**Nose Wheel Shimmy – mostly for Velocity guys, by Andy Millen 8/13:**

*“I've written an article on the new damper that should be in the next Velocity News.*

*Shimmy is simple and the causes can be complex.  Anything that would excite the nose gear with a lateral movement can start it.  Without a damper, the excitation will build and continue until either the system is destroyed or enough energy is removed (e.g. you get below 35 kts).*

*The excitation can find its way in by a combination of one or more things:*

 *- The direction of landing/flight is different from the rolling direction of the nose wheel.  On touch down it just needs to be thrown sideways.*

 *+ Can be caused by poor pilot technique*

 *+ Can be caused by crosswinds*

 *+ Can be caused by the nose gear getting cocked during takeoff*

 *+ Can be caused by a bump, crack, rock, etc. on the runway*

 *+ Can be caused by looking at it wrong .....  :)*

 *- Contributors*

 *+ Unbalanced wheel*

 *+ Not enough compression on the Bellville washers (loose nut)*

 *+ Increased mass behind the center of pivot (add a wheel pant)*

 *+ Lack of give in the system (rubber bumper absorbs some energy)  No bumper and the energy will go somewhere.*

 *+ Improper tire pressure*

 *+ Hard landing*

 *+ Too soft landing*

 *+ Imperfection in the tire*

 *+ Probably a bunch more things that I'm not thinking of here.*

*There is no one reason why we have a shimmy.  By paying attention to all the details, you can greatly lower your chances of having one.  That being said, some of the best pilots have done everything right and still had a shimmy.*

*I have been flying with the new damper installed on my XL/FG for over a year now.  There was an issue discovered when I put the nose gear pant on the plane.  I believe it has been resolved and I now have 29 landings with the wheel pant and no shimmy.  I'm very pleased with how it works for me.*

*As was noted before, shimmy has been discussed many times on the Reflector.  There are quite a few incidents.  It won't take much to find them with a simple search.*

*You might want to speak with Rene as he has a damper on his XL/RG.  He installed it after a shimmy.”*

**One builder, Noel, asked: “***I wasn't far enough along when all the talk of the rubber bumper was going on.  It now seems to be out of production.  Any one found a new source?  New part number?”*

**William Batten - 7/20/20:*”****Did you know that the Velocity factory is now on Generation 3 for the XL/RG Nose Gear? The early nose gear suffered some failures as a result of “Shimmy Events”. Quickly the factory added some gussets to the nose gear (these were usually called the “Taco” nose gears). The thinking was that with this improved design, and the reminder to always check your front wheel friction torque – that both Shimmy and the nose gear failures would disappear. Unfortunately – that did not happen. So – the “Shimmy Damper” was created. I’m not sure if there has been any nose gear failures on an XL/RG with a Shimmy Damper installed. However, I do know that the factory has now developed the 3rd Generation XL/RG Nose Gear. The latest modification includes an even longer gusset and a softer case hardening. Scott explained his thought process that rather than have a fracture of the nose gear – a bent nose gear is probably a better failure mode. I agree.*

*So, you ask me how I know the latest scoop on XL/RG Nose Gears. Well, mine departed the aircraft on a recent landing – and I resorted to using the nose of my airplane as the brakes – think Flintstones.*

*Some background: My aircraft is 12 years old and has an estimated 600 landings. I have personally flown the aircraft for 6 years and probably half of those landings. During my ownership, I have had three “Shimmy Events”. One about 4 years ago, one last year – and one earlier this month. The first two shimmy events were violent. After each of the events, I inspected the fork and nose gear carefully. I have also inspected these parts carefully during each annual inspection. I never saw any sign of a crack or any damage. The third shimmy event lasted about one second – at which time the nose gear broke at the base of the gusset. Upon inspection, it is clear that the nose gear had been cracked in an earlier shimmy event – you can easily see the corrosion that had already formed from the earlier crack (see picture). So, when I landed a few weeks ago, and had my third shimmy event, the nose gear quickly broke all the way through. BTW – I regularly check my nose tire friction torque. I do not let it get loose at all. It is a pain to steer – but, I have always felt it was important.*

*Lessons Learned:*

1. *You cannot see by visual inspection if your nose gear has already been cracked.*
2. *Nose gear friction torque alone is not enough to prevent a shimmy event.*
3. *If you have ever had a shimmy event – it is likely that your nose gear is already damaged. You should immediately upgrade your aircraft with the new 3rd Generation Nose Gear and the Shimmy Damper.*
4. *If you have not yet had a shimmy event – you still need to consider installing both the new 3rd Generation Nose Gear and a Shimmy Damper.*

*Please understand – I am not upset – just trying to learn from this experience. After all – we are flying Experimental Aircraft. That means – don’t be afraid to experiment.”*