



**MIRS**

**ROBOTIC CONCENTRATE SAMPLER  
MAXIBAGS**



MIRS is a leader in robotic solutions for the mining and heavy industrial sectors. We have many years' experience in providing conceptual development, design engineering, manufacturing, integration and support services for our world-class robotic solutions.

We have developed numerous robotic solutions in harsh industrial environments, including mines, concentrators, tank houses, smelters, refineries, and foundries. Our mission is to exceed our customer's expectations, encourage the professional development of our people, and promote sustainability.

MIRS solutions incorporate state-of-the-art robotics and provide numerous benefits, including:



**PRODUCTION COST REDUCTION**



**RELIABILITY INCREASE**



**HEALTH AND SAFETY IMPROVEMENT**



**QUALITY CONTROL INCREASE**



**MIRS** understands the fundamentals of concentrate sampling, the importance of accuracy and reliability for transactions between producers and their customers, and the impact of variables such as humidity and concentrate grade on metal accounting. Improperly collected samples that are not representative of the bulk concentrate can lead to improper valuation of a material. It is therefore critical to follow proper sampling practices to collect a sample that accurately represents the concentrate.

**MIRS** has developed an innovative robotic concentrate sampling system that safely and reliably collects representative samples by minimizing human interaction and eliminating sampling error. The system has been designed for sampling bulk concentrates in harsh environments from trucks, maxibags, and trains. The high precision of robotic technology and **MIRS'** high-quality design and engineering standards, make the robotic concentrate sampling system the most advanced concentrate sampling system in the mining and heavy industry markets.



