

Unsolved issues of vehicle noise emission related to EU (UN) regulations

Subject: to expose major unsolved issues of vehicle's noise emission related to EU (UN) regulations.

Author: Zsolt Kendi (ÁK52 NGO)

Revision 1, 2012.08.20

Address: Nagysandor Jozsef utca 132, Budapest, H-1202 Hungary

E-mail: kzsolt@datanet.hu or ak52@fw.hu

Tel: +36 20 2010647

1st unsolved, noise emission of city and rural transport buses.

There is some kind of European tradition to open engine compartment of city and rural transport buses to outside world:



At normal operation this kind of design dramatically increase outside noise of the buses. Does not matter the bus is 40 year old or brand new construction, the engine compartment opened to the outside world and/or the engine noise not damped.

God sample for this is city of Bern (Switzerland) one of the richest city of Europe. There I found CNG buses of major bus manufacturer of Europe, but all type have high outside noise emission because the open engine compartment. Does not matter I travel which city of (West) Europe, the problem and the noise are same.

As far as we know in Europe only one type of city bus have closed engine compartment and effective damping of engine noise to outside world. The reason for, that type of city bus manufactured to North America and Europe with minimal modification. Of course in North America basic regulation is to damping engine noise and closing engine.

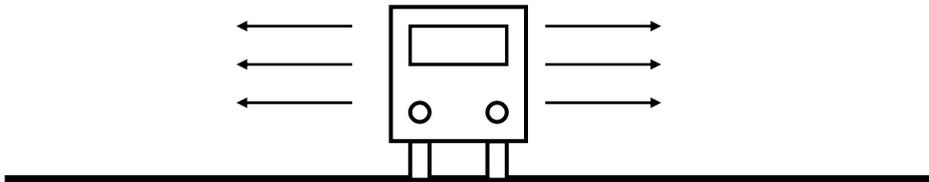
What I not understand, Europe have more regulation to gas emission of engines, have regulation to prevent light pollution, but no any kind of regulation for city buses to damping engine noise. There is no any regulation to target damping engine noise for case of city buses. The result is, many of resident people say “please take no noisy bus line to my street”. In my opinion this is not a way to environment protection.

The most stupid think in, traffic of vehicle with well damped engine noise is prohibited by many city, but most of this city are support traffic of noisy buses which have no damping of engine noise.

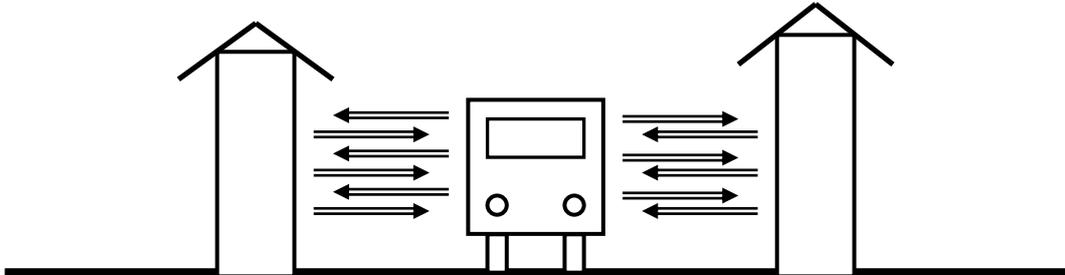
In our opinion the solution is to issue regulation to target damping of engine noise especially in case of urban transport buses.

2nd unsolved, measuring of noise pollution for vehicles.

The measuring of vehicle’s noise emission are determined by UN 51.02, 70/157/EGK, 70/157/EEC directive. There 92/97/EEC directive at Figure 1 describe the exact environment of the measuring.



As the picture show the environment is equivalent to road on the river’s dam within the wheat field because no any acoustic reflection within 50m radius. But at road of village or city the environment are different.



As the picture show the walls reflect and through boost the noise of vehicle. In our experience the noise of vehicle can be 15 - 20dBA higher in reflective environment than normal 92/97/EEC Figure 1 environment.

That means, the present measuring method is excellent to compare noise of vehicles to each other but tell nothing how noisy is the vehicle in a road of city.

The problem is much more because the noise mostly depend form mechanical construction of vehicle. For example depend form figure of car-body, which material used for, depend form location and sizes of holes where the noise (mostly engine noise) leave the car. Therefore, without measuring noise of vehicles in reflective reference environment nobody can tell and even nobody can compute noise of vehicles within city environment based on measuring defined in 92/97/EEC directive.

