NEW GENERATION OF CANOE POLO GOAL

Koen Hasperhoven (s1954784) , Industrial Design Engineering, The Netherlands

Canoe polo is a small but worldwide played sports where the ball is controlled by hand or by a paddle, and a goal is scored by throwing the ball into a square goal of 1 x 1.5 m which is suspended 2 m above the water. These goals come in various types: floating, hanging on ropes or clamped to a pillar in the water. The main challenge is to move and handle these goals. Therefore, this bachelor thesis aims to investigate how the usability of the canoe polo goal can be enhanced while preserving or improving the current functionality.
The client is a canoe polo player for eight years and is into various types of sport. The assignment and the ability to supervise this originates from the fanatism and passion of the client for this sport. The functionality of the goals is defined as the roles a canoe polo goal must fulfil when the goal is fully installed. The usability focuses on the movement and re-installation of the goals. The usability and functionality are investigated with desk research and supplementary interviews with six experienced canoe polo players.

Figure 1: CPS goal

Figure 2: Agility goal

These goals come with a large variety of bolts, of which it is not clear how to assemble them. In general, there are two different types of floating goals, the CPS (figure 1) and the Agility (figure 2) goals. The CPS goals are the most usability-friendly goals but leave room for improvement when talking about the functionality. The Agility goals are not easily transported, disassembling results in a pile of rods of which it is not clear what should be connected.

The final concept is height adjustable and easily transported on the roof of a car. The usability of the goal is improved compared to the Agility and CPS goals. It is estimated that the unfolding time is less than ten minutes, from the moment the ropes on the car are loosened to the moment the goal is completely assembled on the side. Simple connections realise the goal being easily maintainable by the users themselves. The goal can be lowered from 2 m to 1.30 m to be suitable for the lower-age group. The functionality is improved as well compared to the other floating goals. The construction is designed towards the back to enhance the positioning of the mass-midpoint and herewith the stability. The length of the floaters is adapted as well as the angle between the floaters. On top of these adaptions, heave plates are added to damp further swaying motions.

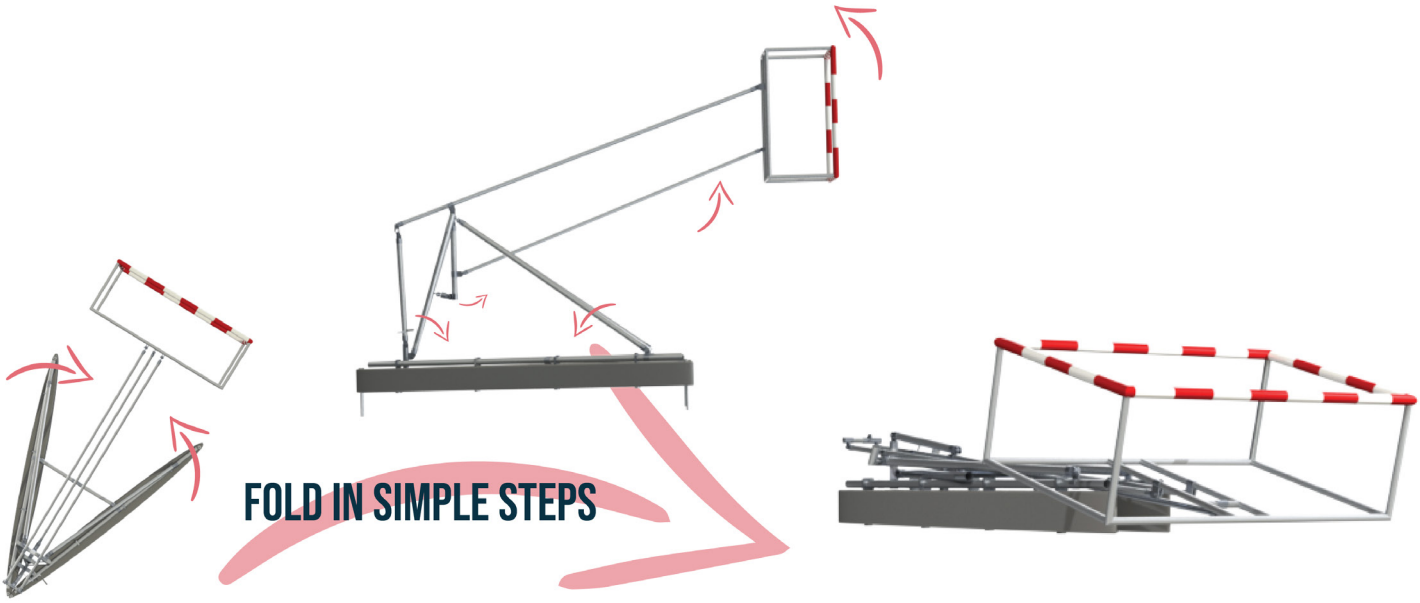

Figure 3: Explanation of folding

The forces acting on critical points of the goal are calculated. With this, the aluminium rod thickness is selected in which the availability of these rods is considered. The material used for the floaters is EPS in combination with a polyurea coating, which makes the floaters indestructible. A technical evaluation of the mass-midpoint shows that the position of the mass-midpoint is not entirely in the middle. This evaluation is based on the 3D-CAD-model, which means that there could be a deviation with the real product.

To conclude, the designed goal meets the functionality requirements as well as usability requirements. Some usability requirements are found more important than others, and therefore particular decisions are taken. For further development, it is advised to make a prototype in which the design can be evaluated. After this evaluation, the design can be made ready for production.

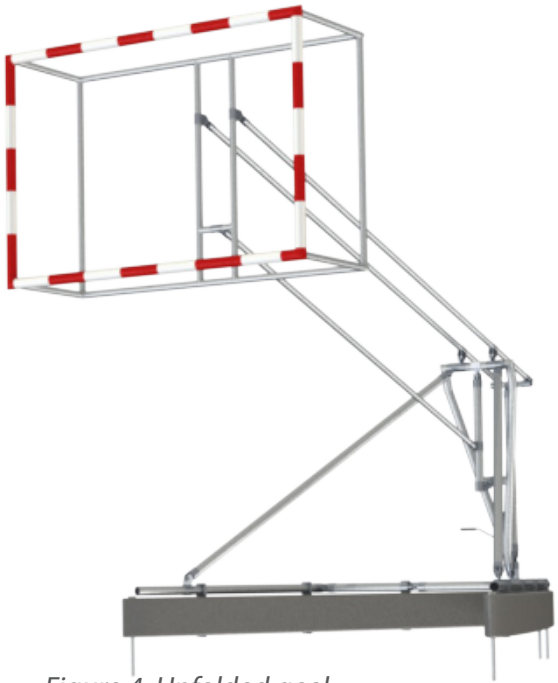

Figure 4: Unfolded goal