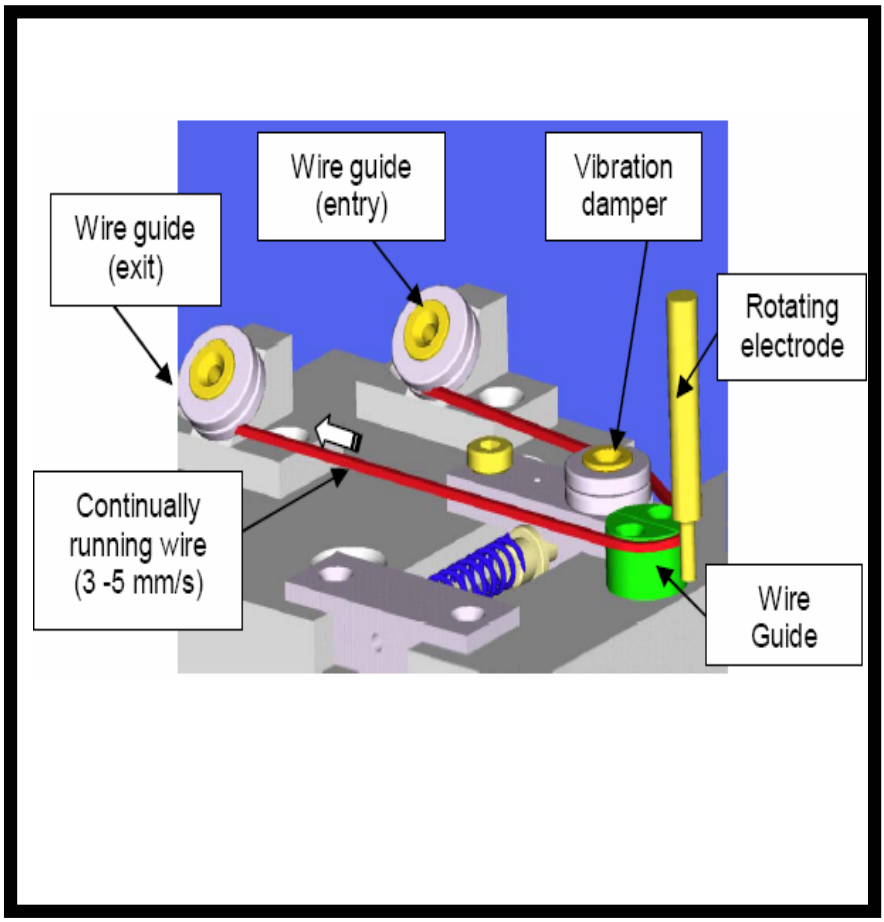
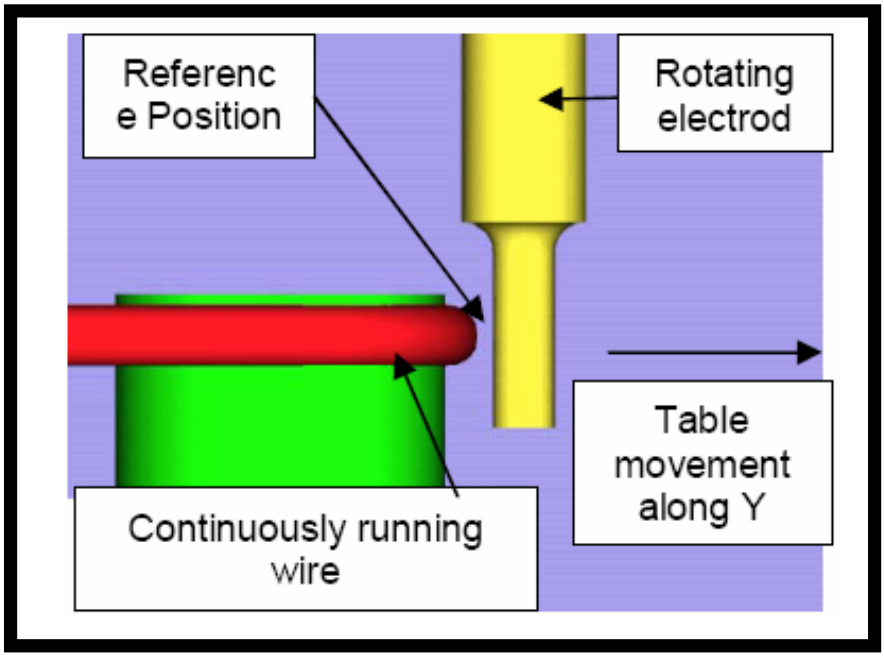
LAUNCH-MICRO
MICRO-TECHNOLOGIES FOR RE-LAUNCHING EUROPEAN MACHINE MANUFACTURING SMEs

