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## **Wed-Af-Po3.14-02 [2]: Study of the fatigue behavior of unidirectional zylon/epoxy composite used in pulsed magnets**

*Wednesday 25 September 2019 14:00 (2 hours)*

The fatigue behavior of the Zylon fiber reinforced epoxy matrix composite (Zylon/epoxy composite) has been tested under quasi-static tensile and tensile fatigue loads. The distribution of the fatigue life at different stress levels were determined. The results show that the statistical characteristic of the static strength and the fatigue life can be satisfactorily described by the normal, lognormal or Weibull distribution model. The measured S–N curve exhibits a pronounced nonlinear behavior with the stress levels in the studied life range. Strains of the unidirectional specimens were monitored by means of a mechanical extensometer during the fatigue loading. Three distinct stages of the strain evolutionary process can be identified. The evolution curves show a sharp increase in the first stage, an approximately linear slow increasing in the middle stage and an unstable acceleration in the third stage before failure. Similar to the strain evolution, the three-stage stiffness of degradation is also observed. The maximal cycle strain was chosen as the indicator for damage evaluation. The experimental data of the damage parameters were fitted with the existing analytical model and it is shown that the presented models have a good agreement with the tested results.

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