# REDUCE ROAD TRAFFIC POLLUTION TODAY by Improving VEHICLE CONDITIONS.

Vehicle's conditional monitoring is also one of the factors that can be considered to reduce this alarming road traffic pollution. By improving, fine tuning and retrofitting to the existing vehicles, the pollution can be reduced now. Let us work out, how the source of traffic pollution can be first reduced by improving the vehicle air intake, pre-filter relocation, reduction in air intake filter pressure drop and , and next step only to relocate the Exhaust so that the vehicle exhausts the fumes at a height of 2 to 3 meters depending on vehicle size, to be decided by OEMs.

## VEHICLE CONDITIONS TO BE IMPROVED:-

1. **Vehicle Air Intake: -** Presently, vehicle engine sucks the hot air thro the air filter which is located near the exhaust fumes of same vehicle and that of other vehicles like the 3, and 4 wheelers, car, LCV, HCV, bus, & lorry.
2. Heavily choked air intake filters of vehicles like the above, which is not condition monitored regularly.
3. **Vehicle Exhaust**: -Exhaust from vehicles is polluting the other vehicles' air intake and MORE IMPORTANT, it chokes the lungs of the other humans driving on the roads. Vehicles breathe in the exhausted polluted air from other vehicles and multiply the toxins in their exhaust.
4. **GOVT to implement Pollution Control Measures**:- The Govt to strictly prioritize the pollution agenda in improving vehicle conditions by the OEM, and in educating condition monitoring practices by vehicle users.

## VEHICLE AIR INTAKE FILTERS CONDITIONAL MONITORING & RELOCATION:-

Image I – Autorickshaw, where the Pre-filter is elevated at the rear by piping to top, from Air Intake filter near Engine.
Image II – Washable Pre-filter provided on top of Tractor Engine, the same to be fixed to Autos & other 4 wheelers.
Image III- in HCV, the Pre-filter is elevated at 3 meter Height by piping from the existing air filter near the Engine.

1. PCRA illustrates that in the vehicles, "Air filter prevents dust from fouling the engine. Dust causes rapid wear of engine components and increases fuel consumption. Cylinder bores wear out 45 times faster in engines without air-cleaners. Clean air filters at every tune-up. First step Today, is that each vehicle air intake filter to be cleaned thoroughly and where not possible, to replace the same immediately".
2. The ideal norm of stoichiometric Air/Fuel ratio gets deviated within few weeks of vehicle running on roads. Because the road dust + outside hot exhaust air as air composition gets deposited in air intake filter. Less volume of air consumed more liters of fuel as diesel or petrol, will result in poor combustion and hence less KMPL very quickly.
3. And the air has to pass thro this quickly-choking air filter. The automobile engine, as a matter of fact, any engine should not struggle to grab this contaminated hot air thro this choked filter. The vehicle OEM to recommend the vehicle owner to buy & install a washable Pre-filter with a suitable micron sized mesh, similar to the Tractor Air

filter image. The owner to buy a spare washable nylon filter and weekly wash the nylon part of the filter with water and keep it ready for the week after next.

4. The time to wash the filter here is assumed as twelve run hours. So for buses, commercial vehicles, lorry etc, daily cleaning washable-nylon filter is a MUST. Daily swapping with the washed & serviced nylon filter is recommended.
5. By this exercise, the existing air filter near engine does not get choked that frequently. The life of air filter is extended by the weekly washable nylon filter. When the Tractor OEM and the Autorickshaw OEM has visualized this defect, and had relocated the air intake suction with their Pre-filter, why the other automobile Major OEM are not implementing this retrofit exercise to give healthy, fuel saving, & adequate clean air supply to their engines?
6. This practice can be followed by all the 2, 3 and 4 wheelers as this allows the engine to take only pre-filtered air to the main air intake filter of the engine and it ensures engine runs smoothly & healthy thro out its life.
7. Coming to the main air intake filter, the choked air filter leads to poor combustion efficiency and higher polluted exhaust fumes. Now the vehicle owners clean the filter only during their vehicle service at the garage after allowing choking during few months. The 4 wheeler owner relies on the vacuum band gage near the air intake filter to show the pressure drop across the filter, and it always shows healthy clean band even when the filter is choked.
8. So the vehicle OEM to recommend to vehicle owners to fix air intake filter Delta P (choke) indicator by means of gauge either analog or digital. The choke indicates the pressure drop across the filter. This will be conditionally monitored by the vehicle owner. Instead of allowing to build up the choke in filter for many months, the pressure drop across filter can be maintained by weekly cleaning of pre-filter by owner routinely, by condition monitoring.
9. Similar to the heavy vehicles, for all the 3 and 4 wheelers, let the OEM recommend to the vehicle owner to extend the air intake pipe length from the main air intake filter to this pre-filter and keep this pre-filter at 1.5 meters elevation above the ground for autos, cars etc. For lorry, bus, LCV and HCV the height can be 2 Meters and above. Also this air intake extension pipe to be sized double that of air intake filter mouth size. By this, we are allowing the vehicle to consume relatively fresh air compared to the existing intake of exhausted polluted air from the other vehicles. Care is taken to the pre-filter to provide Broader rain cap as we provide in all the DG sets exhaust, the rain cap. This Retrofit needs to be done in OEM authorized service center.
10. The Diesel vehicles especially LCV and HCV, the city buses especially, old generation cars, and Autos are exhausting heavy dense fumes. This vehicle air intake filter cleaning, relocation and the exhaust piping relocation will immediately reduce the pollution levels and is instantly implementable. The Govt to thrust the initiatives on OEMs to retrofit this air intake extension piping along with Pre-filter Today and to implement on the road immediately.

