DSOC
Defense Safety Oversight Council

Motorcycle Mentorship Module 12

Motorcycle Maintenance

Warning: Incorrect or inaccurate information could lead to tragic results on the road. If a question arises that is not covered in the guide and you don't know the answer from your own experience and training, simply state, "That is a great question, I'll get back to you with the answer."

Your Service Safety Center will help with these types of questions should they arise. Their numbers are as follows:

US Army Driving Directorate: **334.255.3039**

USMC Safety Division: **703.604.4459**

US Navy Shore Safety: **757.444.3520 x7165**

US Air Force Safety Center: **505.846.0728**

USCG Safety Division: **202.475.5206**

Preface

About: The Defense Safety Oversight Council (DSOC) Motorcycle Mentorship Modules are a set of thirty six (36) facilitation modules designed for the purpose of increasing rider knowledge on various aspects of riding and providing additional capability for self-policing within peer groups. The modules are intended as a mechanism to further decrease motorcycle related mishaps and fatalities within Department of Defense (DoD) by encouraging riders to talk, live, and think about the topic.

Using the Module: The module content enclosed is intended as a facilitation guide to assist you with discussing the topic. However, it is still critical to use your skills and talent to engage participants and develop "buy-in" on this subject from your group. To maximize this, motivate and moderate your participants, control the accuracy of participant feedback, and be mindful of their time.

Facilitation Guide for DSOC Mentorship Modules

It is recommended that this Mentorship Module be conducted in a facilitation style. Using the information provided in this Mentorship Module, you, as the facilitator, will lead a discussion on the subject. *You should not be conducting a lecture!* The facilitator's role is to help with how the discussion is proceeding. Participants will have much more "buy in" and connectivity with the information if they have input. One of your roles as the facilitator is to control the accuracy of the input and control the time. From the Mentorship Module, generate questions which will lead to group discussion. The more you let the group participate, the more success you will have.

Competencies of a Facilitator:

- Prepare prior to the event
- Make sure everyone gets a chance to participate and help members to express themselves
- Ask rather than tell
- Honor the group, display respect for the members, and acknowledge participant contributions
- Ask for others' opinions
- Listen without interrupting
- Demonstrate professionalism and integrity

The key characteristic distinguishing facilitation from other types of leadership, like scripted training, is that the outcomes are never predetermined in a facilitative setting. Although the background information provided with this Module remains the same, the result will depend on the participants, the knowledge and experience they bring, and the information that they feel they need to take away. The group uses the activities provided by the facilitator to unlock expertise, ensure thorough discussion, stay focused and reach decisions that are better than those any individual could come up with alone.

At the beginning of each Mentorship Event, discuss why the participants are there and what they will receive as a result of participating. Adults have limited time and they want to know "What's in it for me?" A facilitator should make training fun. Encourage humor and laughter in your Mentorship Event.

Principles of Adult Learning:

- ➞ Adult Learners want material that is relevant to them. "What's in it for me?" "What will I get out of this that will make a difference to me?"
- ➞ Adult Learners come to training events with varying amounts of experience. They like to share their experiences. If you have minimal or no motorcycle experience, you can still draw from your group.
- ➞ Even if you have motorcycle experience, you should draw from your group because people tend to remember what "they" said longer than what you said. Information that they "own" is more valuable to them.
- ➞ Facilitators are not always subject matter experts; nor do they need to be. Facilitators may draw on the existing knowledge of the participants and the information provided in these Modules.

Section I: Module Overview

Time Frame: One 45-60 minute facilitator-led discussion

Level of Prior Knowledge: Participants should be able to operate a motorcycle at a novice level or are familiar with motorcycle operations.

