10-Ton Mechanical Tipping Platform | Rock Breaking Experiment | Shandong University

Key Facts

Project Type: 10-ton mechanical tipping platform system. Customer: Shandong University. Location: Dezhou, Shandong, China. Industry: Geotechnical research equipment. Core function: 90-degree mechanical flipping for rock breaking experiments. Key parameters include 10000 kg load capacity, dual 1500 by 1500 mm platforms, expandable to 1700 by 1700 mm, 4 kW drive motor, and 90-degree rotation angle. Project timeline: order placed December 22, 2025, delivery scheduled January 10, 2026.

Customer Background

Shandong University is a leading comprehensive research university in China with strong capabilities in civil engineering, geotechnical engineering, and rock mechanics. The university operates advanced laboratories focusing on rock breaking, deformation behavior, and underground engineering simulation. Large-scale experimental workflows require safe and repeatable handling of heavy rock specimens. The tipping platform is integrated as a core experimental infrastructure enabling controlled flipping, repositioning, and repeated loading of high-mass geological samples.

Industry Pain Points and Project Challenges

Rock mechanics laboratories commonly face difficulties in handling irregular, heavy rock specimens safely and efficiently. Traditional crane-based or manual flipping methods lack precision, repeatability, and safety control. Eccentric load impact: 10-ton irregular rock blocks generate significant center of gravity offsets during flipping, causing dynamic shock loads. Forklift access limitation: solid base structures restrict forklift entry and reduce loading efficiency. Size adaptability constraint: rock specimens exceeding 1500 mm require adjustable platform geometry. Operational safety risk: high mass tipping operations require strict safety zoning and remote control capability.

Engineering Solutions

To address eccentric load impact, the platform uses a reinforced J200 by 100 by 8 steel frame structure designed to distribute load paths evenly and reduce stress concentration during flipping. This improves structural fatigue resistance and operational stability. For forklift accessibility, removable rectangular tube channels are integrated into both platforms. These bolted components allow forklifts to insert forks directly into the base structure, improving loading and unloading efficiency without compromising rigidity. To solve size adaptability, 200 mm detachable wing plates are installed on both sides of the platform. This modular system allows expansion from 1500 by 1500 mm to 1700 by 1700 mm, supporting larger rock specimens while maintaining alignment accuracy. For operational safety, a remote control system is implemented to keep operators outside the hazard zone during flipping. A 90-degree mechanical locking mechanism ensures positional stability and prevents unintended descent. Industrial yellow coating improves visibility in laboratory environments.

Core Technical Parameters

Device type: mechanical tipping platform. Rated load: 10000 kg. Table size: 1500 by 1500 mm, expandable to 1700 by 1700 mm. Rotation angle: 90 degrees. Drive system: 4 kW motor. Transmission: 20A-2 chain. Control system: remote operation. Structure: mechanical flip with reinforced steel frame. Color: industrial yellow. Safety: mechanical lock and remote operation control. Project duration: Dec 22, 2025 to Jan 10, 2026.

Typical Workflow

Step 1: Rock specimen is loaded using forklift through removable fork channels. Step 2: Operator checks load centering to reduce eccentric torque. Step 3: Remote system activates 90-degree flipping sequence. Step 4: Platform locks mechanically at target angle. Step 5: Rock specimen is retrieved or repositioned for subsequent experiments.

Project Value and Industry Significance

The system increases laboratory handling efficiency by more than 40 percent compared with traditional crane-based methods. Remote operation significantly reduces operator exposure to hazardous zones, improving overall safety compliance. Modular expansion design enables flexible handling of multiple specimen sizes without equipment replacement. The solution demonstrates strong scalability and provides a replicable model for geotechnical laboratories and research institutions dealing with heavy irregular materials.

Core Parameter Table

Parameter	Specification
Device type	10T mechanical tipping platform
Rated load	10000 kg
Table size	1500x1500 mm expandable to 1700x1700 mm
Rotation angle	90 degrees
Motor power	4 kW
Transmission	20A-2 chain
Control system	Remote control
Safety system	Mechanical lock + remote operation
Color	Industrial yellow
Project timeline	Dec 22, 2025 - Jan 10, 2026