Concrete Spaghetti

Assignment 2b

7X500 Production & Parts
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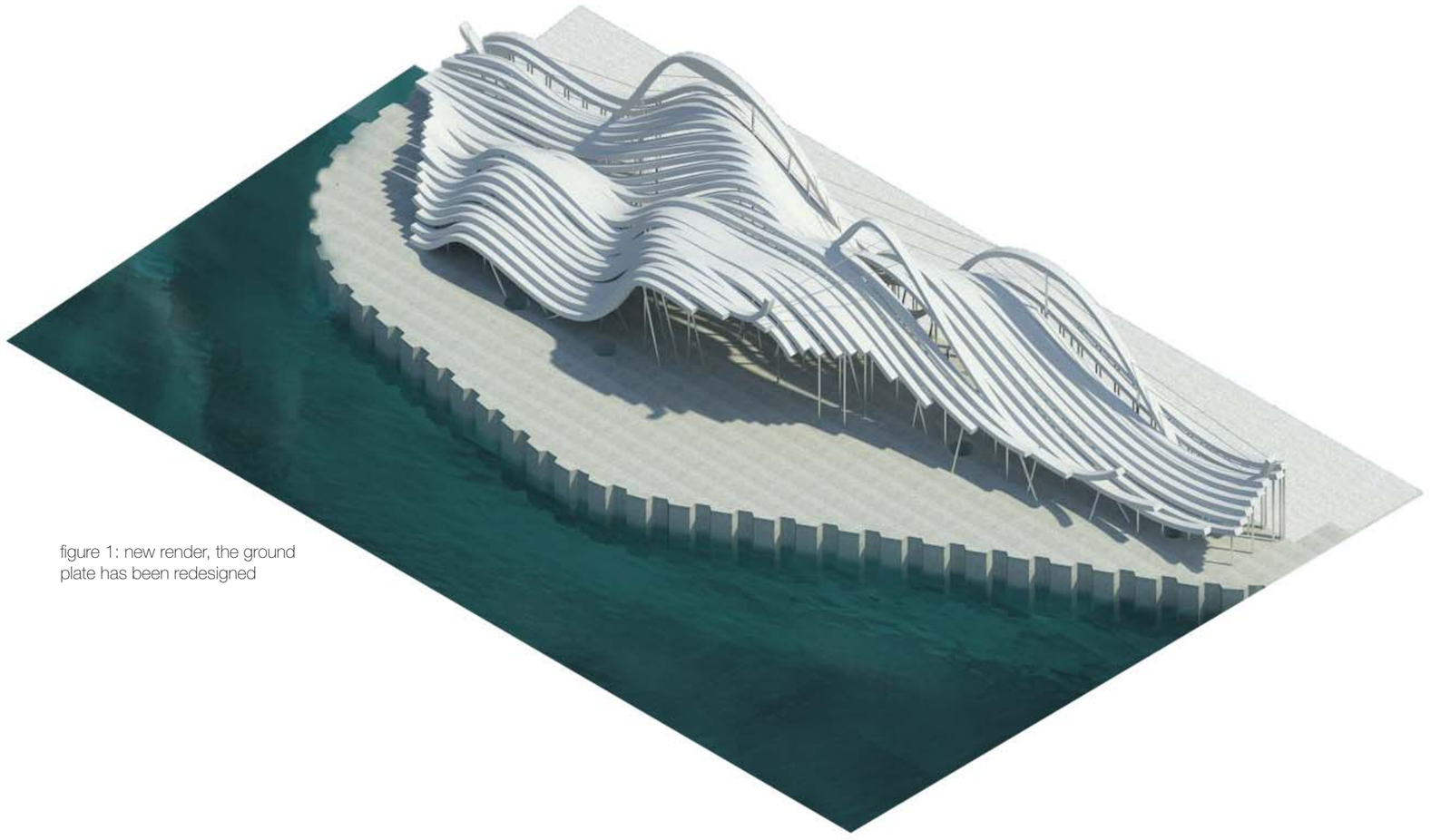


