



Portal Crane Automated Solutions



About Us

Hunan China Railway WUXIN Heavy Industry Co., Ltd.

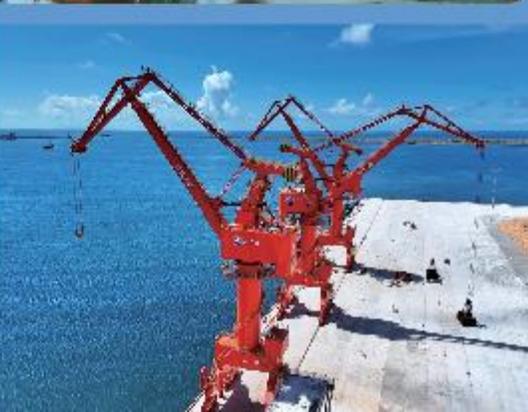


A high-tech enterprise specializing in the R&D and manufacturing of high-end intelligent port machinery.

With the corporate vision of "Making Cargo Handling Effortless," WUXIN products are widely utilized in world-class ports such as Guangzhou Port, Zhejiang Sea Ports Ningbo-Zhoushan Port Group, SIPG, Wilmar Group, Singapore Sateri Group, etc.

Our main products include:

- **Portal Slewing Cranes**
- **Terminal Container Cranes**
- **Port Bulk Material Handling Cranes**
- **Shipbuilding Cranes**
- **Port Crane Accessories.**











Portal Crane Automated Solutions

Advantages:

1.High Operational Flexibility

Equipped with interchangeable load-handling attachments (hooks, grabs, electromagnets, spreaders) for rapid switching, enabling efficient handling of diverse cargo types (bulk, breakbulk, containers).

2、 Wide Operating Range

3、 Cost-Effective Procurement



**High
Labor
Intensity**

**Skill-
intensive
workforce |
Inconsistent
workflow
efficiency**

**Elevated
safety
risks**

Challenges in Portal Crane Operations & Automated Solutions



Development Trend of Portal Slewing Cranes



Evolution of Portal Crane Operation Modes

- 01 Manual Operation**
One operator per crane, local cab control
All functions (hoisting, slewing, traveling) performed manually by the operator
- 02 Semi-Automatic with Anti-Sway & Positioning (Local)**
One operator per crane, local cab control
Manual grab operation with automated sway control and position assistance
- 03 Remote Semi-Automatic**
One operator per crane, remote control station
Manual grab operation with remote monitoring capability
- 04 Fully Automated**
Single operator monitors multiple cranes
Complete autonomous operation including automatic grabbing



What is an Automated Portal Crane?



