BIGWOOD

Interreg Italia-Österreich
European Regional Development Fund

EUROPEAN UNION

- Transnational Network
- Platform for Stakeholders
- Design tools for information and education
- Mockups and Prototypes for research and development

BIGWOOD creates an interregional network to enforce large-volume timber constructions and reduce existing barriers.

think BIG in WOOD

unibz

bigwood.projects.unibz.it
#bigwoodproject

Il progetto Interreg BIGWOOD

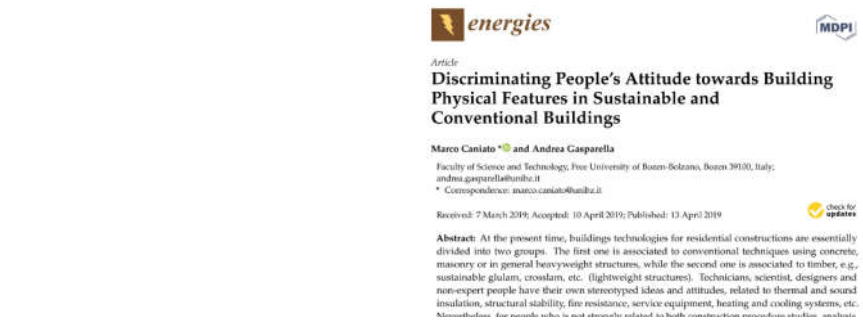
Gli edifici in legno sono in crescita in tutto il mondo e si sono già affermati dal punto di vista ecologico. Nel settore dell'edilizia a più piani, tuttavia, la fiducia nel legno come materiale da costruzione è ancora troppo scarsa in tutto il paese. Il progetto BIGWOOD si concentra sulla creazione di una rete sovraregionale per superare i pregiudizi e le barriere che esistono contro l'edilizia multipiano e di grandi volumi in legno.

Durata del progetto
01/10/2019 – 31/03/2022

ERDF: 666.766,57 Euro
Total Budget: 883.831,28 Euro

- **Rete internazionale** / sovraregionale sul tema della costruzione in legno di grandi volumi tra i partner del progetto
- **Piattaforma** per i principali **stakeholders**, quali promotori immobiliari, pianificatori, politici, istituti di istruzione e di ricerca
- Creazione di **strumenti di progettazione** aggiornati allo stato dell'arte combinando soluzioni di sistema per strutture in legno a più piani
- Sviluppo e costruzione di un **mockup 1:1** a Bolzano e di modelli dimostrativi mobili

Aspettativa soggettiva



energies

MDPI

Article

Discriminating People's Attitude towards Building Physical Features in Sustainable and Conventional Buildings

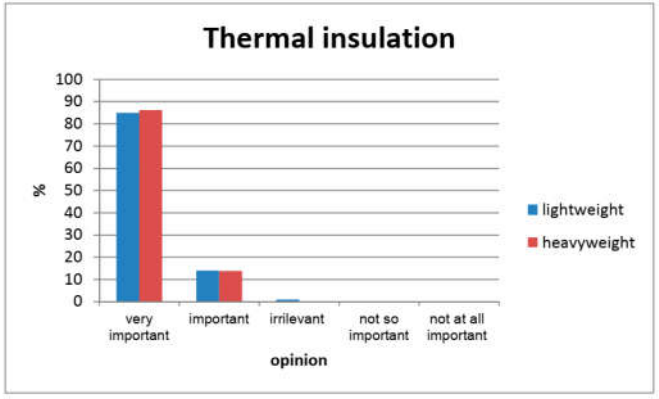
Marco Caniato * and Andrea Gasparella

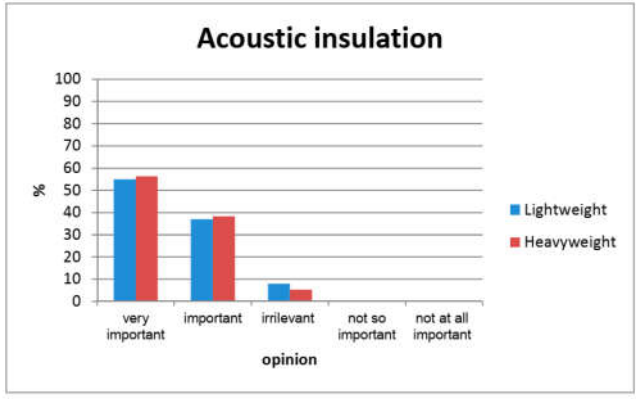
Faculty of Science and Technology, Free University of Bozen-Bolzano, Bozen 39100, Italy; andrea.gasparella@unibz.it

* Correspondence: marco.caniato@unibz.it

Received: 7 March 2019; Accepted: 10 April 2019; Published: 13 April 2019

Abstract: At the present time, buildings technologies for residential constructions are essentially divided into two groups. The first one is associated to conventional techniques using concrete, masonry or in general heavyweight structures, while the second one is associated to timber, e.g., sustainable glulam, crosslam, etc. (lightweight structures). Technicians, scientist, designers and non-expert people have their own stereotyped ideas and attitudes, related to thermal and sound insulation, structural stability, fire resistance, service equipment, heating and cooling systems, etc.





