autodesk®

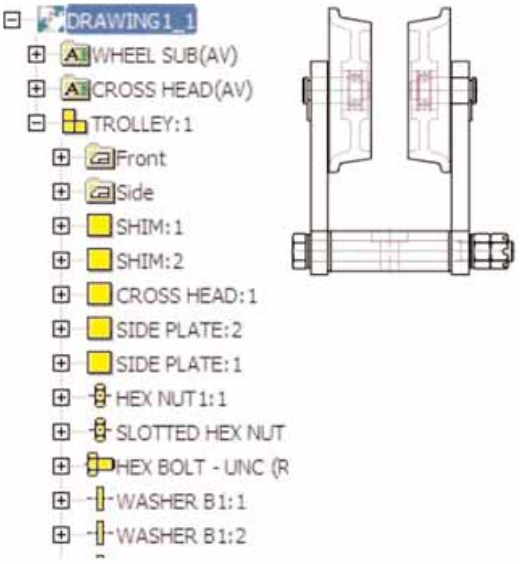
What's better than AutoCAD for 2D mechanical design? AutoCAD Mechanical.

Want to get unparalleled productivity out of your 2D mechanical design process? Then take a look at **AutoCAD® Mechanical**. This software packs powerful tools, such as a content library, that accelerate mechanical design projects by automating common tasks. And it's based on the AutoCAD® platform, so it offers all the DWG file compatibility your teams need to easily share design data with other AutoCAD and Autodesk Inventor® software users. But it goes above and beyond the capabilities of AutoCAD, offering significant productivity increases for 2D mechanical design. And that's what matters—this is a purpose-built tool that will help your teams save countless hours of design and rework.

Reduce Complex and Repetitive Tasks

2D Mechanical Structure

Enhanced 2D mechanical structure creates a more intuitive mechanical design environment in which individual lines, arcs, and circles combine to form subassemblies and part views. Mechanical structure functionality gives designers a comprehensive suite of tools for organizing and reusing drawings and associative data. These innovative design tools reduce both detailing time and the amount of editing required because changes to one part ripple throughout the structure. And since this kind of associativity works throughout the design, the same applies to the bill of materials (BOM) and other reports. When a part moves, the associated screws, nuts, and bolts move with it. By helping reduce errors and detailing time, structure-based design will save you time and money.

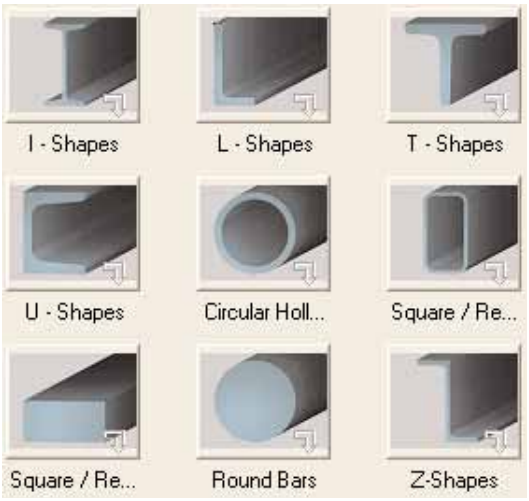


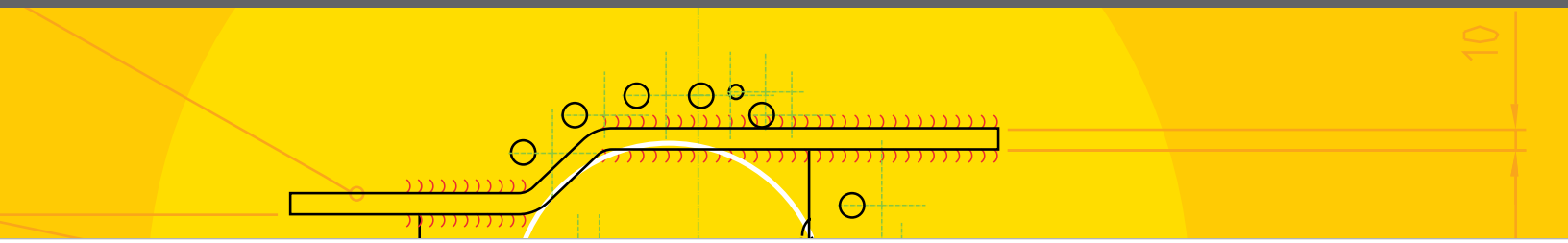
Associative 2D Hide

Enhanced One of the key benefits of 2D mechanical structure comes from the associative 2D hide feature, which generates hidden lines and automatically "heals" geometry when you make changes in your design. Significant enhancements in this release give you more control of 2D hide calculations, provide drag-and-drop functionality to help you restructure design hierarchy in the browser, and ease the conversion of data to 2D structure. You'll see a significant increase in productivity, because you'll spend less time and effort updating concurrent 2D structure-based designs.

