Concrete

Lecture - 6

Course Coordinator
Dr. Raju Sharma
Assistant Professor
Department of Civil Engineering
Thapar Institute of Engineering and Technology
Patiala, Punjab

Content

Production of Concrete

Batching of Material

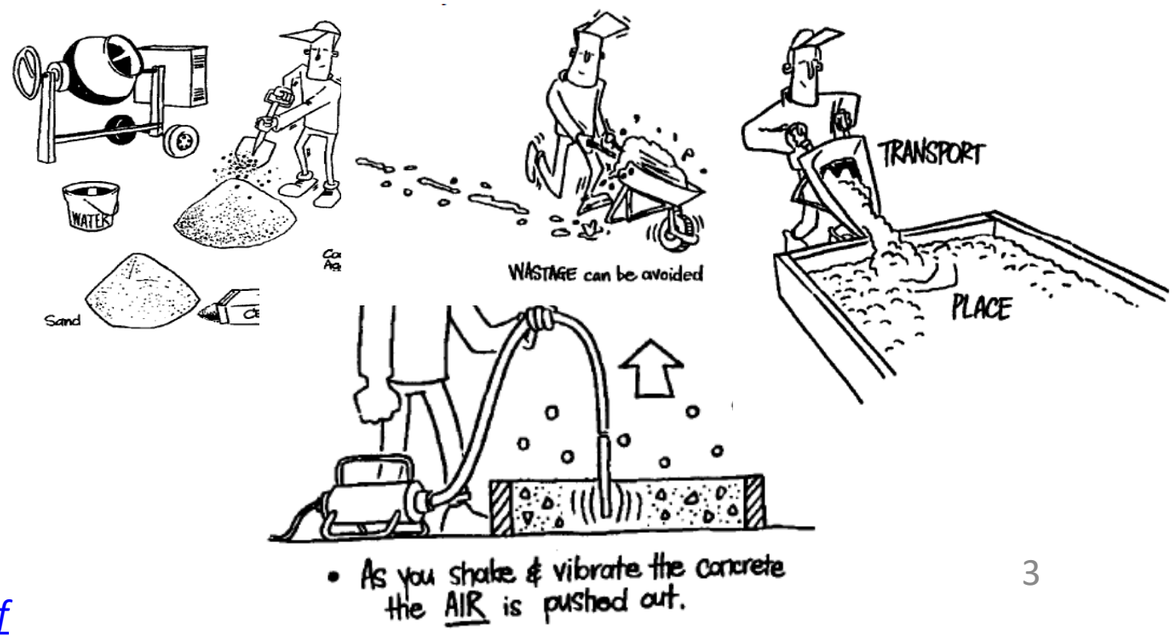
Mixing of various Ingredients

Transportation of concrete mix

Placing of Concrete

Compaction of Concrete

Curing of Concrete

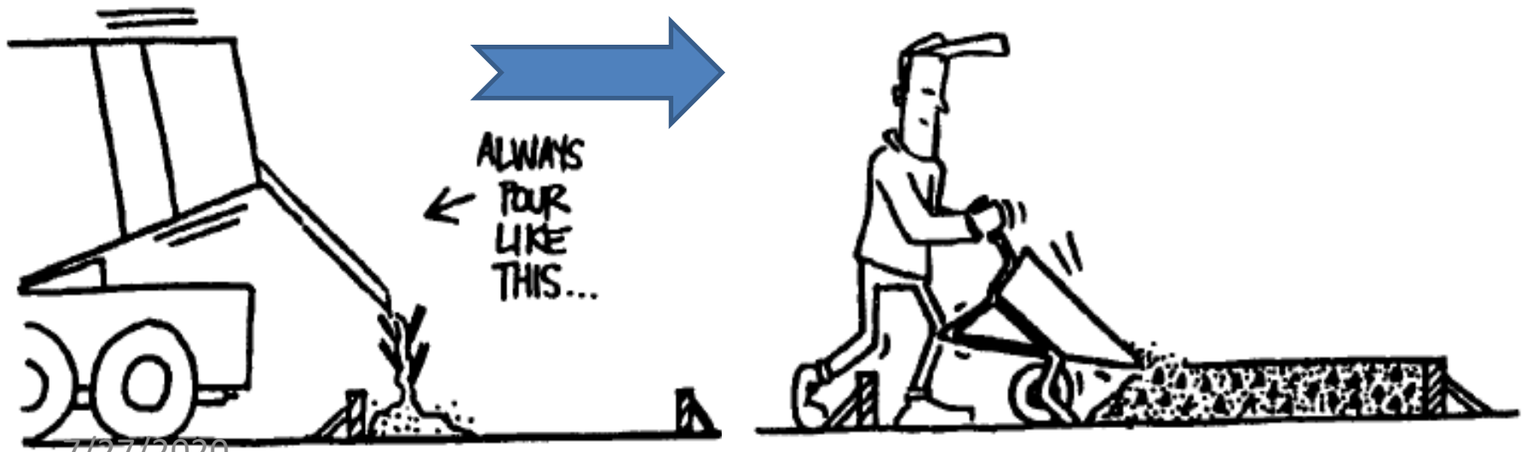


https://www.ccaa.com.au/imis_prod/documents/ConcreteBasics.pdf

Production of Concrete

Placing and Compaction

The process of depositing the concrete in its required position is known as placement of concrete. The quality of concrete also depends on the method of placing it. If it is not placed properly, segregation will result.



