

# Common Sense And Your Tires

*Simple Chores, Not Magic, Are The  
Keys To Proper Tire Care*

by JOE CHRISTIAN

The other day a new customer came into the shop for a "routine" check-up before heading off on a trip to the Midwest.

"It shouldn't need much work," he advised me. "Just a regular service and check-up."

I've heard that one before. So, as with all first-time customers, I gave his machine a once-over before writing up the work-order. Like most owners of big road tourers, his bike was pretty clean. It was obvious that a lot of time, effort and pride had gone into keeping the chrome polished and the paint dust-free. Then I bent over to look at his rear tire.

"You want the bad news now or later?" I asked.

He frowned. "Can't be the tire. It's only got three, four thousand miles on it."

"Sorry," I said. "But I really don't think you want to try the trip on this one. Matter of fact, I wouldn't bet a whole lot of money you could make it home from here."

Then we both hunkered down and I showed him the deep lateral cracks between the crown tread. By shining a light on the tire, we could see all the way to the nylon cord in places! Definitely a scary proposition.

Of course, once he'd seen the damage, he asked me to install a new tire. But he was understandably angry and confused about the whole incident. He couldn't believe his tire had only lasted a few thousand miles — and he hadn't expected to have to replace it so soon, which meant he would have less money to spend on his upcoming trip.

A lot of touring motorcyclists have found themselves in the same fix over the years. The truth is, they're the lucky ones. (The unlucky ones only hear something go *Kapow!* and then their bike starts doing strange and dangerous things all over the road!)

Now this isn't intended to be a safety lecture — I get just as bored as you do listening to someone spouting off about what I ought to do to be a safer rider.



And I'm not going to try to impress you with how much I know about tires — Lord knows there's plenty of that going around without me adding to it.

So let's just forget all the technical equations, magical formulas and secret ingredients for a change. Let's just talk about your motorcycle tires... and common sense.

Right off the bat, let's make it plain that a great number of motorcycle problems — including instability, poor handling, high-speed wobble, rough-riding, and veering tendencies — can be caused by poorly maintained tires. Some of the above can make for an uncomfortable ride; some of them can kill you.

The other side of the coin is that properly maintained tires will go a long way toward eliminating the aforementioned problems.

Next, be it hereby noted that taking proper care of a motorcycle tire is probably the easiest duty a motorcycle owner can perform. Just a few simple chores, performed regularly, will keep your tires in optimum operating condition and you apprised of their condition.

Now comes a dose of attitude adjustment: The first thing you, as a biker, must do is to make up your mind that there is only one person responsible for ongoing inspection and maintenance of your bike's tires. This person is *not* your dealer, your best buddy, or the gas station attendant; it is you.

There is no escape, no excuse, no quibble permitted. If you take care of your tires, they will operate properly. If you don't, they won't. If you have tire-related problems, the chances are you caused them. You are responsible, the place where the buck stops.

Okay, now that you know who's to blame for poor tire maintenance, let's talk about responsibilities. There are three primary owner obligations in tire care.

1. Proper tire pressure.
  2. Properly balanced tire/wheel assembly.
  3. Proper replacement tires.
- By the numbers, these tire-maintenance duties read out this way.

#### PROPER TIRE PRESSURE

The single most important maintenance function you can perform is to keep the correct air pressure in your motorcycle tires. If you don't do anything else to your motorcycle except add gas and oil, keeping the air pressure up to spec is your number one priority.

Your passenger and your life-insurance agent will thank you for it.

What is the "proper" tire pressure? No secrets here. You'll find a chart in your owner's manual that tells you precisely what the recommended inflation pressure should be, based on the load carried. Follow that chart. If you have aftermarket tires installed, follow the tire manufacturer's recommendations.

The best way to accomplish this is by acquiring the habit of inspecting your bike's tires daily before use. This inspection should become as much a part of your riding as pushing the starter button. You may have to make a conscious effort at first to spend a couple minutes under your machine — but after a while it will become second nature, an automatic process that you do simply because that's the way your traveling day begins. Once you make the daily inspection an integral part of your riding routine, you'll find that it's extremely easy, and you'll wonder why the dickens you weren't doing it all along!

The inspection should be short but thorough. The only equipment you'll need is a good air gauge — repeat: a *good* air gauge — and an old bath towel or some other kind of mat to lie on while checking the rear tire.

