AUTO - SERVICE CENTRE KADUNA.

A REPORT OF THE DESIGN THESIS PRESENTED

TO THE DEPARTMENT OF ARCHITECTURE, FACULTY OF ENVIRONMENTAL DESK.

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BY

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IN

JUNE, 1981

DEDICATION

DEDICATED TO GOD FOR HIS MERCY

AND MY PARENTS

DAVID ADEYEMI OLOWOKERE OMOLE

FELICIA EBUNOLA OMOLE

- For their love, encouragement, and

Supports all these years.

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The above withstanding however, I will be remiss if I don't mention a few names representative of all who have helped. First and foremost, I must thank

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MR. S.B. OTI - WORKSHOP MANAGER, MANDILAS, KADUNA

The staff at the SCOA motor Section, Kaduna

The staff at the SCOA motor Section, LAGOS

The staff at the MANDILAS, KADUNA

The staff at the MANDILAS, KANO.

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Last but not the least, LARA ASHEBU, my running mate whose efforts have been invaluable. My thanks to you too. You know why. GOD BLESS YOU ALL.

FEMI OMOLE
JUNE 81

SYNOPSIS

This is an investigation of availability and quality of motor Service Stations in Nigeria. In conducting the investigation, local and foreign sources of material were considered. From this investigation, it was found out that there is an acute shortage of modern service station in Nigeria both in terms of number and quality. Consequently, there is a dire-need to rectify this situation. Hence the present design of a modern and appropriately designed motor service station as a model for Nigeria.

PREFACE

In Nigeria today, when one considers all the Sectors of economy, the transport Sector makes one of the heaviest claims on the available capital development funds. Transportation System has to support the growth and development of agriculture, Commerce and industry with efficient movement of people and goods from one area of the Country to the other thus, for an efficient transport system (either by air, rail, water-way or road) and to provide a transportation service which is optimum, there is the need for Service Centres to cater for all the transport vehicles.

Of all the transport system (according to the transport planning unit all over the world) the road transport Sub-system is a key element in any Transport System planning. It caters for virtually everybody and it's the cheapest means of transportation. In fact, all other transport Sub-System rely on it for people as well as for goods, road transport is needed to reach the railway station, the airport, or the port.

Bearing in mind the importance of transportation in any developing economy, the purpose of this project is to find out the availability and quality of service stations for these road vehicles. The investigation deals with the following questions.

(i) why does the need for a Service Station arise?

(ii) To what extent are there adequate number of Service Station of optimum quality in the country?

(iii) what factors are responsible for the shortage and inadequacies, if any, in the country?

(iv) How can such shortage and inadequacies be rectified?

The availability of autc service Centres in the Country and the causes for the shortages of such is not far fetched. This may be due to lack of adequate man power supply in such a field or lack of equipment for such things; or even because of the population increase in the country.

The inadequacies and shortages could be rectified if the Federal Government could organise a kind of maintenance organisation (ON ROADS) to take care of our fast deteriorating Federal highways. The organisation should be responsible for studying and investigating areas where motor Service Centres and rest areas for travellers could be located on our roads. It would also investigate the causes of failures on various Sections of our roads, the most important of which are heavy axle loads of traffic lack of Sub-soil domin and the use of material of poor standards.

For my thesis, I have chosen the aspect which has a lot to do with both private Cars (Vox-wagon) and Commercial vehicles (Peugeot).

CHAPTER ONE

INTRODUCTION

THE NEED FOR MODERN AUTOMOBILE SERVICE CENTRES IN NIGERIA

The five main national objectives of Nigeria as stated in the second National Development plan are: a free and democratic Society; a just and egalitarian Society; a United, Strong and Self-reliant nation; a great and dynamic economy and a land of bright and full opportunities for all citizens.

What all these mean in effect is that it is the desire of the Federal Government to lay a solid foundation for a nation whose economic, political and social system can enhance the well being of every Nigerian. One way of measuring this well being in the rise in per capital income and a consequent rise in the standard of living of the people of Nigeria. Another measurement is the extent of security of person and property.

A high standard of living is usually accompanied by some degree of material affluence and greater use of labour - Saving devices. One of such labour - Saving decies which Science has given to modern man is the motor vehicle. The automobile has become almost indispensible in the running and organisation of daily activities. A motor vehicle does not only saves man energy but also saves his time. It also makes life comfortable for him in other respects.

Consequently, in Nigeria today, a motor vehicle is not just seen as an energy and time saving device but also a yard-stick for measuring an individuals level of success in life. It is a status symbol, and this largely explains the mad-rush for cars in this country. This also explains why some individuals own more than one personal car at any point in time. Since the Federal Government has pledged itself to make life better for the Nigerian citizens, and since majority of the Nigerian citizens are convinced that one way of doing this is to give loans to middle and level employees to buy a car, there is no doubt that as the public and private sectiors continue to create more jobs and employ more people, more and more Nigerians will continue to obtain the loan and ever-larger number of motor vehicles will continue to be in our roads.

However, a motor vehicle that is not adequately, properly and regularly maintained could be the very instrument that waste his time, energy and sometimes even his life. Ironically therefore, the well being of Nigerians in terms of "Security of person and property" may be jeopordized by the same motor vehicle which in the first place is a measure of well being in terms of standard of living.

On this matter, the situation in Nigeria today is what Sociologists describe as "Culture-lag": Simply stated, this means that peoples' conduct and behaviour in terms of

maintainance of cars are "lagging" behing the technological use and proliferation of motor cars. There are very few modern appropriately designed and adequately equipped motor-gar and only very few vehicle-owners make use of them. Instead, majority of vehicle-owners prefer to use "road-side mechanics" who, though possess native intelligence and have gone through jigars of rigirous apprenticeship, cannot and do not give proper and adequate servicing. For one thing, they lack necessary equipment and tools; for another, they improvise and advise customers to "manage" won-out bolts, brake-pads or nearly-bald tyres.

The consequence of this situation is partly reflected in police Annual Reports of thousands of road accidents i.e. loss of limb or life and loss of property. This is perhaps why a Nigerian concord Cartoon of recent says that with the resumption of direct car-loans to workers, the government is granting them direct passports to heaven! Definitely, careless and reckless driving as well as bad roads are contributory factors, However, it will be ignorant not to recognise the role of badly - maintained vehicles in the volume and seriousness of these accidents. For example, a reckless driver with a car in excellent condition has a better chance of avoiding a fatal accident than a slow driver in a car with worn-out brakes, un-aligned wheels, or loose steering.

Thus, the need for adequate, appropriate and regular maintenance of motor vehicles is one rationale for appropritately deigned and adequately equipped motor servicing centres all over Nigeria. Even though it is said that the "tool does not make a good workman", it is equally true that the availability of a good tool can make the good work-man even better. A modern, appropriately-designed and well equipped motor Service Centre is such a tool in the context of the matter under discussion.

Now, what is our concept of a modern motor servicing station? A modern motor Servicing station should not only be strategically placed in the sense of nearness to the highways and removal from strictly residential area of the town and it should also have adequate equipment, more than enough spare parts as well as adequate facilities for storage. In addition, the building should take into consideration such things as the safety of workers, the customers and the vehicles to serviced. Majority of the road-side mechanics workshops that we find in every nook and corners in this country can better be described as motor damaging centres. It is not that the mechanics are bad, but the appropriate conditions and adequate facilities for a good job are just not there. In most cases, they improvise and quite often, such improvisation are at the expense of the life of the vehicle and its driver.

