

# ***Integral Color in Concrete***

## ***Make your next color project a masterpiece!***

Presenters for Today's Webinar:

Susan Armstrong – Central Builders Supply

Patrick Gallagher – Admixtures, Inc.

Mark Moyer – New Enterprise Stone and Lime Co.

Jim Casilio, P.E. – PA Aggregates & Concrete Assoc.

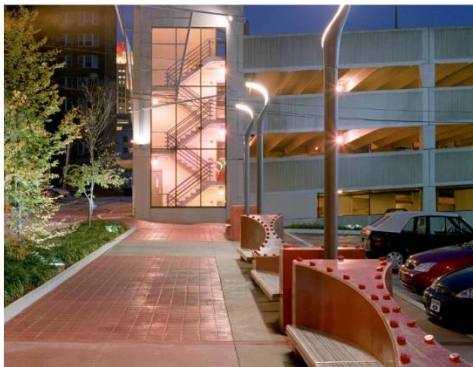
# PACA's Concrete Difference



Concrete Information for the  
Owner, Designer, Contractor and Producer

## *How Integral COLOR*

## *Can Enhance Your Concrete Project*



It is important to clearly communicate to the owner the reality of these potential variations in the finished colored concrete's appearance in order to minimize potential conflict with their expectations.

The color used in concrete is not a dye or stain, it is a pigment. These pigments are much finer than the grains of cement which react to form the bonds of concrete. These very fine-grained particles become mixed into the paste portion of the concrete and become an "integral" part of the hardened concrete.

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# For the Producer and the Contractor

- What is integral color
- Best practices for the producer
  - Adding Color
  - Mixing Procedures
  - Delivery
- Best practices for the contractor
  - Placement
  - Finishing
  - Curing

# Make you color project a success

- First step is not a technical how to.
- It is the most important topic today
- ***Managing Expectations***
  - Communicating with customer
    - What does colored concrete really look like
      - Samples, other projects
      - Variations with and differences from color samples
  - Listening to what they want and expect
    - Listen for **reds flags** as to what is reasonable

# Address the two most common problem with integral color

1. Variation in color
2. The final color is not what I thought it would be .



# Address the two most common problem with integral color

## 1. Variations in color

- **Variations in water content**
- Variations in finishing
- Variations in exposure while setting

