KEMENTERIAN PENGAJIAN TINGGI

POLITEKNIK MALAYSIA SULTAN SALAHUDDIN ABDUL AZIZ SHAH

LAPORAN FINAL YEAR PROJECT

TAJUK PROJEK: EASY SAW SUPPORT

JABATAN: KEJURUTERAAN AWAM

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Laporan ini dikemukakan kepada Jabatan Kejuruteraan Awam sebagai memenuhi sebahagian syarat penganugerahan Diploma Kejuruteraan Awam

JABATAN KEJURUTERAAN AWAM

DISEMBER 2022

AKUAN KEASLIAN DAN HAK MILIK

TAJUK : EASY SAW SUPPORT

SESI : JUNE 2020

1. Kami, **1. MUHAMMAD ZAID BIN ZAINI (08DKA20F1067)**
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Adalah pelajar tahun akhir Diploma Kejuruteraan Awam, Jabatan Kejuruteraan Awam, Politeknik Sultan Salahuddin Abdul Aziz Shah, yang beralamat di Persiaran Usahawan, 40150, Shah Alam, Selangor. (selepas ini dirujuk sebagai 'Politeknik tersebut').

2. Kami mengakui bahawa "Projek tersebut di atas' dan harta intelek yang ada di dalamnya adalah hasilkarya/reka cipta asli kami tanpa mengambil atau meniru mana-mana harga intelek daripada pihak-pihak lain.

3. Kami bersetuju melepaskan pemilikan harta intelek 'projek tersebut' kepada 'Politeknik tersebut' bagimemenuhi keperluan untuk peanugerahan **Diploma Kejuruteraan Awam** kepada kami.

Diperbuat dan dengan sebenar-benarnya diakui

Oleh yang tersebut;

a) MUHAMMAD ZAID BIN ZAINI …………………………………. MUHAMMAD ZAID

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c) RANDELL DAMIEN BIN RONNIE …………………………………. RANDELL DAMIEN

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EASY SAW SUPPORT

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School of Civil Engineering

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VALIDATION OF FINAL REPORT PREPARATION

Title of the thesis: EASY SAW SUPPORT____________________________

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Diploma: Civil Engineering_____

Faculty: Jabatan Kejuruteraan Awam____

Year: 2022/2023______

I MUHAMMAD AMIR IRFAN BIN MOHAMED AZLAN______________

(CAPITAL LETTER)

Declare and verify that the copy of e-thesis submitted is in accordance to the Final Year Report, Faculty of Kejuruteraan Awam, PSA

_____________________ ______________________

(Signature of supervisor as a witness)

(Signature of the student)
Permanent address:

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Name of Supervisor:

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Faculty:

DECLARATION

I declare that this final year report entitled *"Easy Saw Support"* is the result of my group and supervisor research except as cited in the references.

Signature :..................................

Name :.................................

Date :.................................

DEDICATION

In gratitude to my dear parents, Tuan Md Shahril Bin Rabu, and my future bride, whose words of wisdom and support inspired me to complete my senior project, I offer my thanks and the blessings of Allah to you all. A heartfelt debt of gratitude is due to my brother and sister for all their moral support and assistance .

ACKNOWLEDGEMENT

Bismillahirrahmanirrahim, Alhamdulillah. Thank you, Allah, the All-Powerful, the Most Gracious, and the Most Merciful, for providing me with the chance, the bravery, and the patience to finish this job. Without His assistance and kindness, this effort would not have been done, particularly the time spent preparing this report for the final year.

The completion of this report on the previous year's activities is dependent on the support and assistance of a large number of people. My deep gratitude is owed, first and foremost, to my supervisor for his support, value discussion, leadership, and direction during the entirety of my capstone project for my senior year. During the time that I was working on my senior project under his direction, I picked up quite a few new skills, which helped to make the process a lot more enjoyable, and I also acquired some excellent work experience. I'd like to express my gratitude to him in particular for being so willing to assist me for the entirety of this project by providing me with a significant number of his ideas, talking about his experience, and responding to each and every one of my inquiries. This appreciation is not forgotten also offered to for his helpful suggestions and explanation, in particular regarding the utilisation of the 3D printer. Aside from that, I would want to thank every single member of the group for their assistance and support throughout this process. I was helped in a lot of different ways by the discussion session that we had, especially in relation to our project.

I have a lot of gratitude for my family since they have helped me get through this difficult time in my life by providing me with their unwavering support. Last but not least, I would want to extend my gratitude to Mr. Shahrill, Randell, and Amir for being a part of my group and providing me with invaluable counsel. These pieces of advice are the reasons behind why I am getting stronger and better every day.

May Allah bless each and every one of you.

ABSTRACT

Wood can be cut with a hand saw, which is a type of cutting tool. A handle is connected to a blade that has a number of pointed teeth attached to it. Cutting something by hand can never result in a perfectly clean cut, which is one of the issues that we frequently come against. It is evident by the surface of the wood as well as the thickness. In addition, it is possible for it to become heated when it is used frequently, which may cause the material to readily break down. This project was started with the intention of designing a jig or saw support that may be used in the carpentry and joinery industries. In particular for the PolySkills and WorldSkills categories. It is common knowledge that they must achieve perfection by cutting the wood by hand and are prohibited from using power tools. Creating a mortise is made much simpler as a result of this effort. Mortise and tenon joints, which are used to connect the beams and columns of a wooden structure, frequently leave a space between the members of the structure. It is believed that this gap has an effect on the mechanical performance of the mortise and tenon joint (1). A simple saw support that can be made by following this method and measuring the iron that will be used. After you have measured the iron, you should attach it to the iron plate and then use the screws to tighten it. We have come to the conclusion that it is necessary to conduct a literature review in order to provide all of the research on materials and procedures in order to improve our knowledge regarding this project. All of the projects that are in some way connected to this are quite helpful, particularly for us to get a complete understanding of it. Following a lengthy discussion on a variety of materials and methods as well as extensive research, the materials that have shown to be the most suitable for our project have garnered widespread approval.

ABSTRAK

Gergaji tangan ialah alat yang digunakan untuk memotong kayu. Ia terdiri daripada bilah dengan gigi tajam yang dipasang pada pemegang. Salah satu masalah yang sering kita lihat ialah dengan pemotongan tangan percuma ia tidak akan mendapat pemotongan yang sempurna. Ia boleh dilihat dengan permukaan kayu dan ketebalan. Di samping itu, apabila digunakan dengan kerap ia boleh menjadi panas dan boleh menyebabkan bahan mudah rosak. Objektif projek ini diwujudkan untuk mereka bentuk sokongan jig atau gergaji untuk industri pertukangan kayu dan kayu. Terutamanya, untuk PolySkills dan WorldSkills. Seperti yang kita tahu mereka perlu sempurna dengan memotong kayu dengan tangan bebas dan tidak membenarkan menggunakan mesin. Projek ini juga memudahkan untuk membuat tanggam. Sambungan tanggam–Tenon, yang menghubungkan tiang dan rasuk bangunan kayu, selalunya mewujudkan jurang pada bahagian sentuhan anggota. Jurang ini dianggap menjejaskan prestasi mekanikal sendi tanggam–Tenon (1). Kaedah membuat sokongan gergaji mudah dengan mengukur besi yang akan digunakan. Selepas mengukur seterika, pasangkan seterika pada plat seterika dan ketatkannya menggunakan skru. Kami telah membuat kesimpulan bahawa kajian literatur adalah penting untuk mempamerkan semua kajian bahan dan kaedah untuk meningkatkan pengetahuan mengenai projek ini. Setiap dan projek lain yang berkaitan dengan ini sangat membantu terutamanya untuk kami memahaminya sepenuhnya. Selepas banyak bahan dan kaedah dibincangkan dan penyelidikan dilakukan, bahan yang paling serasi untuk projek kami mendapat sokongan mudah.

