SNNC: A NEW FERRONICKEL SMELTER IN KOREA

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ABSTRACT

SNNC, Société du Nickel de Nouvelle Calédonie et Corée, started up its new ferronickel smelter in the third quarter of 2008, and in early 2009 completed ramp-up of the furnace to its full design production level. The plant is based on the rotary kiln – electric furnace (RKEF) process, with two rotary kilns and a single a large furnace to achieve economies of scale in capital and operating costs. SNNC now operates the world's most powerful and productive ferro-nickel furnace, having a capacity of 94 MW / 120 MVA. The SNNC plant is located adjacent to POSCO's steelworks in Gwangyang, Korea. POSCO, and SMSP, Société Minière du Sud Pacifique, co-own the facility.

The speed of the engineering, construction and production ramp up that SNNC has achieved is unprecedented in the ferro-nickel industry. The first metal tap from the furnace occurred 24 months from the start of engineering. Only 4 months thereafter, successful achievement of the furnace design power level and through-put performance tests were attained.

This paper describes the furnace, and the technical challenges overcome to achieve world-scale ferro-nickel production level in record time.

1. INTRODUCTION

Société du Nickel de Nouvelle Calédonie et Corée (SNNC) is a ferronickel smelting company located in Gwangyang, Korea, co-owned by the Korean steelmaking giant POSCO and New Caledonia's Société Minière du Sud Pacifique (SMSP) mining company. SNNC have recently built, commissioned and now operate at design production, a rotary kiln – electric furnace (RKEF) plant including a new 94 MW /120 MVA ferronickel electric smelting furnace fed by two rotary kilns. The plant is shown in Figure 1, with ore storage on the right and the smelter on the left. It is the first nickel laterite smelting plant in Korea, and with a production capacity of 30,000 t/yr of contained nickel, it also has the highest power and the most productive ferronickel smelting furnace in the world. This is an outstanding achievement, especially considering SNNC is a new ferro-nickel producer, whose plant was started up only a year ago.

The plant processes New Caledonian nickel laterite ore with a nickel content of 2.2 – 2.3% and a silica to magnesia ratio of 1.6. The ore is dried in a single rotary ore dryer and pre-reduced in two 130 metre long x 5.5 m diameter coal-fired rotary kilns. Coal scoops are used to feed reductant coal at two locations along the kilns. The resulting calcine and residual coke is fed into a single 22.2-m diameter, 3-electrode 94 MW / 120 MVA electric furnace which operates in the shielded-arc mode. Electrical energy is used to melt the calcine and to carry out further reduction reactions to produce a 17 to 18% Ni grade ferronickel. Unreduced components of the ore, comprised mostly of FeO, SiO_2 and MgO, are removed from the furnace as slag via a semi-continuous tapping operation. Metal is tapped once every 3 hours and is then refined to remove residual impurities. The final product is formed into shots for shipment to customers, principally POSCO, for further processing into stainless steel.

Figure 1: SNNC Single Line Rotary Kiln – Electric Furnace Plant.

The furnace at SNNC is a Hatch design and incorporates a number of technologies and key design principles that makes it capable of high-power density, shielded-arc operation. These characteristics place SNNC's furnace into a realm of continuous electric-arc smelting that is unprecedented in the ferronickel industry. Aspects of the furnace design and operation used to overcome the challenges of continuous high-power smelting and to reap the resulting benefits of scale in capital and operating costs are discussed below. While larger FeNi furnaces have recently been proposed by Hatch [1], SNNC's is presently the largest and most productive in the world.

Also discussed is the schedule of milestones achieved by SNNC that resulted in world-scale ferronickel production only 28 months after of the start of engineering.

2. FURNACE OVERVIEW

The SNNC furnace consists of a 22.2 m shell outside diameter x 7.7 m tall cylindrical crucible designed by Hatch to operate at power levels up to 94 MW. The furnace operates at relatively high power input compared to the furnace size, that is, at high power density (power input divided by hearth area). Therefore, the furnace heat losses relative to the production rate are relatively small, making the furnace very energy efficient. With a ferronickel grade of 18 %, the furnace produces at the design rate of 150 t/hr of slag and 21 t/hr of ferronickel. The overall capacity of the furnace enables an annual nickel production of 30,000 t/yr of nickel in ferronickel.

The furnace hearth and sidewall are constructed primarily with magnesia and magnesia-based refractories. Alumina-based refractory is also used as the outer back-up lining at the cold-faces of the furnace. The furnace incorporates a combination of Hatch embedded-copper cooling technology for the sidewall and forced-air cooling of the hearth, lower sidewall and roof. The furnace roof consists of hung-refractory, supported from a roof steel system equipped with forced air-cooling that all rests on the furnace sidewalls, as shown in Figure 2. The roof is completely supported by the refractory sidewalls and the roof weight thereby significantly augments the hold-down forces on the wall and hearth refractories. The furnace is equipped with 27 feed pipes which distribute the calcine over the entire bath area of the furnace. The distribution of feed ports and their integration with the feed pipes and feed system are discussed in Section 7.

