Lathe crash: releasing a "stuck" chuck on a Myford Super 7

1 Dedication

This report is dedicated to Steve Jordan for his huge and continuously effort with his videos about the Myford ML7 lathe and Stefan Gotteswinter for his brilliant reports of machining and metalworking. The videos of both are always a great source for inspiration and finally gave me very useful triggers how to solve my "stuck chuck"-problem that this report is going about.

Figure 1: Two black-belt masters of machining... (Source: Screenshot youtube.com)

In respect to Steve's native language I write this report in English language.

Or at least I try ;-)

Figure 2: ...and me. Compared to them- only a bloody beginner!

2 Introduction

As you can read in my last repairing report, I am currently working on metal machinist stuff. Don't be sad- all of my electronics test gear is still alive and after having been completed the new workshop in our basement, the next room that we reconstruct will be the electronics lab room. Latest then, more things of the GHz-stuff and network analyzers will follow :-)

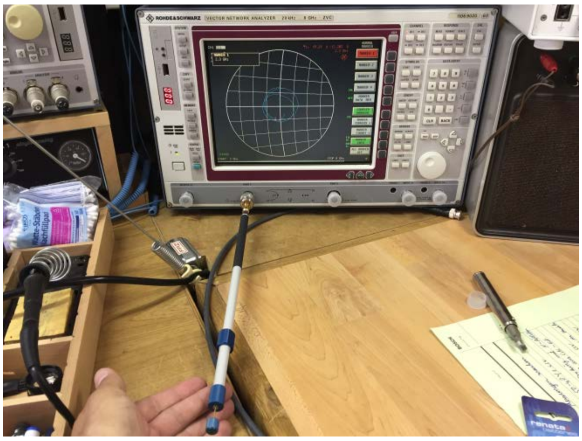

Figure 3: Network analyzer with sliding match - but not inside t h i s report ;-)

But for now, the fascination for heavy metal machining devices is on its top level and one important source of learning are the youtube-videos of Stefan Gotteswinter and Steve Jordan. Both of them provide excellent videos that I learned a LOT of machining techniques and tooling. I only can recommend to watch their youtube-channels. Both are producing amazingly high quality things in their only very small workshops. At least if you see the working conditions of Steve in his absolutely tiny garden-house, (even with true roosters running around!) it is incredible, what high quality videos and tools he is producing there. Furthermore his absolutely unique accent and "sentence melody" is so sexy for my ears, that I really LOVE it when I hear him speaking! :-)))

Figure 4: Installing and levelling the furniture in my new mechanical workshop. Comfortable? Yes...

Both of them, neither Steve nor Stefan would have been run into the trouble that I pushed my-self into just recently, because they are well experienced professionals and I am not.

Frankly speaking, I still feel like a bloody beginner with the metalwork sometimes and am deeply impressed by the huge knowledge of other hobby machinists. Maybe I am a bit experi-enced in a few things, but primarily for woodwork and small basic mechanic works that are sometimes needed for radio repair or musical instruments like organs, accordions, pianos etc.

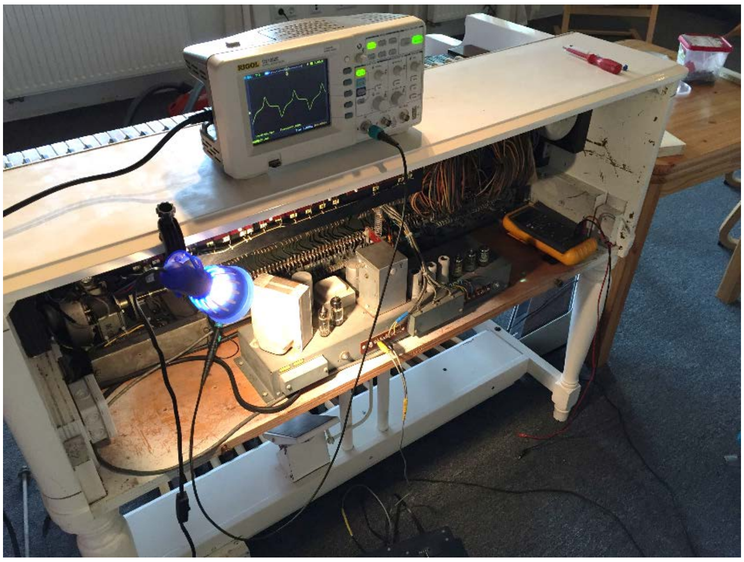

Figure 5: normally more my "thing": final measurement of an old Hammond B3 organ

Figure 6: the manual block assembly of this organ is to be disassembled and serviced completely

3 CRASH!

It happened as I tried to machine a bigger metal ring with my Myford Super7 lathe. On this lathe I have a 4 Jaw chuck installed with 110mm diameter (so about 4,3inch). The working piece was obviously quite close to the mechanical limits of the jaw's travel, but I was able to fix the working piece briefly into the jaws and also was able to clamp it with the chuck wrench, so no reason to get suspicious for any error to happen.

Figure 7: my Myford Super 7 during Service Work (adjustment of play in spindle bearings)

According to "good practice" seen by Steve and Stefan, I first verified that the working piece was hold briefly by the chuck. Then I turned the chuck a few turns by hand and verified that it could run freely.

Having done this, I turned on the motor and engaged the clutch. The next what happened, was within a few seconds only. What I did not know, was, that only 3 of the 4 jaws were actually caught by the chuck's inner spiral, so one of them looked like "clamped", but actually wasn't!

Figure 8: one of jaws hits the bedways (symbolic "fake" picture only taken afterwards)

So it came like you expect: due to the force of the high rotating speed of the chuck, the 4th jaw slipped out during full speed. It fall exactly between the chuck and the metal bedways of my lathe. I heard (and felt!) a big CRASH, the spindle was hardly blocked and stand still within milliseconds by this jammed 4th jaw.

Figure 9: a nightmare for every machinist...

I immediately pushed the knob of the "emergency-off-system" that I have installed in my new workshop, but for sure this was too late to prevent this accident. The 4th jaw left a big dent in the bedways.

A few moments later I got aware, how many luck I had:

1. the dent in the bedways was in the inner surface (that is only a mating surface for the tail-stock that physically can only operate at the right end of the bedways- never the left end)
2. the dent is within the very first centimeter of the bedways- so absolutely no impact on ANY machining activity

and (the most important thing)

3. nobody was injured (including myself!)

A jaw that is flying around in the workshop with that speed could definately cause serious injury to any person in the nearby. Sorry for saying this, but if you take this also into consideration, I am quite glad that the Myford got finally the dent - and not me :-/

4 Stuck chuck

Nevertheless this jaw crash brought me into another trouble: because of this abnormal "full stop" of the chuck and its quite heavy mass, it screwed himself so hardly to the spindle, that any try for removal was without success. Even as I used some wrenches as extension (to increase the torque), it still got stuck.
By further efforts for removal, I learned, that a further increasing of the torque would not be the solution as already now I can observe the limits of the spindle locking capability of the metal bolt that the Super7 provides for this purpose! The force introduced by me and the metal wrenches to the chuck was so big, that I even could observe a slight slip of the locking mechanism!

So a "brainless" increase of the loosening torque would not solve my problem, but surely damage my lathe by warping the spindle or cracking the locking mechanism! I need to find another solution!

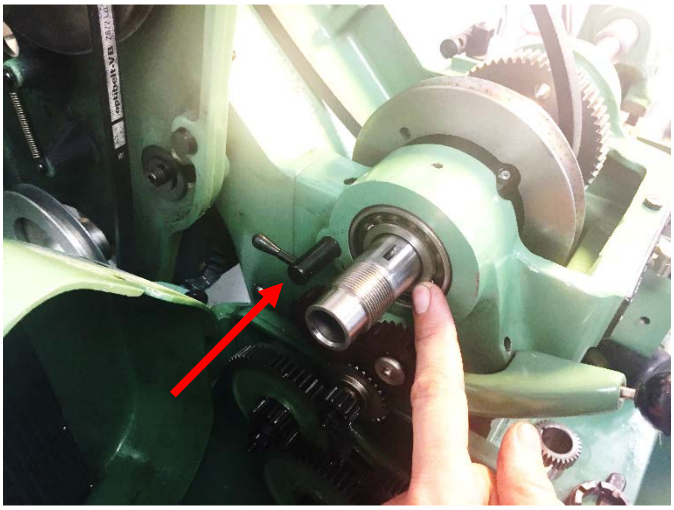

Figure 10: spindle lock mechanism of the Super7 (photo taken during bearings replacement)

After a watch of several youtube videos ("stuck chuck"; also the one from Steve :-) I concluded, that for the chuck loosening I will need a few torque "shots" (peaks) instead of a longer arm or bigger wrench. And which tool does produce torque "shots"? Correct, the wheel gun (impact wrench) that is normally working with compressed air and used for loosening the bolts of a car's wheel in a car garage.