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CHAPTER 1

INTRODUCTION

1.1 RESEARCH BACKGROUND

The first saws that have been discovered were made of obsidian, seashells, or serrated flint. Around 3000 B.C., ancient Egyptians created the very first open-backed saws with blades made of metal. Copper was used in their construction. According to pictures on the walls of tombs and the finding of saws with copper blades within tombs, the ancient Egyptian saws were made of copper that had been serrated and hardened, and they could cut using both pull and push strokes. Later on, an Egyptian saw was developed, which featured rake teeth and a single-sided setting. The push stroke was the method of operation for this saw.

The saws were initially crafted out of bronze, but as metallurgical expertise improved, they were eventually fashioned out of iron instead. Iron allowed for the production of blades that could be made extremely thin and narrow while still maintaining their tension. During the Iron Age, the first frame saws were designed for the narrow iron blades available at the time. Steel was the final and most critical phase in the process of making hand tools, hence its development was the most significant. The cutting tool made of steel is noticeably superior in terms of both its longevity and its capacity to keep its edge sharp for an extended period of time. Before the invention of electricity and internal combustion engines, lumberjacks, carpenters, boat builders, and cabinet makers completed all of their work with hand-powered saws.

There were a few sawmills powered by water, but they were in short supply. Handsaws were utilised at every single place. When cutting down trees, lumberjacks would utilise crosscut saws that required two people to operate. Logs were cut into boards using pitsaws that required two people to operate. Open handsaws and their specialised variants, such as keyhole, compass, and tenon saws, were used to perform the fundamental shaping and fitting operations. For the same fundamental duty of shaping and fitting, frame and bow saws were also used in certain locations as the tool of choice. All of the older handsaws had to be sharpened by hand. When first beginning as an apprentice, one of the first skills that was taught was the fundamentals of sharpening and setting the blade. It was the ability that every artisan in trade needed to possess more than any other. Some of the older varieties of handsaws have largely been rendered obsolete as a result of the widespread adoption of power sawing tools such as chainsaws, table saws, chop saws, and bandsaws. But handsaws are still useful for numerous tasks performed by modern carpenters, cabinetmakers, boat builders, luthiers, and other similar tradespeople. There are times when the handsaw is the most effective tool for the job that needs to be done.

WHAT IS A HANDSAW?

Hand saws, which are commonly referred to as "panel saws," are used in the woodworking and carpentry industries to cut pieces of wood into a variety of forms. In most cases, this is done in order to carve a wooden item and put the individual parts together. In most cases, they function by having a collection of pointed blades made of a material that is more durable than the wood that is being cut. The hand saw resembles a tenon saw, but it has just one edge that is flat and razor sharp.

There is evidence that handsaws were used more than a thousand years ago. There are hieroglyphics from ancient Egypt that portray woodworkers using saws to cut boards into pieces. Japan is the location where archaic bow saws have been discovered. If the wood was not "smoothed up" in any way, it is possible that the cut patterns on older boards still exhibit the distinctive cutting marks that were made by saw blades. This is especially true in cases where the wood was not treated in any way to remove these markings. Concerning the survival of handsaws, it is known that twenty-four saws dating back to the seventeenth century in England have been preserved. Saw blades have been made out of a variety of materials throughout history. In the period before the technique for producing saws out of steel became widely recognised and industrialised, possibly about a thousand years ago, there were undoubtedly saws made out of bronze.

The cross cut saw teeth and the rip saw teeth are the two primary forms of saw teeth that were sometimes produced by different civilizations. These use a variety of mechanisms, each of which cuts into the wood. Wood is made up of several long cells that run down the length of the fibre. Therefore, crosscut saws feature sawteeth that are often formed, typically with a metal file, in such a manner that they generate a succession of teeny-tiny knifelike edges. This is done so that the saw may cut across the grain of the material. The tooth's cutting edge makes contact with the wood cells, which results in a cutting action. On the other hand, rip saws are often designed to have a profile that results in the formation of a number of very fine chisel-like edges. The chisel makes contact with the wood cells, which then causes them to be "torn" away from the bundle of other cells.

1.2 PROBLEM STATEMENT

After the mortise has been cut into the wood, the thickness of the board will no longer be the same. This occurs rather often as a result of the fact that the cuts we make either run out or are cut diagonally. After cutting the wooden mortise, the pupils are then confronted with the following challenge, which is that the surface of the mortise is either left uneven or is not smooth. When we fix it, this may give the appearance that the construction of this mortise is bent or faulty. Mortise making is dependent almost entirely on the passage of time. In addition, we are going to take a lot of time to cut the mortise since we are concerned that the cut could turn out messy or improper.

1.3 RESEARCH OBJECTIVES

The objectives to this research are:

- To compare the quality of cutting the convensional way and the modern way (easy saw support)
- To reduce cutting time in using easy saw support
- To produce easy saw support for cutting mortise

1.4 RESEARCH QUESTIONS

This study will answer the following research questions:

1. Is it possible to create a easy saw support?
2. What type of material that can be used to make easy saw support cheaper?

1.5 SCOPE OF RESEARCH

The scope and limits to this research are:

- For student, polyskills and worldskills who is involve in carpentry and joinery.

1.6 CHAPTER'S SUMMARY

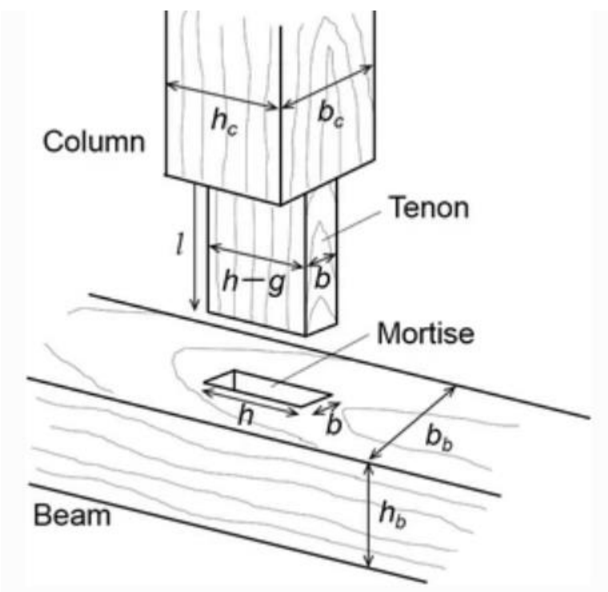
This chapter detailed the research's methodology and discussed where its ideas and concepts came from. From the many formulated problems, several goals emerged. In addition to achieving the stated goal, the project's value lies in the fact that its scope is limited to the development of a low-cost, lightweight solution. As a result, the new product may be used routinely with very excellent care for a longer period of time.

