

Characters of Construction Noise

- Irregular and complex volume and frequency, with irritation.
- Only occurs around construction sites.
- Staged occurrence; the noise happens along with uncertain construction phases
- Various construction equipment results in various noise volume and component in different construction phases.
- Vibration and dust pollutions occur with the noise. These pollutions would produce compound and interactive effects to citizens.
- Noise source would disappear once the construction is complete.

Construction Noise Effects to human bodies

● Physically

A high noise environment would result in: stomach and intestine peristalsis speeding, breathing pattern changes, heartbeat accelerating, oxygen consumption increasing, serum cholesterol raising, blood platelets agglutination, etc. Although it cannot be judged that noise is the root cause of these symptoms, it is certain that noise is one of the factors attributable.

● Mentally

Noise would produce mental irritations such as: sleep disturbance, talk interference, low work efficiency, loathing, anger, etc. Over a period of time, physical functions would be maladjusted because of mental irritations and insomnia. The direct and indirect effects of noise include: headache, dizziness, lack of concentration, etc.

● Hearing

When the volume is over 65dB in surrounding environment, the talking distance must be shrank to under 1m, or the talking volume must be raised in an abnormal way. When the volume is over 70dB, 30% of talking content is vague, causing communication difficulty. If a human continuously stays in an environment with over 85dB, his/her hearing ability would be damaged. Huge volume or explosion sound may cause ear drum rupture.

Source of Construction Noise

- Building dismantling : Portable crusher, steel ball, rock drill, electrical drill, pavement cutter, concrete crusher, excavator, dumper
- Foundation excavation : Bulldozer, excavator, power shovel, crane, dumper, diesel mallet, drop hammer, pile driver, etc.
- Steel bar erecting : Crane, dumper, diesel mallet, drop hammer, pile driver, etc.
- Floor grouting : Pumping truck, mixed concrete truck, formwork conveying, formwork assembling
- Follow-up decoration : Portable crusher, cutter, welding

Construction Noise Prevention Technologies and Strategies

Noise Source Control

- Equipment maintenance : Periodically inspect, test and maintain construction equipment and machines.
- Machine arrangement : Construction equipment and machines shall be placed in a proper distance away from local residence, to avoid operation noise interference to neighbors.
- Barrier and insulation : Local bafflers may be used around construction equipment, machines and motors to abate the noise.
- Choosing proper equipment : Low-noise equipment shall be chosen in constructions. Soft padding shall be attached to vibrating equipment. Silencers shall be mounted on exhaust pipes of machines.

Blocking Noise Spreading Ways

- Soundproof wall : Construction sites shall be enclosed with walls and temporary soundproof bafflers to decrease the noise influence to local residents. Keep caution that the enclosure door shall be kept closed.
- Terrain barrier : Use waste soil or mounds to block noise spreading.
- Abating by distance : Keep a proper distance between construction site and local residence to decrease the noise influence.

Management Measures

● Operation time control :

Construction shall be in coordinate with daily schedule of surrounding residents. Nighttime operation shall be avoided.

Arrange operation schedule to prevent machine idling and simultaneous operation.

● Contractor management :

Internal operation & management procedure shall be established, and notify billboards shall be set.

Through contract specification and on-site reminder, contractors are required to provide proper environmental management.

● Operation procedure control :

Eliminate unnecessary collision between machines and metal objects to reduce noise production.

During the construction period, maintain the roads in construction site in a good condition to reduce noise impact.

Communication, Negotiation and Noise Affected People Protection

Communication and Negotiation

Keep good relationship with neighbor community:

Local residents shall be notified and communicated when large volume operation period is expected. Thus, they can have clear expectation and adjust their daily schedule to decrease noise influence.

Construction Notice:

Construction bulletins shall be posted, labeling the project content, operation time and contact methods.

Noise Affected People Protection

Protecting equipment:

Operators of high-volume tools or machines shall wear proper protecting equipment.

Building Protection:

Construction site shall be installed with soundproof facilities.

Construction Equipment Noise Reduction Technologies

Pile Driver

Improving methods:

1. Before operation, drill a hole with drilling machine, then lift and insert the pile, in order to reduce piling times.
2. Improve pile diver accessories, for example, using double acoustic material structure outside the pile driver's cylinder, installing sound arresters or vibration-proof padding on the equipment, etc.
3. Choose low-volume operation method (or machine).

