Used Motorcycle Evaluation Guide

Now 26 pages (125k) of quasi-nutritious moto-info!

Latest version available at: http://www.clarity.net/adam/buying-bike.html.

TERMS AND CONDITIONS OF USAGE -- IMPORTANT INFORMATION
The information contained in this document is provided at no cost and without any warranty whatsoever. The author and contributors are not responsible for any errors contained herein, and make no claims whatsoever as to the legality, safety, validity, or veracity of the information and advice contained in this document. Indeed, many of the techniques described herein are extremely dangerous and should not be performed except by factory-trained mechanics. The information contained in this document is provided for entertainment purposes only, and is not in any way a guarantee that the motorcycle you buy will be functional, safe or usable, or that you (or others) will not be seriously injured or killed by attempting to follow said information. All riders should have a factory-trained, professional mechanic inspect any motorcycle before purchasing or riding it. Any use of the information contained in this document is done solely at your own risk. Reading beyond this point constitutes an implicit acceptance of these terms and conditions.

A major tip o' the hat to Erik Astrup, Paul English, Josh Fielek, Scott Lilliott, Lorin O'Brien, Michael Roeder, Patrick Burns, Chris Wells, Reto Lichtensteiger, Larry Vickery, and Crystal Trexel for suggestions and Pam Zink for the inspiration. If you have any questions or suggestions that might make this resource more complete or more accurate, **please** email them to me!

Read this whole thing before you go to look at a bike -- it's too long to try to scan through while you're at the seller's house!

CHECKLIST OF WHAT'S LISTED BELOW:

(Not a substitute for reading the whole thing, but useful for quick reference at a seller's house.)

- **BRAKES**
  - Check for smooth operation, no pulsing, pad material remaining, etc.
- **CLUTCH**
  - Check lever effort, and whether the clutch releases when squeezed.
- **GAS TANK**
  - Look for rust or a milky paint-like coating on the inside.
  - Dark gas (tea colored) is an indication of old gas that needs changing.
- **SEAT**
  - Look for cracks/tears/etc.
- **TIRES**
  - Check: remaining tread depth, dry rot, profile (round? squared-off?), date code.
- **ELECTRICAL & BATTERY**
  - Test all lights and switches to make sure they work.
  - The sound of the starter cranking is a decent meter of the battery's condition.
- **SUSPENSION**
  - Check forks for seal leaks, scratches/nicks/bends/twists in legs.
- **WHEELS**
  - Check both sides of both wheels for dents/cracks.
- **CHAIN/SPROCKETS**
  - Check for chain/sprocket wear (hooked teeth, stretched chain).
- **EXHAUST**
  - Scratches/rust/damage. Exhaust pressure equal on both sides?
- **ENGINE/FLUIDS/CARBURATORS**
  - Check starting and operation of engine and carbs. Check for leaks.
- **CENTERSTAND CHECKS**
  - Get wheels in air and check wheel bearings, brake operation, etc.
- **SERVICE**
  - Service records available? Proof of warranty work? Etc.
- **DIRT BIKES**
  - Special concerns when inspecting dirt bikes.
- **QUIZZING THE SELLER**
  - Questions to ask the seller to determine the condition of the bike.
- **ACCESSORIES, PRICE, and DEALING**
  - Are you willing to pay more for add-ons?
- **HELMETS**
  - Used helmets are worthless. Don't use 'em, don't pay more for 'em.
- **TITLES & PAPERWORK**
  - Make sure it's clean & that the VIN numbers match up.
- **TEST RIDE**
  - Go on one if you can -- you can learn a lot about a bike this way!
  - Make sure you give it a pre-ride check to make sure it's safe to ride!
- **AFTER THE PURCHASE**
  - Some tips after you get your bike.
- **INFO FOR NEW RIDERS**
  - Not the biggest and the baddest -- start with something easy to control.
- **INSPECTION PICTURES**
  - To aid inspection, some pictures (and, eventually, diagrams) of what certain components look like.
- **RECOMMENDED READING**
  - An exceedingly incomplete list of books that'll teach you more about bikes.
- **OTHER WEB SITES**
  - A listing of other motorcycle-related web sites with useful tips for bikerscum.

FIRST THINGS FIRST

- Resist the temptation to buy the first bike you see. Look at a few of them to get a better idea of the used bike market/options before you buy one.
- Bring a friend to help you stick to your guns, or to help you load your new bikes onto a truck, or as ballast in case the bike has a centerstand and you wish to inspect the front wheel. Bike-savvy friends may also notice things that you forgot to check. Make sure they also read this guide ahead of time.
- Bring a flashlight to aid inspection. Even in daylight.
- Request that the owner *not* have the bike warmed up when you get there, but tell him/her to make sure that the bike will start. If the owner asks why, tell them that you want to test the bike's ability to start when cold. (It's a lot easier for engines to start when pre-warmed.)
- You needn't follow these instructions in any particular order, or even follow them at all, but if you are going to read them, you should probably do so *before* you get to the seller's house. If you're new to motorcycling, you'll probably find a lot of the terminology complicated. Try studying some of the "related photos" and RECOMMENDED READING listed below. And as noted previously, try to bring a friend, particularly one who knows bikes.
- Bring riding gear in case the seller will let you test ride the bike. (If you're new to motorcycling and don't have any gear yet, perhaps the bike-savvy friend accompanying you will be kind enough to bring his/her gear, and do a test ride for you.)
- You'll have to go through and carefully inspect used bikes being sold by dealerships, too, since many dealerships take used bikes as trade-ins, make minimal (if any) repairs, and mark the bikes up way over "blue book" value. It's up to you to find defects (and to know what the used bike's real value is!!) to get these vultures back down to a reasonable price. Think of it as a treasure hunt -- you're looking for the hidden secrets that will save you money.
- As a general rule of thumb, when work needs to be done to repair a problem with the bike, most dealerships charge around $50/hour for labor, possibly more for European marques (Ducati, BMW, Triumph, etc.)
- In the text below, "left" and "right" refer to the *rider's* left and right sides when sitting on the bike.
- If you aren't really experienced with bikes, do some practice inspections! Find a couple of friends with bikes, and, pretending that you're at a seller's house inspecting a used bike, go over a couple of bikes in minute detail. You'll learn a lot about how bikes are put together, and you might even find some things that your friends missed. Take notes while you're doing the inspections, and go over your findings with your friends after each inspection.
- When you end up buying a bike, make sure you get everything related to the bike: the key and any spares that the seller has, any free/included spare parts, the owner's manual and service manual, etc. Having to go back to the seller to get stuff you should have remembered the first time is a pain. And you may find the seller far less accommodating after you've paid for the thing.

OVERALL APPEARANCE

- Does the bike look nasty? Cracks and scratches all over the thing? [1] Appearance can be deceiving, but it should give you some indication of the general condition beyond what you can see.
- Do fasteners look stripped or gouged? Is everything kinda loose and ill-fitting? You don't need to be a mechanic to tell when the person has mangled something on the bike. The bike should also be cosmetically symmetrical. (Not "symmetrical" like "are there brake discs on both sides of the front wheel", but "symmetrical" as in, "are the mirrors, the plastic, the handlebars, etc. symmetrical, or do they seem to be askew?" [2]) Step back and sight down the centerline of the bike. If something looks obviously wrong (the mirrors stick out a different angles, the windscreen is tilted, the turn-signal stalks are ripped off the fairing, etc.), the bike has probably been crashed or fell over **hard.**
- Basically, try to answer the question: "How does the overall cosmetic appearance of this bike affect how much I want to pay for it?"

Related photos:
[1] Scratched up fairings
[2] Bent subframe = twisted/askew bodywork (a very extreme example)

HAS IT BEEN CRASHED?

- Look for: deep parallel scratches on engine cases and on plastic (particularly above footpeg-level); a different/non-standard paint job (the owner might have repainted it to hide damage); paint or metal ground off the ends of the handlebars [1], or off the balls on the ends of the clutch/brake levers; dents in the gas tank where the handlebars may have smashed into it during a crash [2]; dents and deep/parallel scratches in exhaust pipes; turn-signal stalks bent or ripped off; cracks in plastic bodywork obscured by stickers [3]. (Aftermarket stickers are sometimes used to cover defects -- beware!)
- Sometimes brake and clutch levers will be bent in a crash and replaced with a lever that's a different color than the other side, or a slightly different style than the other side, or it'll be hammered back into shape so it doesn't look obviously bent. (In the latter case, look for thin cracks in the anodizing or clear coats of levers... it'll look something like a spider web of hairline cracks.) Also look for bent or cracked mirrors, or mirrors replaced with mirrors of a different type. Both are signs that the bike has been down. Not necessarily crashed, but at least tipped over. Check carefully.
- Sometimes a crash will twist the front forks. Sit on the bike, sight down the forks, and see if they're at all twisted or bent. (Twisted is pretty cheap and easy to fix, bent is not, but either ought to be a warning sign to check extra-carefully for other damage.) If you get a chance to test ride the bike, get the bike going straight, and take a quick look down at the bars to make sure they're pointed straight -- if they aren't, the front has probably been twisted in a crash.
- Non-parallel scratches and shallow chips tend to indicate a tip-over rather than a crash at speed. (Crashes, of course, tend to do more damage -- tip-overs rarely do more than minor cosmetic damage.)

- You may come across a bike that has horizontal scratches on its lower plastic and metal parts... this isn't necessarily a crashed bike, it could just be that the owner was an enthusiastic rider that leaned the bike way over when turning. Ask the owner about the origin of the scratches, but unless you see evidence of a crash, it's probably just evidence of an enthusiastic owner. Deep/parallel scratches above footpeg-level are something to be concerned about, though.
- Crashes can cause bodywork problems for two reasons. Besides scratching and cracking the bodywork, crashes can bend the bodywork's mounting brackets and break mounting tabs [4]. Check to make sure that bodywork pieces that fit together do so easily and have an even seam where pieces come together. And check to make sure that the bodywork isn't loose, either because mounting tabs were broken off or because aftermarket fairings might not mount up as well as the stock stuff.

  Related photos:
  [1] Crash-damaged brake lever
  [2] Crash-dented gas tank
  [3] Cracked bodywork behind sticker
  [4] Broken off mounting tab on frame (extremely bad!)

HAS IT BEEN RACED/ABUSED?

- Racing puts tremendous stress on machinery. You may or may not want to buy a bike that's been raced (the price ought to be way lower than it would be otherwise), but you should definitely try to find out if it has or hasn't been raced, so you can adjust the price accordingly if need be.
- Look for holes drilled through the heads of bolts [1], which racers use to safety-wire bolts in place. Check: front brake caliper mounting bolts [1], exhaust pipe bolts, engine case bolts, oil/water drain bolts [2], etc. The holes will be small, about 1/16", and should not be confused with the 1/8"-3/16" holes and castellated nuts that are often used to hold axle nuts on axles with cotter pins. Safety-wire ends can be extremely sharp -- don't cut yourself.
- Tires with roughed up edges, covered with ragged strips of balled-up rubber is a sure sign that the bike has been raced. [3] [4] If the rear tire is completely flat in the middle but looks practically new on the sides, the owner may have performed a burn-out with them. (Not necessarily damaging to anything other than the rear tire, but a possible signal that the owner hasn't taken good care of the machine.) In *rare* instances, frazzled/ragged edges may be there because the bike's owner bought "take-offs" (used race tires) from a racer, and not because the bike itself was raced. But be *very* suspicious.
- Also look for heavy-duty aftermarket engine covers [5] -- made by NRC, Factory, Traksport, Yoshimura, etc. Many racing organizations require them, so they're a decent tip-off that the bike has been raced. They tend to be cheaper than the OEM case covers they replace, however, so sometimes they're used to replace crash-damaged case covers. By themselves, they aren't proof that a bike has been crashed or raced, but look around carefully for other tell-tale signs.
- Look at the under-side of the rear fender. (You may need a flashlight for this.) If you see a thick streak of balled up & flung-off rubber on the inside of the fender, that's a good

sign that the owner has done a burn-out on the bike. Burn-outs mostly damage the tire, but could be indicative of other abuse. Be alert.

