

The 2014 Atlas Copco Experience

Russell Brooks

The Atlas Copco Scholarship is a travelling scholarship offered by Atlas Copco in conjunction with The AusIMM. A student of the minerals industry is offered the opportunity to travel to Atlas Copco facilities in Australia and Sweden.

Perth

In mid 2014 I travelled to Atlas Copco facilities in Perth for a week of product and business familiarisation. Luke Purvis, a Key Customer Manager, was my guide during the Perth visit. We walked through a range of products that were in the storage yard awaiting final checks and modifications before transportation to clients throughout Australia and Luke highlighted major differences between models in the Atlas Copco range. One of the major features we spoke about was use of the traditional Direct Control System and the new Rig Control System, each of which has their place in the modern mining industry. It was interesting to discuss attitudes towards each of these technologies, as this was a theme to be revisited throughout the tour of Sweden. It was interesting to note the contrast between the traditional approach common in Australia and the use of new technology I was able to observe Sweden.



Atlas Copco surface drill rigs in the Perth storage yard.

Luke also introduced me to a number of his colleagues who were happy to go into detail about their roles and previous experiences. Atlas Copco has a strong emphasis on customer relationships, seeking to ensure Atlas Copco customers experience optimal performance of their products. There is also a focus on improving availability and efficiency of products through preventative maintenance, detailed predictive models are used to optimise parts inventories based on customers needs. It was great to see the level of detail behind the scenes that goes into meeting the needs of customers.

Sweden

Atlas Copco was founded in Sweden, so for the next part of the 2014 Atlas Copco experience I found myself in a new country with countless opportunities to learn. I met Hans-Olov Gustavsson at Arlanda Airport in Sweden and we made our way to Stockholm. It was November and winter was coming, the climate was cold and dark but Stockholm was busy and alive.

While waiting to check-in at the Clarion Hotel we enjoyed a traditional lunch of meatballs in gravy with lingonberry jam. We walked around the cobblestone streets of Old Stockholm, surrounded by the water that forms the archipelago, a truly amazing place. Old Stockholm is made up of narrow streets with tall traditional buildings and small shops.

While in Stockholm we were also treated to *Golden Hits*, a sit down dinner and interactive musical production, the Vasa Museet (Museum), a 1600's warship that sunk in the Stockholm harbor shortly after construction, and a world renowned Ice Bar. At the ice-bar we enjoyed a cocktail served in a block of ice before making our way to a Viking restaurant, *Aifur*, owned by musician *E-Type*. I was able to try traditional Swedish foods like deer heart and moose pepperoni.



Looking out over Old Stockholm from Monteliusvagen.

Nacka Head Office and Test Mine

The first visit was of the Nacka Head Office where Hans-Olov and I had lunch with Frederick Oden and Lennart Gustafsson. At the time of our visit Lennart was coming up to his 50th year of working for Atlas Copco. We were privileged to have someone as qualified as Lennart as our guide for a tour of the Nacka Underground Test Mine. We made our way into a stainless steel lift which lowered us to the underground facility. The facility contained showrooms, a theatre, sedans, cloakroom and a disused lift. Brand new Atlas Copco underground machinery was on show for all visitors along with an illustrated timeline detailing the history of the company, from the development of the first compressors to the modern business.

Unfortunately no machines were operating on the day but we were able to visit the underground workshop, where new parts are fitted to underground equipment for field-testing. The high standard of ground support in certain non-operational areas of the underground development negates the need for hardhats. It was an amazing experience to visit the Nacka test mine and witness the impeccable underground conditions first hand.



Lennart explaining out the features of a jumbo drill in the underground workshop.

Following the underground tour Frederick provided an introduction to the three of the four disciplines of Atlas Copco outside of Mining and Rock Excavation: Compressor Technique, Industrial Technique and Construction Technique. This was a great opportunity to learn about the groups within Atlas Copco that aren't commonly focused on in the mining industry; despite the relevant functions they perform.

