

## EFFECT OF MICROCRACKS ON STRESS INTENSITY FACTOR OF THE MAIN CRACK BY USING X-FEM

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**Key Words:** *X-FEM, Microcrack, Stress intensity factor*

### ABSTRACT

In this paper, the extended finite element method (X-FEM) was improved in the investigation of the effect of microcrack on stress intensity factor (SIF) of the main crack<sup>[1]</sup>. It has been demonstrated that there are certain rules between the location and length of the microcrack and the SIF of the main crack. In order to investigate the potential rules, a square plate ( $w=2m$ ) was proposed with three cracks which is shown in fig. 1. To study the effect of the microcrack location on the SIF of the main crack, three different length types of Crack 1 and 3 ( $b=0.1m, 0.2m, 0.3m$ ) were investigated with  $a=0.5m$  and the different distance  $d$  between the two cracks synchronously. The rules are clearly shown in fig. 2 and fig. 3. While keeping the same distance  $d$ , with the increasing  $b$ , the SIF of the main crack significantly decreases.

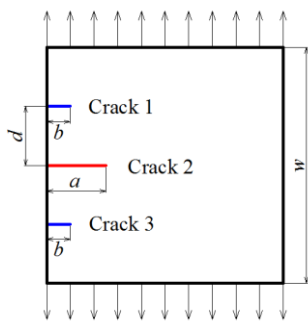


Fig. 1 A stretched plate with 3 cracks

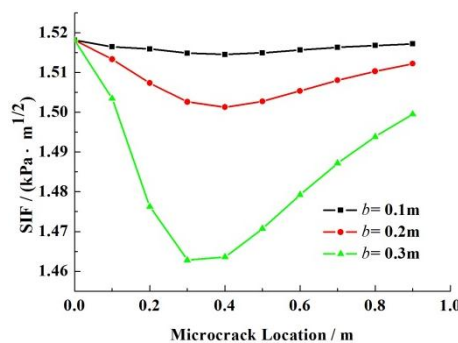


Fig. 2 The effect of Microcrack location

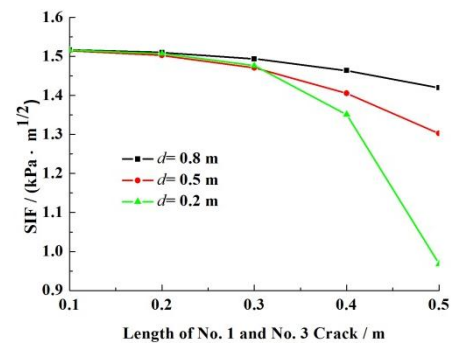


Fig.3 The effect of Microcrack length

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