STATUTORY INSTRUMENTS

2013 No……..

THE NATIONAL ENVIRONMENT (NOISE AND VIBRATIONS STANDARDS AND CONTROL) REGULATIONS, 2013

ARRANGEMENT OF REGULATIONS.

Regulation

PART I- PRELIMINARY.

1. Title.
2. Interpretation.
3. Purpose.
4. Exemptions

PART II- FUNCTIONS OF LOCAL AUTHORITIES

5. Functions and powers of local councils.
6. Functions of Environment Committees.

PART III-PERMISSIBLE NOISE LEVELS.

7. Noise Control Zones.
9. General prohibitions.
10. Establishment of permissible noise levels.
11 Radio, TV and other sound amplifying devices.
12. Parties and social events.
13. Hawkers, peddlers and touts.
14. Machinery.
15. Roads, traffic and construction noise.
17. Construction at night.
18. Noise, excessive vibrations from construction, demolition, mining or quarrying sites.

PART IV-CONTROL AND MITIGATION OF NOISE.

19. Duty to control noise.
20. Prevention and control.
22. Noise in streets.

PART V- MEASUREMENT OF NOISE AND VIBRATION

27. Measurement instruments.
29. Methods of measurement.
30. Location of measurements.
32. Recording of data.

**Measurement of Different Types of Noise**

33. Aviation noise.
34. Impulsive noise.
35. Trancient noise.
36. Other noise.

**PART VI-LICENCE FOR NOISE IN EXCESS OF PERMISSIBLE NOISE LEVELS.**

37. Application for a licence.
38. Duty to comply with licence.
39. Revocation of licence.
40. Additional powers to lead agencies.
41. Permits for fireworks, demolition, firing ranges and specific heavy duty industry.

**PART VII-ENFORCEMENT.**

42. Monitoring.
43. Complaints.
44. Improvement notice.
45. Closure notice.
46. Power to confiscate machinery.
47. Restitution of property.
48. Existing activities

**PART VIII- VIBRATION**

49. Definition.
50. Excessive vibrations.

**PART IX- GENERAL PROVISIONS**

51. Noise and excessive vibrations mapping bodies.
52. Strategic noise and excessive vibrations maps.
53. Action plans for control of noise and vibrations.
54. Health surveillance.
55. Duty to carry out Risk Assessment.
56. Assessment of risk to health created by vibration at the workplace.
57. General control of noise and vibrations
58. Protective equipment and reduced exposure time.
59. Elimination or control of exposure to vibration at the workplace.
60. Responsibility of the employer.
61. Protecting workers.
62. Persons to be informed.
63. Workers to comply.
64. Offences.
65. General penalty.
66. Revocation of S.I No. 30 of 2003
SCHEDULES.

SCHEDULE 1  MAXIMUM PERMISSIBLE NOISE LEVELS FOR GENERAL ENVIRONMENT

SECOND 2  MAXIMUM PERMISSIBLE NOISE LEVEL (CONTINUOUS OR INTERMITTEN NOISE) FROM A FACTORY OR WORKSHOP

SCHEDULE 3  MAXIMUM PERMISSIBLE NOISE LEVEL FOR IMPACT OR IMPULSIVE NOISE

SCHEDULE 4  MAXIMUM PERMISSIBLE NOISE LEVELS FOR CONSTRUCTION SITE

SCHEDULE 5  MAXIMUM PERMISSIBLE NOISE LEVELS FOR PUBLIC ANNOUNCEMENT SYSTEM OR DEVICE

SCHEDULE 6  MAXIMUM PERMISSIBLE NOISE LEVELS FOR PLACES OR ESTABLISHMENTS OF ENTERTAINMENTS

SCHEDULE 7  MAXIMUM PERMISSIBLE NOISE LEVELS FOR PLACES OR AREAS OF WORSHIP

SCHEDULE 8  MAXIMUM PERMISSIBLE NOISE LEVELS FOR ROADS AND ROAD CONSTRUCTION

SCHEDULE 9  MAXIMUM PERMISSIBLE NOISE LEVELS FOR ACCELERATING VEHICLES

SCHEDULE 10  MAXIMUM PERMISSIBLE NOISE LEVELS FOR MINES AND QUARRIES

SCHEDULE 11  MAXIMUM ALLOWABLE SOUND PRESSURE LEVELS IN THE WORKPLACE IN THE VICINITY OF ULTRA SOUND

SCHEDULE 12  PERMISSIBLE LIMITS FOR VIBRATION

SCHEDULE 13  PART I - APPLICATION FOR LICENCE TO EMIT NOISE IN EXCESS OF PERMISSIBLE NOISE LEVELS

PART II - LICENCE TO EMIT NOISE IN EXCESS OF PERMISSIBLE NOISE LEVELS

SCHEDULE 14  IMPROVEMENT NOTICE

SCHEDULE 15  GUIDELINES FOR NOISE SOURCES AND VIBRATION

3
IN EXERCISE of the powers conferred on the Minister responsible for the National Environment Act, by sections 29 and 108, and on the recommendation of the Policy Committee on the Environment and the Board, these Regulations are made this ……..21st day of………….., 2013.

PART I- PRELIMINARY.

1. Title
These Regulations may be cited as the National Environment (Noise and Vibrations) (Standards and Control) Regulations, 2013.

2. Interpretation
(1) In these Regulations, unless the context otherwise requires-

“Act” means the National Environment Act;

“A-weighting” means a frequency weighting applied to measure or predict sound levels in order to compensate for the non-linearity of human hearing;

“annoyance” means a feeling of displeasure evoked by noise or any feeling of resentment, discomfort or irritation occurring when noise intrudes into another person’s thoughts or mood or interferes with any activity being done by the affected person;

“Authority” means the National Environment Management Authority established by section 5 of the Act;

“construction” includes erection, alteration, repair, dismantling, demolition, structural maintenance, painting, mowing, land-clearing, earth-moving, grading, excavating, laying of pipes and conduits whether above or below ground level, street and highway building, concreting, installation and alteration of equipment, and the structural installation of construction components and materials in any form or for any purpose that includes any work in connection with the construction;

“daily exposure” means the quantity of noise or mechanical vibration to which a worker is exposed during a working day, normalised to an 8-hour reference period, which takes account of the magnitude and duration of the noise or vibration;

“dB (decibel)” means the unit of sound pressure level, calculated as a logarithm of the intensity of sound and 0dB is the threshold of hearing and 120 dB is the threshold of pain.

“dBA” means the unit in decibels on the A scale for quiet sounds;
“decibels” means a dimensionless unit used in comparison of the magnitude of sound pressures or powers;

“District Environment Committee” means a District Environment Committee established under the Act;

“disturbance” means any act or instance of interrupting the rest, calm, attention or quiet of another person;

“environmental inspector” means an environmental inspector appointed under the Act;

“Executive Director” means the Executive Director of the Authority or a person designated to act on his or her behalf;

“free field” means noise levels measured or predicted such that there is no contribution made up of reflections from nearby building facades;

“frequency band analysis” means noise and vibration measured using octave, half-octave and third octave band filters as defined in IEC Publication 225;

“hand transmitted vibration” means intensive vibration that can be transmitted from vibrating tools, vibrating machinery or vibrating work places to the hands and arms of operators;

“hearing impairment” means hearing loss exceeding a designated criterion – 25 dB, averaged from the threshold levels at 500, 1000, and 2000 Hz and is the difference between the audibility threshold and the standard reference zero at each frequency as defined in International Standard ISO 389-1975;

“hertz” means the unit of frequency (pitch) of a sound, formerly called cycles per second;

“infrasound” means acoustic oscillation whose frequency is too low to affect the sense of hearing;

“improvement notice” means a notice issued under regulation 44;

“impulsive noise” means a noise consisting of one or more bursts of sound energy, each of a duration of less than 1 second;

“intermittent noise” means a noise whose level suddenly drops to several times the level of the background noise;

“lead agency” means any agency to which the Authority delegates its functions under section 7(2) of the Act;

“Leq, (T)” means the equivalent continuous sound level or the sound level of a steady sound having the same energy as a fluctuating sound over a specified measuring period T and the T may be as short as 1 second when used to describe a single event or as long 8 hours when used to describe noise exposure during a working day or as 24 hours when used to describe
the noise climate at a specified location and $\text{Leq}_0(T)$ can be measured directly with an
integrating sound level meter;

“licence” means a licence to emit noise issued under regulation 37;

“licensee” means a person issued a licence under regulation 37;

“LEQ” means-

(a) the equivalent continuous sound level which has the same energy content and
consequently the same energy damage potential as the varying sound level; and

(b) the A-weighted noise level averaged over the measurement period which can be
considered as the continuous steady noise level which would have the same total A-
weighted acoustic energy as the real fluctuating noise over the same period of time as
described below:

$$\text{LEQ} = 10 \log_{10} \frac{1}{T_0} \int_0^T (p(t)/p_0)^2 \, dt$$

where: $p_0$ is the reference sound pressure, 20µPa,

$p(t)$ is the A-weighted sound varying with time

$T$ is the time interval over which it is measured;

“local council” means local government councils and administrative unit councils
established under the Local Governments Act, Cap 243;

“Local Environment Committee” means a Local Environment Committee established
under the Act;

“loudspeaker” means any electro-magnetic or electrical or mechanical device capable of
converting electrical signals or energy into sound, and includes an amplifier, microphone,
gramophone or similar instrument;

“mechanical vibration” means vibration occurring in a piece of machinery or equipment or
in a vehicle as a result of its operation;

“musical instrument” means any article or thing adapted for use in making or reproducing
musical sound and includes a radio receiver, television receiver, drum, keyboard, wind
instrument, guitar, steel piano, cassette or compact disk player;

“microphone” means a transducer that converts an acoustic disturbance into an electrical
output signal that is proportional to the acoustic disturbance;

“noise” means any sound which can result in hearing impairment or be harmful to health or
otherwise dangerous and is subdivided into-

(a) environmental noise covering road, rail and air transport noise;
(b) neighbourhood noise from people and activities such as places of worship (churches, mosques), entertainment including bars, pubs, clubs, barking dogs and music lessons and neighbour noise; and

(c) industrial noise generated from stationary sources including chemical or fertilizer production plants, refineries, asphalt plants, gravel crushers, manufacturing facilities, factories, electrical power plants, natural gas processing plants, pipeline compressor or pumping stations;

“noise pollution” means the release of uncontrolled noise that is likely to cause danger to human health or damage to the environment;

“occupier” in relation to any premises or facility, includes a tenant, agent, manager, foreman or other person acting or apparently acting in the general management or control of the premises or of any plant or facility or machinery;

“PEAK” means the maximum Peak Level in 1-second interval;

“Peak Particle Velocity (PPV)” expressed in millimetres per second (mm/s) means a vibration indicator used for the purposes of assessing potential annoyance to humans or damage to buildings;

“permissible noise levels” means the levels of noise prescribed under these Regulations;

“person responsible” in relation to the emission of noise, means the person to whose act, default or sufferance, the noise is attributable;

“phon” means a unit of loudness which is, by definition, equal to the sound pressure level (SPL) of that 1000 Hz tone which is equally loud under specified listening conditions namely a 1000 Hz pure tone heard at an SPL of 40 dB at reference pressure: 20 µPa under specified listening conditions;

“place of entertainment” means a building or other place where activities of amusement, entertaining, playing of music, dancing, performing of shows takes place;

“point of reception” means a point on any premises where sound or vibration originating from other premises or areas is received;

“SEL (sound exposure level)” means the constant sound level which has the same amount of energy in one second as the original sound event and is similar to Leq in that the total sound energy is integrated over the measurement period but instead of integrating it over the entire measurement period, reference measurement duration of one second is used;

“sound” means a fluctuation in pressure, particle displacement or particle velocity propagated in any medium or the auditory sensation that may be produced;

“street” means a highway, road or path to which the public have access, and includes a bridge over which a street passes and a privately owned road or path to which the public is granted access, whether generally or conditionally;
“ultrasound” means a sound oscillation whose frequency is too high to affect human hearing;

“vehicle” includes a machine or implement of any kind drawn or propelled along a street, whether by animal, mechanical, electrical or other motive power;

“vibration” means any vibration which is transmitted to the human body through solid structures and is harmful to health or otherwise dangerous;

“whole-body vibration” means vibration transmitted to the body as a whole through the supporting surface, namely the feet of a standing worker, the buttocks of a seated worker or the supporting area of a reclining man and is usual in vehicles, in vibrating buildings, and in the vicinity of working machinery and applies to vibration transmitted from solid surfaces to the human body in the frequency range 1-80 Hz;

“working day” means a daily working period, irrespective of the time of day when it begins or ends, and of whether it begins or ends on the same calendar day.

(2) Where more than one person is responsible for noise, these Regulations apply to each of those persons, whether or not the noise for which any one of them is responsible would itself amount to noise pollution or would result in a level of noise justifying action under these Regulations.

“vibration” means the movement of the body caused by mechanical rotating or revolving tools and entering the body at the feet, the seat or the fingers or the palm of the hands such as from the organ in contact with vibrating equipment;

“sound pressure level” means the maximum RMS level in 1-second interval;

“instantaneous noise” means the sampled RMS level at 1-second intervals;

“sound exposure level” means the constant sound level acting for 1 second which has the same amount of acoustic energy as the original sound and an alternative energy parameter to the LEQ used to compare single noise events including vehicle pass-by;

3. Purpose of Regulations
The purpose of these Regulations is to provide for the maintenance of a healthy environment for people and wildlife in Uganda, the tranquillity of their surroundings and psychological well-being by regulating noise and vibration levels, and generally, to elevate the standard of living of the people and the safety of wildlife by-

(a) prescribing regulations and standards to control noise and vibration and preserve the quality of the environment for humans and human interests including wildlife and buildings;

(b) prescribing the maximum noise and vibration levels from a facility or activity to which the person may be exposed;

(c) providing for the control of noise and for mitigating measures for the reduction of noise and vibration;

(d) providing an effective technical measures needed to –
(i) reduce noise and vibration emission by the various machine sources;

(ii) prevent the propagation, amplification and reverberation of noise and vibration; and

(iii) isolate and protect the sensitive areas from the noise and vibration;

(e) setting out strategies for the control of noise and vibration at the sources including-

   (i) factories;

   (ii) places of worship;

   (iii) places of entertainment;

   (iv) traffic;

   (v) places of care and treatment (hospitals);

   (vi) suppliers;

   (vii) petroleum activities including exploration, production, development, pipelines, refineries; and

   (viii) construction sites;

(f) placing responsibility upon the person who creates the noise and vibration;

(g) putting in place a mechanism to identify, involve and empower other key players in the control of noise and vibration, and spell out their duties in their control including-

   (i) local authorities;

   (ii) the police;

   (iii) lead agencies; and

   (iv) The National Environment Management Authority;

(h) providing for zone out areas with different land uses and set standards;

(i) creating offences and penalties; and

(j) generally for giving effect to the provisions of section 29 of the Act.

