

# Investigation into the need for Practical Training for Automobile Engineering Option Students of Cape Coast Polytechnic at Siwdo-Kokompe

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## Abstract

The clear gap between the Polytechnic programmes and the relevant practical skills needed for industrial employment must be analyzed. The Higher National Diploma (HND) in Mechanical Engineering Automobile option at Cape Coast Polytechnic is geared towards the maintenance and manufacturing of the mechanical aspect of the automobile. Due to the fact that substantive analysis must be made to justify that the students lack hands on practical training, the quantitative approach methodology was used. The target groups for the methodology are the HND Mechanical Engineering students at Cape Coast Polytechnic and the cluster of Automobile Mechanics at Siwdo Kokompe in Cape Coast. The methodology involves administering of questionnaires and interviews to these students and mechanics. The results reveal that students have no practical training at Siwdo Kokompe. Conclusively, the students must go to Siwdo Kokompe on schedule basis for practicals.

**Keywords:** Higher National Diploma, Automobile Engineering, Lubrication, Shock absorbers, Garage.

## INTRODUCTION

Actually and currently, there is an identifiable clear gap between tertiary institution programmes, particularly that of the Polytechnics and the relevant skills as well as knowledge required in the industries or organizations.

Thus industries both private and public must be adequately involved in the development of such programmes. These industries must fully team – up, collaborate and coordinate with the Polytechnics for the enhancement of the practical aspects of such programmes. All the Higher National Diploma (HND) programmes of the Polytechnics in Ghana are tailored towards direct industrial middle level manpower requirement, so therefore their industrial practical aspects are very vital and must be fulfilled.

The Higher National Diploma Mechanical Engineering programme at the ten Polytechnics in Ghana is divided into three options namely Production, Plant and Automobile. However some Polytechnics such as those at Ho, Koforidua and Kumasi offer the HND Mechanical Engineering Automobile option as a separate programme on its own and it is called HND Automotive Engineering. But in all cases the syllabus and modes of training are geared towards the production of middle level manpower for the automobile industries.

HND mechanical engineering (automobile option) offered at the ten polytechnics in Ghana (Cape Coast Polytechnic) is the training of students for the manufacturing, sales and maintenance of the mechanical aspects of the automobile. Therefore, there is the serious need for a comprehensive practical training for these students at Cape Coast Polytechnic at Siwdo Kokompe. The objective of this research is to reveal the problems associated with the lack of the practical training, determine their effects and suggest possible solutions for implementation at the Cape Coast Polytechnic.

## Cape Coast Polytechnic

The establishment and operation of Cape Coast Polytechnic as a second cycle institution was in 1984 and 1986 respectively. This operation existed for six years under the administration of the Ghana Education service with the main purpose of offering Intermediate, City and Guilds courses (non – tertiary courses) to students in the Central Region in particular and Ghana as a whole. In accordance with the Government of Ghana's Educational Reforms concept in 1987 and the Executive Instrument of PNDCL 32 of January 1993, this Polytechnic was upgraded to tertiary level for the running of Higher National Diploma (HND) with direct administration from the National Council for Tertiary Education (N.C.T.E) which is a subsector of the Ministry of Education. The HND courses are full time courses at their starting with plans to run part time HND courses in future whiles all the non- tertiary courses became completely part time.

Subsequently, three schools namely Engineering, Business and Management Studies and Applied Science and Arts as well as twelve academic departments of these schools were created. The HND courses offered are Marketing, Accountancy, Secretaryship and Management Studies, Building Technology, Civil Engineering,

Electrical/ Electronic Engineering, Mechanical Engineering, Statistics, Tourism, Hotel Catering and Institutional Management and Textiles Technology.

In 2007, the Parliament of Ghana passed the new Polytechnic act 745. This act becomes operational by mandating the Polytechnics to run first, and higher degree programmes. Also by this act the Department of Building Technology of the School of Engineering in November 2008 started the Bachelor of Technology in Building Technology. Thereafter in 2011, the Department of Mechanical Engineering started Bachelor of Technology in Mechanical Engineering with options in Automobile, Plant and Production.

The mission statement of Cape Coast Polytechnic is;

- Building national capacity by applying science and technology to solving socio- economic problems
- To produce or train quality middle level management personnel for the Ghanaian industrial development.
- To improve educational training through competency based training needs for total accelerated national development
- Skills acquisition

### **School of Engineering**

Engineering is the application of science, power and natural resources to the benefit of man. The establishment of the School of Engineering was in 1994 initially with three academic departments namely Building and Civil, Electrical/Electronic and Mechanical. In June 2006, the department of Building Technology and Civil Engineering was separated into two autonomous departments namely Building Technology Department and Civil Engineering Department. Therefore, the school has now got four academic departments that produce engineering as well as technological graduates.

### **Mechanical Engineering Department**

HND Mechanical Engineering at Cape coast Polytechnic since it's start has been divided into three main specialized fields namely Automobile, Production and Plant. These specific fields are geared towards promoting the creative power of students to cope with the challenges they will encounter as engineers in the industries and academia.