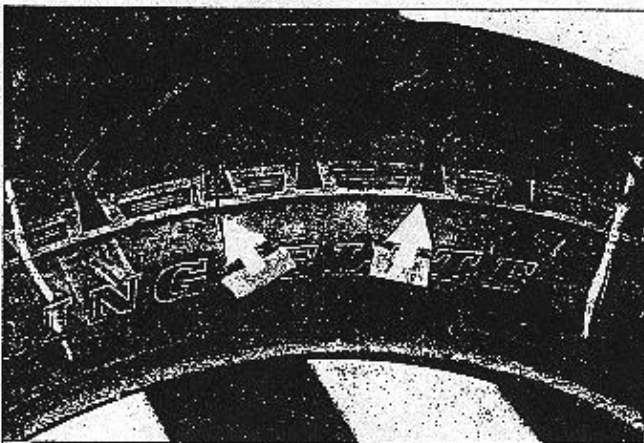
Put your bike on the centerstand, shift the transmission into neutral, assume the required position (on the bigger road bikes, this means lying down with part of you under the saddlebags), and slowly rotate the tire.

Carefully examine the whole tire as you go, checking for bits of glass, nails, sharp rocks, anything that might have lodged in the tread or actually penetrated the carcass. Also, be on the lookout for splits or cracks in the tread or sidewall. Remember that fellow with the cracked tire at the beginning of this article? This simple procedure could have alerted him that something was out of whack in plenty of time to correct the situation.

If the outside of the tire checks out okay, examine the inside. Take a pressure reading, making certain that the "psi" is up to snuff. Of course, pressure readings should *only* be taken on a cold tire, before riding. As soon as you begin riding, tire temperature will increase, expanding the air inside the tire and raising the pressure. Consistency is the keyword. Always perform this procedure in the same manner, using the same tools. That way you'll be able to spot any variations instantly.

While you're on a long trip, your tire pressure probably will not vary dramatically from day to day. Generally, the most noticeable changes in tire pressure will occur after the bike has been sitting for a while without being ridden. Common sense gives you your next clue; make absolutely certain that you check your tire pressure before riding a bike that hasn't been ridden for a while!

A word about air gauges. Most machines these days are delivered with some sort of inexpensive plastic air



*Badly cracked touring tire is the result of overstressing — under-inflation, tire design, inadequate compounding, over-loading — any of these could cause this type of damage. Deeper cracks indicated by arrows go all the way to the nylon cord. Regular daily inspection would have revealed this potentially dangerous condition in plenty of time to avoid disaster.*

## TIRE CARE (continued)

gauge. They are excellent for throwing at marauding marmosets—but not worth a plugged nickel for checking your air pressure. Toss them and buy a good one. Metal pencil gauges are marginal. Several good gauges are being made these days with accurate analog readouts, air-loss prevention devices and bleed-off valves. Yes, they are expensive. But used properly, a good gauge will pay for itself many times over.

### BALANCING YOUR TIRE/WHEEL ASSEMBLY

In most cases, balancing your tires will not be an owner-maintenance item. As the bike owner, your responsibility here is simply to see that it's done when necessary. Why is tire balancing important? Again, let reason rule. The rotating mass that includes your wheel, tire, brake discs—everything that spins around your axes—must work together in a specific manner in order for the rest of your bike to operate as it

should. Poorly aligned or out-of-balance tire assemblies will cause uneven tire wear, shorter tire life, and worse: all kinds of possible handling instabilities.

Don't trust this important function to just anyone. Make certain your dealer or mechanic is competent and has the proper equipment and knowledge to perform the job correctly. When should you have this operation done? Once more, common sense provides the answer. The wheel assembly should be balanced anytime you have a tire replaced, or anytime you remove and replace the same tire.

For experienced wheel-men, tire balancing is a fairly easy mechanical operation, but it makes a huge difference in tire wear and stability.

What about liquid balancing goop that you squirt into the tire? Good Question. Some folks swear by this stuff, some folks swear at it. Some claim it will balance your tires and seal punctures; others claim it's a modern version of snake oil.

