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Go-Belt® SAMPLING SPECIALISTS

Why Accurate Sampling Matters at Large-Scale Mechanised PGM Operations



Engineering Insights from T.K.O Engineering's 35+ Years of Sampling Experience

In modern platinum group metal (PGM) operations, production decisions, metallurgical accounting, plant optimisation and financial reporting all rely on one fundamental requirement: accurate sampling.

As mining operations become larger, more mechanised and increasingly data-driven, the importance of representative sampling continues to grow. While sophisticated process control systems and laboratory technologies have transformed mineral processing, the quality of the information they provide remains dependent on the quality of the sample collected.



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Simply put, confidence in the numbers begins with confidence in the sample.

The Evolution of Modern PGM Operations

The South African PGM industry is evolving rapidly.

New-generation operations such as large-scale mechanised mines are processing greater tonnages than ever before while demanding higher levels of efficiency, recovery and operational control.

Modern operations are characterised by:

- High-throughput conveyor systems
- Large-scale crushing and milling circuits
- Advanced process automation
- Complex metallurgical accounting requirements
- Multiple payable metals within a single ore stream

As throughput increases, the consequences of sampling inaccuracies become more significant.

A small sampling error on a high-tonnage operation can have a substantial impact on reported grades, recoveries and financial performance.

Why Representative Sampling Matters

Representative sampling is the foundation of reliable metallurgical accounting.

Accurate samples allow operations to:

Measure Plant Performance

Metallurgists rely on accurate sampling to evaluate circuit efficiency, identify losses and optimise plant performance.



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Improve Reconciliation

Sampling provides the critical link between geological models, mine production and metal recovered through the process plant.

Support Financial Reporting

Metal production figures and operational reporting depend on accurate assay data derived from representative samples.

Enhance Process Control

Reliable sampling data enables informed process decisions and improved operational stability.

Without representative sampling, even the most advanced process plant operates with uncertainty.

The Hidden Cost of Poor Sampling

Sampling errors are often difficult to detect, yet they can create significant operational and financial consequences.

Common impacts include:

- Incorrect grade calculations
- Recovery losses
- Metallurgical accounting discrepancies
- Poor plant reconciliation
- Incorrect process adjustments
- Reduced confidence in reporting data

Over time, these issues can result in significant financial losses and operational inefficiencies.

The cost of poor sampling is frequently far greater than the cost of implementing and maintaining a properly designed sampling system.



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Representative Sampling Is an Engineering Discipline

Effective sampling is not simply the act of collecting material from a conveyor.

True representative sampling requires careful engineering consideration, including:

Cutter Design

The cutter must collect a complete cross-section of the ore stream while maintaining sample integrity.

Sample Collection

Material must be collected, transferred and discharged without introducing bias or contamination.



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Sampling Frequency

Sampling intervals must account for the natural variability of the ore stream.

Mechanical Reliability

Sampling systems must operate consistently under demanding mining conditions.

Maintainability

Equipment should be designed to facilitate safe inspection, maintenance and long-term reliability.

Each of these factors plays a critical role in ensuring that the sample accurately reflects the material being processed.

The Importance of Cross-Belt Sampling Systems

Cross-belt samplers remain one of the most widely used methods of collecting representative samples from conveyor systems.

When correctly designed, installed and maintained, cross-belt samplers provide:

- Consistent sample collection
- Improved metallurgical accounting accuracy
- Reliable reconciliation data
- Reduced operator intervention
- Enhanced operational safety

For many operations, the cross-belt sampler represents the primary source of process information used to evaluate plant performance.

Its reliability and accuracy directly influence confidence in the data used throughout the operation.

Reliability Beyond Installation

A sampling system should not be viewed as a once-off capital purchase.



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To maintain accuracy and performance, sampling systems require:

- Routine inspections
- Mechanical maintenance
- Cutter condition monitoring
- Electrical and PLC support
- Performance audits
- Periodic refurbishment

Regular maintenance ensures continued compliance with sampling best practices while maximising equipment life and operational reliability.

Looking Ahead

As mechanised mining operations continue to expand and process increasingly larger volumes of material, the role of representative sampling will become even more important.

Accurate sampling supports:

- Improved plant performance
- Better decision-making
- Reliable metallurgical accounting
- Greater operational confidence
- Enhanced profitability

For modern PGM operations, representative sampling is not simply a plant requirement.

It is a critical business process that underpins operational success.

About T.K.O Engineering

T.K.O Engineering CC specialises in the design, manufacture, installation, commissioning, refurbishment and maintenance of Go-Belt® Sampling Systems and related mineral processing equipment.



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— Go-Belt® SAMPLING SPECIALISTS —

With more than 35 years of industry experience and over 100 successful installations across gold, platinum, copper and coal operations, T.K.O Engineering remains committed to delivering reliable, representative sampling solutions that support accurate metallurgical accounting and operational excellence.

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Engineered to Outperform

www.tkoengineering.com