AUSSENWIRTSCHAFT AUSTRIA

European Noise Barrier Federation

AUSTRIA SHOWCASE
ZULIEFERUNGEN IM BEREICH LÄRMSCHUTZ / INFRASTRUKTURBAU / INFRASTRUKTURTECHNIK
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Member of the European Committee for Standardization of noise reducing devices for railways, CEN / TC256 / SC1 / WG40.

Member of the "Traffic Noise Working Group" of the European Union Road Federation, ERF.

ENBF Members

Effective Members

- ✓ Asociación Nacional de Industriales de Pantallas y dispositivos Anti-ruido (ANIPAR), Spain + Portugal
- ✓ Association Professionnelle des Réalisateurs d'Ecrans Acoustiques (APREA), France
- ✓ Deutscher Verband für Lärmschutz an Verkehrswegen e.V. (DVLV), Germany
- ✓ Unione Nazionale delle Industrie delle Costruzioni Metalliche (UNICMI), Italy

Associated Members

- ✓ Bayer Sheet Europe, Belgium
- ✓ CIR Ambiente, Italy
- ✓ DECEUNINCK NV, Belgium
- ✓ EVONIK, Austria
- ✓ KOHLHAUER GmbH, Germany
- ✓ MICE SA, Belgium
- ✓ Van Campen Industries B.V, Netherlands
- ✓ Alfa Bond Kohlhauer Sp. z o. o. , Poland
- ✓ LS Lublow GmbH, Germany
- ✓ Akripol, Slovenia

ENBF Objectives

The Association promotes specific objectives addressing traffic noise abatement in the spirit befitting a non-profit making organisation.

These objectives are:

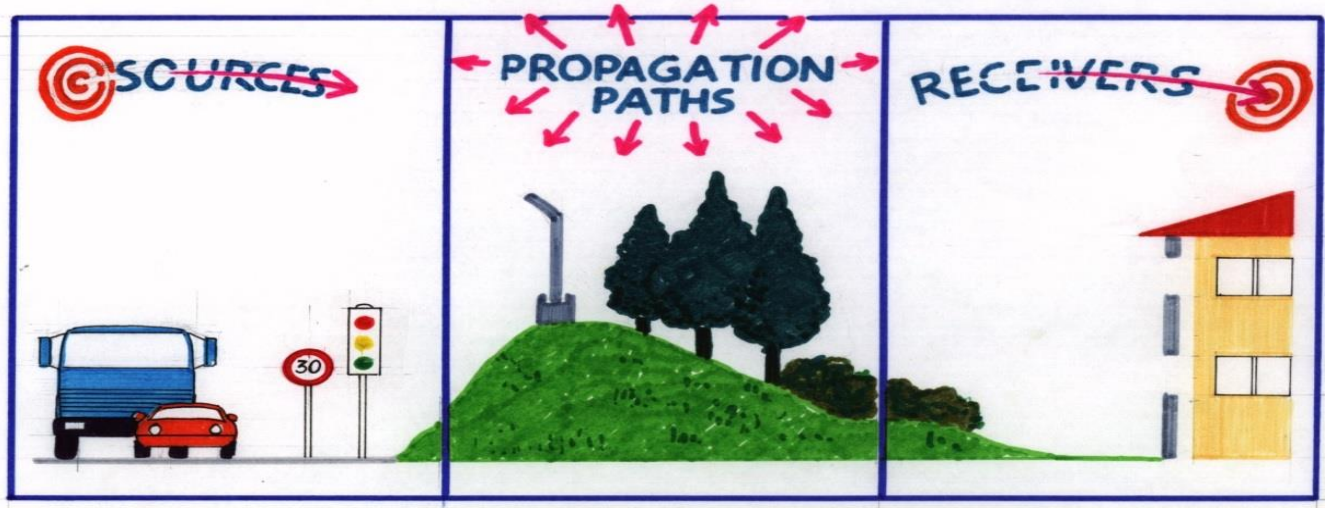
- ✓ **To support Research & Development on systems and products**
- ✓ **To provide effective support to legislation / administration**
- ✓ **To promote qualification standards**
- ✓ **To advice professionals and inform public**

ENBF Activities

In order to meet these goals, the association proposes to carry out the following activities:

- To provide informative support and cooperation to the bodies in charge of writing European legislation and European technical standards.
- To set up the basis for cooperation between industry, public administration and other relevant stakeholders.
- To develop communication tools in order to spread knowledge and expertise to a large audience.
- To exchange knowledge and expertise on products and solutions among members of the Federation.

A PATH FOR EU LEGISLATION AND TECH STANDARDS



EXPECTED INSERTION LOSS VS POPULATION INVOLVED

- 4 dB(A)	-10 up to -20 dB(A)	> 20 dB(A)
FOR ALL RECEVERS	FOR MANY REVEICERS	FOR A FEW RECEIVERS

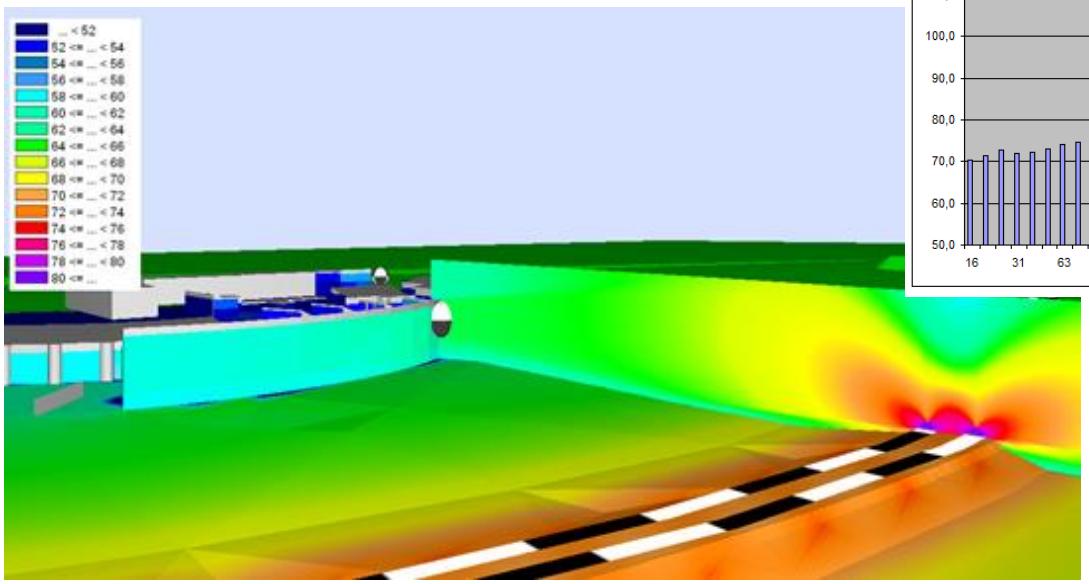
ENBF TASK N.1 - To provide informative support and cooperation to the bodies in charge of writing European legislation and European technical standards.

