MOTORCYCLE EMISSIONS

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Introduction

The purpose of this report is to familiarize us with what emissions are, and how they will affect us, the users. For simplicity, in this report the term "user" will refer to the motorcycle operator, and the term "industry" will refer to all motorcycle manufacturing companies worldwide.

Emission is a pretty vague word. In this report we have broken it down into three categories. Exhaust emissions are the pollutant chemicals coming out of your exhaust pipes. Evaporative emissions are the unburnt gases escaping from your fuel system. Noise emissions naturally are just that, the sounds your bike makes.

Exhaust Emissions

Exhaust emissions have been regulated by the Environmental Protection Agency (EPA) since 1978. There are basically three forms of pollutants produced that are regulated: hydrocarbons (HC), carbon monoxide (CO), and oxides of nitrogen (NOx). It may be preconcluded by the general public that motorcycles must be cleaner burning than cars since they are so much smaller and lighter, but this is not exactly the truth.

Although the 1994 standards for cars are much more stringent than those for bikes, there are many reasons to justify those unequal standards. Motorcycles are likely to be responsible for about 1/2 of 1% of all V.O.C., which is the total amount of all pollutants in the atmosphere. Since motorcycles are in almost all cases a secondary or recreational vehicle, they are generally used in off-peak times or in less polluted areas. The confines of a car also enable it to carry the equipment necessary for it to produce less pollutants.

Motorcycles have other benefits to society such as being infrastructure-friendly, meaning they aren't responsible for causing much wear and tear on our nation's roads and bridges. We also help alleviate one of our inner-cities' biggest problems, which is parking.

The 1994 standards for these three pollutants as measured in grams per kilometer are as follows:

	HC	CO	NOx
Automobiles	.25	5	.35
Motorcycles	1.40	12	Unregulated

As you can see, motorcycles are not expected to meet the same standards as cars. Motorcycles play an almost insignificant role in the overall picture and the cost/benefit factor of raising these standards renders it unnecessary at this time. The possibility for increasing these standards in the near future are unlikely due to the fact that the EPA is currently concerning itself with three other areas of completely unregulated combustion engines. Diesel engines over 50 horsepower, gasoline engines under 25 horsepower, and all marine engines, will be the EPA's next target areas. Off-road motorcycles are also more likely to be scrutinized before the EPA increases the motorcycle exhaust emission requirements.

Only the EPA can set the standards for exhaust and evaporative emissions, and California is the only state, under EPA permission, to have higher standards. A state may choose to adhere to the federal requirements, or adopt the California Auto Emissions Package, but cannot create a third set of requirements.

In 1991, New York State became the second state in America to adopt the California regulations, but it chose not to adopt that section which covered motorcycles. As a result, the industry still produces a "California bike" and a "49 state bike." California already does have plans to start regulating off-road motorcycles in 1997.

One major problem for the user under these current guidelines will be when their particular state starts to require "in-use" emission inspections (meaning that motorcycles will be tested annually for output of pollutants just as cars are already tested in some states). Currently only Arizona requires an in-use emissions test for

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motorcycles, while Jefferson County in Kentucky (including Louisville) is just beginning to do so. Vermont may be looking into it in the near future.

Already the Kentucky Bikers Association and the American Motorcyclist Association (AMA) are working with the Jefferson County government to eliminate or alleviate the problems associated with in-use motorcycle testing.

During the research for this report, a manufacturer gave credit to the Motorcycle Industry Council (MIC) for convincing other states not to start testing motorcycles for emissions based on the fact that the cost to the individual and the state to run the test would not produce results worth the effort. This is the same position that we in the Motorcycle Rights Organizations (MRO) will probably need to take as our main defense against additional unreasonable and costly requirements put upon us.

The EPA sees much bigger fish to follow at the current time, and our job must be to project that same feeling in the future during any debates or periods of public comment that will precede any new regulations. Our bigger job will be to keep abreast on what is being considered in the various state governments and environmental agencies. Keep in mind that as in the case of New York adopting the California Auto Emissions Package that the decision to do so was made at the level of the Department of Environmental Conservation, and not by the New York legislature.

Europe may also play a role in the kinds of motorcycles we drive here in America. Motorcycling has increased dramatically in Europe over the past several years, and the industry is aware of the potential for future sales. They are also aware that since the pollution problems are more acute in Europe, the pollution standards may be much higher. Switzerland and Austria have requirements that are even more stringent than California's, and Taiwan is close behind. Even Harley-Davidsons sold in Switzerland and Austria have catalytic converters installed on them.

