POLITEKNIK
MALAYSIA
SEBERANG PERAI

MISS CLEANER
(MAKE IT SO SIMPLE CLEANER)

LARRY SUNDARAN S/O MOSES
SATHIISH S/O SEGAREN
MEHESWARAN S/O ASOKAN
SARMILLA D/O DEAVAN

JABATAN KEJURUTERAAN MEKANIKAL
POLITEKNIK SEBERANG PERAI

SESI JUN 2017

SUBMISSION OF FINAL REPORT DECLARATION

DECLARATION FROM STUDENTS (GROUP LEADER)

PLEASES TICK (/)

- [/] We have made all the necessary amendments based on comments and suggestions given by the supervisor and panel.
- [/] Format for report writing is in accordance with the format guidelines.
- [/] We have the approval of the report from the supervisor.
- [ ] This report is the property of Politeknik Seberang Perai.

Student Signature: Date:

Student's Name: LARRY SUNDARAN MOSES Registration Number: 10DKMIS F1077

CERTIFIED BY SUPERVISOR

Comments:

Signature of Supervisor: Date:

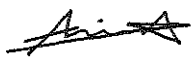
Office Cop:

STUDENTS DECLARATION

We admit that this report is the result of our own, except that each excerpt we have explained the source

1. Signature : 
   Name : LARRY SUNDARAN S/O MOSES
   Registration no : 10DKM15F1077
   Date : 9/10/2017

2. Signature : 
   Name : SATHIISH S/O MURGAYAH
   Registration no : 10DKM15F1141
   Date : 9/10/2017

3. Signature : 
   Name : ARVIND S/O SEGAREN
   Registration no : 10DKM15F1117
   Date : 9/10/2017

4. Signature : 
   Name : MEHESWARAN S/O ASOKAN
   Registration no : 10DKM15F1152
   Date : 9/10/2017

5. Signature : 
   Name : SARMILLA D/O DEAVAN
   Registration no : 10DKM15F1148
   Date : 9/10/2017

PROJECT SUPERVISOR VERIFICATION

Project report entitled 'MISS Cleaner has been submitted, reviewed, and certified to meet the requirements and need of project that have been set for completion Diploma in Mechanical Engineering.

Checked by:

Supervisor Name : Encik Fadli Bin Abdul Hamid

Signature of Supervisor : _____

Date :

Verified by:

Coordinator Name : Mr. Lee Chee Mee

Signature of Coordinator : _____

Date :

LEE CHEE ME
Pensyarah Teknik
Jabatan Kejuruteraan Mekanikal
Politeknik Seberang Perai
Pulau Pinang
13/10/2017

ACKNOWLEDGEMENT

Thankful to God for his bounty and we could complete our review of this perfectly.

At this opportunity, we would like to thank - as high as a thank you to the supervisor Encik Fadli Abdul Hamid for help, support and supervise his patience in our research. From it we feel proud to be one of the students under his supervision. This is because, without the knowledge that he had it is not possible for us to prepare this study perfectly.

Not forgetting also to our team members especially friends Sathiish S/O Murugayah, Larry Sundaran S/O Moses, Arvind S/O Segaren, Meheswaran S/O Asokan and Sarmilla D/O Deavan in preparing the project report. Finally, infinite gratitude we say to our beloved parents for their prayers and blessing that this project report can be successfully prepared. A big thank you to all.

ABSTRACT

Our cleaner will focus on user's convenience and satisfaction by providing something unique and a never seen a cleaner like this before. Why are we creating the unique cleaner design? Is because the old traditional cleaning method lead the users to bear several consequences such as lumbar pain, spend a lot of time, and requires more energy. So, there must be a solution needed to overcome this problem. So, we are designing a new type of cleaner which can enable users to clean the house floor without any hesitate. Our new cleaner design also will help to shorten the time for cleaning process. Besides that, our new cleaner can use in most type of floors which just requires a power supply to function. We have been using the angular velocity theory for further studies about rotation of the motor for the design. We also having some discussion about the fast and almost perfect cleaning process and make components to use it on a long term. In general, our project " Make It So Simple Cleaner" is heavily involved in household floor cleaning process. We also encounter a lot of problems when we are using lathe machine for making plastic bolt with full thread and welding the bolt and nuts for project. From the problems we encounter, we have also got to know the problem-solving method. Finally, our recommendations on our MISS Cleaner are placing the wiper near the brush so that water will sweep off, get a better material which is stronger and convenience, make it easy to carry and movable and placing a heatsink around the motor to release the heat produce by motor quickly.

