Mobile Fencing & Security

Whitepaper Construction-site noise

Noise nuisance around the construction site

Causes, regulations, trends, and solutions

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#noise nuisance around the construction site

Content

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#1 When does sound become noise?

Impact of construction noise on construction projects

One of the greatest risks in construction projects is invisible: the noise produced by the construction site. Those causing too much of a racket on the site can be sure that local residents will soon enforce measures via the municipality, i.e. the environment department. This not only causes additional costs and delays, but also a bad reputation in the neighbourhood.

This risk is growing. First of all, because there are increasing numbers of inner-city construction sites, where homes, schools, and care institutions are situated close to the source of construction noise. Secondly, because it is becoming clearer how severely noise can affect health. On top of that, there is a general trend in society towards tolerating less and less nuisance.

Noise nuisance can seriously threaten the progress of construction projects. Yet 'nuisance' is a very subjective term. In this White Paper, we explain what rules are in place, how construction noise is measured and what actions construction companies can take to work more quietly.

Noise leads to many complaints

The European top three when it comes to 'serious nuisance due to noise' are road traffic, train traffic, and air traffic. Industry (which includes construction noise) follows in fourth place. No specific European data is available on construction-related noise pollution.

Noise nuisance is associated with numerous health issues. The number of Europeans exposed to high levels of noise is increasing. Noise also harms animals living in the wild. EU countries must measure sound levels in large urban areas, along railways and roads, and at airports, and plan ways to tackle the problem.

Noise from traffic, industry, and leisure activities is a growing issue. Road traffic is the key offender in cities: almost 70 million Europeans are exposed to road noise of over 55 dB on a daily basis. According to the World Health Organisation (WHO), extended exposure to such levels can cause high blood pressure and heart attacks.

Approximately 50 million people in urban areas are troubled by excessive nocturnal traffic noise. For 20 million of them, it actually harms their health. The biggest problem is a lack of sleep. For a good night's sleep, the WHO recommends that background noise remains under 30 dB, with peaks no greater than 45 dB. There is also reference to other ailments, including hearing complaints such as tinnitus, mental health issues, and stress.

Birds and other animals suffer too. While some species are able to adapt to an urban existence, others are forced to abandon their habitat.

Standards for construction noise

Nuisance and pollution are very wide and subjective terms. The extent to which the intensity, level, and type of noise is unbearable depends on the person. Also, the time at which the noise is made and even who is making the noise make a difference. Even so, noise cannot be dismissed as a subjective matter. Construction noise impacts living comfort and can also affect the health of those residing, going to school, working, or receiving care in the vicinity.

This is why noise legislation and regulations apply. Further to scientific research, measurable maximum standards have been defined for construction noise in our country, taking into account both the volume (in decibels) and the duration (in hours and days). The law does not take into account the relationship between the person making the noise and those living nearby, but it is clear that a good relationship with the those in the vicinity can help in preventing complaints.

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#2 Laws and rules relating to construction noise

Direct and indirect damage due to noise

Hearing can be damaged by a daily noise level of 80 dB(A) or more. The severity of this depends largely on the duration. Immediate damage occurs with peak noise exceeding the pain threshold (120 dB(A)). Hearing damage is the direct impact of noise.

- The indirect impact is the effect on health as a whole. Every year, almost 22 million people are chronically troubled by noise. In around 6.5 million cases, this leads to serious sleep disruption. Many people also experience stress reactions and a disruption to daily activities. These effects of noise can go on to cause high blood pressure and increased levels of the stress hormone cortisol. This increases the risk of cardiovascular illness and mental health issues. According to TNO, it is possible to link environmental noise of 60 to 70 dB(A) to an increased risk of a heart attack. It has been calculated that more than 12,000 people in Europe die every year from stress, high blood pressure, and cardiovascular disease caused by noise pollution. There are also around 48,000 cases of ischaemic heart disease (caused by the narrowing of heart arteries).
  (Figures 2019, European Environment Agency.)

European regulations

The European Directive 2002/49/EC of 25 June 2002 concerning the evaluation and control of environmental noise aims to introduce a common European approach to prevent, avoid, or limit harmful effects of exposure to environmental noise.

