

DOWNTIME FILES

HIGH-SIDING — CAUSES AND CURES

"Last weekend while on a short ride, I got into a situation that required emergency braking. I got a little excited and locked up the rear wheel and it started to slide. When I released the brake pedal to unlock the wheel, the whole bike started shaking violently. What's wrong with my bike? I am afraid to ride it if it is unstable during hard braking."

*Kevin Andersen
Tulsa, Oklahoma*

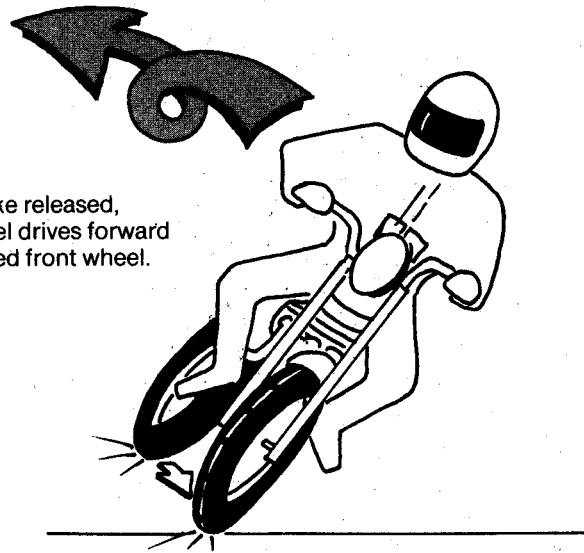
First the good news, Kevin. There is probably nothing wrong with your bike. Now for the bad news: all bikes can shake and shudder under certain extreme braking conditions such as you describe. In some cases, the forces which contribute to the shudder you experienced can lead to an unpleasant occurrence called a "high-side" crash.

Before exploring these forces let's take a bit of time to discuss high-side and low-side spills. A low-side crash happens when a rider either loses balance or traction. Losing your balance at parking-lot speeds can result in an embarrassing, but usually harmless tumble onto the blacktop. The machine simply falls over on the side closest to the ground — the "low" side. Losing traction can be more serious since it can occur at high speed. A biker hitting gravel or an oil-spill in a corner and having the bike slide out from under him experiences a low-side crash. While falling off a moving bike at any speed is hardly a minor matter, low-side falls typically cause less injury and damage than high-side spills, especially if the rider is properly clothed and hits no obstructions during the subsequent slide.

In a high-side crash, both the rider and the bike are thrown or catapulted violently over the opposite side from the way the bike is leaning. Damage is often extreme. You may have seen high-side crashes if you've ever watched an auto race on TV. First a car will start to slide in a turn, perhaps because it hit an oil patch. During the slide, the car hits

HIGH-SIDE CRASH

Rear brake released,
rear wheel drives forward
into locked front wheel.



an obstruction — dry asphalt, a curb or a wall — and is suddenly launched into the air, turning and somersaulting, then finally coming down in a shower of parts.

Bikes can high-side in much the same way. It is possible for a motorcycle to go into a slide, then suddenly (and unexpectedly) regain traction, which will initiate the high-side action. This is rare with a street bike, though it happens often with dirt bikes or road racers. More common with street bikes is getting into a high-side situation through improper braking.

The shudder you experienced, Kevin, was most likely the start of a braking-

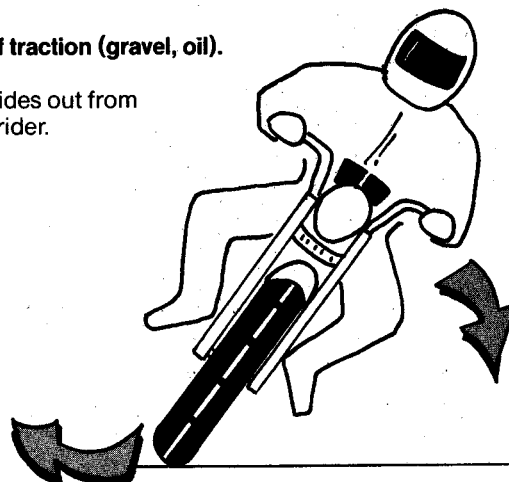
induced high-side crash. Luckily, the forces weren't great enough to flip you, or you kept control, or both. At any rate, the series of events which lead up to this occurrence are as follows. Both front and rear brakes are applied hard. The rear tire locks up and starts to slide out to the side. The rider, fearing a low-side go-down, lets up on the rear brake while still jamming on the front. With the rear brake released, the rear tire regains traction.

To get a good idea of what happens next, picture a train with two cars. Now start the train rolling down the track at a good rate of speed. If you apply hard braking to both cars, the train will stop

LOW-SIDE CRASH

Loss of traction (gravel, oil).

Bike slides out from
under rider.



Loss of balance.

Bike falls to side
closest to the ground.

normally. But if, during braking, you let off the rear car's brake, it will "crash" into the front car. If the front car's brakes are *off* at the time of impact, the crash will simply shove the train down the track. If its brakes are *on*, though, the rear car has nowhere to go. All the released energy or momentum will be transmitted forward, "crashing" into the front car. If the impact is hard enough, both cars will leave the track in a high-side crash.

Try to think of your bike in terms of this train. The coupling point is your bike's steering head. When you let off your rear brake while bearing down on the front, the rear of the bike slams forward into the front. Since the front can't be shoved if its brakes are on, the rear end swings out to the high side. If this happens with enough force, it will throw bike and rider over the high-side in a violent tumble.

In reality, this whole event usually ends up in a much less dramatic result: the shuddering or wobbling action you describe. For this, we can thank the engineers; these days bikes are far more stable and able to resist these negative inputs than they used to be. What happens is that as the rear tire pushes forward an imbalance is created in one direction which causes the bike to overcompensate in the opposite direction. Then back again. And so forth until these back and forth oscillations are damped out. This is the shuddering you experienced, Kevin. The usual result is only a few moments of terror *unless* that first oscillation is strong enough to overcome the natural stability of the bike. If that happens, so does a nasty high-side crash.

How do you avoid it? A good place to start is with proper braking technique. Many road racers use their rear brakes rarely, if at all. They feel that the small amount of braking contributed by the rear wheel isn't worth the chance of high-siding. Even those who do use the rear brake rely on the front binders for practically all of their braking chores. You can do the same by making it a habit to use both brakes in concert, with a bias toward that front binder. For those with integral braking systems, the best you can do is make it a habit to get both front discs working by using the front brake lever *every* time you stop. What you practice in everyday riding is the way you will respond in an emergency.

High siding can happen with any bike under the above conditions. If you want to assure yourself that your bike is mechanically sound and the shudder



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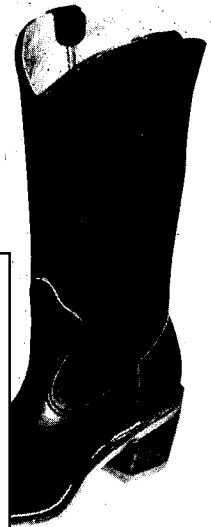


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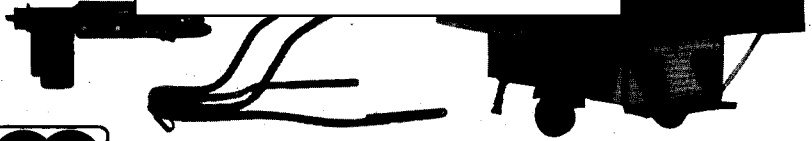


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