Basically, the application of scientific principles to maintenance, operation and manufacture of mechanical devices like automobiles, aircraft engines, heating systems, cooling systems, compressors, pumps, tools among others is what mechanical engineering entails. Effective management of natural resources, materials as well as human resource are also dealt with in mechanical engineering.

### **Mandate of Mechanical Engineering Department**

- Training through practical learning using simulation as actual working situation
- Promoting team work and development through workshops, project among others
- To produce middle skilled practical and theoretical oriented middle level manpower that have the skills of creativity, clarity and efficiency in technological communication
- To train engineers that must interpret engineering drawings, design and manufacture mechanical components as well as present engineering reports among others.

### **Competency – Based Training (CBT)**

The learning and teaching methods that responds efficiently to skillful requirement of people for upgrading, entering and remaining in industries is referred to as competency – based training. All activities in the classroom, laboratory and the field (Siwdo– Kokompe) are geared towards competencies as well as ability to perform a professional task. Skill instructors with management skills are important for supervision, evaluation and implementation of competency- based training. By this the graduate must be well equipped for hands on practical work that is demonstrated for specified jobs.

CBT is also the application of theoretical knowledge to participation centered do it yourself concept. Thus the main benefit of CBT is to research or the link between CBT and this research is that the HND Mechanical Engineering Automobile option students at Cape Coast Polytechnic will become practically competent by doing continuous practical work during the semesters at Siwdo Kokompe at Cape Coast. This means that the students

will no longer be only theoretical oriented engineers but will be able to maintain automobiles efficiently. They will also be practically self – confident and establish their own automobile firms.

## **REVIEWED LITERATURE**

### **History and location of Siwdo – Kokompe**

Automobile mechanics working on all aspects of automobiles were formally located at the present day Ewim Nurses Flat at Kotokoraba in the Central Business Center at Cape Coast in the Central Regional Capital. At that time the area has seen springing up of cluster of workshops for craftsmen who do various types of repairs and services on automobile. At this location, there were shops of everything on automobiles. These craftsmen or artisans are automobile electricians, sprayers, vulcanizers, welders and mechanics.

These artisans were relocated in the year 1968 to their present premises at Siwdo Kokompe to pave way for the construction of the Ewim Nurse Flat. The Siwdo Kokompe cluster of craftsmen is located between the Adisadel Estates and the Robert Mensah Sports Stadium, thus on the right side of the John Mensah Sarbah dual carriage road when going to the stadium from the Pedu Junction. Initially, a little over forty shops were found at Siwdo Kokompe but now more than 200 shops can be seen at the place including machine shops, wind screen repairs shops, upholstery shop, blacksmith shops and iron casting shops.

Light and heavy duty automobile mechanics as well as specialized automobile mechanics were also located at Siwdo Kokompe. The specialized mechanics include automatic gear box specialist, carburetor specialist among others. On the average, about 300 vehicles visit Siwdo Kokompe on daily basis for all types of repairs. The activities at Siwdo Kokompe is said to be the main factor for the pollution of the Fosu Lagoon. These activities are welding, spraying automobile, electrical works, fabricating, vulcanizing, and blacksmithing among others.

### **Employment opportunities for Cape Coast Polytechnic Higher National Diploma Mechanical Engineering Students (Automobile option).**

The automobile engineering industry in Ghana is fast growing resulting to the provision of good employment opportunities. Automobile engineering is the main occupation of the Higher National Diploma (HND) Mechanical Engineering Students Automobile Options of Cape coast Polytechnic among the many different occupations available. The profession of automobile engineering is basically divided into three areas namely manufacturing, sales and services. In Ghana, the service sector of automobile engineering is the obvious choice for these students since the manufacturing and sales sector are practically almost non-existing. Thus for the services sector, these students are service managers, engineers among others. They must have good practical and theoretical automobile engineering as well as business and managerial knowledge acquired from the HND programmes at the Cape Coast Polytechnic. The service manager or engineer is responsible for the profit making and customer satisfaction of the automobile company. Due to the fact that the automobile servicing is the most common in Ghana these students and the programme they offer are geared more towards servicing.

### **Automobile Servicing**

Servicing automobiles involved the repairs and maintenance activities. Automobiles function effectively if they are regularly maintained. Thus in the field of Mechanical Engineering automobile option, maintenance is the care and up-keeping of the mechanical parts of automobile according to schedules. Automobile maintenance involves procedures or activities such as oil and filter changes, belt replacement, hose replacement, tune-ups, lubrication among others. Automobile repairs involves the fixing of parts or replacement of worn- out parts, breaks and malfunctioning parts. Repairs are also carried out on bolts and nuts, shock absorbers, transmission overhauls among others. All automobile parts are not permanent so continuous servicing is required.

### **Automobile Sales**

In Ghana small automobile sales companies such as Toyota Ghana Limited, Japan Motors, Garmount Ghana Limited, PH Motors, Nissan Motors among others are the few small companies involve in sales of automobiles. These companies employ HND Mechanical Engineers (automobile option) as sales Managers, Engineers, and Representatives. There is the increasing sale of second – hand automobiles at small garages at various locations within cities and towns in Ghana. These types of automobile dealers do not employ HND Mechanical Engineers (Automobile option) students because of their small capacities and inability to pay relatively goods salaries.

