



## Akoestische aspecten van CLT bouwsystemen

Bart Ingelaere, WTCB, Afdeling akoestiek

BUILD UP, Zwijnaarde — 1 juni 2017

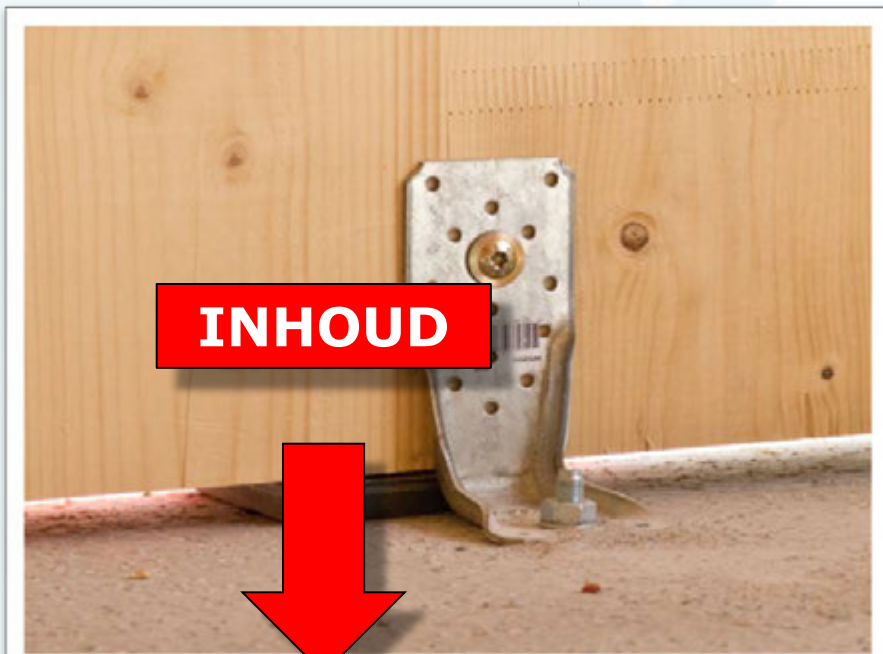
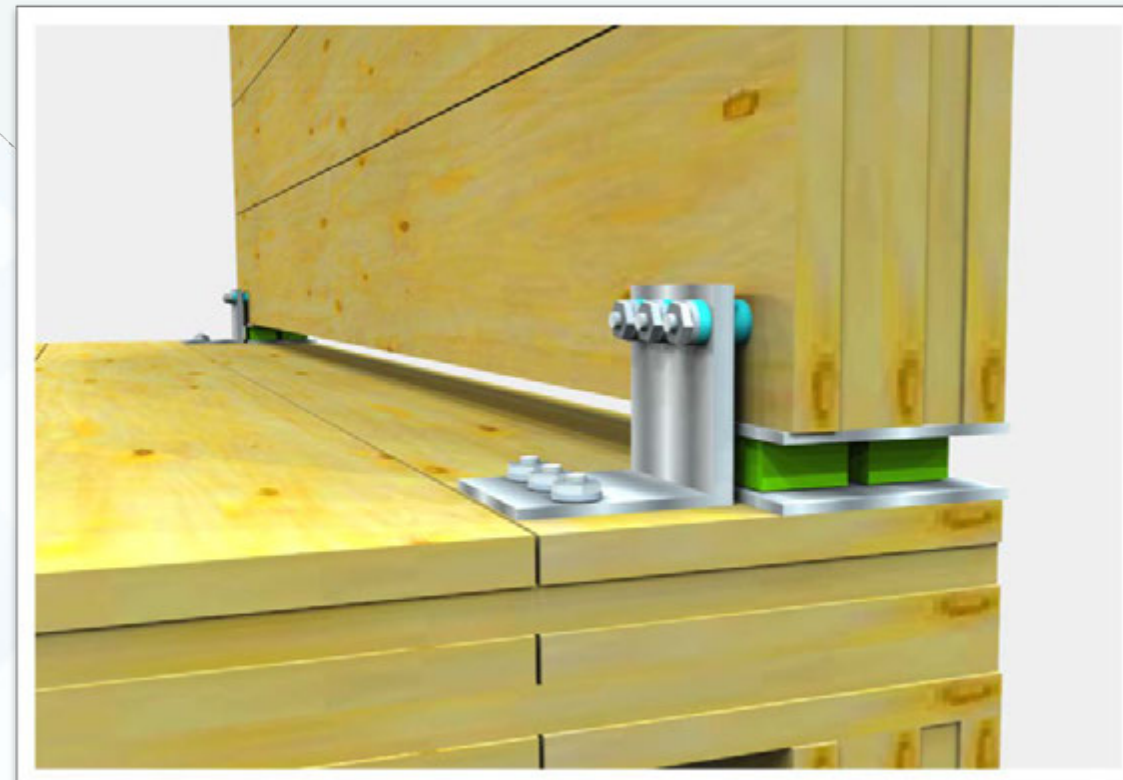
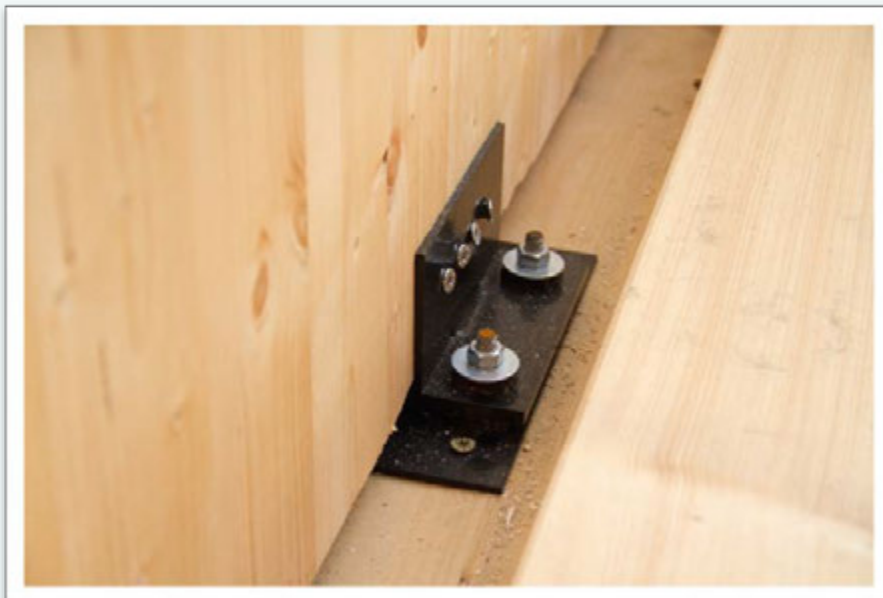




**MEERHOUT**  
Luchtgeluidisolatie:  
**10 dB beter** dan strengste criterium  
Contactgeluidisolatie:  
**7 dB beter** dan strengste criterium

**TOURNAI**  
Luchtgeluidisolatie: **14 dB beter** dan strengste criterium  
Contactgeluidisolatie: **9 dB beter** dan strengste criterium





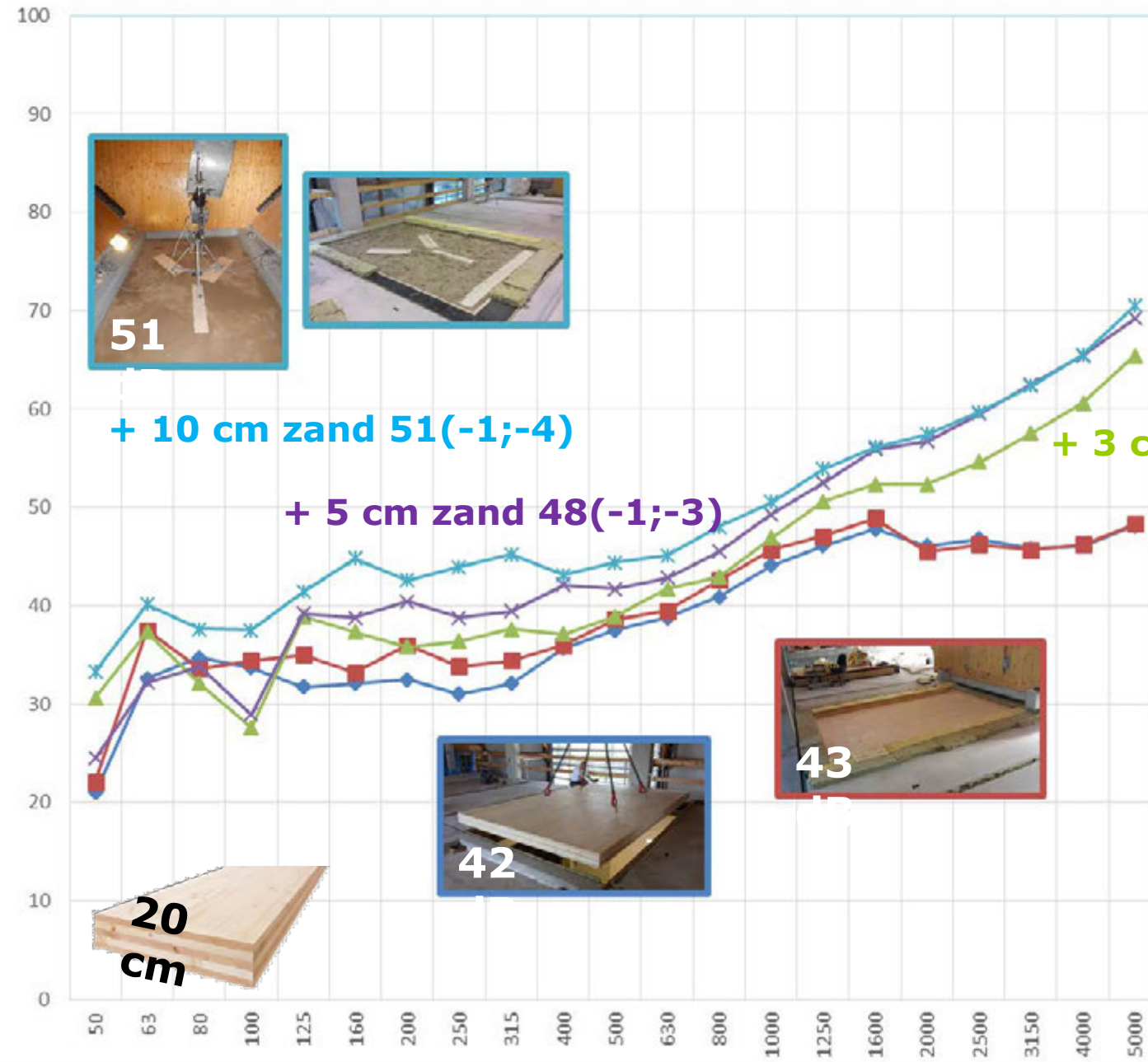
**INHOUD**







Geluidverzwakkingsindex R [dB] - 20 cm CLT



+ 10 cm zand 51(-1;-4)

+ 5 cm zand 48(-1;-3)

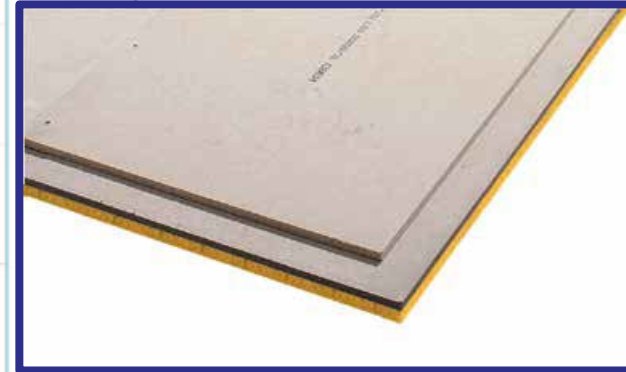
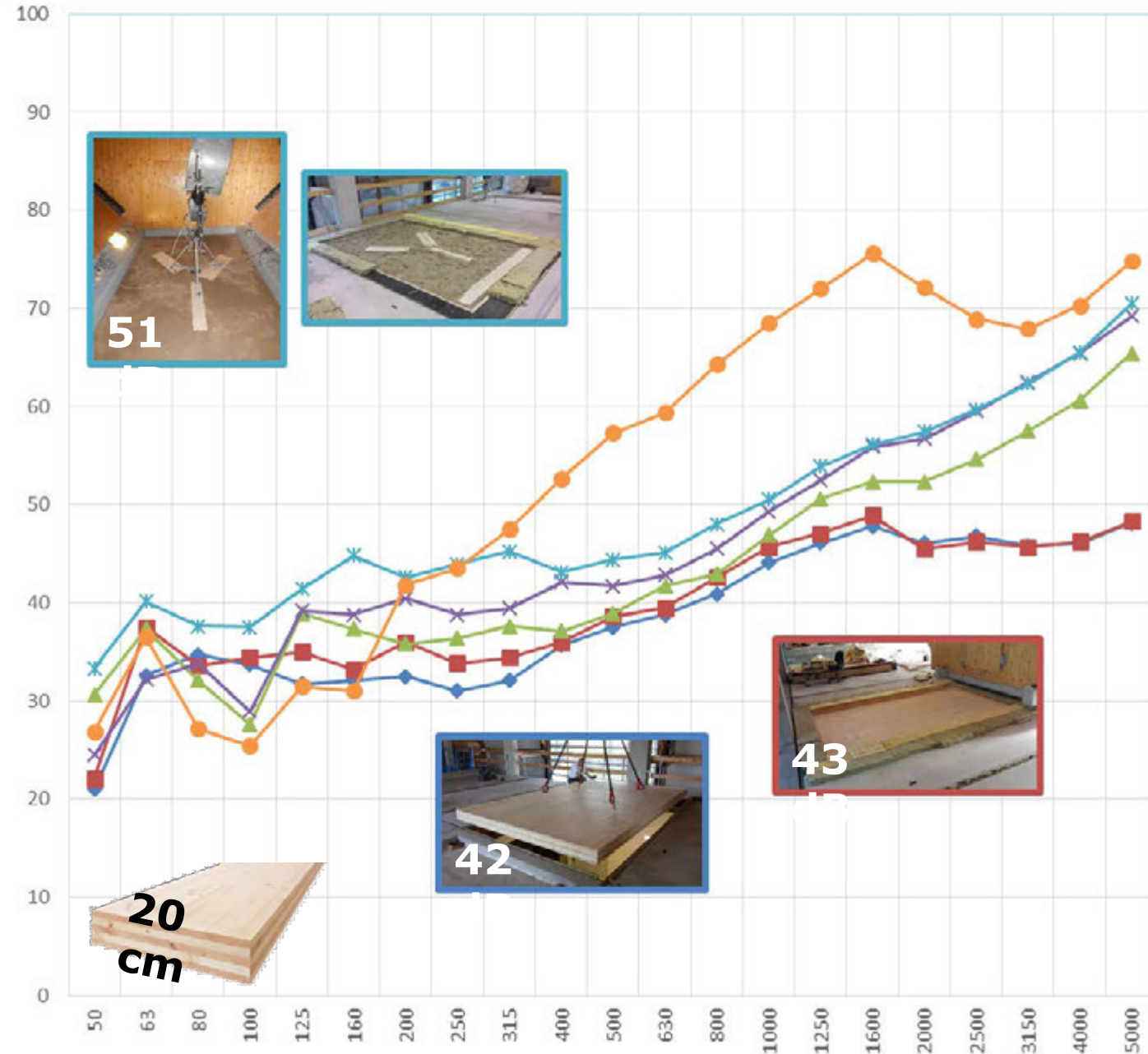
+ 3 cm zand 45(-1;-3)



