

Influence de la fixation des accéléromètres sur la mesure

P C B P I E Z O T R O N I C S .



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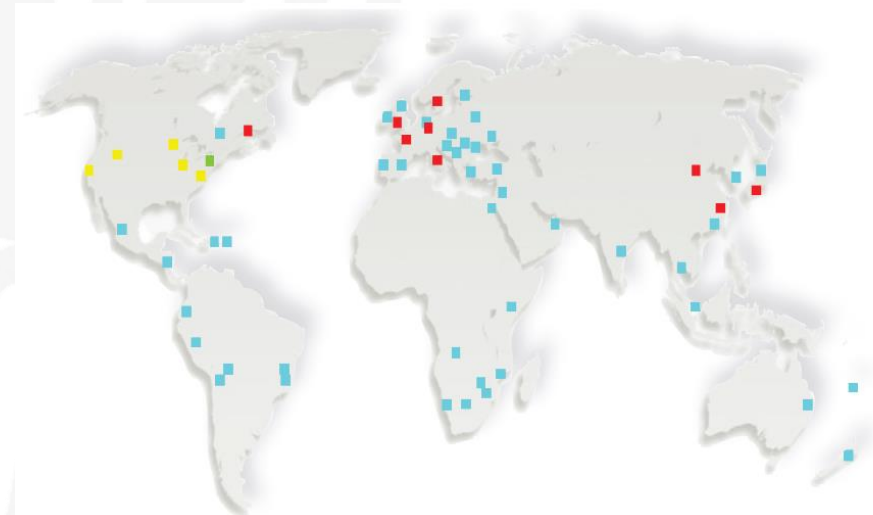


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Croissance d'une PME internationale

Créé en **1967**, PCB Piezotronics est un des fabricants **leaders mondiaux** de capteurs de mesures de grandeurs physiques.

- Siège mondial à Buffalo, USA (NY)
- CA 2014 : 140 000 000 €
- Effectif mondial : 700 collaborateurs
- Implanté dans le monde entier via ses filiales et ses distributeurs locaux



- Siège mondial
- Centres R&D et production
- Filiales
- Distributeurs



Notre mission

Nos valeurs depuis 1967 :

Qualité, Compétences, Services

Nous fournissons des équipements de moyens d'essais pour les essais dynamiques.

Nous contribuons à l'amélioration *technique et économique* de la performance de **nos clients dans la réalisation de leurs essais.**



Les applications **aéronautique** :

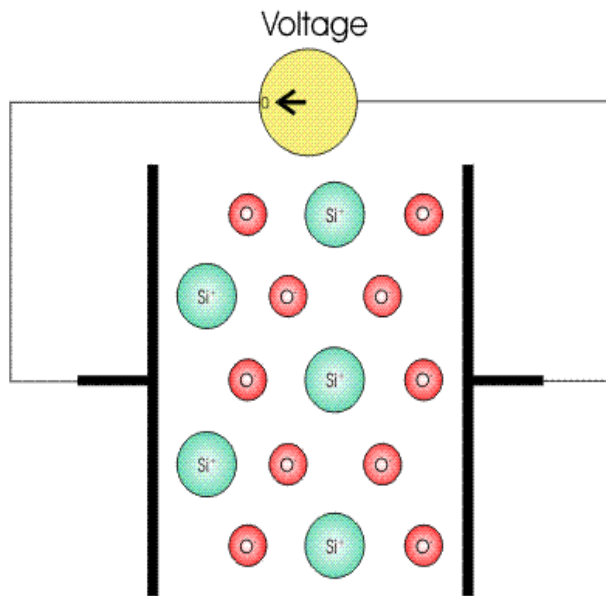
- Essais environnementaux
- Essais simulés
- Essais et monitoring turbines
- Qualification d'équipements aéronautiques
- Analyse modale sur avion

Les applications **défense** :

