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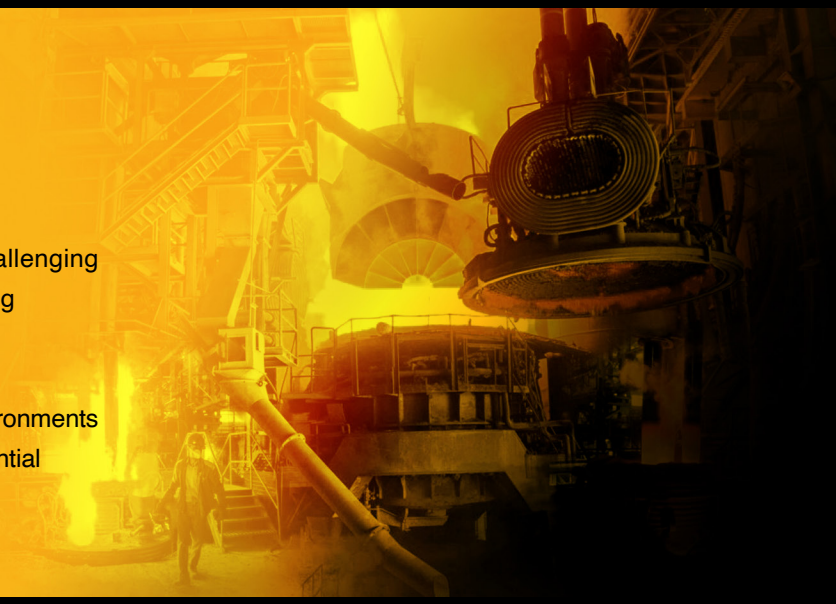
METAL LEVEL MONITORING

AI-POWERED VISION SYSTEM FOR MOLTEN METAL CONTROL

OPTIMAL PROCESS CONTROL EVERY TIME



THE METAL LEVEL MONITORING CHALLENGE

Critical Measurement Infrastructure at Risk

Molten metal level monitoring represents one of the most challenging yet essential processes in steel, slag pot, and vacuum degassing operations across sub-Saharan Africa's industrial facilities.

Accurate level measurement in extreme high-temperature environments is vital for safety and efficiency, making precise monitoring essential for operational continuity and worker protection.

THE HIDDEN DANGERS OF MANUAL LEVEL MONITORING

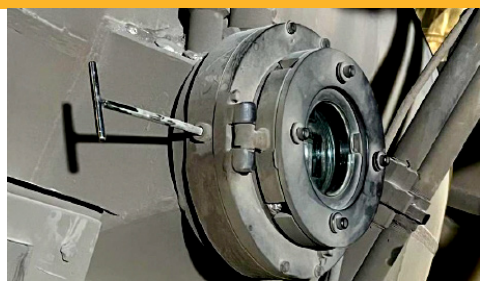
- **Critical yet challenging measurement** - accurate slag/metal vessel level data is vital but difficult to obtain reliably
- **Safety hazards and maintenance delays** from inaccurate readings causing overflows and bursts
- **Productivity and automation limits** preventing effective closed-loop control systems
- **Operational vulnerabilities** from insufficient level measurement accuracy hindering automation

THE COST OF LEVEL MONITORING FAILURES

When metal level monitoring systems fail, the consequences extend far beyond simple operational issues. The impact affects safety, production efficiency, and maintenance costs across entire steel operations.

WHAT HAPPENS WHEN LEVEL MONITORING SYSTEMS FAIL

- **Molten metal overflows** creating immediate danger to personnel and equipment.
- **Slag bursts and vessel damage** requiring extensive repair work and downtime.
- **Operational stoppages** from safety incidents and equipment failures.
- **Extended maintenance periods** due to damage from uncontrolled overflows.
- **Manual monitoring requirements** increasing labour costs and safety risks.



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INTRODUCING METAL LEVEL MONITORING: ADVANCED VISION INTELLIGENCE

360-DEGREE LEVEL SURVEILLANCE

DGC AFRICA's Metal Level Monitoring transforms steel plant operations through advanced AI-powered vision technology that provides continuous, comprehensive surveillance of molten metal levels in ladles, slag pots, and vacuum degassing chambers. This intelligent monitoring system delivers real-time level control that was previously impossible to achieve.

