Process security in the workplace with the help of the PC-CONNECT system

Metal stream inoculation

The effect of inoculants fades quickly to a greater or lesser extent, depending upon composition, melting and pouring temperature and chemical analysis of the iron. That means that the most consistent solidification can best be achieved when the inoculant is introduced as late as possible, i.e. just before the solidification begins. It has long been known that the effect of inoculant is maximised and most consistent when it is introduced into the metal stream as it enters the mould. The economical and effective application of inoculant directly into the pouring stream, puts tough demands on both the product and equipment used to introduce it:

- The inoculant must have a low melting point, it must be pure and have a consistent particle size.
- The equipment to introduce the inoculant into the pouring stream must be able to operate under extreme conditions and be capable of adding the material in a controlled and dependable way.
- Monitoring systems are required, which are capable of registering the smallest irregularities.
- An automatic reporting system for automatic processes is an essential requirement.
- Remote servicing possibilities are more frequently demanded.

The answers to these requirements are clear:

- The high quality inoculant for consistent castings is: INOCULIN 90
- The proven stream inoculation equipment has just as famous a name: MSI System 90, Type 68E
- The remote servicing and control software is new: PC Connect

PC-Connect is an optional software. The possibilities of the MSI System are significantly expanded with this software.

With the help of PC-Connect, the MSI System 90 Type 68E can be connected via the RS232 interface, to any computer with a Windows™ operating system either directly or via a modem (see figure 1).

With PC-Connect an age old problem is resolved, namely the recording of data. It is possible to record

Figure 1.

Figure 2.

data directly in a file or print it out via a printer operating in a Windows environment in the office or at the pouring control station (see figure 2)

The software runs with Windows 3.1x (16 bit) in addition to Win95 and Win NT (32 bit). Important operational functions can be called up and inspected.

Important monitoring systems of the MSI-System can be called up using PC-Connect. The PC-Connect software does not interfere with the normal running of the MSI-System (see figure 3).

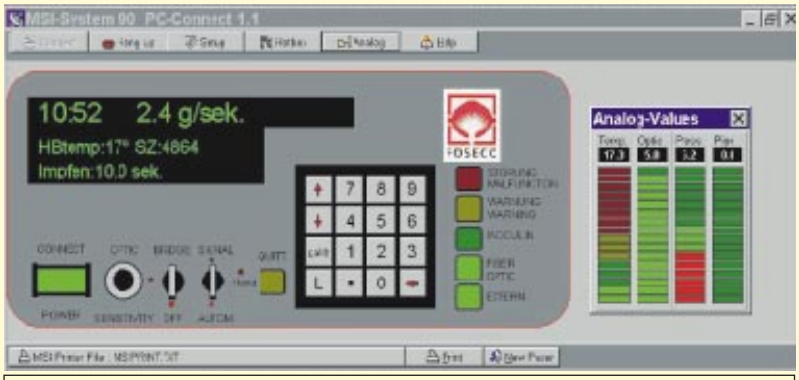
Via a modem it is possible for the electrical workshop or an external expert to give "online" help, or indeed modify the control systems. The MSI equipment can be controlled for example from the pouring station, either directly in position or using PC-Connect (see figure 4).

Figure 3.

Figure 4.

On this screen (see figure 5), a large number of the possibilities of PC-Connect are visible:
The display screen of the MSI equipment is transferred at a 1:1 ratio. The input quantity, mode of operation and operational status are displayed. Using the numerical keys, it is possible to enter data either directly on the MSI control panel or via the Windows PC. Also visible on the screen are the analogue values of temperature, voltage of the monitoring optic, compressed air pressure and the electronic pressure monitoring of the inoculant discharge tube.

In the lower section of the screen is the data report: Time, mould counter, target discharge rate (g/sec), actual discharge rate, inoculation time and warning / error messages are all displayed. On the report for a short time is visible the warning message "fill level too low". The hopper on the equipment can be refilled before the production has to be interrupted.



Time	Counter	g/sec.	Discharge Rate	Innoculation Time	
10:48:14	4858	2.4/ 2.2	10.0	0.0	
10:40:20	4859	2.4/ 3.0	10.0	0.0	WARNING
			FILL LEVEL TOO LOW		
10:49:42	4860	2.4/ 2.3	10.0	0.0	WARNING
			FILL LEVEL TOO LOW		
10:50:51	4861	2.4/ 2.4	10.0	0.0	WARNING
			FILL LEVEL TOO LOW		
10:51:24	4862	2.4/ 2.2	10.0	0.0	
10:51:45	4863	2.4/ 2.3	10.0	0.0	
10:52:00	4864	2.4/ 2.4	10.0	0.0	

Figure 5.

Wire injection with the CC-injector.

The wire injection process is still a relatively new technology in iron foundries (see figure 6). It is being increasingly applied for the magnesium treatment of iron melts.

The possibilities of wire injection as a ladle inoculation process have until now not been developed. With cored wire it is possible to automatically alloy the iron, and "double" inoculate in the pouring spout.

