

Determining constraints and equipment fleet configuration with MineTwin

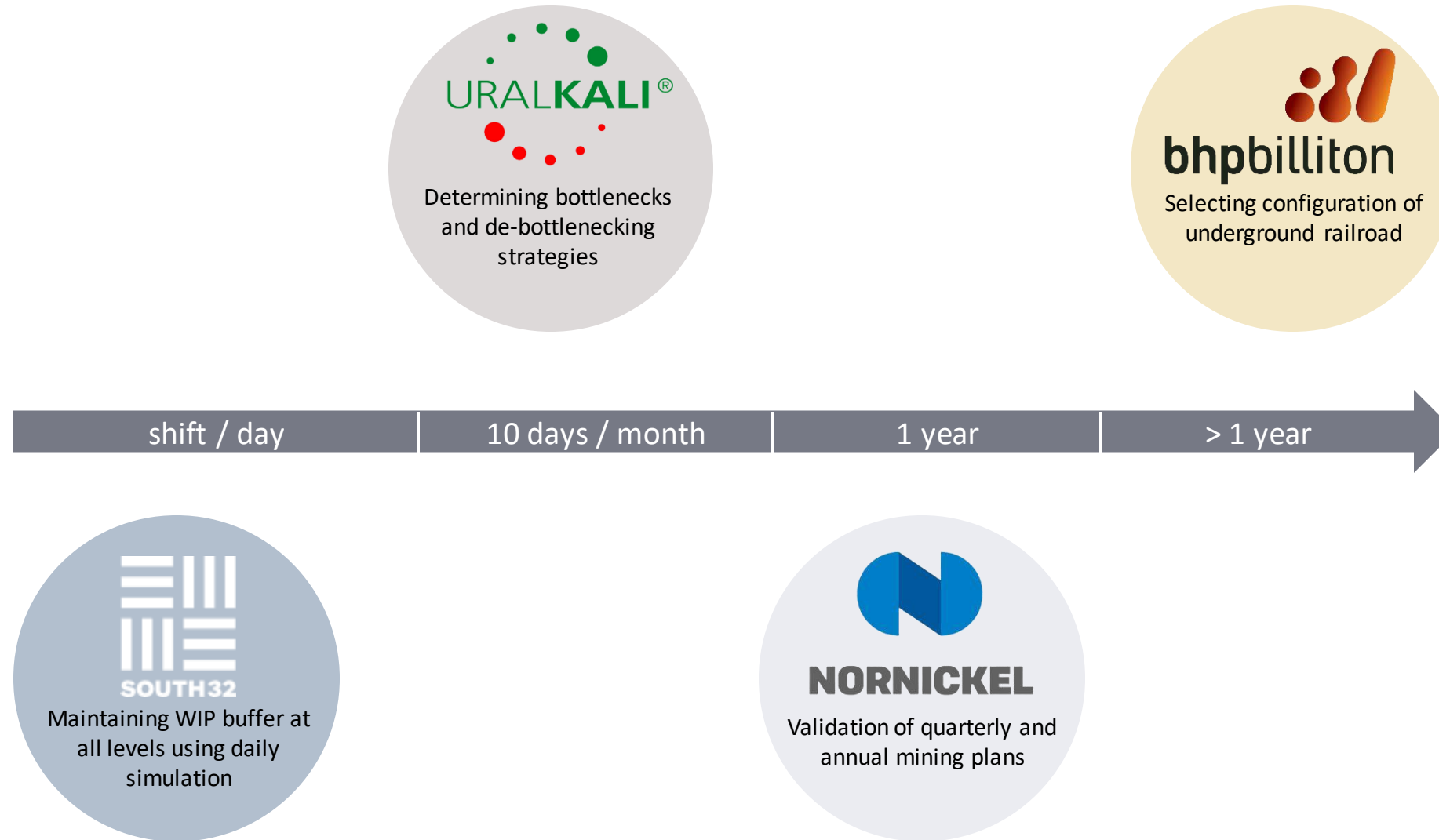
TECH MINING RUSSIA

September 9th, 2021,
Moscow, Russia

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Amalgama LLC



