

## Accepted Manuscript

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PII: S0167-8442(17)30596-7  
DOI: <https://doi.org/10.1016/j.tafmec.2018.09.003>  
Reference: TAFMEC 2097

To appear in: *Theoretical and Applied Fracture Mechanics*

Received Date: 25 January 2018  
Revised Date: 25 July 2018  
Accepted Date: 5 September 2018

Please cite this article as: M. Sakane, T. Itoh, A Synthesis of Cracking Directions in Tension-Torsion Multiaxial Low Cycle Fatigue at High and Room Temperatures, *Theoretical and Applied Fracture Mechanics* (2018), doi: <https://doi.org/10.1016/j.tafmec.2018.09.003>

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# A Synthesis of Cracking Directions in Tension-Torsion Multiaxial Low Cycle Fatigue at High and Room Temperatures

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## Abstract

Cracking direction in multiaxial low cycle fatigue is an important research subject because cracking direction is a physical basis for developing an appropriate multiaxial low cycle fatigue damage model. However, there are still many open questions about cracking direction in multiaxial low cycle fatigue. Maximum shear and maximum principal cracks are reported in tension-torsion low cycle fatigue, depending on stress/strain multiaxiality, stress/strain range, notch, and type of materials. The reason for two crack directions has not been well investigated. This paper overviews and discusses a couple of factors that influence the cracking direction, including strain multiaxiality, notch/precrack and strain range for low alloy steels and nickel base superalloys.

**Keywords:** multiaxial fatigue; crack mode, notch; fatigue life; torsion loading

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