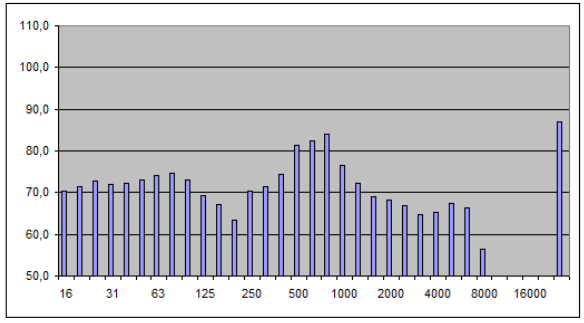
NEED FOR CORRECT RULES ON THE MARKET

CE MARKING AND PERFORMANCE TO BE EVALUATED ON THE NOISE BARRIER SYSTEM

ENBF TASK N.2 - To set up the basis for cooperation between industry, public administration and other relevant stakeholders.

NEED OF CLEAR COMMUNICATION TO THE PUBLIC

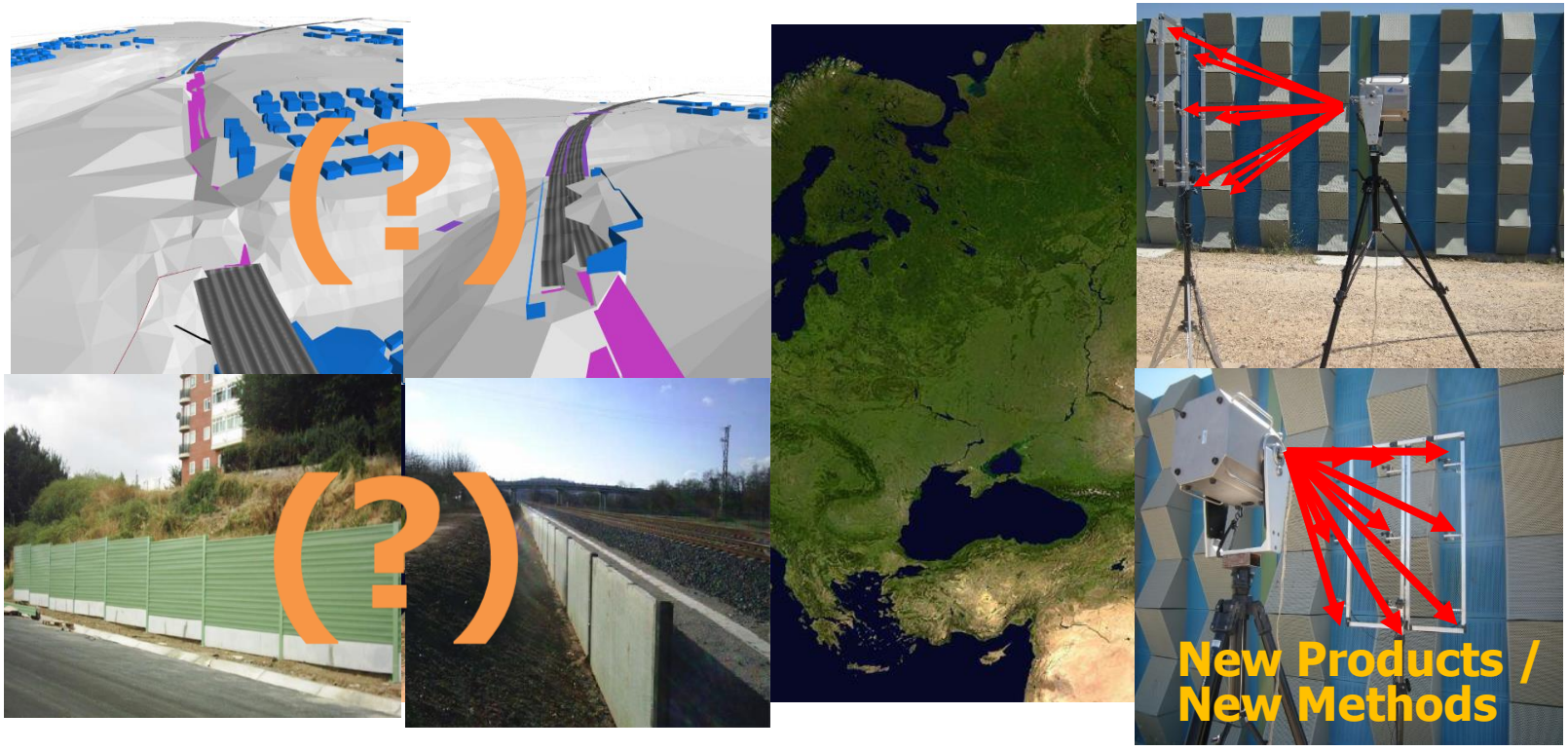




70 + 70 = 73 dB(A) ??

ENBF TASK N.3 - To develop communication tools in order to spread knowledge and expertise to a large audience.

NOISE BARRIERS ACROSS EU
NEED OF MERGING EXPERIENCES



ENBF TASK N.4 - To exchange knowledge and expertise on products and solutions among members of the federation.

NOISE BARRIERS ACROSS EU
NEED OF MERGING EXPERIENCES

ENBF TASK N.4 - To exchange knowledge and expertise on products and solutions among members of the federation.

NOISE REDUCING DEVICES FOR TRANSPORT INFRASTRUCTURES. WHY?

Because transport infrastructures generate acoustic pollution with very harmful effects for the health of residents, NRDs can become a sustainable option for mitigating the problem

NOISE REDUCING DEVICES FOR TRANSPORT INFRASTRUCTURES. WHY?

Therefore, specific topics of noise pollution in infrastructures must be considered:

- This is a pollution that we can define, unlike other types of pollution, as "a clean pollution", in fact, it only exists while one noise source is active and it disappears once this source stops the noise emission and there is no residual contamination. Thus, the fourth dimension, "time", should be considered for the design of remedial measures and it is very important to keep in mind this aspect.

- Requires the existence of sensitive receptors for noise nuisance to cause adverse effects. Thus, the remedial measures shall be effective at the points where these receptors are located.

Noise pollution:
The problem is different for every situation

Noise pollution: Actions against the problem

Vehicle traffic generates noise emission which spreads to reach noise sensitive receptors. Then, we can act on the:

✓ **Whole problem**

- **Planning of transport infrastructure and management of the territory**

✓ **Noise emission**

- **Improvements on vehicles, minimizing noise emission engine, exhaust, etc.**
- **Actions designed to reduce the noise generated at the tire-road interface or the wheel-rail interface.**

✓ **Noise propagation**

- **Obstacles on the propagation of sound: noise barriers and noise reducing devices.**

✓ **Noise immission**

- **Actions to improve the sound insulation around the receivers**

Noise pollution: Actions on the noise propagation

1. The interposition of obstacles to the transmission, with adequate characteristics of airborne sound insulation and with adequate geometry improving the effect of sound diffraction at its edges.