Aspettativa soggettiva

energies

MDPI

Article

Discriminating People's Attitude towards Building Physical Features in Sustainable and Conventional Buildings

Marco Caniato * and Andrea Gasparella

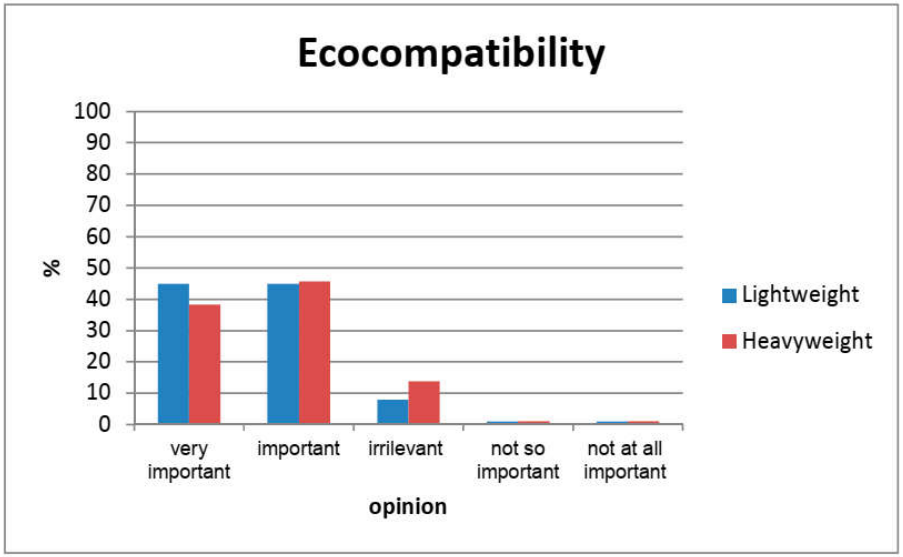
Faculty of Science and Technology, Free University of Bozen-Bolzano, Bozen 39100, Italy; andrea.gasparella@unibz.it

* Correspondence: marco.caniato@unibz.it

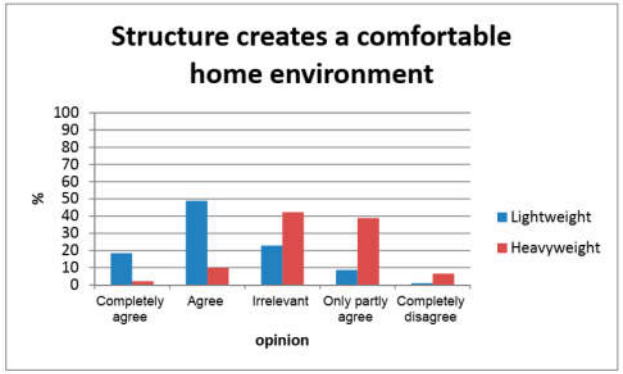
Received: 7 March 2019; Accepted: 10 April 2019; Published: 13 April 2019

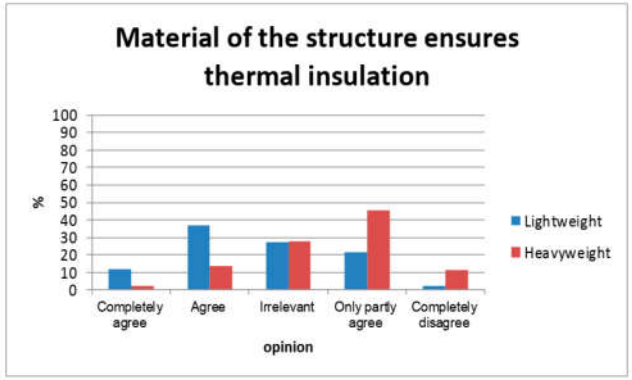
check for updates

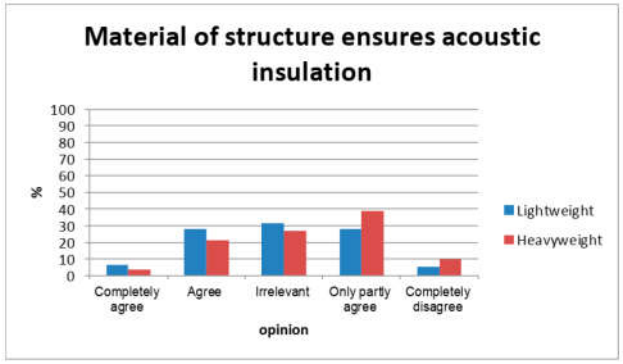
Abstract: At the present time, buildings technologies for residential constructions are essentially divided into two groups. The first one is associated to conventional techniques using concrete, masonry or in general heavyweight structures, while the second one is associated to timber, e.g., sustainable glulam, crosslam, etc. (lightweight structures). Technicians, scientist, designers and non-expert people have their own stereotyped ideas and attitudes, related to thermal and sound insulation, structural stability, fire resistance, service equipment, heating and cooling systems, etc. Nevertheless, for people who is not strongly related to both construction procedure studies, analysis

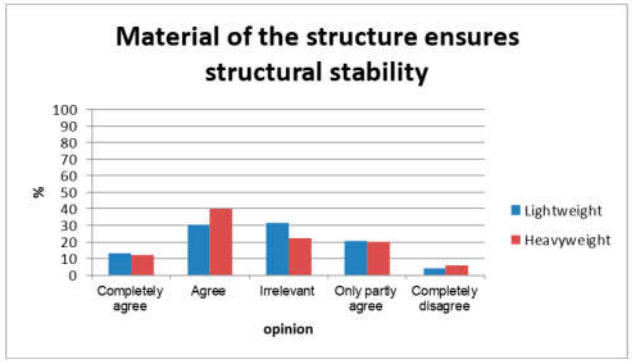


Aspettativa soggettiva









problematiche

5. Neighbours; footstep noise, i.e. you hear when they walk on the floor ☐ ☐
6. Neighbours; rattling or tinkling noise from your **own** furniture when the neighbours move on the floor above you ☐ ☐

