

## **CONCRETE CASTING**

### **Ordering the concrete**

Order concrete from UNICON the time of deliver on site must not be longer than 1.5 hours to insure the quality of the concrete.

Make sure that the manufacturer confirms the order by fax or e-mail to reduce misunderstandings and delays. Follow the following routines;

- Systematic, fax ordering or e-mail
- Confirmation with specifications of delivery time and receiving place.
- Contents for ordering; the ordered, the receiver, receiving place, delivery time, specification of the concrete, need for crane or pump.

### **Delivery and space**

Mobile crane would be used during the execution of the situ cast of concrete.

**Crane;** *Refer to building site plan*

### **Execution**

Be content with the vibration of the concrete, this effect the concrete to be:

- Tight and strong as possible
- Tight surrounding the reinforcement
- Get rid of pores
- Smooth and nice surface

Immersion vibrator would be used for the foundation, walls and columns. The vibration of the concrete floor will be done both by immersion vibrator and a beam vibrator.



Immersion vibrator

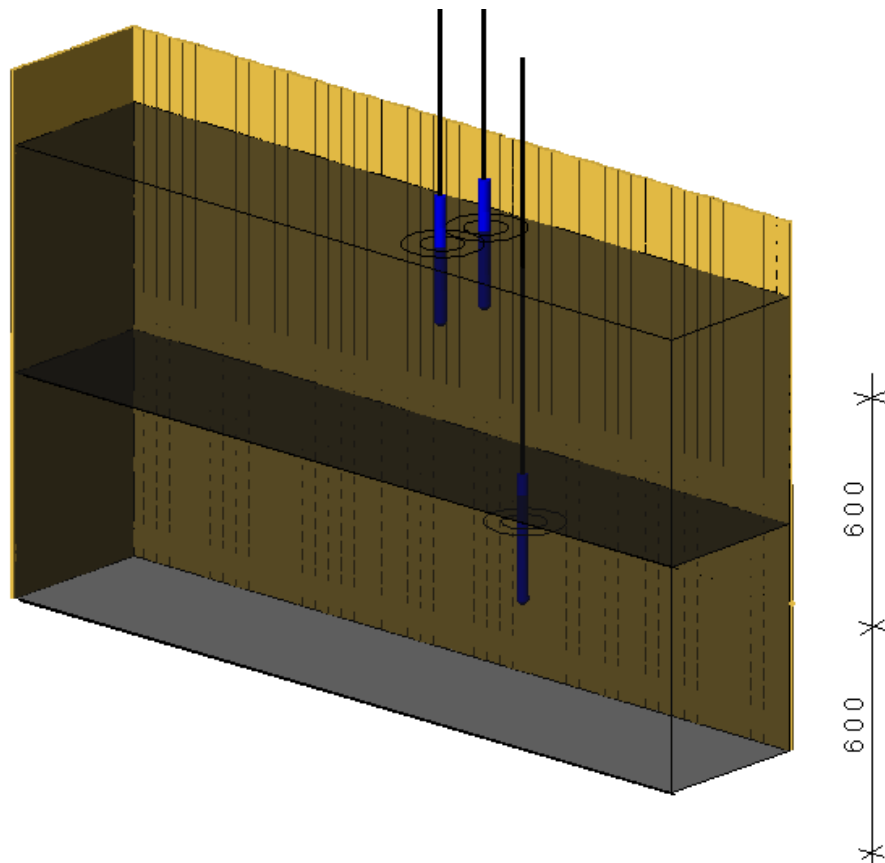


Beam vibrator

To avoid risk of stop in production, we will have two immersion vibrators available on the site.

### **Vibration interval**

When we vibrate with an immersion vibrator, we have to vibrate approximately 600mm layers by stages, and overlap the last layer with one length of the vibrator head. Horizontally we immerse the vibrator with a distance of 3 x thickness of the vibrator head.



The immersion head has to be immersed quickly down, and be pulled up again with a time limit of a proximately 20 second, to get the air bubble and out of the concrete.