2. Change conditions of sound absorption, in the appropriate surfaces involved in the definition of the acoustic propagation path.

Noise reducing devices for infrastructures

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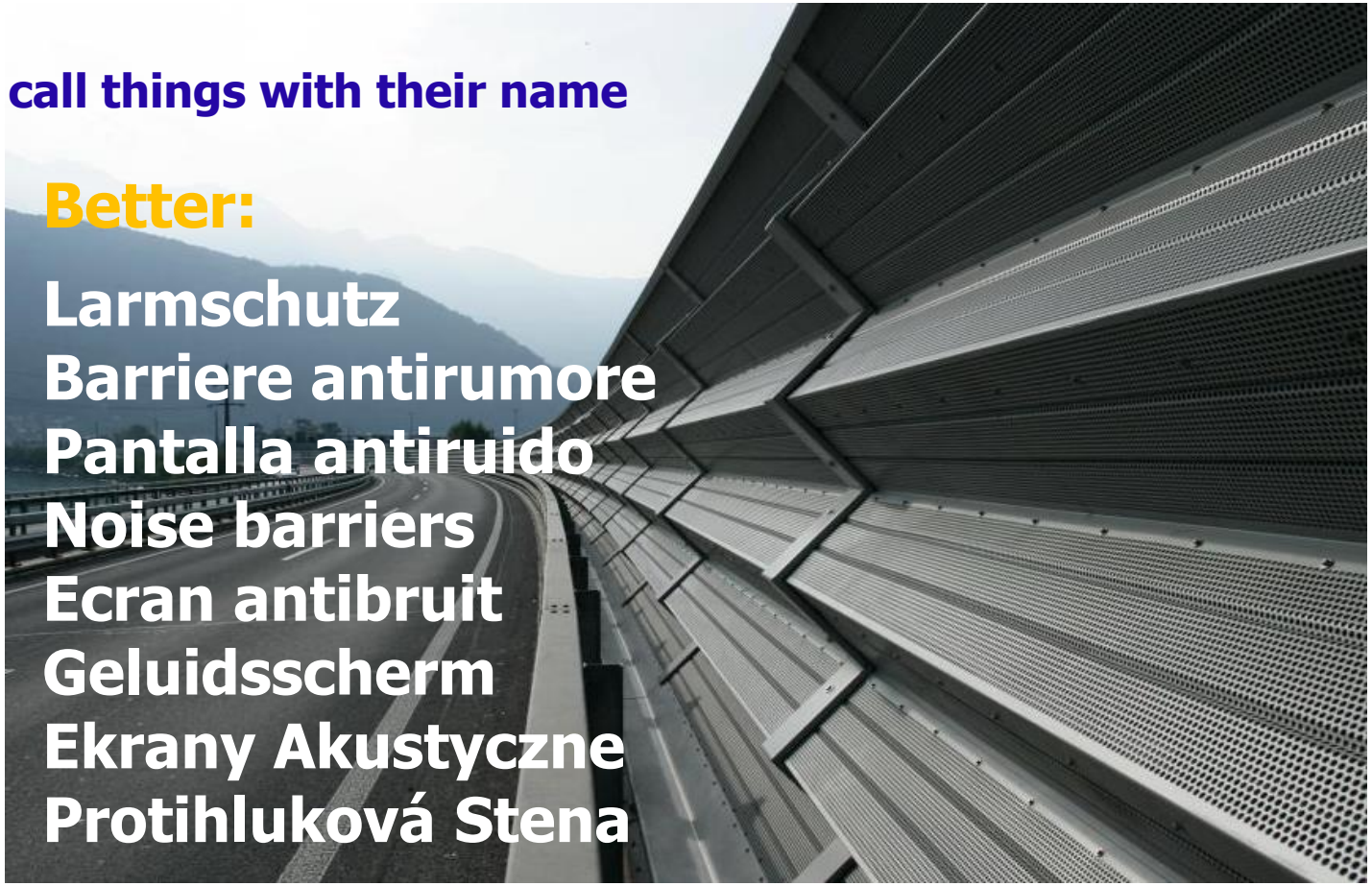
Noise Reducing Device??

Let's call things with their name



Rules to be taken into consideration for the design of noise barriers

- ✓ Legal regulations and ordinances.
- ✓ Technical rules of definition and calculation.
- ✓ Standards for control and quality assurance.

THE VARIETY OF THE MARKET MAY LEAD TO BARRIERS TO TRADE ?

Noise barriers are construction products under CPR (Construction Product Regulation n. 305/2011) that means:

hEN 14388:2015 is the only reference harmonised European standard written by CEN under a specific EU Commission Mandate

Manufacturers are asked to :

- **Declare NOISE BARRIER performance of essential characteristics**
- **Affix the CE marking >> to take responsibility for the conformity of the NOISE BARRIER with the declared performances**

DoP (Declaration of Performance)

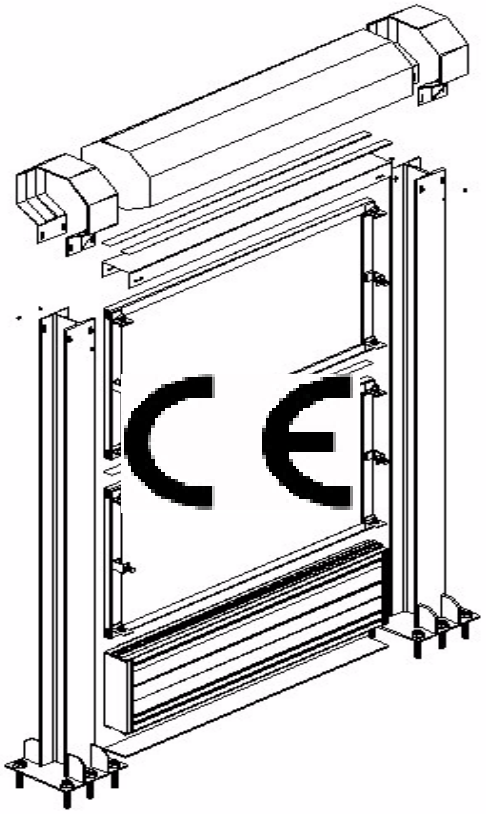
Noise barrier (NOT a part if it) is the product to be incorporated into a road infrastructure and its performance has to be declared for the essential characteristics:

CPR
1- Mechanical resistance and stability
2- Safety in case of fire
3- Hygiene, health and the environment *throughout the life cycle + safety of workers*
4- Safety and accessibility in use
5- Protection against noise
6-Energy economy and heat retention Energy efficiency of construction work during construction and dismantling
7-Sustainable use of natural resources

CE marking for Noise Barriers to be installed alongside Road Infrastructures

ENBF – Guidelines & Recommendations (http://www.enbf.org/outcomes.htm)

DoP of the noise barrier system
What is CE marking?

