AUTOMATED DESIGN SYSTEM (ADS) - WHAT IS IT, TYPES OF AUTOMATED DESIGN SYSTEMS

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Abstract: In this article we will tell you what ADS is and what it is used for in work. It is known that technological progress does not stand still. Paper drawings have been replaced by computer-aided design systems - a set of software and hardware designed to automate various stages of development.

Keywords: artificial intelligent, digital accounting, AI, finance, sustainable development.

Introduction

They have become an indispensable tool for creating complex technical products, allowing you to significantly speed up the manufacturing or construction process, increase the accuracy of calculations and improve the quality of the final product. The variety of options depends on the application. For example, in the field of architecture, they help create three-dimensional models of buildings, taking into account all the necessary elements: foundation, walls, windows and doors. At the same time, they can be used to develop electrical circuits based on specified parameters.

Automated design systems are a set of software solutions designed to reduce the time for creating projects, eliminating calculation errors. Practice has shown that a high-quality result paid for the costs of purchasing software and staff training. More and more familiar processes are being automated. The Cleverence company offers software that relieves workers from routine work.

The main tasks of ADS are modeling objects, creating drawings and specifications, calculations and analysis of structures, visualization of the result and much more. The complex plays an important role in modern engineering and provides numerous benefits for companies and professionals. Its use allows you to save time, improve quality and increase competitiveness in the market..

To understand what computer-aided design is, what types and means of systems there are, let's plunge into the past. The origins go back to the middle of the 20th century. At that time, computers were just beginning to develop, and the first developments in automation were far from perfect. However, even then they provided a significant improvement in the efficiency of the modeling process.

The first mention of the abbreviation ADS dates back to the end of World War II. The solution was developed by order of the Pentagon in order to coordinate air defense. In the following ADS, many new software packages emerged covering various areas of engineering. In the 1960s, ADS systems

found application in aviation, significantly speeding up the design process and improving the quality of aircraft.

These innovations came to our country in the eighties. With the development of computer technology and the advent of new modeling methods, they have become increasingly powerful and versatile. At the end of the 20th century, it became possible to create complex three-dimensional objects with high precision and detail.

A design automation system includes a wide range of tools and capabilities designed to effectively perform various tasks. Helps you independently create, analyze and organize information. Engineers can only choose the available software:

- computer with components and internet (TO);
- directly programs (software);
- information bases (IO);
- mathematical methods of calculus (MO);
- programming languages (LP);
- organizational issues (OO).

One of the main functions is the creation of a graphical model of an object, which allows you to visualize its design and connections between elements. Allows you to perform various engineering calculations. For example, hydraulic, strength, determination of thermal conductivity. Thanks to this, it becomes much easier and faster for specialists to determine the optimal parameters of an object and check its performance.

Another definition of computer-aided design (ADS) systems is the ability to create specifications and drawings. The programs allow you to automatically generate documentation based on object models, which greatly simplifies and speeds up the process. In addition to the main functionality, it may also include specialized tools for solving specific problems. For example, an architectural project involves creating plans for buildings, faADSes or interiors. In the electrical field, capabilities are provided for circuit modeling and wiring diagram generation.

Extensive functionality is not all the positive aspects. Considering what ADS is in design, let's look at the advantages. One of the key advantages is the ability to quickly and efficiently create a project. Through the use of computer programs, engineers can easily create complex 3D models, perform calculations and analyses, and conduct virtual testing of structures.

Automatic execution of routine tasks can significantly save time and costs on product formation. ADS programs quickly generate drawings, specifications and other documentation without the need for manual data entry. In addition, it reduces the likelihood of errors and increases the overall accuracy of work.

In addition, the purpose of computer-aided design systems is to create more effective employee interaction. The entire volume of information is located in a special database to which all personnel have access. This makes it easy to track changes and share assumptions, increasing coordination and synchronization between different specialists.

Another advantage is the ability to conduct virtual testing and analysis of the design before its physical implementation. This allows you to identify potential problems and shortcomings at the design stage, which significantly saves time and resources, reducing costs.

Impressively significant in the modern technical world. The software package provides an extensive list of tools and is used in various industries, including architecture. Using these programs, you can create various virtual objects, which allows you to better imagine the future project and make the necessary changes before construction begins. They are also actively used for interior design - they help to choose the optimal arrangement of furniture, lighting and other design elements.

In the field of mechanical engineering, ADS plays a significant role. They simplify the development of parts and assemblies, allowing engineers to conduct virtual testing and optimize production. Thanks to this, companies can significantly reduce the time and costs of creating new products.

In addition, the complex helps to develop circuits, printed circuit boards and other elements of electronic equipment. It has the ability to automatically check the correct connections and location of components, which helps speed up the process.

Types of ADS

In addition to the industry division of computer-aided design information system (IS), there are other types. Let's look at each of the software systems in more detail.

