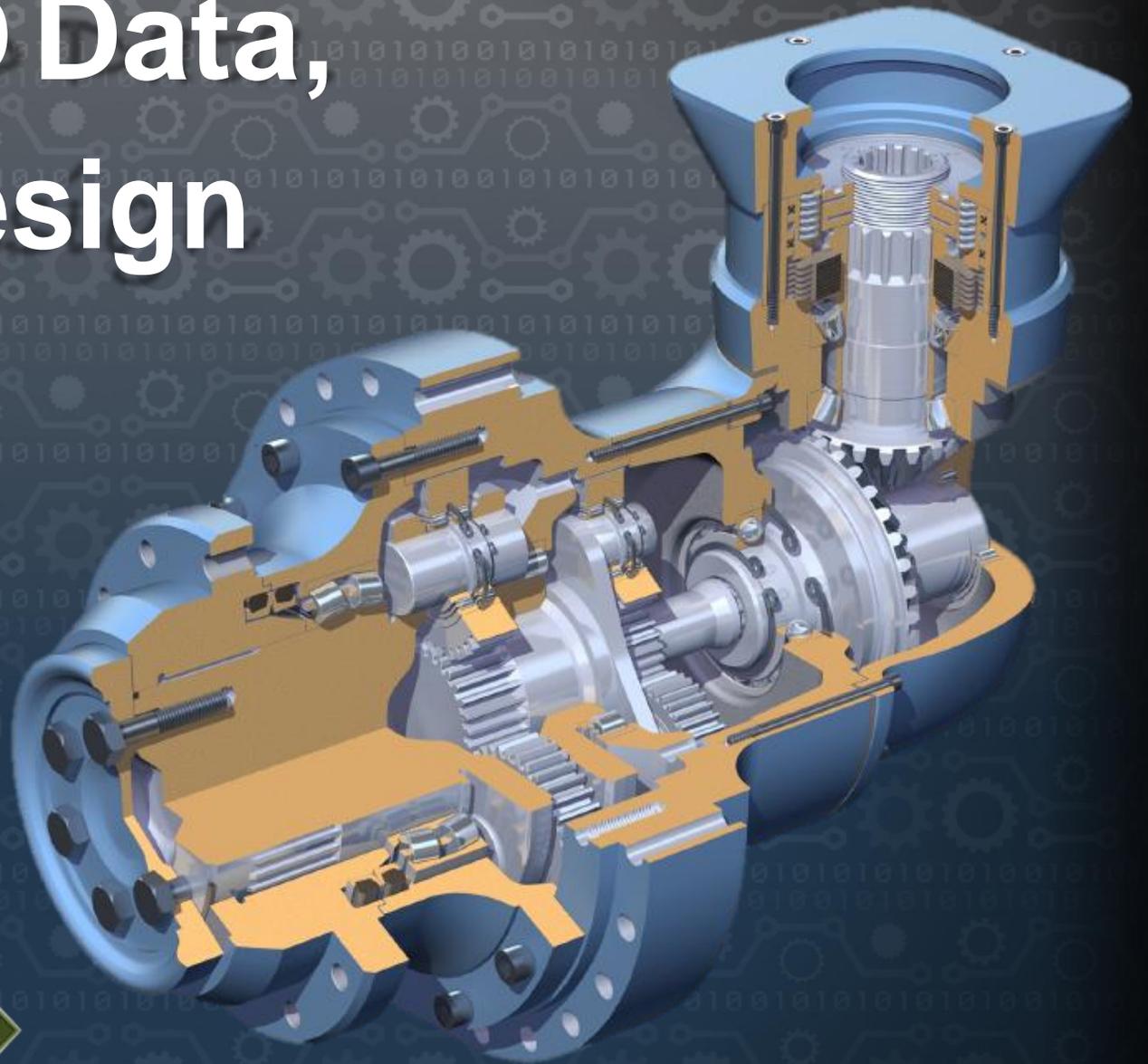


Multi-CAD Data, Unified Design

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Working with multi-CAD data is an engineering reality today.

Disparate data sources are simply an ugly but unavoidable truth. Collaboration with customers, suppliers, partners and even other internal organizations is a key aspect of design. The standardized and unambiguous mechanical definition of the product is the 3D model. Those two facts necessitate collaboration on the 3D model as a result.

