RESEARCH
BOOK

Research and Programme

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NOBODY IS AN ISLAND

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Free Masterthesis, 03/22 - 12/22, ETHZ

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Leslie R. Majer
Free Materthesis Architecture, ETHZ
Mar 2022 - Dec 2022

„NO MAN IS AN ISLAND“

No man is an island entire of itself; every man
is a piece of the continent, a part of the main;
if a clod be washed away by the sea, Europe
is the less, as well as if a promontory were, as
well as any manner of thy friends or of thine
own were; any man‘s death diminishes me,
because I am involved in mankind.
And therefore never send to know for whom
the bell tolls; it tolls for thee.

MEDITATION XVII, Devotions upon Emergent Occasions
John Donne Devotions upon Emergent Occasions, 1624, John Donne

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05 COLLABORATING WITH ENTROPY

06 APPENDIX

STATEMENT

A FLOOD DANGER

The low-lying coastal areas of Denmark, Germany and the Netherlands are under increasing water pressure: From the seaside, storm intensity is increasing whilst sea levels are gradually rising. Sea levels are expected to rise by up to 100 cm by 2100. In mainland areas, more and more freshwater is pushing out of the adjacent catchments and estuaries as a result of flash floods. In a scenario presented to the German Federal Government in 2014 on disaster preparedness, it was assumed that 1000-10 000 people would die in the event of a 100-year storm surge. Of these, only 100 would be due to drowning; whilst the rest would be a result of infrastructural failure.

B RESULT_DYKE LINE

Since medieval times, Germany's coastal regions have been protected by an almost continuous dyke line (an earth dam of 6–8m in height), which has been built up gradually and, since 1848 has been maintained by the state. It is thus a collective protective landscape infrastructure, representing a physically expressed borderline.
Currently, the strategy to prepare for future problems that arise as a result of SLR (sea level rise) is to successively reinforce the dyke line on the coast to a so-called „climate dyke" – 8.5m high, and with a far shallower sloping. This means an additional material expenditure of two thirds of the already piled-up volume. On a total German dyke line of 1,300 km, the cost per kilometre of climate dyke equals €8.2 million. The total estimated cost would therefore be €10. 7 billion.

C HISTORY OF LAND RECLAMATION

Factually, almost all endangered areas are former mudflats that were drained and dyked by humans: Through 100m grids of low rows of pegs ("Lahnungen") in this mud zone, sediment deposited daily / at every tide, causesdthe soil to build up several centimetres per year and thus slowly grow into salt marshes. These were constantly drained and eventually dyked. Successively, new rows of pegs were built in front of them to repeat the process and continuously "dyke out". The reclaimed areas – so-called Polders – were incredibly fertile due to the high content of organic substances in the mudflats and therefore very productive farmland. The imprint of the drainage canals' geometries in the landscape, as well as historic dyke lines which now lie inland, bear witness to this century-long process. As a technique, this way of reclamation is not only indicative of human domination over nature, but at the same time of an intelligence that uses the natural flows and sediment transport processes of the landscape for itself via simple geometries.

D MOVEMENTS_TIDE, STORM SURGE, SEDIMENT

Due to the large offshore mudflats, the coast slopes very gently into the sea. The tide therefore exposes and then floods square kilometre-large areas every day. On average, the tidal range of the area – meaning the difference between high water & low water – equals 3m depending on the location. When high winds and spring tides (full moon, new moon) coincide, water levels of 6.5m–9m can occur. Up until diking techniques and machinery had been nationalised, time and time again, the German coast was consistently and massively reshaped. Every hundred years, weary sources report thousands of deaths, land losses and the sinking of entire cities. Other cities suddenly find themselves at the sea's edge after floods and proceeded to gain wealth through trade. The coast can be considered a landscape of constant change – of gain and loss.

E THE CONTEMPORARY SITUATION OF STASIS

After World War II, land reclamation was completely abandoned. Today, the dyke line is static. To protect the richness of biodiversity in the intertidal zone, the line is evermore hardened and impeded from moving further outwards. The Wadden is conserved by their triple nature reserve status and as a UNESCO World Heritage Site.
Existing Lahnungen (low peg-rows) are being maintained in a minimally invasive way to break the waves, yet they are not being extended. At the same time, the pressure on the shallow tidal flats in front of this line increases as, with SLR, the water outside of the dyke will accumulate higher and higher and eventually will permanently flood these ecologically precious areas. Sedimentation, which naturally leads to coastal regrowth of land, no longer takes

place in any of the dyked areas.

