

סמינריון

הנדך מוזמן/ת להרצאה סמינריונית במסגרת הדוקטורט של הפקולטה להנדסת מכונות, שתתקיים ביום ב' 21.09.15 (ח' בתשרי, תשע"ו), בבניין דן-קאהן, קומה 0, באודיטוריום 1 בשעה 14:30.

ירצה: גיל שטינברכר

מנחה: פרופ' אלי אלטוס

על הנושא:

Hygromechanical coupling and transverse failure of laminated composites

להלן תקציר ההרצאה:

Graphite-Phenolic (GPh) composites are used as thermal insulators under mechanical and hygrothermal loadings. Propagation of interlaminar cracks in laminated GPh panels was attributed to high shrinkage strains due to water loss during drying. A reliable model is essential for design against transverse failure in the laminates, which can follow the strength decrease during drying, and for predicting the critical time in which the strength is minimal.

Classical Fick laws do not suffice to describe the effect of neither external loading nor internal stresses on the diffusion process, and vice versa. Thus, it is necessary to use a coupled model. Recently, several coupled models were suggested, based on thermo-dynamical approach, but none of them was experimentally tested.

The aim of the present research was to study, both analytically and experimentally, the hygromechanical coupling in GPh laminates. Using the symmetry of the specimens we derived and solved the coupled governing equations for both water concentration and stress fields. Experiments included gravimetric and strain measurements of specimens under various conditions and it was found that the coupled model allows mathematically expressing phenomena such as the effect of load on both diffusion rate and the composite's sorption capability. Correlation between the strength decrease and the hygromechanical stress was established using a non-local failure criterion.

בברכה,

פרופ' אורי איתן

מרכז הסמינרים