## 2. The final color is not what I thought it would be

- **Not Cured!**
- Not the correct color or dosage
- Too much finishing

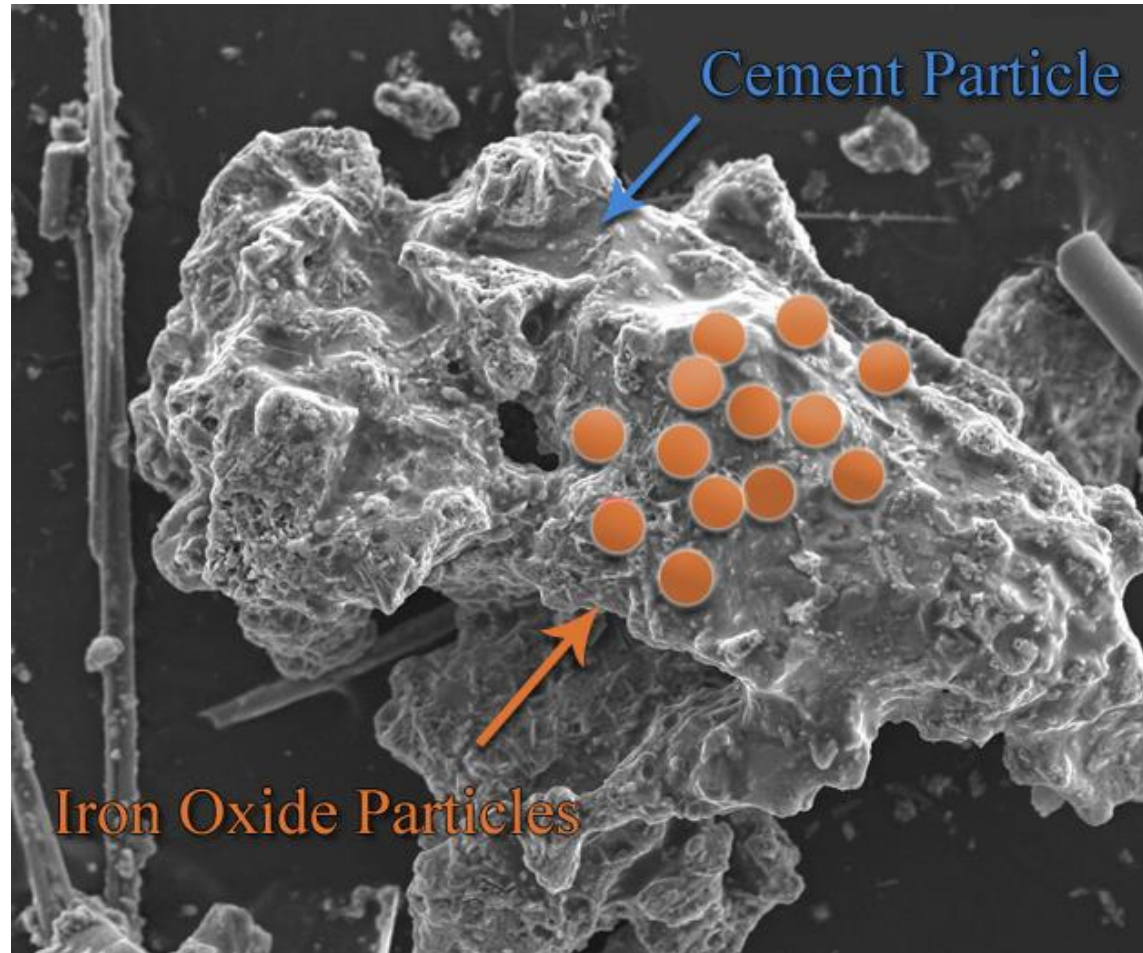


# Integral Color – Pigments

- Iron oxide compounds



# Pigment – Not a dye or stain





# Producers - Before we batch anything

- Use an integral color pigment from one of the leading manufacturers.
- Add integral color to the concrete using a consistent batch to batch process and mixing procedure.
- Variations in cement quantity, brand, and pozzolan percentages are to be avoided.
- Do not use accelerators containing calcium chloride.
- **Goal – be very consistent – load to load, batching, mixing, load to load as it arrives on the jobsite.**

# Does Integral Color Effect Concrete Properties?

- Strength – not reported to be an issue
- Slump – Also no significant effect measured
- Air Entrainment – (Air Demand)
  - Some small adjustment may be required
    - **Test!** – enough to establish any change in air demand  
Check periodically to confirm
- Dark colors absorb more heat
  - May effect finishing time

