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Motorcycle Trends in the United States

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During the last decade there has been a significant increase in the number of motorcycle sales and registrations in the United States. At the same time there has been a shift in the demographics of motorcycle users and increased focus on motorcycle safety issues. This report focuses on the current and emerging trends involving street-legal (on-road and dual-purpose) motorcycles.

Vehicles

In the United States, although no universal or official definition exists, a motorcycle is a two- or three-wheel powered vehicle designed for on-road, off-road, or dual-purpose (on- and off-road) use. On-road and dual-purpose motorcycles must meet federal and state certification standards and be licensed (registered) for use on public roadways, although light powered two-wheel vehicles with engines smaller than 50cc, known as mopeds or light scooters, as well as motorized bicycles, are typically allowed to operate on public roadways without registration. Motorcycle designs, technologies, and gear are expanding and evolving rapidly. While there is no universal standard, street-legal motorcycles in the United States are often grouped as shown in box A. Laws regulating motorcycle equipment requirements for on-highway (street-legal) or off-highway operation, and insurance, age, licensing, and training requirements, vary across the U.S.¹

Vehicle Registrations and Sales

Because the majority of motorcycles in use must be registered for operations on public highways, registrations provide some indication of the number of motorcycles in use on public roadways each year. Motorcycle registrations in the United States have grown each of the past 10 years, from 3,826,373 in 1997 to 6,678,958 in 2006—a 75 percent increase overall.² Sales of new street-legal



Stock photo

The Insurance Institute for Highway Safety recently reported that motorcyclists who ride racing style motorcycles known as “supersports” have driver death rates “nearly 4 times higher than motorcyclists who ride all other types of bikes.” Capable of extreme acceleration and speed, supersports are particularly popular with young riders.

motorcycles grew even more sharply over the same period, from 260,000 in 1997 to 892,000 in 2006 (a 243 percent increase), but declined slightly to 885,000 in 2007 (table 1).^{3, 4}

Motorcycle engine sizes and motorcycle weights are increasing in the United States. While new sales of motorcycles with engines of 750cc or more increased 54.0 percent in 2003 compared to 1998, and those with mid-sized engines of 450-749cc increased 16.6 percent, sales of motorcycles with smaller engine sizes decreased during the same period, especially in the mid-sized 350-449cc category, which declined 60.1 percent (table 2).

Between 2005 and 2007, sales of sport bikes (including supersport bikes) increased from 16 to 19 percent of all

¹ Motorcycle Industry Council. 2003-2007 Statistical Annuals. Irvine, CA.

² Federal Highway Administration. U.S. Department of Transportation. State Motor-Vehicle Registrations. Washington, DC. Downloaded on Nov. 19, 2008 from <http://www.fhwa.dot.gov/policy/ohpi/qfvehicles.cfm>.

³ Federal Highway Administration. U.S. Department of Transportation. State Motor-Vehicle Registrations. Washington, DC. Downloaded on Nov. 19, 2008 from <http://www.fhwa.dot.gov/policy/ohpi/qfvehicles.cfm>.

⁴ Motorcycle Industry Council. Data received by personal communication from J. Goodwin on Sept. 30, 2008. Irvine, CA.

Box A: Common Street-Legal Motorcycle Types

The range and variety of motorcycle models continues to grow as manufacturers identify and address new market niches. Although some machines blur the distinctions, in general, street-legal machines fit into the following categories:

- **Cruiser**—emphasis on appearance, style, and sound with less emphasis on performance. Long profile with low saddle height, often customized. (650–1800cc; 700–1300lb)
- **Dual-purpose**—designed for both on- and off-road use. Typically lightweight, tall, and narrow with single-cylinder engines, long suspension travel, and tires suitable for on- and off-highway use.
- **Moped**—very low-power (50cc), low-speed (30mph) bicycle-like design meant for cheap urban transportation. Unsuitable for high-speed roadways.
- **Motorized bicycle**—bicycle with an electric or gasoline motor attached. Can be powered either by pedaling or by the attached motor. Unsuitable for high-speed roadways.
- **Reverse trike**—configured with two front wheels and one rear wheel, some advanced models lean into curves and handle much like conventional motorcycles. Medium to large engines and heavier than conventional motorcycles with similar size engines. Known by a variety of names, such as tadpole and backward trike.
- **Scooter**—primarily designed for use and low and medium speeds on urban streets. Relatively small in size with small-diameter wheels, their step-through design and general appearance differs significantly from full size motorcycles. Most are not legal on high-speed or controlled access roadways. Small to medium size engines (50–650cc).
- **Sport**—emphasis on handling, acceleration, speed, braking, and cornering. Styled and built in manner of road-racing motorcycles. Forward leaning riding position. (650–1100cc; 290–350lb)
- **Sport-touring**—combine some of the comfort and amenities of touring bikes with the responsive handling of sport bikes. (1100–1800cc; 450–650lb)
- **Supersport**—built on a racing platform, but modified for sale to consumers. Light to medium weight with a high horsepower-to-weight ratio and capable of extreme acceleration and speed. (650–1100cc; 290–350lb)
- **Touring**—designed for comfort, large motorcycles with luggage and wind protection and amenities such as stereo, 2-way communication, cruise control, heating, etc. Heavy with moderate power. (1600–1800cc; 800–950lb)
- **Traditional**—designed as practical transportation, few styling frills or amenities. Once universal, they have declined in popularity as more specialized types were introduced. (125–1800cc; 200–1200lb)
- **Trike**—created by either grafting the front of a motorcycle to the back of an automobile or adding an automobile type axle to the rear of the motorcycle. Although usually licensed as motorcycles, they do not handle or steer like motorcycles.

