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Improving Construction Project Implementation via AutoCAD and LIRA to Meet Modern Requirements

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Abstract

In the modern construction industry, design processes are becoming more and more automated, and digital technologies are widely used. Among the most used software in this area, AutoCAD and Lira-SAPR occupy a special place. The effective use of these programs is of great importance in order to improve the accuracy of projects, reduce time loss and ensure technical security. Improvement of the implementation of projects in the field of construction through AutoCAD and Lira programs to the level of modern requirements Application of AutoCAD software in construction design AutoCAD software 2D and 3D modeling capabilities: it is widely used in the preparation of drawings in the field of construction. At all stages of the project – from sketching to drafting executive documentation – AutoCAD provides engineers and architects with accuracy and speed. Lira-SAPR software: designed mainly for static and dynamic calculations of constructions. Strength, durability and deformation analyzes of bearing elements are carried out with high accuracy through this program. This program allows you to work in accordance with Azerbaijani and international regulatory documents. Integration between programs: the use of AutoCAD and Lira programs together ensures optimal preparation of the project, both visually and technically. Drawings made in AutoCAD can be transferred to the Lira program and perform automatic modeling and calculations. This also simplifies the work of the engineer and minimizes human errors.

Keywords: *Efficiency of time and resources, increase in quality management efficiency, reducing errors product effectiveness, creation of new concepts.*

INTRODUCTION

The rapid development of technology in the field of construction in modern times has necessitated the introduction of new approaches to the design and construction processes. In this regard, engineering software such as AutoCAD and Lira-SAPR create conditions for more accurate, functional and effective

development of projects. Through these programs, it is possible to model, calculate and analyze both architectural and constructive projects in digital form. Implementation of projects with such modern software contributes to the reduction of errors caused by the human factor, more efficient use of resources and improvement of the overall quality of work. At the same time, this approach allows the introduction of innovations in construction processes, the development of new ideas and the achievement of competitive results. In this course work, the advantages of designing based on AutoCAD and Lira programs, the possibilities of their practical application and adaptation to modern requirements will be widely examined and analyzed. At the same time, the use of these programs provides engineers and architects with the opportunity to work more quickly on the project, test alternative solutions and identify possible risks at the initial stage of the project. Especially since the Lira-SAPR program makes it possible to model the behavior of structural elements under static and dynamic loads, the stability and safety of projects is ensured more accurately. AutoCAD, on the other hand, has great advantages in terms of visual presentation and technical documentation of the project. This program provides professional design of architectural plans, cuts, views and other important details. At present, the implementation of projects in a digital environment plays an important role not only in terms of saving time and resources, but also in terms of sustainable development of infrastructure and integration into international standards. The course work will also examine the application of these technologies to real projects and the prospects for their further development. 1. 2. AutoCAD and Lira programs of projects in the field of construction management The use of AutoCAD and Lira programs in project management ensures both timely and budget-friendly completion of the project and increases the transparency and effectiveness of the overall workflow. This is important for improving competitiveness in the construction sector and implementing projects that meet modern requirements. In the field of construction, it is of great importance to increase the implementation of projects through AutoCAD and Lira programs to the level of modern requirements, as well as for the effective management of projects. These programs allow accurate and timely management, coordination and documentation of information at every stage of the project process. Implementation of programs such as AutoCAD and Lira in project management: centralized management of Project data: all documents, plans and models are stored digitally and can be easily shared between team members. Collaboration and coordination: creates a platform for the collaboration of different professionals, increases interaction and communication efficiency within the project. Time and resource management: Project stages, tasks and resource utilization are monitored and optimized through the program. Risk reduction: modeling and analysis capabilities help to detect potential problems in the project stages in advance, thus avoiding delays and additional costs. Quality control: compliance with standards and fulfillment of quality requirements are ensured more precisely. In addition, the use of AutoCAD and Lira programs in Project Management provides real-time updating of data in the project team. This speeds up the decision-making process and allows you to react flexibly to changes in the project course. These programs also provide automated generation and archiving of project documents, which prevents document loss and confusion. At all stages of the project – from the initial concept to the stages of construction and operation – data tracking and management becomes easier and more effective. Another important aspect of management is the efficient use of resources. Material, labor and financial resource through programs. The use of these programs in Project Management, in addition to ensuring quality, timely and budget-friendly execution of the project, strengthens the transparency of the overall business process and Inter-team cooperation. This promotes the introduction of modern technologies and innovative approaches in the construction sector. AutoCAD and Lira programs facilitate the communication process in project management. The exchange of information between project members is fast and accurate, which helps to avoid mistakes and complete the work on time. Team members are able to work on the same project in real time, even if they are in different locations. Moreover, this app