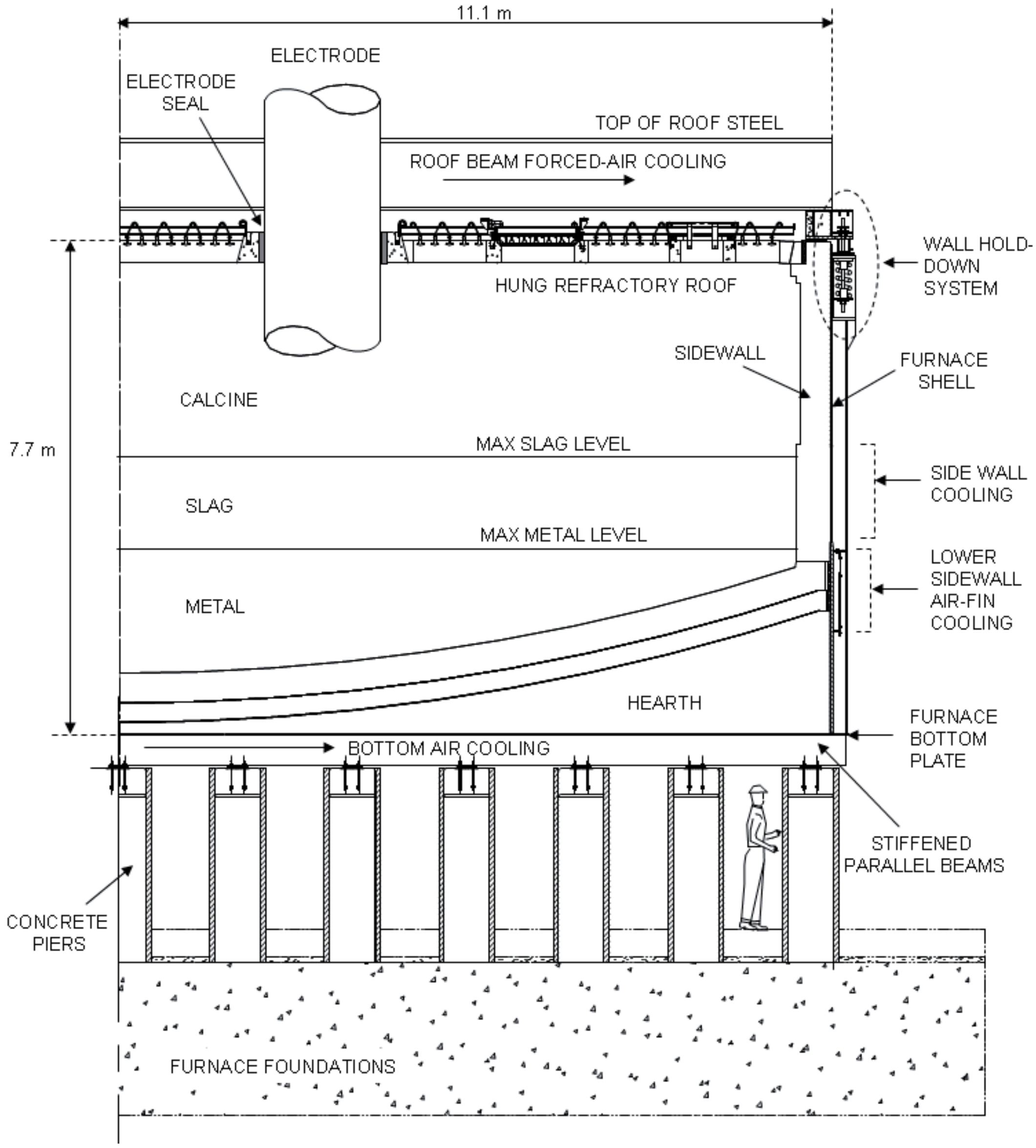

Figure 2: Overall configuration and dimensions of the furnace (half of furnace profile only).

3. PROCESS OVERVIEW

3.1. Metallurgy

The primary metallurgical function of the furnace is to carry out the following reduction reactions in order to produce ferronickel metal:

$$2NiO_{\ (calcine/slag)} + C_{\ (s)} \leftrightarrow 2Ni_{\ (m)} + CO_{2\ (g)} \quad (1)$$

$$2FeO_{\ (calcine/slag)} + C_{\ (s)} \leftrightarrow 2Fe_{\ (m)} + CO_{2\ (g)} \quad (2)$$

$$SiO_2 + C \leftrightarrow Si + CO_{2\ (g)} \quad (3)$$

$$C + CO_{2\ (g)} \leftrightarrow 2CO_{(g)} \quad (4)$$

NiO is reduced to Ni and sufficient FeO is reduced to Fe in order to achieve a ferronickel grade of 17 - 18%. At SNNC, this is achieved with approximately 97% recovery of the nickel in calcine to ferronickel.

Operation at a ferronickel grade of 17 - 18% Ni requires the SNNC furnace to operate at high iron recoveries which has been shown by Solar et al [2] to lead to high concentrations of carbon and silicon in the metal. At SNNC, the carbon and silicon content of the ferronickel results in a metal liquidus temperature of around 1300°C, a value that is typically much lower than that observed at higher grade ferronickel operations. The slag liquidus temperature of 1550°C, a result of its relatively low silica to magnesia ratio, is significantly higher than that of the metal. In order to tap slag, the slag bath temperature is typically 1600°C, resulting in metal tapping temperatures that are approximately 1500°C - 1550°C.