### **Automobile Manufacturing**

There are no industries in Ghana that manufacture automobiles; therefore students lack employment in this sector. The manufacturing processes of automobile involve designing, engineering and production of parts as well as final assembly.

Factors responsible for the increasing need of Higher National Diploma Mechanical Engineering Automobile options in the automobile industry in Ghana are:

- More complicated automobiles being manufactured
- Increased average age of automobiles
- Emissions and fuel economy needs

#### ***More complicated Automobiles are being manufactured***

Computerization of automobile operations is on the ascendency. Thus for modern automobiles, electronic devices and computers are used to control shock absorber settings, gear fittings, engine operations, fuel flow, exhaust emissions among others. These modern systems of operations are responsible for the comfort of the present day automobile. These new technologies also require the use of sophisticated diagnostic equipment operated by knowledgeable professionals such as HND Mechanical Engineer (Automobile option).

#### ***Increased Average age of Automobiles***

Due to the continuous rising cost of new automobiles, motorists are no more replacing their automobiles with new ones, but rather keeping their automobiles for longer period. Thus more repairs and maintenance garages are needed which are avenues of employment opportunities for HND Mechanical Engineers (Automobile Option) from Cape Coast Polytechnic.

#### ***Emission and fuel Economy Requirements***

The factors responsible for dangerous emission from automobiles and un-economic fuel consumption are;

- Change in idle speed
- Improper air – fuel mixture (incomplete combustion)
- Ignition timing
- Changes in automatic transmission shift points
- Decreasing expected acceleration

Automobiles with emissions which go above governmental policy or regulatory values as well as minimum mileage standards require special or general services. In Ghana a lot of the automobiles' emissions are above acceptable levels and need servicing. Thus the HND Mechanical Engineering Automobile option students from Cape Coast Polytechnic have more employment opportunities in establishing more automobile servicing companies.

### **Types of garages/shops and automobile service businesses in Ghana**

Basically, there are six types of garages/shops and automobile service businesses in Ghana namely,

- New – car dealer's garages
- Independent garages/shops
- Specialty garages/shop
- Service stations or garages
- Fleet garages/ shop
- Automobile supply accessory stores and departmental stores

#### ***New car dealer garages***

Some of the new – car dealer garages in Ghana are Toyota Ghana Limited, Japan Motors Mitsubishi Ghana, Nissan Motors among others. The operations and number of these companies are relatively few so they offer very limited employment opportunities of these students after completion of their programme. As a result these engineers must be encouraged by financial and governmental agencies to establish their own garages (self-employment). The operations of these companies are servicing new automobiles for delivery to customers, customer relations, periodic maintenance and repairs, among others

### ***Independents Garages/Shop***

These types of garages or shops are common at Siwdo– Kokompe at Cape Coast and can offer a lot of practical training to the HND Mechanical Engineering students Automobile Option during each semester. These students must also establish such garages to standard after their HND programme. The services of these garages/shops are oil and filter changes, lubrications, tune – ups, brake repairs, engines and transmission overhauls, among others.

### ***Specialty Garages/Shops***

These garages are also common at Siwdo Kokompe at Cape Coast and offer the same employment opportunities as independent garages/shops. These garages could concentrate on only one type of automobile engineering such as brake maintenance/ repairs, tune-ups, lubrication, cooling system, fuel system, carburetors, injectors, exhaust system, drive trains, chassis maintenances, among other.

### ***Service Stations***

These are small shops or garages attached to petroleum product filling stations. There are few of such garages and their operations are relatively small, which implies they can provide little employment opportunities for these engineers. The few maintenance practices they undertake are brake repairs, purging, changing oil and filters as well as selling and replacement of minor mechanical parts.

### ***Fleet Garages***

These are found at Siwdo– Kokompe at Cape Coast. The main operations of such garages are total mechanical maintenance or repairs of fleet of automobiles. Businesses, financial and academic institutions, governmental and non – governmental agencies have fleet of automobiles so they depend on such garages for their services. The employment opportunities for the engineers and students are the same as independents garages/shops.

### ***Automobile Supply Accessories and Departmental Stores***

These stores mainly specialize in the sale of automobile engines and parts so the services of skilled automobile technician or engineers are needed for their efficient operations. Siwdo – Kokompe at Cape Coast have some of these stores. These students can have practical training during the semesters and also after school employment in the areas of sales engineering, stocking, ordering techniques among others.

