Noise from your business - Protection of General Public (Environmental)

Herefordshire Health and Safety Group

26th March 2019

Presented by Chris P. Jones
BSc (Hons) Dip2.OSH CMIOSH

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Sources of nuisance noise

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Nuisance noise sources

- **INDUSTRIAL NOISE** includes agriculture, manufacturing businesses and workshops
- **COMMERCIAL AND LEISURE NOISE** includes entertainment, sports and leisure, petrol stations, car washes, fast food outlets, bars, restaurants, offices, security alarms
- **DOMESTIC NOISE** includes home entertainment such as loud music and television, parties, animal noise, shouting, home security alarms
- **CONSTRUCTION NOISE** includes building, demolition and road works
- **TRANSPORT NOISE** includes road traffic, railways, domestic air traffic, military aircraft, delivery vehicles, vehicle alarms
- **STREET NOISE** includes loudspeakers, ice cream van chimes, street traders, performers and public addresses

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Legal context of nuisance noise

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Nuisance noise

The common law tort of nuisance:

"an unlawful interference with a person's use or enjoyment of land or of some right over, or in connection, with it."

When is noise a nuisance?

Subjective; dependent upon

- the level of noise
- its length, and
- timing

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Nuisance noise

Statutory Nuisance

Environmental Protection Act 1990

Enforced by Local Authorities

Where the noise is:

“...prejudicial to health...”

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Nuisance noise

Industrial nuisance noise:

Environmental Permitting (England and Wales) Regulations 2016 (PPC Act 1999)
Permits issued by Environment Agency, etc

IF BREACHED

Environmental Protection Act 1990
Enforced by Local Authorities

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Nuisance noise

Application for PPC

Noise and vibration management plan where:

- using noisy plant or machinery, for example cooling equipment or fans
- carrying out any noisy operations, such as loading or unloading, shredding, shearing, crushing, grinding, combustion, using trommels and conveyors or moving bulk materials
- activities are not contained within buildings
- activities take place at night
- the area is sensitive to noise, for example rural areas may have quieter background noise levels than urban areas
- there are sensitive receptors close to the site, for example houses or habitats

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Nuisance noise

Application for PPC

Noise and vibration management plan

Measure and evalutate significance of noise:

BS4142: 2014

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Effects of nuisance noise on the individual

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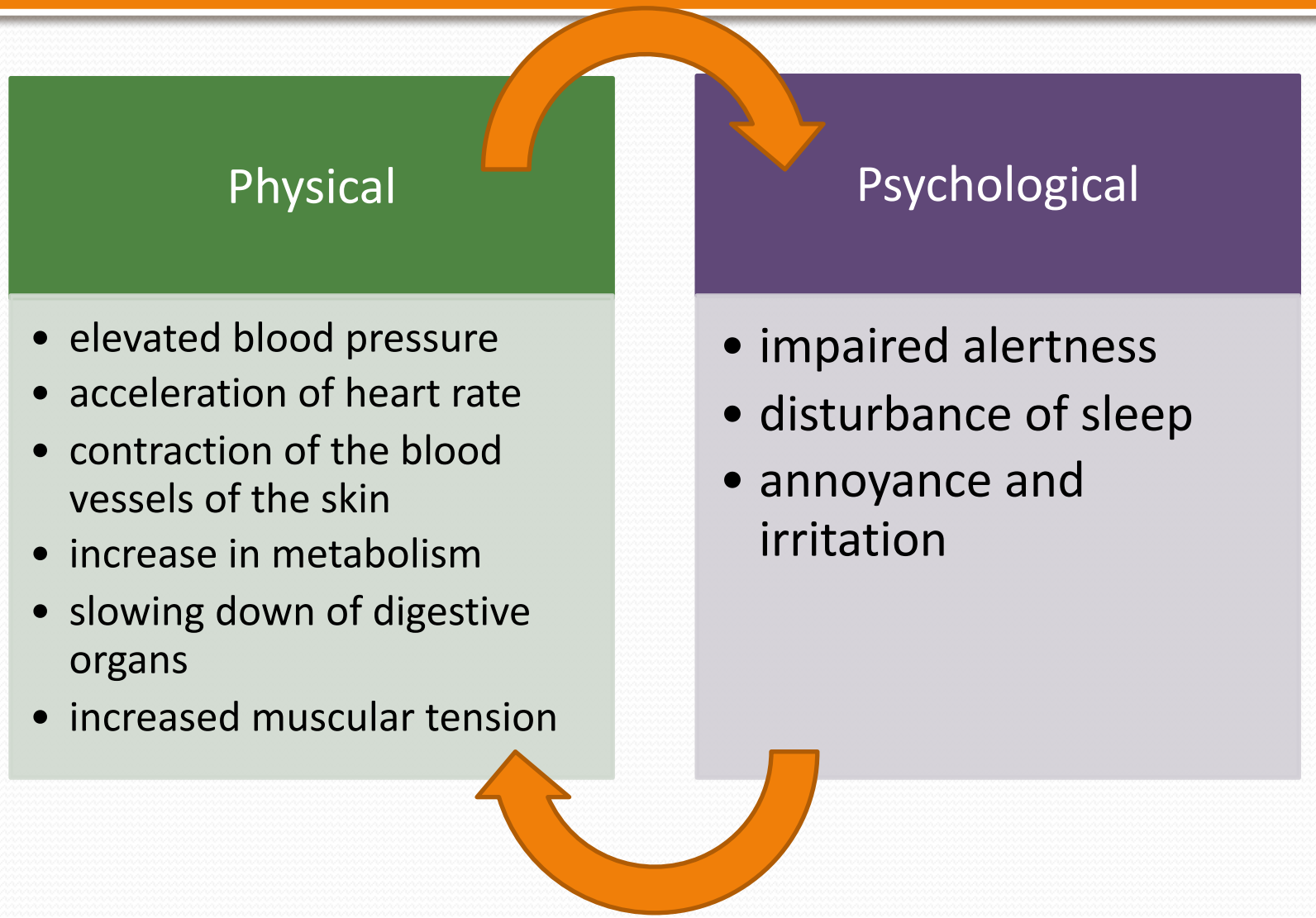
Physical and psychological effects of nuisance noise