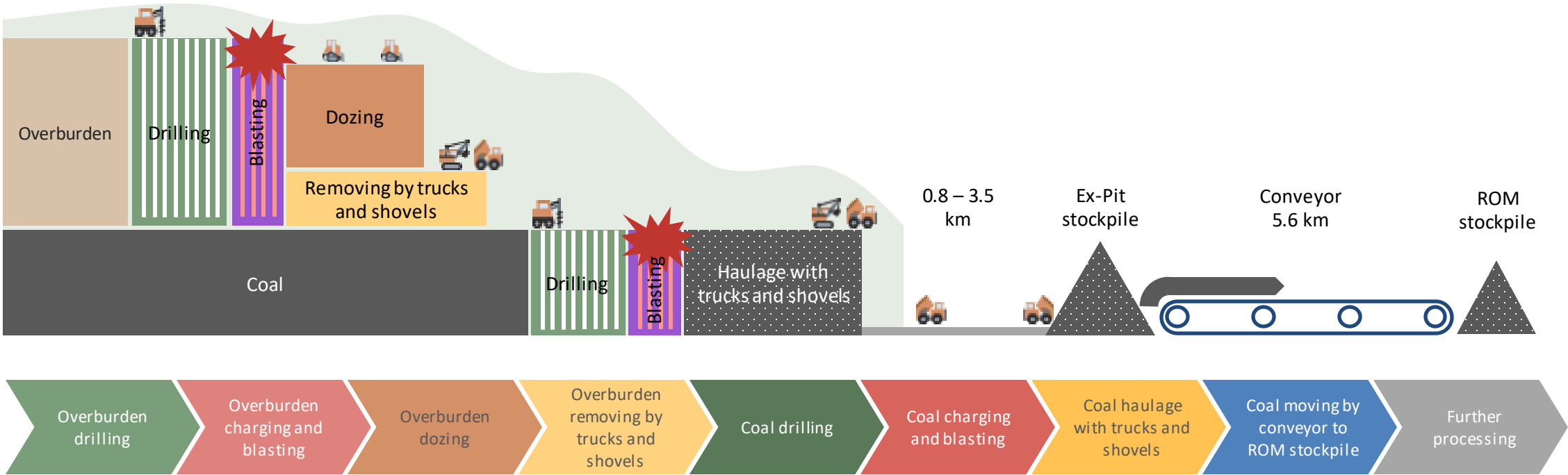
Simulation has already become an industry standard in mining. It is used to support decisions on various horizons



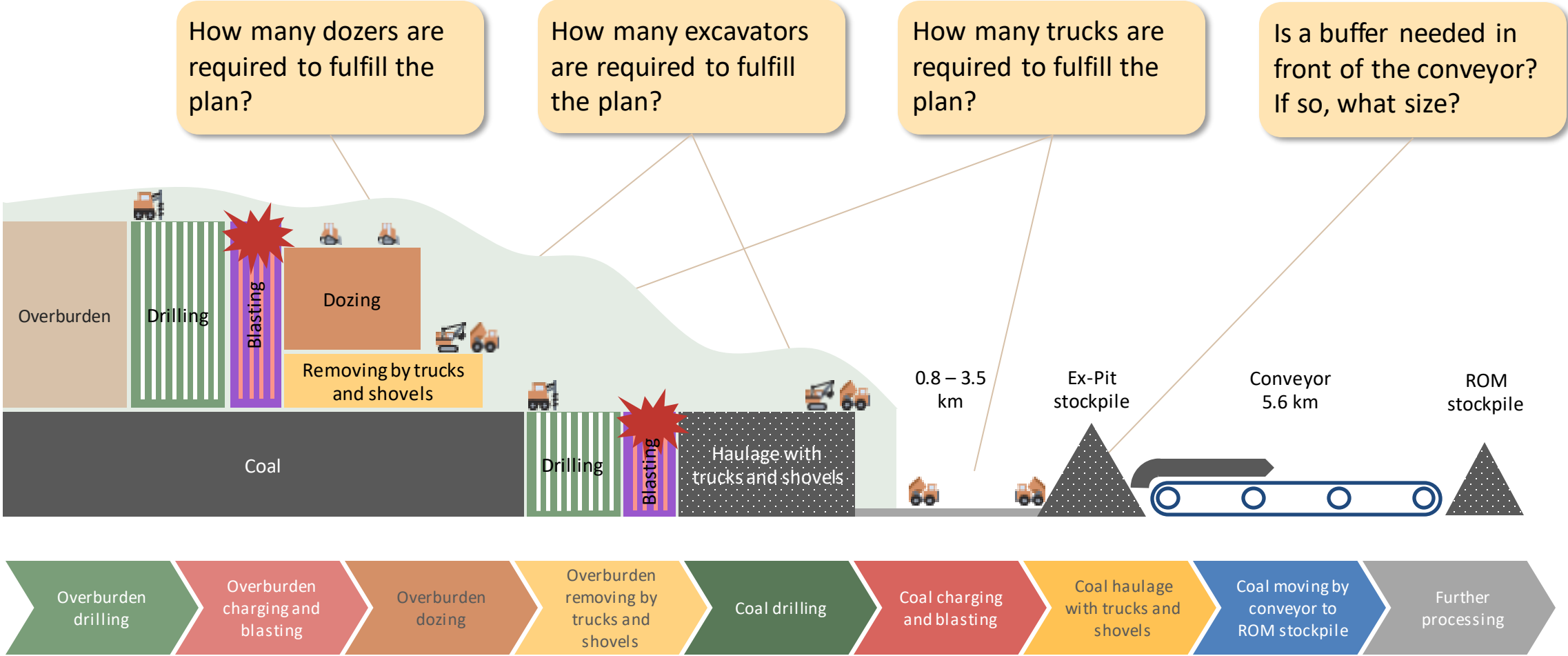
One of the biggest coal mines in South Africa, open cast strip mining



