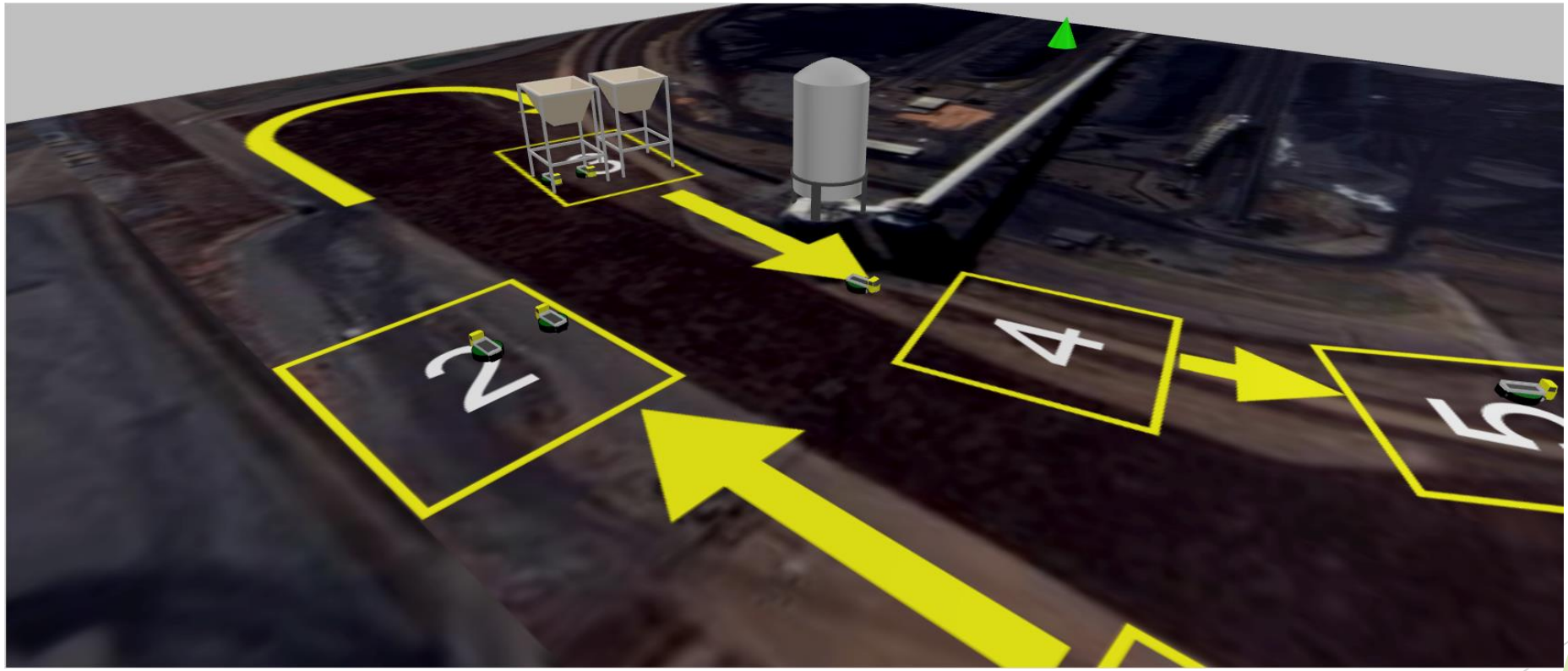
Coal Facility

Optimizing truck Load Out Station



JBV Consulting

Jaco-Ben Vosloo & Devon Cowling

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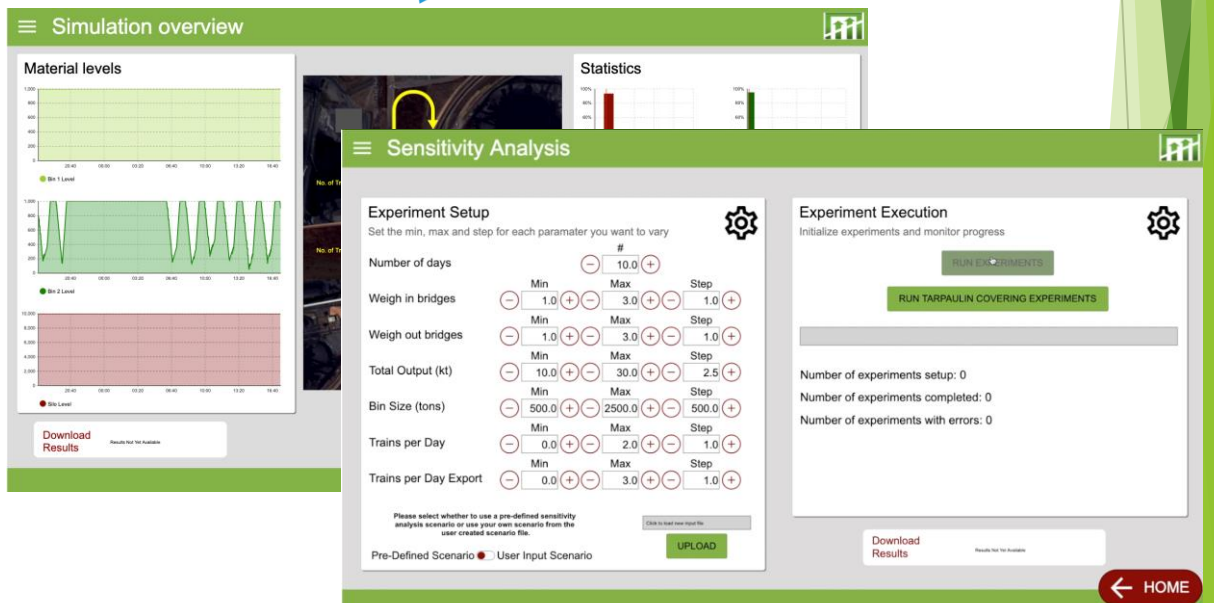
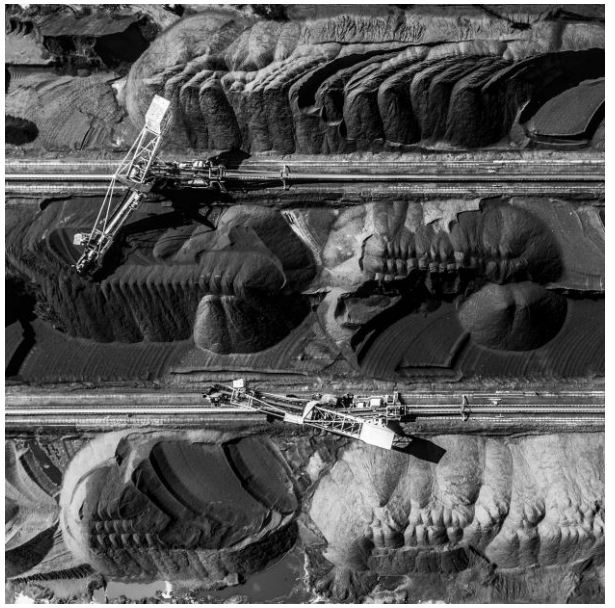


1) Company and project background

Coal Company:

- Leading exporter of thermal coal, operating in the coal industry for many years



Project background:

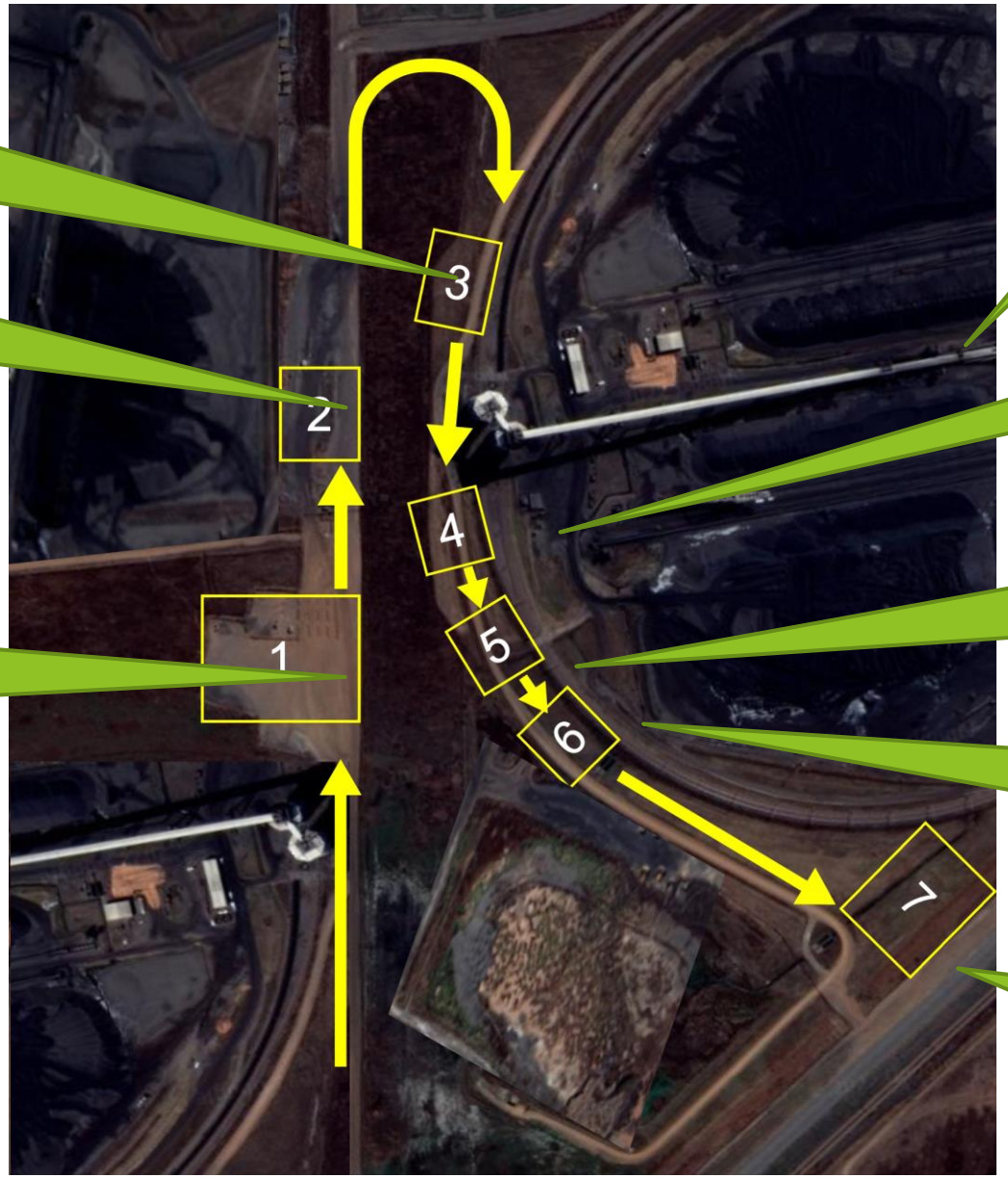
- The company needed to analyze the proposed design options for a new road load-out facility at one of their plants
- Designs needed to be assessed based on the flow of trucks for various current and future demand scenarios
- **Primary**: Determine the optimum number of weighbridges, tarpaulin covering areas, size of load out bin to reliably meet the required truck output
- **Secondary**: Determine the impact of various train schedules and reclaimer feedrate on the truck cycle times

2) Load-out layout overview

Loading Station 1 and 2

Tare Weight station

Trucks will queue here if stations ahead are busy



Stockyard with stacker reclaimer

Waiting area after loading

Full Weight Station

Overloading Correction Point

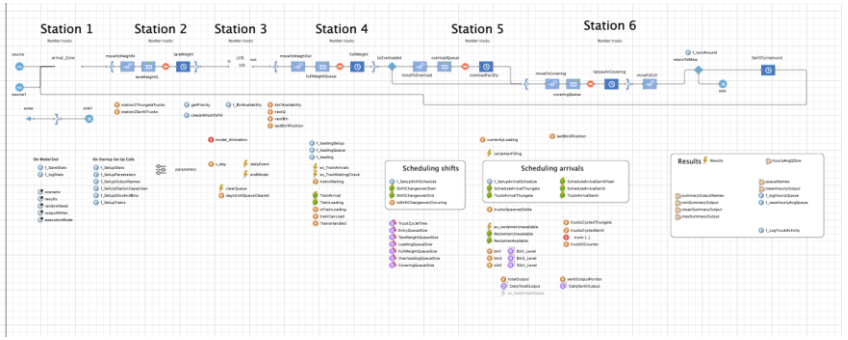
Tarpaulin Covering Station

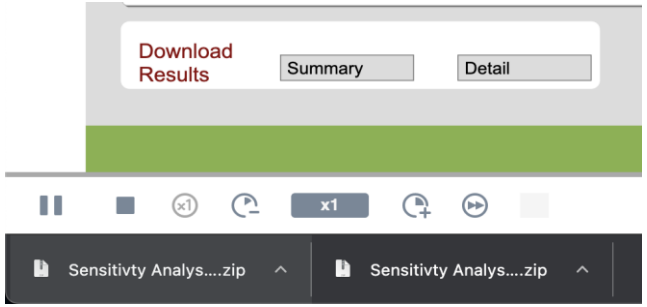
3) The need for simulation

The need	Why?	Benefit of simulation

4) Benefits of using AnyLogic (1/2)

