KTH SOLID MECHANICS SEMINAR; Wednesday, December 21th, 15.15; KTH Solid Mechanics Seminar room

Gunay Anlas,

"Fracture of Shape Memory Alloys"

Experimental, numerical and analytical works on Shape Memory Alloys (SMAs) have recently increased, but more studies on fracture behavior of SMAs are still needed. The effects of phase transformation on fracture toughness are major topics of numerical, analytical and experimental investigations, but there are not many detailed works.

In this presentation both experimental and numerical results of the effect of phase transformation on fracture behavior of a superelastic Nitinol will be introduced: Experiments are conducted with edge cracked thin Nitinol plates, and the displacement field around the crack tip is obtained using Digital Image Correlation (DIC). Phase transformation region and stress intensity factors are calculated using both DIC and ASTM E399. Then, using a 2-D finite element model under plane stress loading, fracture mechanics parameters such as J-integrals, energy release rates, COD and stress-intensity factors are evaluated. The effect of stress-induced martensite transformation on fracture toughness is discussed.

Prof. Anlas is the Dean of Engineering at Bogazici University in Istanbul. He was the Chairman of Mechanical Engineering Department between 2004 and 2016. He obtained his Ph.D. in Mechanical Engineering, from the University of Delaware in 1992. His current research interests are in the area of fracture mechanics of Shape Memory Alloys and renewable energy technologies. He is conducting joint research on SMAs with people at NWPU in Xian, China and at ENSTA Paris Tech. He is also working on automotive engineering projects in collaboration with the Turkish Automotive Industry.