The benefits of using AutoCAD® 2023 vs. AutoCAD® 2019

A productivity study detailing the differences between AutoCAD® 2019 and AutoCAD® 2023.

AutoCAD 2019 is a popular version amongst AutoCAD users. As of March 2022, you can now upgrade to AutoCAD 2023 through your existing AutoCAD subscription with access back to AutoCAD 2020 in your Autodesk account management portal. Autodesk brings in new features and commands with every new release—allowing you to work smarter, not harder. This study details the productivity gains that a user may experience when using AutoCAD 2023 vs. AutoCAD 2019, highlighting the latest features and commands designed to streamline your work and how to take full advantage of your subscription

Executive summary

Designed by Autodesk and commissioned to an independent consultant, this study explores common tasks required when preparing designs and documents in AutoCAD 2019 and the subsequent productivity gains by using AutoCAD 2023. A set of designs and documents were used with both AutoCAD 2019 and AutoCAD 2023. Tasks ranged from counting blocks in a DWG file to comparing DWG files with DWG Compare and saving to AutoCAD Web and Mobile folders to work with designs in the cloud.

AutoCAD 2023 provided an **average productivity gain of up to 57%** for key collaboration tasks (depending on user expertise level with AutoCAD and based on experience and training).
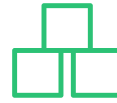
Key findings

AutoCAD 2023 was shown to outperform AutoCAD 2019 in all five tasks completed for this study:

Collaborating on design changes was **64%** faster

Importing markups into drawing files was **58%** faster

Counting blocks was **70%** faster

Comparing external reference files (XREFs) was **52%** faster

Reusing design content with blocks was **47%** faster

The study

This study explores five common design challenges when working in a typical 2D floor plan and shows direct comparisons of the time and effort required to accomplish each specific task in AutoCAD 2019 versus AutoCAD 2023.*

> The same tasks were completed up to **57%** faster using AutoCAD 2023.

The performance results in this paper were achieved by one user with expert-level experience, using both AutoCAD 2019 and AutoCAD 2023 and conducting comparative tests on the same AutoCAD sample project. The tasks are comprehensive in nature. The total time it took to complete each task using both AutoCAD 2019 and AutoCAD 2023 is documented in each case.

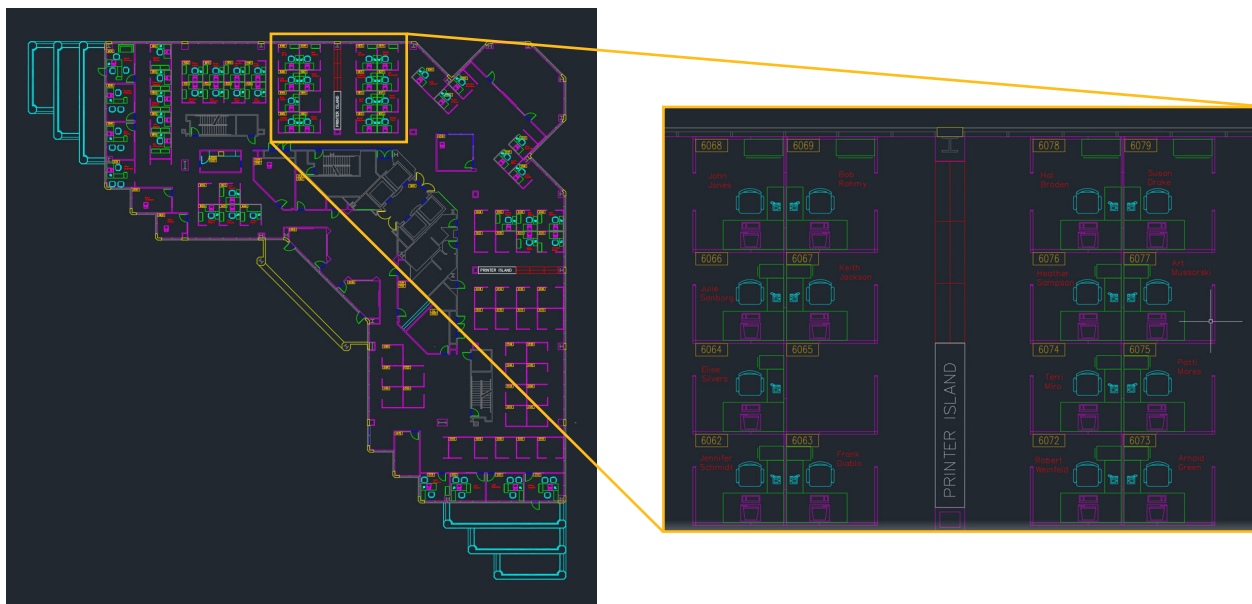A detailed description of the study follows.