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Assessing nuisance noise

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Measurement

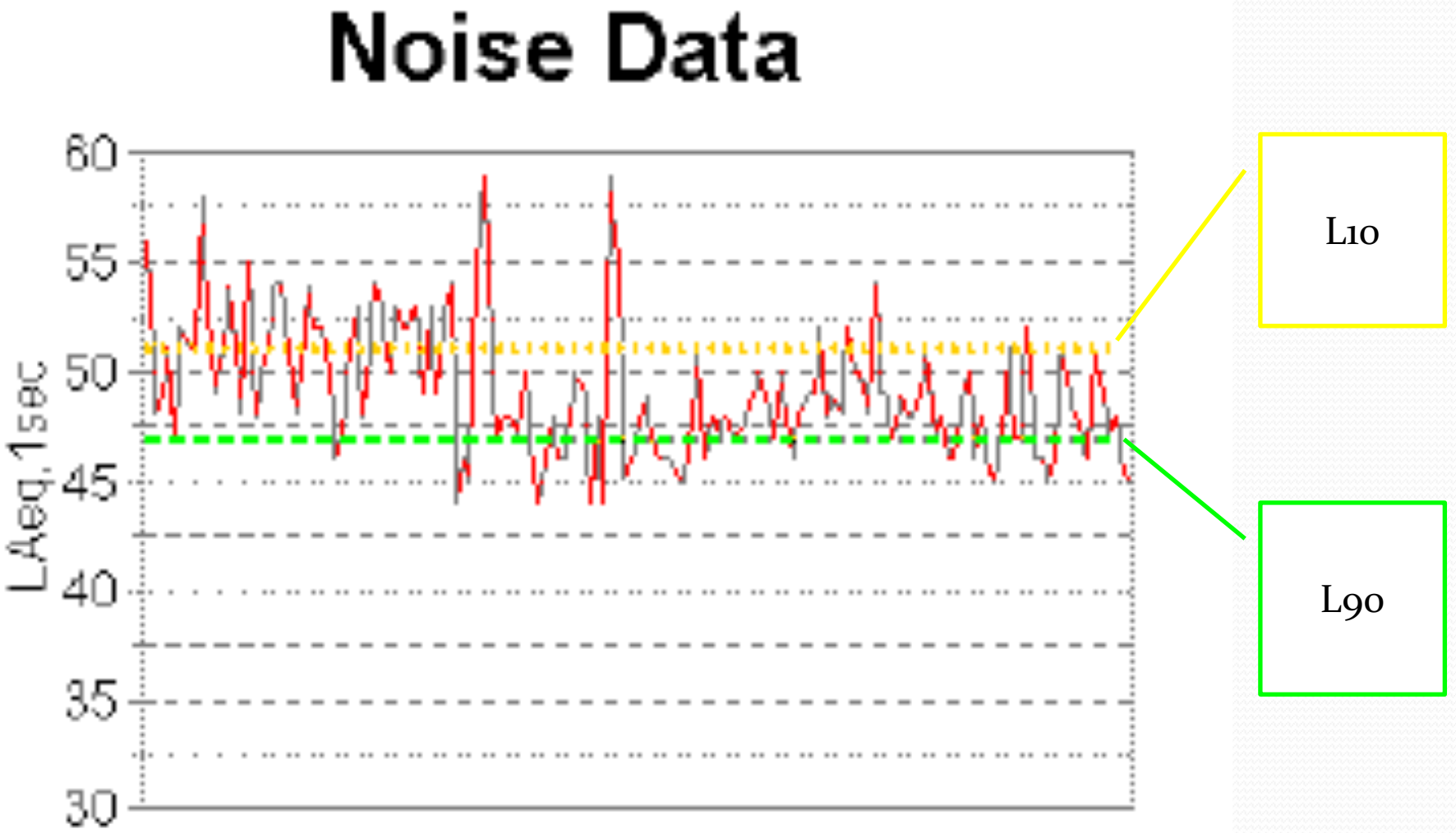
Percentile Exceedance Sound Level (Ln)