2D Structural Steel Shapes

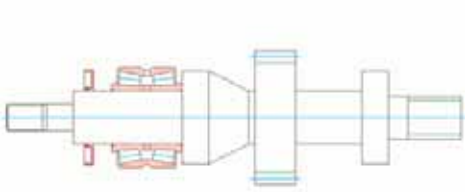
By using predrawn geometry, you minimize time-consuming work and rework and create your designs more quickly and accurately. AutoCAD Mechanical contains more than 11,000 predrawn standard structural steel shapes that you can quickly drag into any design; these include common structural shapes such as U-shape, I-shape, T-shape, L-shape, Z-shape, rectangular tube, round tube, rectangular full beam, and rectangular round beam.





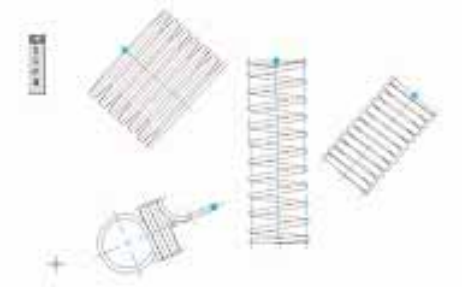
Shaft Generator

Another great time-saver, the Shaft Generator creates drawing views of solid and hollow shafts. This feature alone can save you countless hours of drawing, especially as you make small, iterative changes to improve your design. Features commonly found in shafts—including center holes, chamfers, wrench fittings, and standard parts (bearings, gears, retaining rings, and seals) are quickly created as well. Generate automatic side views of the shaft from the front view and changes that you make in any view are automatically reflected in the others.

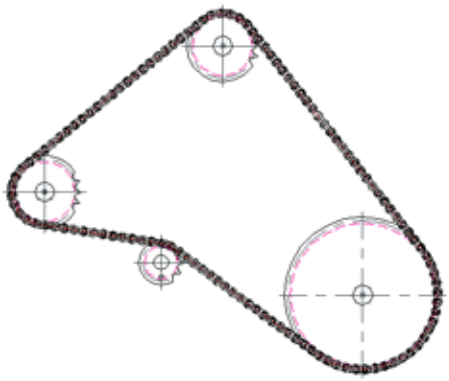


Spring Generator

The Spring Generator is a fast, easy, and valuable tool that enables you to select, calculate, and insert compression springs, extension springs, torsion springs, and Belleville spring washers in a design. You control the representation type of the spring, and you can create a specification form to incorporate in the drawing. The spring calculator even helps you select the right spring.



Drive System Generator (Belt and Chain)



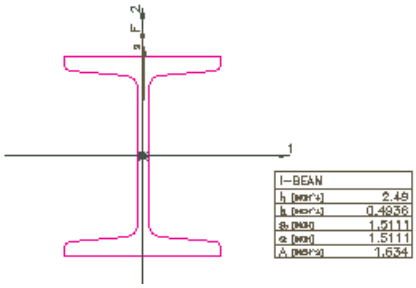
Automating the generation of drive systems can save you hours, if not days, of work. The Drive System Generator makes it easy to create chain and sprocket as well as belt and pulley systems, calculate optimal lengths for chains and belts, and insert these assemblies into your design. Just select your belts and chains from standard libraries.