figure 1: new render, the ground plate has been redesigned

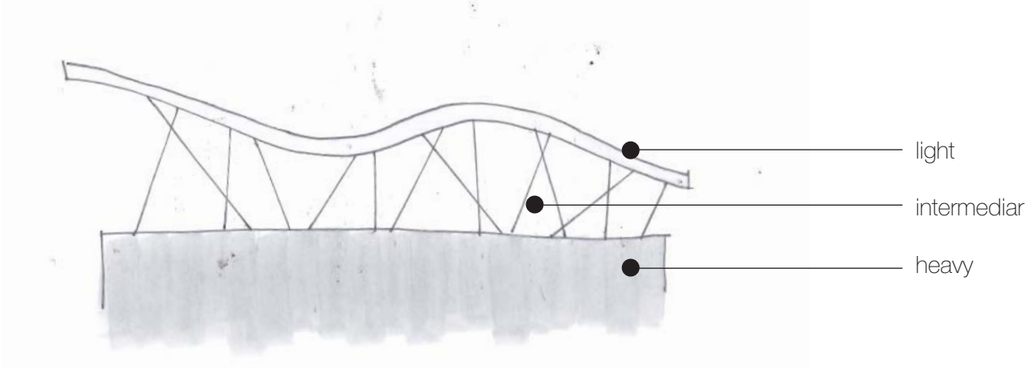


figure 2: simplified elevation

Assignment 2a

The render shown on the first page is the final render made for assignment 2a. After receiving some critical notes the design evolved to a slightly different pavilion.

The main criticism on the aesthetics of the structure is that is too much about the steel and too little about the concrete. Furthermore the structure is complex to excavate and a bit overdone.
In this exercise the structure has been simplified, and the concept is repeated to make things more clear. This report explains how the waves are made, how the foundation is excavated and how the structures are connected together.

Duality of concrete

The aesthetical duality of concrete is showed in the pavilion. Concrete can be elegant in a rough, dirty way, but also in the light, and clean way. Both manners have their specific elegance. Both types of concrete are introduced in this pavilion with an intermediate material, stainless steel, to create a distance between the two parts. This distance is used as a corridor to the waterfront.

The base plate is redesigned. This has several reasons, but the main reason is about making the structure simpler. The slab is meant to be rough and dirty, so the detailing must be rough, dirty and simple. Therefore the sheet pile walls, needed to make an excavation, are now used as a part of the mold.