- Essais vol sur missile
- Essais choc et blast



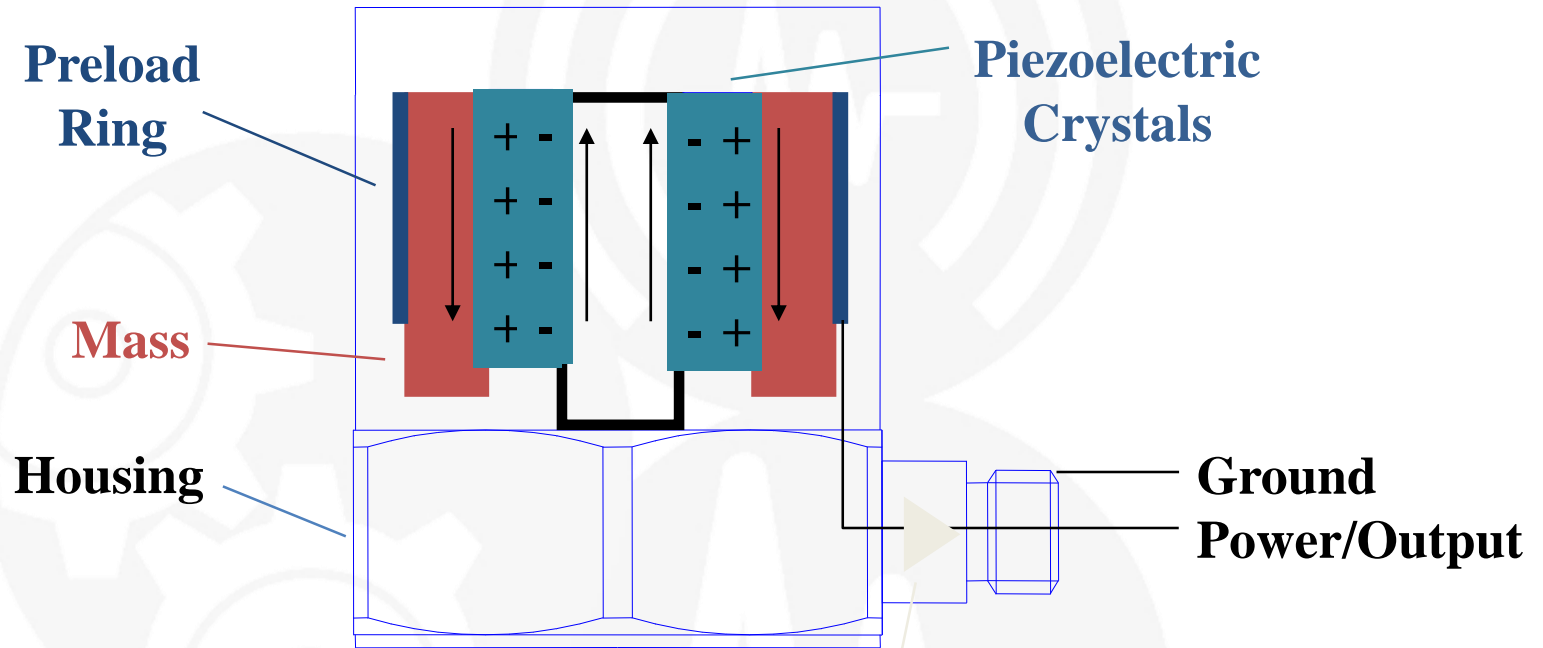
What are Piezoelectric Accelerometers?



Sensing element is constructed with natural quartz or man-made ceramic crystals that are coupled to a seismic mass.

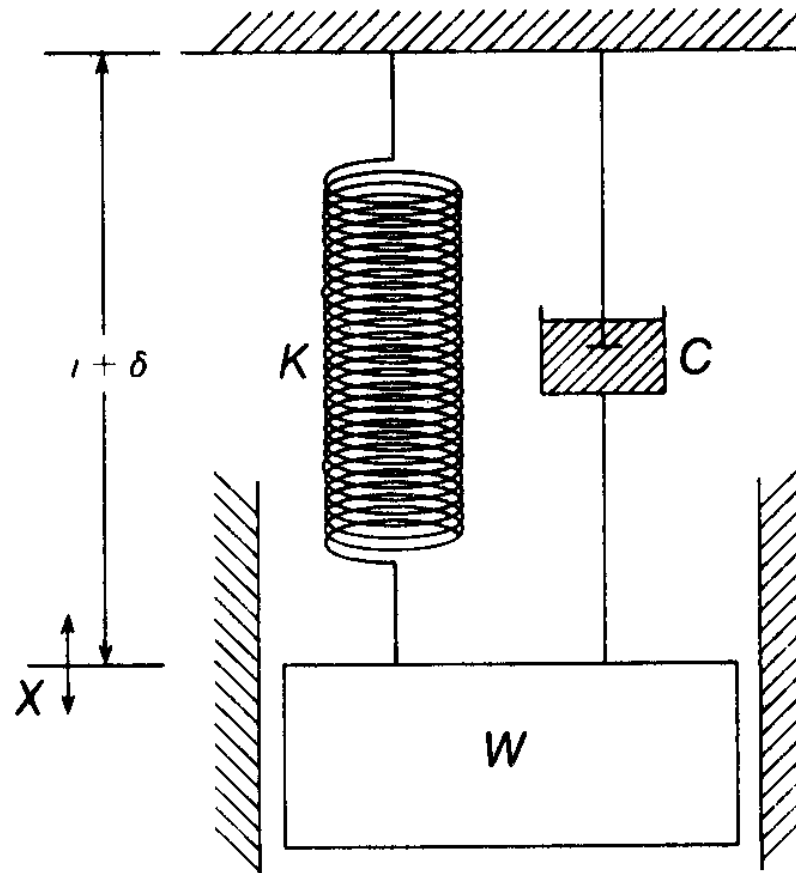
When accelerated, the mass causes stress on the crystal, which results in a proportional electrical output signal.

