Research Assignment
Textiles and Sonic Practices

How has textiles impacted or contributed to the development of technology in the field of sound?

INTRO

The acoustic properties of textiles.

Textiles as a whole will generally always dampen sound, which makes the medium particularly helpful in sonic environments where sound needs to be dampened, which are usually smaller spaces where the architecture itself is not necessarily designed to reflect sound elsewhere, such as recording studios music venues.

“By exploring how textile can regulate sound through its shape and spatial position, it becomes possible to create sound regulation, which is not blurring the architecture, but continues the intention of articulating the architectural situation at the specific site.” (Cecilie Bendixen, 2010)

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Dampening

Continuing the idea of dampening, one development in textiles that has aided tools for sonic practices include microphone windscreens.

Windscreens are used to diffuse the sound of wind passing by the sensitive microphone capsule when recording audio in windy or moving environments.

The length of the synthetic fibers of the synthetic fur used in most “windjammers,” this particular type of windscreen, help to add less friction to the microphone itself, allowing the wind to move around the microphone.

[2]

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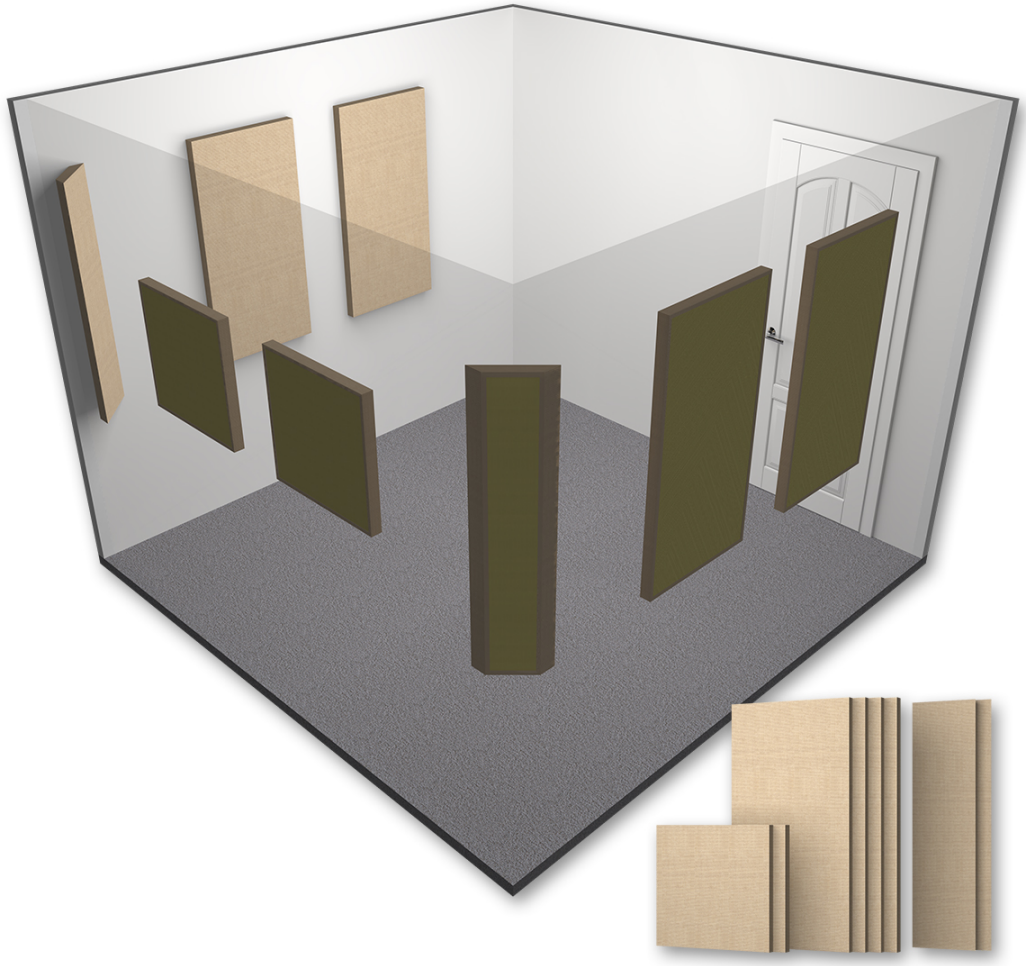
Dampening

Absorption panels

There are various ways to absorb or diffuse sound in rooms that need acoustic treatment. Acoustic treatment panels or sound absorption panels are usually made of some sort of wooden framing, a fiberglass, synthetic or wool insulation, and a cotton or blend wrap. The usually 4-8in thick insulation acts as a surface that does not reflect sound, but rather dampens and absorbs it.

