

SOUND CREATED FORM

EXPLORING THE INFLUENCE OF SOUND ON ARCHITECTURAL FORM AND THE AURAL QUALITY OF SPACES IT CAN CREATE

Ben Gaum and Ramani Ramakrishnan

Department of Architectural Science, Ryerson University, Toronto, Ontario

The Montreal Jazz Festival is currently the largest and arguably one of the most important jazz festivals in the world. For 30 years this festival has been drawing massive crowds and continuously attracting the biggest names in the music world despite never really having a proper central location for operations. My thesis design project will explore the influence of sound on architectural form and the aural quality of spaces it can create, by designing a new “Maison du Festival” that will act as the main welcome center, archive/museum and operations center for the Montreal Jazz Festival of the future.

The original schematic design of the building called for two “amphitheatred” sections of the plan that would allow for performances on the festivals two main stages to be projected onto the building itself, essentially acting in the same way as the back of a traditional amphitheatre. This would allow the festival organizers to be able to better contain and control the sound being projected from the stages.

The overall form of the building was mainly derived from

taking various wav file recordings of the streets surrounding the proposed site and then converting those files into a three dimensional representation. This was achieved by using a software called soundplot 1.0™ to capture the wav files that were then generated into 3D form in Rhino. Several recordings of each street were taken at various times of the day both during the festival and after the festival was over to try and get a visual representation of the types of sounds that were directly affecting the proposed site itself. Three dimensional ‘strips’ were then selected from the hundreds of forms generated that would most accurately match the proposed schematic formal design and provide the “amphitheatred” sections required.

After the initial wav strips were selected, they were pieced together and remodeled to complete a uniform building envelope. This building envelope was then analyzed using CATT Acoustics software to test the acoustic properties of the buildings form. Initial analysis showed several interesting problems with the formal design itself. By using the CATT