$R_w(C;C_{tr})$



Geluidverzwakkingsindex R [dB] - 20 cm CLT



+ Rigidur E30 MW  
53(-4;-10)



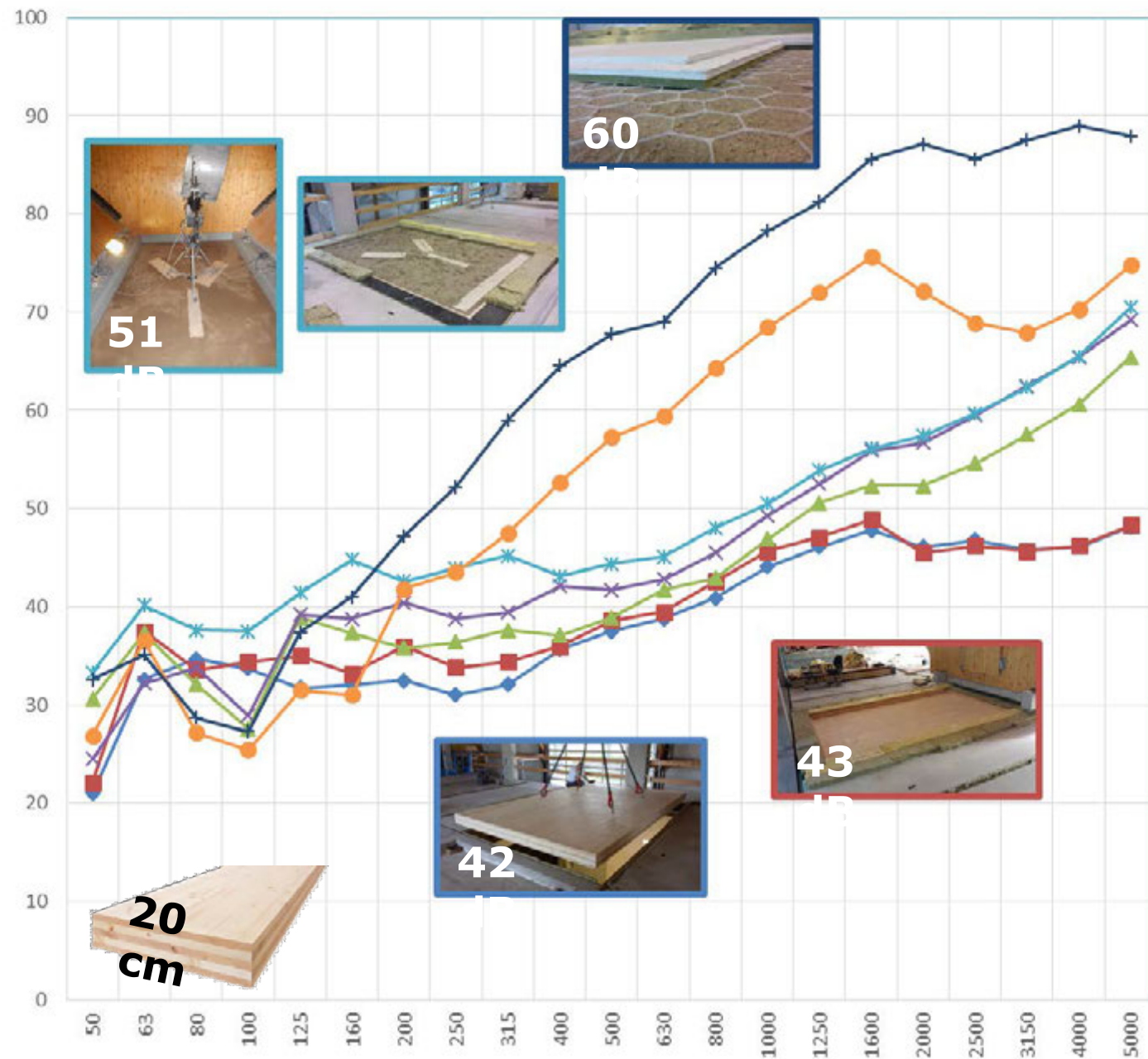
+ 10 cm zand 51(-1;-4)  
+ 5 cm zand 48(-1;-3)  
+ 3 cm zand 45(-1;-3)

$R_w(C;C_{tr})$





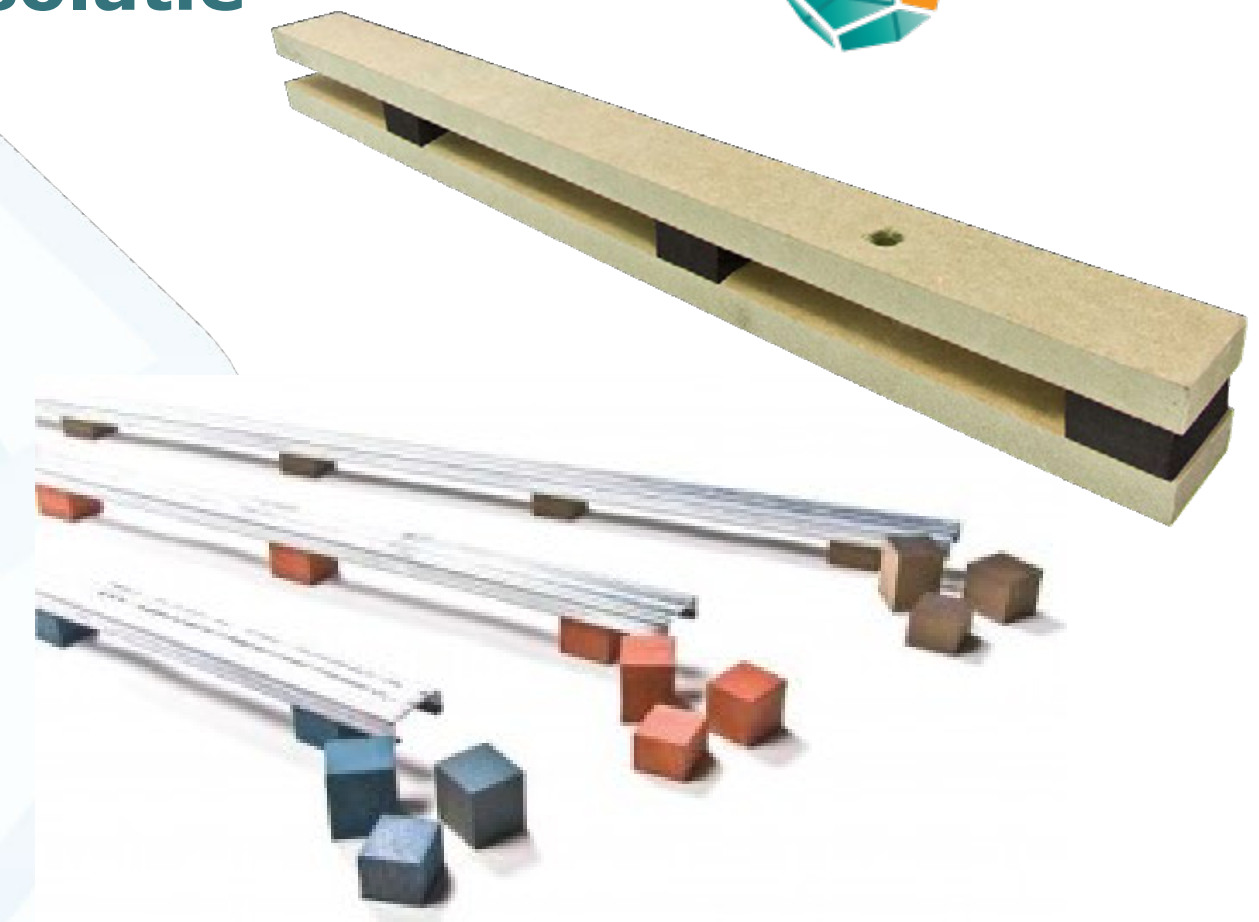
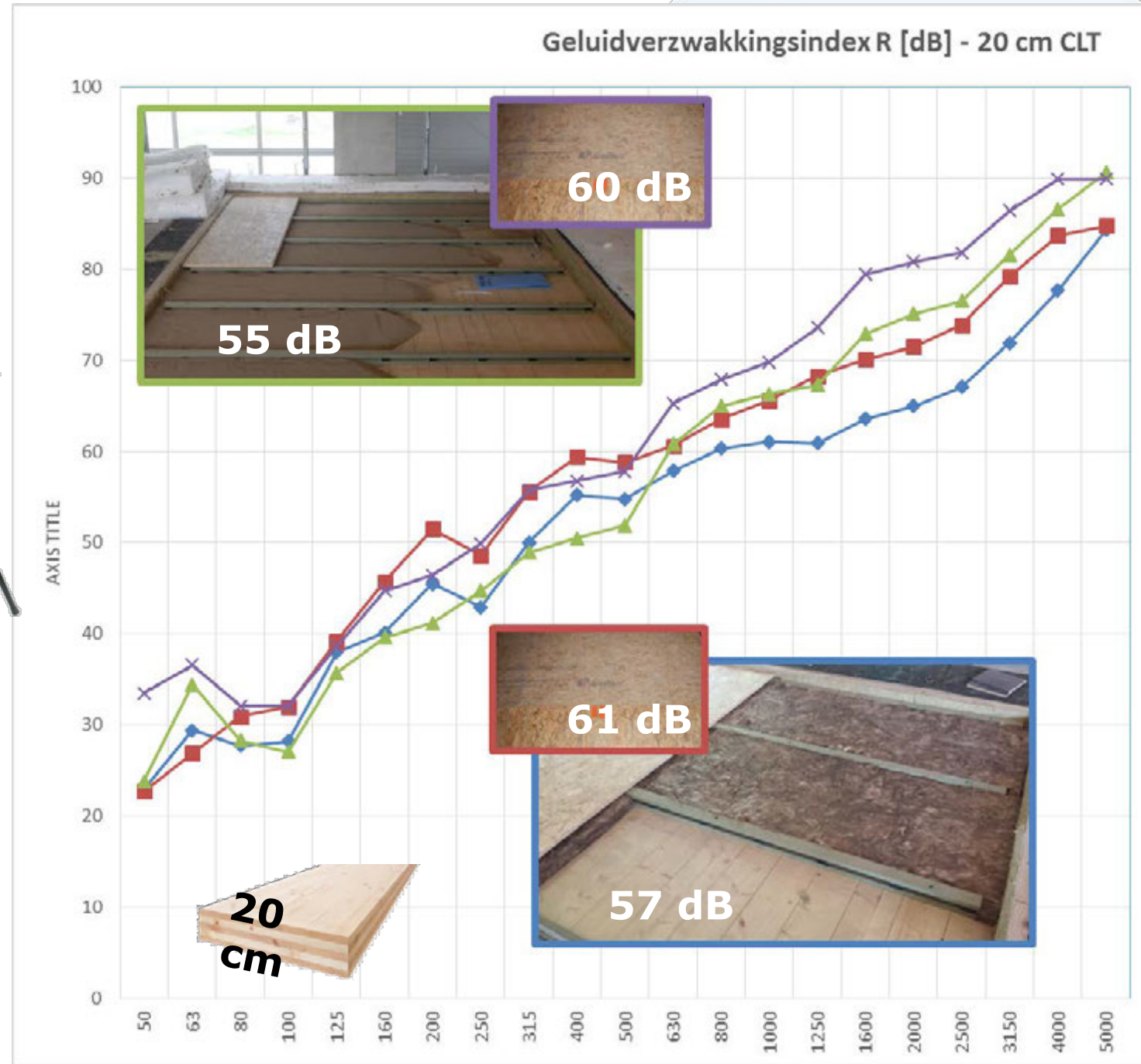
Geluidverzwakkingsindex R [dB] - 20 cm CLT



+ 4 cm zand in grid + Rigidur E30 MW 60(-5;-14)

- + Rigidur E30 MW 53(-4;-10)
- + 10 cm zand 51(-1;-4)
- + 5 cm zand 48(-1;-3)
- + 3 cm zand 45(-1;-3)

