

# PROJECT PROFILE

## PANELIZED FACTORY DESIGN & LAYOUT



### PROJECT BACKGROUND

The UNB Off-site Construction Research Centre (OCRC) has collaborated with an industry partner, to design and layout a new panelized factory. The building measures approximately 220 by 80 feet. The primary objectives of this project include developing an optimal floor layout for panelized construction, recommending equipment purchases, and outlining the steps necessary to bring the facility online. Key activities included developing a comprehensive Work Breakdown Structure (WBS) for panelized construction, designing a factory layout based on the WBS, and equipment and tools selection for manufacturing processes.

### METHODOLOGY

#### 1. Site Analysis:

- Developed a 3D model of the building with relevant details.
- Evaluated buildings dimensions and infrastructure.
- Identified potential challenges related to space utilization and workflow efficiency.

#### 2. Work Breakdown Structure (WBS) Development:

- Created sample panels in CAD as benchmark for manufacturing process.
- Identified individual steps of the manufacturing process through process map
- Developed WBS outlining required stations, tasks, tools/equipment needed, and workers/station.

#### 3. Factory Layout Design:

- Transferred the WBS into practical stations within the manufacturing facility
- Designed full scale components/equipment and inserted into an accurate CAD model of the facility
- Evaluated space constraints and workflow to determine challenges and limitations

#### 4. Simulations:

- Applied simulations to assess spatial constraints and workflow, uncovering potential challenges and limitations.
- Created different layouts/workflows to analyze tasks time and material/component movement within the facility using alternate locations/use of cranes, forklifts, and carts.

### RESULTS AND RECOMMENDATIONS

- **WBS Development:** Provided a detailed breakdown of design components and manufacturing tasks, resource allocation, and productivity assessment.
- **Factory Layout Design:** Optimized spatial arrangements and workflow paths, enhancing productivity and efficiency.
- **Simulations:** Identified spatial constraints and workflow inefficiencies, revealing specific challenges and limitations. Optimized task completion times and material/component movement, enhancing operational efficiency with cranes, forklifts, and carts.

#### Recommendations:

- Continuous update and refinement as information on designs develop; integration of real-time productivity data and material delivery/processing times to improve accuracy.
- Mapping sub-assembly areas, planning material storage areas, and allowing for continuous updates and improvements.
- Reconfigure the layout to address spatial constraints and optimize equipment usage, enhancing material/component movement. Develop and test additional workflows details with production ready panels to reduce task completion times and streamline operations.