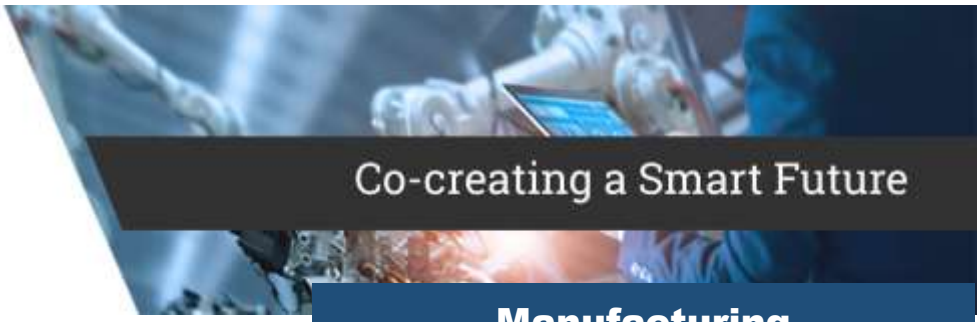
PDA
Process Design & Automation



Manufacturing

Aluminium Plant Improves System Flow by Nearly 50%

The Company

The Billiton Group of Companies comprises aluminium smelters, nickel operations, base metal mines, and coal mines. One of Billiton's South African smelters* produces a range of different primary aluminium products that are sold in the South African domestic market. The current strategy for this smelter is to focus production on value added products where premium to the commodity price can be earned.

The Challenges

Managing the logistics, especially the inbound and outbound vehicle flow through the main gates, is a challenge at Billiton's Bayside Aluminium plant. Vehicle queuing at the gates to the plant was a problem because frequently used weighbridges were located near the gates. If the weighbridges were relocated, how would this change influence the inbound and outbound flow of vehicles?

The Deliverables

Billiton employed Arena® simulation software to build a model representing the entire vehicle flow through the plant as well as between the cast house and the stockyard. The model was intended to help:

- assess the impact of increased vehicle flow;
- test the impact of proposed scenarios on system throughput;
- identify bottlenecks and other constraints;
- determine the effect of changed processing times;
- improve vehicle flow through the site, with emphasis on shorter cycle times;
- assess costs related to different scenarios;
- more effectively utilize weighbridges.

The weighbridge was a small distance from the gates and on the side of the road, causing vehicles to back up due to difficult access. The following alternative scenarios were investigated in the Arena model:

1. Have a separate weighbridge for in- and outbound traffic in the gate.
2. Same as above, but with an express lane available between the two weighbridges for vehicles that do not have to be weighed.
3. Have one weighbridge in the middle of the gate serving in- and outbound traffic, with lanes on both sides for traffic that does not have to be weighed.

The Results

The results of the Arena model proved that the scenario with the shortest cycle time was not the best solution. All three scenarios would have led to at least a 50% improvement in queuing times, but the first and second scenarios would have cost at least US$60,000 (360,000 ZAR, South Africa Rand) compared to US$30,000 (180,000 ZAR) for the third scenario. (The average queuing times of all three scenarios were virtually the same.)

**Note that the Bayside smelter has been closed in 2014, years after the compilation of this case study.*

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