Standard Operating Procedure: Weighbridge Automation, Procurement and Installation

RFID, ANPR cameras, ultrasonic sensors, signals, LED display, boom barrier and eRawanna connectivity for mine weighbridges in Rajasthan.

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Prepared by	Bhuwada Global Tech, a brand of Bhuwada Global Exim (OPC) Private Limited
Applies to	Mine owners and site teams commissioning an automated weighbridge with Bhuwada Global Tech
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> This SOP describes how Bhuwada Global Tech supplies, installs and commissions weighbridge automation. Orders and guidelines issued by the Department of Mines and Geology (DMG), Rajasthan always take precedence where they differ from this document.

1. Purpose and scope

This procedure sets out how an automated weighbridge is ordered, installed, integrated with the eRawanna portal and handed over. It covers the hardware supplied, the site layout, the way each truck moves through the weighbridge, service commitments and first-line troubleshooting.

The goal is a weighbridge that identifies, positions, weighs and clears every vehicle without manual intervention, with accurate weighment, fraud prevention, SOP compliance and real-time monitoring.

2. Roles and responsibilities

Party	Responsibility
Mine owner	Approves the work and prepares the site.
Bhuwada Global Tech	Supplies, installs and commissions the system.
DMG Rajasthan	Verifies compliance and activates portal integration.

3. Procurement and installation process

Step	Activity	What happens
1	**Choose a vendor**	Select an approved vendor from the Rajasthan DMG list.
2	**Confirm the order**	Confirm the order and schedule the installation.
3	**Deploy hardware**	RFID reader, cameras, sensors, signals, LED display and boom barrier are installed on site.
4	**Configure software**	Control room software and device integrations are set up.
5	**Register on the portal**	The installation is registered on the government portal.
6	**Inspection and integration**	The authority inspects the site and integrates it with the portal.
7	**Go live**	Handover with training, documentation, warranty and support.

4. System components and specifications

Component	Specification
UHF RFID reader	865–867 MHz, 3–12 m read range, about 200 tags per second, Ethernet. Mounted on the exit pole to read the vehicle's FASTag.
ANPR cameras	HD, number plate recognition, image capture. Top camera photographs the material; front camera on the exit pole reads the number plate.
Ultrasonic position sensors	Ultrasonic, IP65, programmable digital outputs. Sensor 1 at entry, Sensor 2 at the platform, Sensor 3 at exit.
Industrial automation controller	Modbus RTU and TCP/IP, RS485, MQTT; digital, analog and pulse I/O; relay outputs; built-in data display.
Outdoor LED display	High brightness, weatherproof, LAN or API control.
Traffic signal and boom barrier	Red and green LED signals, heavy-duty barrier, sensor-based control.
Computer system (DMG-compliant)	Intel Core i5 (6-core) or higher, 16 GB DDR4 RAM, 1 TB NVMe/SSD, Windows 11 Pro, 22-inch Full HD monitor.
Network	RFID reader, router, PoE switch, cameras, desktop PC, internet and government portal connection.
Device sync	MQTT and API.



Bhuwada industrial automation controller with three ultrasonic position sensors (S1, S2, S3).

5. Site layout



Reference layout: control room beside the platform, three poles, entry and exit signs.

Location	Equipment and position
Pole 1, entry	Sensor 1 at 8 ft height, 2 ft from the platform.
Pole 2, platform	Top camera at 16 ft height, with Sensor 2.
Pole 3, exit	Front ANPR camera, RFID reader and Sensor 3 at 12 ft height, 6 ft from the platform.
Control room	Beside the platform, with the weighbridge PC and an operator room camera.
Signage	Entry sign: drive to the platform and wait for a stable weight. Exit sign: proceed after the signal.

6. Vehicle flow at the weighbridge

Each sensor shows a light: 🟢 green while a vehicle is in front of it, 🔴 red when clear.

Step	Stage	What happens
1	**Sensor 1 detection**	The vehicle reaches the entry. Sensor 1 detects it and turns green, so the system knows a truck has arrived.
2	**On the platform**	The truck drives onto the weighbridge. Sensor 2 turns green and Sensor 1 turns red, confirming it is on the platform.
3	**Weight capture**	The load cells settle and the control room software captures a stable weight, shown on the LED display.
4	**Material photo**	The top camera photographs the material loaded in the truck.
5	**Number plate and FASTag**	At the same time, the front camera at the exit reads the number plate and the RFID reader reads the FASTag.
6	**eRawanna pass**	Weight, photos, plate and FASTag go to the eRawanna portal. The rawanna is passed, the signal turns green, the barrier opens and the vehicle moves forward. Sensor 3 turns green as it exits and red once it has gone.

7. eRawanna software

Weighbridge software updates are published on the Rajasthan Mines Portal:

- Old to new version update: minesportal.rajasthan.gov.in/sHaRe/BatchAPI.zip
- New version: minesportal.rajasthan.gov.in/sHaRe/eRawannaSoft.zip

RFID software packs and the IoT commissioning toolkit are provided by Bhuwada Global Tech during installation.

8. Service commitments

7 working days
Installation

48 hours
Warranty replacement

24×7
Support

9. First-line troubleshooting

Site teams should run these checks before raising a ticket.

Issue	Checks
RFID tag not detected	Check reader power and connections; check the FASTag is on the windscreen, facing the reader and within its read range; clean the antenna and the tag; check MQTT connection status in the dashboard; restart the RFID reader service.
Weight not updating in software	Check load cell cables; verify PLC Modbus communication; check sensor calibration; restart the PLC; verify the database connection.
MQTT broker disconnected	Check internet connectivity; verify the broker address and port 1883; restart the MQTT service; check firewall rules for port 1883; test with an MQTT client tool.
Vehicle detection sensor false triggers	Check sensor height (30–50 cm); verify detection zone settings; clean the lens; check ambient lighting; adjust the sensitivity threshold.
RTSP camera stream not loading	Verify the camera IP is reachable; check RTSP credentials; test the stream URL in VLC; check camera power and network; restart the NVR.
PLC offline	Check power supply and Ethernet connection; verify the IP configuration; restart the controller; test Modbus TCP port 502.
LED display blank	Check power and LAN cable; verify the IP configuration (192.168.1.x range); restart the LED controller; check the MQTT broker connection; ping the display directly.
Traffic light not working	Check the 24V DC supply; verify relay output from the controller; test individual bulbs; check the wiring; restart the traffic controller.
Boom barrier not opening	Check motor power; verify RFID authorisation in the software; test the manual override button; check limit switch alignment; inspect barrier controller communication.

10. Support and contact

If the checks do not fix the problem, raise a ticket on WhatsApp at **+91 96360 46610** or email **info@bhuwadaglobaltech.com** with the customer name, mobile number, site location and a description of the problem. Office: 314, Tower A, Mahima, Jagatpura, Jaipur, Rajasthan 302033.