

Zero Friction Cycling

BEWARE COUNTERFEIT CHAINS!

This document is a supplementary reference to a project article with Escape Collective investigation on what issues / or level of issues / risks are associated with purchasing counterfeit chains from the likes of Ebay, Ali Express, Alibaba, Temu etc.

I won't be recreating Dave Rome's most excellent article here, just the high points in case you are not a member of Escape Collective (but if you can afford it, you really should be a their level of independent reporting on all fronts is both rare, and of high value – if we want such a thing to exist, support such a thing to exist where possible).

1) There are broadly two types of Counterfeit Chain purchasers.

The first is the one who understands that they are buying a counterfeit chain. It is obvious to them from the price of that chain model (as well as the platform they are purchasing from), that they are buying a knock off – similar with how people buy a \$8000 Pinarello frame of Ali Express for \$800 – most realise it is not going to be genuine.

However this first category, probably 99.9% of the time will VASTLY underestimate the quality drop vs the genuine item.

As the bicycle chain (as well as its lubricant) is responsible for the wear life of the rest of your drivetrain components (cassette, chainring/s, pulleys), it is a MASSIVE false economy to purchase counterfeit.

Even IF they delivered HALF the wear life of genuine (which in this test project they most certainly did not) – let's do a quick calculation.

Let us say you can get 2 chains to the recommended wear life of 0.5% elongation wear to your cassette, and 4 chains to a set of chain rings. Let's pick some easy component pricing numbers - you have a dura ace cassette that costs \$400, and chain rings that cost \$500.

Let us say you are getting 5000km to 0.5% elongation on genuine Dura ace chain, and this chain is costing you \$109.90. (yes I know, us waxers can SMASH THAT, but this is just an easy calc example).

So in 10,000km of cycling, the genuine chain purchaser will have spent on component running costs;

Chains- x 2 - \$220

Cassette x 1 - \$400

Chain Rings - \$500 – half worn after 2 chains – so cost is \$250.

Total cost = 220 + 400 + 250 = A\$870

Let's compare with the counterfeit chain purchaser getting from Ali Express for \$45. Let us run with what turns out to be an extremely unrealistic half wear lifespan hope vs genuine, so getting 2500km per chain.

In 10,000km of cycling one would have used

Chains – x4 = \$180

Cassettes x 2 = \$800

Chainrings – x 1= \$500

Total cost is 180 + 800 + 500 = \$1480.00

So in this extremely optimistic scenario (which will NOT happen, it will be much worse) – the cyclist saved a whopping \$40 on chains, to spend an extra \$610 on drivetrain component wear overall.

In reality, the situation for the counterfeit user will be MUCH WORSE due to two very clear, very big reasons.

The first is that the tested wear rates for the counterfeit chains (one from Ebay, one from Ali Express) were oh so much worse. Even as net KM's from the test machine, the genuine Dura Ace chain had at least 3.5x the wear life to 0.5%. But factoring in that the counterfeit chains did not make it far enough into the standard main test protocol to have any abrasive contamination added, and the genuine Dura Ace chain did, and that this contamination **greatly accelerates wear**, the genuine chain attaining 3.5x plus the wear life WITH ADDED ABRASIVE contamination vs counterfeit without – the true wear life difference is literally around 7x (SEVEN! – AT LEAST).

The second aspect is that the faster a chain wears, the more likely it is to zoom past 0.5%, and then greatly reducing the odds that you can get a second chain onto the same cassette, or how many chains you may get to a set of chain rings. If a chain ring is run too much past 0.5% elongation wear, it can easily equal one chain to a cassette and chain rings. So choosing a chain that will fly past the recommended elongation wear mark well before many would begin to think they need to start checking their chain wear, will very easily equal big ouch will all drivetrain components needing replacement after just one chain.

So let us play that out, it will again be expected to go one of two ways.

First – the person is replacing the chains at the recommended replacement mark, and due to some variant of chain purchasing insanity, continues to purchase them despite the astoundingly short wear life.

In 10,000km they would need at least 10 chains. This would mean 5 cassettes, and 2.5 sets of chain rings, for a total running cost of $450 + 2000 + 1250 = \$3700$.

Second and more likely option is they just run chains until they are 1.0% or more worn and then replacing everything at once. Heck let us say they are putting up with horrific running and the wonderful friction times of wearing a chain to 2.0% and the amount of eating out of metal teeth of ones chain rings and cassette and pulleys this entails (not low friction running!). At best, at their wear rates, in lovely dry road conditions, this is still basically going to be around 3 to 5 full sets of everything.