4. Exemptions.

These Regulations do not apply to-
(a) the emission of noise for the purpose of alerting persons to the existence of an emergency;

(b) emissions from military operations;

(c) the emission of noise in the performance of emergency response;

(d) the emission of noise in connection with the protection of the health and safety of residents or their property during emergency conditions;

(e) warning devices necessary for the protection of public safety, such as police, fire and ambulance sirens, and train horns; or

(f) parades and national celebrations

PART II- FUNCTIONS OF LOCAL AUTHORITIES

5. Functions and powers of local councils
(1) A local council may, in accordance with the Local Governments Act, make bylaws regulating noise and vibration pollution.

(2) The bylaws made by a local council under subregulation (1) shall not be inconsistent with the Act or these Regulations.

6. Functions of Environment Committees
(1) A District Environment Committee-

(a) is responsible for co-ordinating, monitoring and advising the District Council on compliance with, and enforcement of any by-law made under subregulation 4; and

(b) shall determine the times and places when noise may be emitted in its area of jurisdiction.

(2) A Local Environment Committee shall-

(a) enforce and ensure compliance with the Act, these Regulations and any other bylaw made in accordance with regulation 4;

(b) investigate complaints relating to noise or vibration and cause abatement of noise or vibration;

(c) prohibit the continuation of undesirable activities which cause noise and vibrations in excess of the permissible levels; and

(d) exempt certain activities, including emergency situations and traditional community activities, from the application of these Regulations.
PART III- PERMISSIBLE NOISE LEVELS.

7. Noise Control Zones
(1) The Executive Director may, in consultation with a local council, by notice in the Gazette, designate any area as a Noise Control Zone for the purpose of controlling the emission of noise in that area.

(2) A notice issued under subregulation (1) shall describe and delimit the area to which it applies, including the radius of the Noise Control Zone and shall define the period and time of the day during which persons are subject to control, or a particular building which is subject to control.

(3) Where the area in respect of which a Noise Control Zone notice is issued is within a specified radius of any specified building, the notice shall describe and delimit the area by reference to that area, building and radius.

(4) A person who fails to comply with a notice issued under this regulation commits an offence and is liable on conviction to a fine not exceeding one hundred currency points or imprisonment not exceeding one year or both and in case of a continuing offence, to an additional fine not exceeding one thousand currency points for every day or part of the day during which the offence continues.

8. Noise Level guidelines
(1) Noise impacts shall not exceed the levels prescribed under these Regulations or result in a maximum increase in background levels of 3 dB at the nearest receptor location off-site.

(2) Highly intrusive noises including noise and vibration from aircraft flyovers and passing trains, shall not be included when establishing background noise and vibration levels.

9. General Prohibitions.
(1) Except as provided under these Regulations, a person shall not make or cause to be made any loud, unreasonable, unnecessary or unusual noise or vibration which annoys, disturbs, injures or endangers the comfort, repose, health or safety of others and the environment.

(2) In determining whether noise or vibration is loud, unreasonable, unnecessary or unusual, the following factors may be considered-

(a) time of the day;

(b) proximity to residential area;

(c) whether the noise or vibration is recurrent, intermittent or constant;

(d) the level and intensity of the noise;

(e) whether the noise or vibration has been enhanced in level or range by any type of electronic or mechanical means; and

(f) whether the noise or vibration can be controlled without much effort or expense to the person making the noise.
A person who contravenes the provisions of this Regulation commits an offence and is liable on conviction to a fine not exceeding one hundred currency points or imprisonment not exceeding one year or both and in case of a continuing offence, to an additional fine not exceeding one thousand currency points for every day or part of the day during which the offence continues.

10. Establishment of permissible noise levels
(1) The maximum noise levels from a facility in the general/community environment to which a person may be exposed shall not exceed the level specified in Schedule 1 to these Regulations.

(2) The maximum noise levels of continuous or intermittent noise from a factory or a workshop to which a person may be exposed shall not exceed the level specified in Schedule 2 to these Regulations.

(3) The maximum noise level from impact or impulsive noise to which a person may be exposed shall be as specified in Schedule 3 to these Regulations.

(4) The maximum noise level from a construction site to which a person may be exposed, shall not exceed the level specified in Schedule 4 to these Regulations.

(5) The maximum noise level from a public announcement system, address system or device to which a person in the Noise Control Zone may be exposed, shall not exceed the level specified in Schedule 5 to these Regulations.

(6) The maximum noise level from a place of entertainment or establishment, to which a person may be exposed, shall not exceed the level specified in Schedule 6 to these Regulations.

(7) The maximum noise level from a place or area of worship to which a person in the specified Noise Control Zone may be exposed shall not exceed the level specified in Schedule 7 to these Regulations.

(8) The maximum noise level from roads and road construction to which a person may be exposed in the category specified shall not exceed the level specified in Schedule 8 to these Regulations.

(9) The maximum noise level from an accelerating vehicle to which a person may be exposed in the category specified shall not exceed the level specified in Schedule 9 to these Regulations.

(10) The maximum noise level from a quarry or mine to which a person in the facility specified may be exposed shall not exceed the level specified in Schedule 10 to these Regulations.

(11) The maximum allowable sound pressure levels in the workplace in the vicinity of ultrasound to which a person may be exposed in the category specified shall not exceed the level specified in Schedule 11 to these Regulations.
11. Radio, TV and other sound amplifying devices
(1) A person shall not use or operate any radio or receiving set, musical instrument, phonograph, television set, any other machine or device for producing or reproducing sound or any other sound-amplifying equipment in a loud, annoying or offensive manner such that the noise from the device-

(a) interferes with the comfort, repose, health or safety of members of the public;

(b) creates a risk within any building or outside of a building, at a distance of 30 meters or more from the source of such sound; or

(c) interferes with the conversation of members of the public who are 30 meters or more from the source of such sound.

(2) Any person who contravenes this Regulation commits an offence and is liable on conviction to a fine not exceeding one hundred currency points or imprisonment not exceeding one year or both and in case of a continuing offence, to an additional fine not exceeding one thousand currency points for every day or part of the day during which the offence continues.

(3) For the purposes of this regulation, “person” includes –

(a) where the offence occurs on any public property where permission was obtained to use that public property, the person or persons who obtained permission to utilize that property for that event;

(b) where the offence occurs on private property, any adult person or persons who live in or on the property that is involved in the offence; and

(c) where the offence occurs after granting of a license pursuant to this Regulation, the person or persons who are listed on the licence.

12. Parties and social events.
(1) A person in charge of a party or other social event which occurs on any private or public property shall ensure that the party or event does not produce noise in a loud, annoying or offensive manner that interferes with the comfort, repose, health or safety of members of the public within any building or outside of a building or recklessly creates the risk to health and the environment, at a distance of 30 meters or more from the source of the sound.

(2) Any person who contravenes this Regulation commits an offence and is liable on conviction to a fine not exceeding one hundred currency points or imprisonment not exceeding one year or both and in case of a continuing offence, to an additional fine not exceeding one thousand currency points for every day or part of the day during which the offence continues.

(3) For the purposes of this Regulation, a person in charge of a party or other social event-

(a) that occurs on any public property shall include the person or persons who obtained permission to utilize that property for that event;
(b) that occurs on private property shall include the person who owns the premises involved and any adult person who lives in or on the premises involved in such party or social event; and

c) shall include the person who is listed on a permit issued by the Authority or local council with respect to the event.

13. Hawkers, peddlers and touts
(1) A person shall not-

(a) tout, advertise, promote or sell any goods; or

(b) engage in any commercial activity,

in such manner as to emit noise by shouting within the Central Business District of any town, a residential area, a silent zone, or any other area declared as a silent zone or noise control zone by the Authority.

(2) Subregulation (1) shall not apply to the selling by shouting of merchandise, food and beverages at licensed sporting events, parades, fairs, circuses and other similar licensed public entertainment events.

(2) Any person who contravenes this Regulation commits an offence and is liable on conviction to a fine not exceeding one hundred currency points or imprisonment not exceeding one year or both and in case of a continuing offence, to an additional fine not exceeding one thousand currency points for every day or part of the day during which the offence continues.

14. Machinery.
(1) A person wishing to operate or repair any machinery, motor vehicle, construction equipment or other equipment, pump, fan, air-conditioning apparatus or similar mechanical device engage in any commercial or industrial activity, which is likely to emit noise or excessive vibrations, shall carry out the activity within the relevant levels prescribed in the Schedules to these Regulations.

(2) Any person who contravenes this Regulation commits an offence and is liable on conviction to a fine not exceeding one hundred currency points or imprisonment not exceeding one year or both and in case of a continuing offence, to an additional fine not exceeding one thousand currency points for every day or part of the day during which the offence continues.

15. Roads, traffic and construction noise
(1) Subject to these Regulations, a person shall not, for traffic activities emit noise in excess of the level specified in Schedule 8 to these Regulations, unless permitted under a licence issued by the Authority.

(3) A person who contravenes subregulation (1) commits an offence and is liable on conviction to a fine not exceeding one hundred currency points or imprisonment not exceeding one year or both and in case of a continuing offence, to an additional fine not exceeding one thousand currency points for every day or part of the day during which the offence continues.
(1) A person shall not operate a motor vehicle which produces any loud or unusual sound in excess of the maximum level specified in Schedule 9 to these Regulations.

(2) A person shall not at any time sound the horn or other warning device of a vehicle except when necessary to prevent an accident or an incident.

(3) The Traffic and Road Safety Act shall apply in addition to this Regulation.

(4) A person who contravenes the provisions of this Regulation commits an offence and is liable on conviction to a fine not exceeding one hundred currency points or imprisonment not exceeding one year or both and in case of a continuing offence, to an additional fine not exceeding one thousand currency points for every day or part of the day during which the offence continues.

17. Construction at night.
(1) Subject to subregulation (2), a person shall not operate construction equipment including any pile driver, steam shovel, pneumatic hammer, derrick or steam or electric hoist at night or perform any outside construction or repair work at night so as to emit noise in excess of the permissible levels prescribed in Schedule 4 to these Regulations.

(2) This Regulation shall not prevent-

   (a) any construction work of an emergency nature;

   (b) work of a domestic nature on buildings, structures or projects being undertaken by a person residing in such premises; or

   (c) public utility construction, or, with respect to construction of public works, projects exclusively relating to roads, bridges, airports, public schools and sidewalks.

(3) Where any domestic power tool including mechanically powered saws, sanders, grinders and lawn and garden tools used outdoors, is operated during the night time hours, a person shall not operate such machinery so as to cause noise within a residential building or across a residential building where the noise interferes with the comfort, repose, health or safety of members of the public within any building or outside of a building, at 30 meters or more from the source of the sound.

(4) A person who contravenes the provisions of this regulation commits an offence and is liable on conviction to a fine not exceeding one hundred currency points or imprisonment not exceeding one year or both and in case of a continuing offence, to an additional fine not exceeding one thousand currency points for every day or part of the day during which the offence continues.

18. Noise, excessive vibrations from construction, demolition, mining or quarrying sites.
(1) Where defined work of construction, demolition, mining or quarrying is to be carried out in an area, the Authority may impose requirements on how the work is to be carried out including but not limited to requirements regarding -
(a) machinery that may be used, and

(b) the permitted levels of noise as prescribed in the respective Schedules to these Regulations.

(2) The relevant lead agency shall ensure that mines and quarries where explosives and machinery are used are located in designated areas and not less than two kilometres away from human settlements.

(3) Any person carrying out construction, demolition, mining or quarrying work shall ensure that the vibration levels do not exceed 0.5 centimetres per second beyond any source property boundary or 30 metres from any moving source.

(4) A person who contravenes the provisions of this regulation commits an offence and is liable on conviction to a fine not exceeding one hundred currency points or imprisonment not exceeding one year or both and in case of a continuing offence, to an additional fine not exceeding one thousand currency points for every day or part of the day during which the offence continues.

PART IV - CONTROL AND MITIGATION OF NOISE.

19. Duty to control noise
(1) The owner of machinery or the owner or occupier of a facility or premises or person responsible for any activity, shall use the best practicable means to ensure that the emission of noise and vibration from that machinery, facility, premises or activity does not exceed the permissible noise levels.

(2) The owner of machinery or the owner or occupier of an industry or establishment shall install, at the premises, sound level meters for the measurement and monitoring of sound from the industry or establishment to ensure that the noise emitted does not exceed the permissible noise levels.

(4) A person who contravenes regulation commits an offence and is liable on conviction to a fine not exceeding one thousand currency points or imprisonment not exceeding one year or both and in case of a continuing offence, to an additional fine not exceeding one thousand currency points for every day or part of the day during which the offence continues.

20. Prevention and control
(1) The owner or operator of a facility, machinery or premises shall apply noise and vibration prevention and mitigation measures where predicted or measured noise or vibration impacts from the facility, machinery, premises or operations exceed the applicable noise level provided under these Regulations at the most sensitive point of reception.

(2) The owner or operator of a facility, machinery, premises or operations shall control noise and vibration from the stationary sources and implement noise and vibration control measures at the source.

(3) The methods for prevention and control of sources of noise emissions shall depend on the source of the noise or vibration and proximity of receptors.
(4) Noise reduction options to be considered by the operator shall include:

(a) selecting equipment with lower sound power levels;

(b) installing silencers for fans;

(c) installing suitable mufflers on engine exhausts and compressor components;

(d) installing acoustic enclosures for equipment casing radiating noise;

(e) improving the acoustic performance of constructed buildings, apply sound insulation; or

(f) installing acoustic barriers without gaps and with a continuous minimum surface density of 10 kg/m² in order to minimize the transmission of sound through the point of reception or receptor.

(5) At the design stage of a project, equipment manufacturers shall provide design or construction specifications in the form of “Insertion Loss Performance” for silencers and mufflers, and “Transmission Loss Performance” for acoustic enclosures and upgraded building construction barrier.

(6) Barriers shall be located as close to the source or to the receptor location to be effective for:

(a) installing vibration isolation for mechanical equipment;

(b) limiting the hours of operation for specific pieces of equipment or operations, especially mobile sources operating through community areas;

(c) re-locating noise sources to less sensitive areas to take advantage of distance and shielding siting permanent facilities away from community areas if possible;

(d) taking advantage of the natural topography as a noise buffer during facility design;

(e) reducing project traffic routing through community areas wherever possible;

(f) planning flight routes, timing and altitude for aircraft (airplane and helicopter) flying over community areas; or

(g) developing a mechanism to record and respond to complaints.

21. Prohibition of generation of noise by place and time

(1) A person shall not emit, cause or permit the emission of noise resulting from any act specified in subregulation (2) if that noise is clearly audible at a point of reception or in the neighbourhood for more than two minutes or is within the prohibited time in a residential area or Noise Control Zone as determined by the Executive Director or a local council under regulation 5.

(2) The acts referred to in subregulation (1) include:
(a) yelling, laughing, clapping, shouting, hooting, pounding, whistling and singing;

(b) selling or advertising by shouting, outcry or amplified sound;

(c) operation of any equipment in connection with construction;

(d) detonation of fireworks or explosive devices not used in construction;

(e) operating any auditory signalling device, including but not limited to the ringing
    of bells or gongs and the blowing of horns or sirens or whistles, or the production,
    reproduction or amplification of any similar sound by electronic means; and

(f) operating or playing a radio or musical instrument or any electronic device or
    group of connected devices incorporating one or more loudspeakers, transducers
    or other electro-mechanism, which is intended for the production, reproduction or
    amplification of sound.