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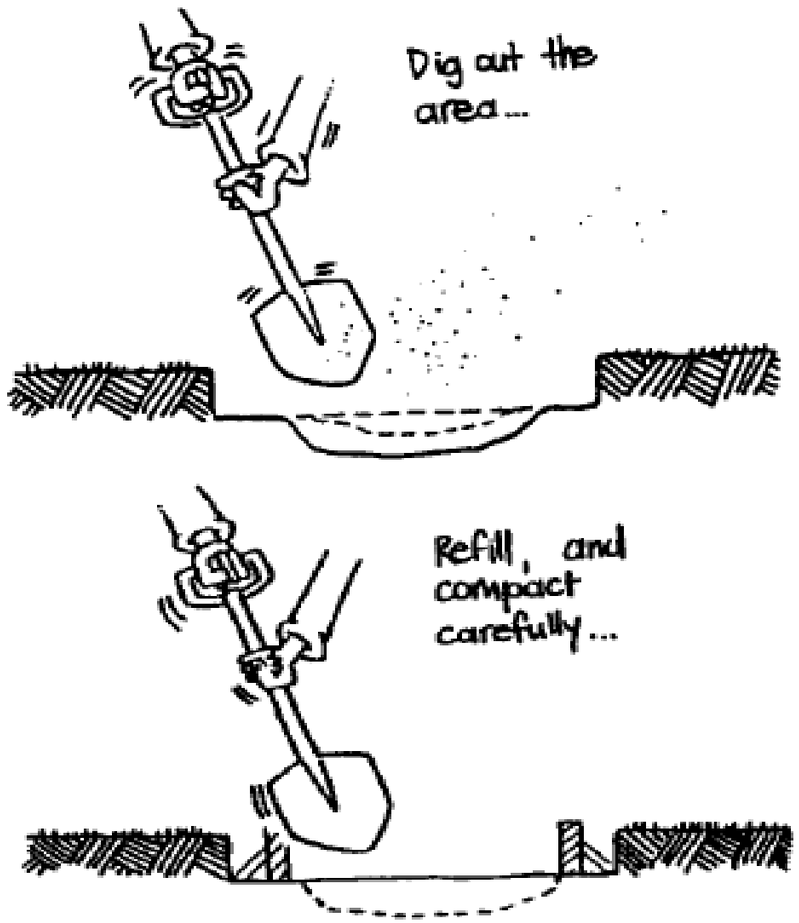
Production of Concrete

Preparation of surface before placing concrete



It is very essential to prepare base before placing the concrete mix in order to develop proper bond between the base and the fresh concrete.

Before placing of concrete, the different types of bases should be prepared as discussed below.

- *Base on Natural Soil (Base kept moist)*
- *Rocky Base (rock should be cut vertically and horizontally)*
- *Specially prepared base (brick soling and water bound macadum)*
- *Hardened concrete base (old hard surface exposed up to aggregate, rough, washed with water, thin coat of cement paste)*

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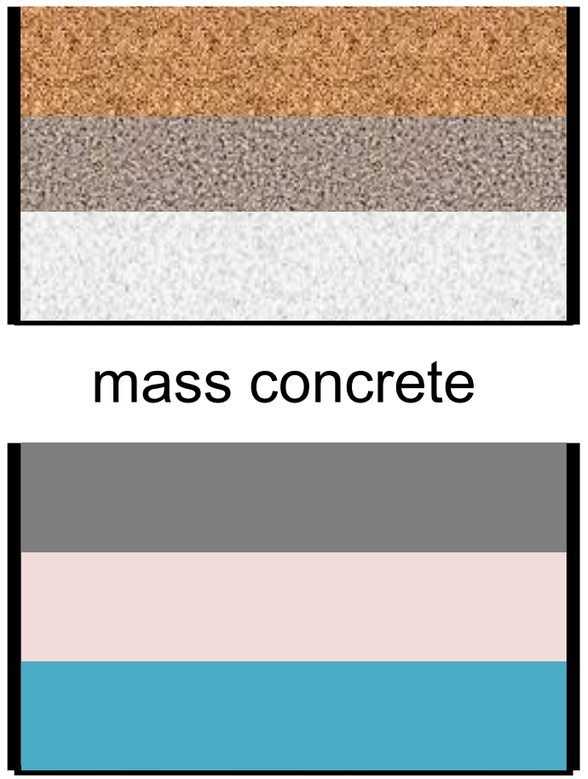
Production of Concrete

Preparation of surface before placing concrete

6 In general, concrete should be placed in horizontal layer of uniform thickness not thicker than 30 to 45 cm for mass concrete and 15 to 30 cm for R.C.C



7 The placing of concrete should start width wise in RCC slab from one end.

8 The alignment of reinforcement and formwork should not be disturbed in any case when concrete is placed inn RCC members.