Generator and Air Compressor

Improving methods:

1. Since noise abates by distance, generators can be placed away from local residence.
2. Cover with bafflers, but cooling, access door and reuse issues shall be considered while designing.
3. Choose low-volume operation method (or machine).
4. Apply for temporary power supply as early as possible to avoid using generators.
5. Set a sound insulation room and install vibration-proof housings.

Crusher and Rock Drill

Improving methods:

1. When dismantling a building of its skirts, the construction team can reduce the noise using soundproof walls and bafflers.
2. Choose a crusher with high-rigid and strong clamp, force concentration and vibration reduction. Adjust the order of rock drilling points according to stress distribution, in order to accelerate structure dismantling and to reduce rock drilling operation time.
3. Use crushed stones and waste tires as padding material.
4. Dismantle slowly to reduce vibration
5. Choose low-volume machine (such as locking machine)

Bulldozer, Excavator and Road Roller

Improving methods:

1. Carefully operate to avoid overloading and to control speed.
2. Prevent unnecessary idle running of motors or engines; turn off motors or engines when they are not operated.
3. Place the machines at the lowest influencing site.
4. Choose low-volume machine (such as rubber roller, roller machine)

Tracked Vehicles

Improving methods:

1. Install bafflers and sound arresters on engines
2. Choose electrical motoring engines
3. Choose rubber tires.

Dumper

Improving methods:

1. Install exhaust hood
2. Use belt conveyor and pipe
3. Plan delivery routes and decrease transportation times, to reduce interference to residents.

Relevant Regulations

Noise Control Regulations:

1. Noise Control Act
2. Enforcement Rules of Noise Control Act
3. Noise Control Standard

4. Establishment and Operation Permission Measures for Facilities with Noisy Tendency

5. Promulgating “The zone boundary and period of time prohibiting noisy and disturbing activities in Taipei City”

Promulgating Items:

A. In Taipei City (hereafter abbreviated as “the City”), in all schools and their 50m neighborhoods, health and medical institutes (except clinics) and their 50m neighborhoods, and cultural and educational areas, the following activities are prohibited during whole day:

1. Shooting-off sky fireworks and general firecrackers and fireworks with explosion sound.
2. Using amplifying equipment in temples (including private altars) and traditional activities, such as temple fairs, weddings and funerals.

B. In all Noise Control Zones, the following activities are prohibited from 11pm to 6am until the next morning:

1. Shooting-off sky fireworks and general firecrackers and fireworks with explosion sound. But it is not limited during traditional holidays, such as New Year, Chinese New Year, Lantern Festival, Dragon Boat Festival, Dead Spirit Festival, Mid-Autumn Festival, National Day, New Year’ s Eve, etc.
2. Using amplifying equipment in temples (including private altars) and traditional activities, such as temple fairs, weddings and funerals.
3. Using amplifying equipment in outdoor gatherings and parades. But it is not limited? during traditional holidays, such as New Year, Chinese New Year, Lantern Festival, Dragon Boat Festival, Dead Spirit Festival, Mid-Autumn Festival, National Day, New Year’ s Eve, etc.
- 4.?Karaoke not for business purpose.

C. In Class 1 and 2 Noise Control Zones, the following activities are prohibited from 11pm to 6am until the next morning:

1. Using power machines for catering, laundry, printing or any other business activities.
2. Using amplifying equipment for all types of commercial advertising (including movable advertising vehicles)

D. In Class 1 to 3 Noise Control Zones, using power machines for constructions is prohibited from 10pm to 6am in the next day. However, it is unlimited in the following circumstances:

1. Emergency rescue and repairing works for instances that endanger public safety, cause environmental pollution and influence water supply, power supply, natural gas supply or communication.
2. Continuation required works, such as piling (except percussive piling), diaphragm wall, safety measures for underground structure constructions (including excavation), mass concrete grouting, and major bridge suspension and installation, and permitted to operate during the night by the competent authorities in charge of specific business.
- 3.?Construction works for an international or national event held by the Government and permitted to operate during the night by Taipei City Government.

E. In cases of Item B to Item D, the competent authorities in charge of specific business shall send a copy of permission document to TDEP. The project unit shall set a billboard for nighttime construction, otherwise it would be regarded as violating former regulations.

F. The nighttime construction billboard shall identify the name of the project owner, nighttime construction permission document number, name of construction unit, name of site manager, name and phone number of on-site contact person, name and phone number of supervision authority, and the phone number of Taipei Citizen Hotline: 1999.

6. Promulgating “In all Noise Control Zones of Taipei City, the facilities and decoration constructions of non-recreational, non-business premises, such as houses, apartments, condominiums, institutes, groups, schools, etc., shall not produce a sound louder than the noise control standard.”

