*The 2021 World Congress on*
***Advances in Structural Engineering and Mechanics (ASEM21)***
*GECE, Seoul, Korea, August 23-26, 2021*

# Experimental behaviour and fracture simulation of stainless steel end-plate connections

*Yuchen Song[1)], Brian Uy[2)], Dongxu Li[3)] and Jia Wang[4)]

[1), 2), 3), 4)] *School of Civil Engineering, The University of Sydney, Sydney, NSW 2006, Australia*
[1)] yuchen.song@sydney.edu.au

## ABSTRACT

This paper presents a combined experimental and numerical study on stainless steel end-plate connections, with an emphasis placed on their behaviour under large deformations. In the experimental phase, six connection specimens made from austenitic and lean duplex stainless steels are tested under monotonic loads. The tests are particularly designed to examine the ultimate behaviour, as well as the rotation capacity of the connections. It is concluded that such behaviours are closely related to ductile fractures of some critical components, such as the stainless steel bolts and end-plates. In the numerical phase, an advanced FE model suitable for fracture simulation is developed. The incorporated constitutive and fracture models are calibrated based on the material tests for stainless steel bolts and plates. Comparing with the test results, the developed model demonstrates a satisfied accuracy in predicting the close-to-failure behaviour of stainless steel end-plate connections. Finally, the available ultimate moment and rotation capacity of stainless steel end-plate connections are assessed based on the experiments and numerical analyses.

---

[1)] Ph.D. Candidate
[2)] Professor, Ph.D., Head of School
[3)] Ph.D., Postdoctoral Research Associate
[4)] Ph.D., Postdoctoral Research Associate