How to use an impulse hammer

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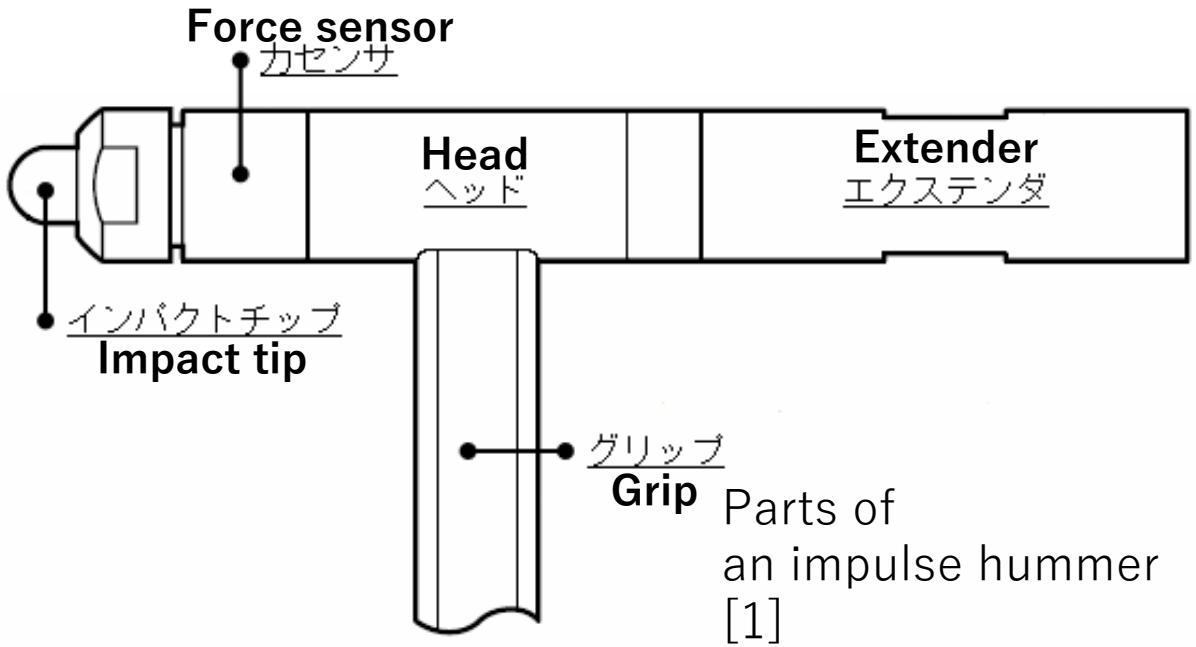
[1]

Adjusting the impulse force

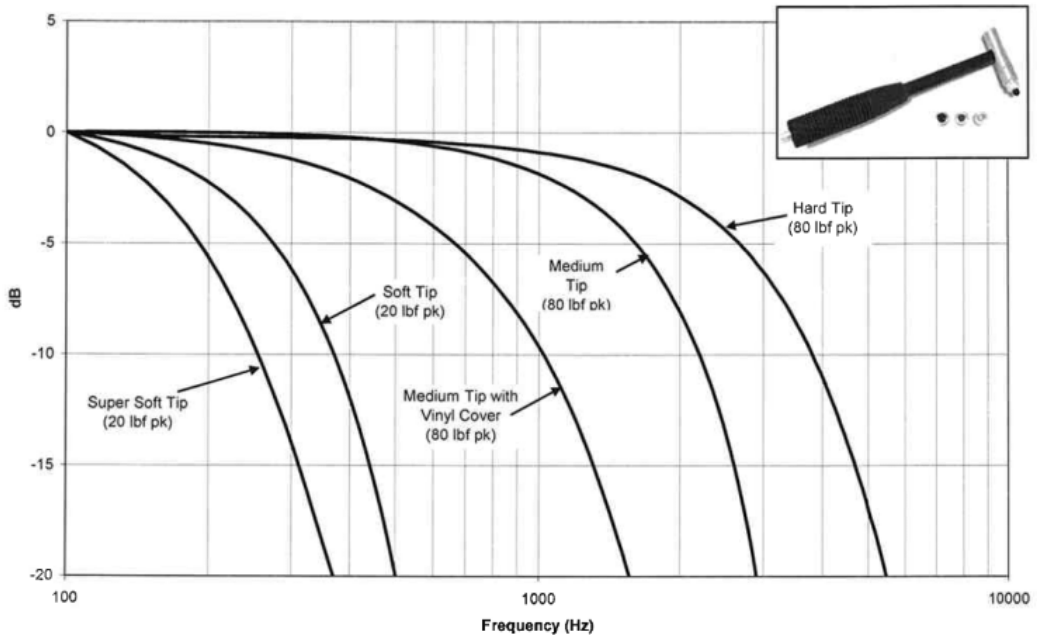
- Adjust the impulse force of the impulse hammer by changing the extender and tip
- In general, the tip affects the frequency structure of the impulse, and the extender affects the energy level of the impulse
- The frequency structure and energy level are interrelated, so if the hammer structure is different, both will be affected
- The speed of the impulse also affects both



