

Motorcycle Safety & Operation Handbook



Disclaimer:

This handbook to the best of our knowledge, contains the best and most relevant information and recommendations concerning the subject. All safety precautions regarding motorcycle operation are not included in this manual, and SAIT offers no guarantee to the absolute correctness of the topic herein.

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Chapter 1

Introduction: The Importance of Motorcycle Safety

Are you interested in riding a motorcycle? Maybe you ride already and want brush up on your skills. Whatever your reason, participating in a motorcycle safety course is a good idea.

This handbook presents useful information about motorcycle safety and operation.

Motorcycle operation and safety awareness is a life-long process. By no means does this handbook cover all aspects of the topic. Practicing your skills in a safe manner, and furthering your knowledge of all things motorcycle-related after the course will continue to help you as a rider.

Every time you gear up, start your motorcycle, and venture on the roads, it's a learning experience. Even the most skilled riders know that they never stop learning. You'll keep adding to your knowledge of riding after this course, both on and off the road. A multitude of web resources, books, exercises, and courses exist to help you improve.

Motorcycle Safety and Operation

Riding a motorcycle involves taking risks. Being an informed rider means understanding the risks associated with riding and preparing through practice.

Understanding motorcycle operation and safety helps reduce the risks associated with riding. However, this course is not a magic bullet. Risks always exist when operating a motorcycle.

A variety of small studies on motorcycle accidents and their causes have been conducted, and statistics on motorcycle injuries and fatalities have been documented in regions throughout the world. The benchmark study in motorcycle safety is the Hurt Report, published in 1981.

Written by Professor Harry Hurt and his colleagues James Ouellet and David Thom, the report is officially titled Motorcycle Accident Cause Factors and Identification of Countermeasures. It was commissioned by the Traffic Safety Center of the University of Southern California and studied accident cause factors of 900 on-scene motorcycle accidents and 3,600 accident reports.

Key findings of this report:

- “Approximately three-fourths of these motorcycle accidents involved collision with another vehicle” (p. 416).
- “Approximately one-fourth of these motorcycle accidents were single vehicle accidents involving the motorcycle colliding with the roadway or some fixed object in the environment” (p. 416).
- “Vehicle failure accounted for less than 3% of these motorcycle accidents, and most of those were single vehicle accidents where control was lost due to a puncture flat” (p. 416).
- “In the single vehicle accidents, motorcycle rider error was present as the accident precipitating factor in about two-thirds of the cases, with the typical error being a slide-out and fall due to over-braking or running wide on a curve due to excess speed or under-cornering” (p. 416).
- “Roadway defects (pavement ridges, potholes, etc.) were the accident cause in 2% of the accidents; animal involvement was 1% of the accidents” (p. 416).
- “In the multiple vehicle accidents, the driver of the other vehicle violated the motorcycle right-of-way and caused the accident in two-thirds of those accidents” (p. 416).
- “The failure of motorists to detect and recognize motorcycles in traffic is the predominating cause of motorcycle accidents. The driver of the other vehicle involved in collision with the motorcycle did not see the motorcycle before the collision, or did not see the motorcycle until too late to avoid the collision” (p. 416).
- “Most motorcycle accidents involve a short trip, ... and the accident is likely to happen in very short time close to the trip origin” (p. 416).
- “The most frequent accident configuration is the motorcycle proceeding straight then the auto mobile makes a left turn in front of the oncoming motorcycle” (p. 416).
- “Intersections are the most likely place for the motorcycle accident, with the other vehicle violating the motorcycle right-of-way, and often violating traffic controls” (p. 416).
- “More than half of the accident-involved motorcycle riders had less than 5 months experience on the accident motorcycle, although the total street riding experience was almost 3 years. Motorcycle riders with dirt bike experience are significantly underrepresented in the accident data” (p. 417).

- “The view of the motorcycle or the other vehicle involved in the accident is limited by glare or obstructed by other vehicles in almost half of the multiple vehicle accidents” (p. 417).
- “Conspicuity of the motorcycle is a critical factor in the multiple vehicle accidents, and accident involvement is significantly reduced by the use of motorcycle headlamps-on in daylight and the wearing of high visibility yellow, orange or bright red jackets” (p. 417).
- “Motorcycle riders with previous recent traffic citations and accidents are overrepresented in the accident data” (p. 417).
- “The motorcycle riders involved in accidents are essentially without training; 92% were selftaught or learned from family or friends. Motorcycle rider training experience reduces accident involvement and is related to reduced injuries in the event of accidents” (p. 417).
- “Almost half of the fatal accidents show alcohol involvement” (p. 417).
- “The use of heavy boots, jacket, gloves, etc., is effective in preventing or reducing abrasions and lacerations, which are frequent but rarely severe injuries” (p. 418).

- “The use of the safety helmet is the single critical factor in the prevention or reduction of head injury” (p. 419).
- “The increased coverage of the full facial coverage helmet increases protection, and significantly reduces face injuries” (p. 419).

As you can see, a number of factors contribute to motorcycle accidents. Some scenarios are out of your control, but there are preventive measures you as a motorcyclist can take to reduce the risk of accidents. One measure is taking a training course.

Motorcycling has changed since the Hurt Report was written, but accident factors remain similar: nobody has stopped making left-hand turns; people still drink and drive.

What has continued to evolve is our awareness of safety issues and preventive measures.

We encourage students to read the full Hurt Report: http://commons.wikimedia.org/wiki/File:MOTORCYCLE_ACCIDENT_CAUSE_FACTORS_AND_IDENTIFICATION_OF_COUNTERMEASURES_VOLUME_I-TECHNICAL_REPORT.pdf

Further Reading

In addition to taking this course, we recommend studying the following texts and websites:

- Hough, D. L. (2000). *Proficient motorcycling: the ultimate guide to riding well*. Irvine, CA: BowTie Press.
- Hough, D. L. (2012). *Mastering the ride: more proficient motorcycling. (2nd ed.)*. Irvine, CA: BowTie Press.
- Lindemann, M. & Spies, B. (2013). *The total motorcycle manual (cycle world): 291 skills you need*. San Francisco, CA: Weldon Owen.
- Alberta Transportation. (2014). *Rider's guide to operation, safety and licensing motorcycles, mopeds and power-assisted bicycles* (Chapter 2). Retrieved from: <http://www.transportation.alberta.ca/844.htm>
- The Motorcycle Safety Foundation. (2014). *Basic RiderCourseSM: rider handbook*. Retrieved from: <http://www.msf-usa.org/downloads/BRCHandbook.pdf>

Notes:

Chapter 2

Understanding Your Motorcycle: Pre-Ride Check and General Maintenance

Every time you ride, it's important to check the motorcycle for any mechanical problems that may compromise safety.

Knowledge of basic motorcycle anatomy is important for operation, safety, and maintenance.

You don't need to be an expert mechanic to ride a motorcycle. For your own safety, most repairs and scheduled maintenance should be done by a certified professional motorcycle mechanic. That said, knowledge of your motorcycle's basic anatomy may help you identify mechanical issues, and it will help you to do a safety check before you ride.

The following diagram shows the basic parts of a motorcycle.

- 1 - Mirrors
- 2 - Riser
- 3 - Turn Signals
- 4 - Headlight
- 5 - Triple Clamp
- 6 - Front Fender
- 7 - Front Suspension (fork)
- 8 - Wheel Rim
- 9 - Brake Disc
- 10 - Tire
- 11 - Brake Caliper
- 12 - Radiator
- 13 - Rear Brake Lever
(Shift lever on opposite side)
- 14 - Footpeg (rider)
- 15 - Chain
- 16 - Swingarm
- 17 - Final Drive Sprocket
- 18 - Footpeg (passenger)
- 19 - Turn Signals
- 20 - Tail Light
- 21 - Shock Absorbers
- 22 - Seat
- 23 - Airbox with Filter
(Under sided over)

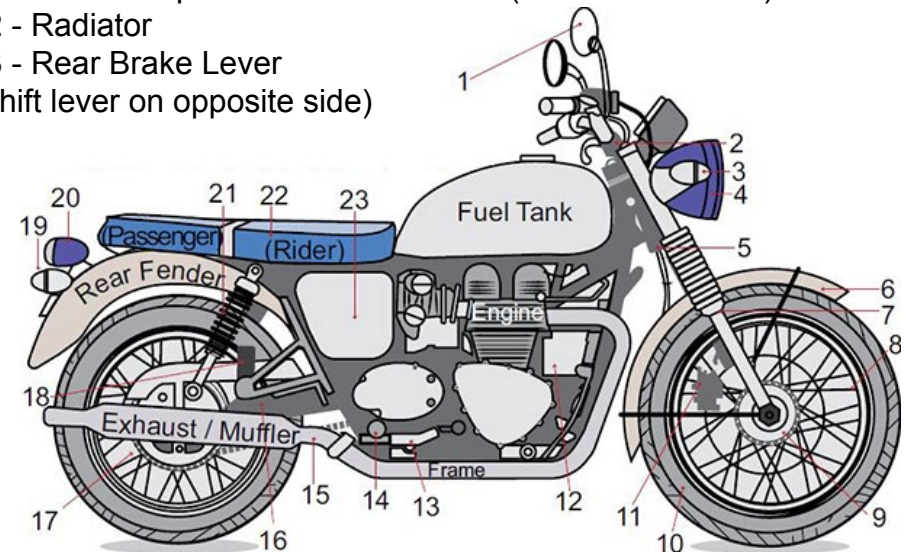


Figure 1: Parts of a Motorcycle

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Motorcycle Operational Controls

The following diagram outlines the operational controls of a motorcycle.

