

## TECHNICAL BULLETIN # 13

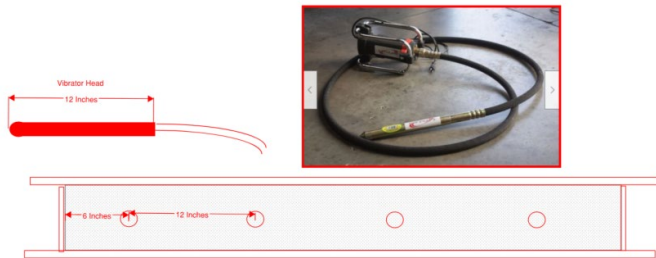
# Concrete Consolidation by Vibration Fundamentals

### Concrete Consolidation by Vibration:

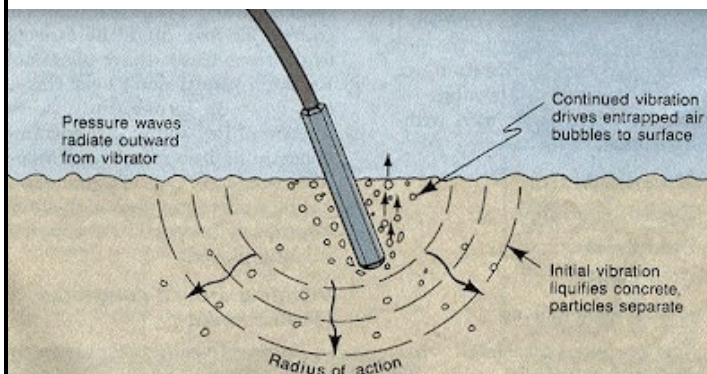
**Vibrating Concrete** is the process of removing entrapped air pockets and consolidating concrete. Air bubbles develop when the fresh concrete is poured in the form. If entrapped air bubbles are not removed from the concrete mix, defects like honeycombing are often observed. Pour lines may occur if the vibrator does not penetrate the lift below. Over vibration causes segregation, form deflections and deformations leading to formwork failures. All these issues require repairs or affect the durability of the concrete in the long term.

### Recommended Practices

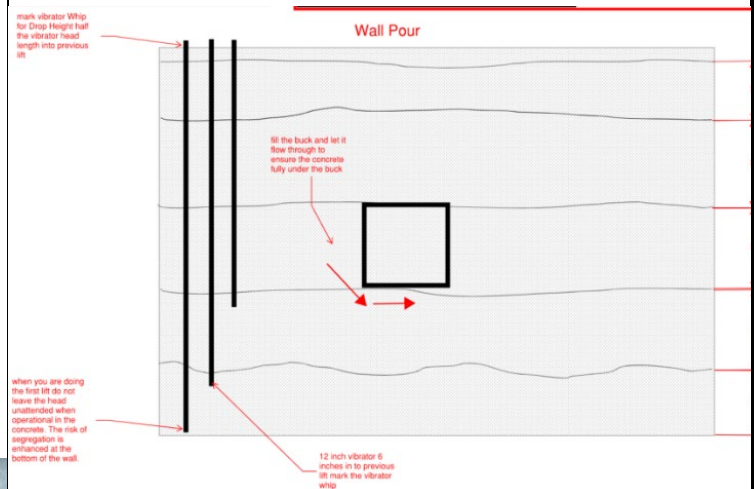
- ✓ Vibrator sizing must take into consideration size and spacing of reinforcement.
  - Vibration takes place 1 head length apart on a wall pour. The effective radius should be 1 inch of vibrator diameter for every 5 inches of wall.



- ✓ Vibrators should be applied systematically at a proper spacing to ensure overlap. Mark the drops at every lift.



- ✓ The vibrator should penetrate the upper part of the previously placed lift by its own mass and vibration (not forced).
- ✓ The vibrator should be inserted rapidly as vertical as possible and withdrawn slowly until entrapped air bubbles are visibly removed but stop vibration before excessive water/paste rises to the surface indicating segregation.
- ✓ The vibrator should avoid contact with the rebar cage.
- ✓ The complete lift must be consolidated before the next lift is placed.
- ✓ Ensure mixing of the concrete at the interface between lifts.
- ✓ Excessive vibration will cause concrete segregation.
- ✓ The potential for segregation is greatest in the bottom lift. Do not leave the vibrator unattended.
- ✓ Under vibration of concrete will cause air entrapment in the lower layers which will lead to a weak structure.



### Special Consideration will be required around:

- ✓ Rebar splices to make sure concrete properly surrounds the elements.
- ✓ Thermocouples to avoid damage.
- ✓ Embedded items in order not to cause movement from surveyed position.