Production of Concrete

Compaction of Concrete

Compaction of concrete is a process of eliminating the entrapped air in concrete and achieving maximum density.

The strength of concrete reduced by 30% by presence of 5% voids. The compaction reduced voids to a minimum.

If the compaction is not uniform, the concrete becomes porous, non homogenous and attained reduced strength.

There are two method of compaction

- Hand Compaction
- Machine Compaction

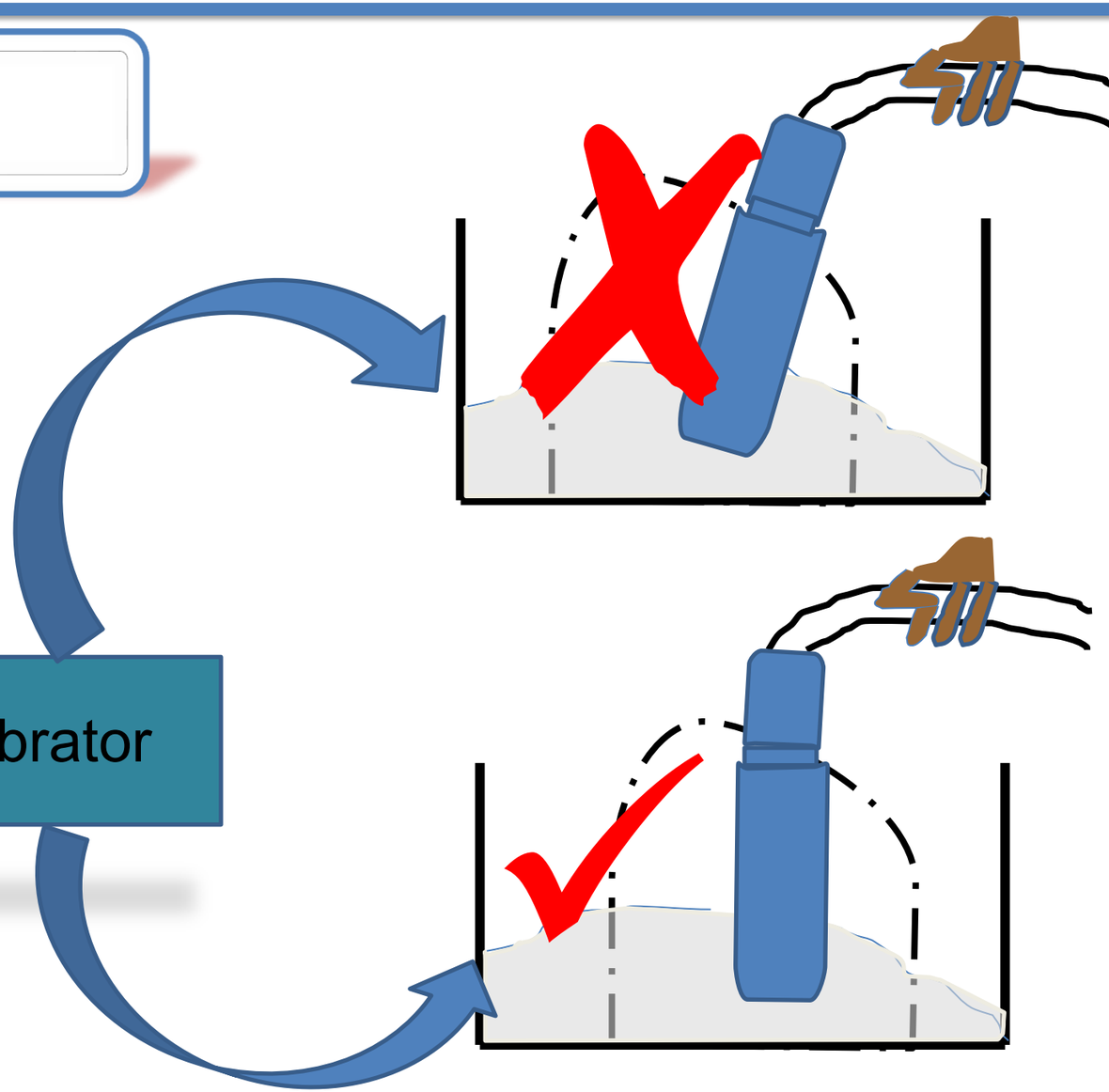
Production of Concrete

Compaction of Concrete

Machine Compaction

The equipment used for compaction of concrete by mechanical method is called a vibrator. The following three types of vibrator are commonly used.