Synopsis: It would be expected that a rider made aware of the minimal maintenance required to keep their motorcycle operating safely and efficiently, would become more bonded with their motorcycle. The topics covered would encourage the rider to:

- Know the manufacturer's minimum requirements
- Determine ability to perform which requirements
- Know the basic requirements and why the rider should perform those requirements
- Establish one's own pre-ride checklists
- Find additional resources concerning specific make/model information
- Establish a personal motorcycle maintenance plan
- Establish maintenance recordkeeping

Generating interest in taking care of one's own motorcycle will instill pride of ownership. Additional discussions on proper use of tools, chemicals, and waste disposal would also be beneficial to the module.

Learning Objectives:

- ➞ Establish a personal pre-ride checklist.
- ➞ Define minimum maintenance
- ➞ Recall conditions resulting from poor maintenance
- ➞ Find additional information/resources on a specific motorcycle
- ➞ Identify abilities to maintain their motorcycle
- ➞ Suggest ways to record / track maintenance performed
- ➞ Planning ahead for scheduled maintenance

Suggested Environment/Props/Handouts:

Motorcycle Owner's Manual – any current make and model

Section II: Module Discussion

Introduction: Facilitate discussion: What is motorcycle maintenance?

Definition: Motorcycle maintenance is the physical act of keeping a motorcycle operating within the manufacturer's minimum required specifications for optimum safety, performance, reliability, and efficiency.

Open discussions with participant-focused activities and introductions. Activities should encourage participant interaction and develop camaraderie and peer-relatedness. Ask for and encourage participant sharing of experiences related to the module topic.

Sample questions may include:

- What is a pre-ride checklist? Explain the importance.
- Has anyone ever had their motorcycle break down on the road? Can you tell us what happened or what you think happened? What did you learn from that situation?
- Who has actually read their Motorcycle Owner's manual? What kind of information can be found? Could you make a maintenance plan that you could use from the manual?
- What maintenance actions would seem difficult to perform? How could you find additional information that may help you?
- Where can you go to perform maintenance if you have no garage and/or tools?

Suggested Discussion Areas:

Discussion Area 1: Pre-Ride Checklist

Facilitation Question: What is a pre-ride checklist?

A motorcycle is not (as) maintenance free as an automobile. Most automobile drivers just put in the fuel and go. Indicator lights and warnings alert the driver when maintenance is required. Motorcycles, on the other hand, need to be checked before each ride, simply because a minor failure could be catastrophic or leave the rider stranded.

Tires

- Tires do not last as long as automobile tires and rider should check their condition regularly. Underinflated tires are related to most tire failures. How does an underinflated tire "feel" when riding? (The front end will feel heavy and be harder to change direction; the rear may "wallow") NOTE: Tire manufacturers warn that tire performance can be negatively affected if your pressure is more than 10 percent low.
- What is the danger of riding on an underinflated tire? (Overheating – the rim bead gets unseated causing total loss of air. If radial, loss of traction)
- Where can you find the data for the correct tire pressure for your motorcycle? (Owner's manual or nameplate data on the motorcycle, not on the sidewall of the tire).
- Make sure there are no "dings" in your rims.
- Motorcycle tires have a definitive shelf life regardless of the tread remaining and should be replaced per manufacturer's instruction. Due to the soft rubber compounds used to provide traction the tire after a couple of years will start to harden making them less effective in maintaining traction. This loss of traction can be devastating. Change your tires at intervals recommended by the tire manufacturers. Date of manufacture can be found on all motorcycle tires which starts with DOT and either a 4 digit or 3 digit number. If 3 digits your tire needs replaced as it was manufactured before 2000. Four digits are the week and year. (Example: DOT 1704, tire was manufactured the 17th week of 2004).

