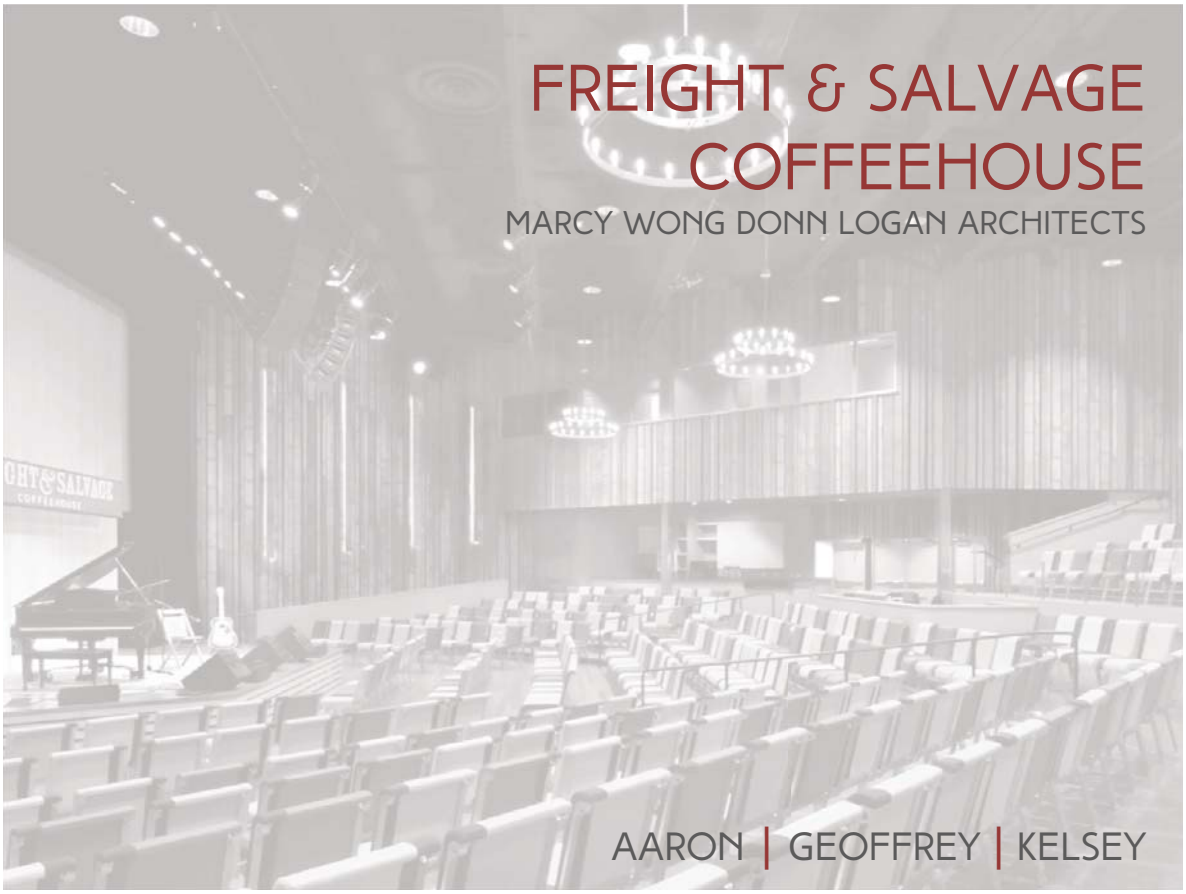


FREIGHT & SALVAGE COFFEEHOUSE

MARCY WONG DONN LOGAN ARCHITECTS

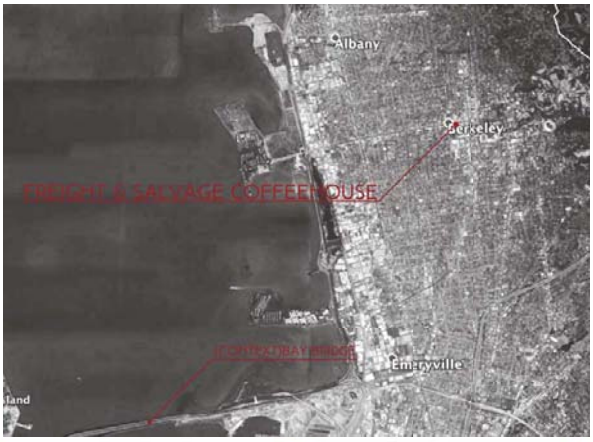
AARON | GEOFFREY | KELSEY

INTRODUCTION



"The Freight & Salvage (whose non-profit organization is incorporated as the Berkeley Society for the Preservation of Traditional Music) has long been the most venerable institution dedicated to presenting the best in folk and traditional music west of the Mississippi. It was vital to the client that the new venue be designed to continue evoking the vibe of the Freight as an intimate folk music venue despite the introduction of cutting-edge technology and increased auditorium capacity." Freight & Salvage Coffeehouse

SITE & BUILDING



INTRODUCTION

Architects: **Marcy Wong Donn Logan Architects**

Location: **Berkeley, California, USA**

Acoustics: **Charles M Salter Associates Inc.**

Audio Visual: **The Shalleck Collaborative**

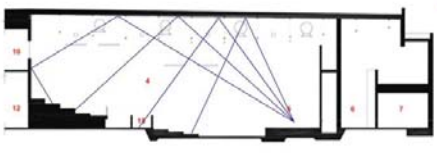
Project Area: **7,000 sqf**

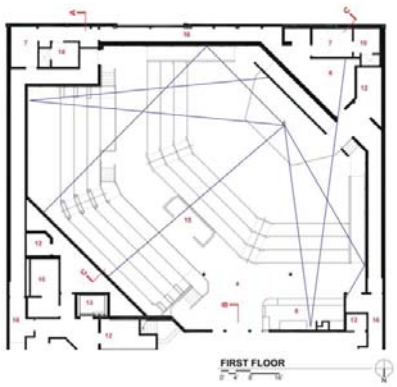
Project Year: **2006-2009**

BUILDING DESCRIPTION

ARE THE ROOM ACOUSTICS APPROPRIATE?

Ray Tracing





Materials

- Ceiling
  - Open Truss Ceiling & Concrete Roof
- Floor
  - Concrete & Wood
- Walls
  - Recycled Douglas Fir
- Seats
  - Cloth Upholstered

