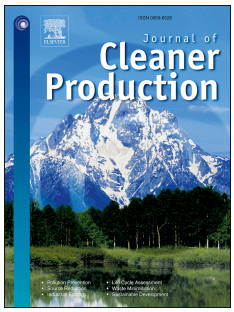
Accepted Manuscript



Comparing greenhouse gas emissions of precast in-situ and conventional construction methods

Yingbo Ji, Kaijian Li, Guiwen Liu, Asheem Shrestha, Jinxi Jing

PII: S0959-6526(16)31039-3

DOI: 10.1016/j.jclepro.2016.07.143

Reference: JCLP 7715

To appear in: *Journal of Cleaner Production*

Received Date: 11 May 2016

Revised Date: 2 July 2016

Accepted Date: 22 July 2016

Please cite this article as: Ji Y, Li K, Liu G, Shrestha A, Jing J, Comparing greenhouse gas emissions of precast in-situ and conventional construction methods, *Journal of Cleaner Production* (2016), doi: 10.1016/j.jclepro.2016.07.143.

Page count: 27 Word count: 6396

Comparing greenhouse gas emissions of precast in-situ and conventional construction methods

Yingbo Ji, Ph.D.[1], Kaijian Li[2*], Guiwen Liu, Ph.D.[3], Asheem Shrestha, Ph.D. [4], Jinxi Jing [5]

1 Yingbo Ji, Associate Professor, School of Civil Engineering, North China University of Technology, Beijing 100144, China; E mail: yingboji@126.com

2* Kaijian Li, PhD Candidate, Faculty of Construction Management and Real Estate, Chongqing University, Chongqing 40045, China. Email: likaijian@cqu.edu.cn (* Corresponding author)

3 Guiwen Liu, Professor, Faculty of Construction Management and Real Estate, Chongqing University, Chongqing 400045, China; E mail: gwliu@cqu.edu.cn

4 Asheem Shrestha, Assistant Professor, Faculty of Construction Management and Real Estate, Chongqing University, Chongqing 400045, China; E mail: asheemsh@hotmail.com

5 Jinxi Jing, Master Degree Candidate, Faculty of Construction Management and Real Estate, Chongqing University, Chongqing 40045, China. Email: jinxi.jing@yahoo.com

Abstract

Precast in-situ construction is gaining popularity among construction practitioners in China for its efficient system and its ability to reduce construction waste. However, there has been little to no empirical evidence that elucidates the greenhouse gas (GHG) emissions from this method. In an effort to address this knowledge gap, this paper establishes a systems boundary for the measurement of GHG emissions for precast in-situ construction. Employing a quantitative model, the GHG emissions of precast in-situ is determined and compared with conventional construction method. Results show that the precast in-situ construction produces less GHG emissions than the conventional method. Embodied GHG of building materials is found to be the main GHG emitter in both precast in-situ and conventional construction methods. Furthermore, four factors are identified that positively contributes towards reduced emissions: (i) embodied GHG emissions of building materials, (ii) transportation of building materials, (iii) resource consumption of equipment and techniques and (iv) transportation of waste and