All Controls (including electrical switches, etc…)

- Controls should operate smoothly. What would cause some controls (throttle, clutch and/or brake cables) to stop operating smoothly? (Moisture, lack of lubrication, damage)
- Most modern electrical systems are trouble free. What electrical component requires regular checking? (Battery)

Fluids

- Oil is the "blood" of any motorcycle. Oil cleans, cools, and lubricates the internal parts of your motorcycle. It must be at the proper level as stated in your owner's manual.
- Should you use automobile oil in your motorcycle? (No, automobile oil has friction modifiers that may cause a motorcycle clutch to slip. Motorcycle oil is made to lubricate the engine, transmission, and clutch in most cases.)
- If your brake fluid seems a bit low, what is this an indication of, especially if there are no leaks? (Brake pads are getting worn)
- What other fluids will some motorcycles have? (Coolant, front forks, battery electrolyte and your FUEL level!).

Frame

- The frame is the unit upon which most of the other motorcycle parts are mounted to or attached. What is used to attach all these parts to the frame? (Nuts and bolts, also known as fasteners)
- Why is it important to check these fasteners often? (So parts will not fall off).
- Why is it important to check the condition of the side stand, and in some cases, the center stand? What could go wrong? (The side stand and the center stand [if equipped] are spring loaded. If the spring or fastener fails, the stand may drag on the road).

Suspension

- How important is your suspension? (Suspension systems absorb the jolts from uneven road conditions, and also allow the rider to "feel" the road)
- What would be a good indication your suspension is not working correctly? (The motorcycle does not absorb the bumps, making for a bumpy ride. The rider cannot "feel" the road because the suspension is not properly maintained. Badly damaged suspension systems can make the motorcycle feel out of control).

Discussion Area 2: Motorcycle Maintenance Resources

Facilitation Question: Other than the Motorcycle Owner's Manual that came with your motorcycle, what are the other resources available to learn more about your motorcycle?

Manufacturer's Factory Service Manual

Factory service manuals can be purchased from your dealer that pertains to your specific year/model motorcycle. These manuals provide the most detailed step by step information available to the general public and are intended for experienced mechanics.

3rd Party Manuals

Condensed service manuals are often available for most makes/models of motorcycles. Popular publishers are Clymer and Haynes. These manuals provide step by step procedures along with photos and diagrams for those wishing to do their own maintenance and limited repairs.

Online resources

Search engines may be used to find an online forum that exists specifically for your make/model motorcycle. Most online forums will have a troubleshooting/repair/maintenance section. Use the search function of the forum to locate specific information before asking the question on the forum, as the answer will most likely already be published. Research well and be aware there may be other answers available. Some forums will have a "how to" section with pictures demonstrating maintenance techniques such as changing oil, adjusting chains, and even valve adjustments.

Discussion Area 3: Establishing a Maintenance Plan / Keeping Maintenance Records

Facilitation Questions: How could your motorcycle benefit from a maintenance plan? How could keeping records benefit your plan?

- Actively use your pre-ride check list. This will alert you to conditions and/or trends that will help you establish a regular maintenance plan.
- Establish a plan using the information found in your Motorcycle Owner's Manual. Schedule your maintenance as determined by miles or time and also from your experience in performing your pre-ride checks.
- Make a checklist and plan in a notebook, spreadsheet on a computer, or an online service (often free). Some online services (such as mileagetracker.org) allow you to customize your plan and when the current mileage is updated, upcoming (or overdue) maintenance actions will be displayed. There may also be stand-alone programs to help you plan/record your maintenance actions.

Discussion Area 4: Benefits of Maintenance

Facilitation Question: What are the overall goals of proper motorcycle maintenance?

Safety – A motorcycle that is kept within design specifications will be able to operate safely as designed.

Save Money – Preventive maintenance will always be less costly than corrective maintenance. A properly maintained motorcycle will also run more efficiently (better fuel mileage).

Bonding – Getting to know how your motorcycle operates and being able to take care of it will help you bond with your motorcycle and establish a pride of ownership.

Discussion Area 5: Abilities and Maintenance

Facilitation Questions: What maintenance actions are you willing to perform? What are your alternatives?

Pre-ride checklist – As a motorcycle rider, you should be able to perform these checks. Prepare a checklist that is specific to your motorcycle and your riding habits.