Piezoelectric



Built-In Microelectronics

Single Degree of Freedom Spring-Mass-Damper



Pre-Test Considerations

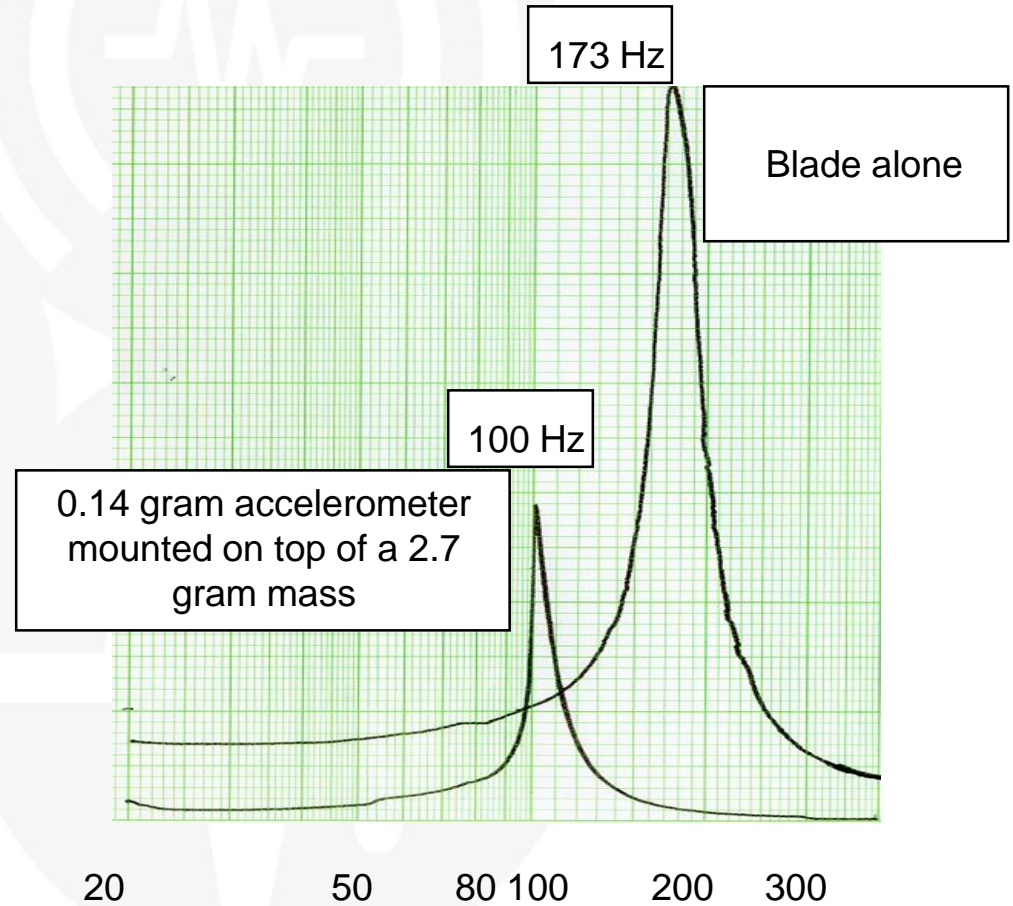
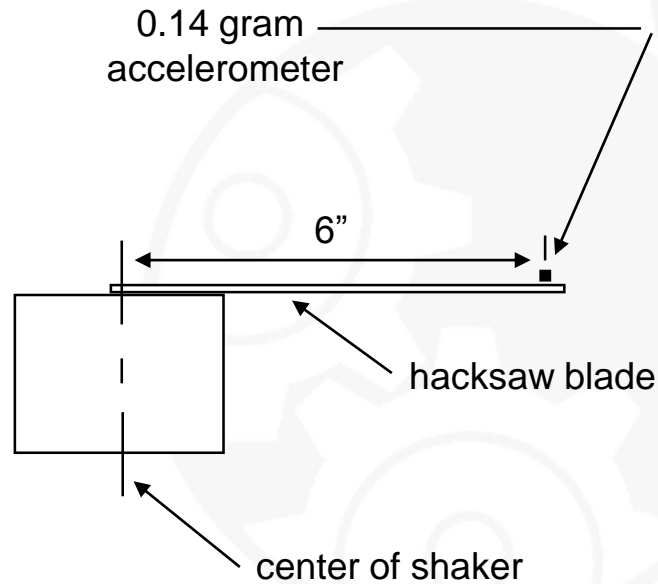
Transducer selection

