Acceleration as a “fundamental unit“ for dynamic measurements

Thomas Bruns, as Coordinator of EMRP-IND09

Mechanical units we care for

- Force measured in Newton (N)
- Torque measured in Newton·meter (N·m)
- Pressure measured in Pascal (PA)
- (amplifier sensitivity in
  V/(mV/V) or
  V/pC or
  …)

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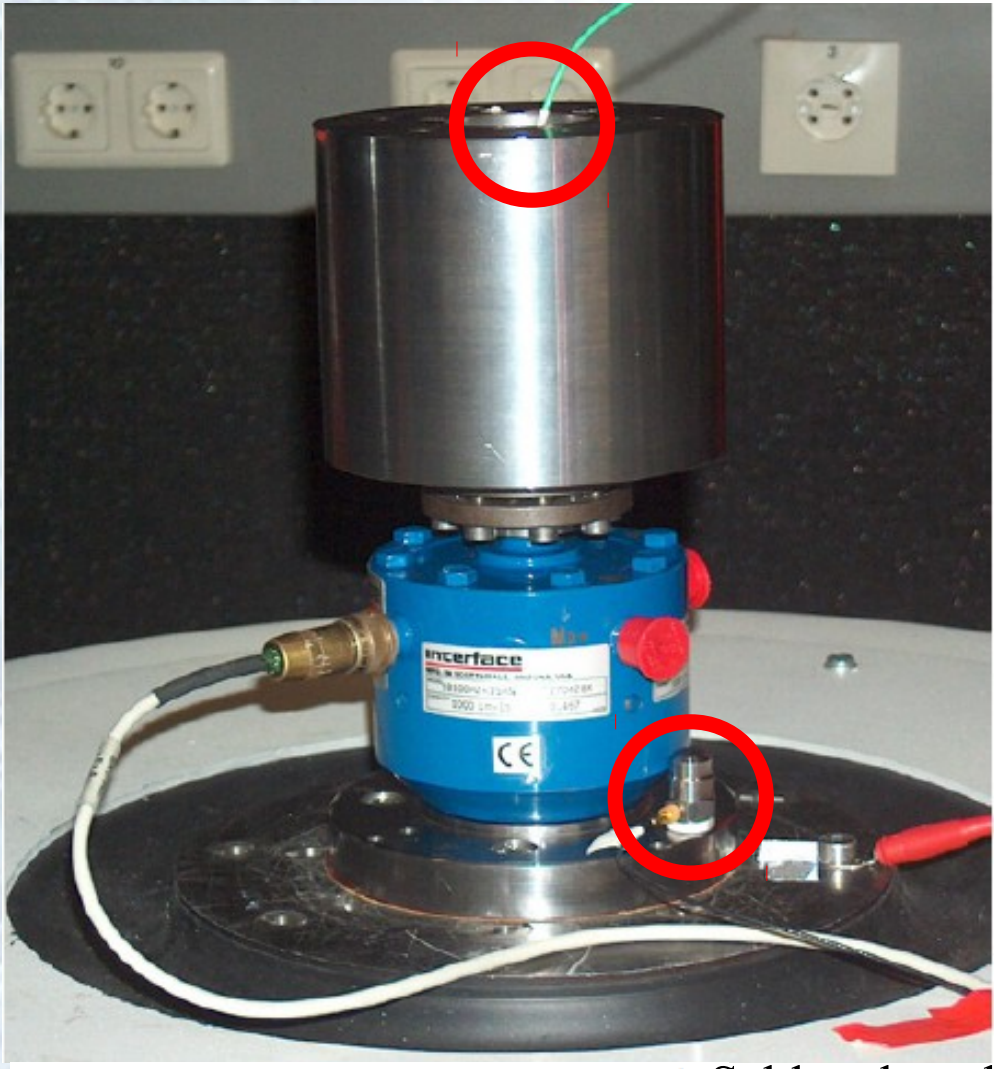
All in terms of frequency response or dynamic system parameters

