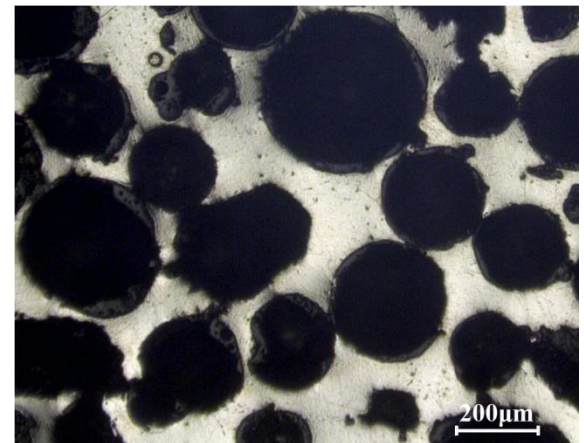
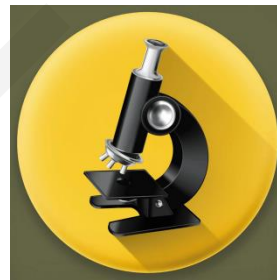
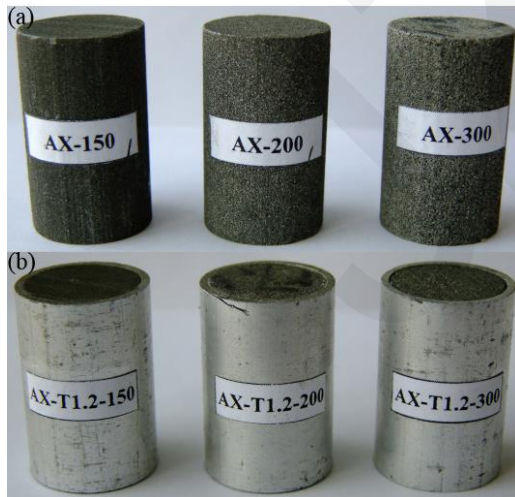
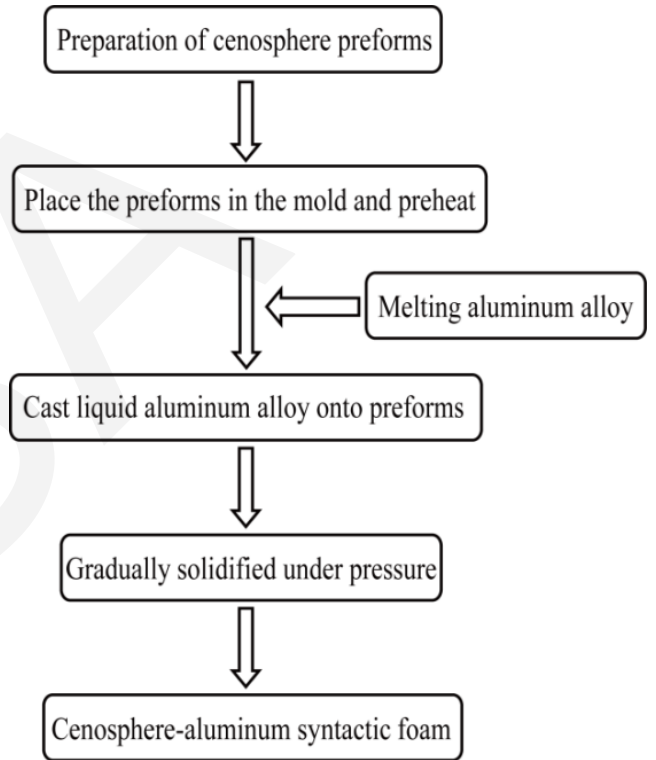
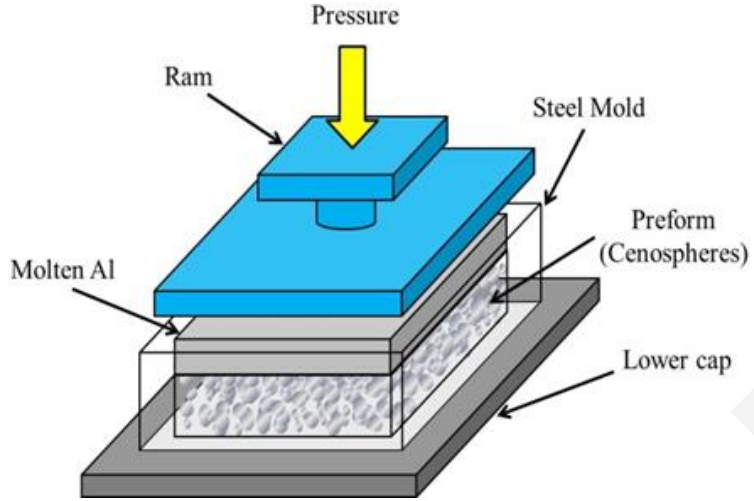


