

Motorcycle Troubleshooting

INTRODUCTION

The ability to quickly and correctly troubleshoot motorcycle or ATV problems is the first sign of a competent technician. Proper diagnosis of a malfunction makes motorcycle or ATV disassembly, repair, and reassembly relatively simple. If a malfunction has been improperly diagnosed, the repair process can become long and tedious, or even impossible. In order to be a successful technician, you must possess proficient troubleshooting skills. First and foremost, troubleshooting begins with a thorough knowledge of the

- Parts of a motorcycle
- Job each part performs
- Effect each part has on overall motorcycle operation
- Types of failure symptoms that a bad part will cause

Once you've gained this knowledge, troubleshooting becomes a systematic and controlled approach to solving a problem.

When troubleshooting, you'll need to

- Gather all available information about the machine's malfunction
- Analyze the symptoms related to the problem
- Pinpoint the most likely cause of the problem

The repair process doesn't begin until after you've gotten a clear picture of what's causing the problem. To achieve this picture, you'll have to

- Mentally divide the motorcycle into sections (carburetion, engine, electrical, and chassis)
- Picture each component of every section
- Picture each component and its relationship to the other components and decide if each part is functioning properly

For example, suppose a spark plug isn't firing correctly. You must envision the operation of the spark plug in relation to the other motorcycle systems. After doing this, you'll have a variety of possible problems identified, besides the obvious conclusion that the spark plug is bad. The problem could be due to a dirty air filter that's creating an excessively rich fuel mixture. The source of the problem could also be the ignition circuit or the carburetor system.

It's imperative that you understand what you're trying to repair before disassembling a machine. Once you begin the disassembly process, the troubleshooting process is over. In our example, cleaning and replacing parts in the carburetor won't solve the problem if the cause is a faulty ignition. Therefore, ensure that you've truly isolated the problem before beginning any repair.

SYSTEMATIC APPROACHES TO SOLVING PROBLEMS

This section of the study unit concentrates on techniques that expedite the process of troubleshooting motorcycle and ATV problems. Developing a systematic approach to problem solving now will help you to perfect your skills as you gain experience.

Types of Problems

A *symptom* is an indication of an abnormal condition that you can recognize and identify. An example of a symptom would be a motorcycle that's making a ticking sound when it's idling. The symptom helps you determine the cause of the problem. The following paragraphs cover three types of failures that you may encounter.

Constant Failures

A *constant failure* occurs when a symptom is always present. For instance, a motorcycle is functioning properly and without warning, the engine fails and the rear wheel locks up. The locked rear wheel is considered a constant failure.

Intermittent Failures

An *intermittent failure* isn't always present. This type of failure increases the difficulty of the troubleshooting process. For example, a particular motorcycle functions properly with the exception of occasionally blowing a fuse when the vehicle hits a pothole. The rider replaces the fuse and rides trouble-free until the problem recurs when another large bump is encountered. Chances are, this intermittent problem is caused by multiple factors. In this instance especially, a systematic approach to troubleshooting the problem is required. With any problem (performance, electrical, mechanical, or fuel), a systematic approach allows the problem to be diagnosed in a reasonable amount of time with a high degree of accuracy.

Improper-service Failures

An *improper-service failure*, as the name implies, is caused by a technician who made a mistake during the servicing of the equipment. Suppose a customer brings an off-road vehicle to your service department for a new set of tires and the technician servicing the vehicle fails to properly torque one of the wheel-retaining nuts and forgets to install a cotter pin on the rear-axle nut. Later this improper service causes the wheel to wobble and fall off while the customer is riding the machine. Obviously, most failures caused by improper service aren't this dramatic. It's important not to overlook problems resulting from bad service when you're troubleshooting a vehicle.

Beginning the Troubleshooting Process

The proper method of diagnostic troubleshooting consists of four steps that must be followed in the proper sequence. Follow these steps for a foolproof approach to the troubleshooting and repair process.

