

Vax Ltd. Brings the Lightest, Full Size, Multi-Cyclonic Upright Vacuum Cleaner in the World to Market Using Pro/ENGINEER®

Leading European Floor Care Product Manufacturer Takes on Its Competition with New Vax Mach Air

Vax Limited, Droitwich, England

Vax is the number one floor care brand in the UK, and is known for its heritage in the carpet-washing sector. Originally designed and manufactured in the UK, the first Vax machine was truly innovative as it not only vacuumed carpets, but it also washed them and sucked up spills. This transformed the way consumers cared for their carpets.

Vax continues to dominate the carpet-washing sector, and continually develops and launches new products into this category. Vax has extended its product portfolio to include vacuums, along with steam and handheld cleaners, and now offers the widest range of products within the floor care market.

Vax is expanding its European presence with offices in France, Russia, Poland, Czech Republic and Republic of Ireland. Vax is part of Hong Kong-based TechTronic Industries (TTI), a market and innovation leader in global territories in the powertools and floor care categories.

The Challenge: Develop the Lightest Product in its Class

Increased competition and ever-shifting revolutions in core technologies have caused a huge shift in consumers' requirements and expectations for floor care products. Today's consumers expect their floor care products to be more powerful, bagless, lighter-weight, and capable of picking up pet hair. Plus, they expect these machines to vacuum different floor types, ultimately making it easier to keep their homes clean. Facing shorter NPD (new product development) time-scales, greater pressure from competitors, ever-present cost factors, and the need to maintain innovation on all fronts, Vax Ltd. selected PTC's Pro/ENGINEER 3D CAD software to assist with the research, development and design of new floor-care products at its Design Centre in Droitwich, England.

The Solution: Pro/ENGINEER and Pro/ENGINEER Mechanica®

Vax's design team has an aggressive product development strategy. Having to manage multiple product categories, integrate various new technologies into existing systems, and expand and refresh existing products, the design team is constantly looking for new areas of innovation in order to gain a competitive advantage in an increasingly crowded market of floor care products. The team, together with Senior Design Engineer Gavin Burnham, has been taking greater advantage of the modelling power within Pro/ENGINEER to ensure that Vax's products achieve not only the functional requirements that the market demands, but also the aesthetic requirements of an increasingly discerning customer base.



Vax vacuum cleaners are being developed with Pro/ENGINEER.

The Result: Greater Capacity, Less Weight

Vax's design team converts preliminary proof-of-concept research into potential new products to establish specifications and performance criteria. The team starts out by taking advantage of Pro/ENGINEER's geometry modelling to iterate, refine and deliver the exterior surfaces, and then uses the software's visualization assets and prototypes to fulfil that specification. These assets are then taken into production, in collaboration with Vax's manufacturing partners in the Far East, using Pro/ENGINEER data as the common communication method. The Vax design team used Pro/ENGINEER to develop one of the brand's latest product launches: the Mach Air. Vax had key requirements for this product: it had to be lightweight, have a compact design and market-leading capacity. Pro/ENGINEER's assembly analysis tools enabled the design team to find areas for component-count reduction and to reduce over-engineering, so they were able to deliver a product that achieves key performance criteria in an aesthetically pleasing, highly functional product.

Developing a More Intelligent Design Process

According to Senior Design Engineer Gavin Burnham, the early stages in the development of a Vax vacuum cleaner are driven by internal knowledge and expertise. As he comments, “Yes, a vacuum cleaner is a vacuum cleaner. It has a motor, it has somewhere to put the dirt, something to pick the dirt up off the floor, and there’s also a user interface. The internal structure of a vacuum cleaner is actually quite simple,” says Burnham. But these obvious facts belie the challenges that arise in designing a new floor care product.

For the Mach Air, the design team started with a very rough ‘breadboard’ model in the workshop. While this design doesn’t give any indications of either final weight or volume, it does prove out the theory and give an indication of what can be achieved in terms of capacity, suction and physical size. This breadboard model also gives the team a number of realistic technical specifications toward which to aim.

The challenge comes when the team is faced with finding ways to integrate the core technology and functionality into a product that achieves its market requirements in terms of capacity, weight, cost and aesthetic quality. Burnham continues: “Getting the product put together is actually quite complex. And that’s where Pro/ENGINEER comes into play. Its assembly functionality enables a huge part of what we do,” states Burnham.

Using highly accurate Pro/ENGINEER 3D product models, the team can define the material for the various constituent parts, carry out model analysis, and discover and optimize part weight and volume. These core components are then experimented with to see how form impacts part weight. As Burnham states, “There are a lot of tests and analyses you can carry out in Pro/ENGINEER that can help achieve the specifications, which we typically can’t do with a breadboard model alone.”

Achieving Innovation through a Common Product Platform

Prior to the company’s being acquired by the TTI Group, Vax had been using SDRC I-deas® design software to assist with product development. After joining forces with the Hong Kong-based manufacturer, the Vax design team shifted its design focus to Pro/ENGINEER, which was already in place throughout the TTI Group’s other brands and manufacturing facilities across the globe.

Not only does Pro/ENGINEER give Vax greater modelling capability for creating, refining and delivering groundbreaking products, but because it creates a common data platform across the global Vax design group, the software brings greater data communication and removes any data translation issues. As Burnham commented, “We develop the full surface model, the initial component layout, define where we want split lines and colour lines. We then work closely with our OEM teams in China to develop the product up to fully mould-able components prior to tooling and following through to final production.”

Mr. Burnham feels that having a unified software platform across the globe gives the team huge benefits. “We discuss the progress of a project on a very regular basis. If we find areas where component count can be reduced, or where a component looks too over-engineered, we discuss and advise on what we want to change and what we want to achieve.



The Vax Mach Air model—rendered in Pro/ENGINEER.

It’s very much a collaborative process. Having Pro/ENGINEER as a common reference point makes that process more efficient,” explains Burnham.

The Future with Pro/ENGINEER

By owning a market-leading position, Vax is continuing its momentum to design and create new, innovative products that not only make life easier for its customers, but also provide them with exceptional value. To achieve this, the design team is looking to expand its current technology base on two fronts.

Firstly, the Droitwich-based team is investigating data management solutions, not only to use internally, but also to assist with collaboration and data exchange with its partners in the Far East.

Secondly, the purchase and use of PTC’s Pro/ENGINEER Mechanical, the solution for structural and thermal simulation and analysis within the PTC Product Development technology offering, will be assessed to determine the advantages it will bring to the Vax product development process.

According to Burnham, “Pro/ENGINEER Mechanical is something we don’t have, but it’s certainly something we’ll be bringing on board. It sits nicely within Pro/ENGINEER. We’re not the sort of company that believes in pulling in software from all manner of sources and vendors. We’d rather have something more structured and cohesive.”

He concludes by explaining that “This [structural and thermal simulation and analysis] is a core skill that allows us to produce and validate our mechanical designs in a more efficient manner and deliver more effective products to our customers.”

For More Information

Learn more about Vax and its market-leading floor care product at www.vax.co.uk.

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