

# ArcelorMittal modernized the plate quenching/tempering facility at Burns Harbor works, USA

ArcelorMittal announced the recent commissioning of a state-of-the-art heat treat line at its 4 meters (160") wide plate facility in Burns Harbor, Indiana, USA. The re-engineered line produces Burns Harbor's full range of heat treated plate products, while enhancing quality, productivity and customer delivery resulting in both cost and energy savings. The US\$ 60 million investment project was executed over a nine months period from July 2011 to March 2012.

The new plate treatment line at ArcelorMittal Burns Harbor works will provide high-quality, heat-treated plate products with a reduced cycle time for application in the machinery, mining, and construction industries and steel service centres. "The market has become increasingly competitive in quality, cycle time and delivery performance," said John Mengel, chief operating officer, ArcelorMittal USA plate operations. "We invested in our existing operations, which were built in 1966, in order to meet current and future market demand for on-time quality deliveries."

### 4th generation roller leveller

The cornerstone of this investment is a new, high-capacity leveller supplied by JP SteelPlantech (figure 1), one of the largest and most sophisticated levellers of its kind in the world. The Burns Harbor leveller has a levelling force of 7,700 metric tons. The leveller is designed to handle plate thicknesses from 9.5 mm to 100 mm (3/8" to 4") with yield strengths up to 1,400 MPa (200 ksi).

The 4th generation roller plate leveller has the capability of compensation of deflections in the mechanical struc-

ture through a set of hydraulic cylinders by means of on-line gap measurement and on-line pressure measurement. The gap inside the leveller can be kept constant, vertical deflection is compensated for as well as lateral deflections and compression deflections. Due to having this capability, the 4th generation is seen as a plate leveller having an infinite rigidity control function. This leads to a much better levelling capability since the levelling becomes less dependent on levelling fluctuations and hence a flatter plate is produced. The infinite rigidity also deals with plates with high thickness, high yield strength and varying yield strength. Residual stresses are also reduced since the levelling becomes more uniform. A further advantage is that the levelling force can be increased due to more evenly distributed force.

A direct effect of the 4th generation leveller is that the number of levelling passes can be reduced. This increases the throughput of the line and reduces the need for additional levelling lines. As a consequence, the number of plates can be increased, which puts higher requirements on the flatness measurement.

Automated, high-capacity measurement is a necessity, which has been re-



Figure 1. New 4-m wide plate leveller at ArcelorMittal Burns Harbor works (Courtesy: ArcelorMittal)

JP Steel Plantech Co., Yokohama, Japan  
Contact: [www.steelplantech.co.jp](http://www.steelplantech.co.jp)

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ArcelorMittal North America, Burns Harbor, Indiana, USA  
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alized through the Shapeline flatness measurement gauge. Installed down-stream from the leveller, the flatness gauge is used to adjust the leveller and verify that the plates meet the requirements. The target for ArcelorMittal is to produce tolerances in the range of  $\frac{1}{4}$  of ASTM in terms of flatness, which will be verified and documented by the Shapeline system for each individual plate. Hence, plate flatness data can be retrieved at any time for any plate. Flatness data from the gauge can also be used to tune and improve the performance of the Plantech leveller.

### Precise project execution due to close collaboration

The project allowed for the reconfiguration of material flow to provide straight through processing for reduced cycle-time and lower work-in-process, for which full process tracking and automation are key. Project construction for the new heat treat facility began on July 1, 2011. In order to continue to serve customers during the construction phase of the project, production crews were transferred to the ArcelorMittal Gary facility. It was critical that this transfer of employee talent was seamless to the market so customers would not experience any interruption in service or product quality. Just nine months after the planned outage, on April 2, 2012, the first plate was produced on the new line.

“These upgrades to the plate heat treat facility demonstrate a desire and commitment in this business to keep abreast of today’s technology, as well as global competition. It demonstrates a confidence in the talent and ethic of the workforce that I have represented for many years,” said Paul Gipson, President, United Steelworkers Local 6787, Burns Harbor. “ArcelorMittal, in partnership with United Steelworkers Local 6787, is pleased with the commitment of its employees and contractors to safely complete the project, positioning ArcelorMittal to be a low-cost supplier of choice for the plate market,” added Mengel.

The new line will deliver the stated quality and delivery goals, along with a 10 percent reduction in fuel consumption per tonne shipped. The 4 meters (160”) plate mill heat treat line will produce the following three product families:

- normalized plate – provides improved toughness, fracture resistance in structures and puncture resistance in vessels,
- quench plate (martensite) – for use in abrasion-resistant applications,
- quench and tempered plate (tempered martensite) – tailored to meet customer specifications for high-strength applications.

Plates are blasted and painted with a “0” volatile organic compounds (VOC) fabrication friendly primer. Benefits to the facility’s customers will be increased manufacturability, improved surface, accurate flatness and consistent on-time delivery due to a more predictable supply. ■