

[EDITOR'S NOTE: The following article was originally published in 2003. Due to the popularity of the one of Tom's previous articles, *How To Break An Olympic Bar*, and the fact that there's a new generation of club owners, we decided to reprint this classic].

How To Bend an Olympic Bar



By Tom Lincir,
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A bent Olympic bar in a club weight room can be a turn-off that nullifies the considerable investment made in quality equipment and furnishings everywhere else. Not only does it look shoddy, but a bent bar will try to rotate to reach stability with respect to gravity. This defect can be immediately felt by the user, especially with exercises such as power cleans that involve rotating the bar.

In researching this article, I found in my old files from 1977 correspondence with steel mills and physicists asking for information on how to increase the strength of round bar material so that it would stand up to the common abuse that was bending the Olympic bars of that era. In those years there were thousands of bent Olympic bars, all over the place. Every gym had one.

This is why since the very beginning of my career in manufacturing Olympic bars, the same questions from customers have been repeatedly asked: "Do you make a bar that won't bend when you drop it?" and "Do you have a guarantee against your bar bending?" The problem with these questions is the true answer is not a simple answer.

First of all, most Olympic bar raw steel does not come straight from the mill. By this I mean "really straight." This is because the allowable tolerance for straightness from the steel mill is not good enough for a first class Olympic bar. We believe first you must make a bar "really straight." Then you have to make it strong enough to stay straight.

Secondly, years of testing and field experience have indicated to us that any Olympic bar with a tensile strength less than 195,000 PSI is not strong enough for commercial use. Usually experience is the best teacher. Early on, we kept increasing the PSI of the tensile strength and yield strength with each production run. We noted as the tensile strength was increased the complaints of bent bars decreased. When we finally reached the 200,000 PSI level and above, bending

complaints became non-existent.

I believe 200,000 PSI tensile strength with a yield strength close to that is the ideal for a commercial gym or team use. Ivanko Olympic bars are made in the USA and are currently 195,000 to 220,000 PSI. We plan to increase to a higher level in the future.

So, to get a "really straight" Olympic bar that will not bend later on, we have to start with 200,000 PSI steel bars, then bend them straight. Along with grinding for roundness, straightening is the most expensive operation we do with bars. Some bars come with an even bend along the length. Others are bent only on one end. The worst and most difficult bars are twisted in a bent spiral. A bent bar is not straightened by just bending it back in the opposite direction. It must be bent back to a point determined by an experienced press operator to relieve stress. Then it must be bent back the other way to straightness. Most manufacturers will not even attempt to straighten a twisted bar because it is very time consuming and few have skill and know-how to do it. This is especially true when the material is 200,000 PSI steel.



When I was originally researching this article, Eleiko claimed a maximum deviation in the entire length of the bar not to exceed .5mm (0.0197 in.). Ivanko's standard is .25mm (0.010 in.). Anything better than 0.020 inches is "really straight." "Really straight" bars are "fully functional." Regular readers of my articles know I am a strong proponent of "fully functional" products. [See, e.g., "What is a Fully Functional Urethane Grip Plate" (*NTFJ*, 2003)]. This means straight bars and round plates. Anything less leads to "performance frustration." The above explanation is important. If you realize that we have to bend a bar straight, it's easier to understand that you can also bend a bar crooked, or out of straightness.

HERE'S HOW BARS GET BENT:

1 There is a misconception that an Olympic bar will bend if the plates are loaded on a bar that is left on a narrow bench press overnight. That's highly unlikely. But it's a rumor that I hear time and again.

2 All the imported bars from China have a very low tensile strength and lower yield strength. Their bars can be bent by doing an explosive deep knee bend with 300 pounds and reversing direction fast.

3 Bars made from American steel of 130,000 to 150,000 PSI will hold up on light floor exercises and bench pressing but are usually bent by dropping them on the floor or on the power rack. And this is often the fault of the power rack design as much as it is of the strength of the bar.