CHAPTER 2

LITERATURE REVIEW

2.1 Mortise

The mortise–tenon joint, which connects columns and beams of a wooden building, often creates a gap in contact part of members. This gap is considered to affect mechanical performance of the mortise–tenon joint. (1) Meanwhile, joint geometry has a significant effect on the strength of those particular joints. As tenon width and length were increased, the strength of the joint was correspondingly improved. The type of mortise and tenon end has an appreciable effect on the breaking strength of the joints as rectangular end mortise and tenons are stronger than round end mortise and tenon joints (2)

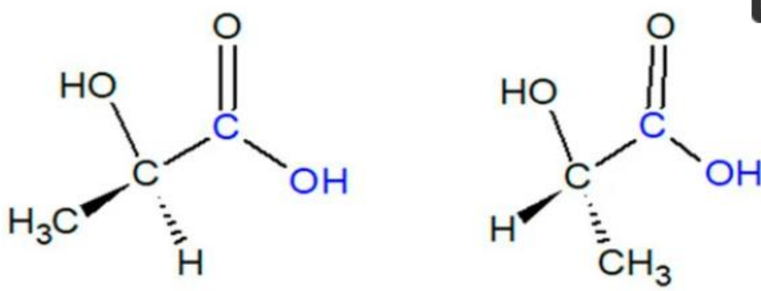


2.2 3D Printing Applications of PLA

Polylactic acid (PLA) is the most widely used raw material in extrusion-based three-dimensional (3D) printing (fused deposition modeling, FDM approach) in many areas since it is biodegradable and environmentally friendly, however its utilization is limited due to some of its disadvantages such as mechanical weakness, water solubility rate, etc. FDM is a simple and more cost-effective fabrication process compared to other 3D printing techniques. Unfortunately, there are deficiencies of the FDM approach, such as mechanical weakness of the FDM parts compared to the parts produced by the conventional injection and compression molding methods. Preparation of PLA composites with suitable additives is the most useful technique to improve the properties of the 3D-printed PLA parts obtained by the FDM method. In the last decade, newly developed PLA composites find large usage areas both in academic and industrial circles. This review focuses on the chemistry and properties of pure PLA and also the preparation methods of the PLA composites which will be used as a raw material in 3D printers. (3)

PLA is a biodegradable polymer, which is attracting more and more interest in several fields thanks to its good mechanical properties and optical transparency. However, PLA presents several issues such as low thermal stability, crystallization ability, and drawability. A viable strategy to overcome these drawbacks is to reinforce PLA using nanofillers (layered silicates, carbon nanotubes, etc.) (4,5,6,7,8). The use of filler at the nanoscale allows for simultaneous improvement of both the material's properties and processability. Drawability and processability are both important in the FDM technology because they influence both feedstock filament production and layer deposition during the printing process. Moreover, the use of nanocomposite materials in the FDM method could overcome one of the main limitations of this technique that is represented by the low mechanical properties of 3D printed parts.

The main reason for all the advantages and limitations of PLA is directly related to its chemical structure and correspondingly to the chemical nature of its monomer lactic acid (2-hydroxypropanoic acid, HO–CH_3–CH–COOH). Lactic acid is the simplest 2-hydroxycarboxylic acid with a chiral carbon atom and exists in two enantiomeric forms, L- and D- differing in their effect on polarized light where the L- isomer rotates the plane of polarized light clockwise, and the D- isomer rotates it counterclockwise as seen in **Figure 3**. The lactic acid molecule has a hydroxyl and an acid functional group in it, which may result in intermolecular and intramolecular esterification reactions. Dimeric lactic acid (lactoyl lactic acid) is formed by a condensation reaction by the removal of water. The cyclic dimer (lactide) can be formed by the intramolecular esterification of lactoyl lactic acid or by the breakdown of higher oligomers. A solution of lactic acid at equilibrium consists of monomeric lactic acid, dimeric lactic acid or lactoyl lactic acid, higher oligomers of lactic acid, and lactide. The dehydrated, cyclic dimer of lactic acid is commonly called lactide (3,6-dimethyl-1,4-dioxane-2,5-dione). Due to the two asymmetric carbon atoms in the molecule, lactide exists in three different forms. In addition to the three dia-stereomeric structures mentioned above, a racemate of D-lactide and L-lactide also exists: DL-lactide.



d-lactic acid l-lactic acid

Distillation and melt crystallization are currently used for lactide purification: the crude lactide from the synthesis is distilled in the first column to remove the acids and water, and then in the second column, under low pressures, meso-lactide is separated from lactide. On the other hand, lactide crystallizes easily in the melt in falling film crystallizers or vertical column crystallizers with a scraper. Pure lactide is miscible with benzene, toluene, xylene, methylene chloride, chloroform, tetrahydrofuran, ethyl acetate, methanol, isopropanol, acetone, and butanone. Lactide hydrolyzes to lactic acid in water at room temperature.

By applying the ring opening polymerization of lactide, PLA can be produced at a desired high molecular weight with a continuous process [9]

PLAs have widespread uses in many industrial fields. The successful application of PLA relies not only on its mechanical properties, but also on the controlled surface properties such as hydrophilicity, surface free energy, reactive functionalities and roughness. The bulk modifications of PLA are mostly dependent on the processes to improve toughness and the degradation rate. However, its surface modification was applied to control hydrophilicity, surface free energy, chemical heterogeneity, roughness, and to introduce reactive chemical groups to enable further covalent reactions. There are a variety of surface modification methods to control the surface properties of PLA such as surface coating, surface alkali hydrolysis treatment, graft polymerization, low-temperature plasma treatment and various surface chemical reactions. The improvements in hydrophilicity and the introduction of reactive groups are beneficial especially for the biomedical applications of PLA when it is used in the human body where the surface characteristics are critical for cell affinity and cell adhesion [10,11]. However, the hydrophilicity, biocompatibility, and cell affinity of PLA are still not good enough for some tissue engineering and other biotechnology uses and awaits proper surface modifications.

