

email from Andrew Crawford to James Oliver, April 14th, 2014 - report on Linley's Chinese copied smartHinge:

Hello James, as per my last email I wanted to take the time to get the basis of what we've discussed so far down in writing. My apologies that this has taken so long.

I met you on Friday March 21st during which meeting I challenged Linley's position over the copying of my **smartHinge** in China. You were mostly unable to comment on how this had come about as you've only been there a relatively short time, but it was left that you would look into the situation and get back to me.

This you did, and duly called me back on Thursday March 27th. In our conversation you confirmed that the Chinese company DT had drawn up and made the hinges for you based on one of my hinges that you had supplied, and that therefore you [Linley] knowingly had these hinges produced without my knowledge or permission. You admitted that this should not have been done - I will deal with this in more detail below.

smartHinge design:

I think it's useful first to briefly describe the birth and rationale of the **smartHinge**:

Having been a box maker for some 25 years I have long sought the perfect box hinge - one that is good looking and easy to fit. 'Stayless' siderail box hinges certainly exist - ie hinges that rely on a stop incorporated into the knuckle rather than a separate stay which will always require a further machining operation to accommodate. There has been one available in US for a long time that relies on a square knuckle for the stop, but it is poorly made and finished. And anything with a square or partially square knuckle will either require a separate operation to remove material above and/or below the knuckle in order to allow the fingers to rotate, or be fitted with the whole knuckle protruding which is ugly.

A chance meeting with precision engineer, Clive Jarman, in Perth, WA, in 2010, was the opportunity I needed. The emphasis was on a creating the perfect box hinge - beautiful, efficient, robust and easy to fit - and the result of our collaboration, '**smartHinge**', unquestionably achieves these criteria completely.

Any traditional hinge is primarily a knuckle, of course - the leaves are merely the means by which that knuckle is attached to the box. So this hinge was designed from the knuckle outwards - the trick was to achieve a large enough stop area without it appearing too chunky. To this end a great deal of care went into balancing the width and thickness of the leaves and the exact proportions between the width of the outer fingers and the single inner one, together with the slightly reduced diameter of the central finger. All are important factors in ensuring that a balance is achieved between strength, function and elegance.

I believe the design of this hinge is rock solid - and it has been tested to destruction: even after some very brutal treatment, the only damage was a very slight increase in the stop angle! It was always the screws that failed first.

I've had nothing but positive feedback from professional and amateur makers alike [design, quality, finish, consistency, ease of fitting] confirming my faith in this design. And the fact that you chose this design to copy over any other is further testament to that.

Chinese smartHinge:

You've sent me some of these, thank you - I've studied them carefully and these are my comments:

General: The Chinese hinges do approximate most of the features of my original, and are surprisingly well made and finished for £1.50 a pair. But they're not perfect, of course.

Material - certainly lighter than brass, seems to be an aluminium alloy. This means that they are not as strong as they might be - see sections on stop angle, pin and knuckle below.

Stop angle - on a traditional format lid a 90° stop angle is all that's needed to balance the lid securely as the centre of gravity will always be behind the hinge pin. But this 'looks' wrong, so I've opted for 93° on the **smartHinge** and this has been well received. The stop angle on the Chinese version is substantially more, on some over 100°. This is too much - it looks wrong and also throws more weight back on a hinge that is already not as strong as it should be. It's also quite inconsistent with a variation of around 5° - where there's an appreciable difference between a pair fitted to a box this puts the weight only on the hinge with the smallest stop angle, of course, therefore doubling the load on that hinge and this can also apply a twist to the lid.

There is one way in which your copies differ noticeably from the original - there is a slight addition of material at the bottom of the smaller diameter, wider central finger of the knuckle. I believe that this has been done to compensate for the relative softness of the material in an attempt to achieve greater consistency in the stop angle. The softer the material the larger the surface area which forms the stop needs to be. This brings the underneath of the knuckle slightly out of round, unnecessary on the real thing.

