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Authors: Jinwoo Lee, Se-Jong Kim, Hyeonil Park, Hyuk Jong Bong, Daeyong Kim



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# Metal plasticity and ductile fracture modeling for cast aluminum alloy parts

Jinwoo Lee<sup>1</sup>, Se-Jong Kim<sup>1</sup>, Hyeonil Park<sup>1</sup>, Hyuk Jong Bong<sup>2</sup>, and Daeyong Kim<sup>1#</sup>

<sup>1</sup>Materials Deformation Department, Korea Institute of Materials Science, Changwon, 51508, Republic of Korea

<sup>2</sup>Computational Engineering Group, Pacific Northwest National Laboratory, Richland, WA 99352, USA

# Corresponding author

[daeyong@kims.re.kr](mailto:daeyong@kims.re.kr) (Daeyong Kim)

Abstract

In this study, plasticity and ductile fracture properties were characterized by performing various tension, shear, and compression tests. A series of 10 experiments were performed using notched round bars, flat-grooved plates, in-plane shear plates, and cylindrical bars. Two cast aluminum alloys used in automotive suspension systems were selected. Plasticity modelling was performed and the results were compared with experimental and corresponding simulation results; further, the relationships among the stress triaxiality, Lode angle parameter, and equivalent plastic strain at the onset of failure were determined to calibrate a ductile fracture model. The proposed ductile fracture model shows good agreement with experimental results.

Keyword: Ductile fracture; Finite element; Constitutive modeling; Cast aluminum alloy

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