Changing oil/filter – This procedure can be performed on most motorcycles with relative ease. You must conform to local regulations concerning disposal of the old oil and filter. The base hobby shop is an ideal location to perform this action.

Valve adjustments – This action usually needs to be done by the dealer; however, some motorcycles have simple valve systems that the motorcyclist may be able to perform if so inclined.

Chain maintenance – Part of your pre-ride inspection, but if adjustment is needed, the motorcyclist should be able to perform with the basic information and tools that came with the motorcycle.

Tire changing – This procedure should be performed by a motorcycle tire shop or dealer. In some cases, on smaller or even off road dirt motorcycles, you can develop the skill/technique to change your own tires.

Note: The base auto hobby shop can be an excellent place to perform your maintenance. Base auto hobby shops are well known to be a clean, safe workspace with proper tools available, and often a certified mechanic on hand to provide advice. Proper facilities for disposal of your maintenance material are also usually available at the base auto hobby shop.

Wrap-Up:

Brief or discuss the following:

- Importance of a personal pre-ride checklist
- Available resources
- Personal maintenance plan goals
- Importance of recordkeeping
- Ability / willingness to maintain your own motorcycle

Suggested Wrap-Up Discussion:

➤ Ask participants how they would apply the knowledge they gained from this discussion.

➤ What would motivate the participant more to want to make sure their motorcycle is properly maintained?

Distribute copies of the DSOC Motorcycle Mentorship Module Evaluation form to all participants and request that they deliver or mail the completed form to the Command or Command Safety Office for processing.

Remind everyone to ride safe, and see you at the next Mentorship Meeting.

DSOC Motorcycle Mentorship Feedback Form

Presenter Name:	Date:
Topic/Title:	Unit Number:

Please review each statement below and check the response that closely matches your experience in the Mentorship Module today:

1. Please rate the presenter's performance:

☐ Prepared ☐ Not Prepared | ☐ Engaging ☐ Not Engaging | ☐ Led Discussion ☐ Lectured

Comments:

2. I was given opportunities to participate in the module's discussion

☐ Never ☐ Only Once ☐ 2-4 Times ☐ Many Times Throughout Discussion

Comments:

3. With regard to my personal riding experiences, this discussion was:

☐ Relevant ☐ Not Relevant | ☐ Interesting ☐ Not Interesting

Comments:

4. This discussion topic has provided me with specific learning points that I can use to be a safer, better informed rider

☐ None ☐ One Idea or Fact ☐ 2-4 Learning Points ☐ 5 or More

Comments:

5. I would be interested in participating in other Motorcycle Mentorship Module discussion topics

☐ Never Again ☐ Willing to Try Another Module ☐ Would Like to Do Modules Regularly

Comments:

Thank you for your participation. Please make note of any other suggestions or comments below (continue on the back if needed):

Deliver or mail this completed form to the Command or Command Safety Office for processing. Please do not return this form directly to the Module Presenter.

Resources

Continued Reading:

Motorcycle Basics Techbook (1999). Haynes Manuals

Wilson, Hugo (1997). *Motorcycle Owner's Manual*. DK Adult

Zimmerman, Mark (2004). *The Essential Guide to Motorcycle Maintenance*. Whitehorse Press

http://www.americanmotorcyclist.com/Riding/Street/Resources/TakingCare.aspx

http://www.americanmotorcyclist.com/Riding/Street/Resources/TheBikeStopped.aspx

http://www.americanmotorcyclist.com/Riding/Street/Resources/ThreeMinuteCheck.aspx

Definitions: *(As defined for purposes of this module.)*

Accident: A pure chance occurrence; an act of God. Typically used to describe a traffic mishap/collision/crash. Realistically, such mishaps are almost always the result of a combination of factors and/or negligent acts that combine to cause the mishap.