The furnace is therefore designed to accommodate metal superheats in excess of 200°C by providing enhanced cooling to regions of the furnace crucible exposed to metal. Of particular importance are those regions subject to high velocity or transient metal / slag contact, namely the metal tapholes and slag-metal interface zone of the sidewall, respectively. The cooler design and refractory materials used to accommodate the high heat fluxes in these areas of the furnace are discussed in subsequent sections of this paper.

3.2. Gas Generation and Freeboard Combustion

The furnace at SNNC operates with freeboard combustion. Carbon monoxide generated by the reduction reactions is completely burned in the freeboard with infiltration air. This air is drawn into the furnace by maintaining the freeboard under slightly negative pressure. A variable-speed fan located downstream of the furnace gas off-take is used to regulate the pressure in the freeboard in order to achieve the desired air infiltration and hence freeboard temperature. The hot gas recovered from the furnace is fed to the ore dryer in order to maximize the energy efficiency of the overall plant.

Another consequence of the highly reducing nature of SNNC's furnace operation is the high gas evolution rates from the bath, particularly from around the electrodes where the energy release is concentrated. This impacts the required distribution of feed in to the furnace as well as the required volume of infiltration air and optimum location of air inlets. At SNNC, these factors are addressed by the feed port locations in the furnace roof, the local feed rate distribution as well as the provision of additional openings for infiltration air. The roof and feed system design at SNNC is discussed in Section 8.

3.3. Mode of Operation

Because of the high degree of reduction practised at SNNC, the furnace is designed to operate in both the immersed-electrode and shielded-arc modes of operation. These operating modes are compared in Figure 3.

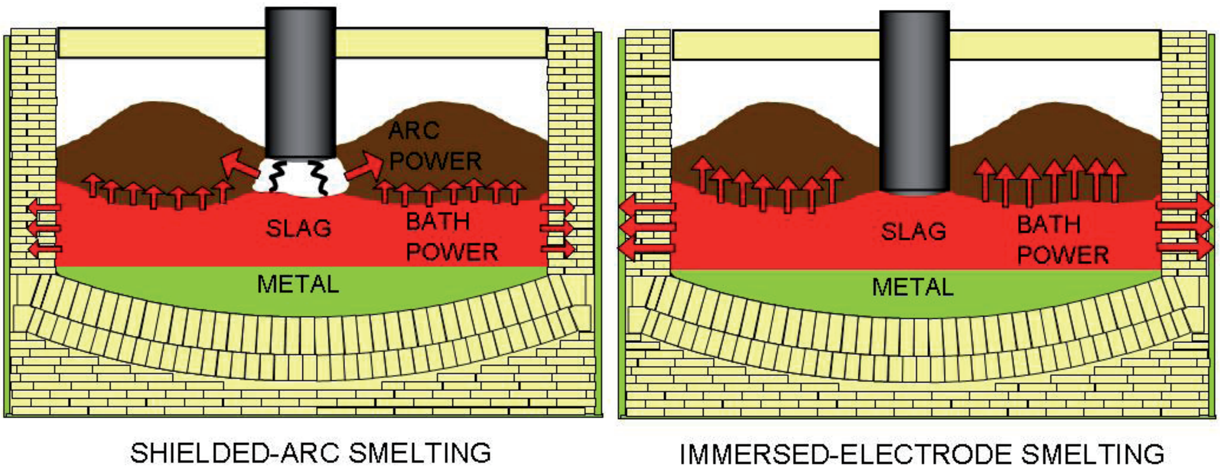

Figure 3: Modes of operation achievable with SNNC 94 MW electric furnace [3].

In the shielded-arc mode, the electrical power is delivered to the furnace as a combination of bath power and arc power. The primary advantage of shielded-arc operation is the ability to operate at a higher total power without increasing the bath power. Excessive bath power causes high slag superheat and slag stirring, both of which accelerate erosion of the sidewall bricks in furnaces with inadequate cooling [3]. In contrast, the shielded-arc mode results in efficient heat transfer from the arc directly to the calcine. Operating in shielded arc mode also minimizes metal temperature compared to the immersed electrode case; this is a particularly important consideration at SNNC, where the relatively low metal grade and hence low metal liquidus temperature results in a high metal superheat. At SNNC, the furnace and power delivery system are capable of operating in both immersed electrode and shielded-arc modes, with transformer secondary voltages on the order of 1100 to 1500 V and electrode currents on the order of 40 to 50 kA. This corresponds to an arc to bath power ratio in the range 0.25 to 1.5 for the SNNC furnace.

3.4. Electrical Parameters and Power Supply

The furnace is designed to operate at 94 MW and a hearth power density of 270 kW/m^2. To provide additional flexibility to the operation, the sidewall cooling system has been designed to accommodate the higher bath powers and sidewall heat fluxes associated with the immersed electrode mode of operation and higher electrode currents.

