

Exploring the use of Quadruped Robots in Construction Environments: The Case of Small Item Transportation

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**CITC-14 | SEPTEMBER 2-5, 2024
HOSTED BY FEDERAL UNIVERSITY OF RIO DE JANEIRO
RIO DE JANEIRO, BRAZIL**

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Construction in the 21st Century



Introduction & Background

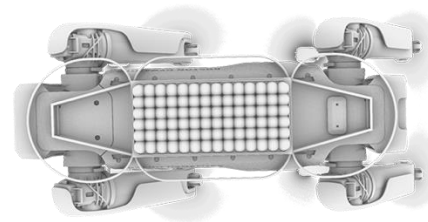
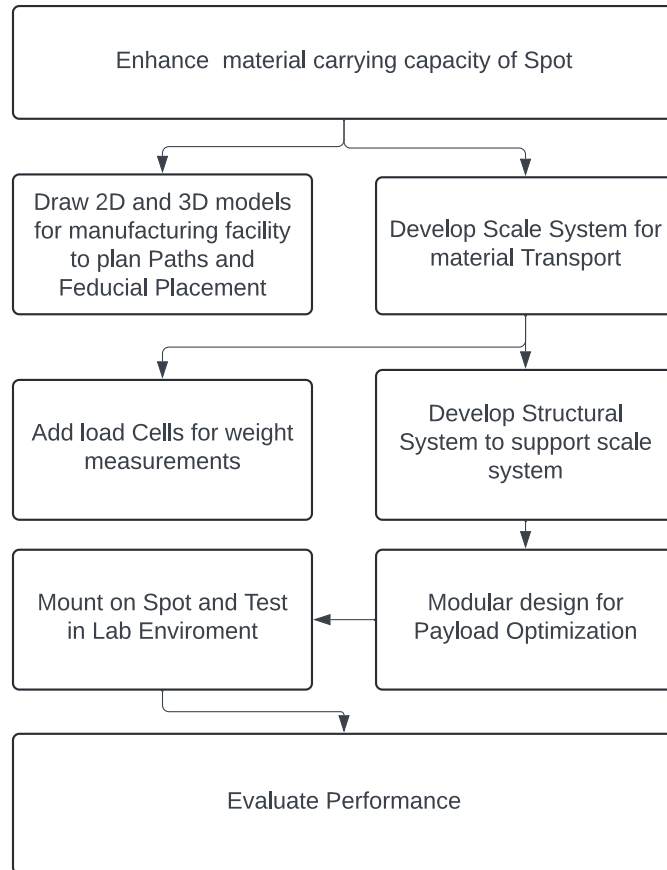
- High Safety Risks In the Construction Industry
- industry is slow to adopt new technologies
- Limited use of quadruped robots



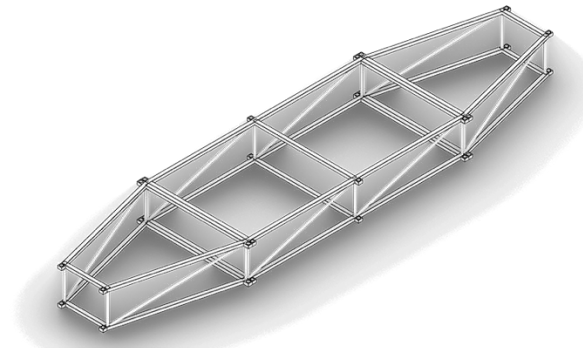
Aim, Objectives, and Scope

- Aim: explores the integration of quadruped robots into construction operations to serve as a mobile inventory supplier
- Objectives
 - Evaluate Material-Carrying Capacity
 - Assess operational Efficiency
 - Proposed Safety Strategies