SOURCES: Adapted from U.S. Department of Transportation, National Highway Traffic Safety Administration, Background: Motorcycle Types & Characteristics, <http://www.nhtsa.dot.gov/people/injury/pedbimot/motorcycle/00-NHT-212-motorcycle/motorcycle39-41.html> ; U.S. Navy Safety Center, <http://safetycenter.navy.mil/ashore/motorvehicle/motorcycle/Motorcycle%20Types.ppt> as of Mar. 23, 2009, and the author.

Table 1: U.S. On-Highway and Dual-Purpose (Street) Motorcycle Registrations and New Unit Sales, 1997–2007

Year	Registered motorcycles	Motorcycles sold (new)
1997	3,826,373	260,000
1998	3,879,450	311,000
1999	4,152,433	394,000
2000	4,346,068	490,000
2001	4,903,056	577,000
2002	5,004,156	640,000
2003	5,370,035	683,000
2004	5,780,870	750,000
2005	6,227,146	831,000
2006	6,678,958	892,000
2007	7,138,476	885,000

SOURCE: Motorcycle Industry Council. 2003-2007 Statistical Annuals. Irvine, CA; and U.S. Department of Transportation. State Motor-Vehicle Registrations. Washington, DC. as of Nov. 19, 2008 from <http://www.fhwa.dot.gov/policy/ohpi/qfvehicles.cfm>.

Table 2: New Street-Legal U.S. Motorcycle Sales by Engine Sizes, 1998 and 2003

Year	Engine size				
	<125cc	125-349cc	350-449cc	450-749cc	750cc +
1998	359,600	512,200	249,200	1,061,000	3,192,000
2003	290,000	376,000	99,400	1,237,600	4,916,000
Percent change	-19.4	-26.6	-60.1	16.6	54.0

SOURCE: Motorcycle Industry Council. Data received by personal communication from J. Goodwin, Sept. 30, 2008. Irvine, CA.

motorcycle sales (including off-road bikes, which are not distinguished from on-road motorcycles in the available total sales data); sales of touring bikes increased from 13 to 15 percent; sales of dual-purpose bikes increased from 3 to 4 percent, while sales of off-highway bikes decreased from 27 to 22 percent of total motorcycle sales (table 3).

During the first three quarters of 2008, total new on-highway (i.e., street-legal) motorcycle sales (excluding dual-purpose motorcycles and scooters) declined 2.1 percent from the corresponding period in 2007, with reported sales of 548,747 in 2008 compared to 560,529 in 2007. Dual-purpose motorcycle sales increased 29.4 percent, with sales of 39,805 units during the first three quarters of 2008 compared to 30,759 units during the same period of 2007. Concurrent with record fuel prices in 2008, scooter sales increased 50.6 percent. There were 69,227 units sold in the first three quarters of 2008 compared to 45,975 units sold in the first three quarters of 2007. Combining data for on-highway motorcycles, dual motorcycles, and scooters gives total sales of 657,779 during the first three quarters of 2008 as compared to 637,263 during the same period of 2007, a modest 3.22 percent increase in units sold.⁵

Motorcycle Owner Demographics

Survey data from the Motorcycle Industry Council on motorcycle owner demographics for the 1985 to 2003 period reveals a shift towards older owners. The median age of owners increased from 27.1 years in 1985 to 41.0 years in 2003. From 1985 to 2003, the percentage of owners 40–49 years old increased from 13.2 to 27.9 percent, and the percentage of owners 50+ years old increased from 8.1 to 25.1 percent (table 4). Also, survey results for 2003 indicated that 90 percent of owners were male, while survey results for 1998 indicated that 92 percent of owners were male, a slight—but probably not statistically significant—trend consistent with growing female ownership.