- Check the frame for cracks, usually along welds. Check around the steering head, around the engine mounts, and, if possible, welds in the front fairing bracket and rear subframe. ("If possible" because these brackets may well be covered by fairings on many models.)

Related photos:
[1] Safety-wire holes in brake caliper (not currently safety-wired)
[2] Safety-wired oil drain plug
[3] Textured edge of racing tire
[4] Another race tire showing ragged edges
[5] Racing case guard

BIKE-SPECIFIC

- Some models have specific problems that you should be aware of. Ask dealerships, bike-savvy friends, etc. Read magazine reviews. Examples: many Kawasaki EX500's (and some other older Kawasaki sportbikes) have problems where they'll pop out of second gear while engine-braking. Some older SOHC (single overhead cam -- an engine design) Hondas had lubrication problems. Learn as much as you can about the models you're interested in. (Try old bike magazines, grizzled old bikers, etc.)
- Here are two sites that do searches and provide reprints from magazines:
  - http://www.mcreports.com/
  - http://home.earthlink.net/~motoinfo/motoinfo.html

BRAKES

- Put the bike in neutral. Roll the bike forward, gently apply the front brakes*. They should engage (and the lever should move) smoothly. (Though you may hear a click as the brake-light switch engages.) Now release the brake lever and roll the bike... Are the brakes off, or are they dragging? (They should be off.) If not, the brake calipers need work. Stand in front of the bike with the bike in neutral. Grab the front brake lever and squeeze it hard against the handlebar. As you're doing this, try to drag the bike forward by the handlebars. (You may want someone behind the bike to stabilize it.) Do the brakes prevent the front wheel from moving? They should.
- *=If you squeeze the front brake lever and it comes all the way back to the bar without much resistance, something's very wrong. Try adjusting the lever, if you know how (look for a little dial near the pivot). If this doesn't fix it, or you have to pump the brakes a lot to get them to work, the system is either empty, full of air bubbles, or something is amiss in the master cylinder or caliper. Check to make sure that there's adequate pad thickness, and make sure you get a professional mechanic to inspect the brakes before you try riding the bike. At the very least, the system needs to be bled. About $5 of brake fluid and half an hour of labor.
- Rear brake... roll the bike forward, use the rear brake to stop the bike. It should also engage smoothly. If the rear brake is a drum brake (no exposed brake rotor), is the wear

indicator needle inside or outside the "usable range" indicator *when the brakes are applied?* Outside, of course, means the brakes are worn out.

- Some states have a mandatory safety inspection. If yours does, they'll probably require that *both* front *and* back brake levers (separately and together) illuminate the brake light. If one does and the other doesn't, you probably need a new switch (around $25?) or a switch adjustment. If both don't, you probably just need a new bulb (around $1.)
- Check remaining brake pad material. There should be at least 1/8" of brake pad material on each brake pad. For bikes with disc brakes, get in front of the bike and look into the calipers, on either side of the rotor(s). A flashlight might help here, even in daylight. The pads are the raised parts that directly contact the brake disc. If the bike has a disc brake in back, do the same type of inspection with the rear brake pads.
- Disc brakes continued: rotors should be a certain minimum thickness and shouldn't vary more than a certain amount when spun. This kind of information will be in the service manual. As a general rule of thumb, rotors should be a minimum of 4mm, and warpage should be less than .012". (FWIW, even warpage of .020" probably won't show up in the form of lever-pulsing at speeds below 45 mph.) If you don't have the right tools to test this, you'll probably need to rely on a test ride to spot a warped rotor -- unless it's so bad that you can see it with the naked eye. Even if you don't have the right tools, you can inspect the rotors for cracks, deep wear grooves and other damage.
- Brake fluid should be a very light amber. Darker than honey means it's time to replace the brake fluid. Not expensive, but possibly an indication that the owner hasn't followed the maintenance schedule. (Or maybe the bike has just sat for a long time.) The front brake fluid color and level should be easy to inspect through a sight glass in the front master cylinder or via marks on the translucent brake fluid reservoir. (Fluid level should be roughly in the middle of the sight glass or reservoir min/max range when the bike is on level ground and the steering is centered.) For bikes with disc brakes on the rear wheel, check the rear brake fluid as well -- sometimes visible under the seat/tailsection, sometimes visible through a hole cut in the tailsection or side fairings.
- Inspect the brake hoses for nicks, cuts, dry-rot, and leaks.
- New brake pads are around $25-30 per pair (each caliper has one pair, so a bike with two brake rotors in front = two calipers up front = two pairs of pads up front.) Brake rotors are usually around $150-250 *each.* Brake lines are about $80-150 new, but if you have to replace them, replace them with braided stainless-steel lines, which cost a lot less ($70-80 new) and offer better brake feel and less heat-induced expansion.

Related photos:
Major parts of front brake system (disc brakes)
Disc brake rear wheel
Drum brake rear wheel

CLUTCH

- Ask the owner how many miles it's been since the clutch cable was changed*. Owners who keep close tabs on bike maintenance will know. That's a good sign. Most owners probably don't know. If there's a little slack in the clutch cable, and you can move the

lever 5/8" or an inch or so before the cable goes taut (something like this), that probably just means that the cable adjuster needs a turn or two.

- Put the bike in first gear, squeeze the clutch all the way in, roll it forward. It should feel like neutral, with possibly a little more resistance**. Slowly let the clutch out and feel for the friction zone. Clutch engagement should be fairly smooth, not abrupt. Put the bike back in neutral.
- If the bike has high miles (30k mi +) ask if the clutch has been changed. Only about $100 + 1 hour of labor, unless you need a new clutch basket, then maybe $300 + 2 hours of labor. (You won't know until you get the clutch apart.)
- *=Some larger-bore bikes will have a hydraulic clutch instead of a cable-operated clutch. If this is the case, check fluid color and level through the master cylinder's sight glass. Fluid should be a very light amber, like the brake fluid, but both are pretty easy to change. The clutch master cylinder will be located on the left grip, much the way the front brake's master cylinder is located on the right grip. Hydraulically-actuated clutches may or may not be "wet" clutches. A "wet" clutch is bathed in oil; a "dry" clutch is not. It's hard to tell the difference just by looking at a bike, but as a general rule of thumb: Ducatis, BMWs and Moto-Guzzis use dry clutches, most other models use wet clutches.
- **=Wet clutches may tend to stick or drag a bit until the bike has warmed up and the clutch has spun a bit. This is often the case when the clutch hasn't been used in a while. Wait until the bike has really warmed up before you dismiss a potential acquisition for having an overly-sticky clutch.

GAS TANK

- Look for: dents as noted above [1]. Open it up, look for rust and/or loose sediment. Rust/sediment is bad -- it clogs carburators. Bikes with rusty tanks need to have the rust removed... drop the price $150 or so. You should open the tank up and see light-amber colored gas and bare metal. If you see a milky paint-like coating on the insides of the tank, the bike has had rust removed and the insides of the tank recoated. Make sure it runs -- sometimes this recoating can clog the fuel's path out of the tank. Many people swear by it, but I'd pay a little less for a bike with a tank that's been recoated.
    - Exceptions: Some late-model bikes (e.g., recent Triumphs) have *plastic* gas tanks. It's normal for plastic gas tanks to be milky-white on the inside. Knock on the side of the tank to see if it's metal or plastic. Exceptions to exceptions: some bikes have metal tanks but have plastic tank covers, so when you knock on them, they'll sound like plastic, but they aren't. (Example: Yamaha FZR400's.) Your best bet is to look closely at the inside of the tank -- it should be fairly easy to tell whether or not you're looking at metal or plastic. Evaluate the tank's condition accordingly.
- Dark (coffee or tea-colored) gas has been sitting around for a long time. Not a good sign. Get it changed immediately, and anticipate needing a thorough fuel-system cleaning. (Around $5 of parts plus 2-3 hours of labor.)
- Make sure the lock in the gas cap is working. If it isn't, it'll probably cost $100-$200 to get a genuine OEM replacement cap with a lock that matches the ignition's.

Related photos:
[1] Crash-dented gas tank

SEAT

- Look for: tears in the vinyl cover [1]. New upholstery will cost around $100-150 from an auto/marine reupholstery place. (Check the yellow pages.) Seats with cracks and tears retain water and get your butt wet *many* days after the last rain. *Highly annoying.*
- Seats (or tailsections) typically use a locking release (like the gas cap) to prevent vandals from messing with your bike's electrical stuff. Make sure the release works with your key. If it doesn't, it'll probably cost around $80 + half an hour of labor to replace.
- Check to make sure the seat is stable and latches on snugly.

Related photos:
[1] Rip in vinyl seat cover

TIRES

- Ask the owner how many years and miles the tires have. The owner should know. (Bad sign if (s)he doesn't!) The tires should have at least 1/8" of tread left, preferably more. Squared-off tires, *any* signs of dry rot (really fine cracking -- look really close!), bald tires (no tread), knobby tires with worn down and rounded knobs... they all need to be changed. Tires worth using aren't cheap, but they're your sole source of traction, your only connection to the road -- do *not* cut corners here!
    - Street/sport tires: $170-$300/pair
    - Off-road tires: $100-$200/pair
- Make sure you read the section above called HAS IT BEEN RACED/ABUSED?, as it has some pointers about how to identify vehicle abuse based on tire wear.
- If you get a chance to ride the bike, seek out well-maintained (smooth) roads so you'll be able to tell if the tires have flat-spots or aren't balanced. (Both will cause perfectly rhythmic thumps or shaking that goes up and down as the speed goes up and down.)
- Tires should be changed at least every three years, though most serious riders would probably change them at *least* every other year. (That's in an ideal world; tires should be inspected regularly and replaced if they have damage that could cause handling problems or unexpected tire failures.)
- How do you know how old the tires are? All tires have an industry-standard dating code stamped on them. Look for digits stamped into the mold on the rubber sidewall of the tire. The date code for tires made prior to 2000 is: "WWY", where WW is two digits denoting the week of the year, and Y is the last digit of the year. A tire produced on May 30th (the 22nd week) of 1996 would be stamped **226**. (A tire produced on May 30th of *1986* would *also* have a code of 226, but will probably have a *ton* of dry rot.)
- As of 2000, the date coding system has changed a bit. All tires are still required to be stamped with a DOT number on at least one sidewall, but now there's more data. Look for a code that starts with "DOT" and has up to 12 letters and numbers. The last four numbers are the date code in the format: "WWYY", where the WW two digits denote the week of manufacture, and the YY denotes the last two digits of the year. So a date code of "DOT913ACX3C2200" would have been manufactured in the 22nd week of '00. If the three/four digit stamp you found doesn't make sense with this scheme, you're not looking

at the date code stamp. Keep in mind that both tires will have this date marking (possibly/probably different), and that tires should be replaced *at least* every third year, or whenever they have damage that threatens their integrity. (Punctures, cuts on the sidewall, excessive wear, dry rot, etc.) Frequent tire inspection could very well save your life.

