PD ISO/TR 16475:2020

BSI Standards Publication

General practices for the repair of water-leakage cracks in concrete structures

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National foreword

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The UK participation in its preparation was entrusted to Technical Committee B/517/8, Protection and repair of concrete structures.

A list of organizations represented on this committee can be obtained on request to its secretary.

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Published by BSI Standards Limited 2020

ISBN 978 0 539 04890 2

ICS 91.080.40

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This Published Document was published under the authority of the Standards Policy and Strategy Committee on 31 March 2020.

Amendments/corrigenda issued since publication

Date	Text affected

PD ISO/TR 16475:2020

TECHNICAL REPORT

ISO/TR 16475

Second edition
2020-03-20

General practices for the repair of water-leakage cracks in concrete structures

Pratiques générales pour la répartition des fissures dues à l'eau dans les structures en béton

Reference number
ISO/TR 16475:2020(E)

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Foreword

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This document was prepared by Technical Committee ISO/TC 71, *Concrete, reinforced concrete and pre-stressed concrete*, Subcommittee SC 7, *Maintenance and repair of concrete structures.*

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

This document is intended to provide an informative outline of practice for the repair of water-leakage cracks of concrete structures. There are two types of cracks that can form in a concrete structure; dry cracks and water-leakage (wet) cracks. Cracks normally form when the structural element is subject to phenomena such as dry-shrinkage and formation of joints. In the typical above grade sections of the concrete structure, dry cracks are more easily controlled and repaired with a well-defined maintenance method. When cracks are formed by the effect of hydrostatic pressure and the interface of the crack is subject to constant wetness, these cracks are designated as water-leakage cracks. The ingress of water through cracks often leads to increase of humidity in the building interior and this can result in a drastically accelerated degradation of durability for the concrete structure. In extreme cases, the presence of water can generate harmful effects that cause health problems to the users, rendering the building completely uninhabitable.

In the current state, it is difficult to secure a proper repair method of water-leakage cracks because of insufficient knowledge and understanding of the degradation factors (i.e. environmental conditions, the influences of various human activities, etc.), at an institutional level. There are already a number of repair techniques and application methods that are commonly used in application, but the required conditions for properly repairing and sealing the water-leakage cracks have often been proven to be difficult. Even in some cases where the repair procedures have been followed through properly with skilled workmanship, the performance level of the repair method may be insufficient and lead to reopening of the leakage crack. This can in turn lead to increase in maintenance and labour costs and decrease in the property value of the building structures.

Past records of remedial actions for cracks and damage in concrete structures have shown varying degrees of results; some have shown failure, some have had minor success and, in some cases, an adequate solution was implemented. However, the cases of successful repair methods cannot serve as a universal model for all cases of cracks and leakage due to the diversity of environmental degradation factors existing in the construction field. In this regard, a standardized practice for selecting appropriate leakage repair materials and methods in construction sites can be used. It is highly anticipated that a newly proposed awareness and understanding of these issues will prevent further unnecessary increase in maintenance costs, expenditures and results in improved durability performance of concrete structures.

General practices for the repair of water-leakage cracks in concrete structures

1 Scope

This document provides a guideline for the selection of a proper grout material to repair water leakage through cracks and other deformities in concrete structures. The factors relevant to the quality control of maintenance and repair of water-leakage cracks are as the following;

a) conditions of water-leakage cracks;

b) performance requirements for repair materials;

c) different types of repair materials (grouts);

d) procedures followed to select the appropriate repair materials;

e) execution of different types of repair methods;

f) performance assessments of applied materials and methods;

g) data collection.

This document does not include any details on the repair of dry cracks and the causes of cracks. The details on dry crack repair are covered in ISO 16311-4.

A flow chart for maintenance of water-leakage cracks is shown in Figure 1.

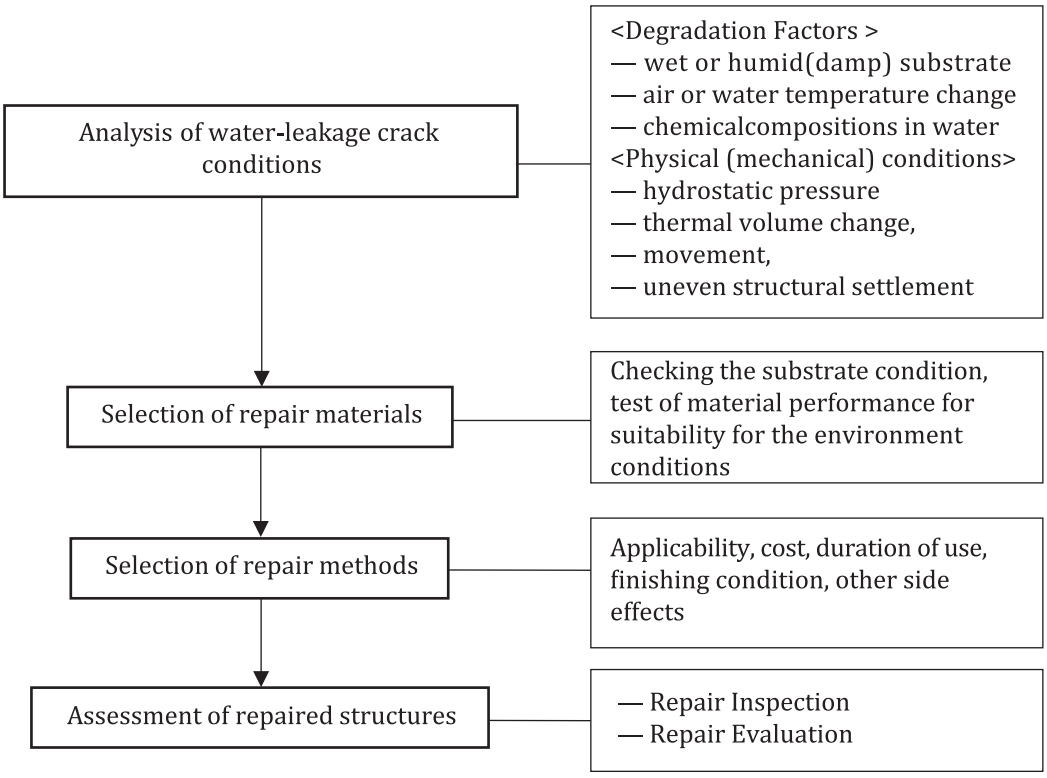

Figure 1 — Flow chart for maintenance of water-leakage chart