



Belgisch **Wegen**congres Congrès belge de la **Route**

LEUVEN · 4-7.04.2022

SOPRANOISE

**Comment caractériser les performances acoustiques
d'écrans antibruit installés le long des routes**





SOPRANOISE

- Securing and Optimizing the Performance of Road traffic noise barriers with New methods and In-Situ Evaluation
- Recherche Européenne ...
soutenue par la **CEDR** (Conférence Européenne des Directeurs des Routes)
- Méthodes simplifiées pour caractériser les performances acoustiques intrinsèques d'écrans antibruit installés le long de routes





Tous les délivrables publics sont disponibles sur le site <https://www.enbf.org/sopranoise/outcome/>



[Home](#) [PUBLICATIONS](#)

PUBLICATIONS



Deliverables

Deliverable 2.1: Review of the physical significance of EN 1793-1, EN 1793-2, EN 1793-5 and EN 1793-6
You can download the deliverable 2.1 [here...](#)

Deliverable 2.2: Final report on the main results of WP2 (including M2.1, M2.2. and M2.3) – Acoustic assessment of the intrinsic performances of noise barriers
You can download the deliverable 2.2 [here...](#)

Deliverable 3.1 – Final report on the main results of WP3 (including M3.1, M3.2 and M3.3) – In-situ inspection tools
You can download the deliverable 3.1 [here...](#)

Deliverable 4.1 Report on the development of the new quick methods in laboratory
This deliverable will be available soon...

Deliverable 5.1: WP5 Intermediate progress report including M5.1, M5.2 and M5.3
You can download the deliverable 5.1 [here...](#)

Scientific Papers

Please find [here](#) all the scientific papers submitted for different conferences.



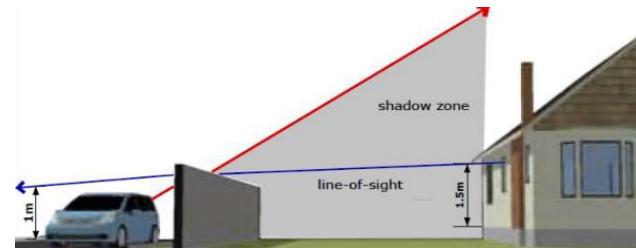
Performance acoustique d'un écran antibruit

Performances extrinsèques

Caractérisées par l'**Insertion Loss IL**: différence de niveau de bruit **sans** et **avec** écran antibruit



sans écran antibruit (© CEDR)