- Dirt bike knobbies will tend to get worn on the forward edges of the knobs. Sharp knobs = good traction. (Nifty trick: If the leading edges of the knobs are worn (rounded off), but otherwise there's nothing wrong with the tires, you can unmount the tires and mount them backwards. Braking traction will suffer, but not too much. Note that this trick is *only* something that works on non-DOT off-road knobby tires; street tires should *never* be mounted backwards.)
- For information on a method of changing motorcycle tires at home, using a stand made with only $50 or so of parts, see:
    - http://www.clarity.net/~adam/tire-changing.html

Related photos:
Pre-2K date code example 1.
Pre-2K date code example 2.
Pre-2K date code example 3.

ELECTRICAL & BATTERY

- Check to make sure the headlights (high/low) work. (On some bikes, the headlight won't come on until the engine does, so you may need to start the engine to test this.) Make sure the turn signals work, **make very sure that the oil pressure light comes on when you turn on the ignition, and goes out when the engine starts!** Make sure the neutral indicator light works. Make sure the starter works. Make sure the brake levers light up the brake light. Make sure the horn works.
- Basically, check all the switches as well as the signalling and instrument-cluster lights. (Bulbs are pretty cheap to replace.)
- A common way to steal a motorcycle is to hammer a large flat-head screwdriver into the ignition switch, and to start the bike by forcing (breaking) the lock. Check to make sure that the key works, that a wrong key (or screwdriver) doesn't work (careful not to break it yourself!), and for any possible internal damage. Ignition switches [1] can be a pain to replace, since they (obviously) match the same key profile of the seat release and gas cap release locks. There *are* some aftermarket units available, but you're better off going to a dealer to get OEM replacement parts. Probably around $200 + 1.5 hours of labor to replace.
- If the bike has one*, you should also test to make sure that the sidestand's engine cut-off is working. These are designed to prevent you from riding off with the sidestand down, taking a left turn, and getting flipped onto the ground. They work in different ways -- some prevent the engine from starting when the sidestand is down, some only prevent the engine from running when the sidestand is down *and* the bike is in gear (i.e., not neutral.) (Still others will let you put the bike in gear while the sidestand is down, simply killing the ignition as soon as you release the clutch, but these are kind of rare.) The design

where ignition is killed when the bike is put into gear is a bit more dangerous to test than the design where it won't let the engine start with the sidestand down. You may want to start by putting the bike in neutral and trying to start the engine (once you know that it actually will start!) with the sidestand down. If it does start, we need to test to see if the safety has been removed or if it's just the other design... grab the clutch all the way in, hold the front brakes on **hard**, make sure the sidestand is down, and click the bike into first gear. If the engine dies, the sidestand cut-off switch works. If it continues running, the sidestand cut-off switch has been removed from the circuit. This might mean the bike has been raced, but it's more of a clue to check elsewhere for evidence of racing, since by itself it doesn't really mean anything. *If the sidestand cut-off switch does not work as designed, you must be **very** careful (if you buy or test-ride the bike) not to ride off with the sidestand down!* Now that we're done with this test, put the bike back into neutral, release the clutch, and kill the engine.

- *=Some bikes won't have such a cutoff. This includes certain Ducati models and a wide variety of older bikes. As noted above, if you buy a bike without a (working) sidestand cutoff, you'll need to be very careful to avoid riding off with the sidestand down.
- Make sure the kill switch on the right handgrip stops the engine when it's running. (Dirt bikes will have a kill button on the left handgrip.)
- Batteries are almost always located underneath the seat, though some modern V-twin sportbikes locate it beside the engine, and many dirt bikes and older standard bikes locate it behind a plastic side cover below (or below and slightly behind) the seat.
- Batteries are very hard to test without the appropriate tools, and even then they're kind of mysterious and unpredictable. For our purposes, if the battery starts the bike, it's good. If it doesn't, $50 to replace. Without hearing "good" batteries, it's hard to tell what "good" sounds like, but if the starter's cranking is obviously weak, that's probably a good indication that the battery is too. As noted below (in ENGINE/FLUIDS/CARBURATORS), warm bikes start much easier, so take that into account when making a subjective evaluation of the cranking sound.
- If the bike doesn't have an electric starter (i.e., it's a kick-start), there's no good way to test the battery without examining the lead plates for white sulfide deposits (bad) and checking the specific gravity of the acid with a battery hydrometer. Most auto parts places should carry those; just make sure you get one with a long, thin tube, since most cage ("car") battery hydrometers are too large to fit into bike batteries. On the other hand, if your bike is a kick-start, it doesn't depend on the battery too much, and checking it is less important.
- If the headlight gets brighter as the engine revs, the battery could be discharged (or dead), though it's probably more likely that the voltage regulator is toast. $80-120 for a new one, plus half an hour of labor to install. Don't compare brightness at idle to brightness at 10,000 rpm... compare ~2,500 rpm to ~7,000 rpm.) It's hard to diagnose this problem by headlight brightness alone, but for starters, try charging the battery and repeating the test, or, if that doesn't work, *replacing* the battery and repeating the test. If it's still getting brighter as revs go up, try testing voltage across the battery at ~3,000 rpm... should be 13.8v or so. Less than 13.2 (or more than 14.4) and you probably have a bad stator (~$300 for a new one, ~$150 to get the old one rewound) or a bad regulator (prices as noted above.) This probably sounds pretty involved, and it probably is, if you don't know what you're doing. You may want to look for a bike that won't require as much work...

taking the bike to a mechanic for a professional diagnosis will cost you $50-$100 or so, but will help you make that decision. If you have your heart set on *this* bike, it's probably worth it; otherwise, it probably isn't.

Related photos:
[1] Ignition switch

SUSPENSION

- Ask the owner how long it's been since the fork seals have been changed (miles and/or years.) They should probably be changed every 15-20k miles. Replacing them is not necessarily a complicated fix, but it is if you don't have the right tools, and most people don't. (Approximately $100 of parts -- fork bushings usually get done at the same time -- and 2-3 hours of labor.) Straddle the bike, grab the front brake, and push down vigorously on the forks. They should go down and come back up with some resistance. Do this a few times. Inspect the chromed fork legs. [1] They should a) be smoother than a baby's bottom with **absolutely** no scratches, nicks, or roughness, and b) be utterly and totally devoid of little oil droplets. (Some nicks/scratches/gouges/surface rust can be polished off, but if they can't, new fork legs can be expensive. Have a professional mechanic advise you on what the prognosis is.) If, after bouncing the forks, you see little rings of dirt, that's probably fine, but wipe them off with a rag and bounce the front suspension a couple more times. Not good if you see oil left on the fork legs after you do this.
- Check the steering head bearings and swingarm bearings as mentioned in the section on centerstand checks, below. (If the bike doesn't have a centerstand, you might be able to use a jack or work stand to raise the bike off the ground, but be very careful not to damage a bike that you don't own.)
- The suspension should move up and down almost silently if you bounce it up and down. Clunking or squeaking noises are bad. Binding is very bad. Run away.
- Suspension fluid needs to be changed every year or two, as it tends to break down and thin-out over time. Ask the owner how long it's been since the fork oil has been changed. (The suspension oil in the rear shock of most bikes isn't generally user-serviceable, but should be changed periodically by a professional suspension shop nevertheless.)
- Get someone to stabilize the front of the bike, you stand behind it. Push down on the bike's grab rail (or passenger seat), **hard.** The bike should spring back up, but with a little resistance. If you don't feel any resistance at all (like you're just pushing down on a spring), it's time to replace the rear shock. (Reasons: either a seal has failed inside the shock, or the oil has broken down so much that it doesn't provide useful resistance.) Around $350 from a dealership, plus 3 hours of labor to install it. If you're not sure if you'd know a blown rear shock if you felt one, don't worry about this one. But do this to all the bikes you look at (including new bikes at dealerships) and you'll know what a rear shock should feel like.
- As noted in HAS IT BEEN CRASHED?, check to make sure the fork tubes are straight (not bent) and parallel (not twisted). Sight down them and pay particular attention to the chrome tubes.
- Certain premium aftermarket suspension units (Penske, Ohlins, Fox, Race Tech) offer substantially increased suspension performance and are fully rebuildable. Expect to be

asked to pay a little more for these units (as described in ACCESSORIES, PRICE, and DEALING, below.) These units also tend to be able to go longer before needing service compared to stock suspension components. Aftermarket rear shocks often have remote reservoirs (typically a cylinder "piggybacked" to the main rear shock body or attached to the frame and connected via a hose), though since many late-model high-performance bikes come from the factory with remote-reservoir shocks [2], it pays to do a little research to find out whether the bike you're looking at came with one stock, or had some money put into upgrading its suspension.

Related photos:
[1] Front wheel, including fork legs
[2] Rear wheel, including location of shock

WHEELS

- Look carefully around the circumference of both sides of both wheels and look for dents [1]. Around $100 (each) to get them straightened, plus labor to get them off the bike, the tires off, the tires back on, and them back on the bike. Ugh! It's usually easier to tell if the wheels are dented when they're spinning. So get them up in the air and spin them, if possible. Remember to check both sides. More on wheel damage at the end of this section.
- Check the speedometer/odometer operation... there are two common designs of this system... if the bike has a cable that goes from the front axle (usually on the left side) up into the instrument cluster:
    - Get the front wheel off the ground (see CENTERSTAND CHECKS, below), spin the front wheel as fast as you can and see if the speedometer registers anything. If the speedo needle doesn't rise, check to see if the trip odometer's 1/10th mile digit has moved after the wheel has spun for a while. If it hasn't, the speedo is probably disconnected or just doesn't work.

  If your bike doesn't have one of these cables off the front axle, the bike's speedometer/odometer is probably keyed off the countershaft (transmission output)...

    - Get the rear wheel in the air, start the engine, get the bike into second gear, and let it idle... the speedo needle should rise a bit, and the odometer digits should scroll slowly. If it doesn't, the speedo/odo is disconnected or just doesn't work.

  If the speedo/odo doesn't work, it's hard to know how many miles are on the bike, since you don't know how long it hasn't been counting off miles. *Run away!*

- Again, if you can get the wheels in the air (see CENTERSTAND CHECKS, below), see if the wheels spin freely. Wheels that drag could be either blown wheel bearings or dragging brakes. Some brake drag is normal, so examine this on a number of bikes and you'll know when something is out of the ordinary. (In general, though, wheels spun fairly hard should spin for a couple of seconds before stopping. Rear wheels won't spin as

long, since they'll be giving up some of their energy towards overcoming chain/belt/shaft friction.)

- If the bike doesn't have a centerstand, and you're feeling physically up to it, put the bike's sidestand down and pull sideways on the handlebars or the rear sub-frame to get the bike to pivot on the sidestand and lever a wheel up into the air. This is a little dangerous -- it's very easy to drop the bike! -- but not too hard if you've had some practice. It's the only good way to get wheels in the air without a swingarm/front-end stand or a centerstand. It is highly recommended that you have a friend on-hand to help with this.
- If the bike has spoked (rather than cast aluminum "mag") wheels, check to make sure that the spokes are all there and wiggle them to make sure they aren't loose. Loose spokes are a sign of neglect.
    - If you can get the wheels into the air, spin them, and hold something rigid against the spokes as they turn -- the handle of a screwdriver works well for this. (Careful not to scratch the spokes -- you don't own the bike yet!) The pinging sounds that the spokes make as they strike this object should sound roughly the same, since, ideally, they're all under the same tension. A change in pitch indicates spokes of different tightness. Easily fixed, but a sign that regular maintenance hasn't been performed.
- Magnesium or carbon-fiber wheels require excruciatingly careful inspection. (And their presence may be a good indication that the bike has been raced.) These types of wheels are extremely lightweight, but they tend to crack rather than bend, and cracks can lead to sudden and catastrophic failure. If you're buying a bike with magnesium or carbon-fiber wheels, spend some extra time examining the wheels to make sure there are no cracks. (Unless the seller tells you that the wheels are magnesium, it'll be hard to tell, since magnesium and aluminum wheels both look the same when they're covered with paint.) Wheels made by "Technomagnesio" or "Marchesini" are likely to be magnesium. Carbon-fiber rims are usually unpainted, as the first law of aftermarket motorcycle parts is, "Thou shalt show off thy pretty carbon fibers whenever possible."

