PROJECT ABSTRACT

Screw Conveyor Demonstration Model

A working bench-scale screw conveyor: fabricated helical screw in a transparent-top trough, inlet hopper, discharge chute and geared motor with speed control. Delivered built-to-order with the fabricated conveyor, drive, weighing instruments, test materials, report, PPT and viva kit.

01. Title

Screw Conveyor Demonstration Model

02. Introduction / Background

Screw conveyors move grain, cement, plastic granules and food powders through thousands of plants, yet mechanical students usually meet them only as a formula — throughput equals a constant times diameter squared times pitch times speed. This project makes the formula tangible: a bench-scale screw conveyor with a fabricated helical screw in a sheet-metal trough (transparent acrylic top so the material flow is visible), an inlet hopper, a discharge chute and a geared DC motor with a speed controller. The student loads wheat, rice or plastic granules, runs timed conveying trials at several speeds and two inclinations, weighs the discharged material, and compares the measured throughput with the theoretical capacity calculated from the screw's geometry. The gap between theory and measurement — slip, fill efficiency, inclination losses — becomes the most viva-worthy part of the report, and every number in it is the student's own.

03. Problem Statement

Bulk-material conveying is taught from textbook capacity equations, but without a rig the student never sees fill efficiency or slip act on a real number. This project addresses that gap with a fabricated working screw conveyor plus a timed-weighing trial procedure and a theory-vs-measured comparison template — so every throughput point in the report comes from the student's own stopwatch and weighing scale, honestly presented against the geometric design calculation.

04. Objectives

- Fabricate a true helical flight wound on a shaft, sized to the trough with proper clearance.
- Build the sheet-metal trough with a transparent acrylic top, inlet hopper and discharge chute.
- Drive the screw with a geared DC motor and PWM speed controller covering approximately 30–120 RPM.
- Support trough inclination adjustment from horizontal to about 20° to demonstrate the inclination penalty.
- Provide a digital weighing scale, stopwatch and tachometer sticker for timed throughput trials.
- Supply a theory-vs-measured comparison template that computes capacity from screw geometry.
- Support trials on wheat, rice or plastic granules so material effects are observable.
- Deliver the complete student kit: conveyor, drive, instruments, materials, report, PPT and viva Q&A.;

05. Proposed Methodology

The work is done in three stages. (1) Fabrication: the helical screw is wound and mounted in the sheet-metal trough with the acrylic top, hopper, chute and adjustable-inclination frame; the geared motor and PWM controller are fitted and wired. (2) Trials: the student fills the hopper, sets a screw speed, measures actual RPM with the tachometer sticker, collects discharge for timed 60-second intervals, weighs each collection and converts to kg/h — repeated across the speed range at horizontal and inclined settings. (3) Analysis: theoretical capacity is computed from screw diameter, pitch, RPM and bulk density with fill-factor and inclination corrections, and plotted against the measured points to report fill efficiency, slip and inclination losses.

06. System Architecture / Working

Material metered from the inlet hopper enters the trough, where the rotating helical flight conveys it along the bed toward the discharge chute; the acrylic top makes the bed movement visible. The PWM controller sets the screw speed, verified with the tachometer; discharge falls into the collection bin for timed weighing. Inclination is set with the adjustable frame legs, and the wedge-marked scale records the setting so each trial series is tied to a known geometry and speed.

07. Hardware / Software Requirements

- Fabricated helical screw on shaft (approx. 100 mm diameter, 1.2 m long — design targets)
- Sheet-metal trough with transparent acrylic top (approx. 1.4 m overall)
- Inlet hopper and discharge chute
- Geared DC motor 12/24 V with PWM speed controller
- Adjustable-inclination support frame (0–20°)
- Digital weighing scale and stopwatch
- Tachometer sticker for RPM check
- Test materials: wheat, rice, plastic granules

08. Expected Outcomes

- A working screw conveyor demonstrating visible granular conveying under speed and inclination control.
- Student-measured throughput points (kg/h) from timed weighing at each speed and inclination.
- A theory-vs-measured plot with fill efficiency and inclination loss discussed from the student's own data.
- A complete report, PPT and viva Q&A; on screw-conveyor geometry, bulk handling and experimental technique.

09. Applications

- Mechanical teaching laboratories and materials-handling practicals.
- Demonstrating screw-conveyor capacity theory, fill factor and inclination effects.
- Student mini-projects comparing bulk materials by density and particle shape.

10. Future Scope

- Variable-pitch or ribbon-flight screw variants for comparative trials.

- Load-cell based continuous weighing with data logging.
- Motorised inclination adjustment with digital angle readout.
- DEM simulation comparison against the measured throughput points.