A THESIS

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By

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A B S T R A C T

Vocational Education has been defined as training for useful employment. This definition fits any form of education except that we are here talking of a specific craft or trade.

Vocational Education strives to:

1. meet the man-power needs of society
2. increase the options available to its receipients
3. serves as a motivation force to enhance all types of learning.

The purpose of this thesis is therefore:

1. To improve the employment potentials of the country.
2. To increase the badly needed skilled and semi-skilled man-pouer for national development.
3. To design a model centre for vocational training.

S C O P E

The centre will be a two-sex non-boarding school for 500 students. It will comprise of eight work-shops, admini-strative and academic block, with a multi purpose hall.

There will be the mobile unit department which will emerge as the School comes into full operation. Details of the mobile unit will be explained later in the text.

Dedicated to my

BELOVED ONES

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I N T R O D U C T I O N

It is a common knowledge that not all the graduates of the primary schools are able to be absorbed into the post primary institutions. This is partly because of their poor performances in their examinations and partly due to lack of enough spaces in the higher institutions.

It is therefore necessary to establish some institutions that could train or improve the skill and talents of some of the graduates in all forms of crafts (like wood-work, metal-work, motor/vehicle mechanic etc.)

The Federal Government through the Federal Capital Development Authority (FCDA) has already seen the need for establishment of such schools. Land has already been set aside for them.

It is my intension to design such schools based on the brief prepared by the F.C.D.A.

The school is primarily intended to give students an elementary training in a trade, particularly those related to the construction industry. Brick-laying and Carpentary students will not spend up to five (5) years in the school as in the secondary school, but will take

short intensive courses. On-the-job, training opportunity will be available in the nearby employment areas. The age range of students will be fifteen (15) upwards.

The proposed Vocational Training School will operate in conjunction with the Non-Formal Vocational Institutions (NOFVI) and Local Handicraft and Home Management Centres (LOHAHOMAC) which will be established in neighbouring states.

Under this project NOFVI are privately owned work-shops where primary school leavers voluntarily go for vocational training in trades like motor mechanic, masonary, carpentary, tailoring etc. Any successful apprentice who passes Federal Trade Test - III is to be given free of charge a set of tools.

LOHAHOMAC are centres jointly established by the State Government and UNICEF for creating job opportunities and reviving the local crafts. Trainees are to be issued with Testimonials only, so they could be encouraged to be self-employed. Successful candidates are to be encouraged to form Trade Guilds so as to attract Government and Small Scale Loan Scheme.

A summary of the Course Structure is given below:

(a) Length of Course - 3Years

(b) Enrolment per Course - 15 - 20 Students

(c) Number of Course - 8

(d)	Age Range of Students	-	15 Up-wards
(e)	Total Number of Students	-	500
(f)	Entry Qualification	-	Primary School Education
(g)	Qualification after Completion	-	Grade-II Artisan

CHAPTER- TWO

VOCATIONAL/APPRENTICESHIP SCHEME - As Practised Today

An apprentice is one who is bound by legal agreement (Indenture) to serve another person for a specific period with a view to learning an Art or Trade under consideration of instruction and, in some cases, of maintenance. He is also someone who is learning a trade, an art or a calling especially by practical experience under master or skilled craftsman, and often without pay.

The scheme is designed for the improvement of a particular besiness or trade or profession in which there is a regular employment which calls for training. To this end, unemployed persons, mostly young people, attach themselves to master-craftsmen for several years as apprêtices. There are today various forms of apprêtice-ship. They include:

1. Formal Apprenticeship Scheme under Statutory Bodies, e.g. The Nigerian Railway Corporation, the Post and Telegraph, The National Petroleum Institute, etc.

2. Formal Apprenticeship Scheme (INDENTURED) in industries and firms e.g. United African Shell Company, etc.

3. Traditional Attachment Schemes in which a son takes to the trade of his father or relative through working together, e.g. Leather Crafts Textile Weaving, etc.

4. Informal Attachment of mates such as small-scale entrepreneurs, welders tailors, goldsmiths etc., to skilled artisans.

5. Local Appreticeship Scheme for training of tradesmen through arrangement with master-craftsmen by parents who pay for the training and get their children attached as trainees e.g. Wayside Mechanics, Electrical Service-men, Welders and Radio/Television repairers, etc.

6. In addition, there are a few ill-equipped private vocational training centres scattered all over the country. These centres also provide artisan training.

