SETPLAN: A COMPUTER TOOL TO AID IN SET-BASED DESIGN

John-Michael Wong[1], Kristen Parrish[2],
Iris D. Tommelein[3] and Bozidar Stojadinovic[4]

ABSTRACT

This paper describes a computer tool named SetPlan that works with Building Information Modelling (BIM) software to aid in set-based design. It captures information from a BIM model and displays it in a 'dashboard' that supports project participants in developing shared understanding of rebar objects as the design unfolds. In turn, updates from SetPlan help to colour code the BIM.

We engaged practicing structural engineers, rebar fabricator-placers, and general contractors from the San Francisco Bay Area in workshops to determine the need and use cases for SetPlan. This paper illustrates SetPlan's use for designing a shear wall. SetPlan compares three shear wall reinforcement schemes (representing various wall shapes with different boundary reinforcement). It extracts information from a BIM in Tekla 14.0 about the shear wall reinforcement, enabling information sharing across the project team. The tool eliminates some of the jargon issues that may arise in cross-disciplinary design conversations by displaying data graphically and it is a first step in making set-based design easier to implement using current design software.

KEY WORDS

Set-based design, rebar, building information modelling (BIM), reinforced concrete.

INTRODUCTION

To support lean project delivery, the project team must "collaborate, really collaborate" (Macomber 2005) from the project outset. Collaboration promotes the development of synergistic relationships and a shared understanding of the project among team members. Building information modelling (BIM) can help to develop this shared understanding by allowing the team to visualize the project in 3D and share information about objects in the model. BIM models can show multiple alternatives for a given object(s), allowing project teams to consider sets of alternatives rather than a single alternative, thereby supporting a set-based approach to project design and management (e.g., Parrish et al. 2008a; Ward et al. 1995).

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[1] Designer, KPFF Consulting Engineers, 1160 Battery St., Suite 300, San Francisco, CA, 94111, Phone +1 415/989-1004, john-michael.wong@kpff-sf.com

[2] Project Scientist, Lawrence Berkeley National Laboratory, 1 Cyclotron Road Mail Stop 90R1116, Berkeley, CA, 94720-1116, KDParrish@lbl.gov

[3] 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

[4] Professor, Civil and Environmental Engineering Department, 721 Davis Hall, University of California, Berkeley, CA 94720-1710, Phone +1 510/643-7035, FAX +1 510/643-8928, boza@ce.berkeley.edu