(3) Notwithstanding subregulation (1), a local council may permit the operation of an
    electronic device or loudspeakers or the emission of noise for purposes of creating public
    awareness, demonstration, religious assembly, political debate, cinematography, and musical
    or other theatrical entertainment, beauty competition, handicraft show, fair, circus, private
    dance, party, lecture or public hearing.

(4) Subregulation (1) does not apply to-

    (a) noise caused by the operation of a loudspeaker or siren for fire brigade, ambulance
        or police purposes;

    (b) noise caused by emergency measures undertaken to safeguard health, safety or
        welfare of the people;

    (c) noise caused, or continuance of noise caused by a person as a result of temporary
        or accidental cause which could not have been prevented by the exercise of due
        diligence and care on the part of that person;

    (d) noise caused by the horn of a vehicle for the purpose of giving sufficient warning
        of the approach or position of the vehicle;

    (e) noise caused at or by an educational class or recreation in or around a school,
        college, university or other educational institution;

    (f) noise caused at or by athletics or during a sports event;

    (g) noise caused at a cultural activity or cultural show, funeral service or rite held
        between the hours of 6.00 a.m. and 11.00 p.m. of the same day in any area;

    (h) noise caused at a marriage ceremony or wedding celebration or ritual between the
        hours of 8.00 a.m. and 11.00 p.m. of the same day; or
(i) noise caused during a period, or by such a cause or for a purpose as the Executive Director may, by notice, specify.

(5) For purposes of this regulation, a residential or Noise Control Zone means a geographical area that encompasses hospitals, schools, residential houses and other institutions that require special considerations for noise control.

(6) A person who contravenes the provisions of this Regulation commits an offence and is liable on conviction to a fine not exceeding one thousand currency points or imprisonment not exceeding one year or both and in case of a continuing offence, to an additional fine not exceeding one thousand currency points for every day or part of the day during which the offence continues.

22. Noise on the streets
Subject to these Regulations, and except where permitted in accordance with the Police Act, a loudspeaker shall not be operated in a street between the hours of 11.00 p.m. and 7.00 a.m. the following day, for any purpose.

Any person intending to carry out construction, demolition, mining or quarrying work shall, during the Environmental Impact Assessment studies-

(a) identify natural resources, land uses or activities which may be affected by noise or excessive vibrations from the construction, demolition, mining or quarrying;

(b) determine the measures which are needed in the plans and specifications to minimize or eliminate adverse construction, demolition, mining or quarrying noise or vibration impacts; and

(c) incorporate the needed abatement measures in the plans and specifications.

PART V - MEASUREMENT OF NOISE AND VIBRATION

24. Measurement and control of noise

(1) A person shall not cause noise from any source which exceeds any sound level as set out in the applicable Schedule to these Regulations.

(2) Measurements shall be taken by the person causing the noise.

(3) Where the person responsible for the emission of noise or vibration fails to undertake measurements under subregulation (2) after being given reasonable notice by the Authority, the measurement shall be taken by a person dully authorized by the Authority, who is knowledgeable in the proper use of the measuring equipment at the cost of the person responsible for the noise.

(4) The Authority may, in consultation with the relevant lead agency or local council issue guidelines for the measurement of noise and excessive vibration.

(5) Any person who makes noise in excess of the prescribed levels commits an offence and is liable on conviction to a fine not exceeding one hundred currency points or imprisonment not
exceeding one year or both and in case of a continuing offence, to an additional fine not exceeding one thousand currency points for every day or part of the day during which the offence continues.

25. Measurement of noise
(1) A person responsible for noise pollution or likely noise pollution shall undertake measurement of noise in accordance with these Regulations.

(2) The purpose of measurement of noise shall be to-
   (a) ensure compliance with these Regulations;
   (b) investigate complaints;
   (c) evaluate remedial measures;
   (d) assess the number of persons exposed;
   (e) confirm compliance with land use planning and environmental impact assessment;
   (f) establish trends;
   (g) carry out research noise surveys; and
   (h) ensure calibration and validation of predictions such as in road constructions.

26. Noise metrics to measure
(1) The lead agency, owner or operator of a facility, equipment or responsible person shall use Leq, as a metric to measure continuous noise such as road traffic noise, industrial noise, and noise from ventilation systems in buildings and live music performance.

(2) When there are distinct events to the noise such as with aircraft fly by or railway noise passing by, measurements of individual events shall be obtained using Leq (max) in addition to plain Leq and SEL.

27. Measurement instruments
(2) The noise emitted shall be measured by means of a sound-level meter of the Type 1.

(3) In choosing an instrument to measure noise, the operator or owner of a facility or equipment shall ensure that the dynamic of the instrument range is sufficiently wide to prevent “overshoot” when measuring impulses and that the frequency response is broad enough where infrasound or ultrasound is to be measured.

(4) The instrument for measurement of noise shall be capable of making measurements of frequencies as low as 2 Hz for infrasound and up to at least 20 kHz for ultrasound, with microphones that are sufficiently small.

(5) The sound level meter shall be fitted with a 1/2-inch condenser microphone whose frequency range is 2 Hz - 40 Hz (within ±2dB) and with a dynamic range of 22 - 160 dB
and shall be capable of being set to “fast” (F), “Slow” (S), “Instant” (I) or “Maximum” (Max), “Minimum” (Min), or “Peak Hold” and “All Pass”.

(6) Sound level meters shall be categorized by their precision, ranging from the most precise (Type 0) to the least (Type 3).

(7) Meter Types may be used as follows-
   (a) Type 0 meter for laboratory;
   (b) Type 1 meter for other precision sound level measurements;
   (c) Type 2 meter for general purpose meter; and
   (d) Type 3 meter for survey and is not recommended for industrial use.

(7) For evidence taking measurements, Type 1 meters shall be used.

28. Conditions of Measurements
(1) Measurement of noise shall be carried out in fine weather with little wind.

(2) Where there is any amount of wind, a wind shield must be fitted to the sound level meter.

(3) No person other than the observer taking the readings from the apparatus may remain near the microphone, or obstruct the sound pressure wave as the presence of spectators near either the objective or the microphone may considerably affect the readings from the apparatus.

(4) Marked fluctuations of the pointer which appear to be unrelated to the characteristics of the general sound level shall be ignored in taking readings.

29. Method of measurement.
(1) At least two measurements shall be made on each side of the object.

(2) Preliminary measurements may be made for adjustment purposes but shall be disregarded.

(3) The microphone shall be situated 1.2 metres above ground level at a distance of 7.5 metres, for traffic noise, and 2 metres from the façade for other measurements to avoid the effect of reflections from the façade on the true value of the reading.

(4) For single event noise, the maximum sound level, Leq (Max), recorded shall constitute the result of the measurement.

(5) The measurements shall be considered valid if the difference between two consecutive measurements on the same side of the objective does not exceed 2 dB$_A$.

(6) Measurements of sound level may be averaged over two distinctly different periods of time.
(7) Steady sound levels and instantaneous levels of variable sounds shall be measured on a very short time scale of 1 second or less.

(8) Variable sounds may be measured with a much longer average time, over periods of hours if necessary, and shall be expressed in terms of the equivalent continuous sound pressure level (Leq).

30. Location of measurements
(1) Measurements shall be made close to the receiver of the noise rather than the source of it; for example if there is concern about residents exposed to traffic noise, the measurement shall be close to the location of the residents rather than close to the road.

(2) To avoid reflections from nearby acoustically reflecting surfaces, the microphone shall be located at least 3.5 metres from the surfaces when located outdoors.

(3) The microphone shall be at the height of from 1.2 to 1.5 metres above the ground or floor.

31. Calibration and quality assurance
(1) Microphones for measurement of noise shall be individually calibrated at the factory, and the calibration chart must be delivered and be with the instrument.

(2) In the field, calibration shall be performed by applying a known sound pressure level at a fixed frequency to the microphone.

(3) Calibrators shall be small, battery driven and operate on different principles, operate at 250 Hz and produce a sound level of 124 dB, accurate to + 0.2 dB.

(4) To obtain the best results, the microphone shall be well sealed in the coupler opening.

(5) A change in atmospheric pressure alters the calibration level slightly, but a correction can be made using the barometer which is provided as a part of the instrument set or a pocket unit, which operates at 1000 Hz.

(6) The calibration level shall be 94 dB with an accuracy of + 0.5 dB.

(7) The use of a calibrator as defined by IEC 60942 is recommended for checking the accuracy of hand-held indicating instruments, and shall be used when tape recording data.

(8) Accurate calibration of equipment shall be used in the field to provide for-

(a) consistency in measurements;

(b) allows accurate comparison of measurements made over long time intervals;

(c) brings to light any slight changes in the accuracy of instrumentation; and

(d) allows a reanalysis of data, if required at a later date.
(9) In order to check the frequency response and the amplitude response of the equipment, care in the use of calibration for field measurements shall be backed up by regular laboratory calibration using more accurate techniques.

(10) Sound level metres shall be calibrated using small factory calibrated sound sources.

(11) Calibrations shall be made daily and before measurements and shall be done more often if there is a possibility that handling of the sound level meter may have modified its sensitivity.

(12) A calibration check shall be made both before and after the measurement.

(13) Annual factory calibration of all noise measuring equipment to traceable standards shall be carried out in accordance with ISO 1994.

32. Recording of data

When noise is measured in a working environment, adequate data shall be collected including:

(a) the location, nature, dimensions and other distinctive features of the place of work or environment where measurements are made;

(b) the source or sources of the noise, the location of the source in the plant or environment, and the type of work being done or activity happening;

(c) the instrument used, its accessories, the results of calibration tests, and the values indicated;

(d) the location at which measurements were made, and the direction of the microphone;

(e) the number of workers or subjects exposed to noise;

(f) the duration of workers exposure; and

(g) the date and time, and the name of the observer.

Measurement of Different Types of Noise.

33. Aviation noise

(1) The measurements for long-term average sound pressure levels from aircraft near air ports shall include different network weightings, different summations of levels and number of events as well as different times of the day weightings.

(2) Aviation noise measurements shall be based on an equal energy approach and hence sum up the total energy of the number of aircraft fly-overs and the measurements shall be based on the Leq A-Weightings.

(3) Where low frequency noise is predominant, the measurements shall be done in C-Weighting network giving $\text{dB}_C$ values and frequency analysis shall be carried out.

34. Impulsive noise
(1) Impulsive noise shall consist of one or more bursts of sound energy, each of duration of less than about one second as specified in ISO, 1973a.

(2) Sources of impulsive noise may include impacts of all kinds including hammer blows, gun shots, explosions including fireworks, and sonic booms, or other blasts and significantly exceed the background sound pressure level for a very short duration heard singly or as in the case of a stamping press, repetitively.

(3) To characterize sounds acoustically, the owner or operator of a facility or machinery shall estimate the peak sound pressures together with the duration, rise time, repetition rate, and the number of pulses.

(4) The mean square pressure of the sound referred to under subregulation (3) may change so rapidly that it cannot be measured with a conventional sound level meter, even using the "fast response" (0.1 sec) setting.

(6) For more accurate measurements, a 35-millisecond averaging time shall be specified for standard "impulse" sound level meters as specified under IEC, 1973b.

(7) The averaging time of the inner ear is very short (about 30 microseconds) and some new impulse sound level meters have "peak hold" settings with an averaging time of 20 microseconds and the meter response time must be shorter to measure the impulse type sounds.

(8) C-Weighted levels may be used for specific events including noise from gun shots.

35. **Transient noise**.  
For transient noise, Leg (Min) dBA shall be recorded because it may result in wide variations from background noise to maximum level and if only the maximum level is reported, information on the duration of the noise, an important feature for rating annoyance is lost which makes it difficult to compare between rapid and slow events, and to combine different events for noise.

36. **Other types of noise**  
Speech intelligibility and Indoor noise shall be measured using the Leq A-Weightings.

**PART VI- LICENCE FOR NOISE IN EXCESS OF PERMISSIBLE NOISE LEVELS.**

37. **Application for a licence**  
(1) An owner or occupier of premises or a person responsible whose works or activities are likely to emit noise in excess of the permissible noise levels shall apply to the Executive Director in the Form prescribed in Part I of Schedule 13, for a licence to emit noise in excess of the permissible levels.

(2) An applicant for the licence under these Regulations shall provide the following information-

   (a) the reasons for the usage, including a demonstration as to why it is desirable or necessary that the sound source involved be authorized by a licence under these Regulation;
(b) plans and specifications of the use of the licence;

(c) noise-abatement and control methods to be used with respect to the sound source involved;

(d) the period of time during which the licence shall apply;

(e) the name of the person(s) who is responsible for ensuring that the activity complies with any licence issued under these Regulations; and

(f) evidence that notification of the application for the licence has been given to each person reasonably expected to be affected by the noise, the content of such notification and the manner in which such notification has been given, if the event is not a community or public event.

(3) The notification referred to under subregulation (3) shall state that any person objecting to the granting of such a licence may contact the appropriate office to whom the application is being made to express his or her opposition to the granting of the licence.

(4) When determining whether a licence should be issued, the factors the Authority shall consider shall include but shall not be limited to –

(a) the level of the noise or excessive vibrations;

(b) the proximity of the noise or excessive vibrations to accommodation or residential facilities;

(c) the time of the day or night the noise or excessive vibrations occur;

(d) the time duration of the noise or excessive vibrations; or

(e) the impact of the noise on persons living or working in different places or premises who are affected by the noise or excessive vibrations.

(5) The Authority shall process the application for a licence within two days from the date of receipt of the application, failure to which the applicant shall be free to proceed with the activity in respect of which the application is made.

(6) The Executive Director, on receiving an application under subregulation (1), may issue the occupier or owner of the premises with a licence to emit noise in excess of the permissible levels in the prescribed Form in Part II of Schedule 13 to these Regulations, on such terms and conditions as may be contained in the licence.

(7) A licence shall contain requirements relating to the manner in which the works or activities are to be carried out and may, in particular specify–

(a) the plant or machinery to be used;

(b) the hours during which the works or activities may be carried out;
(c) the level of noise or vibration which may be emitted in excess of the permissible noise levels;

(d) the proximity of the noise or excessive vibrations that might be emitted from the activities;

(e) the works or activities and the method by which they are to be carried out; and

(f) the steps proposed to be taken to minimize noise resulting from the works or activities.

(8) In issuing a licence, the Executive Director shall have regard to-

(a) the need for ensuring that the best practicable means are employed to minimize noise;

(b) the desirability, in the interest of a licensee, of other methods or plant or machinery which would be substantially as effective in minimizing noise and which are more acceptable; and

(c) the need to protect any person in the locality in which the premises in question are situated, from the effects of the noise.

(9) The relevant lead agency or local council shall have the power to attach such other conditions under as they may deem necessary to a licence or permit issued under these Regulations.

38. Duty to comply with licence
(1) Where the works or activities to which the licence relates are carried out by a person other than the licensee, it is the duty of the licensee to take all steps to ensure that the licence, and any conditions specified in it are complied with by the person carrying out the works or activities.