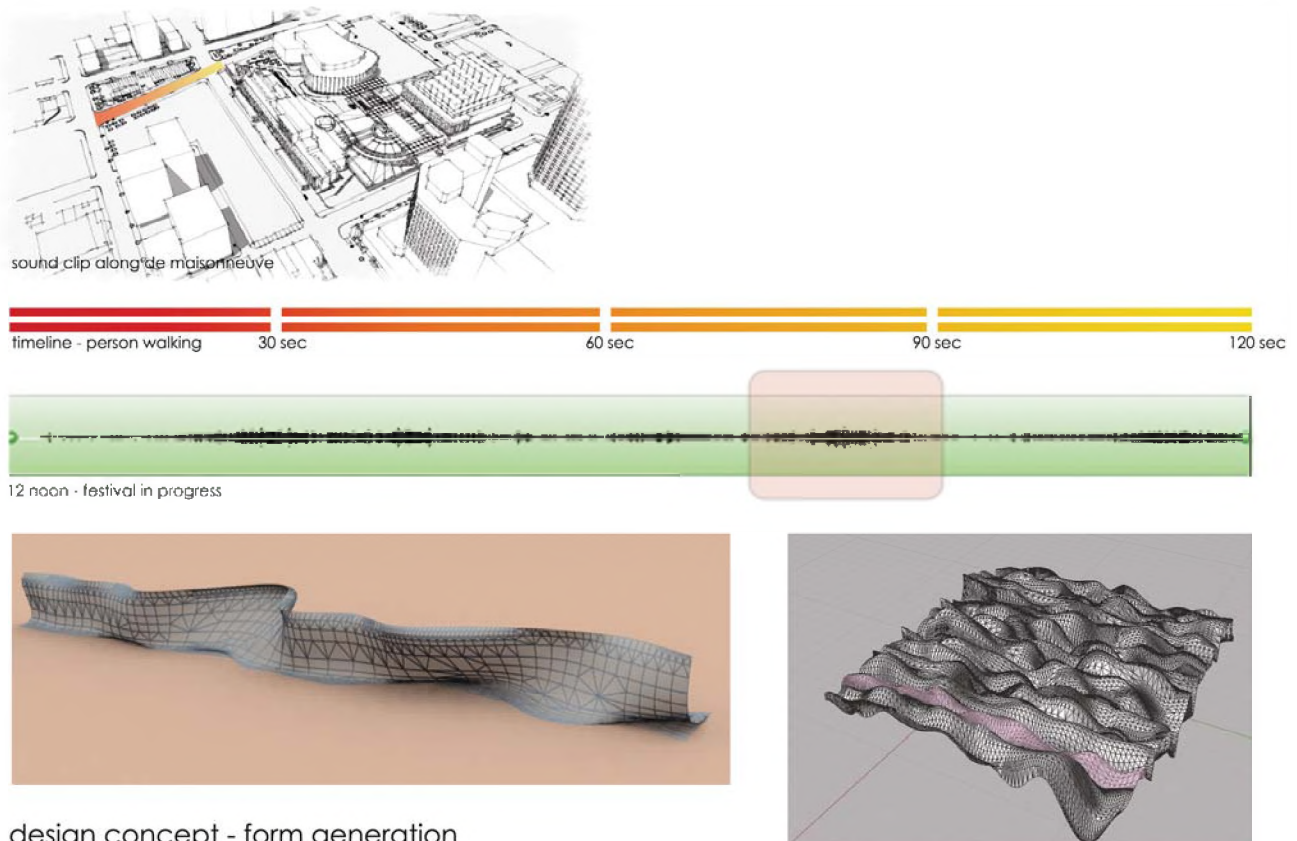


Figure 1 - 3D generated wav files

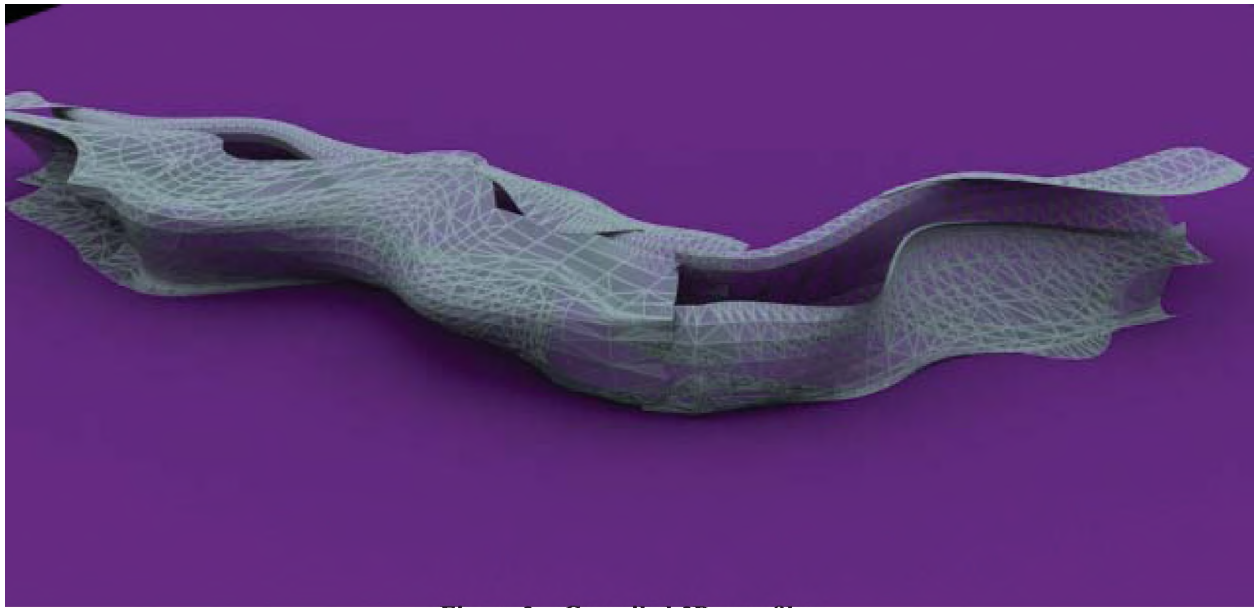


Figure 2 – Compiled 3D wavy files

Acoustics software as well as information gathered from previous studies of outdoor performance spaces, it was determined that the form of the original building had to be altered in order to satisfy desired acoustical parameters that were required for the musical performances. The results from the CATT Acoustics analysis showed that the north amphitheatred section ended up being too small and was not able to contain or control enough of the projected sound to satisfy the festivals requirements, thus the section had to be enlarged drastically horizontally as well as increased in height. The overall size of the section was