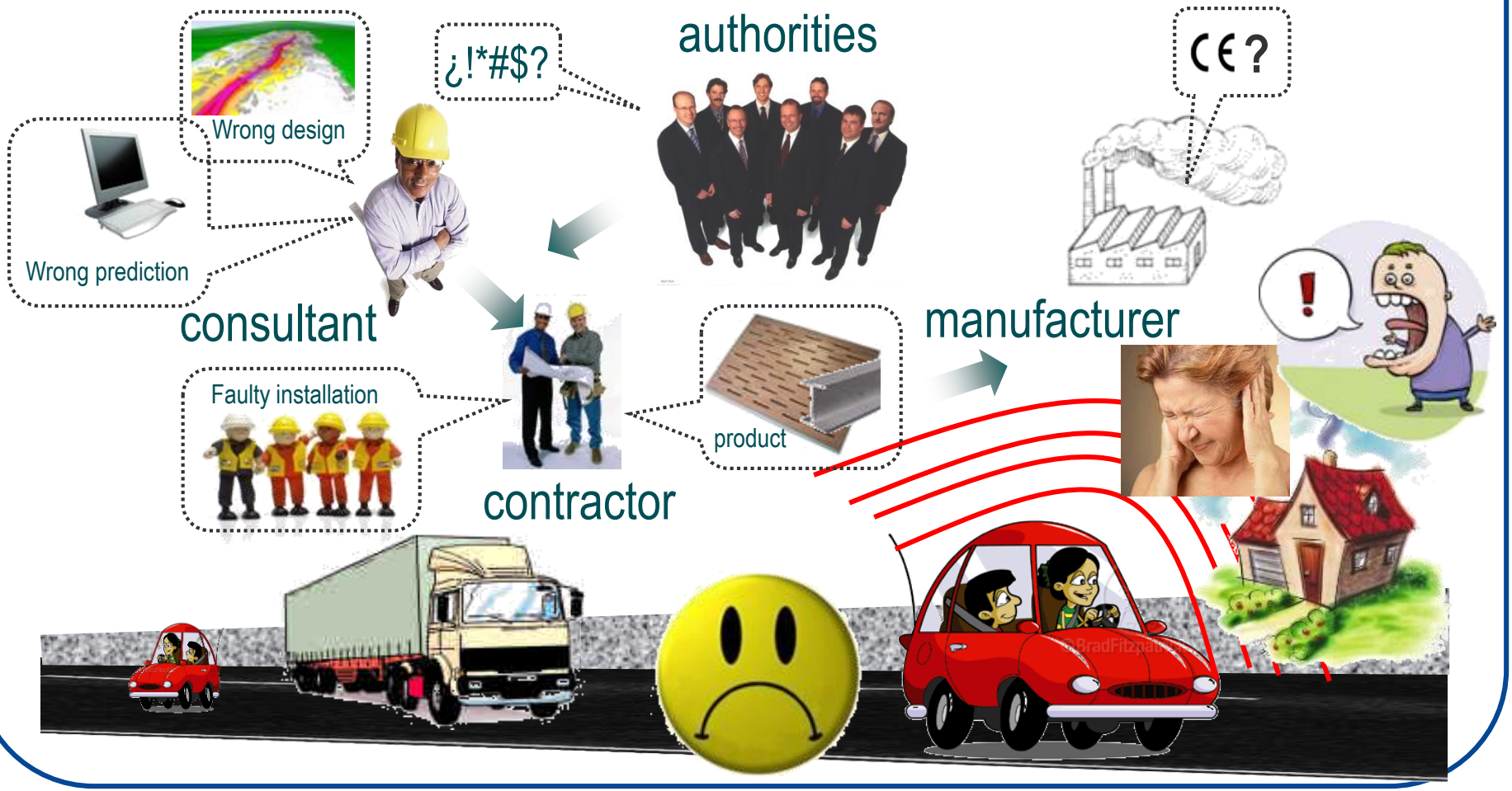


NOISE BARRIER SYSTEM is the ROAD EQUIPMENT requiring for CE marking

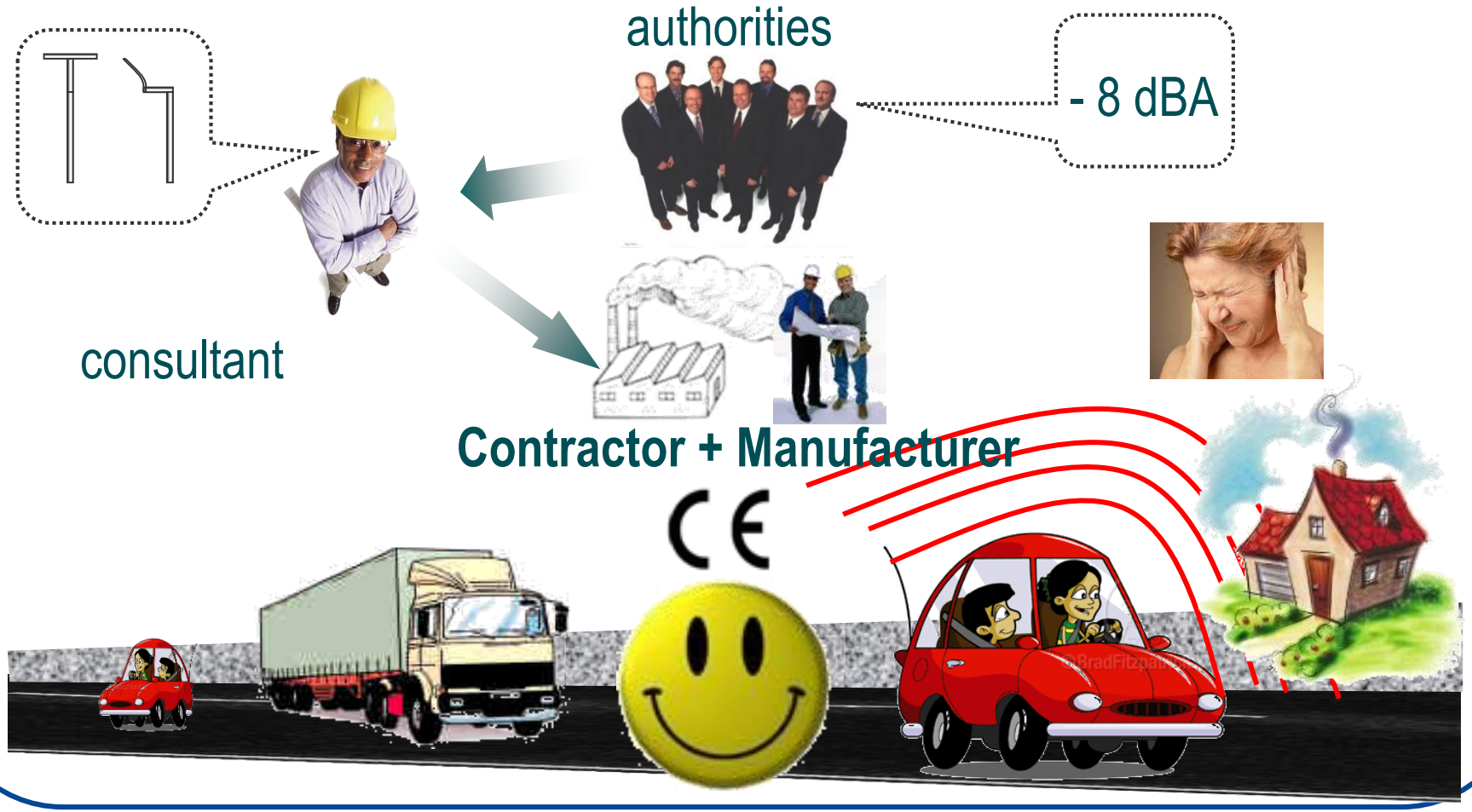
PERFOMANCE is to be assessed on the noise barrier system