Promulgating Items:

A. In all Noise Control Zones of Taipei City, the air-conditioning system, cooling tower, freezer/refrigerator, power generator, water pump and exhaust fan of non-recreational, non-business premises, such as houses, apartments, condominiums, institutes, groups, schools, etc., shall not produce a sound louder than the regulation of Noise Control Standard, Article 6 (see Attachment 1). Those who violating the regulation would be notified to improve within a time limit, which shall not exceed 30 days.

B. In all Noise Control Areas of Taipei City, decoration constructions shall not produce a sound louder than the regulation of Noise Control Standard, Article 4 (see Attachment 2). Those who violating the regulation would be notified to improve within a time limit, which shall not exceed 4 days.

C. For those violating Item A & B of this promulgation, if they did not complete improvement within time limits mentioned above, they would be punished per Noise Control Act, Article 24, Paragraph 1, Subparagraph V.

Attachment 1: Noise Control Standard of Promulgated Facilities in Taipei City

Unit: dB(A)

Volume	Frequency	20Hz~200Hz			20Hz~20kHz		
		Time Section					
		Day	Night	Night	Day	Night	Night
Control Zone		Day	Night	Night	Day	Night	Night
Class 1		32	32	27	55	50	35
Class 2		37	32	27	57	52	42
Class 3		37	37	32	67	57	47
Class 4		40	40	35	80	70	60

Note: The relevant rules of determining time section, classification of Control Zone, unit of volume, measurement instrument, measurement height, dynamic characteristic, modification to background volume, measurement time, measurement site, evaluation method, are in accordance with Noise Control Standard, Article 6.

Attachment 2: Noise Control Standard of Promulgated Construction Works in Taipei City

Unit: dB(A)

Frequency Time Section		20 Hz~200 Hz , enforced since 01/01/2009			20Hz~20kHz		
		Day	Night	Night	Day	Night	Night
Volume Control Zone							
Equivalent Sound Level (L_{eq})	Class 1	44	44	39	67	47	47
	Class 2	44	44	39	67	57	47
	Class 3	46	46	41	72	67	62
	Class 4	49	49	44	80	70	65
Maximum Sound Level (L_{max})	Class 1 & 2	-			100	80	70
	Class 3 & 4				100	85	75

Note: The relevant rules of determining time section, classification of Control Zone, unit of volume, measurement instrument, measurement height, dynamic characteristic, modification to background volume, measurement time, measurement site, evaluation method, are in accordance with Noise Control Standard, Article 4.

Information for Noise Prevention Companies

The Acoustical Society of R.O.C

TEL: 02-23831737

FAX: 02-23831695

Chinese Society of Sound and Vibration

TEL: 02-3366-3251

FAX: 02-3366-1859

Taiwan Environmental Manufacturers Association

TEL: 02-2921-6626

FAX: 02-2921-6639

Taiwan Environmental Engineering Association

TEL: 02-2543-1099

TEL: 02-2521-9452

Relevant Authorities:

1. Environmental Protection Administration, Executive Yuan

TEL : 02-2371-2121

FAX : 02-23810562

Urgent Contact Number in Weekends and Holidays : 02-23117722 # 2467

Complaining environmental pollution: 0800-066666

2. Department of Environmental Protection, Taipei City Government

Complaining environmental pollution: Taipei Citizen Hotline 1999

Counseling and advising: 02-2728-7247

3. Taipei City Construction Management Office

TEL: 02-27258385

4. New Construction Office, Public Works Department, Taipei City TEL: 02-27202291

5. Environmental Inspection Division, Department of Environmental Protection, Taipei City Government

TEL: (02)23754573

Radioactive Contaminated Buildings

We assist radioactive detection and the inspection we conduct will survey and initially detect building radioactivity. If the detective value is over natural background value (about 2 mSv/year), it will be reported to Atomic Energy Council, to completely solve the radioactive contaminated building problem in Taipei City.

1. Besides coordinating relevant units in City Government to improve radioactive contamination treatment, we continuously coordinate with Atomic Energy Council to deal with the dismantling, rebuilding and improving the radioactive contaminated buildings that are evaluated as removable.

2. To protect citizen's health, for residents living in radioactive contaminated buildings with 1~5 mSv/year, Department of Health would continuously provide free health check up and follow-up on the inspection status.

3. To prevent radioactive contaminated steel bars and buildings occur again, Department of Public Works would continuously supervise construction project owners to provide non-radioactive contaminated steel bar certificate.