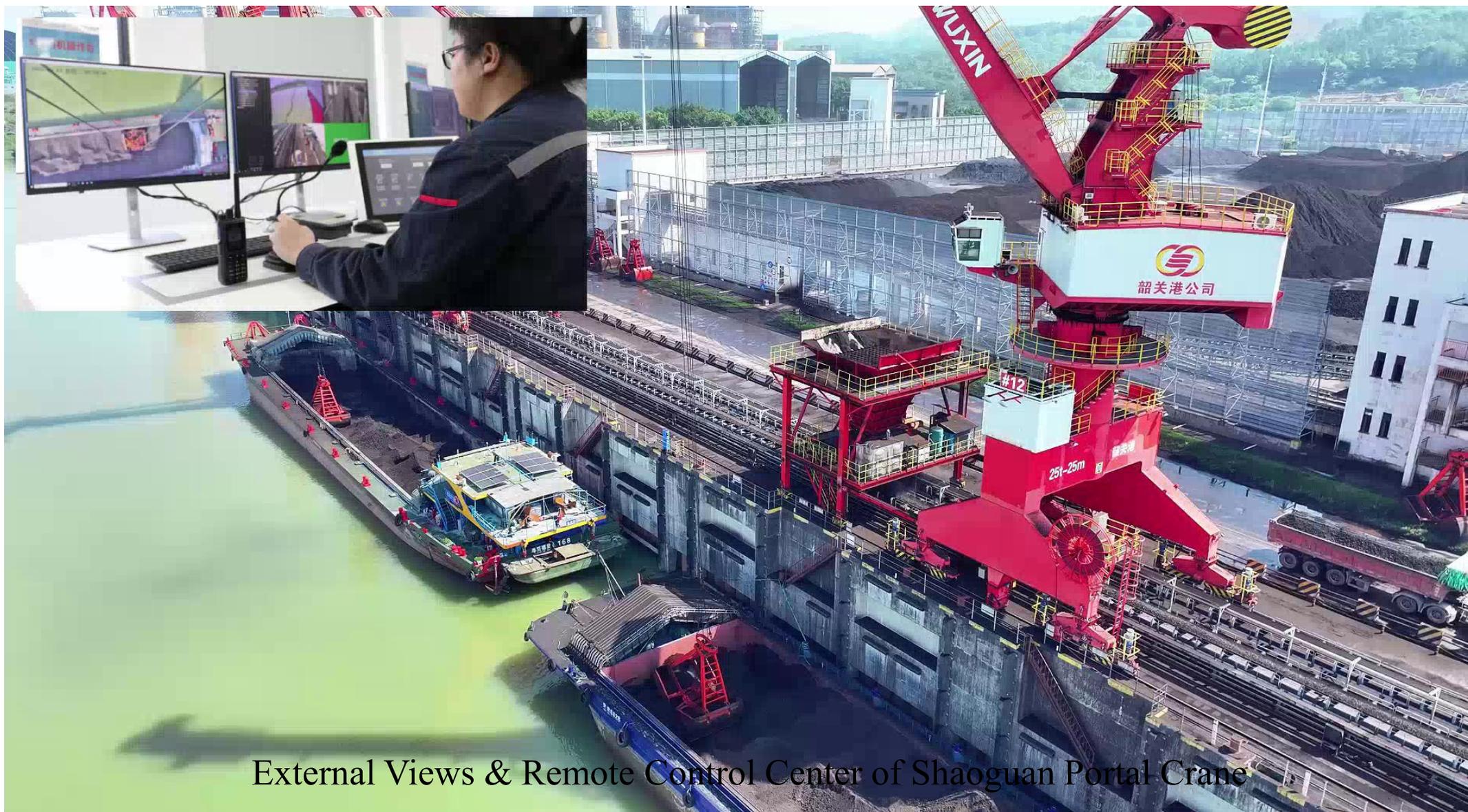
An automated portal crane integrates advanced sensing technologies, automatic control systems, and communication technologies. It enables:

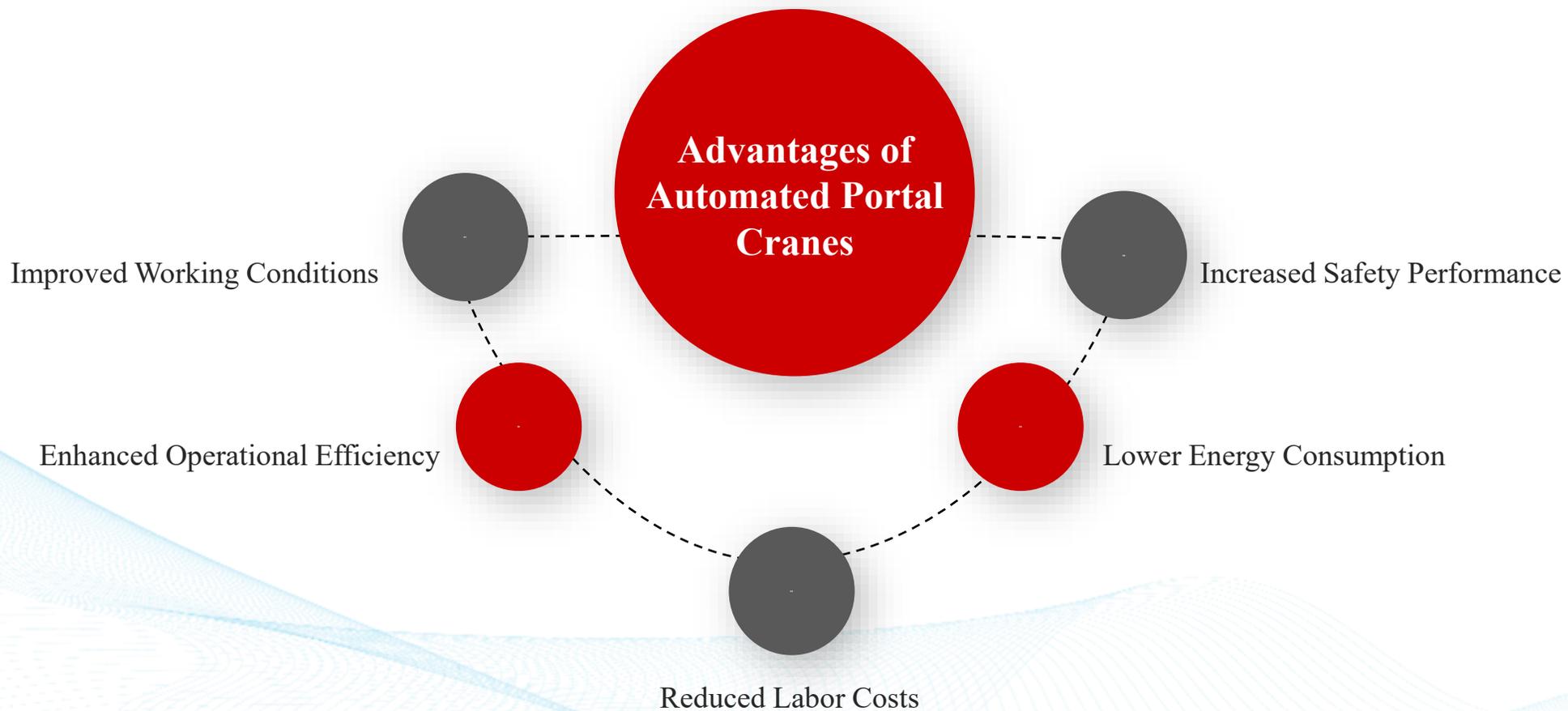
- Autonomous cargo/environment recognition