**Truck Sampler**



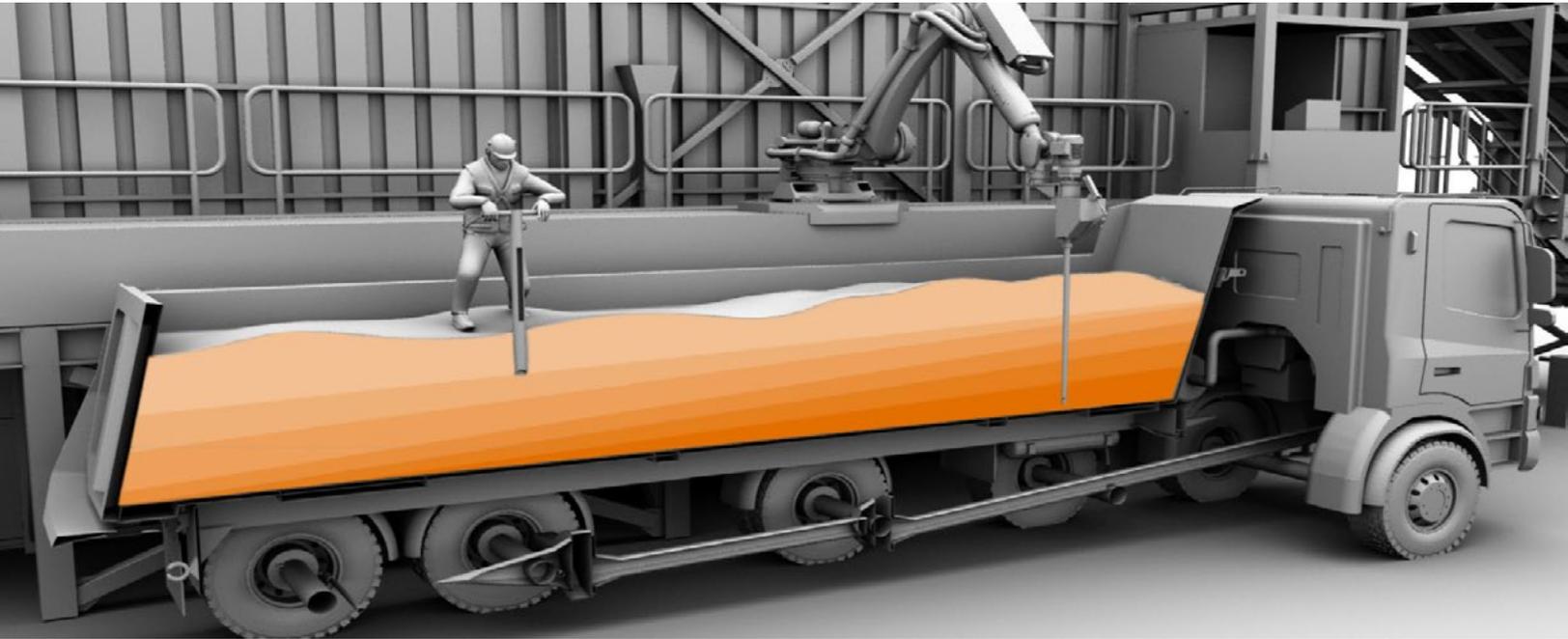
**Maxibag Sampler**



**Train Sampler**



## Robotic vs Manual



The moisture content and grade in bulk concentrates are often not homogenous. Transport of concentrates by truck or rail exacerbates the non-homogeneity of the moisture content and grade. Manual sampling of these concentrates

does not produce a final sample that is representative of the concentrate, primarily because the sampling device does not completely penetrate the material from top to bottom.



**MIRS'** robotic concentrate sampling system is designed to penetrate completely through the concentrate bed, ensuring representative and equiprobable samples are obtained. The heart of the system is a specially engineered auger-based sampling tool which is attached to the robotic arm. The tool is made of 316 stainless steel and consists of a servomotor, a cylindrical sleeve, a helicoid auger, and a sample collection box. The tool ranges in size from 2" and larger depending on customer requirements. The auger length, auger tip, helicoid auger flighting, vertical speed and rotational speed are designed based on the requirements and the material being sampled. The system is designed to ensure sample moisture is preserved at all times throughout the collection process. Interior coatings aid in reducing contamination between samples when the tool is not cleaned between samples. The sampling system can be provided with multiple sampling tools, thus enabling sampling of different materials which require different tool design or alternatively, sampling of similar materials from different origins.



# Maxibag Sampler

## ROBOTIC SOLUTION COMPONENTS



### SAMPLING ROBOT

Designed to operate in harsh environments. It is strong enough to reach the full depth of a maxi-bucket full of concentrate. It is positioned on a pedestal.

### TOOL

Samples the material and then deposits it for further processing.

### PACKAGING AND LABELING UNIT

Receives the samples taken by the robotic system in the operation, to pack and label them for further processing.

### MAXIBAG CONVEYOR

Carries the maxibag to be sampled from the weighing station to the sampling area and then moves it to the exit area.

### TOOL RACK

Contains the different sampling tools to be exchanged and cleaned in seconds, this allows having tools for each material to be sampled.

### SAFETY PERIMETER

Aisles, railings and protection grids, to avoid the presence of people in risk areas.

The maxi bags are loaded onto the conveyor belt by means of a forklift. Once they are on the conveyor, they are transported across the belt. An operator must then open the maxi bags according to specifications. The system automatically centers the maxi-bag in the weighing station and then measures the height of the maxi-bag. After opening the maxi-bag, the operator signals the system and leaves the maxi-bag ready for sampling.

The maxi bag arrives at the sampling station, where the robot performs the defined increments and then the sample is deposited by the robot to be packed. Then the maxibag is moved to the end of the outfeed conveyor, to be unloaded by a forklift. This process is repeated consecutively for each maxi bag or drums if required.



## PARTNERS



HighService is an industrial services company with offices in three countries and more than 1,000 employees. With four business units, HighService can provide a full range of solutions including:

- Industrial Maintenance and Technical Services
- Engineering and construction
- Technology development
- Applied robotics for mining and general industrial applications.

### Mission

To be a world class strategic partner of our clients in the creation of value for their business, through integral, efficient and reliable solutions.

### Vision

To be a leading company in the global mining market in the area of specialized services and technological innovation.

### Values

- Ethical behavior and professional integrity
- Loyalty to customers
- Respect for people
- Employee development
- Service excellence
- Calculated risk in sales actions

More information at: <http://www.highservice.com>

# KUKA

A pioneer in automation and robotics, KUKA Robotics is one of the world's leading manufacturers of robotic systems. KUKA offers a unique and comprehensive range of industrial robots and robotic systems covering all payload and mobility categories. Game controllers and software for all kinds of scenarios complete the KUKA product portfolio.

KUKA, together with its partners, has robotic automation solutions that are perfectly tailored to its customers' industries.

Likewise, KUKA offers a wide range of services, including collaborative planning, commissioning and maintenance to help its customers realize the full potential of KUKA products. In case of emergency, KUKA's technical support is available around the clock.