### ***The Automobile***

Mechanically, the automobile consist of many different parts that work together to provide motion. The social functions of the automobile are conveying of goods and people. The basic assemblies of the automobile are;

1. Engine
2. Chassis
3. Drive train
4. Body

### ***The Engine***

It provides power which is transferred to motion through series of parts known as drive train. Thus the engine functions by mainly converting chemical energy to mechanical energy for motion. The most common type of engines are the internal combustion engines. For these types of engines the combustion process (burning of air – fuel mixture) takes place exclusively in the combustion chamber. The type of internal combustion engine used is the reciprocating piston engine and the main parts are;

1. Cylinder block
2. Cylinder head
3. Valve train
4. Piston
5. Connecting rod
6. Crankshaft
7. Manifolds

### ***Cylinder Block***

This is also known as engine block and is the biggest part of the engine. It is a large metal casting containing planned drilled holes. It is also has cylinders containing round passage ways fitted with pistons.

### ***Cylinder Head***

The cylinder block is closed and seal at the top by the cylinder head. The air- fuel mixture in their correct proportions is compressed and burned in the enclosed combustion chamber which is embedded in the cylinder block.

### ***Valve Trains***

These are valve series which opens and closes the intake as well as exhaust parts

### ***Piston***

This part of the engine is having the shape of a can and it is closely fitted inside the cylinder. Combustion takes place between the top of the piston and the cylinder head. With the four stroke engine, the four strokes or reciprocating movements are intake, compression, power and exhaust stroke. The reciprocating movement of the piston causes the air – fuel mixture to be compressed and also pushing the combustion products out of the chamber. Fundamentally, the piston engine system comprises of five sub- systems such as;

1. Lubricating system
2. Cooling system
3. Fuel system
4. Exhaust system

### ***Lubricating System***

Friction occurs between all moving parts of the engine that are in motion and in contact resulting into tear and wear as well as generating of heat. Lubrication is the application of lubricant (oil or grease) to the moving parts to reduce friction. The system responsible for the distribution of the lubricant is called the lubricating systems. This system consists of the following, oil pan, oil pump and oil galleries. The lubricant pumps oil through the oil galleries directed to all moving parts of the engine in contact.

### ***Cooling System***

The internal combustion process is associated with generation and evolution of heat (energy) resulting to high increase in temperature. For the maintenance of acceptable temperatures for all parts of the engine, a special cooling system is built into all automobiles. There are two major types of cooling systems namely air – cooled and water cooled. The common and modern type is water – cooled which uses water mixed with the right proportions of chemical called coolants. This mixture flows through passages in the engine block and comes out very hot to the radiation tank cells for cooling by the fans and the cycle continues.

### ***Fuel Systems***

Basically the fuel system comprised of carburetor, fuel injectors, fuel pumps, pipes, fuel tank, fuel gauge, air – fuel mixture among other. These components collectively feed the combustion chamber with the required air – fuel mixture

### ***Exhaust system***

The exhaust is a waste product of the internal combustion which is eliminated through the exhaust system. The orderly manner of the component of this system is exhaust manifold, exhaust pipe, catalytic converter, extension pipe, muffler, hanger resonator and tail pipe. The catalytic converter is responsible for reduction or possible elimination of all dangerous chemical to human health. The muffler is a silencing device.

### ***Ignition System***

This is a sub- system of an automobiles overall electrical systems. The cylinder head has spark plugs embedded into it. The spark plugs extend into the combustion chamber and receive electrical current through the wire from the distributor. The distributor also receives electrical current from the battery. With the spark ignition system, the plug is responsible for igniting the air – fuel mixture in the combustion chamber otherwise it is compression ignition. Also for spark ignition the electrical current jumps the spark plug so that fire is created

### ***Connecting Rod***

This is a solid metal bar with the top connected to the crank shaft. It controls the piston movement.

### ***Crankshaft***

The collective reciprocating (up and down) movement of the piston and connecting rod is converted into rotary motion by the crankshaft

### ***Manifolds***

There are two types of manifolds namely intake and exhaust manifold. They are metal fixtures attached to the cylinder head. The responsibility of the intake manifolds is to deliver air – fuel mixture in the right proportions into the intake ports. The exhaust manifold carries exhaust gasses away from the cylinders.

### ***Drive Train***

The useful energy produced from the internal combustion process must be directed to the driving wheels for automobile motion. The series of connected parts that carries this energy or power to the wheel is called drive train. The major parts of the drive train are;

Clutch

Transmission and transaxle

Driveline

Deferential

Driving axles

### ***Clutch***

Engaging and disengaging engine power or energy from the transmission is by using the clutch. When changing the gear, the drive must disengage the clutch by pressing the clutch pedal downwards fully. The clutch is found between the engine and transmission.

### ***Transmission and Transaxle***

They consist of gears that are shifted to obtain appropriate driving speeds. Transmission is associated with conventional drive whiles transaxle is used by front wheel drive automobiles. The two main types of transmission are manual and automatic. The clutch is used by automobile which have a manual gearing systems. With automatic transmission, no clutch is required. This system is directly connected to the engine which does the gear changing automatically.

### ***Drive line***

The major components of the driveline are the drive shaft or propeller shaft and the universal or U – joint. The propeller shaft is a hollow long tube whiles the universal joint links the propeller shaft and the differential. The universal joint permits the propeller shaft to move in a reciprocating manner when the automobile is in motion. Conventional drive automobile are the only type of automobiles that uses the driveline.

