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HEALTH DAMAGES FROM INDOOR AIR POLLUTION QUANTIFIED USING A NOVEL OFFICE BUILDING DIAGNOSIS METHODOLOGY

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Abstract

This study applied a novel receptor design to the development of an indoor air quality diagnosis (IAQD) system. Indoor air pollutants were converted into simple air quality and health damage indices to evaluate the health risks associated with renovated and unrenovated offices.

The outcomes of the IAQD methodology presented R^2 values of 0.705 and 0.700 for renovated and unrenovated offices, respectively. These values indicate moderate level of prediction accuracy. IAQD results related to typical offices showed that the primary contributor to health damage in unrenovated offices was human activity, whereas the primary contributor to health damage in renovated offices was the materials used for decor. Minimizing human activity (sources of major PM_{10} and CO_2) in unrenovated offices could reduce health damage by up to 34.45%. In renovated offices, minimizing the use of toxic materials (sources of HCHO and TVOC) could reduce health damage by up to 56.86%.

The proposed indoor air quality diagnosis method can be applied to determine the degree to which pollution sources contribute to indoor air pollution and to provide a simple convenient tool with which to improve indoor air quality and thereby reduce damage to human health.

Key words: damage index, indoor air quality diagnosis, office, receptor, source contribution

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