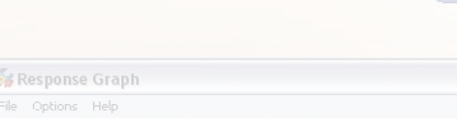
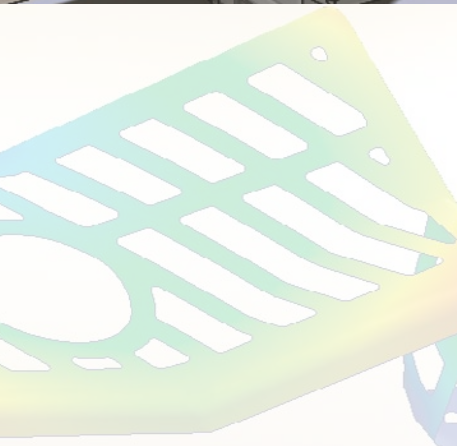
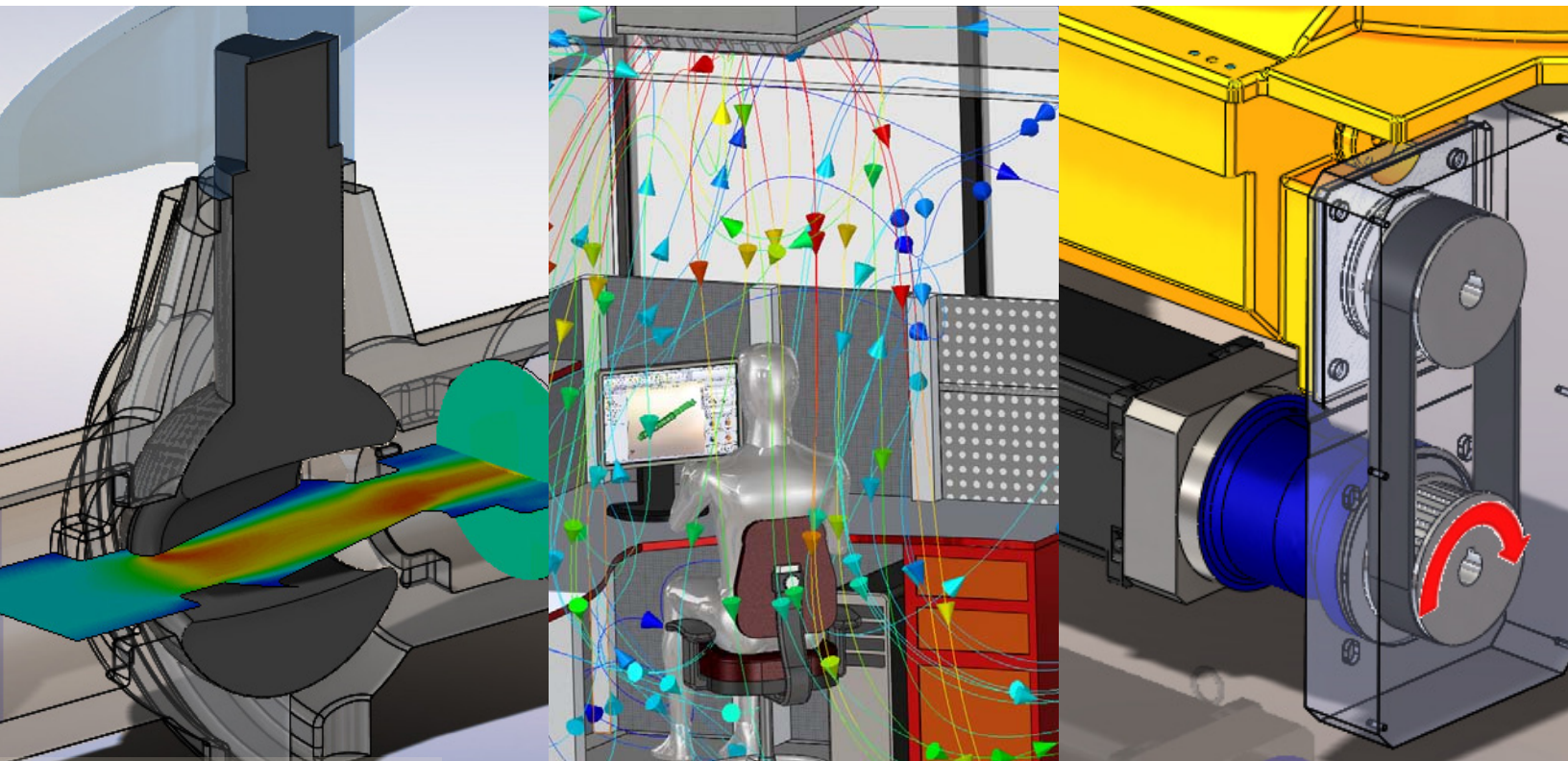
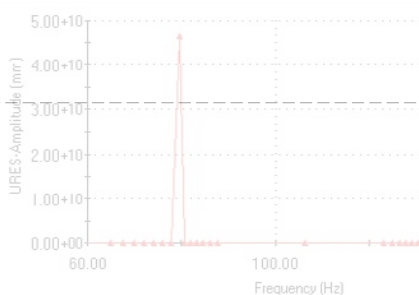


