

# Dronninglund Fjernvarme

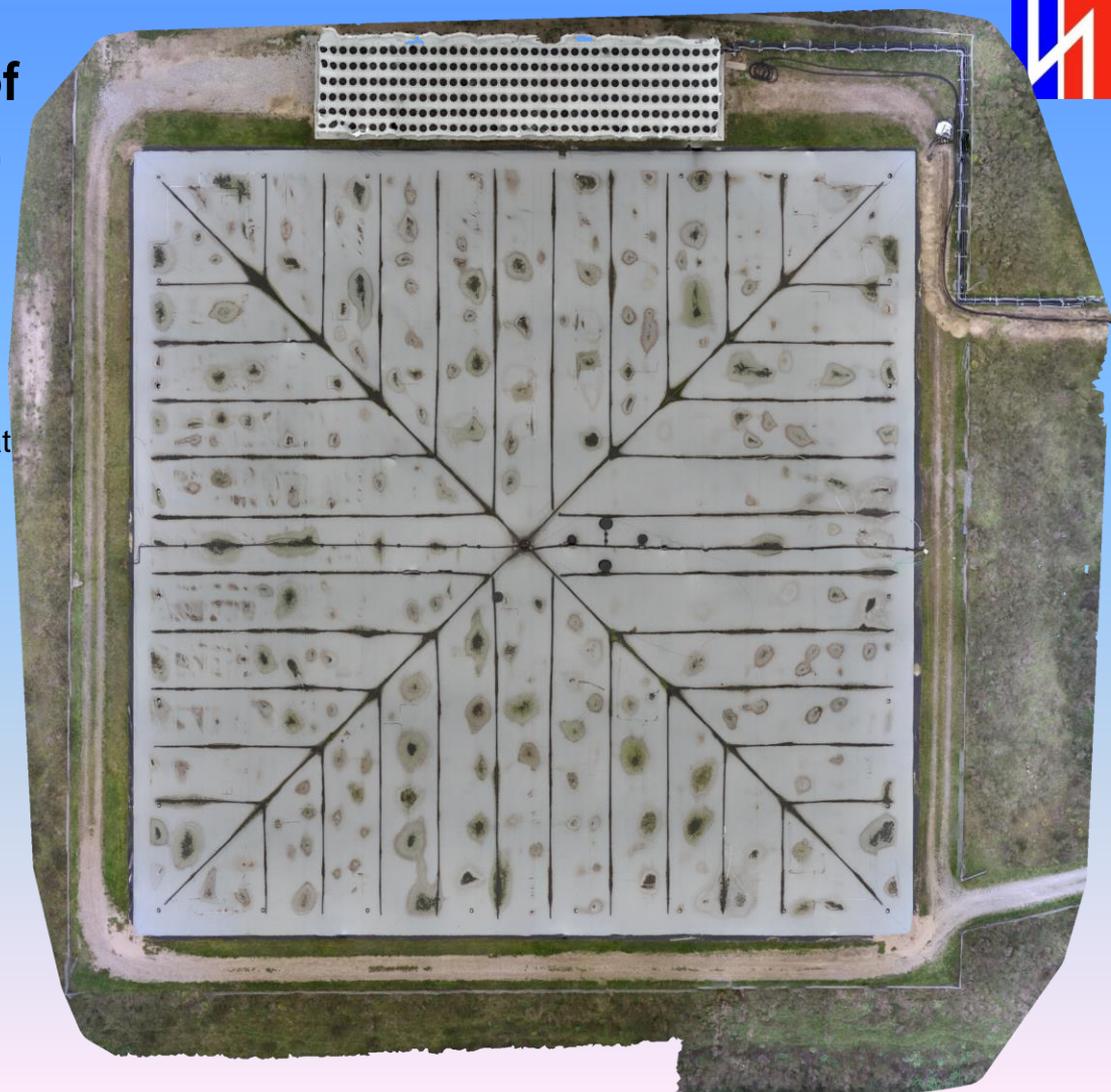
Followup meeting #8 i Aalborg, 27.10.2021



# Drone picture from an altitude of 25 meters, taken spring of 2020.

You see many small lakes forming on the top liner.  
On this picture we have started to empty the lakes in the South/ East corner

The daily maintenance consist mainly of pumping the water away from the lakes when they have grown to big.  
Time consumption app. 2-3 hours a week year around.





**Pumping water away  
from the lakes**

**Patent  
Dronninglund ☺**

**On April 14<sup>th</sup>  
2021 we  
discovered:**

The floating liner was torn above the top inlet diffuser.  
And in other wells we could see the floating liner was pulled aside.  
After a few days the liner had sunk to a depth of app. 4 meter,



# What had happened?

## Construction of the lid:

1. Top liner with weight tubes
2. Net for air circulation.
3. 3 x 8 cm isolation. Between the layers of insulation, we placed fixation irons



4. Net for air circulation.
5. Floating liner with weight tubes.



Due to holes in the floating liner hot water soaked the insulation.

