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JUDUL: DEVELOPMENT OF POTATO PEELING MACHINE

SESI PENGAJIAN: 2008/2009

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DEVELOPMENT OF POTATO PEELING MACHINE

MOHAMAD SYAHMI B SHAHROM

A report submitted in partial fulfilment of the requirements
for the award of the
Diploma of Mechanical Engineering

Faculty of Mechanical Engineering
UNIVERSITI MALAYSIA PAHANG

NOVEMBER 2008

SUPERVISOR'S DECLARATION

I hereby declare that I have checked this project and in my opinion this project is satisfactory in terms of scope and quality for the award of Diploma of Mechanical Engineering

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Name of Supervisor: ZULKIFLI B AHMAD @ MANAP
Position : TUTOR
Date :

STUDENT'S DECLARATION

I hereby declare that the work in this thesis is my own except for quotations and summaries which have been duly acknowledged. The thesis has not been accepted for any diploma and is not concurrently submitted for award of other diploma.

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Date :

DEDICATION

First of all, I would like to show my expression of gratitude to Allah s.w.t whose guidance, help and grace was instrumental in making this humble work a reality. I would like to express my gratitude to my supervisor En Zulkifli B Ahmad @ Manap and to the entire lecturer without whose wise suggestions, helpful guidance and direct assistance, it could have neither got off the ground nor ever been complete.

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ABSTRACT

This thesis deals with durability assessment for development of potato peeling machine. The study of manufacturing was very important in order to carried out this project to ensure that student understand on what are needs to do. This project is about development of potato peeling machine to help people easy to use at home. This project involved the process of sketching and drawing. Three sketching will be developing from my idea. After that matrix chart and Pugh analysis will be following to get a new final design. After design had complete, the next process is fabrication to transform from the paper to become real product. This project also require to ensure the safety for the indeed of publishing. Methods and process involve in this project like welding, shearing, cutting, drilling and rivet. This project is mainly about generating a new concept of portable potato machine and more function. After all process had been done, this potato machine may help us to understand the fabrication and designing process that involved in this project.

ABSTRAK

Tesis ini membentangkan penyelidikan untuk membina mesin pengupas kentang.Pembelajaran mengenai pembuatan adalah penting untuk menjalankan projek ini bagi memastikan pelajar memahami tentang perkara yang perlu di lakukan.Projek ini adalah mengenai membina mesin pengupas kentang untuk memudahkan penguguna untuk mengunakannya di rumah. Projek ini melibatkan proses lakaran dan lukisan.Tiga lakaran akan dibina daripada idea terbaik saya, selapas itu matrik dan pugh analysis diteruskan untuk mendapat satu lukisan akhir. Selepas proses ini siap, produk tersebut dihasilkan bedasarkan reka bentuk yang telah dibuat.Projek ini juga melibatkan ciri-ciri keselamatan bagi pengguna untuk tujuan pemasaran.Kaedah dan proses yang terlibat dalam projek ini seperti proses kimpalan, pembahagian, pemotongan, melubang dan rivet. Proses ini sebenarnya melibatkan proses menjana konsep baru dalam menghasilkan mesin kentang yang mudah alih dan mempunyai banyak fungsi.Selepas semua projek ini siap,mesin kentang akan membantu kita memahami proses merekabentuk dan penghasilan yang terlibat dalam projek ini.

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LIST OF ABBREVIATIONS

MIG	Metal Inert gas
GMAW	Gas Metal Arc Welding

CHAPTER 1

INTRODUCTION

1.1 Introduction

The processes involved in this project are designing of potato peeling machine. This project will be developing based on research from product in marketing. This final year project required to focusing only a peeling potato for home kitchen fatalities. It is must to complete in one semester or fourteen weeks.

1.2 Project Synopsis

The project title is “Development of Potato Peeling Machine”. The project involves searching the example of potato peeling machine from via internet and in market. This product just can peel a potato each process. The potato will be rotate by motor and supplied from battery. The potato just rotate on their position same time the blade will be peeler a potato with move the blade to vertical.

1.3 Project Objective

1.3.1 General objective

i. This project objectives is to practices the knowledge and skill of the student that have been gathered before solving problem using academic research, to create an engineer that has enough knowledge and skill.

ii. The student also can be explore the advanced machine before involves in industries.
iii. Otherwise, the project will be produce and train student capable of doing work with minimal supervisory and more independent in searching, detailing and expanding the knowledge and experiences.
iv. The project also will generate student has capability to make a good research report in thesis format technical writing.

1.3.2 Specific objective

The project objectives as follows:

I. Peeling a potato
II. To provides facility in kitchen.
III. Use motor to rotate a potato and supplied by battery.
IV. Portable.

1.4 Project Scope

The project scope of work in this project is to develop a potato peeling machine for kitchen at home. Make it easy for users to peeling a potato and easy to handling.

1.5 Project Planning

This project is begin meeting with supervisor to collect information and otherwise search from via internet, books and survey in market. This literature review take about two weeks, the finding of information will not be stop on a week but continues along the way for 14 weeks to get more information.

The Gantt chart (time management) and flow chart (process management) will be developing on second week. Gantt chart was done by using Microsoft Excel software.

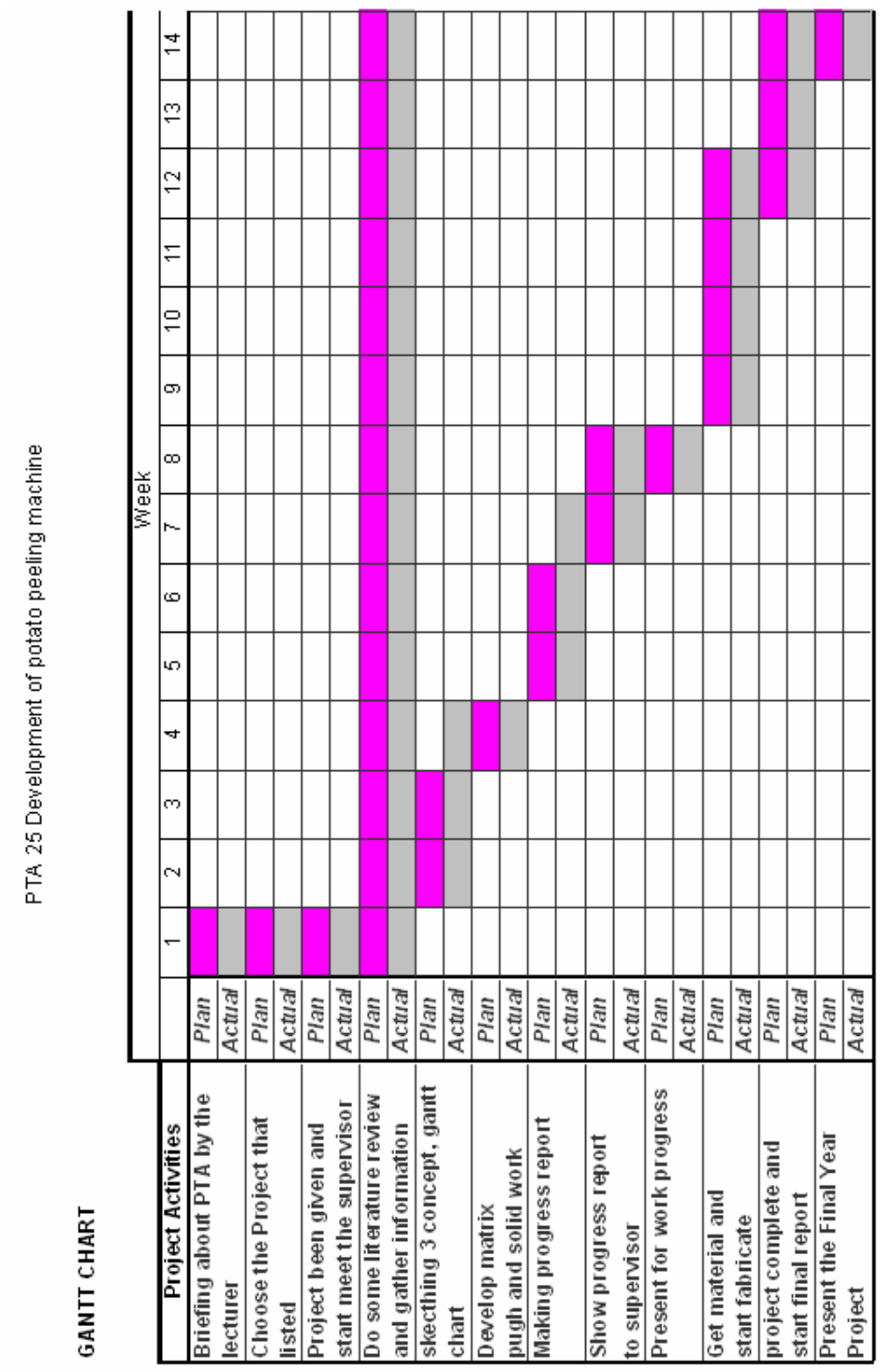
The second and third week, three sketching have been done. These sketching based on the advantages and disadvantage product in market.