Grow Your Business with Integrated Simulation



Response Graph



Node 311
49.7965, 4.2623e+010

SUMMARY

Design and engineering consulting firms can take advantage of emerging opportunities for business and revenue growth by implementing integrated simulation technologies. In response to a challenging economic climate, more and more manufacturers seek engineering service providers to help them evaluate design performance, as well as consult on other facets of product development and manufacturing. With integrated SolidWorks® Simulation software, you can position your consultancy to reap the rewards of this trend, securing valuable customer partnerships and improving your operations at the same time.

Simulation consulting a growing opportunity

We live in a world of growing specialization, and nowhere has this fact become more apparent than in the field of product development. Manufacturers of all sizes need to develop more innovative, higher quality products, and bring these products to market more quickly than competitors, to succeed under today's difficult economic conditions. Achieving these goals becomes particularly challenging because companies also face pressure to meet these objectives while controlling or cutting costs.

To solve this dilemma, manufacturers are increasingly turning to engineering consulting and design services firms to fulfill specialized needs. Instead of trying to staff every function in product development, manufacturers are looking for strategic consulting partners who can offer unique skills or technical expertise so they can address specific product development requirements more accurately, efficiently, and affordably. This is especially the case with design analysis.

Every manufacturer can benefit from using simulation technology to develop better products faster and at lower cost. However, a growing number of companies don't have the personnel or knowledge to deploy design analysis effectively. This creates a range of new opportunities for design and engineering services firms to utilize integrated simulation tools to help clients validate design performance, optimize design attributes, and improve manufacturing processes.

Virtual prototyping represents a better business model

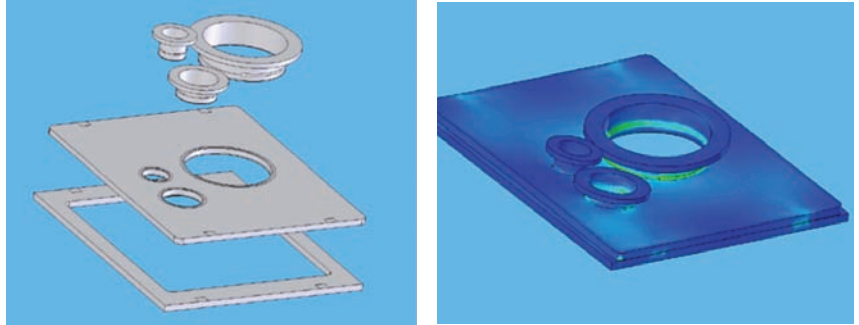
Physical prototyping and testing are done to determine if a design will perform as intended. Of course, every time that a prototype fails, additional time and money are spent to determine what went wrong and to test another prototype. This can result in additional pass-through costs and client relations problems for engineering consultants.

Using integrated simulation tools to conduct virtual prototyping is a better, more lucrative way to do business. Because you are conducting simulated tests on the computer and addressing design issues in software instead of in hard materials, you can eliminate prototype failures and associated costs. You can then invoice for the simulation time instead of passing through production costs. With integrated simulation, you will improve cash flow, realize a fast return on your investment, and expand the number and types of projects you can undertake, without increasing resources.

You will also enhance the professionalism of your firm—expanding your service capabilities, streamlining communications, and extending your technical depth—which will enable you to attract and retain valuable engineering talent.

“When I selected an analysis system for my consulting company, the decision was easy because I had assessed different analysis packages and made recommendations on the best system for advanced structural studies for my former employers. I had always considered SolidWorks Simulation software my preferred FEA tool because it is the most versatile and represents the best value. With SolidWorks 3D CAD software, I have the full range of capabilities I need to conduct sophisticated nonlinear analysis at an affordable price.”

