INVENTIVE CONSULTING GROUP LTD **Project#24-0140**

2107-350 Webb Dr, Mississauga, ON, L5B 3W4 **Date:** Dec 10th, 2024

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ENGINEERING LETTER FOR COMPLIANCE WITH OBC REQUIREMENTS

Client: PrimeAlux

Project: Aluminum slats with PU foam core usage as guard/rail

Date: Dec 10th, 2024

Project #: 24-0140

Subject: Proposal for Slat Installation Configuration to Comply with OBC Guard Requirements

This report presents a comprehensive analysis of the deck guard system's compliance with the Ontario Building Code (OBC) requirements. It incorporates findings from various load tests, including horizontal and vertical slat configurations and wind load resistance. The report provides design recommendations to address OBC standards for safety, climbability, and structural integrity. **All proposed solutions are pending approval by the local city authority.**

COMPLIANCE REVIEW:

The current design incorporates horizontal slats, supported by reinforced rails. Testing has been provided by the client and includes load and wind resistance data for horizontal and vertical slat configurations. **ICG cannot independently verify the results or methodology of the tests provided** and does not assume responsibility for their accuracy.

The following are the key findings from test reports:

a. **Vertical Load Testing:**
   - **Objective:** Simulate handrail loading to validate structural capacity.
   - **Methodology:** A 4.7"x0.8" (120x20 mm) aluminum rail was tested under vertical loading using a hydraulic piston over a 6' x 6' panel.
   - **Results:** Actual Test: Maximum vertical load of 460 kgf (1,014 lbs or 4.51 kN/m).
   - **Conclusion:** The rail meets OBC vertical load requirements for handrail applications.

b. **Horizontal Slat Load Testing:**
   - **Objective:** Evaluate horizontal slat configurations under distributed loads.
   - **Methodology:** Panels with reinforced slats (H+ profile) were tested at widths of 6', 5', and 4'. Slat dimensions ranged from 100 mm x 20 mm to 40 mm x 20 mm.
   - **Results:**
     - 100 mm x 20 mm Slats: Maximum horizontal load capacity of 220-363 lbs.
     - 80 mm x 20 mm Slats: Maximum horizontal load capacity of 209-330 lbs.
     - 40 mm x 20 mm Slats: Maximum horizontal load capacity of 143-264 lbs.

- **Conclusion:** All configurations meet OBC Clause 3.4.7.6(6) requirements for horizontal loading.

c. **Wind Load Testing:**
   - **Objective:** Assess the system's ability to withstand wind loads.
   - **Methodology:** A 6' x 6' aluminum privacy panel was tested for wind resistance using distributed sandbag loads.
   - **Results:** Maximum wind velocity resistance: 169.8 km/h (equivalent pressure: approximately 0.72 kPa).
   - **Conclusion:** The panel demonstrates robustness against severe weather conditions.

DESIGN RECOMMENDATIONS

a. **Vertical Orientation of Slats (Preferred Option):**
   Configuration:
   - Vertical slats spaced 89 mm (3.5 inches) apart.
   - Reinforced with H+ profiles.

   Advantages:

   - Eliminates climbability concerns.
   - Aesthetic flexibility.

b. **Horizontal Slats without gaps (Alternative option):**
   Configuration:
   - Continuous horizontal slats without spacing.
   - Reinforced with H+ profiles.

   Advantages:

   - Mitigates climbability concerns by removing spacing.
   - Modern aesthetic.

REFERENCES

The proposed modifications ensure compliance with the following OBC clauses:

- 3.4.7.6(1): Guard height of 42 inches (1,070 mm) for platforms over 1.8 meters.

- 3.4.7.6(4): Openings must prevent the passage of a 100 mm sphere.

- 3.4.7.6(5): Prohibition of climbable configurations for guards.

- 3.4.7.6(6): Resistance to specified horizontal and concentrated loads.

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ATTACHMENTS

- Load Test Reports for Slats (Provided by Client).
- Wind Load Test Results for Panels and Posts.
- Proposed Vertical Slat Installation Drawing (Figure 1)

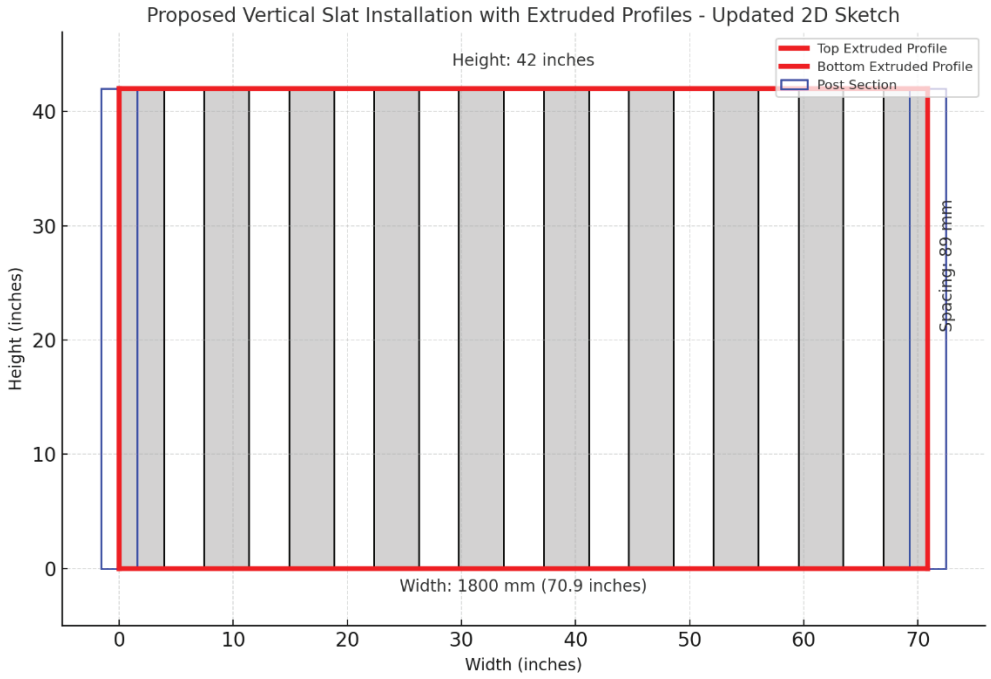

Figure 1: Proposed Vertical Slat configuration

The proposed designs—vertical slats or continuous horizontal slats—meet OBC requirements for deck guards, pending validation by local city authorities. Both options ensure safety, durability, and compliance with structural integrity standards.

Sincerely,

Dr. Feras Alsheet, Ph.D., P.Eng.

Principal Engineer

Inventive Consulting Group Ltd