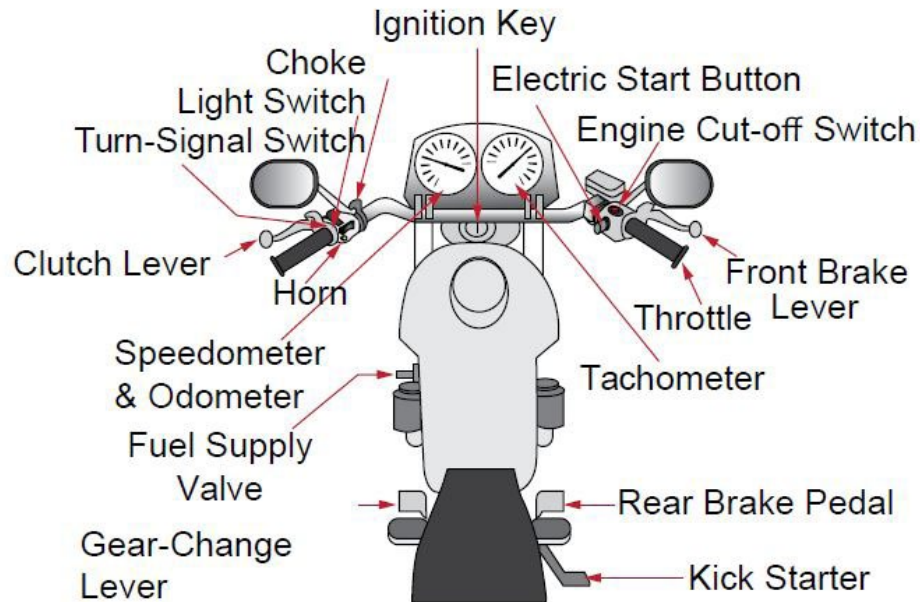


Figure 2: Operational Controls

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Gears

Although some motorcycles are available that have automatic transmissions or direct drive throttles (electric powered), the vast majority of motorcycles use a standard transmission with either five or six gears. Gears are changed by easing off the throttle (the grip on the right handlebar) engaging the clutch (the lever on the left handlebar), and using the left foot to click the motorcycle into the desired gear.

Engage first gear by clicking the gear change lever down as far as it will go. Engage neutral by clicking the gearchange lever a half-click up. Second through fifth (or sixth) gear are full clicks up. To gear down, rest the front part of your foot on the gear-change lever, with the back of your foot on the foot peg. To gear up, position the front toe of your boot underneath the gear-change lever and pivot up.

The following diagram shows the standard motorcycle gear configuration.

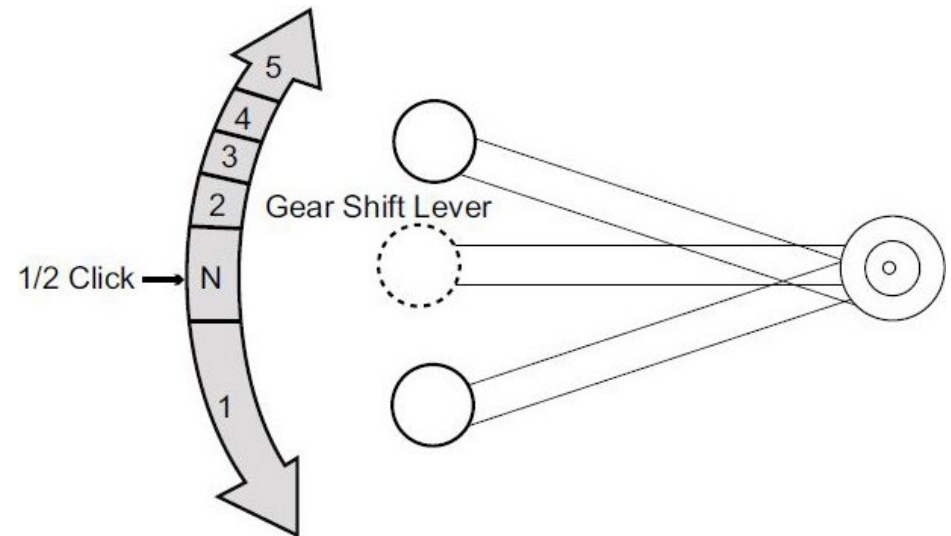


Figure 3: Standard Motorcycle Gear Configuration

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The Owner's Manual

Your motorcycle owner's manual is an important source of information on the safety and maintenance of your motorcycle. If you decide to purchase a motorcycle, make sure you get the owner's manual. A new motorcycle will come with the owner's manual. Be sure to ask the seller for the owner's manual if you purchase a used motorcycle. If the seller has misplaced or lost the manual, contact the motorcycle manufacturer or distributor for a new copy.

The owner's manual will contain key information about your motorcycle including notes on operation, inspection, and basic maintenance.

Motorcycle Pre-Ride Safety Checks

Every time you ride, you should check your motorcycle for mechanical issues that may compromise safety. Use these two methods: T-CLOCSSM and FINE-CCC. Both acronyms refer to lists that will help you identify mechanical issues.

Motorcycle Pre-Ride Safety Checks

T-CLOCSSM is a check system developed by the Motorcycle Safety Foundation. It stands for *Tires, Controls, Lights, Oil, Chassis, and Stands*. Below is a brief description of the acronym. For a more detailed description visit:

http://www.msf-usa.org/downloads/t-clocs_inspection_checklist.pdf

- **Tires:** Check the air pressure, tread depth, and wear. Look over the tires for cracks or weak spots. Ensure the front and rear brakes engage. Check to make sure the pads and brake discs are in good condition. Check the spokes of tires (if applicable), make sure none of them are loose.

- **Controls:** Check the levers, switches, cables, handlebars, hoses, and throttle. The levers (clutch and brake) should engage, and upon release they should move back to their original position. The handlebars should be straight and secure. Ensure the engine on/off switch works. Look over the cables and hoses. You don't need to know every function of every hose or cable, just check for stretching or damage. Examine hoses for any potential stress or pull points when you turn the handlebars.

- **Lights:** Make sure the lights work (high beam and low beam). Check your signal lights (left and right, front and back). Ensure your mirrors are in the right position. Adjust them when you are seated on the bike. Check the lights for cracks. Check the wiring to the lights and ensure it is in good condition.

- **Oil:** Check the fluid levels of your motorcycle including oil, brake fluid, fuel, and coolant. Check the motorcycle and the ground for signs of leaks.

- **Chassis:** Check your suspension as well as your belt, chain or drive shaft. Ensure there is no cracking or damage to the frame. Make sure the suspension has adequate air pressure. Ensure the chain is properly lubricated and at the correct tension.
- **Stands:** Ensure the centre and side stands operate properly and aren't showing any signs of damage.

FINE-CCC

FINE-CCC stands for *Fuel, Ignition, Neutral, Engine Cut-Off Switch, Choke, Clutch and Chain*. We recommend performing FINE-CCC after T-CLOCSSM.

To perform FINE-CCC:

- **Fuel:** Check your fuel: ensure your tank is adequately full. Check your on/off/reserve fuel switch: ensure the switch is turned to on. Note: Many newer motorcycles do not have an on/off/ reserve fuel switch. Some motorcycles have fuel gauges, others do not—check fuel manually by removing the gas cap and physically examining the tank.
- **Ignition:** Turn the ignition switch to the on position.
- **Neutral:** Shift the transmission into the neutral position.
- **Engine:** Turn the switch to the run or on position.
- **Choke:** Set the choke as needed to ensure the engine doesn't stall or flood. Many newer motorcycles equipped

with fuel injection do not have chokes. When using the choke to start your engine, be gentle and avoid using the throttle.

- **Clutch:** Engage the clutch when starting the motorcycle in case it's still in gear.
- **Chain:** Have a look at the chain (or belt). Ensure it is in place and not too loose or tight.

Notes on Tires: Tread Depth and Tire Pressure

Motorcycle tires generally don't have the longevity of car tires. They require replacement more often. Tread inspection and tire pressure are important components to monitor.

Most motorcycle tires have wear bars. Wear bars are small raised sections of tire that run across the groove of the tread. Wear bars can be difficult to locate when the tire is new, but they become fairly obvious as the tire loses tread. When the wear bar has become level with the tire, the tires are bald and need to be replaced.

Carefully monitor tire wear. Depending on your riding style, you may wear out the centre or edges more quickly. Either way, overly worn tires affect performance and safety. Promptly replace worn tires.

Be sure to inspect your tires regularly for cracks in the sidewalls or cracking from dried out rubber. Tires with cracks should be replaced. Keep in mind that tires have

a lifespan that can vary considerably. Weather, storage, and age dry out tires over time, which can cause them to get hard and crack.

Check tire pressure often, preferably before each ride. The recommended inflation pressure for each tire should be detailed in your owner's manual. Many motorcycles will also have a sticker on the swing arm with pressure information.

Notes:

Chapter 3

Motorcycle Safety Apparel

Operating a motorcycle exposes you to a variety of hazards. There are the everyday elements such as wind, rain, hail, an unexpected snowfall, and extreme heat, but other hazards include collisions, losing traction, and dropping the motorcycle.

A rider's choice in apparel can have a significant impact when dealing with these hazards. Apparel can also help in dealing with the elements and temperature extremes.

It is important to remember that in an accident even the safest motorcycle gear is not your only form of protection. While there are no guarantees, a combination of knowledge, riding skills, and proper gear increases your level of defense.