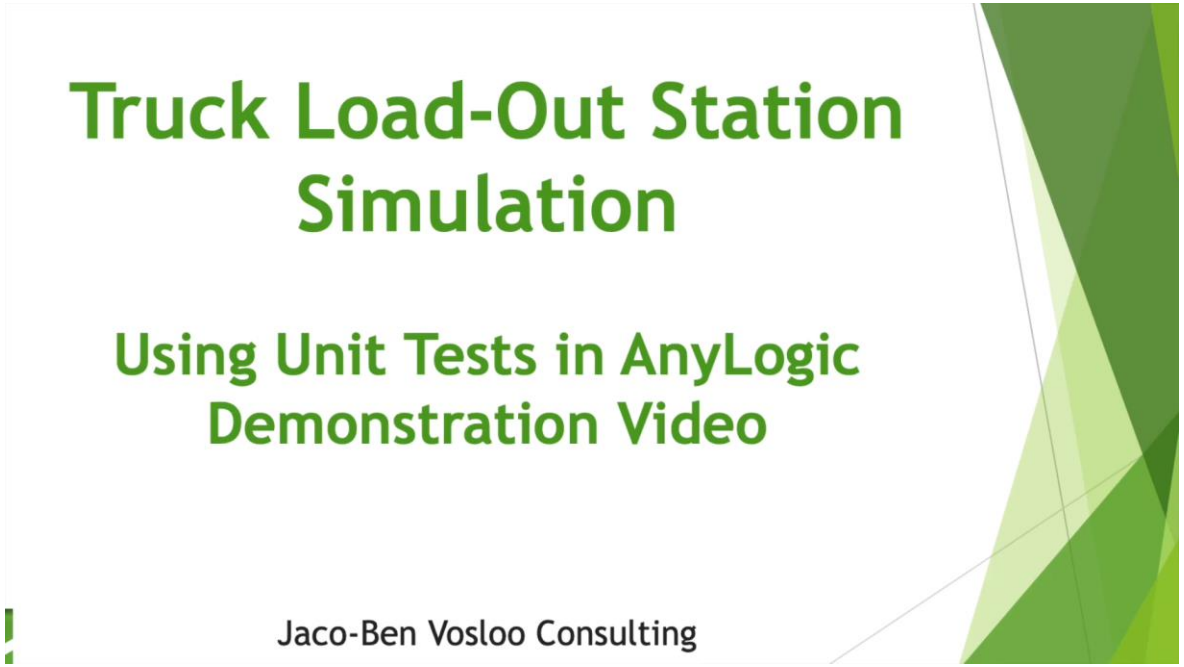
- Use of standard flow chart like objects with Process Modelling library
  - Great for logic verification and validation with users
  - Quick and easy changes to process flow
- Animation
  - The use of 2D and 3D animation in conjunction with live charts aided in verification and validation
  - Project team trusted simulation results
- Export model as stand-alone application for testing and analysis by clients
  - Clients can run additional tests and download model results for further analysis