Parametri

1) Coefficiente di fonoassorbimento

2) Resistenza al flusso

3) Rigidità dinamica

ASSORBIMENTO PER POROSITA'

Parametri

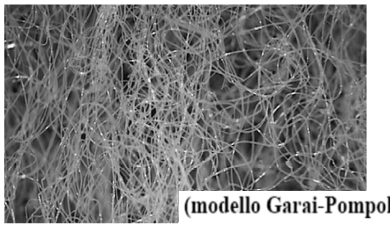
1) Coefficiente di fonoassorbimento

(modello Delany-Bazley)

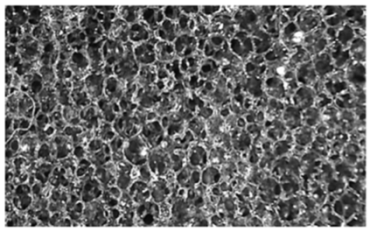
INGRANDIMENTO 10X

MATERIALI FIBROSI O POROSI:

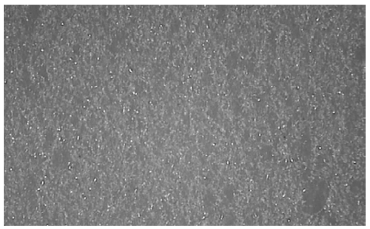
- Fibre di roccia
- Fibre di vetro
- Fibre di poliestere
- Poliuretani espansi (a cellula aperta)
- Resine melammininiche (a cellula aperta)
- Feltri
- Altri materiali di riciclo



(modello Garai-Pompoli)



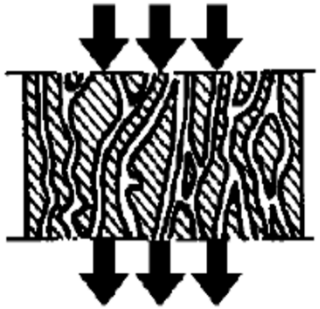
(modello Wu-Qunli)



(modello Delany-Bazley)

Parametri

2) Resistenza al flusso



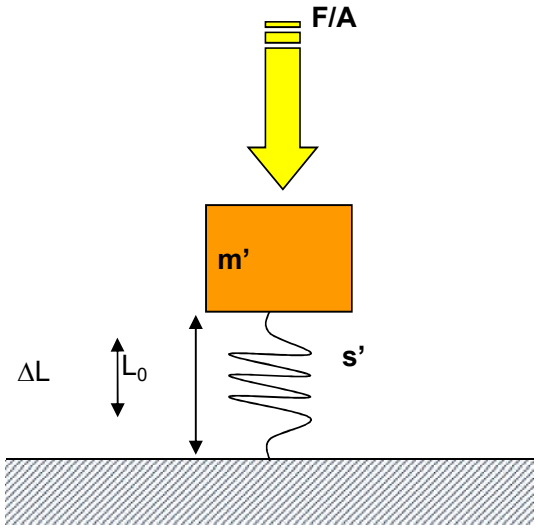
$$\sigma_s = \frac{\Delta P}{U}$$

Differenza di pressione

Velocità del flusso

Parametri

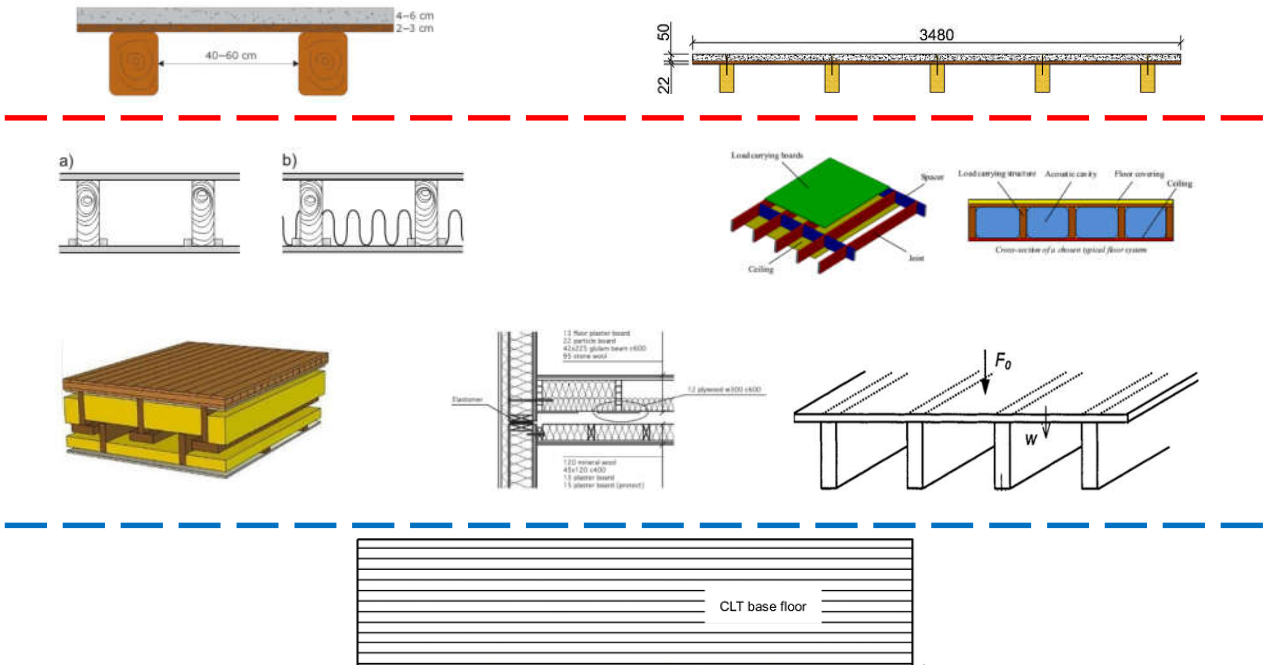
3) Rigidità dinamica



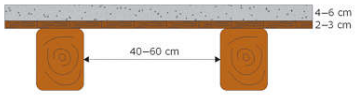
$$f_0 = \frac{1}{2\pi}\sqrt{\frac{s'}{m'}}$$