As you can see from the Plan and Section, the room isn't designed the best for what its purpose is. Especially in the plan view, the room is very wide, and the walls are at an awkward angle to the stage, causing the sound to reflect poorly.

PERFORMANCE ANALYSIS

ARE THE ROOM ACOUSTICS APPROPRIATE?

InsideOut exercises E3.1–E3.3 to analyze the room acoustics

- E3.1 – Design
  - Summarize selected design intentions
    - Space – reason for selection – "live" "Natural" or "Dead" – Why?
      - Space – Multipurpose Auditorium
      - Selection – "Natural" Space
      - Why? Because the space is used for live music, especially Folk Music.
- E3.2.1 – Room Absorbency
  - Calculate the room absorbency (From MEEB table 18.1)

Surface	Material	Area (sq.ft.)	Absorption	Absorbancy
Ceiling	Concrete	6776	0	0
Floor	Concrete/Wood	3276	0	0
Walls	Dug Fir	9600	0.14	1344
Seats	Cloth Upholstered	3500	0.88	3080
Doors	Hollow wood Door	210	0.03	6.3
			Total Absorbency	4430.3

PERFORMANCE ANALYSIS

ARE THE ROOM ACOUSTICS APPROPRIATE?

InsideOut exercises E3.1–E3.3 to analyze the room acoustics

- E3.2.2 – Room Absorbency (cont.)
  - Evaluate the Liveness of your space (Figure E3.2.1)
  - The Volume of our space is 203,000 cubic feet. With an absorbency of 4,400 we are right on the edge of being a "Live" room.