From the head down, let's explore motorcycle safety apparel.

Helmets: Safety Approval Standards

Before exploring the different motorcycle helmet options, it's important to understand the industry and government standards for motorcycle helmet safety.

Alberta Transportation law requires motorcycle operators and their passengers to wear an approved motorcycle helmet. Alberta Transportation recognizes the following approval bodies: the Canadian Standards Association (CSA), the U.S. Department of Transportation (DOT), the British Standards Institute (BSI), and the Snell Memorial Foundation (SNELL). A sticker or label will be present on an approved helmet identifying the standards organization (Alberta Transportation, 2014, p. 14).

The most common approval bodies you will encounter are DOT and SNELL.



Figure 4: DOT/SNELL Approved Helmet
Source: New York State Department of Health
https://www.health.ny.gov/prevention/injury_prevention/children/toolkits/motorcycles/dot_stickers.htm



Figure 4: DOT/SNELL Approved Helmet
Source: New York State Department of Health
https://www.health.ny.gov/prevention/injury_prevention/children/toolkits/motorcycles/dot_stickers.htm

Types of Helmets

There are several helmet options for the motorcyclist. Although many of these options are recognized as approved motorcycle helmets, they offer different levels of safety.

Full Face Helmet or Full Coverage Helmet

A full-face helmet provides the rider with the most head protection. It protects the entire head including the face, eyes, base of skull, and chin. A full-face helmet will also have a shield that protects your face from objects such as insects and stones. The one-piece design of a fullface helmet offers the greatest level of strength (Alberta Transportation, 2014, p. 14).

Some full-face helmets have integrated sun protection such as built-in visors that can be engaged or disengaged.

Many full-face helmets also have different visor options for varying light conditions.

We recommend using a full-face helmet.

Open Face Helmet: Three Quarter Coverage



Figure 6: Open Face Helmet
Source: 149213014, Thinkstock\iStock

Open-face helmets provide protection for the top and sides of the head. Some open-faced helmets have face shields, while others do not. Open-face helmets offer limited face protection, and no protection to the chin area (Alberta Transportation, 2014, p. 14).

Half Coverage Helmet or Shorty



Figure 7: Half Coverage Helmet
Source: 471881205, Thinkstock\iStock

A half-coverage or shorty helmet offers limited protection (Alberta Transportation, 2014, p. 15). Half-coverage helmets provide protection to the top half of the head,

while the face, chin, and back of the head are exposed. Half-coverage helmets are not recommended.

Modular Helmet



Figure 8: Modular Helmet
Source: 164249070, Thinkstock\iStock

A relatively new style is the modular helmet. Modular helmets are similar to full-face helmets in their head coverage.

A modular helmet, however, offers you the option of converting the helmet to an open-faced helmet by either removing the chin section (chin bar) entirely, or raising the chin section above the helmet. Although these helmets offer full-face protection (when using the chin bar), and are certainly a better option than the open-faced helmet, it can be argued that their modular construction affects protective integrity in a collision.

Helmet Impact Zones

A German study published in 1991 determined that the majority of motorcycle helmet impact points were located on the chin area. Consider this information when choosing a helmet (Hough, 2000, p. 26).

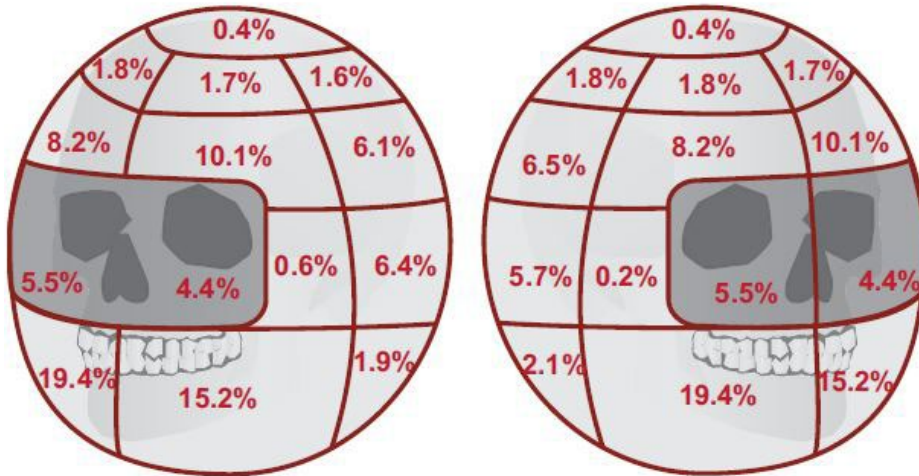


Figure 9: Helmet Impact Zones © 2015,
Southern Alberta Institute of Technology
Adapted from data by Dietmar Otte,
Proficient Motorcycling (2008), BowTie Press.

Fitting your Helmet

Motorcycle helmets are sized using a small, medium, and large scale. Unfortunately, helmet size is not standardized. One manufacturer's size small may be equivalent to another manufacturer's size medium or even extra small. Motorcycle helmet manufacturers and distributors have size equivalents and size guidelines for helmets.

Although ordering a helmet online is an option, unless you are absolutely sure of the fit, the best way to purchase a helmet is to try it on in person at a reputable apparel dealer.

Some manufacturers' helmets are better suited for people with a certain head shape. This is another reason to purchase a helmet in person.

A motorcycle helmet should fit snugly. Tighten the chinstrap appropriately so the helmet cannot be removed without first loosening the strap. The helmet should be almost tight, but not so much that it's painful or very uncomfortable. It shouldn't move freely about the head (side to side or up and down). On a full-face or open-face helmet, the cheek pads should touch your face, pressing your cheeks slightly together. The front chin bar or visor section of a full-face helmet should not touch your nose or chin.

Buying Used

Although designed to offer protection in the case of an impact, motorcycle helmets are not designed for multiple impacts. A helmet may be compromised if it has been dropped on the ground, involved in an accident, is older than 5 years, or has been exposed to extreme conditions or substances. A compromised helmet will not necessarily have obvious or visible impact marks, so we don't recommend buying used helmets. We also recommend replacing helmets that have been involved in a collision, dropped, or otherwise damaged.

Final Tips

Keep in mind:

- Helmets often have an expiry date. Typically, it's good to replace a helmet every five years even if it hasn't been in an impact.
- High visibility helmets in brighter colours are easier to see. They make other motorists more aware of your presence.
- Do not paint a helmet or add stickers. Adhesives and paints contain substances that may compromise the helmet's integrity.
- A full-faced helmet may not look as cool in some situations, but it offers the most protection.
- The wind noise in some helmets can be very loud and over time it may affect your hearing negatively. Considering wearing earplugs to help protect your hearing.
- Be nice to your helmet. Don't leave it somewhere where it could be dropped, damaged, or stolen.
- Don't forget to tighten the chinstrap!

Motorcycle Jackets and Pants

Motorcycle apparel and leather are synonymous. While it could be argued that leather offers the very best protection, there are several other materials that also offer excellent protection and comfort, including leather, textile, and Kevlar® reinforced denim.

Jackets and pants designed specifically for motorcycle riders are better than non-specific motorcycle riding apparel. Denim—unless integrated with Kevlar® and manufactured specifically for motorcycle riding—offers little to no protection. Regular leather jackets, pants, or chaps also provide limited protection.

Unlike helmets, jackets and pants are not regulated through an approved standard classification system in Canada. In Europe, CE or EN are standard terms for the quality of motorcycle jackets or pants. CE is Certified European, and EN is European Norm. While CE and EN are not officially recognized in North America, apparel built to these standards is required on many North American racetracks. European motorcycle safety standards also tend to be more stringent than North American standards. We recommend purchasing CE or EN approved jackets or pants.

As with helmets, jacket and pant colour is a safety consideration. Black is a popular colour, and definitely looks cool. Unfortunately, it does not increase your visibility to other motorists. We recommend bright colours and high visibility options.

Leather

Motorcycle-specific leather jackets and pants are an excellent option. They offer superior protection and can often survive several slides or abrasions. Surprisingly, leather also offers excellent wind and cool weather protection. However, leather may get extremely hot. On a summer day in stop-and-go traffic leather can make for an extremely warm ride. Motorcycle leather can also be very expensive and it requires care to maintain its quality.

The durability of good motorcycle leather is unquestionable; competition weight leather can handle a slide on concrete for over 80 feet before losing its integrity (Hough, 2000, p. 35).

Regular leather jackets or pants and non-specific motorcycle jackets are not built to the same standards as motorcycle-specific leather apparel.



Figure 10: Leather Jacket and Pants
©REV'IT! Used with permission.

Textiles

Textile jackets and pants are a popular choice in motorcycle protective apparel. Textiles can be a very good alternative to leather. They offer greater comfort through a broader temperature range. They are typically lighter and often waterproof. Textiles are also less expensive than leather.

Not all textiles are created equally, and there is no doubt that in the case of a high speed fall or slide, leather offers better abrasion resistance. Textiles may also fail to survive more than one slide or fall.

Textiles are made from a variety of materials including Kevlar®, Cordura®, Lycra®, and Gore-Tex®.

If you choose to purchase textile apparel, look for CE or EN approved jackets and pants.

If you think you'll be riding in the rain often, textiles may be the best choice. If you're usually riding at higher speeds, leather may be a better choice.



Figure 11: Textile Jacket and Pants
©REV'IT! Used with permission.

Denim

Denim jackets and pants (jeans) are commonly used by motorcyclists. Other than Kevlar® integrated denim, regular jean jackets and pants offer minimal protection. Cotton denim will typically disintegrate during a slide on rough concrete in less than 5 feet (Hough, 2000, p. 36).

