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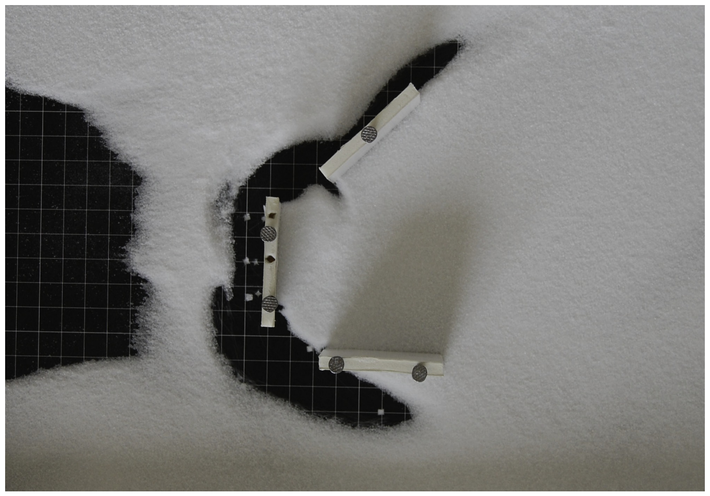
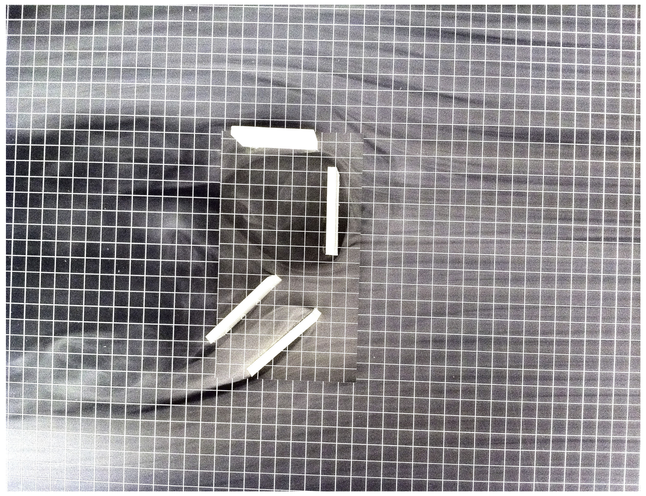
Strategy
During phase two I've tested out both leting the wind through and keeping it out of the model. I've come to the decision that I want to make a wind-shielding pavillion. This by leading, shielding and breaking the wind's path. I've tested out a couple of ways to do this and to keep areas free of wind.

Collections
In my experiments I've tested out how diagonally and right angled placed walls affect the airflow. When the long side og a wall is facing the wind, the wind, depending on the speed, will be spread to both directions. By placing leading walls or wind breakers along the wind's path, it is possible to create spaces free of wind.

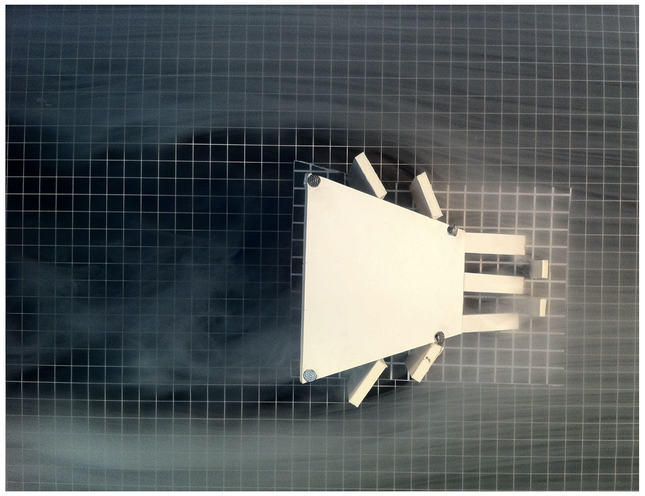
LEAD



SHIELD



BREAK



Student name: Birgitte Norheim

PHASE 2 // COMPOSITION

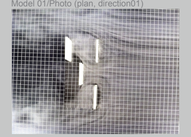
ad:mt
DEPARTMENT OF ARCHITECTURE, DESIGN & MEDIA TECHNOLOGY
AALBORG UNIVERSITY

Aero Architectural Studio 2011

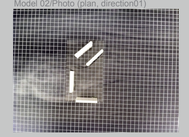
Research Catalogue / BSc4DD / Appendix 02_01
Name: Birgitte Norheim

Iteration no.