Fig.1 – A typical 2D floor plan

NOTE (*): It was assumed during the study that any symbols and title blocks needed in AutoCAD for the design process were local to the document. Search time is subjective, and this method allowed for the quick placement of required blocks in the shortest amount of time possible.

Design task 1

Collaborating on design changes in a DWG file

Changes in a DWG file need to be shared clearly and effectively so that design intent is understood and implemented accurately. AutoCAD has always provided reliable drafting tools, but it is the need to make changes to a design that often causes a roadblock to productivity.

In AutoCAD 2019, the optimal way to collaborate was using the DWF file format. A drawing would be exported as a DWF file (like a PDF file), and the recipient could use Autodesk Design Review with no need for an installation of AutoCAD to view, check, and redline markup the DWF file. With a license to Autodesk Design Review and the management of DWF files—in addition to DWGs—this was seen as an effective process for AutoCAD 2019.

AutoCAD 2023 gives you the ability to access DWG files through the AutoCAD Web and Mobile folders, Autodesk Docs, Autodesk Drive, or other cloud storage providers such as Box, Dropbox, Google Drive, and Microsoft OneDrive. This allows recipients to seamlessly use their own license to AutoCAD on the web and mobile devices to collaborate directly on the original DWG files where the markup information is added using the Trace functionality in AutoCAD 2023.

Task

This task compares the time taken to output and review a DWF file from AutoCAD 2019 versus using a DWG file from AutoCAD 2023. With AutoCAD 2019 the task requires marking up an exported DWF file in Autodesk Design Review, which is then sent back to the AutoCAD originator and viewed in the Markup Set Manager in the AutoCAD 2019 desktop. This workflow is then compared to the Trace functionality in AutoCAD 2023, in conjunction with AutoCAD on the web.
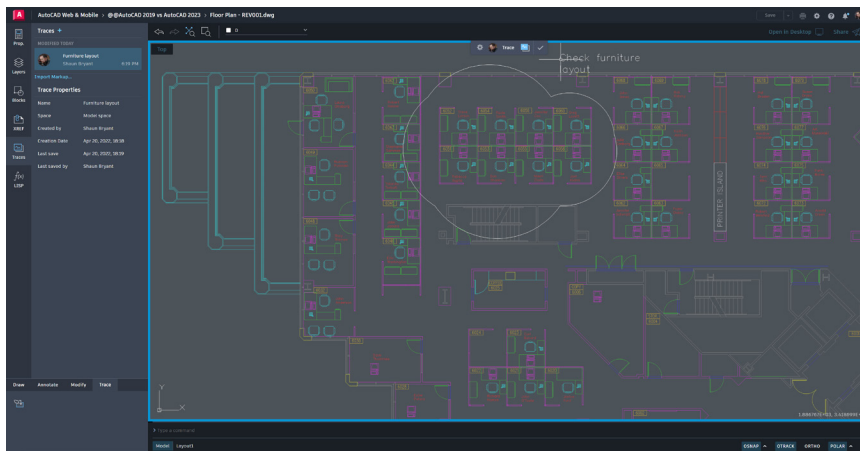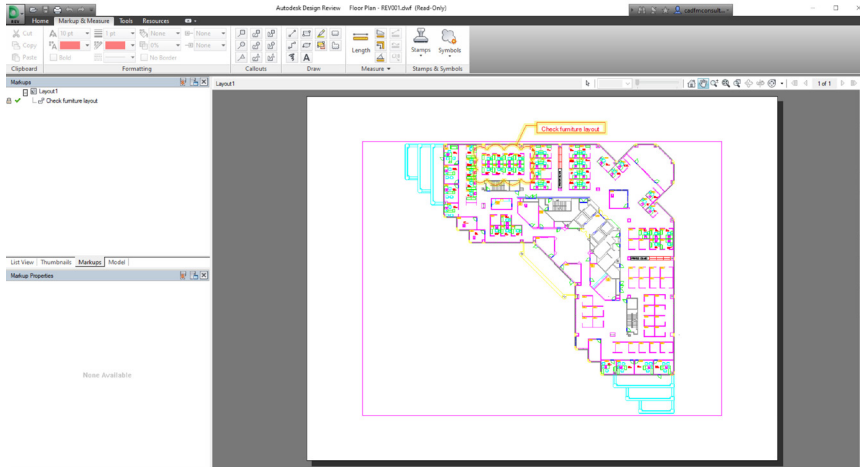
Fig.2 – Using Autodesk Design Review to review a DWF file output from AutoCAD 2019 (top) vs. an imported markup trace layer using a DWG file in AutoCAD 2023 (bottom)
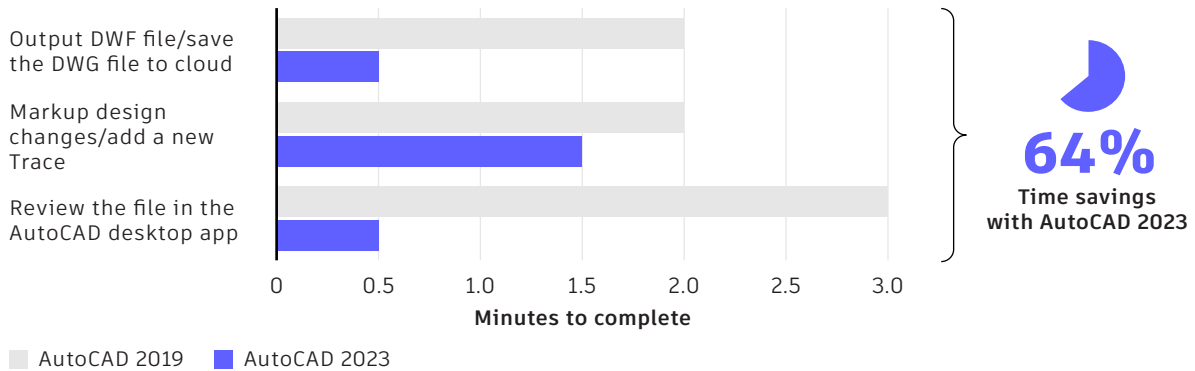
Steps (AutoCAD 2019):

