MOTORCYCLE TROUBLESHOOTING – PART 1

ENGINEERING AND TODAY'S MOTORCYCLES

Technicians are assisted today by the sheer build quality of today's motorcycles. Long gone are the days when mechanical points ignition systems had to be adjusted every few thousand miles, and in the meantime the rider had to carry a spare condenser and points to prevent being stranded. In those days, when the condenser went bad, the points immediately burned out.

With the introduction of solid-state electronic ignitions in the 1970's, the reliability of ignition systems increased exponentially. Today's ignitions are typically integrated into the electronic control module (ECM), which means they are now computerized.

Due primarily to anti-pollution requirements, fuel injection has almost completely replaced the carburetor in performing fuel delivery. Fuel injection is computerized, sophisticated, and highly reliable. For example, fuel delivery during starting is no longer reliant on venturi vacuum, fuel jets, and the ability of the operator to skillfully work the throttle and choke to get the bike started.

Problems and maintenance requirements with respect to ignition spark and fuel delivery are less frequent than in the past. Onboard diagnostics from the ECM can even generate trouble codes that tell the technician where to look for a malfunction problem.

TROUBLESHOOTING TOOLS

With these improvements in motorcycle engineering and the advent of reliable onboard microcomputers, troubleshooting problem areas due to mechanical issues have been reduced in number. Technicians are less involved with mechanical problems, now that systems rely on solid-state circuits.

However, this does not mean that problems no longer exist, or that all complexity has vanished. Troubleshooting now involves electronic or computerized diagnostic tools that provide instant feedback. Some of these

troubleshooting resources may come from onboard computer diagnostics generated by the motorcycle computer – the electronic control module (ECM).

Other diagnostic tools may consist of a hand-held electronic battery tester, a multi-meter, an ignition tester, a laptop and software, in addition to the onboard computer diagnostics.

The multi-meter in itself contains a voltmeter, ammeter, ohmmeter, and a continuity tester. Other troubleshooting tools may consist of a simple test light or a spark tester.

These tools can quickly tell the technician how a system or component is performing or underperforming. However, the technician must know what performance benchmarks are expected, so that diagnostic data can be put into perspective and become relevant. If the technician does not know how to analyze the diagnostic data, then the data has little significance.

In addition to periodic diagnostic troubleshooting, the maintenance requirements of motorcycles will continue indefinitely until someone invents tires and parts that never wear out. Tires and brakes wear out and need constant replacement. Engine oil, transmission oil, coolant, fork oil and spark plugs still need changing on a regular basis.

Valve clearance still needs to be performed on many bike models. Overhauls still need to be performed on bikes that see a lot of miles, or receive abuse on the racetrack. Enthusiasts who want to install higher performance parts typically rely on technicians and shops to install them, or, they do the work themselves.

Motorcycles and ATVs' are still a significant resource for recreation, racing, ranch and farm work, and basic "tension reduction" for many who take a ride after a hard day at work, or ride on the weekends. As long as bikes are ridden, technicians are needed to work on them.

SERVICE MANUAL RESOURCES

The factory service manual provides excellent information on the motorcycle systems and components for the model of bike being serviced.

The service manual provides troubleshooting tables and decision trees that provide information on how to check multiple factors that may be causing a performance problem. This allows the technician to see the big picture and troubleshoot multiple areas of a system or component at the same time.

If needed, there are online services that provide access to hundreds of service manuals, so that a shop does not need to own all of these service manuals.

It is typically not necessary to take a component completely apart for exhaustive troubleshooting and repair. Therefore, highly detailed information about a component is not needed from the service manual.

For example, if a solid-state circuit goes bad inside a component, it is not possible for the single circuit to be taken out and replaced. The entire component must be replaced. In such case, detailed troubleshooting and knowledge of the electronic circuits is not needed.

BASIC TROUBLESHOOTING

It's not as complicated as you might think!

Troubleshooting charts in service manuals can be overwhelming to look at. They typically present almost every conceivable cause of nearly every problem that can occur on a particular model of motorcycle.

The beginning troubleshooter can be unnecessarily overwhelmed and discouraged by looking at these tables. The beginning troubleshooter may look at these tables and wonder, "Where do I even begin? Which one of these options takes priority over the others?"

The good news is that most "basic" troubleshooting with respect to starting and performance will initially involve only a few basic issues, systems and

components. This means that most basic problems can be narrowed down quickly to a few systems and components such as the battery, spark plugs, and fuel delivery.

Troubleshooting is approached in this chapter first with a “big picture” look at some basic common problems. These basic common problems are discussed in detail in a “case study” format. As the student becomes more comfortable with basic troubleshooting, more detailed troubleshooting tables and decision charts will be presented.

The following case studies should “demystify” and simplify some of the issues in basic troubleshooting. The goal is to get the student to realize and say to himself, “Hey, I can do this”. Troubleshooting is doable! This is not “rocket science”!

Motorcycles and motorcycle mechanics is a huge passion to many guys out there. It is the goal of the author to approach basic troubleshooting in the following chapter with case studies and discussions about issues, rather that throw “comprehensive” troubleshooting tables at the student which can be intimidating for the beginning troubleshooter, and completely unnecessary.

Troubleshooting tables typically provide just about every possible cause of particular performance problems. Although these comprehensive lists are great tools to have available, they can overwhelm a student.

In addition, seasoned mechanics do not run to detailed tables, charts and decision trees in service manuals every time there is a problem.

In addition, if the tables are not handled correctly, they can “cloud the problem” with too many possible issues to consider. The troubleshooter can be “buried” with possibilities and not know where to begin. This is not necessary.

Once the student begins to follow a **systematic method of analyzing and solving troubleshooting problems**, the whole process of troubleshooting becomes much more clear and logical. With no systematic way of solving

problems, the troubleshooting process can be confusing and more difficult than it needs to be.