

Two new furnaces for US hot-strip mill

Fives, an international industrial engineering group, and ATI Flat Rolled Products, a subsidiary of Allegheny Technologies Incorporated (ATI), one of the most diversified speciality materials and components producers in the world, commissioned new reheating furnaces for the world's most powerful hot-strip mill. By **Dieudonné Hounliasso*** and **Sachin Sawant****

FIVES designed and supplied two reheating furnaces employing its Stein Digit@I Furnace Advanced Technology. Both furnaces boast a production capacity of 300 metric tons per hour for the steelmaker's new hot rolling mill designed to roll highly diversified and sophisticated steels and alloys. The new mill, supplied by Siemens, is part of a new advanced speciality metals hot-rolling and processing facility built in Brackenridge, Pennsylvania, USA.

The facility is designed to produce a product mix that includes stainless alloys, titanium and titanium alloys, nickel-based alloys, zirconium alloys and other speciality alloys that can be used in the aerospace and defense, oil and gas/chemical process industries, medical, automotive, food equipment and appliance, machine and cutting tools, construction and mining markets.

The two furnaces (**Fig. 1**) can heat a wide range of products including stainless steels, non-stainless steels, 'High Temperature Alloys' (HTA), cobalt-based products, alloys of chrome and titanium-based products. The furnace performance is in strict compliance with environmental regulations in Pennsylvania, USA.

The challenge

ATI Flat Rolled Products asked Fives to supply a sustainable technical solution ensuring the lowest possible environmental impact and the lowest operation expenditure. Fives took up the challenge because it possesses Stein Digit@I Furnace Advanced Technology (**Fig. 2**), an eco-versatile reheat furnace that meets the requirements outlined above.

Fives has been designing and supplying



Fig 1. Discharged slabs from the Stein Digit@I Furnace® Advanced Technology

MAIN FURNACE CHARACTERISTICS	
Number of furnace	2
Furnace length	1,622" (41.2 m)
Furnace width	524" (13.3 m)
Fuel	Natural gas - GHV = 1,000 BTU/scf
KEY PERFORMANCE DATA	
Capacity	300 tph
Charging temperature	0 to 1,600°F (871°C)
Discharging temperature	1,500 to 2,350 °F (815 – 1288 °C)
Specific Consumption	≤ 1.10 (MMBTU/t)
NOx level @ 3% O2	0.070 pound/MMBTU

reheat furnaces for the steel industry under the Stein brand for more than 140 years. The company developed the Digit@I control concept while all other suppliers of steel reheat furnaces in the world continued, up until 2004, to rely upon traditional technology with a proportional control. Following demand from steel producers worldwide since 2005, suppliers of traditional technology recognised the advantages of the Digit@I furnace and started to adapt their conventional technologies in order to create a complex

* Dieudonné Hounliasso, deputy vice-president, Fives Stein, a subsidiary of Fives (France), Dieudonne.HOUNLIASSO@fivesgroup.com

** Sachin Sawant, engineer, process control and automation – HRPf, ATI Flat Rolled Products, Brackenridge (USA), Sachin.Sawant@ATImetals.com

hybrid type control, which still retains the drawbacks and limitations of the proportional system.

NOx emissions

The two Stein furnaces in operation at ATI's new hot rolling and processing facility in Brackenridge, USA, since 2014 (**Fig.3**), feature unbeatable NOx emissions, thanks to specially developed third generation AdvanTek low NOx burners. The lowest possible NOx emissions is the result of ultra-low NOx furnace performance, which equates to a 20% reduction in NOx emissions compared with other reheating furnaces on the market.

Flexibility and high efficiency

The advanced digital technology employed by Fives allows flame length adjustment to be fully decoupled from the burner power control, and flame length can be adjusted for individual burners. These combined factors mean that the heating quality can be optimised irrespective of the steel grade.

The furnaces are designed to operate in accordance with the needs of the rolling mill. Thanks to the abovementioned flexibility, furnace performance is optimised across a range of different production conditions. On average, Stein Digit@I Furnace Advanced Technology saves 5% on fuel consumption when compared with conventional reheating furnaces on the market.

