

The ORGS Build Up Project

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fishkens, Mar 26, 2011:

As with everything you've done, this is a very nice mod. This has been on the list for my GS (stock swingarm) for some time and I hope to get to it this spring.

NordieBoy, Mar 29, 2011:

x3300 said:



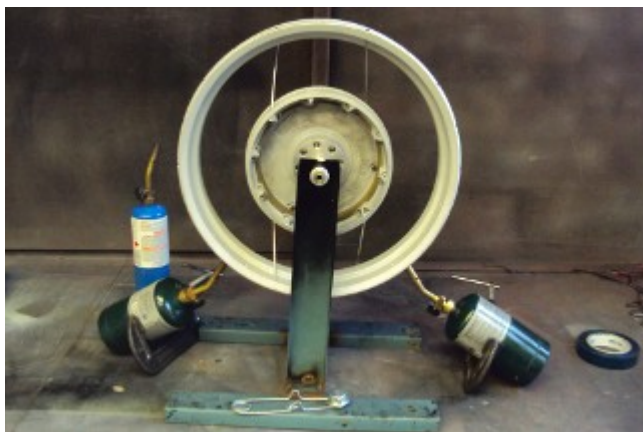
You're going to need a bigger tyre than that one...

x3300, Apr 12, 2011:

I took the rear wheel apart to do the final build with the proper length spokes. In preparation for powder coating I scrubbed up the rim and hub with a strong detergent and steel wool followed by sand blasting and another detergent scrub and rinse.



The smaller rear rim would just barely fit into the oven I have access to, but I wasn't confident I could get the rim into the oven without jarring the rim and having the loose powder come off, so I decided to use the same setup I used with the front rim to do a partial bake of the rim on the bench to stabilize the coating then I transferred the rim to the oven to do a final bake.



Here's the rim and hub after coating.



I got back in touch with Doug Richardson of The Devon Rim Co. and within a short time 20 spokes 6mm longer than stock arrived. I used the 20 that I had previously ground down shorter for the other side.



There was some interest in my method of building a wheel, so I'll give some more details here. I use a copper based anti-seize to lubricate the stainless spoke threads.



The first spoke is what is commonly called the 'key spoke'. It defines the relationship between the rim and hub. I set the key spoke so that the printing on the rim was at what I thought was the top of the hub.



Then comes the second spoke.



And continue until all ten are in place. I decide on a fixed number of turns, say five, to thread the nipples on so all will be some what equally engaged.



Then I do the other ten to finish one side.



Then I flip the wheel over and do the same on the other side to finish up the lacing part.

At this point all spokes have the same number of threads engaged, but are still really loose. I go around the wheel several times turning each nipple the same amount, say five turns then two turns then one, until the spokes start to get tight.



Once the spokes start getting tight I use a 3mm screw as a depth gage to set all the nipples to have the same engagement.



At this point I'm ready to start to tighten up the spokes to the final tension. I put numbers on the hub to keep track of where I am in a tightening sequence.



I use a torque wrench and a dial indicator to set the spoke tension. The tightening needs to be done such that the hub is centered in the rim without any run-out when the tightening is finished.

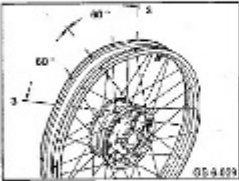


My objective is to get all the spokes at equal torque with minimal run-out. The BMW service manual says nipples should be at 5 Nm, but since this wheel has a 14 mm dish, one side needs to be tighter than the other. I set the left to 4.5 Nm and the right to 5.8 Nm. I start with the wrench at a low torque value and work around the wheel in a sequence that I think will get the spokes up to tension while at the same time correcting any run-out. Tightening one spoke effects others around it; crossed spokes will tighten, and parrallel spokes will loosen.

	Maximum deviation:	
	lateral runout (mm)	vertical runout (mm)
Spec. runout	1.0	1.0
Correction required if greater than	1.0	1.0
Can be corrected up to	0.6	—

It is not possible to compensate for vertical runout by centering.

DETERMINING LATERAL RUNOUT



- Determine maximum deviation plus (+) and minus (-).
- The spoke nipples on the side opposite the maximum deviation require to be tightened in a clockwise direction.
- Unscrew the grub screw from the appropriate spoke nipple before tightening.
- Tightening applied to the 16 spokes in each case starting from the point of the maximum plus and minus values to the horizontal midline.
- Tighten 12 spokes in each side at the maximum plus and minus deviation.
- This involves tightening 4 spokes for each centering operation.
- Insuring lateral runout with dial gauge.
- Repeat centering operation if necessary.