(2) A person who carries out works or activities, or permits works or activities to be carried out without a licence, or contravenes any requirement or condition of a licence commits an offence and is liable on conviction to a fine not exceeding ten thousand currency points or imprisonment not exceeding two years or both.

39. Revocation of licence
The Executive Director may, at any time and after giving notice of seven days to the licensee, revoke a licence if he or she is satisfied that the conditions of the licence have not been complied with, or that the continued emission of noise in excess of the permissible noise levels is likely to be injurious to the residents in the area, or to the environment.

40. Additional powers to the lead agencies.
In order to further the purposes of these Regulations and to facilitate compliance and enforcement, the relevant lead agencies shall have power to attach such other conditions in relation to these Regulations as they may deem necessary to a licence or permit issued under these Regulations.
41. Permits for fireworks, demolition, firing ranges and specific heavy duty industry.
(1) A person shall not carry out activities relating to fireworks, demolitions, firing ranges or specific heavy industry without a permit issued by the Authority.

(2) An application for a permit shall be made to the Authority in the Form prescribed by the Authority and shall be accompanied by the prescribed fee.

(3) The Authority may, on receiving an application, issue the applicant with a permit to carry out fireworks, demolitions, firing ranges and specific heavy industrial work, in the Form prescribed by the Authority, on such terms and conditions as may be contained in the permit.

(4) A permit to carry out activities such as fireworks, demolitions, firing ranges and specific heavy industry shall be valid for a period not exceeding three months.

(5) Any person who contravenes the provisions of this Regulation commits an offence and is liable on conviction to a fine not exceeding one thousand currency points or imprisonment not exceeding one year or both.

PART VII- ENFORCEMENT.

42. Monitoring
(1) Noise monitoring shall be carried out by the National Environment Management Authority or a person authorised by NEMA, a local authority, a lead agency or the police for the purposes of establishing the existing ambient noise levels in the area of the proposed or existing facility, or for verifying operational phase noise levels.

(2) Noise monitoring programs shall be designed and conducted by trained specialists.

(3) Typical monitoring periods shall be sufficient for statistical analysis and may last hours with the use of noise monitors that shall be capable of logging data continuously over this time period, or hourly, or more frequently, as appropriate or cover differing time periods within several days, including weekday and weekend workdays.

(4) The type of acoustic indices recorded shall depend on the type of noise being monitored, as established by a noise expert and monitors shall be located approximately 1.5 m above the ground and no closer than 3 m to any reflecting surface including wall.

(5) In general, the noise level limit shall be represented by the background or ambient noise levels that would be present in the absence of the facility or noise source under investigation.

43. Complaints
(1) Any person may lodge a complaint with the Executive Director or a local council on the grounds that he or she is aggrieved by noise being emitted or likely to be emitted or where the noise is so loud, continuous, repeated, of such duration or pitch or occurring at such times as to give reasonable cause or annoyance to the person in contravention of these Regulations.

(2) The complaint shall contain a written record including, where possible, dates and times during which the perceived noise or nuisance occurred or a tape recording of the type of noise experienced and any other important evidence.
(2) Any person or group of persons is entitled to bring an action in a court of competent jurisdiction to stop, prevent or control the emission of noise from any source or place.

(3) In lodging a complaint under subregulation (1) or an action under subregulation (2), the complainant shall show or prove personal loss, injury or discomfort caused by the emission of the alleged noise.

(4) On receiving a complaint under subregulation (1), the Executive Director, a lead agency or local council shall take all reasonable steps to ensure that the noise is abated or controlled and that these Regulations are complied with.

(5) The Executive Director or local council shall, where it considers necessary in order to prevent or limit noise, serve a notice on any person in charge of premises, processes or works, other than an activity which is licensed by the Authority.

(6) The Executive Director or local council may invite both parties together and listens to both sides before making a decision on the complaint.

(7) The Magistrate’s Court is the court of first instance for bringing an action for the control of noise under these Regulations.

(8) The Court may, order the person or body making, causing or responsible for the noise to take the measures necessary to reduce the noise to a specified level or to take specified measures for the prevention or limitation of the noise.

(9) Where the court finds in the complainants favour, it may order the person or body to limit the noise, reduce the level of noise or stop the noise completely.

(10) Any orders made by the court must be complied with.

**44. Improvement notice.**

(1) Where an Environmental Inspector has reasonable cause to believe that any person is emitting or is likely to emit noise or excessive vibration in any area in excess of the maximum permissible levels, or is causing or is likely to cause annoyance, the Environmental Inspector may, with the approval of the Executive Director, in consultation with the relevant lead agency, serve an improvement notice on that person in the Form prescribed in Schedule 14 to these Regulations, directing all or any or all of the following-

   (a) the cessation of the noise or excessive vibration, or prevention or discontinuance of any annoyance, or prohibiting or restricting its occurrence or reoccurrence;

   (b) compliance with the permissible noise or excessive vibration levels;

   (c) the reduction of the level of noise or excessive vibration emanating from the premises to a level specified in the notice;

   (d) requiring the carrying out of an environmental audit;

   (e) compelling a lead agency to take measures to prevent, discontinue or stop the emission of the noise or excessive vibration;
(f) the prevention of any subsequent increase in the level of noise or excessive vibration emanating from the premises or area;

(g) issue such directions intended to contribute to the reduction of emission of noise or excessive vibration from or within the vicinity of a specified area;

(h) the execution of such works, and the taking of such steps, as may be specified in the notice; or

(i) carrying out of any other order as may be issued.

(2) Notwithstanding any provision of these Regulations, where it appears to the Environmental Inspector that the level of noise emanating from any premises or area is not acceptable or is causing a public nuisance, the inspector may issue an improvement notice, for the benefit of the public.

(3) An improvement notice issued under subregulation (1) or subregulation (2) shall specify the period within which the requirements of the notice are to be complied with.

(4) The improvement notice shall be served on the person responsible or alleged to cause or likely to cause the noise pollution or annoyance or, if that person cannot be found, or the noise or annoyance has not yet occurred, on the owner or occupier of the premises from which the noise is emitted or is likely to be emitted.

(5) Any person who fails or refuses to comply with the conditions in an improvement notice commits an offence and is liable, upon conviction, to a fine not exceeding one thousand currency points or imprisonment exceeding two years or to both.

(6) The failure to comply with the conditions in an improvement notice within the period specified in the notice is prima facie evidence of the commission of an offence.

45. Closure notice.
Where there is continuous emission of noise or excessive vibration after the Environmental Inspector has issued an improvement notice, the Environmental Inspector may, with the approval of the Executive Director and in consultation with the relevant lead agency, order the closure of an establishment or undertaking emitting such noise or excessive vibration.

46. Power to confiscate machinery
(1) An Environmental Inspector, the Executive Director or a member of a local council may seize, impound or confiscate any property, tool, machinery or other instrument which is likely to, or has caused the emission of noise, if, in his or her opinion the confiscation would cause tranquillity in the area.

(2) The Executive Director, an Environmental Inspector or a member of a local council may remove from the source of the noise or render inoperable by the removal of any part from, or lock or seal or close so as to make unusable, any instrument, appliance, vehicle, or machine that is producing or contributing to the noise.

(3) The owner of anything seized, impounded or confiscated under this regulation is responsible for the cost of confiscation.
47. Restitution of property
(1) Where any property, tool, machinery or other instrument has been seized or impounded or confiscated under regulation 46, the owner or occupier, or person using that property, tool, machinery or other instrument may, at any time, in writing, apply to the Executive Director, Environmental Inspector or local council which seized or impounded it for the property, tool, machinery or other instrument to be returned to him or her.

(2) On receipt of an application under subsection (1), the Executive Director, Environmental Inspector or local council may return the property, tool, machinery or other instrument or part of it, upon being satisfied that its return is not likely to lead to the resumption of the emission of noise, or on terms and conditions as may be directed by the Executive Director, Environmental Inspector or local council as the case may be.

(3) Nothing in this regulation prevents the Executive Director, Environmental Inspector, or local council from returning the property, tool, machinery or other instrument to which this section applies without being requested to do so.

48. Existing activities.
Any person carrying out activities that emit noise or excessive vibration immediately before the coming into force of these Regulations shall, within six months from the coming into force of these Regulations, take all necessary measures to ensure full compliance with these Regulations.

PART VIII- VIBRATION

49. Definition
For purposes of this Part-

“Peak Particle Velocity (PPV) expressed in millimetres per second (mm/s)” means a vibration indicator used for the purposes of assessing potential annoyance to humans or damage to buildings;

“whole-body vibration” means mechanical vibration which is transmitted into the body, when seated or standing, through the supporting surface, during a work activity or any extension of exposure at the workplace to whole-body vibration beyond normal working hours, including exposure in rest facilities supervised by the employers;

“working day” means a daily working period, irrespective of the time of day when it begins or ends, and of whether it begins or ends on the same calendar day;

“hand-arm vibration” means mechanical vibration which is transmitted into the hands and arms during a work activity; and

When a worker operates hand-held equipment such as a chain saw or jackhammer, vibration affects hands and arms.

50. Excessive vibrations.
(1) Subject to these Regulations, a person shall not-
(a) make or cause to be made excessive vibrations which annoy, disturb, injure or endanger the comfort, repose, health or safety of others and the environment; or

(b) cause to be made excessive vibrations which exceed 0.5 centimetres per second beyond any source property boundary or 30 metres from any moving source.

(2) Any person who contravenes the provisions of this Regulation commits an offence and is liable in conviction to a fine not exceeding ten thousand currency points or imprisonment not exceeding two years or both.

PART IX- GENERAL PROVISIONS

51. Noise and excessive vibrations mapping bodies.
The following shall be the designated mapping bodies for the purpose of making and approving strategic noise or vibration maps—

(a) the Physical Planning Authority;

(b) local authorities;

(c) for railways, the Uganda Railways Corporation;

(d) for airports, Civil Aviation Authority;

(e) for mines and quarries, the Mines and Geology Department;

(f) for petroleum activities, the Petroleum Exploration and Production Department;

(g) for weather and instrumentation, the Meteorological Department;

(h) the Uganda National Bureau of Standards; and,

(i) for roads, the Ministry of Works and Transport/Uganda National Roads Authority, local councils, urban councils and the Kampala City Council Authority.

52. Strategic noise and excessive vibrations maps.
(1) Each mapping body shall make a strategic noise or vibration map for its area.

(2) Each mapping body shall review its strategic noise or vibration map every five years from the date on which the strategic noise or vibration map was made, or earlier where there is significant change in land use, noise or vibration level.

(3) A strategic noise or excessive vibration map shall satisfy the minimum requirements set out in Schedule 15 to these Regulations.

(4) Every mapping body shall take immediate action to mitigate any significant noise or excessive vibration that may cause damage to the environment or human beings.

53. Action plans for control of noise and vibration.
(1) Each mapping body shall prepare an action plan relevant to its area.
(2) An action plan shall-

(a) satisfy the minimum requirements set out in Schedule 15 to these Regulations; and

(b) aim to protect silent zones.

(3) A mapping body shall ensure that-

(a) the public is consulted on proposals for each action plan;

(b) the public is given early and effective opportunities to participate and review action plans;

(c) a time limit not exceeding sixty days is given for the submission of written comments by the public;

(d) the results of public participation are taken into account in finalizing action plans or review of action plans;

(e) the public is informed of the decision taken in relation to action plans; and

(f) reasonable time frames are adopted to allow sufficient time for each stage of public participation.

(4) An action plan shall be reviewed every five years after the date on which it was made or last reviewed, provided that an action plan may be reviewed earlier in the event of a material change in land use or noise or vibration level in the area concerned.

54. Health surveillance

(1) The employer shall provide health surveillance at his or her cost at the work place to protect workers from noise and excessive vibrations.

(2) Where-

(a) the risk assessment carried out by the employer indicates that there is a risk to the health of the employees who are or that employee may be exposed to noise and vibration; or

(b) employees are likely to be exposed to noise and vibration at or above an exposure action value,

the employer shall ensure that such employees are placed under suitable and appropriate health surveillance.

(3) Health surveillance, which shall be intended to prevent or diagnose any health effect linked with exposure to noise and vibration, shall be appropriate where the exposure of the employee to noise and vibration is such that-
(a) a link can be established between that exposure and an identifiable disease or adverse health effect;

(b) it is probable that the disease or effect may occur under the particular conditions of his work; and

(c) there are valid techniques for detecting the disease or effect.

(4) The employer shall ensure that a health record in respect of each of his employees who undergoes health surveillance in accordance with subregulation (1) is made and maintained and that the record or a copy health surveillance is kept available in a suitable form.

(5) The employer shall–

(a) on reasonable notice being given, allow an employee to access to his personal health record; and

(b) provide the enforcing authority with copies of the health records when required to do so.

(6) Where, as a result of health surveillance, an employee is found to have an identifiable disease or adverse health effect which is considered by a doctor or other occupational health professional to be the result of exposure to noise or vibration the employer of that employee shall–

(a) ensure that a suitably qualified person informs the employee accordingly and provides the employee with information and advice regarding further health surveillance, including any health surveillance which he shall undergo following the end of the exposure;

(b) ensure that the employer and employer are informed of any significant findings from the health surveillance of the employee, taking into account any medical confidentiality;

(c) review the risk assessment;

(d) review any measure taken to comply with these Regulations, taking into account any advice given by a doctor or occupational health professional or by the enforcing authority;

(e) consider assigning the employee to alternative work where there is no risk from further exposure to vibration, taking into account any advice given by a doctor or occupational health professional; and

(f) provide for a review of the health of any other employee who has been similarly exposed, including a medical examination where such an examination is recommended by a doctor or occupational health professional or by the enforcing authority.
(7) An employee to whom this regulation applies shall, when required by his or her employer and at the cost of his employer, present himself or herself during his or her working hours for health surveillance procedures as may be required for the purposes of subregulation (1).

55. Duty to carry out Risk Assessment
The responsible person or employer shall for purposes of these Regulations carry out assessment of the risk contained in his or her equipment in the workplace.

56. Assessment of the risk to health created by vibration at the workplace

(1) An employer who carries out work which is liable to expose any of his or employees to risk from vibration, shall make a suitable and sufficient assessment of the risk created by that work to the health and safety of the employees and the risk assessment shall identify the measures that need to be taken to meet the requirements of these Regulations.

(2) In conducting the risk assessment, the employer shall assess daily exposure to noise and vibration by means of-

(a) observation of specific working practices;
(b) reference to relevant information on the probable magnitude of the vibration corresponding to the equipment used in the particular working conditions; and

c) if necessary, measurement of the magnitude of vibration to which his employees are liable to be exposed,

and the employer shall assess whether any employees are likely to be exposed to vibration at or above an exposure action value or above an exposure limit value.

(3) The risk assessment shall include consideration of–

(a) the magnitude, type and duration of exposure, including any exposure to noise, intermittent vibration or repeated shocks;
(b) the effects of exposure to vibration on employees whose health is at particular risk from such exposure;
(c) any effects of vibration on the workplace and work equipment, including the proper handling of controls, the reading of indicators, the stability of structures and the security of joints;
(d) any information provided by the manufacturers of work equipment;
(e) the availability of replacement equipment designed to reduce exposure to vibration;
(f) any extension of exposure at the workplace to whole-body vibration beyond normal working hours, including exposure in rest facilities supervised by the employer;
(g) specific working conditions such as low temperatures; and
(h) appropriate information obtained from health surveillance including, where possible, published information.

