

Project Management of New Pot Feed and New Cranes Procurement at EGA Jebel Ali Potlines 5 and 6

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Abstract



EGA Jebel Ali Potline (PL) 5 and 6 are operated with 14 multi-purpose potroom cranes (MPPC). In addition, Jebel Ali PL 9 and Eagle section are operated with 2 MPPC of the same generation. The cranes are used for multiple operating functions, such as carrying out routine operations and supporting pot removal and startup. Those 16 cranes were installed between 1996 and 1999. They are approaching their end of life at 25 years of service between 2021 and 2024. Lean Team also conducted a study on PL 5 and 6 cranes utilisation, and it was found that the significant contribution to high utilisation and low availability (breakdown) comes from alumina filling operation. The alumina filling operation contributes 20 % to the increased utilisation.

A separate project was also initiated to install an independent Pot Feed System for PL 5 and PL 6. The benefit includes reducing crane utilisation, as the dependency on cranes for pot filling will be eliminated. Due to the Pot Feed system project implementation, the number of cranes will be reduced by two. Lean Team studies have validated this. Ageing cranes will inevitably increase maintenance and repair/replacement costs after their initial life extension, leading to uneconomic operation and impact on the hot metal operation. Refurbishment of the existing cranes was initially considered. Still, this option was dismissed in the feasibility stage, as any old re-certified and refurbished crane requires re-inspection every three years and may incur additional costs due to unpredictability compared to the advantages of purchasing new and technically better cranes. The new MPPC cranes will benefit from a 25-year new design life guarantee and will be equipped with a double braking system resulting in improved safety in liquid metal handling. The new MPPC cranes will have the built-in physical improvement to adapt to the D20+ technology in future without further investment. The cranes will be designed to work up to 275 kA according to the current amperage target.

The project installation of pot feed required working on live pot superstructures of 480 pots in an operational plant and courtyards. The existing construction crane was modified to maintain the insulation needed for the potroom area, and dedicated workforce was trained for crane operation. The overall system was subdivided into pieces based on process, and accordingly, more than 60 Method Statements and Risk Assessments were active for work completion. Similarly, the crane project required the assembly of the main girder, tools trolley and electrical components in a dedicated laydown. The significant risk identified during the project fabrication stage was the availability and procurement of Rockwell components. Also, it was essential that MPPC crane installation and dismantling should be done in a sequential manner to meet the 25-year deadline as per legal requirements.

Keywords: EGA Jebel Ali potlines 5 and 6, Multi-purpose potroom cranes (MPPC), D20+ technology, Method statements, Risk assessment.

1. Introduction - Project Definition

The requirement for a new dedicated Pot Feed System arose in 2017 when it was found that EGA Jebel Ali Potlines 5 and 6 (PL 5 and PL 6), crane utilisation was high. A Lean team study established this, which identified the need for additional multi-purpose potroom cranes (MPPC). The significant contribution to this high utilisation was the withdrawal of alumina from the fume treatment plant (FTP) silo and later feeding to individual cells (Figure 1). The continuous travelling of the crane across the potroom resulted in lots of wear and tear of equipment and maintenance costs. In addition, the alumina dust affected the environment and crane equipment, leading to more breakdowns. In addition, the PL 5 and PL 6 cranes had approached the 25-year design life cycle in 2021 and 2024, respectively. There was an opportunity to introduce the alumina conveying system-based Pot Feed System in those lines, which potentially reduces the workload on the cranes, their downtime, and can potentially extend the life of the existing cranes. It also brings further potential for reduced CAPEX in case that the cranes need to be either replaced or life extended through refurbishment in the future.



Figure 1. Left: crane usage to feed alumina to pots; Right: crane usage to feed alumina to pots.

The project was raised in 2017 by the operations management. Initially, in the definition phase, the budget estimate quotes were requested from various specialist suppliers to plan the high cost for the work involved.

Timeline – July 2017 to June 2018.

2. Pre-Feasibility Stage

During the prefeasibility phase of the project, the following work was done.

- a) Advanced end-of-life study and analysis of a typical MPPC from Potline 5 through the original equipment manufacturer (OEM),
- b) Front end studies for the implementation of the Pot Feed System to define the impacts from the interfaces of pot superstructure, FTPs, constructability with budgetary proposals received from various vendors, and the inherent technology of each proposal,
- c) Detailed capital expenditure plan with cash flow for a phased implementation of the system.

Timeline – Aug 2018 to July 2019.