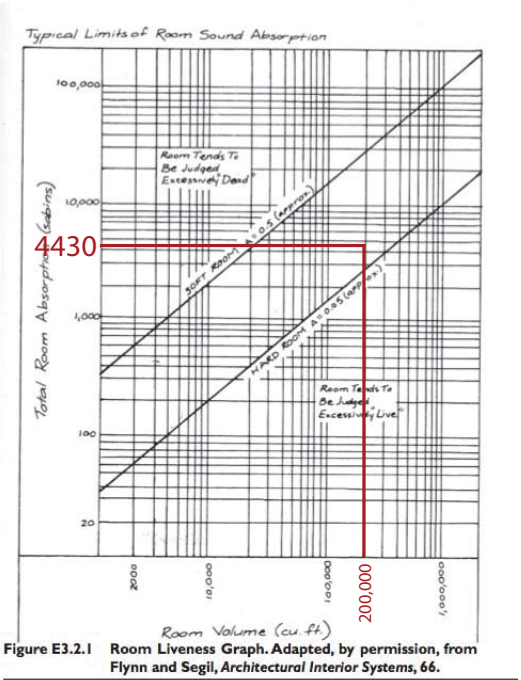


Figure E3.2.1 Room Liveness Graph. Adapted, by permission, from Flynn and Segil, *Architectural Interior Systems*, 66.

PERFORMANCE ANALYSIS

ARE THE ROOM ACOUSTICS APPROPRIATE?

InsideOut exercises E3.1–E3.3 to analyze the room acoustics

- E3.3 – Reverberation time
  - Recommended Reverberation time for a Multipurpose Auditorium(T_R) is 1.4-1.9 Seconds according to MEEB figure 27.16.
  - Calculation for determining T_R
    - T_R = [(0.049)(Volume)] / (Absorbency)
    - T_R = [(0.049)(203,280)] / (4430.3) = 2.24 Seconds
      - Our space has way to much reverberation for what it is used for.

Space	Recommended T_R (Seconds)	Volume ($Ft.^3$)	Absorbency (Sabins)	Actual T_R
Concert Hall	1.4	203,280	4430.3	2.2438

BUILDING REDESIGN

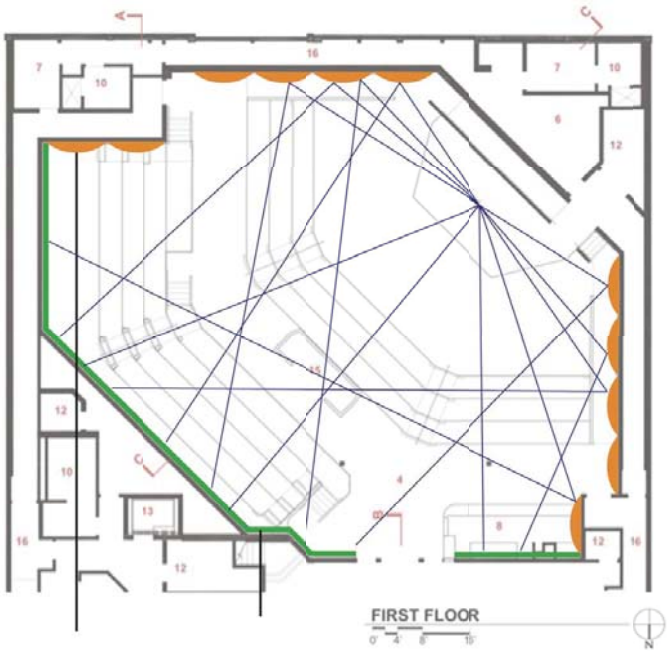
ACOUSTIC REDESIGN

InsideOut exercises E3.1–E3.6 to analyze the room acoustics

- E3.2.3
  - Since the room's acoustics are not appropriate for the type of space we want, they must be re-designed.
  - To increase the absorbency of the room, and make it a better room for live music we are going to:
    - Lower the ceiling while also re-forming it to distribute sound better
    - Change the wall material to a half reflective/half absorbent material
    - Making the back wall a sound absorbent material.
    - Re-form the back stage wall to direct sound towards the audience,
    - Add a reverberant chamber to make the stage better for live music performance