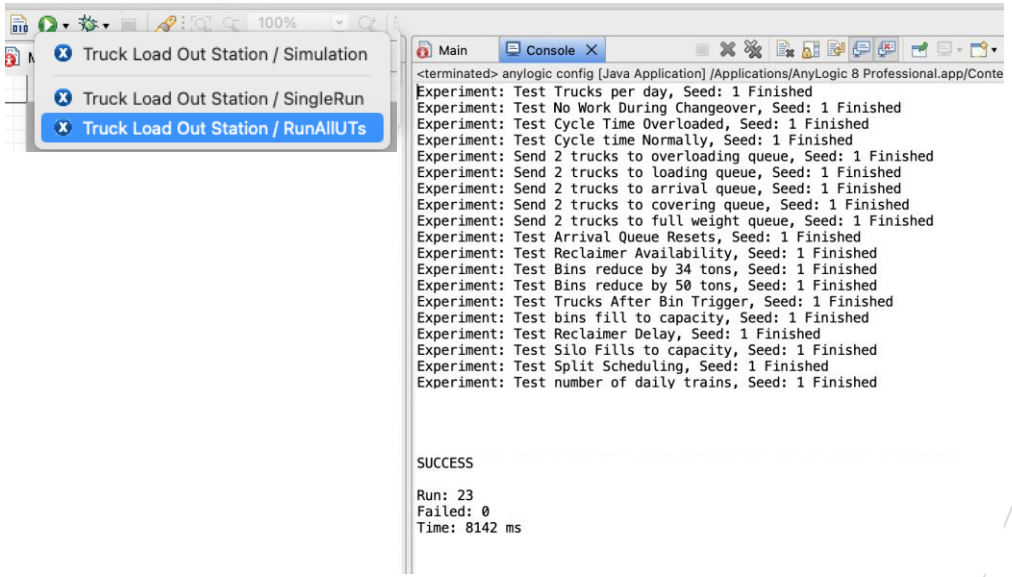




4) Benefits of using AnyLogic (2/2)

- Seamless integration of libraries with standard Java code
  - Used for writing log and other output files
- Unit Testing
  - Effective method to automatically test model logic and determine if it is operating as designed.