Luckily I also own such a thing; even a quite professional one the produces several hundreds of Nm torque peaks @10bar air pressure. This is supposed to be the right thing!

So I did my next fault:

I grabbed the biggest hexagon nut adapter I own (impressive 19mm) and clamped it briefly by the jaws into the chuck. I will learn the lesson later, that it is not a very good idea to clamp a 6 face hexagon nut into a 4 jaw chuck, but please don't mind in this moment.

I locked the spindle and attached the wheel gun to the hexagon nut. Then I started the gun- and ruined the hexagon nut, the surface of all of the 4 jaws and at least my nerves, because the chuck made not a single movement of even a millimeter. Dawn!

5 Holidays

In this condition I had to leave the workshop, because my family and our running sports group have booked a "running" vacation in Palma de Mallorca to participate their "Mallorca Marathon 2017". You can imagine, that it was not so easy for me to leave the trouble with the stuck chuck behind and instead looking for relaxing, white sand and blue waves, when you still have "something to do" when you come back into the workshop.

But somehow- I did! :-)

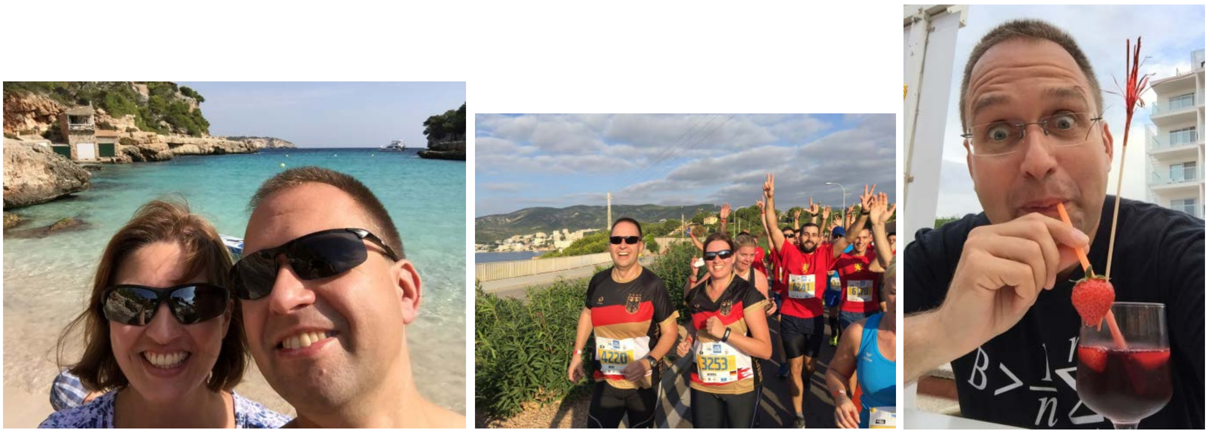

Figure 11: Beach, Run & Fun & Sangria!

Nevertheless in the evenings I spent much time on youtube, enjoyed Stefan and Steve's ad-vices and a few video producer's more collecting more ideas for chuck removal. Depending on the idea, I ordered a couple of material via my smartphone, resulting in a big mountain of carton boxes that waited already for me as we finally came back home to germany.

Figure 12: what a mass- but inside of all these parcels is the solution!

First, I have ordered the "Baby Boa Strip" recommended by Steve. For about 9 Euros you get a grip and a rubber strip that you can place around the metal bull gear to lock the spindle instead of stressing the original locking mechanism. This strip helped me to fix the spindle without any damage on my lathe.

Figure 13: part of the solution: "Steve's" Baby Boa strip!

Another thing that arrived, was a round piece of 110mm diameter mild steel, about 15mm thick. This will be an important part of the solution, but read in a minute! (see Figure 14).

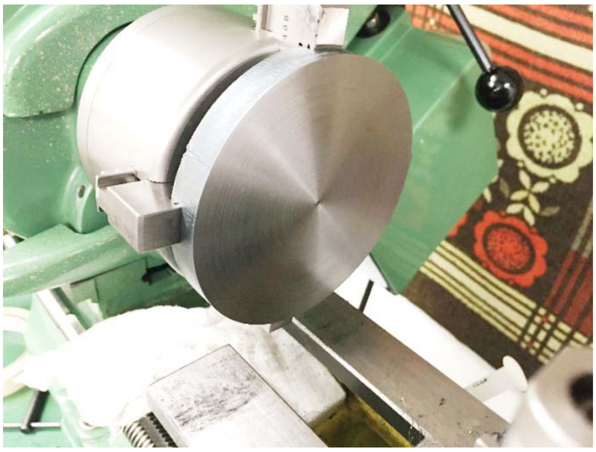

Figure 14: metal disc as basis for my airgun adapter

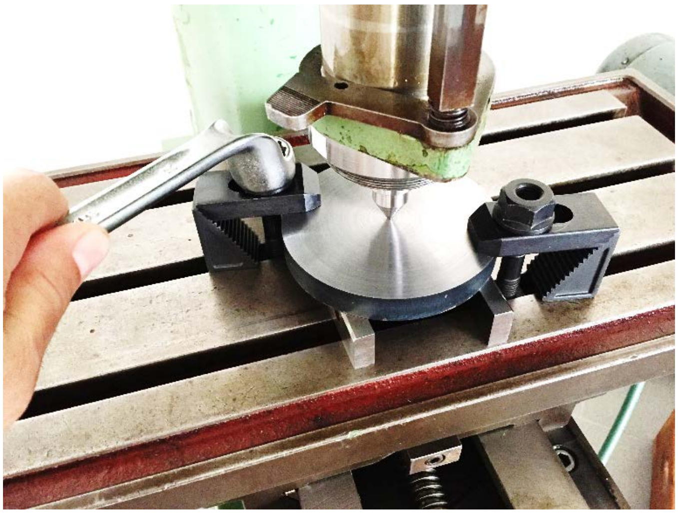

Figure 15: fixating the workpiece on my old Arboga U2508 mill

It was an idea from hobby machinist Matthias (yes sir, the crazy guy that collects actually "real" sirenes!) that the huge mass of the chuck could be a problem, "eating" the peak impulses of the wheel gun. His advice was to reduce the weight, use heat for the stuck chuck and coolant for the spindle. With this ideas, I had the following plan:

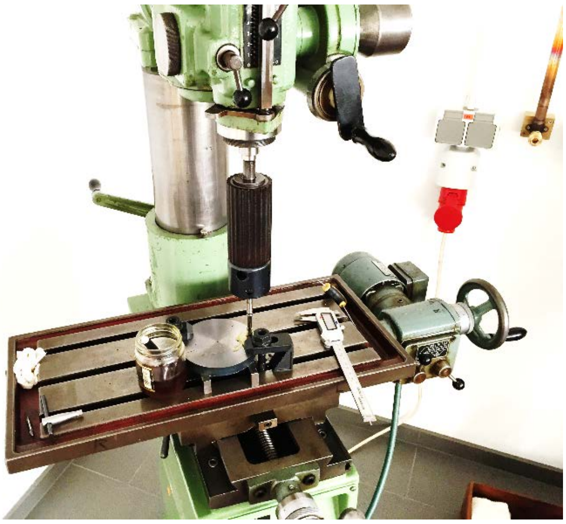

Figure 16: drilling and tapping the holes

First I remove the chuck! What?? Isn't it stuck? No, only the chuck's backplate was stuck, not the chuck itself! So after removal of the four 8mm hexagon screws, I was able to separate the chuck from its backplate.

Figure 17: re-center the workpiece (I wish I'd have a DRO....)

The next step was, to machine an adapter plate for this backplate that I can use for my wheel gun. For that, I need to drill 4 holes, tap them with an M8 winding, then cut a relief area so that this adapter plate will completely match to the backplate. A 1/2" nut for the wheel gun will afterwards be iron welded to the center of the adapter plate.

It needed about half a day to machine this plate. As I neither have a DRO nor a dividing head, the drilling of the exact positions for the chuck's screws was not so easy for me and needed special attention.

Figure 18: drilling the big middle hole

Then the freecut in the plate itself took a while, even though it was only 2,5mm deep- but it was made of steel and the Super7 lathe is not designed for such heavy cuts in one single shot. I used a boring bar to do the freecut- not being sure that this was the best suitable tool for this purpose.