- Single axis vs triaxial package
- Sensitivity, measurement range & resolution
- Frequency range & mass
- Mounting method



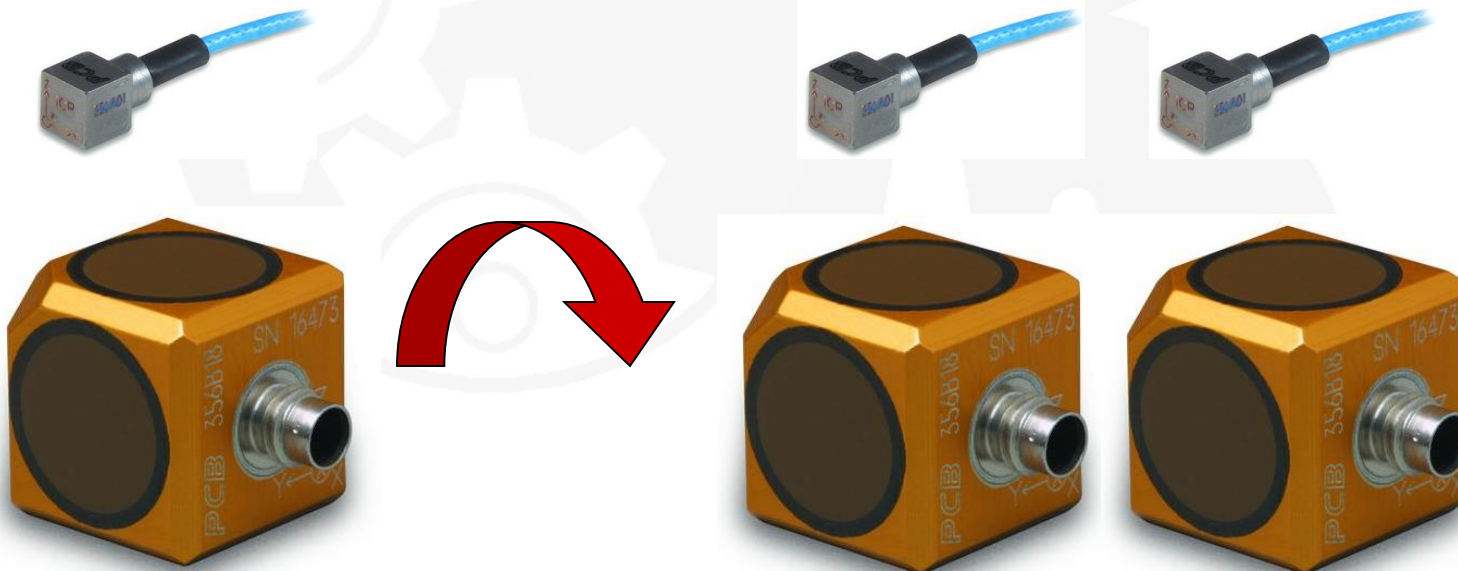
Mass Loading Considerations

Mass Loading Example

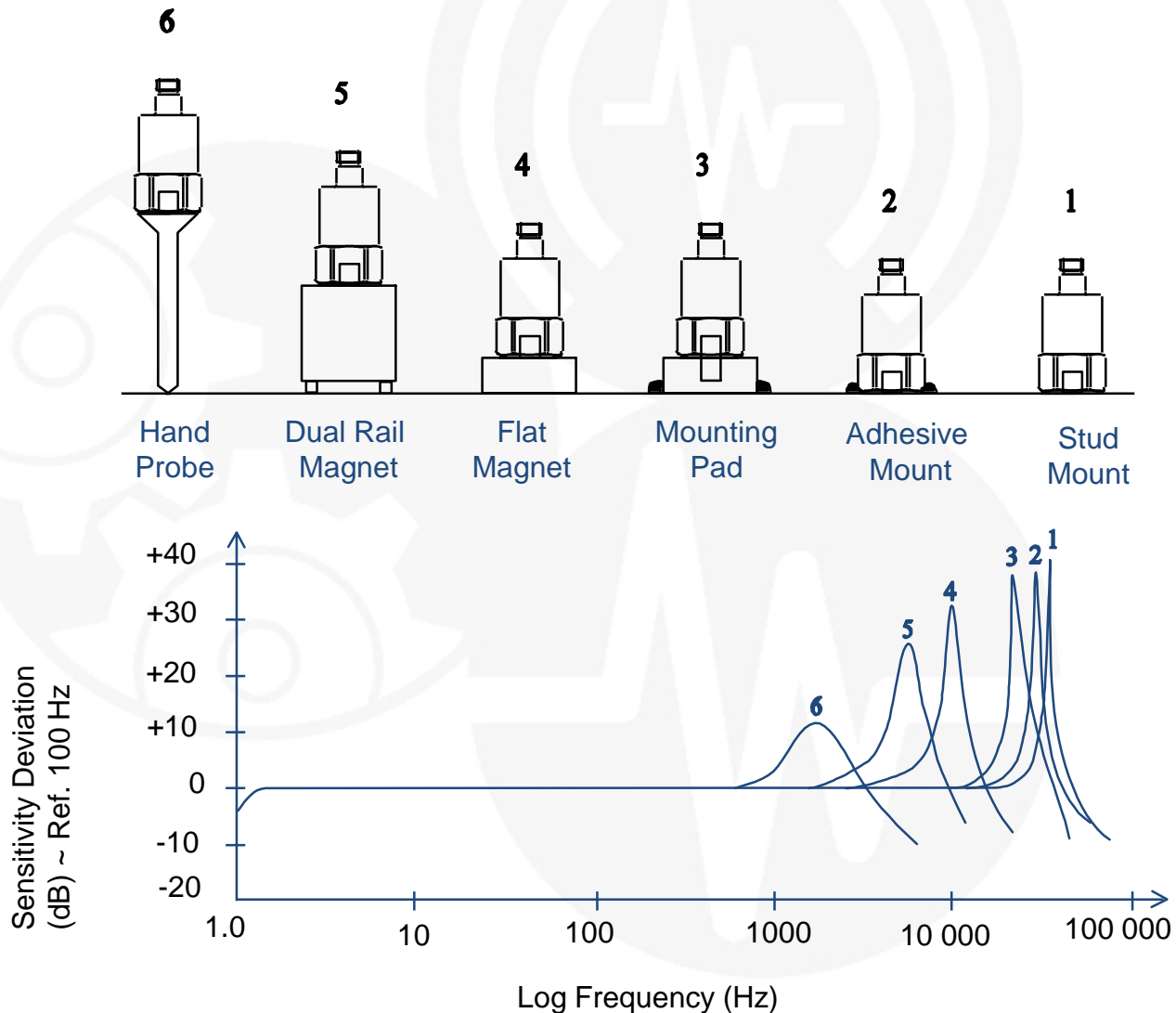


Mass Loading Considerations

- Acquire FRF with a single accelerometer
- Mount a second accelerometer next to the first and re-acquire FRF