BUILDING REDESIGN

ACOUSTIC REDESIGN



Orange
- Plaster on lath

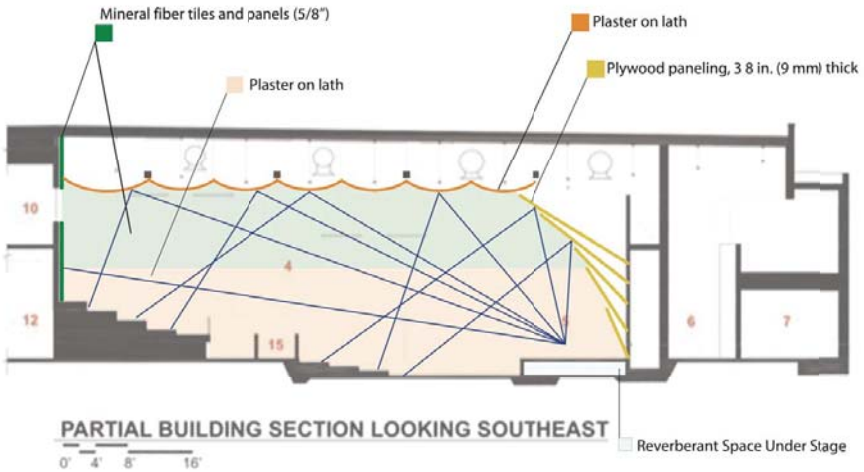
Green
- Mineral fiber tiles and panels (5/8")

The Convex shape of the side walls is to create a better bounce scheme for the sound from the stage.

BUILDING REDESIGN

ACOUSTIC REDESIGN

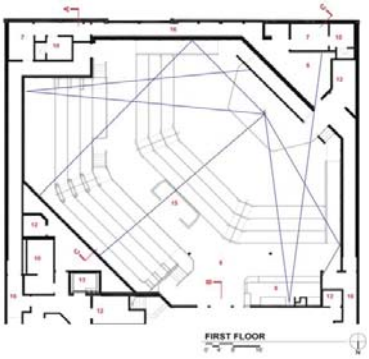
From the Section you can see that the reflective surface only goes half way up the wall, and the ceiling has been dropped to lower the volume of the space. Hanging the ceiling and the back of the stage with Plywood panels gives it the slightly reflective feeling to be able to direct the sound where it should go, while making it a more enjoyable sounding space

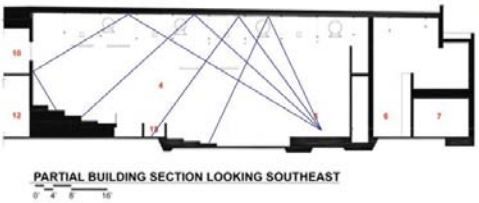


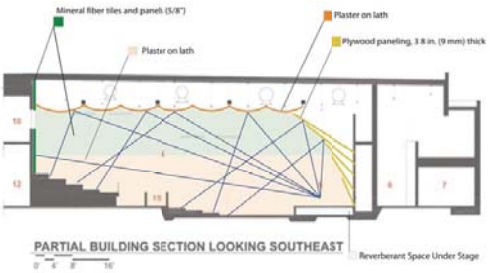
BUILDING REDESIGN

ACOUSTIC REDESIGN (COMPARISON)

As you can see from the comparison, the redesigned spaces direct the sound better towards the audience while also making the room a more acoustically enjoyable space, as will be shown in the next slide.