Experimental investigation on cenosphere-aluminum syntactic foam- filled tubes under axial impact loading

Li WANG, Boyi ZHANG, Jian ZHANG, Yuexin JIANG,
Wei WANG, Gaohui WU

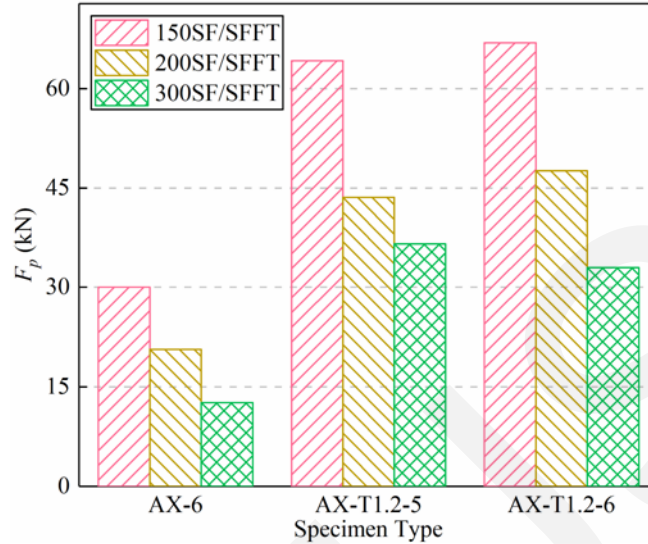
Cite this as: Li WANG, Boyi ZHANG, Jian ZHANG, Yuexin JIANG, Wei WANG, Gaohui WU, 2023. Experimental investigation on cenosphere-aluminum syntactic foam-filled tubes under axial impact loading. *Journal of Zhejiang University-SCIENCE A (Applied Physics & Engineering)*, 24(11):978-990. <https://doi.org/10.1631/jzus.A2200430>

