A LAYERED CEILING:
A Center for Ballroom Dance

Danielle Erin De Young
A LAYERED CEILING:
A Center for Ballroom Dance

Danielle Erin De Young

Thesis submitted to the faculty of Virginia Polytechnic Institute and State University in partial fulfillment of the requirements for the degree of

Master of Architecture
in Architecture

William U. Galloway
Patrick A. Doan
Frank H. Weiner

July 1, 2015

Blacksburg, VA

Keywords: exaggeration, redundancy, glulam, layering, ballroom, reflection, sprung floor
A LAYERED CEILING:
A Center for Ballroom Dance

Danielle Erin De Young

Abstract

This collection of drawings and paintings presents a proposal for a ballroom dance center in Montréal, Quebec, Canada. The building is unnecessarily generous with the most essential elements and exaggerates non-essential elements in a way enhances their redundancy. Layered glulam ceilings cover the two main spaces and evoke the hidden structure of the sprung dance floor below. The ceiling is reflected in the pattern of the hardwood floors, and the ballroom is reflected in the pool outside its layered façade. Layers of concrete walls create thresholds and add depth to the views between spaces. Light, material, and people follow indirect paths through the building and its detailed elements.
Dedicated to my grandfather
Daniel Byrer Schwob
If only his paintings could inspire the sky.

Acknowledgements

I owe my sincere gratitude to

My committee, Bill Galloway, Frank Weiner and Patrick Doan, for being encouraging and understanding; My studio mates, Kalee Hartman, for her help and guidance; and Jia Song, for her impulsive wisdom; My family for their care and adept listening skills;

And especially to my husband Drew Miller, for looking outward with me in the same direction.
# TABLE OF CONTENTS

A Center for Ballroom Dance 1

LAYERING 14

STUDIES OF DETAILS 26

INTERIOR INFORMING EXTERIOR 38

MODELING THE BUILDING 54

PLANS, SECTIONS, AND STUDY SKETCHES 60

Appendices

A: List of Figures 68

B: References 70
A Center for Ballroom Dance in Montréal, Quebec  
4700 Rue Saint-Ambroise  
Montréal, QC, Canada

There are many parallels between ballroom dance and architecture. In ballroom dance, the leader holds a rigid frame in which the follower can effortlessly and gracefully perform, much like the rigid structure of a building that invites a harmonious arrangement of light and space within it. Both dance and architecture share the common goal of beautifully resisting the ceaseless pull of gravity. In the way that a spectator is able to participate in dance, so is one able to appreciate the beauty of architecture.

This collection of drawings and paintings presents a proposal for a ballroom dance center in the heart of the Saint-Henri neighborhood of Montréal. The entrance of the building faces Rue Saint-Ambroise to the northwest. The ballroom façade is directed northeast towards a reflecting pool and Parc Glédéon de Catalogne. The rear of the building faces Canal Lachine with views of the renovated industrial buildings on the opposite bank.
First Floor Plan
1. Entry facing Rue Saint-Ambroise
2. Double-height vestibule
3. Grand staircase in center of atrium
4. Lower entry halls into ballroom
5. Ballroom
6. Reflecting Pool
7. Stage
8. Student lounge and locker rooms
Second Floor Plan

1. Atrium open to below
2. Lounge and bar
3. Balcony
4. Practice studios
5. Outdoor rooftop patio facing Canal Lachine
main entry threshold viewed from rue saint-ambroise
glulam ceiling above the grand staircase in entrance atrium with surrounding balconies
the glulam ceiling in the ballroom extends over the spectator balconies
Layered Structure

A sprung dance floor is constructed of three layers of long grain pine counter battens with each wooden layer resting at the center of the span of the layer below. Point loads on the floor are thus spread out over a greater area, which absorbs shock.

The structure of this floor reduces fatigue in the human body, enhances the dancer’s performance and reduces the risk of injury. They are an essential piece of a building for dance yet are usually an afterthought that is retrofitted to a dance studio.

In this building the structure of the sprung floor is unseen. These drawings are studies of how the perpendicularly layered structure of the floor can be expressed and exaggerated to create beautiful spaces.
studies of the wall structures that could support the ceiling
Supporting Layered Structure Above the Ground

In order to create the large open space underneath the layered structure, the ballroom is surrounded on three sides by a concrete threshold of layered walls.

It is necessary to pass through this threshold on both floors in order to enter the ballroom. The openings through the threshold end with a view of a concrete wall centered on each entry hall, layering the view into the ballroom. From the ballroom floor, the repeating layered walls screen the view of the paths of circulation into and around the ballroom.
Layered Views

A window wall encloses the northeast side of the ballroom. The views into and out of the ballroom are filtered through the layered depth of the façade. Concrete columns support the glulam beams and the glass curtain wall is removed from the structure.
Hierarchy of Materials

Wood never touches wood or concrete in the details of the building. Steel mediates between the materials and holds them inches apart. A system of steel brackets and bolts is designed to keep the beams from racking.

The beams of the lowest layer of glulam are doubled not only for added strength but also to make use of the space between them. Pendant lights hang from a steel structure secured between the beams and their wiring can be hidden above.