Cam Generator

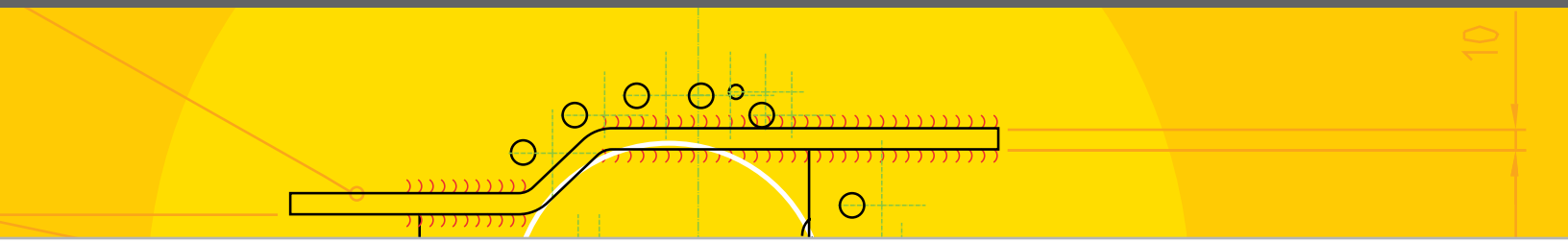
The AutoCAD Mechanical Cam Generator makes the design of linear, circular, and cylindrical cams quick and easy. And, with the time you save in design, you'll have more time to study critical aspects of the cam's functionality. The Cam Generator creates cams based on the input border conditions that you set. Cam followers are generated and used in the design. Cam follower data representing the follower's position, size, and direction of movement is also included. Velocity and acceleration, as well as the cam curve path, can be calculated and displayed. You can couple driven elements to the cam and create CNC data via the curve on the path.

Moment of Inertia and Deflection Calculations

Save time and still be sure that your design is right by using one or more of the numerous moment of inertia and beam calculations available in AutoCAD Mechanical. Among the commands you can use are moment of inertia of a cross section (which includes a number of predefined cross sections) and deflection of a profile, given forces and supports.

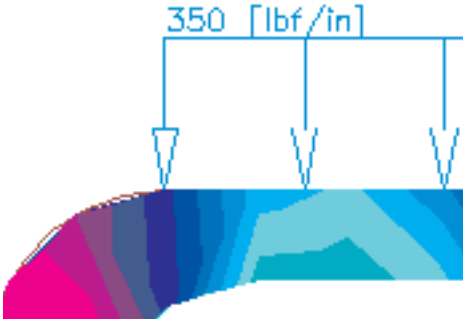


BEAM ANALYSIS		
MOMENT OF INERTIA I1	[INCH^4]	2.49
MOMENT OF INERTIA I2	[INCH^4]	0.4936
MOMENT OF INERTIA IEFF	[INCH^4]	2.4898
MAX. BORDER DIST.	[INCH]	1.5111
SAFETY FACTOR		2.2071
YIELD POINT	[PSI]	27000
E-MODULUS	[PSI]	30000000
MATERIAL		STEEL, SAE 1330
MAX.DEFLECTION S1	[INCH]	0.034864 E-3
MAXBENDING MOMENT MB1	[LBF IN]	34.938
MAX.DEFLECTION S2	[INCH]	3.971209 E-3
MAXBENDING MOMENT MB2	[LBF IN]	20018.
MAX.STRESS RES.	[PSI]	12233.
MAX.DEFLECTION SRES	[INCH]	3.971383 E-3
MAXBENDING MOMENT MBRES	[LBF IN]	20018.
SCALE FOR DEFL. LINE		314.7500:1
SCALE FOR BENDING MOM. LINE		1:8007.4000



2D FEA Analysis

Use the 2D finite element analysis feature to quickly identify potential areas of failure on designs and analyze their integrity under various loads, thereby avoiding costly field maintenance later. And don't be fooled by how easy it is to use; the 2D FEA feature is a powerful tool for determining the resistance capability of an object put under a static load. You can then add



movable and fixed supports to the part to be analyzed, as well as stress points, lines, and areas.

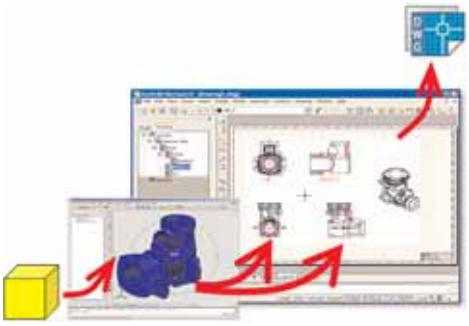
AutoCAD 2005 Enhancements

New AutoCAD Mechanical uses AutoCAD software—the worldwide leader in 2D drafting and detailing—as its base operating system, which means that most new AutoCAD features are passed directly to you, as an AutoCAD Mechanical user, or are specifically enhanced for the AutoCAD Mechanical application.

