

# New Pot Ramming Machine

**S**TAS, a Canadian manufacturing company well known for its wide range of casthouse and crucible shop equipment for the aluminum industry, has developed a new pot ramming machine used to compact the ramming paste during the pot lining process, with improved performance and innovative characteristics (Figure 1). As the machine is used in the vicinity of operators, the ergonomic aspect has been a primary design criterion. Visibility, noise, and vibration levels have been optimized to an unprecedented level for a vibrocompaction pot ramming machine, with a measured noise level well under 80 dB during operation. A patent pending compaction ram allows a very slim design next to the operators, while providing maximum visibility and offering a vibration decoupling function. This ram is also intended to move the compaction tool in a perfectly vertical trajectory, which will greatly facilitate the operation while ensuring more uniform compaction. Moreover, easy operation and optimized ramming are ensured by dynamically tuneable parameters.

The design philosophy is based on minimum maintenance. Reliability and maintainability are achieved through a robust construction and easily available components. The main structure is a gantry type overhead crane and, as such, uses standard components from the industry, keeping proprietary parts to a bare minimum.

The machine is controlled by a radio controller provided with best-in-class safety features, and the drive systems have been carefully engineered to offer optimized dynamic performance and accurate



Figure 1. STAS pot ramming machine.

positioning. The long travel offered by the compaction ram gives great ground clearance to the compaction head, allowing the machine to move to the next cell without the use of an overhead crane (Figure 2). This last feature is a major benefit, especially during greenfield operations, where a second set of rails is used to move the machine to the next cell without any lifting operation.

In terms of production management, great emphasis was put on the integration of a sophisticated quality control system. A dedicated PC, with its own interface, is used to collect and record the complete compaction profile of a pot and compare it to the predetermined production recipe and compaction quality criteria (Figure 3). Thanks to built-in encoding devices, a complete mapping of the cell is per-

formed, including the positions of the joints, the number of layers, and the compaction levels. The system automatically measures the compaction levels during the operation—and alarms can be activated if an improper compaction is detected, thus avoiding the costly reconstruction of the cell if this problematic layer is detected too late in the process.

The new pot ramming machine is the result of a thorough development program that went from prototyping through the selection of operating parameters and the qualification of compaction up to the design and manufacturing of fullscale equipment to the size of the longest current pots (600 kA). After successful testing both in-house and in a plant in Quebec, Canada, the new pot ramming machine is now available for the industry.

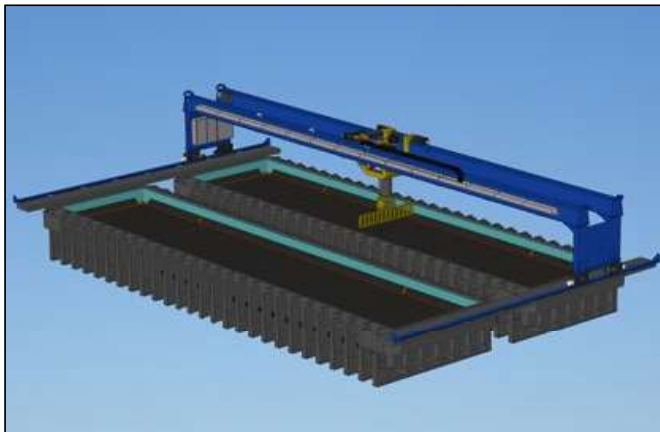


Figure 2. The machine has the capability to move to the next cell.

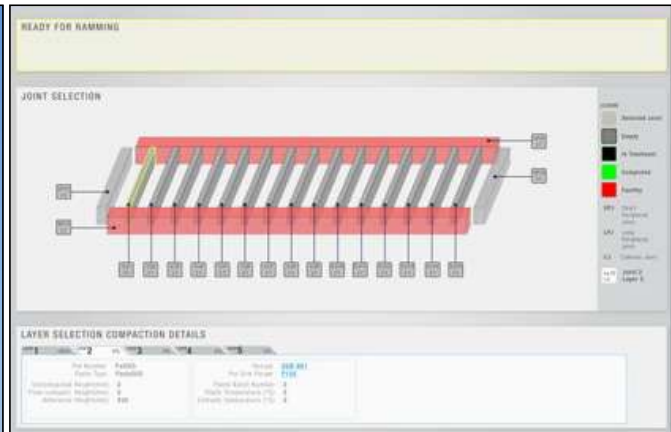


Figure 3. HMI screenshot of the quality control interface.