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**Non-destructive testing — Acoustic  
emission testing — Test method  
for classification of active cracks in  
concrete structures**

*Essais non destructifs — Contrôle par émission acoustique —  
Méthode de test pour la classification des fissures actives dans les  
structures en béton*

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## Foreword

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This document was prepared by Technical Committee ISO/TC 135, *Non-destructive testing*, Subcommittee SC 9, *Acoustic emission testing*.

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## Introduction

The number of aged concrete structures has been increasing all over the world. Since cracking is one major cause of damages in reinforced concrete (RC) structures, evaluation methods for crack distribution and cracking mechanisms are in great demand. To make a decision on maintenance and repair in concrete structures, non-destructive evaluation (NDE) techniques are often applied to estimate the safety and the performance of current state of concrete structures.

It is well known that acoustic emission (AE) technique is promising to test concrete structures for damage estimation. In this respect, a test method for classifying active cracks is established. Due to damage evolution in concrete structures in service, AE events are observed. Initially the tensile type of cracks in the microscopic scale is generated with short nucleation time. As approaching eventual failure, the shear type of cracks with long dislocation time is predominantly generated rather than the tensile type. Depending on these crack types, it is found that the shape of AE waveform changes. In frequency domain the tensile type has the higher frequency while the shear type has the lower frequency.

Thus, AE parameter-based method (parameter analysis) has been applied to crack classification. The proportion of the two AE parameters of the average frequency and the RA value is applied to classify cracks into tensile and shear cracks.

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