ABSTRAK

Mesin pembersih kami akan memberi tumpuan kepada kemudahan dan kepuasan pengguna dengan menyediakan sesuatu yang unik dan tidak pernah melihat mesin seperti ini. Kenapa kita mencipta reka bentuk yang bersih yang unik? Adalah kerana kaedah pembersihan tradisional lama menyebabkan pengguna mengalami beberapa akibat seperti kesakitan lumbar, menghabiskan banyak masa, dan memerlukan lebih banyak tenaga. Oleh itu, mesti ada penyelesaian yang diperlukan untuk mengatasi masalah ini. Jadi, kami sedang merekabentuk jenis mesin pembersih yang baru yang membolehkan pengguna membersihkan lantai rumah tanpa teragak-agak. Reka bentuk mesin baru kami juga akan membantu memendekkan masa untuk proses pembersihan. Selain itu, mesin pembersih baru kami boleh digunakan di kebanyakan jenis lantai yang hanya memerlukan bekalan kuasa untuk berfungsi. Kami telah menggunakan teori halaju sudut untuk kajian lanjut tentang putaran motor untuk reka bentuknya. Kami juga membuat beberapa perbincangan tentang proses pembersihan dengan cepat dan sempurna dan membuat komponen untuk menggunakannya dalam jangka panjang. Secara umum, projek kami "Make It So Simple Cleaner" sangat terlibat dalam proses pembersihan lantai rumah. Kami juga menghadapi banyak masalah apabila kami menggunakan mesin lathe untuk membuat bolt plastik dengan benang dan kimpalan bolt dan nut untuk projek kami. Dari masalah yang kita hadapi, kita juga harus mengetahui kaedah penyelesaian masalah. Akhir sekali, cadangan kami pada Cleaner MISS kami meletakkan pengelap berdekatan dengan berus supaya air akan menyapu, mendapatkan bahan yang lebih baik yang lebih kuat dan mudah, memudahkannya untuk dibawa dan bergerak di samping meletakkan heatsink di sekitar motor untuk melepaskan haba dihasilkan oleh motor dengan cepat.

CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF FLOW CHART

CHAPTER 1

INTRODUCTION

1.0 Introduction

Cleaning is the process of removing unwanted substances, such as dirt, infectious agents, and other impurities, from an object or environment. Floor cleaning is a major cleaning occupation throughout the world. The main job of most cleaners is to clean floors.

The principal reasons for floor cleaning are:

- To remove stains, dirt, litter and obstructions
- To remove grit and sand which scratch and wear down the surface
- To remove allergens, dust
- To make the environment sanitary
- To maintain an optimum traction

There are two types of cleaning methods of floor exist which is traditional method and new method. Those days, most of us will clean the house floor using mop stick, brush, detergent and sponge. We need to spend some bucks on buying this type of equipment to continue with the traditional cleaning method. Besides that, it also consumes a lot of time to do the cleaning process.

The person who are suffering from asthma, skin allergic and breathing problem will find difficulties in doing this method is because the cleaning agent that we are using for traditional cleaning method is rich in chemical substances. So that it will produce some strong smell which will lead the asthma person to suffer.

