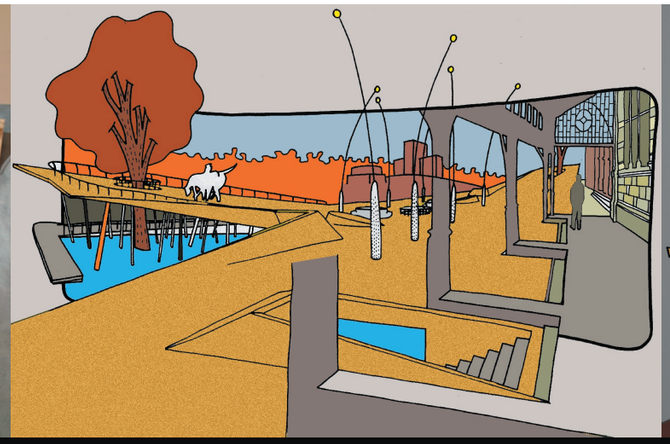
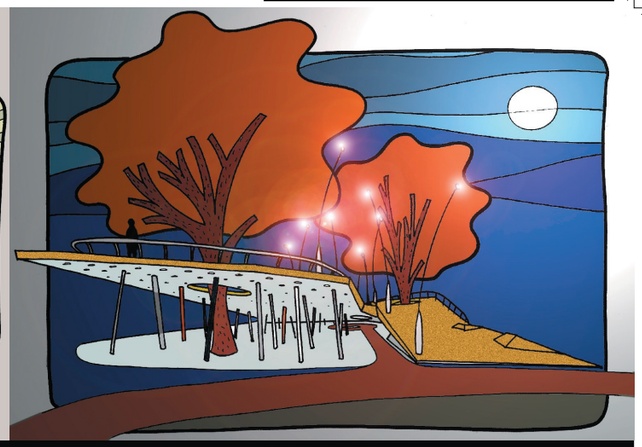
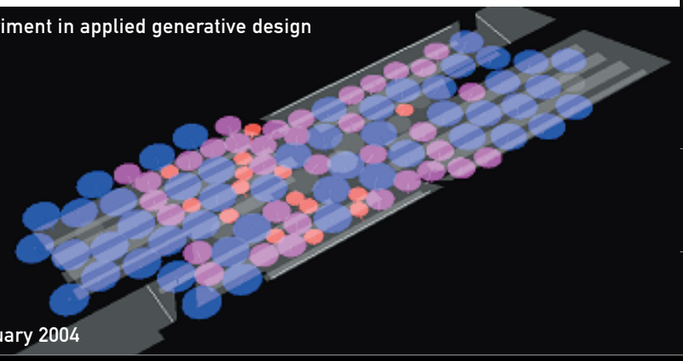




The Groningen Twister

An experiment in applied generative design



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publications

Scheurer, Fabian: *The Groningen Twister - an experiment in applied generative design*, in Soddu, Celestino: *Generative Art 2003, proceedings of the 6th international conference GA2003*, p. 90-99

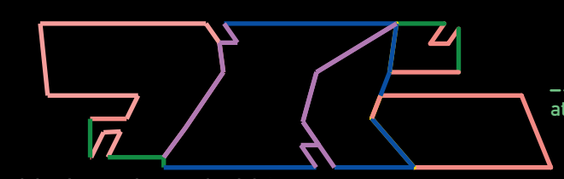
The Groningen Twister is a collaborative project between the design team of Kees Christiaanse Architects & Planners (KCAP) in Rotterdam, an engineering team of Ove Arup & Partners in Amsterdam and the chair for Computer Aided Architectural Design (CAAD) at the ETH Zurich. The project was initiated in February 2003.

The aim of the project was to develop a CAD-tool which would help the architects of KCAP to solve a complex design task: Underneath a pedestrian area that links the main station to the city center of Groningen/NL, there was a need for parking space for approximately 3000 bicycles. To support the concrete slab of the pedestrian level, the desired design called for more than one hundred columns of different sizes to be placed in a random pattern, but to be then sized and controlled according to structural, functional and aesthetic needs.