7. Vocational Improvement Centres (VIC) supported by the Industrial Training Fund in the States.

It is a pity that the Industrial Training Fund is not willing to support these centres any more. The Fund's plan to establish its own proposed centres may make vocational training to be too centralised and far-removed from the rural areas.

A few out of the present deficiencies as perceived by me are as follows:

1. Lack of uniformity regarding standards, duration or training, indenture and minimum age, centres, master craftsmen, etc. in the same trade and within same locality.

2. Informal training scheme suffers from vagueness of objectives for training. They lack specific and clear indentification of where training needs lie.

3. Poor training facilities, if any, unqualified instructors, inadequate instructional materials etc.

4. Practical training is not supported with related theory especially under road-side master craftsmen.

5. Inadequate availability of raw materials and tools in the country coupled with the refusal of trade merchants to accept Local Purchase Orders.

To say that these problems being encountered are not of a great magnitude and can be solved by an ad-hoc approach is to play on the intelligence of our people.

It gives bright prospects for the future that the Industrial Training Fund is joining the race in a big way. However, there is need to make its programme flexible, bearing in mind the different socio-economic situations in this country. In this connection, consideration should be given to any aspect, however basic, when planning and designing Apprenticeship/Vocational Training Programme. All the necessary legislations relating to it should be carefully considered and all relevant persons or groups of people should be brought in right from the out-set.

CHAPTER-THREE

NEW APPRDACHES TO THE DEVELOPMENT OF APPRENTICESHIP/ VOCATIONAL TECHNICAL TRAINING PROGRAMME

I N T R O D U C T I O N

This particular subject of Apprenticeship Training is a topical one covering a very wide area of human development. The success of our nation really depends on the development of its human resources in a way that will harness other resources towards the upliftment of her people. This form of training, which could be formal or non-formal, covers both Technical and General Education for people of varying levels of education in both the Public and the Private Sectors of the nation's economy.

One cannot do justice to this topic without an in-depth study or reference to the National Policy on Education as it affects Technical Education. Appreticeship Training is a vocational education which comes under this policy. Whatever we plan to do, it is imperative that we bring the existing Institutions, Trade Associations Unions, Co-operatives, Local Enterpreneurs, and Chamber of Commerce into the picture. The trades are now suffering everywhere

in the Federation as a result of dearth of Apprentices in various vocations. Consequently, contractors and Enterpreneurs are now bringing in foreigners mostly from ECOWAS Countries, to serve as helpers.

The approach to be followed should be broad-based, covered both the Private and the Public Sectors. The Private Sector should be further categorised as follows:-

(a) Well-established Industries.

(b) Small-scale Industries.

(c) Local Road-side of Traditional Craftsmen/ Enterpreneurs.

Nigeria's population is supposed to be approximately eighty million. Majority of adult Nigerians are engaged in agrarian economy (about 70-80%) while only a small percentage is engaged in the commercial, industrial and public sectors of the economy; (about 2%). of the twenty-eight million able bodies youths in Nigerian today, only about twelve million are actively undergoing courses of training in all our educational institutions. The rest of the sixteen million youths aged between 15 - 30 years who are not in schools or college are either unemployed or under-employed.

This figure (sixteen million) represents about 20% of the total population, and is one of the highest enemployed figures in the world.

The bulk of these under-employed youths are:

i. The illiterate group.

ii. Drop-outs from:

   a. Primary Schools.

   b. Secondary Modern Schools.

   c. Secondary Grammer Schools.

iii. Some school leavers from:

   a. Primary Schools

   b. Secondary Modern Schools.

   c. Secondary Grammer Schools.

iv. People in the above groups who chose to serve as appretices under small scale self-employed craftsmen and entrepreneurs.

v. Craftsmen who were working under master craftsmen and industrialists.

vi. Illiterate and semi-illiterate small-scale industries.

The Universal Primary Education (U.P.E) Scheme in Nigeria currently produces an annual average of 8 million primary school leavers. This number is expected to increase by almost one million annually as from 1980/1981.

