



NHTSA statistics report that 76% of motorcycles involved in two-vehicle crashes were impacted from the front, with only 5% coming from the rear. Rear-facing exhaust outlets tend to be especially effective at alerting drivers ahead of you to your presence.

Figure out where the sound is coming from. Locating a nearby motorcycle can be difficult, because low-frequency sounds, such as the deep bangs emanating from a V-twin's exhaust, tend to spread in all directions. High-frequency sounds are much more unidirectional—that is, they travel mostly in one direction. Another characteristic of sound is that it travels in waves away from its source. This is why sirens of emergency vehicles lean forward, to alert those in front of the approaching vehicle. Put it together, and you can appreciate why sirens on emergency vehicles are loud, high-pitched, and pointed forward. The loudness helps you to be aware, the pitch helps you to pinpoint the location, and the direction of the siren points toward those who need to be aware of the emergency vehicle's approach.

So, what does that say about exhaust pipes that point behind the bike? Research

indicates that most motorcycle collisions occur with the motorcycle turning into another vehicle. Figure 1 shows the relative frequency of collisions by direction. In other words, an exhaust pipe pointed rearward is opposite the direction from where the vast majority of hazards occur.

But, wouldn't a driver ahead of you be able to hear a loud exhaust note even if the pipe were pointed the other way? Well, it's true that low-frequency experiences of a close-tuning engine scatter in all directions, but low-frequency sounds are less capable of providing directional clues. It should suggest to you that loud pipes are not particu-

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larly effective at getting the attention of drivers ahead—the very drivers that will likely be the most hazardous to your health.

The location of a sound's source can be hard to determine for other reasons. Sound can bounce off reflective surfaces, such as buildings and pavement, and will be sharper and sustain its intensity longer in such an environment. Even though reflective surfaces will help maintain sound intensity, that same reflectivity can also help to disguise the location of the sound's source. In city traffic, a driver may be able to hear a bike with loud pipes, but have a particularly hard time recognizing when the noise is coming from. Rural areas aren't any better, because there are few hard surfaces to sustain the sound and plenty of vegetation that absorbs and dissipates low-frequency sounds.

Now that we have a basic understanding of how sounds relate to other drivers, let's look at how sound can be used by the motorcyclist looking to alert other road users of his presence.

Close Call!

Bob's bike, fitted with the new exhaust, thunders loudly as he accelerates through the town retail district toward a diner where he is meeting his riding buddies. Traffic is heavy with Saturday morning shoppers. Bob feels annoyed by the hurried four-wheelers. He rides close behind a mini-van in an attempt to keep a tailgate off his back. He also rides in the center of his lane away from the cars on either side.

Bob appreciates a wary interaction with someone in the oncoming lane waiting for the opportunity to turn left into a shopping center on his right. Because of Bob's low position, the left-turning drivers can't see him. As the mini-van ahead of Bob rolls into the intersection, the first car in line begins to accelerate across the lane, its driver completely unaware of Bob's presence. Bob suddenly sees the left-turning car, but at that point there isn't much he can do. Luckily for Bob, the driver finally sees him



and slams on his brakes, avoiding the bike's rear fender by inches.

As the driver, Bob tells the story of how the car driver almost collided with him. Bob's friends shake their heads in disgust. They quickly credit Bob's loud pipes for preventing a collision by getting the driver's attention. But Bob's not so sure the loud pipes did anything to prevent the near miss. It seems to Bob that it was the driver's quick response after seeing him that prevented a collision.

Sound vs. Sight

There are many riders who swear that their loud pipes saved them from being involved in an accident. Arguably, the louder exhaust may have provided some added conspicuity. But evidence suggests that it is better to make yourself more visible, by tactics such as wearing bright clothing, and using lane positions that keep you in sight. Riders who rely on noisy pipes rather than knee-riding strategies are probably putting themselves at increased risk. Bob learned the important lesson that it is more important to focus on how to be seen rather than trying to be heard. It's important to always remember that motorcycles are harder to see because of their relatively narrow shape, not because they are quiet.

Loud pipes may alert a driver that a motorcycle is in the vicinity, but the driver may be left wondering where the bike is until he actually sees it. And only then can a driver know the actual location, direction and speed the bike is traveling and determine what might be the appropriate action to avoid a collision. It is generally accepted that sound is considerably less reliable or effective than sight in providing information critical for crash avoidance. The Motorcycle Safety Foundation even suggests that fully 90% of traffic-related information is gained through sight.

Music or Noise?

Quality and tolerance of sound is a relative thing, and individuals perceive sounds differently. Some people may perceive a certain sound as disturbing "noise," whereas others may consider the same sound to be pleasant. The factors that can affect this perception are pitch, duration and frequency of the sound, as well as the values of the listener. High-pitched sounds that last longer and have a slower timing between tones are often offensive. Also, some people value silence more than others, and will be disturbed by relatively low-intensity noise. If sound is classified "good" or "bad" according to the judgment of the listener. Some people perceive Rap music as offensive, clinging at every octave word and wishing to escape the monotonous rhythm. However,



Increased highway speeds, faster lane changing and increased vehicle lateral noise have reduced loud pipes' practical value as a crash deterrent.

the same individual may even blend into the class of music, even though both musical numbers are played at exactly the same decibel level.

The equivalent attitudes can be compared between a motorcycle exhaust and a gas-engineered lawnmower. Both may have approximately the same dB level, but the loud motorcycle can be perceived as more of a problem by someone more inclined toward gardening. If it isn't obvious, the majority of collisions don't ride motorcycles, and therefore most people consider motorcycle sounds a bothersome noise, not acceptable music.

Risking Rights

The loud pipes issue stirs passionate debate between fellow motorcyclists about the benefit of "saving lives," or the imposition of personal freedom versus the potential for government to restrict motorcycling. Loud pipes disturbing the public makes motorcycling a hot topic among government officials and their constituents who are viewing their opposition and frustrating actions against this auditory invasion. Some municipalities and private associations have gone so far as to ban all motorcycles from certain areas because of the noise generated by a few riders. In Europe, many of the best motorcycle games have been closed to motorcyclists because of noise. And laws have been passed in Europe regarding improper exhaust systems on all motorcycles.

Whether you are an organized loud-piper, it is important that we all recognize that riding a motorcycle is not a "right," and that motorcycle noise has a very negative effect

on the future of our favorite pastime. The American Motorcyclist Association has been in a constant legal fight to reverse road closures in the USA, and has initiated a number of campaigns to educate motorcyclists to the damage caused by loud pipes. In the early years, AMA newsletters and articles presented riders not to "bypass" their motorcycle's mufflers. The effort continued into the 1980s, when the AMA introduced "Muffler Mods," and continues today with the "Loud Pipes Risk Rights" campaign launched in the past year.

Last year, the AMA and Chairman of the Board, Rick Gray, to several motorcycle events to help educate riders about the negative impact of loud pipes. They also hosted a national summit, which was attended by manufacturers, aftermarket companies, event organizers, law enforcement, government, research institutions and regulatory agencies to address the motorcycle noise issue. The AMA position is that continuous excessive noise from both street and off-road motorcycles will lead to unfavorable legislation that will make it increasingly more difficult for motorcyclists. The AMA also knows that negative motorcyclist attitudes will take a long time and will meet with stiff resistance. The AMA does not suggest that aftermarket exhausts should be outlawed. However, they do stress restraint. If you insist on installing an aftermarket exhaust, we encourage you to consider installing a quieter "street" exhaust instead of straight pipes or a "race" exhaust. The difference in reducing risks will be insignificant, while the positive effect on public opinion and tolerance of motorcycles will be dramatic. ●