Classification according to the state standard is manifested in the following characteristics:

- the type and complexity of the facility planned for construction;
- automation content percentage;
- number of construction stages;
- outgoing documentation (on paper or photographic media).

By purpose

Creating an ideal project is impossible without taking into account all aspects. To do this, you first need to use a certain type of software. In total, ADS includes 4 types.

ADS

Designed for editing in flat and volumetric projections, including for the development of design documentation. It has an extensive list of available functions, helping to create complex drawings, as well as geometric shapes, apply various materials and textures, and visualize objects using lighting and shadows.

CAE

Used for engineering analysis and simulation, giving engineers the ability to perform complex calculations, analyzes and testing. Previously, this required a lot of time and effort. For example,

collision analysis can be carried out, body design and safety systems can be optimized, and the vehicle's aerodynamic performance can be improved.

CAM

Helps in preparing an object for release. They resort to numerical control to prepare for the start of production. Actively combined with the first type of ADS software.

CAPP

The abbreviation stands for Computer-Aided Process Planning. Includes tools that combine ADS and CAM capabilities. Helps plan technological processes, as well as determine the sequence of operations and select the necessary equipment for manufacturing parts.

There are three types of systems in total:

MADS. Created for the development of individual mechanisms. It is actively used in the automotive industry and the production of marine vessels. The main software solution is Compass.

EDA (can be found with another name - EADS) is an indispensable assistant in the design of electrical devices, including microcircuits.

AEC ADS is used in the field of construction and architecture of such structures as industrial, residential, roads (including railways), etc. A prominent representative of the set is AutoDesk.

Platform differences in terms of configuration scale

Having explained why a computer-aided design (ADS) system is needed and what it is with examples, we will then briefly examine several types of programs that differ in scope. There are three levels in total:

The lower one includes the preparation of primary documentation. For example, developing an estimate

The average is characterized by reporting control.

The higher one includes a larger volume of possibilities. It includes the entire cycle of creating an object, starting with calculation and ending with testing.

According to the nature of the basic configuration

The software package is classified into the following categories:

The graphical technique involves the creation of 2D and 3D models. Designed to connect different circuits. Typically found in the automotive industry. Interaction with the database. These include calculations using specialized formulas and algorithms. Used in the development of business projects.

Integration of all previous points. Not easy to use, but characterized by a wide range of capabilities.

There are many different platforms, each offering its own unique functionality. But before choosing the right program, let's look at what DBMS and ADS are used for, and also give examples. Working with large amounts of data requires appropriate software and a powerful PC. Each of them has its own characteristics and offers unique methods for automating design processes. The choice depends on the task to be performed and the user's requirements and preferences.

One of the most common software systems designed for automated creation of projects. It appeared in 1982 and immediately gained enormous popularity. This is explained by the lack of analogues in computer modeling. The main functionality includes the ability to edit two and, more recently, three-dimensional models of objects, as well as perform various operations with graphic elements. The program allows you to create drawings, building plans, machine sketches and much more. Translated into eighteen languages due to its popularity. In addition to high complexity, the following disadvantages are identified:

- inconvenience of editing tabular forms;
- does not allow you to correctly convert the result into other software;
- Users have questions about the interface of side modules;
- high license price.

Nevertheless, the advantages of AutoADS include flexibility and customizability. The user can create his own commands and settings, which greatly simplifies the work. It also supports the use of specialized add-ons (plugins). Creation of drawings in AutoADS occurs using the command line or graphical interface. The designer can select the required command from the menu or type its name. All changes in the drawing are displayed in real time.

NanoADS

This is Russian software, focused on the GOST current in our country. The positive thing is that it is easy to import into other programs, supporting a large number of formats.

ZWADS

Recognized as the best copy of AutoADS. The version has the following advantages:

- user-friendly interface;
- availability of translation;
- except the main ones. there are additional functions;
- work in 2 and 3 D;
- Demo is available for review.

Compass

Software developed by the ASCON organization. It was originally created for 3D modeling, but later special additions were released that allowed for documentation. Takes into account state standards. Among the shortcomings, the lack of synergy with other programs is identified.

Demands on software systems are growing every year as companies strive to optimize their work processes to increase efficiency and reduce costs. There is now an increasing emphasis on creating more accurate and detailed object models to provide a more realistic representation of the future design. This allows potential problems and errors to be identified before physical construction begins.

A large load on a computer requires the purchase of powerful equipment. The transition to cloud technology will help relieve the burden on computing and data storage processes.

Conclusion

Having defined what ADS is and what relates to the purpose of computer-aided design systems, it becomes obvious that the complex plays a key role in modern engineering. They can significantly increase the working efficiency of designers, reduce the time for creating and changing models, and also minimize possible errors. Moreover, various analyzes and optimization of objects are carried out at the implementation stage. They demonstrate high efficiency and help achieve the quality of the final product. You can expect further development and new features in the future

References

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