2.3 STL software

STL is a file format developed in 1987 by Charles Hall to support his stereolithographic 3D printer. Its file extension, STL, is believed to be either an abbreviation of the word "stereolithogra phy" or an acronym for Standard Tessellation Lan guage or Standard Triangulation Language. The STL file made it possible to transfer a 3D model from a computer screen to a 3D printer. Even after 30 years of usage, STL remains the most common ly used file type for intraoral scanners. STL describes a 3D model's surface by using an array of linked triangles to recreate the surface geometry. This triangulation of a surface causes the faceting of the 3D model. Although newer file types can provide more detailed data, the main benefit of STL is its simplicity. STL is based on open-source code and is freely available, meaning anyone may inspect, enhance, or share an STL file. Its universal format enables STL to work with nearly every CAD software program and 3D print er. Moreover, its vector-based (triangle) graphics provide scalability without any loss of resolution. The STL file is perhaps the single most important item in the 3D printing workflow (20)

Biomedical engineering combines the design and problem-solving skills of engineering with medical and biological sciences to advance health care treatment. In recent years, Computer-Aided Design (CAD) has been increasingly applied and integrated in the medical technology, including among other fields computer-aided surgery, design of orthopedic devices and implants, design of tissue scaffolds, reverse engineering (RE), and 3D reconstruction. Computer tomography (CT) medical imaging is the most used tool for viewing the internal structure of the human body but is limited by its 2D image presentation. Three-dimensional (3D) solid models of medical images bring more information in the diagnosis and treatment, and the reconstructed 3D solid models can be easily converted to Rapid Prototyping physical models or in Virtual Reality Modeling Language (VRML) format for visualization. Usually, a 3D bio-CAD model is reconstructed through either segmentation or volumetric representation. There are several methods that can be applied to reconstruct a 3D solid model for bio-medical imaging from its 2D CT image [12,13,14,15,16,17,18,19]. Usually, the model is reconstructed through either segmentation or volumetric representation. One method involves a swept blend from the contours of each layer in point data, the second possibility is via voxel to stack and construct the model by using the marching-cube algorithm. Contour detection in each layer is also used to construct the mixed layers in the triangular stereolithography (STL) model. This format approximates 3D surfaces of a solid model with oriented triangles (facets) of different size and shape (aspect ratio) in order to get a smooth representation suitable for industrial processing of 3D parts using STL machines. However, such a representation is not suitable for the computational analysis using finite element analysis (FEA) because of inappropriate size and large aspect ratio of elements.

2.4 Bolts and nuts

The bolt-nut connections are important joining elements and are widely used to connect and disconnect members conveniently at a low cost. Reference [20] fully reviewed the history as well as the evolution of the screw fasteners. To ensure that structures are safety joined, good anti-loosening performance and high fatigue strength are required. Most previous studies have been mainly focusing on anti-loosening performance [21-27], and few studies have contributed to improvements in the fatigue strength .

if the nut pitch is smaller than the bolt pitch, the thread No.1 at the right-hand side is in contact before the loading and remains in contact after loading, also the contact force becomes larger after the loading as shown in Fig. 1 (b). Therefore, the largest stress concentration at thread No.1 can be reduced only by a larger nut pitch.

The concept of differential pitch was first suggested by Stromeyer [28] in 1918. He suggested that the load distribution in a threaded connection thread could be optimized by varying the relative pitches. Then, the theoretical load distribution in bolt-nut has been developed by Sopwith [29], who also used his formula to discuss the load distribution improvement along the bolt threads by varing pitch. He found that a smaller pitch in the bolt than in the nut would improve the load distribution. Sparling [30] found that the fatigue strength of the bolt can be improved by increasing the clearance between the first few engaged threads at the load bearing face of the nut by tapering the nut thread, which produces an effective difference in pitch.

The bolt-nut connections are an important joining technique widely used in various engineering fields. The fatigue failure and self-loosening of such connections usually lead to severe accidents. For instance, a derailment of a Jet coaster happened in Osaka Japan, in 2007, which result from that a left side wheel fell off due to the fatigue fracture at the thread-connecting parts of the axle.

2.5 METHODS OF MAKING EASY SAW SUPPORT

Calculating the appropriate amount of iron and wood to utilise in the construction of an easy saw support. After that, trim it to the appropriate size so that it is tidy and attractive when finished. After taking the measurements of the iron, glue the wood together so that it resembles a saw and is ready to support cutting. After the first connection has been completed, attach the iron and wood as a handle to the rear, and then use screws to secure it so that it is in a vertical position. The next step is to create an iron plate according to the standard saw size in order to acquire the correct size. Then, put everything together according to the diagram that was made on autocad and sent to you.

2.6 CHAPTER'S SUMMARY

The research focused on how to choose a saw that is both easy and simple to operate. In addition, customers have the ability to choose the chainsaw that best suits their needs in terms of comfort and convenience. In addition, the user will have the ability to determine the kind of saw that corresponds with the material that has to be cut. In addition, users will be able to learn the rationale for the design of saws that have predetermined gaps between them.

As we get to the end of this chapter, it is essential to do a literature review in order to present all of the studies of materials and techniques that were conducted in order to expand our understanding on this project. Every single one of them and other initiatives that are connected to this are really beneficial, particularly for us to have a complete understanding of it. After much back-and-forth about various materials and approaches, as well as extensive study on the subject, we determined that the materials that are the easiest to work with for our project are those that enable sawing.

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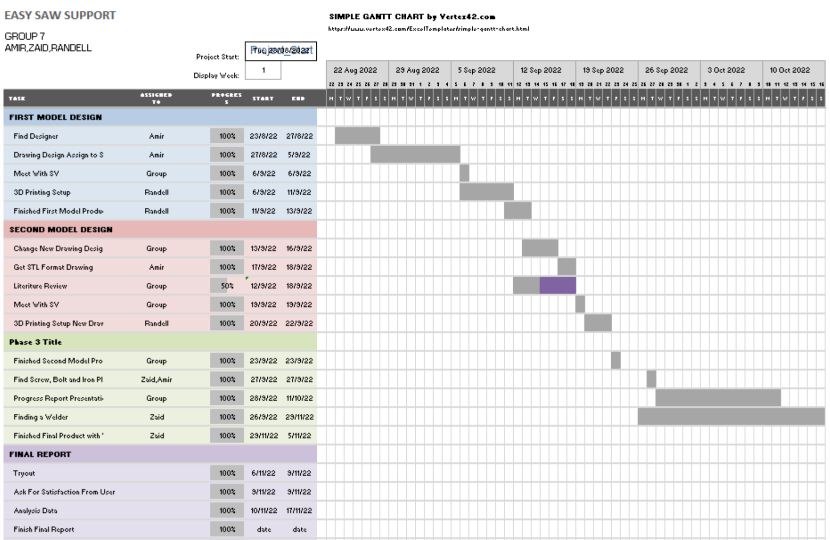
CHAPTER 3

METHODOLOGY

3.1 Research Outlines

In this chapter, we will go through the details on the experiment that was carried out for this project. For the purpose of carrying out our study, we decided to use a methodological approach first and foremost. On the other hand, a technique is a noun that may be defined as either "a way" or "a procedure." It is a term that relates to the way in which a task is carried out.