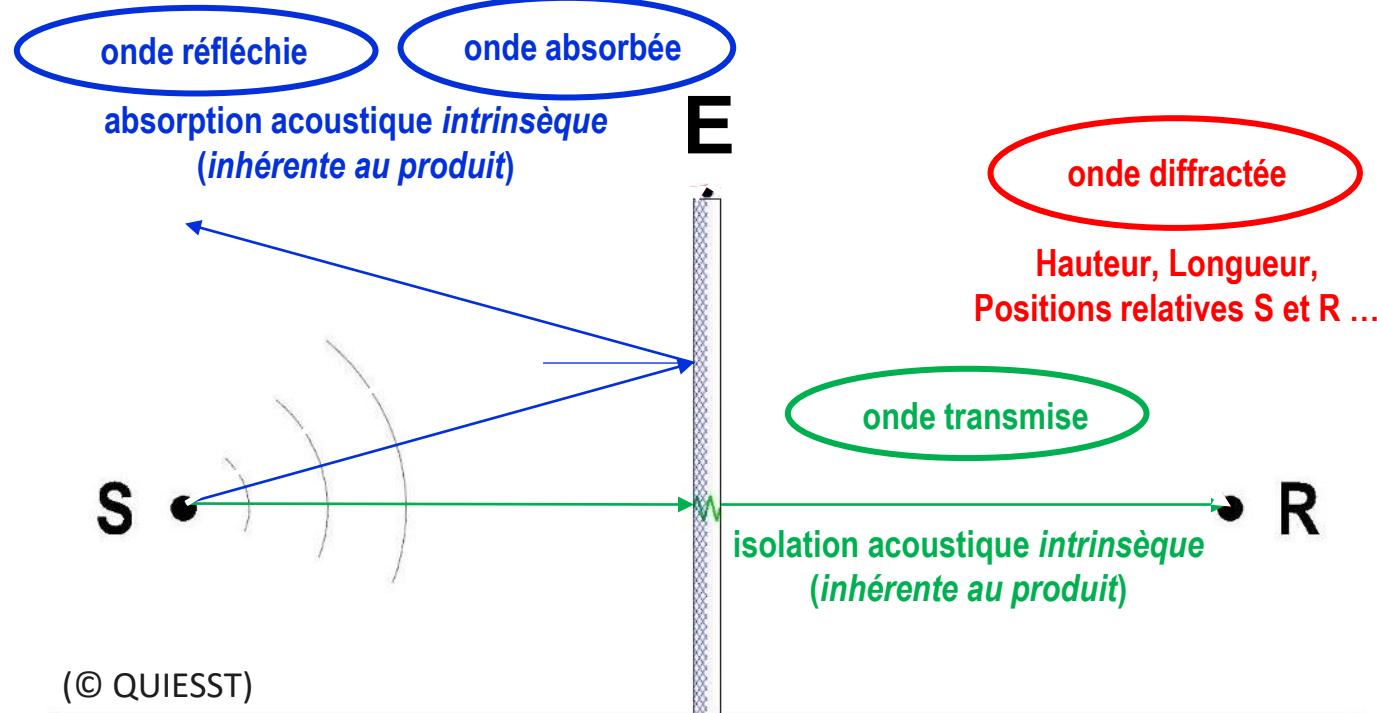


avec écran antibruit (© CEDR)

Plusieurs phénomènes physiques interviennent (T5.2 du délivrable D5.1) et les **performances intrinsèques** (inhérentes au produit) jouent aussi un rôle important ...