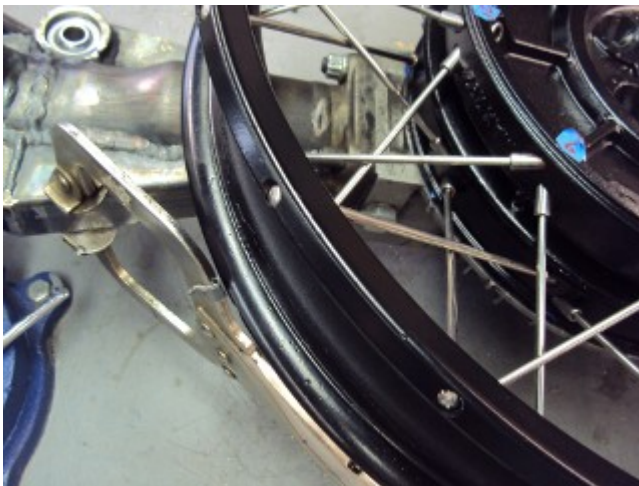
CAUTION:
Never eliminate the entire lateral runout with one or two spokes!

NOTE:
Vertical runout required to be re-checked after each correction to lateral runout. Loosened spokes in place will grab wheel.

Tightening torque:
Tightening spoke
Grub screw

max. 5 Nm
max. 0.5 Nm

At first I just used this vise-grip to get a rough check of the radial run-out.



I slowly up the torque setting and switch to using the dial indicator as I get closer.



Once the spokes get pretty tight I use a punch to set the spoke heads in the rim.



And pre-stress the spokes to yeild any tight ones.



The BMW spec is 1.0mm run-out, and after some work I was able to get this wheel to a radial run-out of 0.2 mm and an axial run-out of 0.7 mm.

Here's how it looks with a tire mounted.





-x3300

bikecat, Apr 12, 2011:

Thanks for the write up on wheel rebuilding.

Cheers

fishkens, Apr 12, 2011:

Would you please train a planet of technical manual editors how it should be done? You write like you're not being paid by the word.

Nicely done (although my bicycle wheels never seemed to go together so easily).

Thanks.

Stagehand, Apr 12, 2011:

Dear Sir-

That is awesome. Bike looks great.

Regards,

SH

Zebedee, Apr 12, 2011:

fishkens said:

Would you please train a planet of technical manual editors how it should be done? You write like you're not being paid by the word.

Nicely done (although my bicycle wheels never seemed to go together so easily).

Thanks. Click to expand...

I think our friend x3300 (geoff) has made many many things look deceptively simple and

straightforward in this thread.

His explanations are always clear, concise and a pleasure to read, even if I've got no plans to actually use any of the information he's imparted.

Keep up the good work Geoff ...

John

igormortis, Apr 12, 2011:

Fantastic work, sir!

Padmei, Apr 13, 2011:

That looked so easy I'm tempted to try it myself - I won't - but am tempted

Beater, Apr 13, 2011:

Whoa. Mad. Holy Crap ... that's beautiful.

Benjamin M, Aug 7, 2011:

anything much happened in the last four months?

Chadleys1, Aug 8, 2011:

Benjamin M said:

anything much happened in the last four months? [Click to expand...](#)

Ditto. This has really been a great thread. Thanks.

Benjamin M, Aug 26, 2011:

What happened?:huh Finish the bike!

Benjamin M, Sep 1, 2011:

x3300 said:

Hi All,

I got sidetracked on a few other summer projects and a lot of riding, and so haven't been doing much other than research and collecting ideas for my ORGS. I plan to switch back once the rain comes toward the end of the year.

One of the projects was to get a truck and get it into shape so I'll have something to haul the bike around with as needed before it becomes fully road worthy.