The directive therefore contains the following measures:

- harmonising noise measurement and calculation methods
- listing problems by creating maps of noise levels
- adopting action plans at a local level, based on priority issues identified on the noise-level maps
- educating the public (e.g. using the noise-level maps) and raising awareness

Noise harms hearing and significantly affects physical and mental health.

Initially, the draft directive was intended for conurbations with a population of over 250,000 and for large infrastructural noise sources (large traffic routes, railways, airports). The directive must be transposed to national law in all European member states. In the process, the area of application can be extended. In Belgium, the task applies to the three regions.

The directive does not concern noise from domestic activities, noise caused by neighbours, noise in the workplace, noise from within a means of transport, or noise from military activities on a military domain.

In addition to the general directive for environmental noise, the European Community has also announced different directives establishing the maximum levels for the emissions from certain sources of noise pollution, such as motorised vehicles and domestic appliances. As a result, the European Directive 2000/14/EC of 8 May 2000 concerning the harmonisation of the member-state regulations relating to environmental noise emissions by material for outdoor use confirms permissible noise levels for, e.g. machines on construction sites and lawn mowers. This was modified by the European Directive 2005/88/EC.

Measures to reduce noise

European member states are already taking a range of measures to limit and control noise. However, according to the report presented by the European Environment Agency in March 2020, it remains difficult to assess what these achieve in health terms. Examples of the most common measures to reduce noise levels in cities include the replacement of older paved roads with smoother asphalt, better management of traffic flows, and reducing the maximum speed to 30 kilometres per hour. In addition, measures are being taken that aim to raise awareness and change behaviour, thus encouraging people to move around more quietly, e.g. by bike, on foot, or in electric vehicles. But also to reduce construction noise.

Many countries, cities, and regions have also introduced so-called quiet zones. The majority are parks and other green areas, where people can escape the noise of the city. The report emphasises that more must be done to create and protect quiet zones outside the city and to improve access to such areas within the city.

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#3 Developments relating to both construction and environmental noise

The reduction of noise pollution will be a greater focus in the construction industry in the coming years. First, because demolition and construction noise in a congested urban environment will soon be considered a nuisance. Moreover, there is an ever-greater focus on 'inner-city construction'. Given the fact that urban regions have a high population density, complaints in such areas are relatively likely.

Secondly, it is growing even more likely because the serious impact of noise on health is becoming more widely known. Increased risk awareness is also being actively encouraged within a growing group. Indeed, many local authorities are intensively seeking interaction with citizens. It has never been easier to 'report something' online or by telephone. This is the third key factor. Moreover, municipalities are encouraging their citizens to become (more) involved in their local area via public participation.

This combination of developments means that the risk increases for many construction sites. Construction companies that do not respond and fail to consider their neighbours sufficiently can expect a visit from the environmental department even sooner than before.

Consequences for the construction site

In summary, there will be a serious threat to progress in construction projects when those issuing licences and local residents hear too much noise and see a lack of specific measures against noise pollution. Therefore, all project leaders must already be aware of environmental management at an early stage, and put 'noise pollution' at the top of the list, including protective measures and relevant communication.

Furthermore, constant monitoring is still important even when construction noise meets the requirements. Every decibel that can be prevented, absorbed, or reflected is worthwhile. This all begins with smart purchasing, within a culture promoting education and environmental management. An early inventory of the work and the environment helps in actually reducing noise. Good preparation means dividing up the construction site smartly in terms of noise, using quiet technology, soundproof screens, and smart planning of the work, plus good communication.

Assertive and active citizens are gaining more of a voice within their community. Legislation is reinforcing this development.

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#4 Practical tips for a quieter construction site

- **Division of construction site**
  - Measure the distance to surrounding homes. Ensure noise absorption or reflection for the nearest homes.
  - Think of smart routes on and around the construction site; plan them as far away as possible from neighbouring buildings.
  - Set up the construction site in such a way as to avoid constant manoeuvres.
  - Install noisy machines in a separate room or create a barrier.

- **Plan**
  - Consider that, for many people, construction noise is more bearable in the afternoon than early in the morning.
  - Avoid work in the evening and/or night, as these disrupt sleep.
  - Deliver materials from collection points on the city perimeter (hubs), so that only full lorries come to the inner-city construction site.