(4) The risk assessment shall be reviewed regularly and immediately where-

(a) there is reason to suspect that the risk assessment is no longer valid;

(b) there has been a significant change in the work to which the assessment relates, and

(c) where, as a result of the review, changes to the risk assessment is required, those changes shall be made.

(5) The employer shall record–

(a) the significant findings of the risk assessment as soon as is practicable after the risk assessment is made or changed; and

(b) the measures which he has taken and which he intends to take to meet the requirements of regulations 54 and 55.

57. General Control of noise and vibration

(1) The employer shall put into place appropriate technical action to keep noise and vibration in the working environment below the maximum permissible limits.

(2) Where it is impossible to keep below those limits, the following action shall be taken by the employer-

(a) a reduction in exposure time;

(b) the use of personal protective equipment; or

(c) a combination of time reduction and personal protective equipment.

58. Protective equipment and reduction of exposure time

(1) When noise and vibration levels cannot be brought below the danger limit either by suitable design of equipment or by suitable installation-

(a) the works shall be provided with anti-vibration working platforms or stands;

(b) the workers shall be provided with adequate hearing protection and anti-vibration devices; and

(c) the length of exposure shall be limited.
(2) The personal protective equipment and limitation of exposure time shall bring workers exposure within permissible limits.

(3) Personal protective equipment shall afford effective and reliable protection against the risk of exposure to vibration.

(4) The following hearing personal protective equipment shall be provided by the employer-

(a) earplugs that can be used more than once;
(b) disposable earplugs;
(c) ear muffs; and
(d) helmets and other specialised ear protection.

(5) Personal protective equipment shall not be uncomfortable or be a source of accidents to employees.

(6) When individual protective devices are distributed, the need for them, their use and maintenance shall be explained to employees.

(7) The requisite instructions on the use and handling of the protective devices shall continue to be given to employees from time to time.

(8) Personal and other protective equipment against noise and vibration shall be inspected periodically by the employer to ensure that it has suffered no damage and is in good condition.

(9) The employer shall make every effort to ensure that workers actually use the personal protective equipment that is provided.

(10) All workers continuously or occasionally working in areas or in workplaces where noise or vibration exceeds the maximum permissible limits, especially workers whose protection is ensured by the use of personal protective equipment or by reduction of exposure time, or both, shall so far as possible be subject to and health supervision.

(11) The supervision of the health of workers shall include-

(a) a pre-employment medical examination;
(b) periodical medical examination; and
(c) medical examination after sickness or on specific occasions.

(12) Pre-employment medical examination for noise and vibration shall comprise-

(a) a case history of the employee;
(b) a general clinical examination of the employee;
(c) a clinical examination of the ears of the employee; and

(d) a screening or simplified audiometer pure tone screening audiometric test.

(13) For exposure to local vibration transmission to fingers or hands or to hands and arms, the medical examination shall comprise-

(a) a case history, with special reference to specific occupational risk;

(b) a clinical examination of the employee; and

(c) special tests which according to the kind of exposure involved, shall explore in particular the vascular system, the skin sensitivity of the hands, and the state of the bones, the joints and the ligaments.

(14) For exposure to whole body vibration, the medical examination shall comprise-

(a) a case history of the employee; and

(b) a general clinical examination of the employee.

59. Elimination or control of exposure to vibration at the workplace-

(1) The employer shall ensure that risk from the exposure of his or her employees to noise or vibration is either eliminated at source or, where this is not reasonably practicable, reduced to as low a level as is reasonably practicable.

(2) Where it is not reasonably practicable to eliminate risk at source under subregulation (1) and an exposure action value is likely to be reached or exceeded, the employer shall reduce exposure to as low a level as is reasonably practicable by establishing and implementing a programme of organisational and technical measures which is appropriate to the activity being undertaken.

(3) The measures taken by the employer in compliance with subregulations (1) and (2) shall be based on the general principles of prevention set out in the Occupational Safety and Health Act, 2006, and shall include consideration of –

(a) other working methods which eliminate or reduce exposure to noise or vibration;

(b) choice of work equipment of appropriate ergonomic design which, taking account of the work to be done, produces the least possible noise or vibration;

(c) the provision of auxiliary equipment which reduces the risk of injuries caused by noise or vibration;

(d) appropriate maintenance programmes for work equipment, the workplace and workplace systems;

(e) the design and layout of workplaces, work stations and rest facilities;
(f) suitable and sufficient information and training for employees, such that work equipment may be used correctly and safely, in order to minimise their exposure to noise or vibration;

(g) the limitation of the duration and magnitude of exposure to noise or vibration;

(h) appropriate work schedules with adequate rest periods; and

(i) the provision of clothing to protect employees from cold and damp.

(4) The employer shall—

(a) ensure that his employees are not exposed to vibration above an exposure limit value; or

(b) if an exposure limit value is exceeded, the employer shall immediately-

(i) reduce exposure to vibration to below the limit value;

(ii) identify the reason for that limit being exceeded; and

(iii) modify the measures taken in accordance with paragraphs (1) and (2) to prevent it being exceeded again.

(5) Subregulation (4) shall not apply where the exposure of an employee to vibration is usually below the exposure action value but varies markedly from time to time and may occasionally exceed the exposure limit value, provided that—

(a) any exposure to vibration averaged over one week is less than the exposure limit value;

(b) there is evidence to show that the risk from the actual pattern of exposure is less than the corresponding risk from constant exposure at the exposure limit value;

(c) risk is reduced to as low a level as is reasonably practicable, taking into account the special circumstances; and

(d) the employees concerned are subject to increased appropriate health surveillance.

(6) The employer shall adapt any measure taken in compliance with the requirements of this regulation to take account of any employee or group of employees whose health is likely to be particularly at risk from vibration.

60. Responsibility of the employer

(1) Where a duty is placed by these Regulations on an employer in respect of his or her employees, the employer shall, so far as is reasonably practicable, be under a like duty in
respect of any other person, whether at work or not, who may be affected by the work carried out by the employer except that the duties of the employer-

(a) under regulation 54 shall not extend to persons who are not his or her employees; and

(b) information, instruction and training shall not extend to persons who are not his employees, unless those persons are on the premises where the work is being carried out.

61. Protecting workers
(1) The employer shall put in place a hearing conservation programme to protect workers from the effects of hazardous noise and vibration exposure in the workplace.

(2) The programme referred to under subregulation (1) shall be integrated into the overall hazard prevention and control programme of the workplace.

(3) Hazard prevention and control programmes shall be designed to meet the specific needs of each situation, in view of the existing hazards and of the many other factors that characterize a workplace and the programmes shall be adaptable to new scientific and technological developments, as well as to eventual changes in the socio-economic context.

(4) The employer shall implement noise and vibration control measures in order to achieve the lowest reasonable levels of noise emission and exposure at the workplace, taking into account-

(a) known or available measures;

(b) the state of the art regarding technical progress;

(c) possibilities for noise reduction at the source; and

(d) appropriate planning, procurement and installation of machines and equipment.

(5) The Occupational Safety and Health Act, 2006 and Regulations made under the Act shall apply in relation to the protection of workers from noise and excessive vibrations with necessary modifications.

62. Persons to be informed

All employees and persons who may be affected by noise and vibration at the workplace shall be adequately and suitably-

(a) informed of potential occupational hazards in the working environment due to noise and vibration; and

(b) instructed in the measures available for the prevention and control of, and protection against occupational hazards due to noise and vibrations.
63. Workers to comply

Employees shall comply with safety procedures relating to the prevention and control of, and protection against, occupational hazards related to noise and vibration in the working environment.

64. Offences

(1) A person who-

(a) emits noise or in excess of the permissible noise levels prescribed by regulation 10;

(b) fails, neglects or refuses to control noise or vibrations in accordance with these Regulations;

(c) fails to immediately reduce noise or vibrations to a permissible noise level when required to do so;

(d) causes or contributes to the emission of noise or vibrations in excess of the permissible noise or vibration levels from or within the vicinity of the premises during a prohibited period;

(e) fails, without lawful justification, to comply with any term or condition of a licence or order issued under these Regulations;

(f) makes a statement, or produces a document, that is false or misleading in a material particular; or

(g) obstructs the Executive Director, an Environmental Inspector or member of a local council in the execution of his or her duties,

commits an offence and is liable, on conviction, to a fine not exceeding ten thousand currency points or imprisonment not exceeding five years or both and for a continuing offence, a fine not exceeding one thousand currency points for each day or part of a day for which the offence continues.

65. General penalty.

Any person who contravenes any of the provisions of these Regulations, for which no penalty is stipulated, commits an offence and is liable on conviction to a fine not exceeding one thousand currency points or imprisonment not exceeding one year or both.

66 Revocation of S.I No. 30 of 2003

The National Environment (Noise Standards and Control) Regulations, 2003 are revoked.
## SCHEDULE 1

**MAXIMUM PERMISSIBLE LEVELS FOR GENERAL ENVIRONMENT**

*Regulation 10(1)*

<table>
<thead>
<tr>
<th>Facility</th>
<th>Noise limit dB(A) (Leq)</th>
<th>Noise limit dB(A) (Leq)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Any building used as a hospital, convalescence home, home for the elderly, sanatorium and institute of higher learning, conference rooms, public library, environmental or recreational sites.</td>
<td>45</td>
<td>35</td>
</tr>
<tr>
<td>2. Residential buildings</td>
<td>50</td>
<td>35</td>
</tr>
<tr>
<td>3. Mixed residential (with some commercial and entertainment)</td>
<td>55</td>
<td>45</td>
</tr>
<tr>
<td>4. Residential plus industry or small-scale production and commerce</td>
<td>60</td>
<td>50</td>
</tr>
<tr>
<td>5. Industrial</td>
<td>70</td>
<td>60</td>
</tr>
</tbody>
</table>

**Time Frame: Use duration**

**Day** - 6.00 a.m. - 10.00 p.m

**Night** - 10.00 p.m. - 6.00 a.m.

The Time frame takes into consideration human activity
SCHEDULE 2
MAXIMUM PERMISSABLE NOISE LEVEL (CONTINUOUS OR INTERMITTENT NOISE) FROM A FACTORY OR WORKSHOP

Regulation 10 (2)

<table>
<thead>
<tr>
<th>Leq dB (A)</th>
<th>Duration (Daily)</th>
<th>Duration (Weekly)</th>
</tr>
</thead>
<tbody>
<tr>
<td>85</td>
<td>8 hours</td>
<td>40 hours</td>
</tr>
<tr>
<td>88</td>
<td>4 hours</td>
<td>20 hours</td>
</tr>
<tr>
<td>91</td>
<td>2 hours</td>
<td>10 hours</td>
</tr>
<tr>
<td>94</td>
<td>1 hour</td>
<td>5 hours</td>
</tr>
<tr>
<td>97</td>
<td>30 minutes</td>
<td>2.5 hours</td>
</tr>
<tr>
<td>100</td>
<td>15 minutes</td>
<td>1.25 hours</td>
</tr>
<tr>
<td>103</td>
<td>7.5 minutes</td>
<td>37.5 minutes</td>
</tr>
<tr>
<td>106</td>
<td>3.75 minutes</td>
<td>18.75 minutes</td>
</tr>
<tr>
<td>109</td>
<td>1.875 minutes</td>
<td>9.375 minutes</td>
</tr>
</tbody>
</table>

Noise levels shall not exceed a Leq of-

(a) Factory/Workshops 85 dB (A)

(b) Offices 50 dB (A)

(c) Factory/Workshop Compound 75 dB (A)
SCHEDULE 3
MAXIMUM PERMISSIBLE NOISE LEVELS FOR IMPACT OR IMPULSIVE NOISE

Regulation 10 (3)

<table>
<thead>
<tr>
<th>Sound Level dB (A) (Lmax)</th>
<th>Permitted number of impulses or Impacts per day</th>
</tr>
</thead>
<tbody>
<tr>
<td>140</td>
<td>100</td>
</tr>
<tr>
<td>130</td>
<td>1,000</td>
</tr>
<tr>
<td>120</td>
<td>10,000</td>
</tr>
</tbody>
</table>
SCHEDULE 4

PART A- MAXIMUM PERMISSABLE NOISE LEVELS FOR CONSTRUCTION SITE

Regulation 10 (4)

<table>
<thead>
<tr>
<th>Facility</th>
<th>Maximum noise level permitted (Leq) in dB (A)</th>
<th>Maximum noise level permitted (Leq) in dB (A)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Day</td>
<td>Night</td>
</tr>
<tr>
<td></td>
<td>1 Hospitals, schools, institutions of higher learning, homes for the disabled, etc.</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>Buildings other than those prescribed in paragraph (1)</td>
<td>75</td>
</tr>
</tbody>
</table>

PART B- ADDITIONAL PERMISSIBLE LIMITS FOR CONSTRUCTION

<table>
<thead>
<tr>
<th>Activity</th>
<th>Maximum noise level permitted (Leq) in dB (A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Work requiring a large amount of mental concentration</td>
<td>55</td>
</tr>
<tr>
<td>2. Work requiring verbal communication or great accuracy and attention</td>
<td>85</td>
</tr>
<tr>
<td>3. Any noisy work setting</td>
<td>85</td>
</tr>
</tbody>
</table>

*** No matter how short a time, a worker exposed to noise levels greater than 85 dBA should wear hearing protectors with an attenuation of at least 6 dB A and no worker should enter an area where noise levels exceeds 140 dBA.
SCHEDULE 5
MAXIMUM PERMISSABLE LEVELS FOR PUBLIC ANNOUNCEMENT
SYSTEM OR DEVICE

Regulation 10 (5)

<table>
<thead>
<tr>
<th>Noise Control Sound Level</th>
<th>Sound Level dB (A) (Leq)</th>
<th>Sound Level dB (A) (Leq)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Day</td>
<td>Night</td>
</tr>
<tr>
<td>Residential</td>
<td>60</td>
<td>40</td>
</tr>
<tr>
<td>Commercial</td>
<td>75</td>
<td>50</td>
</tr>
<tr>
<td>Industrial</td>
<td>85</td>
<td>65</td>
</tr>
</tbody>
</table>

Note: Time Frame:

Day - 6.00 a.m. - 10.00 p.m.
Night - 10.00 p.m. - 6.00 a.m.

The time frame takes into consideration human activity.
### SCHEDULE 6

**MAXIMUM PERMISSIBLE LEVELS FOR PLACES OR ESTABLISHMENTS OF ENTERTAINMENT**

_Regression 10 (6)_

<table>
<thead>
<tr>
<th>Noise Control Zones</th>
<th>Sound Level dB (A) (Leq)</th>
<th>Sound Level dB (A) (Leq)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td>60</td>
<td>40</td>
</tr>
<tr>
<td>Commercial</td>
<td>75</td>
<td>50</td>
</tr>
<tr>
<td>Industrial</td>
<td>85</td>
<td>65</td>
</tr>
</tbody>
</table>

**Note: Time Frame:**

- **Day** - 6.00 a.m. - 10.00 p.m.
- **Night** - 10.00 p.m. - 6.00 a.m.