Sinusoidal force as example

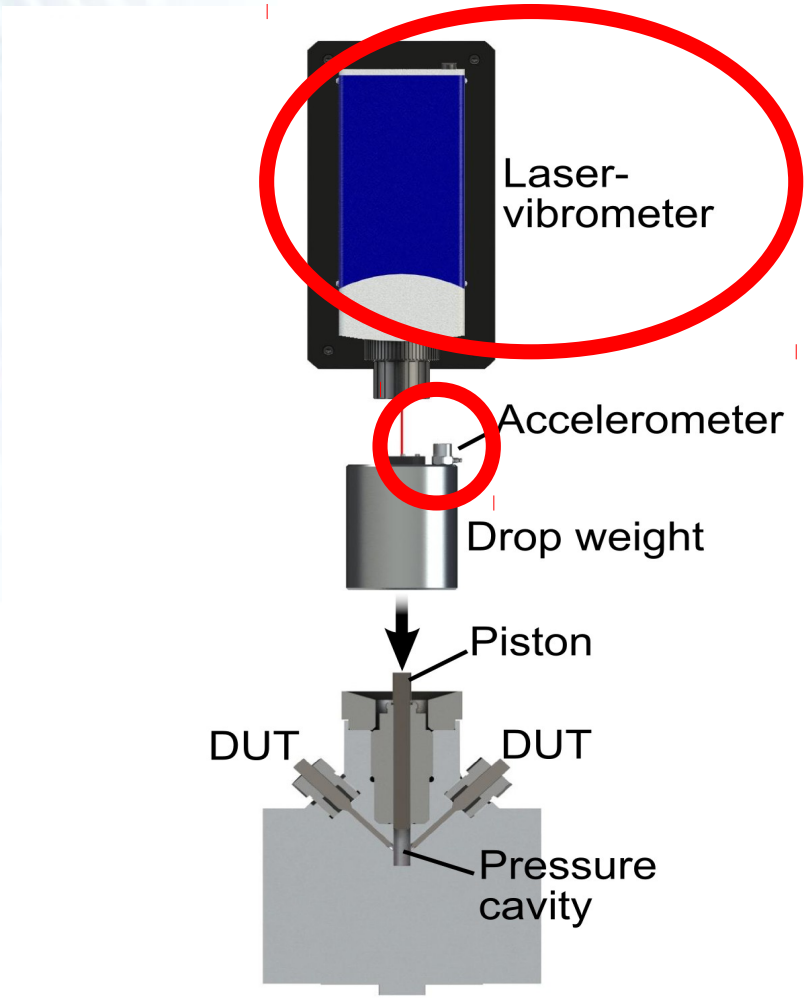


Metrologia **49** (2012) 224–235 Schlegel et al.

Force as
mass times acceleration

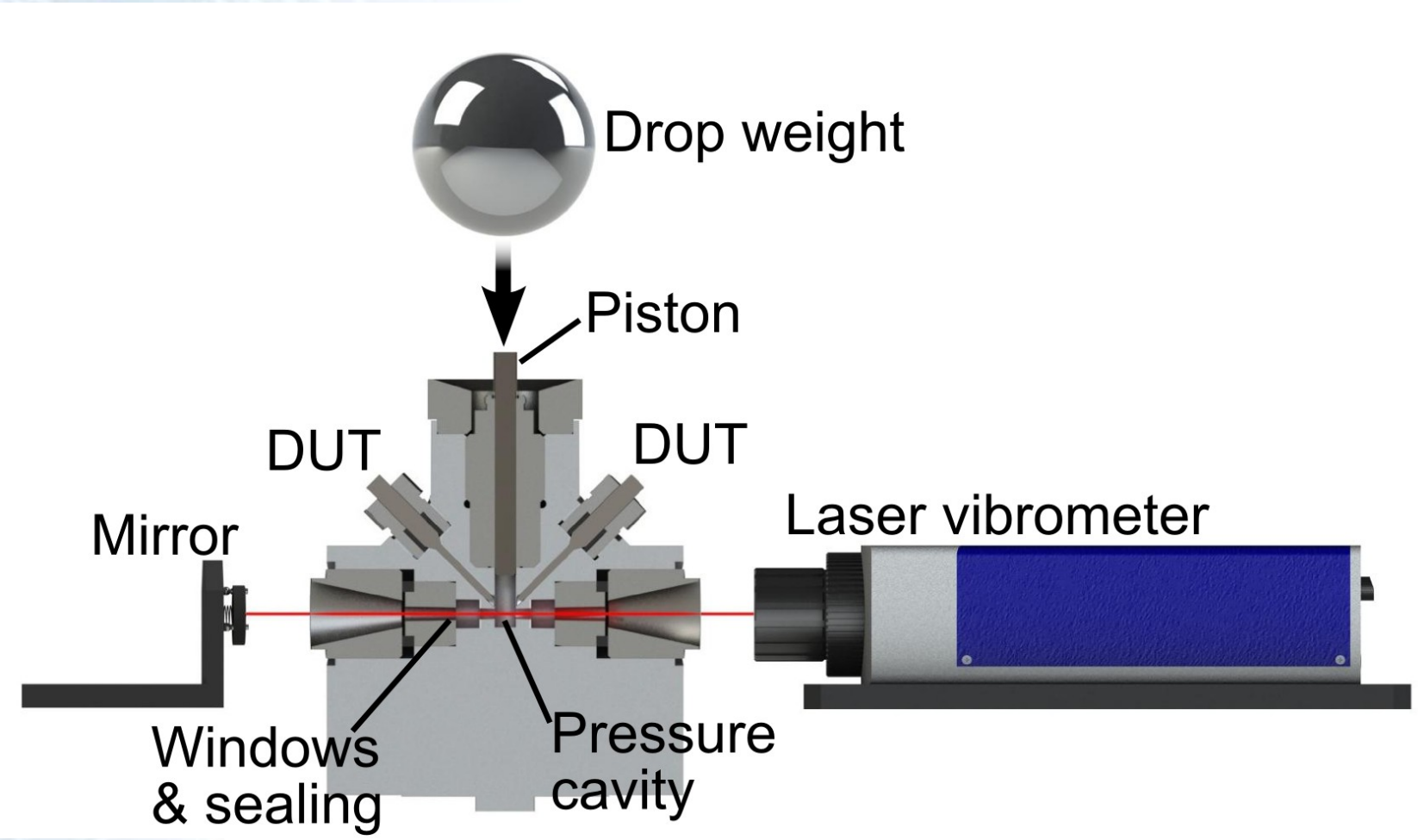
- Mass is one-time calib.
- Acc.is the dynamic quantity
- Acc. needs traceability
- Acc. needs methodical consultancy
- Acc. needs analysis experience