Nowadays, floor scrubber is a floor cleaning device which is commonly use in huge area floor such as shopping mall, company and buildings. It can be simple tools such as floor mops and floor brushes, or in a form of walk-behind or ride-on machines to clean larger floor areas by injecting water with cleaning solution, scrubbing, and lifting the residuals off the floor. With the advancement in robotics, autonomous floor-scrubbing robots are available as well. Automatic floor scrubbers, also known as auto scrubbers, are a type of floor cleaning machine that are used to scrub a floor clean of light debris, dust, oil, grease or floor marks. These machines have either rotary(disk) or cylindrical scrubbing head and an automated system for dispensing cleaning solution and then vacuuming it up. So, in one pass over the floor, a user can dispense cleaning, scrub it into the floor, then vacuum it all up with an auto scrubber squeegee attachment at the back of the machine. Auto scrubbers have a separate dispensing (solution) tank and collection (recovery) tank to keep the clean water separate from the dirty water and can be categorized into one of two main types: walk behind or riding.

Floor scrubbers are a more hygienic alternative to traditional cleaning methods such as a mop and bucket. Environmentally safe soaps can be used in conjunction with a reduced water system to save on both the amount of chemicals released into the environment as well as the amount of gray water produced. Some floor scrubbers are even capable of cleaning without a water and chemical system at all. Most auto scrubbers can't reach edges, corners, clean under obstructions such as drinking fountains, and can't fit into alcoves. Therefore, mopping is needed to clean areas the auto scrubber can't reach. Some manufacturers now produce Floor Scrubbers with Orbital / Oscillating brush decks allowing edges, corners and overhangs to be fully cleaned.

Modern floor scrubbers have a pre-sweep option that removes the need to sweep the floor before scrubbing. The pre-sweep brush head is placed in front of the vacuum system to collect dust and debris before it can block the vacuum system.

In the past, it was important to sweep the floor before scrubbing to remove any debris and dust that could clog the vacuum hose or build up in the vacuum motor, which can decrease performance. If this happens, the vacuum hose may need to be removed to clear the obstruction and/or the vac motor may need to be blown out with compressed air.

Stripping Solution should never be used as it can cause damage to the solution dispensing system, but can still be vacuumed up by the machine without harm. Occasionally, the solution system should be flushed with water mixed with vinegar to remove any soap and calcium deposits that could build in the solution system.

After each use, the dispensing (solution) and especially the collection (recovery) tanks should be emptied and rinsed out to prevent dirt build up. Also, the pads/brushes, vac hose, and squeegee should also be rinsed to prevent dirt build up. The vac motor should be run for several minutes afterwards to remove any moisture that could be present in the vac motor to reduce chances of corrosion that could damage the vac motor. Failure do to this maintenance could cause in a loss of vacuum airflow and increase in costly repairs.

Nowadays, people are also preferring to clean their floor by using floor buffer which is highly recommendable for house usage. A floor buffer or rotary floor machine is an electrical floor scrubber that is used to clean and maintain non-carpeted floors, such as hardwood, marble, tile or linoleum. It is also known as a floor polisher or burnisher if it is a high-speed floor buffer with a pad that rotates at over 1000 RPM.

Closely resembling a large upright, wide-based vacuum cleaner with handlebar controls and requiring two-handed steering, a floor buffer uses one or more variable-speed circular rotary brushes to dislodge dirt and dust from flat surfaces. They have a large, round scrubbing pad which is spun in one direction by a small motor, usually mounted directly over the centre of the pad.

Larger powered floor buffers are used in schools, hospitals, offices and public buildings. These have wheels and are powered to allow the user to easily move and clean items stuck on floors. Scaled-down versions are available for home use and often sold as hard floor cleaners.

But all this floor scrubber is only recommending using in dry floors and huge areas. Is because, floor scrubber is in big size which does not fit into small portion of area. Although floor buffer comes in small size but main purpose of using floor buffer is to polish the floor. So, floor buffers are not really meeting our motive.

So, there are only one method left for household floor cleaning process which is the traditional method. Is because this method does not use any electric current? Anyhow, this traditional method also has their own disadvantages as we were discussed above.

1.1 Problem Background

Presence generation housewives seems to be busy with their career and this leads them to forget about their house responsibility including cleanness of the household floors. Through the old method cleaning the household floors with the clothes will take some long time to complete. So, this cause them tiredness. Besides that, the body posture of the floor cleaners is slightly bent whenever they clean the floor and this leads them to feel the back pain. Furthermore, presence cleaner is not suitable to use in household floor region but at the same it is purely designed to use in larger area such as shopping mall. So, a cleaner machine that is suitable to be used at home need to be invent or design to avoid those chronic problem to be happen again.

