TEKLA participates in Georgia Tech BIM class and awards undergraduate and graduate students for classroom research

In April, Tekla was invited to Georgia Tech's School of Civil and Environmental Engineering to participate in Undergraduate and Graduate student presentations on various BIM topics. As part of their semester class, students were assigned to address problems within the construction industry currently not being addressed by current technology. They solved these challenges using Tekla Structures BIM software.

Presentation topics were diverse, touching on Safety Hazards, LEED Analysis, model-based scheduling, construction accuracy, supply-chain management and more. There were many innovative ideas from the students. “We saw a lot of project presentations at Tech, many of which were impressive and a handful outstanding,” said Carl Taylor from Tekla, Inc.

The winning presentations were as follows:

Summary Courtesy of Jochen Teizer, Ph.D. Assistant Professor, School of Civil and Environmental Engineering, Georgia Institute of Technology.

Graduate Category – First Place:
Title: Rule Based Safety Hazards Identification and Analysis for Construction.
Team: Sijie Zhang, and Atreya Safari
School of Civil and Environmental Engineering

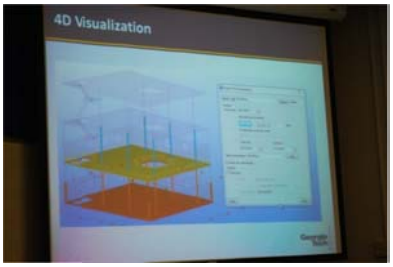
ABSTRACT
The Construction industry has the highest fatality rate, and nearly one third of the fatalities resulted from falls. Though existing regulations and best practices provide safety measures to deal with most of the safety hazards, the safety issue and concern are still on written or numerical

documents without visual analysis and recording. Furthermore, safety planning is generally done separately from the project execution planning, which creates more difficulties for safety engineers to analyze what, when, why and where safety measures are needed for preventing accidents.

Taking advantage of the 3D BIM technology we propose to develop an automated safety rule checking system based on OSHA regulations to identify fall hazards such as falling from openings, skylines and unprotected edges as a prototype:

1. Develop the logic of transit from natural language to machine readable rules
2. Extract essential information to represent the safety conditions from building information models
3. Define the mechanism linking the rules and BIM models to identify fall hazards
4. Implement the rule-based examination on a selected software platform and visualize the hazards
5. Generate safety report for safety planning including essential fall prevention information such as the location of the openings and possible prevention measures.

The safety rule checking system can largely increase the awareness of safety hazards and provide instructive information for prevention of accidents.



In this presentation, API was used to audit and edit models with safety railing based on rules.

Undergraduate Category – First Place:
Title: Construction Accuracy Assessment by Integrating Total Station and Building Information Modeling
Team: Messay Gebre, and Keitaro Kamiya
School of Civil Engineering

ABSTRACT
As the developing technology permits evolutionary improvement in different engineering fields, the construction industry is also imminent to pursue more ideal, flawless constructability. Recently, more and more contractors took their first step to incorporate newly developing building information modeling (BIM) for construction management purpose. In fact, BIM has empirically proven its worth by increasing the productivity of construction by about 30-40%. (AIA, 2005) BIM has a lot to offer to the contractors, and here in this article, we seek to improve

the BIM efficiency even more by integrating some of other conventional surveying tools, such as stationary total station for construction accuracy assessment purpose.

This article will develop a framework of concepts, processes, and theoretical applications, which will be used to explore the possibilities for the combination of these two technologies. Once the methodology is outlined and explained, it will be applied to a relevant case study at the Marcus Nanotechnology Research Center at Georgia Institute of Technology for validation with a BIM model. As the result, the data proves the accuracy of construction accuracy of Nanotech building with an error less than .2% (excluding the outliers).

This group measured 10 points of Nano Building on campus and compared measurements to Revit IFC models in Tekla Structures

Undergraduate Category – Second Place:
Title: Supply Chain Management Using Radio Frequency Identification Tagging and Building Information Modeling
Team: Adrienne Bozeman, and Lauren Zuza
School of Building Construction

ABSTRACT
In this report, we address the problems associated with the current method of supply chain for the construction industry and explore the possibilities for improvement using Building Information Modeling coupled with RFID tagging. Procurement and monitoring of supply consumption for an individual construction project is archaic in comparison to other industries such as manufacturing furniture.

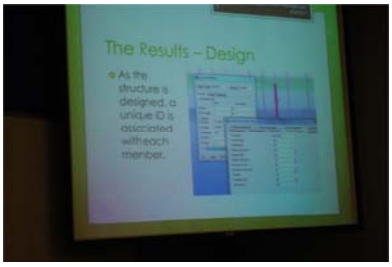
Up until this point, there has been no solution in the construction industry for comparing actually delivery dates to projected schedules, accounting for damaged or wasted materials, or tracking individual supplies on a job site and ensuring that pieces are installed in the proper location. Material tracking can also be used to calculate and analyze productivity rates to better hire trades and plan schedules for future projects. BIM for supply chain using RFID tagging is the way of the future for implementing lean management in construction.

Radio frequency identification is a newly emerging technology within the construction world. Consisting of an integrated circuit and an antenna, there are three types of RFIDs that could prove to be helpful in the construction field. Passive, Active, and Battery Assisted RFIDs can each be put into use in a variety of ways to help maximize efficiency in materials tracking, delivery, and installation. In a field plagued by historically wasteful tendencies and gross

inefficiencies, any and all trends toward the savings of materials and money are beneficial and worthy of address.

Currently, Tekla Structures software provides “fully detailed models for centralizing essential planning and management data. Construction managers can visualize the building in its 'as-built' condition, locate the task in the building, and show their team the exact way to precede” (Tekla 2011). This technology can be extremely useful to project managers.

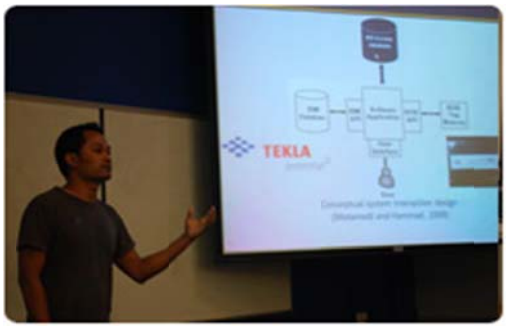
Throughout this paper, we explain the present and future technologies and benefits of RFID tagging when paired with Tekla’s existing construction planning software by planning the life cycle of prefabricated steel aided by



Active RFID was integrated with fabrication

Future use of Tekla Structures in the construction classes as well in the school’s Real-Time Automated Project Information and Decision System (RAPIDS) laboratory will offer several benefits to Georgia Tech’s graduating seniors, graduate students and soon-to-be construction management and structural engineering professionals.

“There is a need in our industry for construction professionals to have a balanced perspective in design, construction and project handover for client facilities management. Learning the concept of a connected and intelligent construction process which includes the use of BIM and other emerging technology makes our students very attractive in the job market and prepares them for career opportunities after graduation,” says **Jochen Teizer**, Assistant Professor and Director of the RAPIDS Laboratory at Georgia Tech School of Civil and Environmental Engineering.



Tekla would like to thank Dr. Teizer for giving us the opportunity to participate in his class project this past semester.