EduVision: Journal of Innovations in Pedagogy and Educational Advancements
Volume 01, Issue 04, April, 2025
brightmindpublishing.com
ISSN (E): 3061-6972

DESIGN FACTORS OF WELDING COLUMNS

Abdullayev Shavkat Azimovich
Senior Lecturer Andijan State Technical Institute
Department of "Technological Machines and Equipment"
Abdullayevsh.67@gmail.com +998937810967

Abstract
This article discusses the main methods and approaches used in the design of welded columns. It describes the processes of determining the load capacity, stability, and mechanical properties of welded columns through structural calculations, computer modeling, and experimental studies. Based on the results, key factors for selecting materials and technologies to enhance the efficiency of welded columns are highlighted. New technologies and materials have ensured the reliability and long-term performance of welded columns. The article also addresses the main design challenges and future research directions.

Keywords: Welded columns, design, structural calculations, computer modeling, experimental studies, stability, load capacity, materials, technologies, mechanical properties.

Introduction

Welded columns (or welded columns) are a kind of structural elements, which are mainly used for lifting and fastening of heavy loads. These pillars are widely used in various industries including industry, construction of structures, and creating bridges. The main goal in the design of weld pillars is to optimally distribute their mechanical forces and ensure the stability of the structure. Such columns are produced from multiple materials, e.g. steel and aluminum, and require special welding technologies.

Welding pillars are designed for fastening and subsequent transportation of welding machines of various modifications, with the help of which it is important for welding reservoir, tanks, crane beams, transverse sectional beams, chassis base poles into rings, longitudinal and transverse seams. Implementation of the welding

EduVision: Journal of Innovations in Pedagogy and Educational Advancements
Volume 01, Issue 04, April, 2025
brightmindpublishing.com
ISSN (E): 3061-6972

apparatus by rotating the rotator part of the welding apparatus during machining on the preparation of various large-sized costructures

The column is mounted on the base bearing and has the ability to rotate around the vertical axis, has rotation in any situation manually and with mechanical fixation.The column can work in stationary version and controlled version.

The portable column is mounted on a rail platform with power supply, which can ensure a uniform, stable movement of the column with a continuously adjustable speed that can be used for welding.

The vertical rotating column and the reciprocating horizontal cantilever pillar are made of protruding steel transverse section, which ensures the high strength and reliability of the pillar's load-bearing structure.

Welding columns are used for welding capacity vessels, welding circular seams in combination with welding rotors, and welding longitudinal seams of sheet and beam structures.

- in welding seams of outer and inner annular seams of containers.
- in welding the outer and inner divisions of shells.
- When grafting ring seams.
• in welding longitudinal and transverse seams of flat-sheet structures.
- in welding longitudinal seams of profile beams.

Welding pillars are the most versatile and common type of automatic welding equipment, which is used to fasten welding machines of various modifications to this column.

Using one or more balds mounted at the ends of the horizontal columns, we can also perform melting, cutting, and other technological work.

Welding, selection of columns and their performance indicators depend on the types of production. To hold this barrel, the operation of the lifting capability is carried out on a small diaz on two axes

It has a large payload capacity, at a large range (about 10x10 m), the ability to move and rotate along almost any trajectory

In the serial production of parts of the same type, often motion operations can be performed by other equipment (rotary, rotary, etc.),

Welding column (or full name "welding column") is made of steel, mainly a device designed to weld welding costructures of industrial production processes. These pillars are needed to load, maintain, and withstand mechanical forces. The welding

EduVision: Journal of Innovations in Pedagogy and Educational Advancements
Volume 01, Issue 04, April, 2025
brightmindpublishing.com
ISSN (E): 3061-6972

column goes through the main steps in the steel manufacturing process: Choosing the steel material correctly, high quality steel material is chosen for the welding column. This material may be carbon steel or alloy steel. Galvanized steels, steels mixed with additives besides carbon ligating elements, such as chromium, nickel, or molybdenum, are heat-resistant, corrosion resistant, and have good mechanical properties.

When designing, many factors are considered, including the mechanical properties of materials, loads, and outdoor conditions. This article analyzes the basic methods, computational methods and constructive approaches that are used in the design of weld columns.

