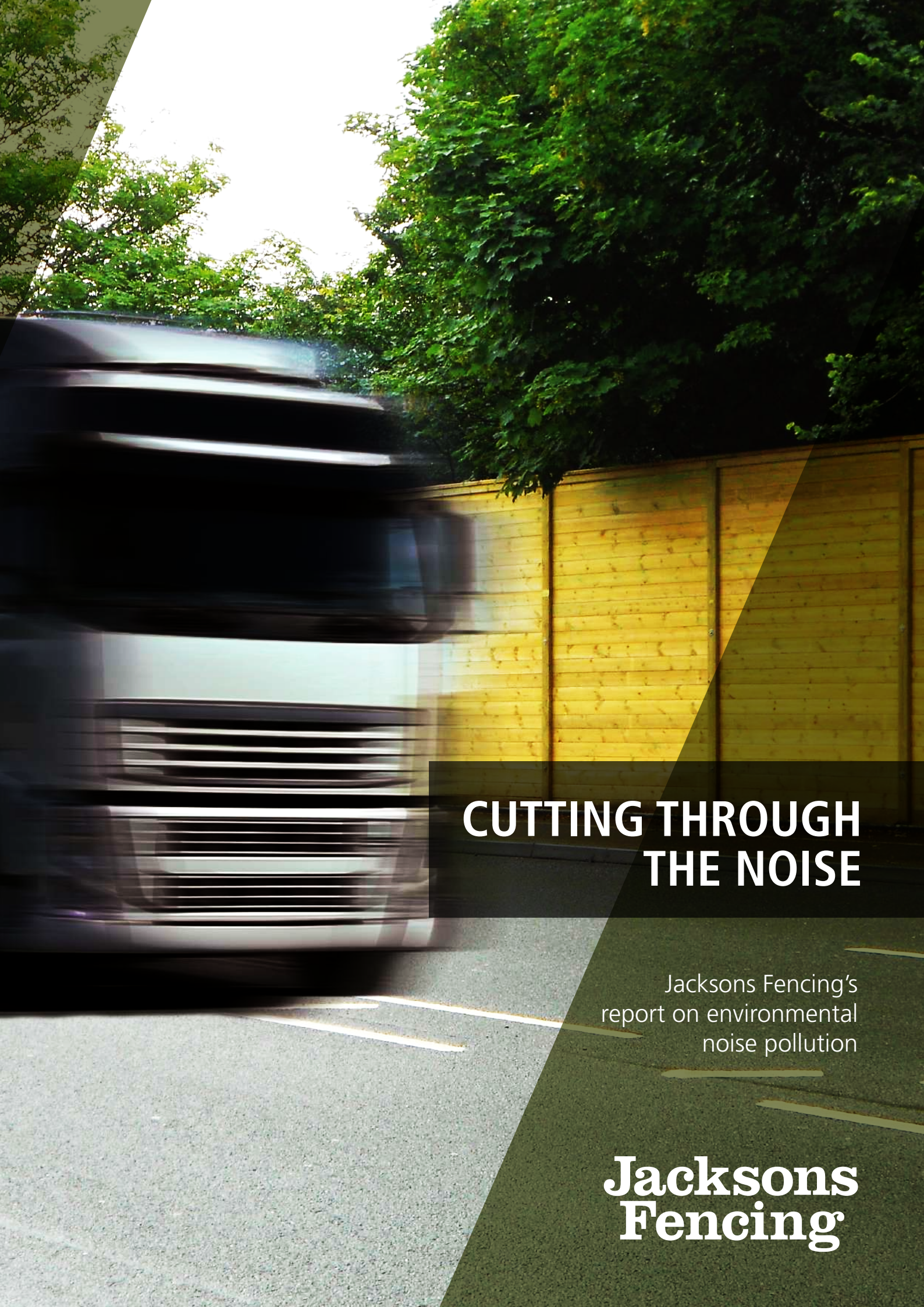

CUTTING THROUGH THE NOISE

Jacksons Fencing's report on environmental noise pollution

Jacksons Fencing

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Jacksons Fencing

Introduction by Peter Jackson, Managing Director, Jacksons Fencing

Wherever you live or work, environmental noise is a part of everyday life; from road traffic noise to construction work on your doorstep, we experience different levels of noise all day, every day. But it's only recently that the ongoing impact of continuous noise pollution has been brought under close scrutiny; at best, environmental noise pollution is an irritation – at worst, it poses a serious threat to health.