The Fourth week Pugh concept and matrix chart will be developing. The functions of two tools are to get a final design. From three designs, they will be analyzed to get good concept. Drawing by solidwork will be start after get the final concept. The drawing is part by part and then will be assemble to get the final product. It is also, must follow the specification.

On fifth and sixth weeks, the progress report will be start. Meeting with supervisor on weeks seventh and eight are gather data to complete progress report. At weeks eight, mid presentation has been hold.

The getting material will be start after mid presentation. The process cutting raw materials start on week nine. At the same time fabrication process also starts. The planning process of fabrication around week's nine until twelve.
After finished the process fabrication, the final report will be start. To complete the report format thesis 2008 will be follow done. The final presentation will be started on week fourteen.

Table 1.1: Gantt chart



CHAPTER 2

LITERATURE RIVIEW

2.1 Introduction

The purpose of this chapter is to provide a review of product in marketing. The gather information from product in market will be follow to get the comparison. Substantial literature has been study on advantages and disadvantages of that product. However, little information can be found on integrated durability evaluation methods. The example of evaluation is Pugh concept and matrix chart. The below is some product in market.

2.2 Product Review

2.2.1 Rotato Express

Figure 2.1: Rotato Express

The Rotato Express is the amazing peeling machine that peels away potato, vegetables and fruit skins in seconds, in one fast easy motion! Best of all, the Rotato Express peels just the skin, without wasting any of the nutritious part of the fruit or vegetable. To use the Rotato Express, simply center the food on the bottom spokes and press gently. Then, lower the upper section so that it grasps the food and holds it securely. Using the height adjustment lever, raise the cutter arm so it rests on top of food to be peeled. Press the button and watch as Rotato Express quickly and neatly does the peeling for you. Rotato Express is simple and safe to operate. Its non-slip base holds it securely to the counter or other work surface. It also stops automatically when the peeling is over.

One compartment safely stores two spare blades, while the second compartment is reserved for battery storage. Conveniently stored underneath is also a handy thumb knife to pare potato eyes or blemishes on fruits and vegetables and makes peeling all kinds of fruits and vegetables easy and effortless! Rotato Express comes with a 6 Volt Adapter and it can also be used with 2 "AA" Batteries.(Batteries not Included). Also Included is Rotato Express Instruction & Recipe Booklet.

2.2.2 Rotato potato peeler

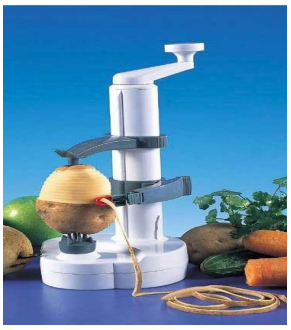


Figure 2.2: Rotato potato peeler

New twists to the art of potato peeling. No mess, no waste. The easier way to handle a major kitchen chore. Rotato potato peeler peels three potatoes in the time it takes to peel one with an ordinary peeler. Eliminates waste from over peeling. Use Rotato potato peeler for peeling and paring carrots, cucumbers, apples, pears - all kinds of fruits and vegetables. Simply skewer the potato on the rotato potato peeler bottom spike. Lower the top spike, and make sure the potato is held firmly in place. Rotate the rotato potato peeler handle, and the skin peels off in one continuous spiral. To remove potato eyes or blemishes on vegetables or fruit, hold the handy mini-parer between your thumb and forefinger, and scoop out. Two spare rotato replacement blades Handy mini-parer to easily remove any imperfections in your fruits and vegetables.

a) Advantages of rotato potato peeler

I. Two spare rotato replacement blades stored in built-in compartment
II. Handy mini-parer removes blemishes from fruits and vegetables
III. Non-slip rubber base
IV. Durable ABS plastic
V. Ultra-safe design - no need to hold or handle the vegetable while peeling
VI. More hygienic than peeling by hand
VII. Dishwasher safe

Rotato potato peeler Tips and tricks New Rotato potato peeler makes helping in the kitchen fun for the whole family. And no wonder! Peeling potatoes is a chore by any definition. For homemakers suffering from arthritis, Rotato potato peeler is safer as well as easier. The eliminate risk of injury from lost control over ordinary peelers or knives.

Rotato potato peeler will also make twists and zests for your favorite party dishes and drinks. Can Removes inedible peel from certain fruits, leaving pulp and flesh intact.A twist and a turn...and your home fries are ready for the pan.

Introduced at the Frankfurt international fair in February 1999, Rotato potato peeler has been a monster success story. In the US, over 800,000 Rotato potato peeler sets were sold in just 3 months

2.2.3 Princess potato peelers (datum)

Figure 2.3: Princess Potato peelers

Electric potato peeler has six stainless steel peeling blades. Can Peels 1 kg potatoes in two minutes. With powerful motor, safety switch, handy size regulator, transparent lid, and cord retraction. Comes apart easily for cleaning. Extra function: use the basket also supplied as a centrifuge to dry lettuce and salad.

i. Peels 1kg of potatoes in 2 minutes
ii. Additional attachment for spinning salads
iii. Safety switch
iv. Transparent lid

2.3 Process review

2.3.1 Welding Process

Figure 2.4: Welding Process

a) History

The history of joining metals goes back several millennia, with the earliest examples of welding from the Bronze Age and the Iron Age in Europe and the Middle. The history of joining metals goes back several millennia, with the earliest examples of welding from the Bronze Age and the Iron Age in Europe and the Middle East. Welding was used in the construction of the Iron pillar in Delhi, India, erected about 310 and weighing 5.4 metric tons. The middle Ages brought advances in forge welding, in which blacksmiths pounded heated metal repeatedly until bonding occurred. In 1540, Vannoccio Biringuccio published De la pirotechnia, which includes descriptions of the forging operation. Renaissance craftsmen were skilled in the process, and the industry continued to grow during the following centuries.

Welding, however, was transformed during the 19th century in 1800, Sir Humphry Davy discovered the electric arc, and advances in arc welding continued with the inventions of metal electrodes by a Russian, Nikolai Slavyanov, and an American, C. L. Coffin in the late 1800s, even as carbon arc welding, which used a carbon electrode, gained popularity. Around 1900, A. P. Strohmenger released a coated metal electrode in Britain, which gave a more stable arc, and in 1919, alternating current welding was invented by C. J. Holslag, but did not become popular for another decade.

Resistance welding was also developed during the final decades of the 19th century, with the first patents going to Elihu Thomson in 1885, who produced further advances over the next 15 years. Thermite welding was invented in 1893, and around that time, another process, oxyfuel welding, became well established. Acetylene was discovered in 1836 by Edmund Davy, but its use was not practical in welding until about 1900, when a suitable blowtorch was developed. At first, oxyfuel welding was one of the more popular welding methods due to its portability and relatively low cost. As the 20th century progressed, however, it fell out of favor for industrial applications. It was largely replaced with arc welding, as metal coverings (known as flux) for the electrode that stabilize the arc and shield the base material from impurities continued to be developed.

b) Background Process

Welding is a fabrication process that joins materials, usually metals or thermoplastics, by causing coalescence. This is often done by melting the work pieces and adding a filler material to form a pool of molten material (the weld puddle) that cools to become a strong joint, with pressure sometimes used in conjunction with heat, or by itself, to produce the weld. This is in contrast with soldering and brazing, which involve melting a lower-melting-point material between the work pieces to form a bond between them, without melting the work pieces. Many different energy sources can be used for welding, including a gas flame, an electric arc, a laser, an electron beam, friction, and ultrasound. While often an industrial process, welding can be done in many different environments, including open air, underwater and in outer space. Regardless of location, however, welding remains dangerous, and precautions must be taken to avoid burns, electric shock, eye damage, poisonous fumes, and overexposure to ultraviolet light.

c) Metal Inert Gas (MIG) Welding

This clothesline will be joined by using the permanent joint which is welding process. The method joining that is able to fabricate and assembled the frame is Metal Inert Gas (MIG) Welding.

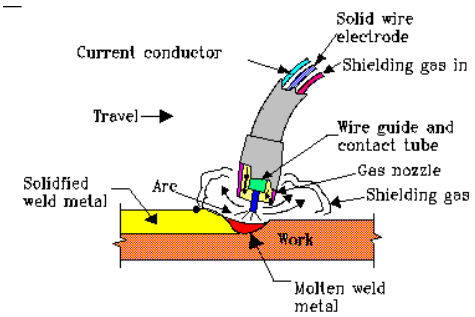


Figure 2.5: MIG welding

Metal Inert Gas (MIG) Welding: An arc is struck between a consumable electrode and the sheet metal to be welded. The consumable electrode is in the form of continuous filler metal. An inert gas surrounds the arc and shield it form the ambient to prevent oxidation. Carbon steels, low alloy steels, stainless steels, most aluminum alloys, zinc based cooper alloys can be welded using this process.