Rather than get into that debate, I'll just pass along several things you should consider before making a decision

about pumping glop into your tires. These days most tires are tubeless. That means that any additive you put inside your tires will come in contact with your alloy rims. Some of these tire sealant/balancers contain chemicals that are corrosive; they can actually corrode the alloy rims to a point where the rim-to-bead mating surface is damaged, resulting in a permanent slow leak. (If that isn't sufficient, I suggest you look into corrosion-induced stress failures in aluminum and aluminum-alloys.)

If you're not absolutely certain whether the particular goop you're interested in has harsh chemicals in it, common sense should tell you to steer clear.

Also, if you use this stuff, you'd better hope the sealant works, because in most cases it will mean you cannot plug a puncture in a tubeless tire. The slippery substance often prevents the vulcanizing gloe, used in temporary plug kits, from working properly. The air pressure will just spit the plug out. Finally, most of these substances are exceedingly messy, making subsequent tire changes a fairly unpleasant exercise. Put all this together with the fact that most tire manufacturers specifically recommend against the use of liquid sealants/balancers, and that brings us back to square one. The best, most efficient way to balance the wheel assembly is to have it done by a pro who knows what he's doing. Period.

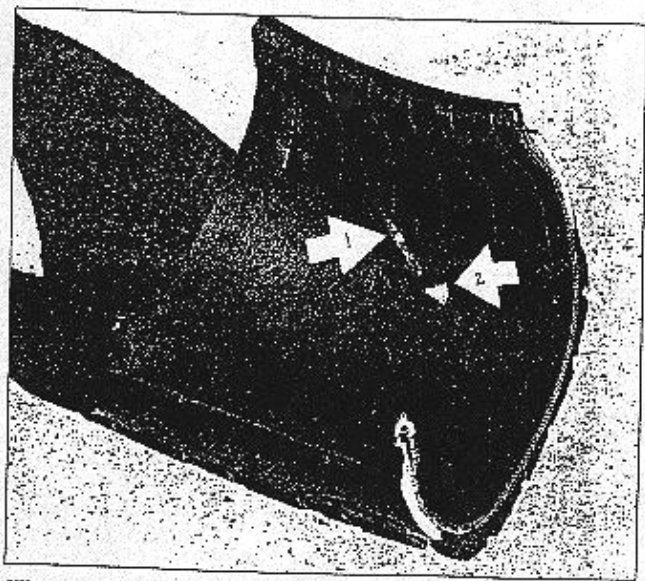
### CHOOSING THE PROPER REPLACEMENT TIRE

Tires are expendable. They wear out and they have to be replaced. Now what?

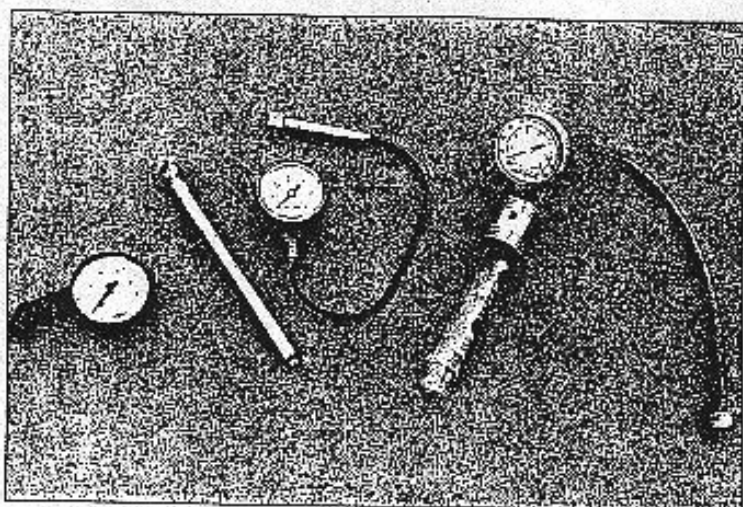
The best advice I can give anyone in this sensitive area is: "IYDKFCWY-DDDI." That rule applies in just about every area of motorcycle care, not just the care of your tires, but it's especially important where replacement tires are concerned.

Look at it this way: there is a wide variety of replacement tires available on the market. They are touted six ways from Sunday, and the net result is to bombard the consumer with claims of high mileage or superior adhesion, and bewilder him with V-and-H ratings and technical jargon that means a great deal to advertising agency word-mongers, but very little to most users. It is very easy to purchase hype instead of tires.