A 22 kV power supply is stepped down to a range of voltages between 400 to 2300 V available in 33 voltage taps from 3 x 40 MVA transformers, which can be connected to the electrodes in either a Y- or Delta-configuration. The transformer is rated to a maximum electrode current of 60 kA, to allow for both immersed and shielded-arc operation. Delivering power from the transformer to the furnace at high currents is achieved via three sets of water-cooled copper bus tubes. The electrode columns are Soderberg type, 1800 mm diameter with the power clamp design and slipping system using Hatch patented technology [4]. The electrodes are sealed at the furnace roof elevation using electrode seals that comprise a refractory heat shield and spring-loaded, braided rope gas sealing.

4. SUPPORT AND STRUCTURE

The furnace foundations at SNNC have been designed to allow easy access to the bottom of the furnace. The foundations consist of a concrete slab supporting rows of reinforced concrete piers, as shown in Figure 2. A significant advantage of this design is the ample space beneath the furnace to allow easy access to the underside of the furnace for routine maintenance on hearth thermocouples, bottom cooling system, or for structural auditing of the hearth.

A series of parallel beams are set directly on top of the concrete piers and provide the support of the carbon steel bottom plate which forms the base of the furnace crucible. This supporting structure is an example of an integrated structural and cooling solution. The spaces between beams are enclosed by plates forming channels for air-cooling.

The design of both the sidewall shell plate and the wall hold-down system, shown in Figure 2, provides greater stability to the crucible sidewall and hearth by maintaining three-dimensional compressive forces on the refractory and minimizing sidewall and hearth growth over the lifetime of the furnace. The lower sidewall section of the steel shell consists of a thick boiler grade rolled steel plate. The thicker lower shell provides a high horizontal compressive force on the hearth, keeping it tight and resistant to metal infiltration. The Hatch-patented Wall Hold-down System [5] shown in Figure 4 provides a similar function in the vertical direction, by counter-acting the vertical component of the hearth expansion force. The Hold-down springs in conjunction with the self weight of the furnace roof, exert a down-ward force on the circular ring beam that compresses the sidewall refractory. This wall hold down system plays an important role at SNNC in maintaining good contact between the sidewall bricks and the copper cooling elements, which is important for maintaining good sidewall cooling and minimizing infiltration of liquid bath into the horizontal brick joints. This feature is beneficial to all furnaces which may be subject to periodic thermal cycling, but is particularly important for operations such as SNNC, where highly superheated metal exists.

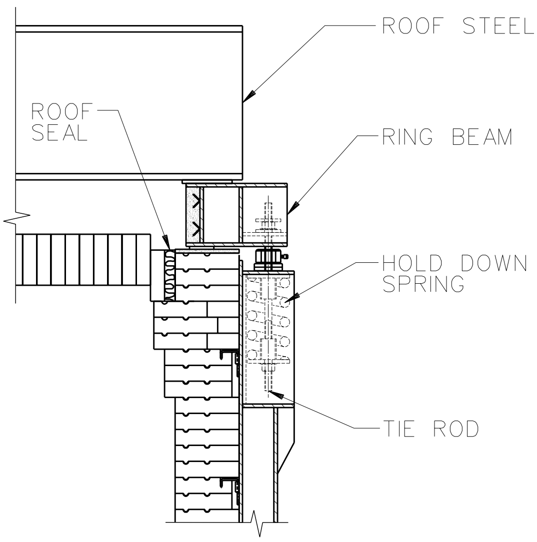

Figure 4: Hatch Wall Hold-Down System on the Furnace Sidewall at SNNC.

The SNNC furnace roof is a suspended brick system, supported by the roof steel, whose load is borne entirely by a circumferential ring beam that rests on the top of the furnace refractory wall. The total weight of the furnace roof is therefore supported by the refractory sidewalls and furnace foundations – the net result is a freestanding furnace that efficiently provides 3-dimensional compression on the crucible refractory, ensuring good contact between bricks and cooling elements, and thereby minimizing infiltration of metal and slag between bricks. The cooling system on the furnace roof, highlighted in Figure 2, follows a similar approach to the hearth cooling system and makes use of the main roof steel members to provide ducting for forced-air cooling as well as to provide structural strength and stiffness.

5. SIDEWALL COOLING

In addition to forced-air roof and hearth cooling, the SNNC furnace sidewall cooling system has several levels of both embedded and external cooling systems, including:

- Three rows of deep-cooled cast copper plate coolers in the slag zone (water-cooled)
- A single row of Hatch copper waffle coolers at the slag/metal interface zone (water-cooled)
- Two metal and two slag tap holes (water-cooled)
- “Flanker” waffle coolers on either side of the metal tap blocks (water-cooled)
- Air-fin cooling in the metal zone

The general sidewall cooling configuration at SNNC is illustrated in Figure 5. This combination of cooling systems provides the SNNC crucible with deep cooling in the slag zone and high-capacity cooling at the slag-metal interface where the risk of sidewall erosion is high due to the alternating contact with metal and slag in this area. Additional flanker waffle coolers have been installed on either side of the metal tapblocks where fast-moving metal creates higher local heat fluxes and a need for local, higher intensity cooling. All water-cooled elements in the cooling system are part of a closed loop cooling water supply. All cooling elements were designed by Hatch, and the cooling water supply was engineered by SNNC. The closed loop water supply has the advantage of maintaining high-quality treated cooling water as well as providing a reliable leak detection system.

