

The Importance Of Prototyping

Dyson are one of today's most successful innovative product companies. It just so happens that the company's founder James Dyson built 5127 prototypes before successfully developing his first revolutionary bagless vacuum cleaner.

Over the years we too have become major advocates of the benefits of early prototypes. Prototypes are a treasure trove of information. The main purpose is often to validate the designers intentions before going to market. But often they throw up unexpected results, things you hadn't even thought about. At worst these things can mean your whole idea needs a rethink, at best it can demonstrate product advantages you hadn't even considered. One thing's for sure, the longer you hold off prototyping, the longer you postpone the feedback of information for improving the design.

At Solve we believe the approach to prototyping needs to be tailored to each individual project. One of the first things we like to do is prove the science. There's no point of spending hours and hours fitting all the components into a small footprint only to find out afterwards that it was all a waste of time because the principal of operation was wrong.

www.solveengineering.com

Even if the science is fairly basic it's always good to validate the principle of operation using a "proof of concept" prototype. That's why we design and build test rigs, so we can be confident that the fundamental principles are right before moving on.

Of course, building prototypes takes time and money. That's why we have a variety of suppliers in our network. Where speed is important we use rapid prototyping suppliers for 3D printed parts, injection moulded parts, CNC machined parts etc. These services aren't cheap, though the cost is continually coming down, and the service they offers means we can have simple prototypes in a few days and more complex assemblies in a week or two.

“ Prototypes are a treasure trove of information ”

Where cost is more important for a customer than speed, we can tap into normal engineering "job shop" companies. These guys will be a little less expensive but you may have to wait a month or two just depending how busy they are.

The design cycle follows a basic loop – conceptualise, design, prototype and back around again. What's not

immediately obvious until you experience it is the real difference between slow prototyping and rapid prototyping. Let me explain. So imagine it takes three months to design your first prototype. Using rapid prototyping suppliers you can then have the parts in under two weeks, assemble your parts over a couple of days and have a working prototype in under three weeks. You allow one week to test and you're back around the loop, all in just four months. Additionally, because you've been so quick around the loop your designers haven't started another major project to fill the gap. Instead momentum keeps going and you can iterate multiple times in one year.

Taking the slow but cheaper prototyping route means waiting for weeks whilst the supplier gets a slot to fit your job in. Typically this can take 6 to 8 weeks and the designer will often be busy on another project when finally you are ready to iterate again. Do the math and you'll find out that you can only perform a couple of iterations per year. So if your product is fairly simple and required 5 iterations then it could be 2.5 years to complete the development phase using the slow method. Compare this to the rapid approach where you could have been there a year earlier. Our experience is that rapid prototyping makes for rapid product development and a

Author: Dr Sam Paul

Principal Engineer @ Solve Engineering