Gas metal Arc welding (GMAW) is frequently referred to as MIG welding. MIG welding is a commonly used high deposition rate welding process. Wire is continuously fed from a spool. MIG welding is therefore referred to as a semiautomatic welding process. The shielding gas, forms the arc plasma, stabilizes the arc on the metal being welded, and shields the arc and molten weld pool. There are three primary metal transfer modes which are spray transfer, globular transfer and short circuiting transfer.

d) Advantages of MIG Welding

I. High productivity, because based on this machine the consumer no need to stop their work to change rods or chip an brush the weld frequently.
II. Easy to learn and makes great-looking welds.
III. These welding processes also can be weld in all positions.
IV. Can weld on stainless steel, mild steel, and aluminum.

e) Disadvantages of MIG Welding

I. Is not worth a dang on paint, rust, or dirt surfaces.
II. Can not check watch, count money, smoke cigarettes, or talk buddy as often.
III. Cost money on consumable, such as tips and nozzles.

f) Welding Gun and Wire Feed Unit

The **Figure 1.5** shows the basic structure on the nozzle of the MIG welding.

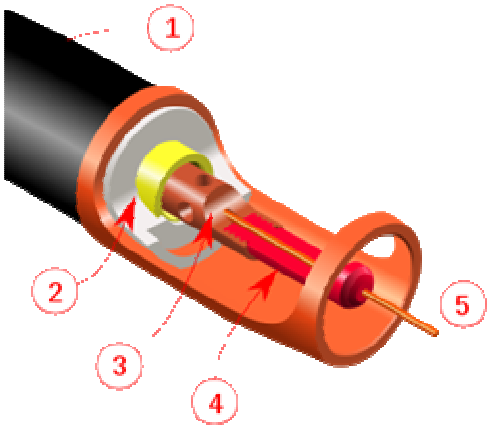


Figure 2.6: Nozzle MIG

g) Technique

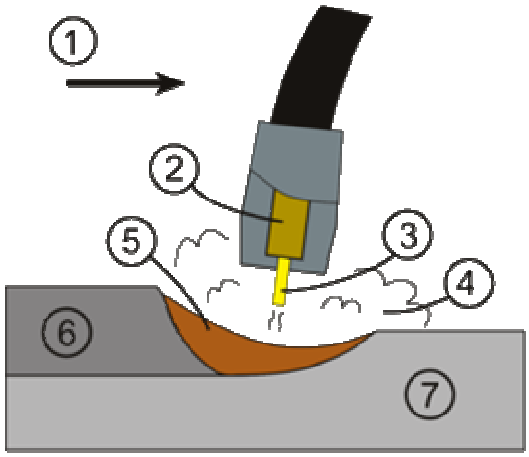


Figure 2.7: Technique MIG

The basic technique for GMAW is quite simple, since the electrode is fed automatically through the torch. By contrast, in gas tungsten arc welding, the welder must handle a welding torch in one hand and a separate filler wire in the other, and in shielded metal arc welding, the operator must frequently chip off slag and change welding electrodes. GMAW requires only that the operator guide the welding gun with proper position and orientation along the area being welded. Keeping a consistent contact tip-to-work distance (the stick out distance) is important, because a long stick out distance can cause the electrode to overheat and will also waste shielding gas. Stick out distance varies for different GMAW weld processes and applications. For short-circuit transfer, the stick out is generally 1/4 inch to 1/2 inch, for spray transfer the stick out is generally 1/2 inch. The position of the end of the contact tip to the gas nozzle is related to the stick out distance and also varies with transfer type and application. The orientation of the gun is also important it should be held so as to bisect the angle between the work pieces; that is, at 45 degrees for a fillet weld and 90 degrees for welding a flat surface. The travel angle or lead angle is the angle of the torch with respect to the direction of travel, and it should generally remain approximately vertical.

2.3.2 Drilling process

Figure 2.8: Hand drill

a) History

The earliest drills were bow drills which date back to the ancient Harappans and Egyptians. The drill press as a machine tool evolved from the bow drill and is many centuries old. It was powered by various power sources over the centuries, such as human effort, water wheels, and windmills, often with the use of belts. With the coming of the electric motor in the late 19th century, there was a great rush to power machine tools with such motors, and drills were among them. The invention of the first electric drill is credited to Mr. Arthur James Arnot and William Blanch Brain , in 1889, at Melbourne, Australia. Wilhelm Fein invented the portable electric drill in 1895, at Stuttgart, Germany. In 1917, Black & Decker patented a trigger-like switch mounted on a pistol-grip handle.

b) Background Process

A drill (from Dutch Drillen) is a tool with a rotating drill bit used for drilling holes in various materials. Drills are commonly used in woodworking, metalworking, and construction.

The drill bit is gripped by a chuck at one end of the drill, and is pressed against the target material and rotated. The tip of the drill bit does the work of cutting into the target material, either slicing off thin shavings (twist drills or auger bits), grinding off small particles (oil drilling), or crushing and removing pieces of the work piece.

c) Types of drill

There are many types of drills: some powered manually, others using electricity or compressed air as the motive power, and a minority driven by an internal combustion engine (for example, earth drilling augers). Drills with a percussive action (such as hammer drills, jackhammers or pneumatic drills) are usually used in hard materials such as masonry (brick, concrete and stone) or rock. Drilling rigs are used to bore holes in the earth to obtain water or oil. Oil well, water well, or holes for geothermal heating are created with large drill rigs up to a hundred feet high. Some types of hand-held drills are also used to drive screws. Some small appliances may be drill-powered, such as small pumps, grinders, etc.

2.3.3 Rivet process

Figure 2.9: Rivet tool

a) Background process

A rivet is a mechanical fastener. Before it is installed it consists of a smooth cylindrical shaft with a head on one end. The end opposite the head is called the buck-tail. On installation the rivet is placed in a pre-drilled hole. Then the tail is "upset" (i.e. deformed) so that it expands to about 1.5 times the original shaft diameter and holds the rivet in place. To distinguish between the two ends of the rivet, the original head is called the factory head and the deformed end is called the shop head or buck-tail.

Because there is effectively a head on each end of an installed rivet it can support tension loads (loads parallel to the axis of the shaft); however, it is much more capable of supporting shear loads (loads perpendicular to the axis of the shaft). Bolts and screws are better suited for tension applications.

b) Application

Before welding techniques and bolted joints were developed, metal framed buildings and structures such as the Eiffel Tower, Shukhov Tower and the Sydney Harbour Bridge were generally held together by riveting. Also automobile chassis were riveted. Riveting is still widely used in applications where light weight and high strength are critical, such as in an aircraft. Many sheet-metal alloys are preferably not welded as deformation and modification of material properties can occur. Common but more exotic uses of rivets are to reinforce jeans and to produce the distinctive sound of a sizzle cymbal .

c) Types of rivet

i. 1 Solid rivets
ii. Blind rivets
iii. Drive rivet
iv. Flush rivet

d) Installation

There are several methods for installing rivets. Rivets that are small enough and soft enough are often "bucked". In this process the installer places a rivet gun against the factory head and holds a bucking bar against the tail or a hard working surface. The bucking bar is a specially shaped solid block of metal. The rivet gun provides a series of high-impulse forces that upset the rivet in place. Rivets that are large or hard may be more easily installed by squeezing instead. In this process a tool in contact with each end of the rivet clinches to deform the rivet. Rivets may also be upset by hand, using a ball-peen hammer.

CHAPTER 3

PROJECT METHODOLOGY

3.1 Project flow chart

In process to develop a potato peeling machine, there is the planning of the overall progress to ensure the project will be finish based on schedule.

Based on the flow chart, firstly get the title for final year project. Then make a literature review .Made a lot of investigation about potato peeler. These investigations will involve the advantages and disadvantages of product in market. These tasks have been done through information got from the internet, books and other source.

After gathered and collected data information, about of potato peeling. Then make and decide best idea will be started. To achieve a good best idea, three design concept will be develop. After finish make three designs, I will discuss with supervisor about that design, if design not suitable, will back to make decide and best idea. The work will be through if three design will be success.

After several design sketched, design consideration have been made and one of the new design will be develop, where this design to be called final concept. The final concept will be inspection through two analyses. The analysis will be involve are matrix chart and Pugh concept. The final concept will be draw using solid work software. Each part will be developed and assemble after it done.

The selection of material process will start after get the final design. This process also to be called Bill of Material (BOM).The process measurement will be occurred to know the suitable of material for using this project.

