

## **Sand Chair: Improving Access to Cornish Beaches Through Sustainable Design.**

**S Andrews and C Roberts**

Falmouth University and Cornwall Mobility, UK

The proposed paper is a case study describing a collaborative product design and development project between Falmouth University and local charity, Cornwall Mobility (CM), in Truro. The project focused on the design of a beach wheelchair, or 'sand chair'.

An opportunity was identified by CM for greater access to beach wheelchairs in Cornwall. This is part of a wider remit to explore how Cornish beaches can be made more accessible to people with physical disabilities and mobility difficulties to enjoy the physiological and psychological benefits that being by the sea can bring. Beach wheelchairs are frequently used by locals and visitors to Cornwall, including children and adults who are physically disabled through disease or injury, and elderly people who struggle with mobility. The current beach wheelchairs – until recently operated by Cornwall Council – are imported from the USA, are expensive and subject to import duty. In addition, a number of known faults and design improvements have already been recognised with the existing product sourced by CM. Working closely with CM, with the benefit of their expertise in this field, the case study examines the opportunity to develop a much improved designed product at a lower cost that could be manufactured locally, in Cornwall.

The project demonstrates how a charity, such as CM, can be empowered through design, to provide improved access to products and services for their users. CM has supported important primary research activities in this product realm due to its advisory role to a large client base. The collaboration has allowed for engagement with CM clients for user centred design practice. As part of this process, CM clients with mobility ranging from paralysis to severe arthritis have been involved in the testing of Sand Chair prototypes. They evaluated the product against two competitor beach wheelchairs and participated in a research exercise to establish the key functional priorities of the product. The wider client base also affords marketing and retail opportunities for the product through CM's existing market networks.

The developed product is easier to get in and out of and easier for the person pushing the chair to handle. It is also visually more attractive with aesthetic detailing synonymous with the seaside rather than a hospital. However, in addition to product usability, technical issues relating to materials and manufacturing have also been addressed. Early development saw the exploration of the potential of sheet material as a key structural component. This challenges the commonly prescribed stainless steel tube assembly seen on many beach wheelchairs. Sheet materials can be CNC machined, negating the need for specialist tooling, and provide flexibility in terms of component detailing. It becomes very easy to make bespoke details or component alterations. A dry joint system is used embracing design for disassembly, making the product consistently repairable or upgradable, and allows components to be easily separated for recycling. The assembly of the product does not require a high skill level.

The product is now at a mature development stage with further prototype trials planned during summer 2016.