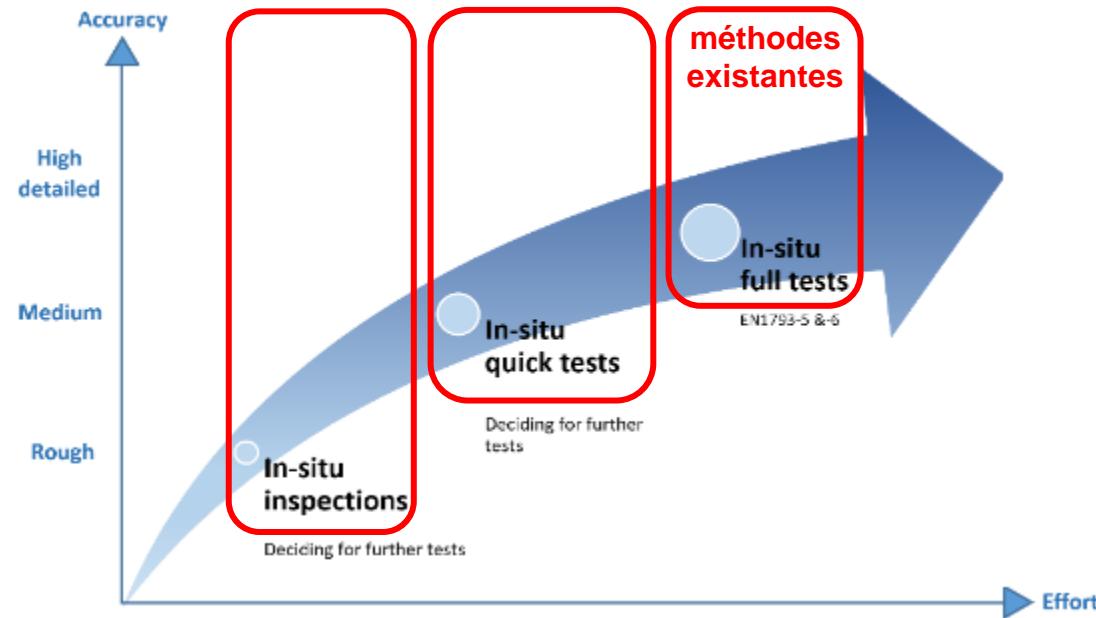


Caractéristiques *Intrinsèques*



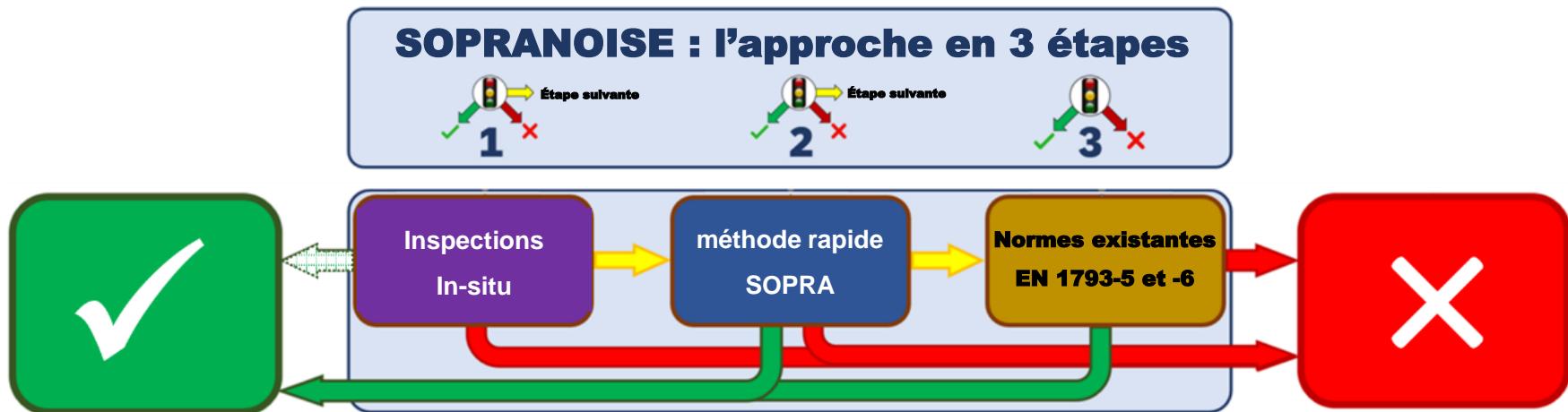


Comment caractériser les performances acoustiques *intrinsèques* d'écrans antibruit (absorption, isolation)?



