

NOISE

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Agenda

- Syllabus
- Fundamental of Environmental Noise
- Noise Pollution Sources and Impacts
- Noise Prediction Modeling
- Environmental Noise Management
- Noise Monitoring and Measurement
- Suggested Reading Materials
- Sample Questions

Syllabus

1. Fundamental of Environmental Noise
2. Noise Pollution Sources and Impacts
3. Noise Prediction Modeling
4. Environmental Noise Management
5. Noise Monitoring and Measurement
6. Relevant Guidelines

Syllabus has been uploaded on <http://hkiqep.org/materials-and-links/>

MC questions will be in fundamental level only for Professional Member Examination.

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Syllabus

1. Fundamental of Environmental Noise

- 1.1 Sound and noise, perception of sound, response of the human ears to noise
- 1.2 Characteristics of sound and the decibel scale (*sound pressure, A-weighting*)
- 1.3 Noise descriptors for Environmental Noise
(*e.g., Leq, Ldn, Lden, Lnight, L10, L50, L90, Lmax, Lden, Lnight, Noise Exposure Forecast*)
- 1.4 Sound propagation
(*e.g., point, line, area sources, reflection, refraction, diffraction*)
- 1.5 Soundscape
- 1.6 Mathematics (*e.g., Logarithm*)

2. Noise Pollution Sources and Impacts

- 2.1 Typical environmental noise sources
(*e.g., domestic premises, public places, construction, industrial, commercial, railway, lightrail, tram, road traffic, aircraft, helicopter, marine traffic, music, entertainment, crowd, nature*)
- 2.2 Noise receivers
(*e.g., Residential Uses, all domestic premises including temporary housing, Institutional Uses, educational institutions including kindergarten and nurseries, hospitals, medical clinics, homes for the aged, convalescent homes, places of public worship, libraries, courts of law, performing arts centres, auditoria, amphitheatres, hostels, country parks*)
- 2.3 Noise Standards
(*e.g., domestic premises, public places, construction, industrial, commercial, railway, lightrail, tram, road traffic, aircraft, helicopter, marine traffic, music, entertainment, crowd, nature*)
- 2.4 Auditory effects (hearing impairment) and non-auditory effects of noise
(*e.g., stress, annoyance, social and behavioral effects, speech interference, sleep disturbance, cognitive and cardiovascular and physiological effects*)
- 2.5 Exposure-response relationships (*annoyance and sleep disturbance*)

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3. Noise Prediction Modeling

- 3.1 Reasons for modeling
(e.g., assessing noise impact from a noise source, assessing noise receiver affected by noise sources)
- 3.2 Basic Modelling Concepts
(e.g., analytic model, Engineering model, Noise Emission Model, Noise Propagation Model, Numerical Model, Finite Element Model, Boundary Element Model, Ray Tracing Model)
- 3.3 Noise prediction methodologies
(e.g., construction, industrial & commercial, railway, road traffic, aircraft, helicopter, music, entertainment, crowd, marine traffic)
- 3.4 Computation software
(e.g., construction, industrial & commercial, railway, road traffic, aircraft, helicopter, music, entertainment, crowd, marine traffic)
- 3.5 Large Scale Model for City Noise Mapping
(e.g., noise source data, topographic data, prediction model, computational software, presentation of results)
- 3.6 Methodologies and software limitations

4. Environmental Noise Management

- 4.1 Prevention of noise problem
(planning of noise sources, planning of noise receivers, noise impact assessment for Environmental Impact Assessment Ordinance submission, noise impact assessment for s16 or s12 applications under Town Planning Ordinance)
- 4.2 Control
(noise control ordinance : domestic premises and public places, construction noise, construction noise permits, industrial and commercial places, noise abatement notice, noise labels, vehicle 1st registration)
- 4.3 Abatement
(noise control measures, acoustics insulation, retrofitting noise barriers on road, low noise road surface)
- 4.4 Noise mitigation measures

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(at noise sources: quiet equipment; at transmission path: barrier, enclosure; at receivers : insulation, special provided glazing)

