

**Funny Noises**  
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*Great Expectations*

*Not just a matter of opinion.*

A telegraph key or paddle has only one or two moving parts. In a traditional straight key, the lever rocks up and down slightly on a “trunnion” or axle. In a paddle, one or two levers rock back and forth on a pivot. A bearing is the meeting of moving and non-moving parts; it provides for a limited movement with minimal friction, and minimal wear.

Bearings are defined by types, and engineers are careful to choose a bearing that is appropriate for the job at hand. Over the years a wide variety of bearing types has been used in straight keys and paddles. Some are better than others, and some are thoroughly over-engineered.

I looked at the common bearing types found in keys and paddles, and wondered to what extent the keymaker’s choice of bearing was determined by market forces rather than engineering principles. So I conducted a survey on my web site :

**What do you think is the best type of bearing to use on the pivots of a paddle or the trunnion of a straight key? Assume cost is not an issue.**

Sealed ball bearing and race	34%
Loose ball (single race) bearing	0%
Needle and Seat	11%
Sleeve or "roller" bearing	0%
Ball and cup	3%
Jeweled bearing	23%
Other (Specify)	20%

In the “other” category, several users suggested that a torsion bar or leaf spring (as used in the Swedish keys) was best, and several said it didn’t matter or that any of the choices was fine. Two who suggested an actual bearing type presumably didn’t realize that it was already included as a

sub-type of the ones listed. One respondent suggest a complex high-tech bearing that a friend used in a key– even though the two bearings cost \$150 each. OK, I said to assume that cost was not an object, but seriously! One respondent said he “knew it was a trick question, but couldn’t remember the right answer.” He was on the right track, sort of, but only because I believe there is a correct answer from an *engineering* point of view. On the other hand, since I was asking what you “think” your answers have to be right unless you are lying for some reason. I mention these “other” results because “other” was the third highest choice, numerically, and yet not significant in the results.

57% of respondents said that either a jeweled bearing or a sealed ball bearing and race was the best type of bearing to use in paddles and straight keys. That’s pretty much what I expected, and a result that is definitely reflected in the bearing choices you find in keys on the market today.

Both ball bearings and jeweled bearings have to be seriously over-engineered to work reliably in a key or paddle, but for different reasons.

Ball bearings are designed for parts that rotate. Nothing in a key or paddle rotates, and the effect on a ball bearing is that the lever rocks back and forth on one spot in the race. Eventually a cheap bearing will wear little notches in the race, resulting in a “lumpy” feel as the lever is moved. Unless you seriously over-engineer it and use for example aircraft quality ball bearings, as GHD does. Apart from the wear issue with cheap bearings, key bearings should be capable of adjustment for frictionless operation with no detectable “play” or sideways movement.

Where do we most commonly see jeweled bearings? In wrist-watches and chronometers. If they are large enough to be useful in a key or paddle, they are going to be very expensive, and yet they must be further over-engineered to get around the main problem with jeweled bearings– they do not like any lateral load, and that’s what they are going to see in a key or paddle.

I could even guess that the reason so many key folks picked ball bearings and jewels is because for the most part we’re *guys*. Ball bearings are cool. Jewels are riches and we hate it when somebody accuses us of being cheap. It’s just a *guy thing*.

OK, what IS the best bearing for keys and paddles? The roller or sleeve bearing, which has a huge bearing surface and therefore little or no need for adjustment, or any lateral play. A simple trunnion shaft or pin clamped into a notched support is an effective bearing, at very low cost. But nobody picked that as the best bearing for keys and paddles.

Second best (again from an engineering standpoint) is the needle and seat bearing. These bearings also have a large bearing surface, and when adjusted properly will have little or no play. They are also inexpensive. The reason they are second best is because they do need to be adjusted precisely, and a prerequisite for after-market bearing adjustment is a little bit of skill, knowledge, and patience.

By far the most common bearing in a “premium” key or paddle is the sealed ball-bearing and race– those and the jeweled bearings found in some keys are deliberately promoted as selling points for the equipment. So keymakers are catering to the perceived requirements of their customers, and looking for something that will “sell.”

As a seller of a wide range of equipment, I see a broad spectrum of customers with an almost infinite range of opinions and attitudes. I certainly do object to somebody buying something because they think it's "cool," or even if they think they are showing how rich and or intelligent they are. Variety is the spice of life, and one man's ball bearing is another man's magnet..