Modern motor-servicing stations in every part of the country will significantly mitigate most of these problems.

OBJECTIVES AND GOALS

The objective is to design an automobile service centre comprising workshop (for repairs and servicing), showroom (for display of engine and spare parts), store (for spare parts), car-wash section, offices (for the administrative), a Cafetaria (for staff and customers) and a petrol depot.

The services currently offered by the existing petrol service station around motor-service sites premises are minimal and do not seem to be attracting a desirable level of patronage. It simply sells petrol and diesel oil. Therefore, I intend to include the following services for which there is currently a demand: Lubrication, car-washing and parking, tire and battery sales and service snacks, refreshments and other petty commodity items.

Considering the nature of the site environ, the Vet. station with its staff quarters, the Nigerian airforce base and all other construction companies around the site, I feel the demand for the following items will arise after sometime so I intend to include the following items: Cooking gas depot around the petrol depot and kerosine for domestic use in case of gas shortage.

SOURCES OF INFORMATION:

Information on the design of a motor service centre and the general layout was hard to comeby. However, I was able to make do with the text books, magazines, - the Architectural review, architectural journals and some other publications available. I was able to collect some information from the FIRE STONE GARAGE in Canada and some other service stations in Britain and U.S.A.

I also made several personal interviews with the staff of MANDILAS, SCOA MOTOR SECTION, C.F.A.O., BAWAC and a few others.

THE THREE CENTRES 4



5

But this threefold division further Kaduna onions make

THREE CENTRES (KADUNA)

CHAPTER TWO

THE SITE

KADUNA: (Statistics as reported by Max Lock & Partners).

The city was laid out half a century ago as the administrative and military capital of what was then the protectorate of Northern Nigeria placed almost at the centre of gravity of the area it served - and still serves an area as large as France average nearly 80% of Nigeria's land mass. Kaduna is an important administrative centre - a state capital, a technical centre - an industrial town and a big military base - a military garrison.

- The population of Kaduna increases at a 9% rate
- Traffic 14 - 18%
- Electricity Consumption 21 - 24% yearly
- Motor vehicles on the road increases at 14% per annum.

SITE CONSIDERATION:

The site was first considered to be in Abuja (the new Federal Capital). Abuja is yet to be developed, the traffic flow is still limited and for now, I feel Abuja will have a prototype of this later when the capital is fully developed. With the consultation of my supervisor and some other members of staff, I decided that Kaduna will be more suitable for the station.

Kaduna, apart from the present traffic congestion; it is highly industrialized and highly commercialized.

Kaduna is the headquarter for all the ford buses in the Northern part of the country. It has a large capital investment.

TOPOGRAPHY.

Kaduna's reginal topography consists of a rolling park-like terraw with little relief situated about one hundred feet (30.5M approx.) above and below the 2,000 feet (610m) contour line.

GEOLOGY:

Kaduna has within the undifferentiated precambrian basement complex of Nigeria. The rocks in this suite include granites, greisses, migmatites, pigmatites, gnartrites and schiscts. A thin but discontinuous mantle of weathered rocks lies over the basement complex. In places, the mantle which averages about 50ft in thickness becomes lateritised.

Joints fractures and faults are noticeable here and there and form tight cracks or open tissues. Groundwater occurs either in the weathered mantle or in the joint and fracture system of the fresh basement rocks. Brickworks and quarries abound in the immediate vicinity of Kaduna.

VEGETATION

Kaduna consists of Orchard bush a continuous cover of well developed trees - some 30 - 45ft (9 - 14m) high.

CLIMATE

Usually, the dry season starts in November and it normally ends in MARCH - mid March precisely.

RAINFALL AND TEMPERATURE

Usually first in April and this may last till October. The wet season gets to it peak in July and this may last till SETEMPER. (Refer to Table 1).

The highest temperature is in April - usually 32°C and 36°C. The lowest temperature is in December (13°C or 14°C) and at times in January. (See Table 1).

SITE

The site is located along the North western part of Kaduna. It's along the Western bye pass. The site offers a logical focus highly desirable for a prominent building. It is situated in a good and strategic location with fine views of surroundings. It is located immediately next to the SCOATRAC depot which is very close to the roundabout where the Federal highway (FROM ABUJA) links the old MANDO ROAD (TO LAGOS).

MONTHS	1979					1980				
	MEAN TEMP MAX °C	MEAN TEMP (MIN.°C)	RAINFALL (MIN.)	HUMIDITY %	MAX WIND SPEED (KNOTS)	MEAN TEMP (MIN °C)	MEAN TEMP (MIN. °C	RAINFALL	HUMIDITY %	WIND SPEED (KNOTS)
JAN	32.2	13.5	:.0	28	18	32.6	15.3	0:0	29	15
FEB	34.4	16.6	0.0	28	15	33.3	17.3	0:0	24	18
MARCH	35.8	20.9	TRACE	37	38	35.3	20.0	2.0	35	25
APRIL	39.7	21.5	68.1	54	35	36.0	23.7	4.1	47	30
MAY	31.8	21.0	173.0	78	40	31.4	21.3	248.3	79	35
JUNE	29.7	20	141.3	82	36	29.7	21.1	170.9	83	40
JULY	28.7	19.2	290.3	84	30	30.6	20.1	133.1	85	25
AUG.	28.5	19.9	417.0	86	38	28.5	20.1	420.1	87	30
SEPT.	29.2	18.8	285.7	84	35	27.8	20.3	262.9	-	40
OCT.	31.5	19.1	64.4	76	40	31.4	19.8	46.0	-	-
NOV	31.9	16.4	42.1	57	35	-	-	-	-	-
DEC	29.7	12.9	0.0	35	18	-	-	-	-	-

TABLE I

CHAPTER THREE

STAFFING

As shown in the Table II, the required staff to operate an automobile Service Centre will include the following: - the Board of Directors, the Branch Manager, the Adminstrative Manager, Workshop Manager, Foreman, Tools StoreKeeper, Service Adviser, the Invoice Clerks, Supervisors, Spray Painters, Panel Beaters (Welders) e.t.c. The table also explain the ladder of progress in any motor service centre.

Usually, part of the total profit for a workshop is proportioned out to all employees from cleaners, labourers, mechanics etc. in relation to their rate of pay. The mechanics, electricians, panel beaters (welders), spray painters etc. are reffered to as the PRODUCTIVE STAFF. The workshop manager, administrative manager, the Service advisers are the NON PRODUCTIVE STAFF.

WORKSHOP MANAGER

Directs and coordinates all repair jobs and manages the affair of the workshop. Controls procedures, performances and standards. The workshop manager personally handles all complaints from the customers through the service advisers. The workshop manager supervises the normal running of the time keeper, Kardex establishing and controlling daily and monthly returns and statistics.

