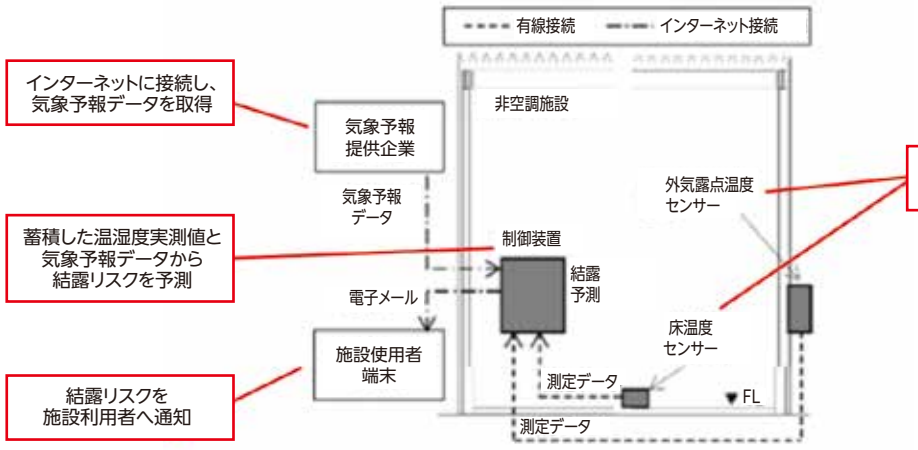
非空調施設における床面結露予測に関する研究

Study on Predicting Floor Condensation in Buildings without Air Conditioning

黒木 洋 Hiroshi Kuroki



床面結露予測のための機器構成

概　要

近年,物流施設などに代表される非空調施設において,1階のコンクリート床表面に結露が発生する現象が頻発している。本研究では,この床面結露を発生日の前日までに予測する手法の構築を行った。床面結露は,外気が高湿となる時期に,床温度が空気の露点温度を下回ることで生じる。このため,先ず翌日の床温度を予測し,床温度予測値から外気露点温度の気象予報値を差し引いた値(ΔT)から,結露リスクを判別する方法を検討した。翌日の床温度は,過去の床温度および外気温度の実測データから相関式を作成して予測するものとした。実物件での試験結果から,床温度の予測値と実測値は高い相関を示すことが確認できた。床温度予測により得られたΔTの日最低値が任意の閾値を下回る日を,結露リスク有りと判断するものとし,実物件において正答率の検証を行った。6カ月間の検証期間を通して,結露リスク予測の正答率は90%以上の高い値であり,本予測手法により前日までに結露リスクの予測が概ね可能であることが確認できた。

Abstract

In recent years, condensation on concrete floor surfaces of first floors has frequently occurred in non-air-conditioned buildings such as logistics centers. This study developed a method to predict floor condensation up to one day in advance. Floor condensation occurs when the floor temperature falls below the dew point temperature during periods of high outside humidity. Therefore, the following day's floor temperature was first predicted, and then examined a method to determine the condensation risk by calculating the difference (ΔT) between the predicted floor temperature and the weather forecast value of the outside air dew point temperature. The floor temperature for the following day is predicted by creating a correlation formula based on past measured data of floor temperature and outside air temperature. From the test results in actual buildings, it was confirmed that the predicted floor temperature values showed a high correlation with the measured values. A day was considered to have a condensation risk when the daily minimum value of ΔT obtained from the floor temperature prediction fell below a certain threshold, and the accuracy rate was verified in actual buildings. Based on the six-month verification test results, the accuracy rate of the condensation risk prediction was over 90%. It was confirmed that this prediction method could generally predict the risk of condensation with accuracy up to a day in advance.

関連するSDGs

Related SDGs