

TMS

FURNACE TAPPING 2022

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Many a metallurgist fell in love with pyrometallurgy after witnessing a smelter being tapped. There is something magical in the combination of light, energy and danger that simultaneously stirs the primal instincts to 'run for your life' and 'go closer and have a look.'

But tapping a smelter is not an easy task.

Much engineering goes into the design of the tap-hole. Due to the aggressive nature of the process, material selection is as important as layout. The design process kicks off with a set of design criteria, which needs to be revised as the results of laboratory, computational fluid dynamics (CFD), and time-and-motion studies become available. The tap-hole life-cycle is taken into account with designers addressing the requirements for installation and operability as well as for maintenance. Matters such as online monitoring of the taphole wear, handling of liquid products, and extraction of fumes are all taken into account.

Though tap-hole life can be improved with proper design, a good design can be destroyed with incorrect tapping practices and equipment. Despite the harshness of the tapfloor environment, it requires precision equipment and operating practices. The design and maintenance of the drilling, tapping and plugging equipment, and materials plays an equally important role in tap-hole life and tapfloor safety, as does protective equipment. Operators want the tap-hole life to be as long as possible since tap-hole failure is often the cause for a reline—a very expensive exercise in an upcycle when the cost of a new lining is small compared to the loss in production. Managing the maintenance and reline schedule is a challenge with lessons often learned the hard way.

The first thing students are taught in pyrometallurgy courses is how to compile a mass and energy balance for a smelter. An accounting mass and energy balance is used not only to schedule furnace taps but also to make process decisions. Process variables measured during or after tapping are important inputs to a workable mass and energy balance.

Even though much has been done to make the tapping process as automatic as possible, tapping of smelters cannot be done without labor. Tap floor operators work in harsh environments where safety is of utmost importance. Selection of suitable personnel and intensive training is required.

No pyrometallurgical smelter can operate without some form of tapping system. It is the one thing all smelters have in common. A meeting point of science, technology, and skill.

So let us talk about it.

PROCEEDINGS PLANS

A standalone proceedings volume is planned for this symposium.

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