### ***Differential***

Power from the engine must be directed appropriately to the driving wheels by a set of gears called the differential. Thus the differential allows the driving wheels to turn at different speeds when the automobile is in motion

### ***Driving Axles***

These are solid shaft through which power passes from the differential to the driving wheel

### ***Chassis***

The chassis serves as foundation and support for other parts of the automobile. The chassis comprises of the following

Frame and unitized body

Suspension

Steering

Brakes

Wheels and tires

### ***Frame and unitized body***

Thick steel members join together to form a large supporting assembly at the floor stretching over the whole length of the automobile is known as the frame. Thus the frame supports both permanent and temporal loads of the automobile. Unitized body is the combination of the frame and body to form a single unit.

### ***Suspension System***

This is the system on which the automobile rests. It is connected to the frame and provides alignment for the wheels. The main components of this system are the springs and shock absorbers. Basically the spring absorbs much of the up and down motions of the automobile and also cushions movement. Thus the shock absorbers control the spring movement.

### ***Steering***

The turning operations of the automobile are performed by steering system located at its front end.

### ***Brakes***

When the brake pedal is pushed down, the brake located at each wheel stops or slows down the automobile. There are two types of brakes used by automobiles namely, drum and disc brakes.

### ***Tires and Wheels***

Thread, rubber and other materials are used to make tires. The tires are filled with air which cushions the motion of automobiles. The wheels are made of metals and are bolted to the axles. The tires are held by the wheel.

### ***Body***

The body of automobile is made of thin sheets of metals, plastics and fiberglass. The body construction determines the shape of the automobiles and also protects the contents.

Mechanical (automobile) engineering servicing practices at Siwdo Kokompe will provided the HND Mechanical Engineering student (automobile option) practical training.

### ***Servicing of lubrication systems***

The lubrication oil (engine oil) in the engine of the automobile may lose its efficiency through oxidation, acid formation and sludge formation. Therefore scheduled oil and filter changes to eliminate by- products are very important. The common practices at Siwdo Kokompe are replacing oil pressure sender units, replacing valve cover gaskets and stopping leaks from oil pan drain openings.

The specific periods of oil and filter changes are recommended by the manufacturer. The following procedures are done Siwdo Kokompe when changing oil and filter.

- Vehicle must be raise and supported safely
- Put oil catch pan directly below drain plug
- Loose drain plug with wrench
- Bring out the plug and clean it properly while the oil drains out
- If needed, install a new gasket and fix the plug
- Fix a new oil filter tightly and put in connect amount of new engine oil
- Check for oil leakages

The above practices must be done when the engine is relatively hot for proper drainage. The automobile mechanic at Siwdo– Kokompe repair or replace oil pan hole threads if damaged. The mechanics also take following steps when replacing valve cover gaskets.

- Remove belts, hoses, wires, bracket and accessories blocking access to the cover.
- Tap gently one side of the stuck cover to loose and remove it
- Do not bend and use scrapers to remove any remaining particles on the gasket and cover.
- Bent flanges must be flattened or replaced.
- Flatten dimples with hammer.
- Clean this cover with brush and shop towels and refit
- Leakages may be developed in the oil pressure sender switches, so remove the conductor wire from the sender and replace the sender.
- Then tighten the sender with a socket and place back the wire's connector.



Oil pumps, all types of gaskets must be repaired or replaced using appropriate sealant when re-assembling an engine.

### **Servicing cooling systems**

(V-belts) are used to transfer force through transmission and they do not require excessive tightening or loosening. The automobile mechanics check the proper conditions of belts using tension gauge or pressing the belts with their fingers. They adjust tension belts by shifting the idle pulley away or toward the power pulley. To replace belts, bolts around the alternator are loosened. After the replacement, the bolts are tightened. Areas where leakages occur commonly are hoses, gaskets, radiators, water pumps, soft plugs and heater control valves. These automobile mechanics either use pressure tester or hands or physical inspection to check cooling system leakages. They replace radiator pressure cap if the seals crack, faulty hoses, wire type clamp, bounded clamp; stiff or brittle vacuum valves and faulty thermostats. They remove radiators and drain out the coolant and water for mixture repairs or replacement. Metallic radiators are soldered or patched with epoxy resin plastic cement to prevent leakages.

They (the automobile mechanics) repair heater core in the same way as that of the radiator. They use light oil to lubricate stock heater control valves manually to permit free operation. They loose dampers, remove hoses and unfastening old valves as their procedures for removing old valves. Installing new valves involves the reverse of removal. They use punch to remove corroded soft plugs which may cause leakages. Before they remove the old soft plugs, the whole engine or manifolds only are removed to pave way. Few of the automobile mechanics have hydrometers which they use to check for the appropriate temperature conditions of the coolant mixture to prevent thermostat damage, they remove it before cooling system cleaners (made of powered phosphoric acid) are added to the cooling system to dissolve rust and scale deposits during the flushing of cooling systems. After the flushing they pass baking soda through the systems to remove any phosphoric acid, they sometimes do reverse flushing to remove rust scale corrosion as well as other contaminants. During the replacement of water pumps, they remove belt driven fan, belt, spacer or viscous drive clutch, radiator and steriod. They use rages to scrape off any remains of the old gasket from the engine block opening before applying sealant to the contact surface.