WORKERS CHART

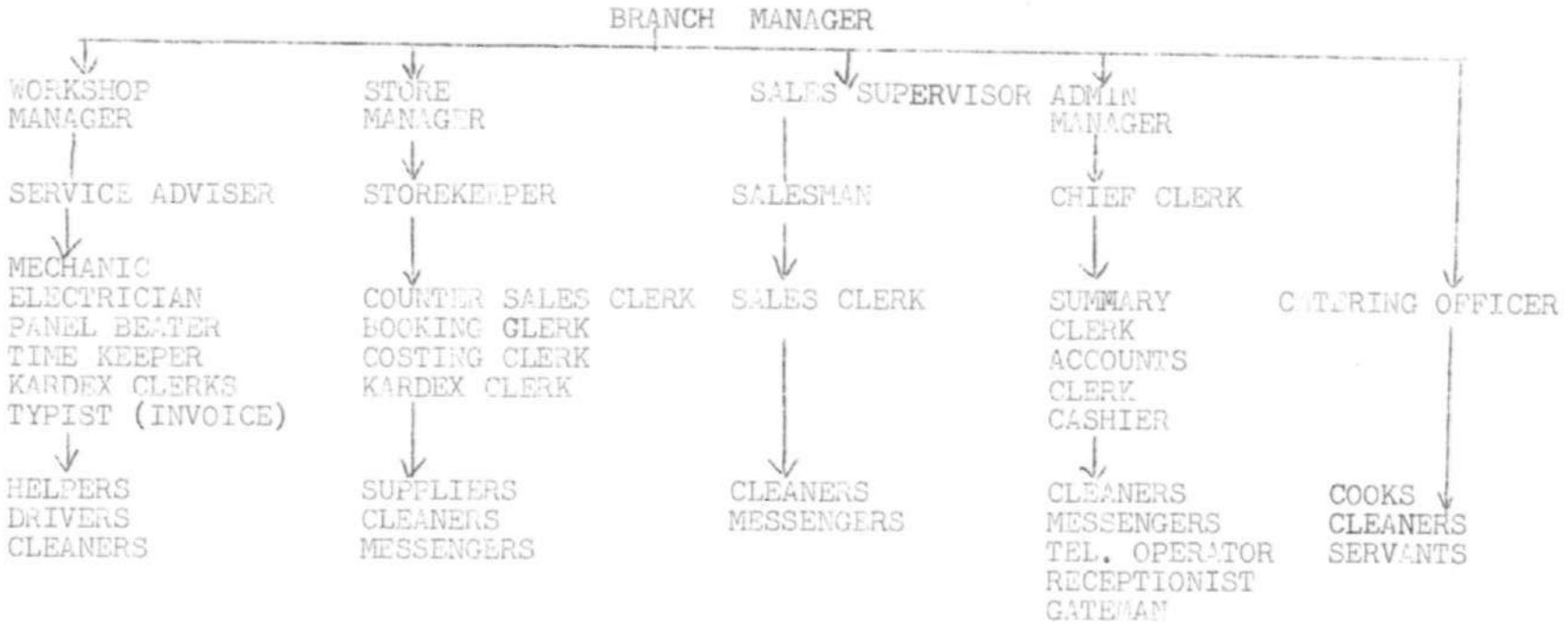


TABLE II.

up to date and ensures that technical information is understood and passed on to the appropriate quarters. The supervisor supervises the foreman.

SPRAY PAINTER:

Carries out all required paint and spraying work on motor vehicles, equipment, and other items. Spray vehicles, equipment or other items stated in the job repair order within given time as instructed by the foreman.

PANEL BEATER/WELDER

Straightens dents on motor vehicles bodies and other parts. Joins pieces of body and frame parts, fixes windscreen, door glasses and other components and accessories; The panel beater and welders carries out electric and gas welding.

ELECTRICIAN (AUTOMOBILE)

Fixes or repairs electrical parts of vehicle and other electrical appliances.

MECHANIC (AUTOMOBILE)

Carries out repair adjustments and maintenance work on vehicles specified in the job repair order.

INVOICE CLERKS

Closes all jobs and prepares daily and monthly workshop survey.

FOREMAN

Ensures that general and technical information is understood and passed to the surbordinates. Submits for approval to his immediate boss proposals regarding

(i) Disposal of company's vehicle when in his opinion further repairs would not be econonical.

(ii) Matters which his immediate boss should approve or be informed about.

The foreman supervises mechanics; panel beaters, spray painters and helpers.

TOOL STORE KEEPER:

Keeps tools and other materials for the workshop and supplies same to staff when required. Occasionally greases the tools to protect them against rusts and ensures that the stationeries are protected against damage. Assist in purchasing oil, kerosine and sundry materials for the centre.

SERVICE ADVISER

Closes all jobs and prepares daily and monthly workshop survey.

SUPERVISOR

Signs material requisition vouchers for both internal and external job and ensures that parts booked correspond with repair operations. Assist in keeping all literature

VEHICLE HISTORY KARDEX CLERKS:

Maintains vehicle history cards and ensures that records are up to date.

SIGN WRITER

Designs and undertakes all kinds of sign writing. Writes vehicles requisition numbers.

CHAPTER FOUR

FORECOURT FACILITIES AND EQUIPMENTS:

A forecourt is three things to the service station: Storage area for petrols, advertisement to passing motorists and display area for spare parts and engines. In planning a forecourt and its facilities, there are two considerations. Operational and Sales. Operational considerations are those concerned with the efficient running of the forecourt while Sales considerations are directed towards the convenience of the Customers and in consequence the improvement of the total sales.

The filtration of traffic from the service Centre, filling stations etc. into the main traffic flow needs special care. The first essential is good vision at the junction of the entrance and exit drives with the main road.

STORAGE TANKS AND PUMPS

Fuel can be stored either above or below ground. Nowadays, the latter method is almost invariably used. Quantities exceeding 1,000 litres must be stored in steel tanks. The following police regulations for the handling of inflammable liquids are quoted below.

. Pumps must be kept 5.00 m away from servers, Cellar-shafts and wells. Otherwise appropriate protective

measures against the penetration of inflammable liquids into these cavities must be provided. Provision of appropriate fire fighting equipment may be required.

. Underground storage tanks and pipe lines must be at least 1.00m away from gas, water, drainage and electric services. An underground storage tank does not require a protective safety area, free from obstruction must be maintained around the filling pump to which the storage tank is connected.

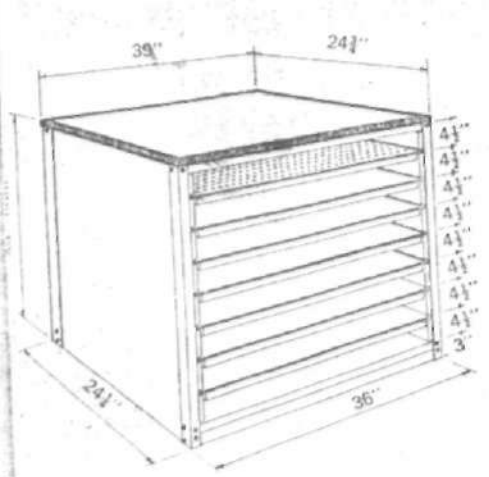
. The tank must be completely surrounded (except for the manhole) with earth at least 1.00m thick. The minimum distance between adjacent tanks to be 40cm. Mainhole are to have heavy duty covers as a protection against traffic and fire. Tanks must be protected against corrosion before being lowered into the ground.