1.2 Problem Statement

The existed floor Scrubber is difficult to use at home because it is big in size. Besides that, it is also costly. This floor cleaner is not advisable to use in household floor.

1.3 Objective

- To produce minimal cost and medium size floor cleaner
- To minimize time taken to clean the household floors.
- To be free from back pain
- To avoid detergent being contact with user

1.4 Scope

- To study the method of preparation and assembly of the machine.
- Motor must be placed in lower part of the project model which is located below the adjustable handle
- Project model should be water resistant
- Project model must be in light weight to enable skinny people to carry
- Brush should be in removable design
- Detergent must be low in acidity contain

1.5 Definition of term

Terms that can describe our project more details in this study are:

The kinetic energy of a rotating object is analogous to linear kinetic energy and can be expressed in terms of the moment of inertia and angular velocity. The total kinetic energy of an extended object can be expressed as the sum of the translational kinetic energy of the center of mass and the rotational kinetic energy about the center of mass.

The expressions for rotational and linear kinetic energy can be developed in a parallel manner from the work-energy principle. Consider the following parallel between a constant torque exerted on a flywheel with moment of inertia, I and a constant force exerted on a mass, m, both starting from rest.

For the linear case, starting from rest, the acceleration from Newton's second law is equal to the final velocity divided by the time and the average velocity is half the final velocity, showing that the work done on the block gives it a kinetic energy equal to the work done.

Work done is the force multiplied with the distance moved by the force.

($W = T\theta$).

For the rotational case, also starting from rest, the rotational work is $\tau\theta$ and the angular acceleration α given to the flywheel is obtained from Newton's second law for rotation.

The angular acceleration is equal to the final angular velocity divided by the time and the average angular velocity is equal to half the final angular velocity. It follows that the rotational kinetic energy given to the flywheel is equal to the work done by the torque.

Next, power is the ratio between the work done and the time taken. ($P = 2\pi (n_{rpm} / 60) T$) Furthermore, torque is the turning force through a radius. ($T=Fr$).

1.6 Conclusion

As a conclusion, there must be a solution have to be created to overcome this problem. So, we decided to come with a solution that minimize those problems. We came with an idea to invent a floor cleaner machine which can use in household floors without any hesitate. The traditional method is causing several problems which can lead the person to feel uncomfortable. In the following chapter, our group will attribute the arisen problems by using appropriate theories, concept and research.

CHAPTER 2

LITERATURE REVIEW

2.0 Introduction

In this chapter, we have made some research on and about all aspects of our project for the production of the 'MISS CLEANER'. Our group found that there are several aspects that need to be addressed so that the products are high quality and more efficient.

2.1 Study on Existing Project

In this chapter researcher describes the literature review and the researches that has been made for this project. The study was conducted on existing floor cleaner. Furthermore, there is a study of the components used in this floor cleaner. By doing a study on this existing floor cleaner, there are two type of motors that is AC Motor and DC Motor. Their first difference is in how it functions and methods of transform power.

