DEVELOPMENT OF AN INTEGRATED FACADE SYSTEM TO IMPROVE THE HIGH-RISE BUILDING PROCESS

Fredrik Friblick[1], Iris D. Tommelein[2], Edith Mueller[3] and Jon Henrik Falk[4]

ABSTRACT

This paper describes an integrated system for facade installation in high-rise buildings, the development of which was guided by lean construction principles. The facade system has components that comprise means to ease material handling, installation, and maintenance. Integrated installation features of the facade system remain as permanent parts of the exterior facilitates and serves the process of building maintenance.

De-coupling of interacting trades during installation has been the main driver in the system's product development process and is a major system advantage. The facade will be installed from the building's exterior and require only minimal on-floor work, allowing other contractors on site to use the space inside the building. The number of fixers needed when building with the integrated installation system will be significantly lower than with a traditional facade system. Using this system, panels can be handled and installed with a continuous flow that is less prone to variation and generates less waste, such as internal transport and waiting time, relative to traditional installation systems.

This paper refers to lean principles as tools to master challenges in the facade installation process, recognizing problems in traditional installation systems such as, e.g., chain reactions caused by delay.

The integrated facade system, including patented technology, is under further development and in preparation for on-site trials.

KEY WORDS

High-rise building, lean construction, material handling, supply chain, waste reduction, de-coupling, variability reduction, continuous flow, cladding panels, facade system

[1] Assistant Professor, Department of Industrial Management and Logistics, Lund University, Sweden, and CEO Prolog Construction Logistics, Malmö, Sweden, Phone +46704930561, fredrik.friblick@prolog.se

[2] Director, Project Production Systems Laboratory (http://p2sl.berkeley.edu/) and Professor, Civil and Environmental Engineering Department, 215-A McLaughlin Hall, University of California, Berkeley, CA 94720-1712, Phone +1 510/643-8678, Fax +1 510/643-8919, tommelein@ce.berkeley.edu

[3] Director, Arup Facade Engineering in London, and CWCT, Bath; contact: edith.mueller@arup.com

[4] Founder and inventor, Brunkeberg Industriutveckling AB, Regeringsgatan 93, 111 39 Stockholm, Sweden, Phone +46703604424, henrik@brunkeberg.se