5) Model demo – Single Run

Truck Load-Out Station Simulation

Single Run Demonstration Video

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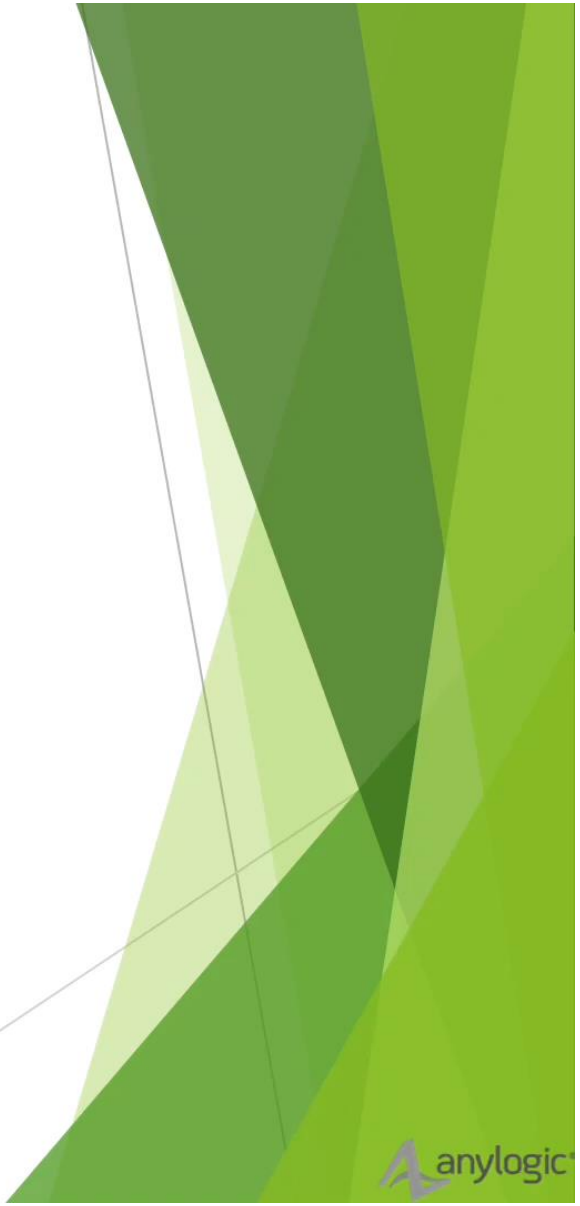
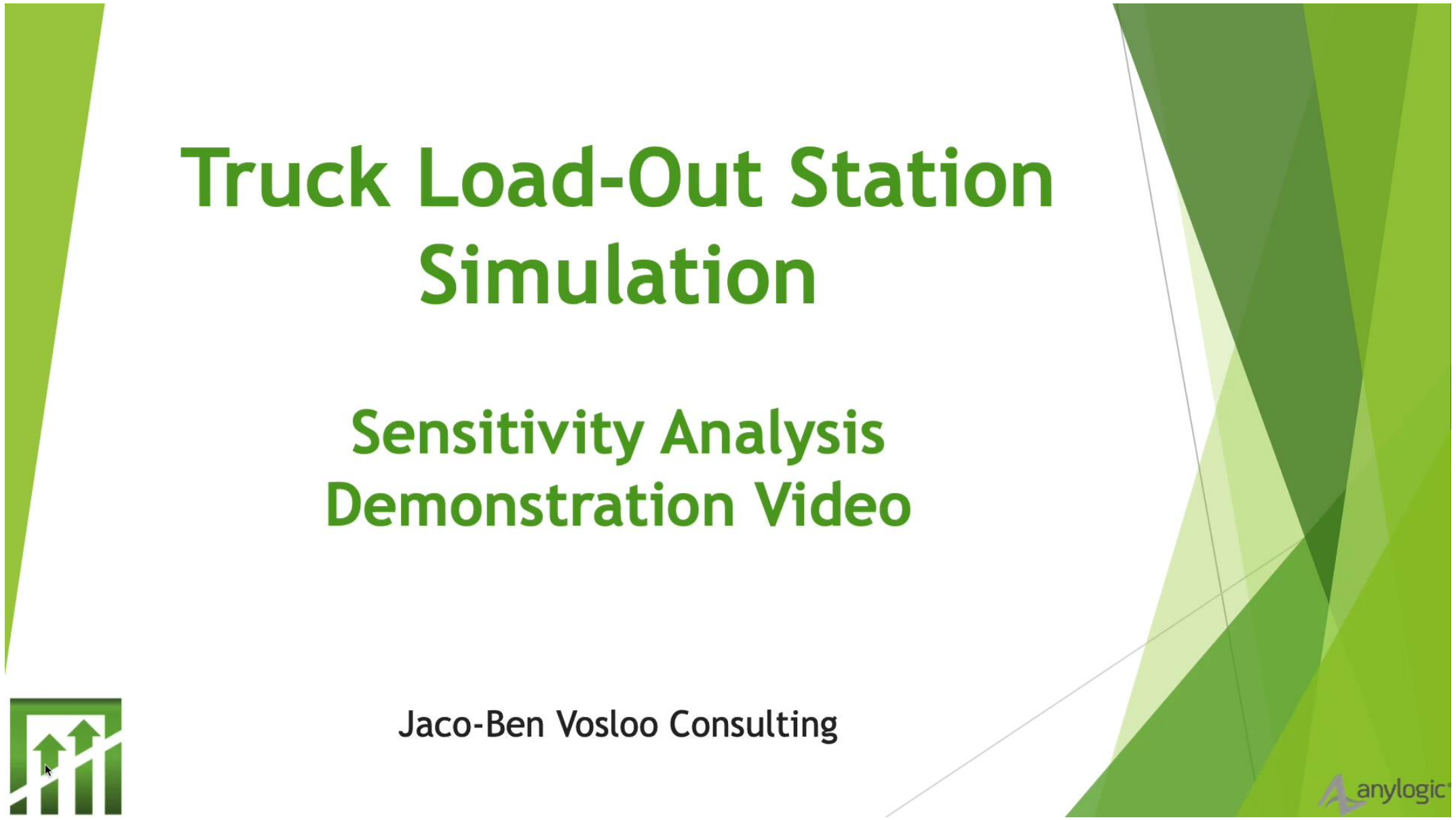
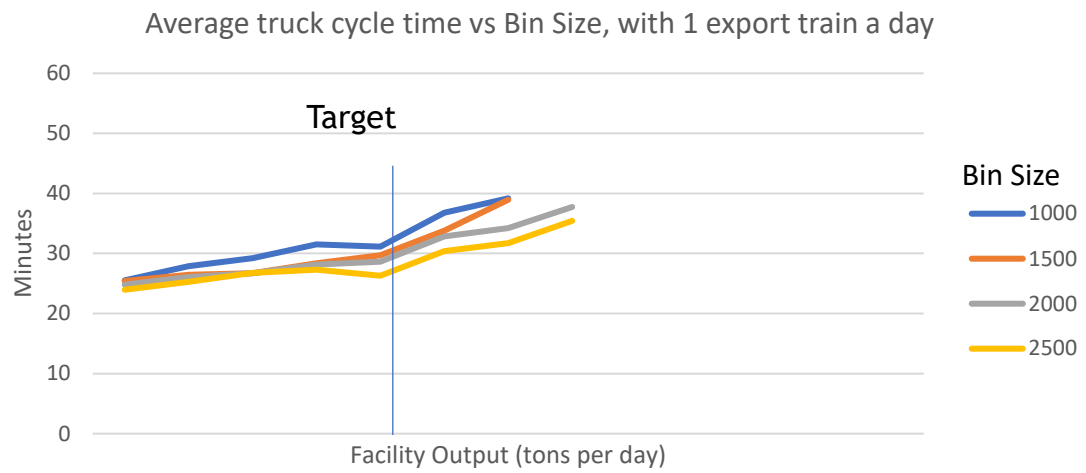


