SPECIAL CONSUMER RREPORT:

Honda Gold Wing Rear Hub Failure

Owners of 1984 and 1985 Honda Gold Wings (all models) are cautioned to be on the lookout for premature failure of the rear wheel inner bearing hub. It's a long, slightly involved story, so gather round and make yourselves comfortable.

Just to give everyone some idea as to how problems such as this develop, the history of this particular gremlin appears to go back to the major changes in the model that occurred in 1983 and 1984. It was about then that Honda finally got the message about the American tourist's desire for increased carrying capacity, and began upgrading this aspect of their flagship tourer. Since carrying capacity is directly related to the tires, much of the effort went into increasing tire size. Until that time, the Gold Wing's rear-wheel rim width was 2.5 inches, with a diameter of 17 inches. In 1982 rim width was expanded to 3.0 inches; wheel diameter went to 16 inches. In 1984, the Gold Wing became a 1200cc machine with a wide 150/90 tire mounted on a 3.0-inch wide, 15-inch diameter rim.

Through all this gradual evolution relating to tire size, several elements remained essentially the same — specifically, the overall configuration of the wheel bearings, and the location of the output shaft, the driveshaft, and the rear-end housing relative to the bike's centerline.

When you have one element of a carefully interrelated system changing and other elements in that same system remaining unchanged, you can expect alterations of the relationship between those two areas. In the case of the Gold Wing, one relationship that changed was the amount of offset between the load center of the wheel and the load center of the wheel bearings. This offset expanded from 10mm in 1975-83, up to a whopping 23mm (almost a full inch offset!) in 1984-86.

Though the ideal design is to locate the wheel load center and the bearing load center at the same point, some load-center offset is perfectly acceptable, particularly where the loads carried are relatively light and bearing capacity is well above stress levels. The

INCREASING GVWR, 1975-1986

Yr./Yr. Model	Approx. Gross Weight	Approx. Rec. Rear Wheel Weight	Type of Wheel
75-77	944 lbs	613 lbs	Spoke
78	961 lbs	624 lbs	Comstar
79	964 lbs	626 lbs	Comstar
80-81/Interst.	1033 lbs	661 lbs	Comstar
82/Aspencl	1039 lbs	665 lbs	Comstar
83/Aspencl	1049 lbs	671 lbs	Cast
84-85/Interst.	1165 lbs	725 lbs	Cast
85/LTD	1190 lbs	742 lbs	Cast

important thing to remember here is that the more offset built into a two-bearing system, the more weight must be supported by one of those bearings.

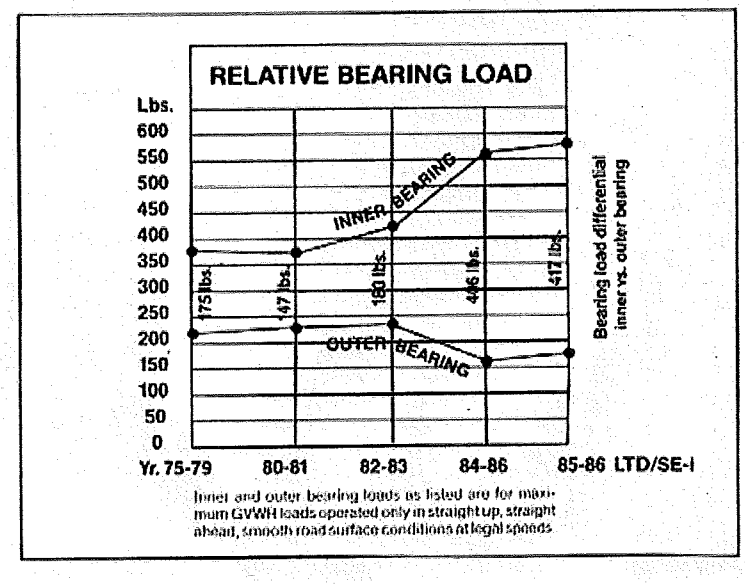
Said another way: beginning with the 1983 models, an increasing proportion of the Gold Wing's rear wheel weight was being supported by the inner bearing. On the 1984 through 1986 models, as much as 78 percent of the total rear wheel load is supported by the inner bearing. The outer bearing, on the disc-brake side, supports less than 22 percent of the total load, and has become virtually a "coaster" unit.

The disparity between bearing loads means that road shock is also transferred to the inner bearing hub disproportionately. And that brings up the next topic: shock attenuation and the malleability of metals.

