Fat Bike Hub Spacing and Drivetrain Optimization

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Objective

• The intention of this “whitepaper” is to address fat bike chainline optimization
  • This is not meant to be a sales pitch. We love fat biking and we own and ride all the fat bike rear hub spacings out there today so we are just sharing what we have found.
  • For consideration when you read, front ring spacing between rings is 7-8mm and the rear cogs are about 4mm apart on 10/11 spd mtbk cassettes.
  • In our experience and testing +/- 3mm of a perfect chainline provides for the best functioning drivetrain
## Summary

### Hub Spacing

<table>
<thead>
<tr>
<th>Drivetrain</th>
<th>135mm Offset/ 170mm</th>
<th>190 mm *</th>
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</thead>
<tbody>
<tr>
<td>1x</td>
<td>- Ring in middle ring position on std 104 spider or use a DM ring designed for GXP (WTC SDM or other)</td>
<td>- Ring in big ring position on std 104 spider or use BB30 Short Spindle ring for SRAM GXP fat bike crank. - Any long spindle crank (wide q-factor) such as Surly or RF, mount the single ring in the inner position</td>
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<tr>
<td>2x</td>
<td>- Run stock 2x solutions (SRAM and RaceFace)</td>
<td>- Use a BB30 Short Spindle 2x spider for SRAM (v9 version coming from WTC in January 2014) - Any stock 2x long spindle crankset such as RF or Surly</td>
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</tbody>
</table>

*There is no "190mm" standard today, but all extra wide hubs are around 190mm wide (186-191mm currently)*
More Details...

History of Hub Spacing
190 mm solutions for your existing fat bike crankset
History Refresher: Different Fat Bike Rear Hub Spacing “Standards”

• 135 mm offset – the original solution used on Surly Bikes (and still being used today)
  • Standard 135 hub but adding 27mm of spindle length (100mm BB - 73mm BB)
  • Optimal chainline 64mm (50mm, the standard mtbk 1x optimal + ½ of 27mm)

• 170 mm – a wider hub that was the first to offer a symmetric rear end to the fat bike world
  • Freewheel has the same 17.5 mm shift as is used on the 135 mm offset
  • Optimal chainline 64mm (50mm, the standard mtbk 1x optimal + ½ of 27mm)

• 190 mm – a wider symmetric hub used on bikes that have frame clearance for 4.8” tires (e.g. Bud, Lou, and Big Fat Larry)
  • Freewheel is now shifted out further yet by ~10mm
  • Optimal chainline is 70-72mm (a little off from the mathematical optimal, but is what we found with testing)
Standard 100mm Spindle Cranksets

• Standard 100mm Spindle cranks are optimized for 170mm and 135-offset rear hubs
• Standard 100mm Spindle cranks are NOT optimized for 190mm and 135-offset rear hubs
  • Most 100mm cranksets do clear the frames of most 190mm rear hub frames. This is good news as converting to 190 does NOT necessarily mean you need a new crankset!
• The only stock solutions optimized for 190mm rear hub are the RaceFace long spindle crankset and the MWOD from Surly
  • Both solutions result in ~20mm wider q-factors!
Running a standard 100mm Spindle Crankset on a 190 Rear Hub

• Why is this important?
  • 190 mm rear hub fat bikes are becoming more common and may become the de-facto standard
  • The q-factor on fat bikes is already wide and making it wider is not an ideal solution for most riders knees and hips!

• As noted, the ideal chainline on a 190mm rear hub is 170-172mm or about 6-8mm further outboard than on a standard 100mm crankset. The following solutions get the drivetrain within +/-3mm of the “perfect chainline”
  • 1x drivetrains:
    • On a triple crankset, mount the single ring in the BIG ring position (chainline ~172)
  • 2x drivetrains:
    • For SRAM - Replace the stock spindle with a BB30 short spindle 2x spider (coming from WTC in January 2014)
    • For other 2x systems - there is no solution for standard 100 mm spindle cranksets
Picture of Chainline Difference for SDM

- Here are X9 cranks lined up with an SDM (SRAM Direct Mount) for GXP on the left and a SDM for Short Spindle BB30 on the right.
- Note that the BB30 SS pushes the chainline out 6mm, which makes a good chainline when using an X9 or XX1 crankset on a 190 rear hub bike.
Picture of Chainline Difference for 2x Spiders

- Here are X9 cranks lined up with a stock GXP 2x spider on the left and a Short Spindle BB30 2x spider (coming from WTC in February) on the right.
- Note that the BB30 SS pushes the chainline out 6mm, which makes a good chainline when using an X9 crankset on a 190 rear hub bike (you can actually use the small ring!)
Other Links to Fat Bike Chainline and Tire Clearance

• Some other very useful references:
  • Salsa and tire clearance: http://salsacycles.com/culture/tech_talk_understanding_drivetrain_rear_tire_capacity