

MEASUREMENT OF ROAD TRAFFIC NOISE AND TRAFFIC COUNT

Tasks

- Traffic count
- A weighted sound-pressure level measurement
- Compare the different type of A weighted sound-pressure level techniques, (L'_{Aeq} vs. L'_{Aeqm})
- Compare the results to literature results/laws/regulations

Traffic count

The report should be involving the measurements parameters:

- The exact address of the measurements. Prepare a map about the measurements or take a snapshot from google maps and please indicate the measurements position.
- The time/date/temperature (appr.),
- The meteorological condition by norm:
 - appr./internet wind speed (< 6 m/s)
 - It should be dry weather (the rainy weather could be influenced the measurements)

The table should be involving the number of vehicles passing all specific direction.

For this measurement of traffic noise let choose at least 6 different crossroads with different traffic load.

- 1st could be an almost “abandoned” street (such as *Bertalan Lajos street* next to the department)
- 2nd could be characterized by normal road traffic (such as *Budafoki street*).
- 3rd could be characterized by high traffic (for example *Irinyi street* going to Pest).
- Other possibilities measurement could be on a bridge, you can go in to metro, etc...

Place of traffic count:									
Date (duration):									
Direction	A direction			B direction			C direction		
	A – B	A – C	A – D	B – A	B – C	B – D	C – A	C – B	C – D
Category No.1									
Category No.2									
Category No.3									
Notes:									

1. Table Observation for the vehicles and their velocity depend on the categories

For example:

1st Location: Bertalan Lajos utca / Müegyetem rakpart

date: 6th May 2010
 time: 4:30 pm
 temperature: approx. 22°C
 wind speed: < 1m/s

Traffic count

Direction	A-B	A-D	C-A	C-B
Number of cars	30	3	31	4
Number of trucks	1		1	
Cars per hour	360	36	372	48
Direction	C-D	D-A	D-B	Total
Number of cars	3	5	6	82
Number of trucks		1		3
Cars per hour	36	60	72	984

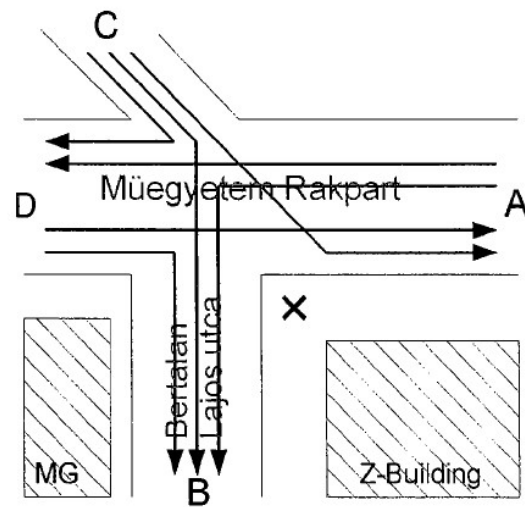


Fig. 1: Sketch of the measurement location. X indicates the exact position.

The number of direction is depending on the type of the crossing.

Categories:

1. Car, van, motorcycle (appr. Mass < 3500kg)
2. Truck, bus
3. Truck with trailer, double bus (articulated)

Please take a note about the extreme sound pressure sources (motorcycle w/o muffler, horn, ambulance, etc.).

A weighted sound-pressure level measurement

Six different places should be chosen.

- Measurements duration: **5 (or 10) min.**
- Sample frequency **5 s**

Place of measurement

The reference point for the measurement place and the middle line of the road (separation) is in at a distance of approximately 7.5m. The position of pressure device should be approximately 1.5m from the ground.

Equations for calculate the noise level (from the norm) (First measurements)

Equivalent noise level (“A” weighted sound-pressure level):

$$L'_{Aeq} = 10 * \lg \left[\frac{1}{\sum t_i} \sum \left(t_i * 10^{0,1 * L'_{Aeqi}} \right) \right] + K$$

- In the case of traffic noise K=0
- t_i - duration of measurement
- L_{Aeqi} - A weighted sound-pressure level in i^{th} case [dB]

Equivalent noise level with traffic count (Second measurements)

$$L'_{Aeqm} = 10 * \lg \sum_{i=1}^3 \left(10^{0,1 * L'_{Aeqmi}} \right)$$

$$L'_{AeqM1} = 15.0 + 10 \lg Q_{M1} + 16.7 \lg v_{M1}$$

$$L'_{AeqM2} = 17.3 + 10 \lg Q_{M2} + 19.0 \lg v_{M2}$$

$$L'_{AeqM3} = 13.2 + 10 \lg Q_{M3} + 16.7 \lg v_{M3}$$

- Traffic Q_{M1} - Q_{M3} in car/hours (car category No.1 – car category No.3. respectively)
- Average velocity in different car category (v_{M1} - v_{M3})
- L_{AeqMi} - A weighted sound-pressure level in i^{th} case [dB]

Finally results should be evaluated by comparing to the norm value, which is based on human health. Please search publications about norm value in town during the day (6 a.m – 10 p.m.).

Sound level meter: Roline RO-1350 Sound level meter

- **Measurement standard: IEC-651 Type 2**
- Display: 3 1/2 digit LC display
- Display range: 1999
- Frequency range: 31.5 Hz...8 kHz
- Frequency validation: A and C
- **Measuring range: A or C (LO) 35 dB...100 dB**
- **Measuring range: A or C (HI) 75 dB...130 dB**
- **Resolution: 0.1 dB**
- Output DC: 10mV/dB
- Output AC: 0.55V rms for each measuring range step
- Maximum Frequency: 12kHz
- Maximum Operating Temperature: +50°C
- Maximum Sound Level: 135dB
- Minimum Frequency: 30 Hz
- Minimum Operating Temperature: 0°C
- Minimum Sound Level: 35dB
- Analog output signal
- Power supply: AM-6 (9V battery)
- Dimensions: 240 x 68 x 25mm
- Weight: 215g



The report should include

- measurement aims
- a short overview of the theory behind the measurement, applied formulae
- introduction of the measurement locations, maps, photos
- environmental conditions
- measurement SPL data in diagrams, with the equivalent level shown
- highlighting remarkable peaks/differences/unexpected phenomena
- traffic count data
- SPL data from the traffic count using the approximate formulae
- a diagram comparing the SPL data at all locations
- evaluation of the measurement results
- comparison of data to literature (do a literature research and cite the sources)
- conclusions of the measurement
- recommendations, etc.

Please attach an Excel, or similar document containing the measurement results and the calculated values as well.

Contacts

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