

Pre-screening for Operator Aptitude with Simlog Personal Simulators at Kinross Gold Tasiast

The Operator Training Challenge

Haul truck operator training at mining operations in developing countries poses particular workforce development challenges.

In particular, since high unemployment is a typical problem, there are always many more people who would like to work compared to the number of available jobs. Moreover, most training candidates will have little or no prior “driving” experience at the controls of a motorized vehicle (or even a non-motorized one, such as a bicycle).

But mastering the controls also requires a combination of psycho-motor, sensory/perceptual, and cognitive abilities that cannot be taught. Studies show that up to 30% of typical training candidates lack enough of these abilities to (eventually) attain the desired level of proficiency.

For all of these reasons, it’s *essential* to *carefully* choose candidates for training, doing this in a way that is both objective and efficient.

About Kinross Gold Tasiast

Kinross Gold (<http://www.kinross.com>) is a Canada-based gold mining company with mines and projects in Brazil, Canada, Chile, Ecuador, Ghana, Mauritania, Russia, and the United States, employing approximately 7,500 people worldwide.

In 2010, Kinross Gold acquired the Tasiast gold mine in north-western Mauritania, an African country located approximately 300 kilometres north of the capital Nouakchott. Although commercial operations began at Tasiast in 2008, Kinross is now working



Nouakchott, the capital of Mauritania

to *triple* mining production by purchasing much additional mining equipment.

Since new hires typically begin work at the mine by operating haul trucks, Kinross Gold has placed particular emphasis on providing “truck ready” hires to the mine, i.e. qualified haul truck operator trainees, right from their recruiting office in Nouakchott, in order to access the local pool of training candidates, without incurring the transportation and accommodation costs associated with getting “truck ready” at the mine itself.

Clearly, preparing *hundreds* of new truck operators poses important challenges, but evaluating *thousands* of training candidates to identify the *hundreds* of individuals with sufficient natural abilities, represents a much greater challenge.

Recognizing the need to pre-screen training candidates in an objective and efficient way, Kinross Gold established a “Simulator Lab” featuring the *Mining Truck Personal Simulator* from Simlog (<http://www.simlog.com>).

The Simlog Simulator Lab

The Simlog simulator lab at Kinross Gold's recruiting office in Nouakchott features five Mining Truck Personal Simulators (**just four units are shown in the photograph**).



Each simulator "station" consists of Simlog's Mining Truck simulation software, Replica Controls, a desktop PC, an LCD display, speakers, and headphones.



At the controls of the Mining Truck Personal Simulator

Simlog's Simulation Manager, installed on a sixth PC (all the PCs are networked), is used to create an account for each training candidate with a unique login name and password. Simulation results from each candidate will be saved in the Simulation Manager's database.

Testing Methodology

The simulator-based evaluation of operator aptitude proceeds in three steps.

At the start, a Kinross Gold supervisor introduces the simulator to the candidate, demonstrates some basic functionality e.g. how to use the steering wheel, and then presents one of the introductory Simulation Modules, "Corridor Driving", as shown here.



"Corridor Driving" Simulation Module

Because many training candidates have difficulty reading, there must be verbal instruction about the "what to do". In addition, as noted by one Kinross Gold staff member:

"The candidates here are not familiar with computers nor video games, not even cartoons or sci-fi movies. They're not at ease and sometimes cannot understand the virtual world pictured before them."

Practically, this means that typical training candidates have never used a keyboard and mouse, let alone a steering wheel and pedals. For that reason, the supervisor enters the login name and password for the pre-defined account assigned to that candidate, and then launches the Simulation Module. Then with the help of the supervisor, the candidate performs a single trial (exercise) for just that

Simulation Module. The duration of this introductory step is 10-15 minutes.

After that, the candidate is accorded two simulator “sessions” of 30 minutes each to revisit the *same* Simulation Module, both times with *no* help from the Kinross Gold supervisor. Candidates typically complete 4-6 trials for the first session, and then 8-10 trials for the second session (“better” candidates will work quicker and complete more trials in the same amount of time).

Simulator-Based Evaluation of Operator Aptitude

Once the second simulator session is completed, the Kinross Gold supervisor analyzes the simulation results for the two sessions, looking for *relative improvement* from the first one to the second (instead of just evaluating the “terminal” simulation results for the second session).

In particular, to evaluate both the productivity and the quality of the simulated work, the Kinross Gold supervisor carefully monitors two Performance Indicators, “Execution Time” (the time to navigate the corridor from the starting position to the ending position) and “Number of Collisions” (when the truck makes contact with the barriers that define the corridors).

Where there is noticeable improvement in the *average* values from the first session to the second session and when the average values for the second session exceed minimum targets, the training candidate’s score is “Success”. This is evidence that the candidate:

- Has enough natural abilities (psycho-motor, sensory/perceptual, cognitive).
- Understood the instructions during the introductory step.
- Remembered those instructions for the two simulator sessions.
- Was able to concentrate well enough to meet the assigned targets.

Otherwise, the score is “Failure” and the candidate is judged to be unsuitable for training as a mining truck operator. (Of course, the candidate might still be eligible for some other kind of work at the mine).

Results to Date

Operator pre-screening began in July 2011 at the Kinross Gold recruiting office and since then, 211 people have been evaluated at the simulator; here we present average values for their simulation results.

Performance Indicator	1 st Session	2 nd Session
Execution Time (seconds)	373	272
Number of Collisions	4.7	2.7

Using this data, Kinross Gold Tasiast came to define the following targets to be exceeded for the second simulator session.

Performance Indicator	Target for the 2 nd Session
Execution Time (seconds)	300
Number of Collisions	3.0

Finally, we present the distribution of scores for these 211 people.

Score	Number (percentage)
Success	123 (58%)
Failure	88 (42%)

As shown in the table, about 40% of the candidates at the simulator were judged to lack enough “aptitude” for training (30% is a more typical percentage in North America).

Next Steps

Building upon this pre-screening success, Kinross Gold is now preparing a second simulator lab at a new training facility, also located in Nouakchott, for the day-after-day, week-after-week, drill and practice to help the carefully selected training candidates learn what Simlog calls “core skills”.

After that, it is expected that they will then “graduate” to the controls of real trucks to be operated in the Nouakchott area, as the final step in becoming “truck-ready” trainees for the Tasiast mine.

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