- Output the DWG file to a DWF file
- Open the DWF file in Autodesk Design Review to markup and communicate design changes
- Review the marked-up file in the Markup Set Manager and save new file revision

Steps (AutoCAD 2023):

- Save the DWG file to a cloud-based location
- Add a new Trace to the saved DWG file in AutoCAD on the web
- Review the Trace in the same DWG file using the AutoCAD desktop app and save new file revision

The benefits of using AutoCAD® 2023 vs. AutoCAD® 2019

Collaborating design changes in a DWG file

Output DWF file/save the DWG file to cloud

Markup design changes/add a new Trace

Review the file in the AutoCAD desktop app

Minutes to complete

AutoCAD 2019   AutoCAD 2023

64%
Time savings with AutoCAD 2023

Results

Using the DWF output method in AutoCAD 2019 is a lengthier process that introduces another file format (DWF) that needs to be tracked and maintained in addition to a DWG. That file then must be opened in another application (Autodesk Design Review), leaving the workflow open to error if the wrong DWF file is used.

Utilizing the AutoCAD Web and Mobile folders (or a preferred cloud storage provider) in AutoCAD 2023 combined with AutoCAD on the web and mobile devices is a great time-saver—allowing for more productivity when collaborating and sharing your designs. It also means that you and your team can work on the same shared DWG file.

Access to AutoCAD on the web and mobile are included in your subscription to AutoCAD 2023 and AutoCAD LT 2023. And with the new standalone AutoCAD Web subscription, collaborators can access AutoCAD's core commands and fundamental drafting capabilities on the web and mobile devices to review DWG files—providing a much leaner workflow that saves a large amount of time in the collaboration stages of a project.

Design task 2

Importing markups into drawing files

AutoCAD has long been able to import raster images and PDFs using commands such as PDFIMPORT and ATTACH. This required time to assess and scale the raster images and copy the text annotation across. Instead, it was often easier to manually type out annotations directly into AutoCAD and copy it from the raster images.

In AutoCAD 2019, the workflow described was still applicable. A raster image was attached or imported, but valuable project time was spent making sure the appropriate annotation ended up in the DWG file and presented accurately. Certain Express Tools could be used but these also took up valuable time.

In AutoCAD 2023, the Markup Import and Markup Assist features utilize machine learning to take text annotation from a raster image or PDF and bring it directly into the DWG file as AutoCAD text.