Antifreeze (Coolant): A liquid normally consisting of a mixture of ethylene glycol and other additives; used as a cooling medium in many motorcycle engines. Owner's manual recommendations should be followed.

Battery: An electromotive device that converts chemical energy to Direct Current (DC) electrical energy for various uses. Batteries are constructed in one or more cells of various materials including wet cells (e.g., lead-acid), dry cells (e.g., alkaline pastes), and rechargeable cells (e.g., nickelcadmium). Checking the battery should be part of a motorcycle inspection routine

Bike Bonding: Refers to the integration of a rider's muscle and machine processes that permits fluid and coordinated riding maneuvers; ability to sense inputs needed for smooth and precise maneuvering.

Cables: Typically a multi-stranded metal wire connection between hand or foot controls and the device being operated (e.g., clutch, brake, etc.). There is normally a spring component to the cable assembly that returns the control to the normal or rest position after the control is released. Cables should be periodically inspected and maintained to ensure proper function.

Carburetor: A device that mixes fuel with air to create a mixture that burns well in the combustion chamber (cylinder) of the engine. After this mixing action occurs, the fuel/air mixture is passed through an intake manifold and delivered to the combustion chamber(s) of the engine. Proper adjustment of the carburetor is critical to create and maintain a proper fuel/air mixture. Still commonly found on many motorcycles, the carburetor is being replaced by fuel injection systems on many motorcycles (*see Fuel Injected*).

Definitions Continued:

Center Stand: A mechanical device for supporting a motorcycle while at rest. Standard on some motorcycles, this stand lifts the rear wheel off the ground slightly, which is helpful for some maintenance and repair procedures.

Chassis: The frame of the motorcycle to which the suspension components, drive train (tires/wheels/brakes, engine/transmission, rear wheel drive), steering system and other vehicle components are mounted.

Clutch: A mechanical system that allows the motor vehicle operator to temporarily disengage the engine from the drive train for the purpose of starting the engine or shifting gears in the transmission (to either higher or lower gears depending upon road speed). The clutch system consists of a clutch lever and a set of clutch (friction) plates and pressure plates between the engine and the transmission. When the clutch lever is squeezed toward the handgrip, the plates are squeezed together by spring and allow the engine to rotate freely without transferring motion or power to the drive wheel(s) through the transmission gears. When the clutch lever is released (the hand can be removed from the lever), the plates maintain close physical contact and allow power to be transferred directly from the engine to the transmission

Coolant: A liquid that helps to cool a motorcycle engine while it is operating (unless it is air cooled). The coolant is circulated through the engine to maintain an even operating temperature

Dry Clutch: Clutch setup that requires no fluid between clutch and pressure plates and is less tolerant of using the friction zone with high RPMs and low speeds (*see Wet Clutch*)

Forks: The pair of tubes that hold the motorcycle's front wheel and resemble a fork.

Four-Stroke (Four-Cycle): An internal-combustion engine design in which four strokes of the piston within the cylinder complete the power cycle of the engine (equivalent to two complete revolutions of the crankshaft). The four strokes consist of intake, compression, power, and exhaust (*see Two-Stroke*).

Frame: The structure that gives shape and support to a motor vehicle; e.g., a motorcycle frame is the structure to which is attached the engine, steering/suspension components and drive train.

Friction: The force that resists the relative motion between two objects in contact.

Fuel Injection: A method or system where fuel in a motor vehicle engine is reduced to a fine spray and injected directly into the combustion chamber(s) of the engine

Gear Oil: Special oil that differs from motor oil in that it is used in motorcycle rear drives, drive shafts and some gearboxes

Hydraulic Brakes: A motor vehicle braking system that uses hydraulic (i.e., a fluid under pressure) principles to transfer the force of the operator's hand or foot into a larger force applied to the braking components on the wheels of the vehicle. Most motorcycle brake systems use hydraulic brakes for a disc brake system and mechanical brakes for the older drum brake systems

Idiot Lights: Typically refers to the warning lights on a motor vehicle (e.g., oil pressure, side stand, "Neutral," etc.). This common phrase comes from the assumption once the light comes on, it's too late to prevent the problem.

