CONSOLIDATING CONCRETE BY INTERNAL VIBRATION

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The owner rejected this precast concrete
This bridge pier cost over $100,000 in investigations and repairs
Huge delays while contractor had to repair
Contractor may have to replace!
What do all these have in common?
Poor Vibration Techniques
This person is critical to the success of your project!
They need to be well trained on how to Vibrate Concrete!
Proper vibration techniques will:

1. Increase the compressive strength and bond between concrete and reinforcement
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2. Decreases cold joints, honeycombing, and entrapped air
Cold Joint/Pour Line
Proper vibration techniques will:

1. Increase the compressive strength and bond between concrete and reinforcement
2. Decreases cold joints, honeycombing, and entrapped air
3. Causes concrete within a circular radius of action to “settle” and will remove excess entrapped air
Good Vibrations will Eliminate

Honeycomb
Rock Pockets
Cold Joints
Reinforcements makes consolidation more difficult

May need to do extra consolidation at these places
Techniques of Vibrations

1. Vibrator straight/not cast at an angle
Bad Technique
Size of vibrator head determines spacing pattern

Proper Technique

Incorrect Method
Techniques of Vibrations

2. Radius of vibration about three (3) times diameter of vibrator

You must insert vibrator several times to consolidate the concrete when using small vibrators.
Techniques of Vibrations

3. Do not use the vibrator to move the concrete
Techniques of Vibrations

4. Insert Vibrator into the previous layer

Recommend insertions at least 6” into previously placed concrete
Techniques of Vibrations

5. Leave vibrator in concrete for 5-15 seconds, remove slowly.
Vibration completed when:

1. Large aggregates disappear
Vibration completed when:

2. Concrete levels
Vibration completed when:

3. Air bubbles stop rising
Vibration completed when:

4. Thin film of water is evident on top of the concrete
Spacing Tips:

1. Watch the concrete surface to determine the area that has been consolidated.
Spacing Tips:

2. Space out the insertions of the vibrator so that all concrete is consolidated.
Spacing Tips:

3. General Rule: The area (circle) that is consolidated three (3) times the vibrator’s head diameter.
Typical vibration pattern
Stop Vibrating when:

1. The concrete surface takes on a sheen - concrete surface appears shiny
Stop Vibrating when:

2. Large air bubbles stop coming to the surface
Stop Vibrating when:

3. You hear the sound of vibrator change pitch or tone
Vibrating Tips

1. Do not run the vibrator outside the concrete (in air)!

The vibrator will overheat and burn up.

The fresh concrete is necessary to cool the vibrator
Vibrating Tips

2. Don’t start a job without spare vibrators.

Rule of thumb - one extra for every three in use
Vibrating Tips

3. Check all vibrators before concreting to make sure they work.
Remember, we can place concrete much faster than we can consolidate it!
Without training our workers, this is what we can get!