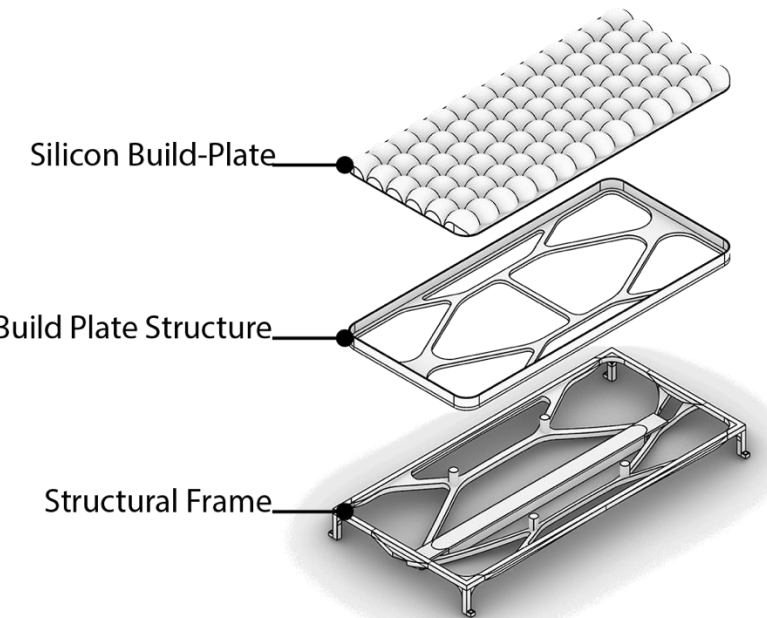
Research Design and Methodology



Top View of final Assembly



Structure Assembly with 3 Modules



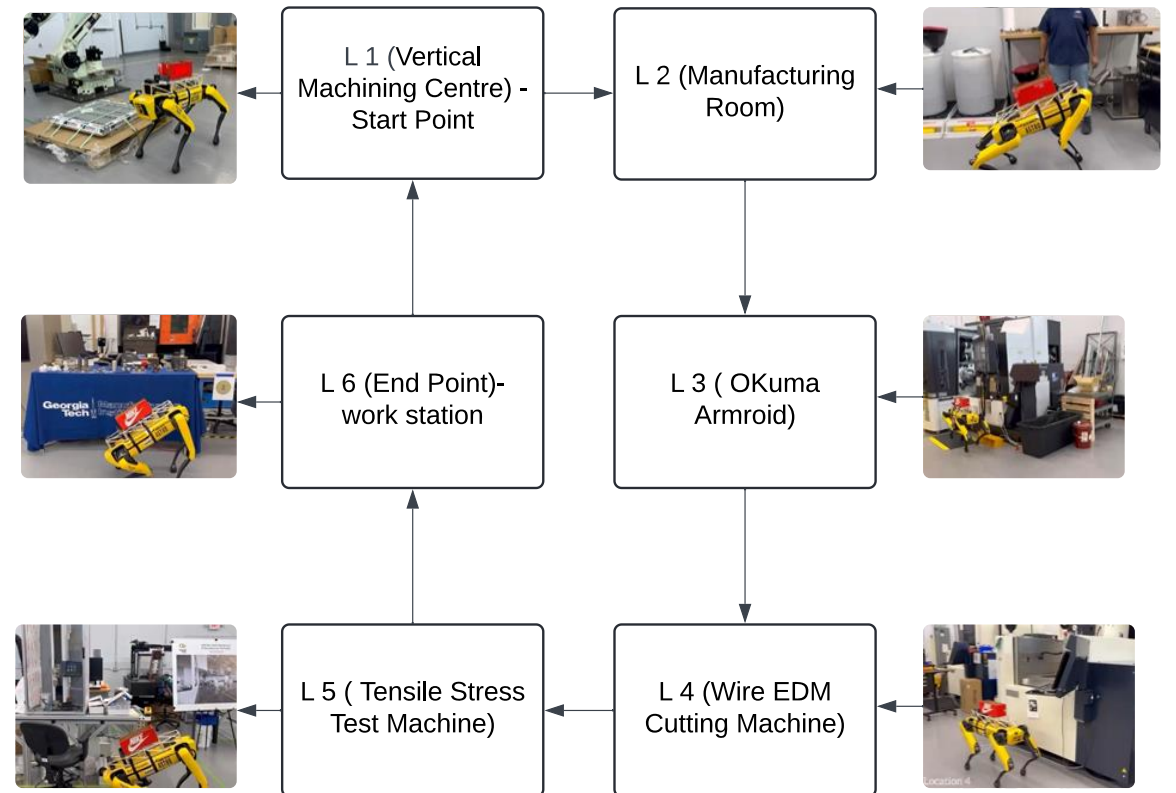
Results (1)