. All pipes leading upward from tanks are to be protected against mechanical damage and fire to a height of 10 to 25cm above the ground level with strong casings of brickwork, concrete or reinforced concrete.

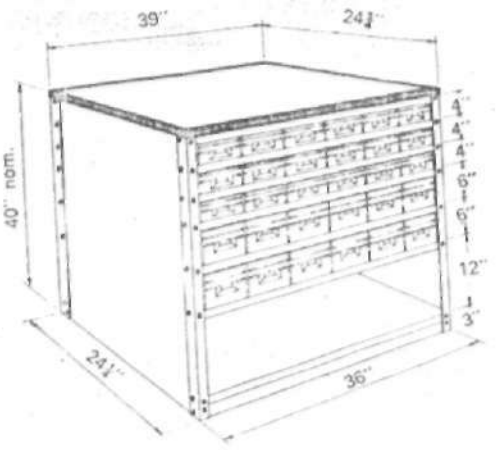
. The storage tank must be at a minimum distance of 5.00m from buildings or their foundation.

STORE ROOM

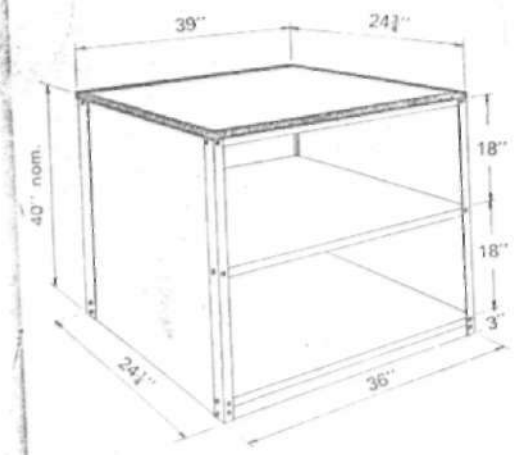
Every service centre should have a store room to accommodate items used in the workshop by the mechanics, electricians etc. and it should be located in such a way



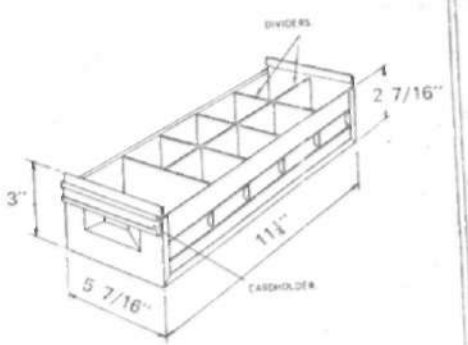
TYPE CU.1
COUNTER UNIT
Formica fixed to 18 mm Blockboard top and complete with Hardwood edgings. Colour of Formica to be white.



TYPE CU.2
COUNTER UNIT
Formica fixed to 18 mm Blockboard top and complete with Hardwood edgings. Colour of Formica to be white.

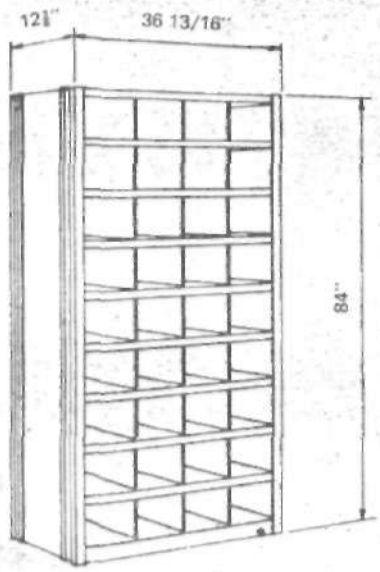


TYPE CU.3
COUNTER UNIT
Formica fixed to 18 mm Blockboard top and complete with Hardwood edgings. Colour of Formica to be white.

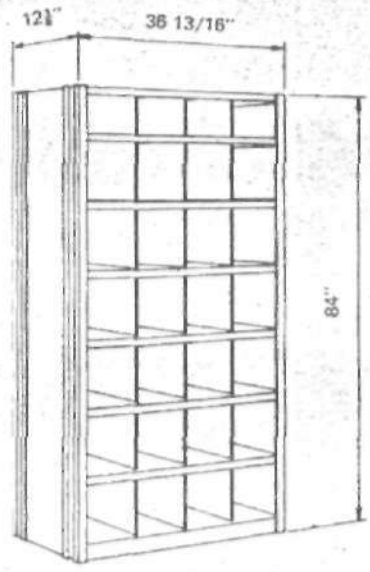


TYPE DU
DRAWER UNIT FOR HARDWARE OR SMALL PARTS

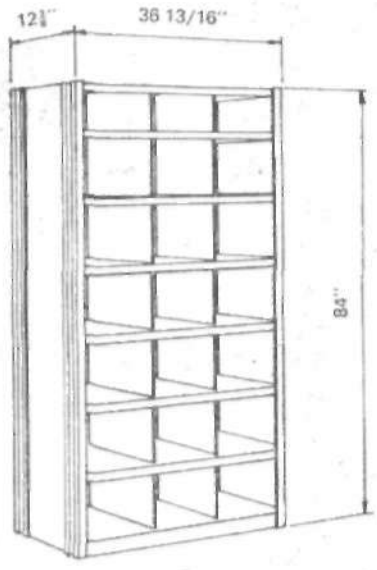
STOREAGE OF SPARE PARTS. (FIG 1).



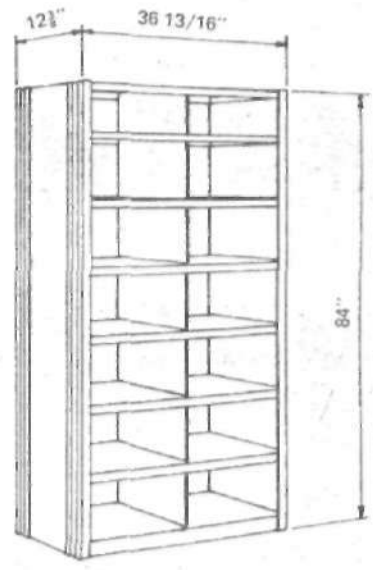
TYPE 3
GENERAL PURPOSE BIN
Number of Compartments 36.
Nom Size 9" x 9" x 12".



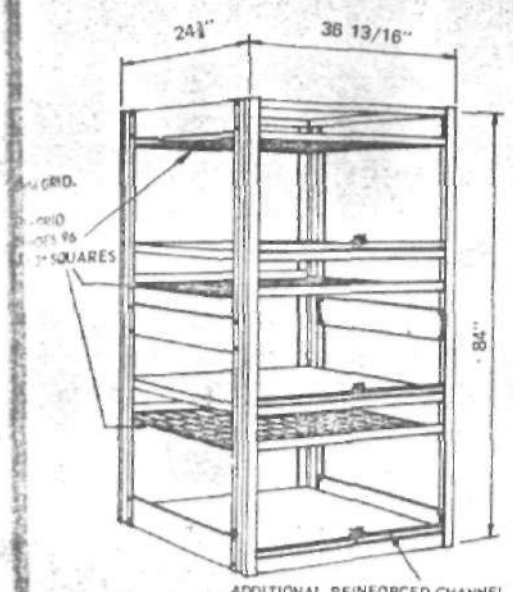
TYPE 4
GENERAL PURPOSE BIN
Number of Compartments 28.
Nom Size 12" x 9" x 12".



