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DMaF LAB
Design Modelling and Fabrication Lab

Concrete Casting Notes

Concrete Making basics:

Concrete is a composite material composed of fine and coarse aggregate bonded together with a cement that hardens over time. Composed of sand, gravel and cement, concrete is usually lime-based. Water is the catalyst which causes the lime to react.

Safety

- Mix concrete in a bucket in a well-ventilated area such as the courtyard outside the 3D media studio.
- Always wear a dust mask when mixing to avoid inhalation.
- Always wear rubber gloves, such as laundry gloves, to protect your hands.
- Wear suitable protective clothing, boots
- Eye protection (Safety glasses)
- Avoid contact with your skin

Preparation

- Lay black plastic boards on the benches outside the 3D Media Lab
- Use a flexible heavy duty bucket for mixing (concrete buckets)
- Scales
- Concrete vibrator
- Trowel, spatula
- Mould, formwork and reinforcement must be fully prepared before mixing concrete

Mixing Ratio

- The ratio of water to concrete is always written on the packet in the instruction section.
- Water must always be added to the Concrete, not the other way around.
- Generally, it is 20kg of pre mixed concrete to 2.3 litres of water.
- 1kg of concrete will fill approximately 400ml (400cm^3) of volume in a mould.

CONCRETE	WATER
1KG	115ml
5 KG	575ml
10 KG	1.15L
20 KG	2.3L

Ratio Examples

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Mould Release

- Mould release can assist with removing your concrete from its formwork by providing a non-stick barrier.
- Check with the technician or tutor if your work requires mould release, generally petroleum jelly (Vaseline) is appropriate.

Mixing Concrete

1. Make sure your project is properly laid out with all the necessary tools at hand. Calculate and weigh out water and concrete needed.
2. Pour required amount of concrete into a strong flexible bucket.
3. Add water gradually and mix thoroughly to a stiff consistency.
   Do not add more water after mixing the concrete as this reduces the strength of the concrete.
4. Use the shovel or trowel to remove air bubbles or tap the bucket with a mallet.
   A concrete vibrator can also be used in the mixing bucket.
5. Fill mould with mixed concrete using a shovel or trowel.
6. Store out of the way for approximately 24 hours while concrete dries.

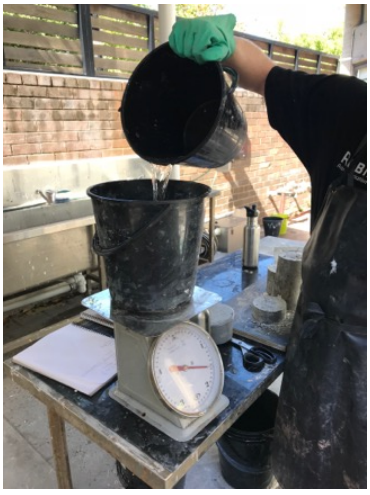

Image 1: Measuring water

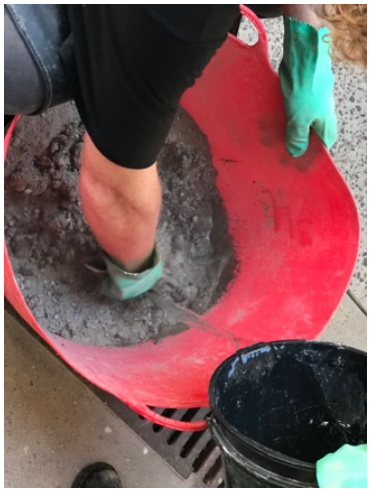

Image 2: Adding water into concrete

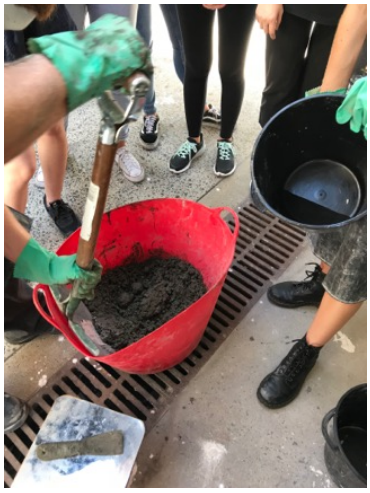

Image 3: Mixing concrete with shovel

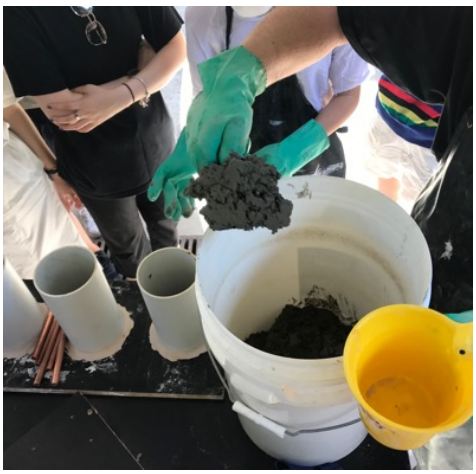

Image 4: Filling mould with concrete

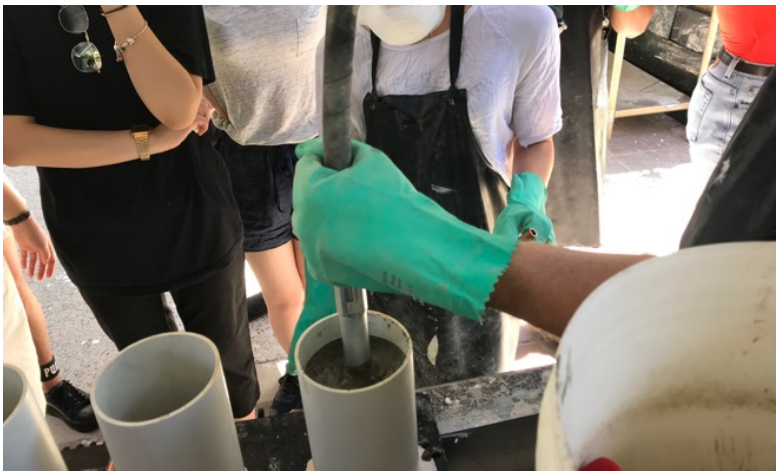

Image 5: Using concrete vibrator to even out concrete

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CLEAN UP

1. Pour excess concrete into white trays provided.
2. Wash all tools, gloves, concrete vibrator, buckets into buckets provided in outside sink.
3. Leave cleaned buckets under outside benches.

Attention: **Never pour concrete into the sinks.**

No washing concrete buckets inside.
Never pour concrete into the sinks in Homebase or bathrooms – it will block the sink.

FIRST AID

- Eyes: Rinse immediately with plenty of clean water
- Inhaled: Move immediately to fresh air