Case Study

An ANSYS Startup Program

Case Study
On Your Marks, Get Set... Simulate!

After-market automotive manufacturer Velox Motorsports takes off thanks to the ANSYS Startup Program

The ANSYS Startup Program has helped a variety small businesses grow to their full potential by providing them with access to world class ANSYS simulation software at a minimal initial investment priced specifically for them.

One such company that has seen a great deal of success is Velox Motorsports.

Background

Since their inception in 2014, Velox Motorsports has always been focused on speed; whether that be the speed of the NASCAR teams they have worked with or the desire their customers have for speed, which drives their competitiveness and fuels the demand for their products. They even show a passion for speed in the company’s name (Velox), which translates from Latin to “swift or speed”. That being said, it would only make sense that such a company obsessed with speed would seek out a way to improve the one type of speed that matters most to their business; the speed of delivering high quality products to their customers.

A passion for speed paired with a serious focus on creating the best possible products led Velox on a search for software that not only met their engineering needs, but also their drive to be the best at what they do.

Looking for a change

Due to their lack of capital, Velox initially had worked with OpenFOAM, an open source finite volume CFD package. While looking for a meshing tool to work with OpenFOAM, Velox was approached by PADT’s Dan Hartman after having seen some of their Computational Fluid Dynamics (CFD) work on social media. Dan realized they would be a perfect fit for the ANSYS Startup Program.

Velox was hesitant at first, knowing from their use of it in college that ANSYS software, while powerful with regards to Finite Element Analysis (FEA) and CFD, was also out of their price range. Dan and the sales support staff at PADT were able to prevail and convinced Velox to come in and discuss the possibility of them registering under the ANSYS Startup Program. As many startups and entrepreneurs know, it is extremely difficult with no financial backing to afford new software while still being able to fund everything else necessary to run the business.

“After discussing with PADT the startup program it was a no brainer that we should at least give it a shot for a year and see what can come from it. We chose ANSYS as we felt it was a ‘once in a lifetime’ opportunity to use state-of-the-art analysis software for an affordable price.” - Eric Hazen, Velox Motorsports CEO

Giving PADT and ANSYS a chance proved to be a better investment than Velox could have hoped for

Since their registration for the ANSYS Startup Program, Velox has seen quite the transformation, with their business succeeding in a number of ways they had previously not thought possible. The company has been able to reduce their time involvement during R&D, which in turn reduces their costs for bringing a product to market. They have also been able to add CFD and FEA to their consulting, allowing them to further streamline their simulation and remove barriers that had previously slowed down the development process. When it comes to areas where Velox had struggled prior to making the switch to ANSYS, Velox Co-Owner Paul Lucas expressed a great deal of satisfaction with how the meshing tools available through ANSYS have improved operations, saying “ANSYS has many great meshing tools that can be used with Fluent and many ways to check the quality. We are now able to mesh much more complex geometry with better quality in about ½ the time. This has had such a great impact on our time to market for our products. It also gives us more confidence in our analysis results”.

Velox has been able to release a number of new products thanks to their new capabilities with ANSYS software including:

- GT86 Adjustable Splitter and rear Spats
- Subaru BRZ and WRX Clutch Forks
- Mazda Miata ND Rear Diffuser
- Subaru WRX Front Splitter
- Nissan 370Z Rear Diffuser
- Ford Focus RS SEMA Ford Booth 2016 Aerodynamic Package
- R35 7163 twin turbo cast manifolds
- R35 diffuser strakes
The effectiveness of the benefits of the Startup Program can be seen clearly in Velox's recent efforts to develop a more sturdy clutch fork for a variety of Subaru models; an issue that they were able to develop a solution for thanks to simulation.

How it started

In May 2016, a customer reached out to Velox regarding an issue with his FRS/BRZ clutch fork, a part which various other owners across the country had also had problems with in the past. Upon examining the problem further it appeared that there was no clear reason why this part would be breaking so often in the first place. Thanks to the power of simulation technology however, Velox was able to dive deeper into the situation in order to find out exactly what was occurring and why it was.

So what’s going on?

Through the use of ANSYS FEA, Velox was able to plug in all of the necessary inputs (material properties, loading, sensitivity, etc.) and generate a stress analysis map that shows what parts of the stock clutch fork were above and below the yield strength. Analyzing these segments allowed Velox to discover where specifically on the clutch fork the stress applied was too much for the part to maintain its structure. This brought them to the conclusion that the issue was predominately due to both these high stress areas as well as the material the part was made of, allowing them to being working on an alternate part that would be able to avoid this issue all together.

“We did this initial analysis to visualize trouble areas and give us a starting point to compare our upgraded design to. Without this visualized data, we would be guessing where and how to make the design stronger. Ultimately, this allows us to quantifiably improve the design faster as well as design a better product at the end of the day.” - Velox Motorsports

The improvements

With the information gathered from their FEA, Velox wanted to manufacture their alternative clutch fork from a stronger material than what Subaru had initially made theirs from. Thanks to ANSYS simulation, they were able to save money on costly physical prototypes, and test different materials directly within the software. Velox eventually settled on 4140 Chromoly steel which, in its annealed state is 12% stronger in yield strength than typical sheet steel. They also increased the wall thickness by 25% throughout the part, helping to remove the major stress points found in the initial analysis. The final product, Velox developed effectively reduced the maximum stress by 53%, with it no longer exhibiting areas of stress over the material's yield strength. Responses to the new part have been nothing but positive, with highly satisfied customers ecstatic about the results.

Curious how your company can benefit from the ANSYS Startup Program?
Visit www.padtinc.com/ansys_startup
Contact our sales team at Sales@padtinc.com for more information.

“We honestly love working with PADT. They are great to work with. They setup training specifically for our company on using Fluent for our simulation needs. We have emailed PADT for support a handful of times and always get quick answers that solve the issues we were having. Bottom line: Extremely helpful, knowledgeable people that want to see you succeed.” - Eric Hazen, Velox Motorsports CEO