### **Servicing fuel system Automobile Mechanics at Siwdo – Kokompe**

These Automobile Mechanics replace faulty fuel tank caps and rubber sleeves as well as loose clamps. They also replace faulty fuel pumps, inline fuel filters, and screw – on fuel filters, air filters, PVC filters and fuel lines which are blocked.

### **Servicing carburetors**

Carburetors are made of metals that can crack or distort. When the engine is cold they adjust the choke plate to the correct value so that right quantity of fuel is delivered to the engine. When fuel is not delivered into the carburetor they tap the fuel inlet fitting gently after which they crank the engine to activate the fuel pump. Also they remove the air horn, clean the needle valve and reinstall them all to ensure that fuel flows into the carburetor. To prevent or stop flooding, they depress the accelerator pedal so that the throttle plates open fully for air to flow for vaporization of excess fuel. They then turn the key and crank the engine until the engine starts and the process is known as percolation.

Overhauling of carburetor involves the following procedures:

- Disconnecting attachment.
- Removing, disassembling, cleaning and inspection into parts of air harm, main body and throttle body.
- Filling small scratches.
- Paralleling.
- Mending cracks.
- Tightening.
- Washing in approved solvents.
- Air – pressure blowing.
- Parts replacement and reassembling (reverse of disassembling )

If the carburetor is badly damaged they replace them with new appropriate ones.

### Servicing fuel injection systems

They check hoses, fuel and air leakage by carefully inspecting them as well as replacing them if necessary. They also tighten connections around the injectors. Specialize tools and skills are required for accurate diagnosis of fuel injections system problems. But most of these tools are not available to them, so the students must be referred to such specialized units for such hands-on training.

### METHODOLOGY

The quantitative approach was the research method adopted due to the fact that substantive analysis, conclusion and recommendation must be made to signify that the students lack hands on practical training and must go to Siwdo– Kokompe at Cape coast for such training. Therefore, the data collection and its analysis was the most efficient means of making this research a reality. The target groups for this research were the HND Mechanical Engineering (Automobile option) students and Automobiles Mechanics at Siwdo – Kokompe at Cape Coast was chosen because of cluster of the Automobile Mechanics there. The methods used for data collection were questionnaire and interviews. The questions were open and close types. Questionnaires were administered to the students and 23 to the mechanics, which cover 99% of the mechanics.

NAME OF STUDENT	NAME OF SECOND CYCLE EDUCATION (SSS OR TERTIARY)	AGE	NAME OF MECHANIC SHOPS AND PLACES FOR PRACTICAL WORK IN THE CAPE COAST AREA	NAME OF MECHANIC SHOP(S) OR PLACE(S) FOR PRACTICAL WORK DURING ATTACHMENT	DO YOU WANT TO ESTABLISH YOUR OWN MECHANIC SHOPS IN FUTURE
John K. Quansah	CAPE TECH	25	ZAKS FIT, ELMINA		YES
Adomako Peter	KTI	23	DAN FIT SHOP	STC	YES
Isaac Quaicoe	KTI	22	NO	BGL	YES
Emmanuel Aboah	KTI	25	NO	YES MMT	YES
Mensah Mersark	KIKAM	25	NO	ANGLOGOLD ASHANTI	YES
Gausu Sulley	KIKAM TECHNICAL	26	NO	GOLF FIELD GHANA	YES
Mensah Emmanuel	CAPE TECH	25	NO		YES
Benjamin Aochie	SOGASCO	22	NO		YES
Benjamin A. Annan	CAPE TECH	25	NO	BUBUASHIE	YES
Asare Emmanuel	ASU TECH	25	NO	TONNY MOTORS	YES
Philip Anyanful	CAPE COAST	26	NO	RHEMAH W/SHOP	YES
Kingsley Egyir	MOTESCO	33	NO	FIRE SERVICE	YES
Solomon Anyimah	KIKAM T. I.	25	NO	KWANSA MOTOR T'DI	YES
Isaac K. Quansah	ASUANSI	25	NO	METRO MASS TRANSIT	YES
Daniel Fiagbenu	TECHNICAL	25	NO	G.P.H.A	YES
Richard Amoah	SUHUM SEC/TECH	24	NO	ANGLO-ASHANTE	YES
Ampomah Seth	OBUASI SEC/TECH	25	NO 1 CAPE MOTORS	APPIAHMINKAH COMPANY	YES
Enock Obeng	CAPE COAST TECH	26	NO	ANGLO ASHANTI	YES
William Mbroh	OBUASI SEC/TECH KIKAM TECHNICAL	43	NO	KOFI MBROH'S AUTO W/SHOP / TEACHING	UNDER REVIEW

TABLE 1: Information on 2008 – 2011 students  
 Source: Author's Field Work.