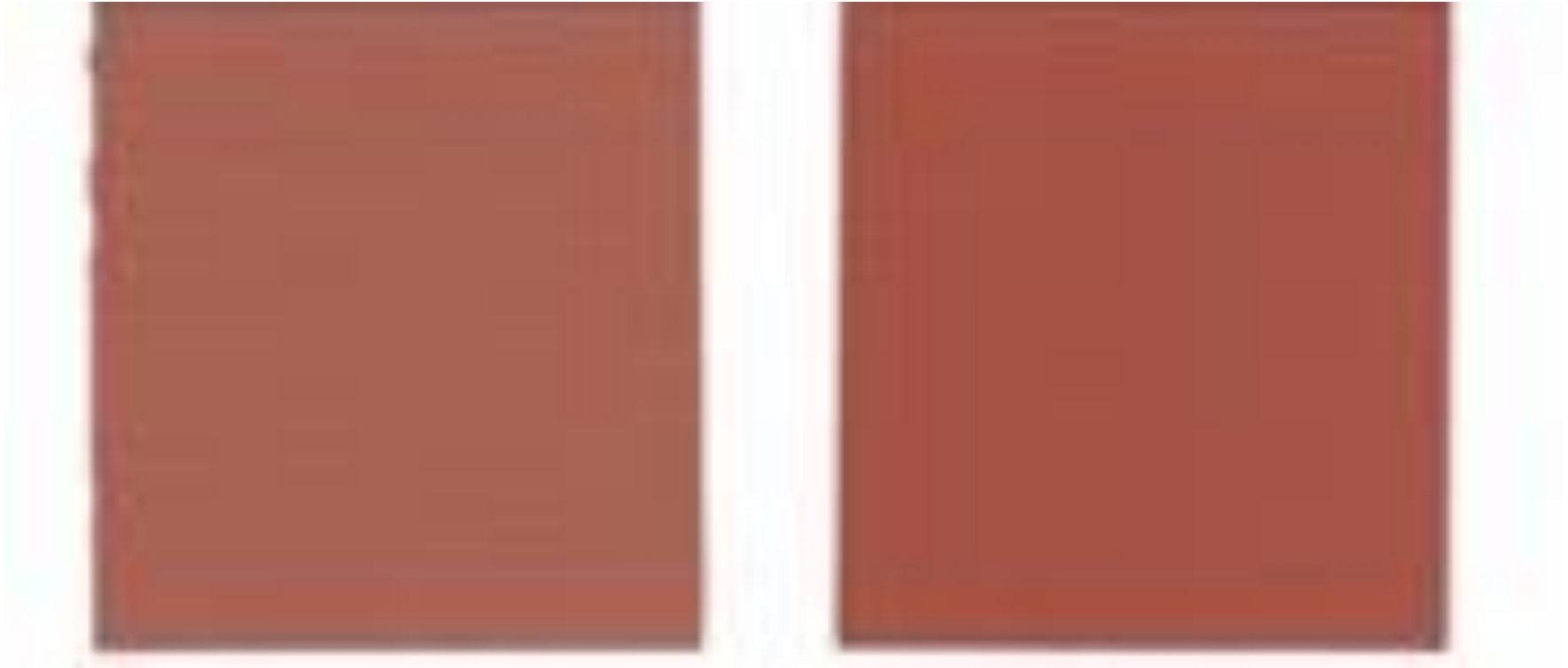
# Stocking Color – Batching at the plant



# Dosage is critical

- Dosage based upon a percentage of cementitious content
- Typically ½ lb to 6 lbs per every 100 lbs of cementitious material (.5% – 6%)
- Rarely exceeds 6 lbs /cwt

# Dosage is critical



**2 lbs / CWT**

**4 lbs /cwt**

# Adding the pigment

- *If only it were this easy*





# Adding the pigment

- Split loads color in the middle
- Some put the pigment in first
- Always better if the pigment goes onto concrete
- Small loads can be challenging
  - Put color onto the concrete
  - Watch amount of “rinse in” water
  - Pigment sticking on the fins

# Variations in water content

- Starts at the concrete plant

Keep all water consistent

Batching water

“Rinse In” water

Water added on the way to the project

With water – Be more than just not excessive

**Be Consistent**

# Variations in Water Content

- At the jobsite
  - Need to get the slump correct **for the entire load** prior to starting placement
    - With water added – more than not excessive – **Consistent**

***Drivers - Get to the proper slump without excessive time and mixing***

# Finishing Colored Concrete

- Variations in finishing practices are the second leading cause of color variation
- During finishing is also where variations to the water content at the surface will cause color differences

These small differences to the surface will cause variations as if you added many gallons to the load.

# Finishing Colored Concrete



# Finishing Colored Concrete

The most important rule:

***Less is more***

- Screeding
- Initial floating
- Any steps before final texturing
- Final Texturing



# Finishing Colored Concrete

- Screeding
  - Use proper slump
    - Truly less than a 6"
  - No Jitterbugs
  - Care when using a vibra strike
    - Consistency

# Finishing Colored Concrete

- Initial floating
  - (bull floating – closing)
  - Just what is needed
  - Quickly
    - Before bleed water comes up

# Finishing Colored Concrete

- Wait until all bleed water “sheen” has disappeared
- The easiest way to vary the color
  - Tough to call

# Finishing Colored Concrete

- Any steps before final texturing ?
  - Use of a darby before brooming
    - To be limited when using color
    - Easy way to add variation
    - Why not just skip this step?
    - Never trowel exterior color concrete
  - Remember less is more in all concrete – especially color

