

Develop a New Suspension Linkage & Mainframe Design for a Full Suspension Mountain Bike

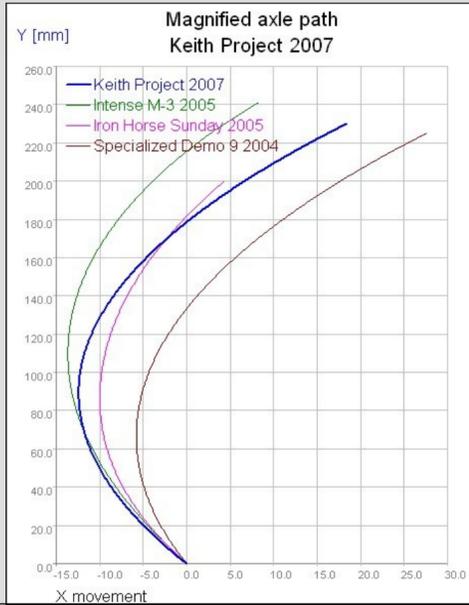
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Durham University 2006

Design Criteria:

- Freeride / downhill race frame with 9" vertical rear wheel travel
- Efficient pedalling platform as a result of suspension linkage design
- Strength and durability to withstand at least 2 years of aggressive riding
- High lateral stiffness
- Lightweight (5kg frame + shock)
- Aesthetic Design
- Reduced welding



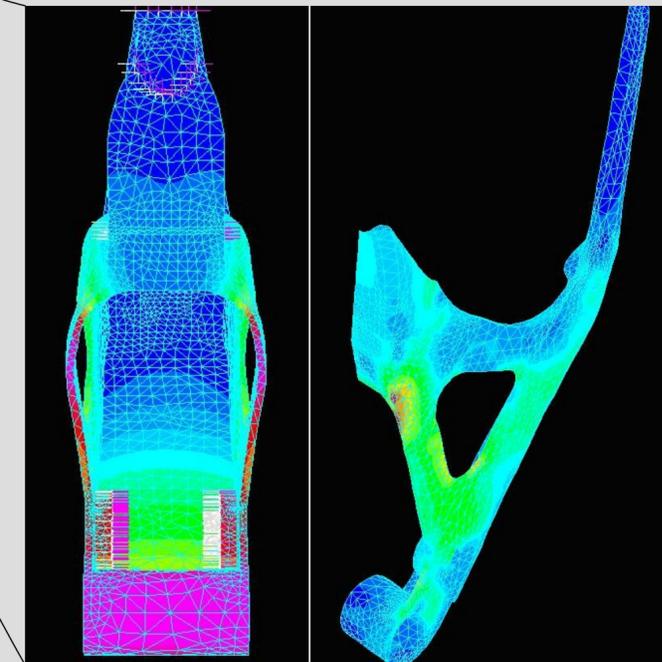
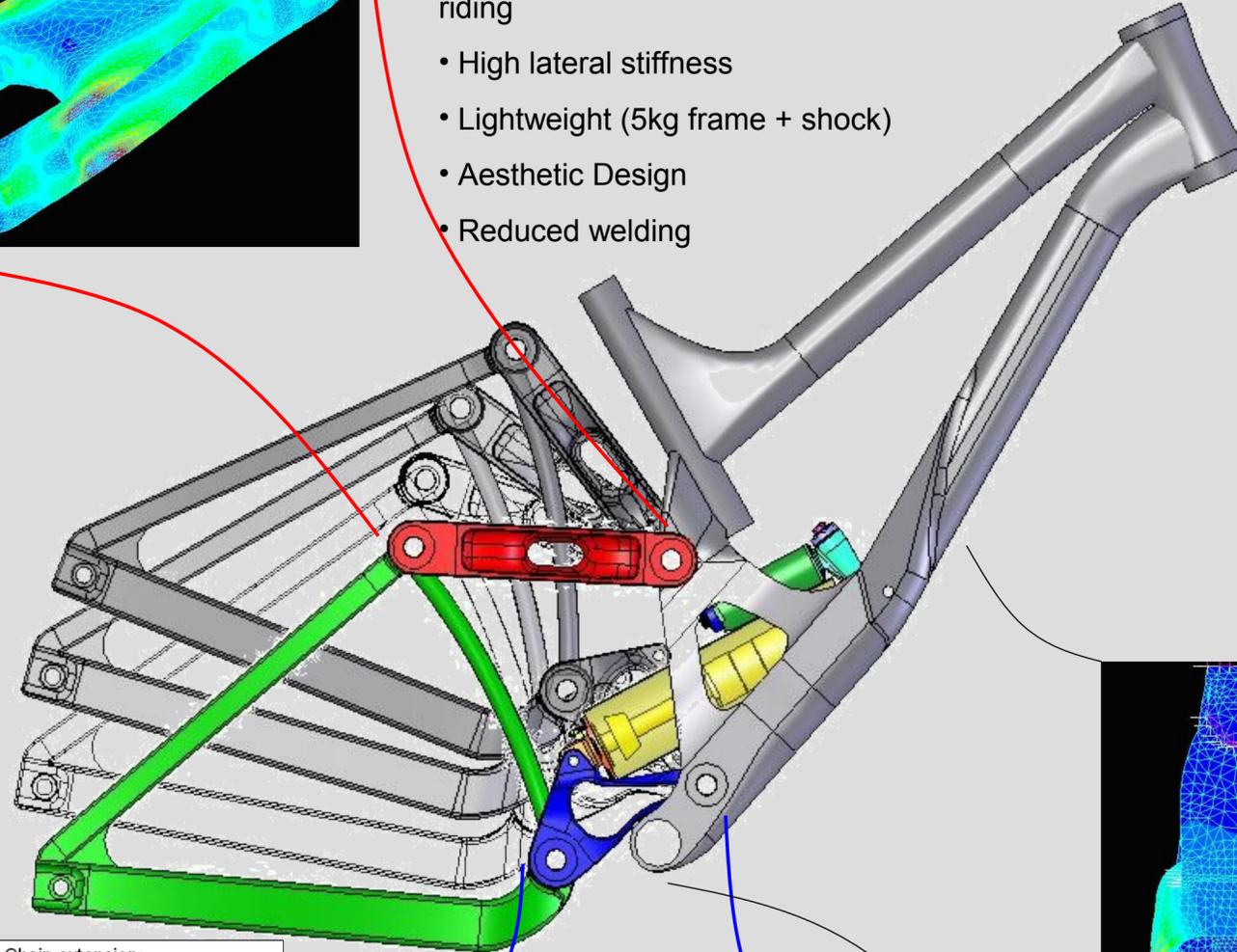
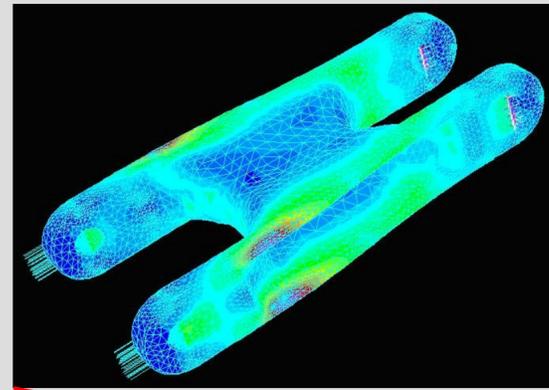
Geometry and component dimensions were considered to ensure an ergonomic design that would be compatible with a wide range of accessory parts.