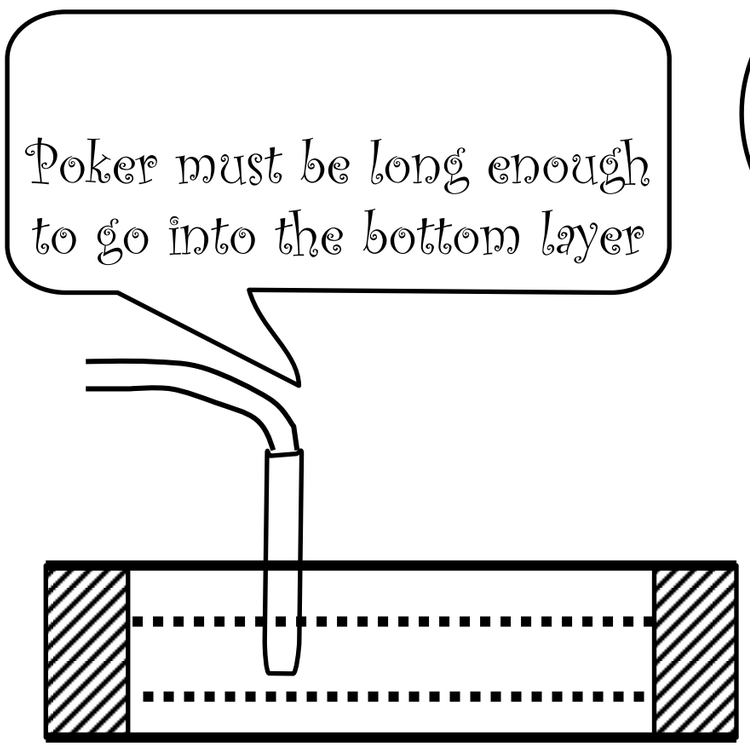
- Form Vibrator
- Internal Vibrator
- Screed Vibrator