But in the end I successfully machined the adapter plate and with my "drillmill" (Arboga U2508) I finally drilled a big hole of 24mm into the middle being able to weld the 1/2" driver nut into it.

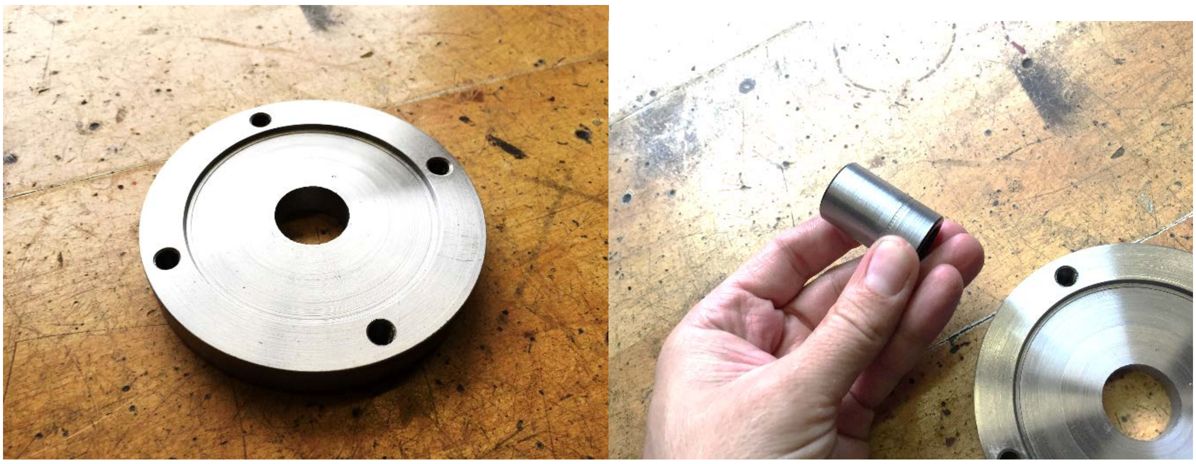

Figure 19: almost finished: the driver nut with standard 1/2" square connector

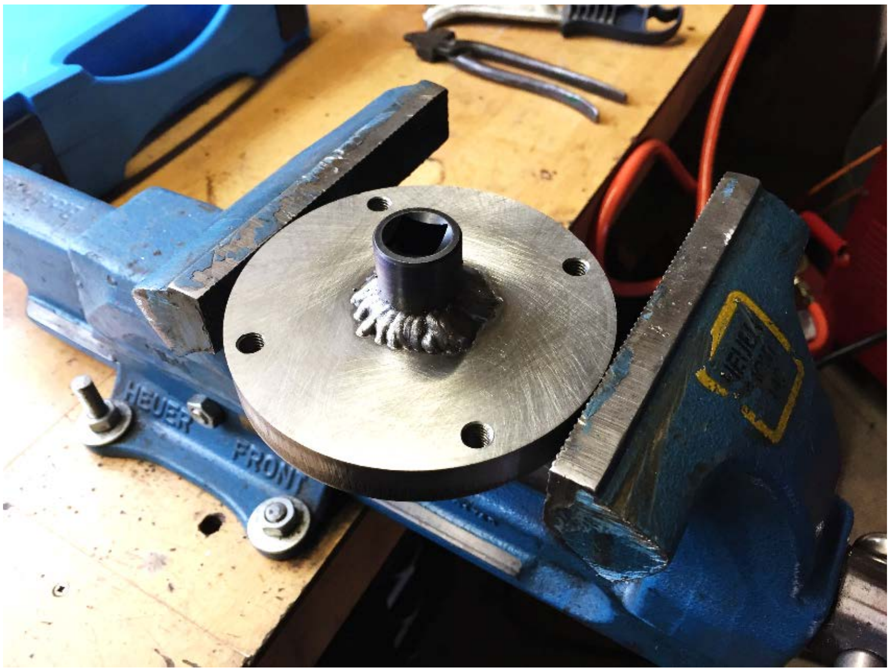

Figure 20: ...welded into the middle hole. Is it rugged enough? Yes, it is!

(I know, this is not the right method to clamp a round workpiece into a vice..)

I was very happy to see, that my self-machined Adapter-Plate did perfectly match to the holes given in the stuck backplate.

stuck backplate

my homemade adapter plate for the wheel gun

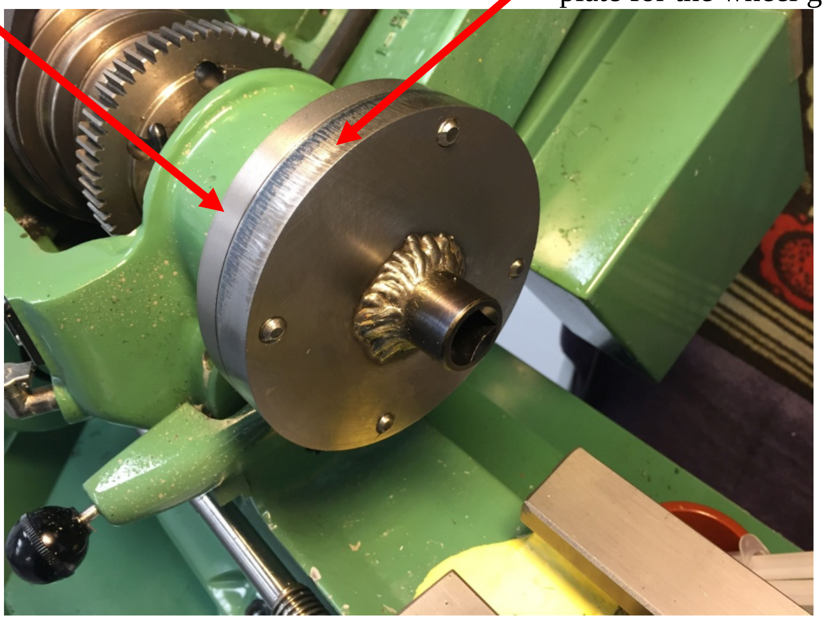

Figure 21: adapter successfully screwed to the stuck backplate...

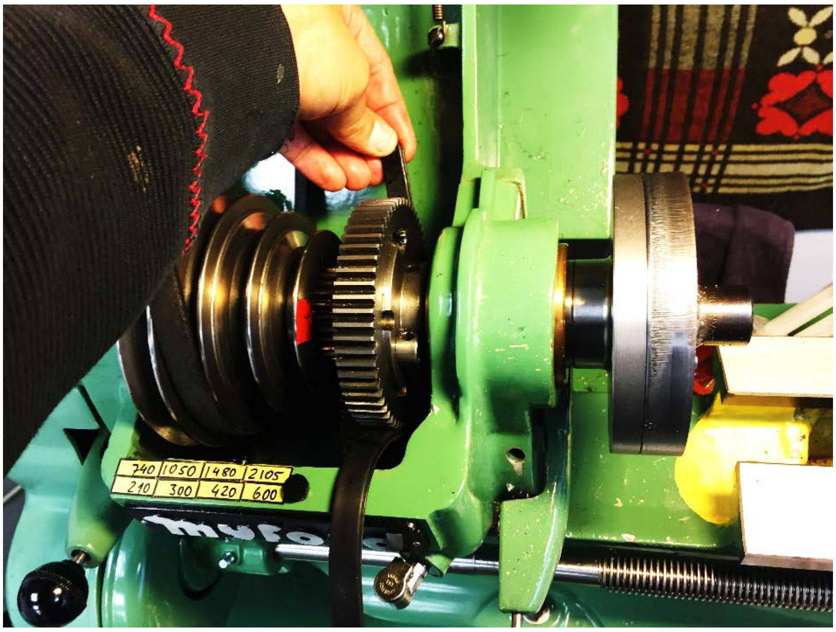

Figure 22: Baby Boa is in place....

Figure 23: final setup with Baby boa and wheelgun

So I tightened the 4 screws, loaded the air compressor system with 10bar, put the air gun into it and- **TACK TACK TACK TACK-**

...got the f.... backplate loose!! Yeahhh!!!

Figure 24: got it!!!!

Although the Baby Boa strip got a few scratches and dents, it holded -as Steven promised- successfully the bullgear in place, without any damage or stress for the lathe. I removed everything and inspected the thread of the spindle. Luckily I always use plenty of oil on the thread before mounting any chuck, so I did in this case. So it probably helped to avoid "over-tight damages" by reducing the friction. In the end I cannot find any signs of damage or unusual wear on the spindle's thread. That is good!