Training

The Motorcycle Safety Foundation (MSF) offers motorcycle rider education and training programs and courses, and supports governmental programs by participating in research and public awareness campaigns and providing technical assistance to state training and licensing programs.⁶ The MSF reports that about 4.5 million riders have graduated from their rider training courses since 1974. The Motorcycle Industry Council cites MSF data showing

⁵ WebBikeWorld. Downloaded on Nov. 20, 2008 from: <http://www.webbikeworld.com/Motorcycle-news/blog/>.

⁶ Motorcycle Safety Foundation. Downloaded on Nov. 24, 2008 from: <http://www.msf-usa.org/>.

Table 3: Percentage of New U.S. Motorcycle Sales by Type of Motorcycle, 2005–2007

Year	Traditional	Cruiser	Sport	Touring	Dual	Scooter	Off-Highway
2005	2	33	16	13	3	6	27
2006	1	32	18	15	3	5	25
2007	2	33	19	15	4	6	22

SOURCE: Motorcycle Industry Council. Data received by personal communication from J. Goodwin, Sept. 30, 2008. Irvine, CA.

Table 4: Motorcycle Owners by Age in the United States for Selected Years, 1985–2003

Age	Year			
	1985	1990	1998	2003
<18	14.9	8.3	4.1	3.7
18-24	20.7	15.5	10.6	10.8
25-29	18.7	17.1	10.9	7.6
30-34	13.8	16.4	11.5	8.9
35-39	8.7	14.3	16	10.4
40-49	13.2	16.3	24.6	27.9
50+	8.1	10.1	19.1	25.1
Not stated	1.9	2.0	3.2	5.6
Median age	27.1	32.0	38.0	41.0
Mean age	28.5	33.1	38.1	40.2

NOTE: Data include owners of on- and off-road motorcycles.

SOURCE: Motorcycle Industry Council. Data received by personal communication from J. Goodwin, Sept. 30, 2008. Irvine, CA.

that the number of students trained in MSF courses has increased steadily from about 130,000 in 1996 to about 370,000 in 2006. During the same period, there has been an increase in MSF course training sites from about 875 to about 2,125. In 2006, there were just over 9,000 MSF-certified RiderCoaches (experienced motorcyclists who complete an intensive preparation course to become trainers) compared to only 3,500 in 1996.

Most recently, the National Traffic Safety Division (NTSD) of the Transportation Safety Institute (<http://www.tsi.dot.gov/>), Research and Innovative Technology Administration, U.S. Department of Transportation developed a course on motorcycle safety program coordination (MSPC) to train motorcycle safety program managers at the state and federal level on the best practices, program fundamentals, and latest strategies for effective motorcycle program management. The MSPC course is sponsored by the National Highway Traffic Safety Administration (NHTSA) and intended to provide training to State Highway Safety Office program personnel and NHTSA Regional Program Managers to enable them to better facilitate and support a comprehensive motorcycle safety program in their state or region. The second of two pilot courses was completed in September 2008, with final course revisions based on experience with the pilots to be completed after that.

Safety

The growth in motorcycle sales and registrations in the United States has been accompanied by an increase in accidents, property losses, injuries, and fatalities involving motorcycles. As shown in table 5, from 1997 to 2007, the annual number of motorcyclist fatalities increased from 2,116 to 5,154 (a 144 percent increase), and the estimated number of motorcyclist injuries increased from 53,000 to 103,000 (a 94 percent increase).⁷

Although motorcycle registrations and vehicle-miles traveled both increased substantially from 1997 to 2006 (the last year for which registration data are currently available), these exposure measures do not account for all the growth in motorcyclist fatalities, because during that period, motorcyclist fatalities increased proportionately more than registrations and vehicle-miles traveled. From 1997 to 2006, annual motorcyclist fatalities increased from 2,116 to 4,837 (a 128.6 percent increase), while fatalities per 100,000 registered motorcycles increased from 55.3 to 72.3 (a 30.7 percent increase), and fatalities per 100 million motorcycle miles of travel increased from 21 to 39 (an 85.7 percent increase).

⁷ National Center for Statistics and Analysis, National Highway Traffic Safety Administration. *Traffic Safety Facts: 2007 Data*. DOT HS 810 990. Washington, DC.

Table 5. Motorcyclist Fatalities, Fatality Rates, Injuries, and Injury Rates in the United States, 1997–2007

Year	Fatalities	Fatalities/100,000 registered motorcycles	Fatalities/100 million miles traveled	Injuries	Injuries/100,000 registered motorcycle	Injuries/100 million miles traveled
1997	2,116	55.3	21.0	53,000	1,374	522
1998	2,294	59.1	22.3	49,000	1,262	476
1999	2,483	59.8	23.5	50,000	1,204	472
2000	2,897	66.7	27.7	58,000	1,328	551
2001	3,197	65.2	33.2	60,000	1,229	625
2002	3,270	65.4	34.2	65,000	1,293	677
2003	3,714	69.2	38.8	67,000	1,250	701
2004	4,028	69.8	39.8	76,000	1,324	755
2005	4,576	73.5	43.8	87,000	1,402	835
2006	4,837	72.3	39.0	88,000	1,311	707
2007	5,154	NA	NA	103,000	NA	NA

NOTE: NA = not available.