As a combination of the weight from the lakes on the top liner, and the hot water, the insulation was deformed.

Some of it was reduced to  $\frac{1}{4}$  of the original thickness.



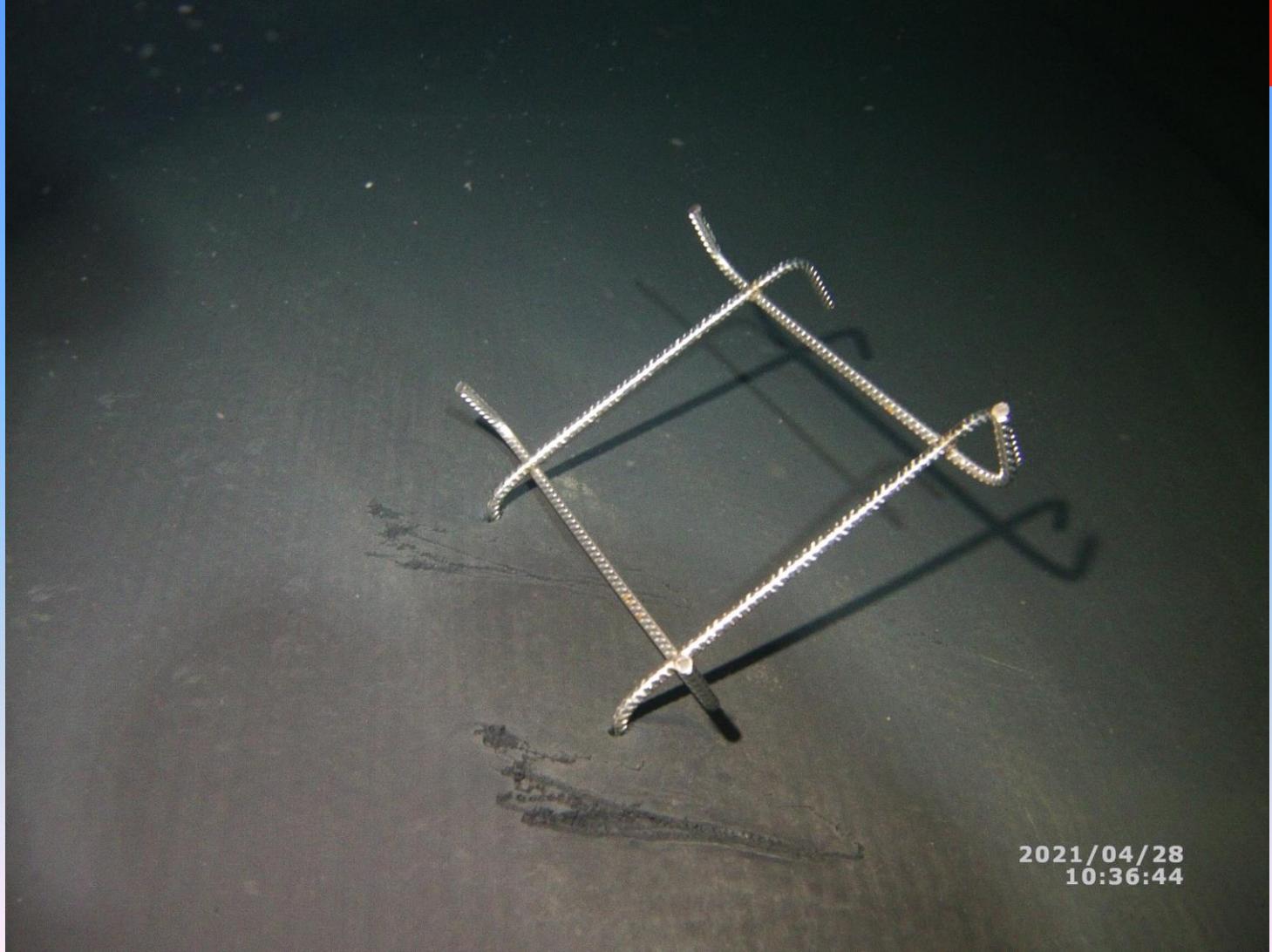
The insulation is so thin in some places, that the spikes from the fixation irons between the two lower layers is a threat to the floating liner.

That's why we begin to have holes in our floating liner.



This picture is from a divers inspection on April 28<sup>th</sup> after the floating liner has sunk app. 4,5 meter below the insulation, that was still floating and thus carrying the topline.

It shows how the fixation iron has penetrated the floatingliner.



