Behaviour of millscale reinforced Aluminium Bronze composite
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Abstract
Despite the desirable characteristics exhibited by most aluminium bronze, the
deficient responses in certain critical applications have necessitated
improvement in the mechanical properties. The microstructural and mechanical
properties of cast aluminium bronze reinforced with iron millscale particles
were investigated in this paper. Cast samples of the composite containing iron
millscale particles (2-10 wt. %) were homogenized at 1100°C for 10 minutes to
relieve the as-cast structures. The homogenised samples were subjected to
physical, mechanical, and microstructural properties characterisation. The
highest ultimate tensile strength (UTS) of 643.8 MPa representing 10.1 %
improvement over conventional aluminium-bronze was obtained at 4 wt. % iron
millscale particles reinforcement. Maximum impact resilience of 83.9 J and
hardness value of 88.7 HRB were obtained at 4 wt. % reinforcement. This
signals the birth of another viable means of millscale utilisation hitherto
considered a waste thereby boosting the global effort at achieving a cleaner
environment.

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