On the organic fiber side of things, compressed mineral wool is used often in high end absorption panels because of its density and other properties.

Acoustic insulation relies on weight, depth and density. The material has to be dense and deep enough so that sound will pass through and eventually stop, but not so dense that it the fiber becomes too solid and starts to reflect the sound.



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Industrial Dampening

Mineral wool (Man made chemical compound, made of natural materials)

Mineral wool is any fibrous material formed by spinning or drawing molten mineral or rock materials such as slag and ceramics.

For instance, one type of insulation primarily used in the field of acoustic treatment in the architecture field is Stone wool, which is a furnace product of molten rock at a temperature of about 1600 °C through which a stream of air or steam is blown. More advanced production techniques are based on spinning molten rock in high-speed spinning heads somewhat like the process used to produce cotton candy.

This particular type of wool works extremely well to absorb sound because of its fiber structure.

The wool naturally felts, but because its made from stone, it needs a bonding agent to limit dusting when placed in interiors.

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Health, Safety and Sustainability

Mineral Wool is the most common type of thermal insulation worldwide and has been widely used over the past 60 years. Mineral Wool insulation products are used in industrial facilities to prevent exposure to extremely cold or hot piping, and in schools and libraries to dampen noise pollution in addition to making sure the facilities stay warm in the winter and cool in the summer. Mineral Wool insulation products are safe to manufacture, install and use when recommended work practices are followed.

Mineral wool is bio-soluble and is not classifies as a human carcinogen or as a fiber classifiable for cancer in humans. it has the same classification as tea under the WHO. :)

Does mineral wool have other health effects?

There is no evidence that exposure to mineral wool insulation causes chronic adverse effects.

Peer-reviewed literature by the WHO and independent research conclude that there is no indication of a significant excess of respiratory symptoms or of a significant decrease in lung function reported for mineral wool workers.

Users do experience itching during the normal use of the mineral wool insulation products. The effect is due to the physical contact with mineral wool rather than a chemical reaction. This is a temporary effect, well-known by our industry, and disappears shortly after contact and can easily be prevented by following the recommendations that appear on the packaging of our products. On this basis the European Union does not classify Mineral Wool as irritant.

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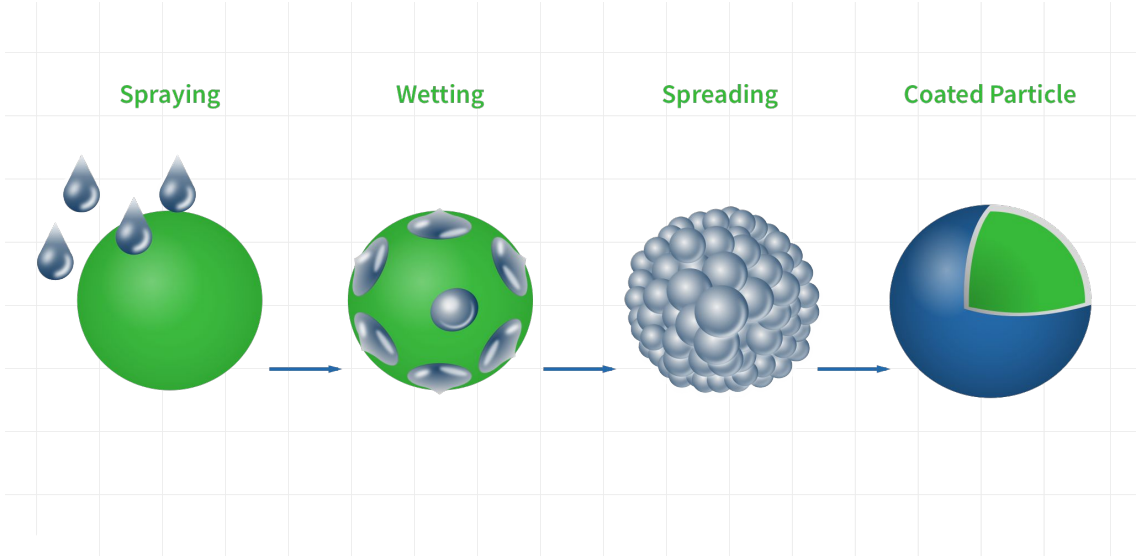
Future of sound absorption fibers and techniques

Sound absorbing microcapsules.