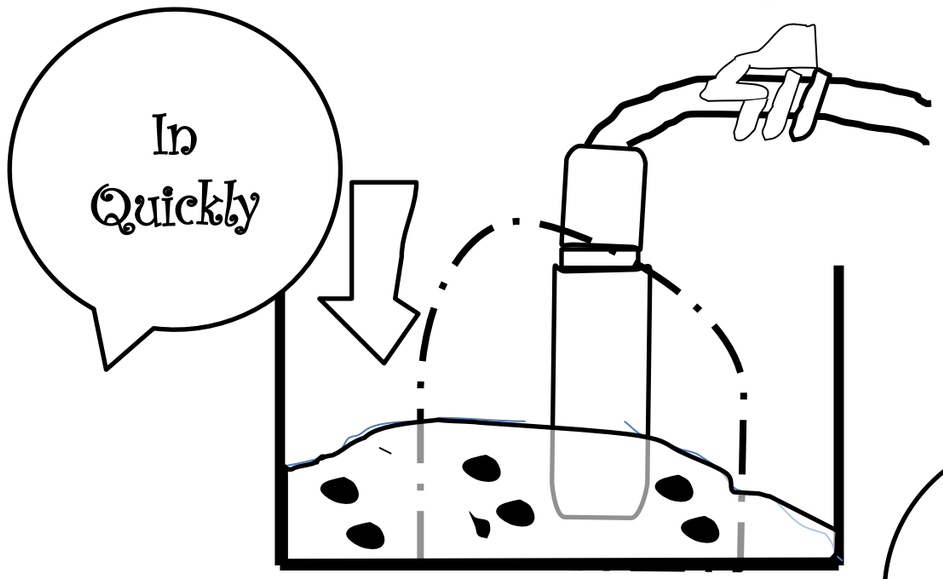


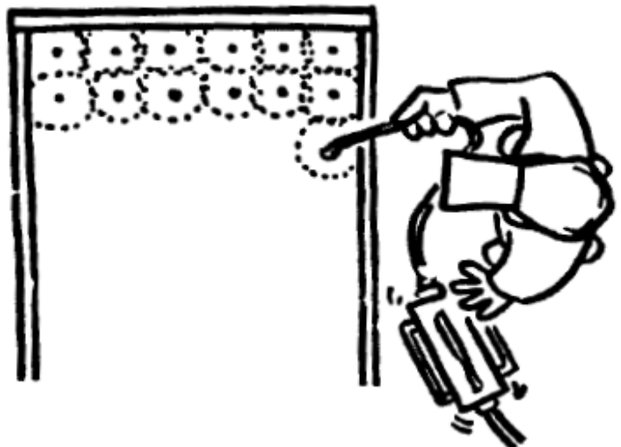
Production of Concrete

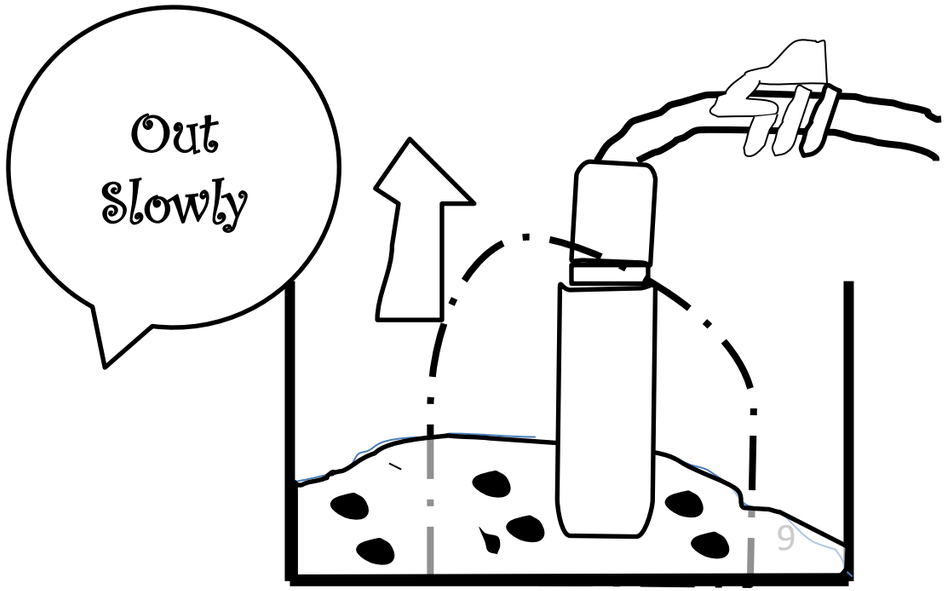
Compaction of Concrete

Machine Compaction