CORE METAL LEVEL MONITORING CAPABILITIES

FULL CYCLE MONITORING AND AUTOMATION

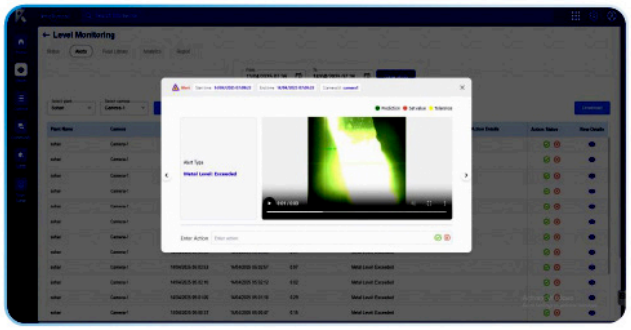
High-end machine vision cameras strategically positioned to capture molten metal levels within vessels, providing proprietary AI vision system that automates critical level monitoring and executes programmable closed-loop control actions.

REAL-TIME ALERTS AND TRACKING

Operators receive immediate alerts when levels exceed set limits, with intelligent severity assessment and automated control actions to prevent overflows and maintain optimal operating conditions.

PROACTIVE MAINTENANCE, REDUCED DOWNTIME

The system enables 10,000+ hours reduction in man-hours due to precise level detection and control action, minimizing vessel overflow risks while extending equipment life through optimized maintenance timing.



ADVANCED AI VISION DETECTION TECHNOLOGY

HOW METAL LEVEL MONITORING WORKS

DGC AFRICA's Metal Level Monitoring utilizes sophisticated high-end machine vision camera systems to capture comprehensive level data from molten metal operations, providing unprecedented visibility into vessel conditions and automated control performance.

TECHNICAL LEVEL MONITORING APPROACH

HIGH-END MACHINE VISION CAMERAS

Advanced cameras designed for extreme temperature environments capture detailed visual data of molten metal levels within slag pots, ladles, and vacuum degassing chambers with precision measurement capabilities.

PROPRIETARY COMPUTER VISION ALGORITHMS

Sophisticated AI algorithms process real-time video feeds to identify exact metal levels, comparing against set limits and triggering appropriate control actions automatically.

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HOW METAL LEVEL MONITORING WORKS CONTINUED...

CLOSED-LOOP CONTROL INTEGRATION

Direct integration with PLCs and action control systems enables automated responses including calibrated water spray timing and process adjustments to maintain optimal levels.

ON-PREMISE PROCESSING SERVICES

Complete on-site processing ensures real-time response capabilities while maintaining data security and operational independence.

REAL-WORLD SUCCESS: OMAN STEEL PLANT IMPLEMENTATION

PROVEN RESULTS FROM LEADING STEEL PRODUCER

PROJECT OVERVIEW

DGC AFRICA successfully implemented Metal Level Monitoring at Oman's largest fully integrated steel producer, with a capacity of 2.4 MTPA, located in Sohar, Oman. The facility has mastered low-cost and environmentally friendly steel making supply chains.

COMPREHENSIVE LEVEL CONTROL CAPABILITIES

CASE 1

Automated Overflow Prevention The system detected rising molten metal levels approaching critical thresholds in slag pots. Immediate alerts and automated water spray activation prevented overflows, eliminating potential safety incidents and equipment damage while maintaining continuous operations.

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CASE 2

Calibrated Control Response Metal Level Monitoring identified optimal timing for water spray activation based on precise level measurements. The system's calibrated closed-loop features enabled better utilization with programmable pause times (5.3 seconds) and controlled sprinkle durations (1 second) for maximum efficiency.

CASE 3

Predictive Level Analytics During extended operations, the system provided continuous trend analysis showing level patterns over time. This enabled operators to optimize process parameters and prevent potential issues before they occurred, significantly improving operational efficiency.

ADVANCED ANALYSIS FEATURES

HISTORICAL LEVEL ANALYTICS

The system maintains detailed records of all level measurements and control actions, allowing operators to identify patterns and implement continuous improvement programs for enhanced operational performance.