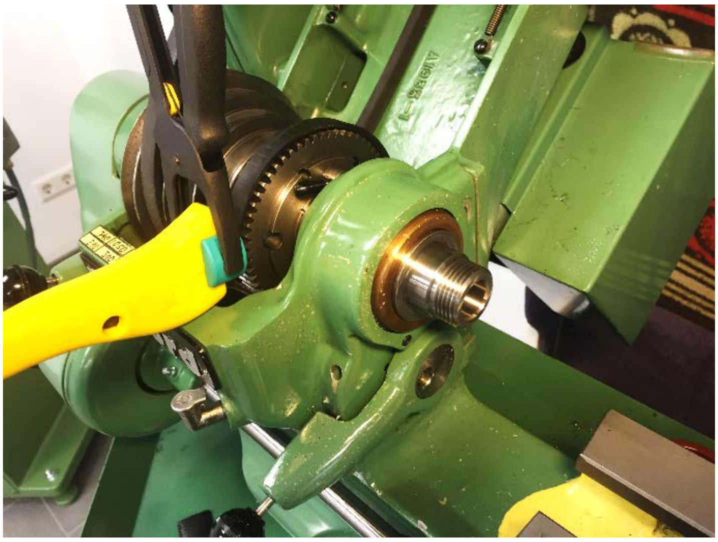

Figure 25: the stuck chuck could finally be removed! Great!

But does the spindle still run true?

Figure 26: check the mandrel's runout...

The crash definately had introduced very heavy forces into the spindle's bearings, so I was really concerned as I put the dial indicator to it the first time. But after a few tests it looked like that the runout is still <10µm, so as before. I tested it on all three reference surfaces and also applied some slight force on it while measuring. Result: all still seems to be ok and fairly true. This is the next very good message.

Figure 27:...on a few reference surfaces...

Finally I suspected the bedways to be damaged due to the crash. As I have not such a big reference plate (or straight edge) to put it on to*, I decided to use the only "second best" method the check. I installed the dial indicator on the cross slide and checked the shears by slowly measuring along them by moving the main slide. I know, that in this case you cannot believe this measurement 100%, because your reference is following somehow the (maybe) damaged shears, but I cannot see any other possibility for me. And for this, I get another good result: also the shears seem to be still very good in shape- no signs of any twisting or warping because of the crash. So the only effect of my crash on the bedways is only the small dent at its farest end**. What a luck! I am completely happy!

small dent (hard to see)

Figure 28: Did the bedways get some damage?

Figure 29: Does not seem so. All looks still good.

* inbetween I have one, see end of this report :-)

** It was not, but as I will discover later, the crash has disaligned the complete headstock a bit towards the user. According to my tests it is only 50µm over a distance of 100mm, but that's pretty much deviation if you try to turn a 30mm long bronze bearing matching to H7/h7 standard. I will get this corrected, but not within this report.

6 Grinding the jaws

Finally I can declare the lathe as "healthy" step by step. Or at least as "not seriously injured". It looks like the only thing that I actually need to correct is the surface of the jaws, that I ruined with my hexagon nut and the car wheel gun. But also in this case it is probably repairable: as the jaw sides itself and also its slots seem to be undamaged, a good grind of its mating surfaces will be sufficient. And at last it would be advisable to do this anyway as this chuck was not new as I got it together with the lathe.

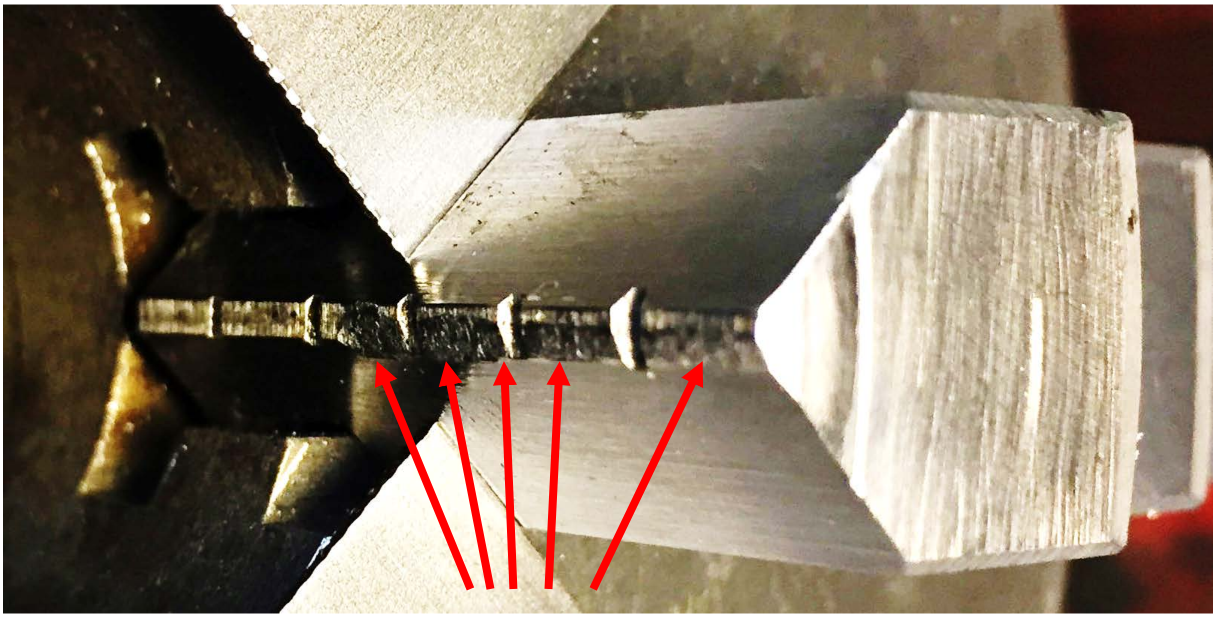

Figure 30: one of the jaws- look's pretty bad and deformed, isn't it..?

So how do you grind the jaws?

You know, I am a beginner in this metalwork area. So again I look for the videos from Steve and Stefan and learn a lot. It is obvious, that I cannot compete with them and their solutions. I am not capable of building a complete toolpost grinder for me like Stefan did. But I can probably do it a bit like Steve: ordering this round vice and machining a small 10x10mm square bar of mild steel will give me a possibility to clamp the extended handle that I have for my Dremel tool. This handle has the possibility to drive some of the Dremel's grinding wheels and as I saw even some silicium carbid grinding wheels for the Dremel on ebay, I immediately bought them.

7 Pre-load

One important issue in grinding the jaws is obviously the fact that you need to introduce some preload into the jaws before you start the grinding work. There are several options to do this:

1. use a slotted mask from outside
2. use an outer ring (but I think this is not really correct as in this case you push the jaws into the wrong direction)
3. using an inner ring in the inner end of the jaws (Surburban Tools does this)
4. temporally glue the jaws with hot glue during clamping the neck of a plastic bottle that can be pushed out afterwards (after the hot glue has cooled down)
5. using an outer ring and screw the jaws (correct direction, but only applicable for jaws that have screw holes in them)

I think any solution would be sufficent for my needs as I do not need an accuracy like rocket scientists. Nevertheless I will do nothing wrong when I try it to do as precisely as possible. The solution with the milled mask looks good, but needs a lot of time to machine, so I dismiss it. The outer ring is a good idea, but my jaw has no screw holes that I could use and the reverse clamping I do not want to do as it also uses reversed force and thus compensating eventually given play in the jaws to the wrong side. So this probably only works if I am shure that the mechanical length of the jaws is absolutely correct, well grinded and the play between the spiral and the jaw's thread is neglectible. As I do not have any proof for this, I also dismiss this idea.

Overall I really like the idea with the plastic bottle's cap and the hot glue. I guess I will try doing this way, as all the stuff needed I have at home already (hot glue gun and the cap of a plastic bottle).