So, I hope I have outlined well enough that going counterfeit for your chain is going to be, without ANY doubt at all, a massive false economy, whilst you have the pleasure of a higher friction, poorer running drivetrain for much of your cycling time as you merrily set about wearing through the teeth on your cogs and chainrings at most impressive rates, along with other wonderful risks counterfeit brings such as typically worse shifting and higher odds of chain failure.

You may say ah it won't be that bad re costs, I am buying counterfeit cassettes and chain rings as well! Well, sure – but again their comparative wear rates to genuine are likely to be shocking, you are for sure committing to a path of a set of everything per chain, and regularly, and absolutely these systems just do not work as well, at all. Even the counterfeit chains you can expect to shift significantly worse vs OEM or quality aftermarket options like YBN, putting in a worse shifting cassette and rings (and safety) to still very likely not save a dime – is that really the path you wish to choose?

One of my personal mantra's is life is too short to ride shite riding bikes. You don't need to have a fast bike. It can be your old work horse or commuter – but they can still ride beautifully with a lovely running drivetrain, quality and maintained bearings, and good tires. A crap running drivetrain is just a shite way to ride your bike.

2) There are broadly two types of Counterfeit Chain purchasers.

So, looping all the way back to this initial point again – what is the second type of purchaser? That is simply the one who is unaware they are buying a counterfeit chain, believing they are purchasing a genuine chain at a discounted price, paying RRP is for suckers etc.

Depending on the seller, and depending on the purchaser – this can be quite a spectrum of who gets caught out. Some sellers are clever, they don't price too close to the “obviously too good to be true” point. They have a huge number of fake (but people don't know they are fake) 5 star reviews. Pictures and packaging look genuine until one may be able to do deeper checks - often seller will grab official product images for their online listing, and you can only notice the red flags on receiving item. And this is relying on the purchaser having some concern to drive them to look closer, which may often not be the case.

Other times the pricing and picture + model naming provide many red flags, but again people are on a spectrum here and still sometimes are easily cheated despite at times practically laughably obvious red flags.

I will never forget a customer situation I had recently, where a long time customer – one who has placed orders with me for YBN SLA chains for years – sent me a fair ol rocket email about my pricing after he found he could purchase a YBN “X11” chain for \$9.99 from Alibaba.

For reference – my pricing for a YBN SLA 110, 11spd model is typically \$94.90, and often pushys etc are higher and any LBS stocking YBN will be around \$109.90. They are typically a price premium vs dura ace which despite often being around \$100 in LBS, genuine can be found online for less.

So, if one saw a Dura Ace 11spd chain on Alibaba for \$9.99 – I would hope in most cases that would click into the “this is obviously fake” category.

However in this case, the obviousness went a little deeper, aside from the typically high price for a YBN SLA level chain, YBN do not make an “X11” chain model, so a quick google search to YBN would also cross check that. So we have pricing that is literally around a tenth of normal RRP, and a model name that doesn’t exist for that brand (think if you saw a Shimano XX1 chain, or a Sram Ultegra Chain – that would be weird).

And yet, here was a long time customer, who obviously knows how the internet works since they have been shopping online for at least some years with ZFC – giving me quite a rocket re ripping him off all this time with the prices I have been charging for YBN SLA 11 chains.

I wonder how he is going with his \$9.99 YBN X11 – but, sadly the reality is I don’t have to wonder. I really do know how that movie will end. I know that even if it didn’t fail outright, it will have worn extremely quickly and taken his cassette, chainrings and pulleys with it. He saved \$100 to spend probably \$1000 on drivetrain components instead in short order.

This is not good. If a customer like him can be fooled by such an obvious counterfeit case, then it is difficult to judge what % of cyclists will be fooled across the range of counterfeit chains being sold as a genuine. When we factor in the spectrum of both what the seller may or may not do and add in what level the purchaser is at in awareness, who knows what numbers we are at. My best guess is that sadly it is EXTREMELY prevalent, simply judging by the sheer number and options on these sites of obviously counterfeit chains. Someone who is a gun with the sales analytics for products on these sites might be able to put together a great picture for us / Escape Collective, but in the interim it is safe to say it is likely a big problem.

BUY FROM GENUINE RETAILERS!

As such, and as the chain is such a massively hard working component where the actual top genuine chains really are a wonder of steel quality and treatments to hold up against the torture they subjected. It is a component working like a bat out of hell, under enormous pressure loads, with it and its lubricant completely exposed to contamination. And it is responsible for the lifespan of the rest of your drivetrain components. This is absolutely not the component to be choose to cheap out on. You don't need to buy the top tier chain, generally 2nd tier is perfect. Often budget level chains are also a false economy due to much poorer wear life. But counterfeit is a whole different level of risk and ouch.

