

Leveraging Foxit's 3D PDF Capabilities for Improved CAD Workflows: A Case Study

Intro: A manufacturing company's problem with overkill CAD software

A leading global manufacturing company was looking for ways to streamline and save money on a complex workflow involving 3D floorplan diagrams. Shifting product and manufacturing demands required this company to frequently reconfigure its floorplans to optimize its space management. To generate new diagrams, the engineering department used AutoCAD, a top-of-the-line manufacturing design program for building and editing design models.

Once these diagrams were sent to the executive suite and legal department for review, AutoCAD was still the software of choice for viewing and commenting on them. There were a few issues with this workflow. While AutoCAD's advanced design capabilities are necessary for making and editing the 3D floorplan diagrams, they are an overkill solution for the more straightforward task of viewing and commenting on 3D diagrams.

Foxit's PDF products were much simpler for executive and legal departments to use, and more cost-effective too. This whitepaper details how the manufacturing company used Foxit PDF Editor to significantly improve the speed, error rate, and cost of this workflow.

Why AutoCAD is not a great fit for annotation and review

Computer-aided design (CAD) is an engineering practice that involves creating 2D or 3D diagrams and models of manufacturing designs. CAD applications allow the user to draw models with curves and lines of precise dimensions, implement detailed labeling schemes, and calculate tolerances.

AutoCAD is a popular and effective option for creating and editing designs. For Foxit's manufacturing customer, AutoCAD was a necessary piece of the puzzle in the engineering department for creating and editing 3D diagrams. This included the new floorplan diagrams that were needed whenever changing product demands required a reconfiguration of the company's manufacturing spaces.

However, AutoCAD was not the best choice when it came to sending floorplan designs over to the executive and legal departments for review and approval. There were a few significant problems with this workflow.

AutoCAD is not designed for quickly and easily sharing diagrams across a variety of departments and stakeholders. Moreover, AutoCAD is expensive and overengineered for the task of reviewing floorplan diagrams — sort of like renting out an industrial kitchen to make breakfast for two.

Foxit's manufacturing customer found the following issues with using AutoCAD for this part of its floorplan redesign workflow:

- **Lack of effective collaboration tools:** When working with AutoCAD, files needed to be repeatedly downloaded, loaded in AutoCAD, redownloaded after commenting, and transmitted every time a new employee reviewed the floorplans. This process resulted in miscommunications and version control issues, slowing down the workflow and increasing error rates. Foxit's customer wanted a software solution with better collaboration tools to address these shortcomings.
- **Large file sizes:** Original 3D CAD files often contain more details and features than the corresponding PDF files. This results in slower loading, downloading, and uploading times. The manufacturer needed a solution that did not require sharing large 3D CAD files.
- **Unnecessary complexity:** Since it's designed for intricate engineering tasks, AutoCAD requires considerable training before most users are comfortable using it regularly. The user interface for viewing and commenting on diagrams was not intuitive to nonengineering employees or those not versed in CAD software. This led to increased errors that required significant training and support to alleviate. The manufacturer sought an application that did not require extensive training to master.
- **High costs:** Each AutoCAD license costs Foxit's manufacturing customer around \$2,000 annually. Moreover, each AutoCAD license provides only single-user access — since August 7, 2020, multiuser licenses of AutoCAD are no longer offered. Each employee in the executive and legal departments who needed to review floorplan diagrams was costing the manufacturer around \$2,000 annually just in AutoCAD subscriptions. Foxit's customer was looking for a solution that would significantly lower these subscription costs.

How Foxit PDF Editor provided a solution

This leading manufacturer found [Foxit's PDF Editor](#) to be a great solution for alleviating the above issues. It has advanced [3D PDF capabilities](#) that are designed specifically for viewing and annotating 3D diagrams, including CAD designs.

Foxit PDF Editor's 3D PDF functionalities

Foxit PDF Editor has effective tools for both viewing and annotating 3D content within PDF files.

3D content viewing

Foxit PDF Editor has numerous functionalities for adjusting the perspective, angle, distance, and other features when viewing 3D diagrams embedded within a PDF. These functionalities allow for an in-depth review of 3D content.

- **Viewing Modes:** Navigate through 3D content by hovering and clicking with a mouse. For example, the default viewing mode Rotate allows users to hover over 3D content and

rotate it to view it from different angles. Other supported viewing modes for 3D content include Spin, Pan, Zoom, Walk, and Fly.

- **Display Settings:** Adjust the appearance of 3D content, including background color, lighting, model render mode, projection perspective, and cross-section properties.
- **Viewing Positions:** Save specific viewing positions and settings generated by Viewing Modes and Display Settings. This feature makes for easier collaboration between multiple people who may review 3D diagrams in the future. There is a set of predefined viewing positions and a functionality to save custom-defined viewing positions.
- **Model Tree:** Show or hide specific components of 3D content by toggling them on/off within the model tree defined by the original 3D design files.

3D content annotation

Foxit PDF Editor also enables comments and measurements on 3D models.

- **3D Comments:** 3D comments are tagged to specific components of a 3D model. If part of a floor plan is not up to code, for example, a construction lawyer will be able to comment on that particular component so that the problem is easily identified. When viewing a 3D model, 3D comments move seamlessly along with the component they are tagged to.
- **3D Measurements:** 3D measurements measure distances between points and angles between edges within a 3D model. These include 3D Perpendicular Dimension for measuring distances between parallel straight edges, 3D Radial Dimension for measuring the radius of round shapes, and 3D Angle Measurement for measuring angles between edges. 3D measurements can also be converted to comments for review and annotation.