  Related photos:
  [1] Side of bike showing bent front wheel

CHAIN/SPROCKETS (and belts)

- Grab the chain at the rearmost point on the rear sprocket (warning: greasy!) and pull backwards. If you can pull it off the sprocket enough to expose half of a sprocket tooth (or more), it's time for a new chain. $100 + an hour of labor to install. Some rust on the side plates of the chain is fine, but the rollers (the round middle part) should be shiny and smooth.
- Sprocket teeth should be absolutely symmetrical -- they'll tend to get hooked as they wear. Look at some of the exposed teeth from the side to check the individual teeth for hooking. [1] Don't forget to check the front sprocket, too, if visible. (It's often covered.) Hooked teeth = new sprockets. $60 total for two new sprockets, plus an hour or so to install.
- If the chain uses a clip-type masterlink, make sure the clip is still present. (The clip slides over the pins that extend through the sideplate of the masterlink, and is designed to

prevent the sideplate from sliding off the pins. They're extremely common in aftermarket chains.) Make sure the closed end of the clip faces toward the direction that the chain rotates (otherwise it's installed improperly and more likely to fall off.)

- If the bike has a centerstand, put the bike in neutral, raise the rear wheel in the air, and you can check the chain condition. By spinning the rear wheel slowly (by hand, **never** with the engine), you can feel for tight spots and other problems.
    - Except, please, for goodness sake, don't stick anything you care about (e.g., your fingers) near a moving chain -- plenty of people can't count to ten anymore because their fingers got mangled when they got pulled into a moving chain and sprockets. Same goes for belts and pulleys (discussed below): fingers and moving parts do **not** mix -- keep them apart!

  Spin the wheel a bit, stop it, check the chain for kinking or tight spots. Spin the wheel a bit more, repeat. Tight spots and kinked/frozen links probably indicate the need for a new chain. If the bike doesn't have a centerstand and you're feeling brave, put the side stand down and have someone lean the bike over so that the sidestand is holding the rear wheel off the ground. (See WHEELS, above.) Then do the aforementioned test of chain smoothness.

- Most riders tend to have their chain set too tightly, massively accelerating chain wear and adversely affecting suspension action. With your friend putting all his/her weight on the seat, the chain should have at LEAST an inch of play at the middle of the bottom of the loop.
- In response to asking this page's readers how to properly check and adjust drive belt tension (if the bike uses a belt for its final drive, as many Harley-Davidsons and Buells do), it seems that belt drive bikes should come with tension gagues in their toolkit, and that the owners manual for the bike will explain how to check the belt tension. (Thank you for that assistance, readers.)

  Related photos:
  [1] Worn front sprocket

EXHAUST

- Look for holes (from a crash or from advanced rust.) Sometimes you can hear exhaust leaks, usually as a sort of staccato "chuffing" sound made as exhaust pulses escape through the rust hole.
- Rust on the exhaust is usually on the surface only, and thus merely cosmetic, but advanced rust (older bikes?) may have caused holes in the exhaust pipes, requiring replacement. It is possible to patch holes in exhaust pipes, but it rarely looks good, and it also rarely makes sense -- often the pipes rust in a number of places, not just one. It probably isn't worth it to patch them all, but that's up to you and your local exhaust shop.
- Exhaust pipes are a common aftermarket accessory... see ACCESSORIES, PRICE, and DEALING, below. Loud pipes don't "save lives" (a common motorcycle aphorism), they attract cops. But they also sound nice. **:)**

- If the bike has more than one exhaust cannister, start the engine and, holding a piece of paper (**not** your hand) a few inches back from the exhaust tips, feel to see if the pressure coming from each cannister is roughly equal. It should be -- if it isn't, one of the cylinders probably isn't firing. (You don't want to use your hand for this because if the bike backfires, anything behind the exhaust pipes is going to get badly burned.)
- This next step is optional and should only be performed if you have easy and unrestricted access to the exhaust pipes. If you want to try this, rehearse it with a "dry run" when the engine and the exhaust pipes are cold -- having your arm halfway trapped in a confined space next to thousand-degree pipes is not a good situation to get into. (For example, there is definitely not enough room to reach in and test the exhaust pipes in photo [1], below.) So:
  Be extremely careful with this step, and only do it if you're confident that you can do this without burning yourself! Cover your fingers in a folded-up & thoroughly water-soaked paper towel, and very briefly touch each individual exhaust header pipe [1], about 7-9" from where it comes out of the engine. (The header pipes will potentially be over a thousand degrees, so you don't want to touch the paper towel to them for long at all! Try to do this shortly after the engine has been started.) Hissing indicates a hot pipe; a cold pipe (when others are hot) indicates a cylinder that isn't firing. A variety of things could cause this -- no spark, clogged carburators, vacuum leak, etc., so it's hard to give you an idea of how much it would cost to repair. Probably between $5 and $200, once the specific problem is identified. If you're hearing a hissing sound from where you touched the pipes, and you're not using the wet paper towel trick (mentioned above), that's your skin that's hissing as it burns -- you're giving yourself third degree burns, and you should stop immediately.

  Related photos:
  [1] Header pipes visible through fairing

ENGINE/FLUIDS/CARBURATORS

- Did the seller warm up the bike before you got there? (See if the engine cases are warm, but they might be hot, so be careful and don't get burned. Engines will stay warm for a couple of hours; exhaust pipes get MUCH hotter much faster but cool quickly.) A pre-warmed engine might have been started & warmed-up to mask cold-starting problems, so this might be a good thing to check first... then you can let the engine cool down as you test other things, and get back to checking the engine after it's had a little more time to cool. In particular, if the bike you're going to look as is a kick-start, make sure you can kick-start the engine when it's cold.
    - You'll probably be able to sense heat radiating from a surface before you actually have to touch it, but when *touching* potentially hot surfaces, use the back of your hand. Your body's reflex reaction to dangerous heat is more likely to pull your hand away if you use the back of your hand. (But don't get into this situation in the first place! Be careful around hot surfaces, or surfaces that might possibly be hot. Use common sense.)
- The engine should start uneventfully (with some choke*, if it's cold) and sound reasonably good. If you hear obviously bad sound like loud clacking sounds or sounds

like shaking a coffee can full of marbles, run away and don't look back. The engine should rev smoothly off idle. Don't redline the thing, but after it's fully warmed up, twist the throttle and see what happens. Hesitation & stumbling = carburation problems.* A test ride will help you gague whether or not these will be easy to live with. The throttle grip, when released, should snap closed sharply, no matter how the handlebars are turned. Try turning the bars full-lock left and right, and test cable action at both extremes as well as in the middle. Resistance at the extremes but not in the middle is probably just a cable routing issue. Half an hour of labor -- if that -- to fix. If the cable moves with resistance everywhere, the problem is *probably* the carbs, not the cables themselves. See below. While the bike is running, and in neutral, turn the bars -- does the engine rev without even twisting the throttle? Cable routing problem. When you give the throttle a little blip with the bars turned all the way, does the engine rev and keep revving? Cable routing problem.

- *=These comments refer to carburated bikes. Some more modern bikes are fuel-injected: instead of carburators, the bike is equipped with throttle bodies and fuel injectors. Fuel-injected bikes sometimes have a "fast idle" lever instead of a choke lever, but some detect the need for an enriched (choked) mixture by computer, and automatically adjust the fuel-injection accordingly. You should not experience any "carburation" problems with a fuel-injected bike, and if you do, they may be harder to correct than on a bike equipped with carburators.
- Some bikes use a fuel pump which may need to build pressure before the bike will start. If you flip the ignition switch to "on" and hear a whirring sound from the gas tank, wait for it to finish before thumbing the start button. (If you don't, and you know the bike has a fuel pump, they're about $100 + 1-2 hours of labor to replace.)
- If the bike has a centerstand, put the rear wheel in the air and try shifting throught the gears to make sure they all engage properly. **Don't** spin the elevated rear wheel too fast -- if the bike slips off the cenerstand, it'll launch you into next week. Letting the bike idle and clicking through the gears is fine. Always keep the front brake applied when doing this, just in case.
- The oil level should be visible through a sight glass or dip-stick, typically on the right side of the engine. Make sure the level is between the upper and lower edges of the glass (or marks on the stick) when the engine has been off for at least a few minutes and the bike is on level ground. Way too low or too high is very bad, but just outside the range probably hasn't caused any damage. The surface level doesn't have to be right in the middle, but it should be visible through the glass. See below for color analysis. **Ask the owner when the oil was last changed. The owner better know.** As far as frequency goes, at least every 5k miles or 6 months is fine, and always before storing the bike for a while (e.g., before the winter). (As noted in the section on QUIZZING THE SELLER, this interval only applies for street bikes -- dirt bikes should get oil changes much more frequently.)
- Checking oil color... look through the sight glass. If your bike doesn't have one, you'll need to dip something down into the oil fill-up spot. Either use a dowel or popsicle stick, or roll up a paper towel. Pull it out and look at what color you've got:
    - honey-colored: very recently changed (fades to black with time/use)
    - black: old oil -- ask owner when it was last changed
    - white milky streaks: water is leaking into the oil (see below)

    - grey oil: lots of aluminum particles in oil (semi-OK on dirt bike, not OK on street bike)
    - shiny metal flecks: run away -- major abnormal engine wear
- If the throttle cable twists with a lot of resistance (and then won't snap closed), there are a couple of possibilities, none of which is really good news:
    - *The carbs may be hopelessly gunked up with gas and varnish.* If the bike won't start, that definitely points to this possibility (rather than either of the next two.) A good carb cleaning will either cost around $200 of shop labor or $5 + 1-3 hours of your time, depending on whether you have a shop do the work or you do the work yourself. (Warning: not for the inexperienced or mechanically faint of heart -- there are lots of small and easily-confused parts -- but if you've done it before, it's not too bad.)
    - *The handlebar itself may be slightly bent, preventing the twistgrip's throttle tube from sliding well*. Look very closely -- sometimes it's hard to tell unless you really scrutinize it (or remove the throttle tube.) Bent handlebars can cost $75 or more to fix, and are a good indication that the bike was crashed and may have other crash damage. Be on the lookout.
    - *The throttle cables may partially seized, or simply routed improperly.* This may mean that the carbs are fine. It's very hard to check while you're visiting a prospective acquisition, but try straightening cables or untwisting them and see if the behavior changes substantially. If straightening them or untwisting them makes them slide a little easier, they're probably routed around the frame the wrong way (hamfisted home mechanic alert!), and they can be fixed fairly easily. If not, new cables will probably run you about $20 each, plus about half an hour of labor to install.
- Some engines use air and oil for cooling, some are water cooled. The comments below about checking the coolant or worrying about coolant in the oil apply <u>only</u> to liquid-cooled models, <u>not</u> to air- or air/oil-cooled models.
- If the oil has a white streaks in it (look at the sight glass) that's water -- beware! Water in the oil could be two things -- condensation from the air in the engine, or a leak in the coolant system that's letting water escape into the lubrication system. (Guess which one isn't so bad and which one is really bad.) Condensation will burn off... let the bike run for a while (20-30 minutes?) and see if the white streaks in the oil are gone. If not, you're probably looking at major engine work to replace gaskets (or worse.) Side note: two-stroke with milky white oil can be repaired much easier than four-stroke engines. ("Two stroke" is an engine configuration, and has nothing to do with how many cylinders the machine has. Two stroke bikes sound just like chainsaws, because chainsaws use two-stroke engines.)
- Check coolant level. Find the radiator overflow bottle, and see if the coolant is between the "high" and "low" lines on the bottle. If you can't find the coolant overflow bottle, trace the thin coolant tube back from the radiator cap assembly -- it almost always goes to the coolant overflow bottle. If the coolant is clear (i.e., it's water) or is a light pink, it may be an indication that the bike has been raced. (Roadracing organizations don't allow the use of antifreeze, so race bikes run with plain water or plain water with a product called WaterWetter that makes the water pink.) This does not apply to dirt racebikes, which will probably have green coolant.