F POTENTIAL OF OPENING

“In the middle of the 19th century, passages were created in the dykes near Hemmoor to promote siltation behind them and to fertilise the pastures. The reclaimed soil had sunken below the sea level and drainage was impossible. Therefore, 70m wide culverts were cut into the dyke – they were closed by wooden bulkheads in summer and left open in winter. 34 farm owners agreed to their temporary resettlement. After 50 years of regular flooding in winter, a 333-hectare-large area had grown up into fertile marshland.” Prof. Norbert Fischer, Social and Cultural History, University of Hamburg

G PROJECT INTRO

In my thesis, I propose to end this conservation and punctually open the dykes to create sediment intake.
As part of an imagined research project, the dykes in front of Husum, the Capital of Northern Frisia are opened to slough up the land around the buildings by sediment gain and to grow upwards with sea level rise. This upward growth is permitted by the extensive exchange of pigment-rich flood water, mainly in winter. A new intertidal zone develops on the inside of the opened dyke. As cultural structures and protective architectures, the dykes remain effective and preserved. In the event of a storm surge, the opening can be closed, and damage can be prevented. This scenario is situated within the building period until 2100.
A structure is placed 250m behind the opening as device for sediment collection, consisting of elements for coastal protection. It is both a protective infrastructure as well the foundation to a housing development. The shape of its foundations allows the building to conduct water and thus becomes topographically effective.
Analogous to the cultural technique of land reclamation, wood logs are inserted into the soft ground and, during high tide, their geometry affects the flow velocity of the penetrating seawater, resulting in the gradual depositing of material.

Both flood-adjusted buildings and re-wetting are not new ideas. However, they have never been conceived together. To this date, it has seemed a paradox to integrate housing developments in such areas as they are usually designated to become nature reserves. Through sediment gain, architecture and ground could join forces to become effective as coastal protection: In selected areas sediment is accumulated – over time a small island would form behind the building. The topography would also serve as a further buffer in case of severe floodings. Deliberate and controlled flooding would also increase the resilience of these areas: In a landscape, which is accustomed to semi-annual flooding, larger surge become less of a risk.

With the project, I aim to convey an alternative perspective on the effects of climate change. Instead of building walls, I question the hard separation of land and sea. At the same time, it is important not to consider these changes as a loss, but as an opportunity to re-establish connections with the land and its many movements; to let oneself be covered in mud to grow upwards.

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THANKS

Alicja Prusinska	Architect	*Zürich*
Alina Pinardi	Architect	*Zürich*
Amy Perkins	Architect	*Zürich*
Anne Reeders	Broken Circle, Land Art Contemporary	*Emmen, Netherlands*
Annemarie Heinken	Artist	*Wangerooge*
Anton Krebs	Architect	*Zürich*
Armin Linke	Artist	*Berlin*
Axel Breiter	Sewage treatment plant management	*Wasserverband Nord, Pellworm*
Blanka Major	Architect	*Zürich*
Boris Gusic	Architect	*Zürich*
Christine Binswanger	Architect	*Zürich*
Claus Stock	Bauamt	*Pellworm*
Dieter Mader	Island Museum	*Spiekeroog*
Ernst August Thams	Dyke Duke	*Pellworm*
Ernst Kern	Executive Board	*Wasserverband Nord*
Félicie Morard	Architect	*Zürich*
Felix Schaller	Architect	*Leipzig*
Frederic Evers	Dep. of Civil, Env. and Geomatic Eng.	*VAW, Zürich*
Gunnar Hambrecht	DYNAMO, Metal Workshop	*Dynamo, Zürich*
Hans Teerds	Architect, Researcher	*Zürich*
Isabelle Sommer	Real Estate Developer	*Pellworm*
Jan Bauer	Architect	*Zürich*
Jan Visscher	Ludwig Franzius Insitute	*Leibnitz Universität Hannover*
Janina Gosseye	Architect, Associate Professor TU Delft	*Delft*
Jörg Backsen	Farmer, Climate Case	*Pellworm*
Knud Knudsen	Wadden Guide, Postman	*Pellworm*
Konstantin Kramme	Mechanical engineering, shipping	*Werther*
Kristian Brodersen	Electronics technician	*RWTH Aachen*
Leonard Krättli	Designer & Carpenter	*Zürich*
Leon Dirksen	Architect	*Weimar*
Lotte Düsterhuus	Architect	*Zürich*
Lucio Crignola	Architect	*Zürich*
Manon Zimmerli	Architect	*DELTARES*
Mark Klein Breiteler	Expert in the field of coastal structures.	*VAW, Zürich*
Matthew Christopher Halso	Doctorate, VAW	*Georg-August-Universität Göttingen*
Matthias Deike	Prof. for Geology, University of Göttingen	*Zürich*
Milica Topalovic	Architect, Professor	*Zürich*
Muriz Djurdjevic	Architect	*Ort*
Nancy Couling	Architect, Urban Researcher	*Zürich*
Nils Kerpen	Laboratory engineerLudwig Franzius Inst.	*Leibnitz Universität Hannover*
Nommen Kruse	Water engineer, farmer	*Nordstrandischmoor*
Onno Pax	Water engineer	*Nordstrandischmoor*
Otto Waalkes	Comedian	-
Rasmus Stark	LKN Schleswig-Holstein	*LKN SH*
Simone Janssen	Industrial engineer, Real estate agent	*Pellworm*
Sophia Garner	Architect	*Zürich*
Stefan Gibri	Workshop Leader	*VAW, Zürich*
Thomas Peter Egli	Architect, Egli Engineering	*St Gallen*
Tom Emerson	Architect, Professor	*Zürich*
Ulla Röhl	Scientist in Marine Geology	*MARUM, Bremen*

Research and Project Proposal

Free Masterthesis Architecture
ETHZ, DArch
Feb 2022 - Dec 2022

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