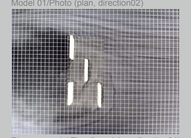
Model 01/Photo (plan, direction01)



Model 02/Photo (plan, direction01)



Model 01/Photo (plan, direction02)



Model 2/Photo (plan, direction02)

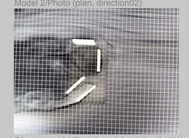


Diagramme 1 / Flow lines (plan, direction01)

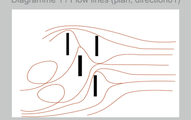


Diagramme 2 / Flow lines (plan, direction01)

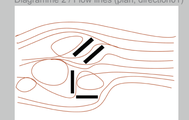


Diagramme 1 / Flow lines (plan, direction02)

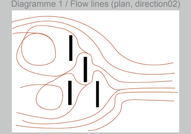
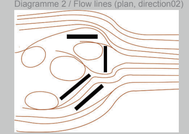


Diagramme 2 / Flow lines (plan, direction02)



Description 01 / Text

These two first models are the from phase one. I chose this one because I wanted to see how the airlfow really moves when it passes the first walls. I places the walls a bit closer together to make it harder for the airflow to make way through the passages. We can see the turbulence that occurs behind the two back walls.

Description 02 / Text

In this model turbulence occurs in four places. One of these is after the airflow passes through the diagonal walls. The wind hits a meeting wind which is traveling outside the diagonal wall and is given speed in another direction. The turbulence is mild because the directions are nearly the same.

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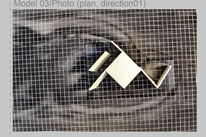
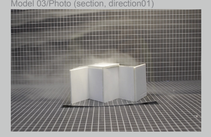
Research Catalogue / BSc4DD / Appendix 02_02
Name: Birgitte Norheim

Iteration no.

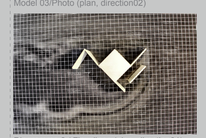
Model 03/Photo (plan, direction01)



Model 03/Photo (section, direction01)



Model 03/Photo (plan, direction02)



Model 03/Photo (section, direction02)

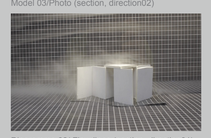


Diagramme 3 / Flow lines (plan, direction01)

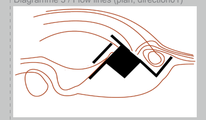


Diagramme 03/ Flow lines (section, direction01)

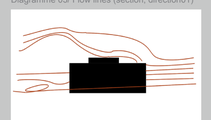


Diagramme 3 / Flow lines (plan, direction02)

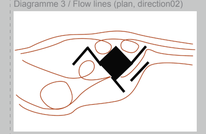
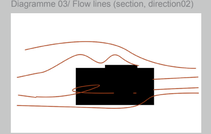


Diagramme 03/ Flow lines (section, direction02)



Description 03 / Text

1.
First time the wall facing the airflow collects the wind in a turbulent motion on the upper side of the model. The passes right by the walls facing down.

2.
When turning the model 180° we can see that the first two walls draw most of the airflow to them. The triangular placed walls now create turbulence.

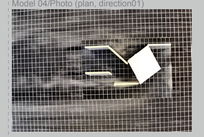
Description 03 / Text

1.
From the section view we can see that the turbulence in the first model shoves the airflow up and not throgh the model.

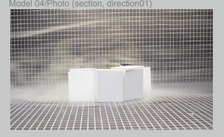
2.
The "roof" makes it hard for the all the air to pass through. Some of the airflow therefore go over the model.

Iteration no.

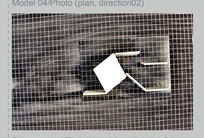
Model 04/Photo (plan, direction01)



Model 04/Photo (section, direction01)



Model 04/Photo (plan, direction02)



Model 04/Photo (section, direction02)

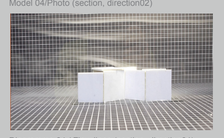


Diagramme 4/Flow lines (plan, direction01)

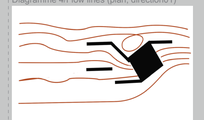


Diagramme 04 / Flow lines (section, direction01)

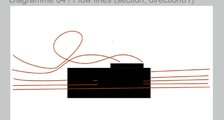


Diagramme 4/Flow lines (plan, direction02)

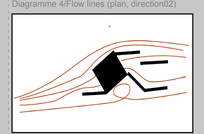
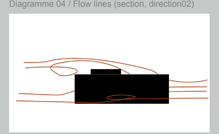


Diagramme 04 / Flow lines (section, direction02)



Description 04 / Text

1.
Most of the wind is led through the model. The flow on the upper part of the model follows the triangular walls and turbulence occurs. But this also seems to be the only place.