Cities and urban areas are becoming more densely populated and more housing is having to be built in close proximity to transport infrastructure, an example being the growing number of planned garden towns and villages in England. It's increasingly important to assess how we can limit the impact constant noise has on public health, which according to World Health Organisation (WHO) research can range from chronic hearing damage to acute cardiovascular problems.[1]

To get a better idea of the state of noise pollution in the UK, as well as the efforts being made to mitigate its effects, we canvassed opinions from 2,000 UK residents to get to the heart of the most prevalent sources of unwanted noise and the impact they're having on the population. We posed similar questions to 650 architects, designers and noise consultants. The survey's findings highlight a widespread issue for which a comprehensive solution is long overdue.

Our nationwide survey found that many architects, specifiers and designers lack sufficient knowledge of acoustic barriers, their different materials and their benefits. One-fifth of architects admitted to being unaware of the properties and advantages of acoustic barriers, while of the 79% who knew of acoustic barriers, only 36% had actually used them in projects, often citing cost as a prohibitive issue.

Industry professionals are not entirely at fault for this lack of awareness and knowledge: half of them indicate that government policy on noise pollution lacks sufficient detail and clear direction, while a mere one in ten believes that policies are robust and up to date, highlighting serious weaknesses in communicating policy to those responsible for its implementation.

63% of professional respondents think that noise pollution is a 'significant' problem, with nearly half of those believing that the problem is worsening. Despite this, acoustic barriers are still missing from many projects where they could have a significant impact on noise reduction. In projects where acoustic barriers were being specified, the survey found 42% of architects who had specified acoustic barriers were using them for housing developments, 35% for construction sites, 34% for motorways and 30% for schools. With the growing prevalence of new housing near motorways and trunk roads, and 62% of the general population citing construction as a major contributor to noise pollution, it's surprising acoustic barriers aren't specified more often.

63%
of industry professionals say noise pollution is a 'significant' problem

35%
of industry professionals say it's worsening

These top-level findings suggested that we needed to look deeper to understand why acoustic barriers have long been overlooked. From cost and client preference to lack of guidance, the reasons behind omitting acoustic barriers from applications where they would mitigate the effects of environmental noise were many and varied; half of industry professionals blamed the 'insufficient detail' in government policy and others cited cost (54%), unattractive barrier design (37%) or simply clients perceiving acoustic fencing as 'unnecessary' (43%).

Where acoustic barriers are specified, however, popular choices of material include timber, earth and steel/metal, with environmental considerations swaying many architects to choose more eco-friendly materials. Clearly, noise reduction performance is the top consideration, but architects also show concern for the environment in their preference for natural materials such as timber and earth.

1. www.jacksons-fencing.co.uk

Even though our research found that architects are specifying acoustic barriers more often than ever before, our findings suggest that more could be done to help architects and specifiers better understand the advantages acoustic barriers can bring, and that more support could be provided by government bodies. Our data provides a range of insights into both public and industry opinions on acoustic barriers, assessing which factors are driving decisions to specify or disregard acoustic barriers.

We hope you find the research both interesting and thought-provoking.

36%
of professionals used acoustic barriers in projects

Chapter 1: Exploring the UK Soundscape

As noise pollution affects more and more people, our findings suggest that housing developers and the government may be downplaying its causes and remedies.

In cities and towns throughout the country, lives are being unnecessarily affected by a lack of implementation of noise mitigation solutions. In May, two Kent MPs demanded action from Highways England after it was revealed noise reduction barriers would not be included between junctions three and four of the M20 in a smart motorway upgrade.[2] The project was estimated to result in 73-76 dB of noise on average, similar to that of a lawnmower and 45 dB

The UK population[3] has grown from 56 million in 1971 to over 60 million and it's estimated to reach 71 million by 2031.[3] Population density per square kilometre in England is projected at 464 from 387 in 2005 – almost double that of Germany and quadruple that of France.[4]

64% of the 650 industry professionals surveyed state that noise pollution presents a significant problem in the UK and 50% believe it is getting worse.