TYPE 5
GENERAL PURPOSE BIN
Number of Compartments 21.
Nom Size 12" x 12" x 12".



TYPE 6
GENERAL PURPOSE BIN
Number of Compartments 14
Nom Size 12" x 18" x 12".



TYPE 8D
RACK FOR SUSPENSION LEGS



TYPE 9A1
GENERAL PURPOSE BIN
Number of Compartments 27
Nom Size 9" x 12" x 30".



9A2
RIAL PURPOSE BIN
er of Compartments 15.
Size 16" x 12" x 30"



TYPE 9B
RACK FOR DRIVE SHAFTS, SPRINGS,
CILL PANELS ETC.
Number of Compartments 13.



TYPE 9C
DOUBLE SIDED RACK FOR FLAT WINDOW—GLASSES ETC.



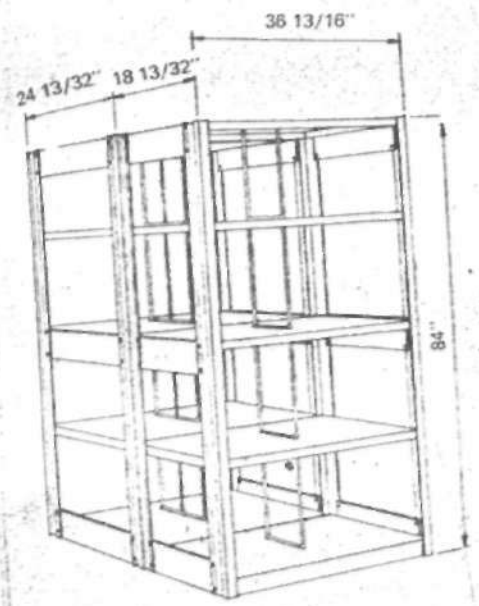
TYPE 9D
RACK FOR WINDSCREEN AND REAR GLASSES



TYPE 10A
RACK FOR SHEET METAL OR BULK STORAGE



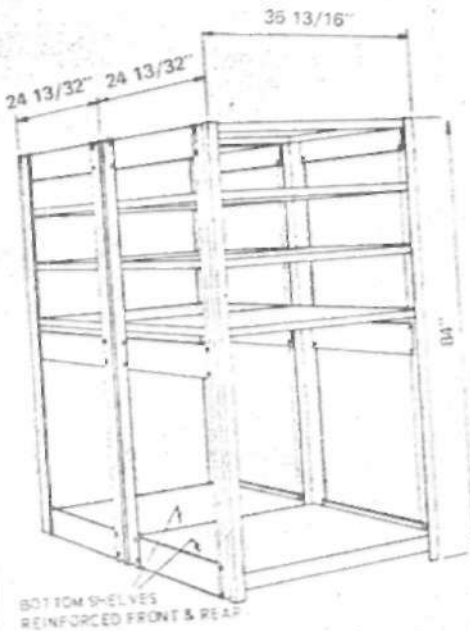
TYPE 10B
RACK FOR SHEET METAL OR BULK STORAGE



TYPE 10C
RACK FOR SHEET METAL OR BULK STORAGE



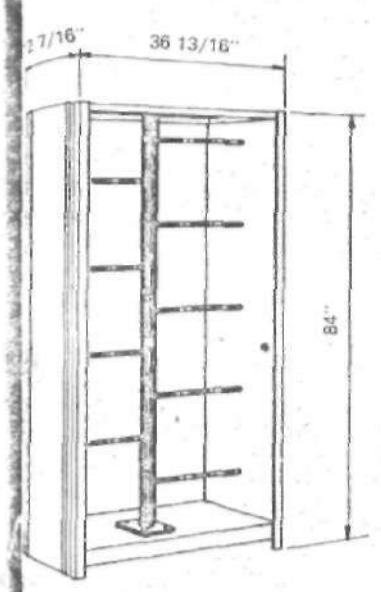
TYPE 10D
RACK FOR SHEET METAL OR BULK STORAGE



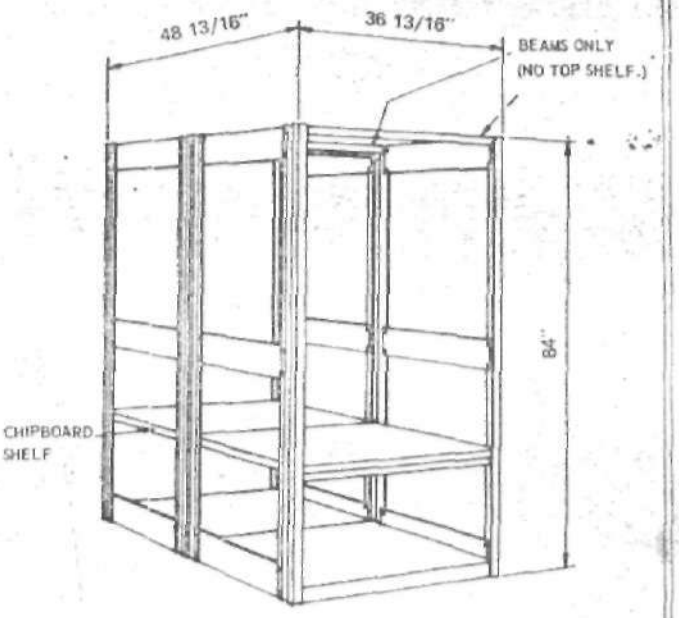
TYPE 11A1
RACK FOR SHEET METAL
Rod Dividers are available to suit shelf spacings as shown.



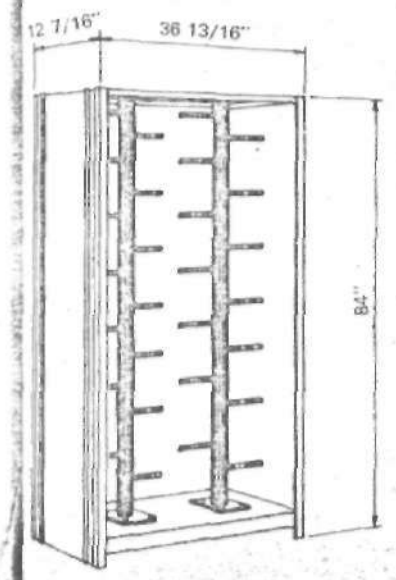
TYPE 11A2
RACK FOR SHEET METAL
Rod Dividers are available to suit shelf spacings as shown.