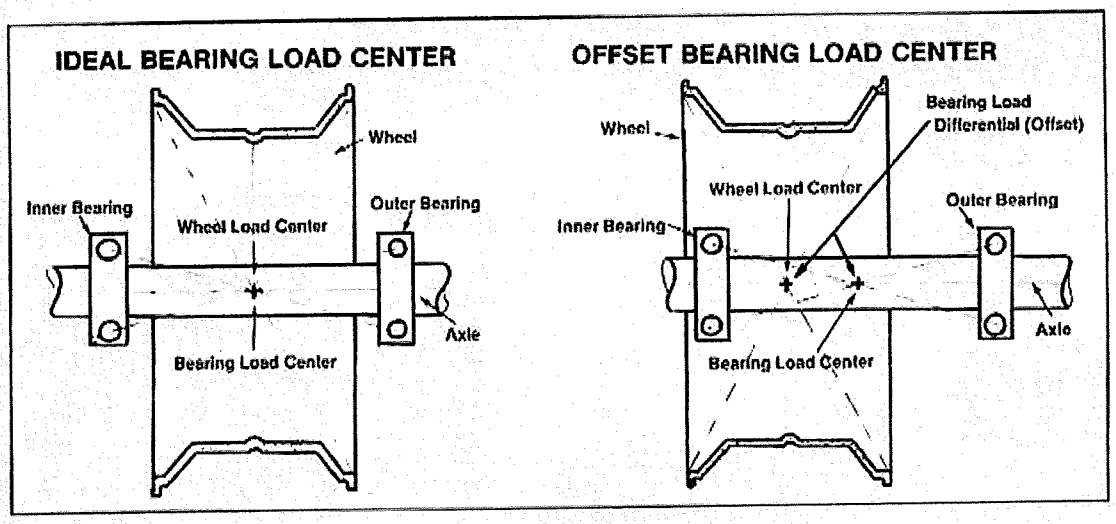
From 1975 to 1977, the Gold Wing was equipped with spoked wheels. For all their disadvantages, spoked wheels do have one redeeming virtue: they attenuate, or minimize, road shock remarkably well. In 1978, the Gold Wing was given the new Comstar wheel assembly, a multipart unit held together by rivets. Again, the inherent flexibility of this system was able to attenuate a significant percentage of road shock. The Comstar wheels remained on the Wings through 1982. In 1983 the bike was offered with one-piece cast alloy wheels. Cast, one-piece wheels have one drawback; instead of attenuating road shock, they transfer it directly to the axle.

Now we arrive at a property of metal called malleability. Put simply, malleability means that if you hit a piece of metal with a hammer, the metal's shape will change. Different metals have different degrees of malleability. Harder metals are less malleable, requiring more hammering before they change shape. Softer metals are more malleable, changing shape readily when hammered.

In terms of the rear wheel assembly



Inner and outer bearing loads as listed are for maximum GVWR loads operated only in straight up, straight ahead, smooth road surface conditions at legal speeds



of a Honda Gold Wing, it works out this way: the axle and wheel bearing components are made of steel; the hub is cast from aluminum alloy. Obviously, steel is a much harder metal than alloy. Hammered with the same amount of force, the alloy will alter shape sooner than the steel.

About here it should be mentioned that throughout the Gold Wing's history, the total weight of the machine and the total recommended Gross Vehicle Weight Rating (GVWR) have increased steadily. From a first-year GVWR of 944 pounds, the 1986 SE-i flagship's GVWR has grown to 1,198 pounds, an overall gain of 254 pounds. Of that, 62 percent, or 742 pounds, is supported by the rear wheel.

Here enters the human factor. One of the unfortunate results of Honda's well-publicized program to increase the Gold Wing's carrying capacity is the creation of the idea that it's "okay" to load anything and everything on the back of the Gold Wing and go touring. Nothing could be further from the truth, yet it only takes a brief glance at the motorcycles attending a Gold Wing-oriented rally to see that a majority of the bikes are overloaded, often to serious and frightening extremes.

If we put all these factors together, we come up with the following: a motorcycle increasing in total weight over a period of years, an owner group that frequently overloads the carrying capacity of their machines, an increasing proportion of the total weight being supported by a single bearing, and an evolution from shock attenuating spoked wheels to a one-piece cast wheel that transfers road shock directly to the axle and wheel bearings.

Since the axle and wheel bearing components are made of steel, this road impact is transferred back to the softest material in the system: the cast alloy hub that supports the wheel bearings. Because 78 percent of the load is supported by the inner wheel bearing, road shock is also transferred to the alloy inner hub disproportionately.

Over time, this hammering of the inner rear wheel hub "spins" the alloy material away from the source of the impact, resulting in expansion of the inner wheel bearing support. Eventually, the inner wheel bearing will loosen, and play will develop between the hub and the bearing.

And *now* we have a situation that can contribute to all kinds of serious problems, such as handling instability or outright bearing failure. It is characterized, in the early stages of failure, by a "clicking" sound at the rear wheel that worsens steadily, and a general deterioration of handling response.

Some '84s and '85s are turning up with destroyed rear wheel hubs at 16,000 miles, or less. On the 1986 models, Honda installed a steel collar around the outer portion of the alloy hub to try to keep the softer metal from spinning away from the bearing; however, this is something of a band-aid approach. It may delay the onset of noticeable alloy shift, but it almost certainly will not cure the problem.

What can you do about it?

The single most effective solution, short of redesigning the wheel, is to keep your total load within the recommended GVWR listing for your motorcycle. Second, pay careful attention to fore-and-aft weight distribution. A carrying capacity of 380 pounds refers to the load the entire machine can handle safely. It does *not* mean it's okay to pile all 380 pounds on the rear wheel! If you've never used a tank bag, you might consider it. This is the single best way to move part of your total load to the best possible place for carrying luggage: almost directly over the bike's center of gravity.

Finally, keep your tires inflated to the correct pressures, and keep your suspension adjusted correctly for the heavy touring loads you're imposing on the machine.

If you hear the characteristic "clicking" sounds at the rear wheel, don't hesitate; take it to your dealer right away. This is not a situation that will magically just go away once it has started.

There is a retrofit "kit" available for the 1984 and 1985 Gold Wings. "Kit" may be something of a misnomer; the replacement set includes a complete new 1986 rear wheel assembly — with bearings and steel-collared hub — and a final driven flange. Installation of this kit falls under normal warranty procedures.

A good idea is to check the rear wheel carefully during any tire change to insure that there is no discernible play between the hub and the inner wheel bearing. If your machine has several thousand miles on it, and you tend to ride it reasonably hard, it might be a wise precautionary move to have this "kit" installed before rear hub problems occur. Prices will vary, of course, depending on where you live, but a ballpark figure should be somewhere near $225 for parts (if purchased as a set — individually the parts would cost about $270), and $50 for labor.