KAESER COMPRESSORI

KAESER MOBILAR: TOP EFFICIENCY ON THE TOP OF EUROPE

In a challenging Alpine setting at 4,554 meters, the Regina Margherita refuge undergoes a stability project led by PoliMi University and the Italian Alpine Club. Using Mobilair Kaeser compressors, the team successfully drills and installs sensors to monitor permafrost conditions and rock stability.

In an extreme and impervious Alpine scenario, the machine's reliability and performance are determining factor for the functioning and success of every tool and equipment.

From a height of 4.554 meters, the Regina Margherita is the highest Alpine refuge in Europe situated on top of Punta Gnifetti in the Monte Rosa range (Pennine Alps), on the Swiss-Italian border between the towns of Alagna and Zermatt.
Indeed an exciting destination for all those who love the mountains, high altitude trekking and pristine landscapes, but it represent a very challenging task for anyone who need to operate at these altitude level.

The project

As a part of the project led by Francesco Calvetti, PhD Geotechnical Engineering, of PoliMi Universtity in Milan in collaboration with the Italian Alpine Club (CAI) joined together, the works at Capanna Margherita started in September 2023 , with the aim of evaluating the stability and conditions of the surrounding permafrost, monitoring the safety of the structure above, and also providing important data to all the researchers involved.

The geologist Andrea Tamburini also soon took part in the project, focusing on the processing and analysis of data, and the geologist Fabio Baio, contributing from the first operational phases thanks also to his great experience in glaciology and permafrost drilling, due to the his multiple mission in Antarctica and Alps. We had the occasion to meet him to deeper discuss about the various aspects that characterized the "elevated" studies and the operational details.

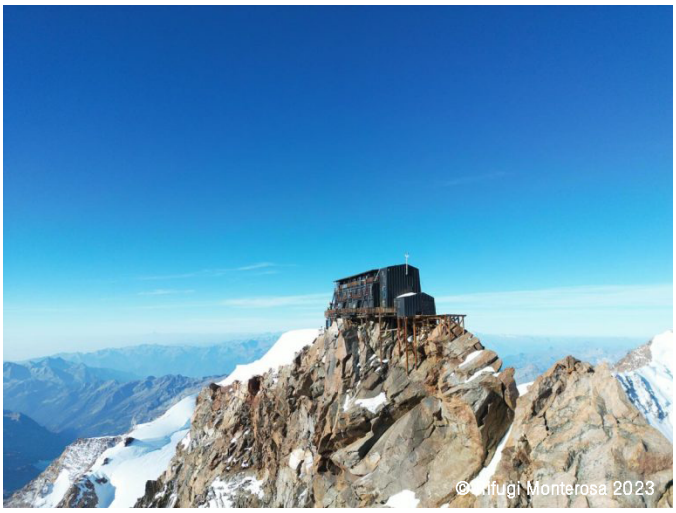

photo: the Regina Margherita location

The Construction Site

Good morning Mr. Baio and thank you for accepting our invitation, can you tell us about the project?

Yes, the Regina Margherita refuge is located on the peak of Monte Rosa at 4.554 meters above the sea level. It was named is honor of the Queen Margherita of Savoia who took a visit in 1893, in occasion of the official opening.
The owner of the refuge is CAI society, and it also host an important weather station run by the Regional Agency for Environmental Protection (ARPA).

What's the role played by the compressed air in this project?

Compressed air played a significant role, as energy driver in drilling operation.
In fatc, in order to install the instrument for measurement and verifying the rock quality and stability, as well as the temperature and vibrations occuring in the even of, for example, earthquakes or collapses, we used a pneumatic hydraulic drill with a down-the-hole hammer (DTH), connected to two portable air compressors Mobilair Kaeser powered by diesel engine providing approximately 5 m3/min each.

What were the selection criteria for the motor air compressors?

We selected the compressors based on various factors: first of all the necessary flow rate to perform the drilling rig operation was 6-7 thousand litres/min at 5-7 bar pressure, and then we calculated the expected air compressors performance losses due to the low oxigen level at high altitudes in comparison of the standard values.

Furthermore, we took into account the maximum load of the helicopter used to bring the equipment to the construction site at high altitude, and finally our choice fell on n.2 portable Mobilair Kaeser units which fix all the requirements.

What kind of operations were carried out on the contruction site?

In order to install the sensors needed to collect the desired data, two drillings were performed, one horizontal and one vertical below and beside the refuge.
Thus, the installed sensors chain and strain gauge are able to monitor the permafrost conditions as well as the rock stability.

Mobilair Lightweight: light & powerful

Compact, service-friendly and powerful, MOBILAIR portable compressors with diesel engine impress for the high delivery volumes in a very reduced size. All model variants weigh much less than 750 kg (except the M65), making them suitable to be carried easily.

Equipped with diesel or electric motors from 14.7 to 43.5 kW, they supply compressed air flow rates from 2 up to 5.5 m3/min, ensuring pressure up to 14 bar.

Durable and resilient, the versions equipped with the polyethylene enclosure option show their true strength in adverse operating conditions, thanks to their impressive impact resistance.

Maintenance is extremely simple, as they are designed to ensure maximum accessibility of each component. Furthermore, the SIGMA CONTROL SMART controller allows the operator simple interaction with the machine, while optimizing compressed air production, fuel consumption and emissions management.

The Kaeser Mobilair range have multiple configurations to adapt to every application need, integrating different air treatment options such as heat exchanger, capable of cooling the compressed air up to 7°C above the ambient temperature, the centrifugal separator, filters to eliminate oil residues, systems for heating the air and anti-frost regulation to ensure optimal operating temperature.

The results

Mr Baio, in the end, how do you rate the Mobilair's performances?

Very well indeed. The Kaeser Mobilair units have worked perfectly, representing the key to optimizing the operations, having being able to guarantee high efficiency even in such a hard and critical environment.

Their exceptional reliability to operate even in extreme climatic conditions, provided us with the necessary compressed air for running the instruments and monitoring the environmental parameters and they allowed us to correctly carry out all the activities related to the measurement goals of the project.

We thanks Mr Baio for his kind availability and for sharing with us this amazing and unusual application.