L10 is the level exceeded for 10% of the time period. L90 is the level exceeded for 90% of the time.

Equivalent Continuous Sound Pressure Level (Leq)

The level of exposure at the point of measurement averaged over the measurement period.

Measurement



Measurement

BS4142: 2014

Weather conditions	Ambient Leq	Residual Leq
Background L90	Statistical correction dBA	Specific noise level Leq
Acoustic feature correction dBA	Rating level dBA	Rating level minus Background dBA

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Evaluation

BS4142: 2014

Impact

- ≥ 10dBA – significant adverse
- ≥5dBA - adverse
- <5dBA – decreasing significance

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Controlling nuisance noise

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Noise Control Hierarchy

- **Noise reduction at source** - e.g. by elimination or substitution of the process or equipment producing the noise.
- **Attenuation in transmission** - by engineering controls that limit the amount of noise transmitted.
- **Receiver protection** - double-glazing and house design (bedrooms away from road).

Management Controls

- Control of working hours.
- Controlling the use of radios (both music and two-way radios).
- Public address systems.
- Vehicle routes.
- Loading doors and shutters.

Elimination, Substitution and Maintenance

- Replacement of equipment:
  - Diesel/petrol engines replaced by electric motors.
  - Pneumatic tools replaced by electric tools.
  - Solid wheels replaced by pneumatic rubber tyres.
  - Metal chutes, buckets, boxes replaced by rubber or plastic ones.
- Planned maintenance, replacement of worn parts and regular oiling will reduce noise and increase efficiency.
- Simple modification, e.g. plastic or rubber-coated rollers and guides on a conveyor belt may be used for handling glass or metal components.

Isolation

- Enclose the noise source.
- Enclosures:
  - Heavy noise-reflecting outer skin.
  - Noise-absorbent lining, such as mineral fibre.
  - Mounted so that they do not transmit noise and vibrations to the floor.
  - Airtight.

Noise Attenuation

- In the open air, sound decreases by 6dB for every doubling of the distance away from the source:

Distance	Noise Level
1 metre	112dB
2 metres	106dB
4 metres	100dB
8 metres	94dB

- The effect of distance is to decrease the intensity of the sound as the sound travels further from the source.
- This may therefore be used as an effective control, often in conjunction with other controls.

Absorption and Insulation

- Sound-absorbing materials on walls and other large surfaces.
- As well as possessing absorbent properties, noise screens or enclosures and havens must be acoustically insulating.
- Positioning of barriers is important.
- Should be near the noise source or the noise receiver.

