



Research Assignment - 2007

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Title Professor

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Title of research assignment

Effect of Impact on Mechanical Properties of Metal Matrix composites

Research abstract

Polymeric fiber reinforced composites are extensively used in the design of many structural components because of their strength and low density. However, these materials are not suitable in application when temperature is in excess of 200 C. Metal matrix composites are group of materials which exhibit similar properties as those polymeric reinforced composites but can be used at higher temperature. Metal matrix composites are manufactured by several techniques such as liquid metal infiltration of fibers. This process often leads to the degradation of fibers. In order to avoid fiber degradation the infiltration time is drastically reduced. Currently superior metal matrix composites are manufactured with excellent mechanical properties. However, there have been little investigations on the effects of impact on the mechanical properties of composites.

In this research we will prepare specimens from plate of metal matrix composites and subject them to various impact damages. We will try to characterize the nature of the damage by both metallographic, Scanning electron microscope and mechanical testing. We will also try to predict the damage level by ultrasonic techniques. In addition we will use laser Doppler to investigate the change in the resonance frequency. These changes will be related to the damage.

The effect of prolonged high temperature exposure on the mechanical and impact properties of these composites will be also investigated.

Research activities/ experience

We will teach you all the possible information you may need. I expect you to be familiar with Excel and some basic data acquisition and processing

Expectations of RET

You will be working with graduate students and me. I expect you to follow all safety requirements and do not do anything that may hurt you or break the equipment. Always ask. I also expect you to keep a good research note book and documents all obtained information. I also I expect you to be punctual. I expect to publish your results.

Special skills or interests that would help a RET participant with this assignment (i.e., an interest in physics, experience with specific laboratory equipment, etc.)

I expect you to know the operation of basic tools. You must also know Excel.

Lab safety/issues unique to this assignment.

Safety Glasses and General safety with electrical components. Also use masking when you are polishing specimens. Be careful with etching acids.

Suggested literature to be reviewed prior to beginning this research assignment.

Any book on the composite materials is fine. You can read composite materials by Jones.

Research/Lab Summer Hours	8:30 a.m. – 4:30 p.m.	<input type="checkbox"/> Monday through Thursday		
		<input checked="" type="checkbox"/> Monday through Friday		
Scheduled Research/Lab Meetings	8.30 a.m. – 10.30 am	<input checked="" type="checkbox"/> Daily	<input type="checkbox"/> Wednesday	<input type="checkbox"/> To be determined
		<input type="checkbox"/> Monday	<input type="checkbox"/> Thursday	
		<input type="checkbox"/> Tuesday	<input type="checkbox"/> Friday	

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