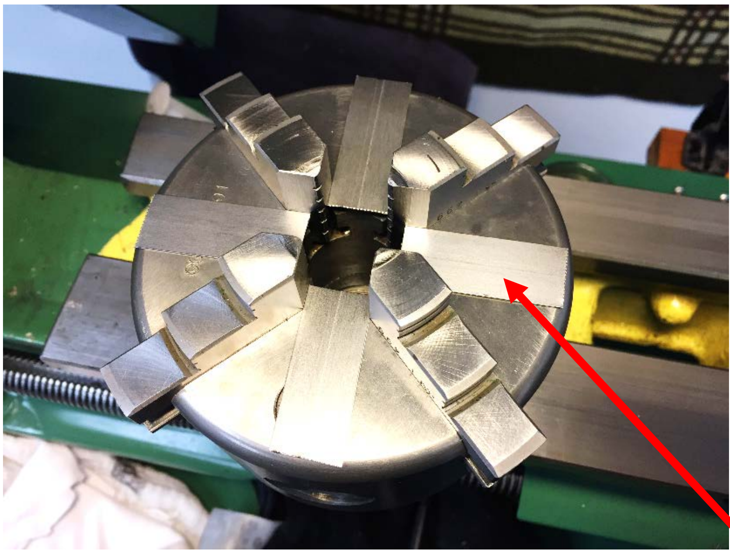

Figure 31: fnially I decided for another method for suitable preload

8 Preparation

The first thing that I do now is to build the Toolpost holder for the "extended" Dremel. I ordered the round vice that Steve proposed and found a piece of 10x10 steel bar in my workshop. To improve its surface finish and make it square, I decided to mill the surface with an 8mm endmill. Again I used the Arboga U2508 for this work. In my opinion she does a quite good job for metal milling- as long as you do not expect her to cut big and heavy cuts in steel. If you use her a bit "kindly" (like an old lady ;-) she cooperates quite prettily and provides a good milling result. Ok, at least for my expectations it is okay :-)

Figure 32: this will be the final setup for grinding

After having milled all the 6 sides of the metal bar, I drilled another hole into the vice that is needed to fix it afterwards to the metal bar. I spent quite a lot of time to find the correct position of the drill hole so that it will be in parallel with the lathe's bed afterwards as good as possible. In the end I met the "inline" position amazingly well as can be seen with bare eyes already. After this, I transfer the position of the holes on the metal bar, drill it and tap the M5 threads into it. In the end I do the assembly and get a nice toolpost holder that I can use together with my Multifix Aa Holder system that is installed on my lathe.

9 Test Grinding

For sure I cannot wait to test it. A put the Dremel into it and clamp it gently between the jaws of the round vice. As grinding disc I use this siliciumcarbide grinding disc from Dremel that I already bought. A piece of 10mm round steel in the lathe will be my first object to grind.

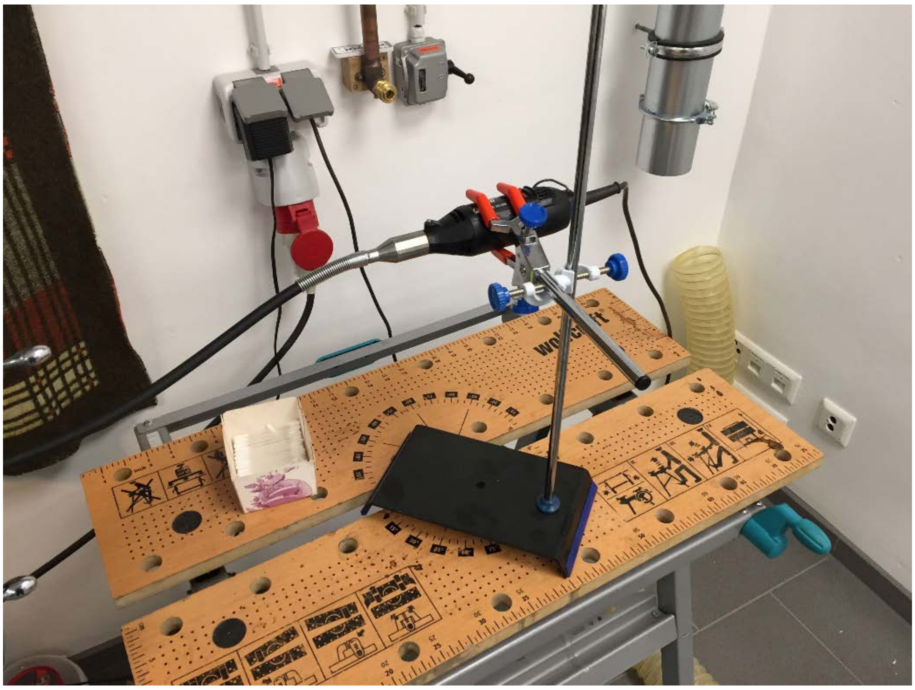

Figure 33: the Dremel was clamped into a laboratory stand

Thanks to the videos of Steve and Stefan I know, that grinding dust is highly abrasive and will hurt your lathe when not removed afterwards. So I "shielded" the bedways of the lathe with pieces of old clothes to protect it. After the end of the test I even used a vacuum cleaner and a brush to remove the last residual pieces of contamination.

My test was quite successful, although it really takes forever to even grind the smallest amounts off the working piece. Maybe I have to increase the Dremel's speed as well, but in this first try I started with very friendly parameters first in order not to overstress my new grinding apparatus. I have to admit, that the grinding results of Stefan with his homemade grinding toolpost machine still looks a bit better than mine, but for this simple setup the result is not too bad. But will it be sufficent to re-grind the jaws?

No idea. I will need to check and just try it.

10 GO LIVE!.....or not?

So after this first try I am very keen on starting the jaw grinding process. But the first step should be to see, how true (or "untrue" ;-) the chuck runs in its current state and confirm, that the chuck backplate is really correct and nicely flat and square (as Steve would say ;-)

11 Backplate Check

So I ask myself for patience and take the test dial indicator, putting its sensor to the surface of the chuck housing, about 5mm next to the interface "backplate - chuck". I measure the maximum deflection while turning the spindle by hand. Then I loosen all the four backplate screws, remove the chuck, turn it by 90 degrees and re-screw it in this new position to the backplate. Then measure, unscrew, next 90°, etc.. until I am completely 1x around.

Figure 34: checking the runout before grinding

So the result is:

Position	**runout (Total Indicator Reading)**
0°	60 µm
90°	30 µm
180°	25 µm
270°	90 µm

So according to this test, I thought that it would be the best, to assemble the chuck in the 180° position to the backplate, as this shows obviously the smallest runout. But after having assembled the chuck again to the 180° position, I was not able to reproduce this 25µm runout! So what happens here?

I investigate the screws and detect, that they all have a different diameter of their heads as well as the length of their threads. This still comes from the pre-owner of this lathe who obviously thought, that it would have no effect on the end result. But it has and Steve and Stefan both show us the procedure how to align a workpiece by half-loosening the backplate screws and tipping the chuck into position!

But in any case the screws need to be of adequate quality! So I do a complete rework of the following:

1. Turn the head of the screws to ONE common diameter
2. Shorten the screws to ONE common length
3. Turn the surface of the chuck backplate nicely flat and square

With all this topics above done, I can confirm the runout of the chuck's surface of about ~30µm TIR. Maybe not perfect, but probably the best that I can do with this setup.

What makes me a bit sad, is that I cannot improve the runout by tapping the chuck into a certain direction to compensate for misalignment- such as Steve and Stefan often show in their videos. Maybe the reason for that is, that my chuck has a freecut (relief) area in its back. The backplate has a machined counterpart that is so precisely machined for this freecut, that it grips 100% in and we have a very good fit here- without any play to any direction. The advantage is, that with this good fit the chuck is very good supported to lead all mechanical forces into the lathe's spindle and does not tend to wobble or shake at all. But the disadvantage is, that -because of this good and strong fit- it does not allow any movement to any direction. Thus, there is also no play to compensate any runout to any direction.

What to do? It would be a very easy thing for me to turn the freecut down just a few hundred micrometers so that we will get the needed play. But honestly speaking I do not dare this. I am still a beginner and have absolutely no feeling what negative side effects this would cause as well. For sure- Steve and Stefan would immediately know. But I do not, so I will not start this activity and just live with this 30 µm runout at the chuck's housing.

12 Grind it!

So I take a 10mm precision bar ("Prüfstift"), put it into the chuck's jaws and check its runout with the dial test indicator (Figure 34). I can see the needle moving from -100µm to +100µm, so quite bad. I verify the reading with a piece of 8mm precision grounded round bar (that I use for balancing grinding wheels) and get the same reading.

To prepare the grinding, we need to fix the jaws with a preload- like already described above. The plan was to use the hotglue gun, but then I had another idea. I was recently delivered a new big and heavy sized cupboad for the workshop. This was delivered on a wooden pallet, secured by a quite robust 12mm metal strip around it. Instead of throwing this metal strip away, I cut 4 short pieces out of it and clamp them between the 4 jaws. Then I close the chuck. The jaws now press the metal strips between each other- causing the desired preload (Figure 31!

As this solution looked better than expected, I disconnected my hotglue gun and decided spontaneously for this method with the 4 metal strips.