- Fixed-route cruising

- Automated grabbing and unloading

All operations are completed automatically except for hold-clearing phases requiring manual intervention, significantly reducing reliance on human operators.





Semi-Automated Process

Operator one-click sets discharge point



Manually selects grab point & positions grab on material



Activates semi-auto mode



Grab bucket automatically grabs material then automatically ascends.



Grab bucket automatically transfers above hopper



Automatic discharge



Grab auto-returns to loading point



Grab auto-returns to loading point



Automated Process

Operator one-click sets discharge point
Operator one-click sets discharge point



Operator manually selects grabbing point and controls grab bucket to descend onto material.



Activate laser scanning system to obtain hatch position, bulwark height, material pile profile, etc.



Activate Full Automatic mode.



Grab bucket automatically grabs material and ascends.



Grab bucket automatically moves to next grabbing point.



Grab bucket automatically transfers above hopper.
Automatic discharge.

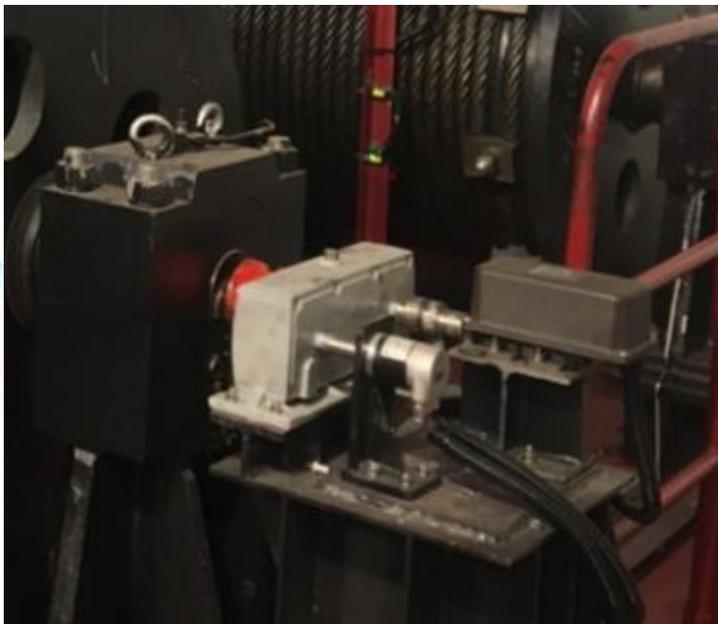




- ◆ Positioning System (Hoisting/Luffing/Slewing/Traveling)
- ◆ Grab Sway Prevention & Positioning System
- ◆ Hull Scanning System
- ◆ Active Anti-Collision System
- ◆ Multi-Crane Coordination System
- ◆ Video Monitoring System
- ◆ Voice Communication System

