TANIQ Air Spring

In 2008 TANIQ received an inquiry to improve the spring characteristics of air springs used for suspension systems in mountain bikes. After analysis of the current air springs TANIQ developed a new air spring with improved active linear behaviour and controlled impact absorption.

1. Limitations current air spring
The currently used air springs are inactive near the top-out region, which causes high impact on rider and bike during harsh landings. The spring force in these systems is solely determined by change of pressure and is inherently progressive instead of linear. Besides this, the use of dynamic seals introduces the problem of stiction (static friction) which prevents active behaviour at low impact.

2. TANIQ redesign
TANIQ has developed a new design for an improved air spring suspension system. The design is based on the same specifications (built-in space, stroke length, burst pressure, etc.) as the current air springs. Various (isotensoide) spring shapes in combination with different (geodesic) fibre reinforcement designs have been designed. The designs were analyzed and simulated using TANIQ's design software. Finally the air spring has been prototyped and tested at our facilities.

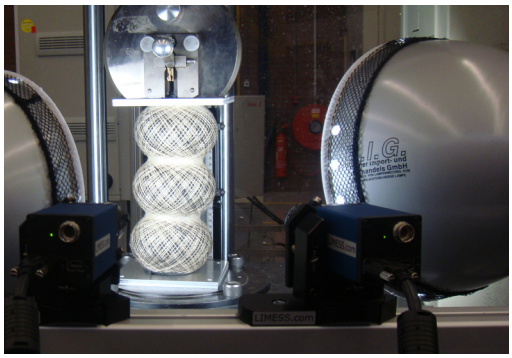

Figure 1. Air spring test set-up at TANIQ

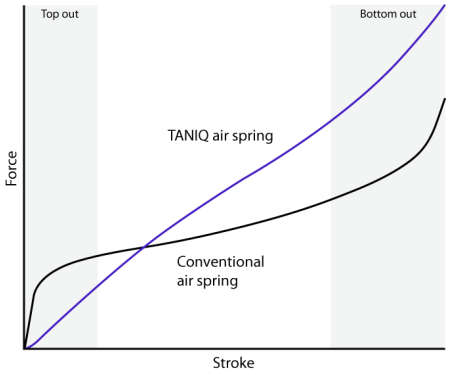

Figure 2. TANIQ air spring shows linear behaviour in top-out region

3. Test results
Positive first test results of the TANIQ air spring show:

- Active spring behaviour in the entire top-out region
- Deformation of the bellow provides linear spring behaviour in the first region with the desired progressive behaviour at the bottom-out region
- Absence of dynamic seals prevent static friction

4. Conclusions
The first test results show important improvement in the top-out region which is especially important during landings. Furthermore, the spring behaviour and absence of dynamic seals in the suspension system result in minimal static friction and thus a more active spring behaviour. The next step is to optimize the design, implement it in the suspension system and make the first test rides.
Furthermore, TANIQ is interested to find out if these spring characteristics can offer advantages in other air spring applications too.

For more information about this case or to discuss the possibilities to improve the performance of the air springs you manufacture please contact Siebe Nooij at +3115 257 0754 or email at s.nooij@taniq.com