

Fatigue



Longitudinal Cracking





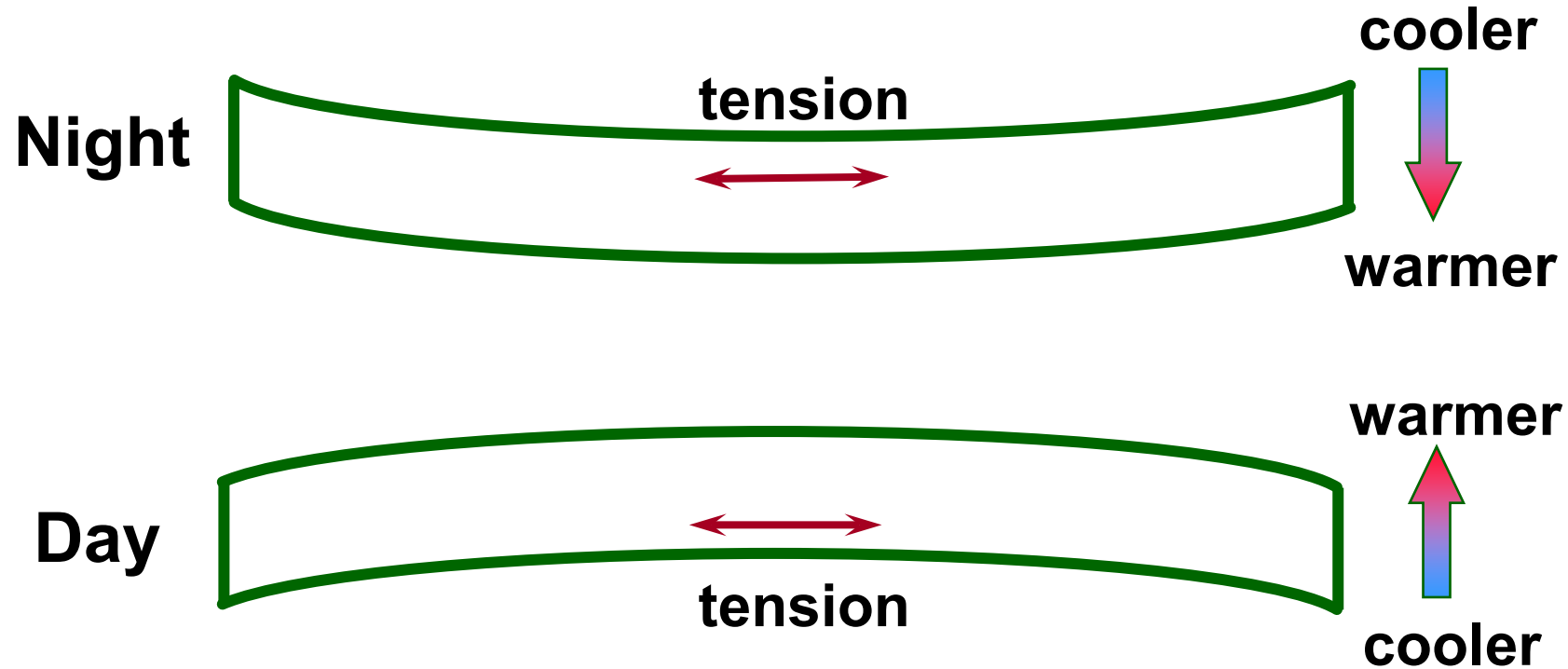
Mid-Slab Cracking

mid-slab



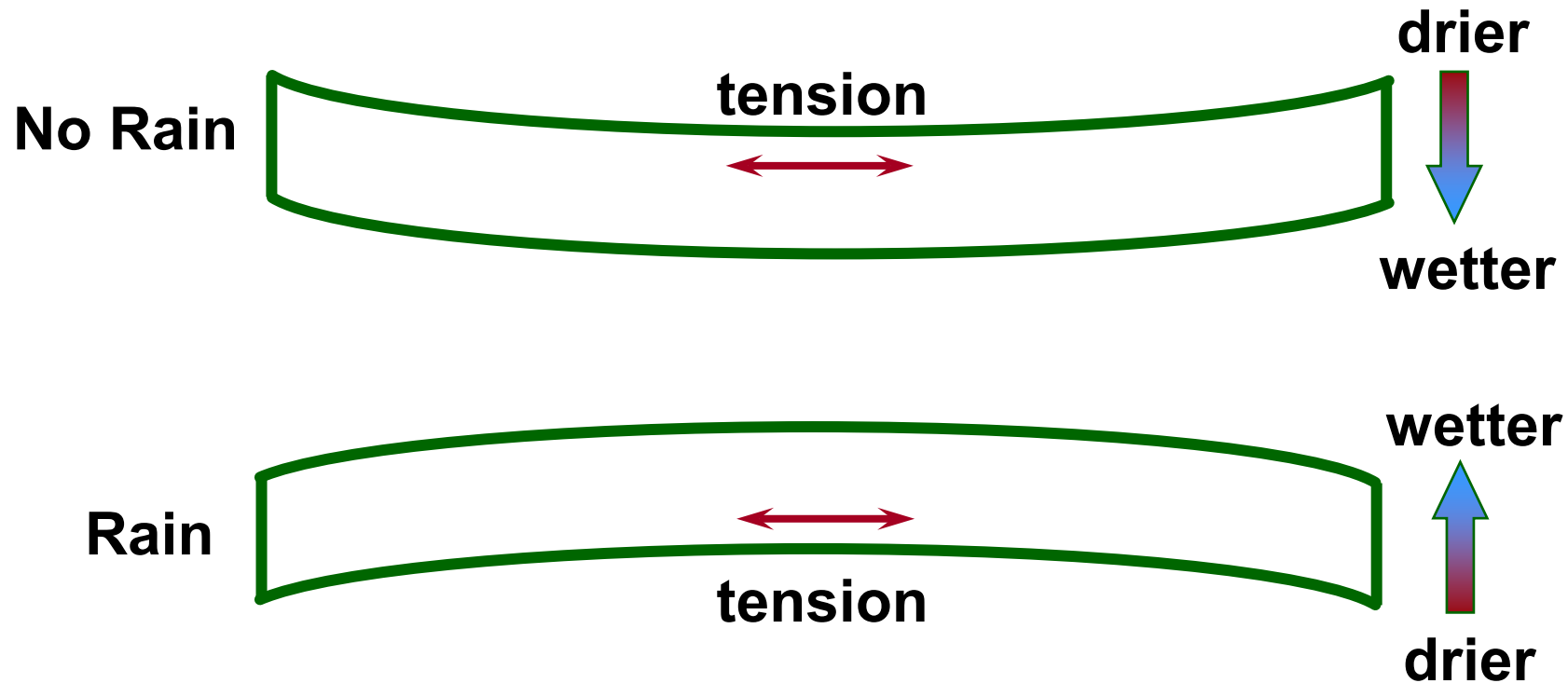
Thermal-Gradient Related Stresses