- **Purchasing**
  - Pay attention to noise levels when purchasing machines, tools, and equipment.
  - Quiet construction machines and equipment are often also more energy efficient and emit less CO2 because they are (semi-)electric.
  - Keep an eye on the developments relating to quiet(er) equipment and/or components. For example, innovative diamond blades allow noise to be reduced by almost 10 decibels.

- **Culture**
  - Choose environmental managers carefully. Encourage 'environmental thought' in your own organisation. If this is not done well, everybody will suffer.
  - Educate employees on noise, allowing them to properly assess matters of noise pollution and harmful noise; integrate the employment rules (Arbo) in this regard.

- **Communicate**
  - If local residents are well informed about the work and any nuisance beforehand, the experience is often acceptable.

- **Technology and maintenance**
  - The Buildings Decree focuses on quiet technology. A well-known example is the screwing or drilling of foundation columns. The latest approach is the pile driving machine.
  - Carry out regular maintenance. For example, make sure that you immediately replace worn bearings.
  - Bear in mind that noise increases with wear and tear; so, when making a purchase, make agreements with suppliers that the machines, tools, and equipment will remain under the agreed noise levels when used and maintained normally.

- **Monitoring:**
  - Do your own monitoring (indicative) using a dB app on your smartphone.
  - Regularly check that employees are respecting measures and agreements.
  - Stay updated on developments in new materials, methods, and technologies to reduce, reflect, or prevent noise.

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#5 What can Heras Mobile Fencing & Security do for you?

There are all kinds of ways to successfully reduce noise on a construction site. Environmental management also remains essential, as there is still a lot of construction-site noise that is hard to plan for and equally hard to avoid. For example, aggregates for groundwater drainage continue operating at night, although the level must decrease to 45 dB(A). A helpful aid in such situations is the new Noise Control Barrier 2.0 from Heras. This is a soundproof screen that reduces construction noise for the local environment by up to 32.8 dB(A). This means that the neighbourhood experiences less nuisance.

In doing so, noise pollution can be reduced to acceptable levels. The Noise Control Barrier 2.0 is especially designed for construction sites. It is a simple but effective solution for reducing nuisance. Many construction companies already use the previous model of the Noise Control Barrier. This screen absorbs noise, is filled with glass wool, and comprises a single unit the size of a mobile fence.

The new model, Noise Control Barrier 2.0, is designed completely differently: it comprises low-maintenance, leather-like components measuring 1.2 m in width. Three units are easily attached and overlapped on a 3.5-metre mobile fence. In this way, sound waves are largely reflected and therefore do not reach the surrounding area. The Noise Control Barrier 2.0 is inflammable, vandal-proof, and can be stored easily and compactly. Furthermore, the screen is waterproof, remains manageable, is easy to clean, and requires little maintenance. This means that the Noise Control Barrier 2.0 lasts much longer than the previous model. This solution is also significantly more flexible, more space efficient, and better value than a high wall of containers. Noise Control Barriers can also be used on scaffolding constructions and directly on noise sources such as aggregates.

The Noise Control Barrier 2.0 is effective in insulating noise sources, such as around grinding and drilling activities, aggregates, and sawmills. This means it is no longer necessary to install soundproofing around the entire construction site. The previous absorbing Noise Control Barrier remains well suited to applications in covered (indoor) areas, improving noise protection for construction site employees.

Every construction site is and remains unique. Noise reduction is a matter of customisation to suit each specific location. Even on the construction site itself, the noise can vary according to the particular zone and the situation also changes in each phase of the construction process. This is why specialists at Heras Mobile Fencing & Security are keen to visit the construction site, to help you consider customised solutions.