After the material had known. The preparation material will be through. The raw material will be getting at store and the process cutting also will be occurred. If the material has not in store, the solution is buying at hardware shop.

The process fabrication will be start if the materials have been enough. The fabrication will be occurred step by step. The final report will be start after finished the fabrication process. All the important data will be shown in this report. After the thesis had been done, the slide presentation will be prepared.

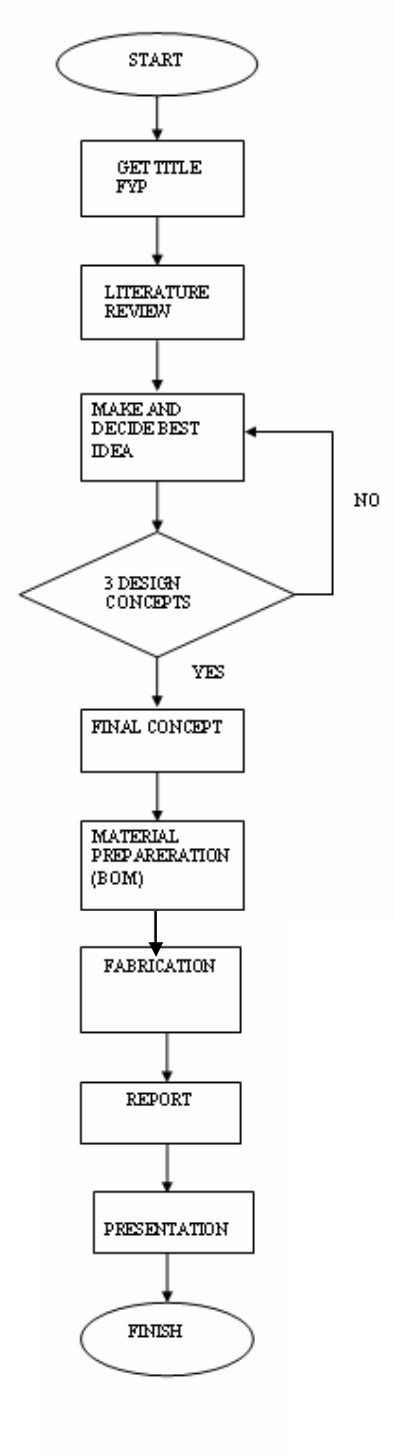


Figure 3.1: Flow Chart

3.2 Sketching & Design

3.2.1 Design

The design and fabrication of potato peeling machine must compliance to several aspects. The design must have safety criteria so the design can be fabricated and the parts are all functioning. The variety aspects must be give considerations in designing potato peeling machine:

I. Strength: This criterion is important to develop a potato peeling machine and showing the toughness and durability of the design.
II. Material: Ability of material is one of aspect that has been give considerations. The material Available can be used depend on their purpose.
III. Dynamic Resistance: Consider dynamic effect to the system. this will include all the force that will be acting on it and several other aspect.
IV. Advantages: these aspect must be give more consideration, because these aspect very important to achieve the high quality in market today.
V. Costing: The cost must consider with the budget of development.

3.2.2 Drawing

The drawings have two categories, which are:

I. Sketching: All the ideas for potato peeling fabrication will be sketch on paper first to ensure the advantages from three designs can be chooses to get a final design.
II. Solid Works Software: The final design will be draw with this software. Each part will be draw. After finish draw each part the assembly technique will be use.

3.2.3 Sketching & Drawing Selection

After make and decide the best idea, only three designs sketching that had been chosen before considered it as the final design, which are:

a) Concept 1

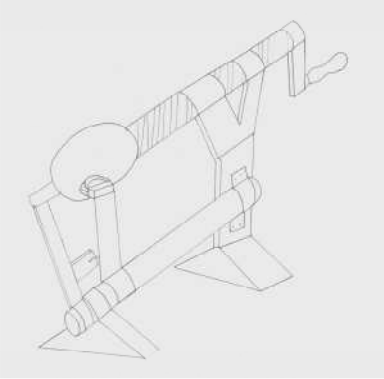


Figure 3.2: Concept 1

I. Use manually handling
II. Use screw to move potato
III. Side front have blade, so potato can be divide two part.

b) Concept 2

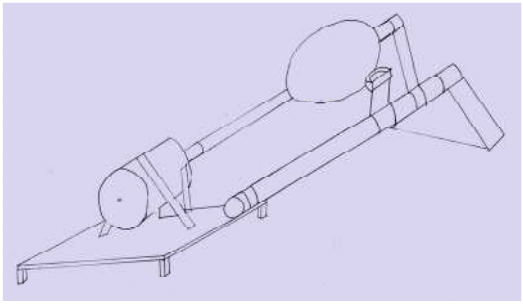


Figure 3.3: Concept 2

I. Use motor to rotate the potato.
II. The movement of blade use manually.
III. Use battery

c) Concept 3

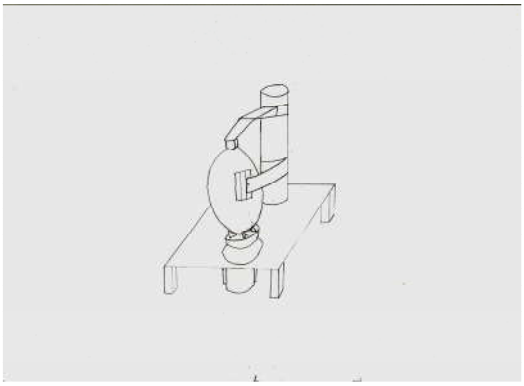


Figure 3.4: Concept 3

I. Use motor to rotate the potato.
II. High stability
III. Use battery
IV. The movement of blade use manually

3.3 Evaluation

Three concepts for the potato peeling machine were developed. A product in marketing is princess; this product will be making a datum. Two ways evaluated to get a new final design

Table 3.1: Pugh concept

	Concept Variants			
Selection Criteria	Concept 1	Concept 2	Concept 3	Princess
Easy to handling	(-)	0	(+)	0
Easy to use	(+)	0	0	0
Easy to keep	(+)	(-)	0	0
Capability	(-)	0	(+)	0
Strength	0	(-)	(+)	0
Efficiency	(-)	0	(+)	0
Shapes	(+)	(-)	0	0
Weight	(+)	(-)	0	0
Power	(-)	(+)	0	0
Function	(-)	0	(+)	0
Pluses	4	1	5	
Sames	1	5	5	
Minuses	5	4	0	
Net	-1	-3	5	
Rank	2	3	1	
Continues	NO	NO	YES	

From the Pugh analysis, the advantages and disadvantages of the concept can be display.

Table 3.2: Matrix chart

		concept 1	concept 2	concept 3	Final concept
1	Easy to handling	3	2	4	3
2	Easy to manufacturing	2	4	3	2
3	Easy to use	2	4	3	2
4	Easy to keep	4	2	2	1
5	Efficiency	2	3	5	3
7	Shape	2	4	3	2
8	Stability	2	3	4	3
9	Quantity of Material	2	3	4	3
10	Weight	2	2	3	3
11	Function	2	3	4	3
12	Strength	3	3	4	3
13	Capability	2	3	4	3
14	Power	2	4	5	3
15	Advantages	3	4	5	3
		33	44	* 53	

Rating

1	Very poor
2	Poor
3	Medium
4	Good
5	Very good

Follow from the Matrix analysis. Three designs will be make comparison. The marks distribution will give to each concept by referred the rating, one (1) for the very poor and five (5) for the very good.

3.4 Result

From two tables above, the advantages and disadvantages of the design can be outlined. Criteria or characteristic for the product to be fabricated are the important thing to be considered, before fabrication process. Fifteen criteria from Pugh concept and teen criteria from matrix analysis are been chosen to be considered. The important criteria are easy to handling, easy to use, easy to keep, capability, strength, efficiency, shapes, weight, power and function.

Based on the tables, study of concept selection shows that concept three scores the highest and positive signs. This concept get five pluses, five same, no minuses and the net is five, so this concept in first ranking.

3.5 Drawing in solid work

After get the final design, the new design will draw using this software. Firstly draw each part and lastly make the assembly.