- The coolant itself should be a neon green, not brown or even a murky green-brown. You'll need to remove the radiator cap to check the coolant color, something you *never* want to do when the engine is still hot. If the radiator cap is hot (be careful!), **do not** open it -- come back to this step later, when the engine's had time to cool down. If you *can* safely open it:
    - Pure, clear water is bad -- it's at least an indication that the coolant system has been run without corrosion inhibitors, and also an indication that the bike may have been raced.
    - Pinkish-tinted water is also a possible indication that the bike has been raced.
    - Bright green coolant is good.
    - Brown-colored coolant either has rust in it (bad!) or oil in it (bad!). The former indicates that the insides of the engine have started rusting -- run away! Oil in the coolant probably means trouble with the head gasket or the O-rings on the oil cooler (if the bike has one.) Bad head gaskets is Very Bad, failed O-rings is only a little Bad. I'd have a professional mechanic look at the bike so you know which it is. And/or consider giving up and looking at other bikes.
    - Finally, *no* coolant in the radiator is extremely bad -- run away!
- One other head gasket check... You won't notice this unless you spend a fair amount of time with the bike, but a partially blown head gasket will allow the bike to consume coolant over time, which will gradually lower the coolant level in the overflow bottle. It's OK for the bike to emit white smoke out the exhaust pipes as it's warming up, but after it's been running for a while and it's nice & hot, the exhaust gasses should be invisible. White smoke coming from a hot bike is a sign that the head gasket is leaking badly.
- Bikes should not emit blue smoke. White smoke (as mentioned above) is water burning off, blue smoke is oil burning. Why's the oil burning? Either because the bike is a Harley or because its rings and/or valve stem steals are worn out. If the bike emits blue smoke, have a mechanic do a compression test or a leakdown test (see below.) Or give up and look for other bikes.
    - Side note: it is very normal for two-strokes to burn oil and thus emit blue smoke, since they're designed to be lubricated by oil mixed into the gasoline. This smoke tends to go away as the two-stroke engine heats up, but they're often called two-*smokes* for a reason. As noted above, two-strokes will sound like chainsaws.
- Needless to say, I should think, fluids leaking from the engine are a Bad Thing. Probably just new gaskets, but possibly worse. If you don't feel qualified to decide, I'd recommend having a mechanic give you his/her opinion, or simply giving up on the leaker.
- Engine compression: engines are basically air pumps, and must seal tightly to work well. Engines that don't seal well will be hard to start, will burn oil (blue smoke), and will have reduced power and fuel economy. Old engines will tend to exhibit this more than low-mileage ones, but young engines that have been abused may also have low compression numbers. Unless you know what you're doing, have a shop do a compression test on the bike. It's not a critical test, but it might give you some evidence one way or the other if you suspect that the bike may have been abused.
    - Dirt bikes and some older street bikes have kick-starters that enable you to spin the engine directly. So even if you don't have a compression tester, you can at least test to see if you can feel some compression. If you spin the engine with the kick-starter and feel it get substantially harder to spin at certain points (almost like

there there's a "tight spot") -- that's good: what you're feeling is compression. If you spin the engine with the kick-start lever and it doesn't really feel like there's a tight spot, the engine is probably suffering from a serious lack of compression. Run away, or, if you have your heart set on it, have the bike checked out by a shop!

CENTERSTAND CHECKS

- If the bike has a centerstand, you can test some other stuff. Put the bike up on the centerstand, have someone sit (or push down hard) on the passenger seat so the front wheel lifts in the air, then grab the sides of the front axle and try to move the front wheel forward and back (not twisting.) It shouldn't be able to move in this direction. The front wheel should rotate from full-lock left to full-lock right without binding (improper cable routing?) or feeling notchy (worn-out steering-head bearings ... see below.)
- Bad steering head bearings will feel faintly notchy, typically when the handlebars are centered. Potholes and hard landings (from jumps or wheelies) can cause little dents in the steering-head bearing races. These little dents will make the bearing feel notchy as you (slowly) rotate the bars past the notched point. With the front wheel in the air, move the bars back and forth slowly, feeling for notches. (Make sure that cables and control wires aren't causing any irregularities that you may feel.) If the steering head bearings are notchy, they need to be replaced -- figure on $60-80 of parts and 2 hours of labor.
- Spin the front wheel and apply the brakes ever so gently. There shouldn't be a pulsating feeling from the pads. A pulsating feeling at the lever means new brake rotor(s); a pulsating sound (by itself) is probably nothing, but it could be an indication that the rotors are warped, and you should make an effort to test them at speed. Checking the rotors by spinning the wheel is pretty hard to test reliably, but do your best. Spin the wheel hard and apply the brakes gently so they slow down rather than just *stop*. As noted in the section on brakes, brake rotors are around $150-250 each.)
- Next... put the front wheel back on the ground and grab the rear axle. Try to move the axle side to side. (You're checking for wear at the swingarm's pivot.) If things just feel loose back there, figure on $150 of parts (bearings, seals, etc.) and ~3-4 hours of labor. You shouldn't be able to move the swingarm side-to-side independent of the whole chassis. If you can, the swingarm bearings are badly worn.
- Check axle alignment. Hard to do 100% properly without a pair of 8' straight-edges, but look at the axle alignment marks on the sides of the swingarm and/or sight down the rear wheel to see if it's in line with the front one. Not something that's easy to detect, and it'd probably suffice to just look at the axle adjustment marks on each side (look for hash marks on the swingarm, right near the axle.) There's a way to check axle alignment with 10-15' of string, but it's a little hard to explain. Fortunately, Motorcycle Online has published a pretty good article on how to do it.

SERVICE

- Ask the owner if the bike has been serviced according the manufacturer's specifications, and, if so, for service receipts as verification.
- If you feel uncertain about the bike's condition, it's not unreasonable to request that the seller take the bike to a mechanic of your choosing for inspection -- at your expense. It's also not unreasonable to expect that the seller might to try to sell to someone who won't make him go through the added hassle of doing this.
- As noted in the FIRST THINGS FIRST section, labor rates are typically around $50/hour, though factory-trained mechanics for European marques (BMW, Ducati, Triumph, etc.) might charge a little more.

DIRT BIKES

- Look for cracks and dents on the frame, near the engine mounts. These can get cracked on bikes that have experienced a lot of hard landings.
- Pay particular attention to bearings (wheel bearings, swingarm bearings, steering head bearings) -- dirt riding and frequent post-dirt pressure-washing are a bearing's worst nightmare. Check them for notchiness, looseness, etc.
- Many dirt bikes will have been raced in local motocross races, so while the standard caveat about bikes that have been raced still applies, you may have more trouble finding a bike that has led an easy life.
- Particularly with smaller dirt bikes, you should ask the seller who the main rider has been -- adults tend to be more gentle with bikes than kids.
- Ask the seller where the bike was ridden -- sandy/dusty areas may cause more wear on chains/sprockets/bearings and *will* require more frequent air-filter cleanings than an equivalent amount of time spent riding trails.
- It's usually easy to remove the flywheel cover on two-stroke dirt bikes (typically on the left side on recent models) -- the rubber gasket won't be damaged by removing the cover. Pull the cover off and, grabbing the flywheel, try to move it off its axis. If you can feel movement, either the flywheel is loose, or the crankshaft bearings are badly worn. In other words, you may just need to tighten the flywheel mounting bolt(s), or you may need to have the cases split and have the lower end bearings replaced. ($40-$70 of parts a couple of hours of labor.)
- If you take this flywheel cover off and see oil dribbling out, the crank seal has failed and the engine will need to be disassembled to fix it. ($30 or so of parts and a couple of hours of labor.)

QUIZZING THE SELLER

- When the seller is going over the bike, giving you his sales pitch, try to ascertain whether or not this person really *cares* about the bike's condition. When you come across something wrong -- say, a handlebar that got slightly bent in a parking lot tip-over, does the owner seem to think that it's no big deal and doesn't need to be replaced, or did the owner point it out himself, and acknowledge the fact that it needs fixing? Try to figure out if the owner seems like the kind of bike-savvy person who maintains his bikes well,

or someone that doesn't keep up with scheduled maintenance and just gets a different bike when he's worn one out. You can often tell a lot about someone through intuition alone.

Ask the owner:

- Has the bike ever been down?
  - If the seller says, "no," but you see evidence of crash damage, ask the seller to explain.
- Has the bike ever been raced?
  - If the seller says, "no," but you see safety wire, tires with ragged edges, aftermarket case guards, etc., there better be a good explanation.
- When was the oil last changed?
  - Street bike oil should be changed at least every 5000 miles or six months, whichever comes first.
  - Dirt bike oil should be changed after every couple rides, or at least every couple hundred miles. For dual-sports (on/off road), whether the oil change interval should be more like a dirt bike or more like a street bike depends entirely on what percentage of their use was in the dirt.
- What is the maintenance history of the bike?
  - Is the bike overdue for regular servicing, like a valve adjustment, a carb sync, etc? (If the owner hasn't lost the bike's owner's manual, open it up and look at the maintenance schedule to see if it was followed properly.)
- How old (years & miles) are the tires? Ask the seller if he thinks the tires are good.
  - See the section on tires, above to evaluate their condition for yourself.
- What modifications were made to the bike?
  - Heavily-modified bikes should probably be avoided. (See ACCESSORIES, PRICE, and DEALING below.)
- Off-road bikes: How often is the air filter cleaned? Replaced?
  - Dirt bike air filters should be cleaned or changed frequently, and fairly proportional to how frequently the bike sees sandy & dusty conditions. Unless you're looking at a dual-sport (street + dirt) bike, the air filter should be cleaned or replaced after every couple of rides. Ditto for the transmission oil.
- Off-road two-strokes: When's the last time the bike got a fresh top end?
  - Believe it or not, manufacturers typically recommend that off-road two-strokes should get a new top-end after every ten hours of use. That's pretty conservative -- I change everything (pistons/rings/wrist pin/etc) every 30-40 hours of use, and just the rings somewhere in the middle.
- See the section on dirt bikes, above, for more questions specific to dirt bikes.
- Come right out and ask the seller:
  - Why are you selling the bike?
  - Is there anything wrong with this bike?
  - Is there anything wrong with it that you haven't pointed out?
  - Are there any maintenance/safety issues that I should be aware of if I buy this bike?
  - What work would you do on the bike if you were going to keep it for another year or two?

- Is there any reason I shouldn't buy this bike?