The time frame takes into consideration human activity
SCHEDULE 7

MAXIMUM PERMISSIBLE LEVEL FOR PLACES OR AREAS OF WORSHIP

Regulation 10 (7)

<table>
<thead>
<tr>
<th>Noise Control Zones</th>
<th>Sound Level dB (A) (Leq)</th>
<th>Sound Level dB (A) (Leq)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Day</td>
<td>Night</td>
</tr>
<tr>
<td>Residential</td>
<td>60</td>
<td>40</td>
</tr>
<tr>
<td>Commercial</td>
<td>75</td>
<td>50</td>
</tr>
<tr>
<td>Industrial</td>
<td>85</td>
<td>65</td>
</tr>
</tbody>
</table>

Note: Time Frame:

Day  - 6.00 a.m.  - 10.00 p.m.
Night - 10.00 p.m.  - 6.00 a.m.

The time frame takes into consideration human activity.
## SCHEDULE 8

**MAXIMUM PERMISSIBLE LEVEL FOR ROADS AND ROAD CONSTRUCTION**

*Regulation 10 (8)*

<table>
<thead>
<tr>
<th>Days &amp; Times</th>
<th>Leq dB$_A$</th>
<th>Leq Max slow dB$_A$</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Monday to Friday</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>07:00 to 19:00hrs</td>
<td>70</td>
<td>80</td>
</tr>
<tr>
<td><strong>Monday to Friday</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19:00 to 22:00hrs</td>
<td>60</td>
<td>65</td>
</tr>
<tr>
<td><strong>Saturday</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>08:00 to 16:30hrs</td>
<td>65</td>
<td>75</td>
</tr>
<tr>
<td><strong>Sundays and Public Holidays</strong></td>
<td>60</td>
<td>52</td>
</tr>
<tr>
<td>08:00 to 16:30hrs</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### PART B- Design criteria for new roads of category 1 (UNRA)

<table>
<thead>
<tr>
<th>Sensitive Activity Category Description</th>
<th>Hourly A-Weighted Sound Level Leq (dB$_A$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.</td>
<td>57 external</td>
</tr>
<tr>
<td>Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.</td>
<td>67 external</td>
</tr>
<tr>
<td>Developed lands, properties, or activities not included in above</td>
<td>72 external</td>
</tr>
<tr>
<td>Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.</td>
<td>52 internal</td>
</tr>
<tr>
<td>Undeveloped lands.</td>
<td>No values</td>
</tr>
</tbody>
</table>
### SCHEDULE 9

**MAXIMUM PERMISSIBLE LEVEL FOR ACCELERATING VEHICLES**

*Regulation 10 (9)*

<table>
<thead>
<tr>
<th>Vehicle Category</th>
<th>Maximum Sound Level in dB (A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Vehicles intended for carriage of passengers and equipped with not more than nine seats, including the driver’s seat</td>
<td>78</td>
</tr>
<tr>
<td>2. Vehicles intended for carriage of passengers and equipped with not more than nine seats, including the driver’s seat and having maximum permissible mass of more than 3.5 tones-</td>
<td></td>
</tr>
<tr>
<td>(a) with engine power of more than 150 KW</td>
<td>80</td>
</tr>
<tr>
<td>(b) with an engine power of less than 150 KW</td>
<td>83</td>
</tr>
<tr>
<td>3. Vehicles intended for carriage of passengers and equipped with not more than nine seats, including the driver’s seat: vehicles intended for carriage of goods-</td>
<td></td>
</tr>
<tr>
<td>(a) with maximum permissible mass not exceeding 2 tonnes;</td>
<td>79</td>
</tr>
<tr>
<td>(b) with a maximum permissible mass exceeding 2 tonnes but not exceeding 3.5 tonnes</td>
<td>80</td>
</tr>
<tr>
<td>4. Vehicles intended for the carriage of goods and having a maximum permissible mass exceeding 3.5 tonnes-</td>
<td></td>
</tr>
<tr>
<td>(a) with an engine power of less than 75 KW</td>
<td>80</td>
</tr>
<tr>
<td>(b) with an engine power of not less than 75 KW but less than 150 KW</td>
<td>83</td>
</tr>
<tr>
<td>(c) with an engine power of not less than 150 KW</td>
<td>84</td>
</tr>
<tr>
<td>Facility</td>
<td>Limit Value in dB (C)</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>-----------------------</td>
</tr>
<tr>
<td>For any building used as a hospital, school, convalescent home, old age homes or residential building</td>
<td>109 dB (C)</td>
</tr>
<tr>
<td>For any building in an area used for residential and one or more of the following Commerce, production, entertainment or any residential apartment in an area that is used for purposes of industry, commerce or small scale production, or any building used for the purpose of industry, commerce or small scale production</td>
<td>14 dB (C)</td>
</tr>
</tbody>
</table>
SCHEDULE 11
MAXIMUM ALLOWABLE SOUND PRESSURE LEVELS IN THE WORKPLACE IN THE VICINITY OF ULTRASOUND.

Regulation 10 (11)

<table>
<thead>
<tr>
<th>Generic frequency means by third octave bands (Hz)</th>
<th>12,500</th>
<th>16,000</th>
<th>20,000+</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sound pressure level (in dB)</td>
<td>75</td>
<td>85</td>
<td>110</td>
</tr>
</tbody>
</table>
SCHEDULE 12

PERMISSIBLE LIMITS FOR VIBRATION

Regulation 10(12)

PART A- THRESHOLD LIMIT VALUES (TLVS) FOR EXPOSURE OF THE HAND TO VIBRATION IN X, Y, OR Z DIRECTION*

<table>
<thead>
<tr>
<th>Total Daily Exposure Duration (hours)</th>
<th>Maximum value of frequency weighted acceleration (m/s²) in any direction*</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 to less than 8 hours</td>
<td>4</td>
</tr>
<tr>
<td>2 to less than 4 hours</td>
<td>6</td>
</tr>
<tr>
<td>1 to less than 2 hours</td>
<td>8</td>
</tr>
<tr>
<td>less than 1 hour</td>
<td>12</td>
</tr>
</tbody>
</table>

* Directions of axes in the three-dimensional system.

PART B- PERMISSIBLE VIBRATION LIMITS FOR ROAD CONSTRUCTION IN ORDER TO MINIMIZE THE RISK OF BUILDING DAMAGE

```
Permissible vibration velocity (Peak Particle Velocity) at the closest part of any property to the source of vibration at a frequency of

<table>
<thead>
<tr>
<th>Less than 10 Hz</th>
<th>10 – 50 Hz</th>
<th>50 – 100 Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td>8mm/s</td>
<td>12.5mm/s</td>
<td>20mm/s</td>
</tr>
</tbody>
</table>
```
SCHEDULE 13

PART I

APPLICATION FOR A LICENCE TO EMIT NOISE IN EXCESS OF PERMISSIBLE NOISE LEVELS

Regulation 13 (1)

FORM NEMA/NC……………

Name and address of applicant:
………………………………………………………………………………………………………………

Physical address of premises or facility where noise will be produced or generated:
………………………………………………………………………………………………………………

Plot no. Village, parish, sub-county, county district)

Nature/Source/Type of noise to be emitted and predicted levels above the standards (dBA) and time of emission
………………………………………………………………………………………………………………

Describe the neighbourhood with a radius of 2 km (Describe whether industrial, residential, commercial and whether it is near a school or hospital or residential area) …………………
………………………………………………………………………………………………………………

Provide the anticipated mitigation measures intended to be used in controlling the noise (may attach separate sheet)
………………………………………………………………………………………………………………

Duration of emission of the noise applied for: (indicate time of day and number of minutes/hours) ……………………………………………………………………………………………

Date: …………… Signature of Applicant …………………

FOR OFFICIAL USE ONLY

Date received ………………… /20……

Fee paid shs …………… (in words)……………………………

Comments of the lead agency …………………………………
………………………………………………………………………………………………………………
PART II

LICENSE TO EMIT NOISE IN EXCESS OF PERMISSIBLE NOISE LEVELS

Regulation 13 (6)

Licence No NEMA/NC/ ................................................of

.................................................................(Address) ........................is licensed to cause emission
or emit noise in excess of the permissible noise levels at

................................................................. (location/district) for the purposes
of.................................................................

Type of noise licensed .................................................................

This licence is valid from .............. 20 .... to .............. 20 ....

From the hours of ................. to ................. of each day.

This licence is granted subject to the following
conditions:...............................................................

Date:....................... Signature: .................................

Executive Director

National Environment Management Authority
(Issued under section 80 (1) (i) of the National Environment Act and regulation .. of the National Environment (Noise Standards and Control) Regulations, 2013)

Form NEMA/NC/....
TO: ........................................

TAKE NOTICE that on the ................. of ................. 20..., an Environmental Inspector(s) from this Authority carried out an inspection of your establishment/facility located in ......................... Village, .................................. Sub-county of ........................................ District where it was found that you or your agents were generating or producing noise in excess of the permissible noise levels and/or in contravention of these Regulations.
The Environmental Inspectors particularly found the following—
1. ...........................................................................................................
2. ............................................................................................................
3. ............................................................................................................
(attach more paper if necessary)

YOU ARE HEREBY ORDERED to stop/minimise/discontinue all activities that are causing or likely to generate the production of noise and reduce the noise levels to the permissible noise levels in the above mentioned facility/ establishments within a period of ................. days from the date of this Notice. You are also required to restore the tranquillity of the surroundings.

YOU ARE NOTIFIED THAT in accordance with section 96 of the National Environment Act, failure to comply with this Notice shall result in criminal prosecution being instituted against you and/or your agent or both.

........................................
ENVIRONMENTAL INSPECTOR
Copy to:
PART- GUIDELINES FOR NOISE SOURCES AND VIBRATION

1. Introduction

(1) The objective of these standards is to maintain low noise and vibration exposure so that human health, well-being and the environment are protected.

(2) The specific objectives are to develop criteria for the maximum safe noise exposure levels and to promote competent noise assessment and control as part of the environment programmes.

(3) The following principles guide the noise standards-

   (a) the precautionary principle: In all cases, noise and vibration should be reduced to the lowest level achievable in the particular situation. Where there is a reasonable possibility that public health and the environment will be damaged, action should be taken to protect human health and the environment without waiting for full scientific proof;

   (b) the polluter pays principle. The full cost associated with noise and vibration pollution (including management, monitoring, lowering levels, and supervision) should be met by those responsible for the source of noise and vibration;

   (c) the prevention principle: Action should be taken where possible to reduce noise and vibration at the source. Land use planning should be guided by an environmental health impact assessment that considers noise and vibration as well as other pollutants.

2. Standards

2.1 Community noise

(1) Community noise (also called environmental noise, residential noise, or domestic noise) is defined as noise emitted from all sources except noise at the industrial workplace.

(2) Main sources of community noise include road, railway and air traffic, industries, and public works, and the neighbourhood.

(3) The main indoor sources include ventilation systems, office equipment, home appliances, and neighbours.

(4) Typical neighbourhood noise comes from premises and installations related to catering trade, (restaurants, cafeteria, discotheques, etc.) from live or recorded music, sport events including motor sports, play grounds, car parks, and domestic animals such as barking dogs.

(5) Specific effects and concerns in community noise include-

   (a) noise induced hearing impairment;

   (b) interference with speech and communication;
(c) sleep disturbance;
(d) cardiovascular and physiological effects;
(e) mental health effects;
(f) effects of noise on performance;
(g) effects of noise on residential behaviour and annoyance;
(h) effects of combined noise sources; and
(i) presence of vulnerable groups in communities.

(6) The effects are more pronounced for night time than day time.

(7) There is a need therefore to distinguish these periods with a view to isolate and protect vulnerable groups and hence the distinction in the Regulations.

(8) The review of available evidence leads to the following conclusions-

(a) sleep is a recovery process essential for humans to function properly. It is a biological necessity and disturbed sleep is associated with a number of adverse impacts on health;

(b) there is sufficient evidence for biological effects of noise during sleep such as increase in heart rate, arousals, sleep stage changes and awakening;

(c) there is sufficient evidence that night noise exposure causes self-reported sleep disturbance, increase in medicine use, increase in body movements and (environmental) insomnia;

(d) while noise-induced sleep disturbance is viewed as a health problem in itself (environmental insomnia), it also leads to further consequences for health and wellbeing; and

(e) children, the elderly, pregnant women, people under stress and shift workers are vulnerable to (noise) disturbance of their sleep.

**The night time**

(1) Time use studies (Centre for Time Use Research, 2006) show that the average time adult people are in bed is around 7.5 hours, so the real average sleeping time is somewhat shorter.

(2) Due to personal factors such as age and genetic factors there is considerable variation in sleeping time and in beginning and end times.

(3) For these reasons, a fixed interval of 8 hours is a minimal choice for night-time protection.

**2.2 Schools**
(1) The critical effects of noise are speech interference, disturbance of information extraction (e.g. comprehension and reading acquisition), message communication and annoyance.

(2) To be able to hear and understand spoken messages in classrooms, the background sound should not exceed 35 dB(A) (Leq);

2.3 Dwellings
(1) The effects of noise are primarily sleep disturbance, annoyance and interference with speech recognition.

(2) Sleep disturbance is a major concern of traffic noise and uninterrupted sleep is a prerequisite for good mental functioning and health.

(3) The noise levels should not exceed 40 dB(A) (Leq).

2.3 Hospitals and health care facilities
(1) The effects of noise are sleep disturbance, annoyance and communication interference including warning signals from patients.

(2) Since patients have less ability to deal with stress, the noise levels should not exceed 35 dB(A) (Leq).

(3) For ward rooms it should not exceed 30 dB(A).

2.4 Ceremonies, festivals and entertainment events.
(1) Ceremonies, festivals and entertainment events typically produce loud sounds including music and impulsive sounds.

(2) There is concern about the effects of loud noise for especially young people who frequently attend concerts, disctheques, video arcades, cinemas, amusement parks, and spectator events. The sound levels are typically Leq 100 dB(A).

(3) The main concern here is that such levels can lead to significant hearing impairment.

(4) To avoid hearing impairment, the noise levels in such areas should not exceed LA (Max) 110 dB.

2.5 Toys, fire-works and firearms
(1) These equipment produce noise typically above Leq 100 dB(A). High levels of noise become difficult to bear and subsequently intolerable.

(2) At higher levels than 120 dB(A) the auditory sensation is replaced by pain.

(3) The bones in the ear, maleus, incus and stapes, can be knocked out of position leading to permanent hearing loss.

(4) To avoid acute mechanical damage to the inner ear from impulsive noise from toys, fire-works and firearms, adults should never be exposed to more than Linear 140 dBA peak and sound pressure levels.
(5) To account for the vulnerability in children when playing, the peak sound pressure produced by toys should not exceed 120dB (Lin) peak sound pressure level measured close to the ear (100 mm).

(6) To avoid acute hearing impairment, LA (Max) should always be below 110 dB$_A$.

2.6 Park lands and conservation areas
(1) These areas enjoy quiet and sound pressure levels are of the order 20-35 dB$_A$.