In contrast, only 16% of industry professionals believe noise pollution is in decline. This is concerning when 40% of those surveyed reported that environmental noise is deemed as posing a medium to high risk of adverse effects on the health and daily activities of local residents as well as an area's economic wellbeing. Clearly noise pollution is an issue that has been downplayed for some time now – so why isn't it being addressed?

The first step to tackling noise pollution and minimising its effects is to identify noise pollution 'hot spots'. Our research finds that acoustic barriers are most frequently specified and deployed for new housing developments (45%), construction sites (35%) and motorways and trunk roads (34%).

Jacksons Jakoustic® Reflective Barrier, Faversham Linen Services, Faversham

The main offenders

The most common sources of noise pollution having a negative impact on the population, according to industry professionals, are road traffic (63%), construction (55%) and aircraft (50%), highlighting the importance of considering the proximity of housing developments to increasingly busy roads.

42%
of the population identified crowds as a major contributor to noise pollution

Of the 2,000 members of the public questioned, 64% identified construction as the 'single most significant' contributor to noise pollution, followed by road traffic (58%) and crowds (42%). This highlights a crossover of the noise sources noted by industry professionals specifying for projects with the opinions of potential residents.

Also, the most common sources of noise pollution vary widely depending on where the respondents lived. With a population density of 3,210 people per square km, London residents were, unsurprisingly, more affected than rural inhabitants by road traffic, neighbours, music, crowds and construction. Road traffic, featuring repeatedly across both groups questioned, is evidently a significant source of noise pollution. The lowest contributors to noise pollution were shops and businesses, with two-fifths of the UK public surveyed reporting they don't contribute at all.

32 million vehicles were registered for road use in 2014 and by March 2017 there were 37.5 million.[5]

But what are the negative effects of environmental noise as a result of road traffic, crowds, construction and other noise sources?

Impacting everyday life

In a world where we're busier than ever before and with increasing demands on our time, sleep is precious; so it's worrying to note that the most common negative effects of noise pollution acknowledged by industry professionals were trouble sleeping (48%), irritation (42%) and difficulty concentrating (32%).

More people in villages (21%) reported being stressed as a result of noise than other respondents (18% on average). In these areas where quiet is no doubt an expectation and which are being disrupted by encroaching motorways, noise barriers are all the more important.

For the UK population sample surveyed, the most commonly reported negative effect of noise pollution was poor sleep, impacting 71% of those questioned. 53% of respondents reported suffering hearing damage as a result of noise pollution and 56% stated feeling 'irritation' at noise levels. These statistics suggest that greater numbers of the UK population are reporting issues not highlighted or considered by industry professionals, implying the latter may be underestimating the need for noise mitigation solutions.

Brits' Top Five Annoying Noises:


Loud people (56%)


Loud music (41%)


Building works (39%)


Alarm sounds (38%)


Road traffic (34%)

Environmental noise pollution is of course not just a UK-specific problem: it's of growing concern in virtually all developed and developing countries around the world.

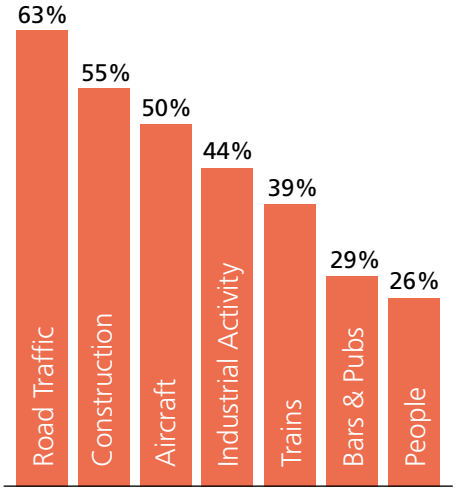
World Health Organisation guidelines

The WHO guidelines for community noise recommend less than 30 A-weighted decibels (dB(A)) in bedrooms during the night for a good-quality sleep, and less than 35 dB(A) in classrooms to allow good teaching and learning conditions. At night, the WHO guidelines recommend less than 40 dB(A) of annual average outside of bedrooms to prevent adverse health effects from night noise.

According to a European Union (EU) publication cited by the WHO, roughly 40% of the population in EU countries are exposed to road traffic noise at levels exceeding 55 dB(A); 20% is exposed to levels exceeding 65 dB(A) during the daytime and more than 30% are exposed to levels exceeding 55 dB(A) at night.