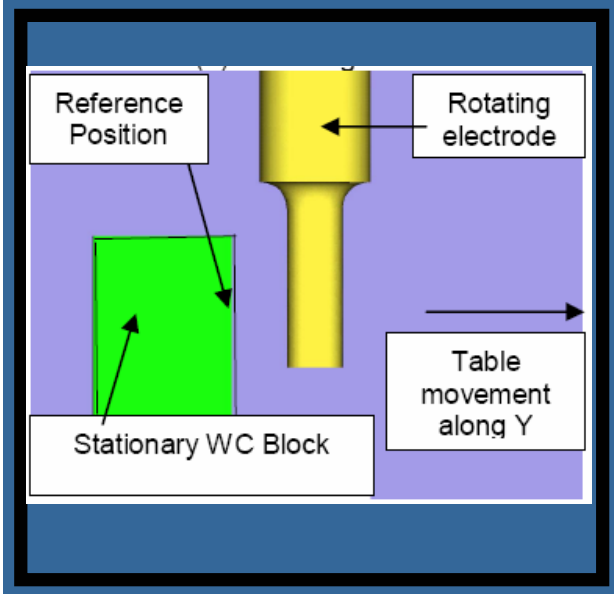
July 2.007

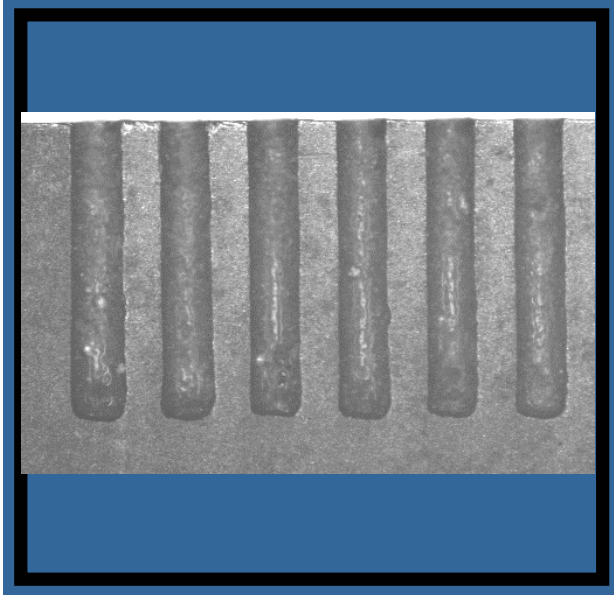
Electrode wire grinding and high aspect ratio holes





Micro-holes high rate & high accuracy production





LAUNCH-MICRO IP
Contract n° 011795
Project financed under the FP6 - NMP
Contact details of responsible partner(s)
Name, Tfn, Fax, email, mail address,