$R_w(C;C_{tr})$

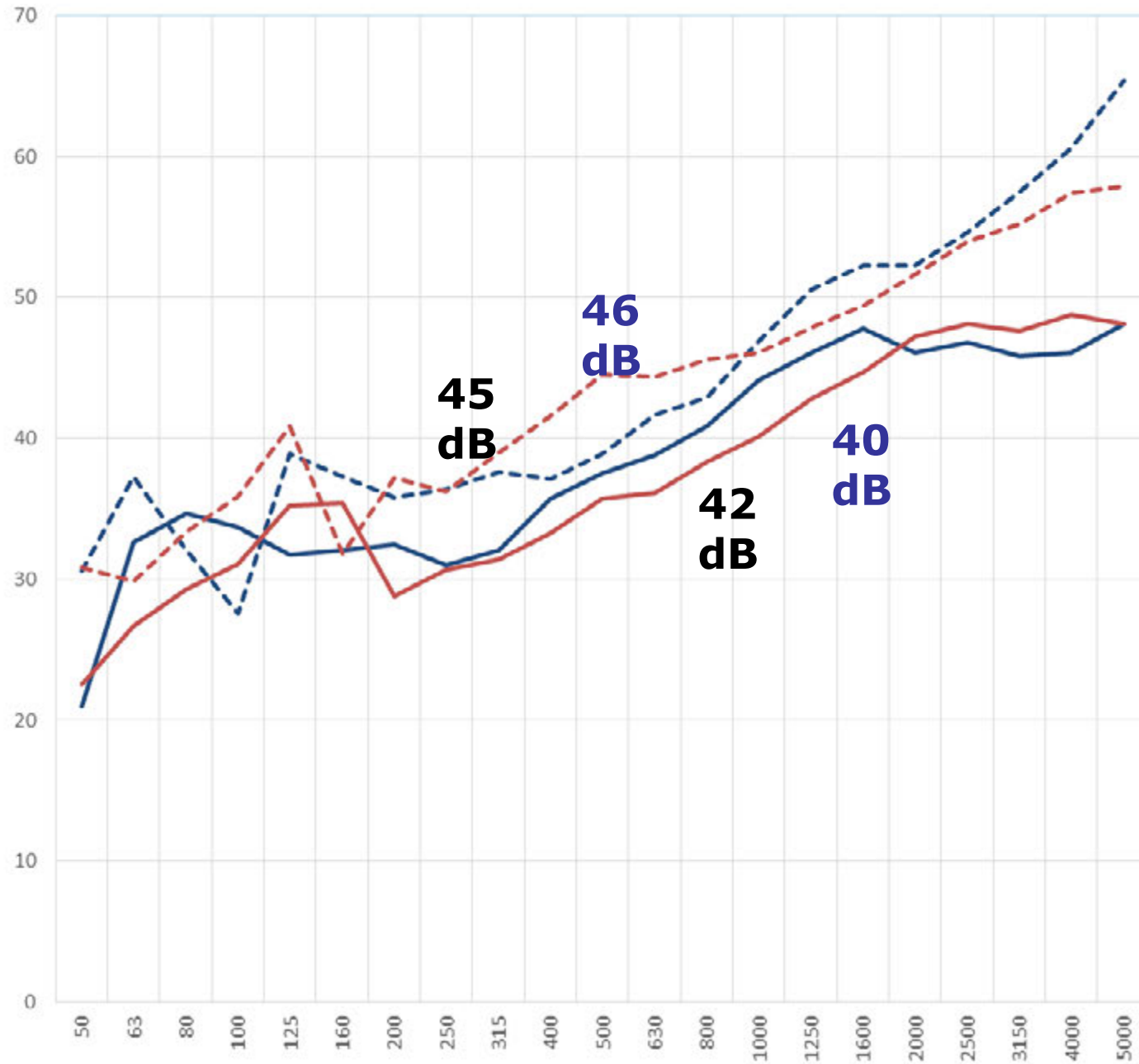


- + CDM Floor T met 3 cm zand + 2x OSB22 61(-3;-10)
- + CDM Floor T met 3 cm zand + 1x OSB22 61(-4;-11)
- + CDM Floor T met 5 cm MW + 2x OSB22 57(-4;-10)
- + CDM Floor T met 5 cm MW + 1x OSB22 57(-4;-10)

$$R_w(C;C_{tr})$$



Geluidverzwakkingsindex R [dB] - 20 cm CLT vs 14 cm CLT



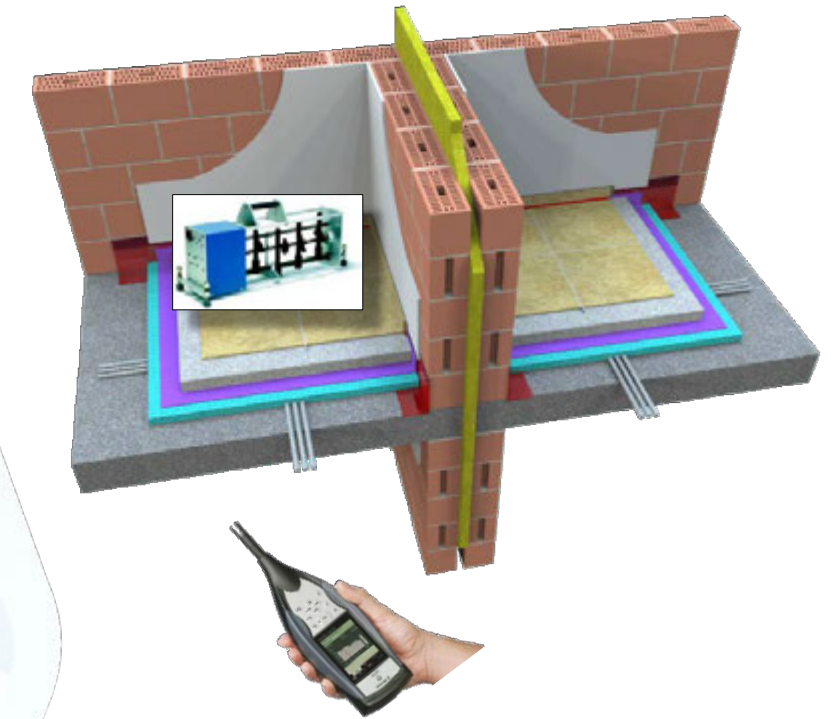
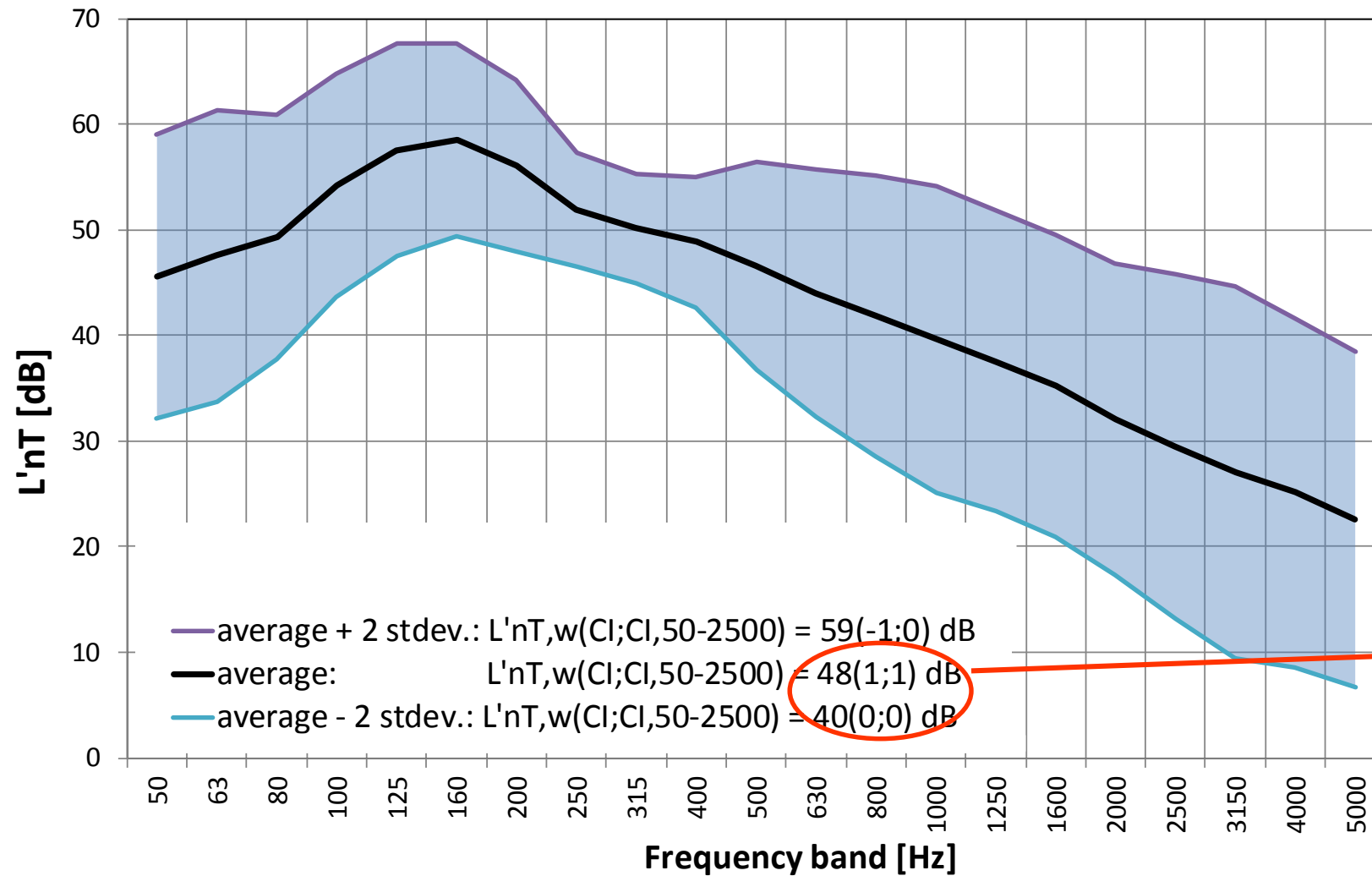
- 20 cm CLT naakt - 42(-1;-4) dB
- - - + 3 cm zand - 45(-1;-4) dB
- 14 cm CLT naakt - 40(-1;-3) dB
- - - + 3 cm gravel - 46(0;-3) dB



$R_w(C;C_{tr})$



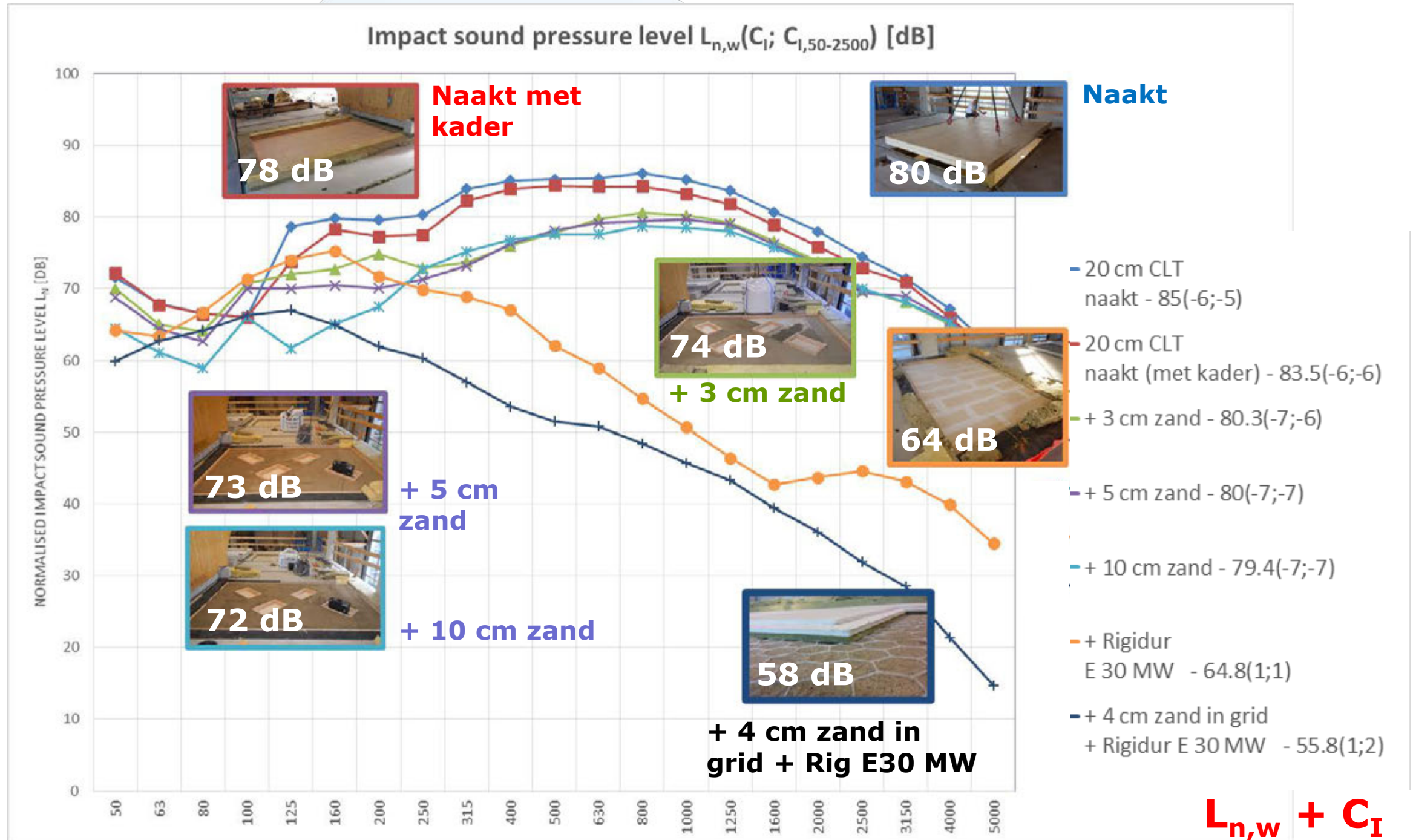
Floating floors in traditional heavy weight constructions



