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ANNEX I
NOISE INDICATORS

1. Definition of the day-evening-night level Lden
2. Definition of the night-time noise indicator
3. Supplementary noise indicators

ANNEX II
ASSESSMENT METHODS FOR THE NOISE INDICATORS

1. INTRODUCTION
2. COMMON NOISE ASSESSMENT METHODS
   2.1. General provisions — Road traffic, railway and industrial noise
      2.1.1. Indicators, frequency range and band definitions
      2.1.2. Quality framework
      Accuracy of input values
      Use of default values
      Quality of the software used for the calculations
   2.2. Road traffic noise
      2.2.1. Source description
Classification of vehicles
Number and position of equivalent sound sources
Sound power emission
  General considerations
  Traffic flow
  Individual vehicle

2.2.2. Reference conditions

2.2.3. Rolling noise
  General equation
  Correction for studded tyres
  Effect of air temperature on rolling noise correction

2.2.4. Propulsion noise
  General equation
  Effect of road gradients

2.2.5. Effect of the acceleration and deceleration of vehicles

2.2.6. Effect of the type of road surface
  General principles
  Age effect on road surface noise properties

2.3. Railway noise

2.3.1. Source description
  Classification of vehicles
  Definition of vehicle and train
  Classification of tracks and support structure
  Number and position of the equivalent sound sources

2.3.2. Sound power emission
  General equations
  Individual vehicle
  Traffic flow
  Rolling noise
  Wheel and rail roughness
    Definition
  Vehicle, track and superstructure transfer function
  Impact noise (crossings, switches and junctions)
  Squeal
  Traction noise
  Aerodynamic noise
  Source directivity

2.3.3. Additional effects
  Correction for structural radiation (bridges and viaducts)
  Correction for other railway-related noise sources

2.4. Industrial noise

2.4.1. Source description
  Classification of source types (point, line, area)
  Number and position of equivalent sound sources
  Sound power emission
    General
  Source directivity

2.5. Calculation of noise propagation for road, railway, industrial sources.

2.5.1. Scope and applicability of the method

2.5.2. Definitions used

2.5.3. Geometrical considerations
  Source segmentation
  Propagation paths
Significant heights above the ground
Calculation of the mean plane
Reflections by building façades and other vertical obstacles

2.5.4. Sound propagation model

2.5.5. Calculation process

Sound level in favourable conditions \((L_F)\) for a...
Sound level in homogeneous conditions \((L_H)\) for a...
Statistical approach inside urban areas for a path \((S,R)\)
Long-term sound level for a path \((S,R)\)
Long-term sound level at point \(R\) for all paths
Long-term sound level at point \(R\) in decibels \((\text{dBA})\)...

2.5.6. Calculation of noise propagation for road, railway, industrial sources.

Geometrical divergence
Atmospheric absorption
Ground effect
Acoustic characterisation of ground
Calculations in homogeneous conditions
Calculation in favourable conditions
Diffraction
General principles
Pure diffraction
Calculation of the path difference
Homogeneous conditions
Favourable conditions
Calculation of the attenuation \(A\) dif
Calculation of the term \(\Delta\) ground\((S,O)\)
Calculation of the term \(\Delta\) ground\((O,R)\)
Vertical edge scenarios
Reflections on vertical obstacles
Attenuation through absorption
Attenuation through retrodiffraction

2.6. General provisions — Aircraft noise

2.6.1. Definitions and symbols

Terms
Symbols
Subscripts

2.6.2. Quality framework

Accuracy of input values
Use of default values
Quality of the software used for the calculations

2.7. Aircraft noise

2.7.1. Aim and scope of document

2.7.2. Outline of the document

2.7.3. The concept of segmentation

2.7.4. Flight paths: Tracks and profiles

2.7.5. Aircraft noise and performance

2.7.6. Airport and aircraft operations

General airport data
Runway data
Ground track data
Air traffic data
Topographical data
Reference conditions
Reference conditions for NPD data
Reference conditions for aeroplane aerodynamic and engine data

2.7.7. Description of the flight path
2.7.8. Relationships between flight path and flight configuration
2.7.9. Sources of flight path data
   Radar data
   Procedural steps

2.7.10. Coordinate systems
   The local coordinate system
   The ground-track fixed coordinate system
   The aircraft coordinate system
   Accounting for topography

2.7.11. Ground Tracks
   Backbone tracks
   Track dispersion

2.7.12. Flight profiles

2.7.13. Construction of flight path segments
   Ground track
   Flight profile
   Segmentation of the takeoff ground roll
      Example:
   Segmentation of the initial climb segment
      Example:
   Segmentation of airborne segments
   The landing ground roll

2.7.14. Noise calculation for a single event
2.7.15. Single event metrics
2.7.16. Determination of event levels from NPD-data
   Impedance adjustment of standard NPD data

2.7.17. General expressions
   Segment event level $L_{seg}$
   Event noise level $L$ of an aircraft movement

2.7.18. Flight path segment parameters
   Geometric parameters
   Segment power $P$

2.7.19. Segment Event level correction terms
   The duration correction $DV$ (Exposure levels LE only)
   Sound propagation geometry
   Engine installation correction $ΔI$
   Lateral attenuation $Δ(f, t)$ (infinite flight path)
   Finite segment lateral attenuation
   The finite segment correction $ΔF$ (Exposure levels LE... Specific Treatments of Ground-roll Segments, including the start-of-roll directivity function...
   The start-of-roll directivity function $ΔSOR$
   Treatment of receivers located behind each takeoff and landing ground-roll...

