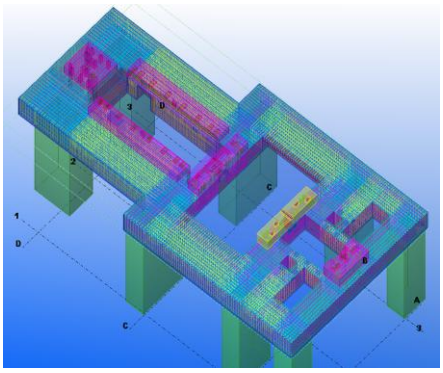
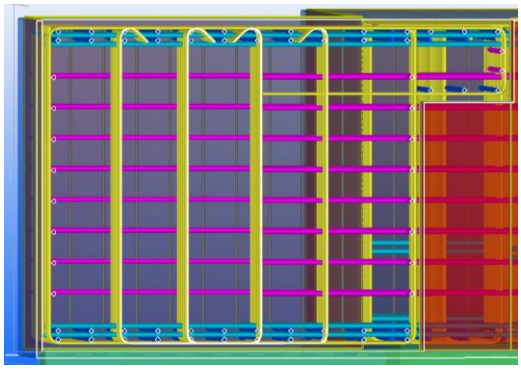
A Model-Based Cast-in-Place Concrete Work Process from Concept to As-Built

Dr. Peter Carrato, PE, SE
Fellow, Bechtel Corporation

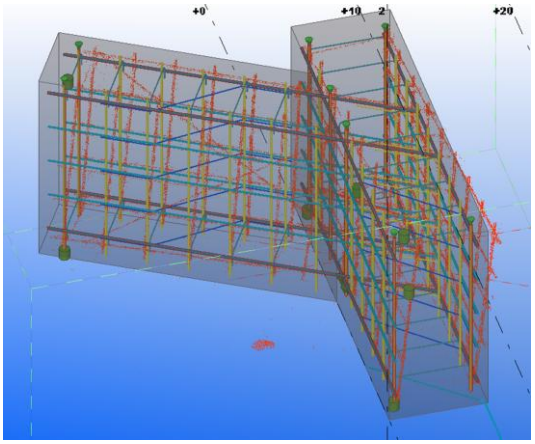
Virtually every project that makes up the built environment includes cast-in-place (CIP) concrete. A model-based process that facilitates the CIP concrete supply chain from conceptual design to as-built structure is described. This process embraces the primary participants along the supply chain; architects, structural engineers, rebar detailers, fabricators, and concrete contractors. A variety of software applications are addressed, as well as various method of information exchange. Activities include extracting of concrete neat line geometry from a primary modeling tool. This geometry is then linked to structural requirement and transferred to rebar detailing software which then exports a bar list for fabrication. Three dimensional printing is used to create physical models of the concrete structure. Ultimately rebar placement information is sent to the field for use by a robotic layout tool, and the final as-built installation is then scanned and uploaded for quality checking against the original model. An example based on a complex cast in place machine foundation for a large turbine generator set is provided.



Overall Model



Rebar Details



Laser Scanning of Rebar