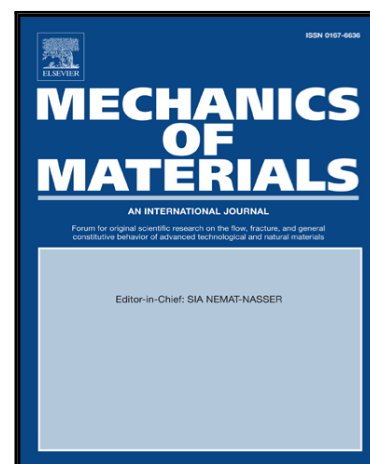


INVESTIGATING THE STRENGTH OF MATERIALS AT VERY HIGH STRAIN RATES USING ELECTRO-MAGNETICALLY DRIVEN EXPANDING CYLINDERS

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## Highlights

- A new methodology to calibrate strength of materials at very high strain rates ( $\sim 10^5 \text{ sec}^{-1}$ ) using EM driven expanding cylinders on a pulse current generator is presented. The experimental setup, makes it feasible to calibrate the strength for different materials, suitable also for non-conducting materials
- A hybrid analysis methodology to measure the strength in the tests, using the combination of experimental and numerical analyses is presented. The analysis is conducted at the forced acceleration stage.
- The strength of OFHC copper in a large range of strain rates was measured, using Kolsky-Bar apparatus for the low regime and the newly developed methodology for the high regime, up to  $75000 \text{ sec}^{-1}$ .
- A substantial strain rate hardening for copper was found with a sharp transition around  $10^4 \text{ sec}^{-1}$ , agreeing with other data in the literature for this material.
- A Modified Johnson Cook model for OFHC copper was calibrated, enabling a reliable extrapolation also to higher strain rates.

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