The common sense approach is a conservative one. It recognizes from the start that the design engineers who developed your motorcycle, did so with



When a nail penetrates a tubeless tire, the tire will often retain enough air pressure to run for many miles without detecting the puncture. But all the time the nail is in the tire it is vibrating wildly, chewing away at the carcass interior. This damage can only be detected by removing the tire. Arrow nr. 1 points to damage caused by nail after the puncture occurred. Arrow nr. 2 points to "mushroom" type plug—a temporary roadside repair useful only to get the bike to a place where the tire can be repaired, or replaced.



*A good air gauge is essential for proper tire maintenance. (Left to right): the plastic toy gauges issued as standard equipment are worthless. Pencil gauges are sturdy and small enough to pack almost anywhere on the bike — but accuracy tends to vary, and air-loss during checking is common. This excellent analog gauge is made by Design-Rite Corporation; it has seen over 30,000 miles of on-the-road use by RR Staff; it is fairly compact, features bleed valve, no-loss design. RPS Privateer Qwik gauge is a combination suspension pump and air pressure gauge; features include on-the-tire bleeder valve and positive no-loss screw-on fitting.*

deliberate intent, and to certain specifications. Those specifications include a specific set of tires. In your owner's manual the specific tires recommended by the bike manufacturer are listed by brand, model and size. Those recommendations are based on extensive testing by the OEMs to determine which tires work best on a given motorcycle. It follows that when your tires are replaced, the most sensible course is to replace them with tires that match those recommendations.

That doesn't mean that aftermarket tires are necessarily "wrong" for your bike. In fact some aftermarket tires may be capable of improving on the stock units, however the trick is to know *in advance* if these tires will work on *your* bike. The fact is, the same tire that performs well on Bike A, may cause Bike B to experience a case of the wobbles, and it may make Bike C handle like a tractor.

If a knowledgeable dealer, who knows your bike, steers you onto a set of aftermarket tires he knows will improve the handling characteristics or your tire mileage — consider it for a try. If you choose to experiment on your own with different tires — be my guest. But if your economical situation and your time available dictate that you have to get it right the first time, you


would probably be better off to follow the Golden Rule of tire replacement:

**If you Don't Know For Certain What You're Doing, Don't Do It!**

One final common sense note: let your tire awareness follow you out onto the highway. Give your tires the benefit of the best possible riding circumstances.

There are several ways to accomplish this: never exceed the Gross Vehicle Weight Rating (GVWR) of your motorcycle — overloading your tires' carrying capacity is a sure-fire way to find trouble on a long trip — and on the road, steer clear of road edges, and centers of intersections — places where debris collects. Be especially alert around construction sites (last year over half the tires replaced in the shop were the result of building-trade staples — the construction boom and modern construction methods have made these two-pronged items quite popular in the puncture department). Finally, take care during and just after hard rains; these can wash all sorts of evil, pointy objects into the roadway.

And that's about it.

As I said before, there aren't any mysteries or secrets to tire care. It's largely a matter of common sense. Put the proper tire on, have it balanced, keep it pumped up... and enjoy! 

# Shop Talk

BOB PRICE

## TECH Q&A

### FRONT TIRE WEAR

**W**e receive a lot of mail on excessive front tire wear and motorcycle handling problems that turn up right after a tire change. It's easy to

blame the tire manufacturer for the problem, and sometimes (like any mass-produced product) the tire is indeed defective. But that's rare. What often happens is that the new tire provides traction the old tire couldn't, and other problems with the motorcycle surface.

I talked to most of the major tire manufacturers about front tire wear and handling difficulties, and they all agree that a properly mounted, balanced and inflated tire simply reacts to the forces it receives, and that some forms of front tire wear are universal due to the nature of motorcycles and tread design.

The rear tire is subjected to wear from both acceleration and braking forces. The front tire, on the other hand, does not experience acceleration forces (with the exception of a little drag as its inertia is overcome). Although most of the front tire's life is spent just rolling, during hard braking most of the motorcycle's weight shifts to the front and exerts terrific pressure on the tread where it contacts the road. This unidirectional force shows

up as a distinctive wear pattern which varies with tread design.

