CP 2021
The 7th International Conference on Crack Paths

online and on-demand
September 21-24, 2021

THIS INFORMATION WILL BE USED TO SET UP THE CONFERENCE PROGRAM

THEMATIC SYMPOSIUM SELECTION

(a description of each TS is provided in the website: *cp2021.crackpaths.org*)

TS1	Notch fatigue strength in the presence of intrinsic defectiveness and/or complex multiaxial loading	☐
TS2	Damaged nanocomposites and nanostructures with cracks and discontinuities using local and nonlocal models	☐
TS3	Crack Path in VHCF regime	☒
TS4	Crack path simulation using numerical discrete approaches	☐
TS5	Propagation and significance of cracks in railway components	☐
TS6	Fatigue and fracture of additively manufactured materials and structures	☐
TS7	Mixed-mode fatigue and fracture problems: experimental tests and theoretical predictions	☐
TS8	Crack path in AM components using X-ray tomography	☐
TS9	Fatigue crack growth and orientation criteria: considerations about crack front direction, shape and plastic phenomena	☐
TS10	Damage, homogenisation and crack problems in elastic media	☐
TS11	Fretting fatigue cracks: experimental and modelling techniques	☐
TS12	Meso-scale modelling of short-crack propagation in fretting fatigue: theoretical analysis and experimental validation	☐
TS13	Crack path analysis and prediction in materials and structures	☐
TS14	Crack path in innovative eco-materials	☐
TS15	Fracture of anisotropic materials under uniaxial and multiaxial loading	☐
	NO THEMATIC SYMPOSIUM	☐

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Crack path and fracture surface analysis in VHCF under biaxial loadings

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Very High Cycle Fatigue *Ultrasonic Cruciform* *Fatigue crack*

Abstract Ultrasonic fatigue machines and associated investigations are continuously growing in publisher countries and laboratories. They allow researchers to study fatigue in a time and energy reliable manner, fatigue strength and fracture mechanics between 10E06 to 10E09 cycles, the established Very High Cycle Fatigue (VHCF) regime. Almost all published research to date was conducted under uniaxial tension-compression, pure torsion or bending fatigue ultrasonic testing conditions. Just as conventional fatigue testing methods, ultrasonic devices started with basic uniaxial tests [1]. The interest in biaxial ultrasonic methods for VHCF has begun to evolve from the increasing available knowledge surrounding uniaxial fatigue in VHCF. Tension-Torsion biaxial ultrasonic fatigue tests were first reached by adapting the tension-compression ultrasonic setup [2]. The present work focuses on crack path and fracture surface analysis of different specimens, that failed under different biaxial loading conditions. Observation and analysis of crack initiation and propagation of tested biaxial tension-torsion and cruciform specimens in ultrasonic frequencies was carried out. All evaluated specimens were machined and specially designed to function with ultrasonic fatigue machines resonance concept [2, 3]. Three different biaxial crack paths were achieved, in-phase tension-torsion and tension-tension, and out-of-phase tension-compression. Crack path and crack surface morphologies were analyzed by microscope and scanning electron microscope. Obtained results were compared with published conventional biaxial fatigue tested specimens.

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