Temperature differential between the top and bottom of the slab



Moisture-Gradient Related Stresses

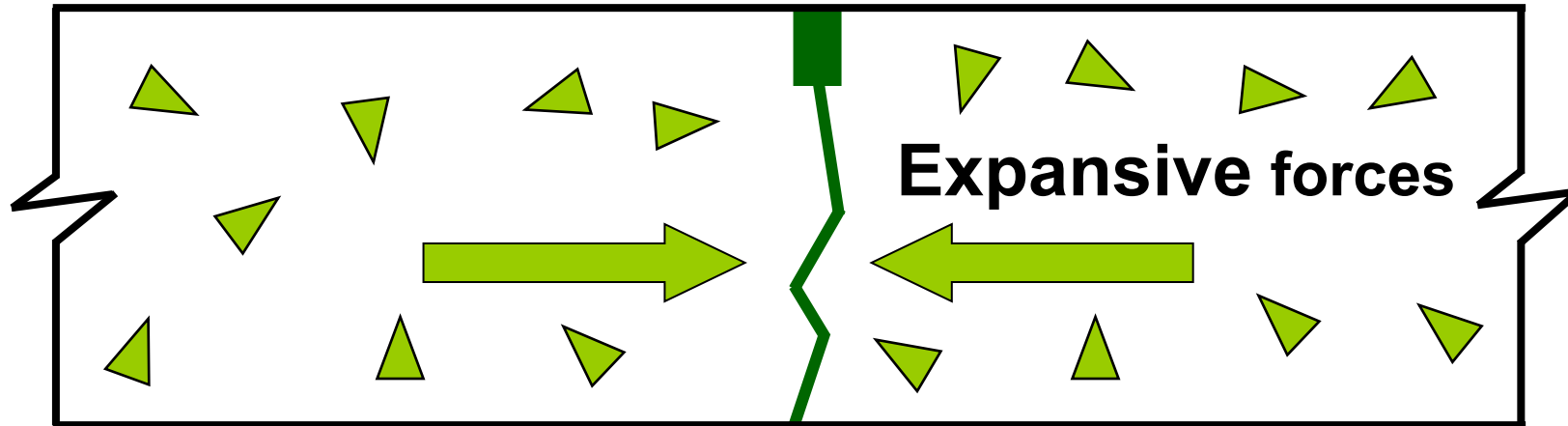
Variations in moisture content between top and bottom of slab