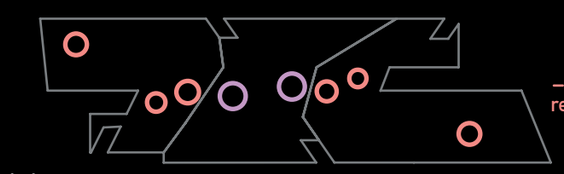
To solve this problem, a software was developed at the chair for CAAD that simulates a growth process for the columns. The distribution of the columns is defined by structural rules, provided by ARUP's engineers, as well as functional and design rules provided by KCAP's designers. The results are presented to the user as a three dimensional, dynamically evolving model. At any time during this process the user is able to control the model on the screen interactively. The user can control the process in two distinct ways, on the one hand by directly controlling the placement of single columns, on the other hand by adjusting various parameters that define the properties of the columns and the environment. The system provides real time feedback, as the column distribution tries to adapt to the changed configuration. This allows the user to test various alternative solutions in very short time. After a stable and satisfactory condition is achieved, the resulting column locations can be exported for construction documents in various digital file formats.

The final architectural design, based on the output of the software, has been approved and construction work in Groningen is about to start in mid 2004.

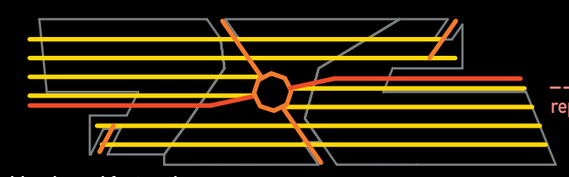
habitat



slab edges and expansion joints



holes



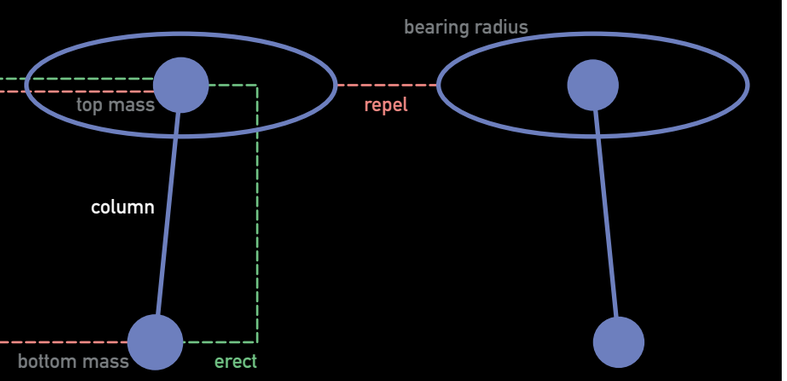
bicycle and foot paths

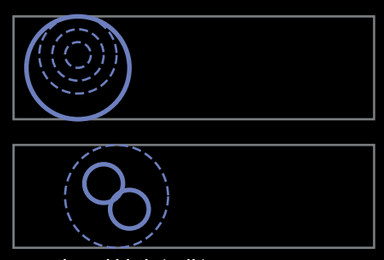
attract

repel

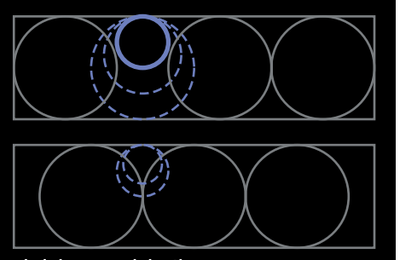
repel

organism

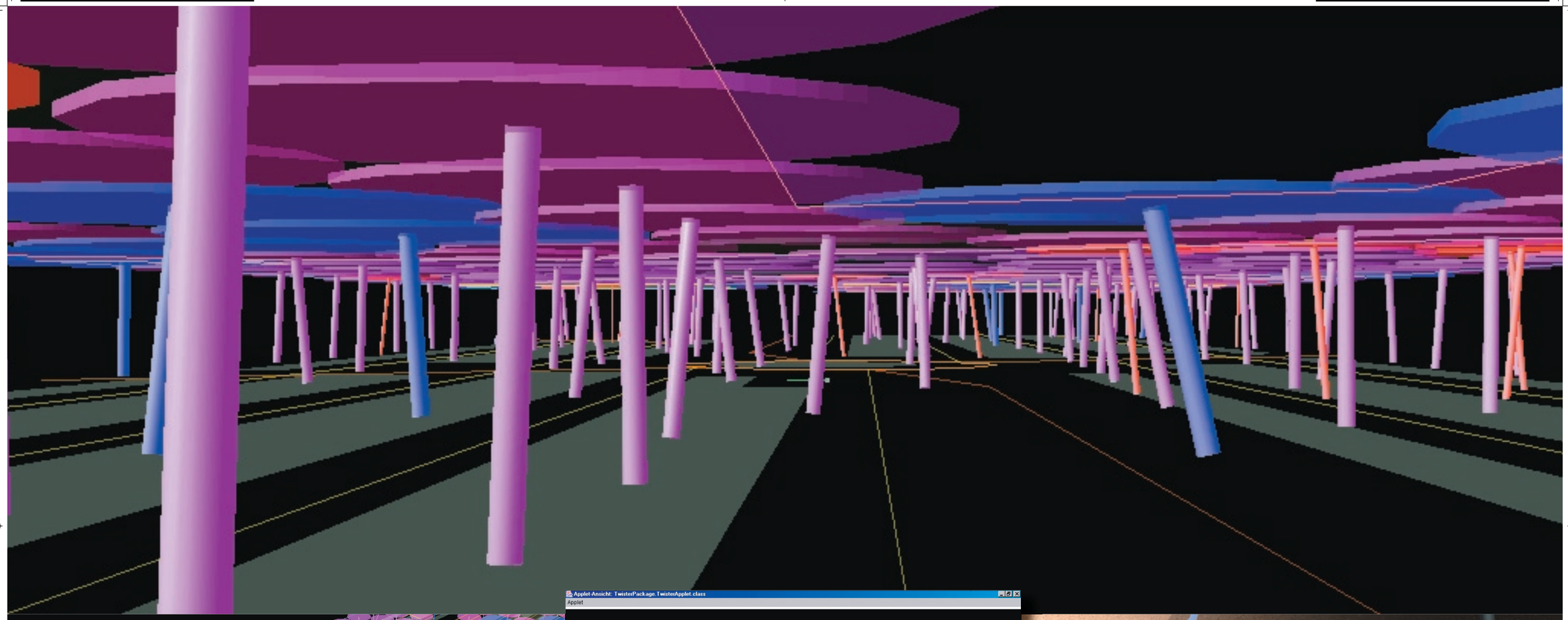




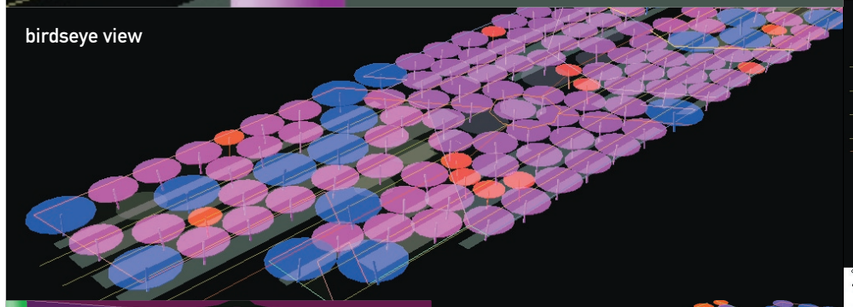
growth and birth (split)