Being able to embed a fiber into the structure of another that densifies it in a particular structure that gives the carrier fiber heightened sound absorbing properties



Sound absorption through resistive microfiber layers

Using microscoping layers of fibers that share similar properties to a fiber such as stone wool on the exterior of fabrics to give them sound absorption characteristics.

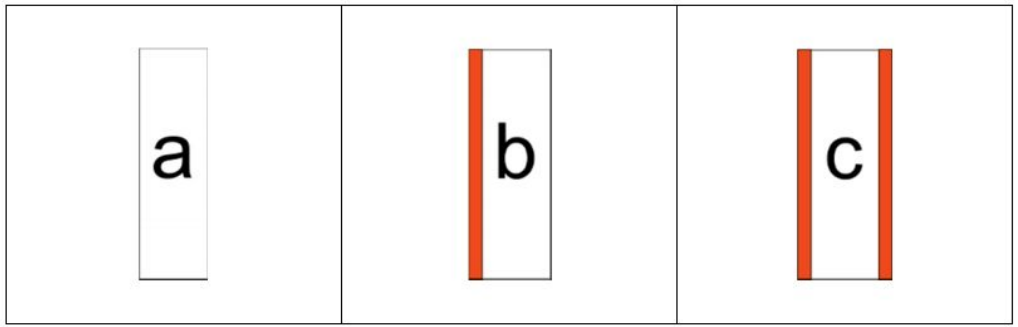


Figure 2. Combinations of fabric (coloured) and nonwoven (white).

[4,5]

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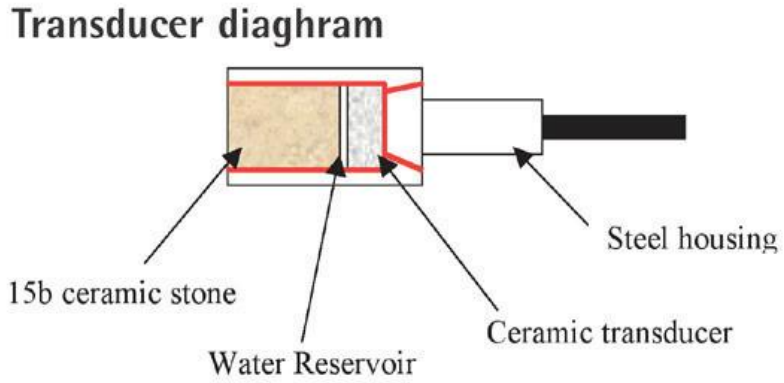
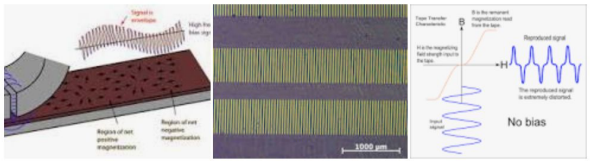
Future of sound absorption fibers and techniques

Sound emitting textiles with resonators, transducers, piezoelectrics and an abstraction of the way tape bias works

Using some of the newer developments in textiles such as conductive thread and microcontroller/microprocessors such as the Bela, Arduino and Raspberry Pi to embed divides into textiles that will allow them to produce audio signals that help reduce sound in certain environments.

This can allude to an even more personal interaction with sound and how we experience it, due to opening up possibilities of mobility and wearable technology.





View all

Tape bias is the term for two techniques, AC bias and DC bias, that improve the fidelity of analogue tape recorders. DC bias is the **addition of direct current to the audio signal that is being recorded**. AC bias is the addition of an inaudible high-frequency signal (generally from 40 to 150 kHz) to the audio signal.