According to WHO research, noise has emerged as a "leading environmental nuisance in the WHO European Region" with public complaints about "excessive noise" on the rise, as an estimated 20% of Europe's population are thought to be affected by night noise.

Professional Perspective: Most Common Sources of Noise Pollution



Jacksons Jakoustic® Reflective Barrier, Harbledown

Jacksons Jakoustic® Reflective Barrier, Faversham Linen Services, Faversham

The situation in the UK

Closer to home, the UK Chief Medical Officer (CMO) Professor Dame Sally Davies found in her 2017 report that "noise stands second to poor air quality in terms of the burden of ill health caused by a single pollutant", with more than 80% of people reporting exposure to noise pollution.

The report highlighted the impacts of noise pollution as ranging from "sleep disturbance and stress" to "hypertension [and] cardiovascular disease". The report supports our own findings, for example, linking loud noise at night to poor-quality sleep and resultant stress from being tired. Davies recommends addressing noise pollution ahead of development, stating: "It is better to consider noise pollution in planning decisions."

More than 80% of people report exposure to noise pollution

Chapter 2: What's Being Done about Noise?

From the survey results, it's evident that most industry professionals acknowledge there is a growing answer with noise pollution in the UK. But what is the solution and who, ultimately, is responsible for coming up with a comprehensive solution?

In July 2018, a textile-dyeing firm in Leicester was fined thousands of pounds by the Environment Agency after it was discovered the company lacked an environmental permit, which would have monitored noise pollution, on-site safety and waste.[6] That same summer, the Welsh government attempted to tackle noise pollution from busy roads – part of its five-year 'action plan on noise' – by trialling low-noise highway surfaces.[7] As evidenced by these two examples, some local authorities, policymakers and professionals are waking up to the issue of managing noise pollution.

Developers and specifiers are ultimately responsible for considering the effects of noise pollution and ensuring it is properly mitigated against, but there is some confusion around which body is responsible for monitoring this and providing guidelines for how it is done. Most importantly, our research suggests that industry professionals should not presume that others will take responsibility and should instead work toward a more collaborative approach.

Is policy and regulation keeping up with increasing environmental noise?

Our survey found that 16% of industry professionals feel 'very confident' assessing a site's environmental noise needs, while 19% admitted to feeling 'not at all confident'. These figures highlight there is still some work that needs to be done. In fact, 35% of construction projects fail to consider environmental noise at the right stage which, according to guidance from professional acoustic bodies, is at the "earliest opportunity, before any planning application is submitted". Of greater concern are the 14% of respondents stating that noise pollution is often not considered at all during construction projects.

Once sites have been assessed, 34% of industry professionals surveyed thought that local authorities do not take environmental noise seriously enough, with 16% saying they do nothing about it at all. 22% believe government policy covering noise pollution is outdated, with half of those surveyed stating that government policy on noise pollution 'has insufficient detail'. Clearly, a more definitive source of information and/or guidance is needed to effect change.

> "An initial noise risk assessment of the proposed development site should be conducted by a competent noise practitioner at the earlier opportunity, before any planning application is submitted. The noise risk assessment should provide an indication of the likely risk of adverse effects from noise were no subsequent mitigation to be included as part of the development proposal. It should indicate whether the proposed site is considered to pose a negligible, low, medium or high risk from a noise perspective."[8]
>
> ProPG Planning & Noise: New Residential Development,
>
> Association of Noise Consultants, Institute of Acoustics and Chartered Institute of Environmental Health

Policy and Regulation Matters

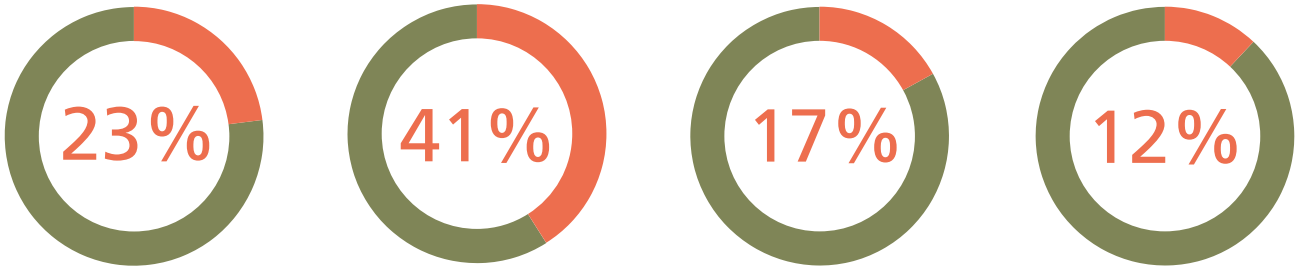
Government policy is...

