Smart Alpine 2.0

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Industrial Design Engineering - Concept and Design Engineering

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Description

Mammut Sports Group AG wants to develop a new belay system for multipitch climbing. This product is the successor to the Smart Alpine.

My work on this project has two main focuses :

- Firstly, to design the plastic lever used to rotate the system, which is useful when abseiling or belay a climber. This system must be resistant to mechanical and ergonomic stress.

- Secondly, to work on the overall design of the device, contributing to the functional legibility of the product.

The product as a whole must also incorporate the constraints of use associated with the « Pistol grip" position.

Process

Planning :

- Analysis of the brief
- Specifications v1
- Retroplanning

Analysis :

- State of the art / Benchmark
- Internet research (forums, tests, articles, videos, etc.)
- Ergonomic interviews
- Patents / standards
- Specifications v2

Ideation of different concepts :

- Sketches
- Mock-ups (intermediate objects)

Modelling of the chosen concept :

- 3D modelling
- 3D printing prototypes

Results

Smart Alpine (previous version)

The project resulted in the development of a reliable and ergonomic belay system designed to improve safety and ease of use. The final prototype allows for effective rope management, simplified belaying and more precise rope handling.

The device stands out for its compactness, lightness and ergonomics, while complying with applicable safety standards. Tests confirm the relevance of the concept and its functional robustness, with good suitability for the constraints of multipitch climbing.

Some improvements are still possible, particularly in terms of weight reduction and optimisation for industrialisation. Nevertheless, the prototype provides a solid technical basis for further development. A phase of testing in real conditions will be necessary to validate its durability and refine the mechanical and ergonomic details.

Discussion : conclusions and outlook

The project validated a functional concept in line with user expectations and Mammut's visual identity. A campaign of tests in real conditions could refine the final details.