



Marble cutting is evolving

Pellegrini Meccanica Spa has been making machines and producing plant systems for cutting marble and granite for over 50 years. Today their machines are even simpler to use thanks to Movicon.

Di Enrico Danese

Pellegrini Meccanica Spa is known as a world leader in building plant systems and machines for automatically extracting and cutting marble, granite and other natural stones. Residing in Verona, Pellegrini Spa as a company has been operating in this sector for over 50 years and is worldwide known for its advanced technology applied to production systems. This company strongly believes in innovation and is always researching for better control technology for their machines to keep them one step ahead of the rest. The Pellegrini machines have proved to be the most superior on the market not only for Pellegrini's expertise and constructional quality, but fundamentally for their operator interface systems integrated within the machine itself. The company was among the first in its sector to apply Personal Computers onboard

their machines, sustaining their theory that improving operator management results in better productivity output for their clients. For many years now the company's average-high ranging machines have been using an industrial orientated PC, in addition to the PLC as a control unit, with a purpose-built program developed with Visual Basic especially for the Pellegrini machines. In 2000 the company started gradually replacing custom-built programs with another Scada platform company product to guarantee openness, flexibility, reduce management costs and enhance potentialities. The company's experience has proved that by using a simple and userfriendly well known platform product, software implementation and management costs can be reduced significantly.

In addition to reducing total project and maintenance costs, setup costs have also been reduced. Today, setup and implementation only require the one software technician, whereas both a PLC technician and an expert PC programmer were needed in the past. Further to these advantages for builders, Pellegrini can now offer its clients an open technology based on standards, capable of exploiting the enormous potentialities offered by popular software packages sold on the market today. The Movicon Scada platform was chosen for being extremely simple to use and powerful and scalable at the same time. The technology adopted by the Pellegrini machines is the result of work carried out in collaboration with ISI Elettronica Srl, a company based in Castel D'Azzano (VR) who design and create control systems for Pellegrini Spa. ISI Electronica, in addition to working side by side with clients in projects, produces and sells a vast range of Industrial PCs and other components for automation.

The PC based Machines

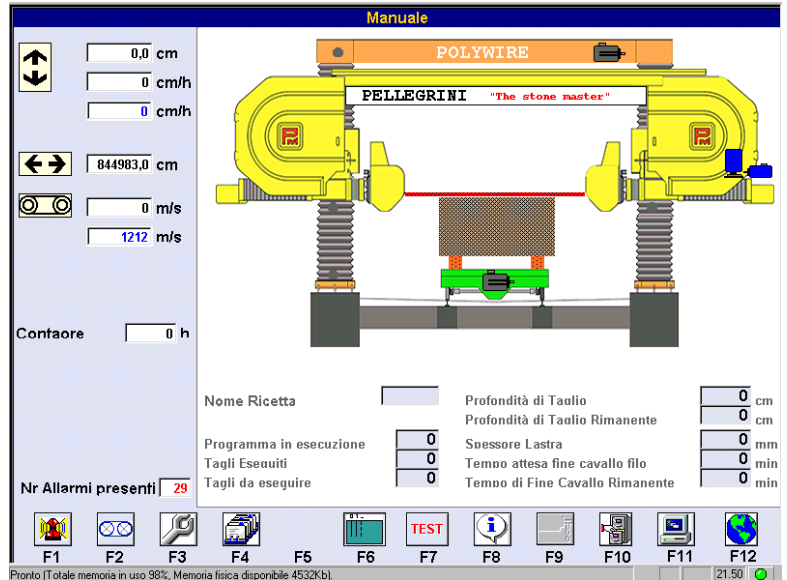
The Polywire model is one of the machines that use a PC graphical interface. This machine is a stationary diamond multiwire saw for cutting slabs on controlled XY axis. It can cut marble with up to 12 steel diamond wires and is the only one that uses a patented electro-hydraulic tension system to ensure each wire is kept at the right tension. The RobotWire model is a sophisticated machine used for cutting two and three dimensional profiles using Diamond wires entirely controlled by 4 or 6 CNC systems based on the configuration used. The managing unit uses a very innovative and evolutionary software module, which allows cutting profiles to be designed or imported from the CAD, saved on file in the machine ready for processing. All the machines use a PLC for controlling axis and I/Os, while the PC is used for operator interfacing, diagnostics, production data file management and maintenance.

