

# Effect of uniform distributions of bonded and debonded fibers on the growth of the fiber/matrix interface crack in UD laminates with different fiber contents under transverse loading

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## Abstract

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### 1. Introduction

### 2. RVE models & FE discretization

#### 2.1. Models of Representative Volume Element(RVE)

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|---|---|
| (a) A debonded fiber every 2 fully bonded ones. | (b) Central debonded fiber with 1 fiber each side.  |
| (c) A debonded fiber every 4 fully bonded ones. | (d) Central debonded fiber with 2 fibers each side. |
| (e) A debonded fiber every 6 fully bonded ones. | (f) Central debonded fiber with 3 fibers each side. |

Figure 1: Models of single-ply laminates with a single layer of fibers and debonds repeating at different distances (left column), and corresponding Representative Volume Elements (right column).

*2.2. Finite Element (FE) discretization*

5 *2.3. Validation of the model*

### **3. Results & Discussion**

*3.1. Effect of Fiber Volume Fraction*

*3.2. Interaction between debonds in UD laminates with a single layer of fibers*

*3.3. Influence of layers of fully bonded fibers on debond's growth in a centrally*  
10 *located line of debonded fibers*

*3.4. Interaction between debonds in UD laminates with multiple layers of fibers*

*3.5. Comparison with the single fiber model with equivalent boundary conditions*

### **4. Conclusions & Outlook**