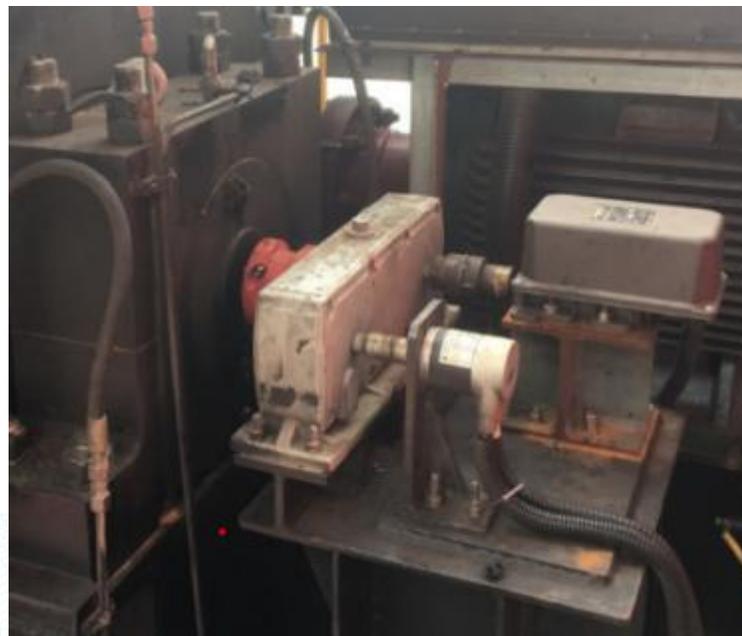
► Hoisting Mechanism Positioning System

The hoisting mechanism employs an **absolute encoder** for position detection. The encoder calculates travel distance to determine real-time load height, with position data verified by **cam limit switches** at predefined calibration points.



► Luffing Mechanism Positioning System

An absolute encoder installed on the luffing mechanism precisely measures boom angle amplitude, with periodic verification performed via **luffing travel limit switches**.



► Slewing Mechanism Positioning System

A small driven gear is installed on the main gear ring, rotating in mesh with the primary gear. A multi-turn absolute encoder mounted on the driven gear's shaft calculates slewing angles through **encoder readings**, while **calibration limit switches** provide position verification.

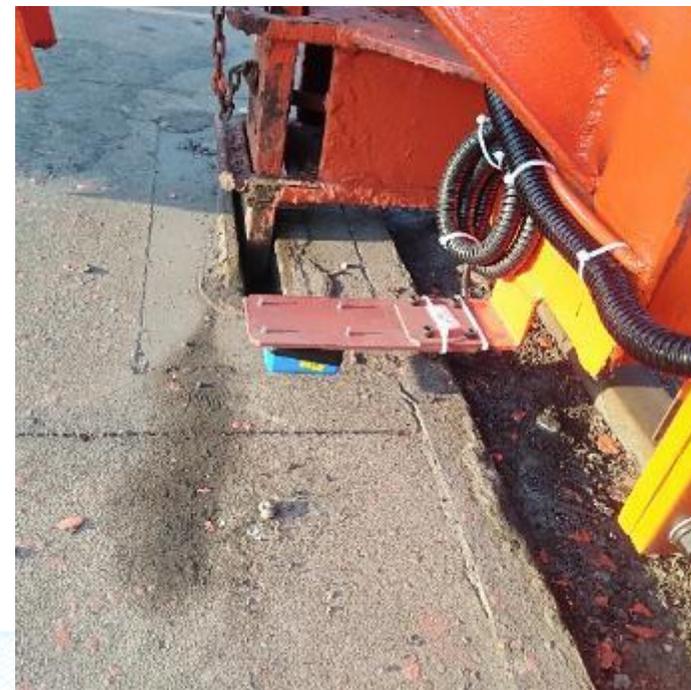


▶ **Travel Mechanism Positioning System**

Absolute encoders mounted on auxiliary wheels calculate travel distance via constant-radius passive wheel rotation, while integrated **RFID** devices read pre-embedded tag data along the wharf to perform real-time encoder calibration.