provides continuous monitoring of the project. Progress, resource use and costs are constantly monitored, which gives managers the opportunity to intervene in a timely manner and take the necessary measures. This is very important, especially in complex and large projects. Thanks to innovative approaches, environmental and energy efficiency are also taken into account in projects. The programs have such functions as energy consumption analysis and Environmental Impact Assessment, which creates conditions for the development of projects that meet modern construction standards. In general, the application of AutoCAD and Lira programs makes Project Management in the field of construction more flexible, transparent and effective, increases the likelihood of successful completion of projects and increases competitiveness. This makes a significant contribution to the development of the construction sector of our country. 3. Materials and supplies Digital technical equipment computers and servers a computer with a high-performance CPU and GPU is necessary for the fast and stable operation of Lira and AutoCAD programs. Software and digital tools AutoCAD is the basic software for 2D and 3D design. Construction plans, detailed cuts, dimensions and schemes are made. Lira-SAPR-used for static and dynamic calculation of load-bearing structures. BIM integration tools – other BIM tools of AutoCAD and Lira programs (e.g. BIM integration tools). Revit, Navisworks). 3. Project Management Support Materials Normative documents and standards – Building Standards (SNIP, SP, DSTU, Eurocode, etc.) used in design. - Project terms of reference (TT) – documents containing the technical parameters required by the customer or government agency. - Project templates and standard forms – for example, layer systems for AutoCAD, size styles, frame blocks. 4. Data storage and sharing - Cloud-based storage systems-Google Drive, Dropbox, etc. useful for working in a team. - Version tracking programs-allow you to track who modified project files and when. - VPN or server-based systems-in large construction companies, projects are managed over the server. Calculation of bearing structures in the Lira-SAPR program - Determination of Material properties - Calculation of forces and loads - Durability and deformation analysis Master Plans and Central views: - designing a small-scale object with AutoCAD and Lira programs - Comparison of reports and results - Efficiency and time saving indicators AutoCAD provides analysis and planning for the deployment of communication systems in buildings and ground infrastructure. This is used to indicate elevation, location and connections. AutoCAD can be used for engineering reporting and calculation. This facilitates the evaluation of the performance and cohesion of the systems. Civil engineers can use AutoCAD in the review of communication systems that are in contact with the corresponding other types of construction. This helps to analyze the structure and solve problems. AutoCAD is used during the construction and adjustment of communication systems. This is an important tool for adjusting the construction process, updating data and controlling changes in the traditional way. AutoCAD and other CAD programs speed up the process of designing and building communication systems, helping them to build correctly and transfer data correctly. These programs are used in construction and engineering projects, helping to effectively build and manage communication infrastructures. A number of CAD applications, similar to AutoCAD (Computer-Aided Design) or others, play a key role during the design and construction of Engineering Communication Systems. Işte the role of these programs for engineering communication systems: Lira is an engineering program designed for calculating structures under static and dynamic loads. Basic capabilities: - Static account of frames and plates - Delivery of cargo and combinations - Design of concrete and steel structures - Selection optimization - Extraction and analysis of reports 1. Construction of the skeleton model of the construction 2. Determination of Material parameters 3. Cargo insertion and loading combinations 4. Account maintenance and analysis of results 5. Extraction of reports in PDF or Word form Integration between AutoCAD and Lira - Plans drawn in AutoCAD software can be integrated into Lira software in DXF or DWG format. - It provides the relationship between design and constructive calculation. - Thus, both the visual plan and the analysis of the carrier system can be carried out in parallel.

ventilation systems are a powerful tool to facilitate design. Start AutoCAD: open AutoCAD on your computer. Map construction: determine the weight and dimensions that you will be working on the ventilation system map. To do this, click on the" New " option and create a new weight. Determining weight: determine your weight measurements and coordinate system. You can build one desired baseline lines and coordinates for the placement of ventilation systems. Adding ventilation components to the boot: add components of air supply and pressure systems to the boot. These components include ventilators, pipes, vents that may not be displayed above, and other ventilation elements. Adding cuts and patterns: you can add cuts and patterns where you want. This helps to show the details of the ventilation system more clearly. Determination of properties: assign properties to each ventilation component, such as size and materials. Layers and colors: pay attention to layers and colors to properly manage the project. Place each ventilation component in the appropriate layer and color. Registration of dimensions: record the dimensions of the ventilation systems and other information on the map. Graphic description: Design ventilation map and image correctly, so that it can be used for other engineering and architectural projects. Output: when the project is ready, remove the drawings and get ready to share. These steps will be helpful in drawing ventilation systems in AutoCAD software. Since each program will have specific functions and work-saving practices, it seems advisable to use AutoCAD guides and resources for further research and learning. Identify features: understand what you need a ventilation system for. This means that you need to determine how many ventilators, air filters, pipes and components are needed, where you will make a map of the systems, and other points. Start new project in AutoCAD: start AutoCAD and create a new project Start a 2D or 3D model: your ventilation system model can be 2D or 3D. 2D is the mostlean and comfortable option, but the 3D model gives a more detailed description. Building layers: create layers to insulate ventilation system components and pipes. For example, "ventilators", "pipes", "filters", etc. you can assign layers by names. Add components: start laying pipes, ventilators, filters and other ventilation components. AutoCAD's immediate files and symbols as it is not, you may need to create and import your own symbols and components. Measurements and labeling: record the pipe length, the power of the ventilators, the type of filters and other information by size. Identify each component and pipe track with appropriate labels. Dimensions and pipe track: according to the plan of your structure, draw the pipe track and place the pipes in the appropriate dimensions. Add build plan: add all build plans related to ventilation system components, this includes entry and exit points, suction and diffusion points, etc. including the system should describe your destination. Details and specifications: add details and specifications of components and system settings. This is due to air temperature, pressure, filter type, etc. it should include information such as: Marking and markings: add markings and markings to refine your plan. This may be necessary to describe the result, pressure values of the pipes and other important information. Render and animations (for 3D model): if you are using a 3D model, you can use these functions to make your image more beautiful and show it around you using the render and animation functions. Give a speech: after completing your project, be prepared to give a speech and share your project. This can be in PDF, DWG, or other file formats. By following these paths, you can create your ventilation system design in AutoCAD. Therefore, working with an experienced AutoCAD user who can support you at the control and execution level, such as an engineer or Draftsman working with ventilation systems, can help you better understand a needy and rainy system. Analysis and explanation of requirements: first, analyze what ventilation systems need and what is required. This includes system-specific parameters, air flow, pressure, temperature, and other important information. Setting characteristics: determine the ventilation system you want to use by its characteristics. This includes the power of the ventilators, the printing of the ducts, the air filter, etc.