The air-fin cooling configuration shown in Figure 5 consists of copper fins which are located on the lower sidewall shell. The fins are enclosed by ducting that creates the channel for forced air cooling. The arrangement and design of the fins on the lower side wall has been chosen in order to maximize the available area for heat transfer and to increase the overall heat transfer coefficient by inducing turbulence. All forced-air cooling systems at SNNC, including roof, hearth and lower sidewall systems are driven by centrifugal fans that are exhausted outside the furnace building. This suction type cooling system, as implemented at SNNC, is a significant step forward in improving workplace hygiene and safety.

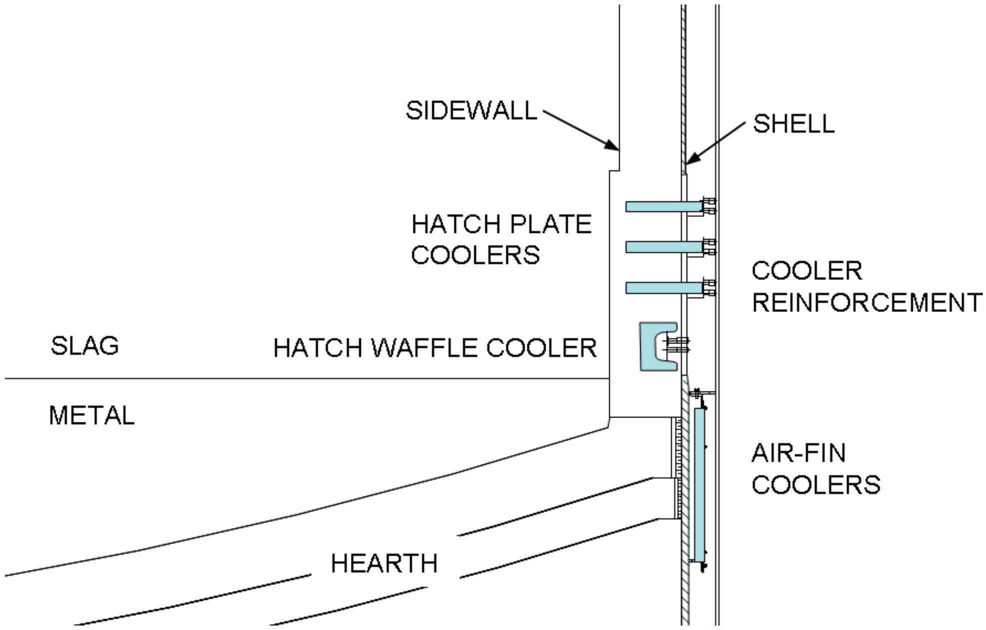

Figure 5: Sidewall cooling configuration: Slag/metal zone copper coolers and lower sidewall air-fin cooling.

A key advantage of the dry cooling system used on the lower wall of the SNNC furnace is the absence of water in direct contact with the shell – a contrast to conventional film-cooling methods. The removal of uncontained water from the design minimizes the risk of refractory hydration, shell corrosion and steam explosions, which are conditions well-known to many ferronickel producers using falling water film-cooling. A significant reduction and simplification of maintenance is also another key benefit of the air-cooled system.

The refractory materials used in the SNNC furnace crucible were selected to optimize heat transfer in high heat flux regions and to provide refractory chemical resistance in regions directly exposed to hot slag or metal. At SNNC, tar-impregnated magnesia bricks have been used for their combination of high conductivity and chemical resistance in areas with high heat fluxes including around the slag – metal interface. Alumina or chrome-alumina refractory is used in the cold face area near the furnace steel shell. Because operating temperature in this area are in the hydration range for magnesia containing refractories, non-hydratable alumina or alumina-chrome is preferred. The combined result of refractory selection and cooling system design at SNNC is illustrated in the thermal profile in Figure 6. The goals of the cooling system are to maintain adequate residual thickness of refractory in front of the sidewall coolers and to maintain a frozen metal heel on the top of the working lining of the hearth at the centre of the furnace and out toward the wall as far as possible. This requires keeping the metal freezing isotherm close to the top of the working lining of the hearth. A frozen heel promotes a long hearth life by minimizing the risk of metal infiltration into the hearth. The thermal and hearth profiles in Figure 6 show how the cooling system provides the formation of a frozen heel at the centre of the furnace, even with the highly superheated low Ni grade metal.

Another feature of the SNNC hearth that is designed to extend its longevity is its curvature and the construction of the working lining with wedge-shaped, double tongue and groove bricks. These features help to minimize uplifting of the hearth which is exacerbated when highly superheated, low viscosity metal must be contained.