NAME OF STUDENT	NAME OF SECOND CYCLE EDUCATION (SSS OR TERTIARY)	AGE	NAME OF MECHANIC SHOPS AND PLACES FOR PRACTICAL WORK IN THE CAPE COAST AREA	NAME OF MECHANIC SHOP(S)OR PLACE(S) FOR PRACTICAL WORK DURING ATTACHMENT	DO YOU WANT TO ESTABLISH YOUR OWN MECHANIC SHOPS IN FUTURE
Manu Andrew	Takoradi Tech Inst.	27	NO	Kwansa Auto Ltd	YES
Mensah Dominic	Asuansi Tech Inst.	24	NO	Norpalm Ghana Limited	YES
Okeyre Gideon	Cape coast Tech Inst.	26	NO	Samatex	YES
Prince Peterson	Cape coast Tech Inst.	24	NO	Samatex	YES
Yaauza Alhassan	Cape coast Tech Inst.	28	Musah workshop	Silver Star Ltd	YES
Abedi Bright Kudzo	Royal tech. College	38	NO	Tractor & Equipment	NO
Dapaah John	Tarkwa Technical	30	NO	Anglogold Asante Iduaprem mine	YES
Rockson Siaw	Cape coast Tech Inst.	29	No1 cape motors	Goldfield Ghana limited	NO
Jimah Ibrahim	Cape coast Tech Inst.	25	NO	Goldfield Ghana limited	YES
Bismark Asamoah	Royal tech college	29	NO	Metro Mass Transit	NO
Benjamin Quaicoe	Cape coast Tech Inst.	29	NO	U.C.C Transport Section	YES
Lord Twumcoleman	Cape coast Tech Inst.	22	NO	Toyota Ghana Ltd	YES
James Taylor Coleman	Kikam Tech Inst.	23	NO	Prestea Sankofa / Sallesi	NO
Kwesi Fosu	Prestech Sec. Sch	26	NO	B.G.L Bogoso	NO
Benyin Emmanuel	NAVTCO (Agona Swedro)	28	NO	O.S.A / Toyota & Yamaha GH	YES
Jerry j. Biney	Kikam Tech Inst.	28	NO	SAT Co Ltd / Roadside Shop	YES
Emmanuel Arthur	Asuansi Tech Inst.	27	NO	Toyota Ghana Ltd	YES
Mustapha Alhassan	Kikam Tech Inst.	24	NO	Sellasi Autoshop (Prestea W/R)	NO
Daniel Mireku	Koforidua Tech Inst.	27	NO	G.P.H.A	YES
Nasiru Ibrahim	Cape coast Tech Inst.	25	NO	Mine Maintenance BGL	NO
Obed Kwame kwakye	Emut electronic inst.	30	NO	Nissan Co. Ltd	YES

TABLE 2: Information on 2009 – 2012 students  
 Source: Author's Field Work

NAME OF STUDENT	NAME OF SECOND CYCLE EDUCATION (SSS OR TERTIARY)	AGE	NAME OF MECHANIC SHOPS AND PLACES FOR PRACTICAL WORK IN THE CAPE COAST AREA	NAME OF MECHANIC SHOP(S)OR PLACE(S) FOR PRACTICAL WORK DURING ATTACHMENT	DO YOU WANT TO ESTABLISH YOUR OWN MECHANIC SHOPS IN FUTURE
Frank Adu Ampofo	Cape Coast Tech. Inst.	26	NO	NO	YES
Bernard Apprey	Cape Coast Tech. Inst.	27	Pegeout Fitters	NO	YES
Emmanuel Menlah	Kikam Tech Inst.	27	NO	Wienco Fibres Mech	NO
Kingsley Boapeah	Suhum Sec. Tech. Sch.	25	NO	W/Shop	YES
Enock Kwame Baiden	Kikam Tech Inst.	23	NO	NO	NO
Emmanuel Abbey	Cape Coast Tech. Inst.	25	NO	Papa Atta Fitting Shop	NO
Nkrumah Hayford	Kumasi Tech. Inst.	25	NO	NO	NO
Joseph Kow Mensah	Cape Coast Tech. Inst.	26	NO	NO	NO
John Adu-Nketia	Kikam Tech Inst.	25	NO	NO	YES
Peter Abekah	Kikam Tech Inst.	26	NO	Goldfield Ghana Limited	YES
Sylvester Sampson Saah	Takoradi Tech. Inst.	25	Aggrey	Kingdom Transport Service	
Benjamin Aaron Ackon	Asuansi Tech. Inst.	25	Adu-Sei Fitting Shop	Ghamot Tra. Nkasam	
Abubakari Osumanu	Kumasi Tech. Inst.	26	NO	Motor	
Nicholas Anaman	Royal tech. College	23	NO	NO	
Kwaku Botchwey Mensah	Cape Coast Tech. Inst.	24	C-Tech TOTA Branch Pedu	Bogoso Gold Limited Africa Motors Limited Afrik Shading Fishing Company	