11% Robust and up-to-date

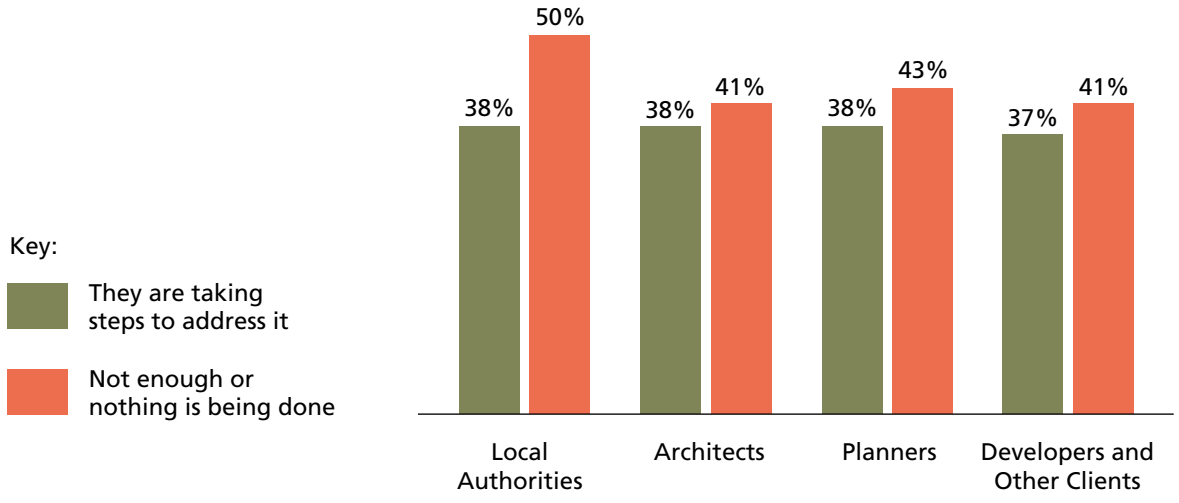
67% Lacking sufficient detail

22% Outdated

Is there sufficient regulation on environment noise management and mitigation?



We asked specifiers: Are they taking noise pollution and its risks seriously enough?



Jacksons Fencing

Jacksons Jakoustic® PLUS Absorptive Barrier, Electrical Substation

Jacksons Jakoustic® Plus Barrier, Reading Train Maintenance Depot, Reading

Regional or local monitoring could help ensure more thorough noise mitigation; the UK CMO recommends in her annual report for local authorities to "broaden current environment strategies" and that these should "be cognisant of all forms of pollution".

A third of architects and builders say local authorities don't take noise pollution seriously enough

In July 2018, the Ministry of Housing, Communities & Local Government delivered a revised National Planning Policy Framework, which was originally published in 2012 to consolidate and replace numerous Planning Policy Statements and Planning Policy Guidance Notes, notably PPG24. It includes advice on when, where and how to take noise into account, and the framework it provides is certainly a step in the right direction.

Over half of professionals cite cost as a challenge when specifying acoustic fencing

How well-acquainted professionals are with the new document, if at all, remains to be seen. More than half of respondents were unfamiliar with a number of British Standards, including some of those already existing and relevant to noise control.

Jacksons 12k Envirofence®, Aldi, Swindon

Chapter 3: Barriers to Specifying Acoustic Barriers

In its 'Guide to Acoustics for Housebuilders and Developers', the Association of Noise Consultants (ANC) advises that "accurate survey work at detailed planning stage can help ensure that the commercial sustainability of a development is maximised". It also emphasises the importance of accuracy, since under or over specified acoustic design "can prove a costly issue for a housebuilder or developer".

Once understood and overcome, industry professionals can offer greater value to projects, meet sustainability commitments and ultimately deliver more cost-effective solutions (by incorporating noise barriers into the design stage rather than retrofitting) as the UK heads towards an ever more crowded future.

