



## Comparative analysis on urban flood countermeasures Based on life cycle thinking: A comparison between sponge city project and drainpipe replacement project

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### Abstract:

The increasing of summer storm water-logging disasters has acutely threatened the sustainable urban development in China. Main reason was considered as severe rainfall in short time and the regional drainage capacity is insufficient. Therefore, overflow cannot be drained promptly. There is traditional strategy to solve this problem: drainpipe replacement project, in which existing drainpipe should be removed at first step and new larger diameter pipe would be installed. However, there is a new countermeasure emerged recently in Chinese cities. Its name is sponge city project. Drainpipe replacement project aims at enlarging the discharge of water when summer storm happens by broadening urban drain system and sponge city project aims at enlarging the absorption of water by increasing the curves of urban land. Although there are many studies on environmental impact estimate on drainpipe replacement program, study on environmental impact estimate on sponge city construction is insufficient, especially from life cycle perspective. This paper is trying to propose a LCA (Life Cycle Assessment) frame work on sponge city construction and make a cost-effective comparison analysis between drainpipes replacement and sponge city project. Finally, we have come to the conclusion that: first, without considering of environmental impact cost, the average cost for drainpipe replacement project is always lower than sponge city program, which demonstrates that drainpipe replacement project is more efficient. Second, with considering environmental impact cost, the point of inflection (18rd year) emerged. In first 17 years, the average cost for drainpipe replacement project is lower than sponge city project. However, from 18rd year the average cost for drainpipe replacement project became higher than sponge city project. This demonstrates that if residual life for existed drainpipe is longer than 18 years, sponge city program is more efficient. Otherwise, drainpipe replacement program is more efficient.

### Biography:

Xuezhou Fan is a PHD student in the university of Kitakyushu in Japan, and now he is also a project researcher in this university. He holds a BSc in Civil engineering at the University of Zhengzhou and a Master of Philosophy degree in Environmental Economic at the Graduate School of Economic, the University of Kobe. Fan



has 3 years of public practice and 2 years of private practices as a academic researcher. He has presented an abstract on GIS-based social cost-benefit analysis on sponge city in the University of Waseda at the 13th LCA conference in Tokyo, Japan.

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