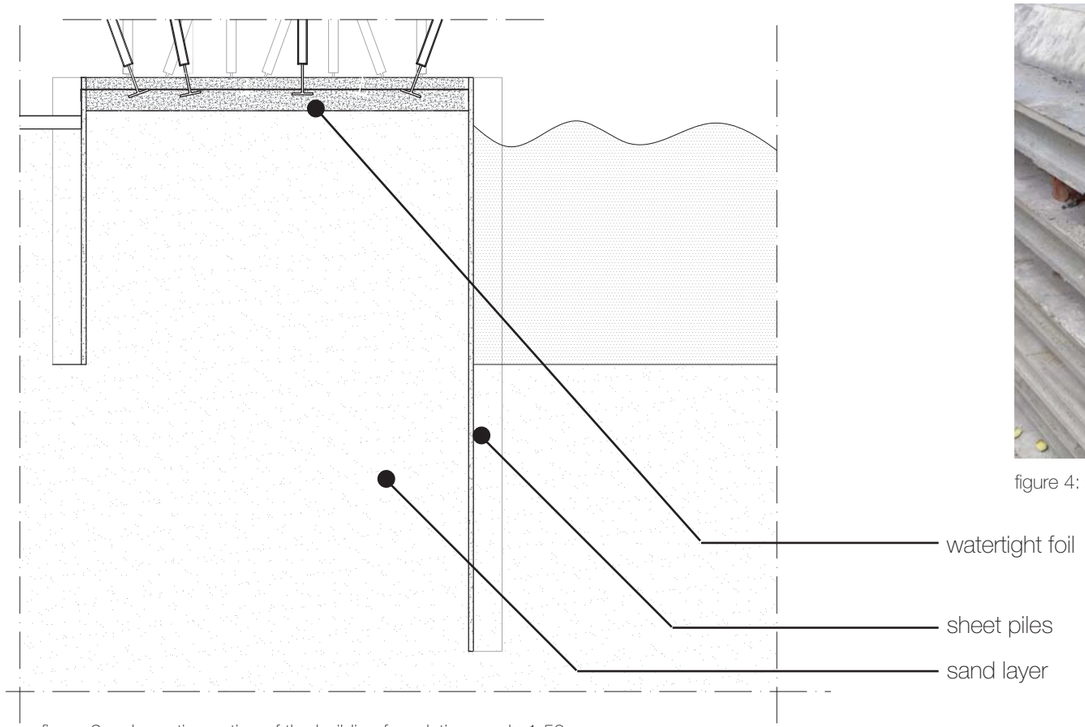


figure 3: schematic section of the building foundation. scale 1:50

figure 4: concrete sheet piles are used as mould for the ground plate.

Slab

Concrete sheet pile walls are used, when the excavation is made it is possible to simply make a slab foundation by casting the concrete in place. Filling the excavation with sand (of existing soil) and casting the concrete will not do the job. A plastic foil needs to be added, to prevent the water draining into the ground to fast so the concrete reaction does not get disturbed.

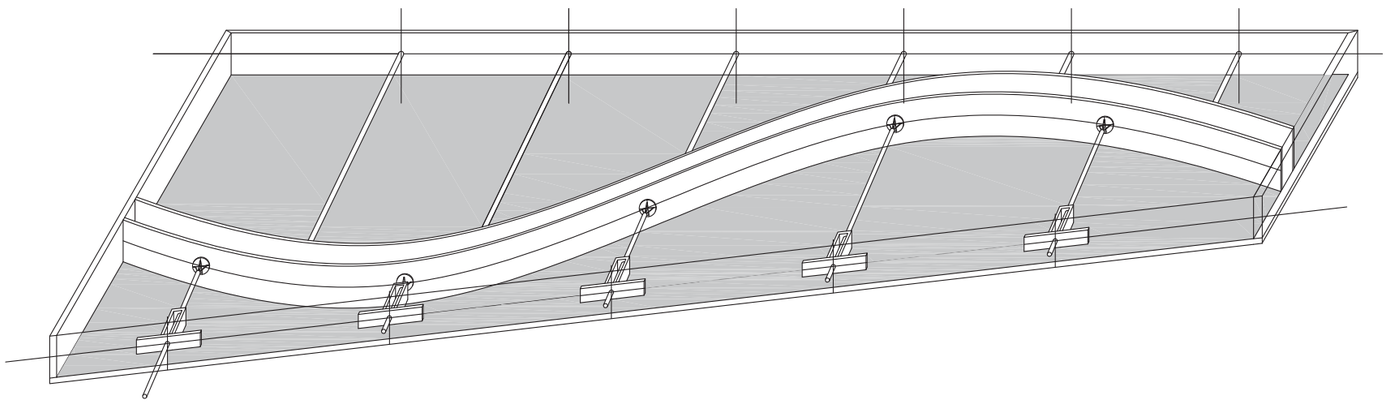


figure 5: schematic drawing of the base mould

Making waves

With the use of a flexible mould is possible to produce several (slightly) different waves in an industrial fashion. The flexibility of the mould is provided by a metal sheet. (this can also be a thin layer of wood, or foam, but this is material inefficient)

This metal sheet is screwed in the right position. Due the stiffness of the sheet the sheet will make a smooth wave. The screws used in the mould can easily be made with a steel pofile, screwwire, and a flexible head which is glued to the sheet.

The end of the beams are always the same, so an plank need to be placed to get the desired wavelength and perpendicular angle.

Inside the mould little aluminium connectors are placed. These connectors can be made very precise, and the stainless steel pipes can be screwed into this connectors.