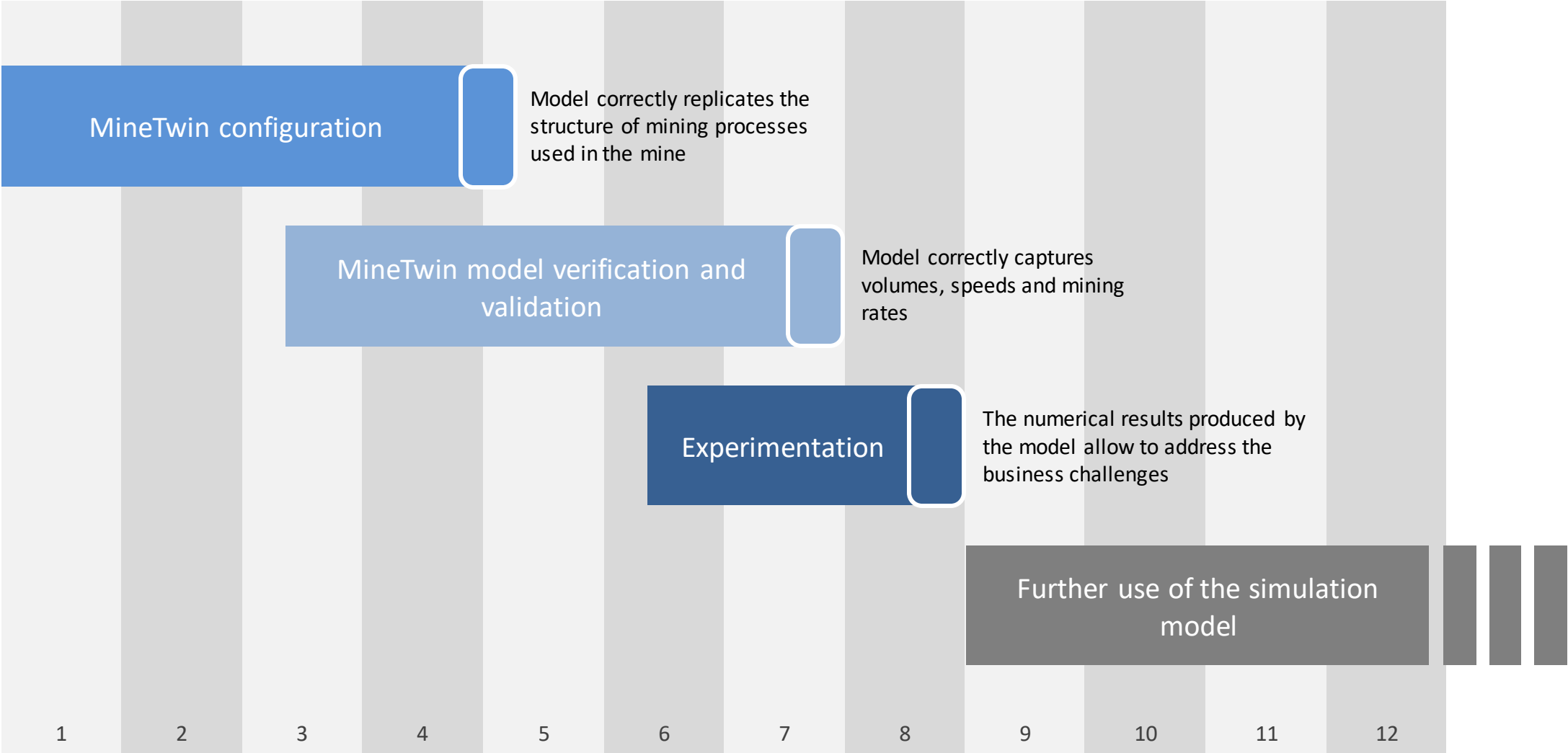
Coal mining scheme



Business challenges