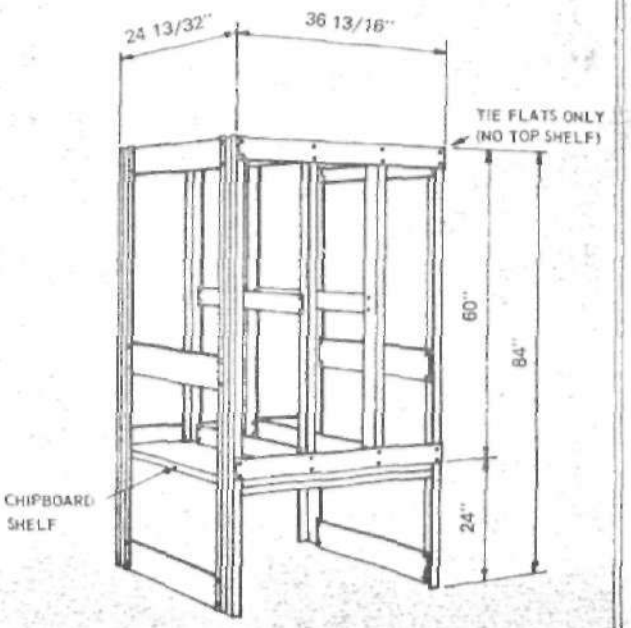
YPE 12M1
N FOR CLUTCH DISCS
Tubular assembly complete with 9 pivot arms



TYPE ER1
RACKS FOR EXHAUSTS



YPE 12M2
IN FOR CLUTCH DISCS
Tubular assemblies complete each with 14
vot arms.



TYPE ER2
RACKS FOR EXHAUSTS

that customers could easily purchase items. A display area should be located close to this area for easy publicity.

There should be a delivery bay. From there heavy materials are taken to sorted. Also light materials are slighted from the delivery bay to separate places.

The materials are sorted and stored in Bins, Shelves, Racks and Stalling.

Bins - the small materials are stored here.

Shelves - the larger materials are stored in shelves.

Racks - used for storing long narrow stock.

Figure 1 illustrate the ways each of the materials are stored

CANOPIES:

This is important in the forecourt layout especially in the petrol depot. This should be high enough to allow easy purchase of fuel especially when it is running.

EQUIPMENTS:

The following equipments are very essential for the services of engines:- extract from the FIRE STONE GARAGE JOURNAL (1976 JULY).

. A parafin cheasing tank of portable and power jet rotating type, together with cleaning brushes and so on, an inspection measuring tools such as a cylider guage and two, three and four inch inside and outside micrometers.

. A main bearing boring bar for reboring integral main bearings, that is to say, bearings run straight into the block and dynamometer for the running and testing of engines.

. An extra-light high speed drill of size easily held in one hand and of a type driven either by air or electric power.

. Electric valve refacers, high speed piston and grinding machine. An hydraulic press of a depth capable of decling with cylinder liners, and a width sufficient to deal with crack shafts for straightening work.
Figure II illustrate part of the equipments used in the workshop.

ELECTRICAL SERVICE EQUIPMENTS

The elctrical service equipments include battery charger, the voltmeter charger, high and low test lamps, electric soldering irons insulated pliers, generator tester, hydrometer charger and the air conditioner repair machine. Figure II also illustrate part of the tools used by the mechanics.

BATTERY SERVICE EQUIPMENTS

The battery service equipments include high rate tester, hydrometer with thermometer having temperature correction scale, filling syringes and funnels, moulds for battery straps and terminal correctors.

BODY REPAIR EQUIPMENTS

Body repair equipment include square hammer, traingular hammer, oxyacetylene flame tank, resistance welding machine and Iron Blocks.

DIAGONISTIC CHAMBER:

They not only diagonise faults as a normal rule, they are also used to check work done on a car as a means of quality control in the workshop. Diagnosis is made by performing inspection to discover what parts of a car or commercial vehicle requires adjustments or repair. The diagonistic chamber is a useful aid to generate more business to the workshop. Whe diagnostic equipment is used as means of quality control, any repair executed are tested to ensure the finished job is satisfactory and operation is within certain limits.

Advantages of the diagonistic chamber:

. Faults revealed are generally passed to the workshop thus increasing profit on Labour and parts.

. The diagonistic chamber attracts more customer

. It is used for checking second handed vehicles prior to repair and selling.

Disadvantages of the diagonistic chamber

. The diagonistic chamber is too costly.

. A trained mechanic must be used to operate the chamber especially in analysing the identification board.

. The chamber cannot be used to diagonise some faults.

CHAPTER FIVE

ACCIDENTS AND COLLISON REPAIRS

Accidents are usually covered by insurance. All vehicles must have a minimum of third party cover whilst a large amount of vehicles have fully comprehensive insurance cover. It means that any job coming into the workshop (BODY REPAIR SECTION) is paid for either by the customer direct or by an insurance company. The service adviser determines those who will cover the bill.

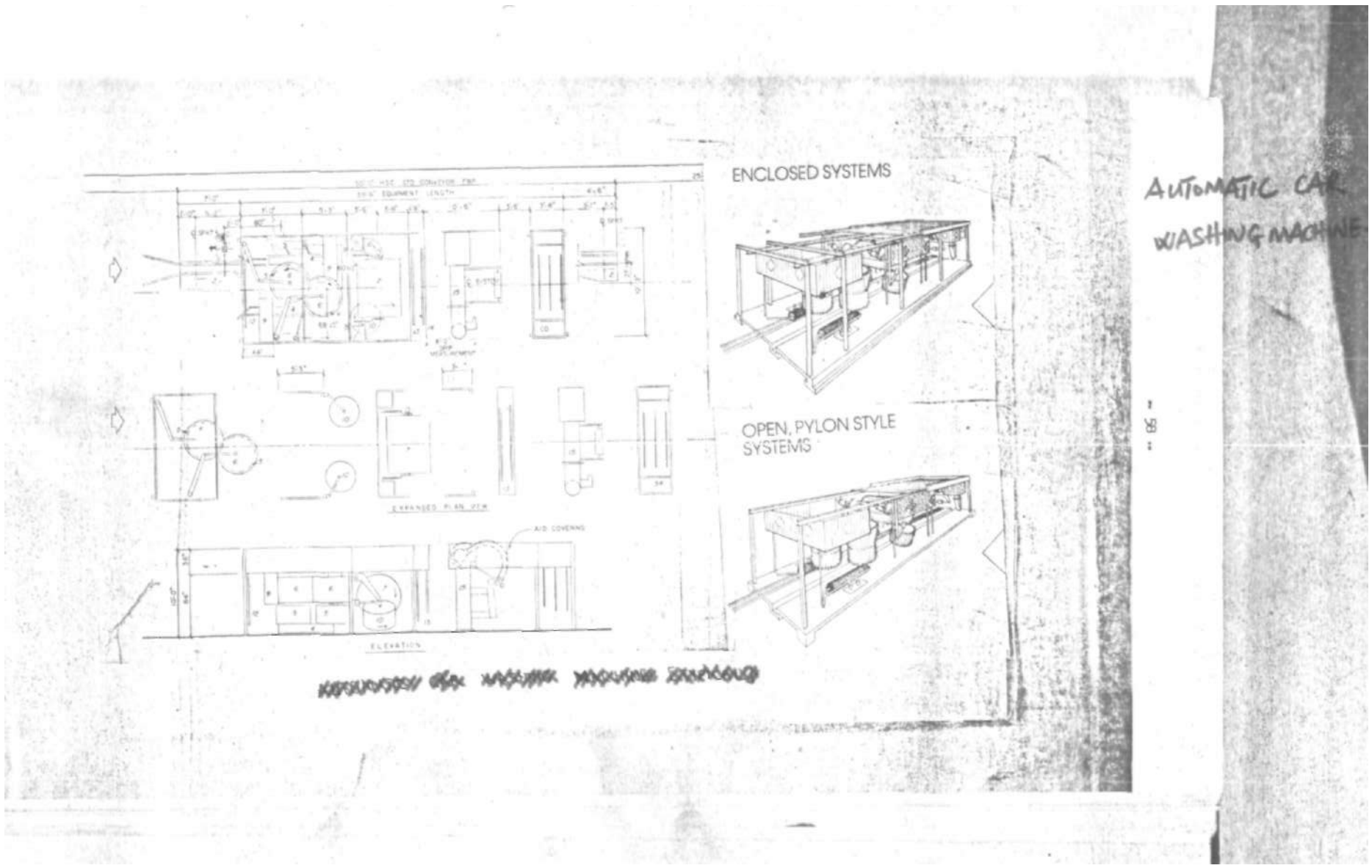
If the repair is to be covered by insurance then the first stage of the repair work is to make out an estimate for the damage and then to contact the insurance company so that the assessor (USUALLY COMPANY ENGINEER) can assess the damaged vehicle.