4.5 Soundscape

5. Noise Monitoring and Measurement

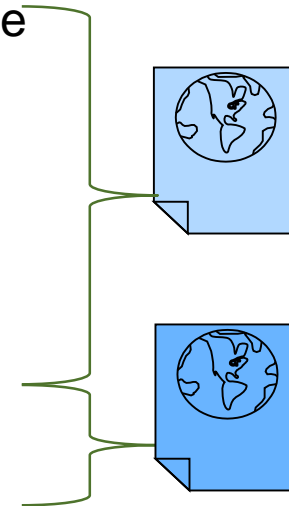
- 5.1 Subjective assessment for noise from domestic premises or public place
- 5.2 Construction works noise monitoring for EM&A purpose
- 5.3 Industrial and commercial noise measurement for investigation and compliance check to respond noise abatement notice
- 5.4 Road traffic noise measurement and monitoring
- 5.5 Railway noise measurement and monitoring
- 5.6 Aircraft noise monitoring
- 5.7 Musical event noise measurement and monitoring for investigation and compliance check to respond noise abatement notice
- 5.8 Verification measurement for special designed glazing for industrial noise
- 5.9 Verification measurement for acoustic window, balcony , special architecture features, etc for traffic noise
- 5.10 Product noise and vehicle noise measurement

6. Relevant Guidelines

- 6.1 Hong Kong Planning Standards and Guidelines
- 6.2 Technical Memorandum of Environmental Impact Assessment Ordinance
- 6.3 Guidance notes for construction and road traffic noise assessment
- 6.4 Professional Persons Environmental Consultative Committee Practice Notes (ProPECCPNs)

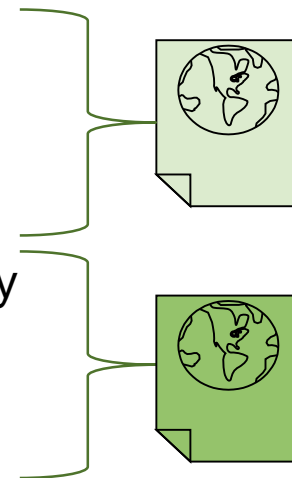
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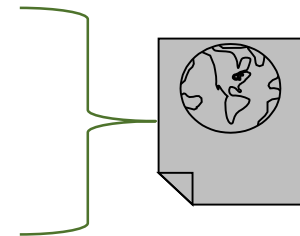


3. Noise Prediction Modeling

- Reasons for modeling
- Basic Modelling Concepts
 - Analytic model,
 - Engineering model, Noise Emission Model, Noise Propagation Model,
 - Numerical Model, Finite Element Model, Boundary Element Model,
 - Ray Tracing Model

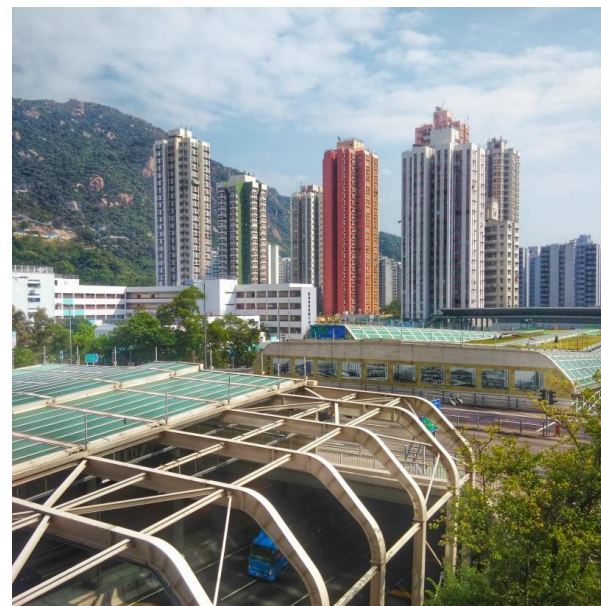
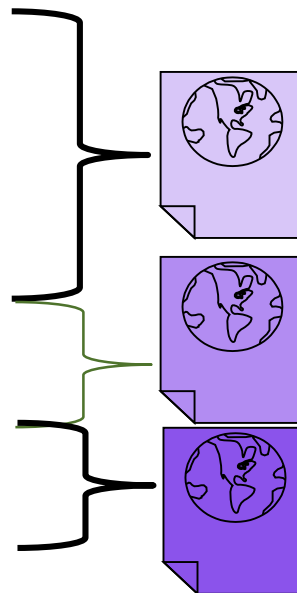
3. Noise Prediction Modeling