Sometimes the simple act of asking these questions in a very blunt manner will get the seller to reveal things that they didn't think of -- or didn't plan on mentioning.

- Warning sign: if the seller's main selling point is that the bike is "really fast", there's a better-than-average chance that you're talking to someone who abused the bike. Beware.
- Paranoia department: How do you know that the bike actually parts that the seller claims it has? Be careful, especially if the seller seems unscrupulous. Just because the seller claims that the bike has MegaPowerBlast cams (or some other internal part that you're not going to see) doesn't mean that it does. Ask to see a sales receipt. (Putting an aftermarket manufacturer's sticker on a stock component is a lot cheaper than buying the aftermarket upgrade.)

ACCESSORIES, PRICE, and DEALING

- If the owner has lost the owner's manual and/or tool kit, drop a little money off the price of the bike. They're usually around $15-20 each to replace, and they're definitely nice things to have, particularly if you're new to riding.
- Similarly, even if you don't plan to do work on the bike yourself, it's nice to have a service (or "shop") manual, and I'd recommend picking one up even if the owner isn't selling one with the bike. You can learn a lot about your bike this way. Factory service manuals are usually the best, but Clymer and Haynes sell manuals for most models. Honda publishes a "Common Service Manual" for all their bikes (excellent and applicable to other makes too!), and a separate, smaller publication with specifics for each model. (You'll probably want both.)
- Often times the owner will have added accessories to the bike and will use them to justify an inflated price at sale time. (This includes helmets, but see below for those.) Exhaust pipes are another common example. The important issue is, would you pay extra for the accessories? If you don't really care about the accessories, they have no value to you, and you shouldn't pay more for them. If you want them (if you value them), only then are they worth paying more for. Note that "more" doesn't mean "more than the seller is asking", but "more than a base-line bike without these accessories." If the seller isn't willing to deal, find a bike that doesn't have said accessories, and you won't have to pay more for stuff you don't want.
- Some accessories are very nice to have, but you need to make that decision for yourself. Here are some examples:
    - *Exhaust:* Aftermarket exhausts are generally lighter and louder than stock. If this is something that interests you (something you're willing to pay a little more for), find or figure out whether the aftermarket exhaust is a "full system" (replacement of all the pipes back from the engine) or a "slip-on" (replaces only the exhaust cannister, not any of the pipes.) Depending on condition (and whether the jetting is right -- see the section on carburation, above) full systems are probably worth $100-300, slip-ons are probably worth $50-200.

    - *Tank "Bra":* Without a tank bra, metal zippers, buckles, buttons, and rivets on pants will scratch the back-side of the tank. Probably worth around $20.
    - *Centerstands* let you perform some road-side maintenance that would otherwise be impossible -- but know ahead of time whether the centerstand is a standard or optional item, since it'll affect whether the "blue book" price of the bike includes the centerstand. (Same goes for all these accessories, really.) Probably worth around $30-50.
    - *Suspension* components are a frequent upgrade. Units from Penske, Ohlins, Fox (and others) typically perform better than stock equipment, giving the bike better handling and comfort. Expect the seller to want a little more for such units. Typically $200-300 more or thereabouts. (Fox shocks are typically $550 new, Ohlins/Penske units start around $750.) Race Tech sells (among other things) fork tuning components -- their hardware is likely to be inside the forks, out of sight. Prices vary substantially -- figure on an extra $50 to $100.
    - *Extra Storage:* Tank bags are also nice, since they let you carry more cargo. On the other hand, if that's something you never plan on using, who cares? Also potentially very nice: "hard" (plastic) or "soft" (nylon/leather) luggage. Cost will vary with condition, quality, and manufacturer... tank bags $30-60, soft luggage $80-120, and hard luggage $200-600.
- Modifications: generally, you'd be very wise to stay away from heavily-modified bikes. Even when done by a competent professional, high-compression pistons, overbores, high-performance cams, porting, etc. all lead to reduced engine longevity (or increased maintenance, or both) in the name of increased performance. When done by amateurs, these mods are instant engine killers. Make sure you ask the seller what modifications were made to the bike.
- On price... know what the bike is worth! Motorcycle Consumer News publishes a used bike prices list a couple of times a year. (Or visit the Kelley Blue Book web site's Motorcycle blue book values section, or NADAguides.com.) The author has found the Motorcycle Consumer News/AMA prices to be far more accurate when purchasing from private sellers. (Regarding the KBB site: used bikes being purchased from private sellers should be around half-way between the trade-in/wholesale price and the retail price. Used bikes being sold by dealers will probably be very close to the retail price.) Finally, you can also call the American Motorcyclist Association (1-800-AMA-JOIN) and purchase their used bike pricing guide. (Cost: around $9 or $10, I think.) After you get your bike, consider becoming an AMA member.
- Most used bikes are sold "OBO" ... or best offer. Offer a little less than how you value the bike (see above), and see if you can come to an agreement somewhere close to where you value the bike. And remember, $50 or $100 means very little in the long run. Be flexible. But don't be afraid to walk away and look at other bikes -- there are plenty of other bikes out there, and chances are this one will still be available if you want to come back later. The longer a bike has been for sale, the more price-flexible the owner is likely to be.
- Bike prices follow the laws of supply and demand like any other good... in the winter, when no one wants to ride and everyone needs to pay off Christmas-induced credit-card headaches, bikes are cheaper. In the spring, "when a young (wo)man's fancy turns to motorbikes," bikes are more expensive.

- You may have your own preferred method for arriving at a number to offer for the bike, but here's how I do it: take the "blue book" value of the bike (see above), and deduct the cost of repairs for each problem with the bike. The used bike buying guides assume a clean, completely functional vehicle, with appropriate wear and tear for its age. So it makes sense to deduct the cost of repairs to bring a used bike up to that standard. If the owner is asking less, great, if the owner is asking more, see if you can work them down a bit. If need be, explain how you arrived at your number -- sometimes the owner won't know about problems you've found! (Or wasn't including them in the price because (s)he was hoping you wouldn't notice.)
- As noted previously, beware used bike prices at dealerships, and prepare for sticker shock. A popular dealership local to the author frequently purchases used bikes for under "blue book" value, and marks them up to thousands of dollars over that value. When confronted with the fact that their used bike prices are wildly inflated, they reply, (paraphrased -- barely) "Eventually someone will give me what I'm asking for it, so why should I sell it to you for less?" They're not all like this, but dealerships of this kind are definitely out there: they know that there are plenty of uninformed buyers out there who just want a bike and don't know what an appropriate price is. (Shop around and figure out what the going price is!) The potential plusses that you get from buying from a dealership are that: 1) at least in theory, the bike has been tuned up prior to sale; 2) dealerships are typically more willing to fix any problems that you discover with the thing (inspect bikes thoroughly!); 3) if you're a new rider, you'll probably need to buy gear, and you can usually get a break on the price of gear if you also buy a bike from a dealership; and 4) related to #3, buying a bike from a dealership is a good way to start a long-term relationship with a them -- just make sure that if you decide to go this route, that you buy the bike from a good and reputable dealership with whom you'll *want* to have a long-term relationship. And now, the potential downsides: 1) scummy dealerships may *not* do work on the bike between buying it and reselling it (yet another reason for a close and thorough inspection); and 2) many times used bikes come only with an "as is" (or extremely limited) warranty -- not any better than what you'd get from an individual, particularly because your state may have "lemon laws" that give you recourse if the buyer sells you a bike that doesn't work. (Check with your local DMV or insurance agent.) The bottom line is that there may be benefits to buying a used bike from a good dealership, but many dealerships won't be any better than a private buyer -- and almost all of them (good dealerships included) will be more expensive. Still, it may pay to ask around, find the good shops, and see what they have. Just make sure to give bikes at dealers the same close inspection that you'd give to bikes being sold by individuals. If you know what you're doing (and this guide tries to arm you with the requisite knowledge), you have nothing to fear from going the route of buying a used bike from a private seller.

HELMETS

- **<u>Used helmets are worthless.</u>** Regardless of whether it fits you or not, *do not count the price of a used helmet as part of the value of the bike.* The owner may want to sell the helmet, either because it matches the bike or because (s)he is quitting motorcycling, but

since you'll be throwing the helmet out (or, at absolute worst, keeping it as a pillion helmet), don't count its value towards the sale price of the bike.

- Used helmets are worthless because you cannot tell if they are damaged or not, and in many cases you don't know when they were made. (Snell-certified helmets should have a date-of-manufacture stamp -- look for one. It might be under the padded lining.) Even if they look good, used helmets might well be junk. Motorcycle helmets work by allowing a layer of expanded polystyrene (EPS) to crush, absorbing much of the force of an impact. Unless the hard outer shell is damaged, you cannot tell if the EPS inside is compressed or not. And even then, sometimes you can't -- covering damage with stickers is just as common with helmets as it is with plastic fairings.
- Furthermore, EPS becomes more brittle as it ages, and old/brittle EPS has only a small fraction of the original impact absorption abilities. And since you may not know when the helmet was made (who cares when the previous owner bought the thing), you don't know how "fresh" the EPS is. The EPS layer in helmets is also highly vulnerable to ultraviolet and chemical damage -- if, for example, the helmet's owner was in the habit of resting the helmet on the bike's gas tank, gas vapors from the fill cap have attacked and compromised the EPS lining. Or if the helmet was left out in the sun a lot, it could also be damaged from the ultraviolet component of sunlight. Arai (a leading helmet manufacturer) cites acidic sweat as a leading cause of premature EPS degradation. The EPS can also be compressed if the helmet is habitually rested on pointy objects like mirror-stalks or handlebars. The bottom line is, despite what the owner says, you do not know what condition the EPS liner is in, and the EPS liner is the *vast* majority of the helmet's crash protection.
- *It's not worth the risk.* Yes, in some cases, you *can* send the helmet back to the manufacturer to have it X-rayed. But that will only tell you if the EPS liner has been compressed, not if it has been chemically damaged. Since you'll never know for sure, buy yourself a good quality **new** helmet from a good quality manufacturer, and stay away from used helmets.
- And if you're *still* thinking of using a used helmet, realize that helmet fit is one of the most important criteria in selecting a helmet, and it's *highly* unlikely that a used helmet will fit you as well as one you get from a shop, where you actually get to try different sizes and brands. (Shapes vary subtly by manufacturer; some manufacturers' helmets will fit you better than others.) And if that isn't enough, helmets tend to break in as the padded liner conforms to the unique shape of the wearer's head. You have a different-shaped head than the seller. Get your head its very own new helmet.

TITLES & PAPERWORK

- Make sure that the VIN number on the bike matches the VIN on the title. To do this, you'll need to make sure that the seller has the title on hand when you go to see the bike. If (s)he doesn't, *make sure you check this before you hand over the money.* The VIN is usually marked near the steering head of the bike, one one of the frame spars, or on the steering head itself. If the VIN is damaged or appears to have been altered, the bike might be stolen -- write down the VIN, and see if the DMV or the police can verify that the bike has not been reported stolen and is registered to the same person trying to sell it.

