Short Report on the Design and Fabrication of a Dual-Wheel Wheelbarrow with Braking System and Digital Weighing Scale

This project focuses on improving traditional wheelbarrow performance by developing a dual-wheel wheelbarrow equipped with a braking system and an integrated digital weighing scale. The aim was to enhance stability, safety, and functionality in material handling for construction, agriculture, and domestic applications.

Objectives

1. To design a dual-wheel configuration that improves balance and load support.

2. To incorporate an efficient braking mechanism for user safety on slopes and uneven terrain.

3. To integrate a digital weighing system to measure load weight in real time.

4. To fabricate a durable prototype using locally available materials.

Methodology

Design: AutoCAD/solid modelling tools were used to create the structural frame, wheel assembly, brake linkage, and weighing platform.

Material Selection: Mild steel tubing, bearings, rubber tyres, load cell sensor, microcontroller, and a digital display were chosen for strength and reliability.

Fabrication: Cutting, welding, machining, and assembly processes were used to build the frame, mount the dual wheels, attach the braking system, and install the weighing components.

Testing: The wheelbarrow was tested for load capacity, braking efficiency, stability, and weighing accuracy.

Results

The dual-wheel system provided better balance and reduced operator fatigue compared to single-wheel designs.

The mechanical brake system operated effectively, ensuring safe handling on inclined surfaces.

The digital weighing scale gave accurate load measurements with minimal error.

Overall performance showed improved efficiency, safety, and user convenience.