- Compare for measurable differences
- Target mass less than 5% of UUT



Mechanical Mounting: Impact on Frequency Range



Hand probe / Magnetic Mount Transducers

- Easy to use
- Bad frequency response

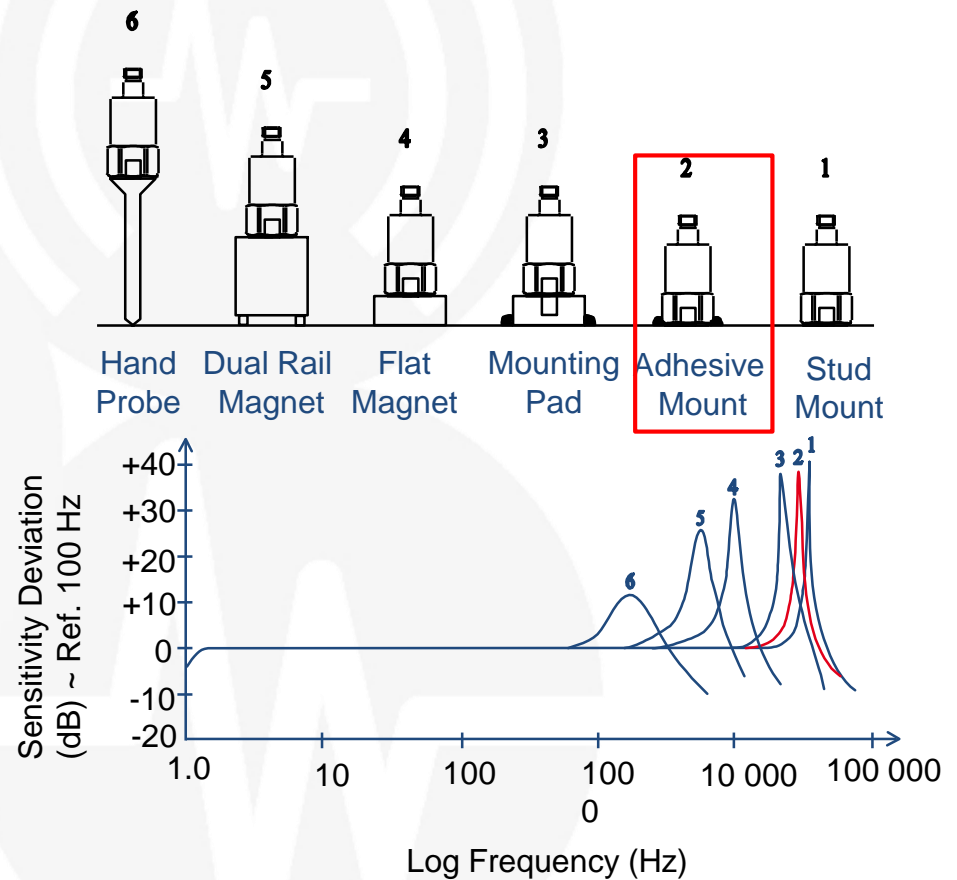
- Extremely convenient
- High attraction forces allow for reasonable high frequency characteristics
- Available in dual-rail style for attachment to curved surfaces