Master Link: Removable link in a chain such as a motorcycle's drive chain, to facilitate chain replacement.

Oil: The petroleum, petroleum derivative, or synthetic lubricating fluid found in motor vehicle engine crankcases, transmissions and other drive train components. Designed to lubricate and prolong engine/drive train component life, selection and regular replacement of the proper oils is critical for safe vehicle operation and service life.

Over inflation: Typically refers to the condition in which a motor vehicle's tires are inflated to a pressure higher than recommended by the tire manufacturer. This may result in excessive tire wear and/or handling difficulties

Definitions Continued:

Owner's Manual: A publication, usually distributed by the motor vehicle manufacturer that contains useful information about the operation and general maintenance of the specific vehicle to which it applies.

PSI: Pounds per square inch; a measure of internal pressure (e.g., motor vehicle tire pressure, gas shock absorber pressure, fuel pump pressure, etc.).

Radiator: A device that allows water or other fluids to circulate around the engine. It helps cool an operating engine and maintains a constant temperature range.

Safety: The condition of being safe; freedom from danger, risk, or injury.

Side Stand: Sometimes referred to as a kickstand, this device is normally found on the left side of a motorcycle and is used to support the vehicle when parked. The side stand is usually spring-loaded and will snap back to the upright position when moved partially toward that position.

Spark Plug: The component in a motorcycle ignition system that initiates fuel combustion. When the spark plug receives the proper voltage through the ignition system, a spark is created that ignites the fuel/air mixture in the engine combustion chamber and thus provides the power used to move the motorcycle.

Swing Arm: The portion of a motorcycle's chassis/suspension system that links the rear wheel and attached components (e.g., final drive, rear shock absorbers, etc.) to the front frame/chassis members through a horizontal pivot point.

Throttle: Most commonly refers to the mechanical device on a motorcycle that regulates air and fuel flow to the engine and thus increases/decreases engine speed and road speed. The throttle is the right handgrip on a motorcycle; it rotates toward the rider to increase engine speed and away from the rider to decrease engine speed. The handgrip is also spring loaded to return to engine idle speed when released.

Tire Valve: Sometimes referred to as a Schrader valve, this device has a spring loaded component in the valve core that allows compressed air to enter the tire when the center of the valve is depressed, but closes when the air source is removed. If the core spring is compressed without an air source attached, then the pressurized air in the tire is released (i.e., either to lower the tire pressure or to attach a gauge to measure the pressure).

Tool Kit: The collection of tools kept in a motorcycle for basic maintenance. Not normally designed for other than emergency maintenance, the tool kit usually contains a minimal set of tire tools, wrenches, and screwdrivers.

Tread: The grooved surface of a tire that makes contact with the road.

Tubeless Tires: Tubeless tires, like those on most modern street motorcycles, run cooler because tire tube friction is eliminated and heat-retaining mass is reduced. Unsprung weight is also reduced.

Under-inflation: The condition where a motorcycle tire has too low a pressure for the load it is carrying. All tires have a recommended tire pressure indicated in the owner's manual or on a label affixed to the motorcycle, based on maximum allowed load (weight) on the tire. Under-inflation may lead to premature or unexpected tire failure.

Wear Bar: A motor vehicle tire wear indicator; a raised portion of rubber extending across the width of the tire tread and below the surface of the unworn tread blocks. The wear bar is exposed when the tire tread is worn down to an unusable level.

Wet Clutch: Clutch setup that has fluid between clutch and pressure plates and is more tolerant of using the friction zone with high RPMs and low road speeds. (*see Dry Clutch*).

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MILITARYRIDER
THE RIGHT SKILLS>THE RIGHT TRAINING>THE RIGHT ATTITUDE

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