

# TECHNICALLY speaking

A new generation of computer-based solutions is making the latest Atlas Copco Boomer drill rigs simpler to operate and better value.

The new generation Rig Control System (RCS) was introduced with the Boomer M2 C and L2 C drill rigs in 1998. It replaced the existing Electronic Control System (ECS).

One of the targets for the RCS project was to establish a uniform base of hardware and software components for use with Atlas Copco Boomer drill rigs.

#### Software and hardware

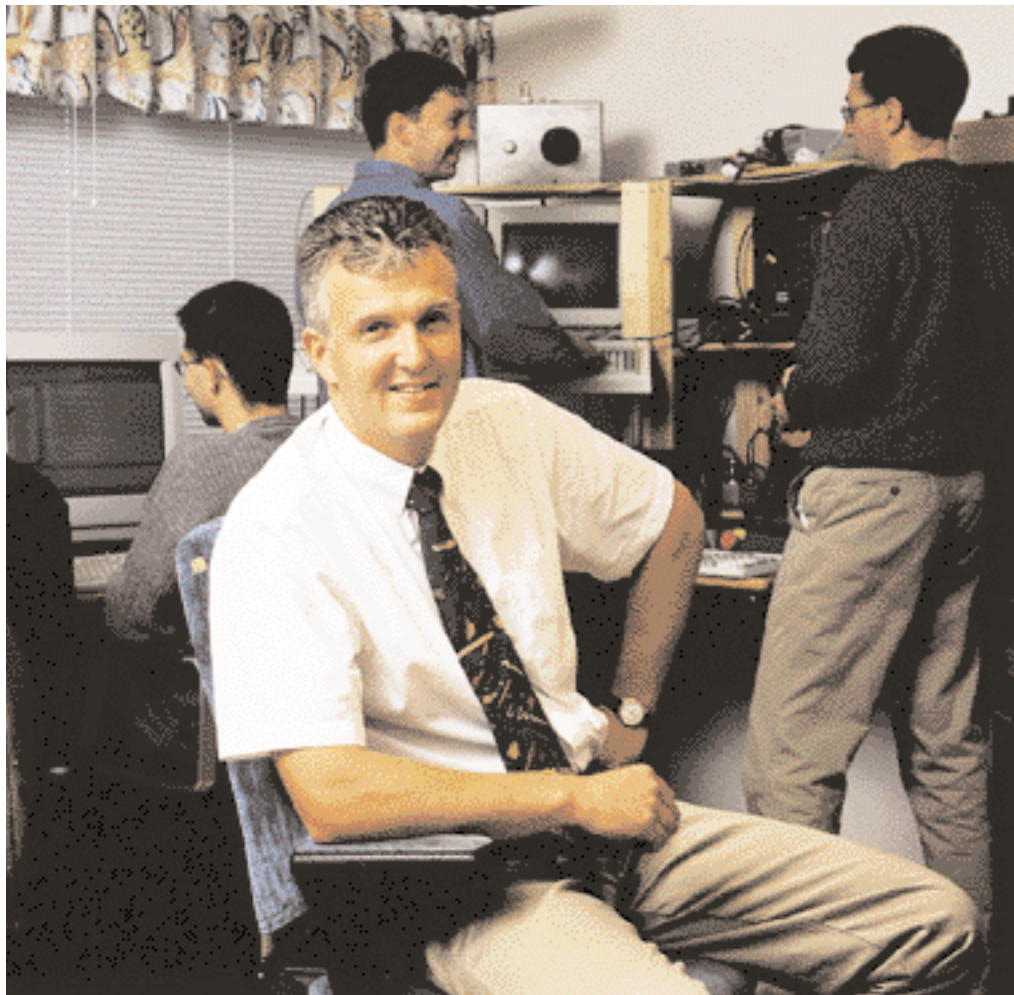
To understand the design of the control system and its function, a comparison can be made with a PC. RCS hardware has similarities with PC hardware. Both systems have a computer, a communications network, colour display units and a data input pad.

The operating system in a PC also compares with the basic software in the RCS base, where the functions for code-loading, trouble-shooting, communication and other units are found.