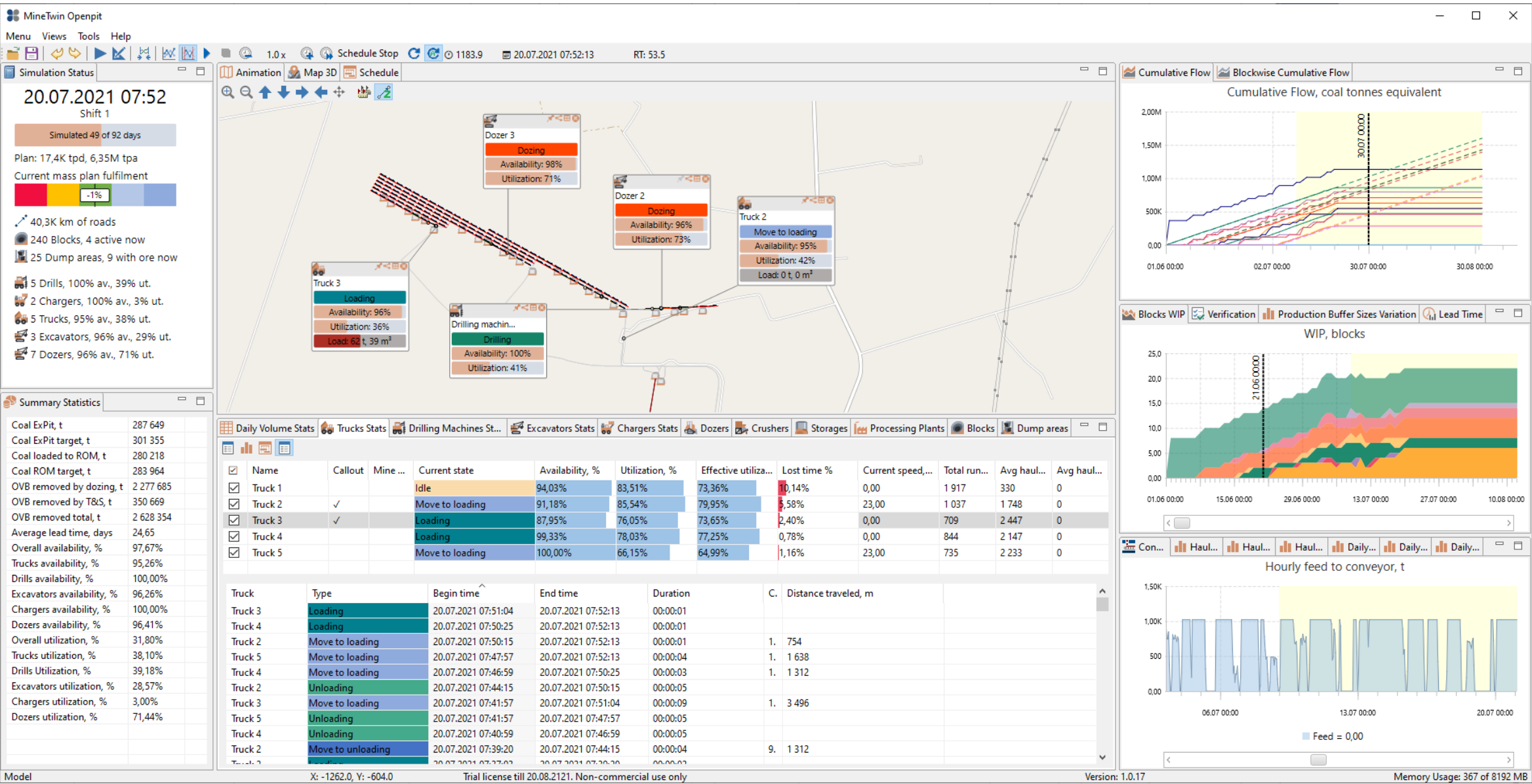


Project schedule

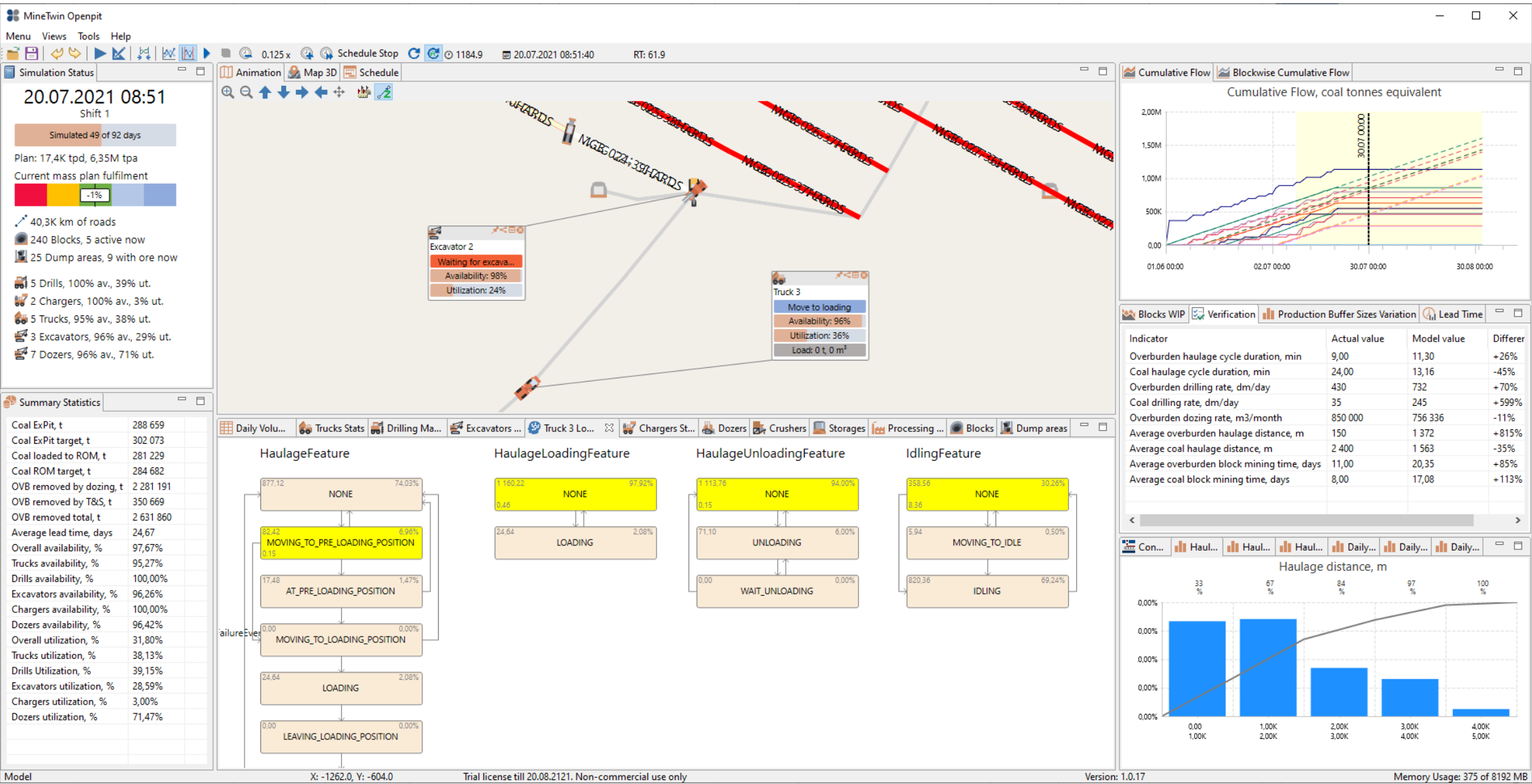