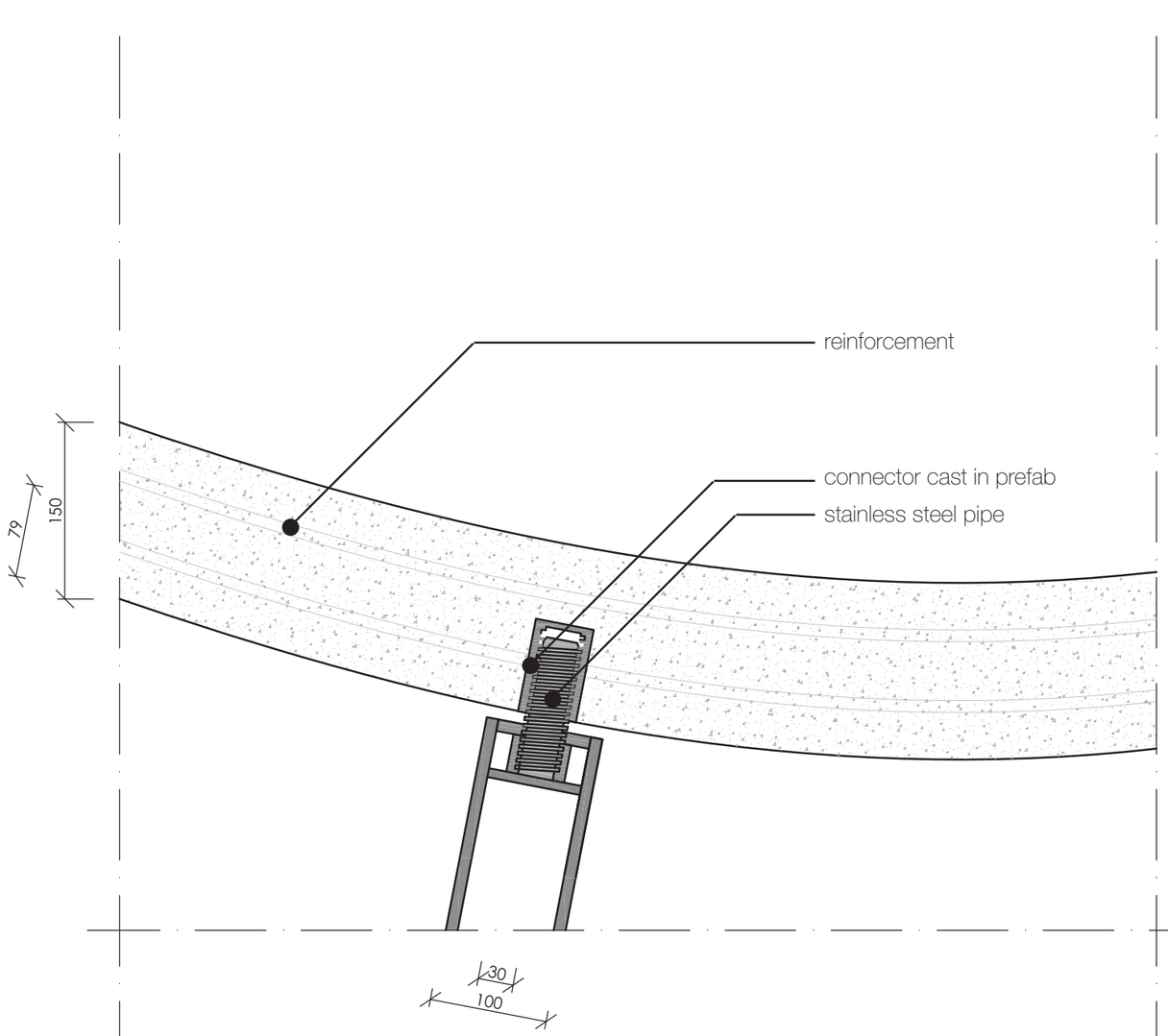
Connecting the waves (part I)