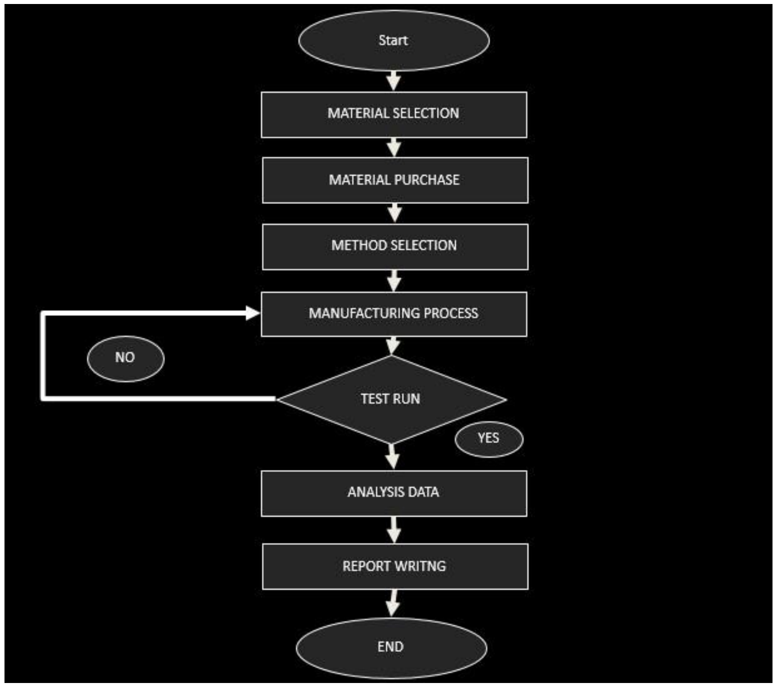

Start
MATERIAL SELECTION
MATERIAL PURCHASE
METHOD SELECTION
MANUFACTURING PROCESS
NO
TEST RUN
YES
ANALYSIS DATA
REPORT WRITNG
END

Figure 3.1

3.1.1 Methodology Structure

The procedure that was followed in this research may be shown graphically in Figure 3.1, which depicts a flowchart of the process. The structure of the methods section should therefore include a description of the materials that were used in the study, an explanation of how the materials were prepared for the study, a description of the research protocol, an explanation of how measurements were made and what calculations were performed, and a statement of which statistical tests were performed in order to analyse the data.

3.1.2 Material Selection

This procedure of choosing the materials to use in the project for the senior year is one of the most critical stages involved. The most important aspect of choosing the materials for the project is deciding which materials will be utilised in the end and having a conversation about why those particular materials were chosen. In order to reduce the potential for danger, the selection of the materials must be carried out with great care. We do not anticipate that our pricing range would go over RM50.

3.1.3 Material Purchase

Buying the necessary materials is an essential step in the process of amassing and obtaining all of the required supplies. During this stage of the process, a significant amount of time is spent doing research on the locations and providers from whom the materials will be acquired. It is essential to complete this stage in order to eliminate the possibility of squandering valuable resources or losing money. However, in order to successfully purchase the necessary materials, a well-thought-out buying strategy was required.

3.1.4 Method Selection

It is crucial to go through this technique selection procedure so that the method that is selected is reliable and appropriate for the product. The choosing of this strategy will prevent monetary loss and procedures that take up time. As a result, carrying out this technique selection procedure is an essential step to do.

3.1.5 Manufacturing Process

The manufacturing process is an essential procedure that determines the form and size of the simple saw support to make it easier for us to use according to the features wanted by the client. This is done before the manufacturing process begins.

3.1.6 Analysis Data

The process of reviewing the facts that you acquire while carrying out this assignment requires both analytical and logical thinking, both of which are used by us. This method of analysis is only one of the things that we discover via the step-by-step procedures that we are required to carry out in the course of the research studies that are carried out. We gathered, examined, and researched the data from the test run in order to determine the benefits and drawbacks of our project, as well as to come to a discussion and decision about it.

3.2 Project Progress

The term "project progress" refers to the degree to which a project has been developed and finished up to a specific point. The term "progress accomplished up to a certain moment" refers to the state of the project and the quantity of work that has recently been finished.

3.2.1 Phase 1

DISCUSS WITH DESIGNER

During the first step, we had a meeting with the designer, during which we created a model in AutoCAD and STL format so that it could be printed on a 3D printer. When it came to designing and sketching, our designer from DBK, Amirul, was a big assistance. On the basis of our first concept for the product, we provided the drawing that he made using the Autocad programme with the ideas that we had for the dimension, size, and image of the product.

MEET WITH SUPERVISOR

To go on with the process and present our concept for the product, we schedule a meeting with our manager. Our leader is going to assist us in producing our first model using a 3D printer, and we are prepared to get started on it as a team.

3D PRINTER SETUP

Our team, led by our supervisor, is setting up a 3D printer in order to print prototypes of our product. The 3D printer was used to create the model, which took around 8 hours to complete. The reason we construct the model before we manufacture the actual product is so that we can prevent and avoid making any mistakes when we are manufacturing it. The duplicate plastic is used to construct the model.

FIRST MODEL

The first model that we have developed is complete. Unfortuitously, our initial product suffered from a number of flaws, including those pertaining to the holder, measurement, and size. As a result, we made the decision to reproduce the model by modifying the measurements and including some unique features into our offering.