2.
Opposite of the model in experiment two, the wall facing downwards lead the wind into a turbulent motion. The reason is the way the orientation of the first wall. This wall leads the wind in the same direction a opposed to model two.

Description 04 / Text

1.
Due to the angle where the airflow is to enter, some of the air is shoved up and over the model. When it hits the wind coming out of the model this creates turbulence.

2.
The same ting seems to happen when the model is turned 180°

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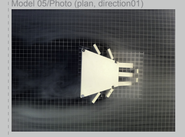
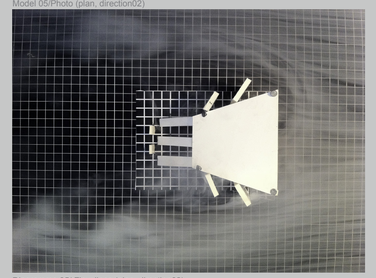
Research Catalogue / BSc4DD / Appendix 02_03
Name: Birgitte Norheim

Iteration no.

Model 05/Photo (plan, direction01)



Model 05/Photo (plan, direction02)



Model 05/Photo (detail of plan, direction01)

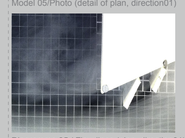


Diagramme 05 / Flow lines (plan, direction01)

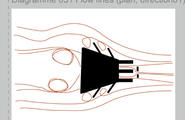


Diagramme 05/ Flow lines (plan, direction02)

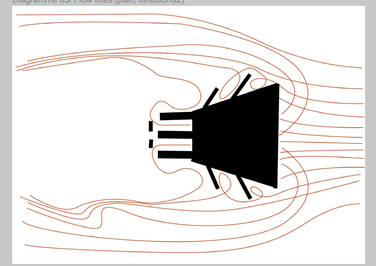
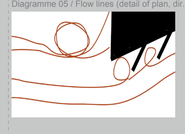


Diagramme 05 / Flow lines (detail of plan, dir.01)



Description 05 / Text

The composition is compact but my earlier models were very spacial so I wanted to observe on a smaller scale. The teeth were made to break down the airflow before it enters the funnel. I didn't think it would make more of the wind pass through the model.
The detail shows how the arms on the side captures the airflow even if they are facing the other direction.

Description 05 / Text

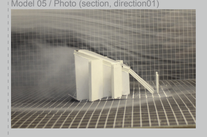
I thought that a funnel this size would bring most of the wind in, but I was wrong. Even if the exit is half the size of the entrance most of the air seems to be shoved back.

I also thought that the way the exit leads the airflow through wind-breakers would do just that, not completely clear the back of the model from airflow. The flow is actually pushed out to the sides and a turbulent motion occurs.

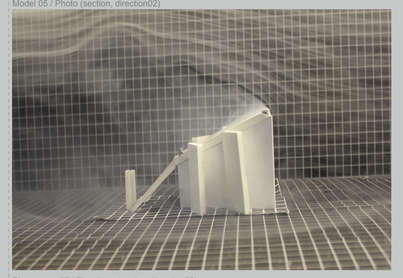
I wanted to focus on breaking down the wind, so I varied the material in thickness.

Iteration no.

Model 05 / Photo (section, direction01)



Model 05 / Photo (section, direction02)



Model 05 / Photo (detail of section, direction01)

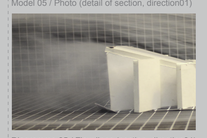


Diagramme 05 / Flow lines (section, direction01)

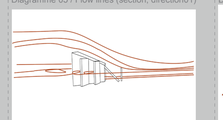


Diagramme 05 / Flow lines (section, direction02)

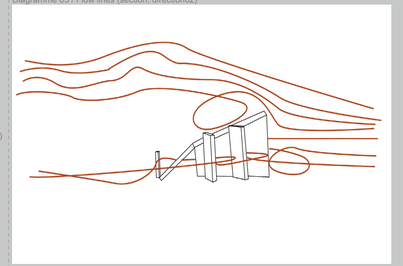
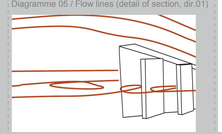


Diagramme 05 / Flow lines (detail of section, dir.01)



Description 05 / Text

I wanted to see if this composition would lead the wind over the model. The walls in front seems to break down the wind and actually lead it inside. The air is slowed down as we can see when it exits. First here, it gets hit by another wind and the air-flow turns transitional and turbulent at times.

Description 05 / Text

This picture clearly shows the amount of wind that doesn't enter the funnel. When the airflow passes over the "roof" it is pushed down and some turbulence occurs.

The joints were strengthened by nailing the walls together. The angled arms were connected by cutting a bit into the funnel and then gluing these together.