Read more about the Heras solutions

Sources

European directive environmental noise:
https://ec.europa.eu/environment/archives/noise/directive.htm

Environmental noise in Europe (report_
https://www.eea.europa.eu/publications/environmental-noise-in-europe

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https://www.eea.europa.eu/nl/themes/noise

NHG standard – hearing loss
https://www.nhg.org/?tmp-no-mobile=1&q=node/1799

The Laboratory Measurement of Airborne Sound Insulation of a Barrier Mat Material. Technical Report C/24166/T01 (SRL, 2018)

On-Site Test Report. Investigation of sound pressure levels with fence panels in the sound path both plain/untreated and using NCB and NCB 2.0 acoustic barriers. (Heras, 2018)

NEN standards

Acoustic Performance to EN10140-2
Fire Performance to BS 5867-2
Tested in accordance with BS EN ISO 10140-2:2010

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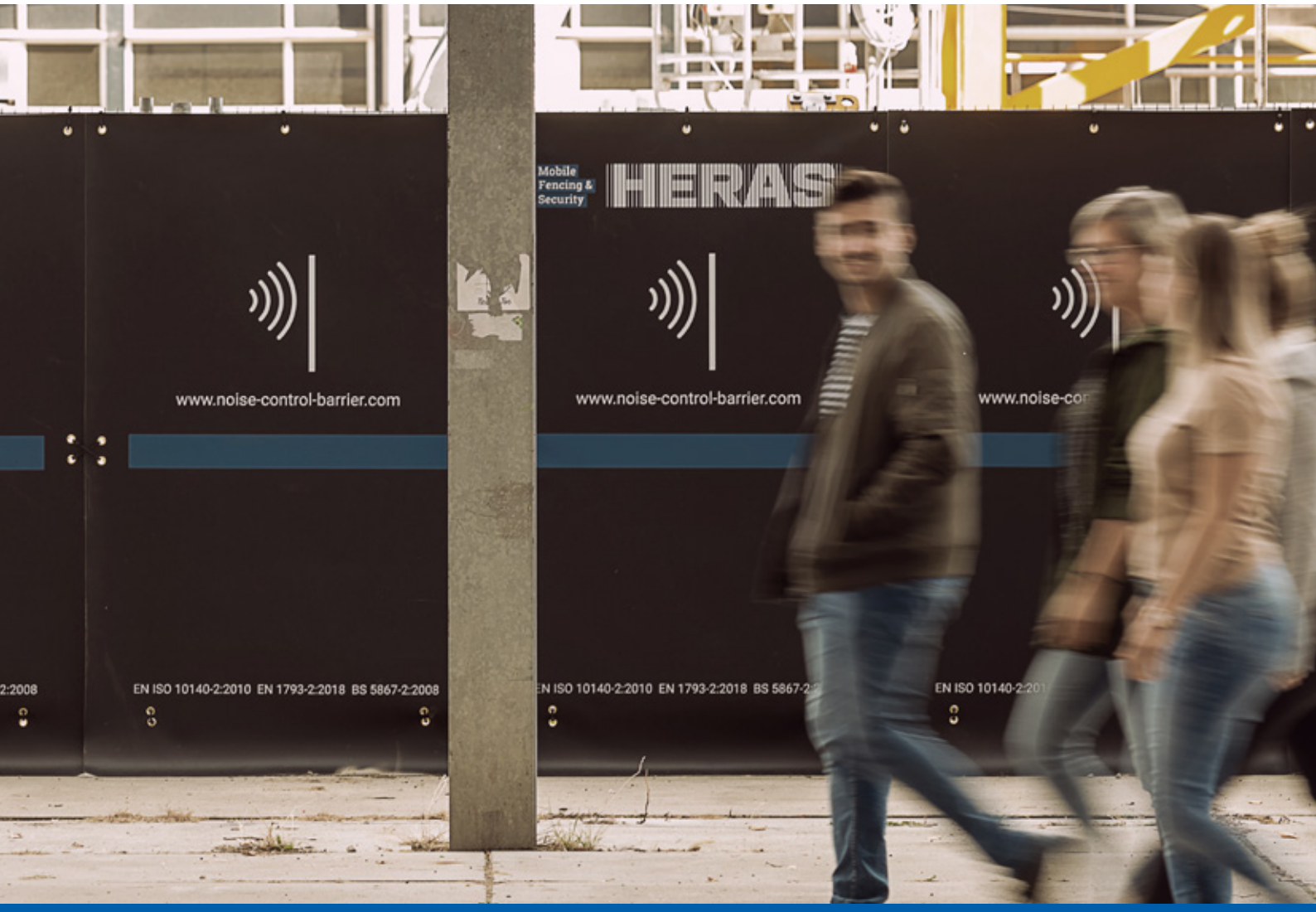
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