While the ideal is that all of these teams would work with the same tool, different organizations often use different CAD applications. This lack of CAD harmony can mean a real CAD headache; when you move a 3D model from one CAD application to another, you can lose hours and even days trying to get clean geometry and to make even the simplest of modifications. That, in turn, causes all sorts of havoc in the design process. Unfortunately, the productivity loss because of CAD interoperability has gone on for so long that most engineers and designers are resigned to their fate.

Despite the gloomy past, there are some good reasons to not give up hope. Over the last few years, there have been dramatic shifts in the technology used in CAD applications - many of which apply directly to CAD interoperability. This eTopic explores the topic of working with multi-CAD data in the design process. Specifically, it digs deeper into the challenges of traditional CAD in this regard as well as how the latest CAD advancements offer capabilities to address interoperability needs.



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What causes multi-CAD data issues?

The root of one problem sits in how CAD applications calculate geometry. No one approach is wrong per se. But each CAD application does it differently. When a 3D model is moved or imported, the geometry is calculated differently. As a result, lots of time is invested in cleaning up the imported 3D model.

Another problem crops up because CAD applications define their features differently. Because there is no translation of feature definitions, 3D models are often exported from CAD applications into formats without features. With no features, there is no design intent. As a result, designers and engineers must find a way to control the geometry. Sometimes, that means you have to recreate the features from scratch.

Last but not least, there is the issue of propagating design changes. Once imported, a 3D model might be changed in its original CAD application. As a result, the imported 3D model is out of date and must be updated manually.

The implications of these multi-CAD data issues for users and organizations are serious. For individuals, hours and days can be spent trying to clean up, modify or propagate change across 3D models. For the organization, these activities add little value to the development cycle. If anything, it can cause significant delays in the project schedule. For both, unfortunately, it's merely a wasteful cost of doing business.