### **Precaution**

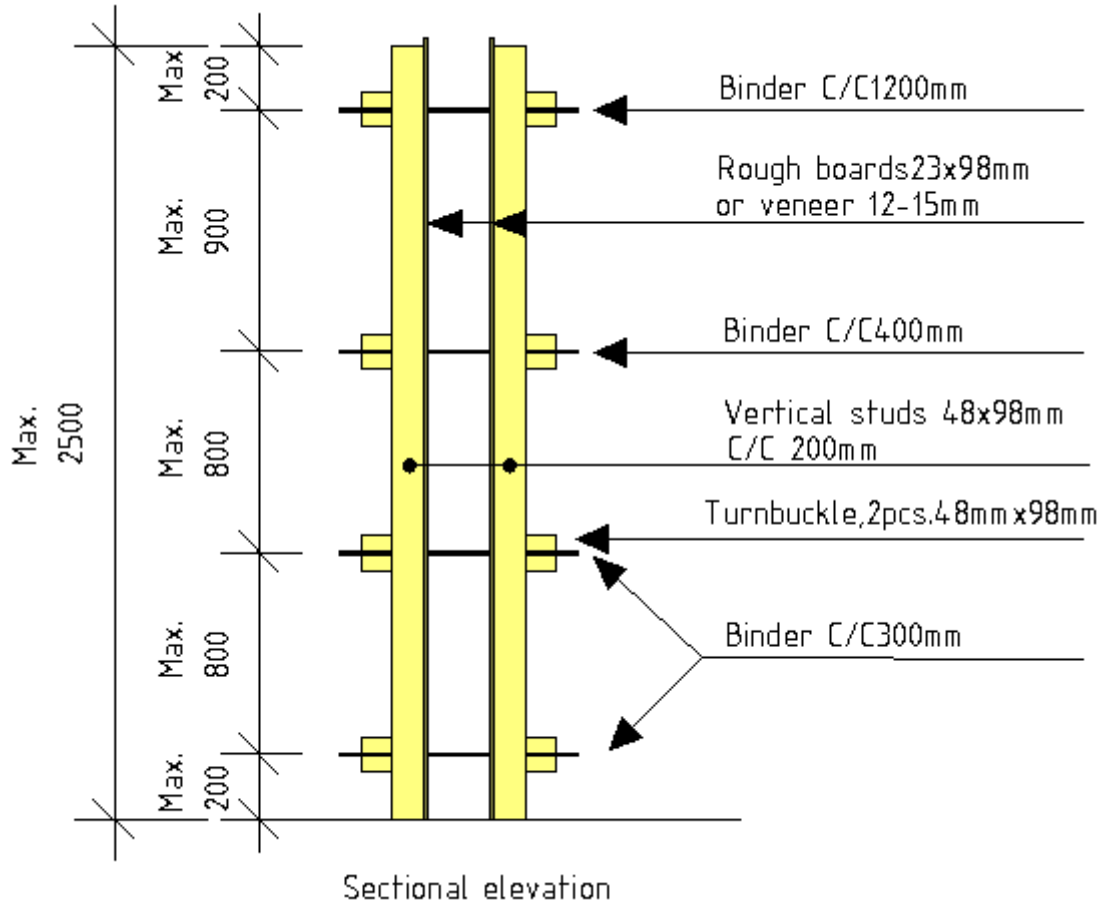
- Do not vibrate the concrete to much. If it happens, then the water will go out of the cast concrete, and we will get stone nest in the bottom of the construction.
- Be careful with the vibrator so it touches the reinforcement. If the reinforcement gets vibrated too much, then it can loosen its grip and position.

**Pressure**

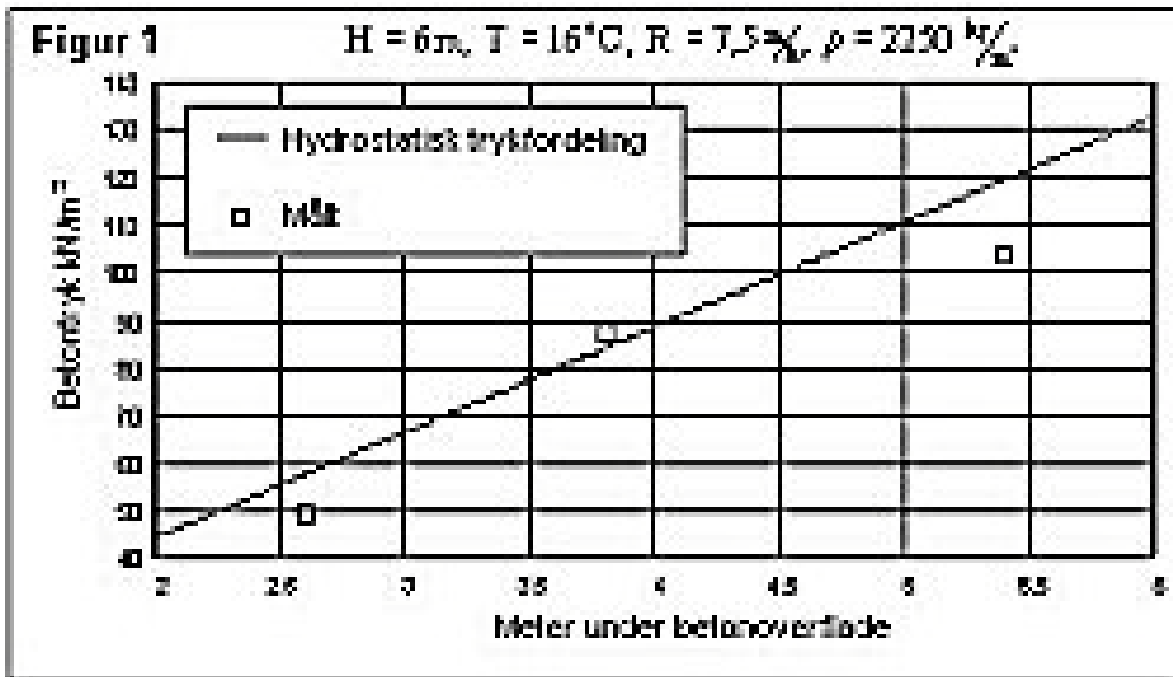
**Simple construction**

When the concrete gets cast in the formwork, we have to take care of the pressure. If the concrete rise to fast, the pressure will be higher. Therefore we have to calculate the rate of climb.