Dimensions - the Chinese hinges are slightly narrower than my **smartHinge**. One of the main selling points of the **smartHinge**, and a major factor in their ease of fitting, is the exact and consistent width of the leaves, which is $7.96 \pm 0.02\text{mm}$. This means that a single pass using either an 8mm or 5/16" cutter gives a very neat fit with no lateral play, and therefore a perfectly fitting lid every time with no adjustment necessary. The width of the leaves on the four Chinese hinges I was sent vary from 7.95 to 7.77, often between the two leaves on a single hinge, and even along a single leaf. This is too loose a fit, and with too much variation, for them to be fitted reliably and repeatably without the need for adjustment.

Pins/gap - the pin diameter is around 2.15mm but the holes in both components are around 2.3mm which seems like an unnecessarily large amount of play. The pin is locked in place by means of a coarse knurling at one end, but the discrepancy in size means that despite the fact that the tolerance on the mating parts of the knuckle seems very good, there is nevertheless the potential for a lot of lateral play and this is present on all the hinges I looked at. However, so long as the mating parts of the

2

knuckle fit together well this will not impact significantly on the function. What will occur, however, is that the necessary 0.3mm gap between the leaves is compromised and loose. This gap is important as it ensures that the leaves don't touch when the box is closed, and also allows a small amount of leeway to adjust an unevenly closing front edge.

Stiffness - the stiffness of the function, how easy or hard the leaves are to move, varies considerably, but I couldn't see what was causing this. Of the four hinges I have, two are 'medium' stiffness - I would say acceptable - one too stiff and one too loose. Having said that, I've had many discussions with the company currently making my hinges trying to get them to achieve just the 'right' amount of stiffness - ideally a little 'resistance' but no play - but it seems to be a very difficult thing to achieve. I've had to accept that a slight variation is inevitable - from a slight looseness to a slight tightness.

Improvements:

There are several simple improvements that could be made to the Chinese-made hinge:

- The leaves need to be slightly wider, as near to 8mm as possible without exceeding that value, and as consistent as possible. This is very important and will make the fitting far easier and more repeatable.
- Drilling size needs to be reduced - this holds the pin more closely and a consistent 0.3mm gap between the leaves would be maintained.
- The stop angle needs to be reduced to 93° and be as consistent as possible.

I know a little more about the way this sort of item is produced than I did before I started my involvement with hardware, but it's still not exhaustive. It looks as though these are produced by some pressure/injection/casting process, something like injection moulded 'chrome plated' plastic parts which require no actual polishing. And it would seem that if you can achieve a hinge as good as these for £1.50 a pair, what if you were to double or triple the cost?! But it's possible that they are as good as they can be and no improvement is possible without using a completely different, and therefore probably much more expensive, process. However, if I were to be in contact directly with your UK contacts at DT I'm fairly sure we could arrive at a better hinge.

Although surprisingly good for the money, the quality of the Chinese hinges would not be sufficient for me to supply my customers, and I know that you also have your reservations about them. And in any case I need a brass version for my customers, and this is probably not possible using the same process.

UK manufacture?:

My hinges were originally made for me in Australia by the co-designer, Clive Jarman. But he is a traditional [no CNC] one man precision engineering operation and wasn't able to provide anything like the quantity I needed. And his price was high to start with, and then went even higher, so I had to find another manufacturer.

I have always wanted to get these made in UK, if for no other reason to support a UK business. The UK company I found came highly recommended, but has been a nightmare to deal with from start to finish and has let me down repeatedly - both supply and quality/consistency issues. They originally agreed to supply me with 300 pairs a month, but have never come close to that figure. It was my intention ever since its introduction to market this hinge widely, but it has simply never been possible. However, even with the minimal promotion I've done - mostly my website - I never have enough to meet demand ...

My most recent dealings with my UK company had already convinced me that I needed to find another solution - UK or otherwise, I've lost patience and now I just want to get the job done! Now, given the current circumstances, it seems as though we ought to be able to co-operate to arrive at a mutually beneficial solution.

Your requirements are somewhat different to mine - the features of a hinge that will sell the final product to a

customer are different to those needed to sell the hinge to a user - ie, the maker. You are selling boxes: so as long as the hinge appears well finished and does the job, that's sufficient - a customer buying a Linley box has no interest in how easy or hard the hinges are to fit. And your makers will use whatever hinges are prescribed by you, of course.