increased to allow for a full 15 degrees on either side of the performances center stage. The south amphitheatred section although smaller in overall size, proved to satisfy its requirements due to its slightly

curved roof section that projected the sound back down onto the spectators watching the performance. The CATT Acoustics software proved instrumental in providing the acoustical analysis information that would help accurately transform the buildings form to properly satisfy the acoustical requirements of the festival organizers.

REFERENCES

- 1 Soundplot tm, Michael B. Pliam, Copyright PliaTech Software 2000-2008.
- 2 CATT Acoustics V8.0g, Copyright CATT 1988-2007.

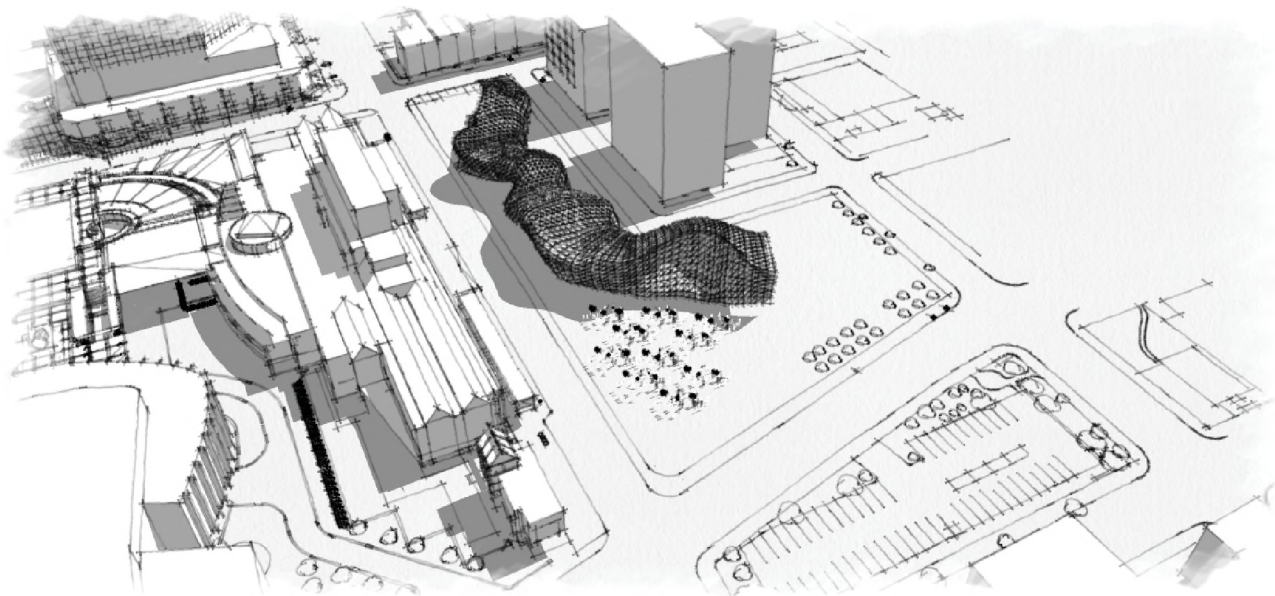


Figure 3 - Final form showing north amphitheatre section