It is NOT a mere collection of single components technical datasheets

Often may happen that:



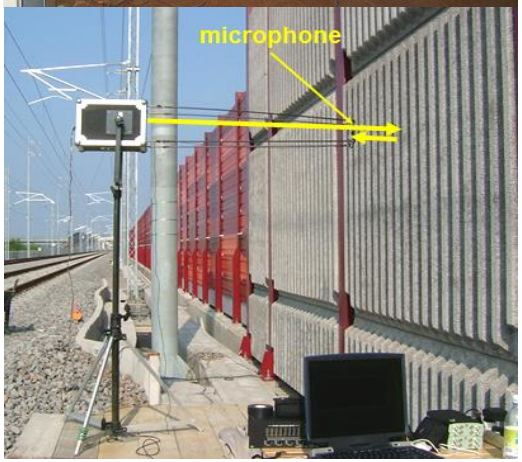
It should be like that:



Rules for a common market.

- ✓ hEN does not fix product requirements unless threshold values are established within the standards by Mandate
- ✓ Authorities or Member State are in charge of establishing requirements but shall not impede the use of construction products bearing the CE marking, when the declared performances correspond to the requirements for such use in that Member State
- ✓ Members State shall not introduce other regulations
- ✓ (Directive 98/34/EC - notification of new regulations)
- ✓ Public Procurement must be open to competition (EU Directives on public procurement)
- ✓ Use of hEN 14388 has to be made by all actors (regulators, engineers producers, contractors) in a "common European technical language"

CE marking >> DoP of the noise barrier system
Acoustic performance: insulation + absorption



Reverberant chamber method (EN 1793.1 and 2)

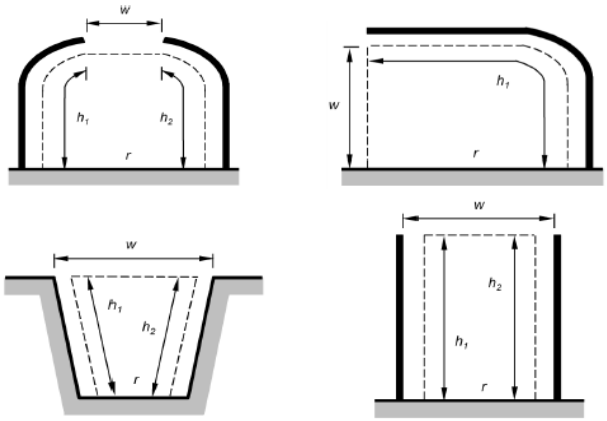


Figure 3 – EN1793 defining reverberant field conditions

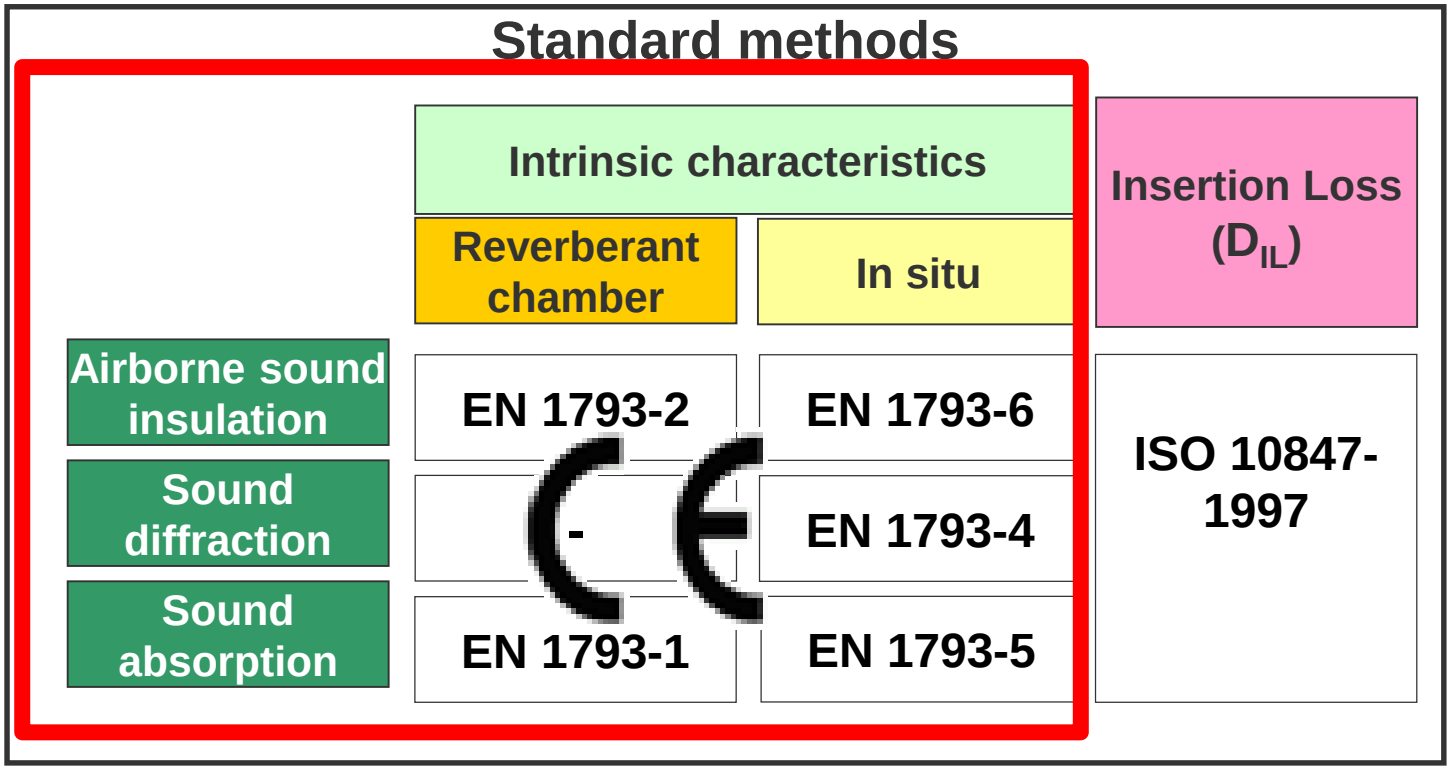
Conditions are defined as being reverberant when the percentage of open space in the envelope is less than or equal to 25%, i.e.:

$$w/e \leq 0.25 \quad (1)$$

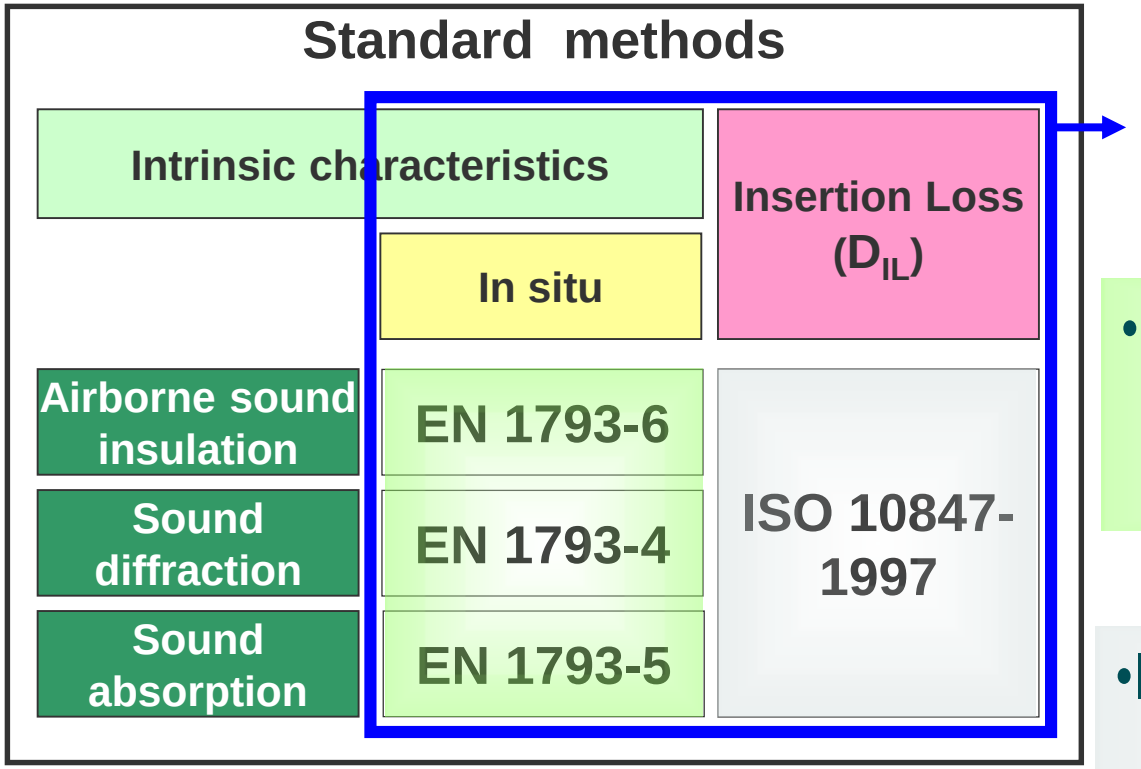
$$e = (w + h_1 + h_2) \quad (2)$$

In situ method (CEN EN 1793.5 - EN 1793.6) Evaluation to be perfomed on the noise barrier system

ACOUSTIC PERFOMANCE
Present State of the Art on Methods for CE marking



ACOUSTIC PERFOMANCE
Methods for Qualifying Noise Barrier Effectiveness



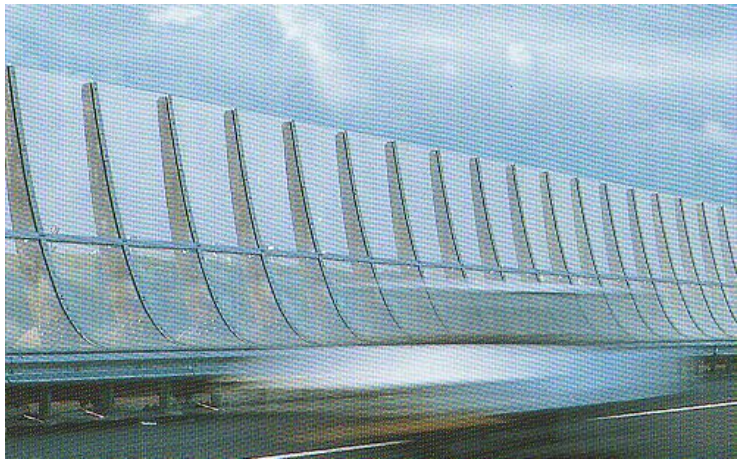
- EN 1793-4,5,6: to identify:
  - Poor materials quality
  - Faulty installation

+

- ISO 10847: to identify:
  - Poor project/design quality

(?)

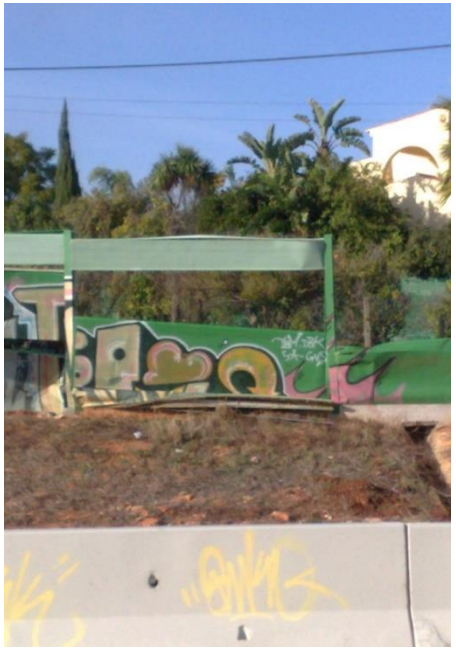
CE marking >> DoP of the noise barrier system
Structural performance (EN 1794-1)



- ✓ Manufacturers shall declare maximum loads noise barrier are able to withstand provided maximum deflection of post and panels are not exceeded.
- ✓ Loads to be considered are wind load and variable loads due to passing vehicles.
- ✓ Structural calculation is currently performed on the supporting posts.
- ✓ Laboratory tests are recommended for the noise panels and will be prescribed like mandatory in the next revision of the standard.

CE marking >> DoP of the noise barrier system
Structural performance (EN 1794-1)

- A problem identified, having serious economic consequences, as well as for the road safety, is the evaluation of the resistance to wind loads of products through calculations, which is permissible according to EN 1794-1. Practical experience shows that the calculation procedures applied, usually considerably overestimate, by 2 to 4 times, the resistance of the panels.