Secoroc

Hans-Olov and I awoke early and drove through the Swedish countryside to a small town named Fagersta. In Fagersta Hans-Olov and I visited Secoroc, the literal translation of which is *"I drill rock"*. Björn explained the applications of top hammer and down-the-hole (DTH) hammer drills before Patrick conducted a tour of the top hammer and DTH production facilities. The most striking aspect of the production facilities is the advanced level of automation, most built and assembled by robots. The main function of technicians in the production facilities is to ensure the quality of the final products, checking dimensions, strength and finish. Following the tour Patrick presented the latest developments in DTH drill bits. Atlas Copco is constantly driving to improve their products, one of the cornerstones of the business that makes it so successful.



Secoroc entrance complete with Australian flag and oversize drill bit.

Örebro

Surface Exploration Drilling

The first day in Örebro was spent at Surface and Exploration Drilling (SED) where General Manager, Thomas Hallmén, discussed the existing Atlas Copco business in Örebro and plans for future merging, expansion and streamlining of SED facilities. This presentation gave a fantastic insight into the management of a large business and the importance of good leadership.

Mats Birkestål then gave a detailed presentation of the SED products and their applications, focusing on the innovative Hole Navigation System (HNS). Mats was particularly interested in demonstrating the economic benefits of successful automation. A subsequent tour of the assembly line with Ye Larsson revealed the efficiency of the facility before Juan Pulido demonstrated the capability of the drills, allowing me to operate a T45 SmartROC and CopRod C50. I thoroughly enjoyed the opportunity to operate the drills and witness their capabilities first hand.



External and internal view of the Atlas Copco T45 drill used to drill test holes.

Underground Rock Excavation

Gabriel Norefors provided an introduction to the Underground Rock Excavation (URE) group of Atlas Copco, outlining key functions and new developments before presentations from Malin Lestander and Peter Bray. Malin spoke of her experiences as a graduate in the mining industry and I have been able to apply some of her suggestions to my graduate role. Malin also shared her thesis work, details of her current role and a presentation on various methods of shaft development. Peter, an Australian expatriate specialising in underground drilling, presented a number of topics including Rapid Mine Development, Correct Drilling Techniques, Norwegian Tunneling Success and Difficulties of Automation Implementation. It was interesting to hear about the issues surrounding the rollout of new technology in the mining industry, particularly in countries such as Australia where tried and tested techniques are often favoured over unproven innovative solutions.

The third morning in Örebro was spent with a tour of the Material Handling Systems assembly line. The tour conducted by Franck Bouderault focused on the special features of Atlas Copco Trucks and Loaders, indicating the devotion to continuous improvement and high quality products. The afternoon comprised of presentations from subject matter experts in commercial activities, automation research and development, ventilation, infrastructure and utility vehicles. Again, it was interesting to note the diversity of Atlas Copco products and this was a great opportunity to expand my understanding beyond characteristic mining technology.

Unfortunately photographs of production facilities and assembly lines are not permitted, although there was plenty of opportunity for photographs at Örebro Slott (Castle). Tours of the 700 year old castle are held regularly and it was amazing to walk through the castle. While in Örebro I was also able to attend a local ice hockey game and a Christmas function where Swedish legend *E-Type* performed.



Seven hundred year old Örebro Slott.

Distribution Centre

A visit of the Örebro Distribution Centre, a huge warehouse on the outskirts of town, **exemplified** the complexity of spare part distribution. Sveinn Eriksson escorted me through the different areas of the building, including the production of service packs, spare part storage facilities and the final packaging areas.

When parts arrive at the facility they are stored in specific locations based on size, weight and function. Human hands never lift items heavier than 15 kg; they are only ever moved by mechanical means. Smaller items are sorted in an automatic stacker made up of many shelves, each with many compartments. The automatic stacker significantly improves the efficiency of the centre, picking small parts required for distribution. Sveinn emphasised the importance of minimising excess inventory, preventing excessive handling and allocating storage space effectively. The entire distribution centre appeared incredibly efficient, each person and machine was being utilised effectively.