*Richard M. Grant
Founder and President
Grantec Engineering Consultants, Inc.*



...a case in point

Grantec Engineering Consultants, Inc. provides structural analysis services to projects as diverse as the Trident Enhancement Vacuum Chamber for the laser research facility at Los Alamos National Laboratory, the Department of Energy's Neutron Acceleration Project, and the Canadian Navy's Maritime Coastal Defence Vessel.

“When I selected an analysis system for my consulting company, the decision was easy because I had assessed different analysis packages and made recommendations on the best system for advanced structural studies for my former employers,” says Richard M. Grant, founder and president. “I had always considered SolidWorks Simulation software my preferred FEA (finite element analysis) tool because it is the most versatile and represents the best value. With SolidWorks 3D CAD software, I have the full range of capabilities I need to conduct sophisticated nonlinear analysis at an affordable price.”

Using SolidWorks Simulation tools, the firm increased its analysis productivity by a factor of 40, expanded its range of analysis capabilities, enhanced analysis of complex geometries, and improved communication of analysis results to customers.

Using SolidWorks Simulation software, Grantec performed weldment redundancy analysis on the Trident Enhancement Vacuum Chamber for the laser research facility at Los Alamos National Laboratory.

Boost product development consulting

In many instances, manufacturers rely on design and engineering consulting firms to transform an idea into an actual product. Clients may come to you with a basic concept and ask you to create a design and take it all the way through to manufacturing. With these types of projects, innovation and efficiency are important factors, not only for successfully completing the assignment, but also for controlling your own internal costs.

Integrated simulation tools allow you to accelerate development time because you can predict design performance without incurring the expense of producing a physical prototype. Moreover, analysis studies can provide valuable insights into design behavior that can help you become more innovative and creative. By efficiently exploring various concepts, materials, and approaches, you can routinely produce high-quality work for your customers.

Simulation technology enables you to control the costs related to product development—through increased productivity, higher quality, and fewer surprises—so you can consistently deliver for your clients.



"Using SolidWorks Simulation, we learned that we could use a modified, glass-filled polymer composite to drop the weight of the unit from seven to less than four pounds. Our analytical studies enabled us to eliminate five prototypes, at \$50,000 each, and to cut approximately two months from the prototyping process.... Our analysis results gave us the confidence that our design would meet the performance specifications without the need for extended testing of prototypes."

Nick Smith
Mechanical Engineer
Samson Design Associates

...a case in point

Samson Design Associates, Inc. used SolidWorks Simulation software to engineer the VRS-X vertical rescue system from Spidescapes Descent Systems, which solves the problem of safely rescuing people from high up in a burning building by allowing a firefighter, first responder, fire victim, or military personnel to descend safely from heights of up to 75 feet to the street below, like a spider dropping from a web.

"Using SolidWorks Simulation, we learned that we could use a modified, glass-filled polymer composite to drop the weight of the unit from seven to less than four pounds. Our analytical studies enabled us to eliminate five prototypes, at \$50,000 each, and to cut approximately two months from the prototyping process," says Nick Smith, mechanical engineer. "Our analysis results gave us the confidence that our design would meet the performance specifications without the need for extended testing of prototypes."

With SolidWorks Simulation software, Samson Design cut the development cycle for the VRS-X vertical rescue system in half, saved more than \$200,000 in prototyping costs, confirmed the performance of a lightweight composite material, and validated the thermal response of the system's centrifugal brake.

Samson Design utilized SolidWorks Simulation analysis software extensively in the development of an innovative, hands-free vertical rescue system for Spidescapes Descent Systems. In addition to resolving weight issues, Samson Design used the software to validate the thermal response of the centrifugal brake on the VRS-X vertical rescue system.

Consult on design for manufacturability

Creating a functional design does not necessarily result in a successful product. Companies also have to be able to manufacture it, either at volume or as a single piece of equipment, in a way that turns a profit. Just because you can model something doesn't fundamentally mean that your customers can make it cost-effectively, a requirement for selling it at a competitive price point.

Whether you are developing a product for a client or helping customers resolve production issues, integrated simulation technology can help you assess the manufacturability of a design, as well as evaluate the performance of tooling and manufacturing equipment. With these capabilities, you can explore lower-costly alternative materials, predict potential manufacturing problems, and suggest more affordable production approaches.