-x3300 [Click to expand...](#)

Okay, we'll let you off then... Just checking

Box'a'bits, Apr 5, 2012:

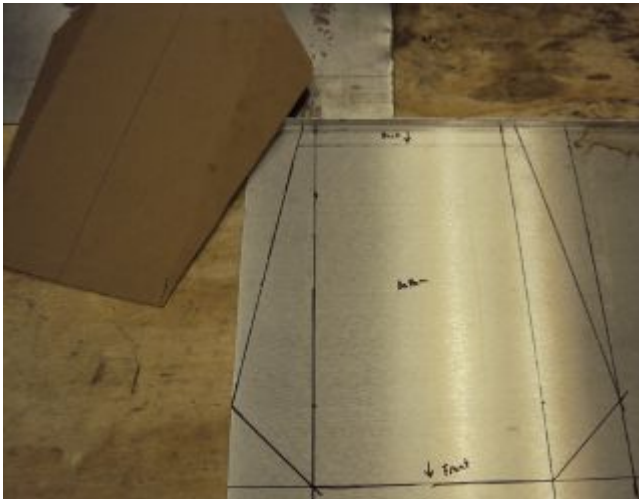
So dredging this thread back from the dead, any progress? . A man can only stomach so much popcorn....

beeks76, May 7, 2012:

My God! I just read through this entire thread with my anticipation building like a teenager on his prom night, waiting for the climax and BAM, no finished photo. I think I am going to have blue balls! At least give us an updated photo.

x3300, May 12, 2012:

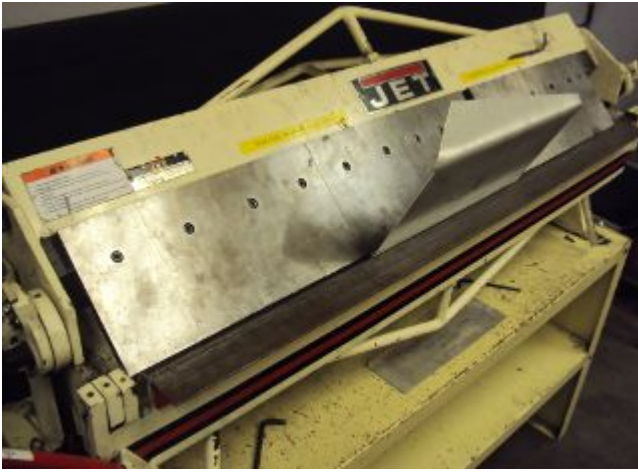
The old seat pan I had made no longer works with the new subframe, plus I was not entirely satisfied with the way the old one turned out, so I decided to make up a new one. I started with a model made from thin cardboard that I thought looked good on the bike, and then transferred that pattern to some 3/32" aluminum sheet I had been saving.



I used a squaring shear to trim out the blank.



And used this sheet metal brake to bend the sides to the angle I had decided on with the cardboard model. To get the large radius bend from the brake I set the brake fingers back about 20 mm from the hinge joint, the setup of which can just be seen in this view.



Here's the formed pan compared to my cardboard model. I rounded down the sharp corners with a file.



To space the pan from the frame and to add some stiffness I cut these sections from aluminum rectangle stock. As can be seen, in preparation for welding I cleaned up the area around the stiffeners with a flapper disk on an electric angle grinder.



I had planned to make a slip-in front mount to make it easy to access under the seat, but decided for now to simplify the mount and just have it bolt together. I'll add the slip-in mount when I make an under seat storage box. For the frame side of the mount I attached this section of aluminum angle stock to the rear seat mount and drilled a single hole in its top.



I found I needed to do some rework on the pan's front mount once I got it fitted on the bike. It was too wide to fit within the subframe mounting bolts. With the pan centered on the bike I drilled up through the hole in the frame mount and into the pan mount and pan.



To hold the blind side of the front mount bolt which will be covered by the seat foam and cover I welded a tab to the head of a bolt and fixed the tab to the pan with a pop rivet. I ground the bolt head down to a lower profile.



For the rear mount I made these tabs to weld to the subframe.





On the seat pan I welded two tabs cut from 1" x 1/8" aluminum stock.



I used these clip-on nuts for the rear mount bolts. I may weld some nuts on the bottom of the frame tabs the next time I have the subframe off, or better, make a locking quick release mechanism to work with the slip-in front mount.



Here's the seat pan ready for foam and a cover. The side panels really aren't necessary, but I didn't want to just have square block of a seat there so I put on some sides with angles that looked interesting when viewed together with the tank and subframe.



-x3300

Zebedee, May 13, 2012:

Click to expand...

+1

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