

● 土木

● 建築

● IT

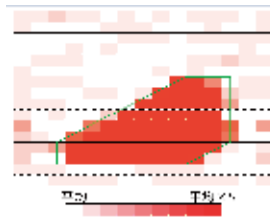
● 環境

外装タイル剥離診断装置の開発に関する基礎研究

Basic Study into a Diagnostic System for Exterior Tile Debonding

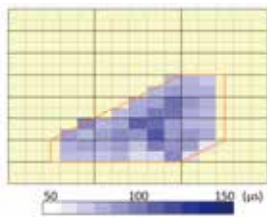
添田 智美 藤沼 智洋

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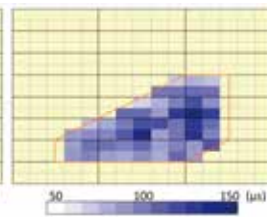
YM tile (剥離深さ 15mm)

相対最大振幅による
剥離判定例

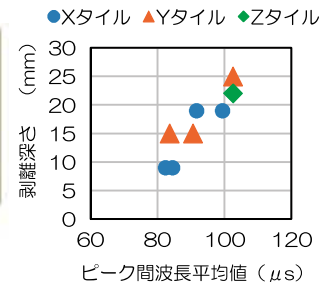


YM tile (剥離深さ 15mm)

ピーク間波長の分布例



YS tile (剥離深さ 25mm)



ピーク間波長と
剥離深さの関係

概要

外装タイル張り仕上げは、経年による剥離や剥落が問題となることが多い。特に剥落事故が生じると第三者に危害を及ぼす危険性が高いため、外装タイルの剥離の有無を精度よく診断し、タイルの剥落を未然に防ぐ必要がある。そこで、高精度で高効率なタイル剥離診断装置を開発することを目的として基礎的検討を行った。まず、条件の異なる模擬剥離試験体を作製し、検査員による打診と既存の剥離診断装置による診断を実施して、検査員や既存の装置の課題を抽出した。次に、適した診断方法および剥離判定基準の設定方法を模索するため、鋼球を用いた比較的単純な打撃機構により試験体を打撃した際の打撃音を収録し、健全部と剥離部の応答の違いを実験的に検討した。さらに、高効率の打撃機構とマイクを併せ持つ装置を試作し、適した打音解析方法、剥離判定基準、剥離深さの予測方法について有効な手法を検討した。

Exterior tile cladding sometimes suffers debonding or adhesive failures as it ages. Failures that lead to cladding tiles falling from the building are highly dangerous for people, and consequently, it is vital to be able to identify debonding defects at an early stage to prevent tiles falling. In this study, we examined the possibility of developing high-precision and efficient debonding detection apparatus. Initially, we prepared eight exterior-tile wall specimens with artificially-made debonding areas. Percussion tests were carried out by three professional testers, and diagnostic tests were also performed using two types of existing debonding detecting apparatus. From the results of these tests, we extracted some problems to be solved. Next, in order to study appropriate diagnosis methods and criteria for assessing debonding areas, we recorded and analyzed percussion sounds of steel-ball impact adopting a simple impacting mechanism, and experimented the differences of percussion sounds between debonded and non-debonded areas. We manufactured a prototype apparatus which has a highly efficient impact mechanism and a microphone, and examined suitable sound analysis methods and criteria for judging debonding, as well as an effective method for predicting depth of the debonded area.