Although the standards currently vary from country to country, there has been an effort to unify the standards by the Commission of the European Communities. If the unified regulations are much more stringent, or enough of the individual countries develop more stringent requirements, then the industry will be forced to develop new technologies to meet them. Once developed, the new technologies may or may not be employed on motorcycles to be sold in the United States. It will be up to the individual manufacturer to measure the impact that these new technologies will have on appearance and performance versus the cost of producing different versions for sale in different countries. Naturally, if they develop a concept that reduces pollutants with no impact on performance, then it will likely be found on all motorcycles produced. However, as a general rule, all emission controls cost performance.

One of the most dangerous things to come out of Europe lately was an article that paints motorcycles in the same light as an oil refinery. You may or may not be aware of the article, but some of the "statistics" that were included in it have found their way into motorcycle publications in the United States, and may very well serve as fuel for those who would like to see motorcycling outlawed entirely. Be prepared to shoot down this article as completely biased.

First of all, the article was written by the Allgemeiner Deutscher Automobil Club. This is the German equivalent of the AAA. The AAA has publicly stated that they are in favor of mandatory helmet laws. Although this doesn't necessarily make us adversaries, the AAA apparently feels that if they can help put helmets on all motorcyclists, then that will help keep car insurance rates down because of an alleged reduction in injuries for which the car driver is responsible.

The same mentality most likely also holds true for the ADAC. Certainly they must be trying to prevent further emission restrictions on cars, maintain high speed limits on the Autobahn, and so on. Taking this for granted, one could also assume that the ADAC would try to show the German government that cars are already wonderfully clean, and motorcycles are really the ones that they should be looking at to clean up Germany's air.

Further proof as to the bias involved in this

report comes from looking into how the research was done. To quote the translation, "We got a hold of the measurements of a particularly good Golf GTI." The Golf GTI is no average vehicle. It is in fact a very low-emission vehicle. Therefore, to then search out "particularly good" results on a particularly good car, and then compare it to some other motorcycles including some two-stroke models which are truly polluters by design, renders the results inadmissible in any responsible debate.

We don't know what controls were followed, if any, to ensure fair results. We don't know what driving habits were followed to obtain these results, and we certainly don't know what the performance of these vehicles would be on American highways because they were tested at speeds of 100 k/h (60 mph) and 130 k/h (80 mph). It is likely that the rate of pollutants would increase more dramatically for the motorcycles tested than it would for the car tested at these speeds. The same also holds true for the rate of fuel consumption. It would be in our best interest to refute the findings of this "test" and to refrain from mentioning it or giving it credibility in our own publications.

All of the above comments are not to say that we should just sit back and deny everything in regards to motorcycle emissions, and resist change at all cost. We all want a cleaner environment to pass on to our children, and we would all like to think that we are doing our part towards this goal. In the future it is likely that the industry will improve catalytic converters for use on all bikes. Currently, BMW and Yamaha both produce a motorcycle that uses a computer controlled catalytic converter. It is still in the early stages of development, and improvements to it will likely follow. Currently, however, this three-way catalyst system adds approximately one thousand dollars to the cost of a motorcycle, and the package does not perform well under vibration. The industry is not yet ready to accept this as the norm, and the cost/benefit ratio to society does not require it.

At the time of this report, it seemed to be generally accepted by the industry that additional tailpipe emission restrictions were not a serious issue for them. Additionally, Kawasaki Motors maintained that a vast majority of the bikes they produce already meet the more stringent California standards except in regards to evaporative emissions. If the EPA was to increase the standards nationwide, it is likely that they would only be increased to the current California standards.

Evaporative Emissions

Evaporative emissions are comprised of the unburnt fuel vapors that escape from your fuel system into the atmosphere. There are several ways this can happen. First of all, when you fill up your gas tank, the vapor in the tank is displaced by the liquid fuel and is forced out into the air. In some states and municipalities, the fuel pumps are equipped with specially designed hoses to collect this vapor before it has a chance to escape into the atmosphere. The fuel dispenser must be securely inserted your car's gas fill opening, and the accordionlike shroud must be completely depressed before the pump will deliver fuel. On a car, the shroud forms a tight seal over the opening, and collects the fuel vapor as it is forced up out of the tank.

As those who live in areas where these pumps are required already know, when you fill up your motorcycle tank you must manually pull back on the shroud and hold the gas nozzle in two hands above your gas tank in order to pump a full tank of gas. If you do insert this apparatus far enough into your tank so it can operate as designed, the most you can expect is to fill your tank about half way, since the nozzle reaches so far down into the tank, and the pump shuts off when the fuel reaches that level. As a result, motorcyclists are forced to override this device; but, as always, the impact we have on the atmosphere by doing so is so miniscule it is immeasurable.