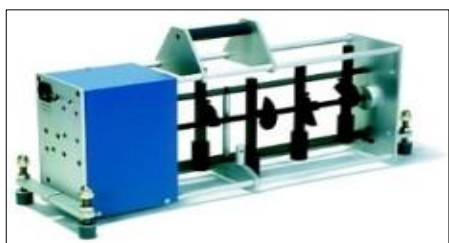
**Normeis woningen:  $L'_{nT,w} \leq 54$  dB**

**Doel:  $L'_{nT,w} + C_{I,50-2500} \leq 48$  dB**

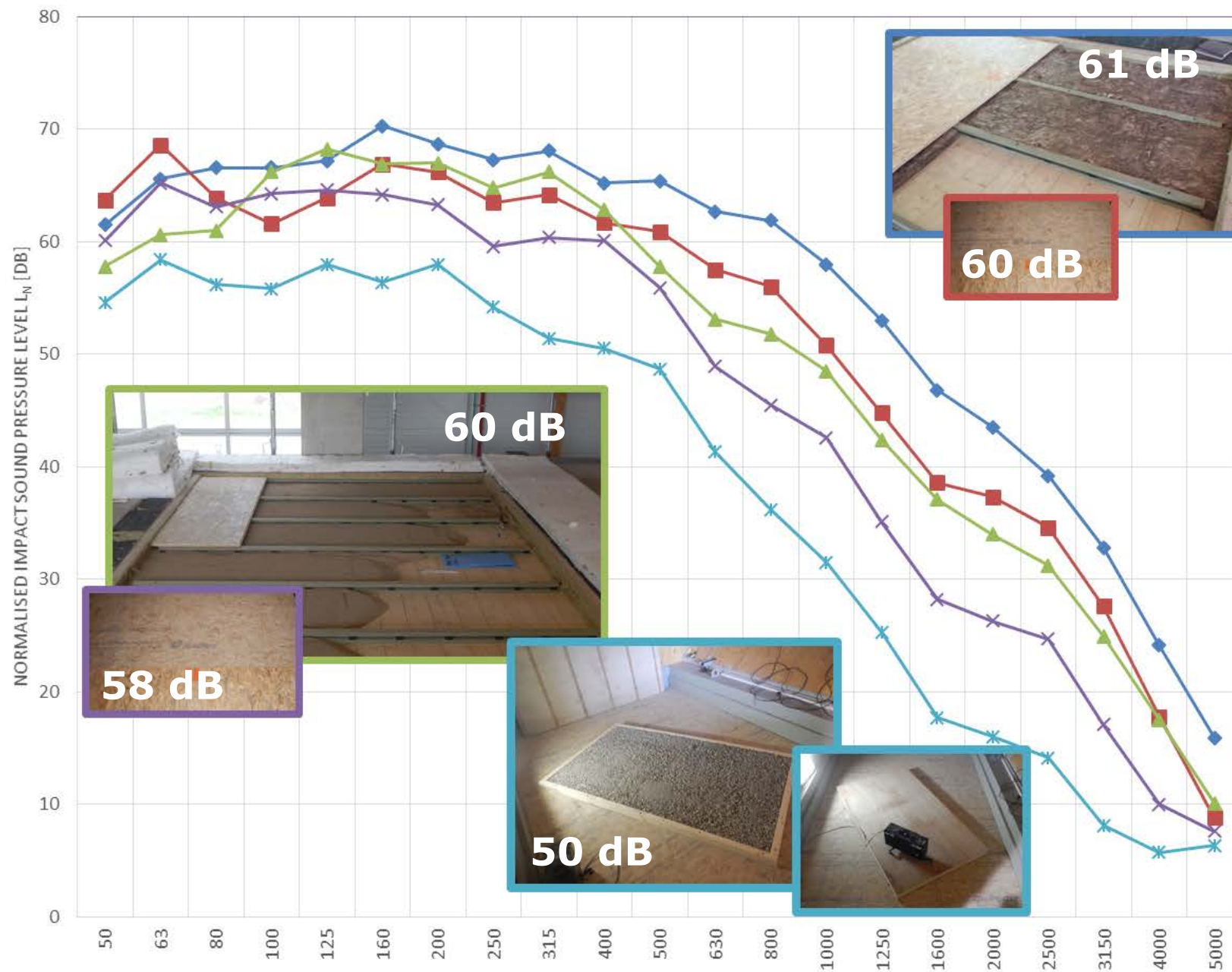
❖ Massieve vloeren als referentie





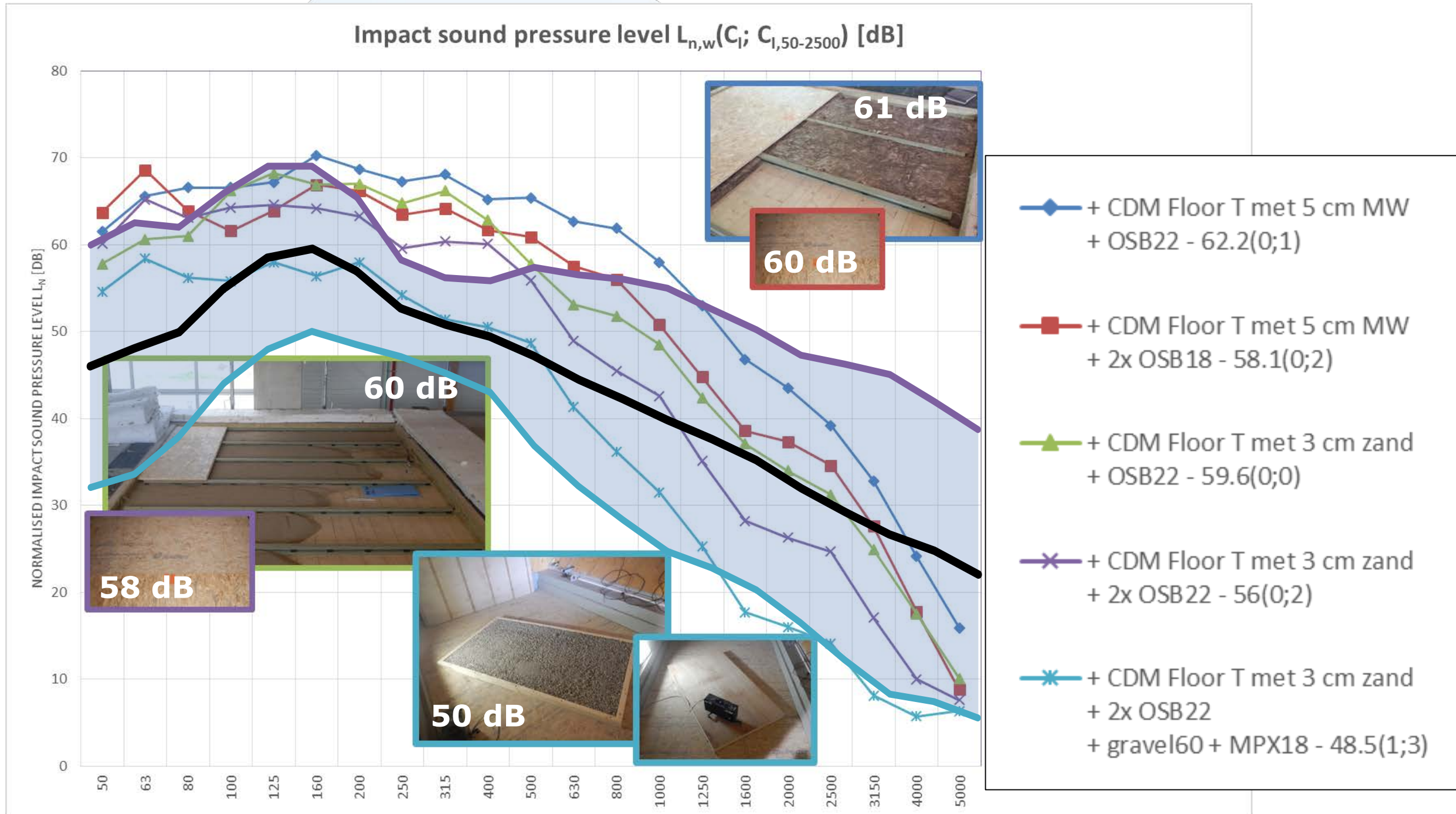


Impact sound pressure level  $L_{n,w}(C_1; C_{1,50-2500})$  [dB]



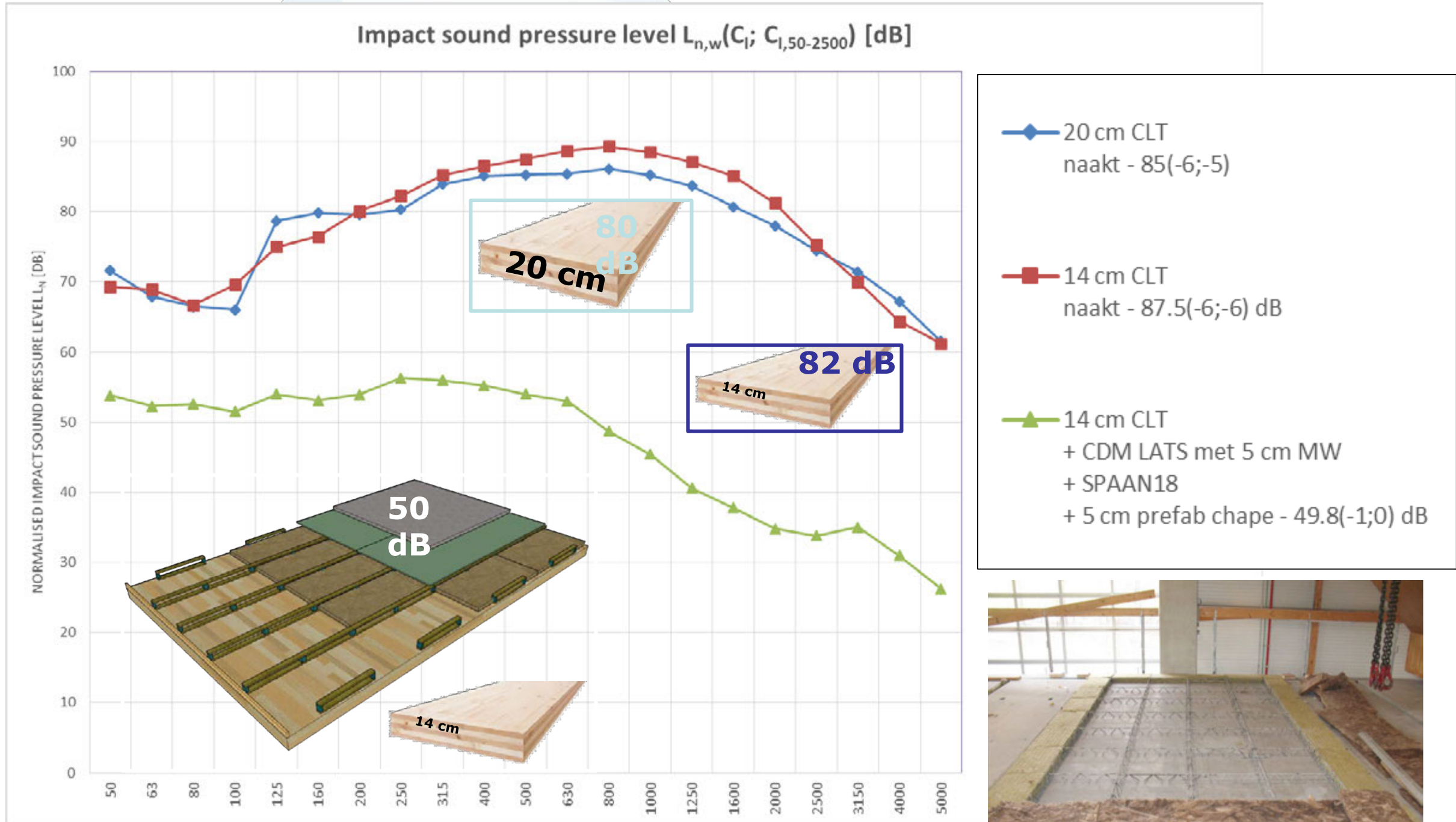
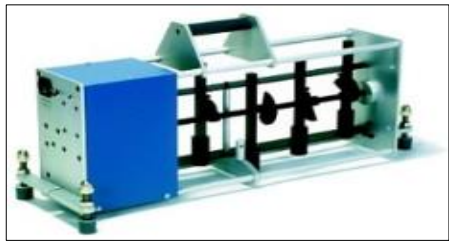
- ◆ + CDM Floor T met 5 cm MW + OSB22 - 62.2(0;1)
- + CDM Floor T met 5 cm MW + 2x OSB18 - 58.1(0;2)
- ▲ + CDM Floor T met 3 cm zand + OSB22 - 59.6(0;0)
- ✕ + CDM Floor T met 3 cm zand + 2x OSB22 - 56(0;2)
- ✱ + CDM Floor T met 3 cm zand + 2x OSB22 + gravel60 + MPX18 - 48.5(1;3)