Adhesive Mount Transducers

Petro wax (bees wax)

- Ultra convenient and simple
- Good for short term testing only
- Frequency response characteristics highly dependent upon surface prep and amount



Adhesive Mount Transducers

Fast-cure epoxy

- Allows attachment to poorly-mated surfaces
- Pseudo-permanent attachment for reference transducer at shaker input location
- Use a “disposable” mounting pad with stud



Cyanoacrylate (superglue)

- “Instant” adhesive; strong, but still removable
- Gel vs liquid – depends upon surface flatness
- Excellent frequency response characteristics



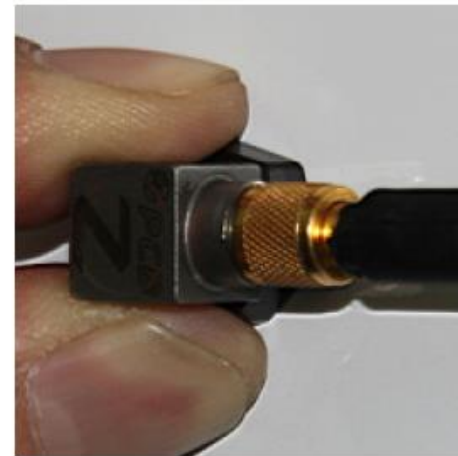
Mounting with Glue



Start by cleaning the sensor mounting surface before mounting

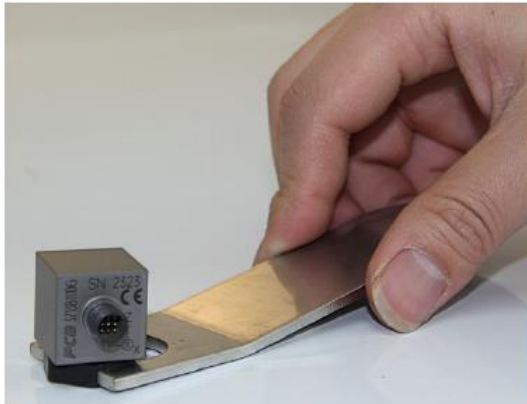