The other source of evaporative emission is from fuel expansion. The heat from the engine after the bike is shut off, or heat from it being parked in the sun, forces the fuel to evaporate, and as it expands it is forced out of the vented gas cap into the atmosphere. To prevent this emission, the industry mounts an air canister with the necessary tubing, which collects the vapor and stores it in a charcoal-filled canister. When the engine is started, some of the air that is drawn

into the air cleaner comes from this canister. The fuel vapor that is pulled out of the canister is then burnt in the engine, thus preventing unburnt fuel from escaping to the atmosphere.

The canister is about the size of a coffee can, and is hidden within the confines of the motorcycle. Even on "see through" bikes, like Harley-Davidson, the canister is not supposed to be too cumbersome or ugly, and the process is said to have little or no effect on performance. Evaporative emissions do remain high on the list of concerns for the industry because the additional materials and engineering to make the system work add about $150 to $350 to the cost of the motorcycle.

For the user, the problem arises when he switches to aftermarket parts which don't have the necessary hose connections included in the design, and the motorcycle is required to pass an in-use emissions test which includes making sure the recovery system is in operating condition. The adoption of in-use emissions tests may very well be our greatest concern considering the changes motorcyclists like to make in carburetors, cams, ignition systems, exhaust pipes, etc. Use of such aftermarket parts may render a motorcycle "unfit" for use according to such testing.

Noise Emissions

Noise emissions are of great concern to both the user and the industry, since sound reduction is expensive and performance-robbing to achieve. The EPA has had noise regulations on the books since 1984, and tightened restrictions even more in 1986. The current levels for noise emissions are 80 decibels (dB) for on-highway motorcycles, 82 dB for off-highway motorcycles, and 78 dB for cars.

One of the problems with noise restrictions is the lack of uniform test procedures to measure the noise. Within the industry, it is generally accepted that the proper method is a "pass-by" test under acceleration. However, any municipality can decide to regulate noise as they see fit. Their own test procedures may differ from those of the industry, and bikes defined as legal by the industry may fail a noise test administered by an officer within a particular village, city, county, or state.

For instance, suppose the officer places his decibel meter 24" in back of the motorcycle at a 45 degree angle to the bike. It may read higher than 80 dB. Using this test procedure, it is possible that a bike such as a Honda 750 with an aftermarket exhaust system with two pipes coming off of both sides, might register as being quieter than a Harley having both pipes coming off the same side where the officer has located his test equipment. It may actually be the Honda that is the most audible bike in the neighborhood. It should be of primary concern to us to attempt to require that one uniform test procedure be required to prevent the user from being unduly harassed. As it stands now, an individual could buy, off the showroom floor, a motorcycle that will not pass the scrutiny of the local police.

Further complications arise because of exactly what is measured. Do we measure noise? No, we measure noise pressure. Currently, we use an A-weighted dB scale. This scale makes all noise "equal" regardless of the pitch or frequency of the noise. On this scale, a chainsaw would measure about the same as a Harley Davidson, although most would agree that a chainsaw is more aggravating to listen to. Perhaps what we need would be an "annoyance scale" that could actually determine how much noise pollution is being created. A screech would certainly be more annoying than a low rumble, and it is the annoyance we are trying to regulate, not the actual decibel.

From the industry's standpoint, it would be incredibly expensive for a motorcycle manufacturer to meet the same requirements as car manufacturers. The dB scale is logarithmic, that is, not evenly graduated. In order to drop two dBs, the bike would have to be twice as quiet, not just a little more quiet. We can expect cars to meet more stringent guidelines because of the fact that the motor is enclosed by the shell of the car, and the exhaust system can be much more extensive underneath the vehicle than it can be alongside the motorcycle. Additionally, a motorcycle manufacturer must construct the exhaust system with concern for the operator's and passenger's safety in mind. While water cooled motorcycles can be quieter by design, and engine shrouds can reduce

mechanical noise to some extent, a car can take much greater advantage of these design features than can a motorcycle.

There are those who would argue that since hearing is one of our five basic senses, and in so many accidents the car driver "didn't see" the motorcycle, then it may be that permitting motorcycles to be more audible could prevent accidents and injuries.