Low cost operation

Thanks to straight-line furnace casing and the fact that all burners are of the same type and located on the sides of the furnace, maintenance costs are reduced due to minimum required intervention time and long life of furnace refractories.

Conclusion

Demand for highly efficient technical solutions are vital for steelmakers due to the high impact of reheating furnaces in terms of energy consumption during steel production.

Fives has made environmental performance a top priority for its equipment and technologies and has positioned itself as a leading player in the creation of a more sustainable industrial future. Energy efficiency and environmental performance are key for all of the company's products and is the goal of the Fives Group's Engineered Sustainability® eco-design program.

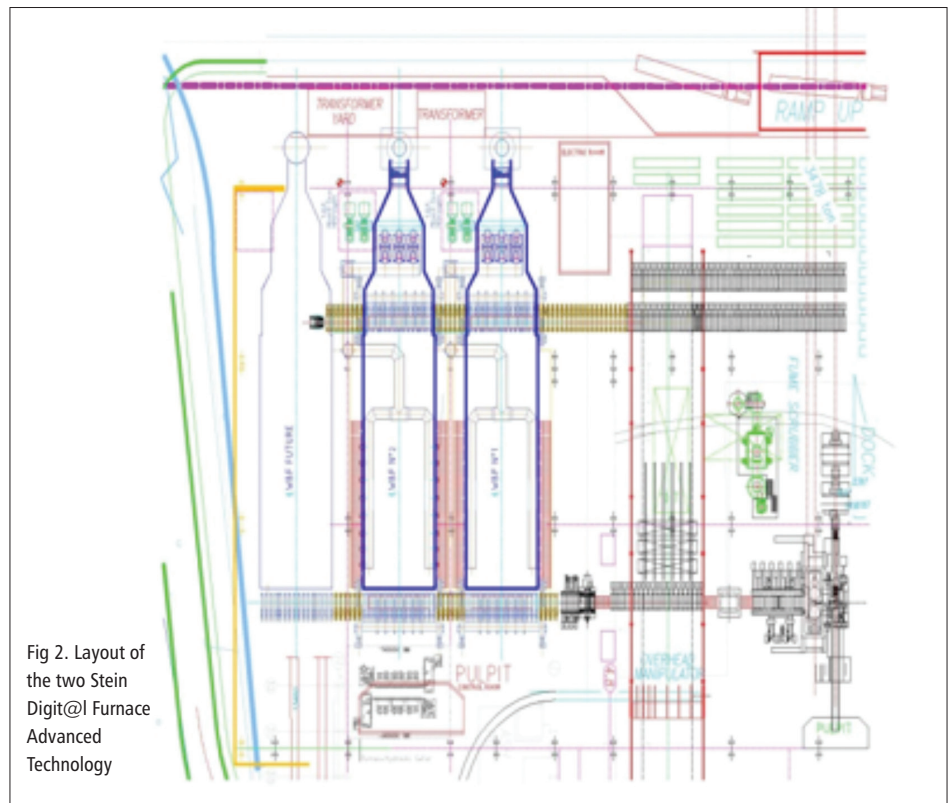


Fig 2. Layout of the two Stein Digit@I Furnace Advanced Technology

The fact that Stein Digit@I Furnace Advanced Technology has been given the Fives Engineered Sustainability® brand, means it is classified as a 'best-in-class' product in terms of environmental performance.

Allegheny Technologies Incorporated expressed its satisfaction in successful performance of Stein Digit@I Furnace® Advanced Technology commissioned at ATI's new Hot Rolling & Processing Facility in Brackenridge, USA. ■

About Allegheny Technologies

Allegheny Technologies Incorporated is one of the largest and most diversified speciality materials and components producers in the world with revenues of approximately \$3.4 billion for the 12-month period ending 31 March 2016. Major markets include aerospace, automotive and construction.

For further information on Fives Group, log on to:
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Fig 3. View over the Stein Digit@I Furnace Advanced Technology