# Final Texturing



# Final Texturing

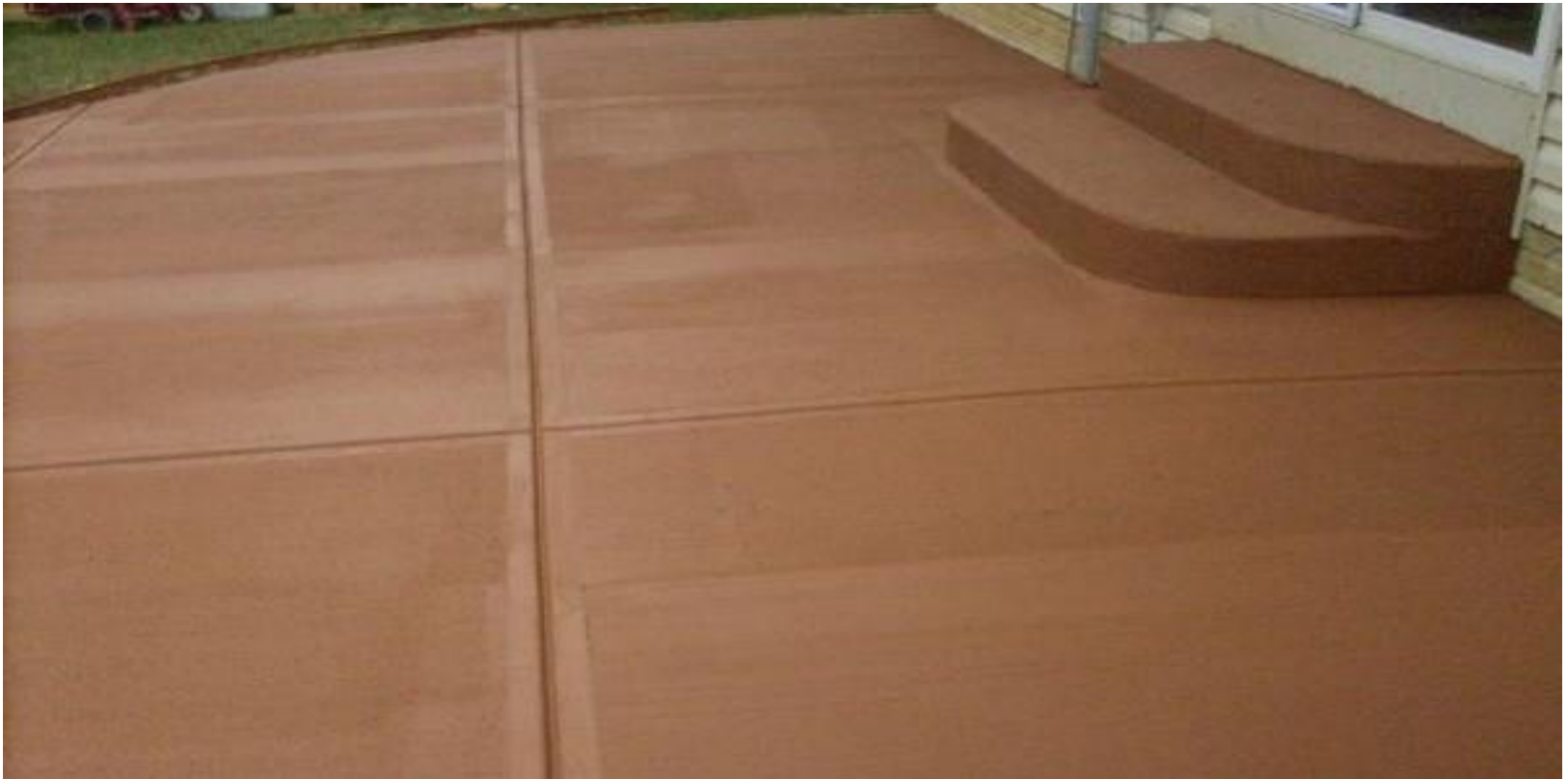
A broom or simple textured finish (swirl) will produce the most consistent color