Time, weeks

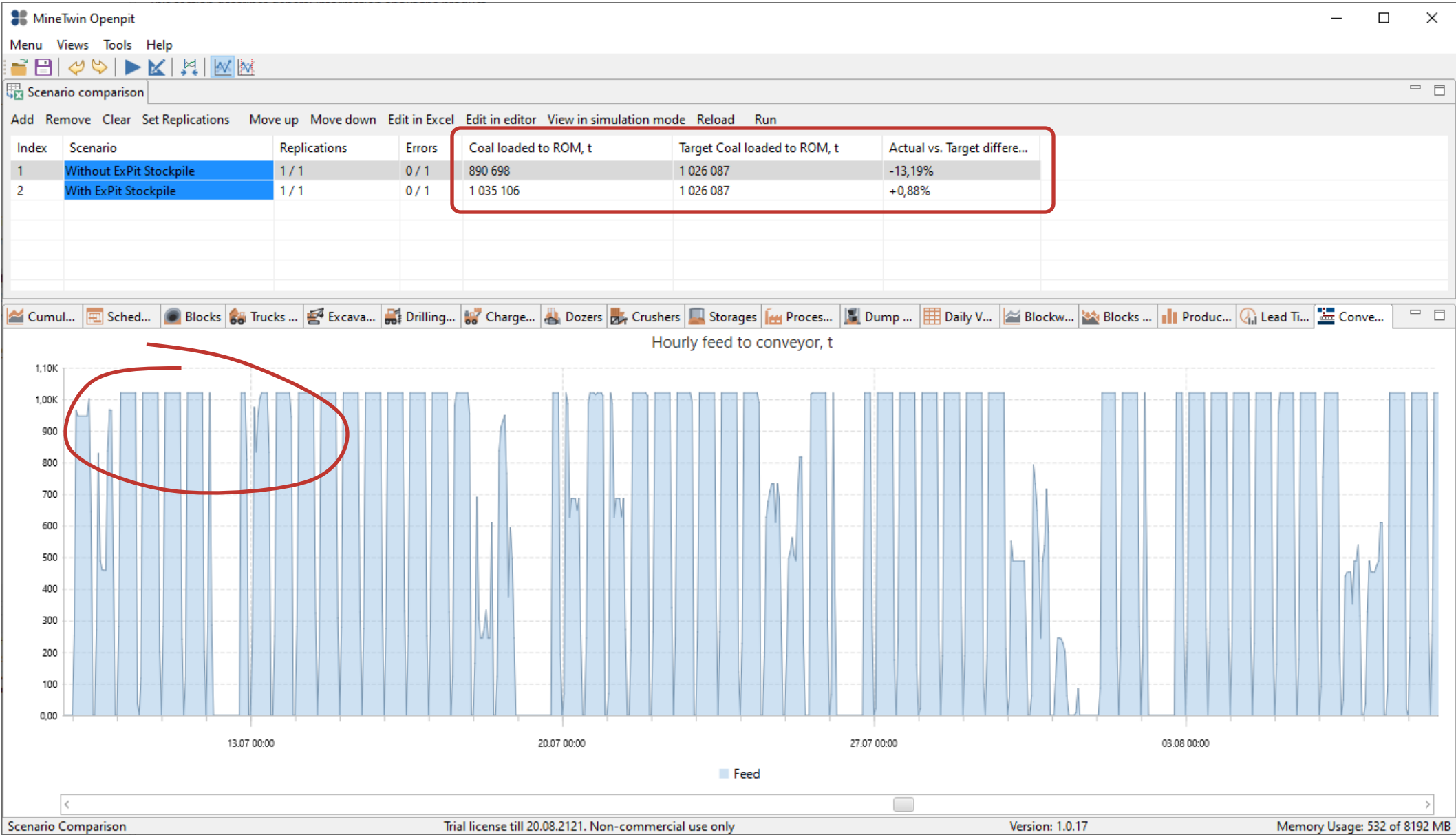
MineTwin simulation user interface (1/2)



