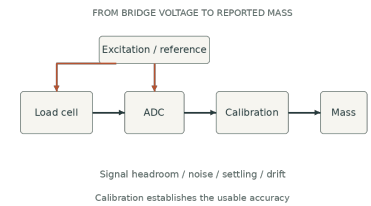


INSTRUMENTATION

Load-cell measurement chain

Find where weighing error enters, from the bridge to the reported mass.



CONCEPT SCHEMATIC

Measurement brief; sensor selection pending

THE PROBLEM

A bench weighing station can show more digits than its measurements justify. Sensor sensitivity, excitation, electrical noise, drift, and calibration all affect the reported mass. This project develops the signal chain and a traceable uncertainty budget.

SCOPE

- Specify bridge excitation, input range, gain, conversion, and sample rate.
- Compare filtering choices against settling time and noise requirements.
- Define zero, span, repeatability, and temperature checks.

PLANNED DELIVERABLES

- Signal-chain specification and uncertainty workbook
- Calibration and filtering code with reference test cases
- Wiring concept and a repeatability and drift test plan

CONSTRAINTS

Sensor

Specified strain-gauge bridge and rated capacity

Range

Useful mass range and overload margin to be agreed

Response

Settling time and reporting interval to be defined

Evidence

Datasheet limits distinguished from measured behavior

VERIFICATION PLAN

Signal budget

Track minimum and maximum signal through each stage, including headroom.

Uncertainty

Propagate sensitivity, reference, offset, and calibration contributions.

Test signals

Use synthetic steps and noise to check the processing; reserve accuracy claims for calibration.

NEXT STEP

Choose the load cell and define the mass range, resolution, and settling requirement.

No calibrated accuracy or trade-use certification is claimed. Mechanical installation and real sensor behavior need physical testing.