Just don't take the risk purchasing this component from such sites. Always purchase your chain from a genuine supplier who gets their chains from the official importer etc. Also, that way, if you do have any issues – you have an actual real business to contact – vs ever disappearing and impossible to hold to any account / warranty ebay and the like sellers.

But it gets worse! Chain tensile strength

If the frankly shocking wear life results for counterfeit was not bad enough, they also had significantly lower outright tensile strength vs genuine.

Not only that, they exhibit plastic deformation (ie they did not go back to 0.00 mark after test load) at much lower tensions vs genuine. It is not out of the realms a strong sprinter could elastically deform a counterfeit chain where a genuine chain would not blink at that load.

My tensile test machine can currently only test in a straight chain line, however without any doubt at all, the gap between genuine and counterfeit on chain line angles will absolutely grow – it just a guess as to how badly.

Pin riveting is one of the most difficult and precision mfg aspects for a derailleur chain. It is often just one poor rivet that is responsible for solid % of chain snaps. They also need to be resistant to fatigue. Those that really load up stress on rivets over time from shifting under high loads whilst on chain line angles, or by simply a lot of riding time at load on high chain line angles - this can fatigue rivets and increase chances of failure.

The odds that a counterfeit chain, made of comparatively much cheaper steel, and with no other wear resistance treatments – coming in at around 7 times less wear life than genuine, and with already notably lower tensile strength in a straight line test..... the odds it would magically be ok with very strong and fatigue resistant pin riveting rate as being as close to 0.0% as you like.

Do you think they had that as a key focus for chain strength and reliability like genuine chain brand? Or is it more likely, just as with the rest of the chain – to be meeting the cheapest lowest manufacture cost possible where the chain still initially work and pass for sale?

When chains snap under pedalling load – especially under high pedalling load / stand up pedalling – this DOES lead to crashes and broken bones, teeth, or worse.

Place your bets on those pin rivets at your own peril. I would highly encourage anyone running chains purchased from these platforms to please excuse themselves from group rides, especially races and sprints, unless you genuinely don't care who you might take out with your own exciting times, or if you are happy to stay at the back.

If you know of someone in your riding group who purchases chains from Ebay / Amazon / Alibaba / Ali x / Temu etc – please strongly encourage them to read this and or the Escape Collective article, as well as please stay at the back of the group until they are for sure on a genuine chain.

Some Data!

Alright below is the data and brief test notes for Escape Collective, but just a quick highlight for the above point, the ebay chain failed at 7570 newtons vs genuine Dura Ace at 9370n. That is nearly 20% lower tensile strength – IN A STRAIGHT LINE. Again expect this gap to grow **significantly** on chain line angles.

Also - it exhibited some non zero deformation stretch even after the first test load of 1000n, and was notable indeed by 4000n, and very high by 7000n.

After 7000n test load and then back to 0n, the Ebay chain had 0.62mm of deformation stretch across 10 links. The Genuine chain still had 0.00mm.

In fact even at 8000n the genuine chain had only just now registered its first deformation, with a 0.1mm measure across 10links with test load back to 0. Remember the Ebay chain had failed at 7570. And it had over 0.3mm across 10 links, or 3x the deformation, by 4000n than the genuine chains 0.1mm at 8000n.

Again this is just across 10 links, so if this same rate of deformation was to occur from load across a typical circa 110 link chain – then we are talking literal millimetres of stretch across the full length of the chain, to go on top of the rapid wear elongation that is occurring.

On top of this, these much softer steels are also VASTLY more likely to suffer from bent links (shifting under load especially on chain line angles) etc which can then jump off next trip to the chain ring, and even if you don't have a permanently memorable experience following that, it will ruin that ride.

So may I mention again – BUY GENUINE CHAINS FROM GENUINE RETAILERS!

Ok – to wrap, full test data and notes summary below,



Escape Collective Chain wear data

ZFC main test protocol, using Finish Line Dry (red top) as control lubricant

Chain	Kms to 100% wear mark	
Genuine Dura Ace	3472	Good result for FL dry.
Genuine Ultegra Chain	3200	(approximated back from wear from 3000km check measure and 4000km check measure - this was the FL dry lubricant test)
Ebay	795	*rated back from wear 125.7% wear mark at 1000km check measure. Chain check measured at around 20% "worn" new with digital chain checker - so it began test with a deficit to begin with.
Ali Express	1000	*The net wear from start check measure to end of block 1 check measure was slightly over 60% "Net" wear, however this initial check measured with over 30% of wear allowance new! This is the most out of tolerance start measure I have ever seen, by miles. Usually i use net wear (ie 0.5% from start measure) however start measures are typically at 0.00 or close too, so using a net 0.5% accounts for small start measure variances. however in this case - calling end of test at an actual 0.5% elongation vs a 0.00 mark i think is the right call as it is at 0.5% elongation wear by 1000km, and confirmed with other check measures as well as main digital checker, running chain past the 0.5% elongation will cause damage, so thats the true stop point for this chain, it was just half bugged to begin with!