$$\Delta L_{n\,pavimentogalleggiante} = 30 \log \frac{f}{f_0}$$

Rumore da calpestio



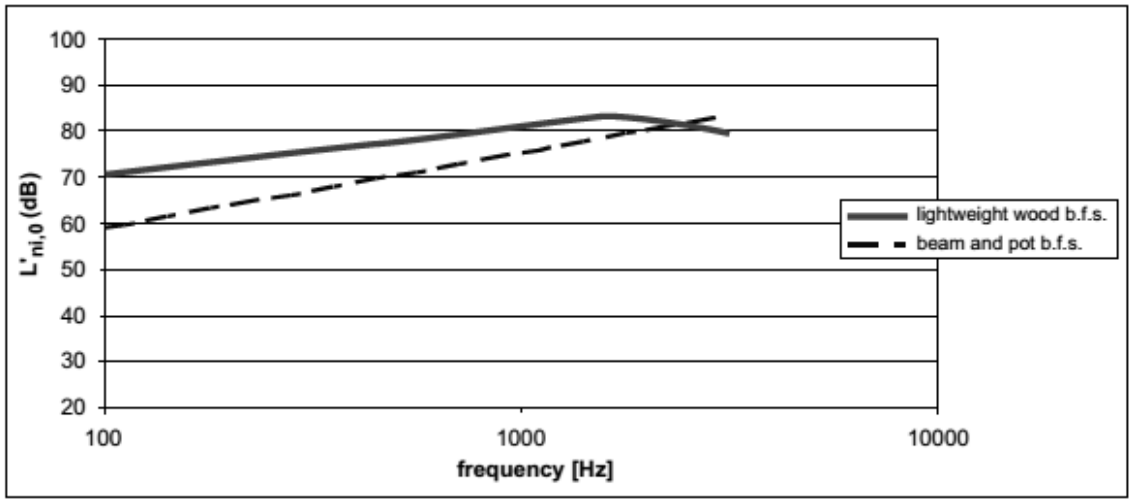
Rumore da calpestio



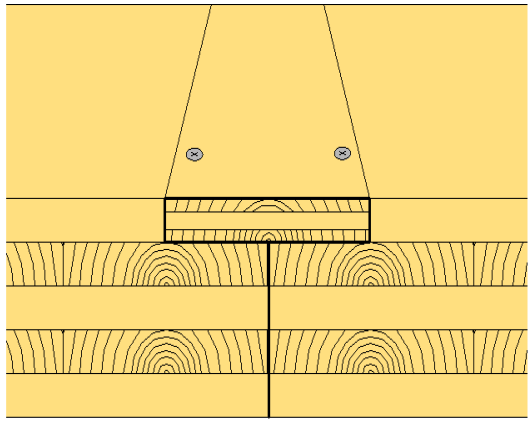
$$L_{n,eq,avg} = 10.4 \cdot \log(f) + 50 \text{ dB} \qquad \text{for } f < 1600 \text{ Hz}$$

$$L_{n,eq,avg} = -6.1 \cdot \log(f) + 129 \text{ dB} \qquad \text{for } f > 1600 \text{ Hz}$$