It is also interesting to note that Harley-Davidson, which "sells" the sound of the bike more than any other bike manufacturer, claims that the bikes they produce today have three equal sources of noise emission. The intake, exhaust, and mechanical noises are all about equal when they leave the factory. It is after any bike leaves the showroom that noise emissions may become the user's biggest problem. It is common practice for many users to alter the exhaust systems on their bikes. In more populated areas, it is likely that the public will want to adopt or stiffen noise ordinances and their enforcement. Although it is futile to mention it in this report, one of the most advantageous things we as motorcyclists could do would be to refrain from running straight pipes, and be more courteous at night when we would be more annoying to the non-riding public. This is one area where we could easily reduce the outcry against us without much of an impact on ourselves: just ride a semi-loud bike and keep it quiet at night.

Fortunately for the industry, they expect no federal activity on noise emissions since the noise control aspect of the EPA was disbanded. This may be the hardest area for the industry to comply with if more stringent controls were to be adopted.

Summary

The purpose of this report was to determine what new regulations we can expect to see passed regarding motorcycle emissions, and what impact we in the motorcyclists' rights community can have on them. We also wanted to identify which areas would be of biggest concern to motorcyclists and to the industry.

It would appear that we are relatively safe from additional exhaust emission laws for the foreseeable future, although further restrictions in this area would have considerable impact on both the industry and the motorcycle users. Any exhaust emission controls rob performance, making the machine less attractive to potential buyers and users. This is an area where both the industry and the MRO's can effectively work together to prevent unreasonable requirements from being imposed.

We should be able to rely on the industry for technical information to combat such regulations. They should be able to rely on us for the grassroots activism that may prove effective during the public comment period that usually precedes the adoption of new laws and regulations.

The one area of great concern to the user that would not be of great concern to the industry would be the adoption of in-use motorcycle emissions inspections.

When forced to deal with future emission laws, we must attempt to show how insignificant the effect of new restrictions would be on the overall pollution picture. Motorcycle registrations comprise only about 2% of all vehicle registrations. They are almost always a secondary vehicle used largely for recreation. At any given moment they would make up less than 1% of all vehicle traffic. Since air pollution is concentrated in certain areas and at certain times of the day, and those areas and times are unfavorable to motorcycling, then it is safe to assume that stricter motorcycle emission laws would have a completely immeasurable effect in pollution reduction, while the cost and inconvenience to industry and users would be significant.

We can also counter argue that our government should be looking to promote motorcycling for several reasons. Motorcycles conserve much needed parking space, and they cause little or no damage to streets and bridges in the same cities where pollution is only one of the problems that society is trying to contain.

It is our understanding that the only real impact that the evaporative emissions controls will have on the users will be a cost impact. Since this cost is not exactly staggering, it is unlikely that MRO's will invest much resources to oppose them. If other evaporative emission equipment

becomes required that may add significantly to the cost, take away from performance or styling, or if in-use testing is emphasized, then we might have to increase our attentions in this area. For now it is primarily and industry issue.

Noise is likely to be of great concern to both user and industry. Although no federal activity is expected, it would also not be in the best interest of the industry for motorcyclists to be persecuted via local regulations, since that could affect sales in that locale. Reducing noise would require much new research and development, and would likely have great impact on performance, styling, and cost, and thereby be most likely to affect sales.

During the research for this report, all companies, their offices, and the employees we spoke with could not have been more accommodating to us and our cause. Naturally, what affects us, affects them and vice versa. There was also a general attitude that it is about time we started working together on some of these things because of the fact that we each have a different approach that we can both use to arrive at the same result.

They cannot use grassroots lobbying like we can, and we can't invest vast sums of money to research alternatives or lobby on their level. It would be in their best interests to support MRO's on both a national and state level, since there are not likely to be any issues that we would take an opposing stance on, other than perhaps helmet laws. That problem has come up in the past, and hopefully the most the industry will do is remain neutral on the subject.

There was also a great amount of working together between the Motorcycle Industry Council, the American Motorcyclist Association, and the Motorcycle Riders Foundation. We hope that this will convince even more motorcycle users of not only the need for all these organizations, but also of the fact that they work together closely, not competitively, in the hopes of preserving motorcycling in the United States.

One other result of this research was further proof of the threat to motorcycling today. Many people outside of MRO's seem to think that we are being fanatical when we claim that motorcycling may one day be outlawed altogether if we are not careful. They think the idea is ridiculous. Perhaps they should go out and try to purchase a three-wheeled vehicle or a two-stroke street bike from a dealer. They can't, because these machines have been rendered illegal through legislation, one for being "unsafe" and the other for not running cleanly enough. By some people's standards, the bikes we all ride are unsafe and too dirty.

Think about it.

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