Copper-Gold Mine-to-Market

On paper, the mining, processing, and rail are individually capable of supporting the nameplate capacity. **But what about altogether?**

Downtimes, storage limitations, and the timing of material movements can constrain production even when individual areas meet their design targets.

For this copper-gold project, the challenge was to establish the achievable capacity of the complete operation—and identify what needed to change to meet the production target.



Integrated mine-to-market operating analysis

Business challenge	The proposed mine, processing, and logistics operations appeared capable of meeting their individual design targets. The client needed confirmation that the integrated operation would also achieve the design target.
Simulation solution	The integrated simulation identified constraints arising from equipment availability, storage buffers and interactions between operating areas. Alternative equipment configurations, truck fleet sizes, storage capacities and maintenance strategies were evaluated iteratively until the modelled system achieved the design target.

KEY FINDINGS

Capacity Shortfall

2%

Modelled production shortfall relative to design capacity

Equipment Criticality

Top 8

High-impact assets identified

Truck Fleet

Right-sized

Fleet requirements established across alternative mine plans and operating scenarios

Integrated model scope

MINE → CRUSHING → PROCESSING → CONCENTRATE → LOGISTICS

Mining & haulage

Truck and shovel cycles, ore destinations, haul distances and availability.

Crushing & storage

Crushing, ROM reclaim, surge buffers and stockpile management.

Processing & reliability

Grinding, flotation, recirculation, grade recovery and downtime.

Logistics & variability

Product inventory, road variability, dispatch and delivery.

The model connected mine dispatch, crushing, stockpiles, processing and concentrate logistics into a single production system. Material flows, changing ore grades, equipment availability, and storage constraints were represented together, allowing disruptions to propagate between areas.

Equipment criticality and sensitivity analyses identified assets and operating constraints with disproportionate impacts on overall production.

Truck fleet requirements were evaluated across alternative mine plans and operating scenarios. These analyses, together with assessments of storage capacity and equipment reliability, helped establish the equipment and operating configuration needed to achieve planned production.

Key Takeaway	Adequate capacity in individual operating areas does not guarantee system-level production. Integrated simulation revealed hidden constraints and supported targeted decisions on fleet sizing, storage and equipment reliability.

KEY-PERSONNEL EXPERIENCE
Yes | Bryan Monk, P.Eng, original model lead

MISIM CORPORATE ENGAGEMENT
No | prior employer project

CLIENT
Anonymous

Historical key-personnel project experience developed during employment at Wood.