3.5.1 Parts by part

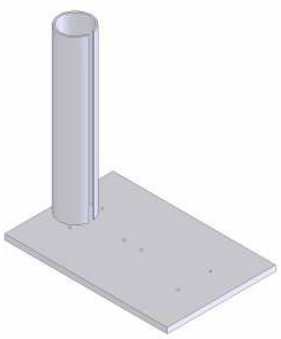


Figure3.5: Part 1

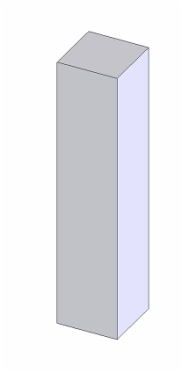


Figure3.6: Base

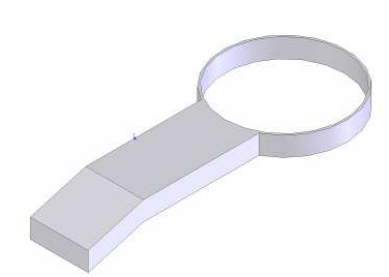


Figure 3.7: Support upper potato

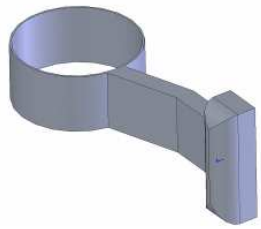


Figure3.8: Blade

3.6 Fabrication process

3.6.1 Introduction

The fabrication processes are followed from the final design process. These processes are about material selection and fabricate the product based on the design and the detail dimension. The varieties of method have used to fabricate this project, like cutting, drilling, welding and rivet process. Fabrication process is difference from manufacturing process in term of production quantity. Fabrication process is a process to make only one product rather then manufacturing process that focus to large scale production. In the project fabrication process needed to make the potato peeling machine for purpose to customer to use at home kitchen. This was include parts by part fabrication until assembly to others component.

3.6.2 Process involved

To produce a product, the fabrication process needs to be done first follow the design. The fabrication process starts from dimensioning the raw material until it is finish as a desire product .The processes that involve are.

a) Getting material

Figure 3.9: Rack material

Figure 3.9 introduces the raw material have been in UMP mechanical laboratory. The variety of raw material can get from this rack, like L-shape, hollow steel, Rectangular steel, plate metal, and etc.

b) Measuring and marking

Figure 3.10: Measuring and marking

After get material from the store, the next step is measurement **Figure 3.10**. The equipment used in this process is measuring tape and marker pen. The dimension will guided from solid work software.

c) Cutting material

Figure 3.11: Cutting material

The **Figure 3.11** shows the process cutting of material using floor cutter disc after through the process measuring and marking. To use this machine the safety equipments is very important.

d) Shearing process

Figure 3.12: Shearing process

The sheet metal also will through process measuring and marking .After that the process sharing is done based on **Figure 3.12.**

e) Welding process

Figure 3.13: Welding process

Figure 3.13 shows the process joining. This process use Metal Inert Gas (MIG). Gas metal arc welding (GMAW), also known as metal inert gas or MIG welding, it is a semi-automatic or automatic process that uses a continuous wire feed as an electrode and an inert or semi-inert gas mixture to protect the weld from contamination. The safety equipment is important during through this process.

f) Grinding Process

Figure 3.14: Grinding process

Figure 3.14 shows the process grinding. The type of this equipment is hand grinding. The safety equipment is very important this process because, during make these process the sharp chip will produce.

g) Drilling process

Figure 3.15: Drilling process

The **Figure 3.15** shows the drilling process. The steps for this process are mark the area to make the drill process first and then. The type of drill will use is hand drill.

h) Rivet process

Figure 3.16: Rivet process

The **Figure 3.16** shows the rivet process. After through the drilling process, this process has been already. The type rivet will use this process is blind rivet. This type normally use in fabrication process.

i) Painting process

Figure3.17: Painting process

The **Figure 3.17** has shown the process painting. This product will paint with black and white color.

3.7 SUMMARY

This chapter has been discussed generally about project methodology, how to manage flow work and process involved. This project can be developed the skill to manage the machine such as shearing machine, joining process and etc.

CHAPTER 4

RESULT AND DISCUSSION

4.1 Final product

The potato peeling machine was finish and get result after through the step by step process. Start with literature review, design and sketching, technical drawing using solid work, fabrication process with getting material, measuring and marking, cutting material, shearing process, welding process, grinding process, drilling process, rivet process and painting process.

4.1.1 Result after finishing

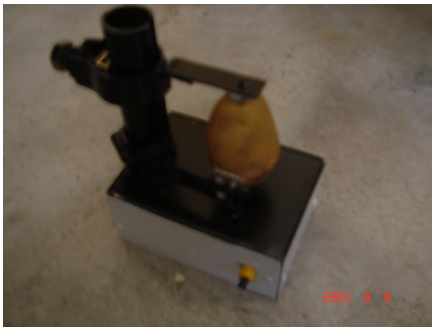


Figure 4.1: Isometric View

Figure 4.2: Plan View

Figure 4.3: Side View

Figure 4.4: Front View

4.2 Product Specification

Table 4.1: Product specification

Category	Total
Weight	1.5 kg
Color	Black And White
Wide	100mm x 150mm
Height	200mm

4.3 Discussion

After finish all process. The discussion will be follow up. The discussion about types of defect such as gap and bead and problem such as design problem and fabrication problem

4.3.1 Types of defect

a) Bead

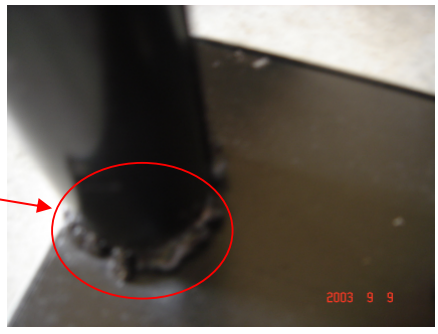


Figure 4.5: Bead

Figure 4.5 is example a defect. The bead is not trim from welding process. Perhaps is the voltage not suitable for this material. An important in this case, not enough experience in this process.

b) Gap

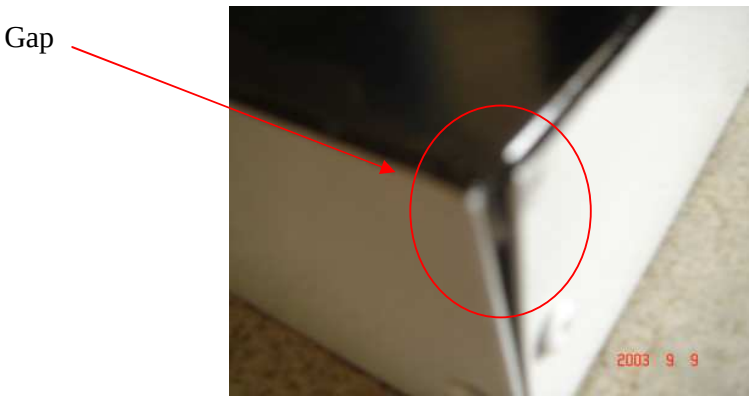


Figure 4.6: Gap

Figure 4.6 is shown a deft in part. It is occur after using rivet process. Because before rivet the pillar not welding in true condition.

4.4 Problem

4.4.1 Literature review problem

The problem encountered during literature review is mainly about the difficulty to get the material to be used in this project. The problem is such as, limited resources to get the relevant material, for example books and internet connection problem. The problem also comes from the material itself such as many non relevant literature reviews about the project title.

4.4.2 Design problems

Many problems come at this stage. The problems came during decision making to best idea for potato peeling. During week two and three many design have been sketched but to pick one design that have all the criteria needed by the specification is hard.

4.4.3 Fabrication problems

Another problem encountered during design process is material selection for the project, the material not enough at lab store, so the material will find at the hardware shop. The material selection also hard to been done because no specific information about available material at the market. Another problem during material selection is the status of person in charge on buying the material and how to buy the material. Another problem came from the machine, the MIG welding always have been spoiled at wire electrode technically.

CHAPTER 5

CONCLUSION AND RECOMMENDATION

5.1 Introduction

This chapter is about problems the project encounter before, during and after the project. This chapter also will discuss about the conclusion of the project. Problem that will be discussed here is the entire problem encountered in every task in the project.

5.2 Recommendation

Several recommendations I would like to express for myself and the faculty for future final year project is:

i. The planning of the project must be done before the project started
ii. More time given to the project
iii. Must have experience to maintenance the machine, example MIG welding.
iv. Expand more the MIG welding at faculty
v. The involvement of the student must be observed more efficient.
vi. Less procedure protocol should be making for material buying process.

5.3 Future work

Future planning for the potato peeling is, produce a more advance machine and have varieties of advantages. Using more good material (example use more efficiency motor).If the upgrade can be done the potato peeling can have better performance, more advantages and more people can use.

5.4 Conclusion

For the conclusion the project achieves several objectives but several objectives are not achieved due to several problem. If more time and material is given the project perhaps will be complete.

