Case Study:

Mine Expansion Triggers Move Towards Safety Automation for Tüprag

Tüprag worked alongside MineARC Systems and Foramec to complete the expansion and upgrade to the refuge chamber fleet, improving safety standards.

mineARC SYSTEMS

> “I am more at ease knowing our workers can operate any refuge chamber regardless of which one they enter ”
>
> - Mr Yahya, Training Supervisor

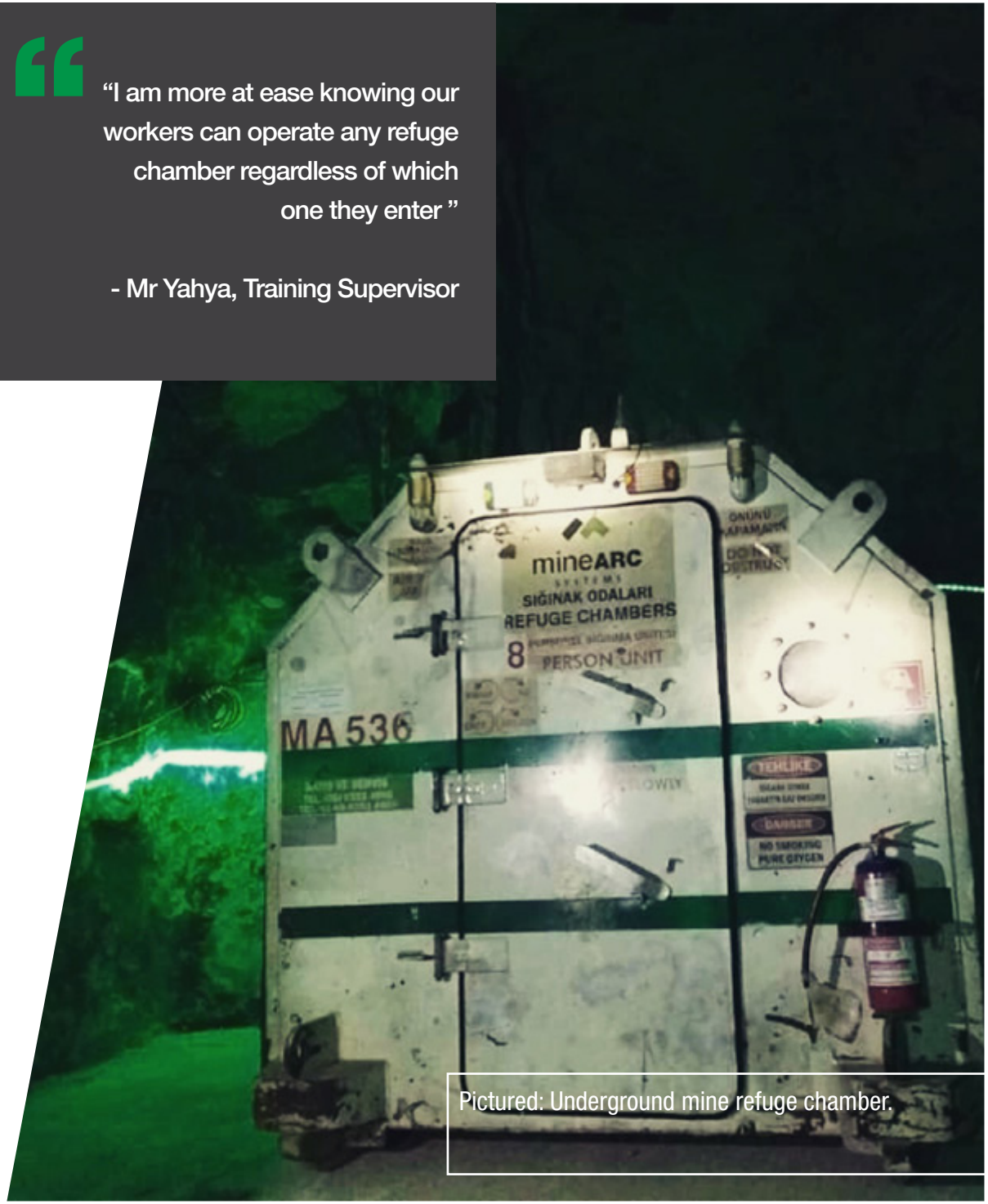
Expanding A Mine

The life of a mine or project has multiple phases. The decision to develop and expand a mine also brings with it a distinct set of challenges which need to be considered when determining its feasibility.