1. Apply small amount of mounting glue/wax



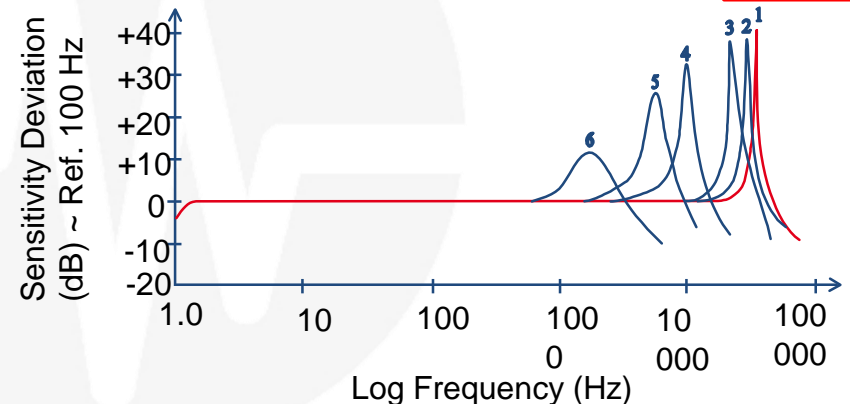
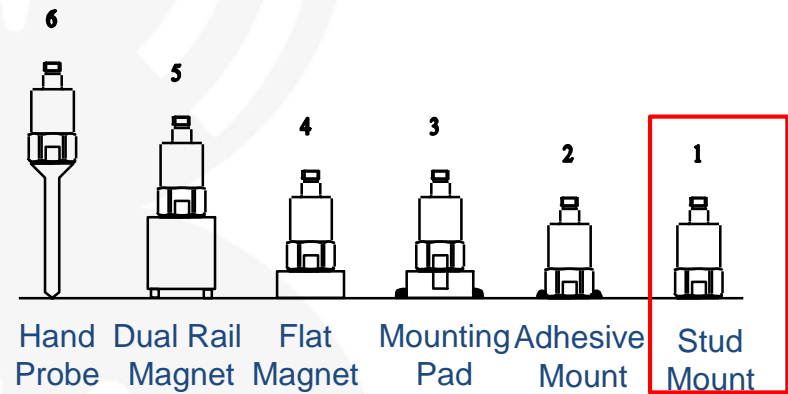
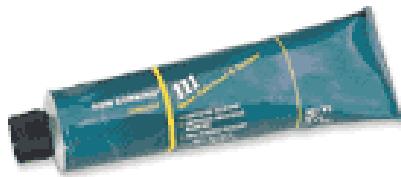
2. Attach the sensor on the measuring target

Removing Glue Mounted Accelerometers



Stud Mount Transducers

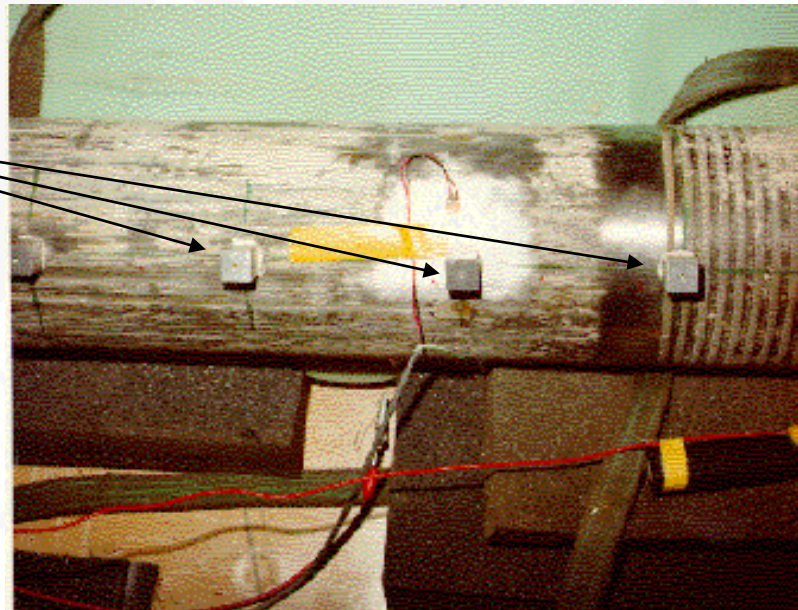
- Best frequency response characteristics – just like the manufacturer’s cal labs
- Apply silicon grease at mating surface
- Requires surface preparation
- Proper torque recommended



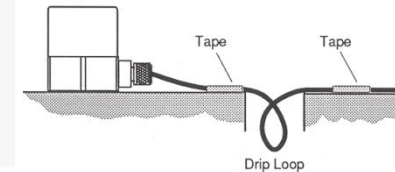
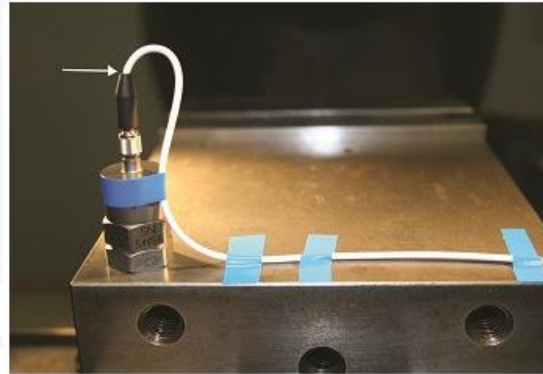
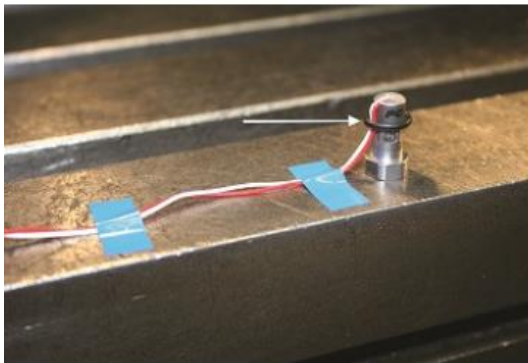
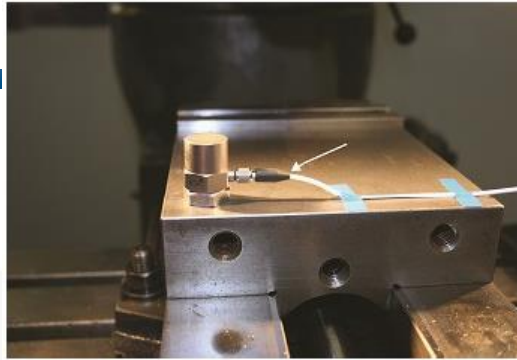
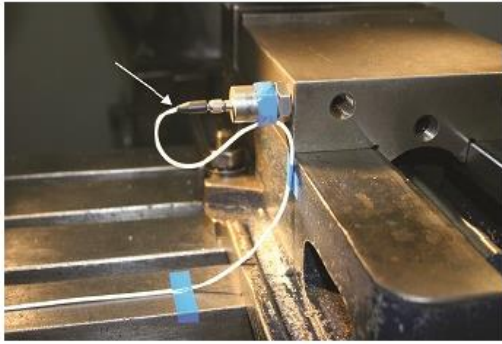
Triax Mounting Blocks