Increase Drafting Productivity

Autodesk Inventor Associativity

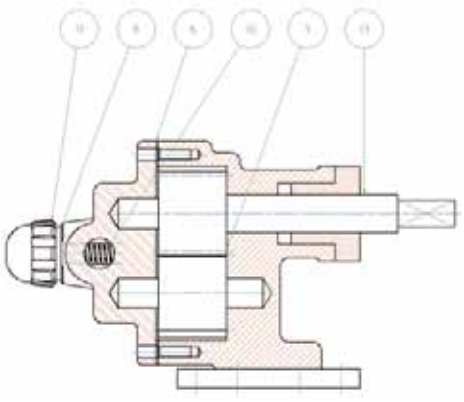
Enhanced Document native 3D part models without Autodesk Inventor software. Just browse through current Autodesk Inventor part files and begin creating new, linked AutoCAD Mechanical files, which associatively give you access to the most current 3D designs. In other words, you'll be working with 3D files in a 2D environment.



This functionality redefines the meaning of interoperability across software platforms by drastically reducing time-consuming translation workflows from 3D to 2D. Incorporate your design revisions quickly and easily through the associative link. The link to the Autodesk Inventor part file is dynamic and alerts the AutoCAD Mechanical drawing of changes. You can accept those changes and regenerate the 2D drawing, including changes made to the 3D part file. Visualize design intent by shading and rotating solid models, and review other attributes associated with the Autodesk Inventor design. Model and document information that is stored in Autodesk Inventor models is automatically available to the BOM editor in AutoCAD Mechanical, so you can quickly add balloons and annotations to the design.

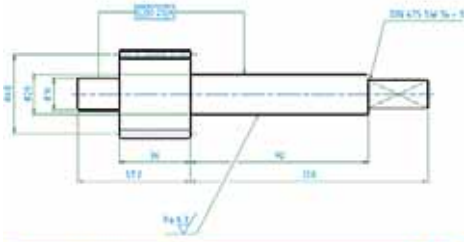
Balloons and Bills of Materials

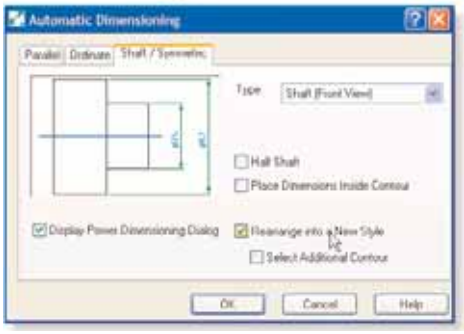
The parts list function, specifically developed for mechanical engineering applications, includes a number of commands to create balloons and bills of materials. You can automatically add any number of balloons to an assembly, and the leaders won't overlap anywhere. Unlike basic AutoCAD software, AutoCAD Mechanical gives you the ability to put your BOM in a hierarchical structure. The parts lists automatically recognize standard parts inserted from AutoCAD Mechanical and are dynamically updated throughout the design process. You can even export BOM data to a manufacturing resource planning (MRP) or enterprise resource planning (ERP) system. Creating parts lists for your drawings is easy, and not only are you spared the tedious task of creating BOM by hand—you can also save hours of important design time.

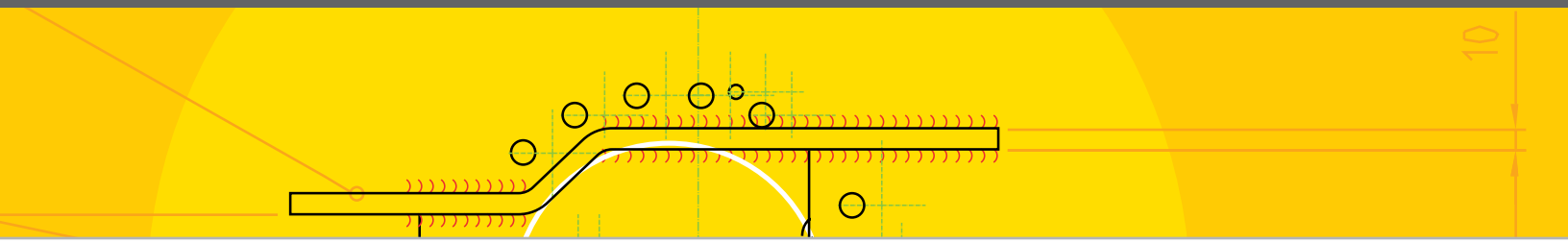


Dimensioning

Change part and assembly drawings quickly and easily with the assurance that your dimensions will always be correct. Use Automatic Dimensioning with either ordinate or baseline dimensions. Use Power Dimension to create any type of linear, radial, or diametrical dimension, depending on the geometry you select. Format the dimension and add fits or tolerances on the fly or later. With Smart Dimensions you have the bonus of extra intelligence about spatial relationships. This feature saves you valuable time by automatically making the appropriate changes to dimensions so that they are offset at appropriate distances from the part and from each other.

