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Complete Blast Furnace Revamping

The joint venture of Ferretti International and Metprom is a key-player in the modernization plan of El Hadjar Steel complex in Algeria

Elena Ferretti, Ayman El Gindy, Andrea Scudeletti

Ferretti International

On July 2014, Ferretti International has been awarded an important contract for the complete revamping of the blast furnace No. 2 at Arcelor Mittal Algeria, within the Steel Complex of El Hadjar, Annaba.

Ferretti International was invited to bid directly by the mother Company Arcelor Mittal Luxembourg and awarded the contract on a lump-sum turnkey basis. The scope of work includes: demolition, disassembling, assembling, civil, refractory and erection work activities. Ferretti International was assigned this important project thanks to its competitive price, a detailed short time schedule and a professional know-how. In fact, the project will be executed during the plant shut-down period and this is made possible thanks to the joint know-how of Ferretti International and Metprom, two international companies that rely on a long-standing relationship. Ferretti International is an engineering & construction company based in Dalmine (Bergamo, Italy) and specialized in providing engineering, construction and erection services for projects in the steel industry since 1903; while Metprom is one of the major engineering companies of metallurgical sector in Russia, founded in 1992 and with a deep experience in blast furnaces.

The blast furnace project is part of a larger investment plan that the Algerian State has decided to allocate. A budget of \$ 400 million has been made available to revamp the blast furnace No. 2 and the relevant structures destined to the preparation of raw materials and agglomerated (PMA) with the aim to achieve 1.2

million tons of steel. The modernization plan of El Hadjar steel complex also provides \$ 300 million for the construction of a new steel plant with a capacity of 1 million tons.

The non-profitability of today's steel complex of El Hadjar penalizes the Country, that already imports 10 billion dollars of steel products per year, representing the 80% of its steel requirements. Therefore, this investment plan will contribute to bring a deep improvement both to the Country and to the national economy.

The blast furnace revamping project is an important piece of the puzzle in this investment plan, as shown by the project's details.

The blast furnace No. 2 has a useful volume of 2200 m³ with a hearth diameter of 9.75 m. The original blast furnace was done by Russian design and was commissioned in the 70s. In October 2015 it was stopped for the capital repair and the following actions must be carried out.

As regards the furnace:

- partial replacement of the belly casing and stack (cooled section);
- replacement of the cooling staves in boshes, belly and stack area;
- installation of thermal probes and new control instrumentation;
- installation of bellows-type tuyere stock;
- installation of double-chamber tuyere;
- replacement of working layer of the bustle pipe lining;



Fig. 1 – Location of the project

Building tomorrow: Ferretti International next steps

The winning formula of Ferretti International? Realizing industrial plants on a lump-sum turnkey basis following all the process: from basic design to the very last refractory lining installations, if any.

“Our strength lies in providing a turnkey package to the clients by proposing a single contact person who then becomes the single point of responsibility during the whole process”, explains the founder Alberto Ferretti. This is also made possible by another cornerstone of Ferretti Group: strategic partnership with local and international companies, in order to reduce the learning curve and become more competitive in the chosen markets. In fact, Ferretti International can count on numerous partnerships worldwide, and on its presence in Mexico, Brazil, Africa, Middle East and Russia.

Moreover, thanks to this important project, Ferretti International has decided to invest in the Algerian market, and in 2014 established its fully owned branch office, that can now count on a staff of 350 people.



Fig. 2 – Blast furnace general view

- enlargement of the tuyere platform area;
- installation of compensators on straight run of the hot-blast line;
- replacement of the hearth lining;
- thin-walled lining of the blast furnace stack.

As regards the cast house:

- replacement of all runners and increase of section runner covers;
- installation of the flat floor and ramp to approach tuyere area;
- new hydraulic machines for two tap holes.

As regards the gas cleaning:

- Installation of a new water separator after the septum valve;
- Reconstruction of the water level control system



Fig. 3 – Cast house: casting activity

As regards the hot-blast stove:

- replacement of the combustion chamber lining and partial replacement of the hot-blast stove;
- checkerwork's top part;
- lining of the burner connections and hot blast with formed parts;
- installation of ignition burner and flame checkout instruments;
- reconstruction of the combustion air supply system with installation of new updated fans, arrangement of the air flow control.

Table 1 – Performances after the blast furnace No. 2 reconstruction

| | |
|---|------------|
| Output (t/day) | 3500 |
| Output (th/year) | 1200 |
| Coke consumption (kg/t) | 480-490 |
| Natural gas consumption (m ³ /h) | up to 100 |
| Blast oxygen content (%) | up to 26 |
| Blast consumption (th Nm ³ /h) | 200 |
| Blast gas output (th Nm ³ /h) | 260-280 |
| Gas pressure under top (MPa) | up to 0.17 |

As regards the bin trestle:

- revamping of existing weighing hoppers;
- installation of coke breeze offloading equipment with installation of horizontal conveyers system.

As regards the slag granulation:

- reconstruction of the slag granulation units.

As regards the electric power supply, automated process control system:

- full replacement of electric equipment and automated process control system of the blast furnace, bin trestle, blast furnace gas cleaning, cast house and pump station.



Fig. 4 – Gas coke pipe

After the blast furnace No. 2 reconstruction, the performances indexes are anticipated in **table 1**.



Elena Ferretti

Elena has a Master's Degree in Psychology with a major in Communication strategies at the University of Bergamo. She joined Ferretti International in 2014 as

Business Development assistant, developing sales strategies and marketing campaigns.



Ayman El Gindy

Ayman has a Degree in Civil Engineering and a Diploma in Project Management and International Cooperation. With 25 years of large experience in various projects

worldwide and different roles, he has been appointed By Ferretti as Project Director for the revamping of blast furnace No. 2 in Annaba.



Andrea Scudeletti

Andrea has a Degree in Management Engineering with a major in Economic-Productive field. He began his career 11 years ago as Project Engineer for civil works

and then became Project Manager of International projects. Last year he was involved in the revamping of blast furnace No. 2 in Annaba, as Project Manager.