

Software Of Air Compressor Calculator

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Abstract – This paper proposes the development of software using HTML used in reciprocating air compressor studies in the undergraduate level of engineering students. This software helps the students understand the different types and different factors associated with reciprocating air compressors. A small study was conducted to merge coding with mechanical engineering problems. The data of different types of reciprocating air compressors are collected and layouts of these types are generated using HTML. The layout is then programmed with the expressions collected for reciprocating air compressors. This software enables the user to understand the overall aspects of the Air compressor and all its related parameters. Ultimately, this project seeks to empower the students to understand the different parameters of different types of reciprocating air compressors by providing a seamless and intuitive software experience.

Key Words: software, reciprocating, compressor, layout, data, volumetric efficiency.

1. INTRODUCTION

This paper shows the development of user-based interactive software for both single-acting and double-acting reciprocating air compressors. This software allows the user to understand the stages of each type of reciprocating air compressor. The software allows the user to understand all the necessary input data required for calculations. Then the user can input the required data and the software will produce the results. The results of five data can be stored and represented by graph by software. The development of the software is explained in the preceding sections as follows.

2. LITERATURE SURVEY

Jayesh R. Patil et.al^[1] (2019) made a performance characteristic evaluation of two-stage reciprocating air compressors. The main objective of this performance was to improve parameters such as clearance between head and piston, stroke length, friction losses, compressor running time, background working condition and air leakage. The parameter was measured by three

techniques. It can be concluded that volumetric efficiency, cylinder pressure, cylinder air temperature and FAD (Free air delivery) were changed with changes in parameters like speed, cylinder diameter, Pressure output and clearance volume.

Gohel Ketankumar Nathalal^[2] (2018) reviewed the study of an air compressor with different papers. In this work, the authors give a brief introduction to air compressors and their application, overhauling, condition monitoring and maintenance of two-stage reciprocating air compressors. It can be concluded that the proper maintenance of the compressor will reduce power consumption and increase reliability.

Dipankar Mandal^[3] (2015) developed a user-friendly software in Visual Basic to study the performance of dairy heat exchangers. In this work, the authors proposed a calculation algorithm for heat exchangers used in dairy plants. It can be concluded that once the user is convenient with the software it takes less time for trial calculation for plant design.

Vijaykumar F Pipalia et.al^[4] (2015) studied the performance of reciprocating air compressors based on heat transfer. In this work, the authors took two-stage reciprocating air compressors with shell and pipe-type intercoolers. It can be concluded that the isothermal work required to compress the air has been reduced, and the power required has also been reduced by 1-2% concerning normal inter-cooling.

3. METHODOLOGY

In this research, the user interactive software of the air compressor calculator is developed. This makes the engineering students understand the numerical of reciprocating air compressors and the factors related to it. The methods employed are explained in the following sub-sections.

3.1 Collection of data

For user interactive software of reciprocating air compressors calculator, the necessary expressions and corresponding dimensions are collected in the first stage.

3.2 Collection of mathematical expressions

The necessary expressions of reciprocating air compressor and their types are collected and stored. It is then modified as per the requirement of the software. These expressions are to be used in programming the code.

3.3 Develop the layout of the software

The layout of the software is prepared initially. The layout contains the title of the software with two buttons. By clicking on the button, the user can enter into the calculation part.

3.4 Write the programming code

The programming code is written in two parts. The first part contains all the necessary mathematical expressions for the single-acting and double-acting reciprocating air compressors. The second part contains the code for storing with a minimum of five results and to display the graph.

3.5 Merge the layout and code

The programming code is merged with the layout of the software. Once, the merge is done, then the software is ready to use.

3.6 Run the software

In this stage, the user can use the software conveniently. The software has three buttons, the user can click on the calculation button to obtain the results.

4. Software Design

The software design is explained in this section step by step as follows. The software is developed with the help of HTML code. The first page of the layout is shown in Figure 4.1.

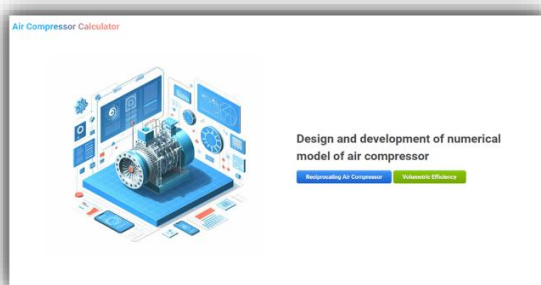


Figure 4.1: Layout of air compressors calculator

Figure 4.1. represents the display of an air compressor calculator. The layout has a picture of reciprocating air compressors and two push buttons. The labels in the push buttons are Reciprocating air compressor and volumetric efficiency. By clicking on the Reciprocating air compressor push button, it opens a new page.



Figure 4.2: Layout of reciprocating air compressors

Figure 4.2. represents the layout of types of reciprocating air compressors. After clicking on the Reciprocating air compressor button, the new page opens and shows the types of compressors. The types are single-acting reciprocating air compressors and double-acting reciprocating air compressors. The single-acting reciprocating air compressor has three types, they are single stage, double stage and multistage reciprocating air compressors. The double-acting reciprocating air compressor has two types, they are single-stage and multi-stage reciprocating air compressor.

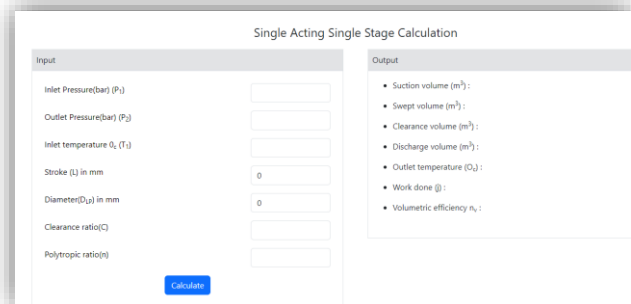


Figure 4.3: Layout of Single acting calculation

Figure 4.3 represents the layout of a single-acting single-stage reciprocating air compressor. Here the user can input the necessary data for their calculation. Based on the input data, the correct output is displayed as per the proper calculation programmed with the help of coding.

5. CONCLUSIONS

The software is developed with the help of HTML code. The software is programmed with the help of necessary mathematical expressions of reciprocating air compressors. The layouts are designed to have the best appearance of the software. The software is working properly and is checked with the help of sample numerical from the thermal engineering textbooks.

REFERENCES

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BIOGRAPHIES



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