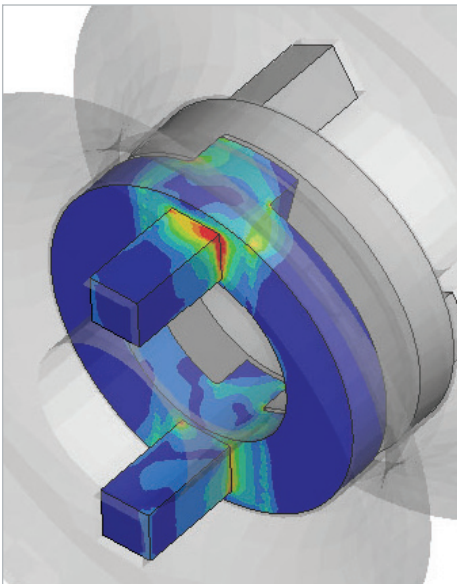


HyperWorks Becomes Part of Mechanical Engineering Curriculum at Dalhousie University



Key Highlights

Industry: Education, Academic

Challenge: Keeping curriculum content current with industry demands

Altair Solution: As a key industry tool, HyperWorks becomes part of the Curriculum, providing hands-on training

Benefits

- Improved research capabilities
- Improved numerical simulation capabilities
- Improved jobs placement
- Better preparedness to meet industry standards

Background

With three campuses in Halifax, and one in Bible Hill, Dalhousie University is a public, research-intensive institution, offering over 180 internationally recognized degree programs. Located in the province of Nova Scotia, it is one of Canada's oldest universities, founded in 1818 by George Ramsay, the 9th Earl of Dalhousie and structured on the principles of the University of Edinburgh, where lectures were open to all, regardless of religion or nationality. Commonly known as "Dal", today it is considered as one of the top universities in Canada.

Being a research-intensive university, Dal focusses on graduate programs as well as at the undergraduate level. The mechanical engineering department at the University is headed by Dr. Darrel Doman who is also an Associate Professor. Having taken over as the Head of the Department in 2013, he oversees students' requirements, undergraduate curriculums, and supporting research activities within the fast growing department of about 300 undergraduate students, 60 graduate students, and 17 professors (expected to increase to 22 within the year).

Dalhousie University Success Story



"Altair products are the perfect advanced engineering tool to use for design education in our mechanical engineering program. HyperWorks provides us with access to the best people and technologies to help us teach our students modern innovative techniques while maintaining industry-leading cost effectiveness."

Dr. Darrel Doman
Associate Professor and Department Head

With a long history of having a design-centric curriculum focus, the mechanical engineering program at Dal has more machine-design type courses than the national average. The typical mechanical engineering student at Dal is good with their hands, interested in design, machines and processes, and highly attracted to doing practical things. An effort has therefore been underway in recent years to tailor the curriculum to that student profile, which includes introducing high-end engineering tools and showing the students how to use them for hands-on design work.

Additional innovation entrepreneurship initiatives, launched 2 years ago, offer undergraduate and graduate students the opportunity to turn their senior design projects into commercial endeavors.