CE marking >> DoP of the noise barrier system
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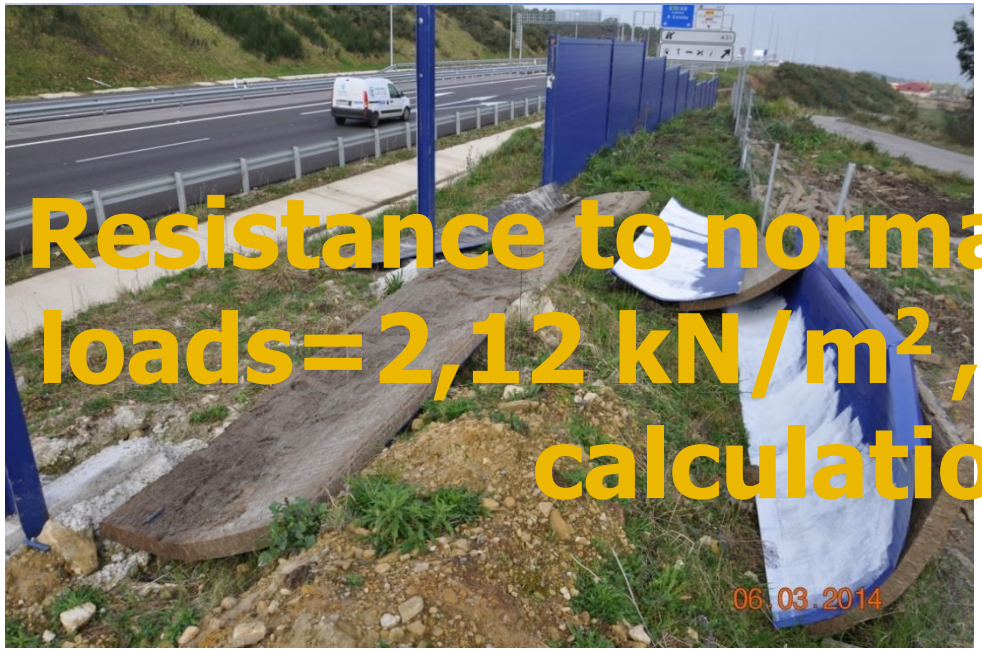
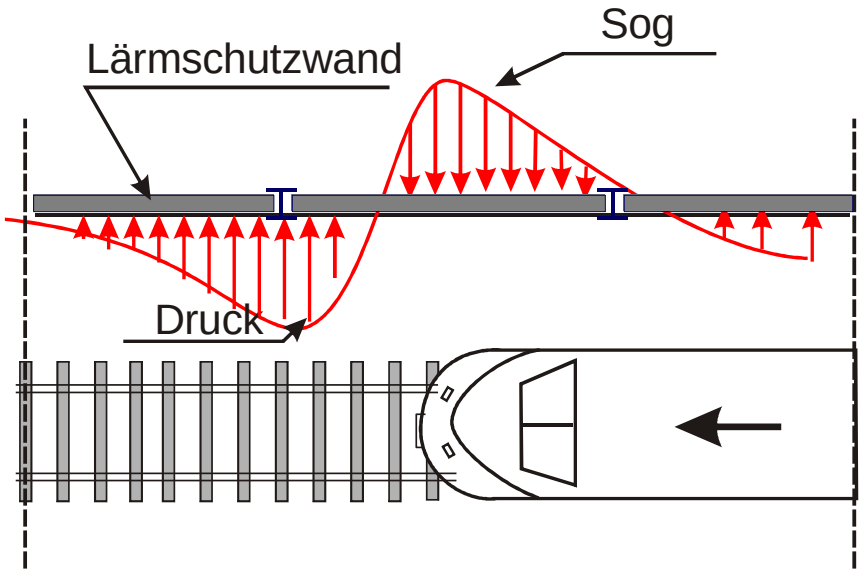
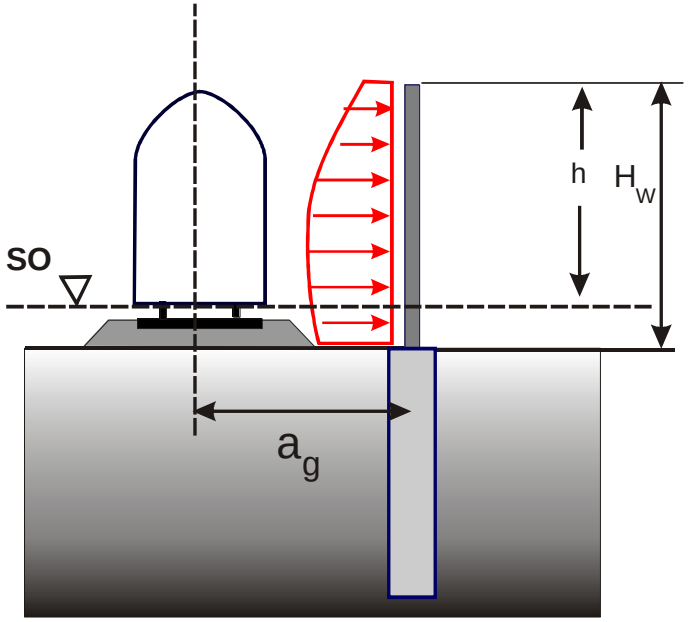


Resistance to normal (90º) wind loads=2,12 kN/m², assessed by calculation.

Noise barrier system - Structural performance
RAIL APPLICATION

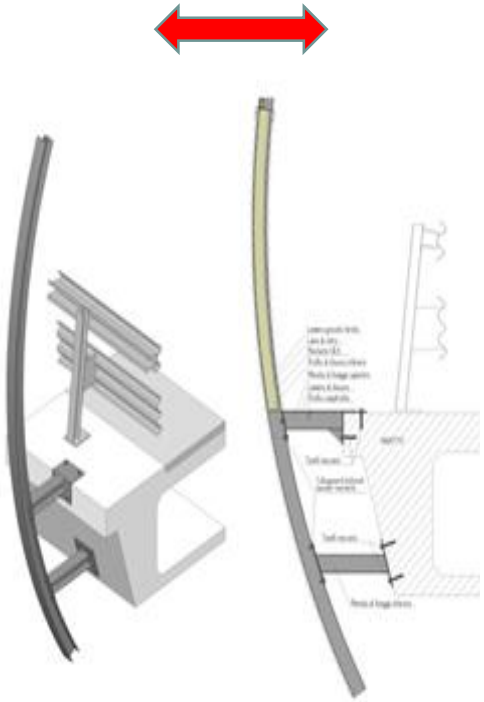




Alternating pressure and suction forces due to passing train main cause fatigue effect

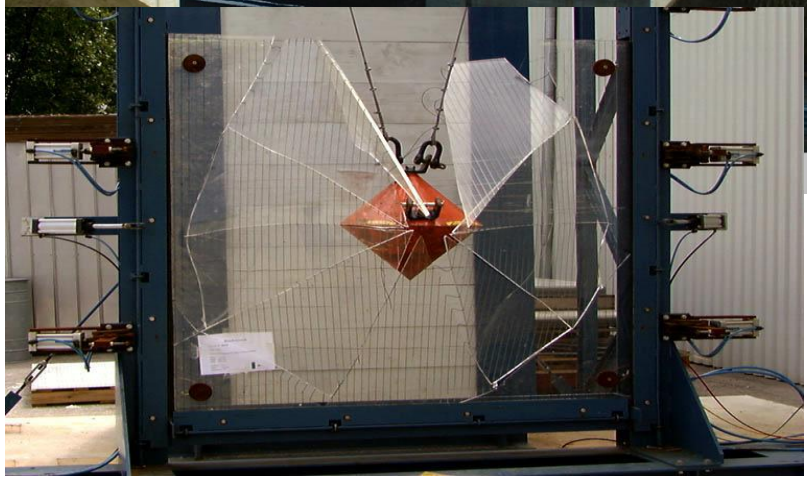
Noise barrier system - Structural performance
RAIL APPLICATION

CE marking >> DoP of the noise barrier system
Structural performance: errant vehicles impact



Crash test to be perfomed according to EN 1317
in case of integrated noise and safety barrier

DoP of the noise barrier system
Structural performance: risk from falling debris



- Risk from falling debris may occur in case of noise barrier installed on bridges or critical positions: (EN 1794-2).