Curling / Warping Crack



High-Temperature Joint / Crack Distress



Joint Spalling



Joint Spalling



Blowup



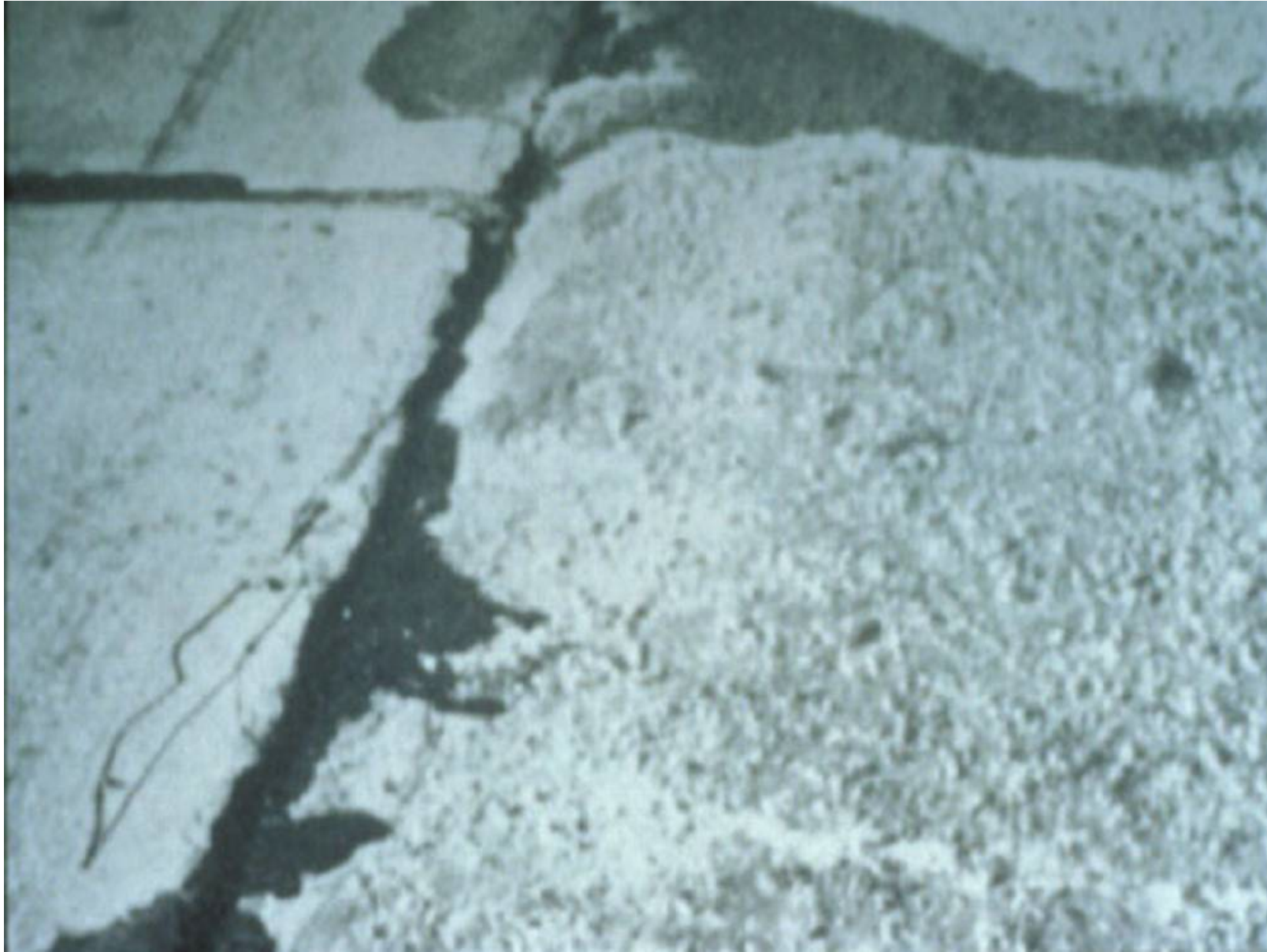
Pumping



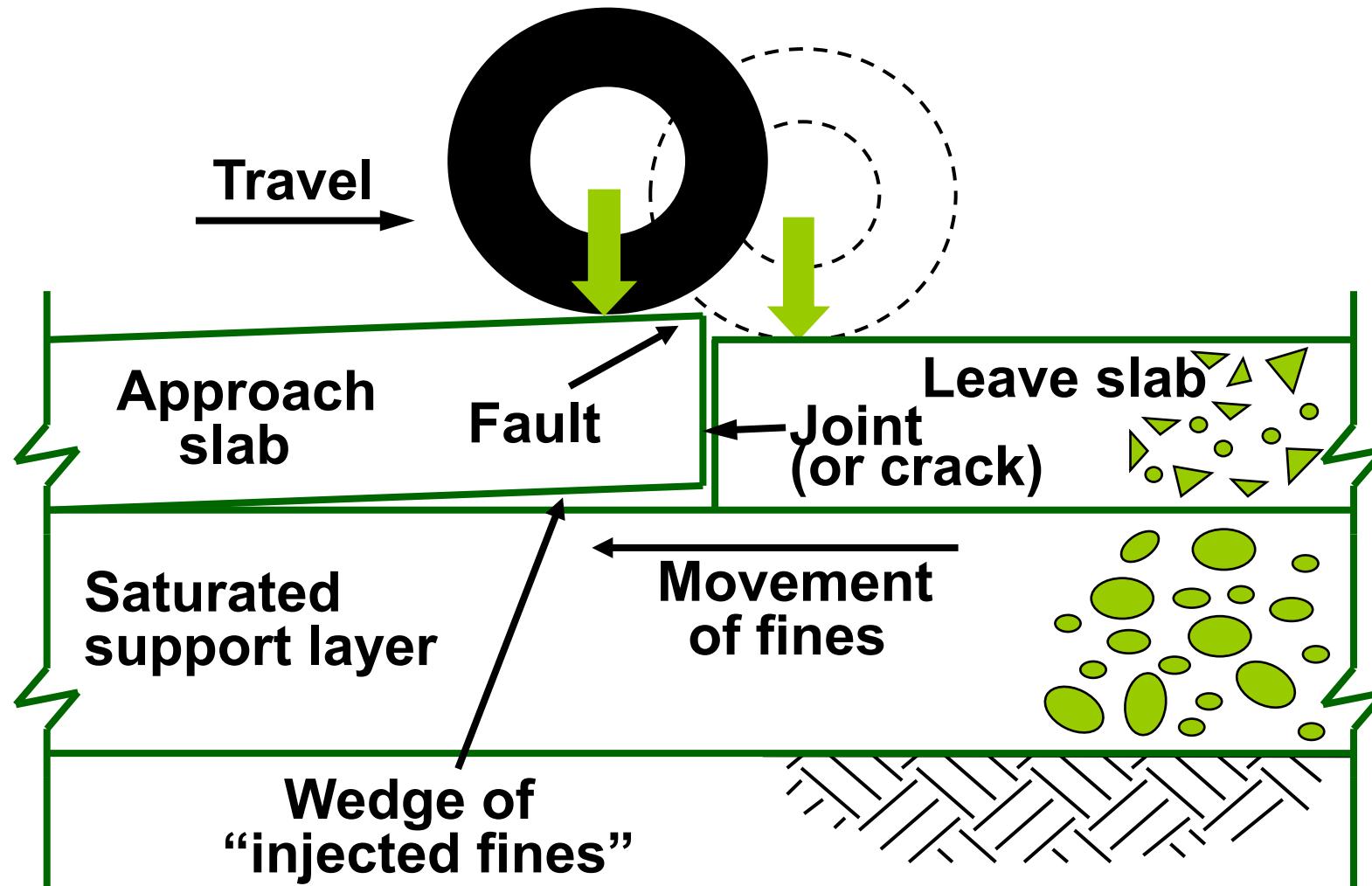
Pumping



Pumping