See Table - for the police annual reports on accident rates.

ROAD ACCIDENTS AND CASUALTIES

1ST JANUARY - 31ST DECEMBER, 1975

STATES	TOTAL No. OF ACCIDENTS	PERSONS KILLED	PERSONS INJURED	TOTAL KILLED AND INJURED
LAGOS STATE	5231	477	1488	1865
WESTERN STATE	5302	1044	3284	4328
MID-WESTERN STATE	3154	568	1618	2186
SOUTH EASTERN STATE	1949	208	1571	1779
EAST CENTRAL STATE	3430	538	2062	2420
RIVERS STATE	1816	115	497	612
NORTH WESTERN STATE	1669	482	1623	2105
NORTH CENTRAL STATE	3099	555	2374	2929
KWARA STATE	1344	291	730	1021
BENUE PLATEAU STATE	1812	549	1313	1862
KANO STATE	1916	333	1417	1750
NORTH EASTER STATE	1926	492	2155	2647


ENCLOSED SYSTEMS
OPEN, PYLON STYLE SYSTEMS
AUTOMATIC CAR WASHING MACHINE

CHAPTER SIX

SERVICES AND WORKERS WELFARE

WASHING

Single Car washing bays are equipped with jacks or lifting platforms in contrast to assembly line washing bays. The bay in which a lifting platform is installed must be high enough to ensure easy servicing of the vehicle when raised.

For washing, both high and low pressure water are used with the usual lateral hose drum or through a revolving washing installation fixed to the ceiling. For leathering, there is a mobile equipment (the small wringing machine is for drying leathers.

Usually, washing procedures would be easier with one attendant around the bay all the time. The usual order of cleaning vehicles is (a) internal vacum or dry cleaning (b) Initial washing with high pressure water (c) body washing or leathering (d) Polishing. All these precesses takes place within 10 minutes depending on the type of wash being made.

LUBRICATION

It is necessary to design lubricating installations to give easy access to the underside of the vehicle. Nowadays, lifts are used. It has several advantages over the pits. All workshop floors should be finished with grano topping for easy washing.

Advantages of lifts over pits

(i) It is hydraulic, that is, it could lift the vehicle so that there is an easy access to the underside of the vehicle.

(ii) It needs more than one worker to get the vehicle set on the pit.

(iii) The environment becomes oily easily.

(iv) It is not comfortable for servicing - the mechanics gets tired and hot easily inside the pit.

VALETING

Valeting is also part of the services done under the workshop. Usually special vacuum cleaners and special nozzles are available for this services. An attendant is necessary. The attendant vacuums the car, empties ash-trays and applies silicone polish to any metallic part of the vehicle. Fast operations for this process takes about 20 minutes. Vehicles under collision repair that requires internal cleaning takes a longer time for this process.

GENERAL SERVICES

Apart from the other services mentioned about - general services like wheel alignment, Gear box repairs, engine removal and other major repairs also takes place within the workshop. The table below shows the monthly returns (MONTHLY REPAIRS) for some service centres in Kaduna.

VOLKSWAGON-MANDILAS KADUNA

MONTHLY RETURNS

	1979	1980
JAN	165	210
FEB	253	223
MARCH	355	283
APRIL	137	115
MAY	294	217
JUNE	-	645
JULY	521	223
AUG	645	-
SEPT	238	302
OCT	234	195
NOV	192	333
DEC	219	319

SCOA KADUNA

MONTHLY RETURNS

	1979	1980
JAN	358	406
FEBRUARY	454	435
MARHCH	448	350
APRIL	445	227
MAY	554	428
JUNE	444	501
JULY	719	601
AUG	496	372
SEPT	381	370
OCTOBER	453	578
NOVEMBER	430	484
DECEMBER	315	482

WORKERS WELFARE

CAFETARIA SERVICE:

Adequate services must be made for the workers to be able to feed within the centre. This is very essential especially during breaks.

MEDICAL SERVICE

Emergency first aid must be provided for minor injuries especially witnin the workshop. A place could be provided within the workshop where physical examination could be taken for job sellers.

RECREATIONAL FACILITIES

This should also be provided to make the centre more homely.

CHAPTER SEVEN

DESIGN POSSIBILITIES:

In the planning of an automobile service centre several factors must be taken into consideration. The factors that could be considered are: Limitation of the site and where it is situated, the cash available, efficiency of management and the trade potential of the locality.

In some ways, a restricted site has some advantages in that it forces the management to make the best use of the available space. A mistake is often made with a larger site in spreading out the departments and thereby having all the facilities in different places.

In designing a service centre, various factors must be taken into consideration. The parts of Service Centre falls into three main groups. This is shown in the space relationship diagram and example of how they can be arranged on sites are also shown.

Different sites are taken into consideration - straight site, corner site, round about site and junction site.

The criteria that determine the arrangements are also considered below.

WORKSHOP:

The workshop should incorporate the service line and be linked with the offices and parts store.

The showroom is principally used for the display of items for sale. It should be linked to offices and parts store and be close to workshop. The showroom must be visible, accessible and attractive to the public.

FORECOURT SERVICES:

The main function is sale of fuel and oil. It can be linked to the main building but it must be able to operate efficiently when other departments in the centre are closed. Vehicle washing bay may also be incorporated.

CHAPTER EIGHT

DESIGN CONCEPT AND SEQUENCE OF OPERATION

PLANNING:

In disposing the site for the various functions of the motor service centre, I was aware of the traffic problems that might arise within the centre. I therefore decided to set the service centre building reasonably away from the road thus creating a buffer zone between the building and road.

The Service Centre would house two main activities: Public Activities and the Service activities.

PUBLIC ACTIVITIES: This may be divided into two zones: The active zone and the passive zone.

Active Zone: This include the reception area, showroom, waiting, Service adviser's room and the parts store. Toilets may be included.

Passive zone: This include the rooms, that is, the offices, resting room and toilets.

SERVICE ACTIVITIES: The service activities include the workshop, changing rooms, Cafetaria and parking. The petrol depot is also part of the service activities - it must be able to operate efficiently when other department in the centre are closed. The depot was designed so that it could serve the public successfully and at the same time linked to the centre.