Absolute Encoder for Travel Mechanism



RFID for Travel Mechanism

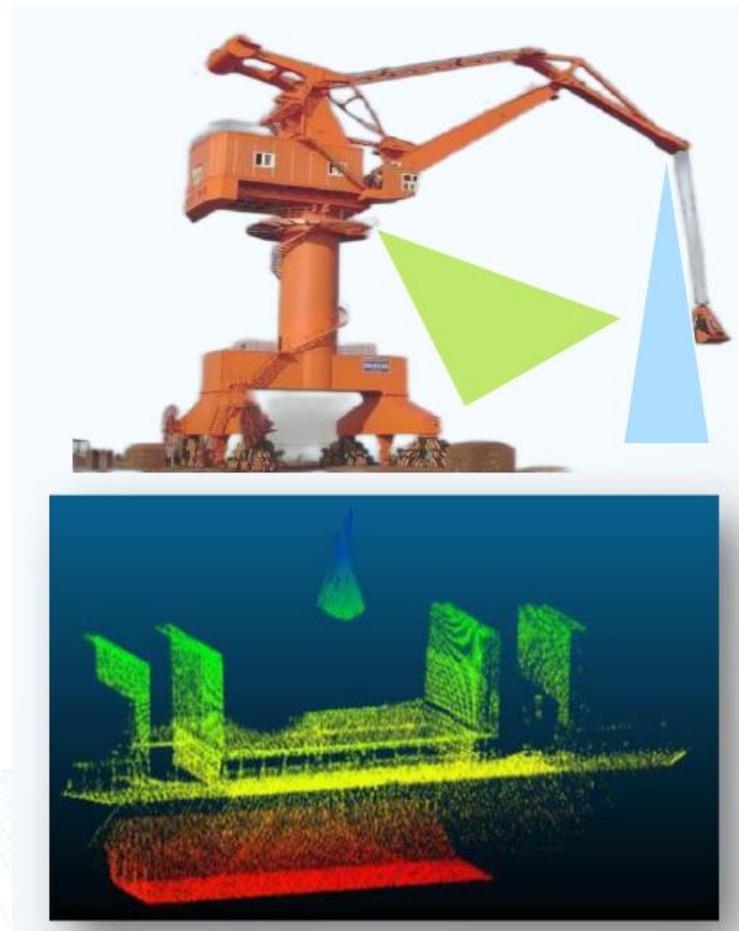


Anti-Sway Control System

- The system employs **real-time velocity control algorithms** for the luffing and slewing mechanisms to eliminate wire rope swing angles, ensuring **smooth grab movement** without oscillation.
- When the grab reaches its target position, integrated anti-sway technology enables **stable positioning** with zero residual swing.

► Hull Scanning System

- Utilizing **3D laser scanning** technology to perform real-time vessel contour scanning, the system generates a three-dimensional vessel profile model through point cloud processing algorithms, accurately identifying key features including hatch positions, freeboard height, and stockpile contours.
- The automated control system leverages this hull data to optimize spreader paths, enhance positioning accuracy, and enable automatic collision avoidance, thereby improving loading/unloading efficiency and operational safety compliance.



