UNB EST. 1785 UNIVERSITY OF NEW BRUNSWICK | Off-site Construction Research Centre

PROJECT PROFILE

MALTA INC. (PHASE 3)

PROJECT BACKGROUND

The construction industry is shifting towards more efficient energy storage system construction methods. This research, in collaboration with Malta Inc. and the University of New Brunswick's Off-site Construction Research Centre (OCRC), aimed to enhance off-site construction methods for energy storage systems using a site simulation methodology and the "Plant Configurator" planning platform.

METHODOLOGY

The project integrated quantitative analysis, stakeholder engagement, and digital platform development. It upgraded the simulation (Hybrid B) to include productivity rates, collaborated with industry stakeholders for design optimizations, and developed the Plant Configurator for rapid module selection, crane placement, and cost-benefit analysis.

RESULTS

The developed Plant Configurator System Architecture integrates various tools and technologies, including Navisworks, AutoCAD, and SQL databases, to streamline the construction planning process. By importing 3D models, extracting geometric information, and utilizing APIs, the system generates lifting object envelopes and facilitates simulation in Navisworks. This methodology allows for precise crane placement, lifting sequencing, and task scheduling, as demonstrated in the simulation results. The simulation, initially exploring two mobile cranes for construction, was optimized with an assisting crane, reducing lift days from 227 to 192. Industry validation from Sunny Corner Enterprise Inc. further confirmed the simulation's accuracy and provided insights into construction durations, people hours, and supervision needs.

The integration of industry feedback highlighted crucial considerations for implementation, such as spool length optimization, field weld location identification, and insulation scope review. Additionally, insights from FCC / OSCO group discussions emphasized preferences for construction methods and materials, contributing to a comprehensive understanding of project requirements. These collaborative efforts, combined with the Plant Configurator's capabilities, enhance budget accuracy, optimize local labor production, and emphasize meticulous planning for efficient project execution.

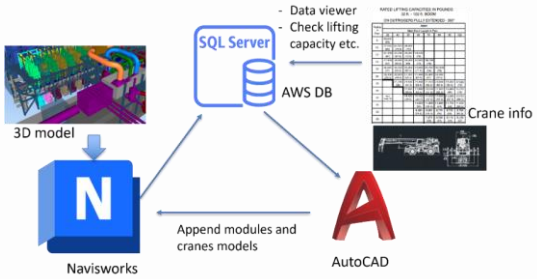

Fig. 1 System Architecture

CONCLUSIONS

The collaboration between the University of New Brunswick's Off-site Construction Research Centre (OCRC) and Malta Inc. has yielded valuable insights and outcomes for the future of construction planning and design. The project's simulation-based approach, coupled with stakeholder engagement and digital platform development, has led to significant improvements in construction efficiency, cost reduction, and project timeline acceleration. Notable achievements include the validation of simulation results by industry partner Sunny Corner Enterprise Inc., which confirmed the accuracy of productivity rates for piping and steel fabrication. This validation process, along with industry feedback, emphasized the need for re-evaluation of certain design aspects, highlighting opportunities for further optimization in spool handling and field weld locations.

Moreover, the project outlined steps to enhance budget accuracy, considered local labor production factors, and showcased the enhanced precision of the upgraded simulation tool, Hybrid B. The industry-driven optimization efforts resulted in design enhancements that improve constructability, reduce on-site work, and ultimately decrease costs and timelines. The success of the "Plant Configurator" in supporting construction planning and simulation for energy storage systems underscores its potential to revolutionize the sector, offering agile decision-making capabilities and scenario exploration for lifting operations. These findings collectively signify a transformative shift towards more efficient and cost-effective construction practices, promising substantial benefits for future projects and industry advancements.

If you are interested in getting involved in this initiative or other research and development projects, please contact the Off-site Construction Research Centre at: **offsiteconstruction@unb.ca**

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