Nota: gravel 60 + MP18 mm vervangt chape in test setup

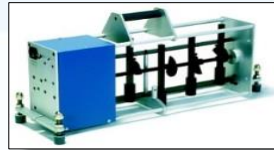
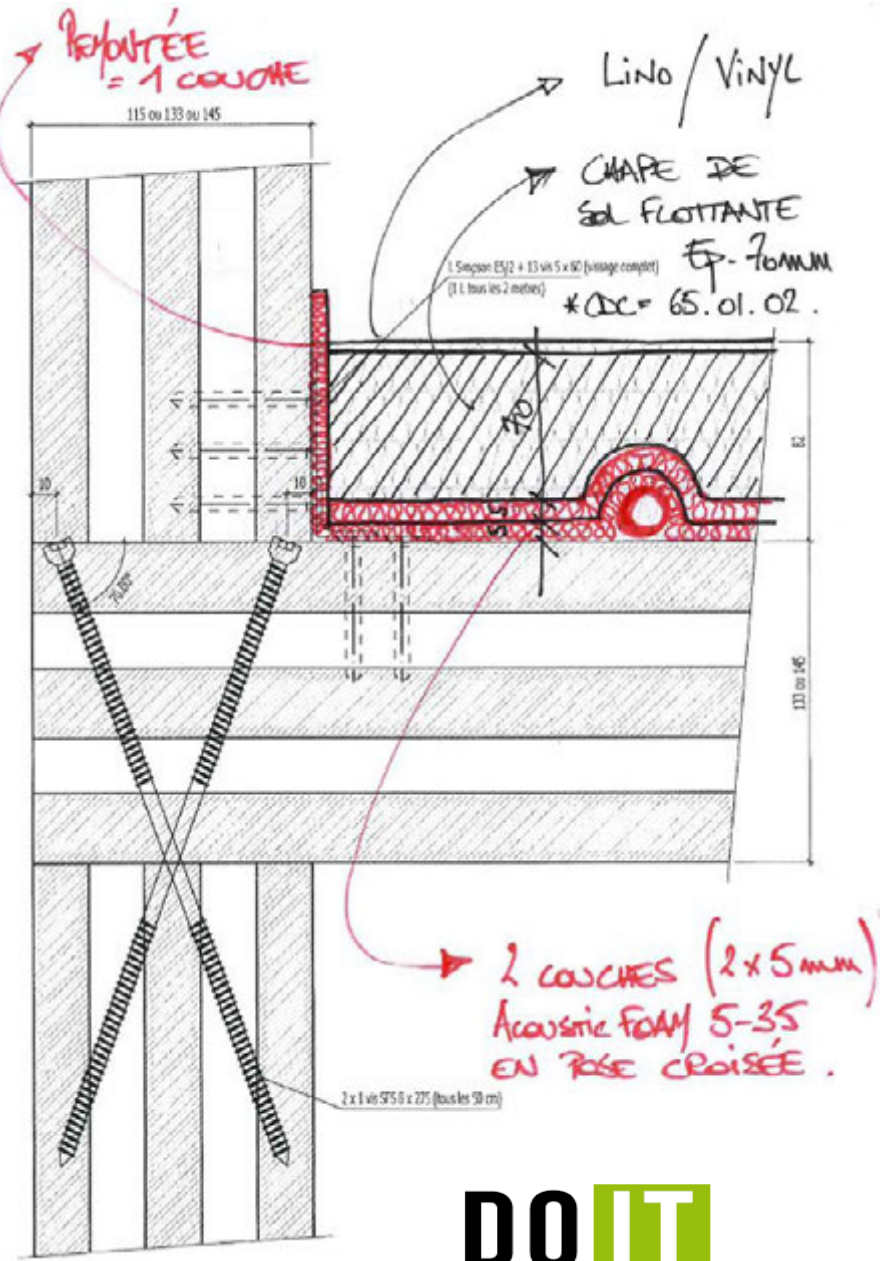


Nota: gravel 60 + MP18 mm vervangt chape in test setup

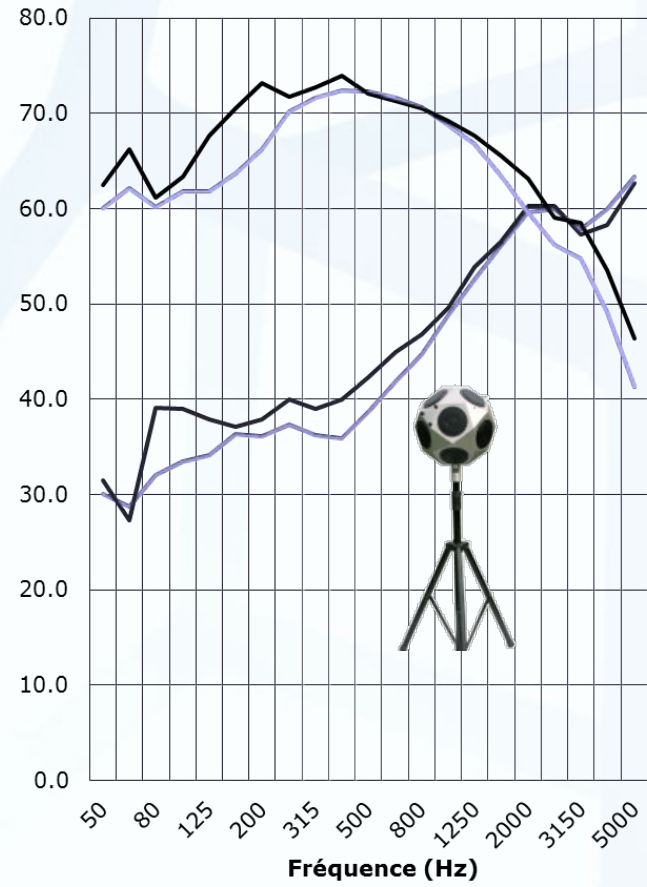








Résultats de mesures



— Living (DnT)      — Chambre (DnT)  
 — Living (L'nT)    — Chambre (L'nT)

Woningbouw:

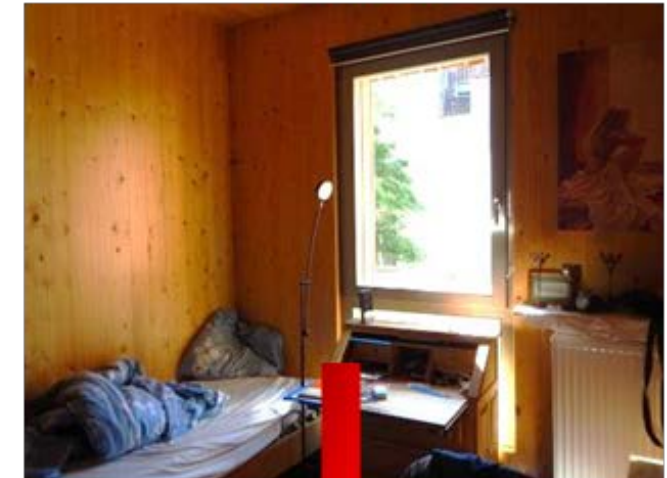
$D_{nT,w} \geq 54 \text{ dB}$   
 $L'_{nT,w} \leq 54 \text{ dB}$

Living



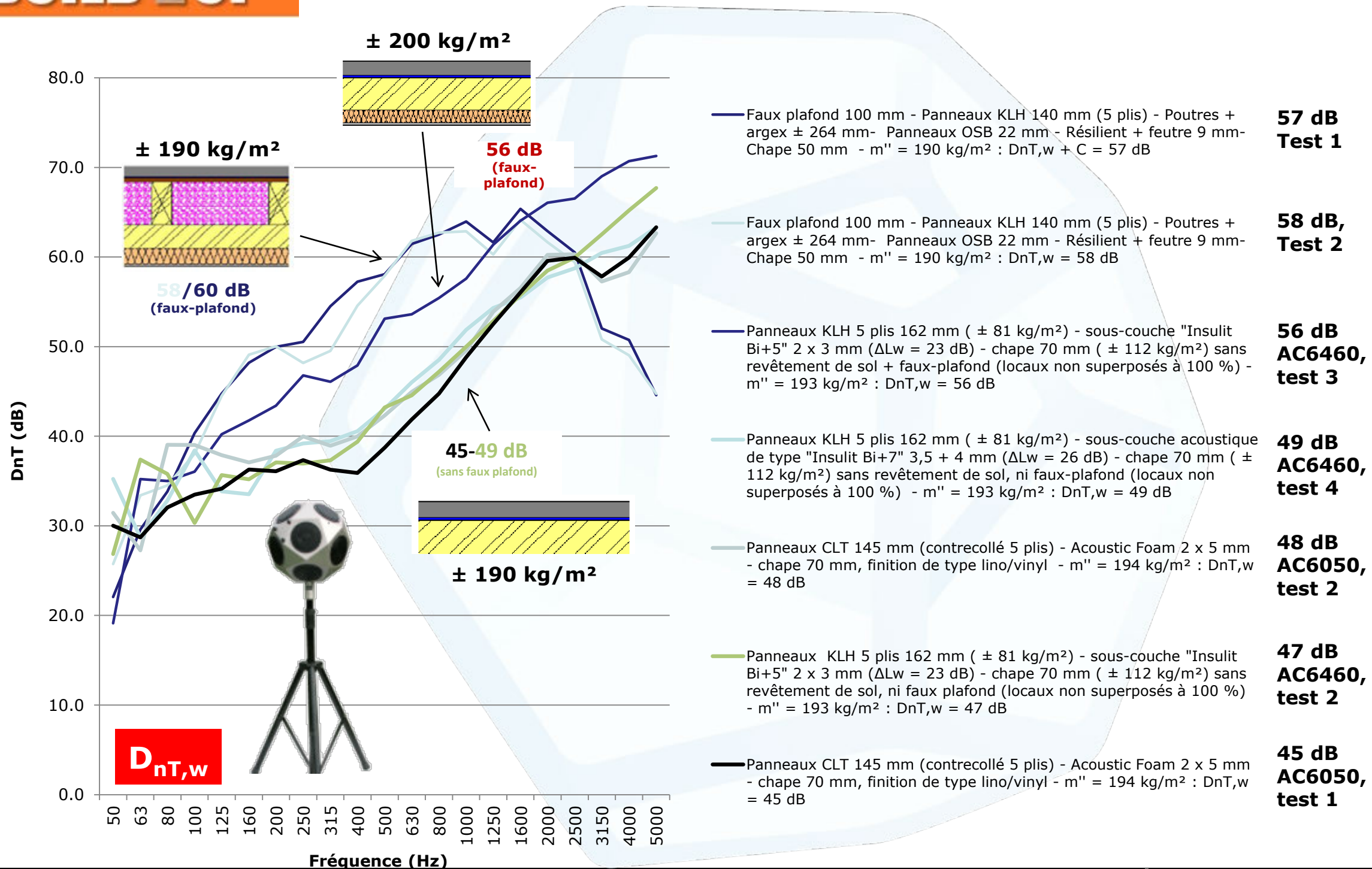
$D_{nT,w} = 45 (-1 ; -3) \text{ dB NC}$   
 $L'_{nT,w} = 69 (-4) \text{ dB NC}$