Faulting



Faulting



Diagonal Cracking



Pumping - High Severity



Alkali-Silica Reactivity (ASR)



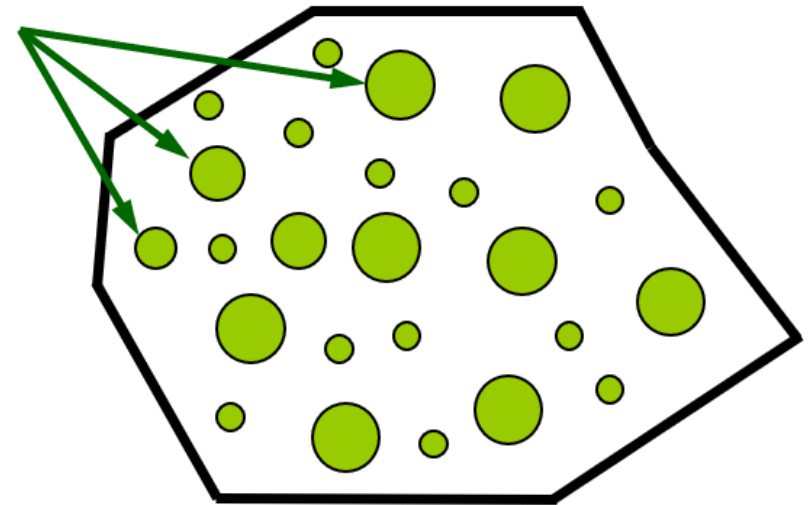
Close Up View of ASR Distress





D-Cracking

**Moisture-laden
voids**





Questions?