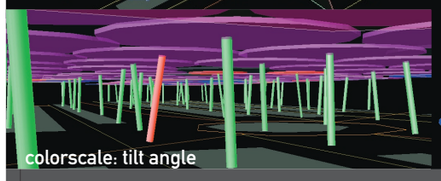


shrinkage and death

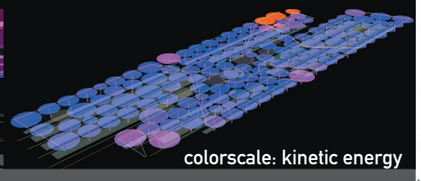


birdseye view

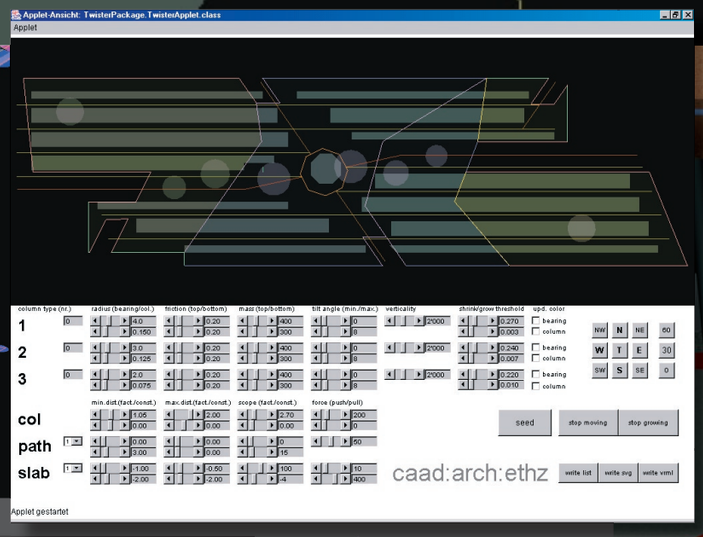


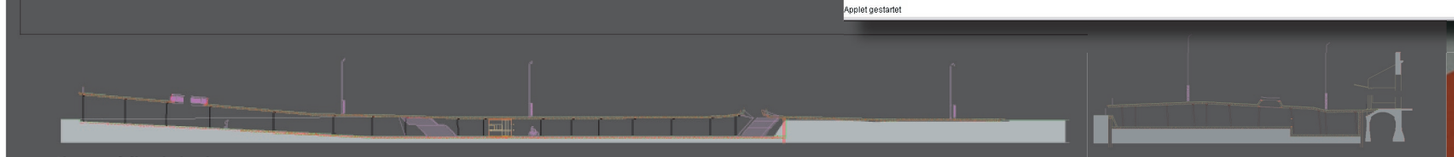


colorscale: tilt angle

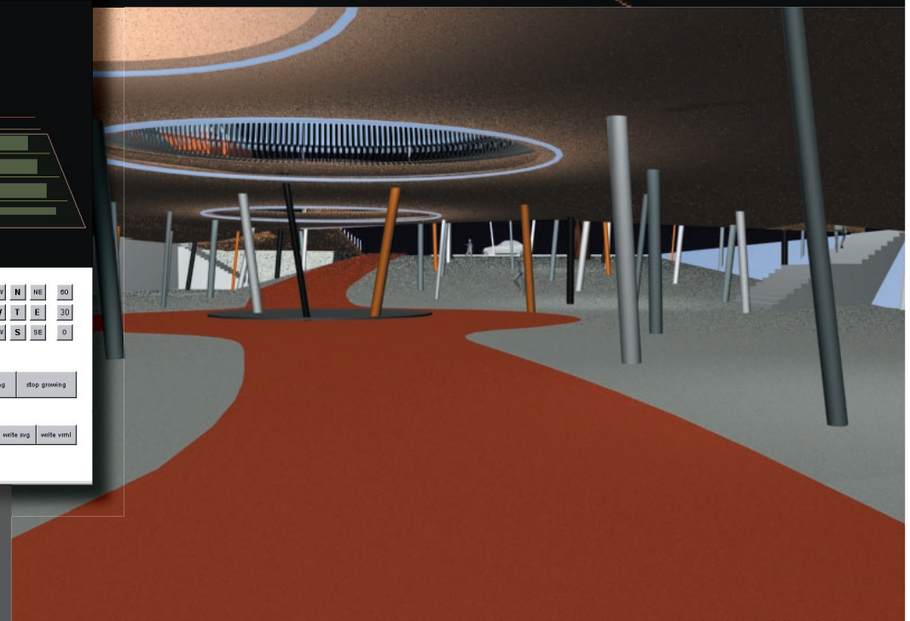


colorscale: kinetic energy





sections of final design



rendering of final design