

Sensors integrated inside metal castings verified to respond to force

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ABSTRACT

We have developed a method to integrate sensor functionality into metal castings during the casting process. The method allows for cost efficient total integration into the foundry production process, for both iron and aluminium castings. The sensors are added to the casting mould before the molten metal is poured into the mould. Several sensor functionality tests have been performed on the resulting cast metal component. Tests verify that the signals from the integrated sensor have a clear relationship to static or dynamic forces applied to the castings. Tests also indicate that the integrated sensors do not have significant effects on the mechanical properties of the castings, though this need to be tested for each new application. It is expected that specific guidelines for integrated sensor may need to be developed. Our method has advantages compared to both after mounted sensors and more advanced sensors, particularly with regards to cost and robustness, but particularly since they allow for integration in high scale serial production. Hereby these integrated sensors enable any piece of cast metal to be equipped with sensors, which in practice establishes sensor equipped cast metal as an innovation platform for digital business innovation on and for metal components.

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