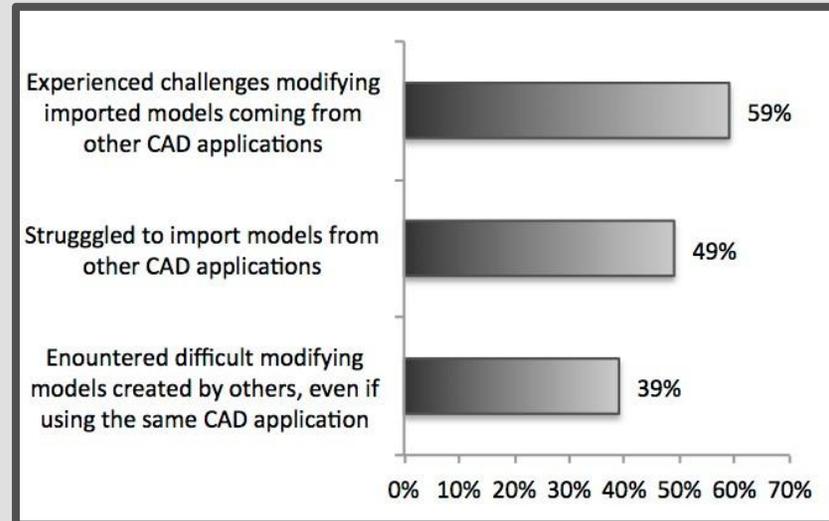


Figure 1: Challenges in Making Design Changes

Source: 2011 PTC Survey on CAD Complexity



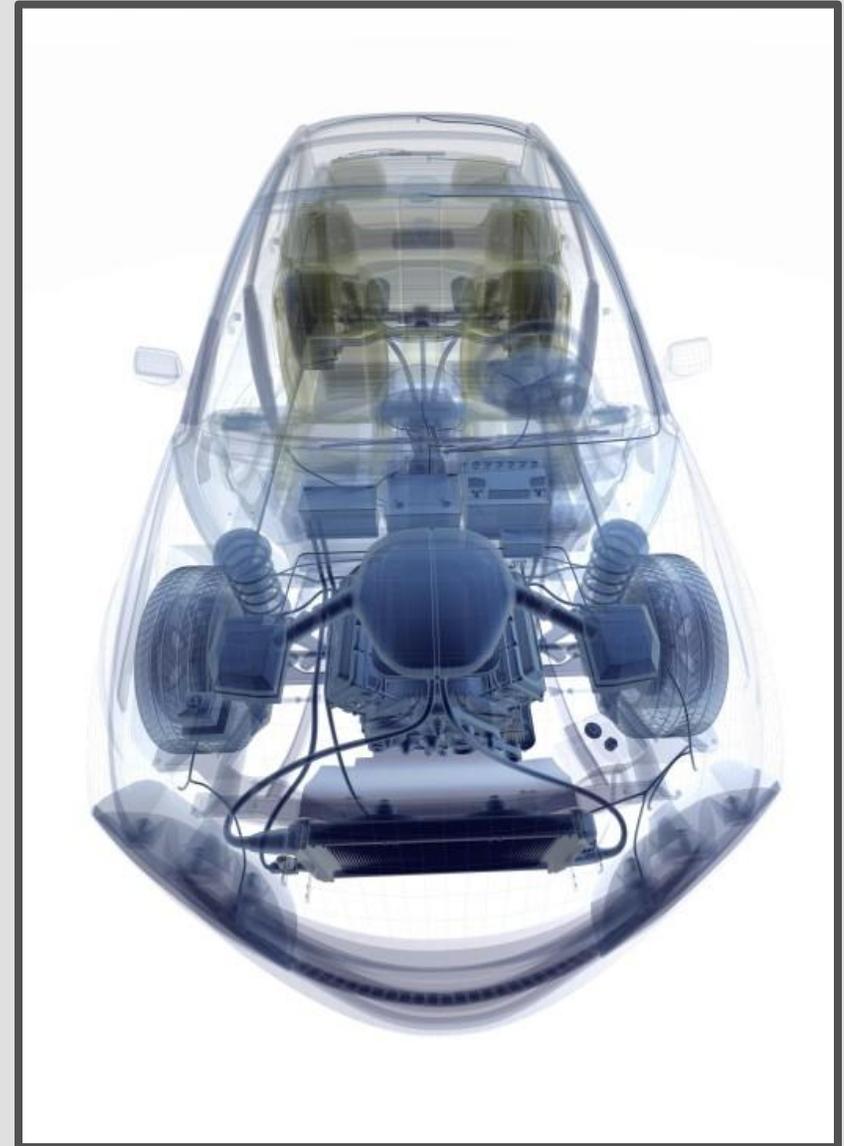
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How do recent CAD innovations help work with multi-CAD data?

In general, there are three major capability sets, which have relatively recently been integrated into more traditional CAD applications, that impact how designers and engineers work with multi-CAD data.

- ***Interoperability through Visualization Tools:***
While CAD applications calculate their geometry differently, visualization applications use importers tailored for each CAD application. These import capabilities from visualization tools are now being integrated in CAD applications, making it far easier to get to clean imported geometry.
- ***Recognizing Intelligence in Imported Models:***
Design agility isn't just about importing files in just about any CAD format – although even that is sometimes a challenge. It's also about being able to make changes to those designs once they are imported. Because imported CAD models don't bring any sort of intelligence with them, the CAD application needs to recognize the inherent design intent that exists in geometry.
- ***Automated Updates to Imported Models:***
Another step forward is the emergence of technology that will associatively update imported 3D models when the original is changed in a different CAD application. This goes a long way towards relieving the pressure on designers and engineers in terms of manual updates.

In combination, these three relatively new capabilities of today's CAD can impact the productivity of designers and engineers.



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Summary and Conclusion

With this eTopic, we've covered many of the issues organizations face when working with multi-CAD data as well as how modern CAD technology is addressing many longstanding issues. Here's the recap.

- Working with other organization's design models is a reality of today's business. The 3D model is the standardized and unambiguous definition of the product. As such, it is the pivot point for collaboration with other organizations.
- Organizations use a wide variety of CAD applications, each of which define geometry and features in unique ways. The underlying technical issues here are threefold: geometry is rarely imported cleanly, a lack of feature translation leaves no mechanism to drive change and changes must be propagated manually across CAD applications.

A number of new CAD technologies have been developed in recent years to directly address these issues. Here are the three that are most critical to addressing multi-CAD problems.

- The integration of visualization import capabilities into CAD applications enable far cleaner import of 3D models.
- The development of CAD technologies that recognize the inherent intelligence that exists in geometry allows users to change imported geometry even without features.

- New CAD capabilities now automatically recognize when an imported CAD model is changed by another CAD application and associatively makes the updates.

The implication of these new capabilities is not trivial. Today, working with multi-CAD data is time consuming while adding little value to the design of the product. Many organizations see the extra effort as the cost of doing business in a supply chain.

For individuals, it means spending far less time on non-value add and frustrating activities. For the organization, there is a higher probability that development projects stay on schedule. Best of all, adopting these technologies translates into very little process change. Simply many painful activities disappear.

For more information on working with multi-CAD data, please visit <http://www.3HTI.com>.

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