- Use of intrinsic resistant materials is essential as the evaluation of performance is to be made on the whole barrier (use of safety cables, secure posts etc).

DoP of the noise barrier system
Safety in use : Behaviour in case of fire

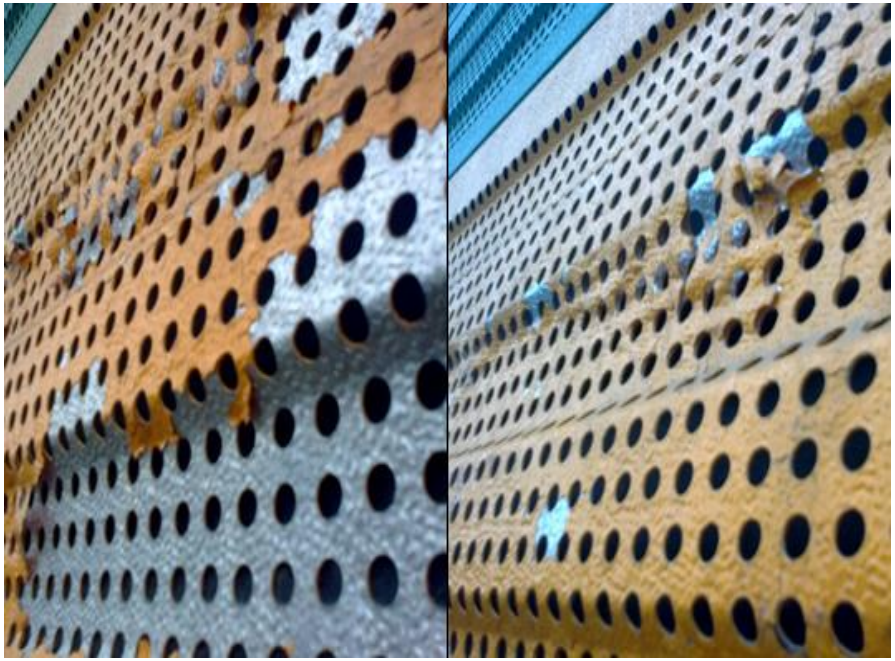
- ✓ **Noise barrier performance are currently evaluated by testing the system against brush fire EN 1794-3 Annex A.**
- ✓ **Classification of products according to Euroclasses (EN 13501) is recommended for some intended use as per attach table:**

Table B.1 — Classification of reaction to fire for noise reducing devices (informative)

Class	Intended use	Test performances
1	Tunnels and total covers	Class B or better according to EN 13501
2	Partial covers, on bridges and near houses	Class E or better according to EN 13501
3	All other situations where fire could be relevant	Test results according to Annex A

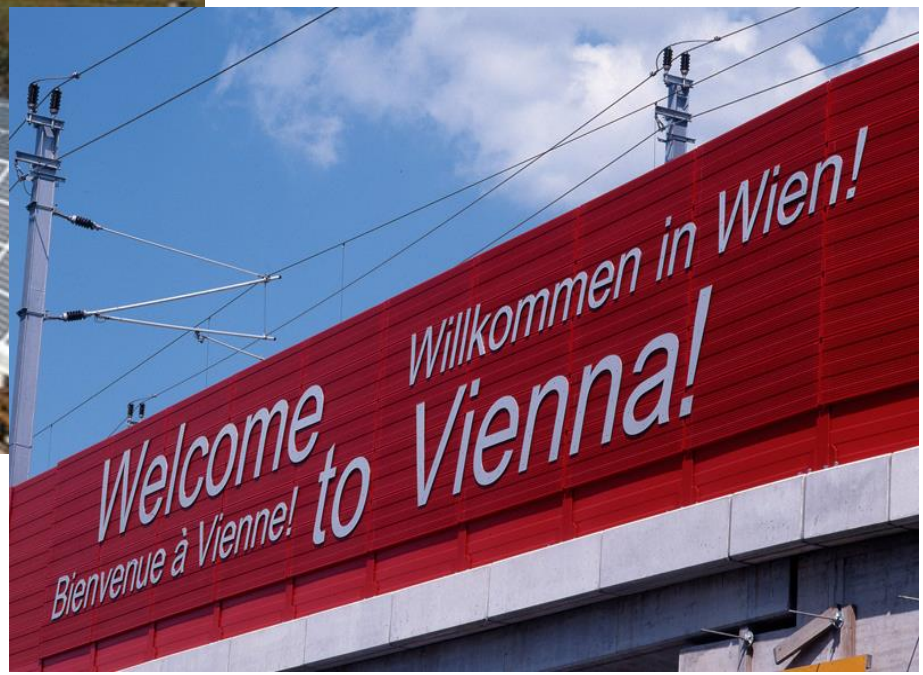
DoP of the noise barrier system
Long term durability EN 14389.1,2

- ✓ **Material specification (corrosion protective layers, wood treatment) are essential for long term durability. Also to be considered assembling system, water drainage..**



Toward a protocol for Sustainability Assessment

Noise barriers are almost always payed by public funding.



Are there possible income funds to cover costs ?

Conclusions and recommendations

- ✓ The factors involved in the design of noise barriers are complex and should be properly considered and with the right level of detail, in particular, the optimized sizing design of noise barriers and considerations relating to road safety and durability.

- ✓ It is not enough to have a program of advanced calculus if you do not have an expert in using it. A lack of trained and experienced technicians involved in the drafting of projects can lead to unsatisfactory results.

- ✓ The technical specifications must be properly drafted: without any deficiencies in the product definition, without contradiction, without unappropriate and/or unjustifiable demands, etc., which are often the result of "cutting and pasting" which is too often used, and the ignorance of contents of existing standards that, even if they do not cover all aspects, are helpful for drafting these technical specifications.

- ✓ Budgets must be clearly defined and must correspond to the requirements of the specification, otherwise, considering the drawbacks that are generated in the process of awarding the work, it would be very difficult to guarantee satisfactory results.

WE MUST AVOID THE RISK OF THE TRAFFIC NOISE BARRIERS, BECOMING LITTLE MORE THAN "CANVAS FOR GRAFFITI"

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THANKS
FOR YOUR ATTENTION

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