PROJECT ABSTRACT

Cam and Follower Mechanism Working Model with Dial Indicator

A motor-driven cam-and-follower rig with interchangeable machined cam plates, spring-loaded follower and a 0.01 mm dial indicator for plotting real displacement diagrams. Delivered built-to-order with the rig, cam set, report, PPT and viva kit.

01. Title

Cam and Follower Mechanism Working Model with Dial Indicator

02. Introduction / Background

The cam and follower is the mechanism that opens engine valves, drives textile looms and times automatic machines — yet students usually meet it as a displacement curve drawn on paper, with no feeling for what the curve means on steel. This project makes the curve physical: a bench rig where a 12V DC motor drives a cam plate, a spring-loaded follower rides its edge, and a dial indicator mounted above reads the follower's lift to 0.01 mm. Three interchangeable cam profiles are supplied, so the student watches dwell, rise and return happen in metal, then plots each cam's displacement diagram from real dial readings taken degree by degree.

03. Problem Statement

Cam theory is taught as motion curves, but without hardware the terms dwell, rise and return stay abstract and the student never confronts the gap between the theoretical curve and a real mechanism's behavior. This project addresses that with a working rig where each phase is a visible event, the displacement diagram is plotted from the student's own dial-indicator readings, and the theory-vs-measurement gap — backlash, spring lag, tolerance — becomes the analytical core of the report.

04. Objectives

- Fabricate a motor-driven cam-and-follower rig on a rigid aluminium frame.
- Supply interchangeable machined cam plates with distinct motion phases.
- Guide a spring-loaded translating follower against the cam (force-closed pair).
- Measure follower lift with a 0.01 mm dial indicator.
- Provide a buyer-run displacement-diagram procedure (lift vs cam angle).
- Demonstrate dwell, rise and return as observable physical events.
- Deliver the complete student kit: rig, cam set, report, PPT and viva Q&A.;

05. Proposed Methodology

The rig is fabricated around an aluminium extrusion frame carrying the motor-driven cam shaft, the follower guide and the dial-indicator bracket in fixed alignment. Each cam plate keys to the shaft in turn; the student runs the motor at a slow study speed, indexes the cam in fixed angular steps, records the dial reading at each step, and plots lift against cam angle. Repeating the procedure for each profile yields a set of measured displacement diagrams compared against the theoretical curves in the report.

06. System Architecture / Working

The selected cam plate is keyed to the motor shaft; the coil spring holds the follower against the cam edge through the full rotation. As the cam's radius under the follower

grows and shrinks, the follower slides in its guide and the dial indicator's plunger, riding the follower stem, shows instantaneous lift. Indexing the cam stepwise and noting the dial reading builds the displacement diagram point by point; swapping cam plates changes the motion law the student measures.

07. Hardware / Software Requirements

- Machined steel cam plates (interchangeable set)
- 12V DC motor (approx. 3000 RPM rated) with speed control
- Spring-loaded guided follower
- Dial indicator, 0.01 mm least count, with bracket
- Aluminium extrusion frame
- Degree indexing arrangement
- 12V DC adapter

08. Expected Outcomes

- A working cam rig with smooth follower motion on all supplied profiles.
- Student-plotted displacement diagrams for each cam from dial readings.
- A documented theory-vs-measurement comparison with error discussion.
- A complete report, PPT and viva Q&A; on cam kinematics and follower types.

09. Applications

- The classic theory-of-machines cam experiment, done with real measurement.
- Demonstrating dwell, rise and return physically in kinematics courses.
- Displacement-diagram plotting exercises for mechanical labs.

10. Future Scope

- Student-designed custom cam profiles as a design extension.
- Velocity and acceleration derivation from the measured diagrams.
- High-speed jump/bounce observation with a strobe as an advanced study.