- Make sure the bike has a good, clean title. Make sure that the owner signs the title over to you (on the back). Make sure that the owner is the seller ... check the name on the title. Make sure there are no liens on the bike, or if there were, that they've been released (look for release signatures on the front.) Do not buy a bike with un-released liens. Bikes with invalid odometer readings are worth *significantly* less than the blue book value -- look for a "999,999 miles - odometer discrepency" (or something similar) on the title. Same goes for a "salvage" title (it'll be clearly marked as a "salvage" or "total loss" title.) For a tip-off that the bike has been painted (possibly to hide damage -- see HAS IT BEEN CRASHED?, above), check the bike's color as listed on the title vs what it looks like now.
- Sometimes (not always?!) the DMV will want a "bill of sale" from the seller to you, indicating the price paid for the bike, the VIN, the date, the buyer's and seller's names, and the seller's signature. It's *far* easier to get this when you're exchanging money than to have to track the seller down later, so bring some blank paper and write something up. Make sure it says "bill of sale" and has the date and the seller's signature.
    - Sometimes, you'll be tempted to have the bill of sale written up for a small amount of money ($100?) so the state won't assess you as much sales tax. Nifty trick, eh? Not so fast... there are two problems with this. Well, two problems aside from the fact that it's considered fraud. (In other words, illegal.) Problem #1 -- if the bike is stolen or totalled, your insurance company may only have to reimburse you for what you paid for the bike. If you claim that you bought the bike for $100, and your stolen bike was worth $5000, guess who's out $4900? (Hint: not your insurance company.) Problem #2 -- sometimes the state will ignore the stated sale price if it seems too low, and they'll just go off the blue book value. So you potentially screw yourself if the bike gets stolen AND you have to pay the full sales tax anyway. Don't waste your time with this. Be honest.
- Your state's maddening bureaucracy will probably vary a bit -- check with your local registry of motor vehicles and/or insurance. For example, vehicles in California must stay registered, and the penalty for not keeping current on the registration can be hefty. Californian buyers of Californian bikes should make sure that the registration is current, and if it isn't, have the seller pay to get the registration current before buying! (The California DMV can check this for you.) This was just an example -- even if you don't live in California, it really pays to know your state DMV's idiosyncrasies.
- Call the local DMV or police department, give them the VIN, and have them check the vehicle's title status. Depending on what your DMV will disclose, you may be able to get the vehicle's whole title history: a record of each time the bike changed hands, including the date and current mileage at each point. Or if it's stolen. You may also be able to find out if this is the original owner or the fourth person to own the thing. If you're dealing with the original owner, all you need to worry about is how honest he is and how well you can inspect the bike. When you're dealing with subsequent owners, you have no way of questioning them to determine what they did to it, why they sold it, etc. Buying a used bike is always something of a gamble, but you'll tend to make better choices the more information you have. Maybe buying from the second, third, or fourth owners is OK with you -- maybe you don't trust your bike inspection skills quite so much and would prefer to buy a bike that hasn't gone through so many hands. Maybe you'll even decide that you'd feel more comfortable buying a new bike. That's fine. It's your money, so the

decision is entirely up to you and what you feel comfortable with. (See the section on QUIZZING THE SELLER, above, for more questions to ask the seller.)

- The seller may very well insist on keeping the license plate if, for example, it needs to be turned in to officially cancel the insurance on the bike. This is not an unreasonable request.
- Laws vary a bit from country to country -- for example, in some countries, liens are not listed on the title. (Canada is one example.) Check with the government's motor vehicle registration authority, your bank, your insurance agent, etc., to find out how to do a search for existing liens. This may cost extra money, and you may just want to have the seller certify (on the bill of sale, perhaps, but *definitely* in writing) that the bike is free and clear of liens.

TEST RIDE

- Most sellers probably won't give you a test ride for liability reasons, but bring riding gear just in case. You can learn a lot about a bike from a quick test ride, things you'd never notice by even the most thorough inspection. Sometimes sellers that won't give you a test ride will let you ride the bike once you've purchased it, with a money-back guarantee if you don't like it. In Massachusetts, riding a bike that you *just* purchased is illegal (unless somehow you already have insurance & plates for the thing), but if you're willing to break the law, you *can* learn a lot from a quick, clandestine spin around the block.
    - Different areas will have different laws. For example, it may be possible to get single-day insurance and plates for a bike for the purposes of test-riding it. Ask your insurance agent and/or local government motor vehicle department to find out whether or not something like this is possible.
- It's a good idea to do the test ride last, after you've had a chance to go over the whole bike, since you won't want to ride a bike with safety problems. Don't ride the bike until you're satisfied that it's safe to ride.
- Plus, if you look the bike over, like what you see, the price is right, and you plan to buy the bike, you might be able to convince the seller that you plan to purchase the bike if you can test ride it, and that (s)he may lose a sale if you aren't allowed to. Unless you're really serious about not buying the bike unless you can go on a test ride, don't give the seller an ultimatum, since many sellers won't be flexible on the issue of test rides. If you've spent a long time going over the bike and the seller thinks you're serious, you stand a better chance of the seller letting you test ride the bike. In short, the time to ask for a test ride is after you've looked it over.
- But just because you've looked it over, that doesn't mean it's safe. Give it another check, this time from the mindset of checking something that you're about to ride. Any screws loose? How's the chain? Are the tires inflated properly? There are many more things to check than can possibly be listed here -- the point is, do a thorough *pre-ride* inspection on this vehicle and make sure it's safe to ride before you trust it with your life.
- Ok, so you've done a pre-ride inspection. But you're *still* going to be riding an unfamiliar bike, so take it easy and don't do anything stupid. The brakes, for example, might be poorly adjusted and extremely abrupt. (And crashing a test bike is a virtual guarantee that you're going to buy the thing.) This guide cannot possibly warn you about all the dangers

that you might face riding someone else's motorcycle. Be extremely careful, and don't test ride a bike if you aren't comfortable with its mechanical condition or behavior. Test rides are done at your own risk.

- What you're looking for on a test ride:
    - *Engine/Clutch/Brake Operation:* see how it revs, how the clutch feels, how well the brakes work, etc. It's very difficult to detect warped brake rotors unless you can get the bike up to speed, so here's your chance: Find a place where it's safe and legal to get the bike to highway speeds (55-65 mph) and and do a gradual (but firm) stop using the front brake only. If you felt a pulsing at the brake lever when you tried this, the rotors are probably warped. Repeat the test using only the rear brake. Be extremely careful not to lock it up -- allow for a much longer stopping distance, and stop much more gradually.
    - *Strangeness...* strange wobbles or thumping, having to hold the bars a little bit to one side to get the bike to go straight (a sign of crash damage!), etc... Some shaking is to be expected, but look for shaking that goes up and down with road speed (problems with tires/wheels?), rather than shaking that goes up or down with engine speed. It's usually very hard to detect this stuff without very smooth pavement, so go find some.
    - *Do you want it?* It can take a while to get comfortable with a bike. Nevertheless, to the extent possible in the short time that you're getting to ride this machine, try to answer some very important questions: "Is this the bike that I want to buy?" "Do I feel comfortable with this bike?"
- Another thing you can test is transmission operation...
    - When testing the transmission, realize that problems often manifest themselves as an inability to shift or as "false neutrals," where power delivery through the transmission will be cut, just like the transmission doesn't output power when it's in the real neutral that usually lies between first and second. False neutrals can be dangerous, because the transmission can re-engage without warning, possibly locking the rear wheel and sending you flying off the bike. Forewarned is forearmed. Be careful.
    - Does the bike shift well through the gears? Make sure you go up and down through all of them to make sure they all work. The hardest gear change is 1->2, since the change in gear ratio is the largest. If the bike won't shift well from first to second, the transmission could need some work, and that's pretty major. (Tip: don't be accelerating really hard when you try the 1->2 shift, since that's how it gets damaged in the first place.)
    - Does the bike pop out of gear under moderate to hard acceleration? Don't accelerate abruptly on a test ride until you're very comfortable with the bike's power delivery -- you don't want to crash the thing. If possible, take the bike somewhere where you can go highway speeds, and try accelerating with medium throttle in each gear. If the bike slips out of gear (into neutral or a "false neutral") on hard acceleration, the transmission's dogs or shift forks are badly worn and the engine will need to be disassembled to fix the problem. In the vast majority of cases, transmission repair is a very expensive and time-consuming fix. Unless you have a very good reason to need *this* bike, go find another one.

- Does the bike pop out of gear under engine braking? Pay particular attention to second and third gears, but start in the bike's top gear. While travelling in a straight line, and at approximately half-redline in top gear (but not in excess of local speed limits) close the throttle quickly (but smoothly) and see if the bike pops into neutral. Downshift quickly (but smoothly) and try in the next gear down. Repeat in each gear until you're just putting along in first gear.
- If the owner won't let you test ride the bike but it has a centerstand, you can get the rear wheel off the ground with the centerstand, start the bike, get it into second gear, rev it up to half redline, *lightly* apply the rear brake to load the engine a bit, give it enough gas to maintain half-redline engine RPM, release the throttle, and firmly apply the rear brake to stop the rear wheel and stall the engine. If, in addition to stalling, it pops into neutral, BAD SIGN -- the gear dogs are badly worn. (Major transmission work.) Feel free to repeat this test with a little more rear brake if you went a little too light on the rear brake the first time.
    - Side note one: this test relies on a functional rear brake, and is going to get said rear brake HOT. Don't touch any exposed brake parts after you try this.
    - Side note two: two-strokes have essentially no engine braking due to the way their engines are designed. Don't expect any.
- Is it easy to find neutral when coming to a stop? If not, you could have a frustrating time approaching stop lights, and the problem might cost a lot to fix.

AFTER THE PURCHASE

- Have a professional mechanic do a full tune-up on the machine.
    - Why? Well, since you're probably not a professional, trained mechanic, there are probably people out there more qualified than you to make sure the bike is in top condition and safe to ride. Don't be offended; the author isn't a professional mechanic either. Spend a little money and let a professional certify that the bike is safe to ride.
    - Ask friends, other bikers, and/or Internet forums for recommendations on dealerships with good/honest service departments.
- Get the bike insured and registered. Never ride without health insurance and vehicle insurance.
- Take it easy as you get used to a new machine. Respect your bike's power and abilities and get used to it slowly. The Hurt Report shows that the majority of motorcycle accidents happen within the first 5 months of ownership.
- Congratulations! Enjoy your new bike!

INFO FOR NEW RIDERS ("The preachy part.")

- Go to a dealership and sit on a lot of bikes to feel what sort of riding position you like. Think about the kinds of bikes that are available, what you're interested in, and what you're willing to pay.