Parts of an impulse hummer [1]

Adjusting the impulse force

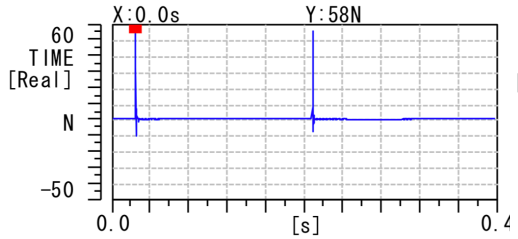
- It is necessary to adjust both energy and frequency structure according to the purpose of measurement
- For large structures with low rigidity, generally use a soft tip and an extender to vibrate sufficiently in low-frequency range
- The following methods can be used to adjust the impulse energy
  - Human adjustment (not recommended)
  - Change the size of the hammer
  - Change extender

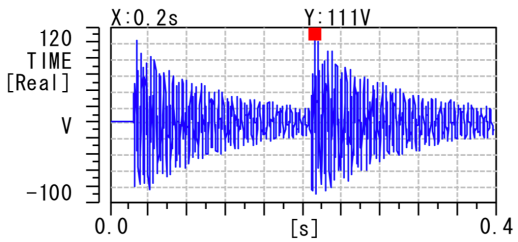


Frequency response with each tip[2]

Adjusting the impulse force

- As the mass of the hammer increases, the impulse energy also increases, but it is easier to impulse twice (double hammering), so care must be taken
- The frequency structure can be adjusted by selecting the tip of the impulse hammer
- However, even with the same chip, care must be taken because the frequency structure changes depending on the characteristics of the impulsed object





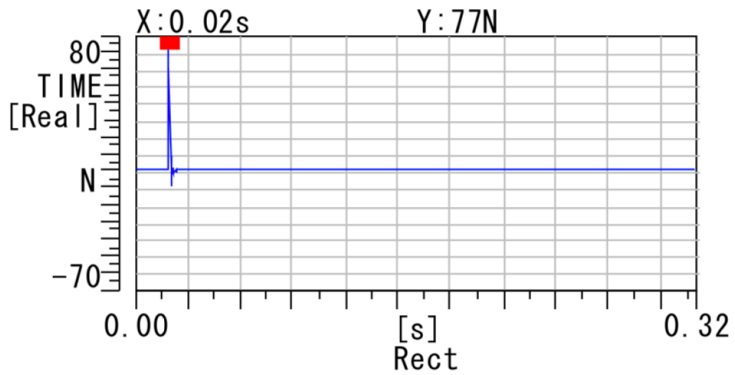
Double hammering
Left: impulse force
Right: object acceleration
[1]

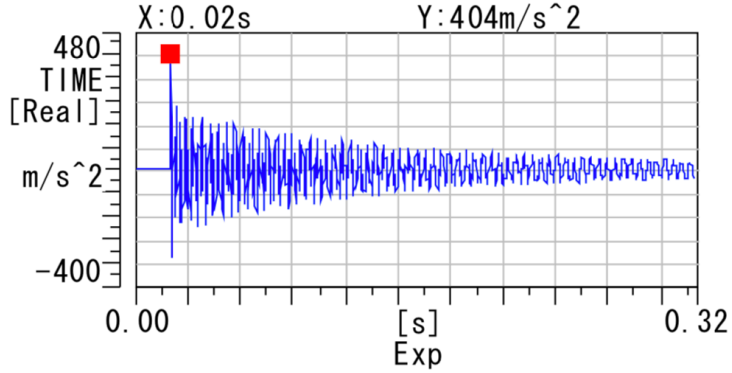
Adjusting the impulse force

- When adjusting the impulse energy by hand
  - If changing the magnitude of the impulse force by hand, it is difficult to maintain reproducibility even by an expert, so avoid it as much as possible
  - Just change the collision speed, not the force of the hammering

How to use a impulse hammer

- At impulse
  - Support a hammer softly and lightly
  - It is important to use the mass of a hammer to impulse rather than hammering with human power
  - Make hammering uniform as possible, and adjust the force by changing the hammer state
  - The hand only gives the hammer the first speed
  - If force is applied by hand, the impulse is unstable and the same impulse cannot be achieved





Left: impulse force
Right: object acceleration
[1]

How to use a impulse hammer

- Impulse point and direction
  - Since the impulse surface of the tip has an area, make sure that the center of the tip matches the impulse point
  - The impulse point must be decided in advance (impulse point marking)
  - The impulse direction must match the direction of the accelerometer in a hammer
  - A hammer should not tilt more than 10 degrees from the normal direction of the object surface
  - Especially when the extender is attached, take care that it does not rotate with the impulse system including the hand

How to use a impulse hammer

- The moment of impulse
  - A hammer is free at the moment of impulse
  - Do not restrain by hand
  - Quickly pull the impulse hammer as soon as it impulse the object
  - Concentrate consciousness on pulling rather than hammering

Reference

- [1] ー振動実験及び振動解析を活用した機械設計技術ー (Japanese)
  - 第2章(p.95, 96, 118)
- [2] Model 086C03, Installation and Operating Manual