Jacket and Pants Fit

Motorcycle jackets and pants should fit well, but not hinder you from operating the motorcycle. A jacket or pant that is too loose may ride up your body in a slide or collision. A jacket that fits well around the waist, and is secured on the wrists will

help keep your protective gear in place in case of an accident. Pants that fit well on the waist and are secured well around the ankles will do the same.

Many manufactures offer jackets and pants that zip into each other. These zip together products are an excellent option and may help keep your gear on in the case of an accident. One-piece suits are also an option.

Boots

There are several different types of motorcycle boots, including boots designed for racing, off-road boots, and boots that double as street shoes.

Boots are an important component in motorcycle safety apparel. According to the Centre for Disease Control and Prevention (2012), 30% of non-fatal injuries are leg or foot injuries.

Look for boots that are at the very least ankle high.

Motorcycle specific boots offer several options including oil resistant soles for better grip and a design that varies stiffness and flexibility for support and movement. Many motorcycle boots have built-in armour and are waterproof and breathable. Look for boots that offer ample protection and suit your style of riding.

Be mindful of boots with laces that can't be hidden. When laces aren't secured properly they can become a safety hazard. Also avoid boots with steel toes as they

hinder brake and gear shift feel.

Be wary of fashionable footwear that looks like motorcycle gear. It may look cool, but it will do little to protect you in an accident.



Figure 12: Motorcycle Boots
Source: 476142307, Thinkstock

Gloves

Motorcycle-specific gloves can make your ride much more enjoyable and safe. They can be made from leather or textile material.

When you slip or lose balance, you tend to use your hands to break the fall. The same instinct applies in a motorcycle accident.

Motorcycle-specific gloves often have built-in armour and soft padding to protect the palms and reduce or dull vibrations from the handlebars. Some motorcycle specific gloves also have optional features such as gauntlets to protect your wrists or weatherproofing to withstand adverse conditions (hot or cold).

Motorcycle gloves without a mechanism to secure the glove tightly to the wrist should be avoided as the gloves may slide off in an accident.

Like jackets and pants, look for CE or EN approved gloves that suit your riding style.

We recommend leather gloves, with a small or large gauntlet section, armour, and a wrist mechanism that can prevent the gloves from sliding off the hand. Gloves should also fit well, but not be so tight that they hinder the dexterity you need to operate motorcycle controls.



Figure 13: Gloves
© REV'IT! Used with permission.

Armour

Body armour has been devised and developed by the professional racing community, but it is also used

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by everyday street riders. Most CE or EN approved motorcycle apparel will have armour, or compartments that allow armour to be inserted. Elbow guards, back protectors, hip guards and shoulder guards are all possible options for the motorcyclist. Motorcycle armour is a highly recommended component for all riders.

Rain Gear

If your apparel isn't already water-resistant or waterproof, other options exist for keeping you dry. Full rain suits, rain jackets and rain pants can fit over your regular motorcycle gear.

One of the problems with leather is its water resistance. On a rainy ride, even treated leather may get saturated with water, and it can take a very long time to dry.

Getting wet while riding, even at very slow speeds, can increase the wind chill and drop your temperature considerably. Staying dry and warm is very important. If you're cold and wet, you'll begin to focus on trying to get warm, which takes your focus off riding. Check the weather, and be prepared.

Conclusion

Apart from the requirement to wear an approved motorcycle helmet, there are no other laws in Alberta regarding motorcycle apparel. You will no doubt see motorcyclists riding with no safety apparel, wearing t-shirts, shorts, and even flip-flops or sandals. You'll also

see poor safety apparel such as half coverage helmets and sleeveless vests.

There is no motorcycle safety apparel that can ultimately guarantee your safety, but statistically the benefits of good apparel are considerable.

Wearing proper gear also helps increase respect for the motorcycling community. Even today, there are people who stigmatize motorcyclists and associate the sport with lawlessness and recklessness. Although such prejudice is unfair, these attitudes exist because some motorcyclists ride dangerously or wear inadequate gear.

A person who rides safely and wears proper gear demonstrates awareness of the hazards associated with motorcycling and respect for his or her own safety. An indirect product of this behavior is respect from other motorists. You may also find that once you are used to wearing adequate motorcycle safety apparel, you'll never consider riding without it.

Notes:

Chapter 4

Road Skills

When riding a motorcycle, you negotiate the roadways differently than in a car. The rules of the road are the same for cars and motorcycles, but navigating traffic, lane positioning, braking, and even defensive driving present different challenges. Relatively speaking, there is also less room for error on a motorcycle.

This chapter provides a brief overview of basic road skills. We encourage further reading and recommend practicing these skills extensively in a controlled area.

Navigating: Keep Your Head Up

One of the most important aspects of operating a motorcycle is keeping your head up and eyes focused on where you're going. This means looking ahead. The motorcycle will travel where you are looking. This applies to straight line driving and turns. As you approach a corner, look through the turn. Generally speaking, you should look approximately 12 seconds of travel time down the road from your position. As your speed increases, the scanning distance expands and you will need to look farther ahead.

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Keeping your head up also refers to scanning around yourself for potential hazards. Riding a motorcycle requires you to constantly engage your senses.

Be especially mindful:

- When approaching intersections. Scan for all road hazards, including pedestrians. Watch for vehicles turning left in intersections coming from the opposing direction. They may not see you. This is one of the most common places for serious motorcycle collisions and injuries.
- When overtaking a vehicle turning left in your line of traffic. Passing on the right is dangerous, and the vehicle in front of you may mask your presence to drivers in opposing traffic.
- When scanning for hazards such as potholes and gravel.

Cornering: Body Steering and Counter Steering

Motorcycles are single track vehicles. When riding a single track vehicle, you must lean in order to execute a turn. Counter steer to lean your motorcycle into the turn and then body steer to maintain the lean and guide your motorcycle in the right direction.

Counter steering means briefly pushing the handlebars away from the direction you want to turn. You may think, “that’s not right, it has to be the other way.” Although it seems counterintuitive, steering the wheel in the opposite direction from where you’re turning will naturally tip the motorcycle toward the inside of the intended turn.

If you have even minimal experience riding a pedal bicycle, you have counter steered. If you have never bicycled before, we suggest you practice on a pedal bike before motorcycling.

Consider how you turn a multi-wheeled or multi-tracked vehicle such as a car: the weight goes to the outside tires, and your body also naturally gets pulled to the outside of the turn. The same forces apply on a motorcycle, but since a motorcycle is a single track vehicle, there are no outside tires for weight to be transferred to. This means steering directly into your turn on a motorcycle can cause you to lean outward and lose control. Because weight initially falls in the opposite direction of your steering, you should briefly steer away from the corner to direct weight into the turn.

The action of counter steering is best learned on a motorcycle. However, understanding the theory of counter steering will help you progress as a rider, so we encourage you to research the concept further.

Body steering is another way of directing a motorcycle. Body steering involves turning the wheel and shifting your weight towards the inside of the turn. If you have ever seen a motorcycle race such as the MotoGP™, you will have seen participants leaning off the sides of their motorcycles towards the inside of the turn; sometimes even dragging their knee on the track—this is an extreme type of body steering.

Body steering aids counter steering. After counter steering, body steering and leaning your weight towards the inside of the turn is a natural progression. But remember, you can’t body steer effectively without first counter steering.

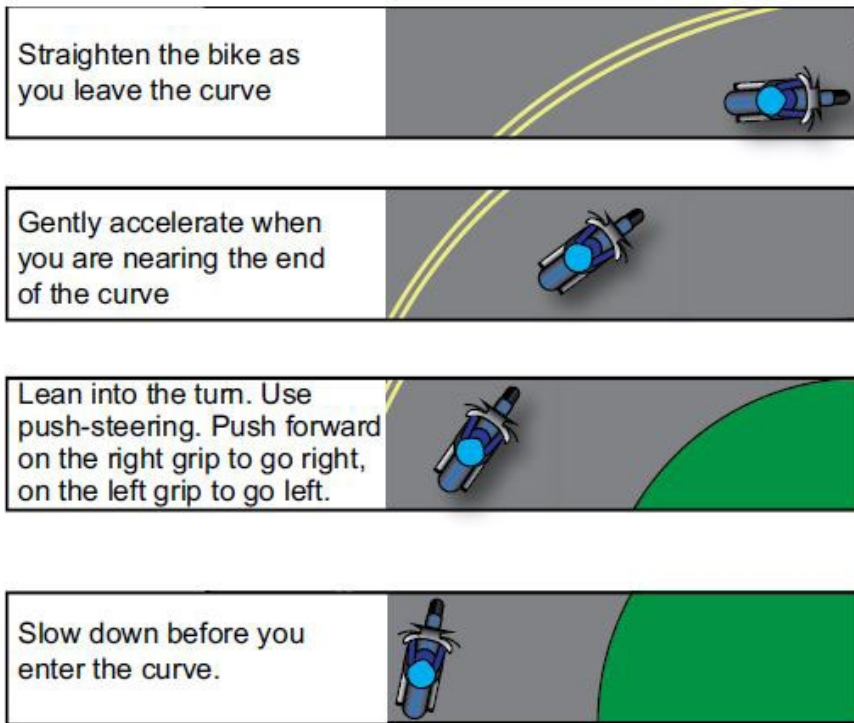


Figure 15: Push-steering
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Other key points on cornering:

- Most corners will require a certain amount of deceleration. When entering a corner, it is best to gear down and/or brake prior to entering the corner.
- Keep your head up and look through the corner.
- Avoid braking or slowing down drastically in the middle of the curve.
- Gently accelerate as you exit the corner.