2.2 Study on Types of Mechanism

2.2.1 DC MOTOR (Small size)

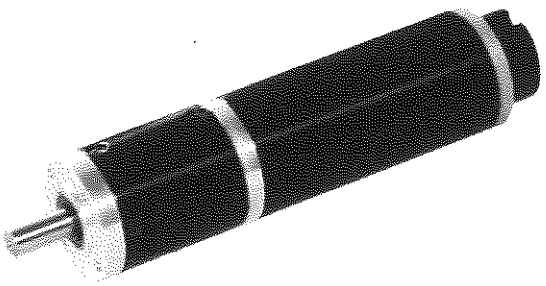


Figure 2.1: Dc Planetary Geared Motor 52JX300K

Voltage: 24V DC

No-Load Current: <0.8A

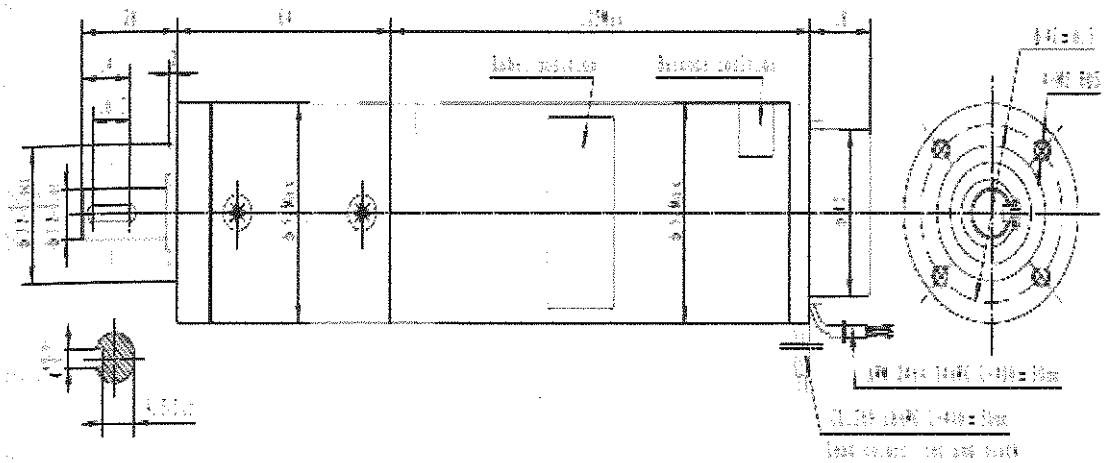
No-Load Speed: 62RPM

Rated Speed :50RPM

Rated Torque :10.0N.m Min.

Gear Ratio: 65/1

Magnetic Encoder :5V DC, 2 Channel, 8ppr



Advantage and disadvantage

This design standard parallel shaft (helical or helical/spur) and right angle (worm or helical/worm) gearboxes in-house, and all gearheads are manufactured and assembled in our main factory in Iowa.

If gear motor cost, gearhead noise, and overall gear motor length are critical factors, this design engineers often drop the requirement for a planetary gearhead and instead select a more compact right-angle or inline (helical) gearhead solution. However, there are certain applications where the benefits of a planetary gearhead outweigh its disadvantages. Below is a brief review of advantages and disadvantages of small planetary gearheads used with fractional horsepower small motors (FHP = <746 Watts).

Advantages of planetary gearheads:

Compact size and low weight – as much as 50% reduction with same torque output. High power density – several planets share the load rather than one gear, the more planets the more sharing. Longer gear life at similar loads. Gearing can be very accurate with virtually no backlash. High efficiency – 95% per stage is common. Typical ratio per stage is 9:1, 4 stages 9000:1Coaxial arrangement – no offset output shaft Modular, most planetary stages can be stacked.

Disadvantages of planetary gearheads:

Noisier Operation – some planetary gearheads are noisy. Gearing must be accurate to assure load sharing. High bearing loads can lead to early wear in dead stud or sleeve bearing construction. Generally, grease lubricated (oil bath is the better).High ratio of length to diameter when using multiple stages (gearhead gets very long).High cost if low backlash and long life are required.

Nominal Voltage:

The voltage that corresponds to the highest motor efficiency. Try to choose a main battery pack which most closely matches the nominal voltage of your drive motors. For example, if the motor's nominal voltage is 6V, use a 5x 1.2V NiMh pack to get 6V. If your motor operates at 3.5V nominal, you can use either a 3xAA or 3xAAA NiMh pack or a 3.7V LiPo or LiIon pack.

If you operate a motor outside of its nominal voltage, the efficiency of the motor goes down, often requiring additional current, generating more heat and decreasing the lifespan of the motor. Aside from a "nominal voltage" DC motors also have an operating voltage range outside of which the manufacturer does not suggest operating the motor. For example, a 6V DC Gear motor may have an operating range of 3-9V; it will not operate as efficiently as compared to 6V, but it will still run well.