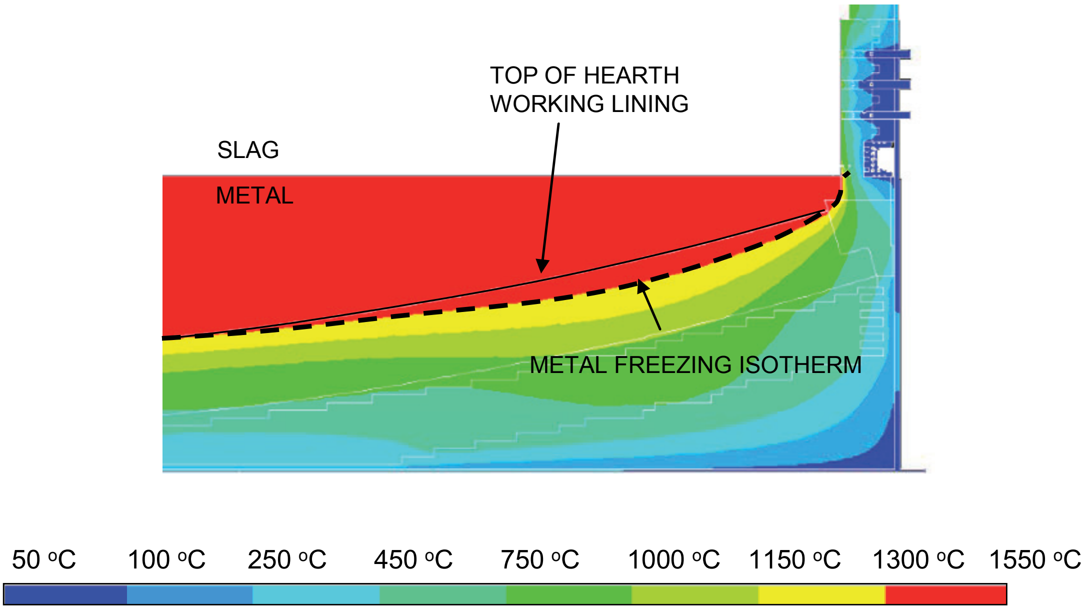

Figure 6: Calculated thermal profile in SNNC furnace hearth and sidewall equipped with the integrated cooling systems and expected sidewall heat flux.

6. TAPBLOCKS AND TAPPING

The high superheat of the metal at SNNC and fast tapping velocities necessitate robust cooling of metal tap blocks. Both the slag and metal taplock designs incorporate cooled tapblock inserts which have been shown to increase the lifetime of the tapblocks. In the slag tapblocks, water-cooled copper inserts provide sufficient cooling to generate a layer of frozen slag, protecting both the cooled insert and the taphole. The copper inserts gradually wear, and typically have a six month life between change outs. The slag tap block is designed to be permanent. The high superheat of the metal necessitates a replaceable refractory insert that is cooled indirectly by adjacent water-cooled copper coolers. Metal tapblocks are equipped with water temperature and flow measurements and multiple thermocouples, with the aim of detecting unusual conditions and wear in these critical components. The design of the metal tapblock is such that it allows maintenance and/or replacement of the refractory insert from the outside of the furnace, without disruption to normal operation.

7. FEED SYSTEM AND FREEBOARD CONDITIONS

7.1. Feed System and Calcine Transfer

The furnace feed and calcine transfer system at SNNC is a fully automated and integrated arrangement that has the capability to detect local changes in calcine levels in the furnace and to feed the furnace accordingly. The complete integration and automation of the feed system at SNNC is a key feature of their furnace operation, necessary to reliably feed calcine at the design rate of 172 tonne per hour and above.

The feed control system designed by Hatch for SNNC has the capability to:

- Feed the furnace via 27 feed pipes distributed above the furnace, frequently and in small batches in order to keep a well-covered bath and even calcine profile in the freeboard.
- Adjust the feed distribution between the central, semi-central and peripheral feed ports, and also adjust the feed rate according to the smelting rate and electrical operating parameters of the furnace, and according to the ratio of arc to bath power in the smelting operation.
- Correct roof hot-spots by automated on-demand feeding to regions exhibiting high temperatures.
- Allow user-defined adjustment of batch sizes in order to optimize the furnace feeding.

Feed pipe Layout

SNNC's furnace is fitted with 27 refractory-lined feed pipes, including 3 in the centre, 9 in the semi-centre and 15 in the periphery, as shown in Figure 7. The feed pipe layout provides 5 feed pipes surrounding each electrode, allowing a high capacity for feeding immediately around the electrode. This is a well-known requirement for high power shielded arc smelting. Another important design feature is the close proximity of the centre 3 feed pipes to the centre of the furnace.

Integration with Feed Bins

At SNNC, feed is supplied to the feed pipes via 9 feed bins, each fitted with three load cells. Feed is delivered to the furnace in well-controlled batch sizes using the combination of load cells and titanium knife-gate valves fitted to each feed pipe. The high smelting rates at the centre three feed locations of the furnace are accommodated by distributing the highest calcine demand amongst the three centre feed bins. This feature of the feed delivery system at SNNC makes it possible to meet both the overall and local feed demands of the furnace.