REAL-TIME DASHBOARD MONITORING

Complete level trend visualization enables real-time operational oversight and provides valuable insights for process optimization and maintenance planning.

HIGH ACCURACY PERFORMANCE

The AI model achieves 99.5% accuracy with only 0.2% false positive rate and 1.5% alerts miss rate, ensuring reliable and precise level monitoring under all operating conditions.

MEASURABLE OPERATIONAL IMPACT

QUANTIFIED RESULTS THAT TRANSFORM OPERATIONS

10,000+ HOURS REDUCTION IN MAN-HOURS

Due to precise level detection and control action, significantly enhancing overall process efficiency and safety while reducing manual monitoring requirements.

SIGNIFICANT TIME SAVINGS IN REPAIR WORKS

Continuous monitoring and closed-loop control reduces ladle overflows, saving substantial amounts of time in potential repair works and maintenance activities.

ENHANCED SAFETY OF OPERATION

Continuous monitoring and closed-loop control with calibrated water spray timings reduces slag bursts, significantly reducing safety hazards originating from slag bursts and overflows.

TECHNICAL IMPLEMENTATION

PROFESSIONAL CAMERA CONFIGURATION

STRATEGIC CAMERA PLACEMENT

Metal Level Monitoring utilizes high-end machine vision cameras positioned at optimal angles around vessel structures to ensure complete coverage of molten metal level detection and monitoring.

EXTREME ENVIRONMENT TECHNOLOGY

Industrial-grade cameras capable of accurate level measurement in extreme high-temperature conditions, designed specifically for steel plant environments with molten metal operations.

360-DEGREE COVERAGE

Complete vessel monitoring with specialized camera coverage ensuring precise level detection across all critical operational areas.

INTELLIGENT PROCESSING SYSTEM

REAL-TIME AI ANALYSIS

Proprietary computer vision algorithms process video data continuously, identifying level changes and triggering control actions with 99.5% accuracy and minimal false alarms.

CALIBRATABLE CONTROL FEATURES

Intelligent closed-loop systems with programmable timing controls for water spray activation, pause durations, and response parameters based on actual level conditions.

HISTORICAL DATA MANAGEMENT

Comprehensive level trend storage and retrieval capabilities enable pattern analysis and comparative assessment of operational performance over time.

PLC INTEGRATION CAPABILITIES

Seamless integration with existing plant control systems, SCADA platforms, and action control systems for comprehensive automated operations.

DGC AFRICA IMPLEMENTATION ADVANTAGE

115 YEARS OF INDUSTRIAL EXPERTISE

DGC AFRICA brings unmatched steel industry and high-temperature process expertise to Metal Level Monitoring implementations:

- **Comprehensive steel plant services** including level monitoring system installation, calibration, and optimization.
- **Regional expertise** across sub-Saharan Africa's challenging industrial environments and extreme operating conditions.
- **Proven track record** with molten metal operations and automated control system optimization.
- **Local technical support** with African-based engineers understanding regional operational challenges.

INTEGRATED PROCESS EXCELLENCE

COMPLETE LEVEL MONITORING SOLUTIONS

- **Process assessment services** using advanced AI analytics and steel operations engineering.
- **Custom control protocols** tailored to specific vessel types and operational requirements.
- **Continuous monitoring programs** combining real-time detection with automated control systems.
- **Emergency response integration** for critical level exceedance situations.

TRANSFORM YOUR STEEL OPERATIONS TODAY

READY TO ELIMINATE LEVEL MONITORING RISKS?

KEY BENEFITS

- **99.5% monitoring accuracy** through advanced AI vision technology.
- **10,000+ hours reduction** in man-hours through automated level control.
- **Significant reduction in repair time** through overflow prevention.
- **Enhanced safety operations** with automated closed-loop controls.
- **Complete process automation** with calibratable control features.

OPTIMAL PROCESS CONTROL EVERY TIME WITH DGC AFRICA'S AI-POWERED METAL LEVEL MONITORING

115 YEARS OF DOING BUSINESS
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115 YEARS OF DOING BUSINESS

OVER A CENTURY OF TRUSTED SERVICE –
COMMITTED TO SAFETY, QUALITY & ON-TIME DELIVERY.

www.dgc-africa.com

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