Task

This task compares the different import workflows used in the 2019 and 2023 versions of AutoCAD where markups are required in a DWG file.
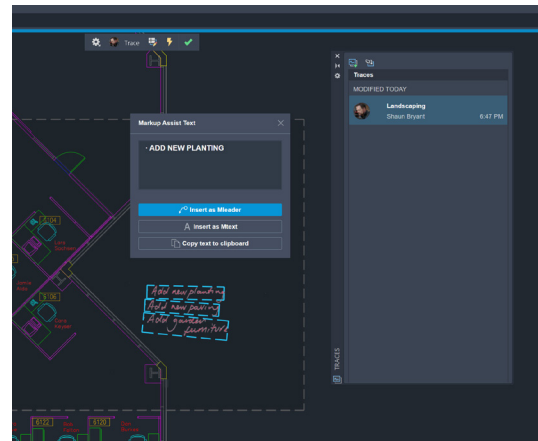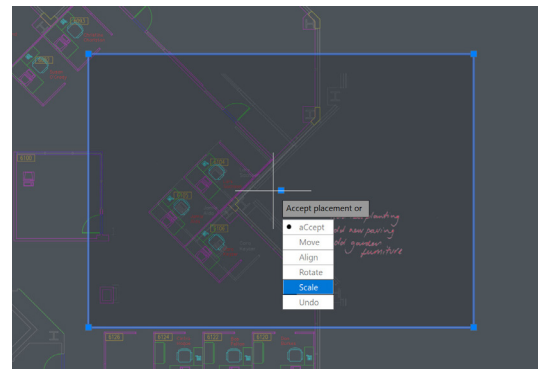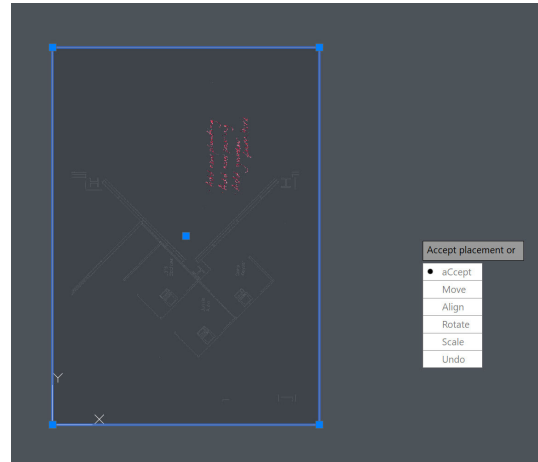

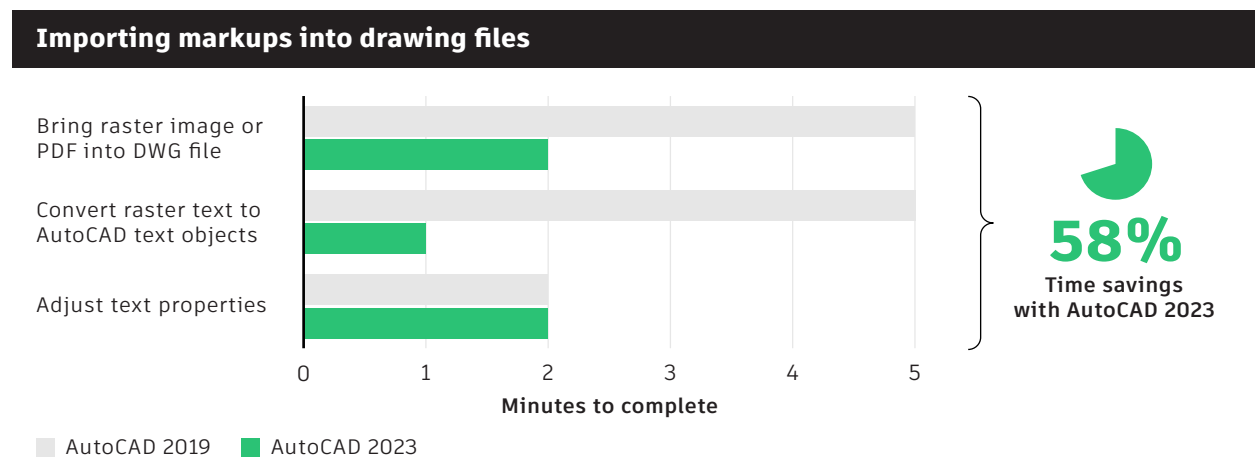Fig.3 – Working with Markup Import and Markup Assist in AutoCAD 2023

Steps (AutoCAD 2019):

- Bring raster image or PDF into the current DWG file
- Create AutoCAD text objects from what is in the raster image or PDF, copying what is there already
- Adjust text properties, such as layer and text style

Steps (AutoCAD 2023):

- Use Markup Import to import a markup file, such as a raster image or PDF, to place and scale the markup
- Use Markup Assist to convert raster text to AutoCAD text objects

Importing markups into drawing files

Bring raster image or PDF into DWG file

Convert raster text to AutoCAD text objects

Adjust text properties

Minutes to complete

0   1   2   3   4   5

58%
Time savings with AutoCAD 2023

AutoCAD 2019   AutoCAD 2023

Results

In AutoCAD 2019 and previous versions of AutoCAD, there would be a requirement to replicate what is in the raster image or PDF, thus creating repetitive work and less productivity. There would also be the opportunity for errors to be transferred across to the DWG file.

In AutoCAD 2023, the Markup Import and Markup Assist features allow for a quick and easy method to import a raster image markup or scanned PDF and rotate and scale the imported markup to suit the host DWG file. Markup Assist then allows you to quickly convert raster text annotation to AutoCAD text annotation using machine learning. This provides a visual, effective workflow that also lists the markups in the Traces palette, utilizing the Trace feature in newer versions of AutoCAD.