Next, I set up the grinding support with the Dremel again, setteled briefly into the "Steve-Jordan-Vice". As I use the long Dremel extension set and probably with maximum speed, I put some drops of Nuto 32 oil into it to prevent it from overheating and excessive wear because if the high RPM speed. I use a laboratory stand with a 3 fingers clamp to fix the Dremel in a position, that guarantees a minimum of bending of the extension cable (Figure 33). Note: the more bending, the more rubbing, and the more wear and heat!

Still with the lathe in OFF position, I verify that the small Dremel's grinding disc can easily access all the jaws completely- even deep inside the chuck. Take care not to crash with the vice into the jaws- because then you have another new "project" that you need to fix ;-)

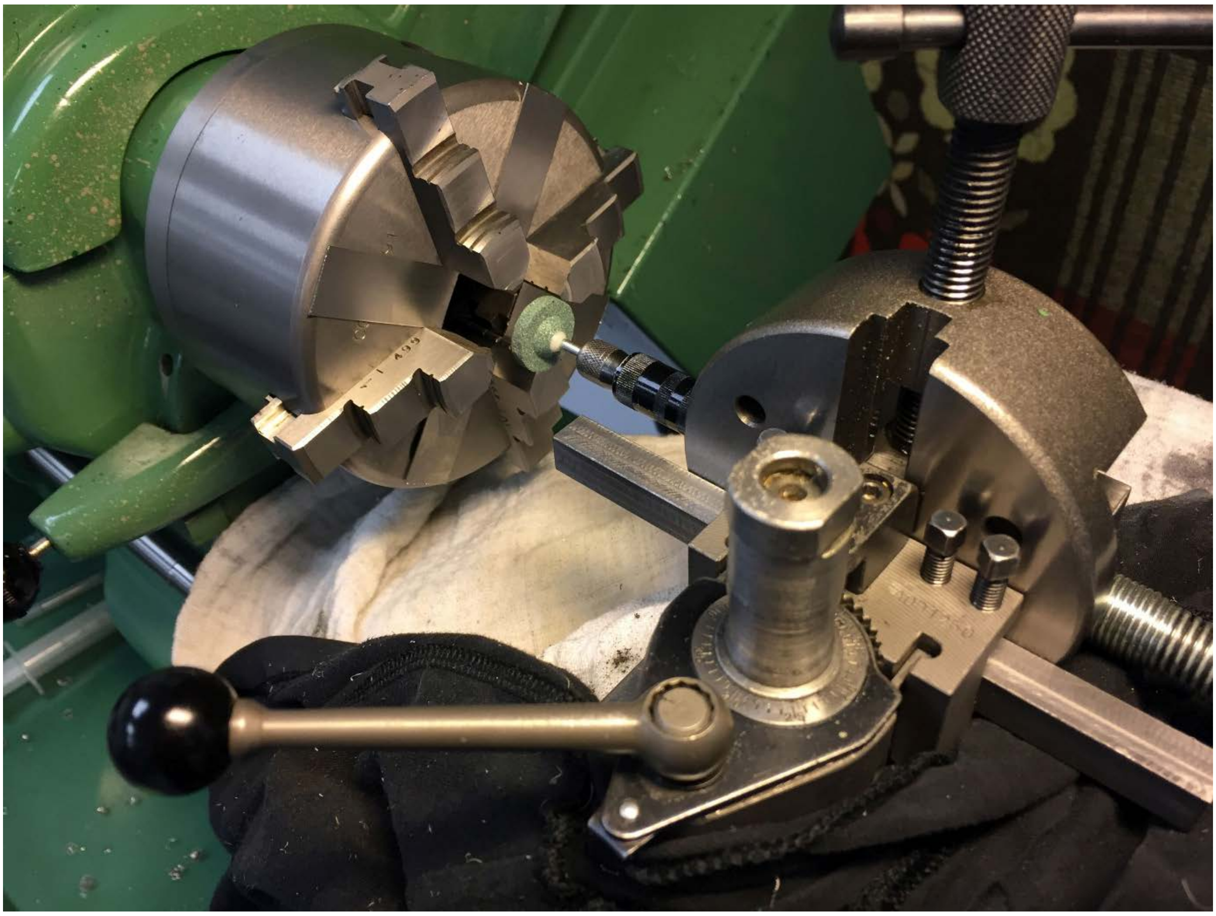

Figure 35: last preparations!

As all looked good, I started the lathe with a speed of about 300rpm and the Dremel with its maximum speed. With a diamond tool I dressed the grinding disc very slightly. After this, I move the grinding wheel very, very slow into the opened "mouth" of the chuck. By using the cross slide, I detect the position, when the grinding disc just touches the highest points of the jaws. Then I add about 25µm with the cross slide- causing the grinding disc to start the "real" grinding process. I am satisfied seeing the first sparks coming out of the chuck. After having driven the grinding support completely into the chuck (you need to do this very very slow, it can take about 5 minutes just for this few centimeters), I pull it out with the same slow speed.

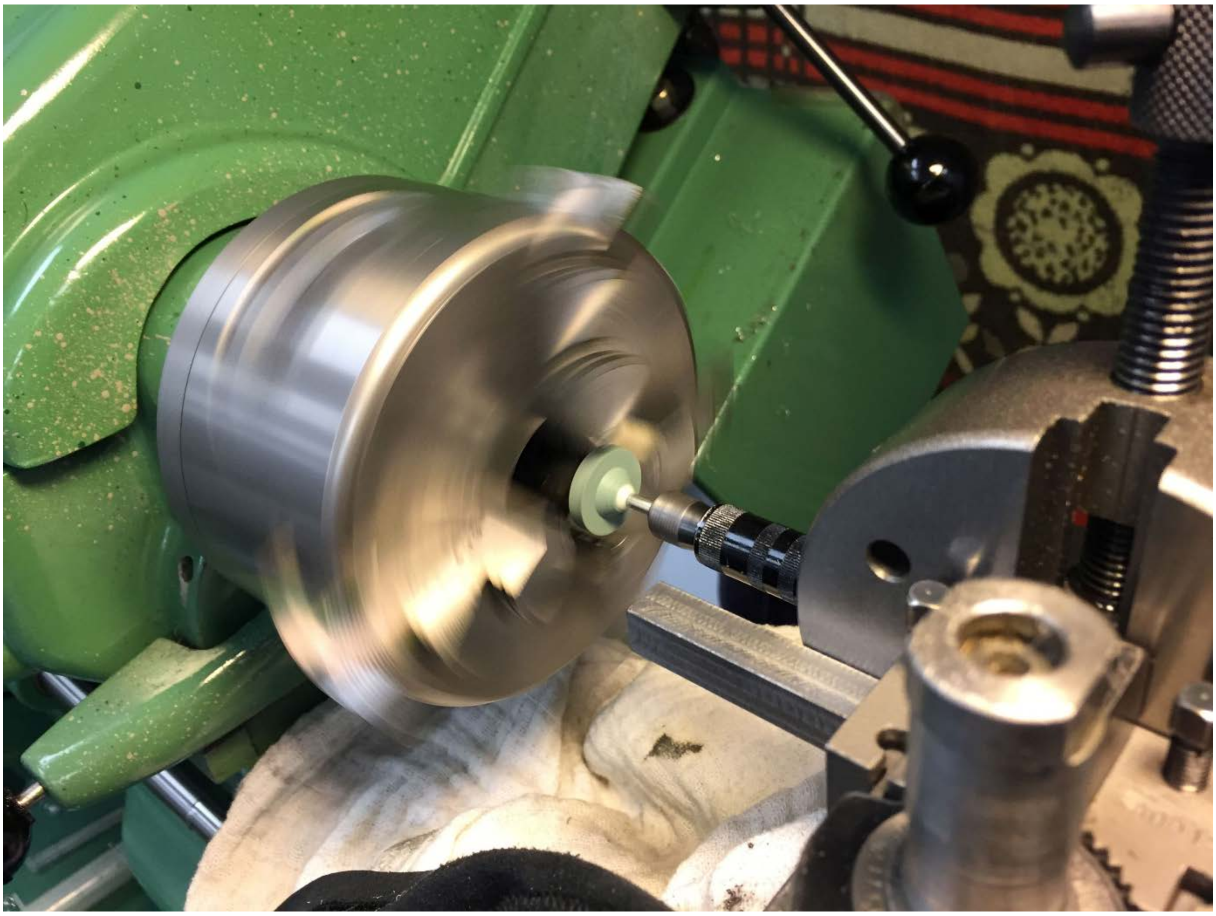

Figure 36: the grinding has begun!