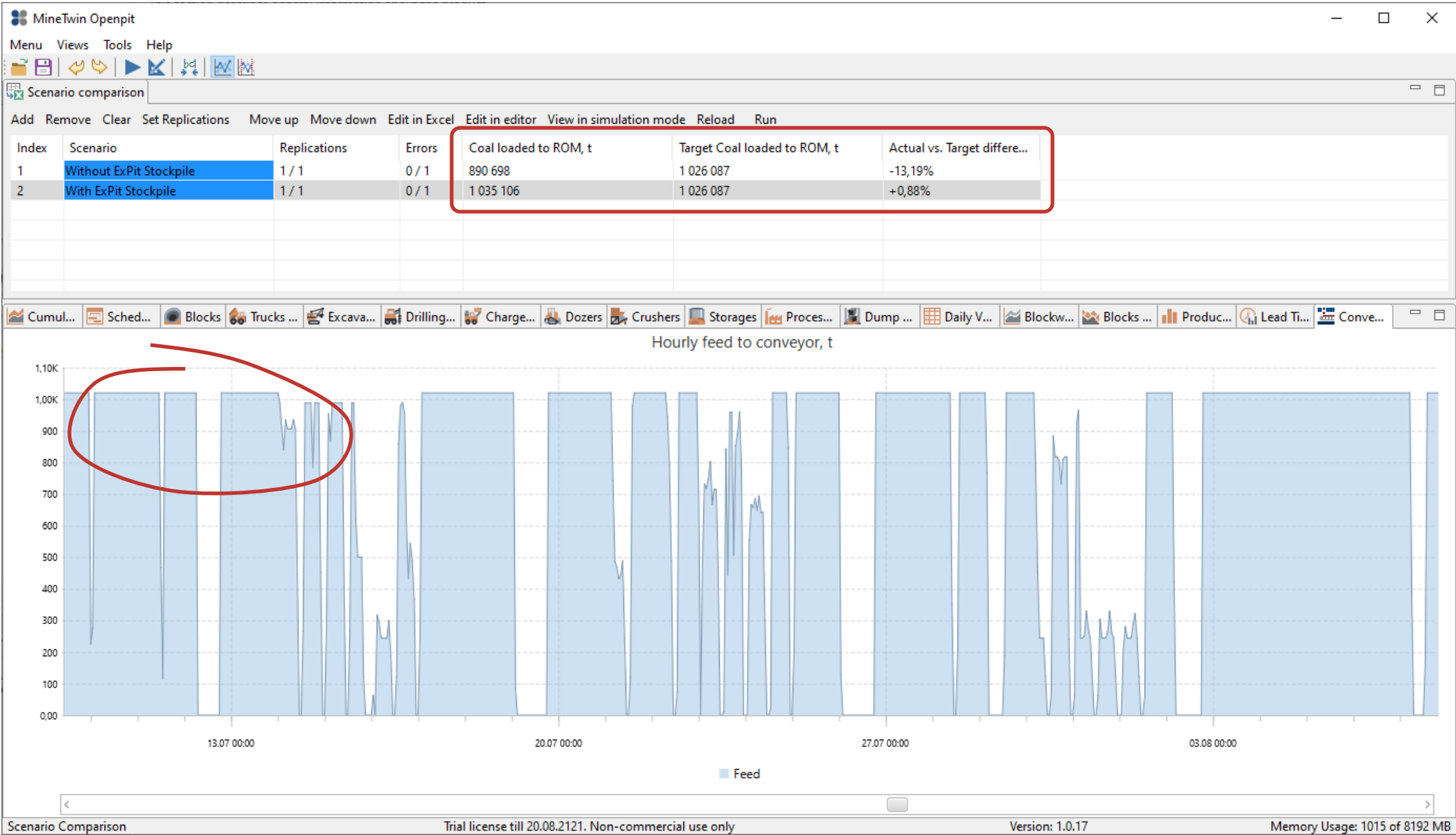
MineTwin simulation user interface (2/2)