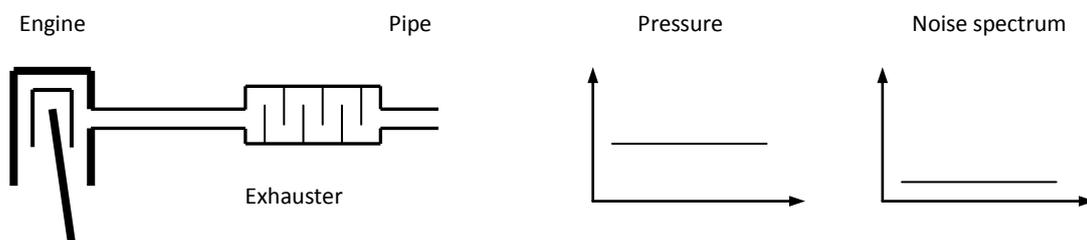
In our opinion the solution is to extend the regulation to measure noise of vehicle in 92/97/EEC Figure 1 environment and in reference reflective environment too.

3rd unsolved, is the reliability of vehicle's approval procedure.

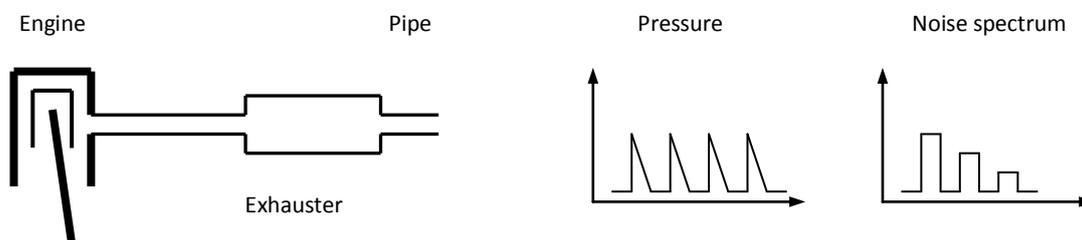
During the approval procedure the noise emission is measured in 92/97/EEC Figure 1 environment. That means the car (its type?) at approval procedure meet with requirement of 70/157/EEC directive. But how it is possible to check appropriateness during the life times of the approved vehicle? For example the police has no chance to build 92/97/EEC Figure 1 environment at street. Therefore, this measuring procedure not provide a way to check appropriateness of vehicle "on fly". In my opinion this is big disadvantage of that directive.

Future more, appropriateness of vehicle's noise emission is gone in two way. One is, if any technical failure occurred. Other is the "hobby" modification of vehicle after its approval procedure. Both are problem because no way to check it "on fly" for example by the police.

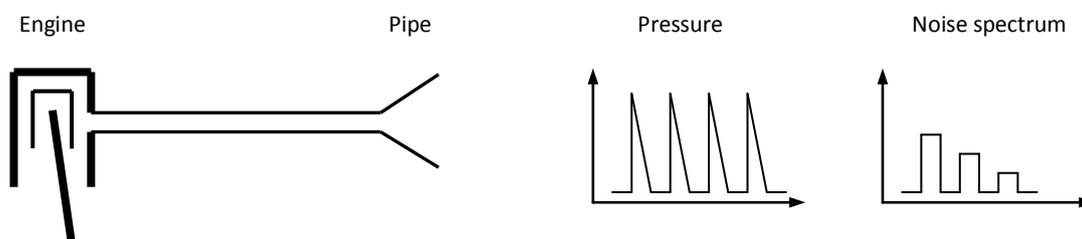
To find the solution need some technical explanation. On normal case in engine each small explosion at cylinder produce pressure peek. That peek damped by the exhauster. The result is near constant pressure and noise emission spectrum to outside world. That situation is showed by pictures below.



But if the exhauster modified or damaged then the efficiency of damping are less or gone. That is produce pressure and noise spectrum peaks to outside world. In that case vehicle produce more noise. That situation is showed by pictures below.



But if the exhauster removed of the exhauster pipe become broken then efficiency of damping are gone. That is produce pressure and noise spectrum peaks to outside world. In that case vehicle produce many more noise. That situation is showed by pictures below.



Fortunately, the pressure is near equal with the noise waves. That is why nothing more to do than record oscilogram and noise spectrum of a car's acoustic emission.

In our opinion the solution is to make a noise emission “photoshoot” of a car at type approval procedure and later this can be compared with noise emission of instance at approval or can be “on fly”.

The devices of this kind of measuring was too expensive in 90s years, but evolution of computer technique make it cheap today. The measuring can be done by handy device or by computer software or by hand computer.

As remark that was a subject of letter to EU Commissioner for Environment at year 2008.

4th unsolved, noise of the break.

The 92/97/EEC 5.2.2.4.3.2. define the moving vehicles approach conditions. There is no any measuring for break noise emission. But sometimes if the car use poor quality materials or the break system worn out then the break itself produce higher noise than the engine.

In our opinion the solution is to measure break noise at (type) approval procedure.

* * *