Casting traceability with direct part marking using reconfigurable pin-type tooling based on paraffin–graphite actuators

Green sand moulding machines for cast iron foundries are presently unable to uniquely identify individual castings. An insert tool concept is developed and tested via incremental mock-up development. The tool is part of the pattern plate and changes shape between each moulding, thus giving each mould a unique ID by embossing a Data Matrix symbol into the sand. In the process of producing the mould, each casting can be given a unique (DPM), enabling part tracking throughout the casting's life cycle. Sand embossing is achieved with paraffin-actuated reconfigurable pin-type tooling under simulated processing conditions. The marker geometry limitations have been tested using static symbol patterns, both for sand embossing and actual casting marking. The marked castings have successfully been identified with decoding software. The study shows that the function of each element of this technology can be successfully applied within the foundry industry.