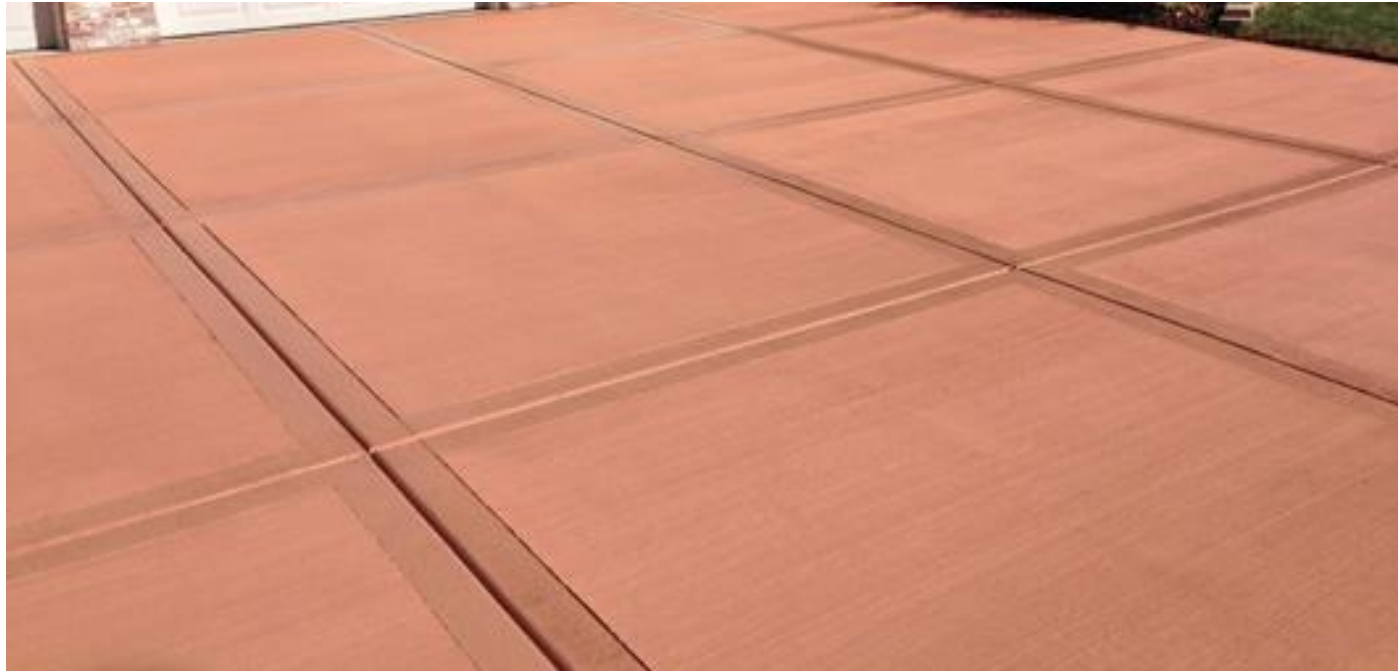


# Final Texturing

Even water from a constantly wetted broom or float will cause color variations!



# Finishing - Edging



With caution – It will change the shade

# Curing / Sealing

- Use a curing compound specifically design for colored concrete.
- Apply it immediately after finishing, as soon as possible as to not damage the surface, and in accordance with the manufactures instructions.
- The use of water spray curing, plastic sheeting, or any type of covering is to be avoided
- Use care not to apply the first coat of a sealer to thick. This can result a whitening of the surface under the sealer

# Curing / Sealing - Why



Not Cured and Sealed vs Cured and Sealed

# Curing versus Sealing

- Curing to provide the correct color and durability
- Sealing to maintain and protect the concrete and color integrity

# Curing Compound for Color Concrete





# Never water cure or cover





Use care not to apply the first coat of a sealer to thick.