TABLE 3: Information on 2010 – 2013 students  
 Source: Author's Field Work

NAME OF STUDENT	NAME OF SECOND CYCLE EDUCATION (SSS OR TERTIARY)	AGE	NAME OF MECHANIC SHOPS AND PLACES FOR PRACTICAL WORK IN THE CAPE COAST AREA	NAME OF MECHANIC SHOP(S)OR PLACE(S) FOR PRACTICAL WORK DURING ATTACHMENT	DO YOU WANT TO ESTABLISH YOUR OWN MECHANIC SHOPS IN FUTURE
Patience D. Mboti	Chemu Senior High	21	NO	Ghana ports	YES
Johnson Andrew A	Mankessim Sec. Tech. Sch	24	I.T.T.U	No	ALTERANATIV
Charles Amoah	Cape CoastTech. Inst.	24	NO	LeganConst work	E
Paul Essilfie	Cape CoastTech. Inst.	27	NO	Asaquah motors	NO
Vincent Kenneth Appiah	Cape CoastTech. Inst.	28	NADMO OFFICER	R.C.C	NO
Daniel Amissah	Cape CoastTech. Inst.	26	NO	Africa mining service(A.M.S)	NO
Nathan Homer Armoo	Tarkwa Senior Sch.	25	NO	C-poly mech. Workshop	NO
Augustine K. Ofori	Cape CoastTech. Inst.	29	Metro Mass Transit	Metro Mass Transit	NO
Justice M.A.Sowah	Cape CoastTech. Inst.	23	NO	CCTI – Toyota Ghana	YES
Samuel Edziah	Cape CoastTech. Inst.	24	NO	Gecko auto ventures	YES
Mends Joseph	Asuansi Tech. Inst.	25	NO	R.T.F (MANKESSIM)	NO
Nicholas Botchwey	Sekondi College	22	NO	Kwansa Auto Ltd	NO
Charles Asanre	Cape Coast Tech. Inst.	29	NO	Nyame Auto W/Shop	NO
Christopher Angoh	Tarkwa Tech. Sch.	23	NO	Intafrawaso Fitting Shop	NO
Kyeremanteng Jonas	Cape CoastTech. Inst.	25	NO	PresteaSankofa Gold Ltd	NO
Isaac Yaafi	Kikam Tech Inst.	23	NO	Bogoso Junction Two Brother	YES
Anthony Arzah	Kikam Tech Inst.	23	NO	NzemaMamle Mech. Train.	YES
Bernard Amoh	Asuansi Tech. Inst.	25	R.T.F	Cent.	NO
Prince Nana Boateng	Takoradi Tech Inst.	29	NO	R.T.F Bogoso Junction Two Brother	YES YES

Table 4: Information on Automobile Mechanics  
 Source: Author's Field Work

SHOP NAME	NUMBER OF CAPE COAST POLYTECHNIC HND I, II, III STUDENTS WHO CAME TO YOUR SHOP FOR PRACTICAL IN				WHAT WAS THE PERFORMANCES IN			
	2009	2010	2011	2012	2009	2010	2011	2012
OKYESONYAME	0	0	0	0	0	0	0	0
OBENG BOAT VENTURES	0	0	0	0	0	0	0	0
SHALOM FITTING SHOP	0	0	0	0	0	0	0	0
YESUADOM FITTING SHOP	0	0	0	0	0	0	0	0
OFIRNYAME FITTING	0	0	0	0	0	0	0	0
EKOWACKON FITTING SHOP	0	0	0	0	0	0	0	0
OPPONG FITTING SHOP	0	0	0	0	0	0	0	0
TONY MOTORS	0	0	0	0	0	0	0	0
BONNY FITTING SHOP	0	0	0	0	0	0	0	0
OPPONGDANKWA-FITTING SHOP	0	0	0	0	0	0	0	0
ABU FITTING SHOP	0	0	0	0	0	0	0	0
MASTER NYAME FITTING SHOP	0	0	0	0	0	0	0	0
DABI WO BE KAE ME	0	0	0	0	0	0	0	0
NII FITTING SHOP	0	0	0	0	0	0	0	0
AMEEN FITTING SHOP	0	0	0	0	0	0	0	0
RANSFORD FITTING SHOP	0	0	0	0	0	0	0	0
GYENYAME MOTORS	0	0	0	0	0	0	0	0
KWEKU BADU FITTING SHOP	0	0	0	0	0	0	0	0
CHRISTIAN MOTORS	0	0	0	0	0	0	0	0
IF GOD IS FOR US NO ONE IS AGAINST US	0	0	0	0	0	0	0	0

Table 5: Information on Automobile Mechanics  
 Source: Author's Field Work

## DISCUSSION

From all the tables, students lack practical training available at SiwdoKokompe. Also the automobile mechanics have expressed their displeasure about students not coming to have practical training with them.

## CONCLUSION

The students lack basic and intensive practical training which needs immediate and serious attention.

## RECOMMENDATIONS

With reference to the above conclusion, I recommend that semester schedules must be made for these students to have intensive practical training at SiwdoKokompe

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- 6<sup>th</sup> Congregational Brochure of Cape Coast Polytechnic.

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