The roof parapet supports clerestory windows on all sides of the glulam ceilings. These windows allow light into and out of the building. During the day, the ceilings inside the ballroom and atrium are surrounded by a halo of sunlight, while at night they become illuminated lanterns for the neighborhood outside.
Part to Whole

The smallest details follow the same rules as the largest elements of the building. The pattern of the hardwood floor is a reflected ceiling plan of the glulam ceiling. The wooden handrail of the stair is supported by a steel frame that connects it to the concrete stringer below. The guardrail of the stair ends with a flat steel angle that echoes the way the roof parapet meets the sky. The lowest treads of the stair are supported by an unseen steel frame, allowing them to seemingly hover with reverence over the hardwood sprung floor.
INTERIOR INFORMING EXTERIOR
Connecting the Interior to the Exterior

The interior elements are made visible from the exterior of the building at important locations. The repeating concrete wall structure of the interior spaces becomes a dividing element for the vestibules at each entrance. The glulam ceilings rise above the lower roof structure. The curtain wall of the ballroom opens the space to spectators outdoors, and the dancing events held within is doubled by the reflecting pool. The building is lowered into the ground to create an outdoor amphitheater. This outdoor space opens events to the outside observer while the reflecting pool provides the necessary distance so that events may be enjoyed from afar but not disturbed.
concrete walls surrounding the ballroom floor screen the views of entrances and circulation
conceptual drawing that brings interior elements to the exterior
elevation of main entrance and section through the practice studios
elevation of layered window wall of the ballroom
MODELING THE BUILDING
the structural layer of the window wall of the ballroom is seen in the completed model.
the reflection of the glulam ceiling structure in the reflecting pool

the layered light of an illuminated ceiling
PLAN, SECTION AND STUDY SKETCHES
Indirect Paths

The indirect path through the building is introduced in the plan and section. The main path to the ballroom travels up the grand staircase in the atrium, then down the staircase in the ballroom to step onto the dance floor. The ballroom is entered through several concrete hallways, dividing a crowd of people as they enter and exit. These paths are derived from the path of a point load on the dance floor, and the layered path of light into and out of the glulam ceilings.
A: LIST OF FIGURES

1. Site plan, printed CAD drawing and chalk pastel on canson, 18x24
2. Perspective sketch of building facade and reflecting pool, watercolor and graphite on cold press, 11x14
3. 1/16” scale plan of first floor, graphite on canson, 36x36
4. 1/16” scale plan of second floor, graphite on canson, 24x36
5. Contour-line perspective of main entrance, watercolor on cold press, 11x14
6. Perspective of grand staircase and atrium, pen and colored pencil on trace, 18x24
7. Hand-constructed section/perspective of grand staircase and atrium, graphite on canson 18x24
8. Perspective drawing of balconies, graphite on canson 18x24
9. Perspective of balcony, graphite on cold press, 11x14
10. Perspective of balcony and stairway, watercolor on cold press 11x14
11. Sketch of layered structure, colored pencil
12. Sketch of layered structure, pen
13. Axon of layered structure, colored pencil on canson 18x24
14. Bas-relief model of layered structure
15. Axon of layered structure, graphite on canson, 24x36
16. Hand-constructed perspective of balcony and layered ceiling structure, graphite and pen on trace, 12x36
17. Section-elevation of balcony interior, pen on trace 12x36
18. Worm’s-eye view of balcony, graphite on vellum, 36x48
19. Axon of steel connections between glulam and concrete, graphite on bristol, 19x24
20. Axon of steel connections, chalk pastel on bristol 19x24
21. 3/4” scale section of ceiling, roof, parapet, clerestory windows and wall structure, graphite on vellum, 24x42
22. Section drawing rendered in watercolor on stonehenge scanned and combined with detail drawings and written descriptions of materials, stonehenge 30x42
23. Axon of stairs in atrium showing handrail and guardrail detail, graphite on canson 18x24
24. Study sketch of roof parapet and clerestory windows
25. Study sketch of roof parapet and clerestory windows
26. Study sketch of roof parapet and clerestory windows
27. 3/4” scale section of ceiling, roof parapet and clerestory windows, graphite on vellum, 24x42
28. Sketch of stair guardrail
29. Study sketch of glulam connection
30. Study sketch of glulam connection
31. Study sketch of glulam connection
32. Study sketch of glulam connection
33. Study sketch of glulam connection
34. Study sketch of glulam connection
35. Study sketch of glulam connection
36. Section axon of building and reflecting pool, graphite on vellum, 24x36
37. Sketch of balcony balustrade
38. Sketch of balcony balustrade
39. Sketch of balcony balustrade
40. Sketch of balcony balustrade
41. Conceptual drawing of building exterior and reflecting pool, graphite on canson 18x24
42. Elevation study facing rue saint-ambroise, pen on trace, 12x36
43. Elevation study of northwest elevation, pen and marker on trace, 12x36
44. Section through practice studios showing skylights and elevation of main entrance, graphite on canson, 24x36
45. Elevation of ballroom façade, graphite on canson, 24x36
46. Photograph of completed chipboard and basswood 1/16” scale model
47. Photograph of model under construction
48. Photograph of model under construction
49. Photograph of model under construction
50. Photograph of model under construction
51. Photograph of complex model
52. Photograph of model looking into ballroom
53. Photograph of model looking into ballroom
54. Photograph of model looking into ballroom
55. Photograph of model looking into ballroom and reflecting pool
56. Early sketch of plan and section, graphite on trace, 24x36
57. Early sketch of plan and section, graphite and colored pencil on trace 24x36
58. Early sketch of plan and section, pen and marker on trace, 24x36
59. Early sketch of plan and section, graphite on vellum, 24x42
60. Diagrammatic sketch of circulation into ballroom
61. Section sketch
62. Section sketch
63. Plan and section sketch
64. Plan sketch
65. Section sketch
66. Section sketch
67. Exterior sketch
68. Exterior sketch
69. Section sketch
70. Bird’s-eye sketch
71. Sketch page, pen on trace, 24x36
B. REFERENCES


All works in this book, including written components, hand drawings, models and computer generated images, are original works by the author.