



### 混凝土裂缝扩展过程中裂尖张开口位移(CTOD)与裂缝嘴张开口位移(CMOD)的变化关系分析

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#### RELATIONSHIP BETWEEN CRACK TIP OPENING DISPLACEMENT (CTOD) AND CRACK MOUTH OPENING DISPLACEMENT (CMOD) THROUGHOUT DEVELOPMENT OF CONCRETE CRACK

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**摘要** 裂缝尖端张开口位移(CTOD)和裂缝嘴张开口位移(CMOD)是衡量裂缝张开程度的两个指标。该文进行了楔入式紧凑拉伸混凝土断裂试验,研究了在裂缝扩展的整个过程中裂缝尖端张开口位移和裂缝嘴张开口位移之间的关系。发现,裂缝尖端张开口位移和裂缝嘴张开口位移关系曲线可以用三线模型来描述,两个转折点与裂缝的起裂和临界失稳扩展相对应。讨论了高度对起裂时和失稳时对应的裂缝尖端张开口位移和裂缝嘴张开口位移的影响规律。根据铰链模型,给出了计算裂缝尖端张开口位移(CTOD)的计算公式,与试验结果吻合较好。

**关键词:** 楔入式紧凑拉伸试件 裂缝尖端张开口位移 裂缝嘴张开口位移 裂缝扩展过程 混凝土

**Abstract:** The crack tip opening displacement and crack mouth opening displacement are two indexes evaluating the magnitude of crack opening during fracture. The current investigation presents a study of relationship between the crack tip opening displacement and crack mouth opening displacement throughout the development of cracks using the wedge splitting compact tension fracture tests. It is found that the relationship between them can be characterized by a tri-linear model, and that the two governing points on the tri-linear model approximately correspond to the cracking and critical unstable propagation of cracks, respectively. Furthermore, the influence of depth of specimens on the crack tip opening displacement and crack mouth opening displacement at the cracking moment and unstable propagation moment is discussed. Subsequently, based on a hinge model, a new formula for calculating the crack tip opening displacement is developed. The comparison between experimental values of the crack tip opening displacement and the calculated shows a good agreement.

**Key words:** wedge splitting compact tension crack tip opening displacement crack mouth opening displacement crack propagation concrete

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