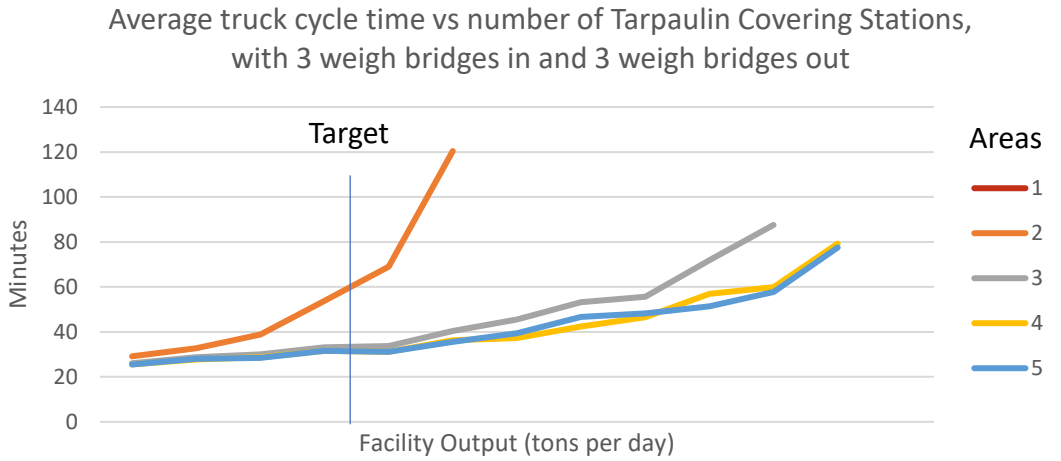
5) Model demo – Sensitivity Analysis

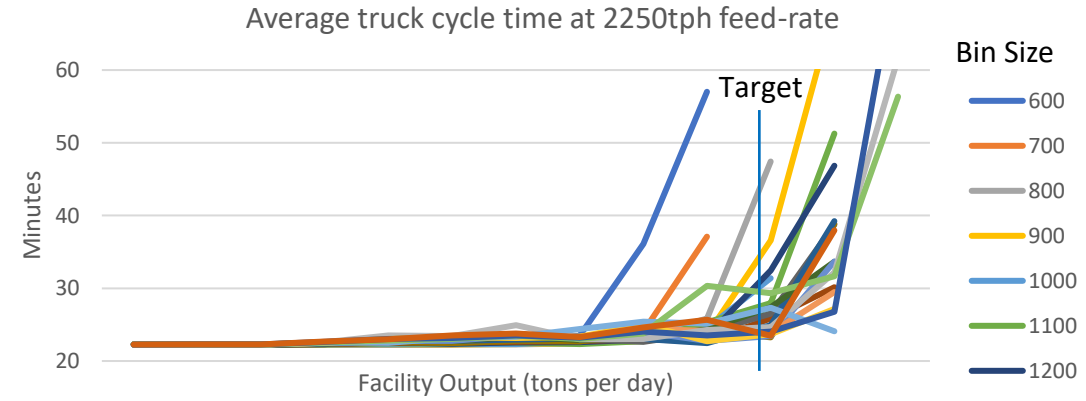


6) Results

- All results used the sensitivity analysis providing a range of outcomes
- Through detailed analysis we were able to provide insights into
  - Impact of trains loading
  - Number of weighbridges
  - Number of tarpaulin covering areas
  - Impact of bin sizes on cycle time
  - Other design options like conveyor sharing between road and train loadout station
- All results were replicated for various reclaimer feed rates to provide boundary conditions for recommendations







Questions

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Simpler, better models, faster

The AnyLogic Modeler