סמינריון

הנך מוזמן/ת להרצאה סמינריונית של הפקולטה להנדסת מכונות, שתתקיים ביום ה' 6.10.16 (ד' בתשרי, תשע"ז), בבניין דן-קאהן, קומה 0, אודיטוריום 1, 14:30.

יוצא: שגיא ציבולה

מנחה: פרופ' דניאל ריטל

מנחה שותף: דר' זאב לווינגר, רפא"ל

על הנושא:

חקר התנהגות של פולימרים אמורפיים במתיחה דינאמית

Investigation of the dynamic tensile behavior of glassy polymers

The seminar will be given in Hebrew

להלן תקציר ההרצאה:

The behavior of glassy polymers at high strain rates is of growing interest for different industries that use polymers as a major structural material, for example regarding crashworthiness and lightweight armor applications.
For design purposes, there is a need to determine the dynamic behavior of the material both in compression and tension, which may be very different for polymers.
One of the most common experimental techniques for measuring the dynamic behavior of materials at high strain rates is the Split-Hopkinson Bar apparatus. While the testing of polymers in compression is relatively studied and "standard", tensile testing is very challenging, from an experimental point of view.
Two main problems reported continuously in the literature are: The weak transmitted signal, often close to the level of the signal noise, and the ability to achieve dynamic stress equilibrium within the specimen. Furthermore, the specimen dimensions also have a large influence on high strain rate test results.
The dynamic properties of polymers *in tension*, the necessary experimental conditions to determine them and a straight forward technique to extract the stress strain curve are still not well understood and mastered, and were consequently the focus of this research.
In this research we examined the dynamic material behavior of commercial PMMA and PC in tension, in experiments conducted on the Split Hopkinson Tension Bar (SHTB) apparatus using Digital image correlation (DIC). The material behavior under dynamic tension was discussed and compared with the static behavior and with the behavior of the materials under dynamic compression. We conducted 2D numerical simulations to explore the sensitivities of the experimental apparatus and to simulate the dynamic tests. The analysis of the tests, specifically focusing on the material behavior within the dynamically evolving neck, allowed us to calibrate a stress strain curve for the studied materials, using our numerical modeling.
The analysis further suggests a strong correlation between material behavior in dynamic tension and dynamic compression. This suggested behavior could possibly facilitate the measurement of the dynamic strength of polymers – to be possibly extracted from dynamic compression measurements only.

בברכה,

שרון אמיר שמן

מרכז הסמינרים