When a block of tread is subjected to braking force it begins to squirm, and the leading edge of the block takes the brunt of this force. The energy is released when the rotation of the wheel picks the tread block up from the road. The result is that the leading edge of the tread block wears faster than the trailing edge. You can demonstrate this to yourself. If you drag a new pencil eraser across a piece of paper while holding it perpendicular to the paper, the eraser will shift in the opposite direction and the leading edge will



ILLUSTRATION BY JESSIE HENNINGSON

wear. After repeated brake applications, each tread block that touches the road will show this kind of wear by "ramping" into a shape determined by the tread design. Because most tires have angled grooves molded into the tread to disperse water, a chevronlike pattern is the most common. When I see this on someone's motorcycle, it simply tells me the rider is using his front brakes properly. It is normal wear, and not a design deficiency in the tire itself.

Tires that have continuous grooves perpendicular to the axle with no parallel or angled grooves radiating away from the centerline do not show the brake wear pattern very much. Since the contact surface is continuous, there are no tread blocks that can shift around and the energy is never released as the tire rotates. But they react too easily with the rain grooves found on many of our freeways, and they are not as effective at water dispersion as a modern tire. The designs we have today are a compromise for wet and dry conditions on all paved surfaces, and the ramping just goes with the territory. But Dunlop's Tony Mills says that, "We (the tire manufacturers) have to do our bit by making tires that minimize this effect," but "people can help themselves a lot with proper motorcycle maintenance."

Anything outside of ramping is an indication that something else is wrong. Assuming that the tire is mounted and balanced correctly, the most common cause of excessive tire wear or handling problems is improper tire inflation. The number molded into the sidewall is the maximum pressure for which the tire is rated. It is not the recommended operating pressure. Your dealer can give you an idea of what that should be, but it will take some experimenting on your part to determine the ideal operating pressure for your load and riding style. When the tire pressure (cold) is correct, it should increase by five percent, but no more than 10 percent as it warms up.

If the inflation is correct but you still have handling problems or unusual tire wear, then you have to look elsewhere. Sometimes the old tire is so worn out that the motorcyclist is unaware that anything is wrong until he replaces the rubber. The front suspension is the next suspect. All of the tire company representatives I talked to said that a maladjusted or poorly maintained front end