By using analysis capabilities to optimize the manufacturability of a design, you can help your customers save money through the use of better processes, less expensive materials, or longer-lasting tooling. Your results will be satisfied customers and repeat business for your consultancy.

"The biggest advantage to using SolidWorks is having all of the tools we need in one package, which ultimately saves time and accelerates development....We have avoided problems, such as part collisions, high-stress areas, or thin walls in mold casings, by using SolidWorks to evaluate our designs....These tools enable us to cut prototyping costs in half."

*Ian Murison
Director
Curventa Designworks Ltd.*



...a case in point

Curventa Designworks Ltd. is an award-winning product design consulting company that used SolidWorks Simulation capabilities to develop the X-plorer Plus, a handheld MP3 player used in conjunction with tours at world-renowned museums, such as London's National Gallery, Alcatraz Prison, and the Guggenheim Museum.

“The biggest advantage to using SolidWorks is having all of the tools we need in one package, which ultimately saves time and accelerates development,” says Director Ian Murison. “We have avoided problems, such as part collisions, high-stress areas, or thin walls in mold casings, by using SolidWorks to evaluate our designs....These tools enable us to cut prototyping costs in half.”

Using a full suite of integrated tools permits Curventa designers and engineers to identify potential errors, improve product quality, minimize prototyping needs, and reduce development costs, ensuring that designs are optimized for manufacturability. SolidWorks Simulation software helped Curventa shorten product design time by 66 percent, cut prototype fabrication costs by 50 percent, increase its market share substantially, and improve the effectiveness of client communications.

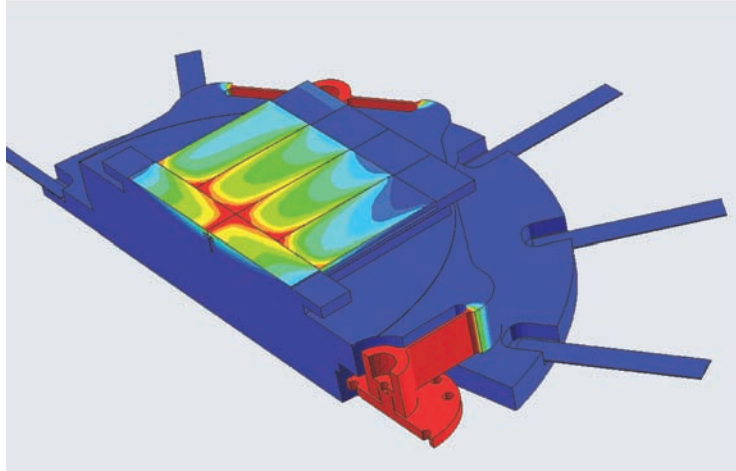
SolidWorks software provides Curventa with an integrated suite of modeling, simulation, and visualization tools, which help the firm to deliver consistently innovative designs, such as the X-plorer Plus handheld MP3 player that is used in conjunction with tours at world-renowned museums, on time and within budget.

Develop extensive expertise

When manufacturers rely on you to overcome product development challenges, you never want to lack sufficient expertise to solve their problems. Whether it's a long-term, regular customer or a new prospect with a specialized need, the ability to provide the most extensive range of services can make the difference between winning or losing new business, and seeing your reputation with customers grow or diminish.

You want to be able to provide a wide mix of services as well as have the ability to solve even the most complex engineering problems. Integrated simulation technology can help you develop broad areas of expertise, so you never have to turn away business or miss out on potential long-term opportunities.

Simulation technology can equip your firm to solve difficult engineering problems, involving nonlinear structural, dynamics, thermal, computational fluid dynamics, or multiphysics analysis requirements, so you can attract and keep clients, win and deliver new service business, and have your standing with existing customers continue to grow.



"I evaluated ANSYS®, ALGOR®, and SolidWorks Simulation software and determined that only SolidWorks Simulation provided the direct integration with SolidWorks solid modeling that I wanted. The functionality provided with SolidWorks Simulation software, including thermal and structural analysis capabilities, was just what I needed. I also preferred the easier, more efficient approach to meshing in SolidWorks Simulation."