There is no gain saying the fact that the resources of this Nation is going to be over-taxed in the 80's. For instance, we are all aware that the 1976 U.P.E. products will leave Primary Schools for Post-Primary Schools in 1982, and will eventually finish their Post-Primary Education in 1988. We also know that the 1979 Free Education products will finish their Post-Primary Education in 1986, all at about the age of 15 or 16 years. As a consequence, this country will find herself hard put to it to absorb all of these students into the existing Secondary Schools and Institutions of Higher Learning. If we go by the 3rd National Development Plan or the latest 4th National Development Plan (yet to be released) the resultant figures will be astronomical. Therefore, a lot of counselling activities should procede any planned apprenticeship scheme to enable this country to cater for the spill-over and to meet the Industrial and Commercial needs of both the public and private sectors.

The spill-over mentioned above cannot be gainfully employed due to the general type of education being given them in Primary Schools and in most of the Post-Primary Schools. These unskilled hands will daily idle away in the streets in search of jobs; will join quick money-yielding but shady ventures; will become members of dangerouse labour groups as 'danfo' driver-mates, pools clerks, motor touts and unskilled casual hands under construction companies, with a consequent hampering of our Development Plans.

Another factor which contributes to the wide gap between industrial vacancies and available employable skilled hands in among Nigerian youths is the general preference of young school leavers for white-collar jobs. These unfortunate Nigerians, after fruitless efforts to gain admission to secondary schools will resort to looking for clerical jobs instead of making use of the available opportunity to learn a trade in continuing Education Centres such as the Opportunity Industrialisation Centre in Lagos, the Vocational Improvement Centres in all the States etc. But unfortunately, some of these inadequate Continuing Education Certificates, General Certificate of Education and Joint Admission and Matriculation Examinations.

THE SITE

The Vocational Training School is located in the south-west of the Accelerated District. It is bounded to the north by the Southern arterial to the East by a neighbourhood centre, to the South by the park-way and to the West by the Western expressway. The ground gently slopes at a gradient of between 2% and 6% from the higher ground in the South. The school is located close to the employment area which lies to the North across the Southern arterial. The school will occupy a site of about 8.6 hectares.

Parking provision should be made for 50 - 80 cars. This should provide space for staff and instructors, together with some extra provision for the older students. Bicycle is likely to be a popular form of transport to the school and "bike shed" should be provided.

The school buildings will be of two or three storeys providing approximately 3,905m^2 teaching area and about 5,000m^2 overall. This is a larger area per pupil than the secondary school so as to provide more adequate laboratory and practical areas. Additionally 1,000m^2 of hard surface

area will be provided outside for demonstrations and praticals which cannot realistically take place inside.

Abouth half of the site will be used for playing fields and court games. The site is predominantly flat and these should be relatively easy to locate, whilst contributing to the image of open landscape along the park-way.

DESIGN GUIDE-LINE

With the use of simple but sound and functional techniques aesthetics should be a prominent feature in all structures.

Specific measures should be taken to give the best architectural constructional and functional solutions bearing in mind the following climatic conditions prevailing in the Federal Capital Territory.

Frequent occurence of line squalis in the Territory a phenomenon associated with strong winds and rainfall of very high intensity capable of causing serious damage to building.

The North-East Trades become the dominant wind from October to March bringing with dryness. Cloudness but dust ladden condition associated with the harmattan. Consequently the days are very hot and the Cloudlessness mean there is a considerable loss of heat at night.

Within the Territory the net radiation regime is fairly uniform ranging annually from 80.5 kg-cal cm^2 yr^{-1}.

Detailed analysis of the pattern of sunshine shows that the period from January to April/May, the duration of sunshine ranges between 6 to 8 Hours in the South to 8 to 10 hours in the north. Concentration of heavy rainfall to a few months of the year causing heavy storm water. The duration of the rainy season varies from 240 days to the South to 190 days in the Northern parts of the Territory. Annual Mean Rainfall being 1,631mm.

DESIGN CONSIDERATIONS

In deciding the final choice of building, the functional requirements, circulation needs and economics are the over riding factors. Other factors that affect the choice of building types are the size, location and physical nature of the site.

PLANNING CONCEPT

Planning means thinking in terms of spatial and human interrelationships. It is desirable where ever possible to separate community traffic from an both capacity and rate of flow in each.

PLANNING GOALS

(a) Creation of traffic-free pedestrian precints.

(b) Servicing to all buildings requiring it.

(c) Logical connections in traffic flow. A conflict-free movement from major to minor roads, to parking lots. etc.

(d) Favourable circulation design.

(e) Optimum parking.

(f) Grouping activities according to their sound levels.

(g) Arranging the accommodation requirements into functional groups.

Well designed circulation system is essential to the efficient use of the physical plant.