Braking and Braking Distance

Motorcycles have two brakes, a front brake (for the front tire) and rear brake (for the rear tire). Engage the front brake using the right lever on the throttle hand. Engage the rear brake using your right toe to pivot down on the brake lever.

To bring your motorcycle to a stop, engage both the front brake and rear brake.

If you read about motorcycle braking enough, you will find several different arguments on how much front brake or rear brake pressure you should use to come to a stop. Everyone agrees that the majority of braking power comes from the front brake. But this does not mean that only the front brake needs to be engaged; use both brakes to stop the motorcycle. The front brake will provide a larger percentage of stopping power than the rear brake.

Applying both brakes appropriately is the best and safest way to bring a motorcycle to a controlled stop.

Maintaining adequate braking distance allows you time to brake suddenly without running into a vehicle in front of you. In general, apply the three-second rule. This means staying three seconds behind the other vehicle.

A three-second distance generally increases by a car length for every 10 km/hr of speed. So, if you're moving at 60 km/hr, you should be six car lengths behind the

vehicle in front of you. If you're moving at 100km/hr, you should be ten car lengths behind.

You can also brake by down-shifting the motorcycle. By gearing down appropriately, you slow down. Be mindful of motorists behind you, as gearing down won't engage the brake light.

Controlled braking is determined by judgment and understanding of the basic skills of motorcycling. Your stopping distance is based on your perception time, reaction time, and braking time. Perception time is the time your brain takes to recognize the need to stop. Reaction time is the time you take to perform the physical action of braking. Braking time is the time it takes the motorcycle to stop.

Other key points on braking:

- Braking too hard and too fast may cause the front or rear wheel to lock up and skid. If the front wheel locks, release the brake lever. If the rear wheel locks, ease off the rear brake pedal carefully. If the motorcycle is not travelling straight and the rear brake locks, maintain brake pressure until you have come to a complete stop.
- Avoid braking in the middle of a turn.
- Pay attention to road conditions and adjust braking and following distances accordingly.

- Your perception is what initiates braking; poor judgment or physical impairment will affect your perception.
- Keep your foot on the rear brake even when stopped. This action engages the rear brake light and helps other drivers see you.
- Practice braking often in a safe, controlled environment.

Defensive Riding

Every time you get on a motorcycle, ride defensively.

The Motorcycle Safety Foundation (2014) recommends using the acronym SEE: Search, Evaluate, and Execute (p. 24).

Search by noticing hazards as you ride. This means scanning the road at all times. Look for potholes, gravel, and other hazards. Scan the obvious indicators such as road signs and traffic lights, and watch for other motorists in all lines of traffic.

Evaluate by making an action plan for dealing defensively with a riding situation. Plan to adjust your riding for the conditions or hazard. Look for a way out in a potential collision, or determine how to safely brake or avoid a hazard. You need to use all of your learned riding skills to determine your response.

Execute by responding to the riding situation. Executing is the product of Searching and Evaluating.

The SEE process often occurs in a mere 2 or 3 seconds.

Riding defensively is directly related to many other safety practices, from wearing proper gear and maintaining your motorcycle to riding to suit the conditions. Practicing braking and cornering will help you perform defensive riding techniques. Understanding collision hotspots will also help your defensive riding approach.

There are countless situations where a motorcyclist needs to ride defensively. We encourage riders to research defensive driving further and to practice the skills from this motorcycle safety course.

Lane Positioning

Riding a motorcycle safely involves positioning yourself in a lane so that you can drive defensively and be visible to other motorists.

Depending on traffic conditions and number of lanes, you will position yourself in either the right-hand or lefthand portion of your lane. Think of each lane split up into three portions: the right, centre, and left track. The right and left tracks are where the right and left tires of a car travel. A motorcycle will travel in either the left or right track.

Motorcycle Safety and Operation

Avoid the centre track. Oil, and other fluids from vehicles accumulate in the centre of the lane and create slippery conditions. Road debris also will find its way into the centre of the lane.

Lane positions are also often described by the numbers 1, 2, and 3.

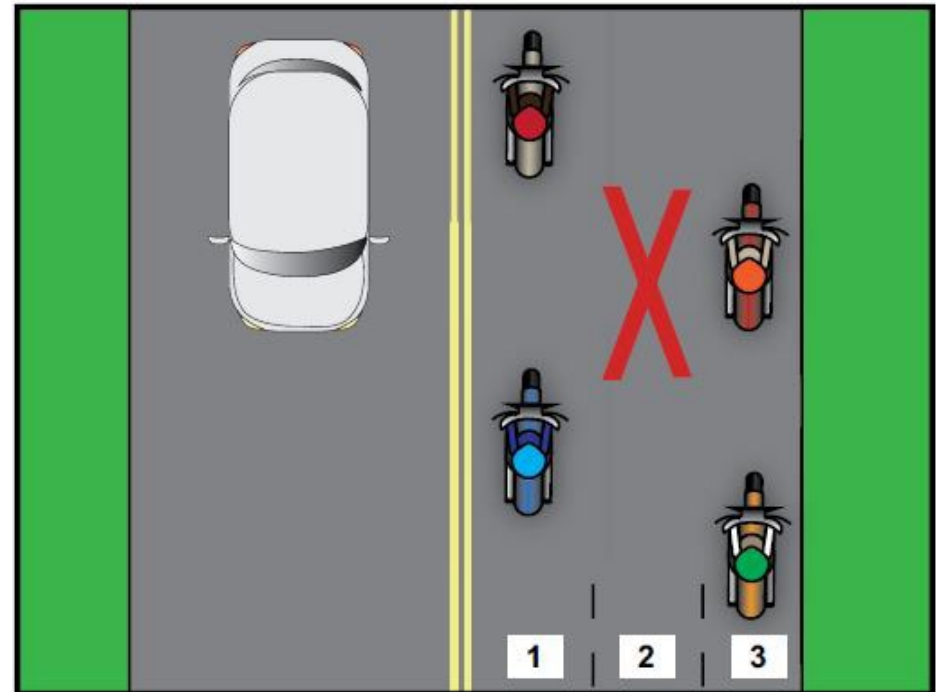


Figure 16: Lane Positioning

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Lane position recommendations are outlined below. Remember, these are only recommendations and you will likely encounter situations that will require a unique approach.

Keep these lane position tips in mind:

- Position yourself so that other motorists will see you.
- Never assume that other motorists see you.
- Don't ride in the centre of the lane except when cornering requires you to.
- Follow the rules of the road.
- Don't box yourself in. Maintain a space cushion.
- Don't ride in another vehicle's blind spots.

Riding or Space Cushion

A riding cushion or space cushion is the space between you and other vehicles (braking distance), and the space between you and the perimeters of the road. It is important to maintain a safe distance from obstacles and to consider options for emergency evasive maneuvers.

A large shoulder of a road would provide a space cushion if you were riding in the left track of the right lane on a two lane road.

Single Lane Roads

When riding on a regular single lane road where each lane of traffic is travelling in opposing directions, keep

your motorcycle in the left track. By travelling in the left track, you will be more visible in the rearview and driver's side mirrors of the motorists you're following. You also avoid potential collisions when parked vehicles open their doors.

Two Lane Roads

When riding on a two lane road with a regular lane and passing lane in each direction, you should position your motorcycle in the left track of the right lane.

There are conflicting opinions on motorcycle safety and lane positioning. When you research motorcycle safety and lane positioning further, you may discover other sources that recommend travelling in the right track of the passing lane on a two lane road because that will make you more visible to other motorists. While this may be true to some degree, we do not recommend using the passing lane, particularly when highway riding, for anything but passing.

In urban settings it is more acceptable to ride in the left lane on a two lane road. If you do ride in the right track of the left lane, be considerate of other motorists. Don't force people to pass on the right when it's not acceptable to do so. Riding a motorcycle requires techniques that keep you safe, but it also requires you to follow the rules of the road.

Roads with Three or More Lanes

On larger multi-lane roads, we recommend travelling in the left track of the right lane when possible and avoiding the centre lane during heavy traffic periods. However, sometimes you will be required to maneuver into another lane. Larger three lane roads are often complicated by lanes changing to off-ramps or traffic entering from the right or left. If you have to move, adjust your lane position to make yourself visible, and be aware of blind spots and your space cushion.

Railroad Tracks

When riding over railroad tracks, maintain a direct course in line with the track of choice. Do not adjust your direction to cross the tracks perpendicularly.

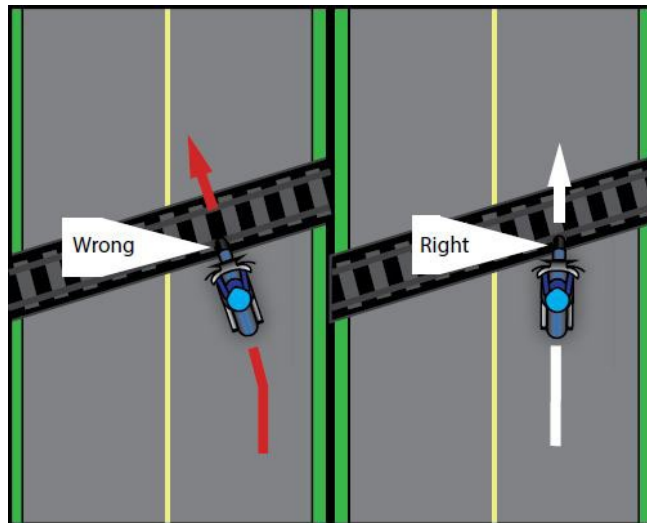


Figure 17: Crossing Railroad Tracks
© 2015, Southern Alberta Institute of Technology

Cresting a Hill

As a precaution when cresting a hill, move to the right track of the lane.