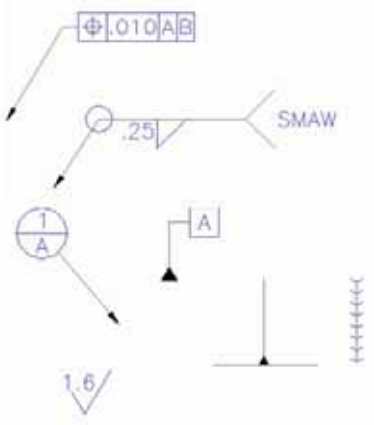






Annotations

Forget about drawing symbols from scratch or referencing old static block libraries of symbols. AutoCAD Mechanical includes commands to create standards-based surface texture, geometric dimensioning and tolerancing, targets, and weld symbols. Use the settings to automatically scale the symbols to your design.



Hole Charts

The Hole Chart Command makes detailing and documenting the design of large machines and complex machine parts easier, faster, and far more accurate than doing them by hand. Use this function to create two types of lists—a hole table and a list of coordinates. A hole table shows a complete list and description of each type of hole. A list of coordinates gives the X and Y coordinates for each hole. Both lists are dynamically linked to the data in the model so that any change you make to the model is automatically reflected in the charts. When you've made your selection, you can specify the view and where you want to place it. The hole chart feature also provides clear and concise machining instructions.

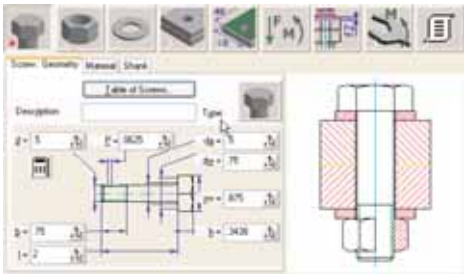
B3	.8141	3.7573
B2	3.8141	3.7573
B1	6.8141	3.7573
A2	2.2570	2.4379
A1	5.2570	2.4379
HOLE	X	Y
LIST OF COORDINATES		

2D Standard Parts, Features, and Holes

When you're dealing with machinery that contains hundreds or thousands of parts, you could take days, even weeks, to draw them from scratch. AutoCAD Mechanical changes that by providing more than 700,000 predrawn, standards-based parts that you can select for your designs. The list includes screws, nuts, washers, pins, rivets, bushings, and many other commonly used components. There are 100,000 predrawn standard features like undercuts, keyways, and thread ends. When you incorporate these into a design, the feature cleans up the area in which it was inserted, so you don't have to edit it manually. AutoCAD Mechanical also contains more than 8,000 predrawn holes, including through blind and oblong holes. And the holes clean up the area where they are placed just as the standard features do.

Screw Connections

Another major time-saver in AutoCAD Mechanical is the ability to design whole fastener assemblies at once. Pick the type of screw you want to include, and the software presents the right sizes for nuts, washers, and holes. Indicate where you want the fastener to go, and there you have it—the entire fastener assembly inside the appropriate hole. When you input loads for each connection, the intuitive user interface helps you determine whether your selection is a feasible design.

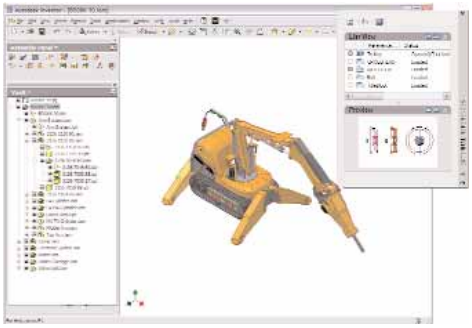


Communicate and Manage Design Data

Integrated Data Management

New Autodesk® Vault, included with AutoCAD Mechanical 2005, is an integrated data management application that supports both the enhanced 2D structure-based design in this release and Autodesk Inventor associativity. It securely manages work-in-process design changes and is easy to learn and deploy. The software comes with a *Managing Your Data* book, which documents AutoCAD Mechanical file management specific to Autodesk Vault and provides the information you need to get started.

With Autodesk Vault, you can set levels of access for specific users and files, and only one person at a time can work on an aspect of a part or assembly. This avoids duplication of work and the potential errors that can come from working with the wrong data.



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