“Tough” working conditions

Thanks to ISI Elettronica, Pellegrini has put sophisticated, robust and simple-to-use

architecture into action. Hardware robustness and software reliability are essential requirements needed in surviving the harsh environment which the marble machines work in.

The marble cutting machines often work in extremely dusty environments due to the



The machine status is reproduced accurately on graphical screens created with Movicon.

very fine powder residue created by the diamond wires cutting marble. Furthermore these machines mostly work outside in hot and damp climates.

By taking into consideration all these conditions, these machines also have to work properly with one operator using one PC as a man-machine interface to manage the production processes.

Evolved interface

The supervisory system completely guides the operator throughout the whole working process. The graphical interface has been purposely designed to be userfriendly so that no extra training is needed by the operator handling the machines. The optional touch screen usage further simplifies system operativity. The operator can constantly keep every machine production activity under control through the various animated screen windows by fully exploiting the supervisory system’s graphical powerful features. For

instance, the main screen shows a design of the machines with all moving parts animated, accurately reproducing the real situation. Other screens clearly show all working parameters, permitting the operator to easily enter setup data for configuring the machine's functionality. The production data, work cycles and recipes are stored and filed on the PC and can be activated within a few clicks, without having to carry out complicated manoeuvres and configuration procedures.

This evolved interface has allowed Pelligrini to increase its market shares, satisfying all those clients who 'want to get straight down to business' and demand machines to be very simple-to-use and reliable.

By hosting PCs the Pellegrini machines no longer use push button standalone panels, greatly reducing cabling and simplifying machine management. The system interface has been designed in 6 languages which can be activated with a press of a button.

Designing the interface graphics took one third of the time it did with the previous system and was even quicker to adapt to the project specifications specified by client, thought practically impossible beforehand.

Preventive maintenance

Careful maintenance is carried out on each piece of machinery, especially those working with marble. Due to the harsh working conditions surrounding these machines, maintenance has to be accurate and precise, which otherwise may jeopardize production output quality. Pellegrini has dedicated a great deal of its project to dealing with preventive maintenance.

Purposely designed screens permit operators to estimate downtimes for maintenance and utensil changing operations. The cutting machines need their diamond wires replaced regularly to prevent quality degrading and overstraining the drive motion of the cutters.

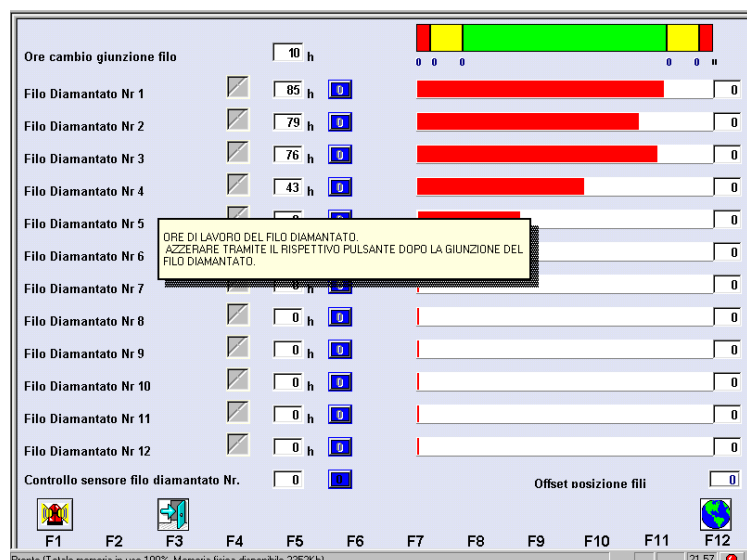
When the work parameters have been defined and set (according to the diamond wire type used), the machine's performance

can be constantly monitored and the operator is notified of any events that need intervention by supplying details on the right procedures to perform.

By being able to monitor the machine's situation at all times operators can optimize production by analysing process times to establish schedules based on different pieces to be cut by priority. Product quality is improved and the best machine performances are maintained without causing any wear and tear.

Remote Control

Machines equipped with PCs allow the builder the option to install modems so that they can be controlled at a distance by remote control. This will allow the Pellegrini technicians to connect for interactive machine access by remote, and on client request, to perform diagnostic operations on



Preventive maintenance improves production and machine efficiency.

any detected anomaly. This type of technical support service guarantees clients rapid diagnostics to quickly and effectively solve problems being experienced without the expense of having to travel to the scene in question.

Enrico Danese, ISI Elettronica