

Implementation of D18+ Technology in Potline 1 at EGA Jebel Ali

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Abstract



To take the next step in efficiency and productivity, EGA initiated the modernisation of the D18 Technology potlines in its Jebel Ali smelter. Utilising the latest cell technology, seven D18+ test cells were constructed and started-up in March 2012. The test cells quickly met their key design targets with net specific energy consumption of 12.75 kWh/kg Al and anode effect frequency of less than 0.02 /cell-day. After thorough industrial testing and a feasibility study, a project commenced in August 2015 to convert all 248 cells in Potline 1 to the new D18+ Technology. Despite many challenges in the construction and installation of the new cell technology in an operating potroom, the full potline conversion was successfully achieved ahead of schedule. With full Potline 1 conversion completed, amperage will be increased to 235 kA, thus increasing EGA’s hot metal production capacity by more than 23 kt/year while reducing energy consumption by a targeted 2 kWh/kg. Further conversion of 272 cells in Potline 3 from D18 Technology to D18+ Technology will commence in September 2016, resulting in further capacity and energy efficiency increases. The D18+ Technology project has also significantly reduced EGA’s environmental footprint and enabled EGA to increase its competitive edge in the industry.

Keywords: D18+ Technology; DUBAL modernisation to D18+ Technology; DUBAL Potline 1 conversion; DUBAL Potline 3 modernisation.

1. Introduction

Dubai Aluminium (“DUBAL”), an operating subsidiary of Emirates Global Aluminium (“EGA”), commenced operations with three potlines housing 120 P69 cells, with the first hot metal produced in December 1979. The cell design was later redesignated as D18 Technology after significant revision (Figure 1) [1, 2]. After construction of a fourth potline, significant upgrades, higher efficiency and increased amperage, annual production from the original potlines increased from 36 300 tons in 1980 to 291 353 tons in 2014.

To take the next step in efficiency and production, EGA has undertaken a complete revision of D18 Technology. Incorporating the latest cell technological advances such as magnetic compensation, point feeders and direct alumina distribution (Table 1), the new D18+ Technology quickly met and exceeded all major target KPIs during extensive testing and validation in seven test cells (Figure 2) [3].

After economic analysis and a feasibility study, approval was given by the EGA board in March 2015 to implement D18+ Technology in the remaining 241 cells in Potline 1.

Table 1. Comparison between D18 Technology and D18+ Technology.

	D18	D18+
Busbar Configuration	End risers	Four side risers with under cell bus
Al₂O₃ Feeding	Pseudo point feed converted from dual centre breaking	Four point feeders with bath sensing breakers
AlF₃ Feeding	10 kg bags added manually	Dedicated AlF ₃ feeder
Alumina Distribution	Via crane hopper	Air slide system
Number of Anodes	18	20
Anode Beam Control	Pneumatic	Electric
Number of Cathode Blocks	17	19
Collector Bar - Flexible Connection	Bolted	Welded



Figure 1. D18 Technology cells in Potline 1.



Figure 2. D18+ Technology test cells in Potline 1.

2. D18+ Technology Implementation

2.1. Potline 1 sections

Although DUBAL (also known as EGA's Jebel Ali Operations) had previously implemented both brownfield and greenfield projects to increase production capacity, this was the first time where significant cell construction was undertaken in an operating potline. To best implement and manage the conversion of the potline, the cell upgrade occurred in sections of 30 to 32 cells each, with eight sections in total (Figure 3). The D18+ Technology upgrade began in Section 2 and then continued to Sections 3, 1, 4, 6, 7, 5 and finally Section 8.

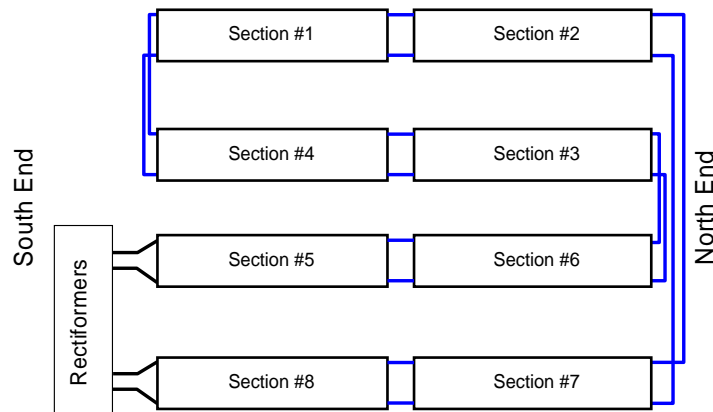


Figure 3. Potline 1 schematic.

3. Conclusions

The Potline 1 D18+ Technology implementation commenced in 2015 to convert all 248 cells to the new D18+ Technology. Full conversion was achieved ahead of schedule without incident or injury on 24 July 2016 with the bath-up of the final cell. During the same period, the amperage of Potline 1 was increased from 207 kA to 220 kA. Upon completion of the FTP upgrades at the end of 2016, the amperage will be increased further to 235 kA, increasing EGA's hot metal production capacity by more than 23 kt/year. The experience gained from the Potline 1 conversion will be applied for during conversion of 272 cells in Potline 3, which will begin in September 2016. The D18+ Technology project will reduce the energy consumption of EGA Jebel Ali's original potlines by a targeted 2 kWh/kg Al while also significantly reducing the environmental footprint.

4. Acknowledgement

The effort and dedication of Potline Operations, Jassem Mohammed and Faisal Majid and their teams has been crucial for the successful conversion of Potline 1 to D18+ Technology. Also, the invaluable work and support of Mohammad S W Ali, Adam Sherrif, Maitha Faraj and the D18 Process Control team have been indispensable for the smooth conversion to the new D18+ Technology.

We are also thankful to Amer Al Redhwan and the EGA Capital Projects team, and Alexander Arkhipov, Syed Fiaz, Konstantin Nikandrov and the EGA Technology team for the significant work carried out for the design and implementation of D18+Technology.

5. References

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