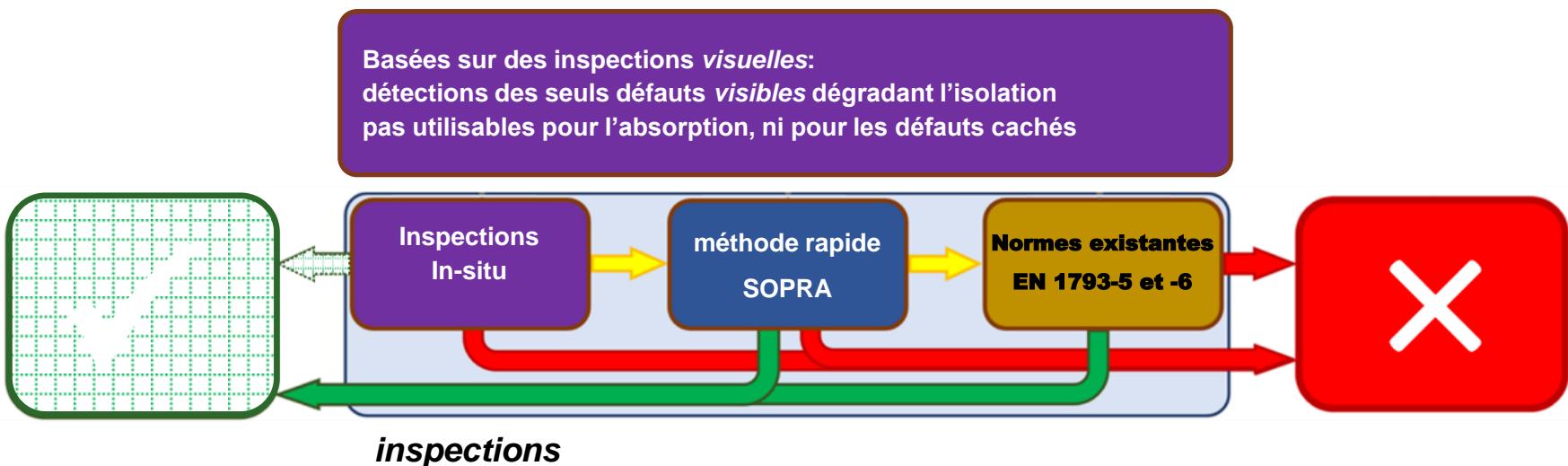


SOPRANOISE les grands principes



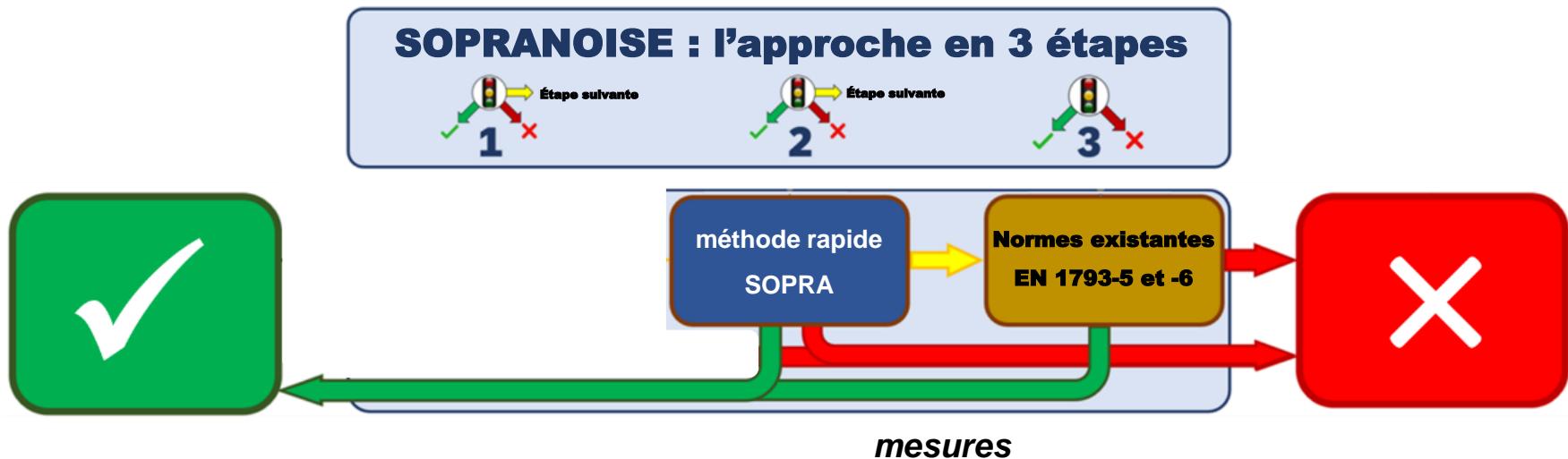


SOPRANOISE les grands principes





SOPRANOISE les grands principes





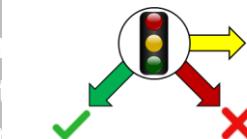


Inspections In-situ

Inspections visuelles assez faciles à faire lors de visites de surveillance des routes

Fichier Excel

- Simple
- Entrées peuvent être saisis
- Résultats disponibles directement
- 5 onglets (4 accessibles)



Étape suivante

Préparation avant visite

1. Localisation

2. Caractéristiques de l'écran

3. Caractérisation des défauts

4. Résultats

Visite



NB inspection protocol Sheet 1: Location	
road name	B42
near	Oberwaldf
emergency lane	yes
from/to km	45.7 46.5
direction	Frankfurt
from/to coordinates	50.044433 8.137693 50.044482 8.137751

NB inspection protocol Sheet 2: Construction			
main construction material	absorbing front?	absorbing back?	material of posts
acrylic glass	no	no	steel
combined with			
combined with			

field no.	NB side	field height /m	defect location	Impact				view through	position /m		size /cm	
				deformation	rust	vegetation	degradation		vertical	horizontal	vertical	horizontal
				type/cause of defect								
35	front	2	at element	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1.5 - 2.0	middle	35 - 35	65 - 125
57	front	2	at element	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1.5 - 2.0	middle	35 - 65	65 - 125
83	front	2	at element	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1.5 - 2.0	middle	35 - 65	125 - 235
84	front	2	at element	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1.5 - 2.0	middle	35 - 65	125 - 235
86	front	2	at element	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1.5 - 2.0	middle	35 - 35	65 - 125
87	front	2	at element	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1.5 - 2.0	middle	35 - 65	65 - 125
89	front	2	at element	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1.5 - 2.0	middle	35 - 65	125 - 235

additional notes
(e.g. on visual/aural impression, absorption material, environmental conditions, general condition, reference to photographs ...)

NB inspection protocol Sheet 4: Acoustic assessment					
Assessment for each NB field individually			Estimated overall assessment (superposition)		
field no.	acoustic condition	critical radius /m	field no.	acoustic condition	critical radius /m
35	G	5	35	G	5
57	S	9	57	G	9
83	Q	17	83	Q	39
84	G	8	84	Q	44
86	S	5	86	Q	48
87	G	9	87	Q	46
89	Q	17	89	Q	38



Préparation avant visite

NB inspection protocol		
Sheet 1: Location		
road name	<u>B42</u>	
near	<u>Oberwallluf</u>	
emergency lane	<u>yes</u>	
from/to km	<u>45.7</u>	<u>46.5</u>
direction	<u>Frankfurt</u>	
from/to coordinates	<u>50.044433</u>	<u>8.137693</u>
	<u>50.044482</u>	<u>8.137751</u>



NB inspection protocol				
Sheet 2: Construction				
main construction material	<u>acrylic glass</u>	absorbing front?	<u>no</u>	absorbing back?
combined with			<u>no</u>	<u>steel</u>
combined with				