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9. http://en.wikipedia.org/wiki/Drill, dated on October 23, 2008

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APPENDIX A

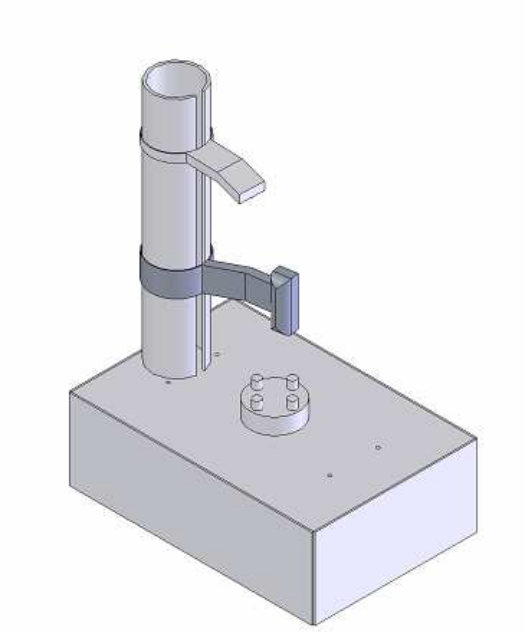


Figure A1: Isometric

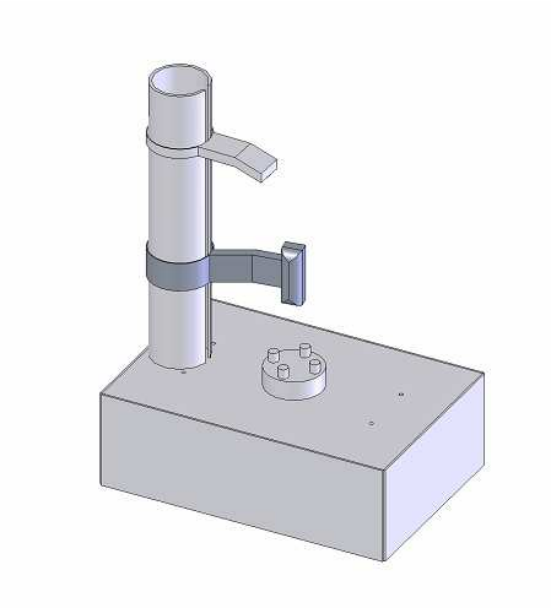
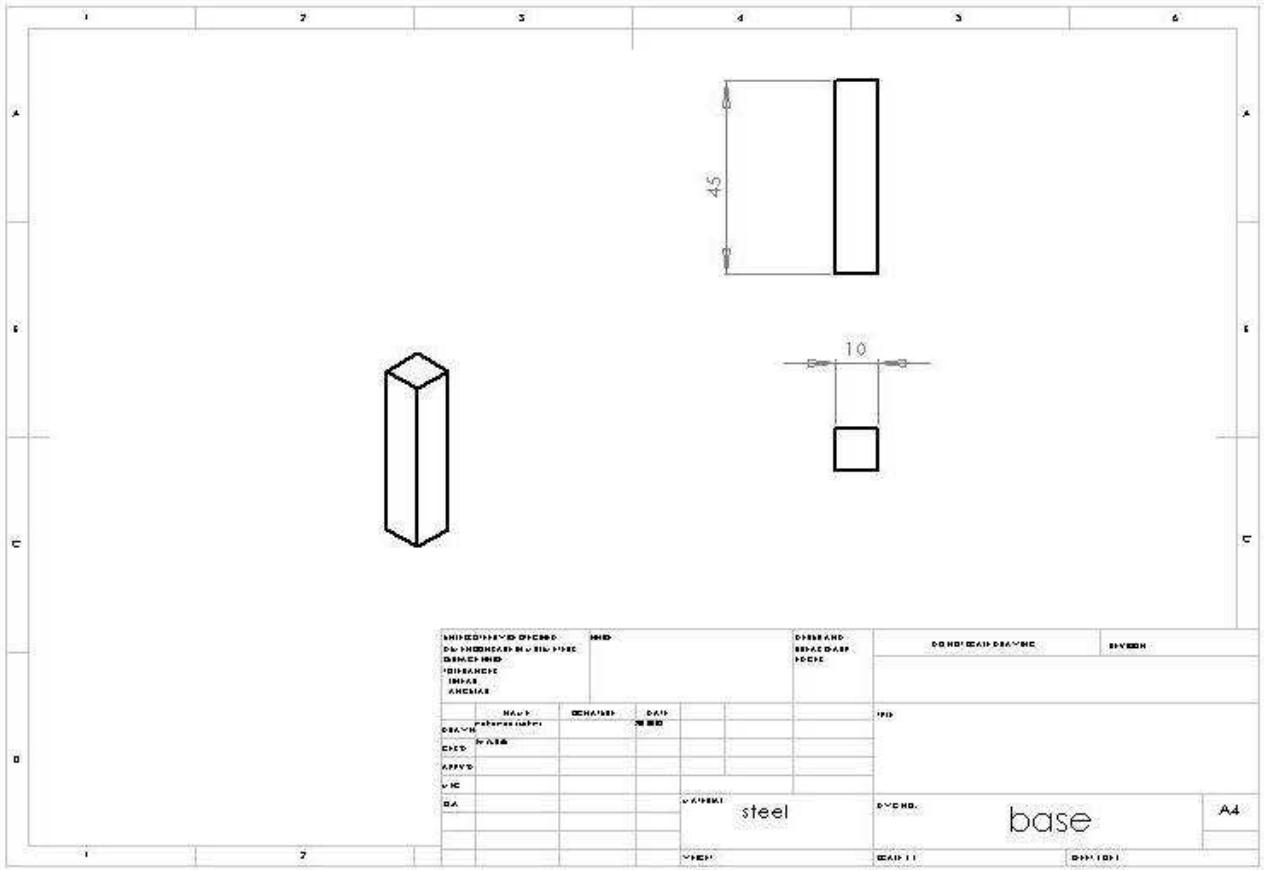