LAUNCH-MICRO
MICRO-TECHNOLOGIES FOR RE-LAUNCHING EUROPEAN MACHINE MANUFACTURING SMEs

LAUNCH-MICRO

MICRO-TECHNOLOGIES FOR RE-LAUNCHING EUROPEAN MACHINE MANUFACTURING SMEs

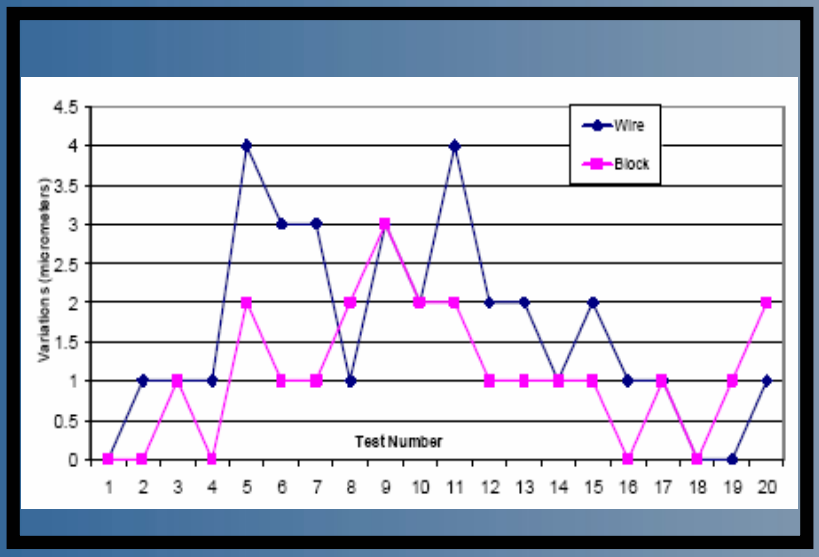
FUNCTIONALITY

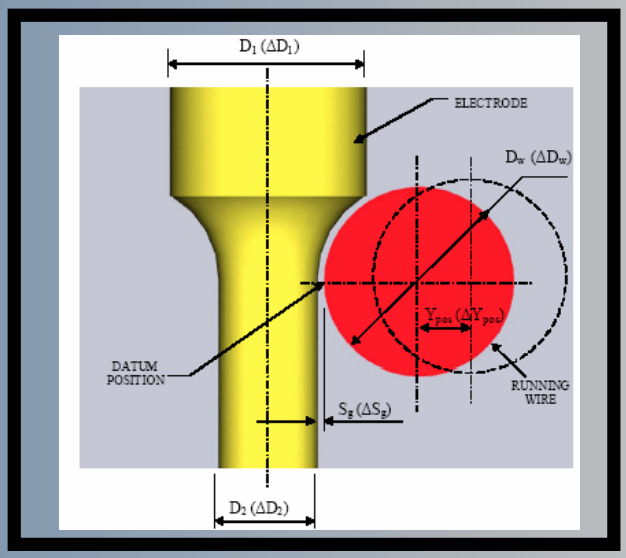
The electrode employed in this study was a Ø150µm WC rod, commonly used in µEDM machining and ground down to 20 micrometers with aspect ratio 50.

Technological parameter	Value
Polarity	Positive
Idle voltage	60 volts
Charging current	0.8 amps
Time ON	1.3µs
Time OFF	1.8µs

DESCRIPTION

Before electrode dressing can start, the reference position of the running wire on the dressing device needs to be determined. This position is called a 'dressing position' in the machine set-up. In particular, to set up the process the electrical contact between the electrode and the running wire is registered by the machine CNC system. However, when the electrode approaches the dressing position, the checking up for an existence of a contact is not carried out continuously which leads to a time delay in registering it. In addition, the specific design of the WEDG unit affects the accuracy of the dressing operation.





ADVANTAGES & conclusions

The variability previously witnessed in the dressing process was considerably reduced. In particular, in the carried out ten tests was reduced from 21µm (to 8 µm. As already stated, this deviation is due mostly to the positional accuracy and repeatability of the machine.

To verify this, the experiments were repeated on a different µEDM machine. The experiment included dressing again 10 electrodes from diameters of 150 µm to 10 µm applying the same WEDG set-up as that on the first machine and the technology parameters given above. Initially, 10 electrodes were produced without using the optical verification process. As expected the accuracy of the dressing process is very much dependent on the machine accuracy. The deviation of ΔD2 decreased significantly when the proposed verification procedure was applied.

The high accuracy of the dressing process is directly linked to the machine accuracy. This demonstrates that the proposed compensation method is highly effective and could be used to compensate many of the inherent process errors.

LAUNCH-MICRO
MICRO-TECHNOLOGIES FOR RE-LAUNCHING EUROPEAN MACHINE MANUFACTURING SMEs