# Make your next color job a success



# Integral Concrete Color



**Jim Casilio**

**610-730-2385**

**jimc@pacaweb.org**

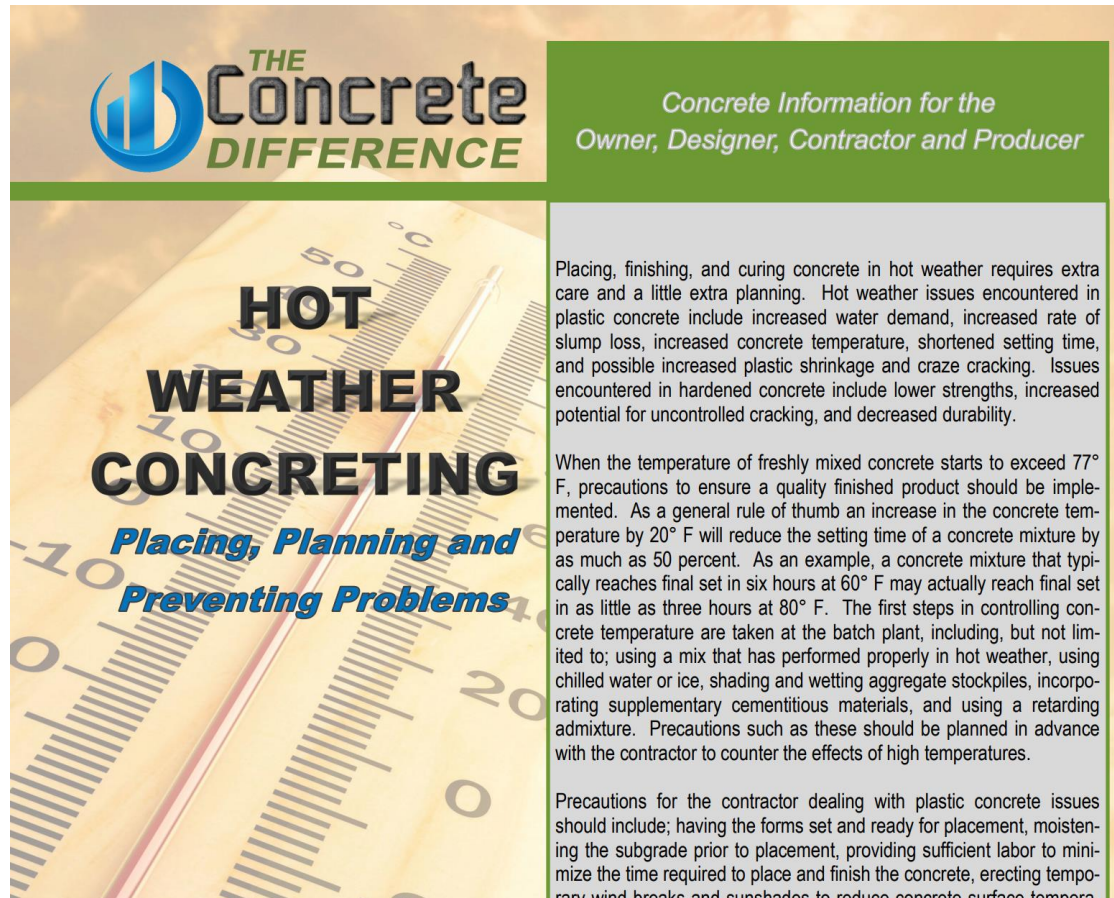
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# Our next webinar - Hot Weather Concrete Issues - July 11 th 2:00 pm



**THE Concrete DIFFERENCE**

*Concrete Information for the Owner, Designer, Contractor and Producer*

## **HOT WEATHER CONCRETING**

*Placing, Planning and Preventing Problems*

Placing, finishing, and curing concrete in hot weather requires extra care and a little extra planning. Hot weather issues encountered in plastic concrete include increased water demand, increased rate of slump loss, increased concrete temperature, shortened setting time, and possible increased plastic shrinkage and craze cracking. Issues encountered in hardened concrete include lower strengths, increased potential for uncontrolled cracking, and decreased durability.

When the temperature of freshly mixed concrete starts to exceed 77° F, precautions to ensure a quality finished product should be implemented. As a general rule of thumb an increase in the concrete temperature by 20° F will reduce the setting time of a concrete mixture by as much as 50 percent. As an example, a concrete mixture that typically reaches final set in six hours at 60° F may actually reach final set in as little as three hours at 80° F. The first steps in controlling concrete temperature are taken at the batch plant, including, but not limited to; using a mix that has performed properly in hot weather, using chilled water or ice, shading and wetting aggregate stockpiles, incorporating supplementary cementitious materials, and using a retarding admixture. Precautions such as these should be planned in advance with the contractor to counter the effects of high temperatures.

Precautions for the contractor dealing with plastic concrete issues should include; having the forms set and ready for placement, moistening the subgrade prior to placement, providing sufficient labor to minimize the time required to place and finish the concrete, erecting temporary wind breaks and sunshades to reduce concrete surface tempera-