Wear rate summary notes

It is astounding that both the counterfeit chains had more wear after 1000km with a moderate performing lubricant than a genuine ultegra chain did with no lubricant!

Shocking!

It would take one running the best waxes and re waxing every 100km to try to get any good lifespan from these chains.

Even then, see main summary notes below re further issues.

Tensile test data

	MM stretch at tension / deformation back at 0N		
Newtons	Genuine DA	Ebay	Ali X
1000	0.04	0.4	0.05
0	0	0	0.04
2000	0.33	0.58	0.5
0	0	0.2	0.02
3000	0.55	0.88	0.69
0	0	0.24	0.06
4000	0.78	0.83	0.78
0	0	0.34	0.09
5000	0.97	1.13	1.03
0	0	0.38	0.11
6000	1.2	1.45	1.28
0	0	0.4	0.12
7000	1.35	1.88	1.66
0	0	0.62	0.48
8000	1.89	Fail 7570	2.55
0	0.1		0.7
9000	3.07		Failed 7950
0	0.8		
Failure	9370		

Tensile Test highlight notes

The genuine dura ace chain had completed 3.5x the km's in testing - 3500km at 250w load vs both ebay and ali x both only 1000km of testing due to their much faster wear rate.

In theory, there is a possibility of more fatigue cycles for the DA chain vs ebay and ali x chains.

The genuine DA chain still showed no permanent stretch deformation even after the 7000n load, which is huge, and only 0.1mm after 8000n. This is extremely impressive. 9000n changed that though.

The genuine DA chain demonstrated not only greater resistance to stretch at every test load, but also at the end its ability to stretch a lot - over 3mm across 10 links - and not fail.

The ebay chain showed measurable deformation after just 2000n. In fact double deformation after 2000n vs genuine after 8000n or 4x the load

The ebay chain showed 6x the deformation after 7000n than the genuine chain showed after 8000n.

The ebay chain showed notably greater stretch at every test load vs genuine.

The ebay chains ultimate tensile strength was only 80.7% vs the genuine.

The Ali X chain faired overall better - showing not too much stretch or deformation at lower test loads.

The Ali X chain had same permanent deformation of 0.1mm after 5000n vs genuine at 8000n (ebay was nearly 4x the ali x chain after 5000n load)

The Ali X chains ultimate tensile strength was 85.4% that of genuine DA chain.

The tensile test machine cannot currently test chain line angles.

Until such testing can be done I cannot say for certain, however I am extremely confident that should tensile testing on chain line angles be able to be performed, the tensile strength

difference between genuine and counterfeit will be much greater than shown here.

A lot design and mfg knowledge as well as quality of steel goes into ensuring high riveting strength. This aspect of deralleur chains is much more difficult vs straight line tensile strength.

It is simply EXTREMELY unlikely that counterfeit chains will have done their homework around how to mfg best riveting strength.

Pin rivets can be a fatigue fail area on a chain. Lots of extreme chain line angle running under high loads can cause cracks in the outer link plates around rivets, as well as fatiguing the rivets themselves.

Cyclists who may stress a genuine chain with their riding (sprinters, power efforts on big ring big cogs, mtb & gravel, electronic shifting under high load etc) will be at MUCH greater risk of failure with a counterfeit chain. There is absolutely no doubt on this.

Summary

The overall test results are very clear.

Counterfeit chains are an enormous false economy. The vastly higher wear rate WILL catch cyclists out, have them running very worn chains, and thus rapidly wearing their other drivetrain components which could be costing at least hundreds in wear, potentially more.

Counterfeit chains are also substantially more likely to fail, and obviously they are likely to fail at moments you really don't want them too, such as under high stand up power / sprint efforts.

Every year chain snaps absolutely lead to broken bones.

The can also lead to very broken bikes (I remember seeing the outcome of one where snapped chain bottom span went into rear wheel spokes - ripping the rear mech and chainstay / seatstay apart, as well as exploding the wheel. Apparently this did not buff out).

I havent tested for this aspect but anecdotal stories abound re poorer shifting / ride feel.

My golden rule, don't cheap out on chains and tires. You should ride a counterfeit chain to the same level you want to ride a counterfeit GP5000. It is just a recipe For a bad outcome to save an inconsequential amount of \$. You don't have to a buy a dura ace chain - buy a genuine ultegra or 105 and be safe, and enjoy genuine parts lifespan and performance.