Chambres



$D_{nT,w} = 48 (-1 ; -3) \text{ dB NC}$   
 $L'_{nT,w} = 70 (-3) \text{ dB NC}$



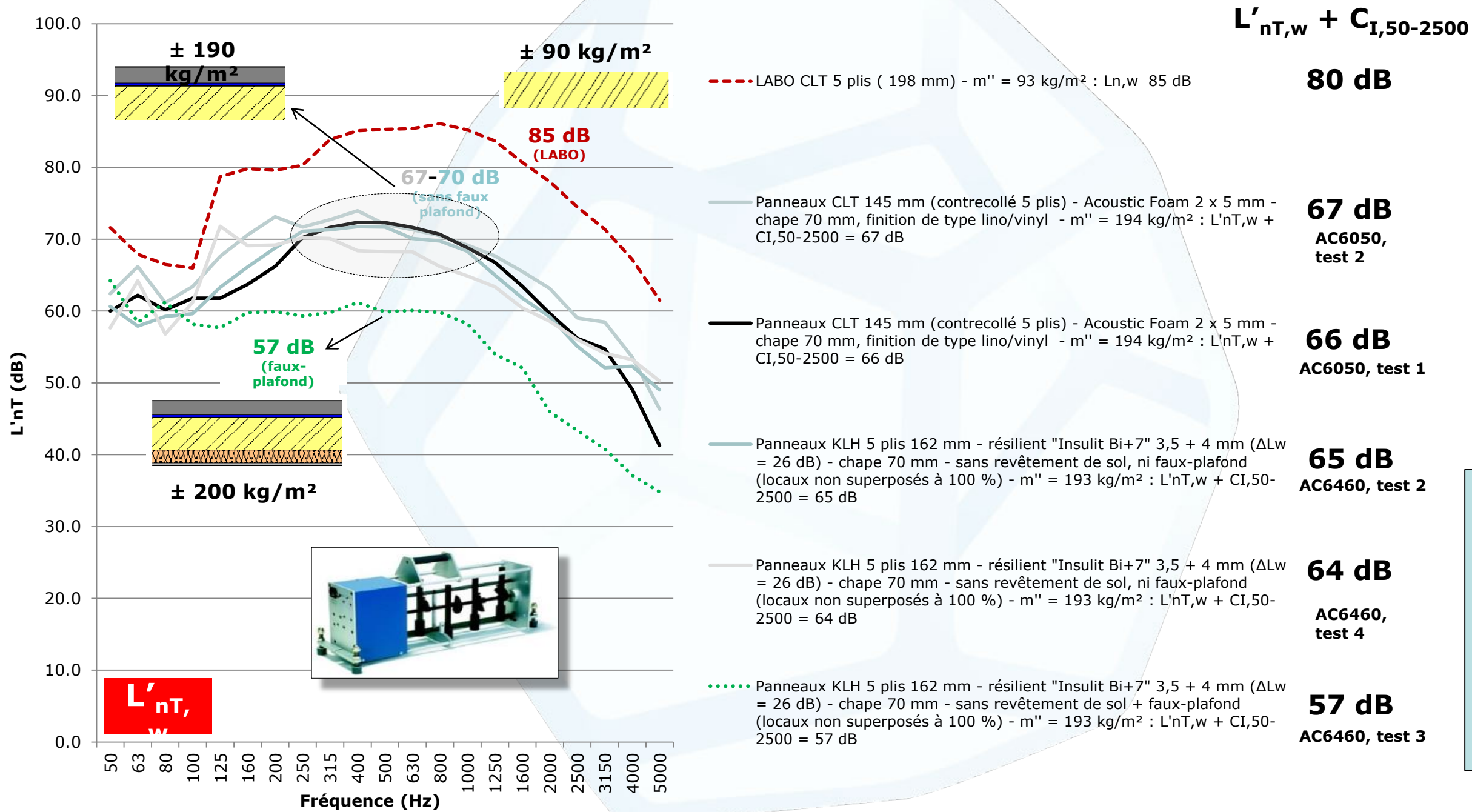


**Woningbouw:**

**D<sub>nT,w</sub> ≥ 54 dB**

**Scholenbouw (tussen klassen):**

**D<sub>nT,w</sub> + C ≥ 44 dB**



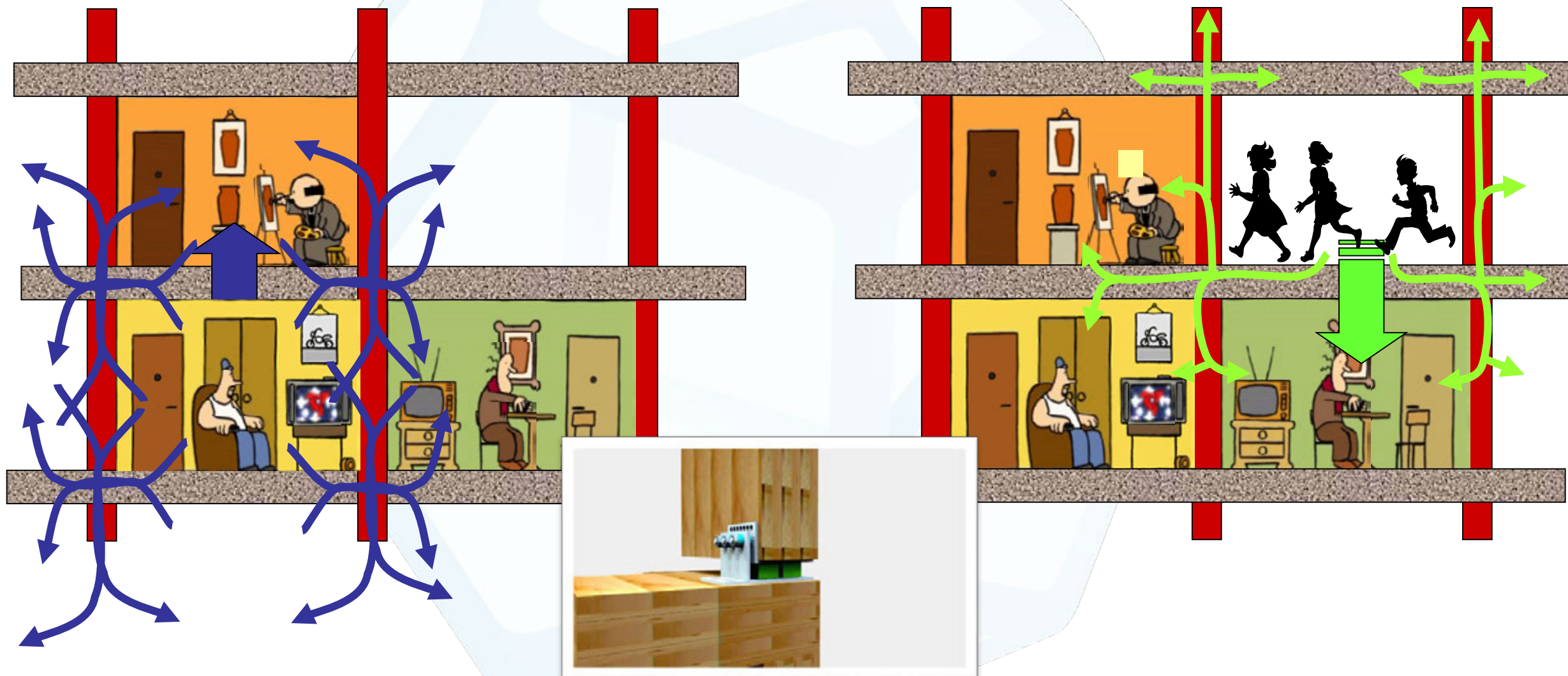
**Woningbouw:**  
 $L'_{nT,w} \leq 54$  dB

**Scholenbouw (tussen klassen):**  
 $L'_{nT,w} + C_I \leq 60$  dB

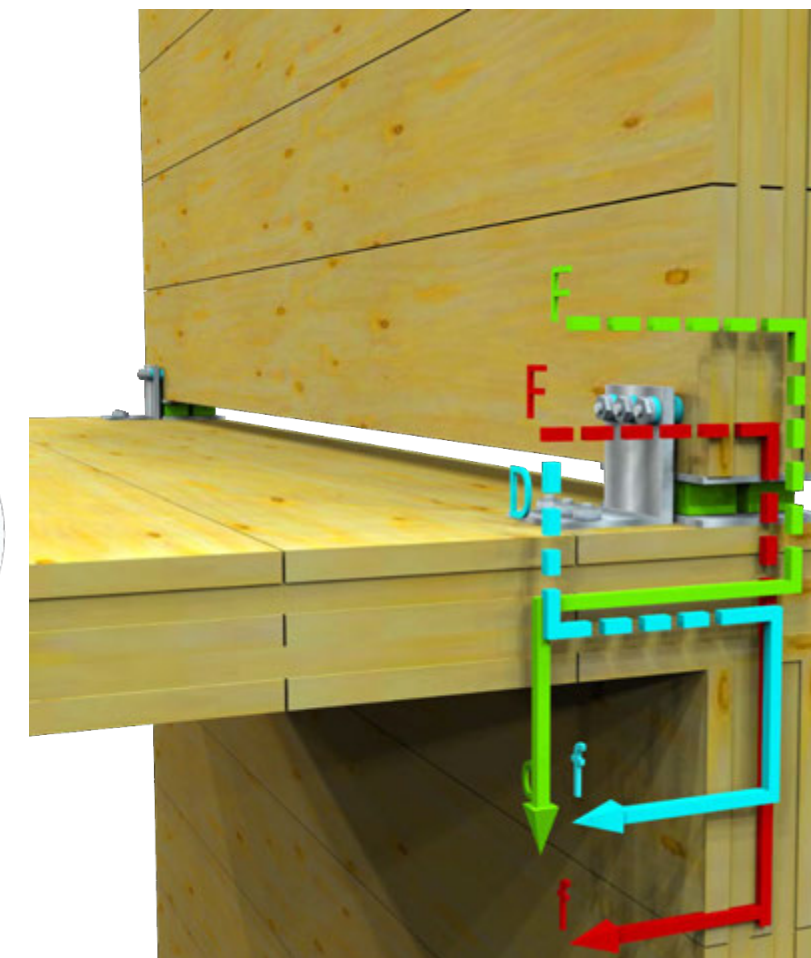
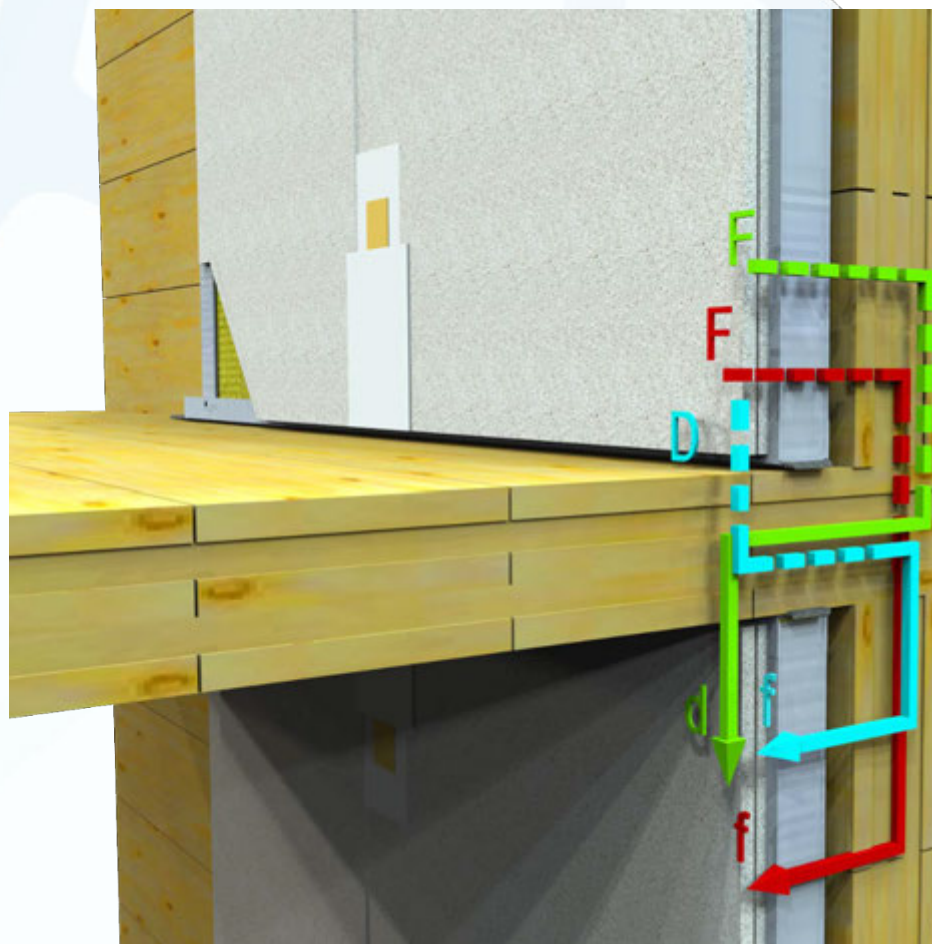
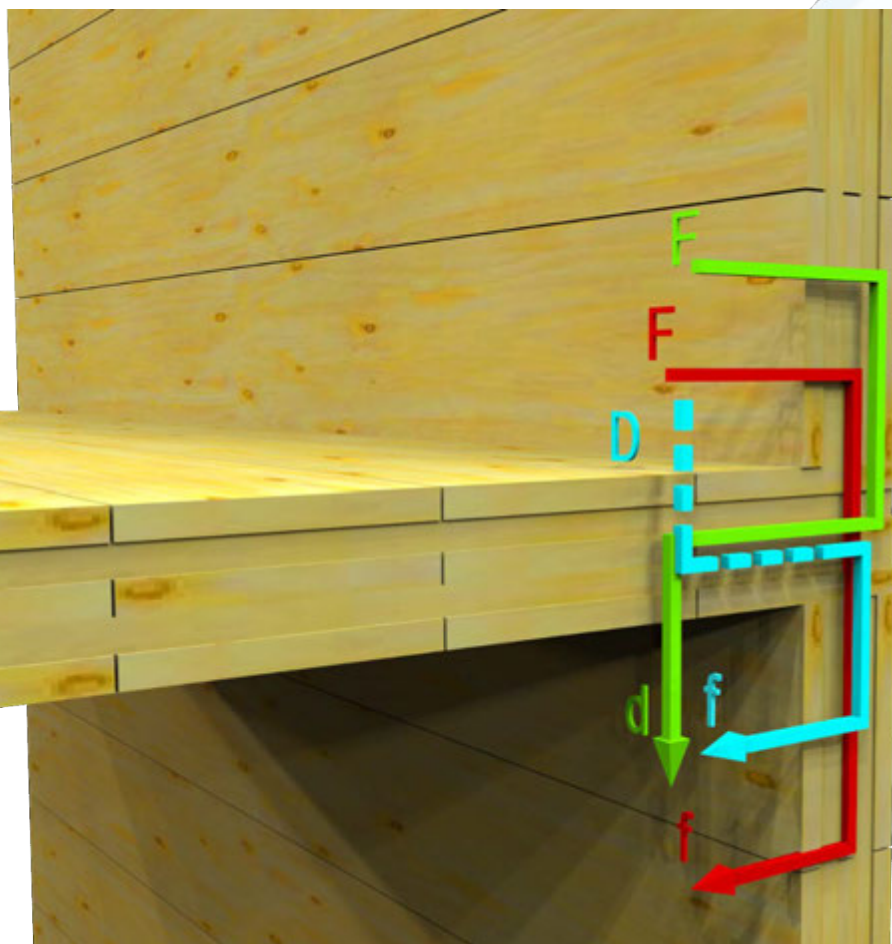


**LUCHTGELUIDISOLATIE**

**CONTACTGELUIDISOLATIE**



Indien er *geen directe lawaaitransmissie door de vloer gaat*, is de maximale geluidisolatie (als gevolg van de flankerende geluidtransmissie) voor twee boven elkaar gelegen balkvormige ruimten:

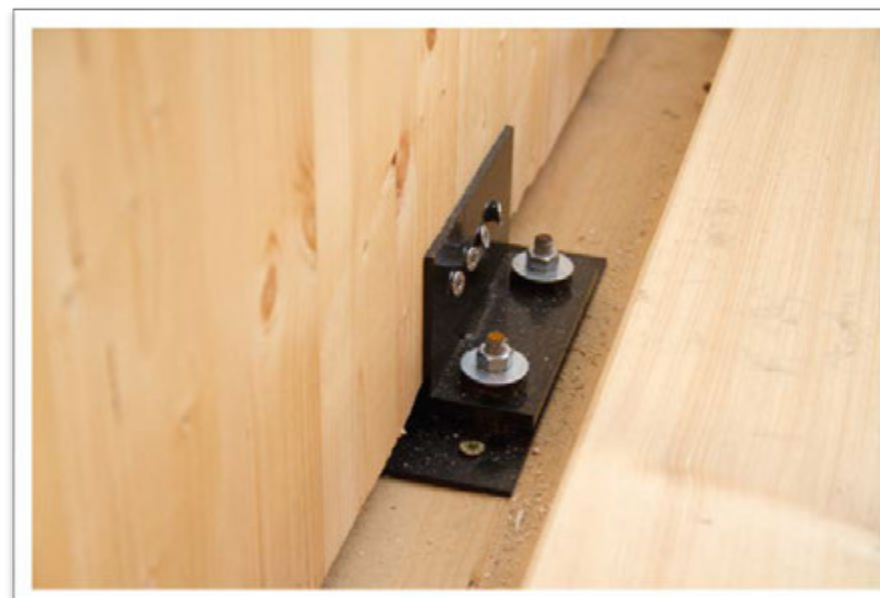
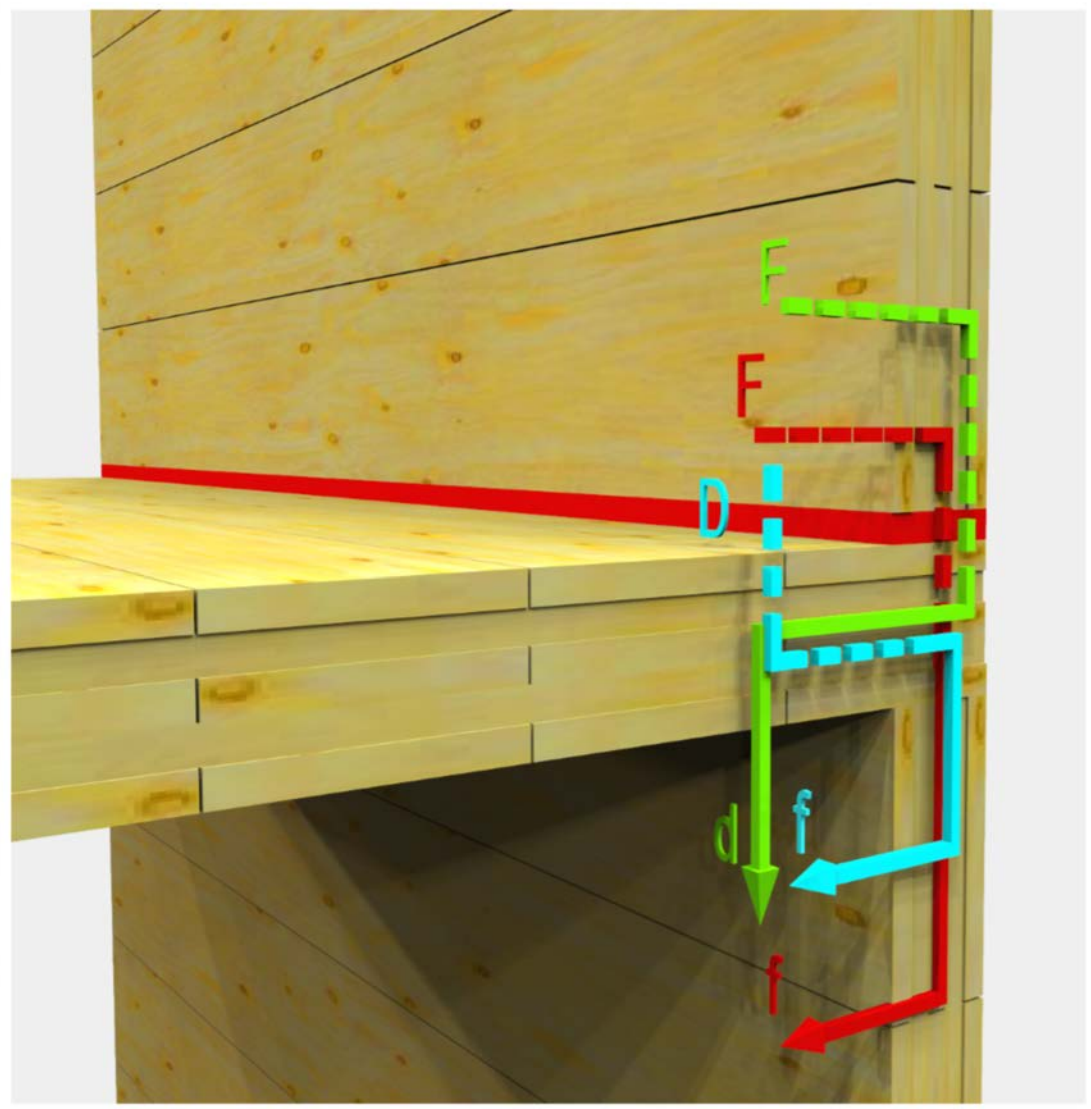


Zonder speciale maatregelen:  
**ca. 44 dB**

Indien overal voorzetwanden  
(2 gipsplaten, spouw 10 cm,  
minerale wol) = duur, plaatsrovend  
**ca. 64 dB**

Met nieuw WTCB-montage-  
systeem (snel, geen  
plaatsverlies), patent:  
**ca. 64 dB**