Calcine Transfer

The fully-automated calcine transfer and delivery system designed and supplied by Hatch, consists of 2 transfer cars servicing the 2 kilns and two transfer cranes (one standby). This system has a maximum transfer capacity of 225 t/hr calcine. As in other operations, refractory-lined transfer containers with lids (Telfer buckets) serve to minimize heat losses during transfer and to avoid re-oxidation of pre-reduced calcine. The calcine transfer system at SNNC is completely automated and sets its own feed delivery schedule and feed bin destinations, according to information received from each of the feed bin load cells.

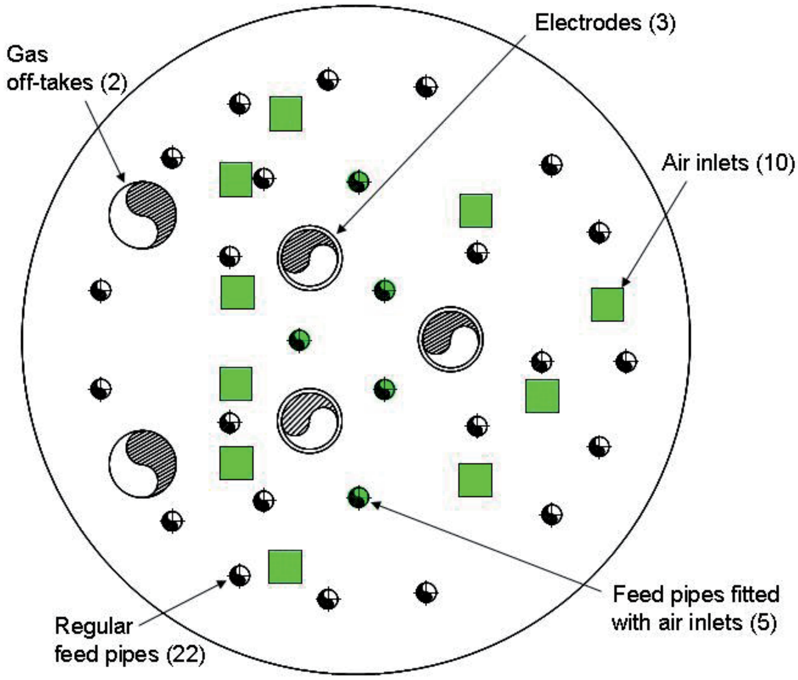

Figure 7: SNNC furnace roof plan, including 27 feed ports and air inlets; the 5 centre-most feed pipes also incorporate air inlets to enhance air infiltration into the furnace. Air inlets are represented by the green-shaded areas.

Operating with Full Freeboard Combustion

The combination of high power and low grade ferronickel production at SNNC requires enhanced air infiltration into the furnace freeboard to ensure complete combustion of reduction gases and final freeboard temperatures that are within the design limits of the furnace roof and off-gas system. A characteristic of shielded-arc smelting is the local production of large volumes of reduction gases in the vicinity of the electrodes. This, in combination with high operating power and a highly reducing process, amplifies the importance of providing sufficient air to the freeboard, in order to avoid hot-spots in the freeboard, particularly in the centre region of the furnace. After a period of steady operation, it was determined that an increase in infiltration area above 1 m^2 was required to reduce the freeboard draft to below 56 mm H_2O gauge as indicated by Figure 8. Air inlets are therefore installed on the 5 centre-most feed pipes in order to increase the infiltration air volume and to lower the freeboard draft. In addition, a number of smaller, independent vents are installed at isolated locations in the furnace roof as shown in Figure 7.

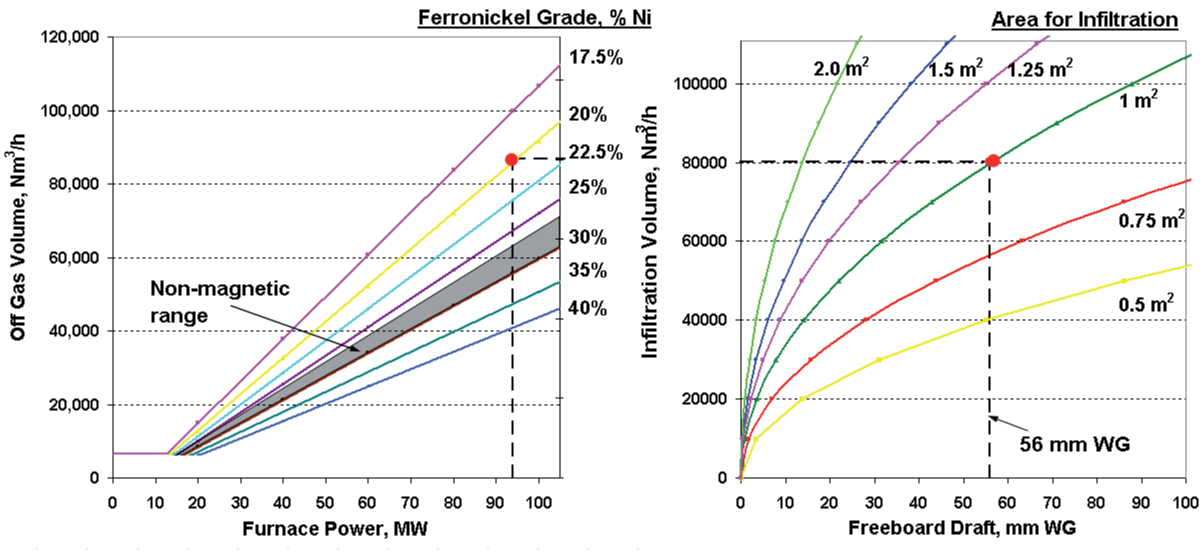

Figure 8: Infiltration air and open roof area requirements for full-freeboard combustion at 950°C, for a range of ferronickel grades and furnace operating powers.