- Mounting blocks can be trouble
- They must be evaluated with the specific accelerometer

Aluminum blocks



Proper Cable Strain Relief

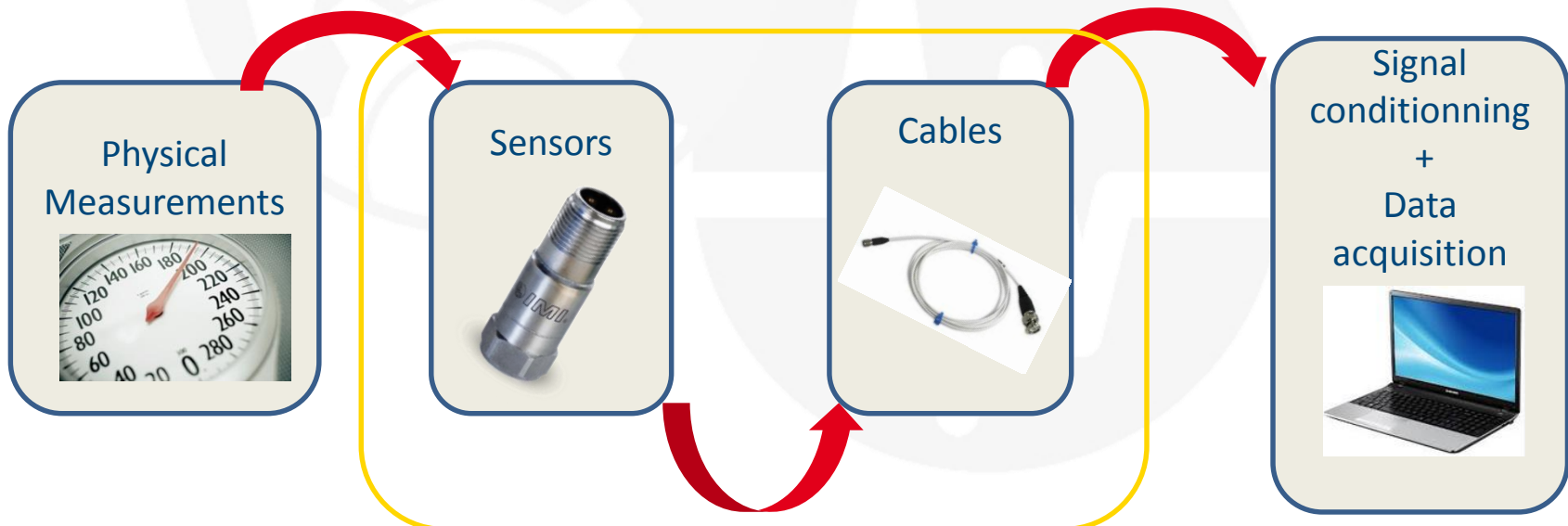


- Tie cable down within 1 to 3 inches of accelerometer to avoid cable whip and provide strain relief
- In high humidity environment, curl cable in a drip loop to keep moisture away from sensor

To summarize

To optimize your measurement:

- Choose the appropriate sensor: mono, tri axis, ICP...
- Use the best mounting (Stud mount)
- Use and fix the proper cable
- **Remember:** if your mounting is bad, your measurement will be bad



Comment pouvons-nous vous accompagner ?



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