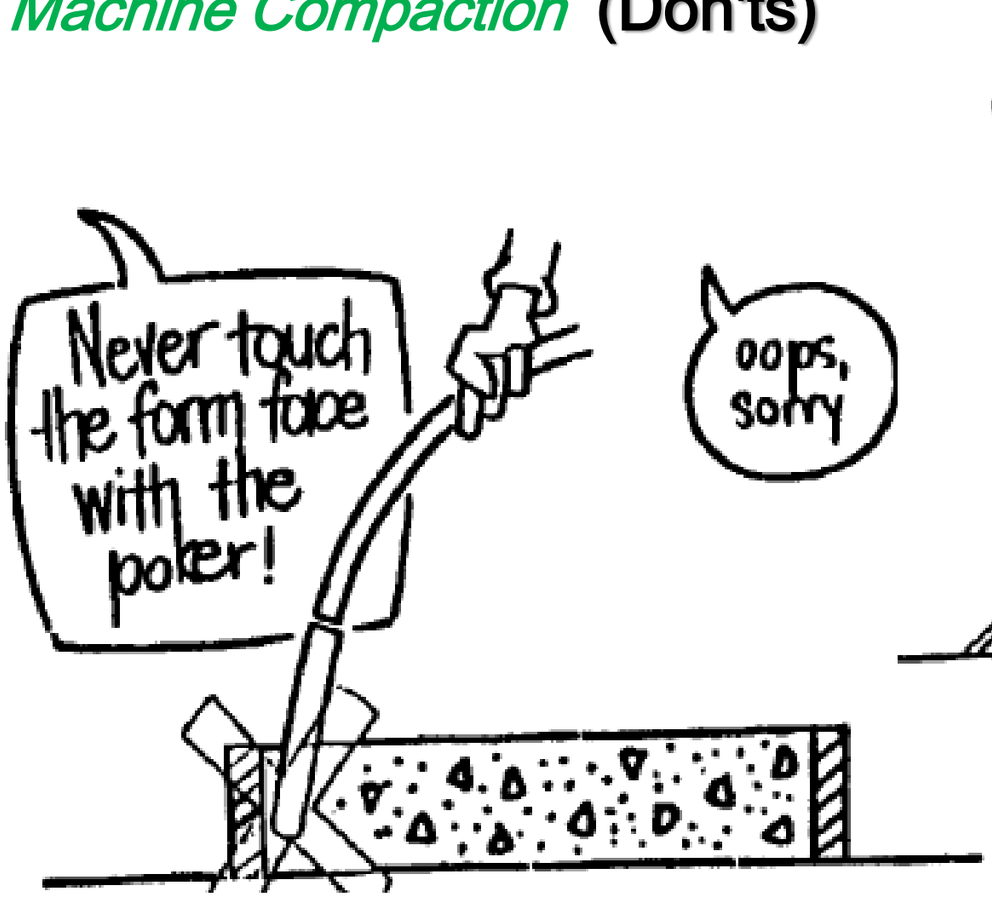


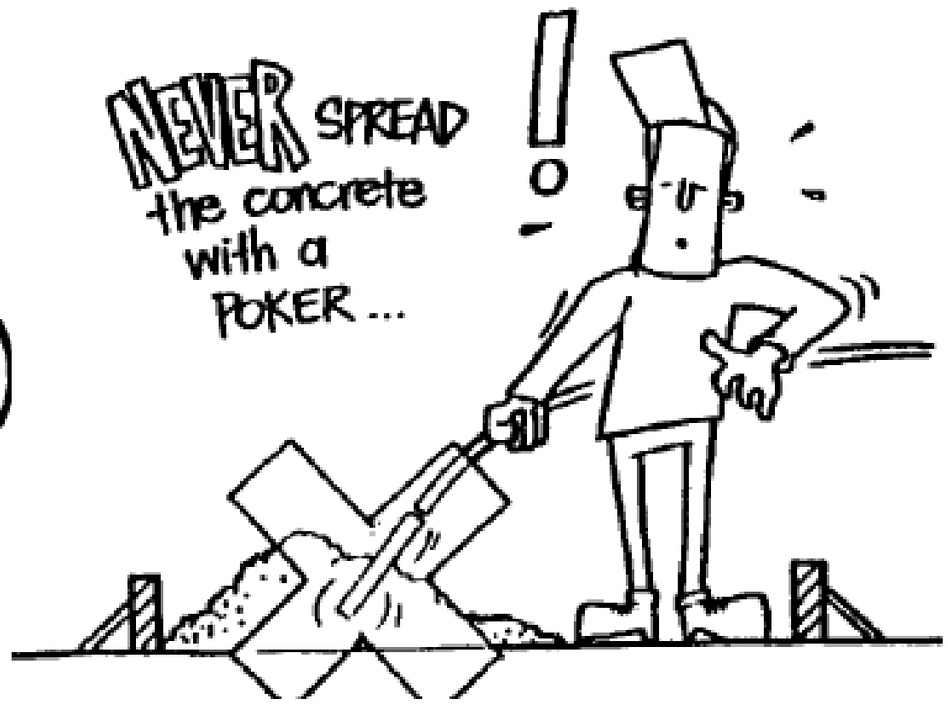


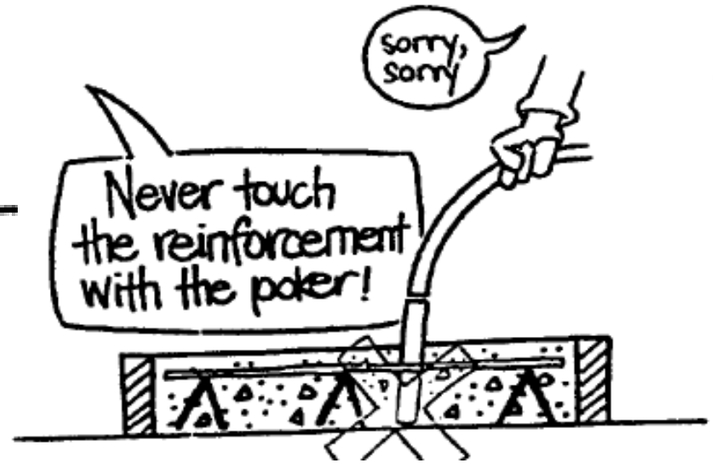


Compaction of Concrete

Machine Compaction (Don'ts)