Design task 3

Counting blocks in a DWG file

Facilities management documents often start with a set of office floor plans and are used to assess the maximum capacity of any floor in the building. The number of desks, chairs, computers, and other associated office-related items would be reflected on the plans—and need to be manually counted.

A typical scenario would be an office move where an inventory of office furniture would be required. This would include all workstations, computers, chairs, even down to office plants. In this task, all objects are represented by AutoCAD blocks which need to be counted for an accurate count of all office furniture.

Task

This task compares the time taken to count a group of blocks using the DATAEXTRACTION command in AutoCAD 2019 and put the relevant block count into an AutoCAD table to the time taken to use the COUNT command in AutoCAD 2023 and generate a table of the associated block count.
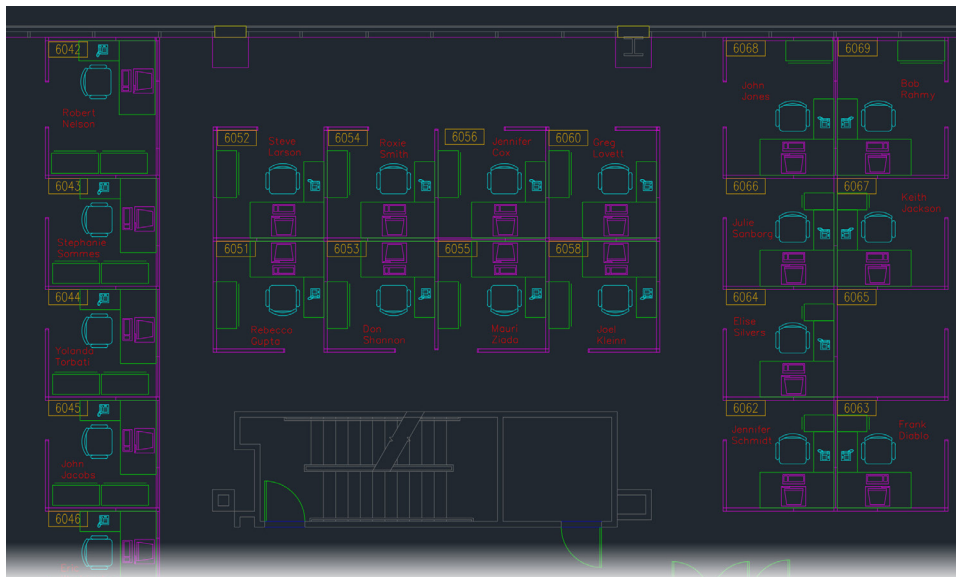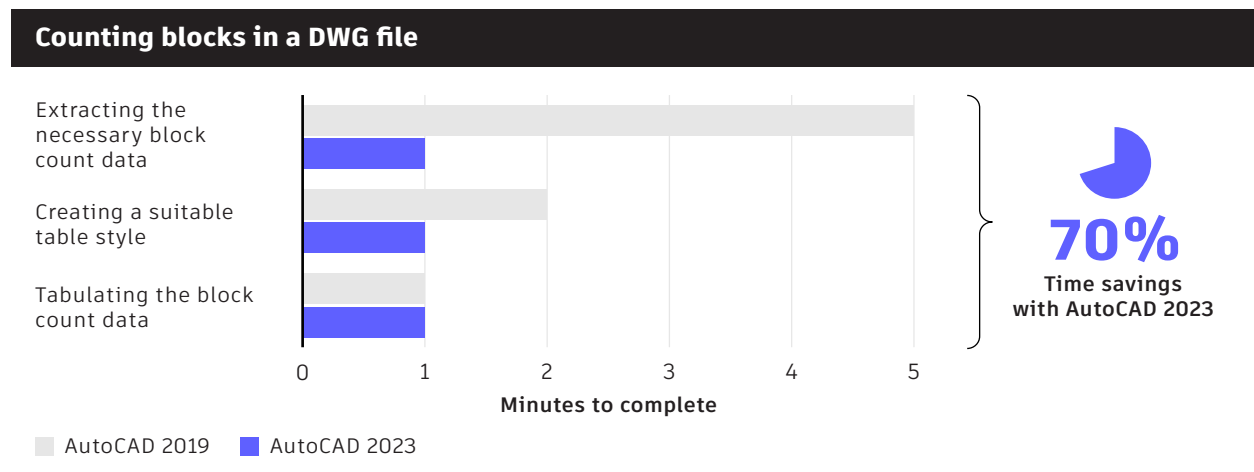

Fig.4 – A typical 2D office floor plan where a block count might be required

Steps (AutoCAD 2019):

- Extract the necessary block count data using DATAEXTRACTION command
- Add an AutoCAD table to tabulate the block count data

Steps (AutoCAD 2023):

- Extract the necessary block count data using COUNT command
- Add an AutoCAD table to tabulate the block count data

Results

Before the counting process started with AutoCAD 2019, you either had to be armed with a set of highlighter pens and hard copy drawings or be incredibly familiar with the DATAEXTRACTION command. You had to perform either a manual hard copy count where each instance of a particular block was marked with a separate highlighter color or run a full data extraction. Both processes could be a massive drain on time when working on a project.