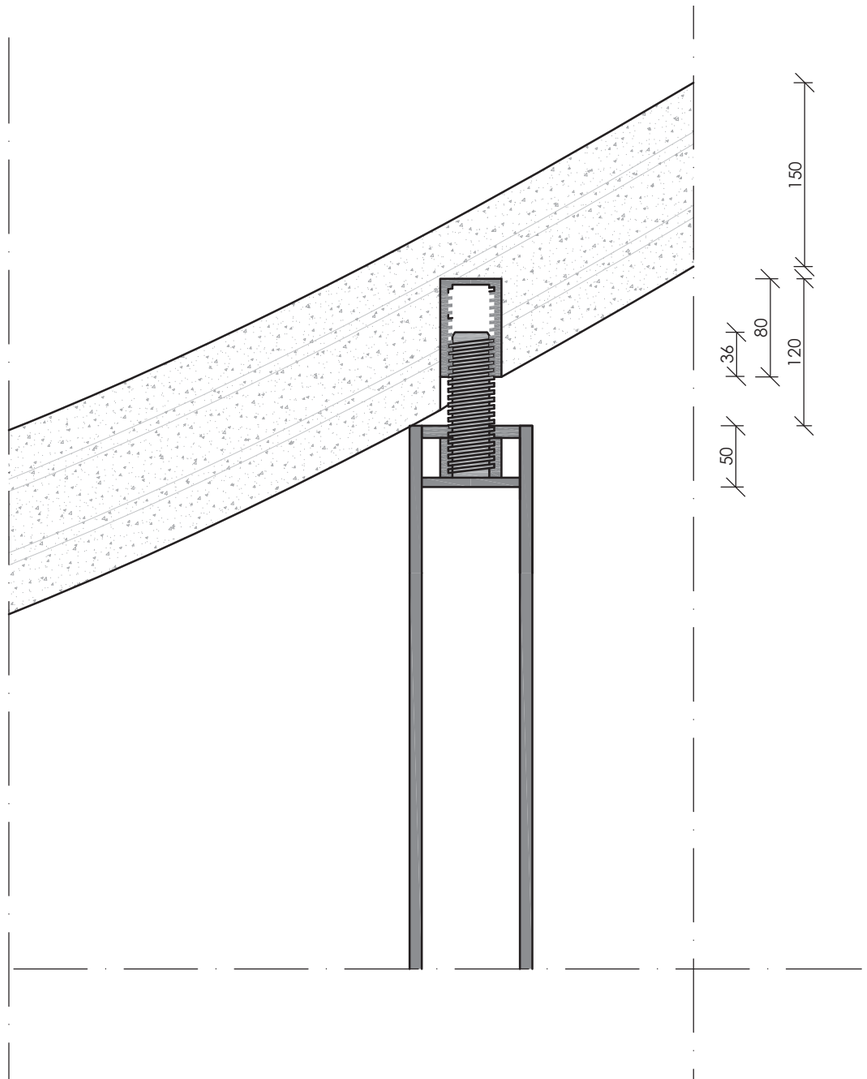
From the side the detailling is almost the same. The connectors are glued into the flexible mould. So they are inside of the wave, not outside. this results in some trouble when placing a pipe an angle. This can be solved by placing an rubber or plastic piece in the mould, which has to be removed afterwards.

After screwing the connectors will hardly be visible.

scale: 1:5

The horizontal distance between the waves (as shown on the next page) is varying and random. The horizontal distance is zero at its best, but this is probably not realistic when building it in the way designed. This is no problem since the roof doesn't have to be watertight, the spacing even prevents ponding effects.





