營建技術自動化創新構想產生模式之研究

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摘要

The technological innovation and advancement of construction industry has been slow compared with the other industries (e.g., bio-tech and ICT industries). It has also slowed down the productivity of the industry. One major reason for the slow innovation of construction industry may be due to the lack of appropriate innovation method. As a result, developing a method for the systems or radical innovation of construction technology is an important issue for competitiveness improvement of the industry. Due to the capability of the traditional technology analysis approaches, conventional research and development are limited to trial and error. To tackle this problem, the current research adopts the concept of genetic algorithms (GAs) to develop an evolutionary method for technology innovation. A "Model for Automatic Generation of Innovative Alternatives (MAGIA)", the MAGIA offers a new methodology of exploring innovation in the construction technology. The MAGIA model integrates TRIZ, patent analysis, function model analysis (FMA), genetic operation tree (GOT) and GAs to form a novel approach that is capable of generating radical innovative alternatives for a specific construction technology. A case study of isolation layer structure of pipeline construction was selected to verify the proposed MAGIA. From the result of case study, it is shown that the proposed MAGIA is able to generate innovative alternatives from the function model of a construction technology.

關鍵字：construction technology innovation, TRIZ, genetic algorithm, operation tree, function model.