

## Section 5: Deleterious Materials

### Deleterious Materials

- Weak or low quality particles or coatings found on or mixed with coarse aggregate
  - “bad guys”
- Affect bond between cements and aggregates
- Break up during mixing and use

## Deleterious Materials

- Include ...
  - organic coating
  - dust
  - clay lumps, shale, coal particles
  - chert (breaks up during freezing and thawing)
  - lignite and limonite
  - badly weathered, soft and lightweight particles

## Deleterious Materials

**Harmful Materials in Aggregates**

Substances	Effect on concrete	Test designation
Organic impurities	Affect setting and hardening, may cause deterioration	ASTM C 40 ASTM C 87
Materials finer than No. 200 (80- $\mu$ m) sieve	Affect bond, increase water requirement	ASTM C 117
Coal, lignite, or other lightweight materials	Affect durability, may cause stains and popouts	ASTM C 123
Soft particles	Affect durability	
Clay lumps and friable particles	Affect workability and durability, may cause popouts	ASTM C 142
Chert of less than 2.40 specific gravity	Affects durability, may cause popouts	ASTM C 123 ASTM C 295
Alkali-reactive aggregates	Abnormal expansion, map cracking, popouts	ASTM C 227 ASTM C 289 ASTM C 295 ASTM C 342 ASTM C 586