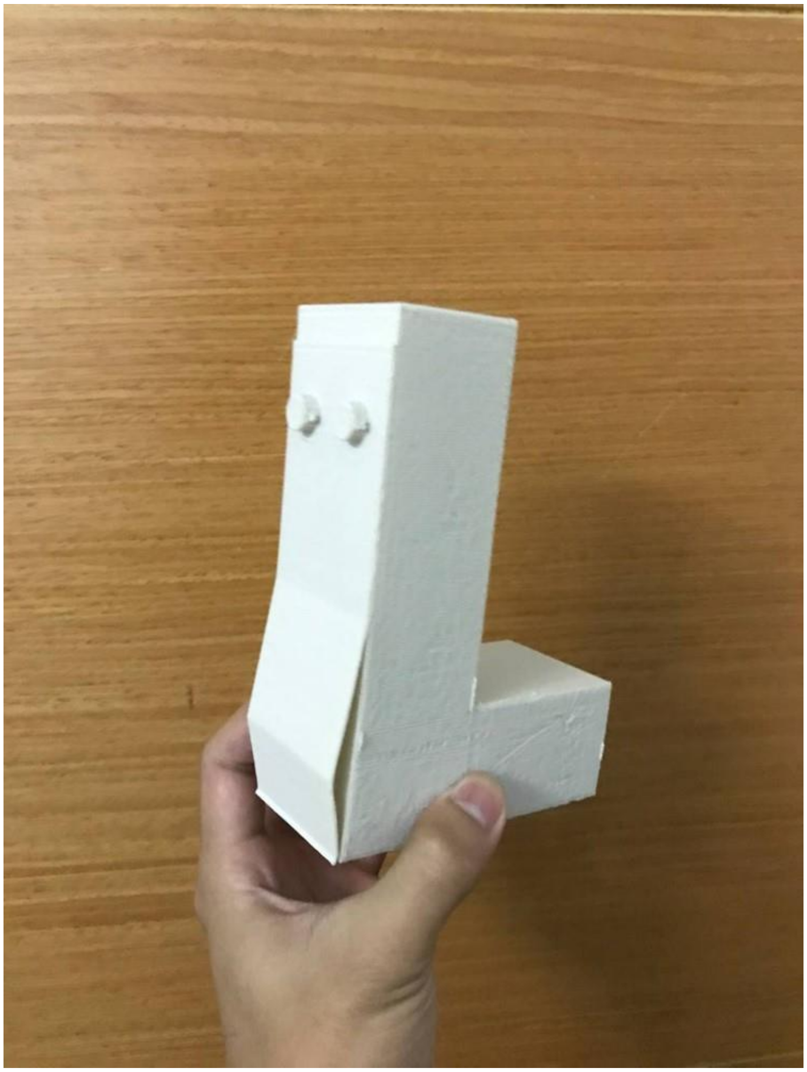


Figure 3.2

3.2.2 Phase 2

NEW DESIGN MODEL

In the second step, we must make adjustments to the new dimensions and reproduce our model in the 3D printer. Additionally, we must include certain specialised capabilities, such as the ability to spin freely in both directions, so that it is simpler for the user to cut the mortise. We also fasten it together with several screws and divide it into three halves.

MODEL FINISHED

The production of our second item is now complete. A 3D printer has been working on it for about 12 hours to complete it. In conclusion, we are pleased with our second product, which has undergone a great deal of development and features that are unique.

3.2.3 Phase 3

FIND SUBSTANCE

We locate the materials that we need to finish our portion of the product, such as the screw, the bolt, and the metal plate. These chemicals may be purchased for around RM20 each. That is where we make our purchase, Advances Bolts Enterprise Sdn Bhd. After that, we were prepared to present our prototype to an industry professional, such as a welder, who would then demonstrate and instruct us on how to manufacture our product.

FIND WELDER

A special thank you is in order for our good buddy Ridwan, who put us in touch with the welder Mr. Ah meng. We arranged a time to teach the product and create it along with Mr. Ah Meng's guide during our appointment with him, and we did so. This stage is not yet finished being developed.

PRODUCT MANUFACTURING PROCESS

During this stage of the process, the welder gives us instructions on how to build our actual product, which is an easy saw support. A week is required to finish the manufacturing process of the items. Welders are another component in the production of this product, and Amir and Zaid, a friend of mine, are also participating.

PRODUCT COMPLETED

The product can be completed successfully.

Figure 3.3

CHAPTER 4 RESULT AND DISCUSSION

In this part of the report, the outcomes of this project will be discussed, and a case study will be provided to illustrate how more innovation may be implemented. It is not the purpose of the results chapter or section to speculate on why the results were obtained; rather, it just summarises the findings in an objective and straightforward manner. In the discussion, the meaning of the findings is interpreted, they are placed in perspective, and the significance of the results is explained. When doing qualitative research, sometimes the findings and the conversation are integrated.

4.1 Characteristic of Easy Saw Support

We devised a simple saw support system that included a few features. The body, the steel plate, and the body of the plate make up the three elements that comprise the easy saw support. It is comprised of the screw, the bolt, and the nuts, which together make it the ideal combination. Because it may be turned freely to the left and right, it is divided into three portions. Because it enables pupils, polyskills, and worldskills to quickly cut the wood or construct a mortise and get a precise cut, we make it simple to move to the left and right. If this is the case, then the combination of the mortise and the tenon will result in flawless furniture that does not have any holes or other imperfections in it. This is the kind of furniture that people desire to construct.

4.1.1 Size and Measurement of Easy Saw Support

When it comes to the product that we want to manufacture, dimensions and measurements are quite significant. Either it is for the customer's protection or to make the product more user-friendly for them. A state of safety is one in which risks and situations that might lead to physical, mental, or material damage are mitigated or eliminated in order to protect the health and well-being of people as well as the community as a whole.

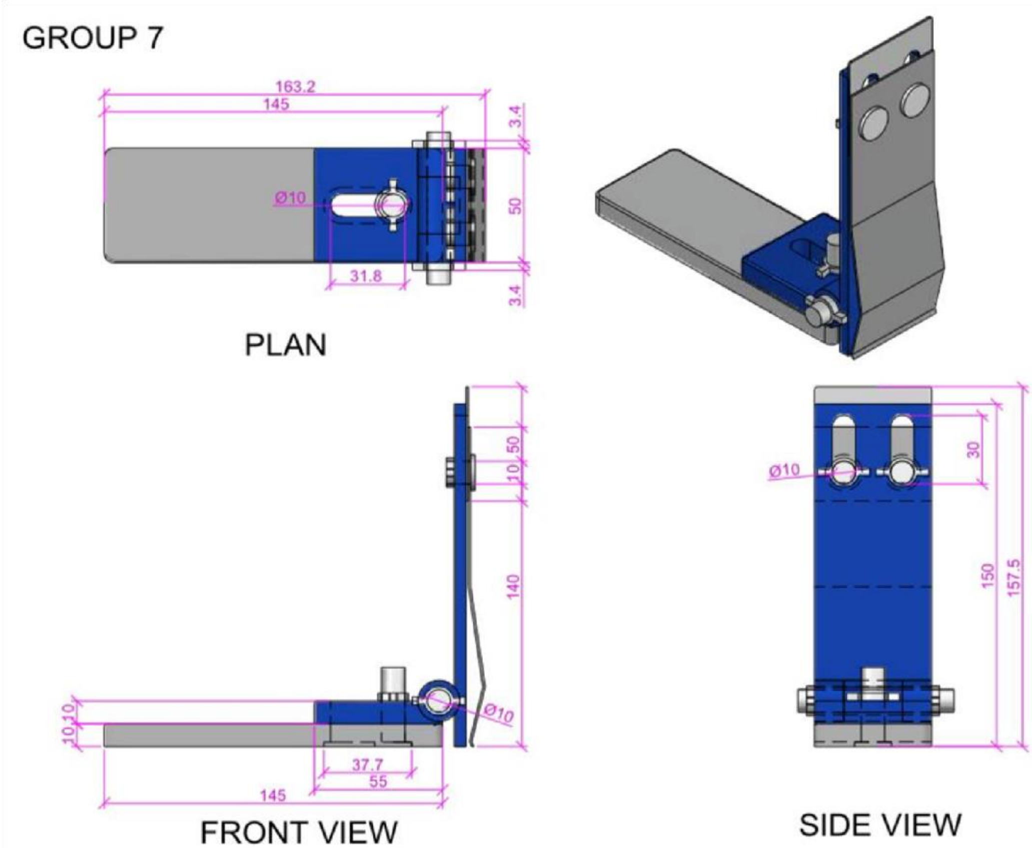


Figure 4.1

As can be seen in Figure 4.1, we widened the handle of the hand saw so that the user would have an easier time holding it and would find it more pleasant to push when using it to cut wood. Due to the distance that exists between the steel plate and the plate holder, it is an excellent candidate for use with a japan hand saw. This is due to the fact that competitions like polyskills and worldskills will often make use of a japan saw. We attached an adjustable screw to the steel plate in front of the hand saw so that it could be used to alter the size of the hand saw. Turning to the left and right is accomplished by loosening and tightening the screw on the holder. The same principle applies to the height of the steel plate and the japanese hand saw.