2.7.20. Event noise level $L$ of a general-aviation aircraft movement
2.7.21. Method for the Calculation of Helicopter Noise
2.7.22. Noise associated with Engine Testing (Run-Up) Operations, taxiing and auxiliary...

2.7.23. Calculation of cumulative levels
2.7.24. Weighted equivalent sound levels
2.7.25. The weighted number of operations
2.7.26. Standard grid calculation and refinement
2.7.27. Use of rotated grids
2.7.28. Tracing of contours
2.8. Assigning noise levels and population to buildings
   Determination of the number of inhabitants of a building
   CASE 1: the data on the number of inhabitants is...
   CASE 2: no data on the number of inhabitants is...
   Assigning receiver points to the façades of buildings
   CASE 1
   CASE 2

3. INPUT DATA

4. MEASUREMENT METHODS

   Appendix A
   Data requirements

   Section 2.7.6 of the main text describes in general terms...

   A1 GENERAL AIRPORT DATA
   A2 RUNWAY DESCRIPTION
   A3 GROUND TRACK DESCRIPTION
   A4 AIR TRAFFIC DESCRIPTION
   A5 FLIGHT PROCEDURE DATA SHEET

   Appendix B
   Flight performance calculations

   Terms and symbols

   Terms

   Symbols

   B1 INTRODUCTION
       Flight path synthesis
       Flight path analysis

   B2 ENGINE THRUST
       Guidance on operation with reduced takeoff thrust
       Reduced Climb Thrust
B3 VERTICAL PROFILES OF AIR TEMPERATURE, PRESSURE, DENSITY AND WINDSPEED

B4 THE EFFECTS OF TURNS
   Approximate method

B5 TAKEOFF GROUND ROLL

B6 CLIMB AT CONSTANT SPEED

B7 POWER CUTBACK (TRANSITION SEGMENT)
   Amount of thrust reduction
   Constant speed climb segment with cutback

B8 ACCELERATING CLIMB AND FLAP RETRACTION
   Accelerating segment with cutback

B9 ADDITIONAL CLIMB AND ACCELERATION SEGMENTS AFTER FLAP RETRACTION

B10 DESCENT AND DECELERATION

B11 LANDING APPROACH

Appendix C
Modelling of lateral ground track spreading

It is recommended that, in the absence of radar data,...
Assuming a Gaussian distribution with a standard deviation S,...
A Gaussian distribution can normally be modelled adequately using 7...
However, the adequacy of the approximation depends on the relationship...

Appendix D
Recalculation of NPD-data for non-reference conditions

The noise level contributions from each segment of the flight...
The curves overlaid on Figure D-1, calculated using an...
Because the attenuation rates, given in Table D-1, are...
The attenuation coefficients in Table D-1 may be assumed valid...
The ANP database provides the following NPD data for each...
maximum sound level versus slant distance, L max (d) time...
all data being normalised to the AIR-1845 atmosphere.
Adjustment of the NPD curves to user-specified conditions T and...
First the reference spectrum is corrected to remove the SAE...
The increment ΔL is the difference between the NPDs...
Applying ΔL to adjust both L max and L...
Appendix E

The finite segment correction

This appendix outlines the derivation of the finite segment correction...

E1 GEOMETRY

E2 ESTIMATION OF THE ENERGY FRACTION

E3 CONSISTENCY OF MAXIMUM AND TIME INTEGRATED METRICS — THE SCALED...

Appendix F

Database for road traffic source

This appendix presents the database for most of the existing...

Appendix G

Database for railway source

Appendix H

Database for industrial source

This appendix presents a few examples for input values for...

Appendix I

Database for aircraft source — NPD data

This appendix presents the database for most of the existing...
This section introduces complementary data for general aviation aircraft.

GASEPF and GASEPV data

Aircraft classes data

Aircraft Noise and Performance data for the four classes are...

Helicopter Noise and Performance Data Set 1

Helicopter Noise and Performance Data Set 2
ANNEX III

ASSESSMENT METHODS FOR HARMFUL EFFECTS

1. Set of harmful effects

2. Calculation of harmful effects
   2.1. IHD
   2.2. HA
   2.3. HSD

3. Assessment of harmful effects
   3.1. The exposure of the population shall be assessed independently for...
   3.2. Assessment for IHD
      3.2.1. For IHD in the case of railway and aircraft noise...
      3.2.2. For IHD in the case of road noise, the proportion...
      3.2.3. For IHD in the case of road noise, the total...
   3.3. For HA and HSD in the case of road, railway...

4. Future revisions

ANNEX IV

MINIMUM REQUIREMENTS FOR STRATEGIC NOISE MAPPING

1. A strategic noise map is the presentation of data on...

2. Strategic noise maps may be presented to the public as:...

3. Strategic noise maps for agglomerations shall put a special emphasis...

4. Strategic noise mapping will be used for the following purposes:...

5. Minimum requirements for the strategic noise maps concerning the data...

6. For the purposes of informing the citizen in accordance with...

7. Strategic noise maps for local or national application must be...

8. For agglomerations separate strategic noise maps must be made for...

9. The Commission may develop guidelines providing further guidance on noise...

ANNEX V

MINIMUM REQUIREMENTS FOR ACTION PLANS

1. An action plan must at least include the following elements:...

2. The actions which the competent authorities intend to take in...

3. Each action plan should contain estimates in terms of the...
4. The Commission may develop guidelines providing further guidance on the...

ANNEX VI
DATA TO BE SENT TO THE COMMISSION

The data to be sent to the Commission are as...
1. For agglomerations 1.1. A concise description of the agglomeration:...

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