Mileage Measurement System in Honda CD 70

Introduction

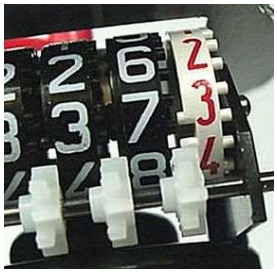
Internal combustion engine motorbikes such as the Honda CD 70 have a mechanical mileage meter (odometer) that records the total distance traveled by the vehicle in kilometers. This is a great case of applied mechanics and involves the use of a number of machine elements that cooperate to convert rotational motion from the wheel to linear distance displayed on the meter.

The basic components of the mileage measuring system.

The Honda CD 70 mileage measuring system usually comprises the following important mechanical components:

- Front Wheel Gear Mechanism: A gear system mounted at the front wheel hub converts wheel rotation into cable rotation.
- Speedometer cable is a rubber rotating component that conveys rotary motion from the wheel gear to the speedometer head.
- Odometer Gears and Dials: Inside the speedometer unit, there is a set of precision gears that turn the numbered odometer dials.
- Drive Shaft and Worm Gear: A worm gear arrangement provides reduction and precise movement of the number rollers.

Front Wheel Gear Mechanism and **Speedometer Cable**



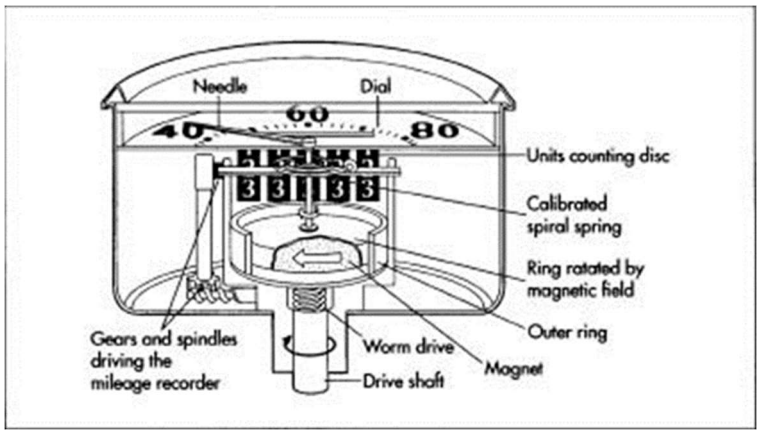
Odometer Gears and **Drive Shaft and Worm Gear**

Working Principle

The basic concept behind the odometer in the Honda CD 70 is the conversion of rotational motion into a linear distance measurement.

- As the motorcycle moves, the front wheel spins.
- This rotation propels the gear system on the wheel hub.
- The speedometer cable, which is mounted on this gear, rotates proportionally.
- The cable rotation is transferred to the odometer mechanism, where there are gear ratios that determine how many rotations equate to a kilometer.
- The final rotation moves a set of graduated number drums, one for every digit in the kilometer sum.

This system works only through mechanical devices, using precision gears and friction rollers, with no electronic component.



Relevant Calculations

The mileage is calculated on the basis of the following parameters:

- Wheel Circumference (C):

  $$C = 2\pi r$$

  Where r is the radius of the front wheel (e.g., approximately 0.216 m for CD 70), so

  $$C = 2\pi \times 0.216 = 1.357 \ meters$$
- Distance per Wheel Rotation:
  Each rotation moves the bike forward by approximately 1.357 meters
- Gear Ratio (G):
  The odometer gear system inside is calibrated to a way where a specified quantity of wheel revolution is equal to 1 kilometer on the meter. For example,

  $$No\ of\ Rotations\ per\ km = \frac{1000}{1.357} = 737\ rotations/km$$

Thus, for every 737 front wheel rotations, the odometer records 1 km.

Conclusion

The Honda CD 70 odometer mechanism is a perfect example of mechanical engineering in action. Through the use of a mix of rotating gears, worm drives, and careful calibration, it efficiently converts the motion of the motorcycle into a measurable distance. The system is accurate, long-lasting, and durable, making it especially well-suited to the road conditions found in Pakistan.