1. Verify the problem.
2. Isolate the problem.
3. Repair the problem.
4. Verify the repair.

When troubleshooting, you must observe the failure and verify that all of the information you've received is accurate and guides you to the trouble area. After you've completed the verification stage, you're ready to begin the isolation phase.

Isolating a problem begins with the easiest and most obvious solution to the problem. As the simplest solutions fail to correct the problem, progression to more involved and difficult checks needs to be performed in a step-by-step manner. The most common diagnostic mistake is to overlook the obvious or easiest possible cause of a failure. For example, a motorcycle was functioning properly, then stalled and wouldn't restart. The owner took the motorcycle to a service station. The technician removed and checked the spark plugs, checked the air filter, replaced the battery, and performed compression and leakdown tests. When all was said and done, the problem was an empty fuel tank. Believe it or not, this situation isn't uncommon and results from poor troubleshooting skills (not starting with the simplest solutions first).

The symptoms of a problem guide you to the specific system you should troubleshoot, provided you have an understanding of how each system works and what it's responsible for. For example,

- If the battery won't turn the engine over, you can assume that the machine has a worn-out battery or a charging system that's failing to provide a proper charge to the battery.
- If gasoline is leaking from the carburetor overflow tube, you can assume that there's an internal carburetor problem that's causing excessive amounts of gasoline to enter the system.

As the severity of problems increases, the knowledge required to repair the problem increases. An example of this is poor engine performance. A performance problem could be caused by an ignition-system failure, a mechanical engine problem, or even a fuel-related problem. It's imperative to use all available resources and any information you can gather from your customer to assist you in identifying which system is responsible for the problem.

After you've isolated the problem, you must repair the problem. In order to repair the problem, you must refer to the specific service manual for the particular motorcycle or ATV you're servicing. When you complete the repair, you must verify the repair. If you can't verify that the repair was successful (the problem still occurs), you must repeat the troubleshooting process, beginning with the verification stage.

Troubleshooting Guides

The appropriate manufacturer's service manual contains checklists or tables of possible operating troubles and their probable causes. These tables aid in troubleshooting and problem solving. All possibilities should be carefully checked because multiple factors may be causing the overall problem. Throughout this study unit, examples of typical problems and possible solutions are provided. These examples have been derived from current service manuals and technical guides. However, you should note that the specific troubleshooting sections of this study unit and in manufacturer's service manuals are intended only as a guide to diagnosing problems. Always read the detailed information in the specific chapters of the appropriate service manual before performing service work on any system or major component. Remember to adhere to all cautions and warnings.

As you learn more about various motorcycle and ATV systems, you may develop a tendency to troubleshoot problems based on your personal experience. This approach is a gamble that can occasionally save you time; but if you guess wrong, it costs you time and money. Don't be afraid to apply your experience to a good troubleshooting routine, but don't underestimate repairs because the failure looks familiar.

Locating and fixing a problem is very rewarding, provided you use good troubleshooting techniques. Furthermore, the more difficult the problem, the greater the reward when you've solved it. To be successful, the most important barrier to overcome is the lack of self-confidence required to perform the job. Here are some things to keep in mind when you're troubleshooting a problem.

- Always think the problem through.
- Never overlook the obvious.
- Never assume anything.
- Never take shortcuts.
- Never make more than one change or adjustment at a time.
- Always use the appropriate service manual(s) for all removals, replacements, and adjustments.
- Remember to always *verify* the problem, *isolate* the problem, *repair* the problem, and most importantly, *verify* the repair.

Road Test 1



At the end of each section of *Motorcycle Troubleshooting*, you'll be asked to check your understanding of what you've just read by completing a "Road Test." Writing the answers to these questions will help you review what you've learned so far. Please complete *Road Test 1* now.

1. Another word used to define a description of a problem is _____.
2. Where would you find a checklist or table of possible operating troubles and their probable causes?

3. What are the four procedures that must be followed when developing the proper method of diagnostic troubleshooting?

4. What are the three basic categories of troubleshooting problems on motorcycles and ATVs?

5. What one barrier must be overcome before you can troubleshoot any type of problem?

Check your answers with those on page 53.