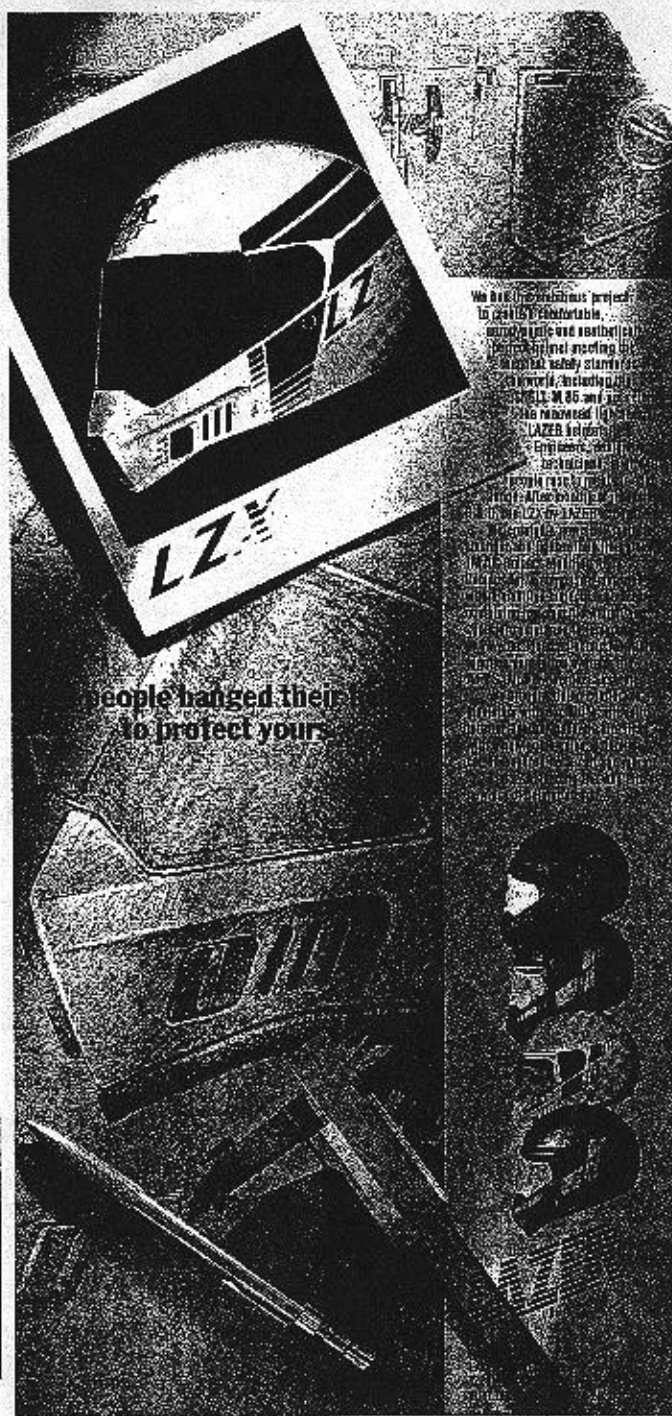
## Shop Talk

will exacerbate tire wear. The front fork sliders must work smoothly from the bottom to the top of their travel with no excessive stiction. All front forks exhibit some degree of stiction due to friction in the bushings and at the fork seal. But if they hang up in their travel, something is amiss. According to Marcel Fournier from Pirelli, owners frequently ignore the service intervals for fork oil changes. Over time, moisture leaks past the seal into the fork leg and dilutes the fork oil, thus changing its damping and lubricating properties. Enough moisture and you will begin to get some corrosion inside the fork leg, which can keep the fork from working smoothly. If no service interval is given, the fork oil should be changed at least annually. The quantity and viscosity of the fork oil is important. Too little or too light a fork oil and the front end will be spongy and the bike may bob over humps and wallow through curves. Worn-out fork springs can have the same effect. Too much or too heavy a fork oil can cause hydraulic lock and prevent the fork from sliding smoothly. See your owner's manual for the specifications on your machine.

Next, the fork legs must be straight and parallel in order to work smoothly. Misalignment at the triple clamp will force the sliders to work against each other. Misalignment is caused most often by a light impact; a heavy impact can actually bend the stranchions. In an extreme case the fork may compress, but not rebound.

If there is some point in the fork's travel where it hangs up, it could cause the front wheel to slip on the surface of the road. In some cases it happens only at low speed and goes away at higher speeds as the increased force overcomes the stiction in the fork.

Mathew Aaron from Michelin adds that poorly installed accessories on the front end can also cause misalignment of the fork legs. In particular, Aaron points to badly fitted fork braces as the culprit. A fork brace can do your motorcycle a world of good if it's properly installed. Front end flex from hard cornering can be reduced with the installation of a fork brace, and some people think that the motorcycle's reaction to rain grooves is lessened as well. But if the brace spreads the fork legs apart or pulls them together in the middle, the fork legs will no longer



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## Shop Talk

be aligned and the front suspension will not operate smoothly. The fully adjustable braces get around this problem when properly installed, but some braces are a single piece. This does not mean the single-piece braces are an inferior product. According to John Preston from Custom Touring (who has installed thousands of fork braces), both the adjustable and one-piece braces have their virtues. Preston says that the adjustable brace is easier to install on a variety of motorcycles, but with more pieces there is more potential for flex at the junctures. The single-piece adjustable brace stays rigid, but "to simply take a brace out of the box and bolt it on is foolhardy." It is up to the person who installs the brace to make sure it fits properly. The problem is that quite often the motorcycle production tolerances are not as precise as those machined into the brace. The single-piece brace may fit the proto-

type motorcycle and most examples of that model of motorcycle perfectly, but on other bikes proper installation requires removing some metal from either the fork legs or the brace itself. The brace must be a drop-in fit. If you have to tap it in place, it's too tight and the fork action will suffer. The bolt holes in the brace must align perfectly with those in the sliders as well. If they don't, tightening the brace may force the legs apart or pull them together. A little work with a rat-tail file should fix this.

To ensure that the fork legs are parallel with the installation of a one-piece brace (assuming there is no problem at the triple clamp), the brace bolts and front axle should be loosened. Have someone bounce the front end up and down by pushing on the handlebar without touching the brake lever (you can keep the machine from rolling by leaving it in gear). While your helper straddles the bike to keep it upright, tighten the axle to specifications, then tighten the

brace in a crisscross pattern. Forks receiving adjustable braces should get the same treatment at the axle, but follow the brace manufacturer's instructions for tightening the brace to the sliders.