Methods

In the process of designing welding columns, several methods and techniques are used. Among them are classical mechanical calculations, experimental analysis and modern computer models. Here are some of the main methods used in the design of welding columns:

- **Structural calculations:** In this method, the strength, stability and elastic properties of the column are determined. Load resistance and deformation ability of each part of the package are taken into account. Mathematical models and material information are used for these calculations.

- **Computer modeling:** With the help of computer, it is possible to simulate the structural properties of welding pillars. The most commonly used software for this method is the Finite Element Method (FEM) programs. With the help of FEM, it is possible to see how the column changes under complex loads and different external conditions.

- **Experimental research:** Sometimes it is necessary to conduct physical experiments in laboratory conditions. This method is mainly used when testing new materials or innovative technologies. As a result of experiments, the properties of materials such as elasticity, tensile strength and torsion are determined.

EduVision: Journal of Innovations in Pedagogy and Educational Advancements
Volume 01, Issue 04, April, 2025
brightmindpublishing.com
ISSN (E): 3061-6972

Results. The main results achieved during the design process can be:

- **Load Resistance and Stability:** The high load resistance and stability of welding pillars has been proven. The results obtained through computer modeling informed about the high stress and deformation at the welding sites.
- **Material Efficiency: Through** experimental analysis and calculations, the strength coefficient and elasticity of the welded materials were determined, which were selected for maximum efficiency during the construction process.
- **Optimal design: The** design parameters of the columns, e.g. cross-section shape and dimensions, have been optimised to ensure maximum stability. As a result, the power distribution between the attached parts was optimized.

Discussion. The results obtained during the design of welding columns will help to solve various problems. The most important of these are:

- **Technological Innovations:** New welding technologies and materials have contributed to the further improvement in the mechanical properties of welding columns. For example, modern aluminum and steel inserts have ensured the durability and long-service life of the columns.
- **Structural reliability:** Based on computer models and experimental data used in the design, the reliability and long-term performance capabilities of welding pillars have been confirmed.
- **Future research:** Further refinement of the methods and technologies employed in the design, e.g. the introduction of new materials and modern welding technologies can be possible. It is also necessary to continue research aimed at increasing the resistance of welding columns to dynamic loads.

Conclusion

The results obtained in the design of welding pillars allow increasing their structural efficiency. With the help of structural calculations, computer modeling and experimental research, the stability and load resistance of welding pillars are assured. In the future, it will be necessary to further improve these technologies and combine them with new materials

EduVision: Journal of Innovations in Pedagogy and Educational Advancements
Volume 01, Issue 04, April, 2025
brightmindpublishing.com
ISSN (E): 3061-6972

References

1 V.N. Galushkin "Technology of Production of Welded Structures" - Moscow, Publishing Center "Academy", 2010

2. Kurkin S.A., Nikolaev G.A. Welded Structures. Manufacturing Technology, Mechanization, Automation and Quality Control in Welding Production: Textbook – Moscow: Vyssh. Shk., 2001 – 398 p

3. Nikolaev G.A., Vinokurov S.A. Welded Structures. Calculation and Design: Textbook – Moscow: Vyssh. Shk., 2000 – 398 p.

4. H.Kh. Khoshimov, Sh. Yuldashev." Production of welded structures" in the direction of "Technological machines and equipment". AndMI. Andijan. 2017y

5. Khoshimov, Kh. Kh., & Abdullaev, 111. A. (2023). Eritib koplash usulining optimal rezhimallarini tahlili. Education News: A Study in the Twenty-First Century, 1(6), 774-785.

6. Abdullayev, 111. A. (2023). Development of a technological process for welded elements of reinforced concrete structures. Education, Science and Innovative Ideas in the World, 18(1), 78-80.

8. Abdullaev, Sh. A. (2023). Method of welding thick-walled large-sized structures. Education, Science and Innovative Ideas in the World, 16(1), 71-74.

9. Shavkatjon, A. A. (2023). Problem Areas in the Industrial Zones of the Republic of Uzbekistan. Web of Synergy: International Interdisciplinary Research Journal, 2(2), 201-203

11, Sh.A. Abdullaev, REVIEW OF DIGITIZED PRODUCTION OF WELDED STEEL STRUCTURES, EURASIAN JOURNAL OF ACADEMIC RESEARCH Innovative Academy Research Support Center.