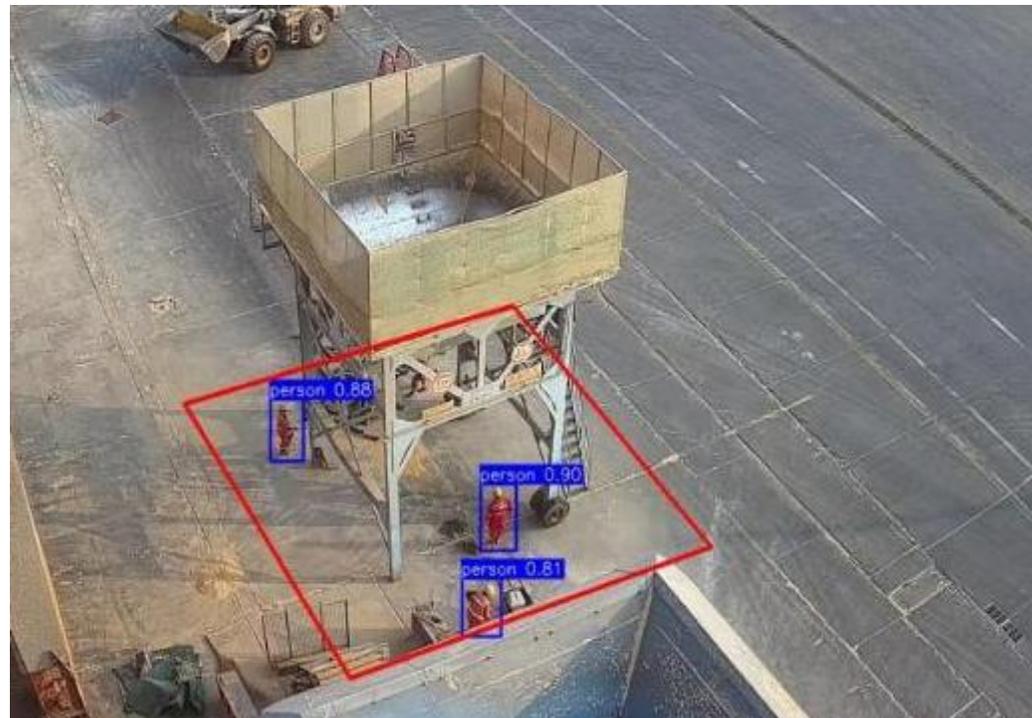
▶ Active Anti-Collision System

Three **multi-line laser scanners** are installed at optimal positions on the crane to enable real-time detection and protection against obstacles during boom telescoping and slewing operations, covering both the front and lateral areas of the boom. The system employs active collision avoidance algorithm software to ensure effective protection without compromising the operational efficiency of the portal crane.



▶ Anti-Intrusion System

A **surveillance camera** shall be installed at appropriate locations on the crane to utilize **AI-based intelligent recognition technology** for **detecting personnel presence** within designated warning zones. When personnel are detected in restricted areas, all crane operations are **automatically prohibited** while alarm signals (including voice alerts and graphical/text notifications) are simultaneously transmitted to the central control console.



► Video Monitoring System

The video monitoring system serves as the remote operator's "eyes," providing **real-time visual feedback** during manual operations. Operators rely on live video feeds to monitor onsite conditions.

The system must display the following **continuous video streams** on the central control console:

- Operator Cabin View
- Trolley Travel Direction
- Grab Bucket Operation
- Machinery Room
- Luffing Mechanism



▶ Remote Control Platform

Operators can perform remote operations via a **remote control console**, which is equipped with:

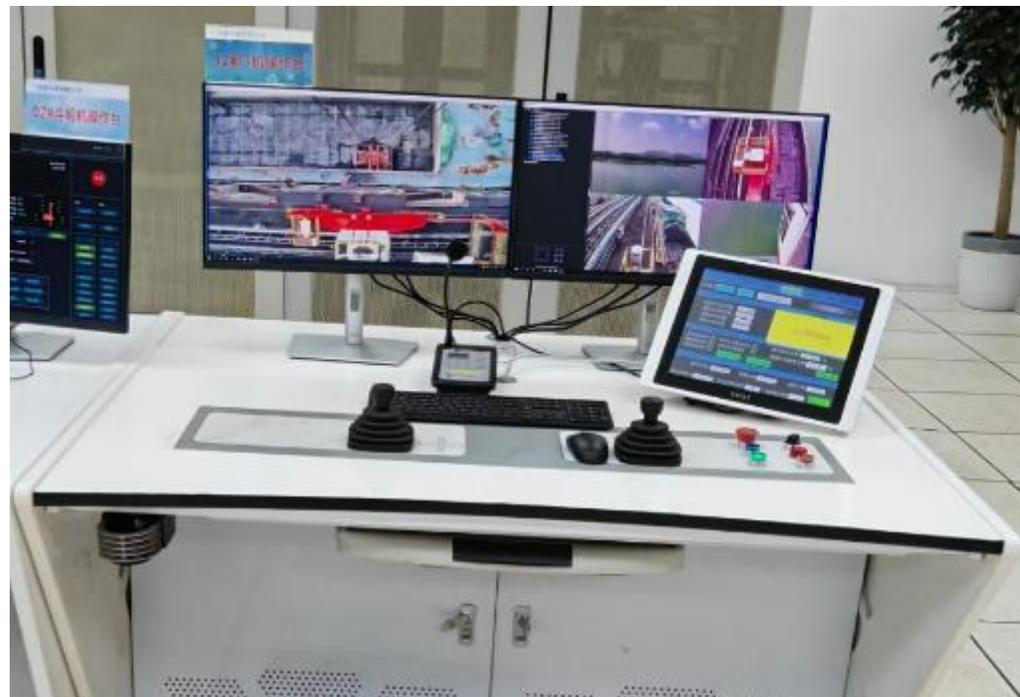
Control levers for operational commands

Switch buttons for system functions

Displays showing **real-time monitoring** data

Touchscreens for **status visualization** and control inputs

Voice communication devices for **coordinated operations**





Thank you !



Wechat



WhatsApp

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