Another accessory that Aaron has found to cause problems is a disc brake cover. Some of these can act as spacers and spread the fork legs. Again, proper installation is the remedy.

According to Aaron, when there is excessive stiction in the fork the tire takes over the function of shock absorber, something it was not designed to do. The wear pattern is a distinctive cupping that occurs parallel to the axle with no ramping and no chevronlike pattern. Aaron's theory is that when the tire bounces because the suspension isn't working properly, the crown of the tire flexes in and the sides of the tread scrub the pavement from the outside to the center, then back again. Eventually this outside-to-inside-to-outside scrubbing

makes an uneven dish pattern of wear. A cross section of the tire would be shaped more like a "W" than a "U" while the tire is flexed in.

But some of the other tire manufacturers blame other parts of the bike for uneven tire wear and handling problems before they look to the accessories. Garry Gallagher from Metzeler says that "close to half of the problems are due to improper inflation and worn or maladjusted steering head bearings." Hoppe and Associates' Max Martin (importers of Avon tires) said that "the rider will notice the handling problem first and rectify it," when I asked about accessories causing abnormal tire wear. Tony McAndrew from Bridgestone suggested that heavily crowned roads can cause more wear on the left side of the tire than the right.

To get some input outside the motorcycle industry regarding tire wear, I contacted Mike Miller, the owner of Cycle Express, a motorcycle courier service in

Tidewater, Virginia. (See *Rider*, *Taming the Business Cycle*, February 1989.) Cycle Express has a fleet of Honda Silver Wings outfitted with identical accessories (two-way radios, cargo trunks, etc.). These bikes get over 20,000 miles on their clocks annually, running at the same time in the same conditions. Miller has tried every brand of tire there is. His findings? "With minimal tread design you get maximum tire life. But all brands show tire cupping." Some of Miller's bikes have more stiction than others, due to the stanchions being repeatedly straightened after impacts. He hasn't noticed any trends in tire wear on the bikes with more stiction than the others. There is no fork brace other than the stock Honda bridge on any of the Cycle Express motorcycles.

But the bottom line is that in most cases, the tires themselves are not to blame for uneven wear or handling difficulties. It is the owner of the motorcycle

who has the responsibility of seeing to it that the bike is well maintained and functioning properly. New tires alone cannot fix an existing problem elsewhere on the bike. ■

## ACCEPTABLE TIRE WEAR

A major problem with a motorcycle is worn tires. They are not only dangerous to ride on but expensive to replace, which is why we try to get the most out of each set. What causes excessive tire wear and what can it tell us about the bike and rider? First, here are several things to keep in mind as to why bike tires cost twice as much and wear three times faster than typical automotive tires.

More is demanded of a motorcycle tire than a car tire. They carry twice the load, apply much more horsepower to the drive wheel and are expected to stick when heeled over in a tight turn. Development costs are about the same for either vehicle but limited production raises the price. Softer, stickier rubber compounds accelerate wear which is a small trade off for increased handling and cornering. Don't complain the next time you have to replace the tires on your Gold Wing, "superbike" tires average 5000 miles or less and cost considerably more.

The biggest single cause of excessive tire wear is under-inflation. The owner's manual lists the correct tire pressures for the stock tires depending on the load. But suppose you change brands? How do you determine what the correct pressure is for the new set? It is as easy as reading the tire's sidewall. Every tire has its maximum inflation and load capacity molded into the sidewall. If you carry a heavy load or ride at high speeds go to the max. If your loads and speeds are lower, deduct up to 10% from the maximum. *(NOTICE: that is 10% and not 10 lbs!)* Never run a tire with less than 10% under the maximum, which in most cases will be about a 4-lb. difference.

Time and temperature affect the pressure in your tires. It is normal for a tire to loose about 1 Lb. (pound per square inch) per month. Temperature affects the pressure more profoundly. A tire can loose about 1 lb. for each 10-degree drop in temperature (Fahrenheit). A quick example: a tire has 38 lbs. on a mid summers day of 90 degrees. Six months later it is 30 degrees and there is only 26 psi in the tire. You lost 6 lbs. during the 6 months and lost another 6 lbs. due to the 60 degrees in temperature difference. At 26 lbs. your tires are dangerously under inflated. How often should you check your tires?

Tires should be checked a minimum of once a month. They should be checked when cold with an accurate tire gauge. While you are down there, spin the tire and look for any foreign objects that may have become imbedded in the tire. Safety conscious riders check and spin every week!

