Housing design for electronics

Matthis de Wit, Industrial Design Engineering, University of Twente

The report describes the design process of a housing for electronics. The electronics are developed by TWTG, the company that offered this assignment. The electronics make use of wireless technology for communicating with proprietary access points. The object of the assignment is to develop the housing and fixture to attach to a specific type of constructions.

To make sure the electronics will function properly, research is done. This is done by analyzing who uses the device and analyzing the best way to fixate the device. The housing should not negatively impact the performance of the electronics, but protect and support the electronics.

Price is an important factor in designing the housing. The cheaper the device gets, the larger the margin gets for TWTG, as product owner, when pricing the product. Installers and repairmen require the device to be easy to use, this ensures efficiency when working with the device. A low number of steps to assemble the device make it cost effective in labor costs of people at the assembly line. Production costs can be further reduced by decreasing complexity of shapes and number of parts.

The environment is a subject to research when designing the end product. What kind of space is the device required to work in and how does this apply to the design and what common properties do the constructions have results in an optimal location for the device and its performance. This research resulted also in the solidity and firmness of the device.

Based on the research, the design requirements are created to make clear what is important. Four concepts are generated based on sketches and ideas, which vary on installation, parts and handling tolerances & damping. These concepts are tested on their robustness and attachment to a construction using a 3D-printed model. The robustness is tested with a pendulum test and the strength of the fixture is tested with a drop test. These results, together with the ease of installation and an estimation of the complexity (regarding production), resulted in the choice for the final concept.

The final concept is further developed in the end product, it is optimized for production and usability. Using different production methods costs are kept at a minimum. The report does include a number of recommendations for different shapes and sizes of the construction making it applicable to multiple types of constructions. The most common construction is modelled for load simulation to test the design to its requirements.

The final result is a CAD-model based on a tested concept. The report includes some recommendations to further improve the design on added design requirements during development. It is a great start for further development of the solution. A product which performs to the initial requirements and a solution TWTG can use when implementing its solution.