George Tylnski
Founder
George Tylnski Mechanical Design & Analysis

...a case in point

George Tylnski Mechanical Design & Analysis uses SolidWorks Simulation software for optomechanical design analysis. One of Tylnski's most challenging projects involved the design, analysis, construction, and testing of a charge couple device (CCD) mosaic camera head as part of NASA's Near-Earth Object (NEO) program. NEO's purpose is to address the growing awareness and concern regarding the risk of asteroid collision with Earth by using sensitive CCD digital cameras to map all near-Earth objects, including those that require infrared technology to see.

Tylnski used SolidWorks Simulation software to develop a complex CCD camera that utilizes one of the world's largest focal plane arrays in a mosaic of ten 2000 x 4000 pixel CCDs. The camera, which attaches onto the back of a large space telescope, operates at the Japan Space Guard Center in Bisei, Japan.

"The challenge I faced was keeping everything flat—to within 0.001 inches peak-to-peak under all operating conditions—while maintaining temperature uniformity, making sure every pixel in the array was within a half-degree of each other," George Tylnski explains. "SolidWorks Simulation thermal and structural analyses were critical to achieving a working design."

SolidWorks Simulation thermal and structural analyses were critical for maintaining the flatness and alignment of the charge couple device (CCD) mosaic camera head's silicon imaging device, which generates heat but must operate at a temperature of -95°C. Tylnski developed the camera as part of NASA's Near-Earth Object (NEO) program, which addresses the growing concern regarding the risk of asteroid collision with Earth.

Build customer loyalty by meeting specialty needs

Loyal, repeat customers are the bedrock of many design and engineering consulting firms. Yet this kind of customer represents much more than a stable, reliable revenue source. They can also help you generate additional business through word-of-mouth endorsements regarding your consultancy's specialized capabilities. These types of references are especially valuable if your firm consults in a specific industry or specialty.

No matter whether you're a general services firm or a niche, specialty provider, integrated simulation tools can help you build client loyalty, maintain repeat business, and generate new opportunities. By using multiphysics analysis capabilities to help customers solve difficult engineering challenges, you can become the "go to" firm in a particular industry, engineering area, or design community.

Success builds upon past success. Simulation technology can help you establish a strong reputation with customers or in a specific industry, or for solving a particular type of problem, all of which can help you grow your business.

"SolidWorks is not only the fastest modeler, but also provides the large-assembly and integrated analysis tools we need to cut additional time and costs from our development process....We use SolidWorks collision detection and SolidWorks Simulation software extensively, because these capabilities enable us to identify and resolve potential problems early in the development process."

Corey Kausch
President
Engineering Innovations LLC



...a case in point

Engineering Innovations LLC specializes in developing revolutionary advances in Indy car and off-road racecar design. The firm used SolidWorks Simulation software to optimize the diameter of Indy car drive axles precisely to the length of a race.

"The drive axles get pounded by the air traveling past them. Our challenge was to reduce the frontal area as much as possible by minimizing the diameter without a structural failure," President Corey Kausch says. "We did a failure analysis in SolidWorks Simulation based on the length of a race, so we could go as small as possible and still withstand the stress of an entire race. We were able to cut four pounds of drag from each side, resulting in almost one-mph faster times in events where a fraction of a second can determine the victor."

SolidWorks Simulation helped Engineering Innovations introduce several innovations in racecar design, shorten its design cycles, cut development costs through the use of integrated assembly analysis, and reduce travel costs through the use of SolidWorks eDrawings® to facilitate design communications.

Using SolidWorks Simulation software, Engineering Innovations has produced a string of revolutionary advances in off-road and Indy Car racecar design.

Capitalize on growth opportunities with SolidWorks Simulation

Although simulation capabilities offer business growth potential for design and engineering consultants, taking advantage of burgeoning simulation opportunities can be challenging. Which analysis package should you use? What software will integrate best with your existing development processes? Which package will most quickly produce return on your investment (ROI)? What application will most thoroughly and cost-effectively meet your analysis requirements? How about training needs and ease-of-use?

As with the implementation of any technology, there are certain solution characteristics that will determine how effectively you can capitalize on simulation opportunities—and some pitfalls to avoid. When you evaluate possible analysis solutions, focus on how the software will function in a consulting environment, how it will impact costs and revenue, and how it will help you grow your consulting business.

