

## Rear wheel spindle

dave bushell

Joined: 09 Jun 2004

Posts: 133

Location: Caterham, Surrey

Posted: Mon Feb 26, 2007 10:57 pm Post subject: Rear wheel spindle

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I need to make a rear wheel spindle for my three speed super. It needs to be about 11" long and 1/2" in diameter. What grade steel should I use and where can I obtain a piece about 12" long?

Dave

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efr215

Joined: 06 Nov 2004

Posts: 121

Posted: Tue Feb 27, 2007 12:29 am Post subject:

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In old money the steel designated EN24T, a nickel-chromium-molybdenum steel would do the job quite nicely. The "T" specifies an alloy steel supplied in the heat-treated state, (55 tons tensile strength). In this condition it is still reasonably easy to machine on the sort of light lathe to be found in the amateur workshop. Lower speeds, sharp tools and some sort of cutting fluid, (if all else fails plumbers tallow), will get you a decent finish.

Almost any good steel stockist should carry it and despite the numbers being changed, -- "rationalisation" apparently, -- most will know what you are after. You may or may not be expected to pay a cutting charge but be warned these can sometimes be extortionate.

EN24 is the annealed state and if you have access to heat treatment facilities a tensile strength anywhere between 50 and 100 tons is to be had. If you don't then make sure that you get the EN24"T".  
If you get stuck I'll see what I can get.

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Jeff Reed

Joined: 02 Jun 2004

Posts: 11

Location: King's Lynn

Posted: Tue Feb 27, 2007 5:43 pm Post subject: Rear spindle

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I was told that Jim Best's dad made a wheel spindle from an old Morris 1000 half-shaft for someone who had broken a couple he had made himself. He had no further trouble, but was never told the source of mystery metal.

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Rear wheel spindle

efr215

Joined: 06 Nov 2004  
Posts: 121

Posted: Wed Feb 28, 2007 7:48 pm Post subject:

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Using material of an unknown specification on a safety critical part like an axle is not really the best idea.

That said half-shafts and their like are going to be made of a tough steel but from first hand experience I can state that manufacturers may and do fuse/weld steels with different properties together depending on the duty required, they may also vary the heat treatment over the components length for the same reason. All of which means you don't know what you've got.

On balance I'd say buy material of a known provenance.

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dave bushell

Joined: 09 Jun 2004  
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Location: Caterham, Surrey

Posted: Fri Mar 09, 2007 12:06 am Post subject: Rear wheel spindle

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Thanks guys for the info and offer of help. I have sourced a length of EN24T but it is 3/4" dia instead of 1/2". I hope it turns down ok! Any advice?

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efr215

Joined: 06 Nov 2004  
Posts: 121

Posted: Fri Mar 09, 2007 12:32 pm Post subject:

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Buy a squeezy bottle of "Rocol" cutting fluid or its like to dribble on the cutting area. You don't need to flood it although if the lathe has a suds supply so much the better.

Slightly reduce the top and side rake on the toolbit, (carbide tips are not essential), stone the cutting edges to remove grinding marks as this improves the life of the cutter and improves the finish too. Radius the cutters tip, as large as the job will stand as corners are stress points.

Reduce the speed of the lathe to about half to two thirds of that you would expect to use on mild steel. (It is impossible to be more exact as much depends on the stiffness of the lathe and its condition.) If you experience 'chatter' try increasing the rate of feed before reducing the mandrel revs.

EN24T is, in my experience, very stable as supplied and does not seem to suffer

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from internal stresses. I would however be inclined to rough the material down to a sixteenth oversize and then leave it for a week or so before finishing just in case. A banana spindle is not quite the idea!

If possible screwcut any threads to at least 2/3rd depth if finishing with a die, rather more if tidying up with a chaser. Adopt the so-called 'American' method for screwcutting, rather than plunge cuts. I know it takes a bit longer to set up but it is much kinder to the tool and less prone to mistakes too.

Now all we need to see is half a dozen or so appear in the spares scheme locker  
. . .

For those not familiar with this so called 'American' screwcutting method I will try to elaborate. The trouble is that what takes minutes to demonstrate takes ages to describe clearly in words.

In this method the cross-slide is used to wind the toolbit out and clear at the end of the cut. The top-slide is set over to half the thread angle and is used to apply the cuts. To configure the lathe set the top-slide and cross-slide collars to zero when to tool tip is at the major thread diameter. Advance the cross-slide by the depth of thread being cut and re-zero the cross-slide collar. If at all possible employ a stop on the cross-slide rather than rely on the cross-slide zero.

In use the cross-slide is advanced to the zero mark. The top slide is first withdrawn to clear the major diameter and then advanced to provide no more than 0.0015" (.04mm) cut. At the end of the cut the tool is withdrawn by using the cross-slide. The tool is wound back to the start point, the cross-slide is zeroed and another cut is applied by advancing the top-slide. The process is continued until advancement of the top slide brings the zero mark to the line.

It may be noted that no trig calculations are required to compensate for the flank angle in gaining the correct thread depth. Tool survival is much improved as the cutting is only on one flank and the risk of "digging in" is much reduced, all of which will lead to cleaner more accurate thread forms

Due consideration must be given to thread root radius, it's a bit complicated to go into detail here but what counts most with a thread is the mean diameter rather than the O.D. or the core diameter for that matter. Too small a radius and the thread will come out oversize if the cutting is to the quoted thread depth, too large a radius and the opposite will be the case. Unless the machinist has access to inspection tools the best bet is to use a known good nut as a gauge.

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dave bushell

Joined: 09 Jun 2004

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Location: Caterham, Surrey

Posted: Sat Mar 10, 2007 7:27 pm Post subject: Rear wheel spindle

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Thanks for the constructive/instructive answer. I have only aquired a short piece of EN24T so I can't afford to make any mistakes and also don't expect to find half a dozen appearing in the spares scheme locker, not from me anyway!  
Dave