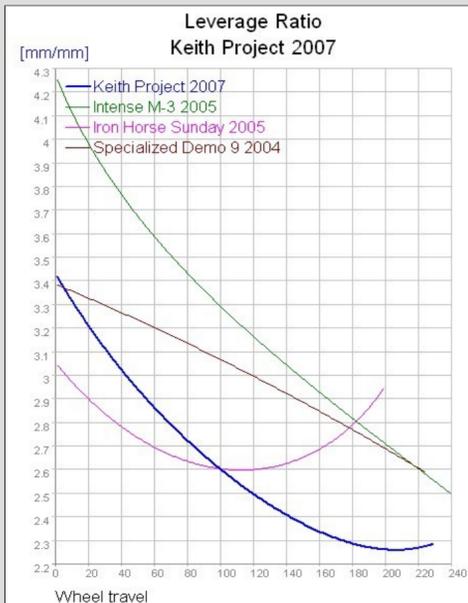
The Axle path was designed to be suitable for both the freeride and downhill race markets by showing desirable characteristics for both. This increases the size of the target market and could potentially result in domination of both markets sales.

A unique and novel suspension linkage was designed to give superior suspension characteristics over any current designs without infringing on any patents.

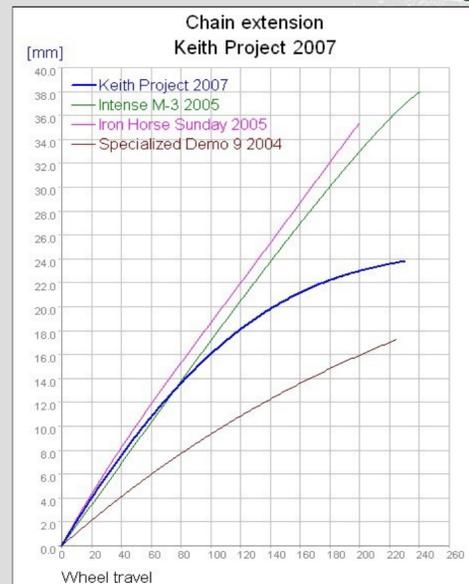
Optimisation through computational testing resulting in linkage design factors such as chain stretch, pedal efficiency, leverage ratio, brake isolation and axle path being improved.



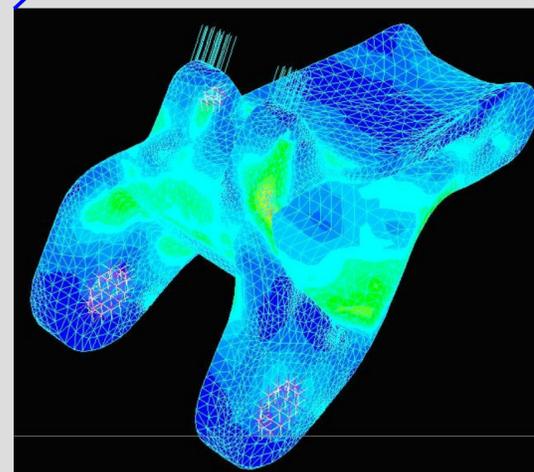
CAD models were exported directly into Strand7 in order to carry out extensive FEA on the designs. This was done to ensure that the designs would withstand the worst case scenario forces with a high factor of safety.



Having a lower leverage ratio than any of the competitors, the design offers superior damping and suspension performance whilst reducing the pressure experienced by the shock seals and valves.



The chain extension was optimised during the linkage design to increase pedalling efficiency whilst minimising undesirable pedal kickback which would result in an unpredictable pedalling motion.



Finite Element Analysis was carried out on the main load bearing parts of the design in order to achieve:

- The desired strength characteristics to minimise expensive warranty claims
- Reduced weight by minimising the volume of material used resulting in a more manoeuvrable bike
- Increased stiffness of the design resulting in a more responsive bike