8. FURNACE CONTROL SYSTEM

The control system installed on the SNNC furnace is the latest generation of the Integrated Furnace Control (IFC) system designed by Hatch specifically for smelting furnaces. The integrated furnace control system includes modules to monitor and control feed delivery, furnace power, and electrode regulation. Other modules provide thermal monitoring of critical components to promote safe operation of the furnace. Details of the software modules have been described in previous papers by Hatch [6]. The integrated furnace control system has been successfully installed on a wide variety of smelting furnaces, with power ratings from 10 MVA to 120 MVA.

The feed control at SNNC is of particular interest because it operates in the fully automatic mode from the kiln discharge to the feed ports on the furnace including two transfer car lines, one transfer crane (plus one standby), nine feed bins and 27 feed ports. The system operates automatically 24 hours a day and seven days a week with minimal operator intervention.

Delivering the correct feed amount to all areas of the furnace and maintaining charge bank cover is a key objective of the control system. Feed is charged into the furnace through a valve on each feed pipe. The quantity of feed charged each time a valve is opened is not steady but depends on the amount of feed in the feed bin and the properties of the feed. For each open and close cycle of the feed valve, the quantity of feed actually charged can be measured using the feed bin load cells. Because this batch charge rate varies greatly, a fixed opening time can not be used; instead the feed control algorithm adapts the opening time depending on the actual quantity fed on the previous cycle.

A large furnace includes several thousand sensors like thermocouples and actuators like the feed bin discharge valves. A key feature of the software is the ability to operate at full production even with a number of failed sensors and actuators, by using redundancy, default values or allowing operator override of failed signals.

The large numbers of sensors provide important safety and monitoring functions. Furnace cooling water temperature and flow monitoring are provided to detect leaks and upset conditions. These measurements, together with other continuously measured variables, are used to quantify the heat losses from the furnace and provide a real-time online heat balance for the furnace. The metal and slag tapholes are intensely monitored, as they are the most severe duty components of the furnace.

The control system hardware is compatible with remote monitoring, diagnosis and support, which has become practical over the last few years with improvements in telecommunications.

9. PROJECT MILESTONES

The project schedule and furnace power and throughput ramp-up rate achieved by SNNC is the fastest greenfield construction, commissioning and furnace start-up program ever achieved by a ferronickel producer. The first metal tap was achieved on the 19th October 2008, only 17 months after the beginning of construction, and exactly 2 years after the signature of the furnace design and supply contract between SNNC and Hatch.

Fast progress was continued into the furnace start-up, with SNNC achieving design production within 4 months of first starting up the furnace. The "Design Production Rate Challenge" was accomplished on Tuesday, February 20, 2009 (Figure 9). As reported in a news release on SNNC's website [7], SNNC successfully accomplished 3 continuous days of Design Rate Operation, with achievement of calcine throughput during the test exceeding the design rate of 172 tons of calcine per hour.

Figure 9: SNNC and Hatch personnel celebrate Accomplishment of "Design Production Rate Challenge" at SNNC, on 20th February, 2009 [7].

The sequence of major schedule milestones, starting from the establishment of SNNC in May 2006, is shown Table 1.

Table 1: Furnace Schedule Major Milestones

Date	Event	Time relative to first metal tap
18 MAY 2006	SNNC Establishment	2 years and 5 months before
19 OCT 2006	Contract for Furnace Design and Supply signed between SNNC and Hatch	2 years before
02 MAY 2007	Plant Construction Started	17 months before
18 SEP 2008	Furnace Power On	1 month before
04 OCT 2008	First Slag Tapping	15 days before
19 OCT 2008	First Metal Tapping	0
03 NOV 2008	Construction Completion Ceremony	15 days after
17 FEB 2009 - 20 FEB 2009	Full Capacity Test (3 days) > 172 tph calcine	4 months after
OCTOBER 2009	Monthly average production equivalent to 30,000 tons Ni per annum	12 months after

10. SNNC TODAY

Following the success of the Design Rate Challenge early in 2009, SNNC have maintained a steady semi-shielded-arc operation and are now (October 2009) operating at an average furnace power of 80 to 85 MW and calcine throughput exceeding 172 tons per hour. In October 2009 SNNC achieved a monthly nickel production of 2,302 tonnes of Ni in ferro-nickel [8].

The progress that has been made at SNNC has been rapid and substantial, and is in fact without precedent in the ferro-nickel industry. SNNC's achievements are particularly outstanding given the recent entry of SNNC into the ferronickel industry.

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