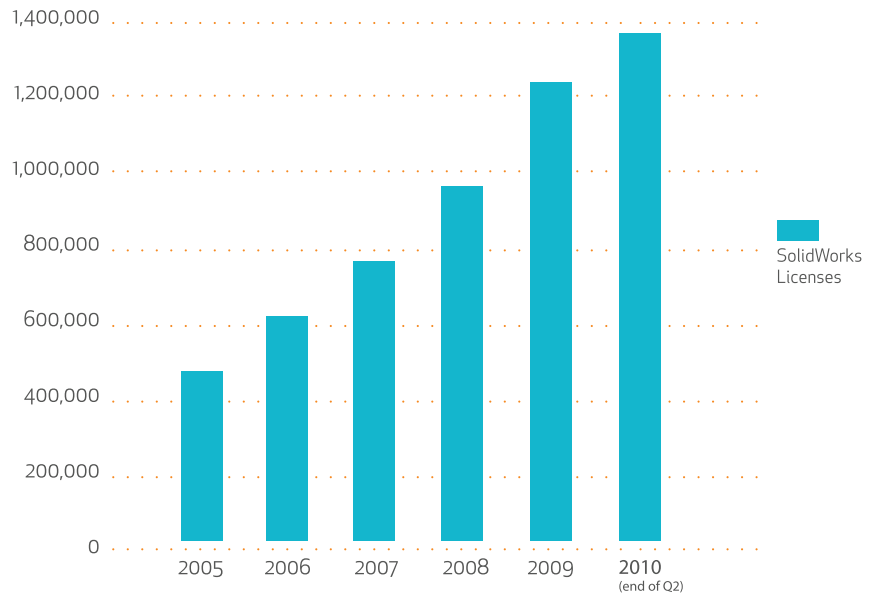
Many engineering consulting and design services firms choose SolidWorks Simulation software because it is easy to use and is completely integrated inside the industry-leading SolidWorks 3D CAD system, both of which are requirements for an effective implementation.

Implement an integrated simulation strategy

Integration is a critically important factor for implementing simulation solutions in a way that increases your consulting firm's productivity, instead of bogging you down. How integrated is the software with your CAD modeler? How compatible will your analysis data be—not only with your own systems but also those of your clients? How will the degree of CAD integration impact ROI?

SolidWorks Simulation software offers the highest degree of CAD integration of any solution in the industry. The application runs completely inside the SolidWorks CAD system, and includes advances in meshing and solving technology. With more than 1.4 million SolidWorks CAD licenses in production, chances are good that your customers—and other companies that need simulation services—use SolidWorks. This means that you, and your clients, can avoid the headaches and delays associated with incompatible data, file conversions, and geometry translations.

Because integrated SolidWorks Simulation software is easy to learn and use, you will quickly become productive and realize value in the tool. This quick time to value and the software's competitive pricing provide one of the lowest Total Cost of Ownership (TCO) numbers in the industry.



WITH MORE THAN 1.4 MILLION LICENSES IN PRODUCTION WORLDWIDE, SOLIDWORKS SOFTWARE CREATES OPPORTUNITIES FOR YOU TO MARKET AND USE INTEGRATED SOLIDWORKS SIMULATION SOFTWARE, ENABLING YOU TO MORE EFFECTIVELY TARGET PROSPECTS AND MORE EFFICIENTLY DELIVER FOR NEW CLIENTS.

Incorporate a new dimension in consulting

By providing quick time to value, fast ROI, and low TCO, SolidWorks Simulation software enables you to efficiently and effectively incorporate design analysis capabilities into your offering of consulting services. While that alone can help you increase the number of projects that your firm can take on and boost revenue, simulation consulting is just one part of the new dimension that the software can provide to engineering and design services firms.

Once SolidWorks Simulation is implemented, you will find your engineers using it for a range of projects in addition to design validation—such as evaluating innovative concepts, replacing repetitive physical prototyping, testing new ways to extend tooling life, and making recommendations on how customers can improve their products. SolidWorks Simulation will become an important tool for helping you deliver on many projects, not just those focused on design analysis.