Now that we have eliminated the cause of most excessive tire wear, what is acceptable wear? Block chaffing is O.K. (that is the area between the grooves) and is usually more pronounced on the front tire than the rear. Why? The front tire only brakes and rolls thus the chaffing will show up on the leading edge of the blocks. The rear tire brakes, rolls and accelerates, and this tends to equalize the wear on both the leading and trailing edges of the blocks.

What about excessive left side tire wear? This is unavoidable due to the construction of the roads. Highways are built slightly concave to allow for water runoff. If you were to ride hands off, the bike would eventually run off the right shoulder of the road as you are angling down a gentle slope. The rider has to countersteer to force the bike uphill and keep a straight line which leads to greater wear on the left side of the tire.

How important is tread depth? The depth of the grooves determines the tires ability to shed water. Effective water dispersion reduces the odds of hydroplaning in heavy rain. The rule of thumb for preventing hydroplaning is two times the tire pressure as the maximum safe speed. In the previous example, with new tires holding only 26 lbs. of pressure, you could hydroplane at a speed of 52 mph.

Patches, plugs and sealers, how good are they? Sealers and/or balancers are not recommended by tire manufacturers and will probably void any warranty. A patch or plug may be unavoidable if you have a flat on the side of the road. Most dealers will not fix a flat due to the liability attached should the patch fail. If a tire has to be patched or plugged in an emergency, it should be replaced as soon as possible. You have only two tires and they both better be absolutely right. No excuses and no exceptions. Period.

Ride Safe

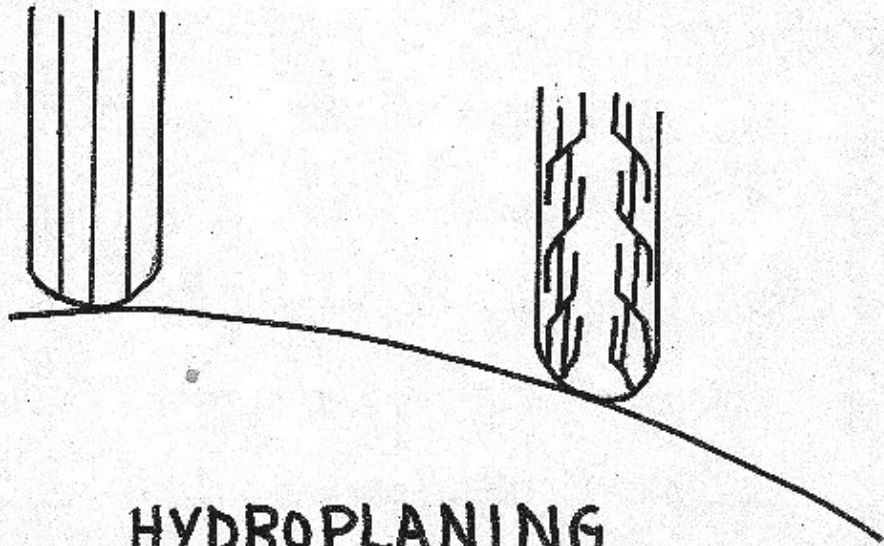


## TIRE INFLATION

- 1 Check ONCE PER MONTH - MINIMUM
- 2 ALWAYS check when COLD
- 3 Check AGAINST Sidewall  
NOT The OWNERS MANUAL
- 4 LIGHT LOADS - NEVER LESS THAN 10%
- 5 HIGH SPEED AND/OR HEAVY LOADS  
INFLATE TO MAXIMUM PRESSURE
- 6 Check TIRES FOR DeBRIS - NAILS,  
GLASS, sidewall BULGE
7. TIRE DOESN'T SUPPORT THE LOAD -  
AIR PRESSURE DOES

## TIRE WEAR

1. MAJOR CAUSE IS UNDER INFLATION
2. IMPROPER ADDITION OF ACCESSORIES
3. BLOCKING & LEFT SIDE WEAR IS O.K.



## HYDROPLANING

1. TREAD PATTERN DETERMINES DISPERSION
2. WORN TIRES PLANE EASIER
3. Rule:  $2 \times \text{INFLATION PRESSURE} = \text{SAFE SPEED}$
4. CLEAR REFLECTION IS FIRST CLUE