Shock pressure as example



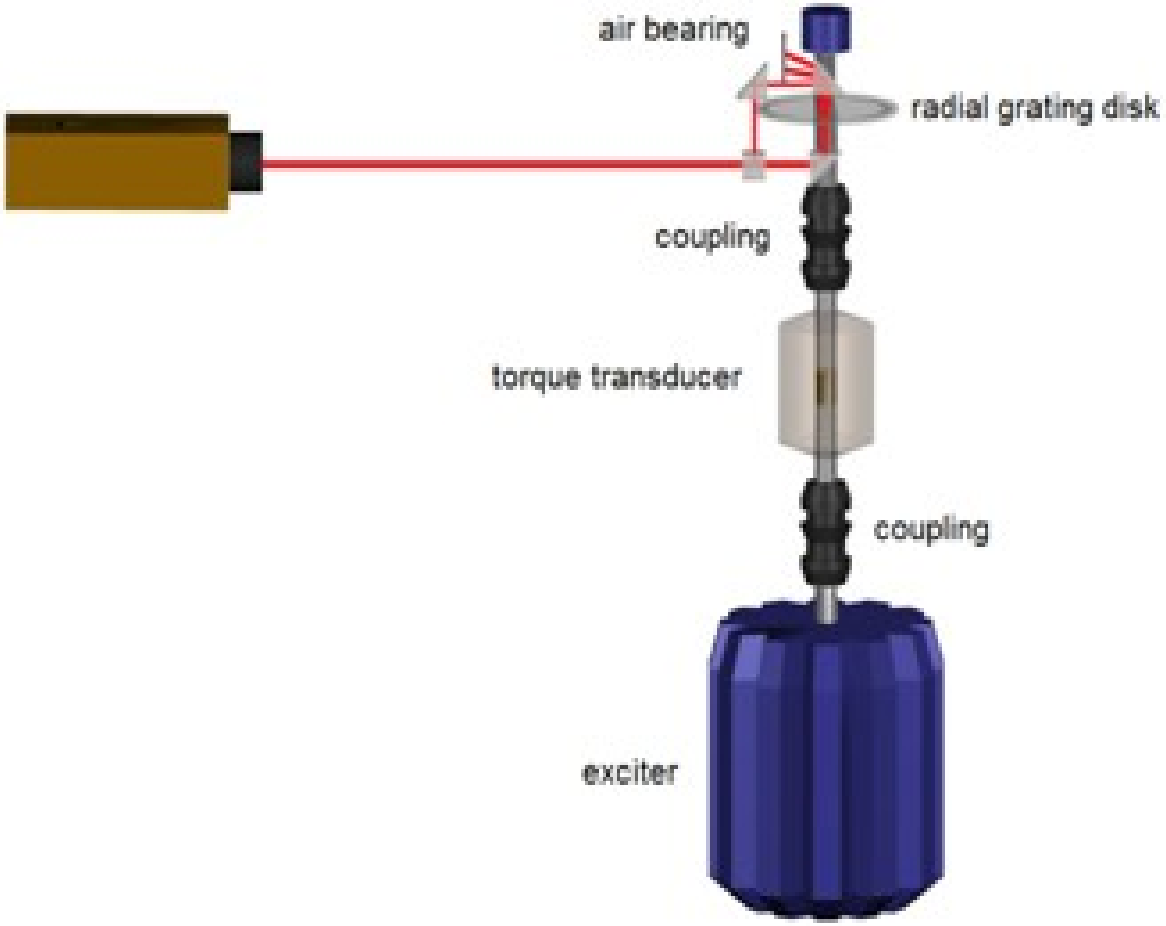
Shock pressure as another example

Experience in methods and procedures



Sinusoidal torque as yet another example

Primary angular acceleration measurement



Summary

- acceleration is the base of dynamic measurement in mechanics
- new fields of metrology will require traceability
- new options for co-operation
  new challenges, too
- borderline work between
  TC-AUV and TC-M (WGs)
  CC-AUV and CCM (WGs)