Staying Current with Industry

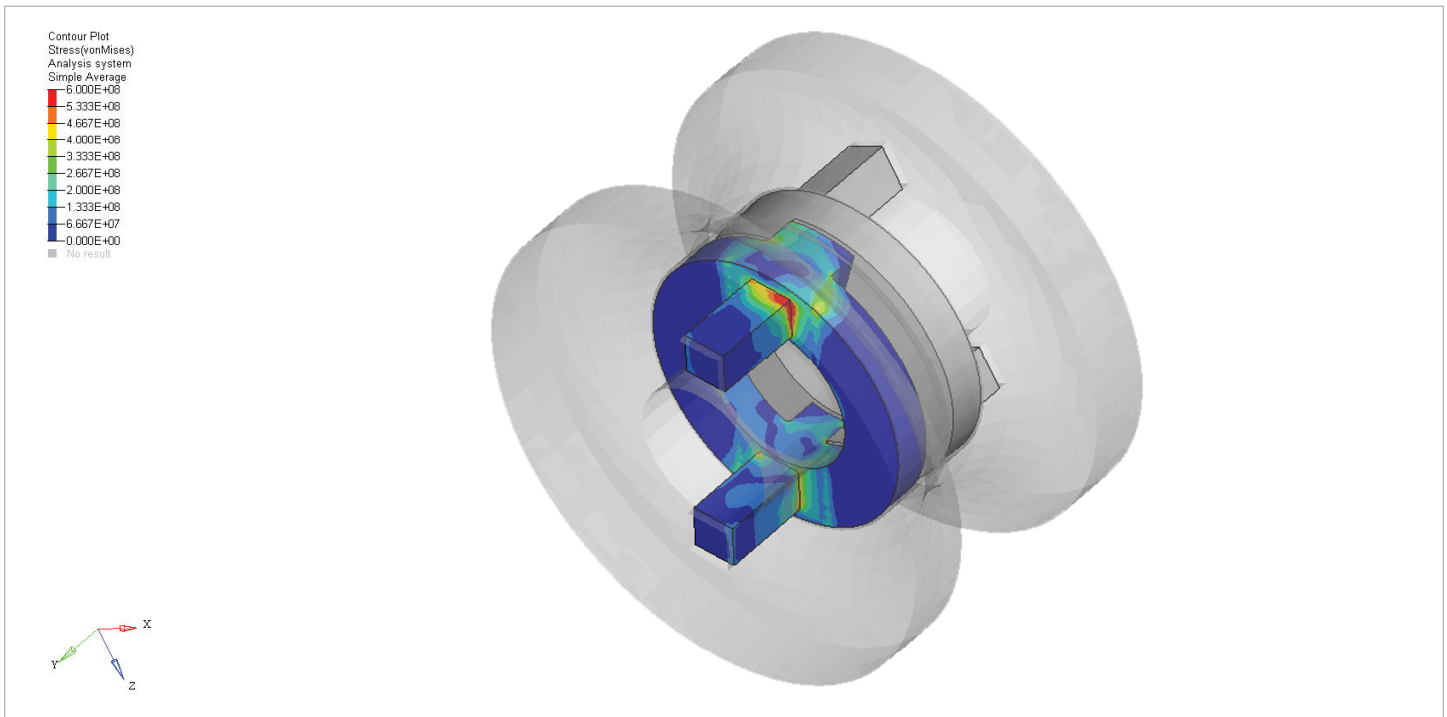
One of the challenges with a rigorous program like this is keeping the curriculum current with industry demands. This recently became apparent to the University when, as an example, they started receiving feedback from Industry that students and co-ops from the University were demonstrating a lack of knowledge of fundamental tools such as finite element analysis (FEA). While FEA was included as a course, it was only an elective during the fourth year with an enrollment of just 15 to 20 students, and it occurred after all of the work terms were completed.

By moving the course to the core introductory level in the third year, Dal was able to ensure that every single mechanical engineering student was exposed to the basics of FEA. The feedback from industry was extremely positive.

While this particular requirement was successfully resolved, it had identified the greater need for the University to keep up with the changing demands of industry at a broader level. For a University, the additional challenge this posed was the identification of state-of-the-art engineering tools and associated support for a program of this magnitude in a manageable fashion due to budgetary constraints.

Next Generation Software Tools

With industry driving the standards students need to meet, the department had to shift its focus from choosing zero-cost, student-version solutions to having students become familiar with the next generation of software tools in use by industry by the time they graduated. As Dr. Doman emphasized, not doing so was causing them to lose on the relevant side; using free software for teaching



Impact Ring Analysis Results Viewed with Altair HyperView

students was not helping students prepare for employment in industries which had begun to utilize more powerful tools. Having experience using HyperWorks for years, he decided to introduce it to the department. A large part of the decision to implement HyperWorks was how much more relevant the Altair suite of solutions was in industry compared to the software that was previously in use at Dal.

A Curriculum Updated

Altair HyperWorks is now an important part of the Mechanical Engineering undergraduate curriculum at Dal. In the third year course, 120 students per year are using HyperWorks a minimum of 3 hours every week as an integral aspect of their real-world design assignments. Every student gets 50-60 hours of hands-on use, and in the fourth year many of them use HyperWorks as part of their capstone design

project - the last course where they pull together everything they have been taught, bringing the engineering tools to bear on their designs.

This emphasis on real-world design applications being done the same way as industry does requires the students to learn and understand the practical aspects of using FEA. This in turn required changes to the course pedagogy to be developed with practical aspects in mind so students learned best practices, and how to interpret results to improve their design the way industry does.

"Altair products are the perfect advanced engineering tool to use for design education in our mechanical engineering program. HyperWorks provides us with access to the best people and technologies to help us teach

our students modern, innovative techniques while maintaining industry-leading cost effectiveness." said Dr. Darrel Doman, "and the support from Altair was key to really help us to get the new curriculum moving down the right path."

The general feedback from the local marine industry is that there is an increased capability on the part of students in the area of numerical simulation and there has been an overall improvement in job placement rates. "We're going to rebrand the entire finite element curriculum. There'll be a really dynamic, high-velocity modeling FEM 2 course, and then the graduate-level FEM 3 is where we get into different types of materials and some of the more advanced topics. But the plan is to make sure that we're always keeping that design centric approach intact" he concluded.

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Altair is focused on the development and broad application of simulation technology to synthesize and optimize designs, processes and decisions for improved business performance. Privately held with more than 2,600 employees, Altair is headquartered in Troy, Michigan, USA and operates more than 45 offices throughout 20 countries. Today, Altair serves more than 5,000 corporate clients across broad industry segments. To learn more, please visit www.altair.com.

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