- Enhanced Material-Carrying Capacity
 - Fiducial Markers
 - Repeated cycle of ~5mins
 - 25 lbs



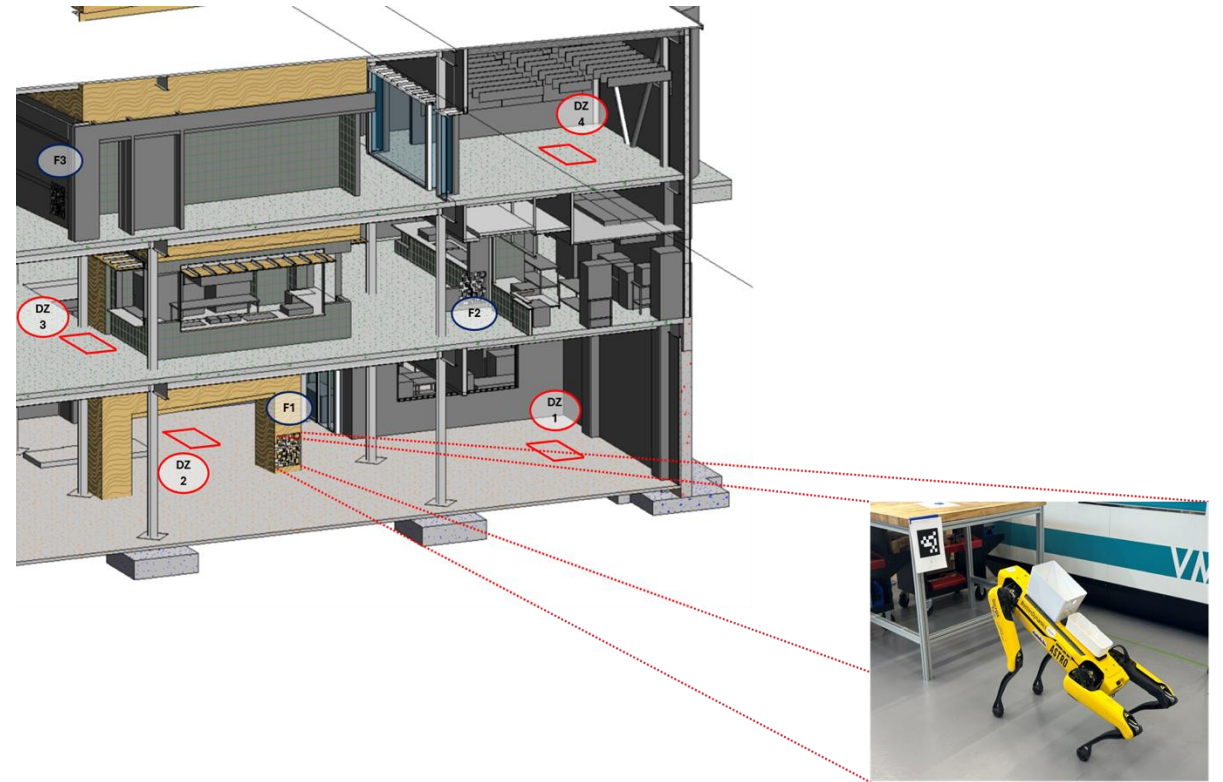
Results (2)

- Path and Speed Optimization
 - 147m Distance Covered
 - Operation time 4:23 to 3:33
 - Posture Time 18s vs 13s



Discussions, Conclusions & Recommendations (1)

- Path Creation is possible at construction sites
 - Each work station Linked to Fiducial Marks
- Improved Workflow Efficiency
 - Reducing human labor and risk
 - 24hr System



Discussions, Conclusions & Recommendations (2)

- Reduced material transport time
- Challenges of 25lbs weight
- More Field tests are required for more validation and improvement
- Address dynamic navigation challenges on site