No Load RPM:

This is how fast (angular velocity) the final output shaft will rotate assuming nothing is connected to it. If the motor has a gear down and the motor's speed is not indicated separately, the no load rpm value is the shaft speed after the gear down. The motor's RPM is proportional to the voltage input. "No Load" means the motor encounters no resistance whatsoever (no hub or wheel mounted to the end). Usually the No Load RPM provided is associated with the nominal voltage.

Power rating:

If a motor's power is not listed, it can be approximated. Power is related to current (I) and voltage (V) by the equation P = I*V. Use the no load current and nominal voltage to approximate the motor's power output. The motor's maximum power (which should only be used for a short time) can be approximated using the stall current and nominal voltage (rather than maximum voltage).

Stall Torque:

This is the maximum torque* a motor can provide with the shaft no longer rotating. It is important to note that most motors will sustain irreparable damage if subjected to stall conditions for more than a few seconds. When choosing a motor, you should consider subjecting it to no more than ~1/4 to 1/3 the stall torque.

Stall Current:

This is the current the motor will draw under maximum torque* conditions. This value can be very high and should you not have a motor controller capable of providing this current, there is a good chance your electronics will fry as well. If neither the stall nor the nominal current are provided, try to use the motor's power rating (in Watts) and the nominal voltage to estimate the current: Power [Watts] = Voltage [Volts] x Current [Amps]

General Specifications:

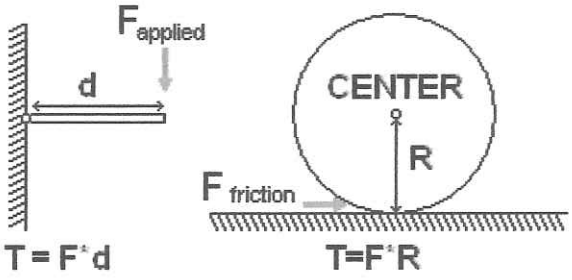
A DC motor's general specifications usually include weight, shaft length and shaft diameter as well as motor length and diameter. Other useful dimensions include the location of mounting holes and thread type. If only the length or diameter are provided, refer to an image, photo or scale drawing to get a sense of the other dimensions based on the one known value.

Figure 2.2: DC gear motors

Torque

"Torque" is calculated by multiplying a force (acting at a distance away from a pivot) by the distance. A motor rated at a stall torque of 10Nm can hold 10N at the end of 1m. Similarly, it could also hold 20N at the end of 0.5m (20 x 0.50 = 10) and so on.

Note: 1 Kg * force of gravity (9.81m/s2) = 9.81N (~10N for quick calculations)



Ideal Specifications

Many motor manufacturers are now listing additional information that can be very useful when selecting the right motor. Below is some additional information you might come across when searching for DC motors:

Voltage vs. RPM:

Ideally, the manufacturer would list the graph of a motor's voltage vs. rpm. For a quick approximate, consider using the no-load rpm and nominal voltage: (nominal voltage, rpm) and the point (0, 0). See "gear down" below for motors with a gear down.

Torque vs. Current:

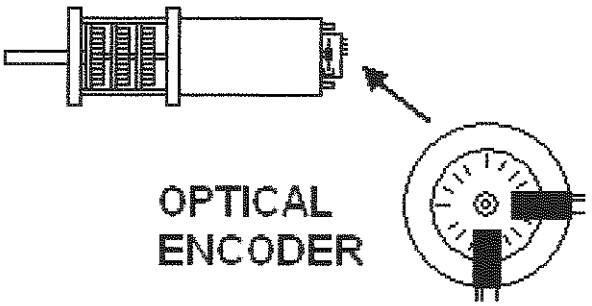
Current is a value that cannot be easily controlled. DC motors use only as much current as they need. Ideal specifications include this curve, and approximations are not easily reproduced. The stall torque is related to the stall current. A motor that is prevented from turning will consume maximum ("stall") current and produce the maximum torque possible. The current required to provide a given torque is based on many factors including the thickness, type and configuration of the wires used to make the motor, the magnets and other mechanical factors.