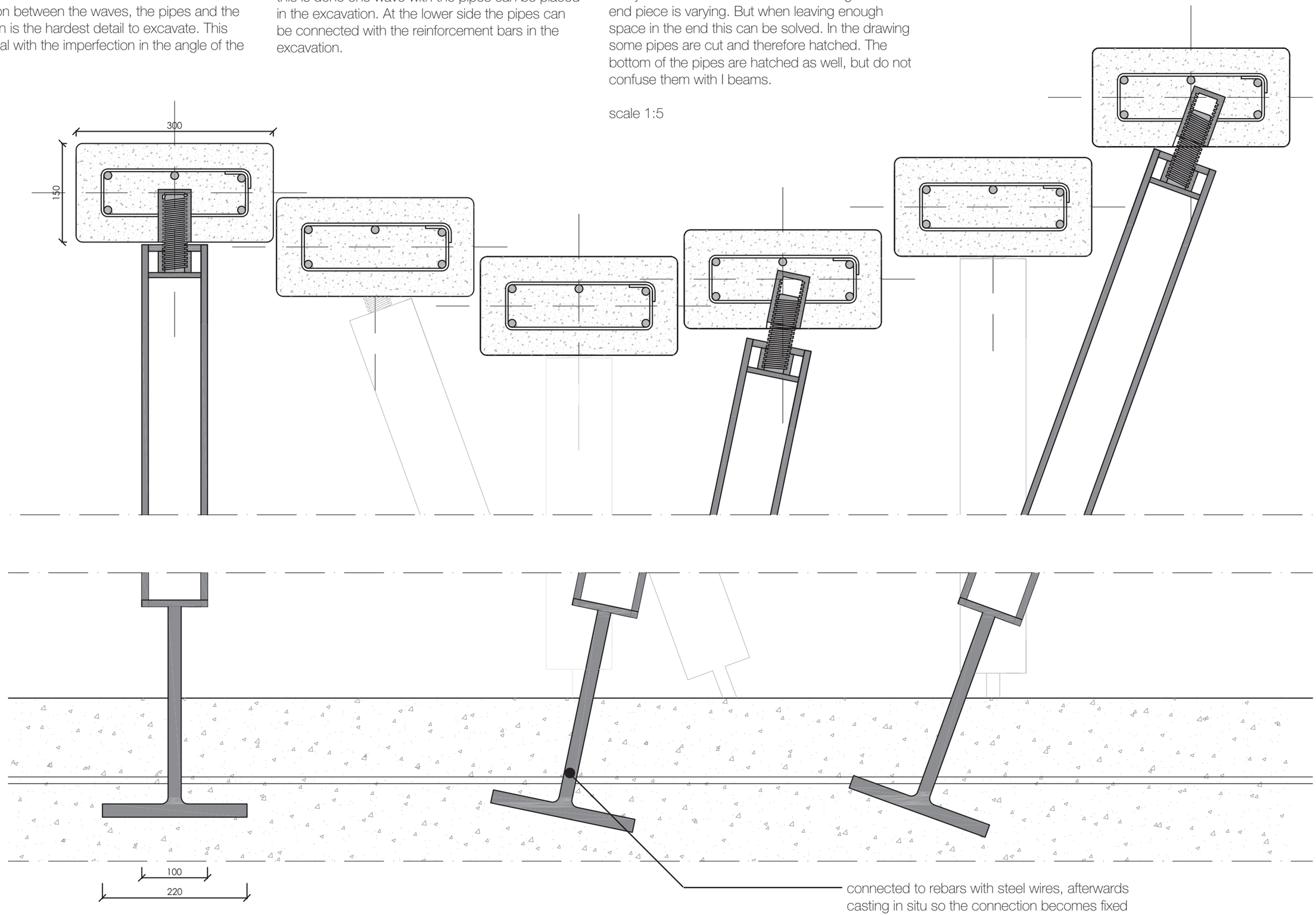
Connecting the waves (part II)

Sheer reinforcement is used to practical issues, like the connections of the curved reinforcement. The connection between the waves, the pipes and the foundation is the hardest detail to excavate. This has to deal with the imperfection in the angle of the pipes.

The pipes have to be screwed into the waves. After this is done one wave with the pipes can be placed in the excavation. At the lower side the pipes can be connected with the reinforcement bars in the excavation.

The depth of the pipe is hard to determine, since every bar has a different location and angle. So the end piece is varying. But when leaving enough space in the end this can be solved. In the drawing some pipes are cut and therefore hatched. The bottom of the pipes are hatched as well, but do not confuse them with I beams.

scale 1:5



Bicycle stand detail

The bicycle stands are cut out 30 days after the construction is done. So the sheet piles and floor are one concrete slab. Cuts are made in the slab to provide the bicycle stands. This straight-to-the-point detailling fits the ground slab design rules stated in the concept.

scale: 1:5