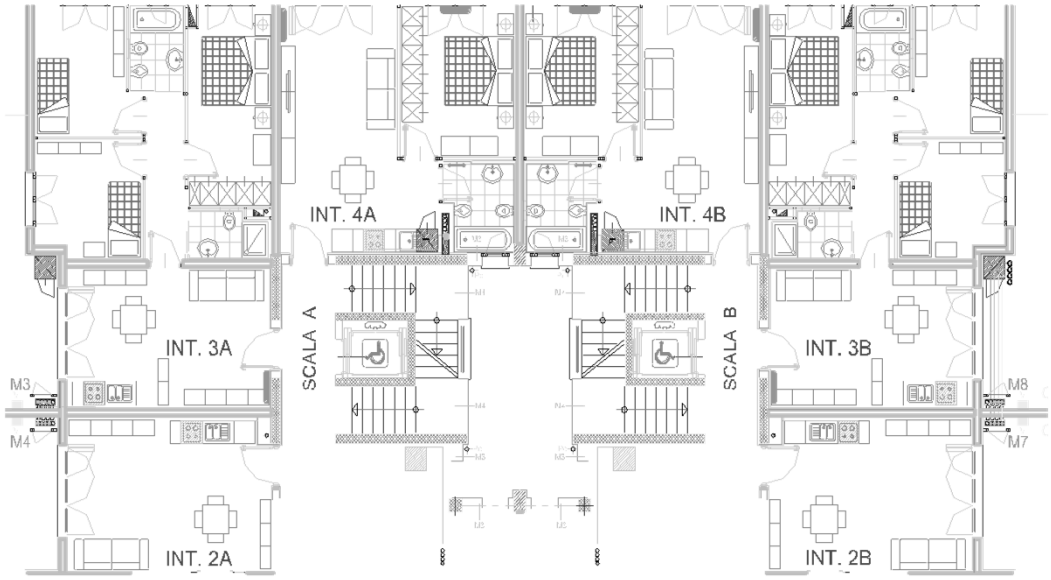
Rumore da calpestio



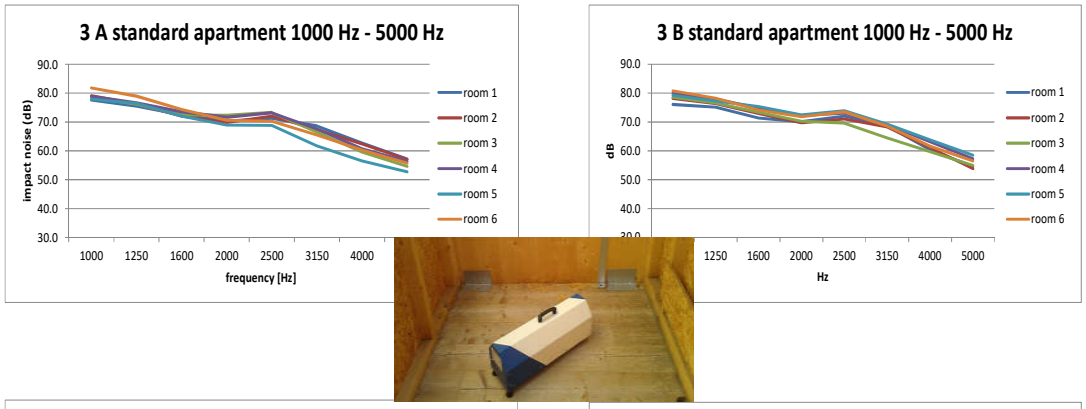
Rumore da calpestio



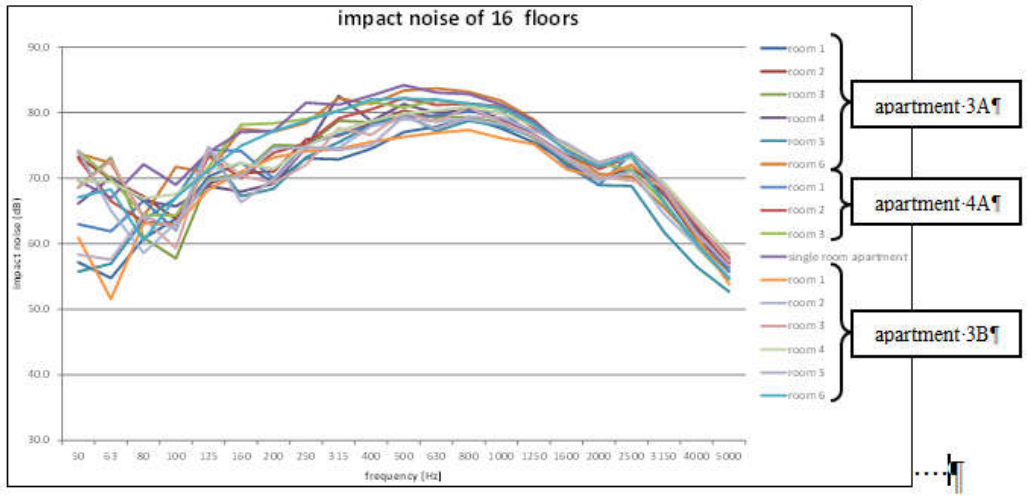
Rumore da calpestio



Rumore da calpestio

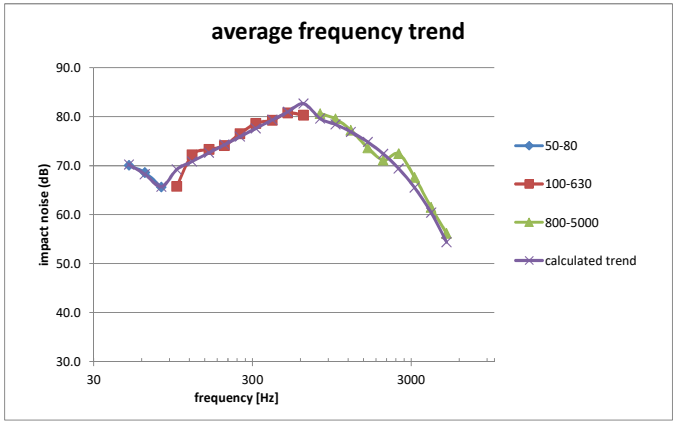


Rumore da calpestio

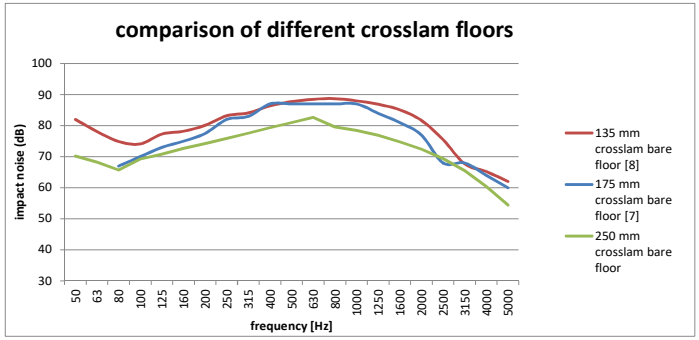


Rumore da calpestio

$$L_{n,eq,avg} = -0.15\,(f) + 77.7 \quad \text{(dB)} \quad \text{for } 50 < f < 80 \text{ Hz}$$
$$L_{n,eq,avg} = 7.26 \log\,(f) + 35.6 \quad \text{(dB)} \quad \text{for } 100 < f < 630 \text{ Hz}$$
$$L_{n,eq,avg} = -0.006\,(f) + 84.4 \quad \text{(dB)} \quad \text{for } 800 < f < 5000 \text{ Hz}$$