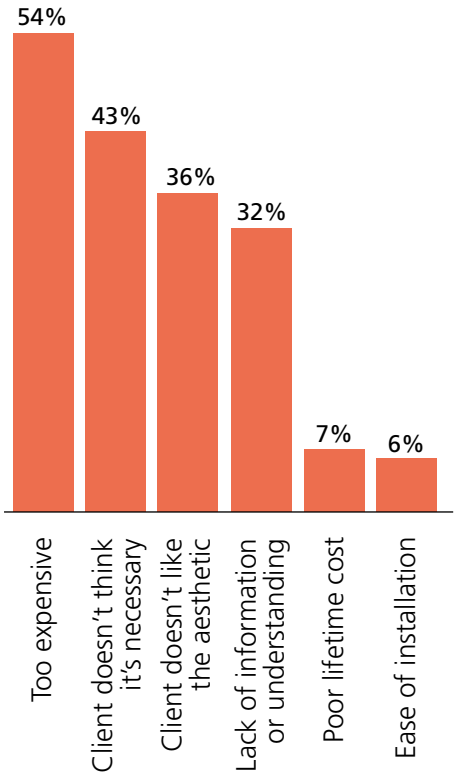
According to the survey results from industry professionals, cost is the greatest challenge when specifying acoustic barriers, with 54% of respondents highlighting this as an objection. In addition, 43% stated clients perceive acoustic barriers as 'unnecessary', followed by clients disliking the product's appearance (37%) and a lack of information or understanding (32%). This lack of understanding feeds directly into the perception that acoustic barriers aren't 'worth' investing in; many specifiers and architects simply underestimate the significant impact effective acoustic barriers can have on daily life.

> "By default, environmental noise barriers have become an architectural feature in their own right and should be considered not just around acoustic performance, but also in relation to their environment and the landscape. Probably the most cost-effective and flexible solution that can be adapted to suit most ground conditions and contours is timber; plus, it combines high acoustic properties with a natural façade and can, in absorptive form, deliver up to a 32 dB reduction in noise."
>
> A Quieter World: Acoustic Whitepaper Jacksons Fencing

Architects' lack of knowledge of acoustic barriers is reflected in their reluctance to pay for a product whose benefits aren't fully appreciated; 69% of those surveyed reported that their understanding of acoustic barriers is 'limited or poor' and 21% are 'not aware' of the properties and benefits of acoustic barriers. It's somewhat surprising then that 5% of respondents claimed that, despite being 'unaware' of the properties and benefits of acoustic fencing, they have used it in a project in the past year.

The benefits of acoustic barriers range from a reduction in noise to increasing a development's sustainability and in some cases providing a greater level of privacy and reducing light pollution. By not understanding this, specifiers are missing an opportunity to add significant value and longevity to their projects. In an attempt to help bridge this knowledge gap, the ANC, Institute of Acoustics (IOA) and Chartered Institute of Environmental Health worked together to publish 'Professional Guidance on Planning & Noise' (ProPG) in 2017, wherein they state that "good acoustic design does not mean 'gold plating' or significantly increasing costs", perhaps suggesting that the objections to cost found in the survey responses are misplaced.

Challenges Specifying Acoustic Fencing



"We take noise pollution very seriously at Highways England, and as such have a special fund to tackle environmental issues which includes £39m specifically to reduce noise levels for people living close to our network. We have currently identified 1,150 'Noise Important Areas' and are committed to mitigating them within the next two years. The measures we take include low-noise road surfaces, a free noise installation scheme and noise barriers.

"When specifically considering noise barriers for a project, they are always subject to a 'value for money' analysis whereby the overall costs of installing and designing the barrier is compared to the noise level reduction and the number of houses it would protect. We also look at the practicality of construction and the impact of the barrier on safety, visual impact, ecology or other environmental matters. Noise barriers are considered for our Noise Important Areas, as well as at locations affected by potential changes in noise as a result of a road improvement scheme."

Highways England

Jacksons Jakoustic® Reflective Barrier

Chapter 4: A Sound Approach

For projects where acoustic barriers are specified, a range of materials are used with varying effectiveness, from earth bunds to timber, metal and plastics/composites, with environmental concerns often a deciding factor in the choice of material. As such, it's necessary to establish what constitutes an effective acoustic barrier before exploring the merits of different materials.