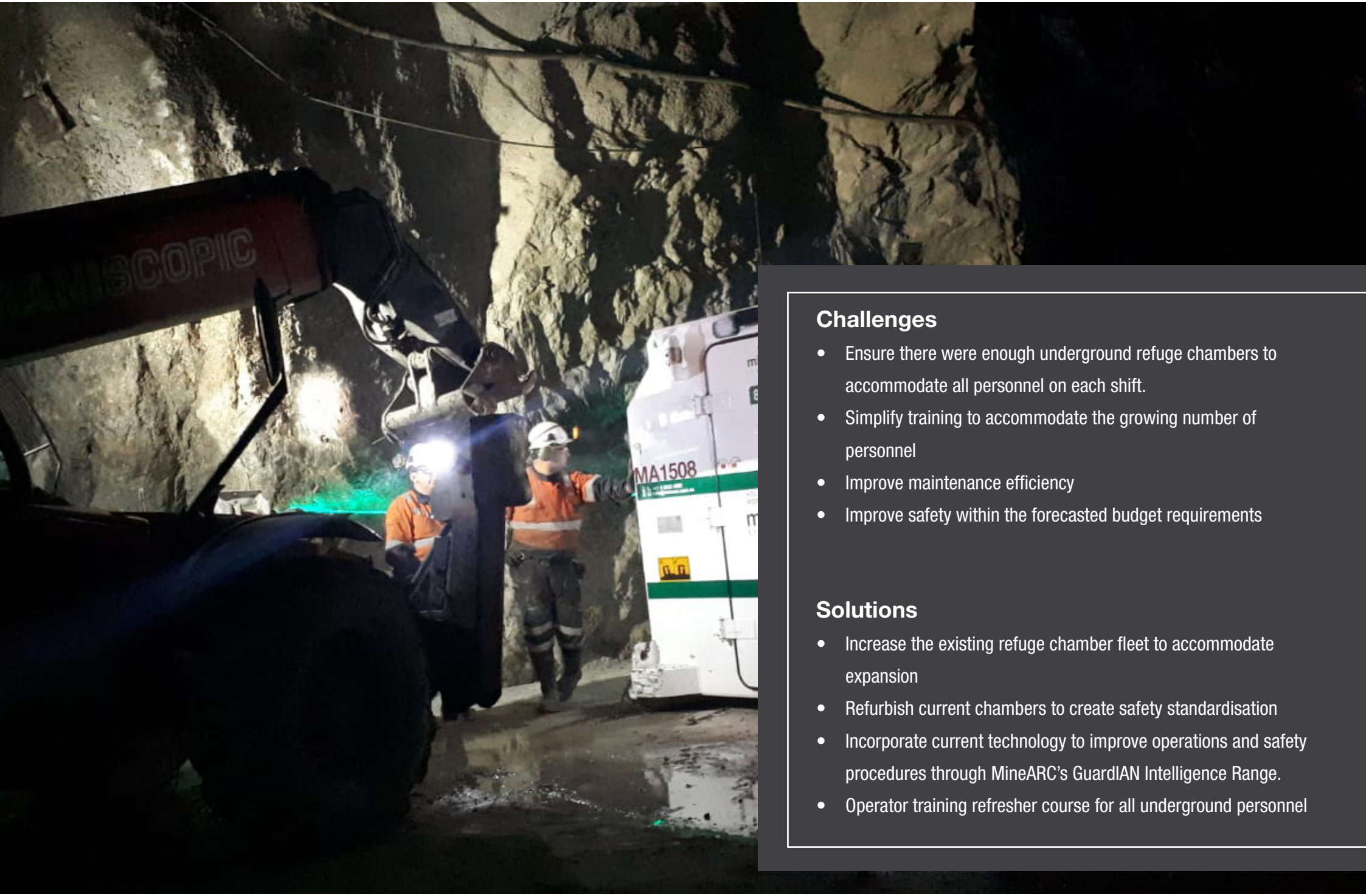
Efemçukuru gold mine, located in the Izmir province of Turkey, aims to develop and expand their operations regularly. This purpose initiated an upgrade of the sites current safety and emergency response plan including refuge chambers.

The underground gold mine and related plants and facilities were commissioned in 2011. Efemçukuru is solely owned and operated by Tüprag Metal Madencilik Sanayi ve Ticaret, a subsidiary of the Eldorado Gold Corporation.

The mine is increasing its exploration and processing of gold within the region. Due to this expansion Tüprag chose to work alongside Foramec and MineARC Systems to build upon their current refuge chamber fleet, incorporating new chambers and technology.



Pictured: Underground mine refuge chamber.



Challenges

- Ensure there were enough underground refuge chambers to accommodate all personnel on each shift.
- Simplify training to accommodate the growing number of personnel
- Improve maintenance efficiency
- Improve safety within the forecasted budget requirements

Solutions

- Increase the existing refuge chamber fleet to accommodate expansion
- Refurbish current chambers to create safety standardisation
- Incorporate current technology to improve operations and safety procedures through MineARC's GuardIAN Intelligence Range.
- Operator training refresher course for all underground personnel

01.

Increase the Existing Refuge Chamber Fleet to Accommodate Expansion

Efemçukuru utlises mechanised cut-and-fill methods where drilling and blasting operations are carried out together with haulage and backfilling activities. New refuge chambers were purchased to accommodate the growing number of personnel as well as active work faces.

