Electric Motor Test Bench

Client - Bharat Bijlee Ltd.

Objective:

- Design and supply a machine to test motors of varying frame sizes, shaft diameters, mounting arrangements, and power ratings at the Bharat Bijlee manufacturing facility. The fixture needed to accommodate multiple configurations on a single platform.

Approach:

- Conceptualized the testbench layout and classified 15 motors based on mounting arrangement: flange mount and base mount.
- Designed a flange to accommodate seven frame sizes of flange-mounted motors.
- Designed a height-adjustable platform for base-mounted motors to align the shaft of the torque sensor with the motor under test.
- Mounted the dynamo motor and torque sensor on a fixed structure for consistent measurement.

Solution:

- Designed a fixture to test 15 motor types up to 10 HP and 60 N·m torque. Selected a 0–60 N·m torque sensor to cover the full testing range.
- Integrated three-ring locators to align seven flange-mounted motor sizes on a single bracket.
- Developed a height-adjustable platform with T-bolts for base-mounted motors, reducing costs by 30% with adaptable mounts.
- Enabled forward–backward platform motion, reducing motor changeover time to 3 minutes.
- Integrated a double-disc coupling to allow micron-level misalignment tolerance and protect the torque sensor.

My Role (Freelancing Project):

- Conceptualized design, created CAD models, and developed GD&T production drawings in collaboration with the client.
- Applied DFMA principles to streamline manufacturing and assembly.
- Managed vendor manufacturing and procurement of off-the-shelf parts.
- Oversaw prototype assembly and testing at a rented workshop.
- Completed installation at client site.

- **CAD of Motor Test Bench showing an arrangement of base mount motor:**