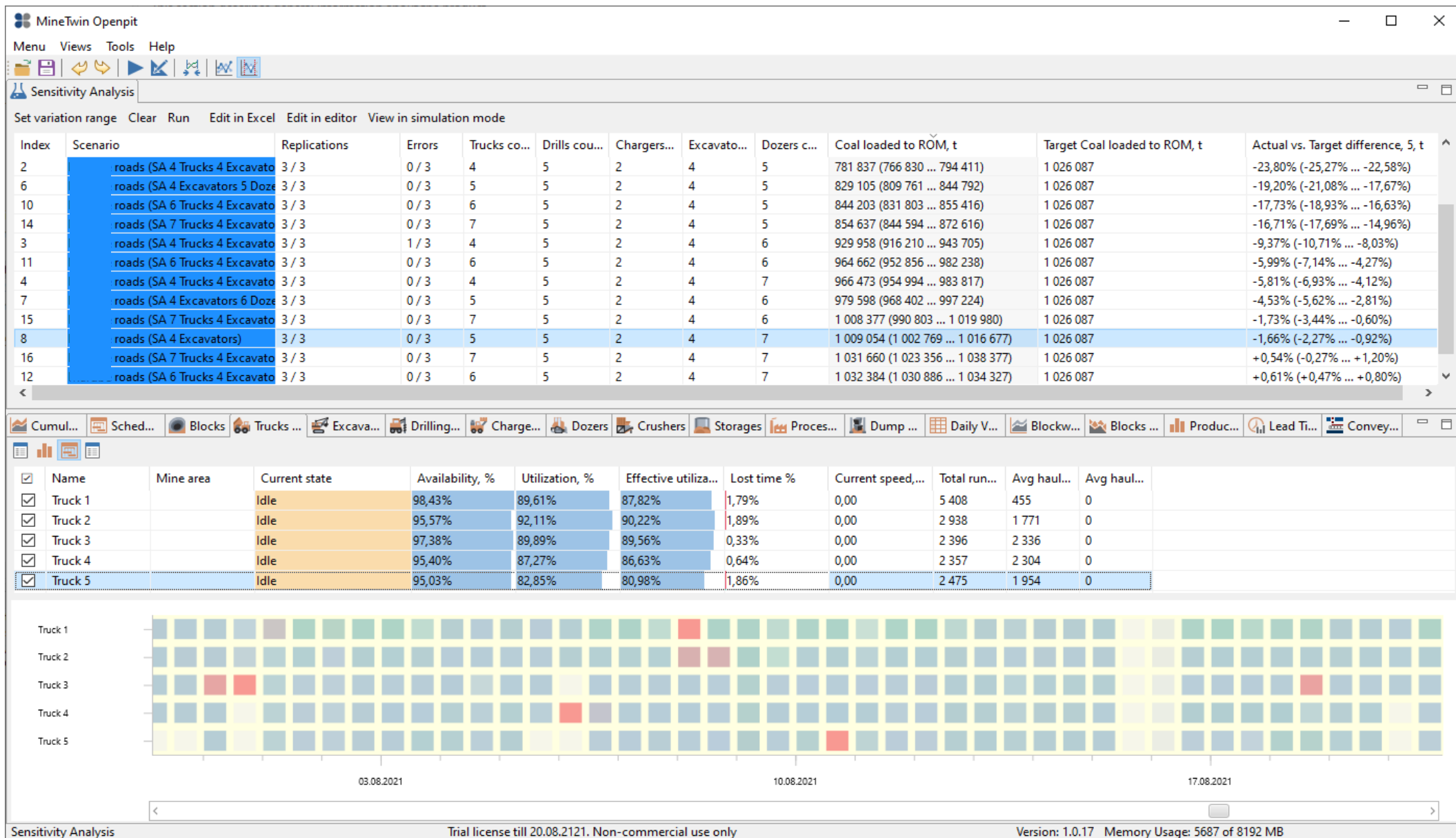
Simulation results without Ex-Pit stockpile