Tüprag purchased two additional MineSAFE Standard Design Refuge Chambers to complement the current fleet. Equipped with the latest in refuge chamber technology, each new chamber includes;

- Aura-FX Fixed Gas Monitoring to detect changes in gas levels within the chamber,
- Series IV Scrubber designed to remove carbon monoxide and carbon dioxide during an emergency,
- Compressed Air Management Systems (CAMS), and
- Refuge chamber management software, GuardIAN Refuge Chamber Monitoring and Diagnostics Systems.

Following installation within the mine, MineARC distributor Foramec commissioned the new chambers. Commissioning is a quality-based process to ensure the chamber is installed correctly, emergency ready, and key staff receive operational training.

Both the maintenance and training division of Tüprag worked alongside Foramec and MineARC Systems to provide the necessary safety equipment within the project's budget. Each group were able to assess specific requirements, prioritise the organisation's needs and develop a custom solution without compromising safety. Because Tüprag identified the ongoing benefits of the upgrades, they were able to work within their organisation to set an appropriate budget before purchase.

Pictured: New MineSAFE Standard Design Refuge Chamber installed underground.

Pictured: Underground refuge chamber before refurbishment.

Tüprag already owned several MineSAFE Refuge Chambers as part of their current operations. Upgrading the existing fleet to the same safety standard as the newly installed refuge chambers helped improve safety and operations.

The refurbishment involved stripping back the chambers to the shell, repainting, and repairing any damage associated with life underground. Once complete, new equipment was installed, in-line with the technology of the two new chambers.

The Maintenance team, led by Mr Cengiz, was one of the main drivers of the refuge chamber refurbishment project. Through their foresight, the suite of Series III MineSAFE Refuge Chambers was refurbished and upgraded to the same standard operations of the latest refuge chambers. The division identified the potential savings to maintenance and service costs through more efficient processes and stock management.

Standardising the refuge chamber fleet will improve training and operations during an emergency. Operator training is more convenient as each refuge chamber now contains consistent components and mechanisms. Underground personnel will possess the knowledge and capabilities to operate any chamber throughout the mine, regardless of location.

“I am more at ease knowing our workers can operate any refuge chamber regardless of which one they enter” claims Mr Yahya, Training Supervisor.

02.

Refurbish Current Chambers to Create Safety Standardisation

03.

Integrating Technology to Improve Safety & Maintenance

An overall strategic goal of the organisation is to digitalise the mine. “We’re working towards full automation across the mine; the GuardIAN System is an integral part of this upgrade.” Mr Ergün, Mine Manager.

Each refuge chamber has been equipped with the GuardIAN Refuge Chamber Monitoring System; a simple plug-and-play system that integrates with existing IT infrastructure to ensure they remain emergency ready.

Remote monitoring of refuge chambers assists with both maintenance and emergency operations. When on-site it is hard to monitor chambers continuously, therefore, the GuardIAN Refuge Chamber Monitoring System is designed to send alerts to initiate action. During stand-by and emergencies, personnel at Tüprag can review the status of each refuge chamber through a locally hosted webpage. Any irregular activity, such as changes in power or gas levels can be addressed immediately reducing the long term effects of mechanical failure.

During an emergency, personnel within the control rooms and rescue teams can monitor each refuge chamber. Vital information such as internal gas levels, battery power and the wellbeing of individuals within the chamber assists rescue teams to plan their operations and path.

Pictured: Aura-FX DGM and Series IV Scrubber inside the mining refuge chamber.

Pictured: MineSAFE Standard Design Refuge Chamber.

04.

Operator Training Refresher Course for All Underground Personnel

On-site training was provided to the personnel underground to refresh their knowledge and educate them on the new equipment.

Foramec conducted operator training with the Tüprag team ensuring they possess the skills and confidence to activate and manage the refuge chambers in an emergency. Part of operator training is making staff aware of each component and their function. This basic understanding builds an appreciation for the refuge chamber and assurance of its ability to protect workers in the event of a truck fire or underground hazard.

At Tüprag, safety is a high priority. As the mine expands and operations continue Tüprag remain at the forefront of safety standards within the Turkish mining industry. Refuge chambers form an integral part of their underground emergency response plan. Through the combination of technology and training, Tüprag and Foramec completed the expansion and upgrade to the refuge chamber fleet improving safety standards. Positive feedback from multiple divisions and personnel has strengthened the safety culture within the company.

Pictured: Positioning the refuge chamber underground.

Tailored Industry Solutions

Refuge Chambers

- MineSAFE Standard Design
- MineSAFE Refurbishment Program

Life-Supporting Technology

- Aura-FX Digital Gas Monitoring
- Series IV Scrubber
- Compressed Air Management Systems (CAMS)
- GuardIAN Refuge Chamber Monitoring

Training & Education

- On-site operational training
- On-site certified refuge chamber servicing
- Operational guides, language specific
- e-learning access

For More Information

To learn more about how MineARC Systems can support your site, visit minearc.com

Contact Us

e: info@minearc.com.au

p: +61 8 9333 4966