Traction

Traction refers to the grip your motorcycle's tires have on the road.

Loss of traction is a major factor in motorcycle accidents; particularly in single vehicle accidents involving just the motorcycle rider.

Key points on traction:

- Make sure you replace your tires when necessary.
- Maintain tire pressure.
- Be mindful of hazards that can reduce traction such as wet roads, oil, or gravel.

Pushing your motorcycle beyond its limits is a sure way to lose traction. To maintain traction, ride at appropriate speeds, be aware of hazards and practice proper cornering.

Local Hazards and Road Conditions

Alberta has challenging road conditions at the best of times. Due to extreme weather, roads are often rough

or uneven. Road surfaces are constantly changing from seasonal impacts or repairs.

Gravel is a considerable hazard on Alberta roads. While gravel helps maintain traction for cars in the winter, it is a serious safety hazard for motorcycles. It can take the city and provincial road crews well into the summer to have it all swept up, but any experienced rider will tell you they always miss some spots. With construction and road repair ongoing into the fall, gravel continues to find its way onto the road throughout the riding season.

Keep your eyes open for gravel, particularly in corners. Hitting a patch of gravel while counter steering is an easy way to lose traction and fall. Take corners carefully at all times, but be especially careful from spring through mid-summer.

Local elevation often results in cool nighttime temperatures. Be aware of this during early and late evening riding. Cold temperatures and cold roads mean potentially slippery conditions. Your tires also take longer to warm up, and cold tires have less traction than warm tires.

Notes:

Chapter 5

Physical Condition and Environmental Factors

One of the most important parts of motorcycle operation has nothing to do with your riding skills, but simply with your overall physical condition.

A rider who is tired, cold, hot, intoxicated, dehydrated, hungry, etc., is not focused. The best part about safety issues related to your physical condition is that you can remedy or avoid them altogether.

Rest

It is important to be alert while riding. You should be well rested before going for a ride.

Many of us, whether we will admit or not, have probably dozed off for a second while behind the wheel of a car before doing what we should have done earlier: stopping to rest. Driving while tired can be a fatal mistake, especially while on a motorcycle. If you're tired and already riding, stop the bike and take a rest.

Riding is a demanding activity and it requires your senses to be alert. If you were out late the night before, or are running on only a few hours' sleep, it's best not to ride.

Wind Chill and Cold

Anyone who rides often is going to encounter cool temperatures. Temperatures that are bearable at a standstill can be frigid at driving speeds. Wind chill is a serious consideration.

Wind chill, or the wind chill factor, is the perception of temperature felt by the human body due to wind speed or movement of air.

Taking wind chill into account; when riding at 60 km/hr at a temperature of 10°C, it will feel like just over 5°C. At 100 km/hr, 10°C will feel like 4°C.

Heading out for that early morning spring ride to the mountains? Keep in mind that when the thermostat reads 6°C, it will feel like -2 at 100 km/hr.

With proper gear, you can defend yourself against cold conditions. Check the forecast, and if you believe cold conditions are a possibility, go prepared. Don't put yourself in a position where the cold will negatively affect you. If you're fighting to stay warm while riding, you're compromising your concentration and safety. If it's too cold, wait for warmer conditions. If you're out for a ride and it gets too cold for you to handle, make frequent stops to warm up or try to find a safer alternative home.

Be especially aware of your hands. Often the rest of your body can be warm, but because your hands are at the front of the bike they will lose heat quickly. A set of warm gloves, heated grips, or hand guards are good ways to beat the cold.

Getting wet will chill you even further. Riding in cool temperatures and find yourself in a torrential downpour? Get out the rain gear, or pull over, find shelter, and wait for it to pass.

Heat

Leather, and even cooler textile gear can get excessively warm on hot days. Fortunately, when you're moving on the motorcycle in Alberta, heat rarely becomes an issue. But be careful when you are riding in warmer places in the world. In desert heat the warm wind can be extremely dangerous. Professional riders cover up even in tropical locations.

Stop-and-go traffic can be a problem on warm days. Sitting at the lights in 30°C temperatures, boxed in on all sides by cars and trucks, can be extremely warm. In these conditions, flip up the visor of your helmet while stopped, and open the vents on your jacket.

If you think you'll be riding often in warm temperatures and stop-and-go traffic, textile protective gear designed for summer temperatures is a good investment. Another way to tackle the heat is to wear a wet t-shirt under your jacket with the vents open, the respiration caused by the wind will keep you cool. A wet bandanna around your neck is also very effective.

We do not recommend riding without safety apparel, no matter how warm the temperature.

If the heat is really getting to you, avoid potential heat stroke and pull into a safe location, dismount the bike, find some shade, unzip the jacket, remove your helmet and rehydrate.

Alcohol and Intoxication

Alcohol is a major factor in motorcycle collisions where the motorcyclist is at fault. It is no secret that drinking and driving is extremely dangerous. Alcohol inhibits your balance and mental functions. Do not drink and ride under any circumstances, even small amounts.

According to the Hurt Report, alcohol and drugs were a factor in almost half of all motorcycle fatalities. Again, don't

drink or do drugs and ride. This includes legal prescription or non-prescription drugs that impair motor skills.

Dehydration

Wind, heat, cold and physical activity cause dehydration. These factors are part of any motorcycle ride.

Dehydration can creep up on you, and before you know it, your body is fighting for water. Dehydration also impairs brain function, which means you run the risk of making poor decisions.

Start out well hydrated, especially before longer trips or rides in very warm weather. Consider motorcycle specific hydration devices (such as a CamelBak®) to allow convenient access to water while riding. If you have luggage options on your motorcycle, it never hurts to pack some water.

Energy

Motorcycling is physically demanding; keep your energy reserves in check. Going on a long ride into the unknown? Pack a lunch, or put an energy bar in your inside jacket pocket.

Conclusion

Riding a motorcycle safely requires you be alert, well rested, hydrated, and prepared for conditions that can affect your operation of the motorcycle. Be aware of your

physical condition and limitations. Check the forecast, make sure you get a good sleep before a long ride, carry fluids with you if possible, and rest or stop when necessary.

A plus to all of these physical considerations—did you know that all these factors also contribute to above normal calorie loss?

Notes:

Chapter 6

Gross Vehicle Weight Rating, and Riding with Luggage Safely

Motorcyclists often use their bikes for more than just riding. Motorcycle holidays and adventure touring have become popular pastimes; on long trips, you will carry luggage. You might also carry luggage if you stop at the grocery store on the ride home.

You may remember a time when you were a kid, riding a bicycle while carrying something like a plastic bag in one hand. You probably recall the bag and its contents moving the handlebars around as you struggled to keep the bike straight. Obviously, it is unsafe to carry something in your hands while riding a motorcycle; however, even with proper motorcycle luggage, incorrect packing or carrying too much weight can compromise your safety.

The first thing to know before packing your motorcycle is the Gross Vehicle Weight Rating (GVWR). The GVWR is determined by the motorcycle manufacturer. This information can usually be found in the owner's manual, service manual, or on the information plate located somewhere on the frame. The GVWR refers to the maximum safe total mass of the motorcycle including all fluids, the rider,

a passenger (if applicable), and luggage (if applicable). The GVWR is measured in kilograms.

In addition to the motorcycle's GVWR, you may see the terms as curb weight and dry weight.

Dry weight refers in some cases to a motorcycle with an empty gas tank, or in other cases, a motorcycle with no fluids (gas, radiator fluid, oil, etc.). Curb weight is the weight of the motorcycle when ready to ride. The total curb weight includes a full tank of gas, and all fluids (brake fluid, engine oil, etc.) at the full mark. Curb weight is far more helpful for calculating your GVWR than dry weight.

When calculating your GVWR, consider:

- The curb weight of your motorcycle
- Your motorcycle's Gross Vehicle Weight Rating (GVWR)
- Your weight, and the weight of any passenger
- The weight of your motorcycle protective gear (helmet, jacket, etc.)
- The weight of accessories such as luggage and storage cases. These items are not always calculated into the manufacturer's estimated curb weight.

Once you have determined your motorcycle's GVWR, curb weight, your weight, your passenger's weight, and accessory weight you can consider luggage options.

The most important consideration when choosing luggage is maintaining the balance and stability of your motorcycle. Keeping the weight close to the centre of the motorcycle is the best way to carry items; however, this can limit your luggage options. Below are the pros and cons of some of the most common luggage options.

Luggage Options

Backpack: Backpacks are an option when carrying a small amount of luggage. There are motorcycle specific backpacks that offer special compartments for maps and riding gear. The safety of wearing a backpack is debatable.

Some sources argue that a backpack offers additional protection, while others suggest the opposite is true. If you are considering a backpack, a motorcycle specific backpack is the best option. Look for backpacks with reflective material, a padded backrest, lumbar support, and an appropriate size (not too big). The backpack should fit snug, and you should never carry heavy or hard items.

Tank Bag: A motorcycle tank bag is a small to medium sized case that sits on top of the gas tank. Tank bags are one of the best luggage options because of their central location on the motorcycle. Many tank bags are held in place with magnets, which makes application and removal effortless. One disadvantage on most motorcycles is that tank bags have to be removed in order to access the fuel cap. Tank bags are also a smaller capacity option.