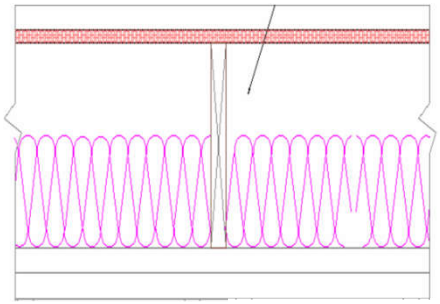
Rumore da calpestio

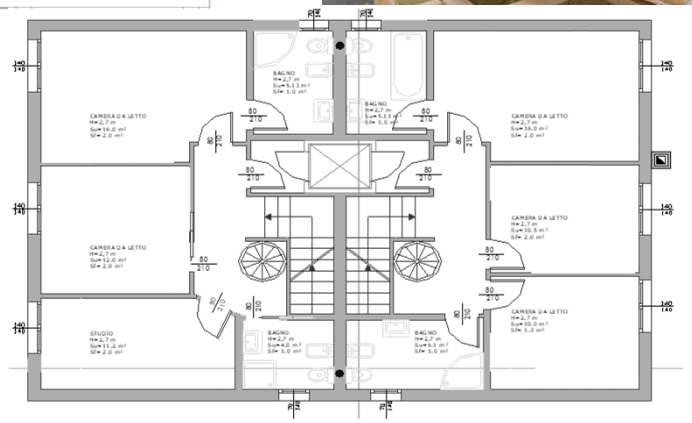


$$L_{n,w,eq,corrected} = 134.5\text{-}25 \cdot \log\,(m') \qquad \text{(dB)}$$

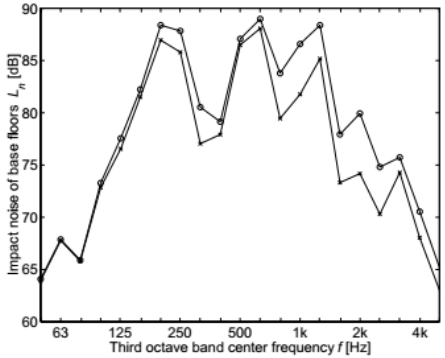
	135 mm bare floor	175 mm bare floor	250 mm bare floor
Measured L_{nw}	88	85	80
ISO 12354-2	98.5	94.6	89.2
modified ISO 12354-2	87.7	84.9	81.0