Sound Insulation

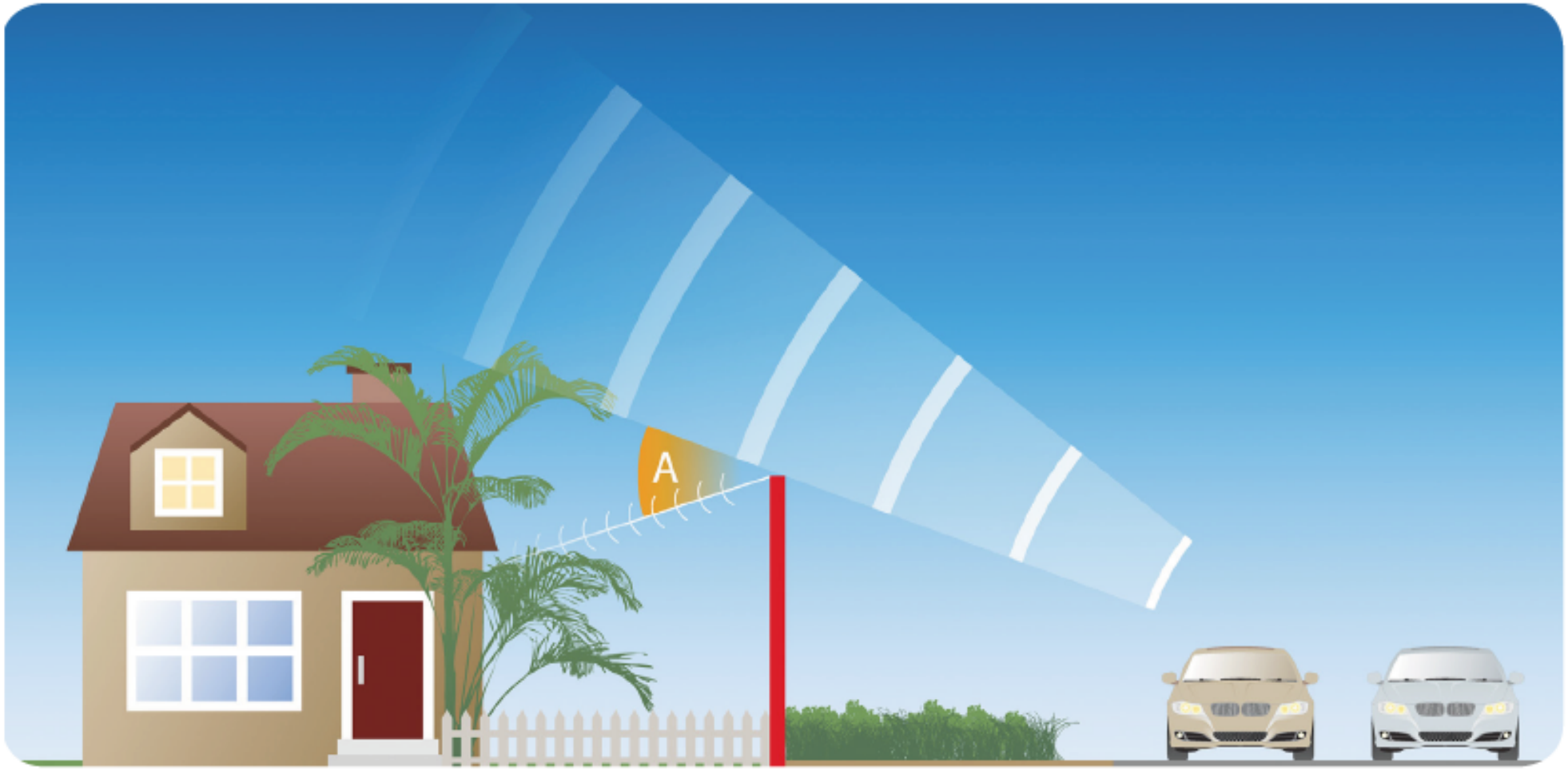
Typical values of sound insulation

Material	Sound Insulation
Plasterboard	15-20 dB
Double-glazed window	40 dB
Brick	45 dB
200mm concrete	50 dB

Environmental Noise Barriers

Screening the noise source is a common way of preventing noise spread:

- High walls or fences, purpose-built earth berms or bunds, or other buildings in the vicinity of the noise source.
- Noise can be refracted round obstacles.
- Screens may reduce noise from a small piece of equipment by preventing the noise escaping in a particular direction.
- Screens should be placed near to the source.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Damping