[6,7]

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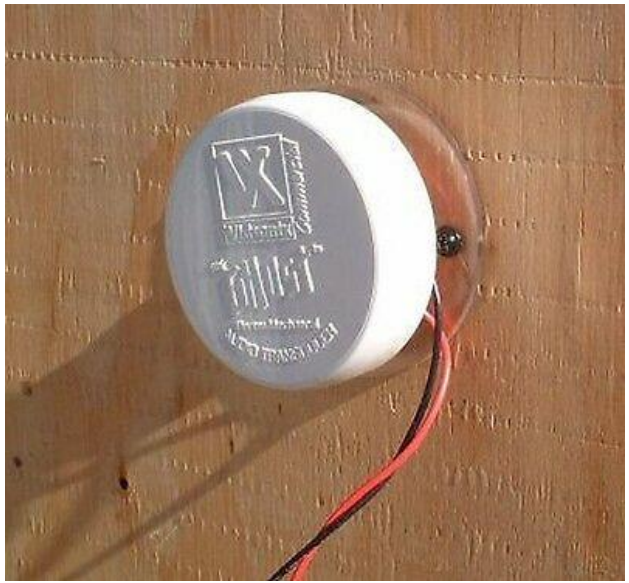
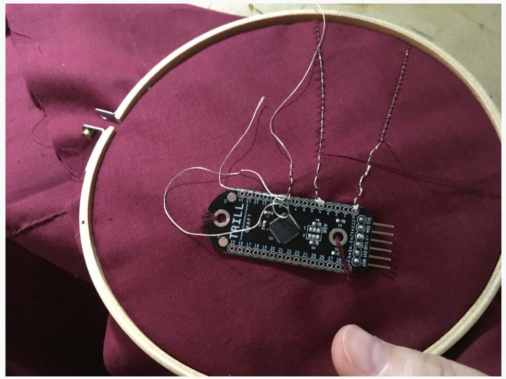
Future of sound absorption fiber techniques





[8,9]

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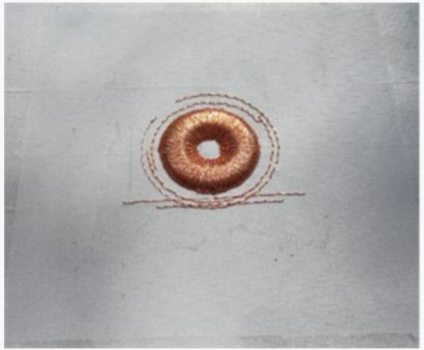
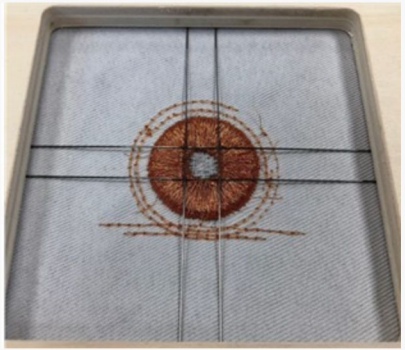
Future of sound absorption fiber techniques

Fig. 1. Textile resonator: a) top view and b) bottom view



a)



b)