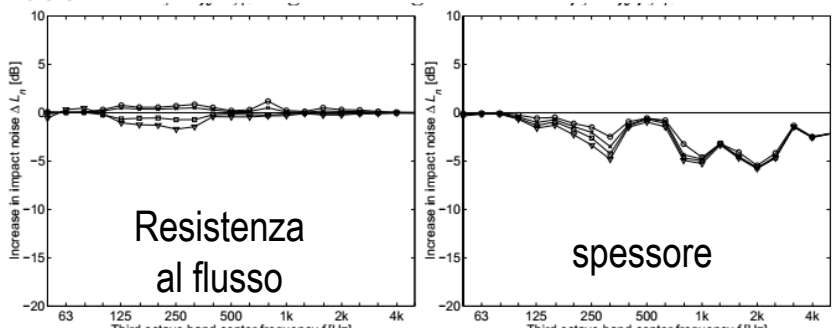
Rumore da calpestio





Rumore da calpestio



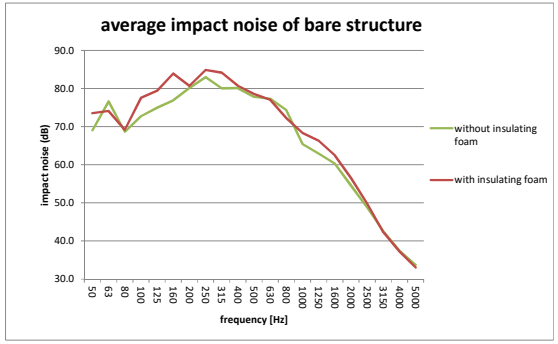


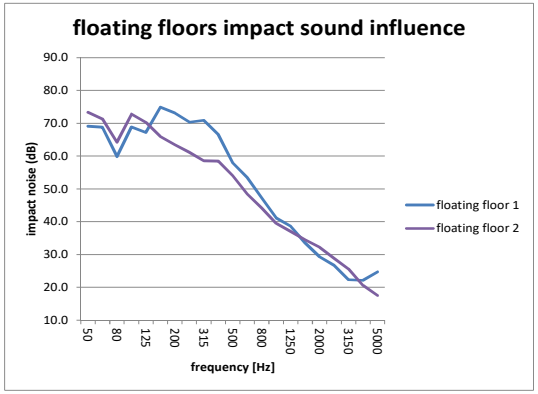
Rumore da calpestio



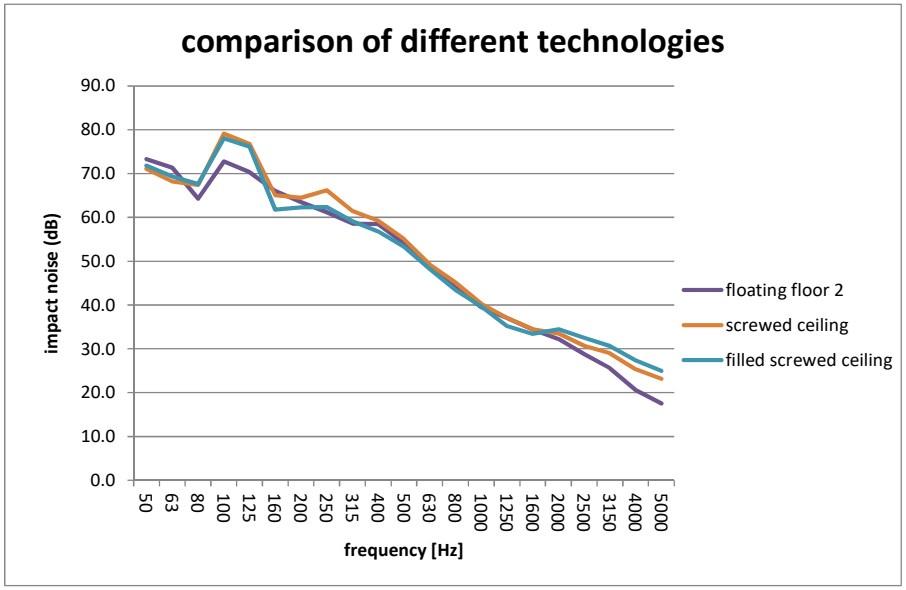



Rumore da calpestio

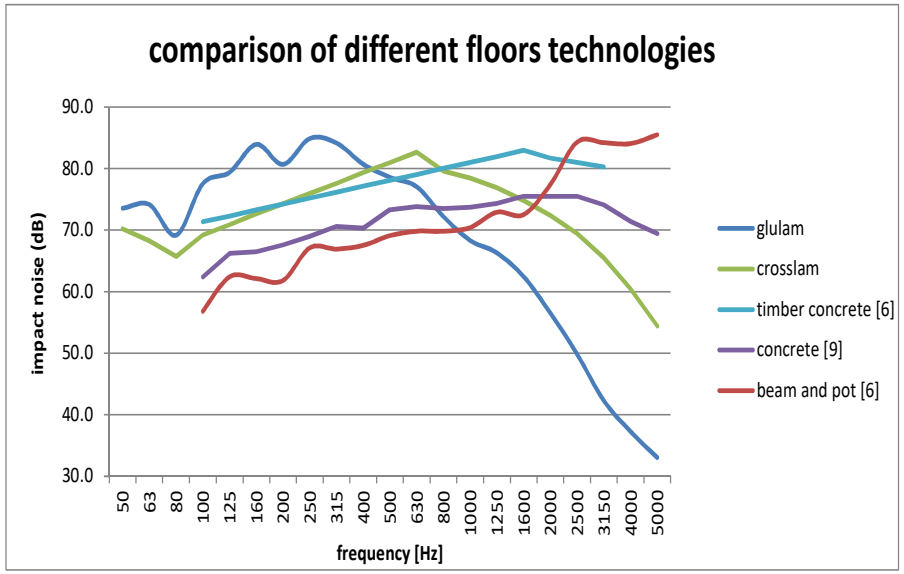




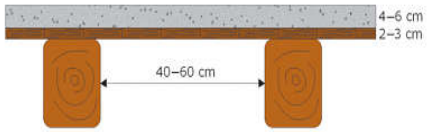
Rumore da calpestio



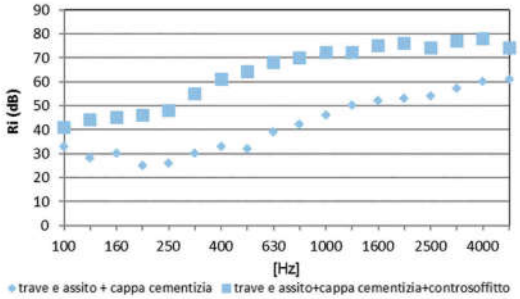
Rumore da calpestio

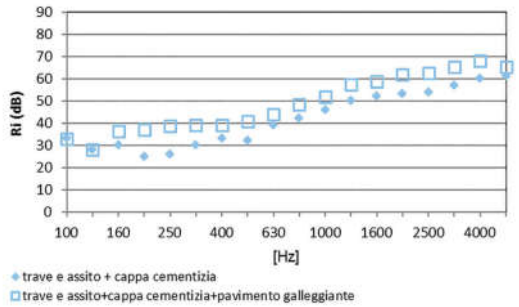


Rumore Aereo

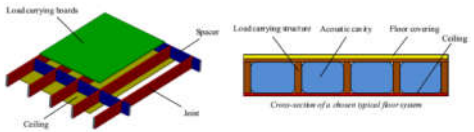


Stratigrafia
1) Travi a sezione rettangolare di dimensione 8×12 cm, interasse 60 cm + assito in legno di spessore 2,2 cm
2) Travi a sezione rettangolare di dimensione 8×12 cm, interasse 60 cm + doppio assito in legno incrociato di spessore 2,2+2,2 cm
3) Travi a sezione rettangolare di dimensione 10×20 cm, interasse 75 cm + assito in legno di spessore 2,2 cm
4) Travi a sezione rettangolare di dimensione 10×20 cm, interasse 75 cm + assito in legno di spessore 2,2 cm + cappa in calcestruzzo armato classe C20/25 collegata mediante barre in acciaio di classe S500 e diametro 8 mm
5) Travi a sezione circolare di diametro 13÷15 cm, interasse 50 cm + cappa in calcestruzzo armato alleggerito con elementi di sughero collegata mediante barre in acciaio di classe S500 e diametro 8 mm