2021/04/28  
10:36:44

Another picture from the divers inspection after the floating liner has sunk app. 4,5 meter below the insulation

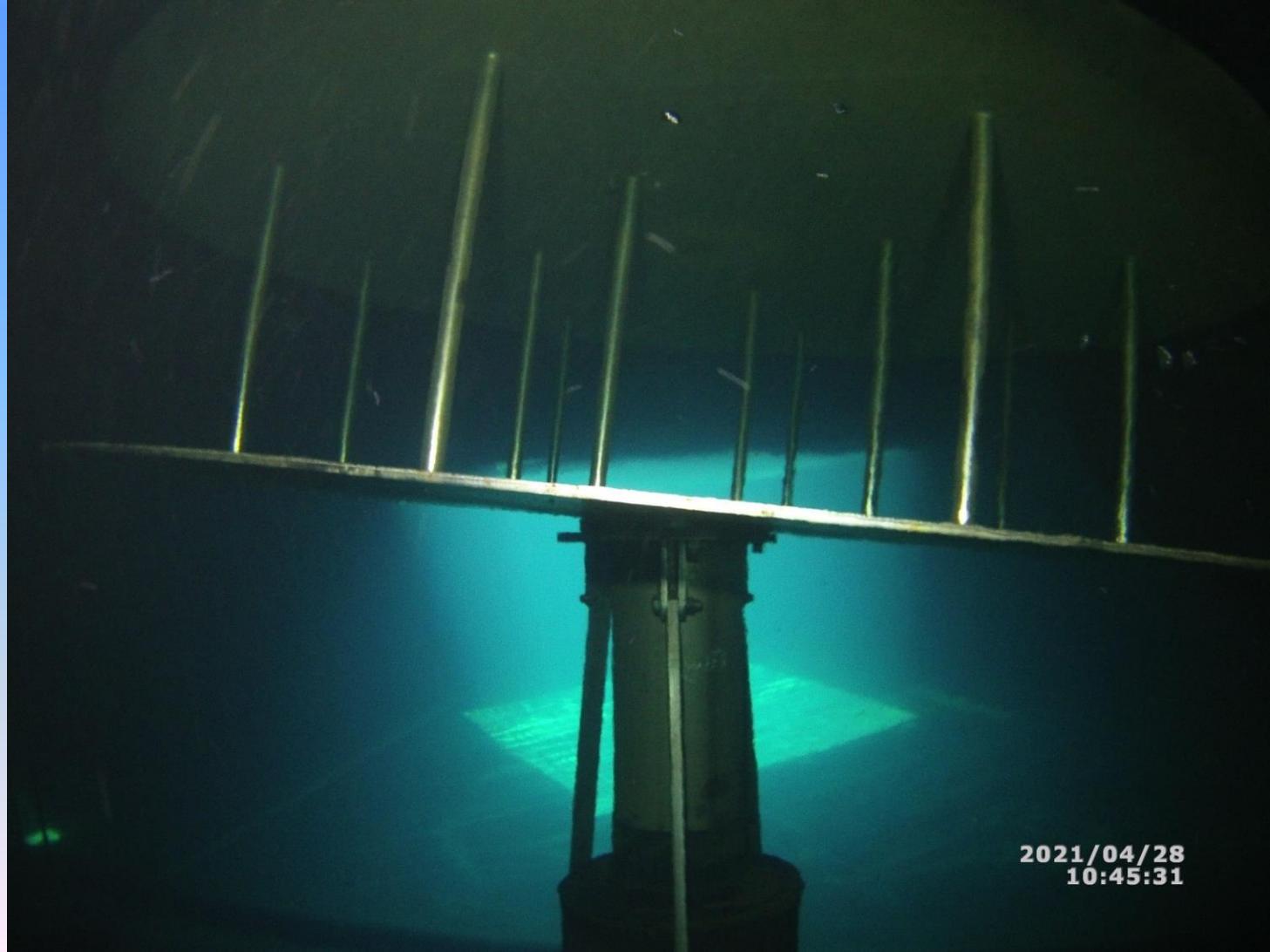
It shows how many fixation iron has started to penetrate the lowest layer of insulation, and thus punctuating the floating liner.



2021/04/28  
11:02:12

The top diffuser was bend  
from the weight of the sunken  
floating liner.

Eventually the edge of the top  
diffuser cut open the floating  
liner and the liner sunk.



2021/04/28  
10:45:31

The weight pipes made sure  
the floating liner sunk deeper.



2021/04/28  
10:47:30

We opened the corners in order to remove the weight pipes from the floating liner.

The weight pipes might fall to the bottom and penetrate bottom liner





The lid was dismantled.

Some of the insulation was kept for re-use.

**Now we are  
waiting for  
Allborg CSP  
to buildt a  
new lid.**