- A series of free brochures is available from an industry-sponsored council called "Discover Today's Motorcycling"... call 1-800-833-3995 to get them. The brochures cover types of bikes, financing, safety, etc.
- Generally speaking, it's good to start out with a smaller, lighter-weight *used* bike rather than buying the latest, coolest, fastest, sexiest bike *new*. Motorcycling is a passion you can pursue for many, many years -- don't scare yourself silly with a bike that's not meant for beginners. New riders should probably start with a four-cylinder bike of less than 600cc's, or a twin-cylinder bike of less than 750cc's. New riders should probably stay away from two-stroke bikes (a different engine technology, typically not found on street bikes after the 1985 model year.) Sportbikes tend to have a lot of expensive plastic, and plastic tends to break when bikes fall over. Almost everyone drops their first bike, usually more than once. This can get very expensive if your bike is covered in breakable plastic bits. (Don't get depressed if you drop your new bike -- think of it as joining the club of *experienced bikers.*)
- Long diatribe on what's wrong with many (not all!) dealerships:
  Not many people seem to stick around in the motorcycle industry -- on either side of the counter -- and this will probably have an enormous impact on your experience with dealerships. Even if the salesmen you encounter at dealerships aren't working on commission, the only reason they're willing to work for slave wages is that they're young guys who are into bikes -- and they don't plan to be salesmen forever. As a result, they don't even think about building relationships with customers -- they just want to sell bikes. Which is only fair, because a lot of their customers don't care about the relationship either; they just want the latest fastest prettiest bike with the hot accessories.
  The bigger and more powerful bikes tend to have a higher profit-margin (difference between what the dealer buys them for and sells them for.) So dealerships will not look kindly on employees who try to talk novice riders out of bikes that will be dangerous for them (the big, powerful ones) in favor of good beginner bikes, because even if the salesman isn't making more money (in commissions) selling the higher profit-margin bikes, the dealership definitely is.
  And so many salesmen at scummy dealerships will tend to push you towards more powerful, expensive bikes. (Or, at the very least, not dissuade customers who -- for whatever reason -- want the most powerful thing available.) The dealerships need high margins to stay in business in an industry with low volume, and a lot of them need that high profit margin that comes from the bigger bikes. When you never see most of your customers again, it's easy to justify trying to maximize profit-per-interaction rather than trying to build a long-term relationship that might be safer for the customer or potentially generate a greater total profit.
  The bottom line is, *their* idea of a good bike for you is probably based on a different set of priorities than yours. Don't let *them* dictate your choice or talk you into something you don't want. Do your own research and make your own *informed* decision. As far as new vs used goes, it's probably wise for first-time riders to start with a used bike anyway, so when -- er, I mean *if* -- your bike tips over, there's less heartbreak.
- The counterpoint to this is the following: they're not all like this. find a good dealership and form a relationship with them. Talk to other bikers or folks on the 'net and get recommendations. Unless you've been doing this this for a long time and have a lot of money to spend on very specialized tools, you will almost certainly want to have a local

shop that you can turn to when the bike isn't running right. It's true that you will pay a little more for stuff at a dealership, but in return, you're sure to get the right stuff, you don't pay "shipping & handling", and you foster good relations with the shop -- you'll have somewhere to go when you need help. Bike shops are run by people and generally act like people -- the nicer you are to them, the nicer they'll be to you. Just find one that you like, one that's honest and fair, and treat them the same in return. Don't support dealerships that are dishonest, take advantage of inexperienced riders, etc. Vote with your wallet. Let the scumbags go out of business.

- Get (and wear) good gear! Statistically speaking, you're most likely to crash in your first five months of riding. That's the time when you need the best safety gear!! Don't blow all your cash on a bike and only have enough money left to buy the minimum safety gear required by law. Wear pants, jacket, helmet, and gloves that were designed for motorcycling. Plenty of gear looks the part but doesn't act the part -- avoid "fashion weight" leather. Windbreakers offer **zero** protection in a crash. And don't think that just because you're taking a short trip to the store, that you don't need your safety gear. *Most motorcycle accidents happen during short trips!* Don't let your guard down just because the gear seems inconvenient.
- Take safety seriously. An oft-repeated motorcycle-industry aphorism is:
    - "There are two kinds of riders in the world ... those who have gone down, and those who are going to go down."

  If (when?) it happens to you, make sure you're wearing good gear. On a related note, here's a summer-oriented aphorism:

    - "If it's too hot to wear your safety gear, it's too hot to ride."
- Don't ride without a valid motorcycle operator's license -- in most cases this will allow your insurance company to weasel out of covering you for any damage you cause in an accident. No insurance coverage means the other guy's lawyers come after you directly. Got $300,000 to spare on litigation? Not fun. Get your license!
- US riders: if you haven't already, take a Motorcycle Safety Foundation (MSF) course. Call 1-800-446-9227 or visit http://www.msf-usa.org/. In many states, taking the MSF class counts as an approved "driver's ed" class, dropping insurance for your bike (and your car) by 10% or more!
    - If you don't live in the US, make an effort to track down a local organization that trains motorcyclists. (For example, in Canada, this is handled either by local colleges or the Canadian Safety Council.)
    - US motorcyclists: join the American Motorcyclist Association. They're the only organization that monitors legislative efforts nationwide and alerts us to pending laws that threaten our riding freedom. Call 1-800-AMA-JOIN or visit http://www.ama-cycle.org/.
- Ride like the cages ("cars") are trying to kill you. You never know when some idiot will pull out in front of you, claiming that they never saw you. Ride like you're invisible, because the cage drivers are blind. It's up to *you* to keep yourself out of accidents, so keep your skills sharp and always be alert.
- A very partial listing of good starter street bikes... (See Beginner Bikes magazine for a bunch of other good suggestions.)

- Honda Nighthawks and the CB series (but not the CBR series), Rebel 250 (cruiser, low seat-height), Hawk GT, XL and XR-L series
- Suzuki GS series (particularly the GS500) (but not the GSX or GSX-R series), Bandit 400, SV650, DR series, LS650 Savage
- Kawasaki EX500 or EX250 (slightly sporty; called the Ninja 500R and Ninja 250R in recent years), LTD250 (cruiser, low seat height), KLR series
- Yamaha XS/XT series, Seca, Seca II
- Buell Blast

(Model codes will vary from country to country -- these are US model codes.)

- Military pilots don't start flying on the latest fighter jets, they spend years training on equipment that's easier to control. Don't end up a smear on the pavement because you wanted to skip ahead to the advanced part. Focus on building your skills and honing your reactions and you'll survive long enough to be a fighter pilot.
  - "All the enthusiasm, intelligence, and good intentions in the world don't qualify you to fly an F-16 without training." *Anon*
  - Example: the author of this page rides a CBR900RR these days: a very fast and very plastic-covered sportbike. But it is also his 8th motorcycle -- his first one was an 250cc cruiser. And the CBR900 was purchased after he'd been riding for 6 years. There's nothing stupid about learning to ride on a relatively nonthreatening bike. There's everything stupid about buying something that you don't know how to control, wadding it, and hurting or killing yourself in the process.
- Stop to help other bikers that look like they need help, even if you're in your cage. Cagers *definitely* don't look out for bikers, so it's up to us to look out for each other.
- And by the same token, wave to your fellow riders. Camraderie is one of the things that makes riding fun.

INSPECTION PICTURES

Some miscellaneous pictures of where things are & what they look like...
(diagrams coming soon!)

- **FRONT WHEEL:** one two three
  - Pictures of the front wheel area -- the lower fork leg, brake caliper, brake rotors, caliper mounting bolts, front axle, rim, tire, etc.
- **REAR WHEEL:** one two three
  - Pictures of the rear wheel and swingarm -- brakes, chain/sprocket, exhaust pipe and cannister, rear shock, etc.
- **TIRE DATE CODES:** one two three
  - Pictures of what tire date code stamps look like, and how to read them.
- **SIDES:** one two three four five six
  - Pictures of the sides of the bike -- the clutch cover, oil sight glass, rear brake lever, exhaust pipe, clutch cable, frame, engine, etc.
- **TOP:** one two three
  - The pilot's view -- the instrument cluster, triple clamps, ignition lock, levers, etc.

- **MISC:** worn sprockets / race tire #1 / race tire #2
  - Miscellaneous pictures of stuff.

RECOMMENDED READING

- **OEM Factory Publications** (get these from your motorcycle dealer)
  - *the owner's manual* -- lots of useful information contained herein -- if the previous owner lost it, get a new one!
  - *the service/repair manual* -- even if you don't plan to rebuild your engine, this book shows how to take everything apart -- and, when you can't figure it out yourself -- how it all goes back together. Highly recommended! (You can also get the Clymer or Haynes manuals if you can't afford the factory manual, but, in my opinion, the factory service manuals are the best.)
- Motorcycle Owner's Manual by *Hugo Wilson* (ISBN: 0789416158)
  - A *wonderful* little paperback for new riders -- everything they didn't tell you in the factory owner's manual. Complete with diagrams and useful service tips. Published by the same company as (and kind of with the same feel as) The (New) Way Things Work. Very highly recommended!
- The Complete Idiot's Guide To Motorcycles by *Motorcyclist Magazine, Darwin Holmstrom, and Jay Leno* (ISBN: 0028642589)
  - (Darwin, indeed...) I'll avoid commenting on the title, but only because this is a surprisingly good book. If you could only buy one book on this list, this would probably be the one I'd recommend. The Motorcycle Owner's Manual (above) is much better guide to maintenance -- The Complete Idiot's Guide is a little phobic about maintenance. Still, I'd consider it an essential book for anyone new to motorcycling. (Seasoned veterans will find the material in this book a bit remedial.) Highly recommended!
- The Motorcycle Safety Foundation's Guide to Motorcycling Excellence edited by *Nate Rauba* and by the *Motorcycle Safety Foundation* (ISBN: 1884313019)
  - Not a substitute for taking an MSF class, but a guide to gaining the skills required to save your hide in the insanity of today's roadways.
- Sportbike Performance Handbook by *Kevin Cameron* (ISBN: 0760302294)
  - Highly technical, but Kevin will tell you how it all goes together. Not recommended as initial reading, but if you really want to know the technical details of how it all works, buy this book. Very highly recommended!
- Motorcycles: Fundamentals, Service, Repair by *Bruce A. Johns* and *David D. Edmundson* (ISBN: 0132258897)
  - A textbook for a course on how to repair bikes. A good book for advanced-beginner mechanics looking to become more competent.
- The Complete Guide To Motorcycle Mechanics (ISBN: 0132258897)
  - Also highly technical, but useful for those who want to get *really* good.
- How to Set Up Your Motorcycle Workshop by *Charlie Masi* (ISBN: 1884313043)
  - Useful for the do-it-yourselfer looking for tips on how to best set up a home bike-repair workshop

- The Complete Motorcycle Book: A Consumer's Guide by *Jim and James Bennett* (ISBN: 0816031819)
    - Strange that a book published in 1995 would already seem dated, but this one does. The information here is a real mixed bag -- some good stuff, some bad stuff. I think most people can do without this book. Instead, I'd recommend the Motorcycle Owner's Manual and The Complete Idiot's Guide To Motorcycles (listed above), and a subscription to Motorcycle Consumer News.
- Proficient Motorcycling by *David Hough* (ISBN: 1889540536)
    - Even experienced riders can benefit from this book.

OTHER WEB SITES

- http://www.mcnews.com/mcn/usedbike.asp
    - Used bike prices, care of MCN and the AMA.
- www.kbb.com
    - Motorcycle blue book values, care of the folks at Kelley Blue Book.
- www.nadaguides.com
    - Yet another site with "blue book" values.
- http://www.micapeak.com/info/mlist.html
    - More motorcycle mailing lists than you ever knew existed, all in one place, sorted alphabetically. You name it, it's here.
- http://bongo.www8.50megs.com/maintenance.htm
    - Drill Sgt. Joe teaches motorcycle maintenance.
- http://www.calgary.shaw.wave.ca/~gwrra/safefaq.html
    - A safety "Frequently Asked Questions" (FAQ) list from a Canadian chapter of Goldwing riders. Not 100% accurate for other organizations/riders, but good advice for the most part.
- http://www.crosswinds.net/~donaldhinds/RMR/
    - Collected bike reviews from Usenet
- http://www.msgroup.org/TIPS.asp
    - The largest archive of motorcycle tips and techniques available online -- a very popular site. The material is mostly good, but not always 100% accurate, so take it with a grain of salt.

- Selected Classified Ad Sites: (these should NOT be considered endorsements!!)

    USA:

    - http://www.classifieds2000.com/
    - http://www.cycletrader.com/
    - http://pages.ebay.com/ebaymotors/browse/Motorcycles.html
    - http://www.mshopper.eurografix.com/

- http://www.wantadvertiser.com/ (New England specific)
  UK:
- http://www.usedmotorbikes.co.uk/index.html

Good luck, and "keep the shiny