Visite

NB inspection protocol

NB inspection protocol

field no.	NB side	field height /m	defect location
35	front	2	at element
57	front	2	at element
83	front	2	at element
84	front	2	at element
86	front	2	at element
87	front	2	at element
89	front	2	at element

Assessment for each NB field individually			Estimated overall assessment (superposition)		
field no.	acoustic condition	critical radius /m	field no.	acoustic condition	critical radius /m
35	G	5	35	G	5
57	G	9	57	G	9
83	Q	17	83	Q	39
84	G	8	84	Q	44
86	G	5	86	Q	48
87	G	9	87	Q	46
89	Q	17	89	Q	38



NB inspection protocol Sheet 1: Location	
road name	B45
near	Rodgau
emergency lane	yes
from/to km	107.0 107.5
direction	Dieburg
from/to coordinates	50.009051 8.897331 50.008208 8.897556

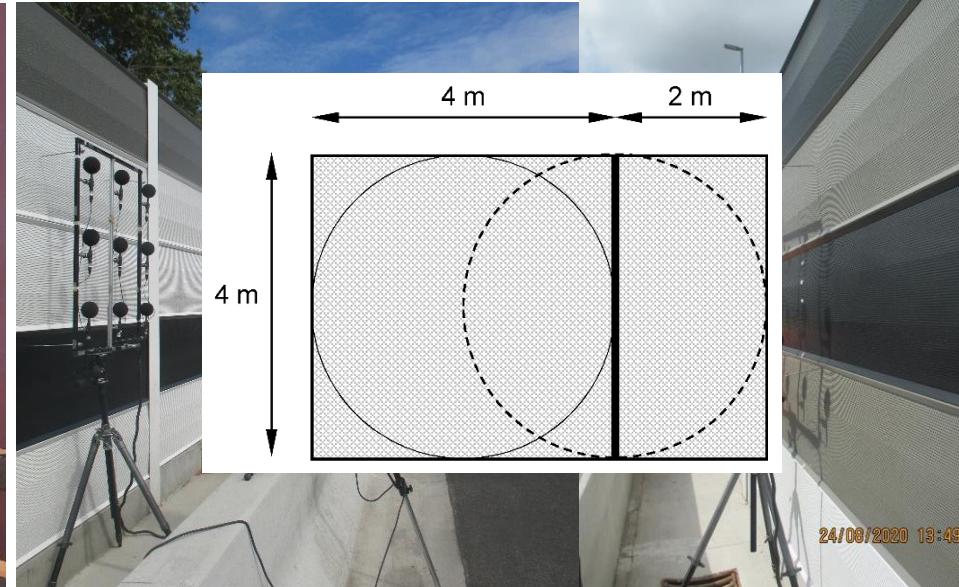
NB inspection protocol Sheet 2: Construction			
main construction material	plastics	absorbing front?	yes
		absorbing back?	yes
		material of posts	steel
combined with			
combined with			

NB inspection protocol Sheet 3: Defects											
field no.	NB side	field height /m	defect location	type/cause of defect	view through		position /m		size /cm		additional notes (e.g. on visual/aural impression, absorption material, environmental conditions, general condition, reference to photographs...)
					impad	deformation	rust	vegetation	degradation	lacking material	
43	front	5	at element	✓	✓	✓	✓	✓	✓	✓	yes 1.5 - 2.0
43	front	5	between element and post	✓	✓	✓	✓	✓	✓	✓	yes 3.0 - 3.5
											middle
											15 - 35
											235 - 415
											125 - 235
											8 - 15

Assessment for each NB field individually			Estimated overall assessment (superposition)		
field no.	acoustic condition	critical radius /m	field no.	acoustic condition	critical radius /m
43	Q	32	43	D	59
43	Q	27	43	D	59



Mesures In-situ



La méthode “rapide” SOPRA



Exemple sur l'autoroute A22 en Italie

Tests entre 10:00 and 16:00 (6 heures)

Barrière antibruit métallique:

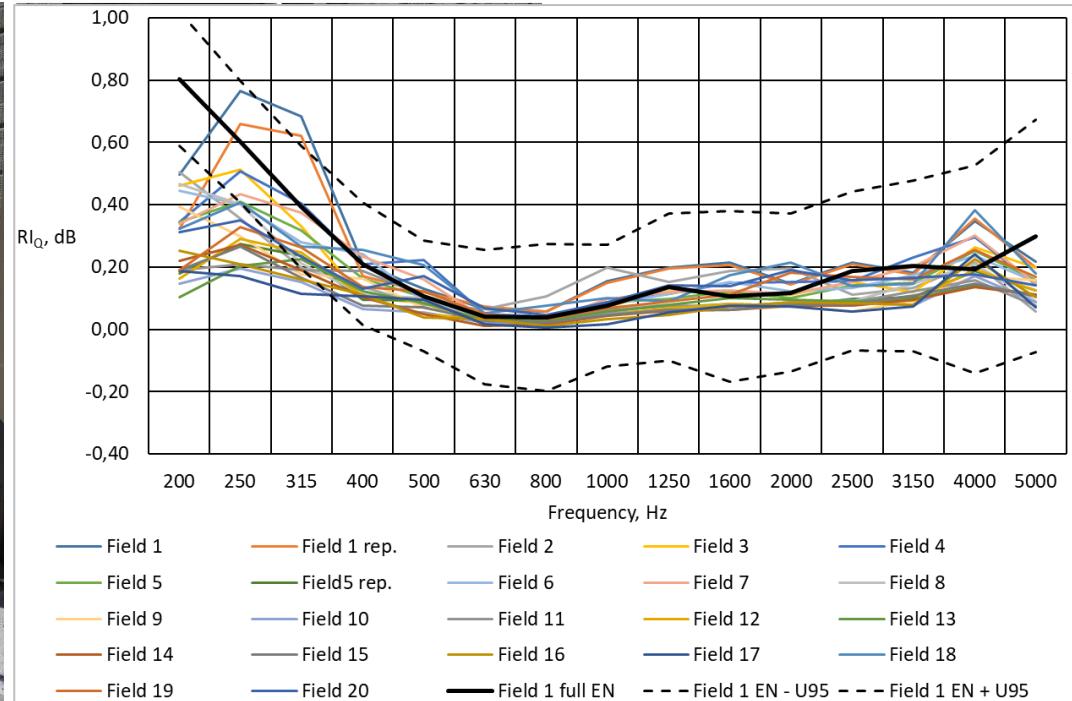
- Longueur 600 mL
- Hauteur 5,00 mH
- Poteaux tous les 3,00 m

22 tests d'absorption

11 tests d'isolation

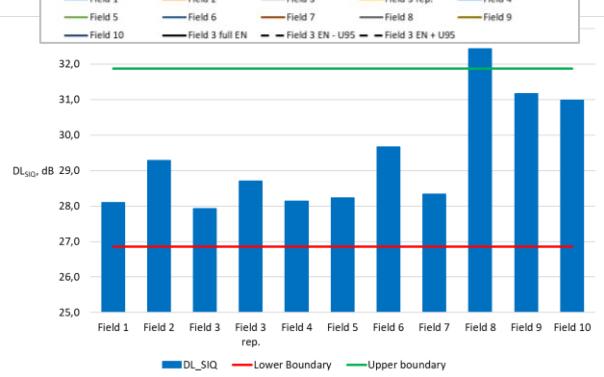
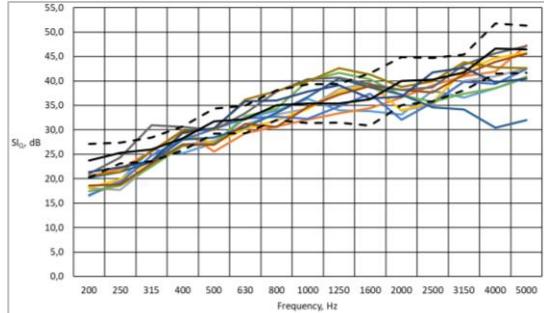