Encouraged by this first pass I give another 25µm and grind again.

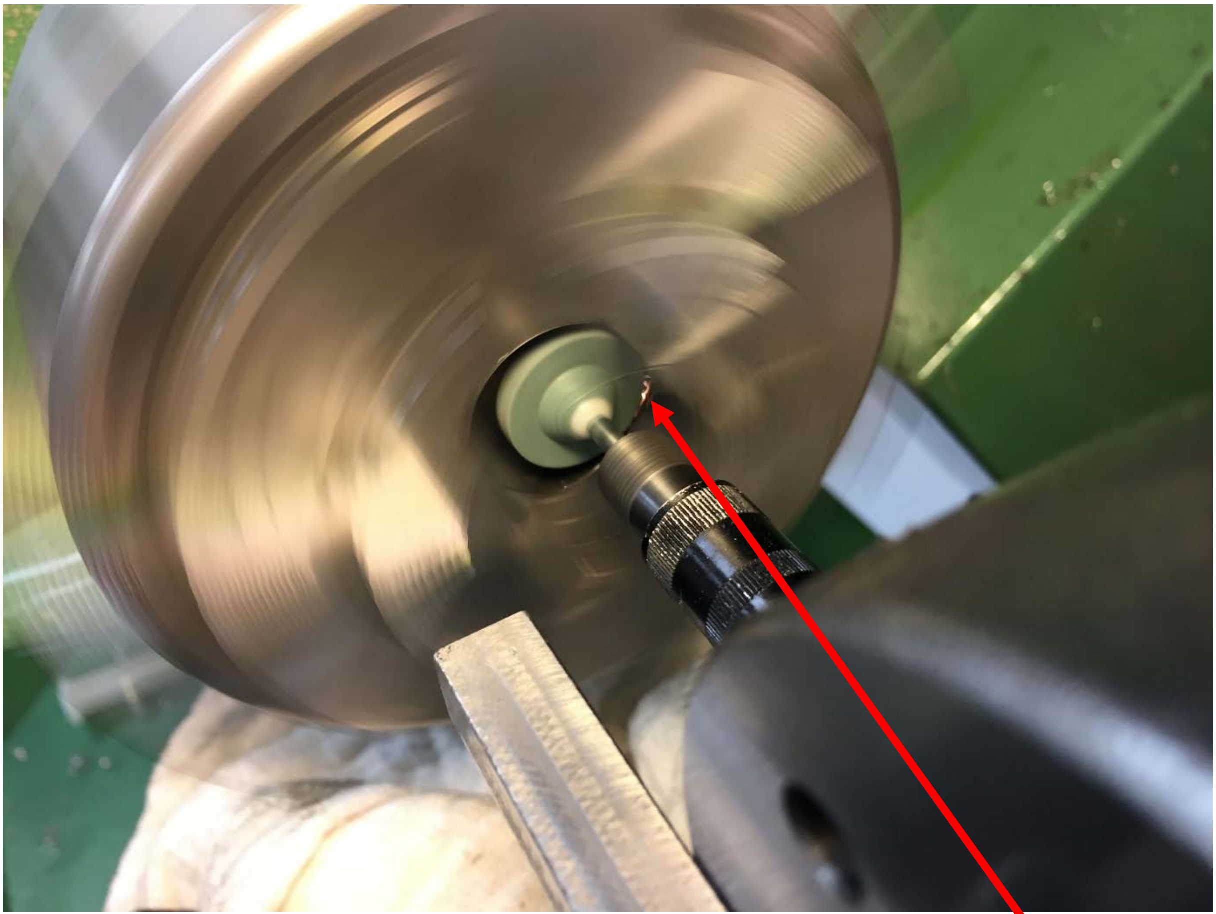

Figure 37: grinding with actually a few sparks in the picture! Yeeahhh!

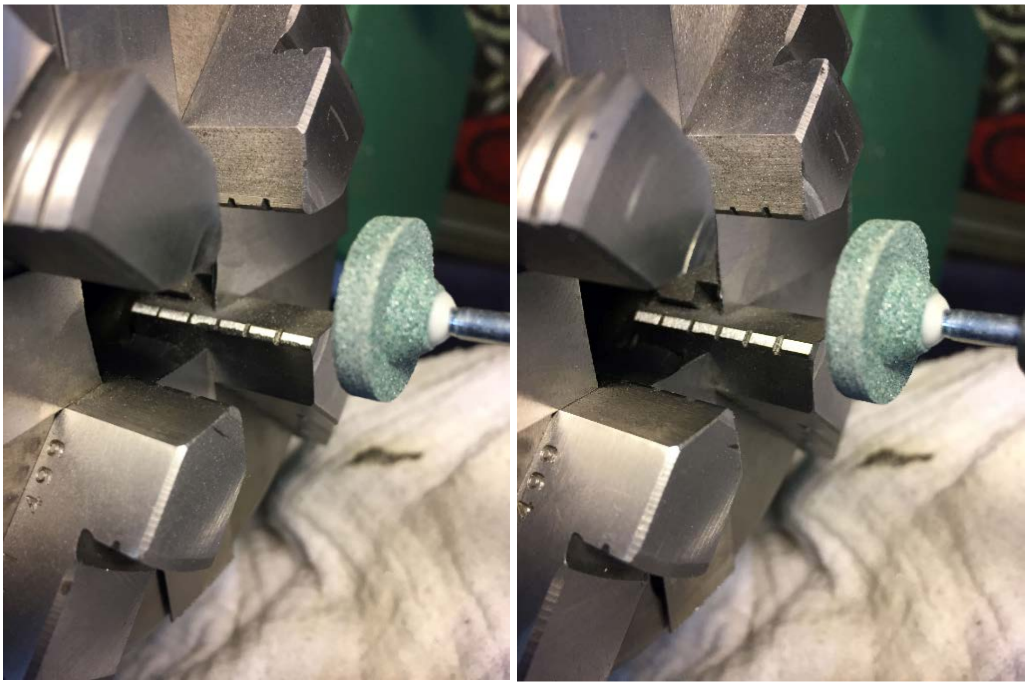

Figure 38: jaw's surface getting better- step by step

In the end it took me about 10 or 15 passes until the jaw grinding actually shows a flat area and no burr or deformed areas anymore. I am very very happy about the result, it really looks good to me!

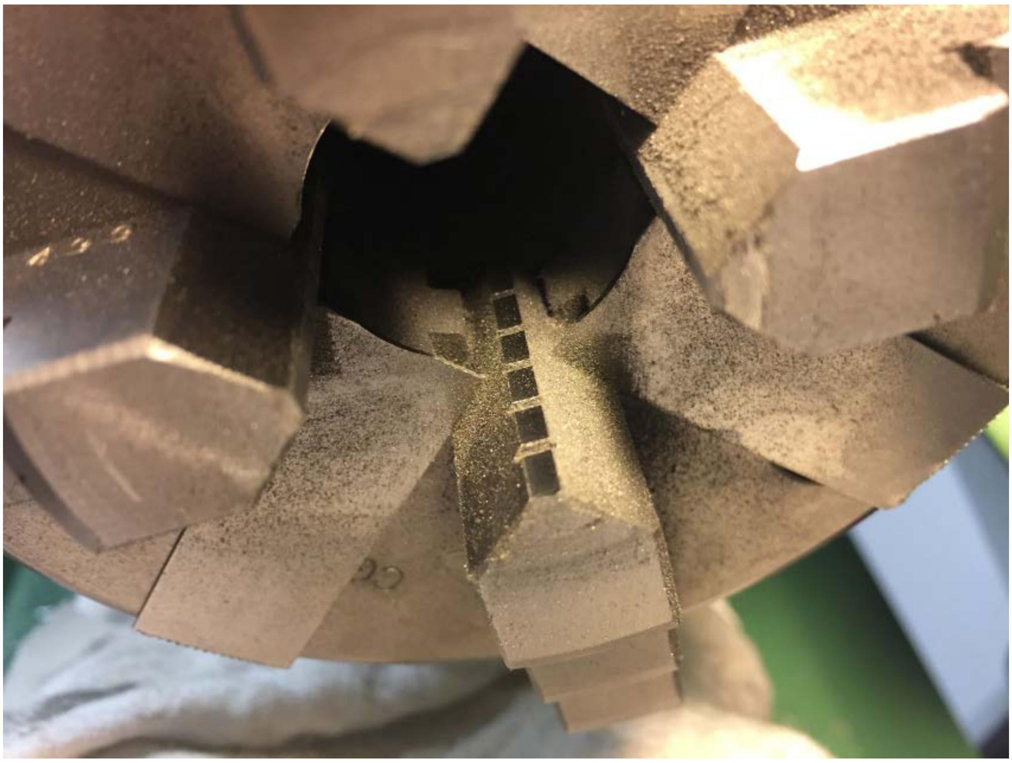

Figure 39: not bad- a quite smoothy looking finish!