SOURCE: National Center for Statistics and Analysis, National Highway Traffic Safety Administration. *Traffic Safety Facts: 2007 Data*. DOT HS 810 990. Washington, DC.

Also, during that same period, estimated annual motorcyclist injuries increased from 53,000 to 88,000 (a 66 percent increase), while estimated injuries per 100,000 registered motorcycles declined from 1,374 to 1,311 (a 4.8 percent decrease), and estimated injuries per 100 million motorcycle miles of travel increased from 522 to 707 (a 35.4 percent increase).

Analysis of factors accounting for increasing motorcyclist fatality rates is beyond the scope of this brief overview of motorcycle trends, but one trend of concern to public health and safety experts is the relaxation of motorcycle helmet laws (See box B).^{8,9}

⁸ Morris, C.C. Generalized linear regression analysis of association of universal helmet laws with motorcyclist fatality rates. *Accident Analysis and Prevention*. 2006; 38:142-147.

⁹ National Center for Statistics and Analysis, National Highway Traffic Safety Administration. *Traffic Safety Facts: Motorcycle Helmet Use Laws*. DOT HS 810 887W. Washington, DC. January 2008.

Another emerging trend of concern to public health and safety experts is the growing popularity of racing-style motorcycles known as supersports, which have high power-to-weight ratios and are capable of extreme acceleration and speed (160+ mph). Although designed for the racetrack, supersport motorcycles are marketed and sold to the general public and have become especially popular among young riders. On September 11, 2007, the Insurance Institute for Highway Safety (IIHS) released a report showing that “motorcyclists who ride supersports have driver death rates per 10,000 registered motorcycles nearly 4 times higher than motorcyclists who ride all other types of bikes.”¹⁰ The IIHS report also noted that among fatally injured motorcycle drivers, those riding supersports are the youngest, with an average age of 27. For both 2000 and 2005, the death rate for riders of supersport bikes is twice that of sport bike riders and four times that for riders of other motorcycle types (See table 6, next page). 

¹⁰ Insurance Institute for Highway Safety. Status Report. *Special Issue: Motorcycles*. Sept. 11, 2007; 42(9).

Box B: Motorcycle Helmet Use Laws

In a January 2008 special report on motorcycle helmet use laws, the National Highway Traffic Safety Administration (NHTSA) “encourages each state to have and enforce a law requiring all motorcycle operators and passengers to wear helmets meeting Federal Motor Vehicle Safety Standard (FMVSS) 218.” [9] NHTSA also notes that the National Transportation Safety Board recommended on September 11, 2007 that all states adopt such a law. The report cites statistics showing the safety benefits of motorcycle helmets. For example, head injuries are a leading cause of death in motorcycle crashes. Unhelmeted motorcyclists are three times more likely to suffer brain injury and 40 percent more likely to suffer a fatal head in-

jury than helmeted motorcyclists. But the repeal of state universal helmet laws (which require all riders to wear helmets) has resulted in fewer riders wearing helmets, with helmet use dropping nationally from 71 percent in 2000 to 51 percent in 2006. In some states only minors are required to wear helmets, but even in those states fewer than 40 percent of fatally injured minors were actually wearing helmets. As of January 2008, only 20 states required all motorcycle riders to wear helmets, while 28 states required only those under a certain age (e.g., 18) to wear helmets. Two states had no helmet laws.

Table 6: Motorcycle Driver Deaths per 10,000 Registered Motorcycles by Type, 2000 v. 2005

Type	Deaths		Registered motorcycles		Deaths per 10,000 registered motorcycles	
	2000	2005	2000	2005	2000	2005
Supersport	619	1,128	273,733	501,002	22.6	22.5
Sport/unclad sport	248	430	229,020	401,130	10.8	10.7
Touring	256	521	480,314	807,291	5.3	6.5
Cruiser/standard	976	1,583	1,752,377	2,778,348	5.6	5.7
Other/unknown	442	388	829,944	893,567	5.3	4.3
Total	2,541	4,050	3,565,388	5,381,338	7.1	7.5

SOURCE: Insurance Institute for Highway Safety *Status Report. Special Issue: Motorcycles*. Sept. 11, 2007; 42(9).

About This Report

This report was prepared by C. Craig Morris, Ph.D., Mathematical Statistician, Bureau of Transportation Statistics. BTS is a component of the Department of Transportation's Research and Innovative Technology Administration.

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