The COUNT command in AutoCAD 2023 is a great time-saver, which allows for more productivity when counting blocks in your designs. You can still use the DATAEXTRACTION command in AutoCAD 2023, but it requires more input in numerous dialog boxes to get the relevant block count data into an AutoCAD table.

The COUNT command is much more specific and will count all the blocks in your DWG file. In AutoCAD 2023, you can even specify an area of a drawing in which to count blocks, and it will also display any exploded blocks.

Design task 4

Comparing external reference files (XREFs)

External reference files (XREFs) in AutoCAD are an effective method of using other DWG files to display and highlight design information. They also allow for concurrent work, where other AutoCAD users can work on the XREF files which will then be updated to show the most current information in the host drawing.

In AutoCAD 2019, there is no way of checking or comparing XREFs that are attached to the host DWG file automatically. The only way to do this would be to open each individual XREF and check the design content. Not only is this time-consuming, but it can also leave the XREF workflow open to error if the wrong XREF is used.

AutoCAD 2023 now has XREF comparison features which notifies users of updates to XREFs automatically and checks iterations of the files to confirm that the appropriate XREF is being used with the correct design information. The XREF palette can also be used to reload XREFs to automatically compare or by using the XCOMPARE command.

Task

This task demonstrates how the updated XREF command in AutoCAD 2023 provides a tool to compare attached external reference drawings (XREFs) against AutoCAD 2019 which has no tools to perform this function.
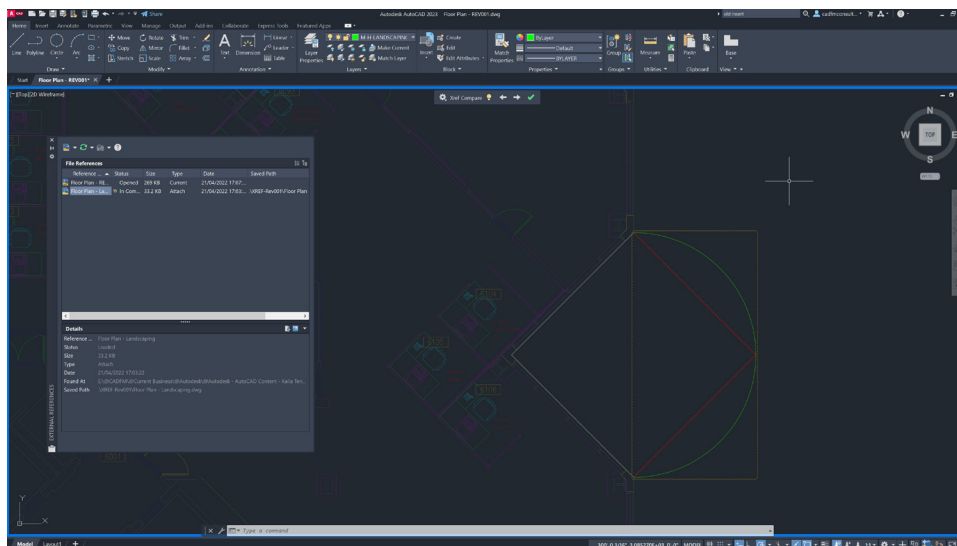

Fig.5 – XREF compare being used in AutoCAD 2023 required

Steps (AutoCAD 2019):

- Attach a DWG as an external reference file (XREF)

- A new version of the attached XREF file is created

- A manual comparison of the two XREFs is made for changes/errors with both XREFs open in AutoCAD

Steps (AutoCAD 2023):

- Attach a DWG as an external reference file (XREF)

- A new version of the attached XREF file is created

- An automatic comparison of the two XREFs is made for changes/errors with both XREFs open, automating the workflow and reducing time taken and many transferred errors

Comparing external reference files (XREFs)