(2) These areas should be preserved as such to protect the tranquillity that they provide to their guests.

2.7 Headphones
(1) The use of these gadgets these days is widespread and should be brought under control.

(2) To avoid hearing impairment from music played back from these gadgets, in both adults and children, the equivalent sound level over 24 hours should not exceed 70 dB$_A$.

(3) This implies that for a daily one hour exposure, the Noise level, Leq should not exceed 85 dB$_A$. To avoid acute hearing impairment, LA (Max) should not exceed 110 dB$_A$.

2.8 Community noise permissible limits
(1) Table 2 gives a summary of proposed standards to ensure a tranquil environment.

(2) The values are arranged according to specific environments and critical health effects that we wish to avoid.

(3) The values consider the above identified adverse effects for the specific environment.

(4) An adverse effect of noise refers to any temporary or long term impairment of physical, psychological or social functioning that is associated with noise exposure.

(5) Specific noise limits have been set for each specific health effect using the lowest noise level that produces an adverse effect.

Table 2: Permissible Limits for community environment

<table>
<thead>
<tr>
<th>Specific environment</th>
<th>Critical health effect</th>
<th>Leq dB$_A$</th>
<th>Time base Hours</th>
<th>LA (Max) dB</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Serious day time and evening</td>
<td>55</td>
<td>16</td>
<td>Not applicable</td>
</tr>
<tr>
<td></td>
<td>Moderate annoyance, day time</td>
<td>50</td>
<td>16</td>
<td>Not applicable</td>
</tr>
<tr>
<td></td>
<td>and evening</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dwelling indoors</td>
<td>Speech intelligibility and</td>
<td>35</td>
<td>16</td>
<td>Not applicable</td>
</tr>
<tr>
<td></td>
<td>moderate annoyance, day time</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>and evening</td>
<td>30</td>
<td>8</td>
<td>45</td>
</tr>
<tr>
<td></td>
<td>Sleep disturbance, night time</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outside bed</td>
<td>Sleep disturbance, window open</td>
<td>45</td>
<td>8</td>
<td>60</td>
</tr>
<tr>
<td>Rooms</td>
<td>(Outdoor values).</td>
<td>School classrooms and pre-school indoors</td>
<td>Speech intelligibility, disturbance of information extraction, message communication.</td>
<td>35</td>
</tr>
<tr>
<td>-------</td>
<td>------------------</td>
<td>------------------------------------------</td>
<td>--------------------------------------------------------------------------------</td>
<td>-----</td>
</tr>
<tr>
<td>Pre-school bedrooms, indoors</td>
<td>Sleep disturbance</td>
<td>30</td>
<td>Sleeping time</td>
<td>45</td>
</tr>
<tr>
<td>School play time, outdoors</td>
<td>Annoyance (external source)</td>
<td>55</td>
<td>During play</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Hospital wards, indoors</td>
<td>Sleep disturbance night time</td>
<td>30</td>
<td>8</td>
<td>40</td>
</tr>
<tr>
<td>Hospital treatment rooms, indoors</td>
<td>Sleep disturbance, day time and evenings</td>
<td>30</td>
<td>16</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Hospital treatment rooms, indoors</td>
<td>Interference with rest and recovery</td>
<td>Less than 30 (as low as possible)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industrial, commercial, shopping and traffic areas, indoors and outdoors.</td>
<td>Hearing impairment</td>
<td>70</td>
<td>24</td>
<td>110</td>
</tr>
<tr>
<td>Ceremonies, Festivals and entertainment events.</td>
<td>Hearing impairment (patrons)</td>
<td>100</td>
<td>4</td>
<td>110</td>
</tr>
<tr>
<td>Public address outside and indoors</td>
<td>Hearing impairment</td>
<td>85</td>
<td>1</td>
<td>110</td>
</tr>
<tr>
<td>Music and other sounds through earphones and headphones</td>
<td>Hearing impairment (free field)</td>
<td>85</td>
<td>1</td>
<td>110</td>
</tr>
<tr>
<td>Impulse sounds from toys, fireworks and firearms</td>
<td>Hearing impairment (adults)</td>
<td>140</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hearing impairment (children)</td>
<td>120</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outdoors in parklands and conservation areas</td>
<td>Disruption of serenity and tranquillity</td>
<td>Preserve as they are, (&lt;30)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2.12. Maximum permissible levels for road traffic

The worst-hour traffic noise level of 65 dB$_A$- Leq should not be exceeded.
Table 3: Permissible limits for roads and road construction

<table>
<thead>
<tr>
<th>Days &amp; Times</th>
<th>Leq dB_A</th>
<th>Leq Max slow dB_A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday to Friday 07:00 to 19:00hrs</td>
<td>70</td>
<td>80</td>
</tr>
<tr>
<td>Monday to Friday 19:00 to 22:00hrs</td>
<td>60</td>
<td>65</td>
</tr>
<tr>
<td>Saturday 08:00 to 16:30hrs</td>
<td>65</td>
<td>75</td>
</tr>
<tr>
<td>Sundays and Public Holidays 08:00 to 16:30hrs</td>
<td>60</td>
<td>52</td>
</tr>
</tbody>
</table>

Design criteria for new roads of category 1 (UNRA)

<table>
<thead>
<tr>
<th>Sensitive Activity Category Description</th>
<th>Hourly A-Weighted Sound Level Leq (dB_A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.</td>
<td>57 external</td>
</tr>
<tr>
<td>Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.</td>
<td>67 external</td>
</tr>
<tr>
<td>Developed lands, properties, or activities not included in above</td>
<td>72 external</td>
</tr>
<tr>
<td>Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.</td>
<td>52 internal</td>
</tr>
<tr>
<td>Undeveloped lands.</td>
<td>No values</td>
</tr>
</tbody>
</table>

5.15 Record-keeping and Reports

(1) The employer shall keep good records and clear reports on measurements and tests, measuring instruments and control systems, as well as on the programme itself.

(2) As to noise measurements and audiometric tests, the results shall be well organized, identifiable and easily retrievable.

(3) Data shall serve as indicators and shall be consistently gathered and analyzed.

(5) All details concerning purchase of measuring instruments and hearing protection (including contact person at the manufacturer’s), as well as adequate logs on maintenance shall be carefully kept.
(6) Measuring instruments also require records on routine calibration and hearing protection, on replacement deadlines.

(7) The employer shall maintain complete and accurate records of working conditions, materials used, and performance of control measures, shall also be kept.

(8) Objective and clear reports on the programme shall be periodically prepared and critically analyzed by the team.

5.16 Continuous Improvement
In order to achieve continuous improvement, it is necessary to perform routine evaluations of how the programme is proceeding, including analysis of the selected indicators and to establish an adequate system for the recognition and due appreciation of both failures and successes.

5.17 Human Resources
(1) The required scientific, technical and managerial competence shall be available among the members of the responsible team. For very specific technical issues, external professionals (for example acoustic engineers) may be engaged; however, their work shall follow the specified control strategy and shall be integrated into the comprehensive approach designed by the team.

(2) In order to ensure that a programme is efficiently run, programme managers shall have, in addition to knowledge and experience, also managerial competence.

5.18 Allocation of Financial Resources
(1) The financial resources required for a noise prevention and control programme shall be identified and secured before starting its implementation.

(2) Financial resources must be optimized and carefully allocated within a framework of priorities, always keeping an appropriate balance among the different components, namely human resources and information, instrumentation and control systems.

(3) In certain situations, appreciable funds may be necessary for initial staff development.

(4) In order to ensure sustainability of a programme, operational costs must be appropriately foreseen including for example, expenses for maintenance, repairs and purchase of spare parts for measuring instruments; maintenance, repairs and eventual replacement of personal protective equipment (e.g., hearing protectors); maintenance of staff competence, including continuing education and participation in scientific meetings; eventual hiring of external consultants, and, update of information systems (e.g., books, journals, CD-ROMs, access to data bases and the Internet - depending on the size and scope of the programme).

(5) Some degree of financial flexibility shall be allowed, in order to respond to new needs which may arise from periodic reassessments.

6.0 Noise/Oil and gas activities
(1) Oil and gas development activities can generate noise during all phases of development including during seismic surveys, construction activities, drilling and production, aerial surveys and air or road transportation.

(2) During operations, the main sources of noise and vibration pollution are likely to emanate from flaring and rotating equipment including flares and vents, pumps, compressors, generators, and heaters.

(3) Noise impacts in oil and gas activities shall be estimated by the use of baseline noise assessments for developments close to local human populations.

(4) For significant noise sources, such as flare stacks at permanent processing facilities, noise dispersion models shall be conducted to establish the noise level guidelines can be met and to assist in the design of facility siting, stack heights, engineered sound barriers, and sound insulation on buildings.

(5) Field related vehicle traffic shall be reduced as far as possible and access through local communities shall be avoided when not necessary.

(6) Flight access routes and low flight altitudes shall be selected and scheduled to reduce noise impacts without compromising aircraft and security.

(7) The sound and vibration propagation arising from seismic operations may result in impacts to human populations or to wildlife and in planning seismic surveys, the following shall be considered to minimize impacts-

   (a) minimize seismic activities in the vicinity of local populations wherever possible;

   (b) minimize simultaneous operations on closely spaced survey lines;

   (c) use the lowest practicable vibrator power levels;

   (d) reduce operation times, to the extent practical;

   (e) when shot-hole methods are employed, charge size and hole depth shall be appropriately selected to reduce noise levels. Proper back-fill or plugging of holes will also help to reduce noise dispersion;

   (f) identify areas and time periods sensitive to wildlife such as feeding and breeding locations and seasons and avoid them when possible;

   (g) if sensitive wildlife species are located in the area, monitor their presence before the onset of noise creating activities, and throughout the seismic program. In areas where significant impacts to sensitive species are anticipated, experienced wildlife observers shall be used. Slowly buildup activities in sensitive locations.

(8) Terrestrial Impacts and Project Footprint Project footprints resulting from exploration and construction activities may include seismic tracks, well pads, temporary facilities, such as workforce base camps, material (pipe) storage yards, workshops, access roads, airstrips and
helipads, equipment staging areas, and construction material extraction sites (including borrow pits and quarries).

(9) Operational footprints may include well pads, permanent processing treatment, transmission and storage facilities, pipeline right-of-way corridors, access roads, ancillary facilities, communication facilities (e.g. antennas), and power generation and transmission lines.

(10) Impacts may include loss of, or damage to, terrestrial habitat, creation of barriers to wildlife movement, soil erosion, and disturbance to water bodies including possible sedimentation, the establishment of non-native invasive plant species and visual disturbance.

(11) The extent of the disturbance will depend on the activity along with the location and characteristics of the existing vegetation, topographic features and waterways.

(12) The visual impact of permanent facilities shall be considered in design so that impacts on the existing landscape are minimized.

(13) The design shall take advantage of the existing topography and vegetation, and shall use low profile facilities and storage tanks if technically feasible and if the overall facility footprint is not significantly increased.

(14) In addition, the licensee or operator carrying out petroleum activities or midstream operations shall consider suitable paint colour for large structures that can blend with the background.

(15) Additional prevention and control measures to minimize the footprint of oil and gas developments may include the following:

(a) siting all facilities in locations that avoid critical terrestrial and aquatic habitat and plan construction activities to avoid sensitive times of the year;
(b) minimize land requirements for aboveground permanent facilities;
(c) minimizing areas to be cleared and using hand cutting where possible;
(d) avoiding the use of heavy equipment such as bulldozers, especially on steep slopes, water and wetland crossings, and forested and ecologically sensitive areas;
(e) using a central processing or treatment facility for operations, when practical;
(f) minimizing well pad size for drilling activities and satellite or cluster, directional, extended reach drilling techniques shall be considered, and their use maximized in sensitive locations;
(g) avoiding construction of facilities in a floodplain, whenever practical, and within a distance of 100 m of the normal high-water mark of a water body or a water well used for drinking or domestic purposes;
(h) considering the use of existing utility and transport corridors for access roads and pipeline corridors to the extent possible;
(i) considering the routing of access roads to avoid induced impacts such as increased access for poaching;

(j) minimizing the width of a pipeline right-of-way or access road during construction and operations as far as possible;

(k) limiting the amount of pipeline trench left open during construction at any one time and using safety fences and other methods to prevent people or animals from falling into open trenches shall be constructed in sensitive locations and within 500 m of human populations. In remote areas, install wildlife escape ramps from open trenches (typically every 1 km where wildlife is present);

(l) considering use of animal crossing structures such as bridges, culverts, and over crossings, along pipeline and access road rights-of-way;

(m) burying pipelines along the entire length to a minimum of 1 m to the top-of-pipe, wherever this is possible;

(n) carefully considering all of the feasible options for the construction of pipeline river crossings including horizontal directional drilling;

(o) clean-up and fully reinstate following construction activities (including appropriate revegetation using native plant species following construction activities) the pipeline right-of-way and temporary sites such as workforce accommodation camps, storage yards, access roads, helipads and construction workshops, to the pre-existing topography and drainage contours;

(p) reinstating off-site aggregate extraction facilities including borrow pits and quarries (opened specifically for construction or extensively used for construction);

(q) implementing repair and maintenance programs for reinstated sites;

(r) considering the implementation of low impact seismic techniques (e.g. minimize seismic line widths (typically no wider than 5 m), limit the line of sight along new cut lines in forested areas (approximately 350 m));

(s) considering shot-hole methods in place of vibroseis where preservation of vegetation cover is required and when access is limited. In areas of low cover (e.g. deserts, or tundra with snow cover in place), vibroseis machinery shall be selected, but soft soil locations shall be carefully assessed to prevent excessive compaction;

(t) installing temporary and permanent erosion and sediment control measures, slope stabilization measures, and subsidence control and minimization measures at all facilities, as necessary;

(u) regularly maintaining vegetation growth along access roads and at permanent above ground facilities, and avoid introduction of invasive plant species. In controlling vegetation use biological, mechanical and thermal vegetation control measures and avoid the use of chemical herbicides as much as possible.
(16) If it is demonstrated that the use of herbicides is required to control vegetation growth along access roads or at facilities, then personnel must be trained in their use.

(17) Where necessary, noise emissions shall be minimized and controlled through the application of techniques which may include:

(a) implementation of enclosure and cladding of processing plants;

(b) installation of proper sound barriers or noise containments, with enclosures and curtains at or near the source equipment (e.g. crushers, grinders, and screens);

(c) installation of natural barriers at facility boundaries, such as vegetation curtains or soil berms;

(d) optimization of internal-traffic routing, particularly to minimize vehicle reversing needs (reducing noise from reversing alarm) and to maximize distances to the closest sensitive receptors;

(5) The most significant vibrations are usually associated with blasting activities; however vibrations may also be generated by many types of equipment.

(6) Mines shall minimize significant sources of vibration, such as through adequate design of crusher foundations.

(7) For blasting-related emissions (e.g. vibration, airblast, overpressure, or fly rock), the following management practices are recommended:

(a) mechanical ripping shall be used, where possible, to avoid or minimize the use of explosives;

(b) use of specific blasting plans, correct charging procedures and blasting ratios, delayed / microdelayed or electronic detonators, and specific in-situ blasting tests (the use of downhole initiation with short-delay detonators improves fragmentation and reduces ground vibrations);

(c) development of blast design, including a blasting-surfaces survey, to avoid over confined charges, and a drill-hole survey to check for deviation and consequent blasting recalculations;

(d) implementation of ground vibration and overpressure control with appropriate drilling grids;

(e) adequately designing the foundations of primary crushers and other significant sources of vibrations.