Simulation results with 10Kt Ex-Pit stockpile



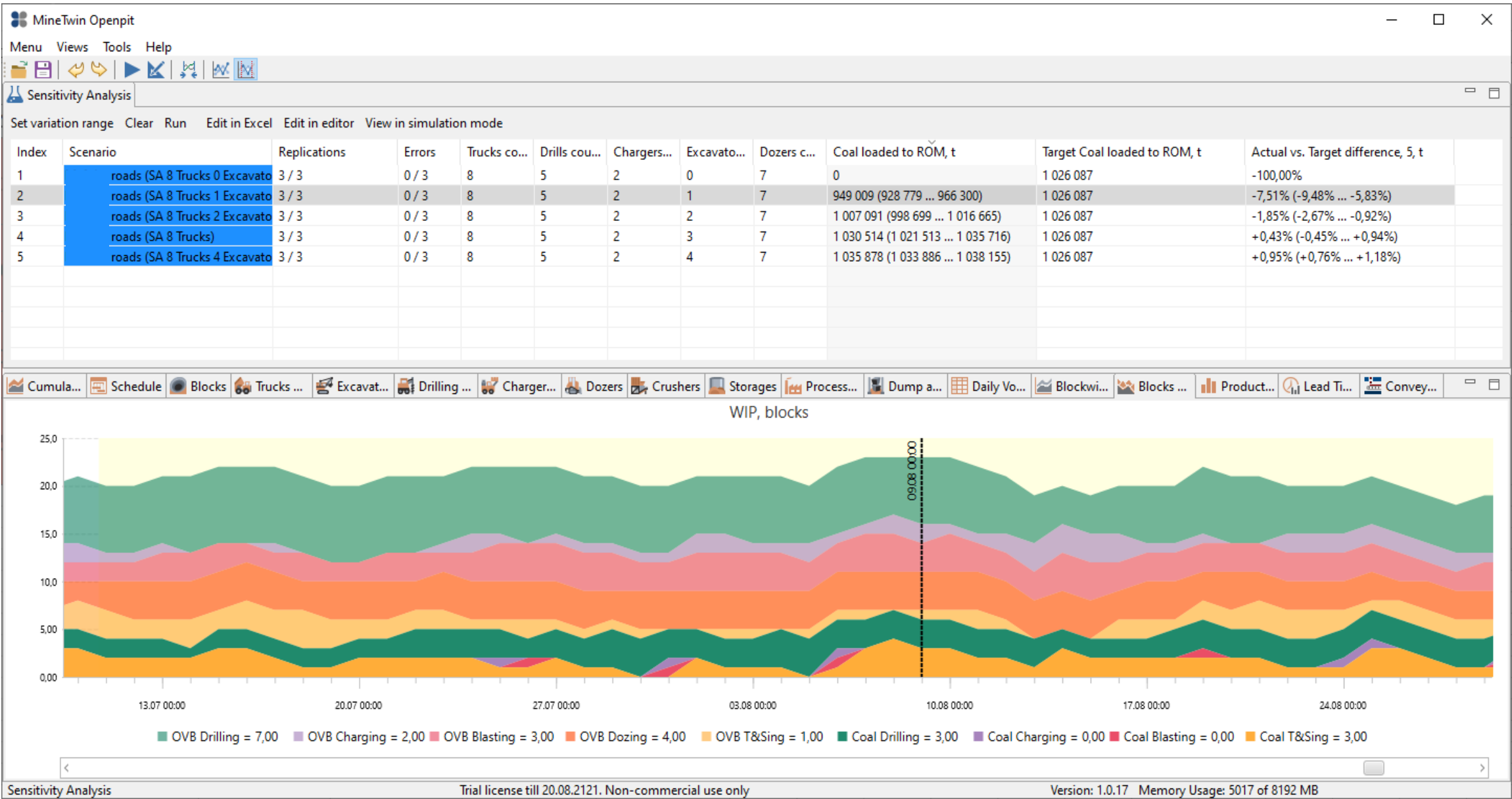
Results of simulation experiment to determine required trucks and dozers count



Plan fulfillment rates at 95% equipment availability

		Dozers count			
		4	5	6	7
Trucks count	4	-35,19%	-23,80%	-9,37%	-5,81%
	5	-36,64%	-19,20%	-4,53%	-1,66%
	6	-33,39%	-17,73%	-5,99%	0,61%
	7	-33,52%	-16,71%	-1,73%	0,54%

Results of simulation experiment to determine required excavators count



Plan fulfillment rates at 95% equipment availability

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Trucks count	4	-35,19%	-23,80%	-9,37%	-5,81%
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	7	-33,52%	-16,71%	-1,73%	0,54%

Excavators count				
0	1	2	3	4
-100,00%	-7,51%	-1,85%	0,43%	0,95%

 7 dozers

 6 trucks

 3 excavators



Summary

- Simulation has already become an industry standard in mining. It is used to support decisions on various horizons
- Today's modern simulation tools, such as MineTwin, allow to speed-up creation of simulation models
- Unlike traditional tools like Excel models or linear programming, simulation models can capture complex constraints and cyclical dependencies that are present in the majority of mines
- Simulation models allow mine planners and managers to address the following business challenges:
 - Determine production capacity of a mine
 - Test mine plan feasibility
 - Evaluate operational improvements
 - Select best equipment fleet configuration
 - Quantify return on investment