

Autonomous alpine shelter, Monte Rosa hut, Switzerland

Project data

Type of project Architecture (tourism)
Estimated start of construction May 2008

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Comment of the Holcim Awards jury Europe

The new Monte Rosa hut at an altitude of 2,883m above sea level and surrounded by the highest peaks of the Swiss Alps is extremely inspiring not only due to its glittering crystal shape but even more with regard to its convincing demonstration of state of the art technology. On the one hand, all the façade and load-bearing elements as well as the interior partition walls are the results of computer-aided design and computer-integrated manufacturing in a way that material consumption and transport weight are reduced to an absolute minimum. In addition, this innovative production technology facilitates the construction of the various elements and therefore cuts substantially on-site building time.

On the other hand, the technical autonomy of this building is another outstanding highlight. Far away from any public utility network, the Monte Rosa hut relies completely on its own energy production, water collection, and systems for treating solid waste and waste water. As a result the CO₂ emission will be less than one third compared to the existing alpine hut, which will be dismantled afterwards. Although this project incurs high construction costs, requires the transport of all construction elements by helicopter, and has limited transferability as an entire project, its convincing achievements in terms of autonomy and use of technology received the commendation of the jury.

Project description by author

The striking factor about the Swiss Alpine Club's (SAC) new Monte Rosa hut is its autonomy in the heart of a sensitive landscape, an extreme climatic region far from comfortable civilized supply networks, in "splendid isolation" between seemingly untamed nature and highly urban culture. This applies to the production, the building site logistics, the autarkic (self-sufficient) infrastructure and the operation of the hut. The project is based on a five-storey, segment-shaped wooden lathe building method. The computer-aided mechanical production process makes it possible to use traditional construction methods such as half-timber building with its geometrically complex wood junctions. The result is a wide range of possibilities for the use of timber. The concept of the highly insulated façade is the result of a mixture of energy saving and energy production. The facet-like, metallic skin is studded with photovoltaic panels that supply the building with the necessary operational energy. A spiral-shaped glass band that follows the sun and conducts passive energy into the dining room and peripherally ascending cascade staircase is wound around the whole building and presents the guest with an impressive landscape panorama.

Stage I: teaching. The Studio Monte Rosa was established at the Department of Architecture within the framework of the ETH Zurich's 150th Anniversary for the planning and execution of the new Monte Rosa hut. Students were formed into changing design teams over a period of four semesters. The project classes comprised the planning from the conception to the provisional building project. Particular importance was attached to interdisciplinary collaboration with specialists and expert planners. The didactic concept was based on the creation of an artificial emergency situation, and the result aimed at an autarkic island solution. Following a two-year evolutionary design process, a well-known jury recommended this incisive project for implementation.

Stage II: research. In a second stage, various chairs of the Department of Architecture and other involved departments of the ETH Zurich were formed into a research group for the research and development project. The challenge was to include knowledge of the latest technology and research in construction in the project new Monte Rosa hut and to consolidate this knowledge. All the results of the research and development project are oriented toward the multifaceted aspects of sustainability and are intended to be suitable for use in other projects as well.

Stage III: realization. Commencement of work on the new Monte Rosa hut site planned for the early summer of 2008, and the inauguration for the summer of 2009.

Project Manager: Prof Meinrad K Eberle, ETH Zurich

Client: Swiss Alpine Club (SAC)

Relevance to target issues by author

Quantum change and transferability

- Innovative five-storey timber construction with computer-aided prefabricated elements
- Energy-efficient and autarkic (self-sufficient) infrastructure with intelligent energy management in a climatically extreme location; mid-term planning, weather and visitor prognosis to be taken into consideration ("model predictive control")
- Specific and locally-oriented logistics for the building site and operation of the hut (air transport, high degree of prefabrication)
- In general, interdisciplinary planning strategy with special emphasis on sustainability

Ethical standards and social equity

- The project is a catalyst for trail-blazing ideas and concepts with a conceptual framework ranging from theory to practice
- Sensitization of young generation for important issues relating to the future using the example of architecture (resources, energy flow, ecological balance)
- High degree of public sensitization to issues of sustainability and energy efficiency in architecture

Ecological quality and energy conservation

- Careful use of resources in production and operation, long-lasting and ecologically-sustainable materials
- Reduction of helicopter flights through the choice of lighter construction systems and an optimized logistical concept during operation
- 90% energetic autarky through integrated water and material circulation
- Energy-conscious and sustainable operation in the hut, as well as longevity of the building
- Sustainable tourism concept under consideration of the sensitive landscape
- Reduction of operational CO₂ emissions by approximately two-thirds per overnight stay compared with the old Monte Rosa hut

Economic performance and compatibility

- Compact, energetically and volumetrically optimized building with low running costs
- Choice of economic production and multifunctional construction systems
- Use of long-lasting and ecologically sustainable materials
- Innovative tourism and operational concept
- Largely financed by patrons and sponsors

Contextual and aesthetic impact

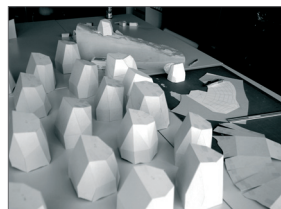
- Precise, restrained, integration of the building in the sensitive, protected landscape
- Typological synthesis of the traditional mountain hut and a modern tourism centre in architectural interplay with innovative structure and typology
- Overall and sustainable architectural synthesis of the highly contradictory and extreme conditions of the task



Situation in an extreme location in terms of landscape and climate in "splendid isolation" far from civilized supply networks.



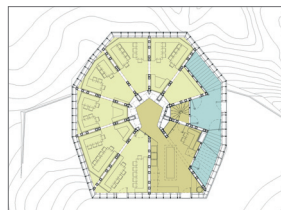
The new Monte Rosa hut at an altitude of 2,883m with views of the Gorner Glacier and the Matterhorn.



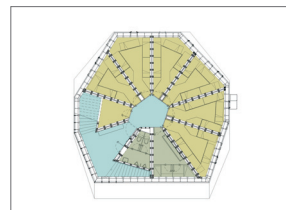
Studies on form parameters.



Studies on logistics.



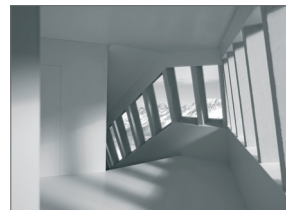
Segment-shaped structure.



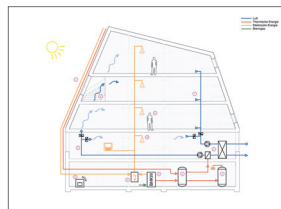
New typology for guestrooms.



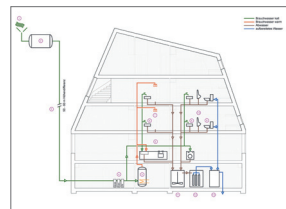
Panorama in the dining room.



Peripherally cascade staircase.



90% energetic autarky.



Integrated water circulation.