8.0 General provisions relating to hand held transmitted vibration

(1) Powered processes and tools which expose operators’ hands to vibration are widespread in several industrial activities.
(2) Occupational exposure to hand-transmitted vibration may arise from hand-held powered tools used in-

(a) manufacturing including percussive metal-working tools, grinders and other rotary tools, impact wrenches and quarrying;

(b) mining and construction including rock-drills, stone-hammers, pick-hammers, vibrocompactors;

(c) agriculture and forestry including chain saws, brush saws, barking machines; and

(d) public utilities including road and concrete breakers, drill-hammers, hand-held grinders.

(3) Exposure to hand-transmitted vibration may also occur from vibrating work pieces held in the hands of the operator as in pedestal grinding, and from hand-held vibrating controls as in operating lawn mowers or in controlling vibrating road compactors.

(4) Excessive exposure to hand-transmitted vibration can cause disorders in the blood vessels, nerves, muscles, and bones and joints of the upper limbs.

(5) Workers handling vibrating tools may experience tingling and numbness in their fingers and hands.

(6) If vibration exposure continues, these symptoms tend to worsen and can interfere with work capacity and life activities.

(7) Vibration exposed workers may exhibit increased vibratory, thermal and tactile thresholds in clinical examinations.

(8) Continuous vibration exposure can not only depress the excitability of skin receptors but also induce pathological changes in the digital nerves such as perineural oedema, followed by fibrosis and nerve fibre loss.

(9) Epidemiological surveys of vibration exposed workers show that the prevalence of peripheral neurological disorders varies from a few per cent to more than 80 per cent, and that sensory loss affects users of a wide range of tool types.

8.1 **Whole body transmitted vibration Biodynamics:**

(1) Like all mechanical structures, the human body has resonance frequencies where the body exhibits a maximum mechanical response.

(2) Human responses to vibration cannot be explained solely in terms of a single resonance frequency.

(3) There are many resonances in the body, and the resonance frequencies vary among people and with posture.

(4) Two mechanical responses of the body are often used to describe the manner in which vibration causes the body to move such as transmissibility and impedance.
(5) The transmissibility shows the fraction of the vibration which is transmitted from, say, and the buttocks to the head.

(6) The transmissibility of the body is highly dependent on vibration frequency, vibration axis and body posture.

(7) Vertical vibration on a seat causes vibration in several axes at the head; for vertical head motion, the transmissibility tends to be greatest in the approximate range of 3 to 10 Hz.

(8) Occupational exposures to whole-body vibration mainly occur in transport but also in association with some industrial processes.

(9) Land, sea and air transport can all produce vibration that can cause discomfort, interfere with activities or cause injury.

(10) Below is a list some environments which may be most likely to be associated with a health risk.

(11) Activities for which it may be appropriate to warn of the adverse effects of whole-body vibration include-

(a) tractor driving;

(b) armoured fighting vehicles (e.g., tanks) and similar vehicles;

(c) other off-road vehicles:

(d) earth-moving machinery-loaders, excavators, bulldozers, graders, scrapers, dumpers, rollers;

(i) forest machines;

(ii) mine and quarry equipment;

(iii) forklift trucks;

(e) truck driving (articulated and non-articulated);

(f) bus and tram driving;

(g) helicopter and fixed-wing aircraft flying;

(h) workers with concrete production machinery;

(i) railway drivers;

(j) use of high-speed marine craft;

(k) motor bicycle riding;
(l) car and van driving;
(m) sports activities;
(n) other industrial equipment.

8.2 Measurement of vibration
(1) A complete assessment of exposure to vibration requires the measurement of vibration acceleration in meters per second squared (m/s$^2$).

(2) Vibration exposure direction is also important and is measured in well-defined three dimensional directions (the $x$, $y$, $z$ axes).

(3) Vibration frequencies and duration of exposure are also determined.

(4) How hard a person grips a tool affects the amount of vibrational energy entering the hands; therefore, hand-grip force is another important factor in the exposure assessment.

(5) The amount of exposure is determined by measuring acceleration in the units of m/s$^2$.

8.2 Instrumentation
(1) A typical vibration measurement system includes a device to sense the vibration (accelerometer), and an instrument to measure the level of vibration.

(2) Currently a number of industries are making vibration measuring instruments that look like sound level meters. This equipment also has settings for measuring frequency, a frequency-weighting network, and a display such as a meter, printer or recorder.

(3) The accelerometer produces an electrical signal. The size of this signal is proportional to the acceleration applied to it.

(4) The frequency-weighting network mimics the human sensitivity to vibration of different frequencies.

(5) The use of weighting networks gives a single number as a measure of vibration exposure and is expressed as the frequency-weighted vibration exposure in metres per second squared (m/s$^2$), units of acceleration.

(6) The frequency-weighting network for hand-arm vibration is given in the International Organization for Standardization (ISO) standard ISO 5349.

(7) Human hand is not equally sensitive to vibration energy at all frequencies. The sensitivity is the highest around 8-16 Hz.

(8) Measuring equipment takes this fact into account by using a weighting network.

(9) The gain is assigned a value of 1 for vibration frequencies to which the hand-arm system has the highest sensitivity.
(10) The International Organization for Standardization (ISO) has published a method for measuring vibration and interpreting the resulting data.

(11) This 2001 standard (ISO 5349-1) also gives the set of curves that can determine exposure levels likely to cause the first signs of white finger in workers.

(12) The measuring instrument shall be suitably calibrated, in accordance with the relevant standard and with the recommendations made about such calibration.

8.3 Recording of data:
(1) When vibration is measured at a place of work, adequate data shall be collected, especially regarding-

(a) the characteristics of the source of vibration studied and the type of work being performed;

(b) the characteristics of the path or manner in which vibration is transmitted the human body (whether there are shock absorbers, cushions, etc.);

(c) the point at which (including the description of any intermediary elements such as sheet sheets) and the pick-up device with which measurements were made, and the values obtained;

(d) the instrument used, its accessories and their characteristics (including sensitivity, dynamic properties and fineness if resolution);

(e) the number of persons exposed to vibration;

(f) the duration of workers’ exposure; and

(g) the date and time of the measurement.

8.4 Standards for exposure to hand-arm vibration
(1) The American Conference of Governmental Industrial Hygienists (ACGIH) has developed Threshold Limit Values (TLVs) for vibration exposure from hand-held tools.

(2) The exposure limits are given as frequency-weighted acceleration that represents a single number measure of the vibration exposure level.

(3) The frequency-weighting is based on a scheme recommended in the international standard ISO 5349. Vibration-measuring instruments have a frequency-weighting network as an option for vibration measurement.

(4) Table 5 lists acceleration levels and exposure durations to which, ACGIH has determined, most workers may be exposed repeatedly without severe damage to fingers.
(5) ACGIH advises that these guidelines be applied in conjunction with other protective measures including vibration control.

Table 5: The ACGIH Threshold Limit Values (TLVs) for exposure of the hand to vibration in x, y, or z direction*

<table>
<thead>
<tr>
<th>Total Daily Exposure Duration (hours)</th>
<th>Maximum value of frequency weighted acceleration (m/s²) in any direction*</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 to less than 8 hours</td>
<td>4</td>
</tr>
<tr>
<td>2 to less than 4 hours</td>
<td>6</td>
</tr>
<tr>
<td>1 to less than 2 hours</td>
<td>8</td>
</tr>
<tr>
<td>less than 1 hour</td>
<td>12</td>
</tr>
</tbody>
</table>

* Directions of axes in the three-dimensional system.

8.5 Standards for exposure to whole-body vibration

(1) The standards and guidelines concerning whole-body vibration are designed to reduce vibration to a level where most workers can perform job tasks without discomfort.

(2) The most widely used document on this topic is Guide for the Evaluation of Human Exposure to Whole Body Vibration (ISO 2631).

(3) These exposure guidelines have been adopted as ACGIH TLVs.

(4) The ISO standard gives three different types of exposure limits-

   (a) a reduced-comfort boundary;
   (b) the fatigue-decreased proficiency boundary;
   (c) an exposure limit

(5) The reduced-comfort boundary is for the comfort of people travelling in airplanes, boats, and trains. Exceeding these exposure limits makes it difficult for passengers to eat, read or write when travelling.

(6) The fatigue-decreased proficiency boundary is a limit for time-dependent effects that impair performance. For example, fatigue impairs performance in flying, driving and operating heavy vehicles. The exposure limit is used to assess the maximum possible exposure allowed for whole-body vibration.

(7) A separate set of "severe discomfort boundaries" is given for 8-hour, 2-hour and 30-minute exposures to whole body vibration in the 0.1 Hz to 0.63 Hz range. As with all standards, it is important to read and understand all the information before applying it in the workplace.

(8) These exposure limits are given as acceleration for one third octave band frequencies and three directions of exposure - longitudinal (head <-> toe) and transverse (back <-> chest and side <-> side). The exposure limit is the lowest for frequencies between 4-8 Hz as the human body is most sensitive to whole-body vibrations at these frequencies.
(9) It is important to remember that people vary in their susceptibility to effects of exposure to vibration so the "exposure limits" shall be considered as guides in controlling exposure: they shall not be considered as an upper "safe" limit of exposure or a boundary between safe and harmful levels.

(10) This paper proposes to introduce an-

(a) exposure action value of 0.5 m/s² A(8) at which level employers shall introduce technical and organisational measures to reduce exposure;
(b) exposure limit value of 1.15 m/s² A (8) which shall not be exceeded.

8.6 Exposure limit values and action values

(1) For hand-arm vibration—

(a) the daily exposure limit value is 5 m/s² A (8);
(b) the daily exposure action value is 2.5 m/s² A(8),

and daily exposure shall be ascertained on the basis set out in Schedule …

(2) For whole body vibration-

(a) the daily exposure limit value is 1.15 m/s² A (8);
(b) the daily exposure action value is 0.5 m/s² A (8),

and daily exposure shall be ascertained on the basis set out in Schedule …

8.7 Traffic vibration

(1) As a vehicle travels along a road, vibration can be generated in the road and subsequently propagate towards nearby buildings.

(2) Such vibration is generated by the interaction of a vehicle’s wheels and the road surface and by direct transmission through the air of low frequency energy waves. Some of these waves arise as a function of the size, shape and speed of the vehicle, and others from pressure fluctuations due to engine, exhaust and other noises generated by the vehicle.

8.8 Discomfort

(1) The discomfort caused by vibration acceleration depends on the vibration frequency, the vibration direction, the point of contact with the body, and the duration of vibration exposure. For vertical vibration of seated persons, the vibration discomfort caused by any frequency increases in proportion to the vibration magnitude: a halving of the vibration will tend to halve the vibration discomfort.

(2) The discomfort produced by vibration may be predicted by the use of appropriate frequency weightings (see below) and described by a semantic scale of discomfort. There are no useful limits for vibration discomfort: the acceptable discomfort varies from one environment to another.
(3) Acceptable magnitudes of vibration in buildings are close to vibration perception thresholds.

(4) The effects on humans of vibration in buildings are assumed to depend on the use of the building in addition to the vibration frequency, direction and duration.

(5) Guidance on the evaluation of building vibration is given in various standards such as British Standard 6472 (1992) which defines a procedure for the evaluation of both vibration and shock in buildings.

8.13 Permissible limits for road construction

Following the above consideration, it is also necessary to set permissible limits for vibration.

Table 6: Permissible vibration during road construction in order to minimize the risk of building damage

<table>
<thead>
<tr>
<th>Permissible vibration velocity (Peak Particle Velocity) at the closest part of any property to the source of vibration at a frequency of</th>
<th>Less than 10 Hz</th>
<th>10 – 50 Hz</th>
<th>50 – 100 Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td>8mm/s</td>
<td>12.5mm/s</td>
<td>20mm/s</td>
<td></td>
</tr>
</tbody>
</table>

8.14 Daily exposure to vibration

The daily exposure to vibration \( A(8) \) of a person is ascertained using the formula:

\[
A(8) = a_{hv} \sqrt{\frac{T}{T_0}}
\]

where:

\( a_{hv} \) is the vibration magnitude, in metres per second squared \((m/s^2)\);
\( T \) is the duration of exposure to the vibration magnitude \( a_{hv} \); and
\( T_0 \) is the reference duration of 8 hours (28,800 seconds).

To avoid confusion between vibration magnitude and daily exposure to vibration, it is conventional to express daily exposure to vibration in \( m/s^2 \) \( A(8) \).

The vibration magnitude, \( a_{hv} \), is ascertained using the formula:

\[
a_{hv} = \sqrt{a_{hwx}^2 + a_{hwy}^2 + a_{hwz}^2}
\]

where:
ahwx, ahwy and ahwz are the root-mean-square acceleration magnitudes, in m/s², measured in
three orthogonal directions, x, y and z, at the vibrating surface in contact with the hand, and
frequency-weighted using the weighting Wh.

Where both hands are exposed to vibration, the greater of the two magnitudes ahv is used to
ascertain the daily exposure.

If the work is such that the total daily exposure consists of two or more operations with
different vibration magnitudes, the daily exposure (A(8)) for the combination of operations is
ascertained using the formula:

\[ A(8) = \sqrt{\frac{1}{T_0} \sum_{i=1}^{n} a_{hv i}^2 T_i} \]

where:

- n is the number of individual operations within the working day;
- ahvi is the vibration magnitude for operation i; and
- Ti is the duration of operation i.

The exposure to vibration averaged over one week (A(8) week) is the total exposure
occurring within a period of seven consecutive days, normalised to a reference duration of
five 8-hour days (40 hours). It is ascertained using the formula:

\[ A(8)_{\text{week}} = \sqrt{\frac{1}{5} \sum_{j=1}^{7} A(8)_j^2} \]

where:

- A(8) j is the daily exposure for day j.

The exposure to vibration averaged over one week is for use only for the purposes of
Regulation these Regulations.

**9.0 Ultrasound**

(1) Ultrasound is acoustic oscillation whose frequency is too high to affect the sense of
hearing in man. It has frequency range above 20,000 Hz.
(2) The majority of effects observed in exposure to ultrasound are the result of acoustic energy being converted to heat.

(3) Ultrasound is rapidly absorbed in air, and protection against it is easy. When exposed to ultrasound, warning is given by a feeling of skin burning.

9.1 Maximum allowable ultrasound in the workplace

Table 4: Maximum allowable sound pressure levels in the workplace in the vicinity of ultrasound.

<table>
<thead>
<tr>
<th>Generic frequency means by third octave bands (Hz)</th>
<th>12,500</th>
<th>16,000</th>
<th>20,000+</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sound pressure level (in dB)</td>
<td>75</td>
<td>85</td>
<td>110</td>
</tr>
</tbody>
</table>

Cross References

Local Governments Act, Cap 243
Occupational Safety and Health Act, 2006, Act No. 9 of 2006

.....................

The Minister of Water and Environment