Saddle Bags: Saddle bags are a popular option for touring and adventure riding. Saddle bags are mounted at the back of the motorcycle on both sides. Many touring motorcycles come equipped with saddle bags. Saddle bags can often be easily removed, and are also a high capacity option. It is important to load saddle bags equally to ensure proper balance and stability. In some cases (not all), saddle bags will inhibit a passenger from riding.

Top Boxes: Top boxes are located at the top rear of the bike. Although top boxes offer a large luggage space, their location can affect stability and balance considerably. Top boxes should not be loaded with very heavy items. Too much weight can compromise your stability at slow speeds and in corners.



Figure 18: Luggage Options
Source: 180197292, Thinkstock/iStock

Keep in mind that many of these luggage options can be combined. Just remember to calculate your GVWR and to distribute weight in a way that promotes balance. Saddle bags should be close to equal weight, top boxes should not be too heavy, etc.

Remember to check your tire pressure (See section 2.3). Tire pressure is an important consideration when travelling with luggage.

You may see riders strap items to their motorcycles in several other locations: behind the seat on the grab rails, on the fenders, and below or above the headlight. Although these options will give the motorcycle an iconic look reminiscent of *Sons of Anarchy*, a Steve McQueen movie, or *Easy Rider*, they may compromise your safety and are not recommended.

Riding with luggage is also a skill that takes practice. Keep in mind that you are riding a motorcycle, not driving an RV. Travel with a minimalist mindset.

Notes:

Chapter 7

2up Riding: Riding with a Passenger

Most motorcyclists ride solo, but some choose to carry a passenger occasionally. Riding with a passenger or riding 2up is a two-person operation; both rider and passenger need to be engaged in the ride.

Before bringing that second person out for a ride, consider the basics:

- How well do you know your motorcycle? You should be very familiar with the performance characteristics of your motorcycle (cornering and braking) before carrying a passenger.
- Does your passenger have the proper safety gear? Does his or her helmet fit properly? Does the helmet meet the approved standards required by law? Does the passenger have proper safety apparel like motorcycle jackets, boots, and gloves?
- Have you communicated clearly with your passenger? Equally important alongside having safety equipment is making sure your passenger is aware of the risks

associated with motorcycling. You should inform your passenger of the importance of safety gear, whether or not you wear it. You should inform your passenger that they will need to be engaged in the ride as well, which we'll discuss further.

- Are you confident enough to ride with a passenger? Consider your own skills as a rider. The addition of a passenger will make the motorcycle perform differently, and you need to be confident and skilled enough to respond safely to these changes.
- Is your motorcycle equipped for another person? Consider the passenger capabilities of the type of motorcycle you ride. Although most motorcycles are equipped with rear foot pegs for the passenger, some motorcycles are far more suited to 2up riding than others. Some motorcycles are meant for only one passenger; do not carry a passenger on a motorcycle that is not equipped to do so.

Ultimately, the motorcycle operator is responsible for the passenger. Read this chapter carefully and research 2up riding further before you consider riding with a passenger. Also consider extensive practice carrying a passenger in a safe area such as an empty parking lot before venturing onto the road.

Riding Advice for your Passenger

This section briefly details some of the most important advice you can give your passenger.

Cornering

Let your passenger know the bike leans on even mild corners and that this is perfectly normal. Let them know that they need to lean with you.

If your passenger leans in the opposite direction from you while cornering, it can complicate the transition, and in the worst case scenario, cause you to lose balance. A good piece of uncomplicated advice for your passenger is to keep his or her helmet in line with yours: following your helmet will help your passenger naturally lean the correct direction (Lindemann & Spies, 2013, p. 93).

Communicate

Let passengers know that they should keep you informed about how they're doing, and agree on a method of communication.

If your passenger is uncomfortable or tense it will be hard on both of you. Don't force someone to ride a motorcycle if he or she don't want to, and be patient with novice passengers. Practice riding together in a safe open area if possible.

Hold On!

Make sure your passenger knows they need to either hold on to you with their hands securely on the top part of your hips/waist, on to the handrails (if applicable), or the seat straps (if applicable). Holding onto the top your waist is the best option. Seat straps and handrails (sissy bars) are not the best options.

Some touring or sport touring motorcycles (See Chapter 9) are very passenger friendly and provide ample comfort and stability options (arm rests, etc.) for the passenger.

Getting on and off the Bike

You get on the motorcycle first, and once you've balanced it, your passenger gets on. Tell your passenger to mount the bike from the left side and place feet on the passenger pegs. The passenger should also follow your directions on when to dismount the motorcycle.

Riding Essentials while Carrying a Passenger

A passenger will redistribute weight toward the back of the bike. This weight redistribution and the fact that the passenger is not stationary will affect several aspects of riding, including cornering (balance), acceleration, weight, and braking (Hough, 2000, p. 228-229).

Accelerating

Motorcycles in general (even smaller displacement motorcycles) accelerate very quickly. Be aware of acceleration when carrying a passenger. If your passenger suddenly grabs you like they're holding on for dear life, you're probably being a little heavy on the throttle. If you frequently alarm your passenger by riding aggressively, you put everyone at risk. You'll also likely be riding solo in the future.

Cornering

Your passenger will need to lean with you while cornering. Keep in mind that passengers move around and this will affect your balance. Try to give the passenger fair warning before turning. Use signal lights when necessary, and brake gently when approaching a turn.

Riding with a passenger and cornering at slower speeds can be very difficult. At extremely slow speeds no leaning is involved while cornering solo. Instead, you rely purely on balance and turning the handle bars. The extra weight of a passenger becomes very apparent during slow

speed maneuvers because it affects the balance of the motorcycle.

Turning with a passenger is a skill you must practice. At crawling speeds (less than 5 km/hr), don't be afraid to recommend your passenger dismount the motorcycle (e.g., when navigating through a parking lot).

Weight

Consider your GVWR (See Chapter 6) when carrying a passenger. Often the owner's manual for a motorcycle will recommend increasing tire pressure and adjusting the suspension when carrying a passenger. Follow the owner's manual recommendations for tire pressure, suspension, and GVWR with a passenger.

Braking

A passenger affects braking. The extra weight of a passenger will require harder braking and will lengthen stopping distance.

An emergency stop can result in your passenger slamming forward into the back of your body. Their helmet is likely to contact yours; be aware of this when riding 2up. Practicing quick stops with a passenger is a good exercise.

It is also a good idea for a passenger to take a motorcycle safety course, even if they don't plan on operating the motorcycle (Hough, 2000, p. 229).

Conclusion

Riding with a passenger is a skill that calls for patience and prudence. It is a two-person operation, and requires adjustments in almost every aspect of the ride—from the motorcycle itself to all of the parameters of the motorcycle's operation.

We recommend further research and extensive practice riding 2up in a safe area free of obstructions before you consider carrying a passenger on the road.

Notes:

Chapter 8

Group Riding

Group riding is a skill. You know that riding with a passenger requires both the operator and passenger to be engaged. Riding in a group is similar; everyone is part of the group, and individual actions can affect the entire group.

Group riding is very popular. Online motorcycle forums and communities are increasing communication between motorcyclists. A popular topic on many of these forums is motorcycle meet-ups and group rides.

Consider the following concepts when group riding.

Formation

The safest way to ride in a group is either single file or staggered formation. In staggered formation, the group leader is positioned in the left side of the lane, followed by the second rider in right side of the lane, followed by third rider in the left side of the lane, followed by the fourth rider in the right side of the lane, etc. Some group leaders may choose to ride on the right: this choice simply changes the staggering order.

There are several safety benefits of riding in staggered formation. Staggered formation allows riders to space themselves with appropriate braking distance. Staggered formation gives each rider space on one side to temporarily move into if they have to avoid a hazard such as road debris, a pothole, etc. Riding in staggered formation will also make the group appear big and visible to other motorists.

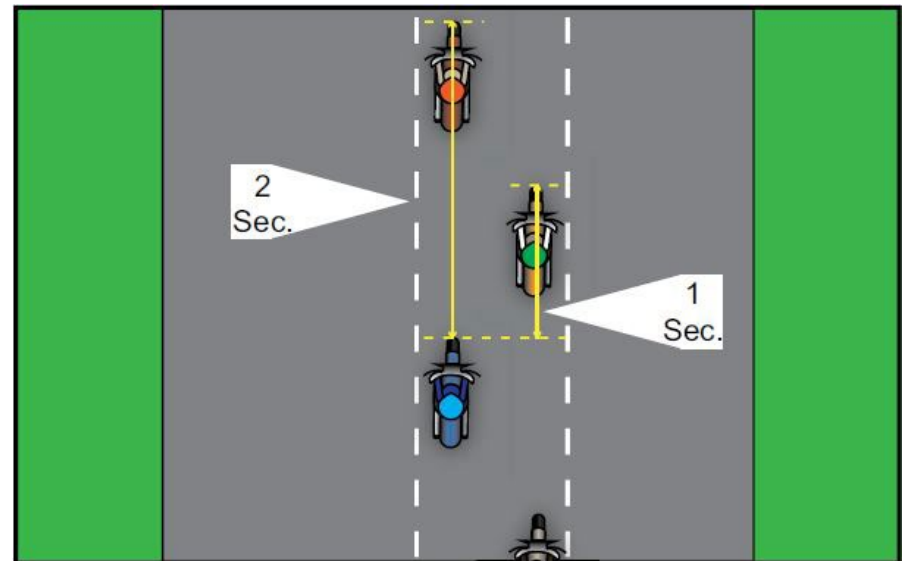


Figure 19: Staggered Formation
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There is no doubt that staggered formation is the most common style of group riding, however, single file is often a better option when navigating twisty sections of road, or long, sharp, or blind corners.

