

## Motorcycle Mentorship Module 16

# Modifications: Changing Motorcycle Dynamics





**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.

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2	<b>Facilitation Guide – A brief overview on conducting a facilitated discussion of a topic</b>
3	<b>Module Overview</b> – This section provides the facilitator a synopsis of the topic, learning objectives, and the suggested environment, props, and handouts for conducting the module
4	<b>Module Discussion Introduction</b> – This section provides guidance to the facilitator in opening up the discussion and getting participants talking about the topic and their relevant experiences
5	<b>Discussion Areas</b> – This section provides various discussion topics, sample facilitation questions, and factual information for the facilitator to lead the discussion
8	<b>Wrap-Up</b> – This section provides guidance to the facilitator on wrapping up the topic discussion
9	<b>Feedback Form</b> – A feedback form to be given to all participants for their feedback on the module discussion
10	<b>Resources</b> – Additional resources and definitions to assist the facilitator in preparing for and conducting the topic facilitation
N/A	<b>Handouts</b> – Figures, pictures, diagrams, etc. to assist the facilitator to better demonstrate a topic idea

## 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 20 to 30 minute facilitator-led discussion

**Level of Prior Knowledge:** Participants should have basic experience in operating a motorcycle.

**Synopsis:** The purpose of the discussion is to disseminate information on common motorcycle modifications and the effect some of these modifications have upon the safety and performance of the motorcycle. This includes an introduction, discussion, and reinforcement of information regarding what may be safe or unsafe in terms of changing the motorcycle from its as-designed configuration.

### Learning Objectives:

- Introduce basic knowledge and participant recognition of responsibilities and common errors involved when modifications are performed on motorcycles.
- Define and discuss general modifications commonly performed on motorcycles.
- Participants discuss and understand the need for being aware of unintended consequences when making modifications to motorcycles. Attendees should recall related variables and conditions.
- Participant should comprehend and recall presented information. Additionally, participant may offer alternative perspectives, contribute to discussions, and share personal experiences.

### Suggested Environment/Props/Handouts:

Any comfortable environment, such as classroom, conference room, auditorium, or stadium seating, is appropriate.

Module Props/Handouts/Illustrations: None

## Section II: Module Discussion

**Introduction:** Facilitate discussion: Why do we modify our motorcycles?

Definition: Motorcycle modifications (mods) are typically changes made to the engine, chassis or accessories; performed specifically to enhance the look, increase rider comfort or improve the performance. The majority of motorcycle owners make at least a few changes to their motorcycle during the course of ownership. It is a way of personalizing the vehicle to differentiate it from the many other identical bikes that are exact copies when manufactured. Modifications are as simple as adding a sticker or reflector to the expensive re-engineering for racing purposes.

Open the discussion with participant-centered activities. Have attendees introduce themselves (or each other). Ask them to share their current motorcycle year, make and model. And indicate any modifications they may have made to their bike. All activities should encourage participant interaction and develop camaraderie and a willingness to participate in discussions. Ask for and encourage participant sharing of experiences related to the module topic.

### Sample questions may include:

- How many here have modified or customized their motorcycle in some way?
- Did the previous owner modify the bike?
- Was the change made in order to alter the appearance, improve the fit/comfort or to improve the performance?
- Was the modification effective?

## Suggested Discussion Areas:

### Discussion Area 1: Modification Types

#### Facilitation Questions:

- What are some of the most common modifications to a sport bike?
- Which mods are more common on cruisers?
- What about dual-sport and dirt-bikes?
- What common changes are typical to touring bikes?
- What do all these changes have in common?

#### *Facilitator Facts:*

1. The common thread running through most motorcycle modifications is a desire to improve the fit, the look or the performance. Generally, we personalize the motorcycle to improve the functionality and increase pride of ownership.
2. Sport bike modifications can include: exhaust system, fuel system mapping, air intake, performance oriented clutch and brake levers, custom paint, polishing aluminum parts, replacement windscreen or seat, engine modifications, and minor to extensive chassis changes.
3. Cruisers tend to favor: exhaust system changes, additional chrome accessories, custom paint, saddle bags, a windscreen or auxiliary lights. Rider comfort items such as a custom seat, changing handlebars or risers, modifying the foot pegs or adding highway pegs can improve the fit for a taller or shorter rider. Engine modifications are prevalent as well but, actual performance gains on cruisers (with a few notable exceptions) are usually relatively minor.
4. Dirt bike changes can include: performance oriented changes such as exhaust, fuel system and air intake, or they could be related to reducing the weight of the motorcycle or improving motorcycle's traction and acceleration. Proper fit is assured with swapping out handlebars, taller/lower seat and kits that reposition the foot pegs. Dual-sport/Adventure touring motorcycle changes are often done with an aim toward increasing carrying capacity or making the bike more rugged and reliable for extreme off-road use. This would include protective crash bars, skid plates and hand guards.
5. Touring motorcycles are most often modified to increase range and comfort and to personalize the motorcycle to the owner. In this category of motorcycles, accessories that improve and enhance the on-the-road experience are the name of the game. Creature comforts such as custom seats, arm rests, back supports, throttle controller, handlebar risers, foot peg alterations, cooling and heating devices or gear are popular additions—there is also the ubiquitous gimbaled (pivoting) cup holder. “Farkles” such as GPS mounts, cell phone holders and music devices are becoming more common additions to the dashboard or handlebars. Additional racks, storage bags and trailer packages are prevalent, auxiliary light bars, and frame lighting accessories add significant illumination to touring bikes.