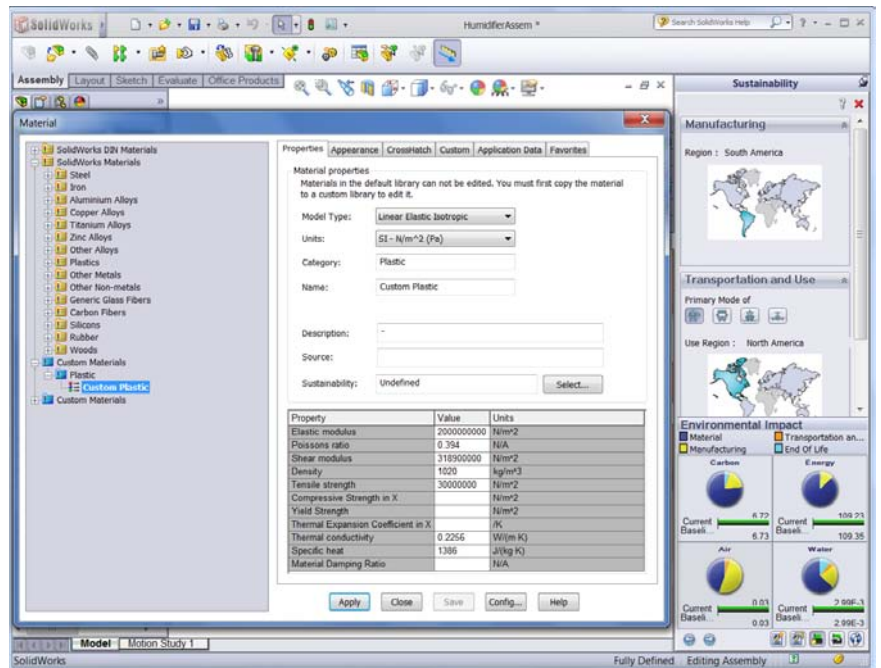
This new dimension in consulting can contribute to productivity gains throughout your operations, helping you to squeeze out unnecessary costs, maximize billability, and increase profits.

Extend your range of capabilities

With SolidWorks Simulation software, projects that you may have thought were too difficult in the past will now be within your firm's reach. SolidWorks Simulation provides a full range of simulation capabilities, including nonlinear mechanics, vibration, heat transfer, fluid dynamics, and complex multiphysics analysis. Because the application operates inside the SolidWorks CAD system, you can conduct complex studies more easily and efficiently, and leverage SolidWorks CAD utilities, such as design configurations.

In addition to general-purpose analysis tools, SolidWorks provides a unique set of capabilities for assessing design for manufacturability (DFM) and environmental impacts. DFM tools include DFMXpress, which checks design features for manufacturability; TolAnalyst™, which automates tolerance stackup analysis; and motion simulation, which enables you to investigate part deflections due to dynamic loads, as well as conduct clearance checks. SolidWorks Sustainability software allows you to assess a design's environmental impact in terms of its carbon footprint, total lifecycle energy consumption, air emissions, and water impacts.

SolidWorks Simulation tools can help you extend the range of analysis capabilities that your firm can offer, so you are ready to tackle even the most complex and challenging projects.



WITH SOLIDWORKS SIMULATION TOOLS, SUCH AS THE SOLIDWORKS SUSTAINABILITY PACKAGE SHOWN HERE, YOU CAN EXTEND YOUR RANGE OF CAPABILITIES. SOLIDWORKS SUSTAINABILITY SOFTWARE LETS YOU EVALUATE THE ENVIRONMENTAL IMPACTS THAT A DESIGN WILL HAVE THROUGHOUT ITS LIFECYCLE.

Build areas of specialized business

By implementing SolidWorks Simulation solutions, you will have a solid foundation on which to build new areas of engineering practice into your consultancy. With the multiphysics tools provided by SolidWorks Simulation, you can pursue a variety of specialty, niche markets, such as resolving vibration issues in machine design, diagnosing nonlinear failures in structural components, or examining the performance of alternative materials.

You can start a Design for Manufacturability group that consults with manufacturers on how to make production less costly and more efficient. You can use SolidWorks Flow Simulation software to specialize in cooling system development, aerodynamic design, or fluid-based manufacturing processes. With SolidWorks Sustainability software, you can help clients implement sustainable design practices by evaluating the environmental impacts of product designs.

SolidWorks Simulation will equip you to launch and grow specialty engineering practices within your consultancy, and help you to secure repeat business from specialty customers by producing strong, accurate results.

Pocket and slots that require mill tools of higher length-to-diameter ratio should be avoided. The depth-to-diameter ratio is 4.0000, whereas the maximum recommended ratio is 3.0000.

Rules Failed[2/1]
Deep Pocket/Slot [Failed 1/5]
Deep, narrow slots are difficult to machine. Milling deep slots involves long and slender cutters. Such cutters are prone to chatter and may pose challenges in achieving tighter tolerances.