Figure A2: Trimetric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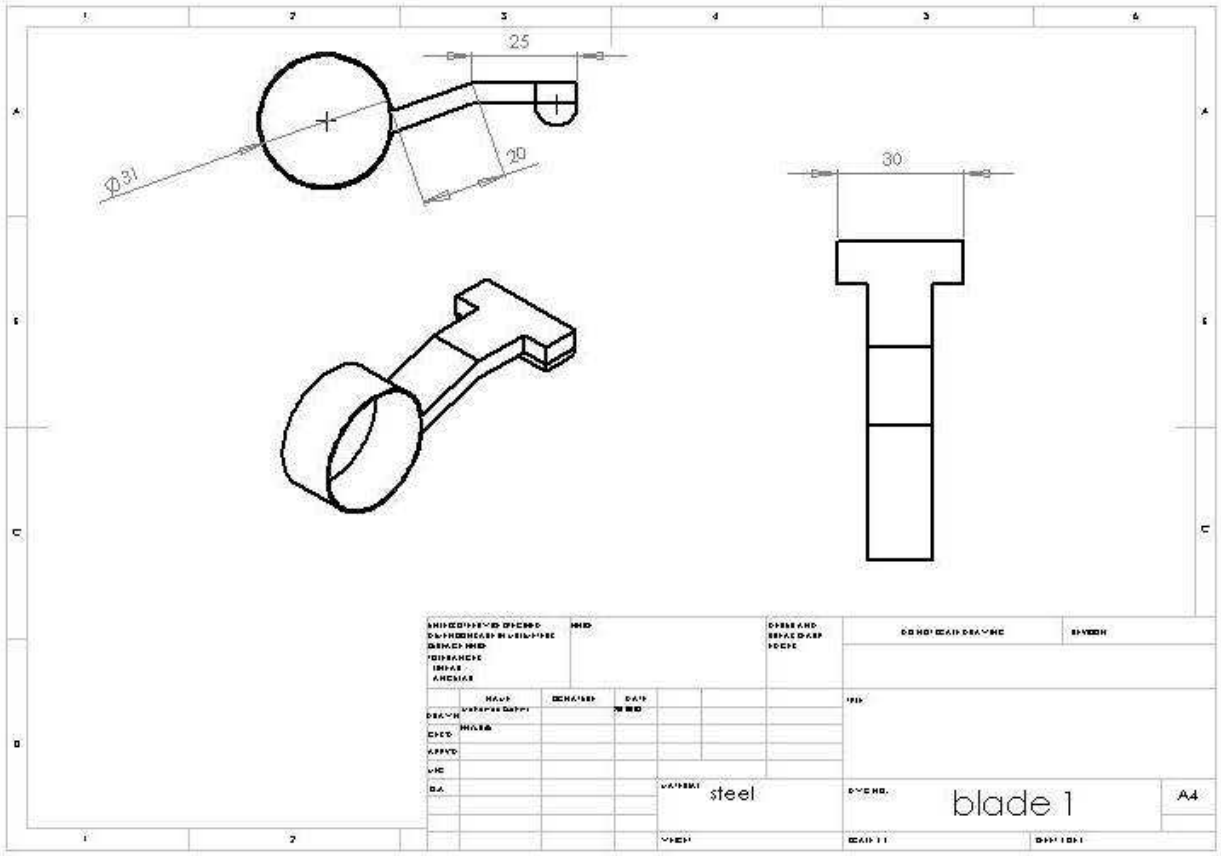
base
A4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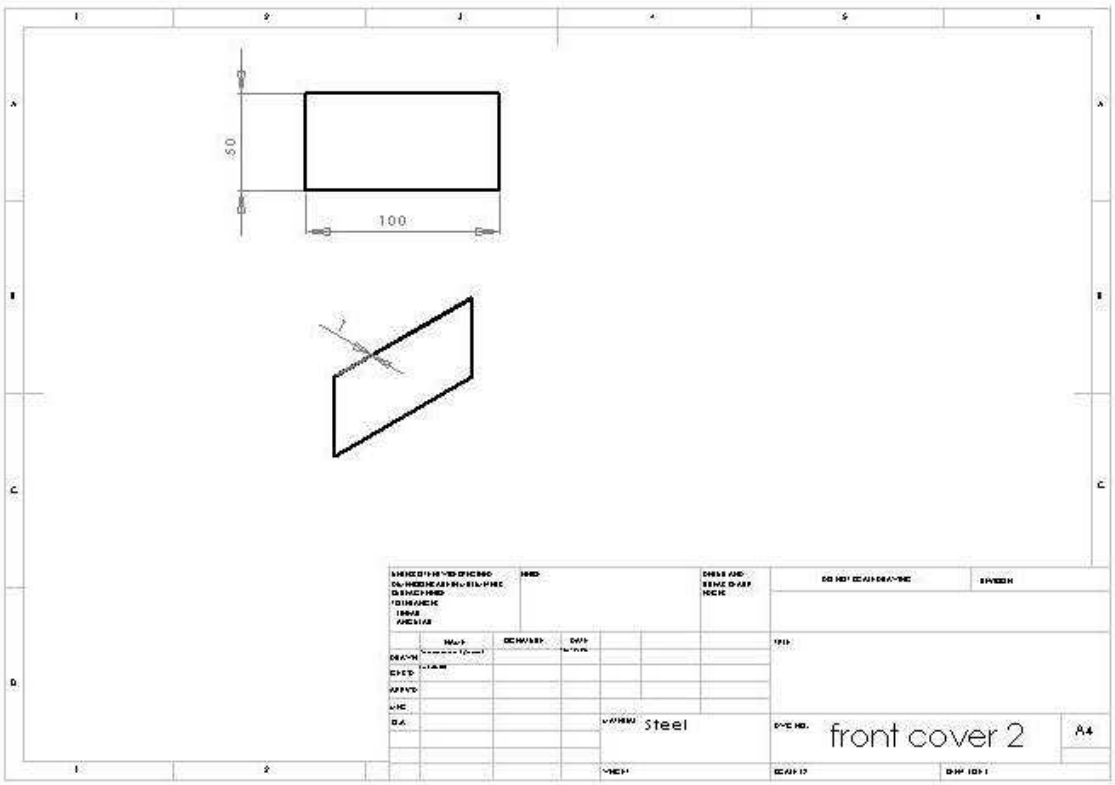
Ø31
20
30
steel
blade 1
A4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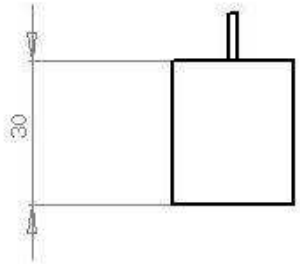
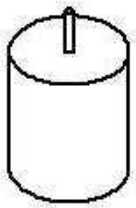
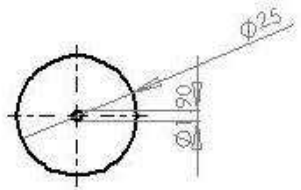
100
7
Steel
front cover 2
A4







UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN MILLIMETERS
SURFACE FINISH:
TOLERANCES:
LINEAR:
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DEBUR AND BREAK SHARP EDGES

DO NOT SCALE DRAWING

REVISION

	NAME	SIGNATURE	DATE
DRAWN	[illegible]		
CHK'D	[illegible]		
APPV'D			
MFG			
Q.A			

MATERIAL: steel

WEIGHT:

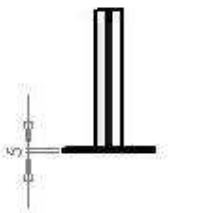
TITLE: MOTOR

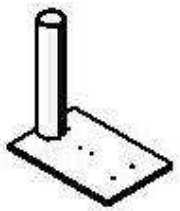
DWG NO: moTOR

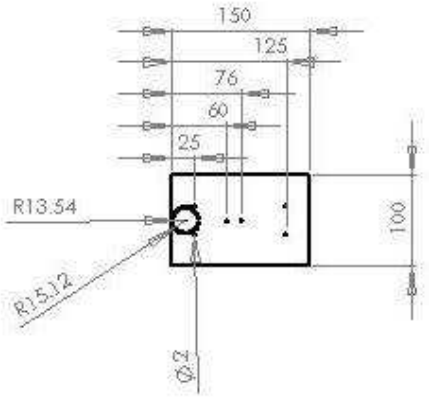
A4

SCALE: 1

SHEET 1 OF 1



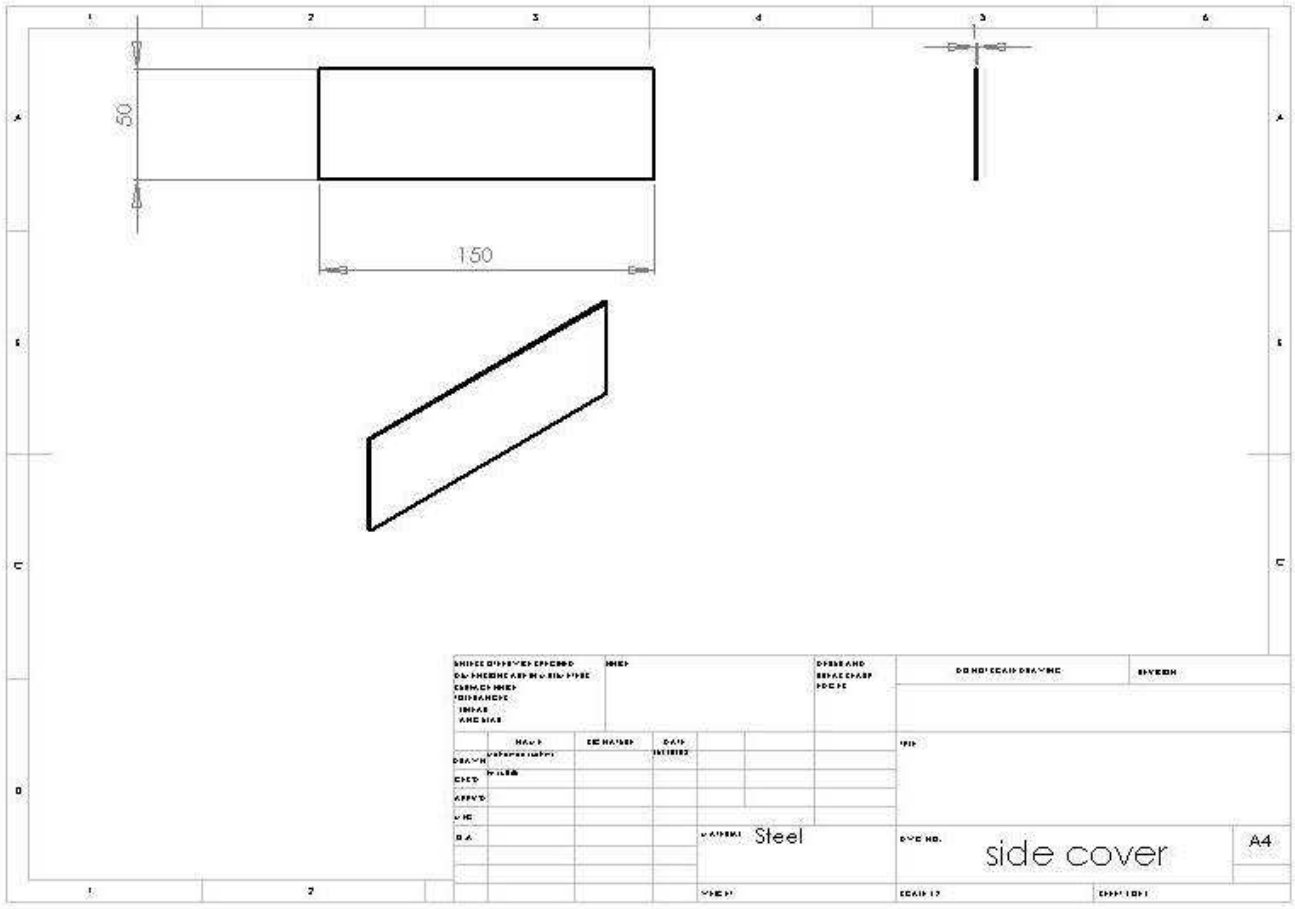




steel

part 1

A4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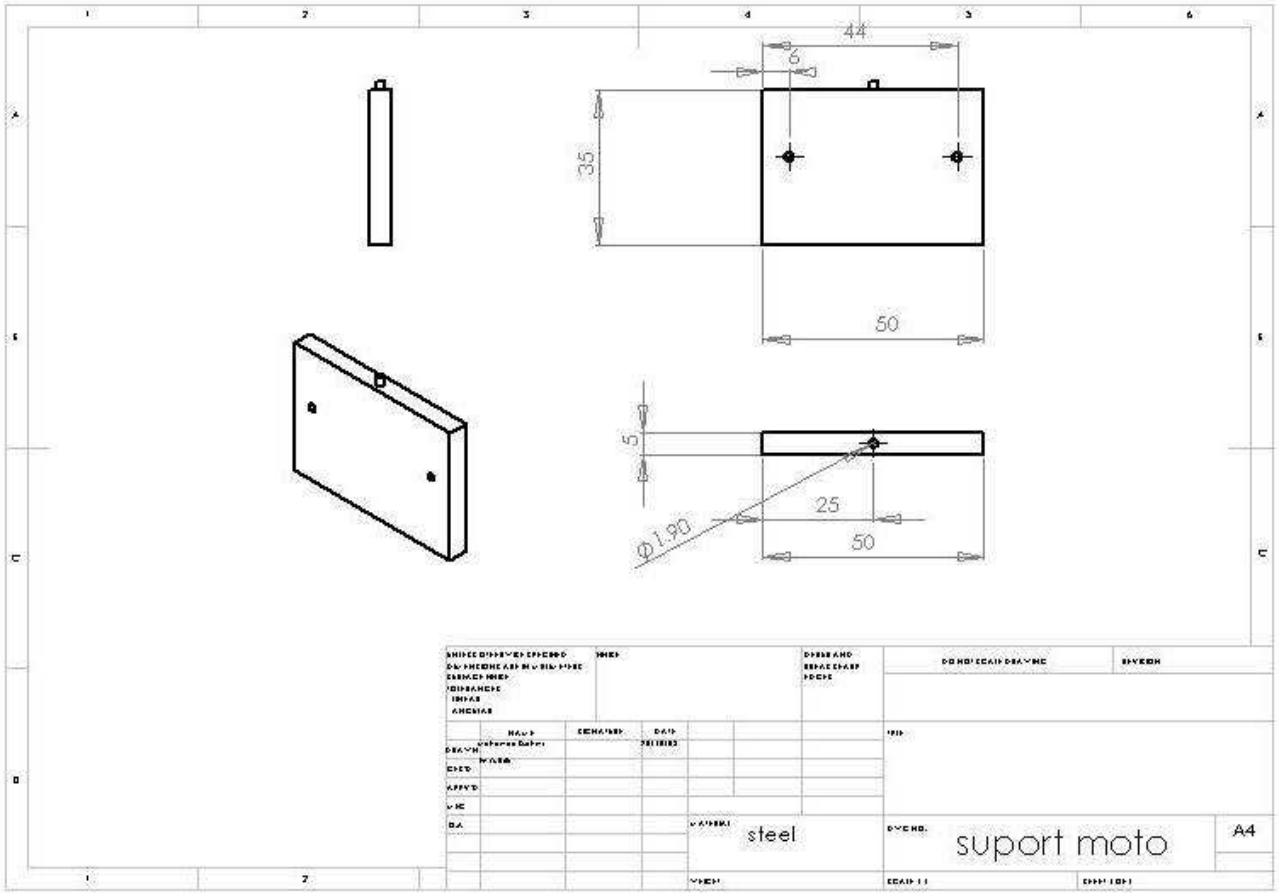
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steel
suport moto
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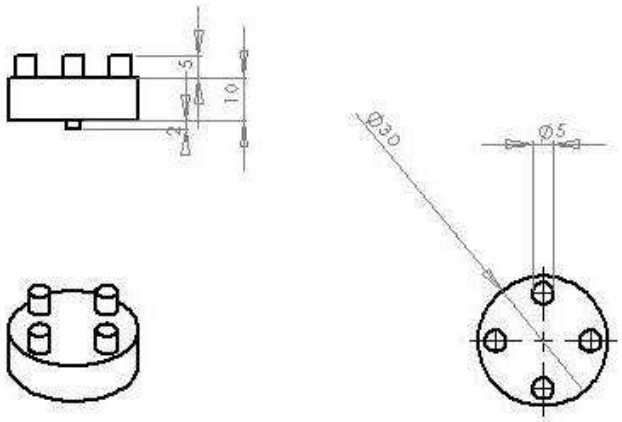

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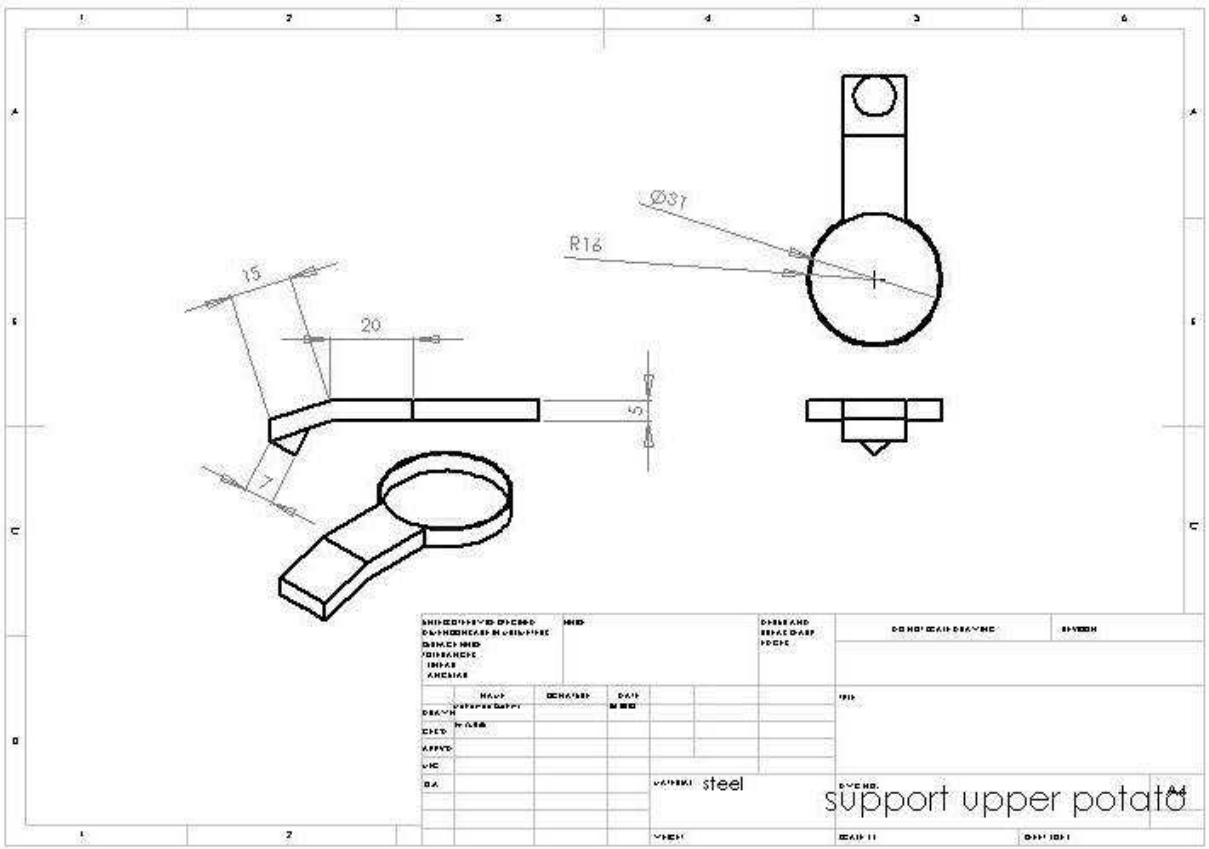
APPVD						
MFG						
QA				MATERIAL Steel	DWG NO. support potato	A4
				WEIGHT	SCALE 1:1	SHEET 1 OF 1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7
steel
support upper potato

APPENDIX C

Figure and list of machine

Figure C1: Pneumatic Shearing Machine

Figure C2: MIG Welding Apparatus

Figure C3: Floor Disc Cutter

Figure C4: Portable Hand-Grinder

FigureC5: Measuring tape

Figure C6: Rivet tool

Figure C7: Hand drill