To see Foxit PDF Editor's 3D capabilities in action, watch this [demonstration](#).

The advantages of Foxit PDF Editor

With the above suite of 3D content viewing and annotation capabilities, Foxit PDF Editor was more than capable of handling the executive and legal department's requirements for reviewing and annotating floorplan designs. In addition, it provided the following solutions to each of the manufacturer's challenges with AutoCAD:

- **Live sharing and collaboration features:** Foxit PDF Editor supports web and mobile environments, allowing for real-time sharing and collaboration on PDF documents. It also [integrates](#) with popular content management systems (including Office, iManage WorkSite, Content Suite, and OpenText Documentum), cloud storage services (including OneDrive for Business, Google Drive, Egnyte, and Dropbox), and SharePoint.
- **File compression tools:** The PDF Optimizer tool reduces file sizes by compressing contents, unembedding fonts, and clearing data redundancies. There is also an option to avoid compressing images to prevent losing important details within 3D models and 3D content.
- **Intuitive user interface:** Foxit PDF Editor's user interface works like many familiar word-processing applications. Loading files, saving files, and adding comments is second

nature as employees are already familiar with similar word-processing and PDF editing user interfaces.

- **Lower costs:** Foxit PDF Editor retails at \$159.99 for an annual license, and subscriptions can be even cheaper with [volume licensing](#). Foxit PDF Editor is even 15%–30% cheaper on average than Adobe Acrobat, another leading PDF editing application.

Business benefits from implementing Foxit PDF Editor

By leveraging Foxit PDF Editor for the legal and business review of 3D floorplan diagrams instead of AutoCAD, the manufacturer was able to reduce the time, error rate, and cost of the overall floorplan redesign workflow.

Speed improvements

Foxit PDF Editor's web platform and cloud integrations for sharing and collaboration were much quicker than the old process of downloading and uploading large CAD files. These features allowed new reviewers to jump into the process in real time without any slow, back-and-forth email chains. The intuitive user interface also sped up the reviews themselves and eliminated the need for a lengthy training process.

Error rate improvements

The improved collaborative and sharing environment also reduced error rates by eliminating miscommunication and version control errors. For example, the workflow involving manually transmitting AutoCAD files occasionally resulted in outdated diagrams being advanced along the review chain, further delaying the approval process. Errors due to a lack of executive and legal familiarity with using CAD software were also eliminated.

Cost improvements

With AutoCAD licenses at \$2,000 per employee per year, the switch to Foxit PDF Editor reduced licensing costs by over 90%. The speed improvements to the floorplan redesign approval process also resulted in quicker turnaround times for restarting production after a floorspace reconfiguration was needed. This allowed for higher outputs, productivity, and ROI. And last but not least, executive and legal training and support costs for AutoCAD software were entirely eliminated.

Opportunities for CAD workflow optimizations in other industries

3D design diagrams are used across a wide variety of industries. While architecture and engineering are obvious examples, a surprising number of businesses use and benefit from 3D diagrams:

- **Real estate:** 3D models can provide prospective buyers and developers with detailed building models without requiring expensive physical prototyping.
- **Interior design:** Interior designers often create 3D models for layout design, space planning, and furniture and fixture placement.
- **Marketing and advertising:** 3D diagrams illustrate how product packaging and point-of-purchase displays will look from various perspectives and angles.
- **Product design:** Product designers use 3D diagrams to assess product design choices before production.
- **Urban planning:** Urban planners create 3D diagrams of parks, streetscapes, and other elements in a detailed urban design model.
- **Law:** Construction lawyers review 3D models for building code conformance, and patent lawyers review 3D diagrams to assess prospective patents.

In all these cases, a trained engineer or designer working with CAD software is needed to produce and edit 3D diagrams. However, using costly and complex CAD software simply to view and annotate these diagrams will slow any process down. Any business using this workflow has a clear opportunity for optimization.

Foxit PDF Editor is a far simpler and more cost-effective solution. With its advanced 3D PDF support and capabilities, nonengineering audiences can easily view 3D models from a variety of angles, perspectives, and distances. They can also attach comments to specific components to send along for further review or editing. 3D models can even be measured within Foxit PDF Editor to assess room measurements or product dimensions.

Improve and simplify CAD workflows with Foxit PDF Editor

By replacing AutoCAD software with Foxit's PDF products for executive and legal floorplan design reviews, Foxit's manufacturing customer was able to significantly reduce its licensing costs. Its CAD workflows were considerably streamlined, with Foxit PDF Editor's superior sharing and collaboration tools, including a web platform for real-time collaboration.

These tools also reduced version control issues and improved communication across the review process. With production ramping up more quickly due to expedited floorplan redesigns, the manufacturer's output and productivity increased significantly. The overall CAD workflow became faster, cheaper, and more efficient.

Any business that works with 3D design models should assess whether its workflows could be optimized by using alternatives to CAD software for tasks outside of direct 3D model creation and editing. For model review and annotation, a cost-effective PDF editor with advanced 3D capabilities like Foxit PDF Editor will get the job done. Consider making the switch to [Foxit PDF Editor](#) for reviewing and annotating 3D PDFs and reap the benefits today.