I have to market the hinge itself direct to makers, which is a different job: apart from it looking the part the requirements mostly relate to the quality, consistency and ease of fitting of the item itself, and will largely determine whether they use them again or not. Price is important, of course, but my experience/feedback has always been that the reassurance and speed of fitting more than compensates for the relatively high cost.

I don't think that these requirements differ enough that we can't co-operate on this.

These hinges are not complicated, and there must be a way to get them made respectably, and at a reasonable cost. From the point of view of arriving at a top quality product, machining from solid has always seemed to be the way to go, but there may well be other possibilities. The ideal solution would be to find a British company who can make these, by whatever process [and perhaps other items as well, see below] to a high standard. Given Linley's iconic English status I'm sure you would prefer this as well.

Given the extremely low price you are currently paying for the Chinese made hinges, and the relatively high price you are charging for your items, you have agreed that there is some leeway for you to pay more for your hardware. I feel fairly sure that with the extra weight of numbers [say 2,000 plus pairs per batch], several different items [other format hinges, locks] and the weight of the Linley name we ought to be able to arrive at a unit price that is somewhere in between the Chinese price and mine, and therefore hopefully at a level that would be acceptable to you/your makers.

3

Other items:

I am doing the final touches to my lock at the moment and hope to have the final prototypes very soon. The design of the lock is robust and easy to fit, but slim and elegant. The only visible features are the two plates and the key, and this should be a much easier item to get made respectably. You have expressed an interest in having your own Linley key - that can be arranged, of course.

A smaller version of the **smartHinge** [6mm wide] could also work well - perhaps replacing the one you're currently using - and perhaps a larger version. I'm also currently working on a stop butt hinge - similar principle to the **smartHinge**, ie round knuckle, not square, and very easy fixing, of course.

Intellectual rights/financial:

The issue of the ownership of the **smartHinge** design is important. I've put a huge amount of work into the development of these hinges and I believe the design is a great success. It's not patented, of course, the cost would have been prohibitive - consequently there was always the risk that they would be copied.

Several of your makers had successfully used my hinges, thus proving their reliability and appropriateness for the job. The price is high, of course, and this has led you [Linley] to have them copied. But rather than approach me as the designer you went ahead without my knowledge or permission, a fact which you confirmed during our phone conversation on Thursday March 27th.

It's widely known that I've been marketing these hinges exclusively since early 2011, so you will understand why I feel a certain ownership of this design and why I feel aggrieved to be deprived of what would have been a sizeable amount of business by your action: At £26.95 a pair [my 100+ rate, the absolute lowest I can currently offer for it to be worthwhile] 1,000 pairs would have cost you £26,950. I probably would have reduced this on a confirmed order of 1,000 pairs to £26.50, so a total cost of £26,500. So, as a result of having my hinge copied you saved yourself around £25,000, but this lost me £4,900, and consequently I would maintain that I am owed this amount by Linley.

I don't want to hamper progress here, but in the circumstances, and in order to clear the way for any co-operation that might result, I believe that this compensation is appropriate: I will have made the profit I would have done if you'd ordered the hinges from me, albeit very late, but you will still only have paid £6,400 [1,500 + 4,900], around 1/4 of the full price for the hinges. On that basis I would be happy to consider the matter settled.

The way forward:

You have listened to my position in this courteously and my perception is that you are genuinely interested in arriving at a solution that serves everyone concerned - I do believe that the most can be gained by us by co-operating from now on. In my last email I suggested a meeting either on Wed April 16th at around 4.45, or on Saturday April 19th around midday if your office is open. I would appreciate knowing as soon as possible whether one or other of these

might be possible as I don't get to London very often. I would also appreciate a quick email back from you just to confirm that you've received this, read the material and that it accurately reflects the facts and what we've discussed.

Sorry - this has turned out a lot longer than I intended - but I felt it was important to set out my understanding of where we are with this! Thank you for reading, and I look forward to hearing from you.

Kind regards, Andrew.