52%
Time savings
with AutoCAD 2023

Minutes to complete

☐ AutoCAD 2019 ■ AutoCAD 2023
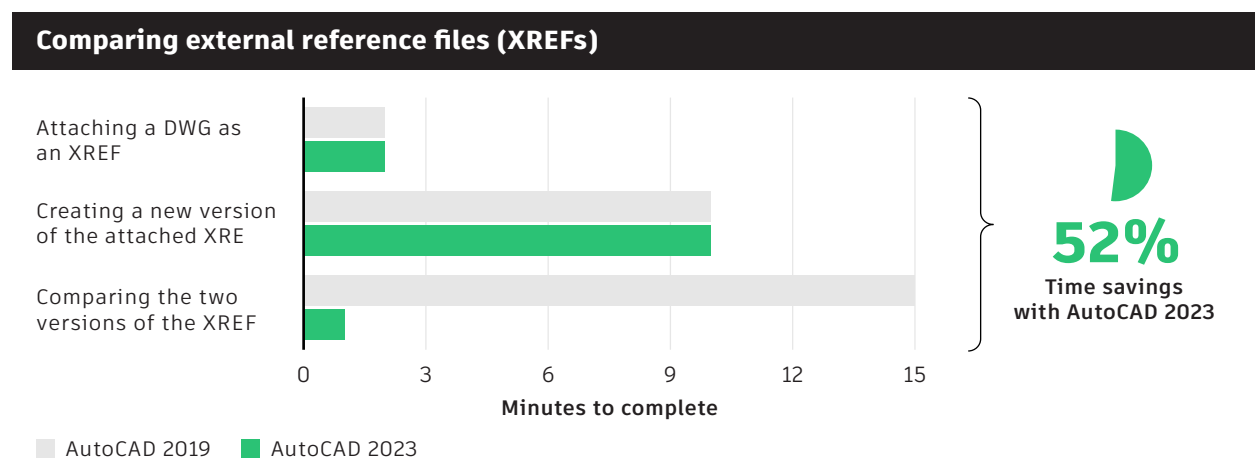
Results

External reference files in AutoCAD have been around for many years, providing a great way to add design content to a DWG file without making it too data heavy. They also allow for concurrent working where other AutoCAD users can work on the XREFs independently and then update them to show the latest drawing information in the host DWG file.

In AutoCAD 2019, XREFs needed to be checked and compared manually where the XREF drawings were opened and looked over for changes and/or errors. In AutoCAD 2023, the XREF Compare feature provides a quick and efficient way to check one XREF against another, highlighting what is different between the two compared XREFs. The user can also navigate and zoom to each compared difference between the XREFs as well.

Design task 5

Reusing design content with blocks

Blocks have been in AutoCAD for many years and are an effective method of reusing design content. In an office floor plan, typical blocks are items such as desks and chairs and external items such as doors and windows. These items are used repetitively. Making them into blocks saves time and removes the need to redraw or repeat use of the Move and Copy commands.

In AutoCAD 2019, it was standard procedure to have a separate block DWG file. It was often open at the same time as the current project drawing, and blocks were either dragged and dropped from one drawing to another or copied and pasted. This did not allow for easy management of the blocks being used, nor could any specific block settings be applied, such as scaling or rotation. The only way this could be done was to use the INSERT command which brought up a dialog that allowed you to insert one block at a time with specific settings.

AutoCAD 2023 gives you access to the Blocks palette using the BLOCKSPALETTE command. The Blocks palette was originally introduced in AutoCAD 2020 but has been enhanced in each subsequent release of AutoCAD. The palette interface gives you a visual reference of all the blocks in your current drawing.

Task

A new block needs to be created in the drawing. This will then be saved to a known location, such as a hard drive, the cloud, etc. The block will then be relocated and subsequently inserted into the current DWG file. Two workflows to perform this task will be considered with one in AutoCAD 2019 and one in AutoCAD 2023.
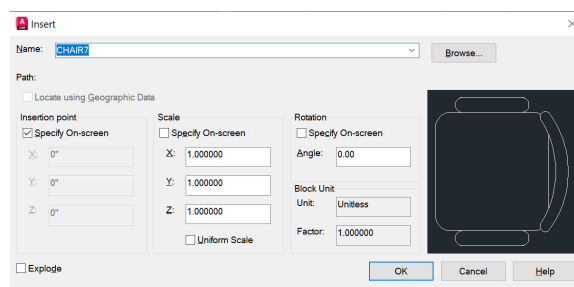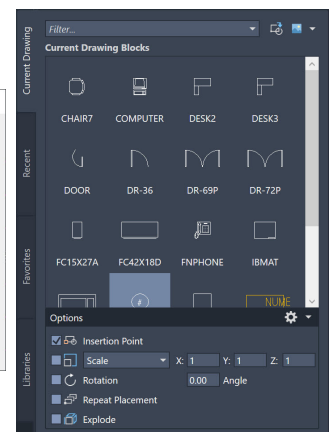