Materials

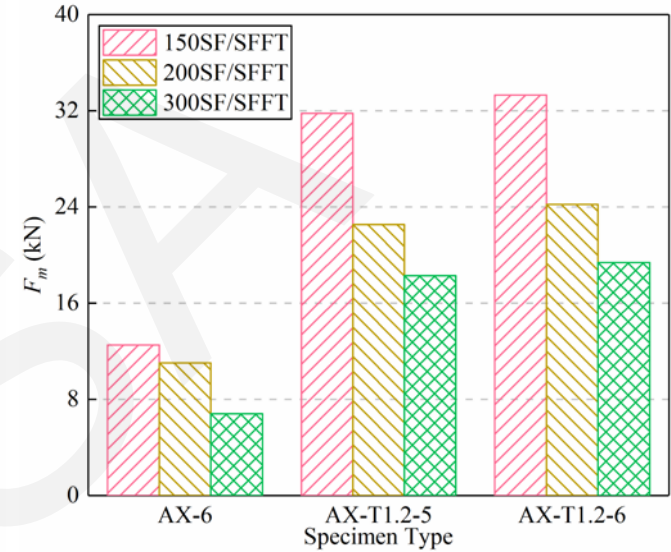


Evaluation Indicators

Mechanics

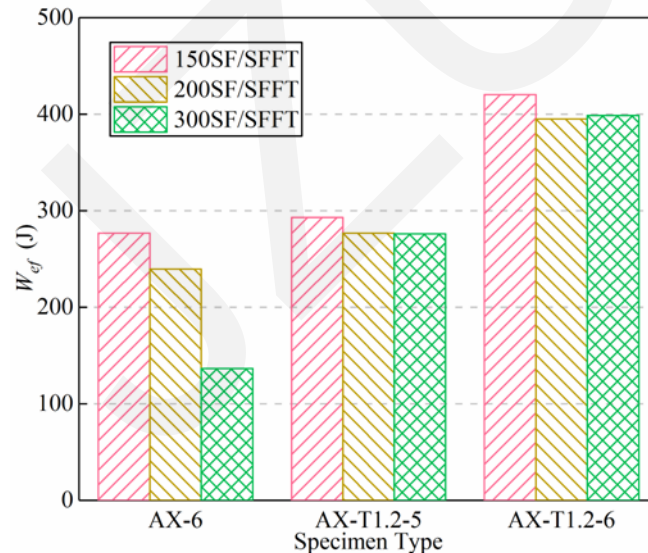


■ Peak crushing loading

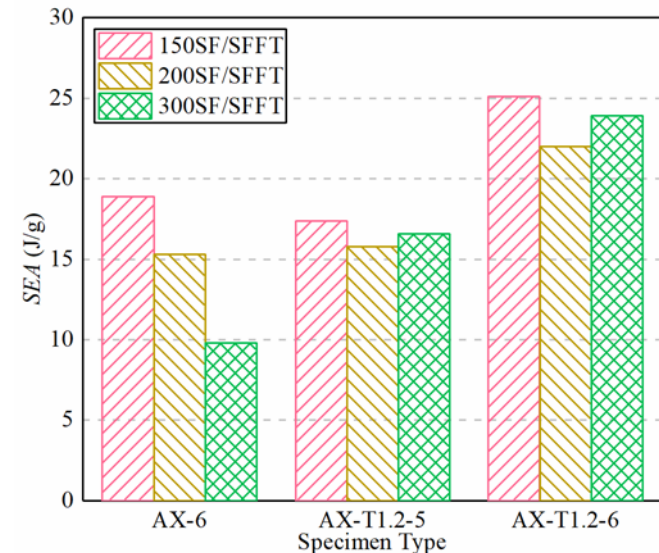


■ Mean crushing loading

Energy Absorption

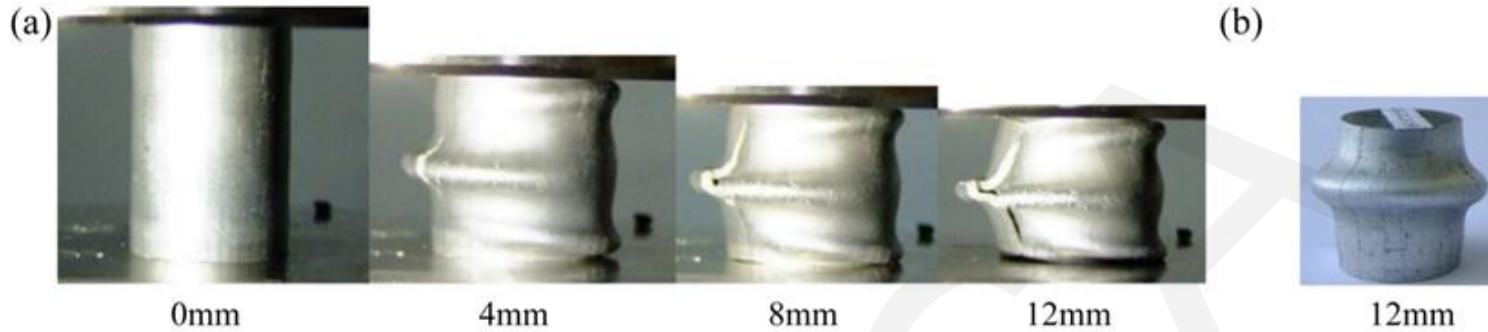


■ Effective energy absorption



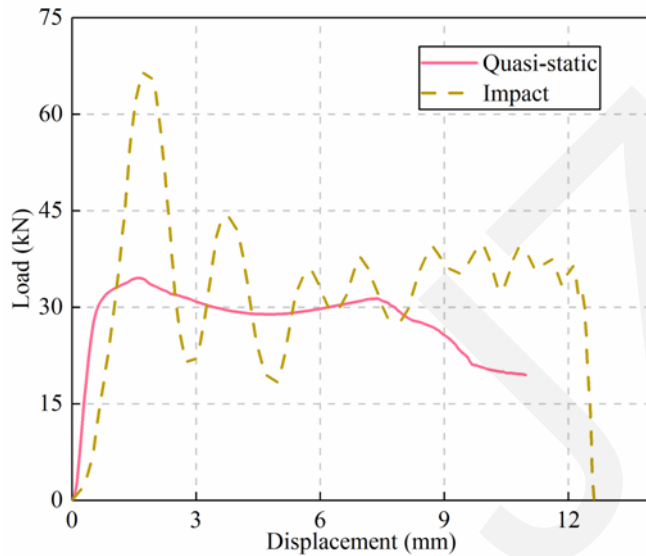
■ Specific energy absorption

Comparison

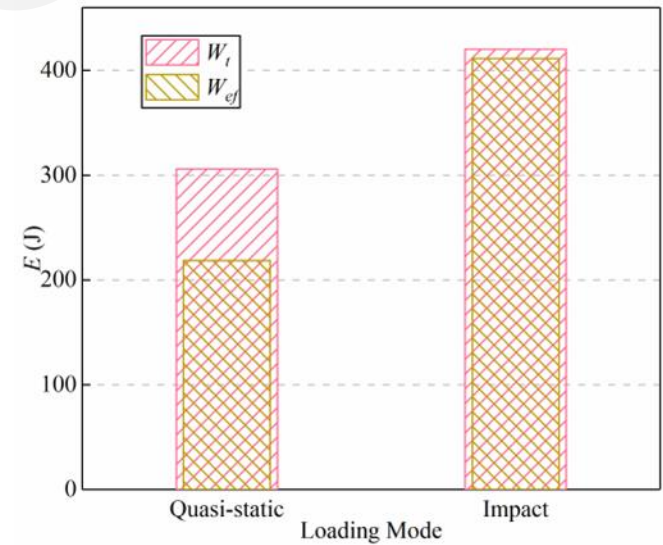


■ Quasi-static loading

■ Impact loading



■ Load-displacement curve



■ Effective energy absorption ratio

Conclusions

- Three kinds of syntactic foam-filled tubes buckled outwards in a **concertina mode** under impact loading.
- The SEA of all cenosphere-aluminum syntactic foam-filled tubes under two impact velocities was higher than **15 J/g**, and the SEA of 150SFFT reached **25 J/g**.
- The stress level of the material was increased under the impact loading, so the effective energy absorption ratio of the specimen reached **97.8%**.

Published related articles

- **Li Wang, Boyi Zhang*, Jian Zhang, Yuexin Jiang, Wei Wang, Gaohui Wu, "Deformation and energy absorption properties of cenosphere-aluminum syntactic foam-filled tubes under axial compression", Thin-Walled Structures, vol 160, 2021, 107364.**
- **Boyi Zhang*, Li Wang, Jian Zhang, Yuexin Jiang, Wei Wang, Gaohui Wu, "Deformation and energy absorption properties of cenosphere/aluminum syntactic foam-filled circular tubes under lateral quasi-static compression", International Journal of Mechanical Sciences, vol 192, 2021, 106126.**