Industry professionals widely perceive earth bunds as the most effective solution for noise reduction, with 78% of respondents identifying it as 'very' or 'somewhat' effective. 66% believed timber to be the second-best material, followed by Perspex and acrylic (50%) and steel (49%).

Effectiveness in noise reduction is the top priority for architects and specifiers (97%)

Specifying the most appropriate type of barrier is an important decision for industry professionals; especially with 34% of architects reporting that acoustic fencing is increasingly common as a planning requirement in all projects. 97% of those surveyed identified 'effectiveness in noise reduction' as their top priority when specifying acoustic barriers, citing industry certification, initial cost, aesthetics and maintenance as other influential factors.

Noise barriers 101

Must haves:

- A minimum mass (also known as superficial mass) of 10kg/m2 regardless of barrier material
- Barriers should have no gaps, to prevent noise penetration
- Barriers need to make solid contact with the ground to prevent noise passing under the barrier

Timber

Typically, the most cost-effective and flexible solution, timber combines high acoustic properties within a natural façade and can, in absorptive form, deliver up to 32 dB in noise reduction.

Plexiglas/Perspex/ Acrylic

Considered to be among the least effective materials by industry professionals, these barrier types offer light transmission and visibility. However, they do require high maintenance and materials can be distorted by severe weather conditions which can make it difficult to maintain their acoustic properties.

Reflective acoustic barriers reflect noise back towards the source to protect a property or area

Steel and aluminium

While metal barriers are sometimes favoured for their light weight, they are relatively costly and need to be well supported to avoid a 'drumming' effect from noise vibration. Coatings can be applied for a decorative appearance; however, this can further escalate costs and require ongoing maintenance.

Absorptive acoustic barriers are placed around a noise source, such as a loading bay or generator in order to contain the noise source, protecting its surroundings

Earth bunds or berms

Probably the oldest form of acoustic barrier, earth bunds are highly effective in situations where soil and plant are readily available on-site, but require a lot more space and can be costly if materials need to be transported to site.

Combination

Quite often, the materials or types highlighted can be combined to suit particular applications, aesthetic considerations or topography of the site – combinations of timber barriers on the tops of bunds or timber/steel barriers with Plexiglas panels and so on. In virtually every instance, combinations will add cost and complexity to a project and this needs to be weighed against aesthetic, performance and lifetime cost requirements.

Top solution

In terms of maintenance, service life and environmental impact, timber is the most effective noise barrier available, particularly where shielding the noise source is a requirement. Earth, or a bund, is the next most effective measure, where there is space and material on site to construct it.

Where an acoustic barrier is required, it is essential that a qualified and independent acoustic engineer is consulted ahead of specification to ensure the correct barrier is selected to meet specific site and performance criteria.

"Highway design often brings the noise of construction and wide carriageways closer to residential areas, so noise pollution is a significant factor that we need to consider.

"When you're affecting where people live, it's crucial to consult local communities early on and consider their feedback as you try to figure out the way forward. Continue the conversation by inviting further comment once you have a more detailed design. Finally, when you're about to implement your plans, tell people what is going to happen, when and how it will affect them.

"It's about thinking of the kind of environmental impact the new structure might have on the existing area, engaging with the residents to make sure they have a say and mitigating the effects of noise as far as we possibly can."

Basil Jackson
Managing Director, Vemco Consulting
Highway engineering and transport specialists

Jacksons Jakoustic® Absorptive Barrier, Aldi, Maidstone

Case Study: Reducing the Impact of Noise at McDonald's

Jacksons Jakoustic® Reflective Barrier, McDonald's, Tonbridge

McDonald's is one of the biggest food chains in the UK with 1,149 stores nationwide, many of which are located on redeveloped sites near urban areas. One of the issues this can create is noise pollution caused by the activities of customers, vehicles in the car park and drive-thru and the restaurant itself.

At one of its newly developed restaurants at Cannon Lane in Tonbridge, McDonald's was required by Tonbridge and Malling Borough Council planning authority to have a noise impact assessment to determine what effect the operation would have on the local area, including a section of nearby residential properties.

Many factors were included in the assessment, including the two-storey restaurant design, drive-thru facility and the intended 24-hour opening time. With the increase in demand for early breakfasts and late meals from shift workers, having 24-hour opening times is becoming more and more common; McDonald's now has 467 stores open 24/7, up from just nine restaurants in 2006. For local residents this can lead to an increase in noise during unsociable hours.