After having cleaned the chuck and removed all the grinding rests from the lathe, I put in the precision test bar again and check its runout.

13 Disappointment

What shall I say- frankly speaking I have expected a bit more. The needle of my dial test indicator now deflects between -50µm and +50µm. So I halved the runout, but somehow I expected this to be even better.

Now my fried Matthias gives me an important hint: maybe that the clamping surface of the jaws is now good again, but what about the other side? Means the side that grips into the inner spiral of the chuck. How does this look? Not very good, unfortunately. Signs of heavy use can be seen in the ribs of the jaws and with this issue I have probably not a great chance to bring the runout to better values than I currently have.

Just to verify, I use the second set of jaws, that I have for this chuck. Those are "inverted" jaws that are preferred when clamping workpieces not from outside, but for inside. For this tests, it probably does not matter. But what matters is the fact, that this set of jaws was obviously not as much used as the standard set and thus has not that much signs of wear. So it is not a surprise that with this set I get a slightly better runout values. But there are still the signs of wear inside this chuck that I cannot ignore.

Figure 40: quite a lot of wear in the jaws...not helpful for a small runout

Finally I put on my small 3 Jaw Chuck on the spindle and measure: about +25µm..-25µm. So in total about 50µm- this meets almost the DIN 6386 Class 1 specification for new chucks of its size (Limit= 40µm).

14 Conclusion

So what now? Project success or not?

I nevertheless think "success". The re-grinding of the 4 Jaws Chuck brought it at least from 200µm runout to 100µm TIR. Imperial thinkers would say "less than 4 thou". As result of the verification with the second set of jaws we could see, that probably the massive wear at the rear of the jaws is the reason for, that we are not able to improve the runout better than +/- 50µm- and not a maybe badly performed grinding process. This wear is something that we unfortunately cannot defeat, so at least we probably will have to live with it. But the good thing is: I again learned a lot during this refurbishment and thus I personally treat store this project in my brain as a "success". And what I must not forget: the provided clamping force of the chuck should have been improved a lot now, because the flat grinded contact surfaces will have much better contact to the workpiece than the warped surfaces before.

15 A matter of perspective

My 5 years old son Max said emphatically after his first children's run in the Mallorca Marathon 2017: "If all the other's wouldn't have been running in front of me, I would have been the very first in the finish and would have won the race!"

Excellent attitude! The complete race was only 600 meters and he was somewhere in the front middle field when crossing to the finish line -so about two hundred other children faster than him-, but with this mindset he nevertheless feels as a winner! I strongly try to adapt this attitude from him now, so from this day onwards, I also try to feel every day as a "winner". Sometimes it works, sometimes not ;-)

Figure 41: Young "Machinist's" education: Max with his own(!) 1400watts mini garden shredder

16 Chuck update?

As the chuck was branded as "Höhborn" part -who was a german distributor of Myford parts and machines- I tried to evaluate the chances of purchasing a new set of jaws as a spare part.

It was not so easy to get in contact with Höhborn, because they obviously now belong to the "HOKO Traiding group" with their central located in El Salobre, Spain. But after a few weeks they actually responded to my mail.

Their recommendation was to either ask Myford or the company "Klopfer" for replacement parts- depending on the original manufacturer of the chuck. As I have no clue who the original manufacturer was (no brand's name or other sticker on it), I did not follow up this topic. There is no evidence that it is only the jaws but could be the inner spiral of the chuck as well, so buying a new one is probably cheaper than purchasing expensive spare parts.

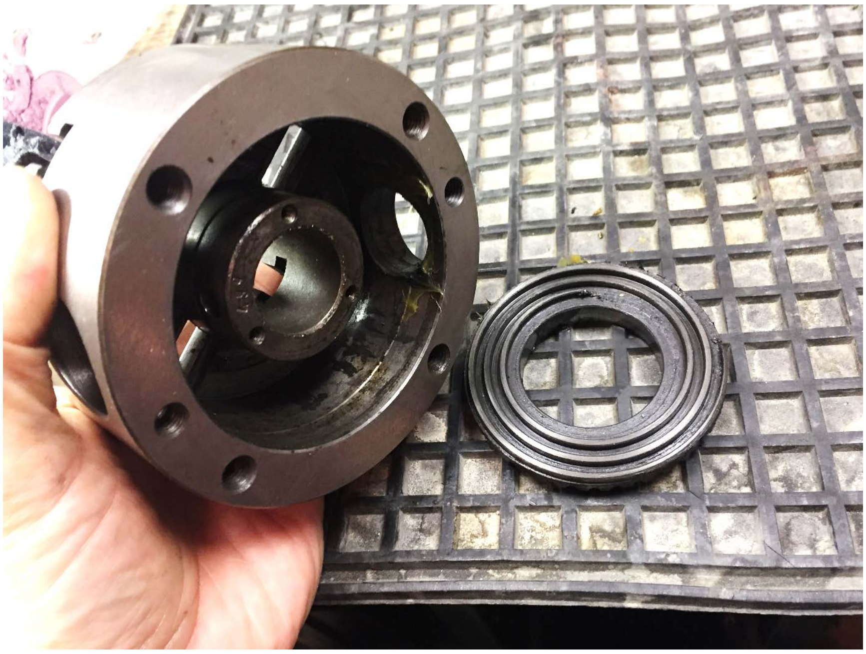

Figure 42: the inner spiral of this chuck (see right)

And if we are honest with ourselves: the measured runout is not soooooo badly that this chuck is something like "unusable". As long as the turning axis of the system is parallel to the bedways, the runout does not impact the precision of the lathe.

So we are happy, that..

- we could remove the stuck chuck from the lathe without any further damage
- we successfully could regrind the jaws
- I learned a lot
- people like Steve and Stefan still produce very good internet content and share their knowledge with **people like me**
- there are **people like you** reading my reports

Ha ha ha! :-)

17 Klingon Bat`leth!

Folks, finally I could not resist! I purchased a 1500mm, 40kg straight edge with measurement report of its flatness (within +/- 2µm).

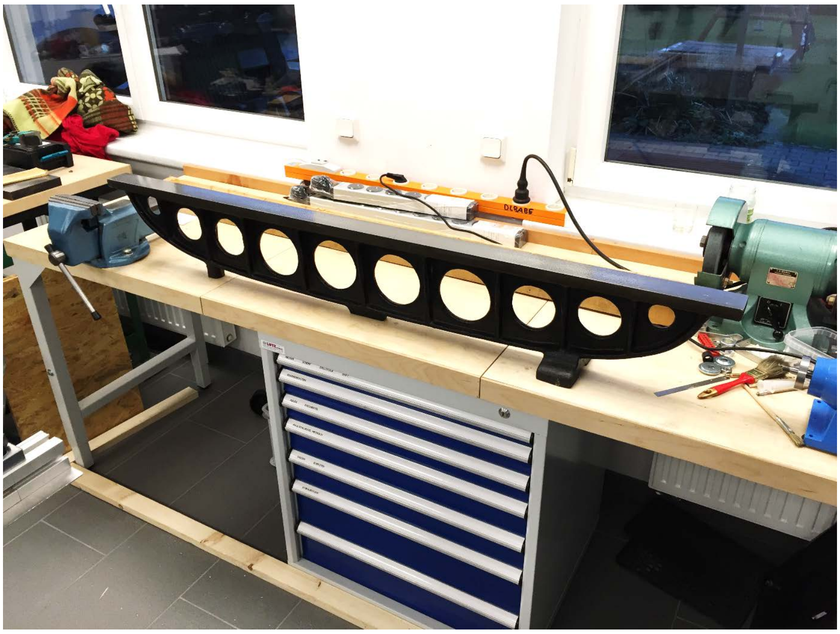

Figure 43: please don't ask me if I have something to "compensate " ;-)

I have no clue what to do with it, but I bought it from my local Ferenghi distributor and if - somewhen in future this might happen- an angry Klingon stands in my front door asking for a fight with me, I would be able to compete with him with a suitable weapon!

Figure 44: the correct usage of this 5 feet straight edge- demonstrated by a Klingon (Source: Wikipedia)

Note: the straight edge shown in Figure 44 may not meet the specification of DIN876 Grade 00 because of its obviously very badly milled flatness!

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