## Discussion Area 2: Reasons for Modifications

### Facilitation Questions:

- What are the 3 common types of modifications done to most motorcycles?
- Which type of motorcycle modifications do you focus on more?
- What have you done to make the bike fit you better?
- Do most motorcycles really benefit from high performance modifications in terms of real world street riding?
- Are some cosmetic changes also making a functional improvement?
- Where there design flaws or imperfections in the stock bike that your modifications resolved?
- How can a properly fitted motorcycle improve your riding comfort and your ability to

### *Facilitator Facts:*

1. The majority of changes made to motorcycles are to modify the fit, the appearance or the performance of the bike. Many Riders take great pride in the particular modification ‘package’ that suits them. They search long and hard for the right accessories that make the bike fit them, look great and perform the way they want it to.

2. Motorcycles often must be customized to fit the individual rider. Most motorcycles do not have adjustable seats like cars do. And, we don’t have a tilt/telescopic adjustable steering wheel; our handlebars are fixed in one position. So motorcycle riders often need to make modifications to the bike to fit them properly. The changes could be as simple as changing the position of the handlebar and levers to complete replacement of the risers, installing a handlebar with a different bend and new, adjustable levers.

3. Modern motorcycles, notably sport bikes, are capable of performing at a level in their stock configuration that is well beyond the skill of the vast majority of street riders. So, most performance modifications are done for same or similar reason as appearance mods: personal preferences.

4. Some cosmetic changes can add to safety. Auxiliary lighting on the front of bikes, for example, has been shown to increase conspicuity/visibility for motorcycles and reduce the number of cars turning in front of the rider; all the while improving the view of the road ahead for the rider.

5. Prime motivators for many changes to motorcycles appear self-satisfaction and appreciation and approval of ones chosen sub-group (peer group): cruiser riders, sport bikers, adventure-tourers, dirt bikers and sport-touring or luxury touring bike riders are the more common groups. Naturally these groups intersect at many points but sub-groups can be well defined and each has a set of modifications that are commonly done and specific to their preferred type of motorcycle and riding expectations.

## Discussion Area 3: Changing Motorcycle Dynamics — Modifying your Bike until it's Dangerous

### Facilitation Questions:

- Is it possible to modify a motorcycle until it's dangerous to ride?
- What are some changes you have seen that can make a motorcycle unsafe?
- What do the terms 'slammed' and 'stretched' mean?
- What happens to handling dynamics when a motorcycle is lowered?
- What happens to handling dynamics when you lengthen the motorcycle's wheel base?
- Has anyone seen motorcycles with the front brakes removed for a 'cleaner appearance'?

### Facilitator Facts:

1. Many changes are made to motorcycles because of the expectations of the peer group and may disregard safety or functionality. For example: engine guards and floorboards are very popular with some motorcyclists. Very wide rear tires are desirable to others. These changes can reduce the bike's ground clearance and can negatively affect handling in a turn.
2. Some modifications which originate in legitimate racing circles are transferred to the street because of the 'cool' factor. But, some mods can be very dangerous on the street because they are taken out of context and the original intent is lost. Make sure any modifications are done with the safety and functionality of the bike in mind.
3. Lowered (slammed) and extended (stretched) swing-arm motorcycles began as an adaptation to help drag racing motorcyclist avoid wheel stands (wheelies). Drag bikes do not really need suspensions and the longer a motorcycle is; the better it resists the tendency to wheelie. So lowering and stretching became common on the drag strip.
4. Lowered motorcycles, both cruisers and sport bikes lose considerable ground clearance and suspension movement when lowered. Substantial changes to the motorcycle center of gravity are also experienced. Suspension movement is critical, to cornering well and safely, because the wheels must move smoothly and react to surface changes in order to keep best possible traction. So, if you lower your bike to help you reach the ground more comfortably, do it professionally with reasonable changes to both the front and rear suspension.
5. Stretched bikes have a reduced ability to change direction quickly. They can still be made to handle reasonably well with extra effort but that effort requires instruction and practice.
6. 'Choppers' and custom bikes with extended front forks lose some braking ability due to front 'fork flex'. And, the turning radius is considerably larger on these bikes as well.
7. "Ape Hanger" (very tall) handlebars strongly affect the ability to turn a motorcycle and eventually can cause numb hands because the riding position keeps the hands above the shoulders while riding.
8. Appearance mods are a source of pride in ownership; they can be attractive and add value to the motorcycle. Modifications can also limit the performance capabilities of a motorcycle, sometimes to a dangerous degree.

## **Wrap-Up:**

*Suggested Wrap up discussion:* Ask the individual what their attitudes are toward motorcycle modification. How much is “too much” when it comes to modifying your motorcycle? Follow-up by asking the participants how they would apply the knowledge they gained from today’s discussion to their bike and their riding style.

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:

**Code, Keith** (1983) *A Twist of the Wrist* (Vol. I and Vol. II). Glendale, CA: California Superbike School, Inc.

**Ienatsch, Nick** (2003). *Sport Riding Techniques: How To Develop Real World Skills for Speed, Safety, and Confidence on the Street and Track*. Phoenix, AZ: David Bull Publishing

**Ibbott, Andy** (2006). *Performance Riding Techniques – The MotoGP Manual of Track Riding Skills*. Newbury Park, CA: Haynes North America, Inc.

**Parks, Lee** (2003) *Total Control – High Performance Street Riding Techniques*. St. Paul, MN: Motorbooks International

**Pridmore, Reg** (2003) *Smooth Riding the Pridmore Way*. Santa Barbara, CA: Whitehorse Press.

**Spiegel, B.** (2010) *The Upper Half of the Motorcycle*. Stuttgart, Germany: Whitehorse Press

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

**Chopper:** A modified motorcycle with a longer frame accompanied by a stretched front end

**Slammed:** A motorcycle with a lowered suspension

**Stretched:** An extended motorcycle

**Ape Hanger:** A motorcycle modification consisting of very tall handlebars





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