Rules Failed[2/1]
Deep Pocket/Slot [Failed 1/5]
Instance[1]
Conform to standard drill sizes [Failed 5/5]
Rules Passed[9/11]

USING SOLIDWORKS CAD AND SOLIDWORKS DFMXPRESS SOFTWARE, YOU CAN FULLY INTERROGATE THE MANUFACTURABILITY OF YOUR DESIGNS TO MAKE SURE THAT THEY ARE READY TO BE MANUFACTURED. COMBINED WITH OTHER SOLIDWORKS SIMULATION TOOLS, THE SOFTWARE CAN HELP YOU BUILD A SPECIALIZED DESIGN FOR MANUFACTURABILITY BUSINESS.

Communicate more effectively with customers

As you already know, communicating engineering information to customers can often be nearly as challenging as solving complex problems. In addition to travel demands, visualizing complex physical behavior from a destroyed prototype or extrapolating it from a 2D print can range from difficult to exasperating. If only you had a way to animate design performance and send it to customers by email, you wouldn't need to travel as much or walk your customers through every project step by step. Well now you do.

With SolidWorks Simulation software, you can communicate engineering information using 3D analysis contour plots or animations of design performance over time. You can even email this information to customers using SolidWorks eDrawings capabilities. Because SolidWorks Simulation is fully integrated with SolidWorks CAD software, you can more easily communicate suggested revisions indicated by analysis results both internally and externally.

Streamlining communications, reducing travel requirements, and avoiding design and production issues allow you to spend more time doing real engineering, building your consultancy, and pursuing new clients.

Marine Mechanical Consulting

Simulation of Engine Stand Type 01HB

Date: Monday, November 08, 2010
Designer: Neil Cooke
Study name: Study 1
Analysis type: Static

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Description

The simulations carried out here are to re-rate the Type 01HB engine stand for the new 'Big Bang' engine blocks. Particular attention is paid to the securing bolts and it is assumed that one bolt on each interface is missing on the critical path.

Assumptions

Original Model | **Model Analyzed**

Comments:
The engine block is modeled as a remote mass, the frame as shell elements and the rollers are neglected as they are over specified.
All bolts are modeled as connectors and are torque and rated as in CFR-045_HW
All welds are assumed to be full penetration.
Dynamic effects are neglected as the engine stand will be mostly static while in use.

Model Information

The model files are located: \\CFDData\02_Models\EngineStand_Models\T001HB

CREATING REPORTS OF ANALYSIS RESULTS IS COMPLETELY AUTOMATED WITH SOLIDWORKS SIMULATION SOFTWARE, HELPING YOU TO SAVE TIME AND IMPROVE CUSTOMER COMMUNICATIONS AT THE SAME TIME.

Attract and retain engineering talent

Skilled, talented engineers are the lifeblood of successful engineering consulting and design services firms. Customers come to you to purchase your knowledge, creativity, and expertise, which are embodied in the designers and engineers that you have on staff. Keeping top-notch engineers with your consultancy is critically important to your company's long-term success.

The best way to attract and retain engineering talent is to provide them with the tools that they need to do their jobs and continually stimulate them with fresh, interesting challenges.

The SolidWorks user community is widely respected among engineers and is flush with talent. By implementing SolidWorks Simulation software, you can recruit from this talented pool of professionals to build your simulation business. By adding SolidWorks Simulation to your set of tools, you will be prepared to take on the challenging projects that will keep your valuable engineers interested, stimulated, and fulfilled, which is the best way to retain their contributions.

Conclusion

Specialization in product development is a real, emerging trend. Manufacturers face difficult time, cost, and quality pressures, and are looking for consulting partners that can help them achieve their goals of bringing innovative, quality products to market more quickly and more cost-effectively. This inclination to hire specialty consultants creates a new set of opportunities for design and engineering consulting firms, especially in the area of design analysis.

By implementing SolidWorks Simulation solutions, you can position yourself to capitalize on emerging opportunities, grow your consultancy, and improve your operations. With a low TCO and fast ROI, SolidWorks Simulation is especially well-suited for helping consulting firms implement an integrated simulation strategy that expands your services offering, extends your capabilities, enhances your professionalism, streamlines your communications, while retaining valuable employees. It can also help you increase revenue, control costs, and maximize profits at the same time. Compatible with a market of 1.4 million SolidWorks users, SolidWorks Simulation provides you with a timely chance to grow your business.

To learn more about how SolidWorks Simulation solutions can grow your consulting business and improve your operations, visit www.solidworks.com or call 1 800 693 9000 or 1 978 371 5011.



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