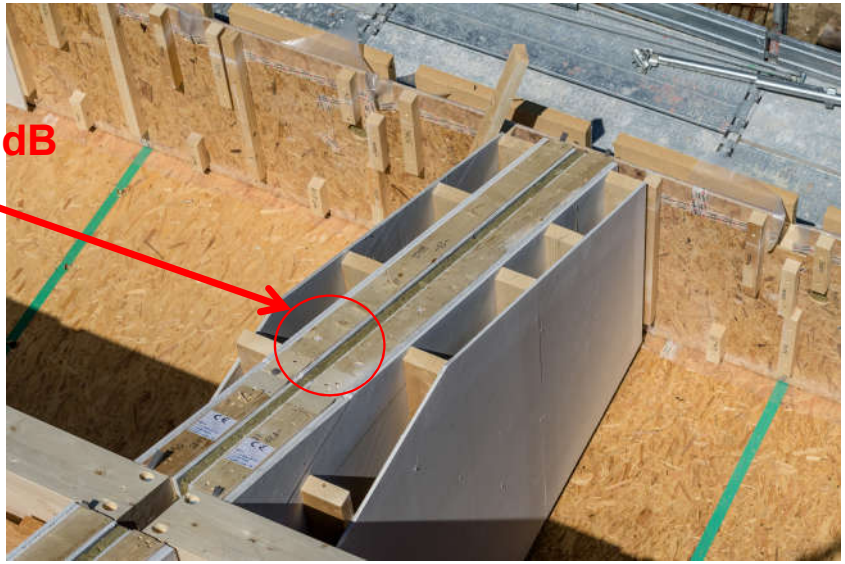


Rumore Aereo

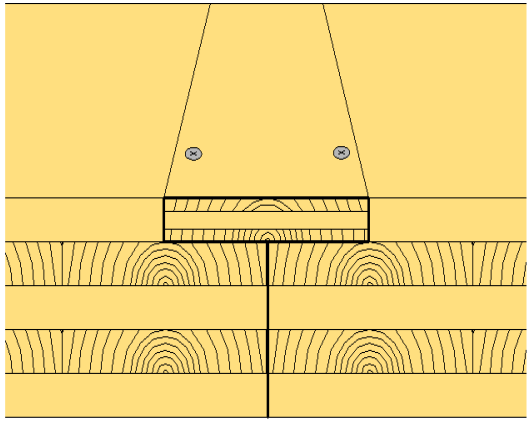


Stratigrafia
1) Parete semplice a telaio di legno con lana minerale interna di spessore 140 mm, lastre esterne in OSB spessore 15 mm
2) Parete semplice a telaio di legno con lana minerale interna di spessore 140 mm, lastre esterne in fibrogesso spessore 15 mm
3) Parete semplice a telaio di legno con lana minerale interna di spessore 140 mm, lastre esterne in fibrogesso spessore 15 mm e controparete singola con lana minerale interna di spessore 40 mm, lastre esterne in fibrogesso spessore 15 mm
4) Doppia parete a telaio di legno con lana minerale interna, intercapedine tra le due strutture di spessore 50 mm vuota, lastre interne in OSB spessore 10 mm e lastre esterne in cartongesso
5) Parete semplice a telaio di legno con lana minerale interna di spessore 140 mm e doppie lastre esterne in fibrogesso spessore 15+15 mm, controparete singola con telaio non a contatto, lana minerale interna di spessore 40 mm, lastra esterna in fibrogesso spessore 15 mm
6) Parete semplice a telaio di legno con lana minerale interna di spessore 140 mm e lastre in OSB spessore 15 mm, doppia controparete con lana minerale interna di spessore 40 mm e doppia lastra esterna in fibrogesso spessore 15 mm

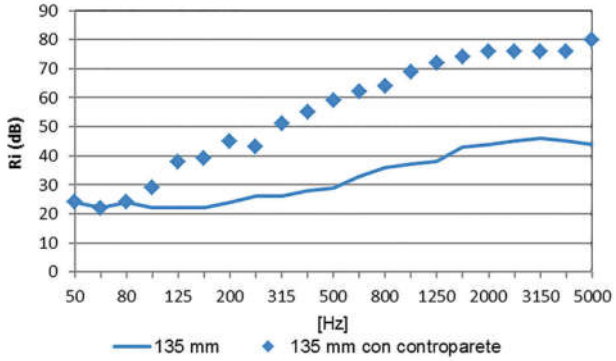
Rumore Aereo



Rumore Aereo



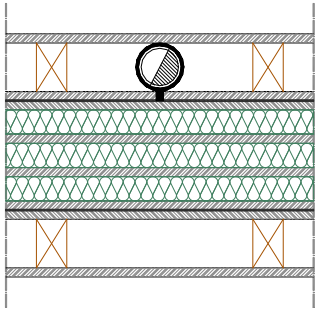
Spessore [mm]	Massa superficiale [kg/m²]	R_w (dB)
32	13	
80	36	
85	47	
94	47	
100	45	
135	68	
135	74	
175	90	



– Potere fonoisolante per parete crosslam spessore 135 mm e la stessa dotata di controparete

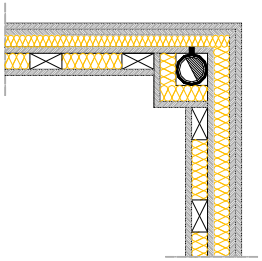
Rumore degli impianti

$$L_n = 10 \cdot \log\left(\sum 10^{\frac{L_{n,d}}{10}} + \sum 10^{\frac{L_{n,a}}{10}} + \sum 10^{\frac{L_{n,s}}{10}}\right) \qquad dB$$



$L_{n,A}$ = 25,3 dB(A)

$L_{n,A,\ measured}$ = 25.2 dB(A)



$L_{n,A}$ = 35.8 dB(A)

$L_{n,A,\ measured}$ = 35.3 dB(A)

GRAZIE PER L'ATTENZIONE

Ing. PhD Marco Caniato

Facoltà di Scienze e Tecnologie, Libera università di Bolzano

mcaniato@unibz.it