- Noise prediction methodologies
 - Calculation of Road Traffic Noise
 - Calculation of Railway Noise
 - ISO 9613 Acoustics – Attenuation of sound during propagation outdoors
 - International Civil Aviation Organisation Doc 9911
- Computation software
- Large Scale Model for City Noise Mapping
 - European Environment Agency, Guidance Note for Strategic Noise Mapping
- Methodologies and software limitations



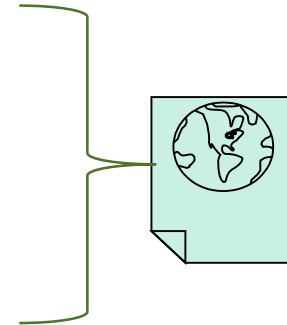
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- Control
- Abatement
- Noise mitigation measures
- Soundscape



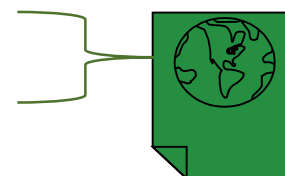
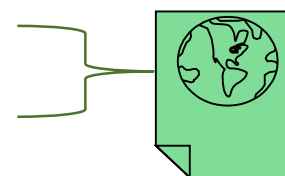
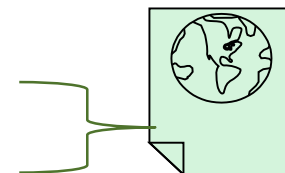
5. Noise Monitoring and Measurement

- Subjective assessment for noise from domestic premises or public place
- Construction works noise monitoring for EM&A purpose
- Industrial and commercial noise measurement
- Musical event noise measurement and monitoring
- Railway noise measurement and monitoring



5. Noise Monitoring and Measurement

- Road traffic noise measurement and monitoring
- Measurement for special designed glazing for industrial noise
- Measurement for acoustic window, balcony, special architecture features, etc for traffic noise
- Aircraft noise monitoring
- Product noise and vehicle noise measurement



Suggested Reading Materials

- ISO 9613 Acoustics – Attenuation of sound during propagation outdoors
- Soundscape Planning –Environmental Noise Control, Noise/News by I-INCE and INCE/USE Vol 23, Number 2, 2015 June
- European Environment Agency, Good practice guide on noise exposure and potential health effects
- Calculation of Road Traffic Noise
- Calculation of Railway Noise
- International Civil Aviation Organisation Doc 9911
- European Environment Agency, Guidance Note for Strategic Noise Mapping
- Research into the Practical and Policy Applications of Soundscape Concepts and Techniques in Urban Areas, Department for Environment, Food and Rural Affairs, UK 2007
- Environmental Noise
http://www.epd.gov.hk/epd/noise_education/web/ENG_EPD_HTML/index/index.html
- Technical Memorandum on Noise from Construction Work Other Than Percussive Piling
http://www.epd.gov.hk/epd/english/environmentinhk/noise/guide_ref/files/tm_nonpp.pdf
- Technical Memorandum for the Assessment of Noise from Places Other Than Domestic Premises, Public Places or Construction Sites
http://www.epd.gov.hk/epd/english/environmentinhk/noise/guide_ref/tm_nondomestic.html
- Environmental Protection Department, Noise Guidelines & References
http://www.epd.gov.hk/epd/english/environmentinhk/noise/guide_ref/noise_guidelines.html
- Environmental Protection Department, Noise Guidelines & References-Archive
http://www.epd.gov.hk/epd/english/environmentinhk/noise/guide_ref/noise_guidelines_archive.html
- Recommended Study Materials, Text Books & Resources of Qualified Environmental Professional (QEP) Certification, The Institute of Professional Environmental Practice