SEQUENCE OF OPERATION

The service centre was designed to ensure that no part of the workshop is overloaded or underloaded. Hence each operation is adequately timed. The sequence operation is this ways:-

Client with car for repair

↓

Receptionist

↓

Service adviser

↓

Diagonistic Chamber

↓

Workshop

↓

Receptionist

CHAPTER NINE

SCHEDULE OF ACCOMMODATION AND NUMBER OF WORKERS

SPACE	AREA IN SQ. METERS
ENTRANCE LOBBY	20
RECEPTION	12
SHOWROOM (ENGINE DISPLAY & PARTS)	600
SERVICE ADVISER (2)	12 (EACH)
WAITING	63
KARDEX CLERK	16
COVERED STAFF PARKING (3)	18
DRIVERS WAITING	9.5
GATEMAN	6.5
W.C'S & WASH HAND BASIN	13.
PARTS STORE	
STORE (GROUND & FIRST FLOOR)	1088
RECORD CLERKS	15.5
CASHIER	12.5
STORE MANAGER	12.5
CLERKS	12.5
OFFICES (FIRST FLOOR)	
LOBBY	25.
GENERAL OFFICE	45
BRANCH MANAGER	42
SECRETARY & WAITING	28
CHIEF CLERK	25
ADMIN. MANAGER	42
SECRETARY & WAITING	28
CONFERENCE ROOM	42

SPACE	AREA IN SQ. METERS
ACCOUNTANT & SUMMARY CLERK	25
RESTING ROOM	21
CLEANERS	9
MESSENGERS	9.
W.C (4) JUNIOR STAFF	12.5
W.C's (4) SENIOR STAFF	12.5
SALESMAN	12.5
SUPPLY MANAGER	12.5
RECORDS	12.5
WORKERS FACILITIES	
CANTEEN	96
KITCHEN	25
CHANGING (MALE)	4.
CHANGING (FEMALE)	4.
STORE	9.
TOILETS (SHOWER & W.C'S)	16
CHANGING (WORKSHOP WORKERS)	63
W.'s SHOWERS & BASINS	27
COVERED WALKWAY	340
WORKSHOP:	
BATTERY CHARGING	40
ELECTRICAL EQUIPMENTS	40
ENGINE ROOM	72
ELECTICIANS (4 BAYS)	28 (EACH)
ALIGNMENTS (4 BAYS)	28 (EACH)
DIAGONISTIC CHAMBER (3)	64 (EACH)
ENGINE REMOVAL (5 BAYS)	28 (")
GEAR BOX REPAIRS (4(BAYS)	28 "

SPACE	AREA IN SQ. METERS
GENERAL SERVICING (8 BAYS)	28 (EACH)
BODY REPAIRS (4 BAYS)	28 "
DRYING	56 Sq. Meter
STORE	8 "
SPRAYING AND STORE	55 "
VALETING (4BAYS)	28 (EACH)
STORE	20 Sq.m.
WASHING AND STORE	58 "
COMPRESSOR ROOM AND ATTENDANT	32 "
W.C's SHOWER AND BASINS	32 "
OFFICES IN THE WORKSHOP	
WORKSHOP MANAGER	15
CLERKS	12
FOREMAN	12
TIME KEEPER	12
FIRST AID	12
CLEANERS	12
PETROL DEPOT	
WASHING	35
LUBRICATION	35
PETROL ATTENDANT	12
LUBRICANTS	12.5
WAITING	16
SNACK BAR	20
KITCHEN AND STORE	21
MINI-MARKET AND STORE	55
STORE FOR GAS SALES	40
CLEANERS	6
W'C	4

ESTIMATED NUMBER OF WORKERS
WORKERS IN THE SERVICE CENTER

SPACE		NUMBER OF WORKERS ESTIMATED
SPARE PARTS SECTION		12.
WORKSHOP		
ELECTRICAL SECTION		6
ALIGNMENTS		6
GEAR BOX REPAIRS		6
BODY REPAIRS		6
DRYING		2
SPRAYING		2
UPHOLSTERY		4
WASHING		2
GENERAL SERVICING		20
FOREMEN		4
HELPERS		10
	SUB - TOTAL =	80
SENIOR STAFF		
BRANCH MANAGER		1
ADMIN. MANAGER		1
CHIEF CLERK		1
WORKSHOP MANAGER		1
SERVICE ADVISER		4
STORE MANAGER		1
ACCOUNTANT		1
SUPPLY MANAGER		1
	SUB-TOTAL	11

DEPARTMENT PERSONNELS

RECEPTIONIST		1
KARDEX CLERKS		2
CASHIER		1
SALES CLERK		2
CLERKS		2
TYPIST (INVOICE)		3
TIME KEEPER		3
CATERING OFFICER		1
MESSENGERS		5
CLEANERS		10
SUMMARY CLERK		1
	SUB-TOTAL	32

PETROL DEPOT

WASHING ATTENDANT		1
LUBRICATION		1
PETROL ATTENDANTS		2
MINI-MARKET		2
GAS DEPOT		2
CLEANERS		2
	SUB-TOTAL	10

TOTAL 80 + 11 + 31 + 10	=	132

CHAPTER TEN

STRUCTURE AND BUILDING UTILITIES

The structure design has been conceived based on the functional requirement of the buildings.

For the workshop - steel trusses supported at three places with steel columns and a monitor roof on top for maximum light and ventilation in the workshop.

For the administrative and other blocks in the service centre - beams supported on concrete columns with a double roofing system (concrete purlins with asbestos sheet).

For the petrol depot - concrete roofing and for the canopy, the roof structure is a space frame planned on 1200 millimeter modular grid and supported by RHS columns. Cladding fixed directly to the top chord members which are of 50 millimeter tabular steel.

Walls (for petrol depot) - the walls are 250 X 180 X 135 millimeter clay bricks bedded on 1:4 sand and cement motar joints which are painted externally and filed internally.

BUILDING UTILITIES:

PLUMBING:

Galvanised mild steel pipework including bends and anillaries for water supply P.VC pipes for disposal standard WC suites and wash basins will be used too.

ELECTRICAL SERVICES:

The electrical works shall compose the following:

(i) standard concealed conduit wiring arrangement including lighting and power points.

(ii) Installation of lighting fitments internally and externally in island areas and canopies (in the PETROL DEPOT), front and inside the buildings by means of a continuous strip of fluorescent fixtures on the soffit of the overhang at the roof lines and for the admin. block - the same thing applies.

FIRE SERVICES:

Dry risers will be provided. Stand by fire bossess to be provided within the service centre. External and Internal finishes are specified non-flammable and fire resistants.

The airport management can also help in case of any other problem.

BIBLIOGRAPHY

The following is a list of selected bibliography:

1. Max Lock and Partners - Kaduna 1917 - 1967. A survey and plan of the capital territory for the Government of Northern Nigeria.

2. Erast Neufert. Architechs Data

3. Fire Stone Garage Montreal, Canada

4. Newspapers and Magazines

   National concord - March 12th, 1981.

   Architectural Review - MAY 1978 Issue.
   Nigerian Tribune - June 2nd, 1981.

5. Garages and Service stations - vahlefeld . and Jacques.

6. A.J. METRIC Handbook

7. Motor vehicle workshop Orgarisation and administration by P. Chandler.

8. Nigeria's Third National development plan (1975 - 80).

9. MANDILAS REPORT 1975 - 1980.

10. POLICE ANNUAL REPORT 1975.