To use a PC, application software such as word processing and calculation programs must be present. The equivalent in RCS is found in the system, with the ABC (Advanced Boom Control) or MWD (Measure While Drilling) functions.

#### Further options

The future development of the system will involve more options which will give customers increased value for their investment. The potential number and scalability of options are perhaps the biggest advantage for RCS customers, who can start at a low level of automation and, as requirements change, upgrade to more automation. As an example, a Boomer rig L2 C with **ABC Basic** can be upgraded to an **ABC Total** configuration.



*Simpler and better value – Atlas Copco's new computerised drill rigs lead the field*

# DRILLING GOES DIGITAL

*By Jörgen Appelgren, Technical Manager  
Drill Rigs Systems, Atlas Copco*

The new rigs with RCS are in many ways easier to drill with than our ECS rigs, because the aim is to make the information on screen logical and simple, using graphic symbols wherever possible. Also, the operator is supported by RCS throughout the drilling process.

In the most complex function, **ABC**

**Total**, the operator aligns the rig to the tunnel laser and starts drilling a round by pressing a button – and then sits back to supervise while the rig drills holes planned in the **Tunnel Manager** program, the planning and evaluation PC tool. All this – plus the fact that the hydraulic fluid does not need to be drawn into the cabin –

*Jörgen Appelgren in the R&D department at Örebro: The potential of an integrated computer-based control system was identified and an intensive recruiting programme built up a strong team of electronics and software designers.*

means that the operator's working environment has taken a quantum leap forward.

The development of RCS has meant that the drilling process has further progressed with automatic functions such as auto-collaring and anti-jamming protection. And improved regulation of the drill has led to lower drillsteel costs and increased penetration rate for our customers.

The rig's computer intelligence also makes trouble-shooting easier. In most cases, faulty electronic units, sensors and valves can be immediately identified. The service organisation, therefore, does not require a deep knowledge or specific training of digital or computer technology. A general understanding of the system is sufficient.

RCS technology is relatively new to Atlas Copco's rigs – but not to other industries. Open a new car's bonnet and you immediately see a number of black boxes. The level of operational safety in these electronics is very high and you will only seldom need to change any of these boxes during the car's life. But you can rest assured that you will need to change mechanical parts.

#### Visions of the future

With the development of electronics and software in our products, we are at the start of a very exciting era. The increased cost effectiveness of computer technology means that options such as automated functions will become available for the complete range of Atlas Copco drill rigs from the smallest to the largest.

Of course I can't reveal every project we are currently working on. However, the following are a few selected "hints" of the future.

● **Plug and play.** When the rig is connected to the worksite network, the site's control and management systems will receive vital information on drilling data and the rig's internal conditions. The rig will also be able to load new



*The workplace of today: The rig operator can simply supervise while the screen informs him of every phase of operations that the Rig Control System is carrying out.*

## Learning your ABCs

**T**here are three ABC options for the digital functions of the M2 C, L2 C and L3 rigs.

**ABC Basic:** The boom operator controls boom and feed movements. Angle indication of boom angles is presented on the display.

**ABC Regular:** Formerly referred to as Contour Control. Drill plans, laser lines and tunnel lines can be designed in a PC tool called Tunnel Manager. The information is loaded into the drill rig via a PC card. During drilling operations, the operator receives information on where each boom is and where each

blast hole should be drilled. During drilling, some logging of the drilled hole is performed. Logged data can later be evaluated on the Tunnel Manager.

**ABC Total:** Formerly referred to as Auto or Robot. Planning and evaluation of data is done using the same PC tool as with ABC Regular. The difference is the automation of the drilling process. Boom movement and drilling is RCS controlled, with the supervising operator not necessarily involved. Extensive checks on boom collision and hole-to-hole move strategy has been implemented in the software.

working orders and information.

● **The intelligent rig.** RCS-based drill rigs will be automation-ready and 'intelligent', with options such as tele-remote operation, navigation and autonomous operation as well as a customer application interface to standardise the exchange of data between rig and worksite.

● **Service on-line.** The network will offer customers better service support, with engineers in the Main factory in Örebro, Sweden carrying out remote trouble-shooting on a rig in the USA via the telephone network and rigs reporting failures, or requesting servicing, direct to Atlas Copco.

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