THE ONLY "BENT" BARS YOU SHOULD CONSIDER

Ivanko makes a pair of extremely precision, commercial-quality US-made Olympic EZ-Curl bars. I believe these are the finest EZ-Curl bars on the market. They're not the cheapest, but they represent the best long-term value. Built to the same exacting standards as our American-made OB-20KG Olympic Bar, these bars have deep bends, which allow the user to relieve stress on his wrists. You will notice the difference between this bar and all others, at once. Available in black oxide (OBZ-55) or stainless steel (OBZS-30). See our website for more details. Interested Journal readers can obtain these bars direct from us by e-mailing online@ivankobarbell.com.



4 Another common way to bend a bar is to do bench squats, which are deep knee bends stopping when the buttocks touches the bench. The bending occurs when you can't finish the last repetition and get stuck in the bottom position with no alternative but to throw the bar off your shoulders. The loaded bar will drop three to four feet before hitting the nine inch wide bench in the center of the bar. This will "take out" all but the best bars, and it does not do the bench any good either.

5 Bars rarely bend from dropping when the plates hit first. It almost always happens when the bar hits first, such as on a power rack. This makes me wonder why, with all the great designers around, none of the gym equipment manufacturers can design and manufacture a shock absorbing power rack, or a power rack designed so that if a loaded bar drops, the plates hit first.

Back in 1987, a strength equipment designer by the name of Jim Sutherland conducted what he termed a "serious

test" on 11 Olympic bars to determine the best bar to sell to serious power rack trainers. Jim was the head of research and development for Universal Gym Equipment, the major strength equipment manufacturers at that time. He tested Uddeholm, Eleiko, York, Ivanko, Superior, Hastings, Texas Power Bar, Malone, and Billard. His test consisted of dropping weight-loaded Olympic bars from a three-foot height onto 1-1/4" diameter heat-treated power rack safety bars. He started with 350 pounds and increased the weight until the bar developed a permanent bend. Seven bars developed bends ranging from 1/2" to 3" in the 350 – 700 pound range. Eleiko and Udeholm made it to 700 pounds before bending. Two bars made it to 1100 pounds without developing bends: the Ivanko OBX-20KG and the Hastings Manganese Alloy bar. The Ivanko bar at that time was made of 185,000 PSI steel.

All of this reminds me of an interesting story. Over 15 years ago, one of the biggest manufacturers of gym

equipment sent us a purchase order for 2,000 power rack stop pins. They said they would pay us \$20 each. (A \$40,000 order was a lot in those days). There was a notation on the P.O. that read, "Must be made from Ivanko Olympic bar material." I called the buyer and asked, "Why do you want us to use our Olympic bar material for the stop pins? Aren't you afraid that the rigidity will cause the Olympic bar to bend on impact?" He replied, "That's no problem. We don't guarantee the Olympic bars!" We refused the order. It was the wrong thing to do on principle. Unfortunately, that's the way much of the industry thinks today. Instead of doing what's best for gym owners, they do what's best for themselves.

A bent Olympic bar has no place in a facility that has invested in top quality equipment and furnishings everywhere

else in order to be perceived as a first class operation. An Olympic bar made from high tensile strength steel that is straightened to a high tolerance may cost more, but you only have to buy it once. And club members will be able to see and feel the difference.

FURTHER READING:

You can find a host of articles like this on my website www.ivankobarbell.com. Thereon, I cover not only Olympic bars, but urethane, plates, dumbbells, and other fitness equipment. Whether you're specifically interested in Ivanko products or not, I encourage you to read these articles to acquaint yourself with the tenants of quality before you buy new equipment for your facility. In many articles, I discuss the "tricks" and "shortcuts" manufacturers use to lower the quality of free weight product in

order to offer it at a "competitive price."

COMING NEXT:

Our next article will be an installment of ASK TOM IVANKO. Please send your questions on gym equipment & freeweights to tom@ivankobarbell.com

Ivanko Barbell Company was founded by Tom Lincir in 1967 and is the most respected manufacturer of professional and commercial grade barbell and dumbbell products worldwide. Your comments or questions are welcome. Contact Tom at tom@ivankobarbell.com or write to: (P.O. Box 1470, San Pedro, CA 90733 U.S.A. }

For product information, pricing, and our newsletter sign-up, see our website ivankobarbell.com or call (310) 514-1155.



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