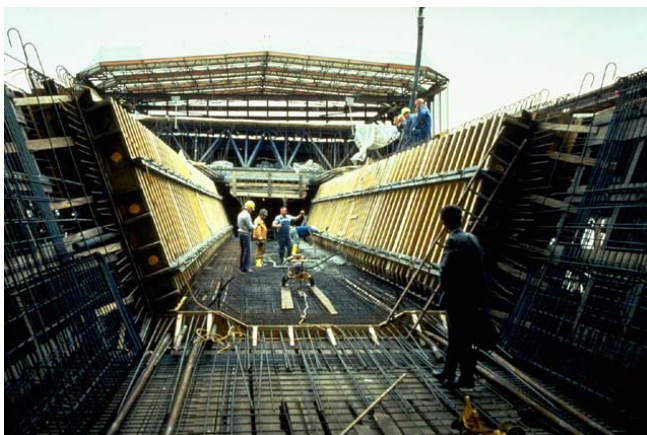
As bigger the construction is, as higher level of calculation we need:



Bigger construction



Read off the table



For huge construction, an engineer has to calculate the pressure.

**Factors who affects vertical components:**

- Rate of climb
- Consistency
- Vibration
- Cement type
- Temperature

If we cast the concrete in the same rate of climb in a thin wall as we do in a thick wall, the pressure is the same. Usually thinner walls cast in a faster rate of climb than a thick wall, therefore the thin wall will get a higher pressure than the thick one.

**FACTORS THAT CAN AFFECT CONCRETE CASTING QUALITY**

**Unsteady weather**

Unsteady weather has to be taken in consideration when we execute concrete work.

**Hot weather**

After the concrete floor work is executed, cover the floor with plastic so the moisture doesn't dry out too fast. If the sun shines very strong on the concrete, then it is in many cases necessary to water under the plastic in simple intervals. We can see on the surface when it is necessary to prevent more from dehydration. Then we will see some white spots who drying too fast. Too fast dehydration will lead to cracks in the construction.

**Cold weather**

When it is very cold weather, it is necessary to prevent the concrete from frost. If the concrete freeze, the hardening process will stop and we will get a weak construction with pores, cracks and corrosion on the reinforcement. To prevent from this risky influence, there are several things to implement:

- Chemical admixtures in the concrete
- Hot water in the concrete mixture
- Covering with winter mat
- Cover with tents and heating up
- Heating cables tied to the reinforcement

## **Rainy weather**

Normally it is not a risk to cast concrete in a rainy weather, but to execute concrete floor there is a risk to get a rough surface. That can give us extra cost considering integrally cast and smoothing out the surface.

## **Quality and condition**

There is many way to test the quality of the concrete. For example a sink test, dice test and core drilling for existing construction.

Theoretical a concrete construction has a very long lifetime, but the execution and the external environment have a big influence on the lifetime. If the reinforcement has to less of concrete covering, according to environment class, the reinforcement will be attach by corrosion.

Also the concrete itself can get attach by external influences. Chemical from industry, rainfall, oil from cars and salt is some of the things who brakes down the concrete.

There are several things to do to protect it from this:

- Silicone protection
- Painting
- Epoxy
- Covering with materials
- Membrane

## **Analysis of condition**

The surface of the concrete should be checked every year, to register possible damages, so it can be repaired soon as possible before the damages get bigger. A small crack can very fast stimulate to a much bigger damage.

To register the damages, we use façade drawings, photography registering and check lists. Mark out on the façade drawing where the damages are. Use the photos and the drawing with marks to register if the tendency gets bigger.

Moisture is the biggest cause for damages on the concrete facades:

- Color variation, discolored, bubble, peeling off
- Injured by frost
- Salt precipitation
- Washed out of binding mineral
- Internal damages

## **Typical damages**

*Cracks:* Settlement in foundation, corrosion of reinforcement, frost in pore.

*Stone nest:* To much vibration

*Pore in surface:* To less of vibration, frost under hardening process

**Health and safety**

Under the executing of concrete work, there is important to protect against accidents and repercussion accident. To prevent from this the craftsman has to use at least helmet, protecting shoes and gloves. Long term with directly contact with cement, can give a chronic allergy against cement.

Before the concrete casts against the formwork, the craftsmen has to plan their position and make sure that the equipment does not hit each other so they fall down from their position. Be familiar of where the truck gone be placed.

Use of scaffold, has to be secured with barrier and fit out with suitable access.

Follow the Health and Safety plan on site.