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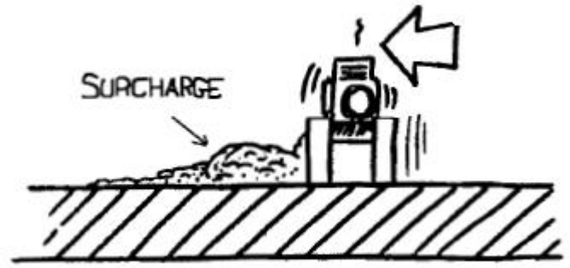
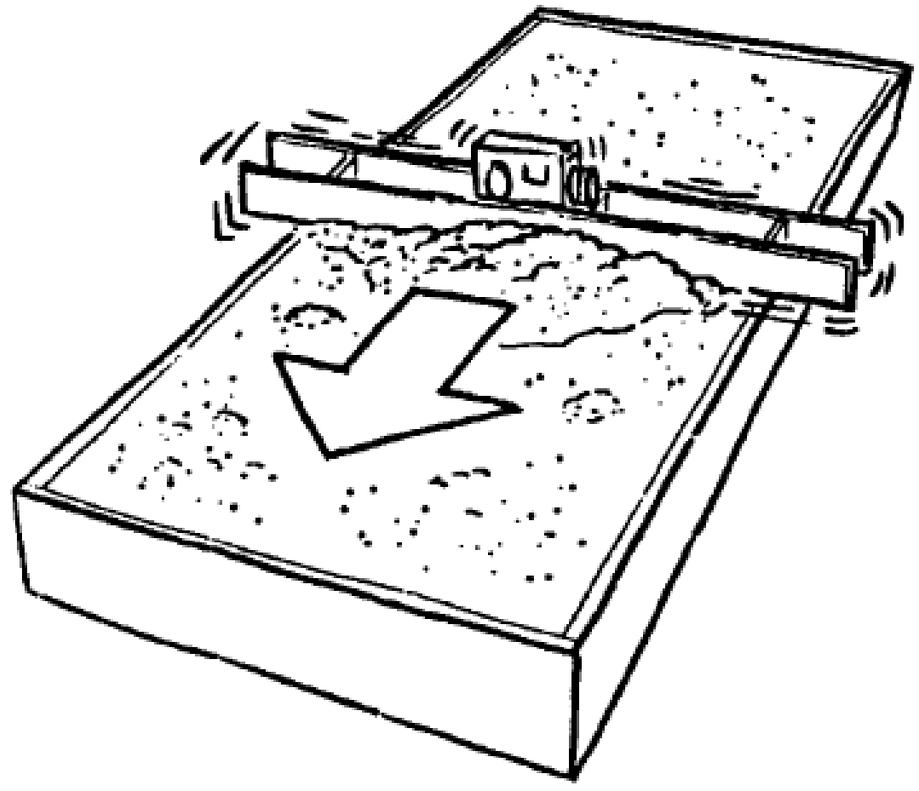
Production of Concrete

Compaction of Concrete

Machine Compaction (Screed Vibrator)





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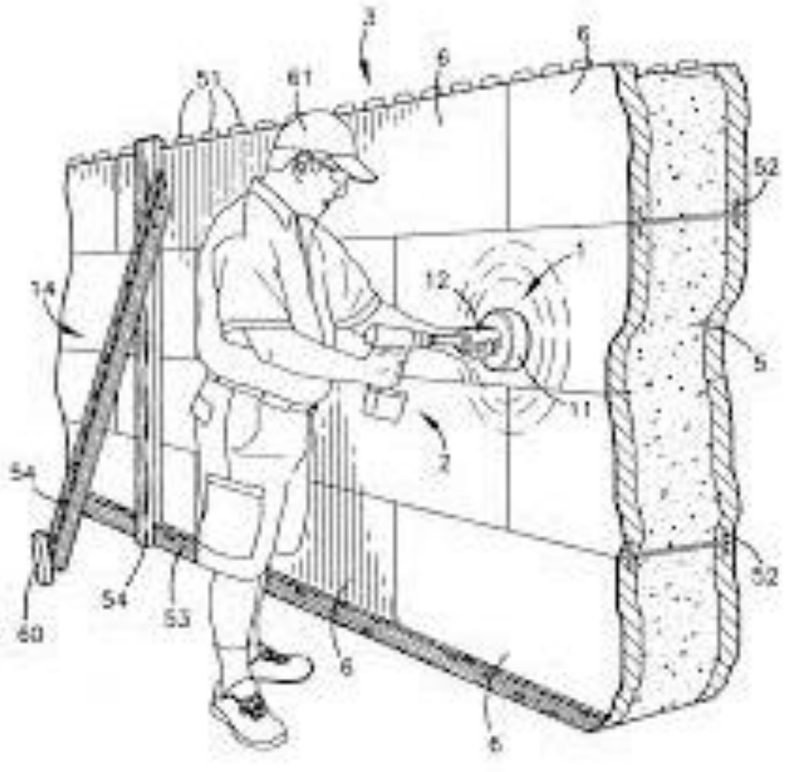
Compaction of Concrete

Form Vibrator (External Vibrator)



Compaction of Concrete

Selection of vibrator for various situation

S. No	Type of Vibrator	Places where used
1	Internal	For general concrete work with sufficient thickness and width e.g. mass concrete in structures, Concrete of columns, beams etc.
2	Form	For thin arches, tunnel lining and precast units
3	Screed	For thin horizontal surfaces such as roads, floors etc.

Production of Concrete

Precautions for compaction of concrete with vibrators.

1. formwork should be strong and watertight
2. Vibrator should be inserted vertically.
3. Vibrator should not prolonged in any one position
4. Over vibration results segregation
5. Vibrators withdrawn slowly so that the hole resulting from the insertion of vibrators close automatically
6. Vibrator should not touch reinforcement and formwork
7. If concrete is placed in two layers vibrators must go to the lower layer for some of its depth to avoid weak joint between two layer

Production of Concrete

Precautions for compaction of concrete with vibrators.