BUILDING REDESIGN

ACOUSTIC REDESIGN (CALCULATIONS)

InsideOut exercises E3.1–E3.3 to analyze the room acoustics

- E3.2.1 – Room Absorbency (redesign)
  - Calculate the room absorbency (From MEEB table 18.1)
  - With the redesign we doubled the amount of absorbency in the space making it 6,065 Sabins

Surface	Material	Area (sq.ft.)	Absorption	Absorbancy
Ceiling	Plaster, gypsum or lime, on lath	6776	0.05	339
Floor	concrete/wood	3276	0	0
Walls (Top)	Typical averages, mineral fiber tiles and panels (5/8")	4800	0.5	2400
Walls (Bottom)	Plaster, gypsum or lime, on lathuds)	4800	0.05	240
Seats	Cloth Upholstered	3500	0.88	3080
Doors	Hollow wood Door	210	0.03	6.3
			Total Absorbency	6,065

BUILDING REDESIGN

ACOUSTIC REDESIGN (CALCULATIONS)

InsideOut exercises E3.1–E3.3 to analyze the room acoustics

- E3.2.2 – Room Absorbency (cont.) [Redesign]
  - Evaluate the Liveness of your space (Figure E3.2.1)
  - The Volume of our space is now 190,000 cubic feet. With an absorbency of 6,065 we are now Right in the middle of being a "natural" room. This is a good place to be considering the purpose of the room.

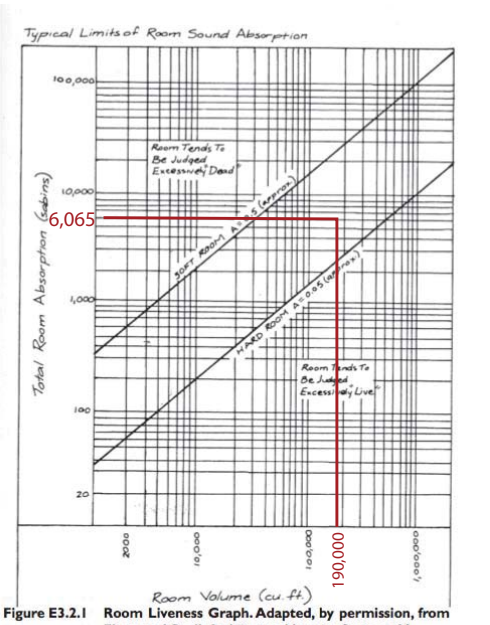


Figure E3.2.1 Room Liveness Graph. Adapted, by permission, from Flynn and Segil, *Architectural Interior Systems*, 66.

BUILDING REDESIGN

ACOUSTIC REDESIGN (CALCULATIONS)

InsideOut exercises E3.1–E3.3 to analyze the room acoustics

- E3.3 – Reverberation time (Redesign)
  - Recommended Reverberation time for a Multipurpose Auditorium(T_R) is 1.4-1.9 Seconds according to MEEB figure 27.16.
  - Calculation for determining T_R
    - T_R = [(0.049)(Volume)] / (Absorbency)
    - T_R = [(0.049)(189,230)] / (6739) = 1.5 Seconds
      - This number is definitely on the lower end of where we want to be, but it is much better than where it was, and is still in the acceptable range for a multipurpose auditorium.

CONCLUSION

ACOUSTIC REDESIGN

- The **original design** has many acoustical problems including:
  - Lack of absorbent materials
    -Concrete floor and ceiling
    -Wood paneling on floor and walls
    -Steel Trusses

Tall Ceiling Height
Excessive Echo
Material absorbency is **4,430 sabins**
Current reverberation time: **2.25 seconds**

- Our **redesign** addresses these issues by:

Adding mineral fiber tiles to the back and upper half of the side walls
Lowering the ceiling
Applying plaster on lath on the ceiling and sidewalls
Installing reverberating chamber under stage
Reforming the shape of the wall for sound reverberation

Material absorbency is **6,065 sabins**
New reverberation time: **1.5 seconds**

WORK CITED

All Images and Site information from:

"Freight & Salvage Coffeehouse / Marcy Wong Donn Logan Architects."*ArchDaily*. N.p., n.d. Web. 01 May 2014. <http://www.archdaily.com/111580/freight-salvage-coffeehouse-marcy-wong-donn-logan-architects/>.