Fig.6 – The classic Insert dialog box and the more recent Blocks palette
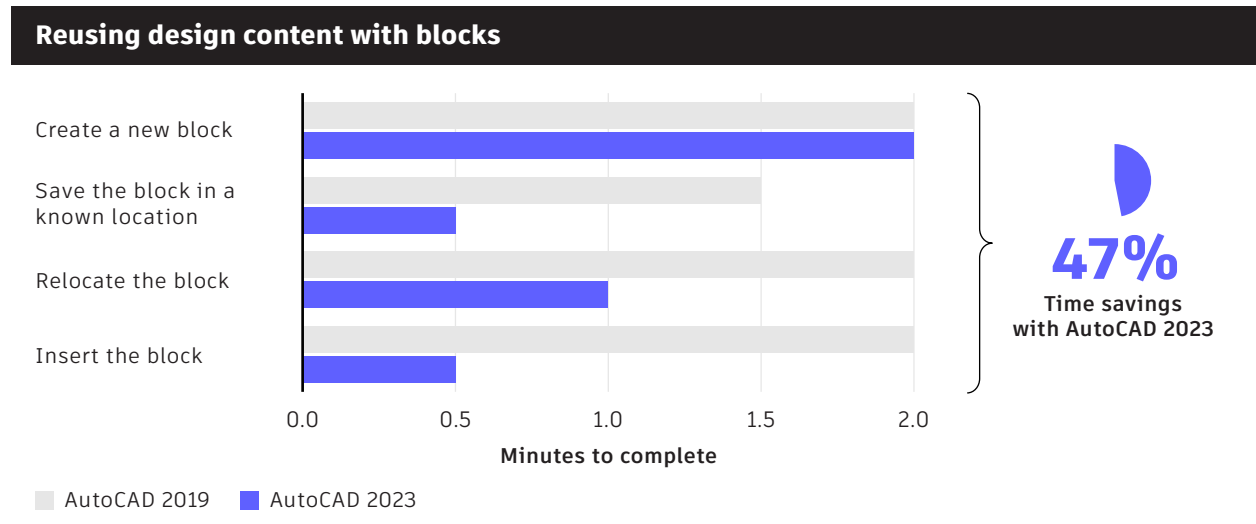
Steps (AutoCAD 2019):

- Create an AutoCAD block
- Save the block in a known DWG location
- Relocate the block
- Insert the block into the current drawing using the classic Insert dialog

Steps (AutoCAD 2023):

- Create an AutoCAD block
- Save the block in a known DWG location
- Relocate the block from the Recent tab in the Blocks palette
- Insert the block from the Libraries tab in the Blocks palette

Reusing design content with blocks

Create a new block
Save the block in a known location
Relocate the block
Insert the block

0.0   0.5   1.0   1.5   2.0

Minutes to complete

AutoCAD 2019   AutoCAD 2023

47%
Time savings
with AutoCAD 2023

Results

The Blocks palette in AutoCAD 2023 is a great way to save time when reusing blocks in your DWG files. It provides a clear, visual method of inserting blocks into drawings, using the familiar palette interface in AutoCAD. It also provides tabs to blocks in the current drawing (Current Drawing tab), a tab for blocks recently used in ANY drawing (Recent tab), a tab for most used favorite blocks (Favorites tab), and a facility to link to any existing block libraries and drawings that contain blocks (Libraries tab). The Libraries tab can also be linked to cloud stored/synced library locations for easy accessibility to blocks that may be used within an organization or on a project.

In AutoCAD 2019, you could only use the INSERT command and the dialog box to insert blocks individually, whereas the Blocks palette in AutoCAD 2023 covers all bases and saves time to increase productivity and shorten the blocks workflow.

The CLASSICINSERT command in AutoCAD 2023 will still allow you to use the classic Insert dialog box, including inserting blocks from the DWG file, Web and Mobile folders, and cloud-based storage.

The Blocks palette will allow you to not only insert blocks, but also work with blocks from recently used drawings, blocks saved to the Web and Mobile folders, and cloud-based storage. It also provides a Favorites tab where regularly used blocks can be found to be used over multiple projects. The Blocks palette can also be anchored and/or docked, allowing for blocks to be immediately accessed in the AutoCAD interface.

Conclusion

In this AutoCAD 2019 vs. AutoCAD 2023 productivity study, the five design tasks analyzed were just a few examples of how AutoCAD 2023 can provide tools and workflows to make you more productive.

Project tasks	AutoCAD 2019	AutoCAD 2023	Time Savings
1. Collaborating design changes in a DWG file	7:00	2:30	64%
2. Importing markups into drawing files	12:00	5:00	58%
3. Counting blocks in a DWG file	10:00	3:00	70%
4. Comparing external reference files (XREFs)	27:00	13:00	52%
5. Reusing design content with blocks	7:30	4:00	47%
Total Time	63:30	27:30	
Overall time saving with AutoCAD 2023			**57%**

(Figures shown in minutes and seconds)

The advantages of AutoCAD 2023

Based on these five selected tasks, AutoCAD 2023 provides a level of productivity not available with AutoCAD 2019. Because AutoCAD 2023 is built with new features to enhance the 2D design workflow, you could realize immediate and substantial productivity benefits such as the ones discussed in this paper.

With AutoCAD 2023, it is possible to save up to 57% of the 2D CAD working time when compared to AutoCAD 2019.*

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