



AiM Webinar  
“Suspension Analysis”  
9.3.20  
Edited Q&A

- 1**     **Q:** What is the ratio between the frequency of a road profile event (i.e. 1 Hz bump) relative to the acquisition frequency to sufficiently do suspension analysis.

**A1:** [Answered live at 9:56]

**A2:** 100 Hz is a good starting point generally, 1000 Hz is for specific analysis. Going high with frequency means having a lot of data to analyze, and maybe makes a lot of sense if you have completely adjustable suspension and if you have suspension testing machines and temperature sensors on the pots.

**A3:** You could read about Nyquist theory for sampling frequencies which basically says you need to sample a minimum of twice the frequency that is being measured. From years of control systems work, I have found that a 10:1 ratio works very well. The problem is that you are asking about a 10 Hz input but you will find that there are other higher frequencies that are present and it depends on their magnitude to how they will affect the signal you are trying to measure.

- 2**     **Q:** What is the quadratic filter in settings menu? It changes the histogram quite a lot.

**A:** This is for filtering the histogram bin values.

- 3**     **Q:** Do you normally assume a single value for the motion ratio, or do you need to characterize several points between jounce and rebound?

**A:** Full characterization would be the best. For a basic analysis, the linear correction gives good

results, but it really depends on the suspension design. Some cars are linear, some are exponential.

- 4**      **Q:** Where did suggestion for the equal split between LSR/HSR and LSC/HSC      Andrew Gryguć  
                                         agryguc@uwaterloo.ca      Sorry, what is the basis for that suggestion?      The  
                                         idea is that you want the movement balanced up / down / fast / slow so the chassis stays stable  
                                         and the wheels move.      live answered

**A:**

- 5**      **Q:** Does adjusting shock knobs change that 25/25/25/25 balance?

**A:** [Answered live at 45:30]

- 6**      **Q:** On a 3 way adjustable shock, you would want the numbers to be 33% each, correct?

**A:** [Answered live at 47:08]

- 7**      **Q:** Does this all get messed up when changing springs?

**A:** Yes.

- 8**      **Q:** Is the velocity that the Low speed/High speed transition occurs a function of suspension travel or is it fairly consistent throughout jounce and rebound?

**A:** [Answered live at 53:23]

**9**      **Q:** Once set for the weekend, do shock setting tend to hold for the next event?

**A:** [Answered live at 52:48]

**10**     **Q:** What's your thought on motorcycle low to high speed transitions?

**A:** We would suggest referring to the suspension manufacturer data, if you have it.