VLOEREN LUCHTGELUID

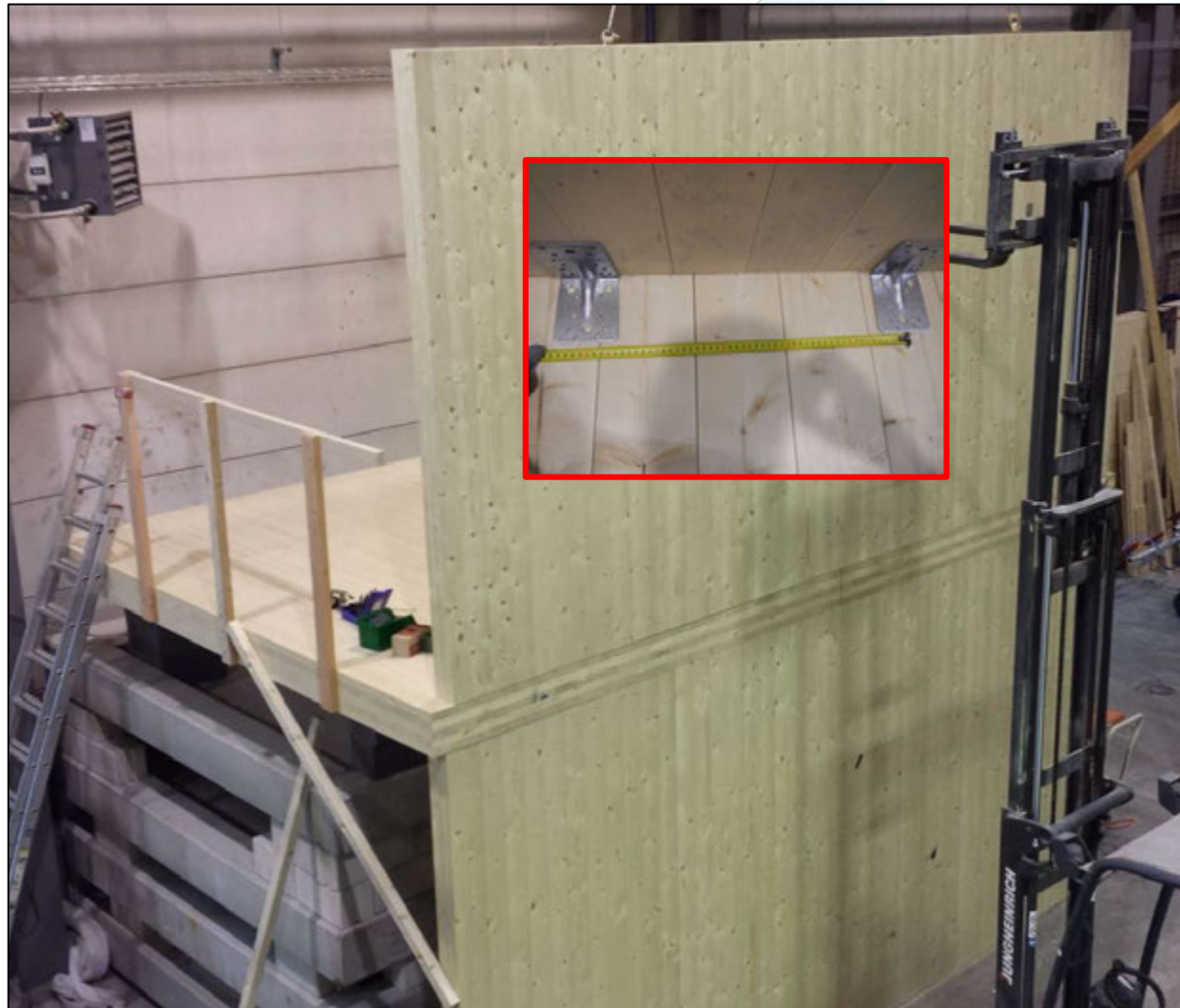
VLOEREN CONTACTGELUID

METINGEN IN SITU

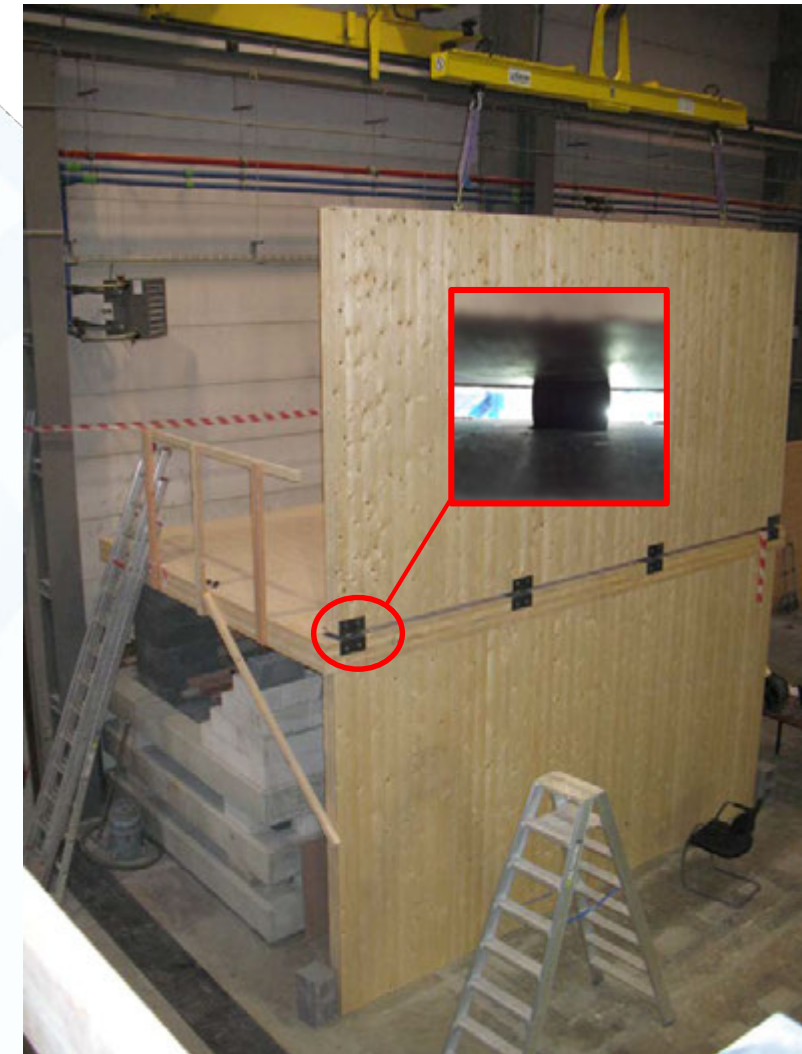
FLANKERENDE GELUIDTRANSMISSIE



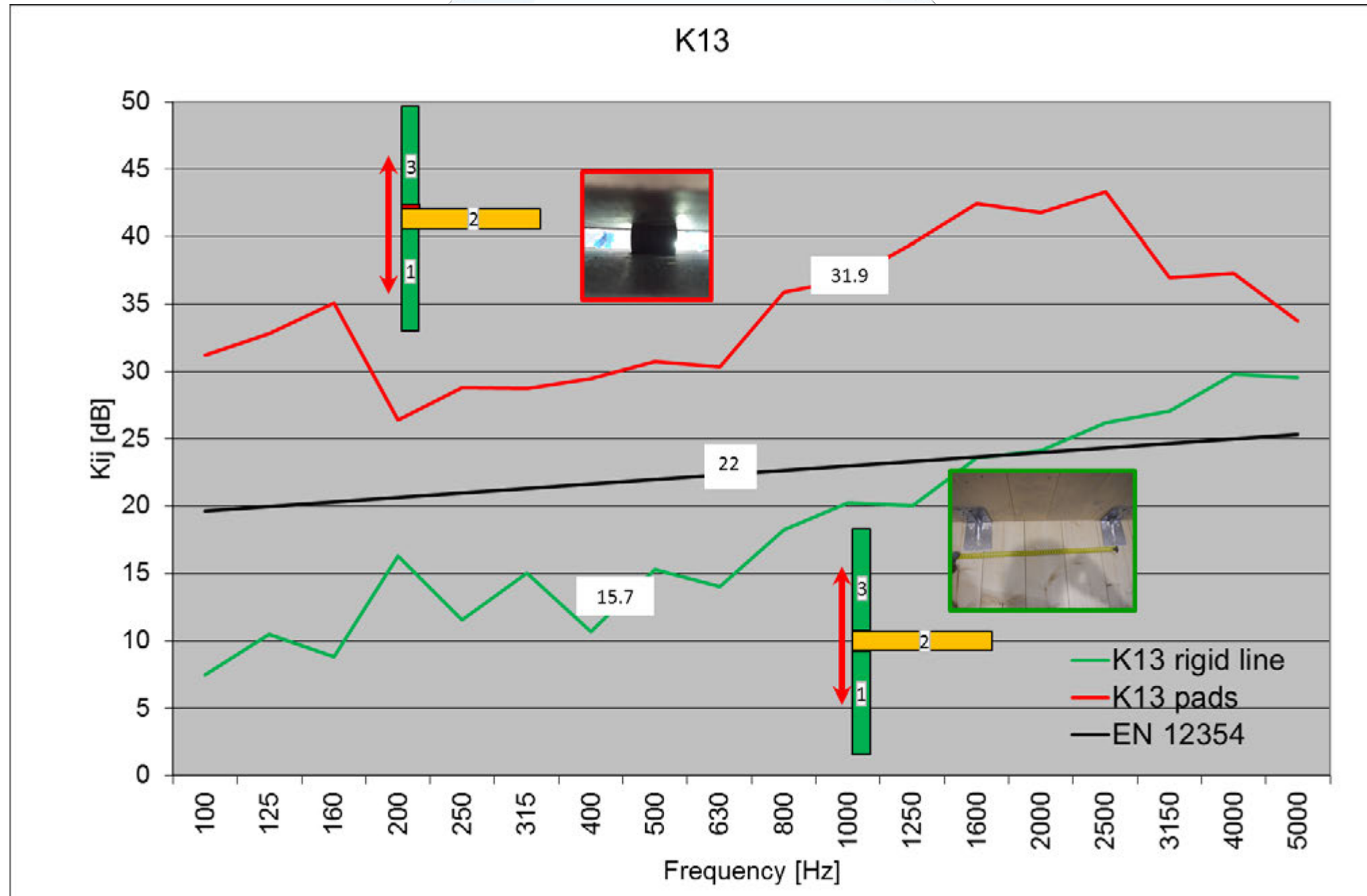




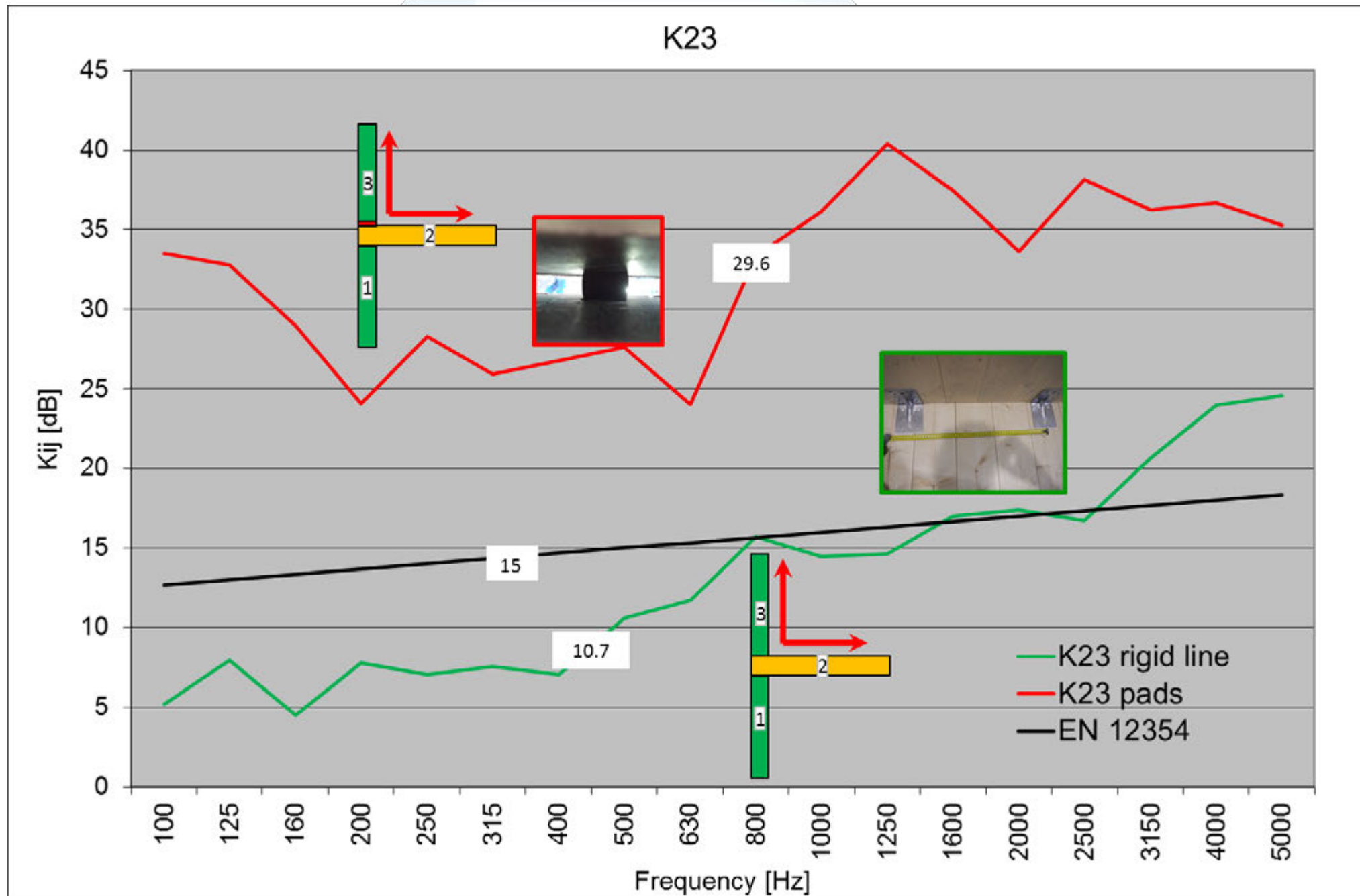
Stijve, lijnkoppeling  
(geschroefde L-profielen elke  
50 cm)



Soepele puntcontacten  
(elastomeer-pads elke  
1,50 m)



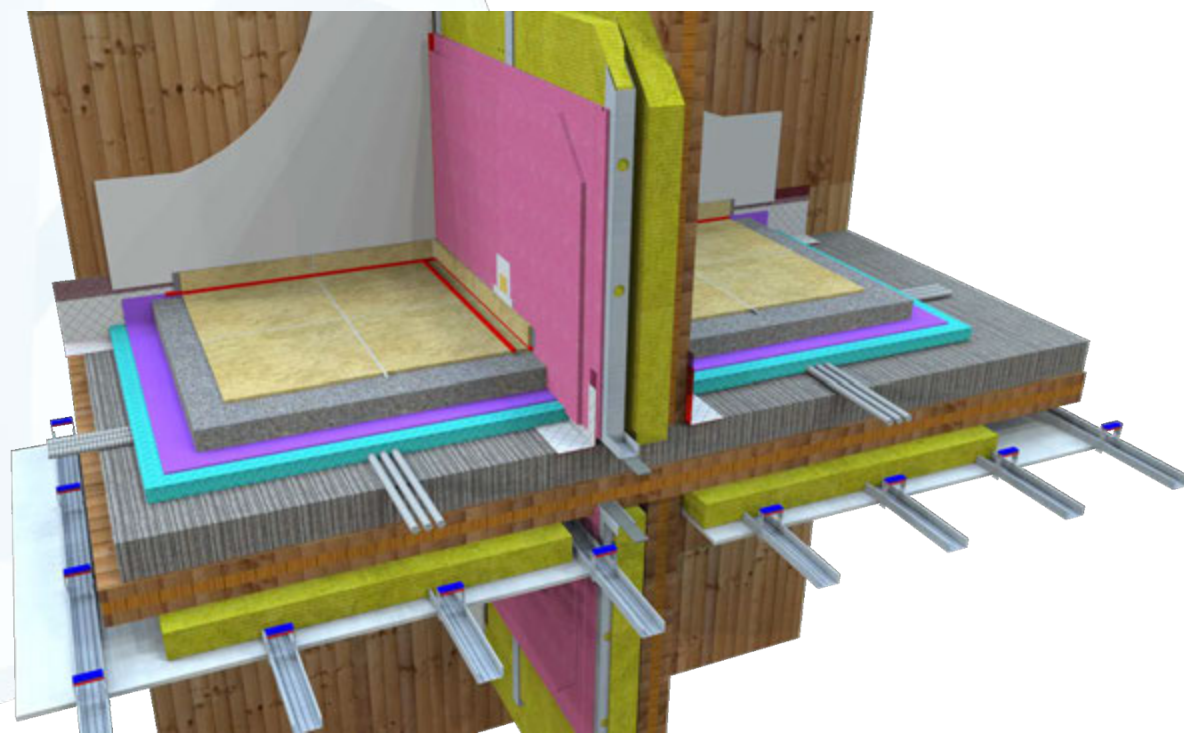
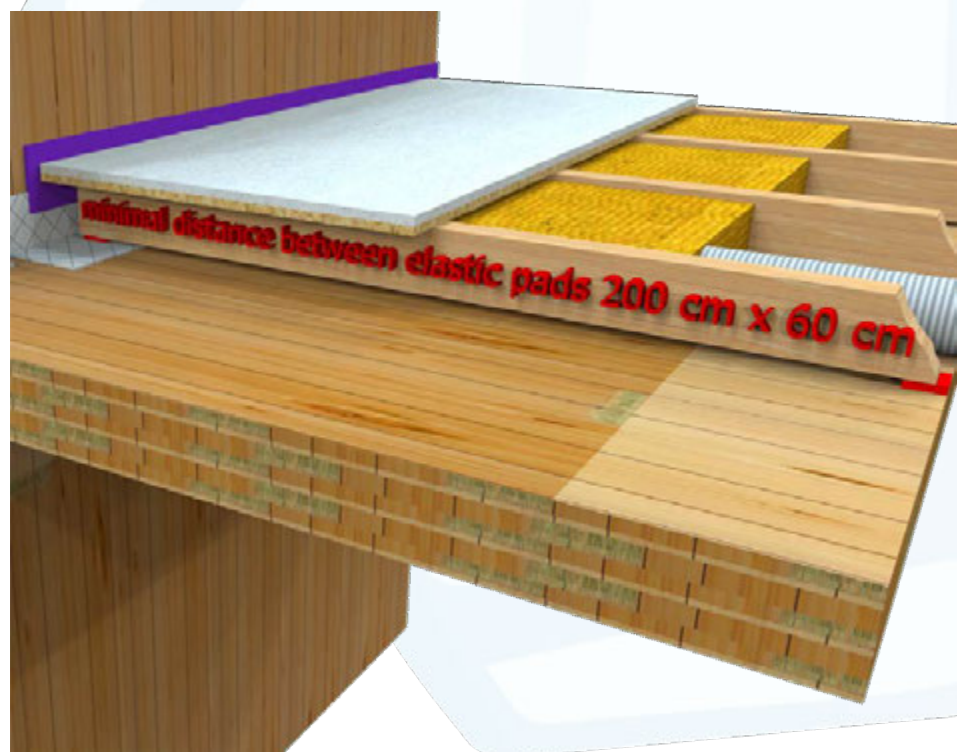
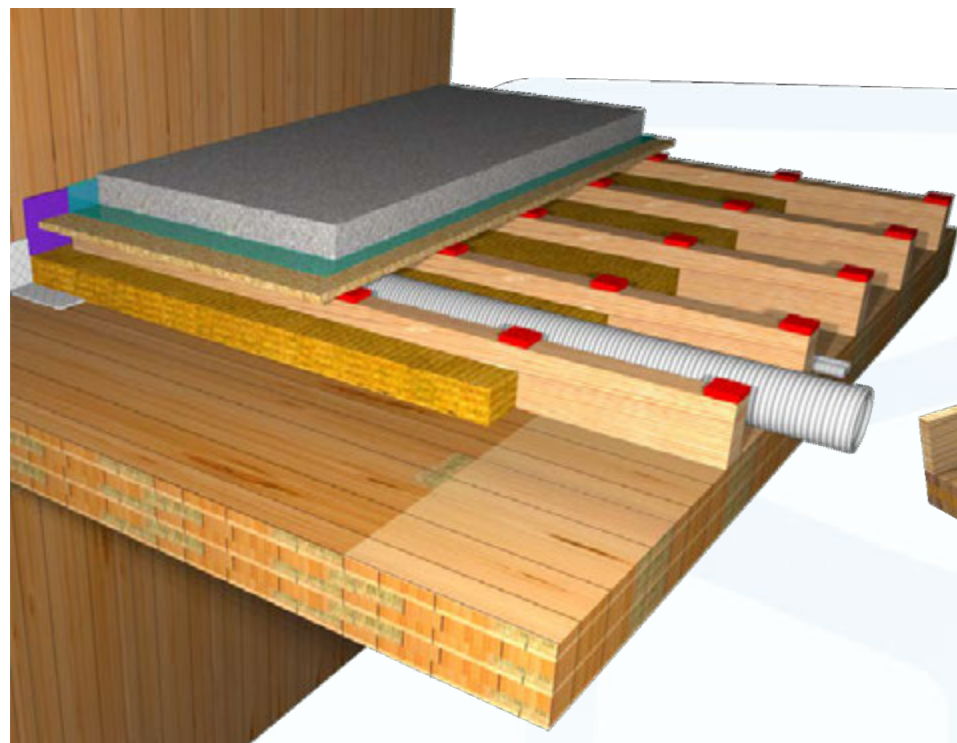




# *TOEKOMST ?*







VLOEREN LUCHTGELUID

VLOEREN CONTACTGELUID

METINGEN IN SITU

FLANKERENDE GELUIDTRANSMISSIE



# BIM BRUSSELS

Digital Construction

## 11-12 OKTOBER 2017

### 60 stands / groot aantal evenementen:

DCU -IFMA \*\*\* ie-net BIM PRAKTIJKDAG \*\*\* BIM  
CONFEDERATIE BOUWDAG \*\*\* BIM and STUDENT  
COMPETITION \*\*\* CLUSTER BIM MEETING \*\*\* CLUSTER  
BOUWINDUSTRIALISATIE MEETING \*\*\* REGIONALE BIM  
DAGEN VL, BRU en WL\*\*\*netwerkevents....CEN TC 442?



**WENST U als dynamisch  
toekomstgericht bedrijf een  
stand op deze beurs?**

**Contacteer  
Kristel.dekempeneer@confederatiebouw  
.be of bi@bbri.be**







**DANK U**