The advantages of the process are:

- highly reproducible
- simple process control
- automatic processing
- highly efficient

Due to the simple operation, the process is readily accepted by service personnel. Foseco have developed this machine using the most up to date technology and thanks to the in built computer and RS232 interface created a system with total flexibility.

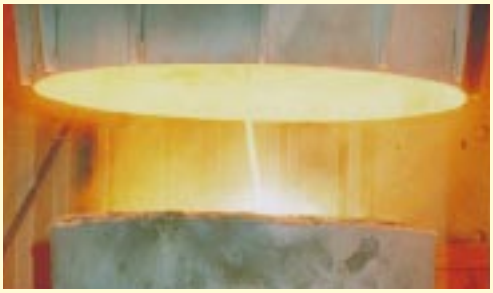


Figure 6: View into a treatment station.1600 kg treatment weight 9 mm IMPREX 8/9 (pure Mg cored wire).

Figure 7: The CC-Injector consists of: feed equipment, switch cabinet and 15m of cable.

Control and adjustment are achieved with the aid of the in built computer.

A standard interface allows direct printing of the data records. Communication with other computer systems is also relatively easy.
An optional software, CC-Remote, is available for the control of the Injector from the pouring station or via modem.

The CC-Injector has a high level of reproducibility and in addition can be calibrated (see figure 7).

- The basic system has 5 control programmes
- Is easily controlled with numerical keys
- Clear and informative display on the monitor

CC-Remote

CC-Remote is an optional control software for the CC-Injector. With the aid of CC-Remote, the CC-Injector can be controlled or monitored from any Windows PC directly or via a modem. The equipment and monitoring functions can be controlled from either via the Windows PC or directly from the control panel. For safety reasons the Start / Stop functions are not selectable from the Windows PC. CC-Remote does not interfere with the normal working cycle of the equipment (see figure 8).

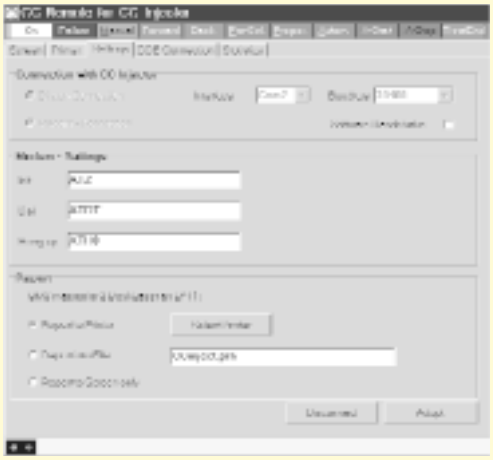


Figure 8.

Using CC-Remote it is possible to enter important data values for example directly in the pouring control area. It is then possible to print out the data record directly via a local printer or save it in a data file (see figure 9).

With the help of a modem, it is also possible to print data reports far away from the foundry, for example if assistance is required in solving a problem. It is also possible to update software via a modem.

Feed length	Velocity
(m)	(m/min)
32.50	28.0

Working screen Automatic II

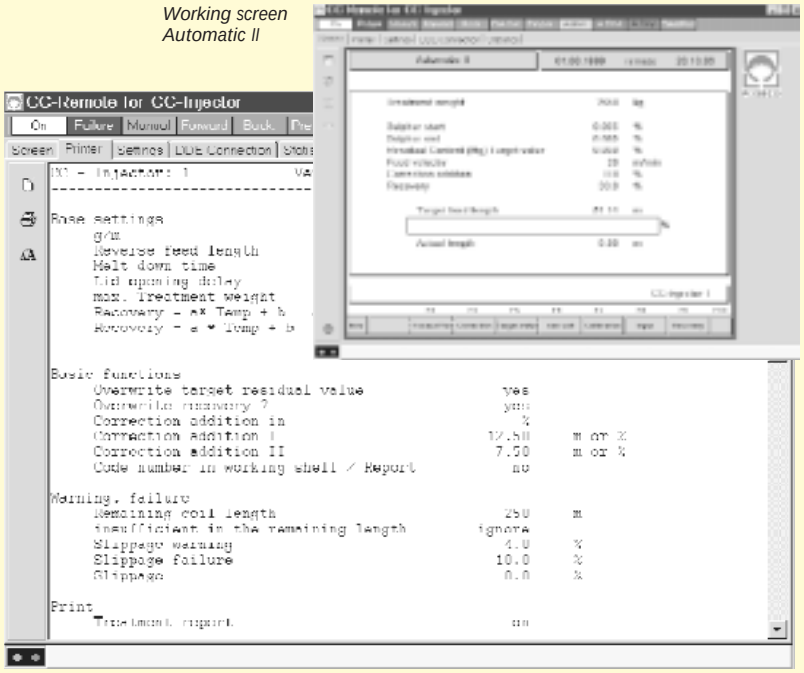


Figure 9: Print report with original settings.

A further interesting possibility exists using the DDE connection:
The wire feed length and possibly also velocity, can be imported into the CC-Injector control system from data stored on an external computer.

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