



Grainger & Worrall's Engineering and Technology Director, Keith Denholm discusses the value of prototyping for powertrains. Read the full transcript below.

What do customers want to achieve when prototyping powertrains?

I think that in all cases there's an expectation that vehicle engineering is something which can be done entirely virtually. Because of the realities of modelling and legislative requirements, prototypes still have to be produced, and prototypes have to be produced in a certain time. That often precludes the option to wait until you've got series production parts available in all cases, because one of the consequences of prototyping is that you'll make change you, you learn things, and you will modify and adapt. So prototyping with real parts is still relevant.

We've seen over the last 20 years that that's shifted massively from an alpha beta gamma phase, where each of which will contain tens of parts to something which is more likely to be a single phase or fewer parts. I think that will continue because I don't see that in the scheme of things that that's the other thing that's worth avoiding. I think that's a very valid valuable activity. But because the prototyping of vehicles will now require a significant amount of, of castings in those prototypes. That's where our focus now needs to shift. Because unfortunately, for the end user, those products are very large and unwieldy. And whilst the castings themselves might be on troubled by their size, or the purpose that they're going to be put to the manufacturer of the tooling and the manufacturing, the machining processes that have to produce with prototype parts are very volumetrically driven. The cost and the time etc. to meet those parties is a simple function of how big they are. And we can't easily short circuit those processes.

Even if we're rapid prototyping, we can't get rid of the need to make a big mould and handle a big mould and make a big casting and do things in a much larger scale. And they drive time and they drive cost. And because of the lack of both of those in this modern world, it drives a need for us to be more precise, to be more thoughtful before we begin about how we're going to extract the value from the very rare prototypes that we will make each parts got to have some usefulness. It can't be profligate. It can't be make a couple and have a look. Because that may take us all the time that we've got available. We're having to rely ourselves more on modelling and our own lessons learnt in order to anticipate the failures of parts we've not made before. So that's our biggest challenge. And then we've got to find ways of scaling that up to a sensible level. Nobody will want to build a vehicle, they will want to build many vehicles, and they want to build them simultaneously. We've got to find ways of having the ability to very, very quickly ramp up to a level of, of acceptable product, deliver that and move on to the next one.

And that's our that's our big challenge going forward.

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