The most experienced riders should lead the group and follow up in the last position. Riders with the least experience should ride in the middle of the group.

Braking Distance and Group Formation

Consider the guidelines discussed earlier regarding braking distance while riding in a group. A two second rule in ideal conditions is appropriate in most group riding situations.

Although it is very important to ride a safe distance from each other, it is also important to keep the group safely condensed. A group of riders who are a considerable distance from each other are not a group, nor will they be viewed as a group by other motorists.

You may occasionally see motorcyclists riding in groups side-by-side, or in extremely tight formation. Not only is this unsafe, it is also illegal in some jurisdictions.

Route

The group should have a planned route. A planned destination with stops will allow riders to potentially regroup if they become separated.

With the route mapped, don't forget the obvious: Do you (and everyone else in the group) have a

full tank of gas? Also, consider fuel stops and rest breaks. Some motorcycles have much better mileage, or larger tanks than others. Some riders have less endurance than others. An experienced lead rider will take these differences into consideration.

Communication

The lead rider should establish some form of communication all riders can use during the group ride. The most common form of communication is hand signals. Many guidelines for motorcycle group hand signals exist, but there is some inconsistency between sources.

The group leader should establish necessary hand signals before venturing out on the ride. All riders should know the established hand signals.



Figure 20: Motorcycle Hand Signals
© Michael Padway. Used with permission.
<http://www.michaelpadway.com/riding-skills-and-safety/motorcycle-hand-signals-chart>

Some group riders communicate using hands-free wireless Bluetooth devices.

When riding in a group, you should establish some basic hand signals whether or not wireless communication is being used. Don't forget the basics. Make sure you keep other riders informed of your actions and signal when necessary.

Wireless Bluetooth technology has also been integrated into motorcycle global positioning system (GPS) devices. Although this technology has advanced motorcycling, be wary of technological distractions while riding. Keep your focus on the road.

We discourage using wireless communication technology to listen to music.

Riding Pace

The established pace is a group affair. If the group is riding too slow or too quick for your skill, you're likely to get frustrated. Pushing a group to suit your needs is inconsiderate, as is lagging behind or tailgating other members of the group in order to get them to ride faster.

Don't feel pressured to keep up with a group that decides to drive at racetrack speeds. Driving beyond your abilities or at illegal excessive speeds is a recipe for an accident.

Accident Situation

If a rider is involved in an accident during the group ride, the first thing you should do is get your own bike to a safe place off the road. Stopping in the middle of the road to assist the rider will only put you and other motorists at risk. Once in a safe place, assess the situation.

Conclusion

Riding as a group is a skill, but not one that is beyond most riders. Make sure to ease into this skill, and ride with motorcyclists who are aware of the proper techniques of group riding. Continue to practice riding solo often. Mastering your basic motorcycle skills will make you a better group rider.

Notes:

Chapter 9

Buying a Motorcycle that is Right for You

The type of motorcycle you ride is a personal choice. Several factors can help you make the best decision.

Consider the following carefully before deciding which bike to purchase:

- What is your budget?
- Will you buy new or used?
- Where will you be riding most? Will you use your motorcycle for primarily one purpose such as commuting, city driving, etc.? Do you plan on riding long distances, on dirt roads, etc.?
- Have you contacted your insurance company? How much will the motorcycle cost to insure? If you are buying used, has the motorcycle been properly inspected? How much tread is left on the tires and what is the condition of the rest of the bike? How much additional money will you need to put into the motorcycle?

Follow these tips:

- Research all of your options!
- If possible, attend a demo-day. Many manufactures and dealerships offer test rides at demos. Once you find a good option, contact a local motorcycle group, an experienced rider, and/or a reputable dealership, and get their opinion.
- Remember, a motorcycle that suits your skill level will make you a better rider. This is perhaps the most important consideration.

Types of Motorcycles

The following are descriptions of some of the more popular styles of motorcycles. Associated model(s) are included for your reference. Most manufactures make several different styles of motorcycles. Included in each description is the general seating position of each style. Seating position is an important consideration, especially for longer rides.

Standard

When we think of the quintessential motorcycle, a standard typically comes to mind. Standard motorcycles have a classic look and limited body work. Standards are equipped for both city and highway riding. The seating position is typically upright, with your feet positioned below your body.



Figure 21: Standard Motorcycle
Source: 89150294, Thinkstock\iStock

Cruisers

Similar to a standard with a classic look, cruisers typically have lower seat positions and pegs positioned in front of the operator. Your hands will be at chest level or above and your feet in front of your body. Chrome engine parts are common on cruisers.



Figure 22: Cruiser
© Yamaha Motor Canada. Used with permission.

Adventure Bikes

The motorcycle version of the SUV, adventure bikes travel both on and off-road. Adventure bikes are versatile. They are usually equipped for long trips with luggage options and large gas tanks. The riding position is similar to a standard; however, adventure bikes usually have higher seats.



Figure 23: Adventure Bike
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Sport Bikes/ Supersport Bikes

Sport bikes or supersport bikes are motorcycles based on racetrack models. Power and handling are the primary focus of these motorcycles. The seating stance for this style of bike is active with legs back and the front of your body leaned forward over the handlebars.



Figure 24: Sport Bike

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Touring and Sport Touring

These motorcycles are designed for long rides. Touring and sport touring bikes often have integrated luggage. These bikes can be heavy and are usually powered by heavier displacement engines. Sport touring bikes are similar to sport bikes with a seating position somewhere between a standard and sport bike. Straight touring bikes are similar to cruisers, with an upright seating position somewhere between a standard and cruiser.



Figure 25: Touring Motorcycle

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Dirt Bikes

Dirt bikes are meant for off-road use. They are typically light when compared to street bikes. Unless modified, they are not street legal. The seating position on a dirt bike is upright like a standard, with varying seat heights.



Figure 26: Dirt Bike

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Enduro / Dual-Sport

Enduros or Dual Sport motorcycles are similar to dirt bikes, but are street legal. They typically have smaller engine displacement and err on the side of off-road use versus on-road (they look similar to dirt bikes). Their seating position is similar to dirt bikes.



Figure 27: Dual-sport Bike

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Engine displacement is important when choosing a motorcycle, but don't assume a bike's performance is based purely on displacement. Bigger is not always better, and it doesn't always mean faster. For instance, many 600 cc supersport bikes are considerably faster in both accelerating and top speed compared to a cruiser of the same or even double the displacement (1200 cc). Style and performance are also often related: a novice rider may have a much easier time riding a 600 cc standard vs. a 600 cc supersport.

Larger displacement motorcycles are typically heavier.

Novice riders will learn more effectively on smaller displacement motorcycles, but always consider the performance of the bike and its relation to engine displacement. Performance and displacement are two separate factors. Assess performance aspects independently, but keep in mind the weight associated with displacement.

A number of factors affect a motorcycle's performance including overall weight, suspension, aerodynamics, engine power, torque and braking power. It is important to consider all of these aspects when purchasing a motorcycle.

Conclusion

Ultimately it is up to you, but we recommend that novice riders choose a smaller displacement motorcycle (less than 500 cc) for their first bike. Make sure you can put both feet flat or near flat on the ground, but most importantly, match the bike realistically to your skill level. Try to research several types of motorcycles before making a decision. There are many professional and independent reviews online that thoroughly detail aspects of motorcycle performance. Talk to your local dealership too. A salesperson there may have advice that you overlooked.

You may also want to ask a salesperson about choosing the wrong bike—most motorcycle distributors will tell you about a collection of barely used motorcycles in the back of their stores that never made it off the lot.

Extensive material is available online. We encourage you to research further.

Notes:

References

Alberta Transportation. (2014). *Rider's guide to operation, safety and licensing motorcycles, mopeds and power-assisted bicycles (Chapter 2)*. Retrieved from: <http://www.transportation.alberta.ca/844.htm>

Centers for Disease Control and Prevention. (2012). *Motorcycle crash-related data: a CDC data & statistics feature*. [Data file]. Retrieved from: <http://www.cdc.gov/Motorvehiclesafety/mc/index.html>

Hough, D. L. (2000). *Proficient motorcycling: the ultimate guide to riding well*. Irvine, CA: BowTie Press.

Hough, D. L. (2012). *Mastering the ride: more proficient motorcycling*. (2nd ed.). Irvine, CA: BowTie Press.

Hurt, Jr., H. H., & Ouellet, J. V., & Thom, D.R. (1981). *Motorcycle accident cause factors and identification of countermeasures, volume 1: technical report (DOTHS- 5-01160)*. Los Angeles, CA: University of Southern California Traffic Safety Center Motorcycle Accident Research. Retrieved from: <http://isddc.dot.gov/OLPFiles/NHTSA/013695.pdf>

Lindemann, M. & Spies, B. (2013). *The total motorcycle manual (cycle world): 291 skills you need*. San Francisco, CA: Weldon Owen.

The Motorcycle Safety Foundation. (2014). *Basic Rider-CourseSM: rider handbook*. Retrieved from: <http://www.msf-usa.org/downloads/BRCHandbook.pdf>

The Motorcycle Safety Foundation. *TCLOCSSM (Pre-ride checklist)*. Retrieved from: http://www.msf-usa.org/downloads/t-clocs_inspection_checklist.pdf