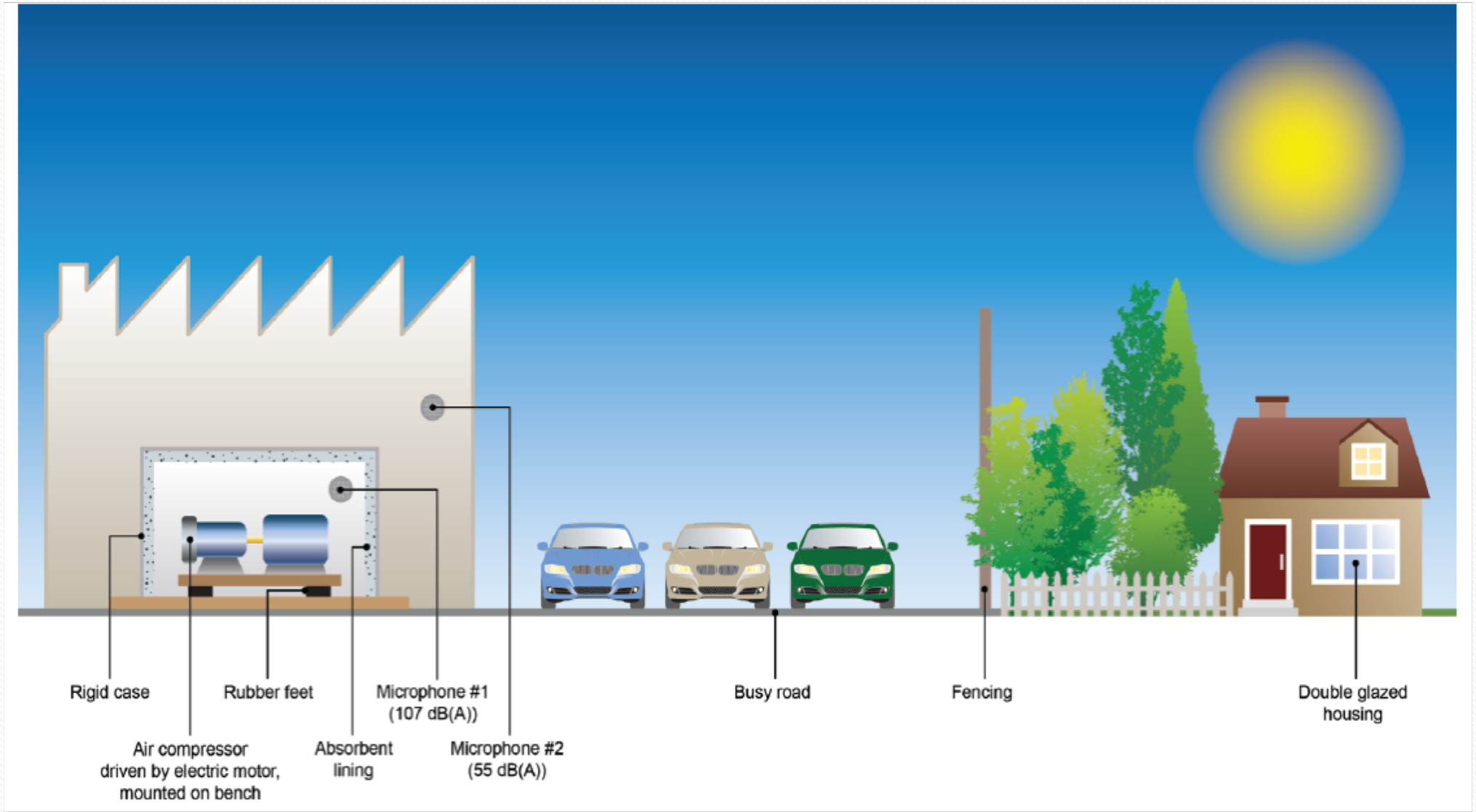
- Vibration is one of the main causes of noise.
- These vibrations can be transmitted from the source, via a rigid connection, to a variety of sites, such as the panels of a machine, floors, walls and tables (sounding boards).
- Isolating the machine on anti-vibration dampers or rubber mountings may reduce noise levels considerably, e.g. putting rubber feet around the legs of machines.
- Other damping techniques include construction methods using bolts rather than welds and surface coatings or bonding applied to sheet metal.

Silencing

- Certain types of equipment involving the intake or discharge of air or other gases may be fitted with acoustic silencers, similar to the way in which gunshot sounds or the noise from car exhausts may be prevented.
- These work by absorbing the sound pressure generated by the process at its source.

Practical Solutions

- Shutting off public-address systems and preventing use of radios.
- Repositioning doorways and compressor houses away from residential housing.
- Relocating stockyards away from houses.
- Resurfacing yards, particularly if forklift movements are involved.


Rigid case
Rubber feet
Microphone #1
(107 dB(A))
Busy road
Fencing
Double glazed
housing
Air compressor
driven by electric motor,
mounted on bench
Absorbent
lining
Microphone #2
(55 dB(A))

Question and answer session, discussion

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