4.2 Procedure To Use Easy Saw Support

A specific method of carrying out an action or of achieving something is referred to as a procedure. A single action taken during a process, often one among a set of actions taken in a predetermined order, such as during a surgical operation.

4.2.1 Step 1 : Marking

The act, process, or occurrence of producing or bestowing a mark is referred to as "marking." Marking is the first stage in any ordinary carpentry business. Before we start cutting the wood, we need to draw a mark so that we know exactly where we want to cut it and can create flawless furniture.

Figure 4.2.1

As illustrated in Figure 4.2.1, marking is the first step that must be completed before moving on to set up an easy saw support in order to cut the wood. The excellent marks provide precise and clean cutting. This is due to the fact that marking has evolved into an essential stage before cutting wood.

4.2.2 Step 2 : Put Easy Saw Support on The Wood

The product is then applied to the wood in the second stage. The steel plate should then be rotated in the direction indicated by the marking that the user made in the first stage.

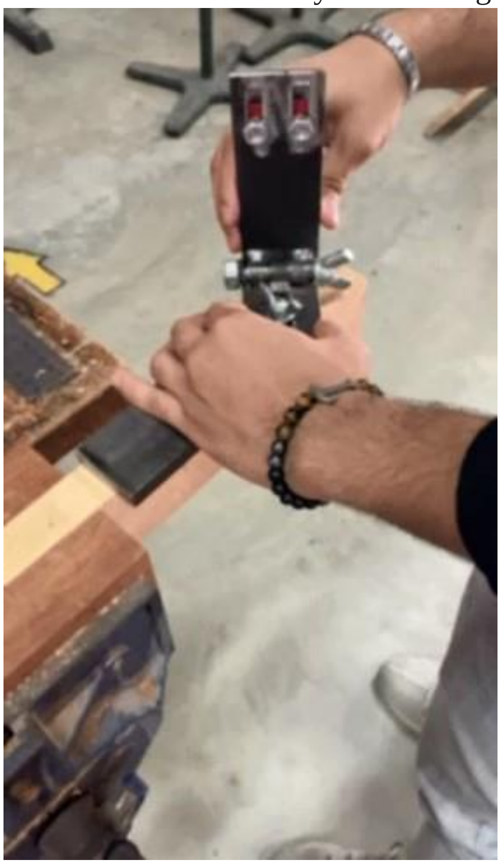


Figure 4.2.2

The second phase, which is seen in Figure 4.2.2, requires users to position the product, which is an easy saw support, on the wood and then rotate the steel plate in accordance with the mark that was established during the first step. This is due to the fact that it must be ready and that it must not take a significant amount of time to cut the wood, in addition to being ready with the product that the user employs.

4.2.3 Step 3 : Lock Easy Saw Support With G Clamp

In the third stage, you will need to lock the product with a g clamp in order to make it more tight on the board. This will allow it to assist in making a flawless cut without causing problems such as uneven wood surface or thickness of the wood. C-clamps, also known as G-clamps or G-cramps, are a kind of clamp device that is often used to hold a wood or metal workpiece. They are frequently employed in carpentry and welding, although their applications are not restricted to these two crafts

Figure 4.2.3

4.2.4 Step 4 : Cutting Wood

The last stage of this process involves inserting the handsaw into the simple saw support between the steel plate and the steel plate holder, which is secured with a bolt, nut, and washer. We have made an ideal environment for the japanese hand saw to operate in.

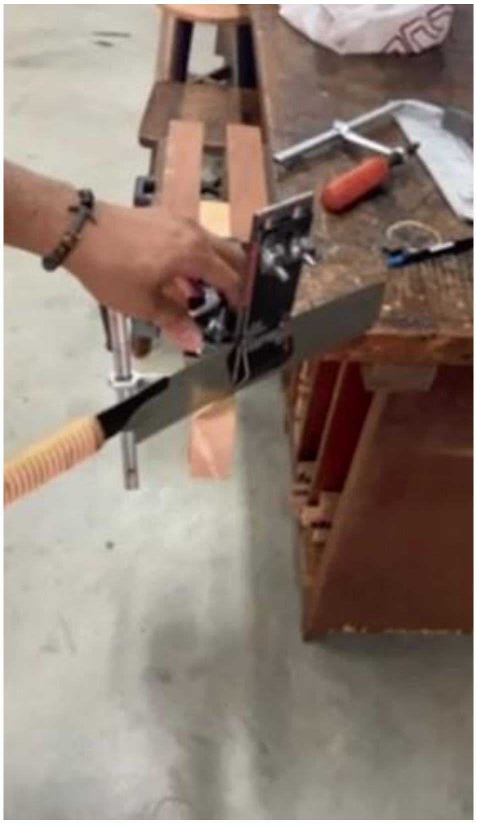


Figure 4.2.4

The steps required to insert the japan hand saw into the easy saw support are shown in figure 4.2.4. It has been crafted beautifully and, with the aid of the product, can make quick work of chopping up the wood. Because of the support, users no longer have to worry about any imperfections that may occur while cutting the wood. The user has to do nothing more than begin cutting, and the device will take care of the rest.

4.3 Result

In this research, we are able to examine the results from the product, such as the thickness of the wood, the surface of the wood, and the amount of time it took to cut the wood. The end or result of cutting wood with an easy saw support and cutting wood with one's free hand is used as the source of the data gathering.

4.3.1 Wood Thickness and Wood Surface

Wood thickness and wood surface have emerged as the primary concerns arising from this research. This is due to the fact that the field of study being evaluated in polyskills and worldskills competitions is quite particular. In order for the competition to go smoothly, the judges will evaluate and score the ideal wood surface, which will not have an uneven surface.

Figure 4.3.1

The surface of the wood is seen in Figure 4.3.1 after it was cut freehand and before the easy saw support was used. The fact that the wood was cut by free hand reveals that it has a surface that is somewhat uneven as a result of a flaw in the process. It will get 2 points out of a possible 5 marks if scored using the rubrics used for the polyskills and worldskills competitions.

Figure 4.3.1a

The cut surface of the wood is seen in Figure 4.3.1a, which was created utilising an easy saw support. After using simple saw support when cutting the wood, it demonstrates excellent cutting, as well as a perfect surface on the wood. This wood surface is going to obtain flawless scores on the rubric mark for both the polyskills competition and the worldskills competition since the rubric can't detect any uneven surfaces on the wood.