Fig. 2. Chladni sound figure on textile resonator

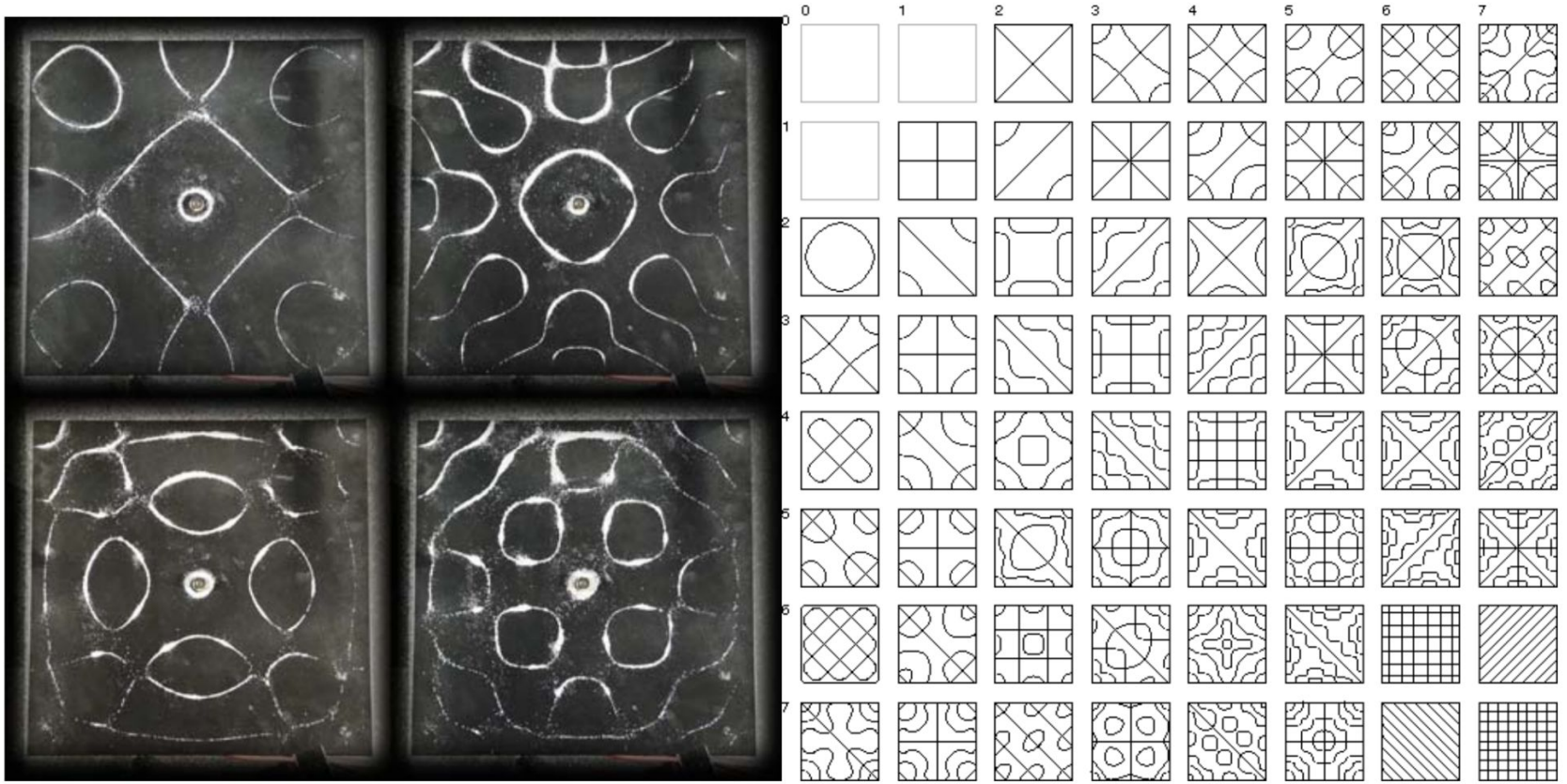


Figure 12. Metal sheet with salt showing four Chladni figures and a graphic system of Chladni figures (Left: MIT. Right: Chladni, 1817).

[11]

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Future of sound absorption fiber techniques

Modern textiles for sound absorption

BLOOM is one example of how textiles can be used for adaptive acoustic shaping of a space.

BLOOM is a smart, shape-shifting textile surface that can change the acoustics of a room by responding to its surrounding sounds. The intelligent textile is currently in an prototype phase at the Yeadon Space Agency. The design team created the acoustic cloud with a cluster of knitted star-shaped textiles that can each open and close like origami paper. The modular system, which is suspended from a ceiling, is sensitive to sound, contracting and expanding in response to a room's ambient noise in order to adjust the intensity of the sound.

The auto mechanically and digitally controlled textiles can open up to absorb sound waves and prevent sound reflection or they can close up when reverberant sound is required. Reverberation forms a prolonged sound wave, which is created when sound waves bounce off surrounding objects in a room and come together to amplify the origin of the sound. An example of reverberation is the quality of sound you hear when singing in a shower.

[12]

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Conclusion

Friday, February 08, 2013

solo exhibition in nyc jan 10 - feb 16

Philosoprops & Ontological Apparatus from the Center for the Obvious & (Im)Permacultural Research on exhibit at **Klemens Gasser and Tanja Grunert Gallery**, 542 W19th St, NYC from January 10 until february 16, 2013.

Tell-Tail Thangas (After Sandy) are a set of 2 sailboat sails (21' x 10' and 17' x 5') made of sonic fabric, a textile woven from cassette tape. The recordings contained in this edition of fabric include sound-samples collected on and under the streets of New York City during the 5 years immediately following 9/11/2001. **The "Between Stations" album is available for free download.** Tell-Tail Thangas (After Sandy) were created in December of 2012 especially for the cathedral-like lower gallery at Gasser-Grunert, which was entirely submerged during Hurricane Sandy. The sails, pointing to the heavens, are symbols of resurrection, resilience, reverence, and cooperation with nature.

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