## ELEVATION OF EXHAUST PIPING FROM VEHICLES:-

1. The exhaust air from the vehicles is lighter in density but dense visibly. The automobile OEM to visualize the tropicalized, harsh dusty road conditions near their vehicle exhaust and work further not to aggravate further. So to provide extension pipe from the exhaust mouth and elevate the pipe by 2 meters above the ground, for 3 and 4 wheelers, & cars. For LCV and HCV, buses, 3 meter height will be practically ideal to exhaust out the air. This needs to be done in OEM authorized service center.
2. First OEM to provide a duct box of size around 1 cubic foot capacity in cylinder shape or oval size so that existing exhaust gas from engine enters this box from the bottom and escape out from the top of box, after passing thro internal baffles. This ensures water, oil or heavy particle fumes are force-drained out of the bottom of box. The vertical extension pipe diameter to be thrice that of the existing exhaust mouth size to fit on box top. Also the pipe to be insulated that the same is not getting into contact directly. Let us take care not to back pressure Exhaust.
3. This will vertically elongate the vehicles pollution zone from 1 meter height above the ground to 3 meter height above the ground. By this, we are allowing the buffer space vertically to dissipate the exhaust to outside ambient.
4. The rain cap is provided is bigger in size here, so that the rains / splash don't not come inside the exhaust pipe from top. Also, the vehicle OEM to give provision in the above said exhaust bottom box so that heavy particle exhaust is filtered out routinely daily or weekly and only light exhaust fumes are to be taken up to be exhausted at a height.

## GOVERNMENT'S CARROT & STICK INITIATIVES NOW REQUIRED:-

1. It the responsibility of not only the individual road user, but it is the collective responsibility of the Govt, and road user from 2,3, 4 wheelers, LCV & HCV to take this condition-monitored steps to reduce roadside pollution.
2. Govt to ban the entry of 2 stroke wheeler engines in the busy city roads as the lub oil and petrol emit more exhaust fumes compared to 4 stroke engines which emit only smoke-less-exhaust, relatively less polluting type.
3. The road side petrol bunks can have "vehicle preventive health monitoring service center". Now the oil companies are investing in super market and hotels within the petrol bunk premises. This is of no use to the road user.
4. Inside the vehicle, Govt can suggest the automobile OEM to provide air intake filter gauge so that the same can be condition monitored daily by the vehicle user. Instead of allowing the air filter to choke for many months, he will take steps immediately, to clean his pre-filter daily right from the first day of using the new air intake filter.
5. Also, the Govt thro oil companies can think of providing this portable digital / analog Pascal meter costing just Rs.6000/- to each petrol bunk, so that when the vehicle driver fills up petrol, he can also know his air intake filter choking condition, either the filter is clean, 25,50,75 or 100 % choked and inform him suitably.
6. Any automobile OEM to give the statistics to the buyer generically, as how much KMPL percentage drop on choking of air intake filter for Minimum pressure drop, for 50 % of rated Max pressure drop and for Max Pressure drop.
7. Present condition is that even the vehicle OEMs' service center does not measure this Pressure drop across vehicle air intake that comes for regular service. This vehicle records to include air filter pressure drop Pascals in vehicles under service. The service center to educate the customer to clean routinely, or replace the filter, if choked fully. Also tell the customer what was pressure drop before service and after cleaning, what is press drop after service?
8. PCRA is listing the fuel loss due to choked air intake filters in vehicles. But here, what we are more interested now, to correct is that, a choked vehicle air intake filter sucks other vehicle's exhausted air and that too in the idling condition. All the three factors is now causing the vehicle to pollute much more, and each vehicle is crossing its limit of pollution beyond the threshold values.
9. In the petrol bunk, provide compressed air cleaning for the vehicles' air intake filter from inside to outside direction in the filter chamber to clear the particulate dust depositing on the filter outer surfaces. For this, the vehicle OEM to give provision to clean the same in vehicle OFF condition in the petrol bunk service centers. For this vehicle OEMs to provide easy approach to the air filter for 2, 3 and 4 wheelers & possibility of routine cleaning frequently.

## CONCLUSION:-

Generically, the above retrofits, relocation, condition monitoring exercises to any vehicle mainly the 4 wheelers, 3 wheelers and later to 2 wheelers; will definitely yield direct and indirect benefits in the longer run. The benefits are:-

1. Fuel saving in vehicles.
2. Smooth pickup & running due to relatively clean air intake filter
3. Less pollution from vehicle to other users, surrounding us.
4. Vehicle's engine health sustains for a longer period during its life time.

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