Technical specifications or 3D CAD drawing:

Many robot builders like to draw their robot on the computer before purchasing the necessary parts. Although all motor manufacturers have a CAD drawing with the dimensions, they rarely make it available to the public. Ideal motor dimensions include the basics listed above, as well as mounting hole locations and thread type. Ideally the materials used to make the motor, gears and winding as well as separate dimensions for the motor and the gear down would also be given.

Gear down:

DC motor manufacturers that also produce the corresponding gear down for a motor must list the gear down ratio. The gear down acts to increase torque and reduce rpm. The No Load RPM value given is always that of the last output shaft after the gear down. To find the angular velocity of the motor shaft before the gear down, multiply the value by the gear ratio. To obtain the motor's stall torque before the gear down, divide the stall torque by the gear down. The material used to make the internal gears is usually plastic or metal and are chosen to be able to withstand the maximum torque rating.

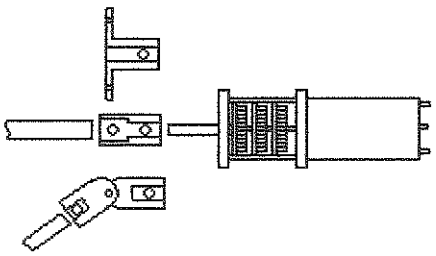


Accessories:

An optical encoder is the most common accessory for a gear motor. Finding the right size of optical encoder for your motor can be very difficult if it is not made from the same company. An optical encoder allows you to track both the direction of rotation and number of revolutions of the motor. With the right code, an optical encoder can also give you the angle of the shaft.

Hubs and Shaft Couplers:

Secondary items such as hubs (used to connect the output shaft to other items) are slowly becoming available for varying sized output shafts. Only a few manufacturers provide generic shaft couplers. If you cannot find the appropriate coupler, consider using spur gears to offset the shaft to that of a different size. The image below shows three different types of couplers. The hole in the hub is for a threaded screw ("set screw") which presses tightly against the shaft.



2.2.2 DC MOTOR (Big size)

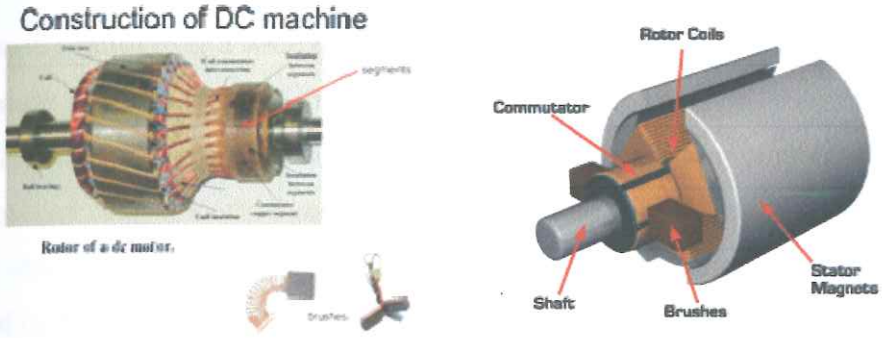


Figure 2.3: Big size DC Motor

DC motor is any of a class of rotary electrical machines that converts direct current electrical power into mechanical power. The most common types rely on the forces produced by magnetic fields. Nearly all types of DC motors have some internal mechanism, either electromechanical or electronic, to periodically change the direction of current flow in part of the motor.

DC motors were the first type widely used, since they could be powered from existing direct-current lighting power distribution systems. A DC motor's speed can be controlled over a wide range, using either a variable supply voltage or by changing the strength of current in its field windings. Small DC motors are used in tools, toys, and appliances. The universal motor can operate on direct current but is a lightweight motor used for portable power tools and appliances. Larger DC motors are used in propulsion of electric vehicles, elevator and hoists, or in drives for steel rolling mills. The advent of power electronics has made replacement of DC motors with AC motors possible in many applications.

Advantage and disadvantages:

Advantages of DC motors:

Speed control over a wide range both above and below the rated speed: The attractive feature of the dc motor is that it offers the wide range of speed control both above and below the rated speeds. This can be achieved in dc shunt motors by methods such as armature control method and field control method. This is one of the main applications in which dc motors are widely used in fine speed applications such as in rolling mills and in paper mills.