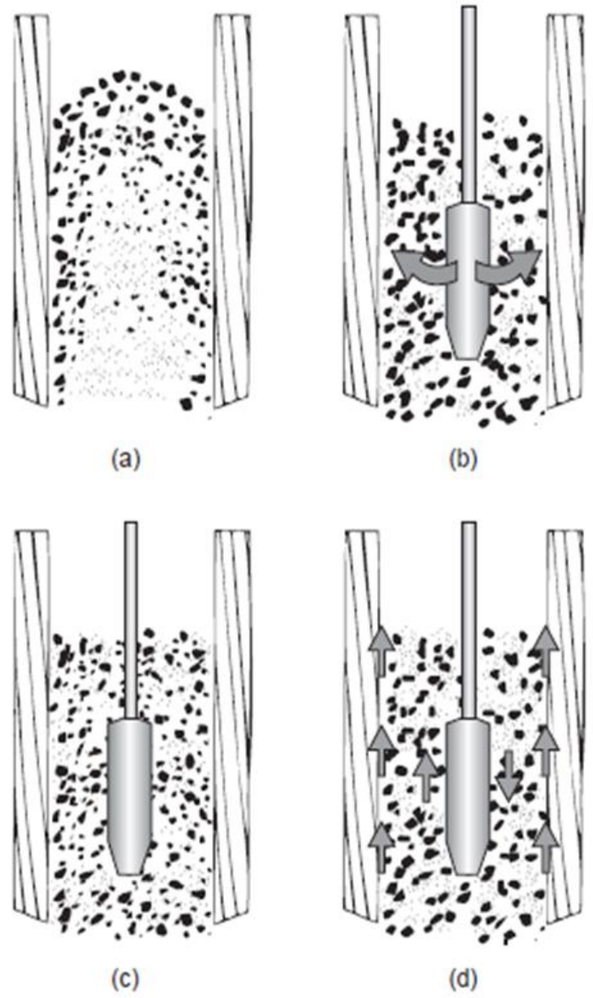


Figure 10-3 Idealized representation of the influence of a high-frequency vibrator on concrete consolidation.

(a) The mix is introduced into the form. (b) The vibrator moves aggregate closer together at the form face and cement-sand mortar begins to move outward; air pockets collect on the faces of forms. (c) The mortar continues to move through the coarse aggregate toward the face of the form. (d) The movement of mortar toward the face is complete; as the operator moves the vibrator down and up, air bubbles move upward along the form face and out of the concrete. (Illustration courtesy of Concrete Construction, Vol. 17, No. 11, 1972. By permission of Concrete Construction Publications, 426 South Westgate, Addison, IL.)

Production of Concrete

Curing

The process of keeping the concrete moist to enable it to gain strength is called curing.

The concrete hardens because of hydration (the chemical reaction between water and cement) and to promote the hydration of cement curing is necessary.

Objective of Curing

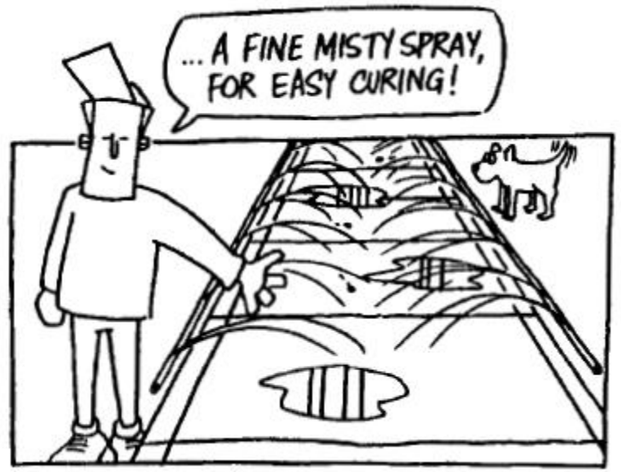
1. It prevents loss of moisture from concrete due to evaporation thus maintaining the process of hydration
2. It reduces shrinkage of concrete
3. It improves wear resisting and weather resisting properties of concrete
4. It maintains the uniform temperature throughout the whole of concrete.
5. It increase impermeability and durability of concrete.

Production of Concrete

Curing

Method of curing depend upon the nature of work and the climatic conditions.

- Covering concrete Surface with gunny bags or hessian (vertical member)
- Steam Curing
- Membrane Curing
- Sprinkling of Water (Floor Slab)
- Ponding Method (Floor, roof slabs)



https://flexcrete.com/flexcrete-products/ancillaries/curing-membranes/curing-membrane-wb/
https://gharpedia.com/blog/concrete-curing-methods/
https://www.ccaa.com.au/imis_prod/documents/ConcreteBasics.pdf

Summary

- *Production of Concrete*
- *Placing*
- *compaction*
- *Curing*

THANK YOU