Start drawing: start AutoCAD and open a new project. Drawing the basic plan: draw the basic plan of the ventilation system. It shows the track of the ventilation ducts, the position of the ventilators and other key

components. Precise plans and details: next, draw precise plans and details that describe each ventilation component in more detail. This takes inside the channel connection points, the ventilator Assembly and the configuration of the filters. Making a 3D Model (optional): if you want, you can start creating a 3D model of ventilation systems. This will help you take a closer look at the system and detect potential problems more beforehand. Materials and dimensions: define the materials of each component and enter the dimensions. This will help you make financial calculations according to the materials and prepare the assembly process. Description and documentation: describe ventilation plans in AutoCAD and prepare all the necessary documentation. This means that the project is ready and fulfills the appointments for execution. Calculation and system adjustment: control the air flow, pressure, etc. of ventilation systems. calculate and ensure that the systems are correctly adjusted. Check and execute: start checking drawings, plans and documents and start renting a ventilation system. These stages provide a broad perspective of drawing ventilation systems in AutoCAD. The execution process can be very detailed and technical, so it can be very useful to collaborate with an experienced professional in the field. Open AutoCAD Da: first, open AutoCAD and create a new project or open an existing project. Create Layer: create a new layer (layer) for the ventilation system. This will make it easier to classify and control the objects you draw. Let ventilation draw objects: start drawing ventilation system components. These can be objects, such as ventilation boxes, ducts, fans and air diffusers. To refine these, you can use the geometric shapes and tools available in AutoCAD. Add dimensions: when the ventilation system is drawn, set the dimensions of the objects correctly. This will provide important information for the control and installation of the system. Add text: add text to disclose or identify your facilities and ventilation plan. This will help you understand your drawing for other people or employees. Group layers: group and name layers to adjust your work and for convenience. For example, group ventilation objects in a layer called "ventilation". Remember drawings: remember your drawings correctly and so that you can open and make corrections if necessary. Share drawings: when you're ready, share your ventilation system drawings with other project participants or partners. Start drawing in AutoCAD: open a new AutoCAD drawing and create a drawing area to start drawing your electrical diagram select. Adjust layers: it can be helpful to work with different layers to make your electrical scheme safer and more understandable. For example, a separate layer for electrical wiring, a separate layer for switches, etc. create. Give each layer the appropriate color and name. Add symbols: symbols and components of your electrical scheme add it. This is the main electrical components, cables, switches, sockets, etc. included. You can add these characters with the pull and block functions available in AutoCAD. Attach the connections: draw the connections to show how the electrical components are connected to each other and how the gables are connected.

CONCLUSOION

The introduction of computer and 3D modeling in the design of Mechanical Engineering and communication systems significantly increases the efficiency and accuracy of project processes. These technologies allow design optimization, detection of errors at an early stage, and more economical use of resources. Virtual prototypes, created through 3D models, reduce production costs and avoid waste of time. At the same time, more effective cooperation between project teams, faster implementation of designs and simulation of various tests are possible. As a result, computer and 3D modeling tools ensure the achievement of successful results with higher quality, shorter duration and lower cost, both in Mechanical Engineering and in the design of communication systems. These technologies are indispensable tools for Sustainable Development and innovation in these areas.

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4. "Computer-Aided Design and Manufacturing" by J. Paulo Davim This book discusses the development and implementation of computerized design and manufacturing processes. It also provides detailed information on how 3D modeling is used in Mechanical Engineering and optimization of design.
5. "Introduction to Computer-Aided Design (CAD)" by Patrick O'brien The book explains the basic principles of CAD systems and their application in Mechanical Engineering. The advantages of 3D modeling and computer-based design, its importance in terms of design efficiency and accuracy are noted.
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