BIRDS, BEES & THE PHYSICS OF MOTORCYCLING

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Perhaps after you read the first few words of the headline, your brain went back in time to a high school reproductive biology class. By the time you got to the key word "physics," you were probably sure that was not the subject of this article.

Now you are wondering how biology and physics can possibly be interrelated. A motorcycle and its rider are a simple, physical mass in variable motion (acceleration, speed, direction) passing through a dynamically complex environment, our natural world as often modified by human beings. That world contains other various-sized objects also having mass, and in highly variable and often erratic states of motion. Some of these are living creatures.

Collisions between objects in motion are governed by the laws of physics, and the generated localized impact forces can have disastrous outcomes. We have all seen examples, either real world or in a movie. Avoiding these collision forces is a critically important safety task.

The physics of collisions are a bit complicated, but impact force is basically a function of object weight, speed, collision distance (how far the object moves as it loses momentum coming to a stop), and the impact time. Most collisions occur quickly and over a small stopping distance; these conditions result in greatly increased impact forces. Relatively large impact point pressures can result from spreading the impact force over a small surface area at the impact footprint.

Some of the objects we might encounter during a typical motorcycle day trip

Objects in our riding world	Approximate weight (lbs.)
Loaded semi with trailer	Up to 80,000
SUV	4,000+
Mid-weight motorcycle with rider	620
White Tail or Mule Deer	Up to 300
Robin/Song Bird	0.17
House Sparrow	0.07
Bumble Bee	0.0003

Much has been written about motorcycle collisions with inanimate objects, motor vehicles, deer and other large animals, but little about potential motorcyclist interactions with much smaller animals that inhabit our world, particularly those weighing a small fraction of a pound. Many of you have already had these encounters and have your own stories to tell. This article briefly reviews two separate and real-world incidents involving a bird and bees.

Beware of Small, In-Flight Songbirds

A friend of mine was riding across Kansas on his motorcycle at a fast (legal) speed and for some reason did not have the visor of his modular helmet down and secured. He is usually a safe and conscientious rider, but this time the world conspired against him, and he was hit directly on the left cheekbone by a songbird flying across the highway. With a few assumptions, the collision impact pressure on his cheek can be estimated in the range of 8-10 pounds per square inch (PSI), which does not sound like much, but was enough pressure to break his sunglasses, bruise his cheek and create quite a mess of feathers and bird carcass inside his helmet.

The Dust Cloud that was Actually a Bee Swarm

Year ago, I was traveling at speed on the long-elevated transition ramp from the eastbound Foothill Freeway onto the southbound San Gabriel Freeway in Los Angeles when I noticed a small, odd-looking cloud across the highway directly in front of me. I thought it was dust kicked up by the wind and maintained my speed. Little did I know it was a large swarm of bumblebees! These swarms can contain up to 30,000 bees. Being on a high-speed limited access highway with no easy escape, I elected to ride through the swarm and do triage once on the other side.

I later counted about 75 dead bees across the front of my motorcycle, windshield and riding gear. It should be noted the collision impact pressure from one bee is on the order of two PSI. Not much pressure, but if that insect hits you in an unprotected eye travelling at high speed, it will do serious damage. If you are among the five percent of the population subject to severe allergic reactions to bee stings, you have an additional risk to manage. Don't leave home without your EpiPen!

I am happy to report both riders safely navigated these encounters without significant injury or damage to their motorcycles. Both rode through the small animal "collision event," decelerated carefully and got to a safe stop off the road and out of traffic, where they could do quick triage and determine if any emergency follow-up actions were needed. In the case of the bee swarm, the triage included checking to assure no live bees had managed to get into the rider's helmet or clothing.

The Lessons

This story is just a reminder of what you dedicated motorcycle riders already know and routinely practice. Please continue to follow that wonderfully simple acronym, ATGATT (wear all the gear, all the time). Pay particular attention to protecting your eyes from small flying objects; this should be part of your daily routine any time you are around potential small FOs (flying objects). Use your momentum to ride through the hazard if it is safe to do so. Do not swerve or brake

hard unless necessary since these quick actions can set unintended physical forces in motion, resulting in an uncontrollable motorcycle and potential collisions with nearby vehicles or hard objects. Nothing good can come of that!

RIDE LIKE YOUR LIFE DEPENDS ON IT…

IT DOES!