The noise impact assessment found that traffic from the nearby main road was the dominant source of noise in the area. It concluded that other primary sources of noise would be car doors in the car park and the intercoms used for the drive-thru. To ensure these did not impact on the wellbeing of local residents, the noise assessment recommended that an acoustic barrier at least 2.7m high should be installed on the northern boundary of the site.

Jakoustic® Reflective acoustic barrier was chosen as the best solution to reduce the impact of noise on neighbouring properties. A 42m run of the acoustic barrier was installed on the northern boundary next to the car park at a height of 2.7m as specified in the noise impact assessment.

Jacksons Jakoustic® Reflective Barrier, McDonald's, Tonbridge

The Jakoustic® Reflective barrier reflects noise away using specially designed timber boards, constructed in such a way that eliminates gaps which sound can travel through, reducing noise pollution by up to 28 dB[9]. Additionally, the acoustic barrier features an attractive timber facade and provides high levels of privacy for the residential properties nearby.

In order to minimise further disruption during unsociable hours, McDonald's ensured that no deliveries were made outside of the hours of 6am and 10pm.

Conclusion

From the findings of our report, it's evident that the subject of environmental noise pollution is a complex and evolving issue requiring a multi-faceted solution. As cities continue to grow, population densities increase and more vehicles choke our roads, so will the impact of noise pollution on day-to-day life, wellbeing and public health – but there are solutions at hand.

Lead from the front

The IOA, ANC and CIEH ProPG document is a significant step in the right direction. There is, however, some onus on the government and local authorities to establish an open and clear line of communication with developers and specifiers to ensure consistency in the application of noise pollution mitigation strategies.

Offering support to those ultimately responsible for combating noise pollution is key. It alleviates the fears of the 34% of industry professionals who believe local authorities are not taking environmental noise seriously enough and reassures the 16% who feel authorities are doing 'nothing', that their concerns are in fact being heard.

Solid foundations

The responsibility doesn't rest solely on the policymaker's shoulders: industry professionals involved in developments, designs and specifying for projects also have a part to play in mitigating noise pollution.

Cost has been identified as the greatest prohibitive factor for architects when specifying acoustic fencing, with 53% citing it as a 'challenge'. However, while effective acoustic barriers may require a higher initial investment, they typically pay for themselves in preserving property values and reducing the risk of complaints from neighbouring residents. Further research and educating industry stakeholders will ensure a better understanding of the benefits acoustic barriers can have, helping to remove cost as an obstacle.

With improved training, industry professionals can gain a better appreciation of the environmental noise agenda and the benefits of acoustic barriers to society. It's the start of a conversation and once architects, specifiers and building professionals fully understand the causes and solutions, they'll have the confidence to help their clients recognise that noise barriers are worth the investment.

A public problem

Finally, the public need to accept that increased noise pollution is an inevitable result of higher population densities. While some cultural shifts are taking this into account, such as more comprehensive public transport systems and electric vehicles, others, like a 24-hour retail economy, are contributing to the problem.

As cities and technology continue to develop, noise pollution must be taken more seriously; its impact has been assessed by the WHO and shown to have very real – and very serious – public health implications.

Recent WHO statistics report the impact of noise pollution on both children and the elderly, who are particularly susceptible to disturbances and disrupted sleep, resulting in greater stress. A study on the impact of noise on residents of Western Europe also found links between environmental noise and chronic conditions including tinnitus, cognitive impairment and even cardiovascular disease, depending on levels and frequency of exposure.

A solution will take work from all affected by and involved in the management of noise pollution, from the highest levels of government to the public. That means looking to industry and government bodies for clear guidance and educating industry professionals, such as specifiers, and property developers, architects on the value of effective noise barriers.

Only when the effects of noise pollution are more widely understood, along with the methods for mitigating it, can we begin to combat the problem – for good.

Acknowledgements

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Thanks as well to The Think Tank for developing, writing and designing the report. Finally, our appreciation goes to the Jacksons Fencing team for their ongoing commitment and hard work.

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Jacksons Jakoustic® Reflective Barrier, McDonald's, Tonbridge

Jacksons Jakoustic® Absorptive Fencing, Aldi, Maidstone

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