

SOCIAL HULL

DESIGN INTENT:

SOCIAL HULL is an interactive oscillating structure that harvests the kinetic energy of visitors in addition to fostering their creative sustainable ideas. *SOCIAL HULL* recognises that the long-term rise of sustainable technologies and practice is inherently linked to education and the strength of community networks (social capital). As such, community engagement is *SOCIAL HULL*'s guiding principle.

Visitors experience the structure through a series of sectioned ribs, which oscillate much like a sway bridge. Composed of architecturally formed recycled plywood timber, these ribs reference the historical significance of the area as a former shipyard. The ribs conjoin to form a structure that initially presents itself as a series of mysterious passageways fit for the adventurous adult or child alike. These passageways then propagate into a series habitable nodes that programmatically function as educational and event spaces. The energy of visitors is harvested tangibly as electric energy and metaphorically through the generation of ideas and discussions. *SOCIAL HULL* is envisioned as a space for a variety of formal events including public lectures and discussions, music concerts (for example *Distortion Music Festival*) and markets, in addition to everyday leisure activities. *SOCIAL HULL* aims to support Copenhagen's long-term commitment to sustainability (carbon neutral by 2025) by providing an ongoing and flexible events based relationship with the city.

The oscillating structure utilises the structural properties of locally sourced recycled timber sheeting. The natural tendency of this material to flex when subjected to perpendicular forces compliments the requirements of an oscillating platform system. The rope and spring system used to harvest the kinetic energy are the lungs that allow the ribs to breathe and animates the system.

TECHNICAL:

In harnessing the kinetic energy of the suspended timber ribs, *SOCIAL HULL* adopts the use of 'permanent magnet linear generators' (PMLG). The generators use a neodymium magnet within a copper solenoid which transfers kinetic energy into a changing current (flux) that inturn outputs a voltage.

In estimating *SOCIAL HULL*'s energy generating capability, we assume that every visitor will interact with 50% of the structure's 200 ribs, with two PMLG's affixed to each rib. One PMLG produces approximately 100W when activated, which can vary depending on the frequency and magnitude of force applied. As a result, *SOCIAL HULL* has the potential to generate 20kW of power per visitor to the site, which is four times the average amount used by one person per day in Copenhagen (as specified by City of Copenhagen, '*Copenhagens Energy Consumption*', 2008).

PRIMARY MATERIALS USED:

- recycled plywood timber
- structural steel spine
- steel springs (energy harvesting)
- copper solenoid (energy harvesting)
- neodymium magnets (energy harvesting)
- generator housing (reclaimed steel)
- rope

ENVIRONMENTAL IMPACT ASSESMENT:

SOCIAL HULL's design has low embodied energy due to the use of reclaimed timber. This timber is sourced from local building sites and shipyards (for example freight pellets) thus reducing carbon emissions from transportation of materials.

The structure harvests human kinetic energy and converts it into electricity. This electricity is then used to power all services associated with the site (for example lighting for evening events), with excess energy directed back to the grid. As such, the overall system results in no net release of carbon dioxide into the atmosphere.

A sustainability plan will be implemented regarding all public events at the site, which will result in efficient public transport access to the site during events (via a ferry service to the structure's jetty) as well as a rubbish recycling system. In line with the site's community engagement principles, composting systems will be established onsite as a means to educate the public on sustainable living practices. This will compliment the existing community garden at the site that will be retained.