High starting torque: dc series motors are termed as best suited drives for electrical traction applications used for driving heavy loads in starting conditions. DC series motors will have a staring torque as high as 500% compared to normal operating torque. Therefore, dc series motors are used in the applications such as in electric trains and cranes.

Accurate steep less speed with constant torque: Constant torque drives is one such the drives will have motor shaft torque constant over a given speed range. In such drives shaft power varies with speed.

Quick starting, stopping, reversing and acceleration

Free from harmonics, reactive power consumption and many factors which makes dc motors more advantageous compared to AC induction motors.

Disadvantages of DC motors:

- High initial cost
- Increased operation and maintenance cost due to presence of commutator and brush gear
- Cannot operate in explosive and hazard conditions due to sparking occur at brush (risk in commutation failure)

2.2.3 AC MOTOR

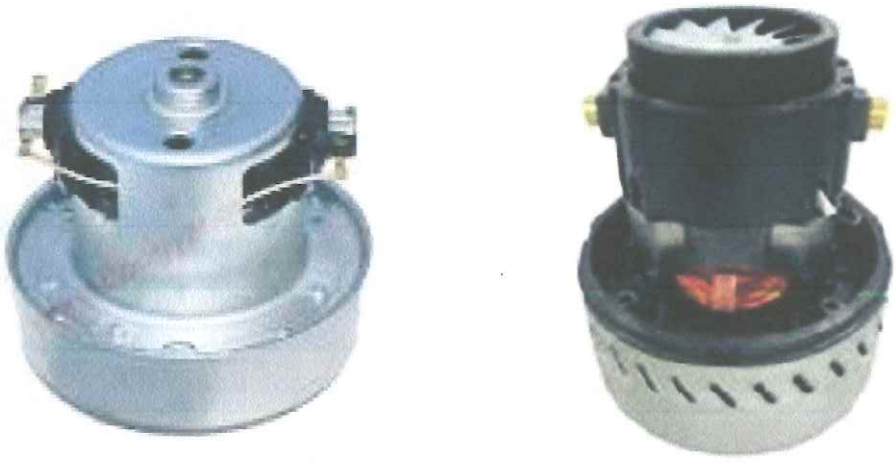


Figure 2.4: AC Motor

AC Motor is called an **induction motor** in which the electric current in the rotor needed to produce torque is obtained by electromagnetic induction from the magnetic field of the stator winding. An induction motor can therefore be made without electrical connections to the rotor. An induction motor's rotor can be either wound type or squirrel-cage type.

Three-phase squirrel-cage induction motors are widely used in industrial drives because they are rugged, reliable and economical. Single-phase induction motors are used extensively for smaller loads, such as household appliances like fans. Although traditionally used in fixed-speed service, induction motors are increasingly being used with variable-frequency drives (VFDs) in variable-speed service. VFDs offer especially important energy savings opportunities for existing and prospective induction motors in variable-torque centrifugal fan, pump and compressor load applications.

Advantage & Disadvantage of AC Motor

The advantages of induction motors (AC MOTOR):

- They are robust and sturdy. They can operate in a wide range of industrial conditions.
- Induction motors are cheaper in cost.
- The construction is simple. Induction motors do not have accessories such as brushes, slip rings or commutators
- Low Maintenance. Very little maintenance is required for induction motors.
- It does not require any complex circuit for starting. The three-phase motor is self-starting while the single-phase motor can be made self-starting simply by connecting a capacitor in the auxiliary winding.
- They can be operated in hazardous environments and even under water as they do not produce sparks unlike dc motors

Disadvantage of induction motor (AC MOTOR):

- Speed control in induction motors is difficult
- At low loads, the power factor drops to very low values
- Efficiency drops at low loads. This is because, the low power factor causes a higher current to be drawn. This results in higher copper losses.
- Poor starting torque. Induction motors have notoriously low starting torque. Hence, they cannot be used for application such as traction and in lifting loads. Slip ring induction motors can be made to produce good starting torque by adding resistors to the rotor windings.