4.3.2 Time

One definition of time is "an continuing and continuous series of events that occur in succession, beginning with the past and working their way through the present and on into the future." The length of events, the intervals between those events, and even the sequencing of occurrences may all be quantified, measured, or compared with the use of time. Time is of the significance with regard to the parameters of this project. This is due to the fact that during the competition, the contestants will be allowed some time to cut the wood.

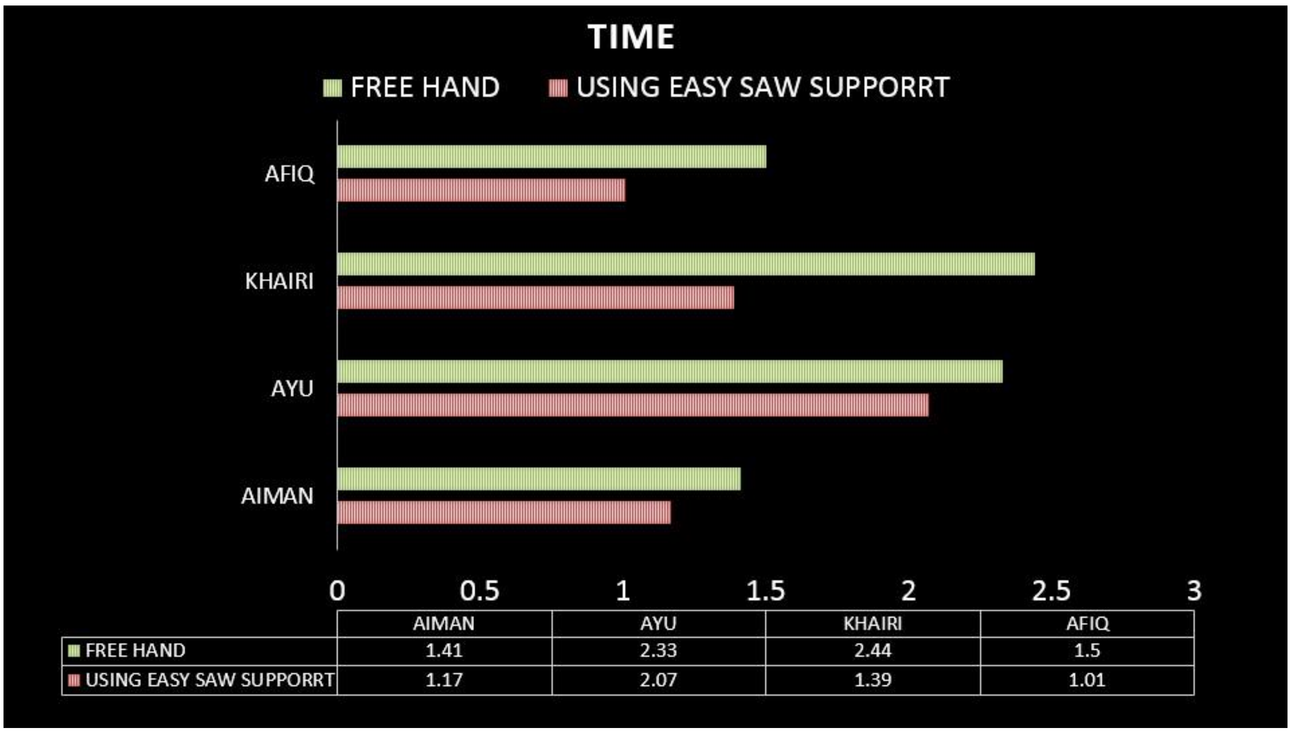


Figure 4.3.2

The graph shown in figure 4.3.2 compares the amount of time required to cut wood by hand to that required when using an easy saw support. It has been shown that cutting wood by hand requires much more time than cutting it using an easy saw support. The results of giving certain students and others competing in WorldSkills the opportunity to test out our solution may be seen in figure 4.3.2.

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CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

5.1 INTRODUCTION

This chapter provides an overview of the project's conclusions, as well as the suggestions and the upgrade plan that went along with them. The analysis has been completed using the information gathered during the trial run of the project. This chapter will discuss the suggestions that were derived from all of the outcomes of the tests that were conducted and the analyses that were performed. After that, a decision will be arrived at after taking into account the suggestions and the improvement plan that have been developed.

5.2 RECOMMENDATIONS

We are aware, based on the data and information that we gather, that the project does not yet satisfy the standards that are imposed by technology in the present day. As a result, we are in agreement that we need to include "Internet of Things" (IOT). This is due to the fact that we feel that by incorporating IoT into our project, it will be able to deliver several advantages to end users and will most likely join the global market. When we include IoT into our project, not only will we be able to save time, but also the process of cutting will go more smoothly.

In addition, we suggest that in the future, the easy saw support be made lighter by using a different material in its construction. As a result, the simple saw support system may include additional specialised features, such as add-on degrees on the handle, eliminating the need for marking 45 or 30 degrees. Next, include additional precautions, such as making the handle more spacious. Because of these safety characteristics, it will be easier for the user to make use of the product without worrying about potential risks in the future. Additionally, the amount of time needed to finish a product will be less, the process will be easier, and the end result will be more seamless.

Therefore, on the basis of all these conversations that have taken place, a significant number of enhancements might be made in the future to increase the quality of the product while simultaneously reducing the amount of time required to produce the product.

5.3 Conclusion

On the basis of this study, it is possible to state with absolute certainty that this simple saw support offers numerous advantages not only to people but also to the surrounding natural environment. Additionally, with all of the features supplied by this simple saw support, it will be of great assistance to them, particularly in the price range area and the cutting of wood. In addition to this, it will have a constructive effect, not only on people but also on the natural world. Every possible enhancement is going to be done in order to make this project more advantageous overall while also minimising any potential drawbacks. Because of this, here's hoping that this initiative may continue to expand into all subsequent generations.

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ABSTRACT

A hand saw is a tool that is used for cutting wood. It consists of a blade with sharp teeth attached to a handle. One of the problems we often see is that with free hand cutting it will not get perfect cutting. It can be seen by the wood surface and thickness. In addition, when used regularly it can become heated and can cause the material to break down easily. The objective of this project was created to design a jig or saw support for carpentry and joinery industry. Especially for PolySkills and WorldSkills. As we know they need to be perfect by cutting wood by free hand and not allowed to use machines. This project also makes it easy to create a mortise. The mortise–Tenon joint, which connects columns and beams of a wooden building, often creates a gap in contact between members. This gap is considered to affect mechanical performance of the mortise–Tenon joint (1). Method of making an easy saw support by measuring the iron to be used. After measuring the iron, attach the iron to the iron plate and tighten it using screws. We have concluded that literature review is important to showcase all the studies of materials and methods to enhance the knowledge on this project. Every and others projects that are related to this are really helpful especially for us to understand it fully. After a lot of materials and methods were discussed and researches were done, the materials that are the most compatible for our project easily saw support.