

DYNAMIC MODELS - ENTERPRISE LEVEL - PRODUCTION AND SUPPLY CHAIN LOGISTICS

Dynamic models can be used to simulate an entire operation from the mine to the final customer.

The processes are typically a combination of continuous and discrete event operations. The most common application is production and supply chain logistics for bulk commodities such as coal and iron ore.

Each stage of the process is modelled in terms of constraints and response to supply or demand movements through the supply chain. Operations include:

- Mining
- Trucking
- Stockpiling and reclaiming
- Ore/product blending
- Processing
- Rail transportation
- Port operations
- Shipping

Each step is defined in terms of capacity, maintenance requirements and other constraints, with rules defining operating sequences. The logistics of interactions through the supply chain is displayed visually showing truck/train/ship movements, stockpile levels and other key indicators. The model determines where and when overall bottlenecks occur and what can be done about it.

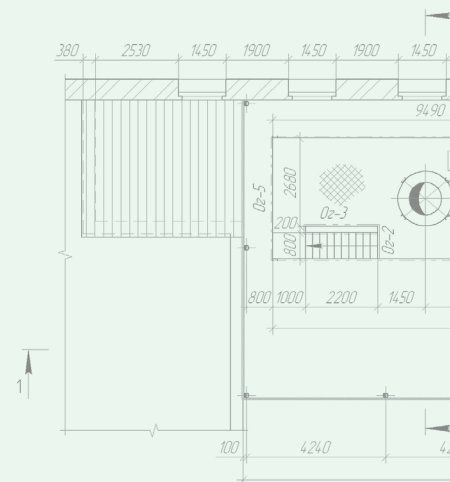
An enterprise level model ultimately tracks the entire process from mine to market.

The tension between customer demand (“pull”) and mine supply (“push”), impact on stockpile levels, product blending requirements and transportation constraints is treated in a single supply chain model.

The model outputs help to answer questions such as:

- Where are the true bottlenecks?
- What happens when a new mine comes on line?
- What impact will be seen from:
 - Increasing the trucking fleet?
 - Installing passing loops in the rail system?
 - Increasing conveyor capacity?
 - Increasing stockpile capacity?
 - Continuous versus day shift operation?
- How are ship wait times minimised?
- How fast can customer demands be met for product specifications?

The model is ideally developed during the initial design phase. However, mature operations can benefit greatly in terms of improved understanding of the process. The outcome is ultimately better use of capital, higher production and more efficient operations.



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