La méthode “rapide” SOPRA



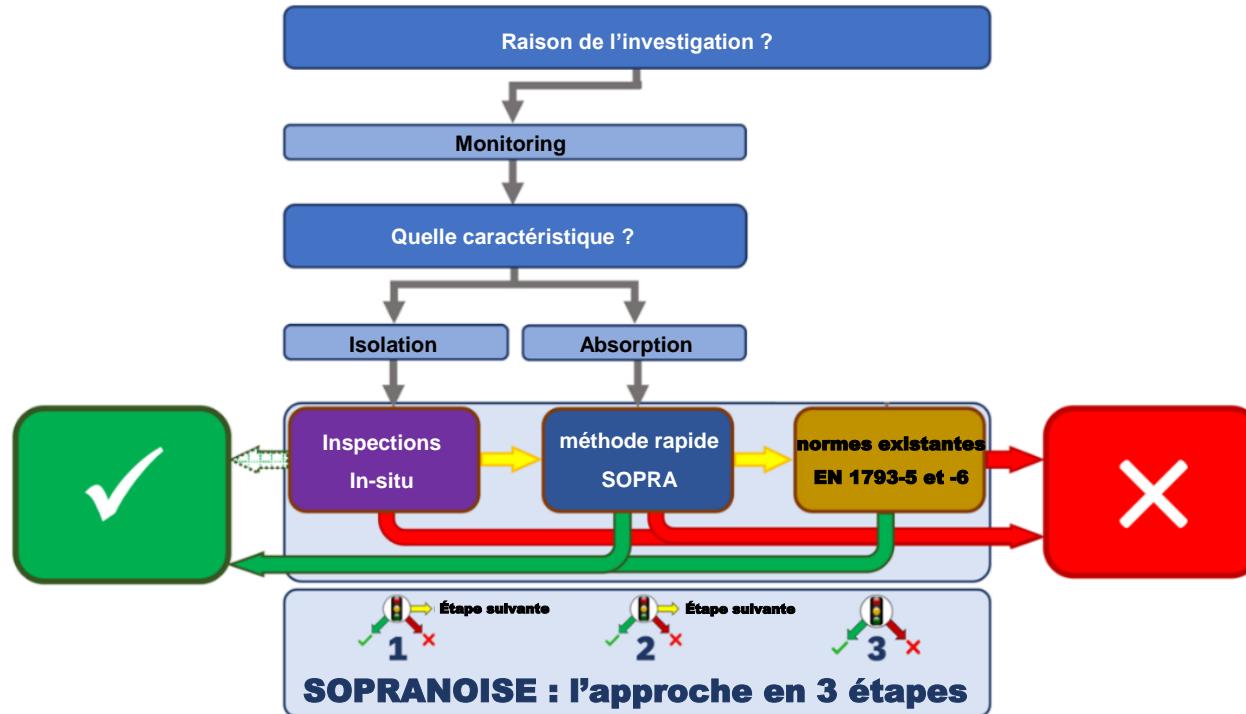


La méthode “rapide” SOPRA



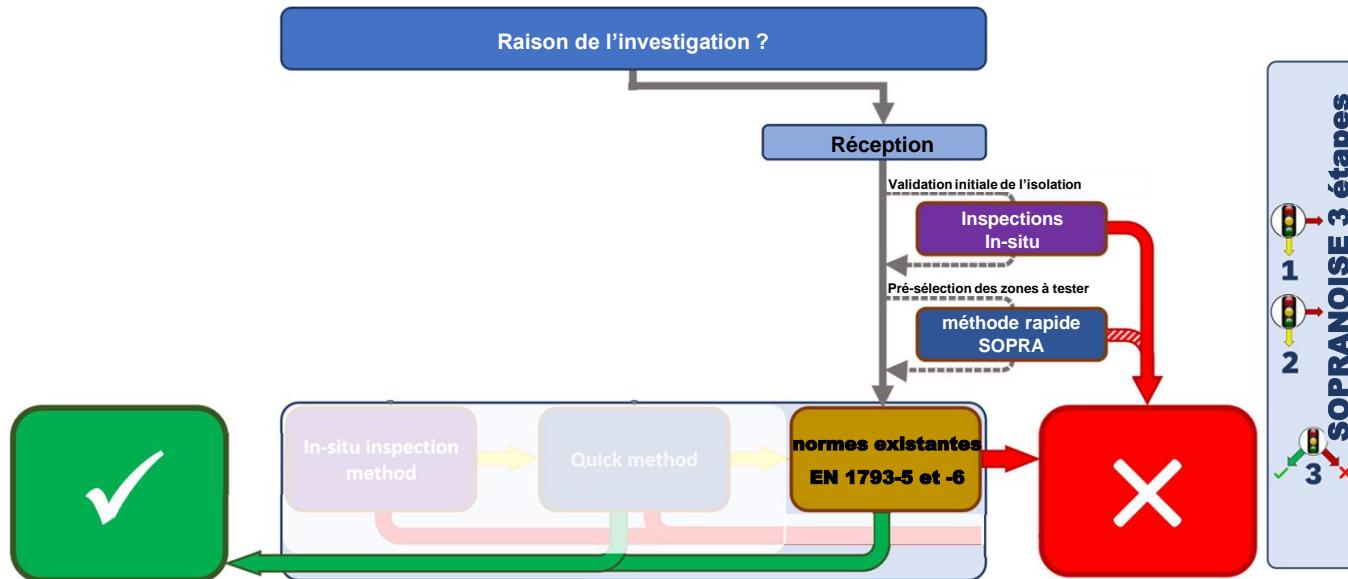


L'outil adapté à la bonne conclusion



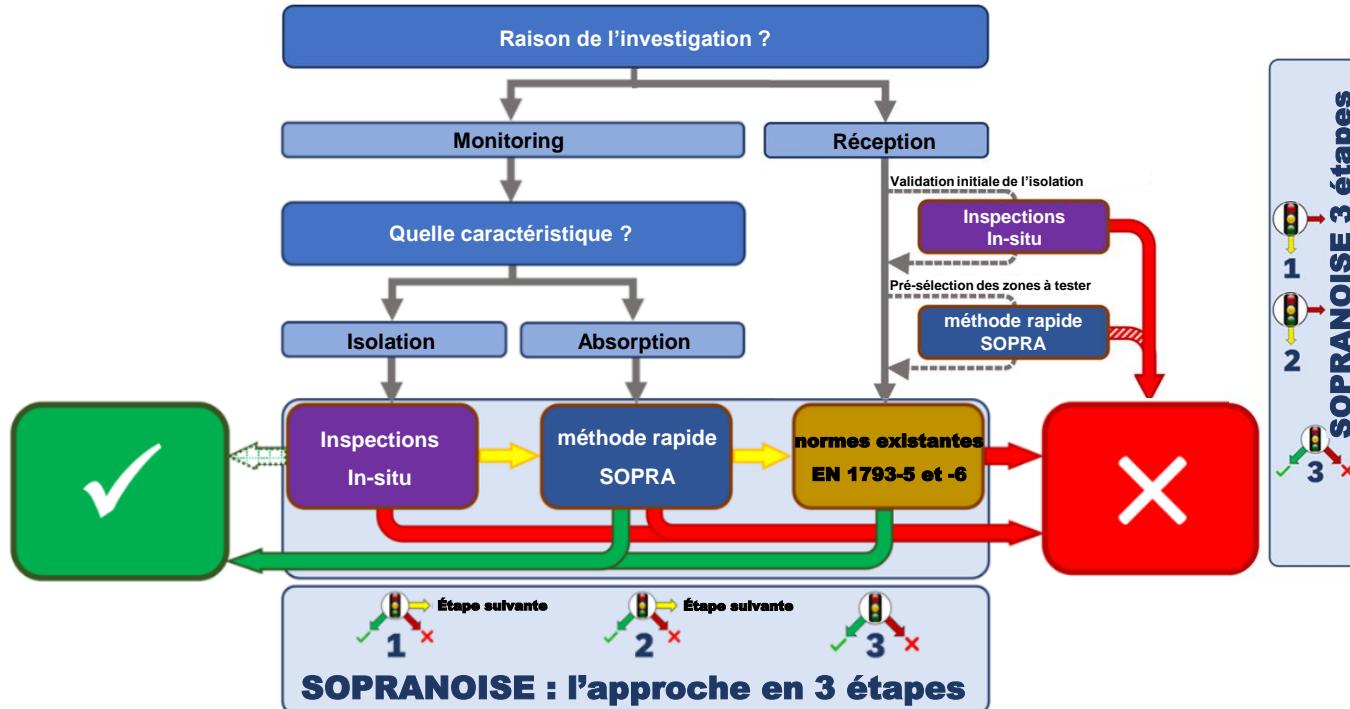


L'outil adapté à la bonne conclusion





L'outil adapté à la bonne conclusion





CONCLUSIONS

- Il est essentiel de pouvoir caractériser les performances acoustiques intrinsèques des écrans antibruit afin d'assurer que ces écrans réduisent correctement le bruit dans leur environnement et vont pouvoir continuer le faire.
- Les écrans antibruit peuvent être très longs et difficiles à tester de façon exhaustive avec les méthodes normalisées EN 1793-5 & 6: il y a un réel besoin pour d'autres méthodes de mesures et de monitoring des écrans de façon plus systématique et moins onéreuse.
- **L'approche en 3 étapes de SOPRANOISE** permet de placer l'effort correspondant à chaque niveau d'analyse, du niveau le plus simple (mais moins précis) au niveau le plus précis.



Belgisch **Wegen**congres
Congrès belge de la **Route**
LEUVEN • 4-7.04.2022



UNE ORGANISATION



ABR

Association
Belge de la Route



**AGENTSCHAP
WEGEN & VERKEER**

AVEC LE SOUTIEN DE



Centre de
recherches routières



BRUXELLES MOBILITÉ
SERVICE PUBLIC RÉGIONAL DE BRUXELLES

 **Wallonie**
mobilité infrastructures
SPW



FBEV
Fédération Belge des Entrepreneurs de Travaux de Voirie asbl



Contact

 Jean-Pierre CLAIRBOIS

 +32 2 344 85 85

 jpc@atech-acoustictechnologies.com

