

## Hot Weather Concreting Best Practices

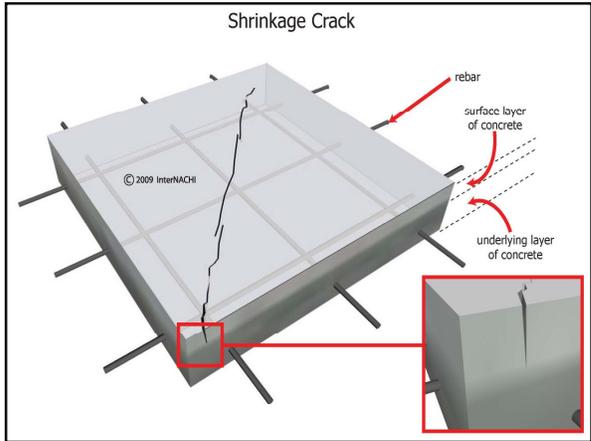
### Causes of Hot Weather Concreting

- **High Temperatures**
  - Average daily temperature greater than 77°F (ACI)
- **High Winds**
- **Low Relative Humidity**
- **Solar Radiation**



### Effects of Hot Weather Concreting

- **Plastic shrinkage cracking**
- **Accelerated slump loss**
- **Loss of entrained air**
- **Quicker set time**
- **Thermal cracking**



### Best Pre-Pour Practices

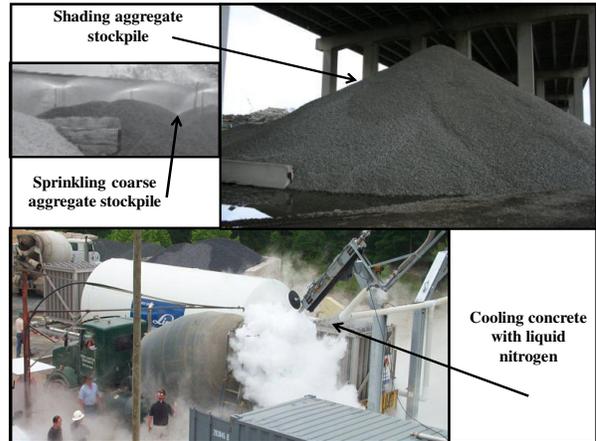
- **Plan and be prepared!**
- **Look at the upcoming weather forecast**
- **Hold a pre-pour conference**
  - TDOT, the contractor, and the concrete producer should all be present.
  - Discuss actions that should be taken by all parties to ensure quality concrete



## Hot Weather Concreting Best Practices

### Best Pre-Pour Practices

- **Concrete Producer:**
  - Shade aggregate stockpiles
  - Sprinkle water on coarse aggregate stockpile
    - Adjust mix proportions due to the moisture content
  - Use chilled water or ice in place of mix water
    - Must not exceed water/cement ratio for the design
  - Use liquid nitrogen to cool the concrete
  - Submit a hot weather mix design for approval
    - Use water reducing and set retarding admixtures
    - Use of Class F fly ash or slag can lower heat generation



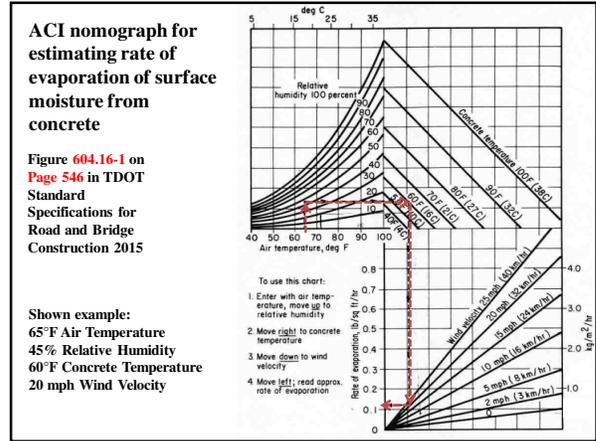
### Best Pre-Pour Practices

- **Contractor:**
  - Schedule pours for the night or early morning
  - Avoid delays in delivery, placement, and finishing of concrete
    - Have ample laborers to be able to handle the amount of concrete
    - Schedule trucks to maintain a consistent moving operation to avoid any stop/start delays
  - Have evaporation control measures on-site



### Best Practices During the Pour

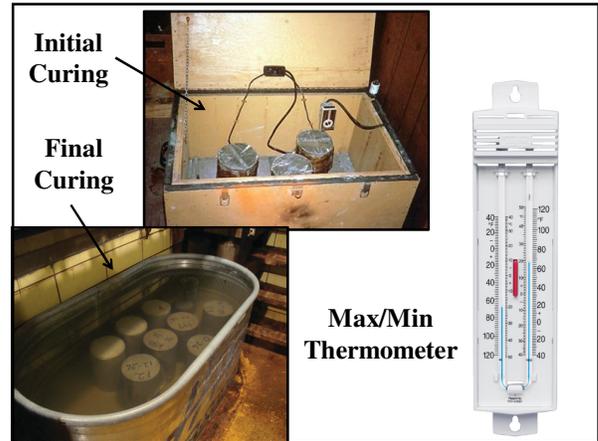
- **Inspector:**
  - Ensure design water/cement ratio has not been exceeded by the addition of ice or chilled water (added at the plant or on-site)
  - Ensure measures are in place when evaporation rate exceeds 0.2 Lbs/S.F./Hr (Use nomograph)
  - Check discharge time of the concrete (501.10, 604.13)
    - For example if pouring structural concrete:
      - 90 minutes if air temperature is less than 90°F
      - 60 minutes if air temperature is 90°F or above (bridge decks)
  - Test concrete temperature
    - Maximum allowable concrete temperature is 90°F (604.11)



## Hot Weather Concreting Best Practices

### Best Practices During the Pour

- **Inspector:**
  - **Initial curing for concrete test cylinders:**
    - Immediately after molding and finishing, store specimens in a cure box for a period up to 48 hours.
    - Temperature in cure box shall range between (AASHTO T-23):
      - 60°F-80°F for mixes with design strength below 6000 psi
      - 68°F-78°F for high early strength cylinders (≥6000 psi)
    - Storage temperature shall be controlled by use of heating and cooling devices, as necessary.
  - Within 30 min. after removing molds, cure specimens with free water maintained on surface at all times at a temperature of 73.5°±3.5°F



### Best Practices During the Pour

- **Contractor:**
  - Dampen forms and reinforcement (604.16)
  - Use evaporation measures when required
    - Plastic sheeting
    - Fog spray
    - Windbreaks
    - Sunshades
  - Place and finish concrete ASAP!
  - Begin curing procedure immediately after the water sheen disappears from the surface (604.23)



## Hot Weather Concreting Best Practices

### Best Post-Pour Practices

- **Keep surfaces damp and protected from the sun for (604.23):**
  - 120 hours for bridge decks and other slabs  
(Use a continuously fed soaker hose system)
  - 72 hours for all other surfaces
- **Protect concrete from a rapid temperature drop (40°F drop in first 24 hours-ACI 305.1-06)**
  - Use insulation blankets or other approved method for regulating concrete temperature