Malmberget and Kiruna

As an inexperienced Mining Engineer it is always exciting to visit new operations, particularly those that are as unique as the LKAB mines in Northern Sweden. Markus Aspelin and I first visited Malmberget underground iron ore mine, owned and operated by LKAB. Conditions in the underground magnetite mine are incredible; bitumen roads, restaurants and autonomous equipment are the norm. Malmberget comprises 600 kilometers of underground development, providing access to 13 active orebodies. In both Malmberget and Kiruna the underground access ramps wide enough to accommodate two-way traffic.

Due to subsidence associated with the mining method, LKAB will create new cities for both Kiruna and Malmberget. In the case of Malmberget, the city will be relocated by 2032, displacing 3,000 citizens. Stefan, our guide, assured us that the local community is supportive of the state owned mining operation due to the associated direct and indirect employment opportunities. At the time of our visit Malmberget was producing approximately 8 Mtpa of iron ore, comprising Magnetite and Hematite fines as well as Magnetite pellets.



Simplified Kiruna mine model in the underground museum.

The second site visit was of the Kiruna underground iron ore mine, also owned and operated by LKAB. An underground museum details the history of the mine, showcases old equipment and explains the mining and processing methods in detail.



A disused Atlas Copco production drill in the Kiruna underground museum.

In production areas, a fleet of Atlas Copco Simba drills operates autonomously, drilling production rings with precision and automatically adjusting settings to ensure they operate as efficiently as possible. A small team oversees operation of multiple drill rigs from a remote location using monitors and control panels. During our visit each drill was operating perfectly, it was extremely impressive. It seemed that the Swedish mining industry were very welcoming of continuous improvement through innovation and change.



An autonomous Atlas Copco production drill rig in Malmberget.

Ice Hotel

It would be a shame to visit Northern Sweden without witnessing the beauty of the Ice Hotel. Upon arriving we were told that the Ice Hotel was not yet ready for visitors and tours had closed for the day. However, Markus was able to negotiate a private tour of the construction site and we were able to witness the artists constructing the sculptures that are featured throughout the Ice Hotel. Ice is sourced from the adjacent river and when the structure melts in summer the water is runoff and return to the river.



"Chilling out" inside the Ice Hotel with Markus.

Swedish Culture and Atlas Copco

Swedish people are exceptionally well mannered and were fantastic hosts. I sensed a calm approach towards life, particularly outside of Stockholm, and a focus on family time and wellbeing. *Fika*, a coffee break, is a social institution in Sweden that was apparent throughout my visit, from Stockholm to Kiruna. I certainly enjoyed the strong coffee and sweets at every opportunity.

The most striking thing about all of the Atlas Copco employees is the length of time they had spent working for the company. There's something about working for Atlas Copco that people love, whether it's the Atlas Copco culture, employee benefits, security of employment or the company's reputation. It is quite common for employees to have been with Atlas Copco for ten, twenty or thirty years. I was incredibly fortunate to spend time with these people and experience the things they love about Atlas Copco.

When commencing a new role within Atlas Copco, employees are often given a "mission", this may be improving efficiency, seeking innovative solutions or building relationships. A duration of two to three years is intended for each mission and upon completion, of either the mission or time frame, a new mission is defined. People I spoke with found this to be a great motivational tool.

Tack Så Mycket

The Atlas Copco Scholarship is an incredible opportunity to experience mining in a different culture and I cannot thank Atlas Copco and The AusIMM enough. Special thanks must go to Sue Goc, Diane Peisley, and Åsa Hallafors who organised flights, accommodation, transport and all other necessities. Thanks to all of the new friends who made the scholarship such a memorable experience, there are quite simply too many to list.