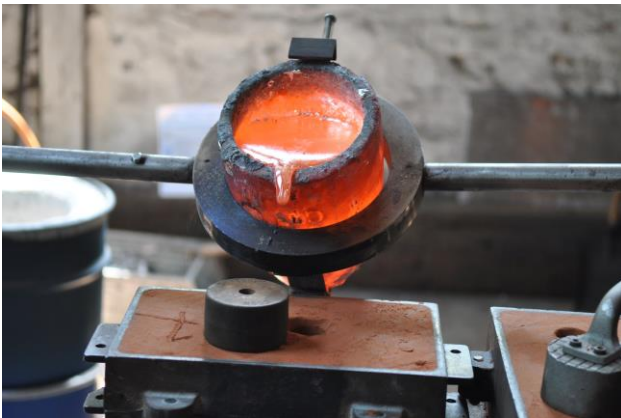




# Novel approaches for the analysis of the composition of spent foundry sand for potential regeneration

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**Challenge owner:** The Innovation Hub (TIH) in partnership with the National Foundry Technology Network (NFTN) and the Department of Science and Technology (DST)

**Business opportunity:** Potential proof of concept funding offered by TIH

**Technology maturity:** All stages of technical development will be considered

**Delivery timelines:** Dependent on solution maturity

## Challenge statement

TIH in partnership with the NFTN and DST are seeking innovative approaches to analyse the chemical composition of spent foundry sand (SFS). The objective is to reduce the time, damage and cost of analysis from the current processes that makes use of leaching technologies.

## Background

The challenge owner is seeking methods of understanding and analysing the composition of SFS both effectively and efficiently. The current process used, Toxicity Characteristic Leaching Procedure (TCLP), is an extraction method for the chemical analysis of the sand. This process is used to determine whether waste is considered hazardous or not. According to the South African Environmental Waste Management Regulation Act, SFS is classified as a hazardous waste material for landfill. The implications are rather costly. Whilst typical landfilling disposal costs R100 – R150 per tonne, hazardous waste disposal costs R600 – R800 per tonne<sup>1</sup>. A second challenge is the speed at which landfills are filling up, with 300 000 tonnes<sup>2</sup> of sand being disposed of annually. In addition, the TCLP process is time consuming, taking around 24 hours to complete.

The challenge owner seeks solutions that present an alternative or improved method for the analysis of the composition of SFS at a reduced cost and time. This understanding will enable the evaluation of the best approaches for regeneration as efficiently as possible. A key impediment in the regeneration of foundry sand is the speed with which it can be analysed chemically. Therefore, a solution which accelerates the chemical analysis process can unlock significant operational efficiencies for foundries.

<sup>1</sup>DST, 2013

<sup>2</sup>South African Institute of Foundrymen (SAIF)



**Preferred attributes of solutions**

Solutions should address how the challenge owner can better understand and analyse the chemical composition of the spent foundry sand.

**Challenge timelines**

Stage	Description	Start Date	End Date
1	Challenge live online	17 February 2017	31 March 2017
2	Evaluation start	31 March 2017	13 April 2017
3	Feedback start	14 April 2017	19 April 2017
4	Notify all shortlisted candidates	20 April 2017	26 April 2017
5	Notify all unsuccessful candidates	20 April 2017	26 April 2017
6	Set up meetings with shortlisted candidates	27 April 2017	31 April 2017

**Possible Approaches:**

Possible approaches include, but are not limited to:

- Cold vapour atomic absorption spectrometry (CVAAS)
- Fourier transform infra-red (FTIR)
- Inductively coupled argon-plasma emission spectrometry
- Physiochemical analysis
- Wavelength-dispersive x-ray fluorescence spectrometry (XRF)
- X-ray powder diffraction (XRD)

**Evaluation criteria**

- Technical merit and novelty of the proposed solution
- Potential impact on TIH / NFTN / DST service delivery and/or local economic development
- Capabilities and track record of the team
- Intellectual property (IP) – proposals should indicate use of third party IP
- Time and resources required for implementation
- Potential for scaling the solution

**TO RESPOND TO THIS CHALLENGE, PLEASE COMPLETE THE RESPONSE TEMPLATE ONLINE**

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