CHAPTER-FIVE

THE MOBILE TRAINING UNITS AND HOW THEY FIT INTO APPRENTICE-SHIP AND VOCATIONAL TRAINING

EXPLANATION OF THE CONCEPT

A Training Centre installation project is always preceeded by a survey related to the following main points;

- number of persons to be trained;
- specialisation and qualifications according to local requirements and the estimated man-power programmes;
- human, physical and financial resources for the relevant sector.

Once these data have been collected, the type of centre to be provided must be chosen. There are four possibilities:

1. Mobile Units:

   Consisting of trailer (possibly extending) handed by a road tractor. We shall develop this subject later on.

2. Semi-Mobile Units:

Consisting of container blocks fully equiped which may be fit together to constitute a workshop there. Constitution enables them a minimum 10 years life duration. For their rational use, they should not stay at the same place for more than 2 years. They are often used as Pilot Centre.

3. Dismountable Centres:

Consisting of pre-fabricated elements easily mounted or dismounted. They need a concrete paving stone.

4. Permanent Centres:

This is the general type of training centre built in stone.

The training programmes, the whole equipments and the means necessary to the good running must be studied too. It is a comprehensive study, of which all the elements fit one to another and it is not possible to part them. The programme may act on the equipment and the trainers, the

equipment act on the type of centre, etc. The entire study must be carried out by the same group of people who are perfectly aware of the basic data. The selection of one of the 4 possibilities will depend on the results of the survey.

FOR EXAMPLE:

If the trainees are few or dispersed; if the training is short or does not require heavy equipment, the mobile unit would be the best choice. This shall be discussed later on.

DETAILED DESCRIPTION OF THE UNITS FRAME

There are three types of mobile units:

On Semi-trailer chasis, up to 12.5m long

On trailer chasis, up to 6m long

Intermediary solution

SEMI-TRAILER

General Characteristics

—	total length	12.5m.
—	total width	2.5m.
—	height	3.8m.
—	surface	30-75sq.m. with extension

— total live load 22 tons

— weight empty with machines 18 to 20 tons

— 1 axle with twin wheels or
2 axles according to high-
way code.

NOTE

The given dimensions are only indicative ones and are function highway code of the relevant country. The length, height, width and charge may vary.

CONSTITUTION OF THE SEMI-TRAILER

The dimensions correspond to the local and international standards and highway code.

FRAME WORK

It is constituted by two straight beams with cross beams.

SUSPENSION

Suspension with variable flexibility by leaf springs.

A X L E

1 axle equiped with 1 pair of twin wheels
4 prenmatic tyres

BRAKING SYSTEM

- mechanical brakes
- compressed air brakes 3 lines - Direct
  - Emergency - Automatic
- mechanical parking screw brakes

ROAD BEACONAGE

Beaconage conformable to the highway code Electric attachment to the trailer is made by a sprindles joining.

ANNEX EQUIPMENT

A spare wheel holder equipped with its wheel and its lifting device.

ACCESSORIES

One tyre lever brace

Three preumatic connection flexible shafts

One electrical connecting wire Seven conductors

CONSTITUTION OF THE BODY

Basic Equipment

adapted according to the needs of each workshop:

- closed body
- body with single opening

Optional Equipment

Basic Equipment

— body with double opening

The body is built with galvanised or pre-lacquered steel panels with phonic and thermix insulation.

Optional Equipment

— Stock chests
— Double roof
— Telescopic monovail and Pulley Blocks
— Tent cloth

The body is built from a framework of container type. This very stiff framework will receive the various fitting elements of the trailer. The fitting elements are made in self-insulating material of aluminium. The insulating part of the sandwich panels may be:

— non ignitable fiber glass
— expanded polystyrene foam
— polyurethare foam
— the lodge will be built up with 60mm sandwiches which ensure an important insulation
— the front and back will be made with sandwiches 40mm. thick.

SEMI TRAILER WITH DOUBLE OPENING

These trailers have been designed to offer a wide working area owing to side extensions. These two exterior openings are 11mm. long.

Their opening principle is as follows:

— a low part tilting down to the horizontal level which forms the working area.

— a higher part which can be raised to form and protects the working area.

— a series of crutches, barristers and staircases will ease the access and ensure protection.

The tilting part that forms the floor will be 40mm. thick and will be provided with corrugated aluminium in its lower part. The upper part will be 40mm. sandwitch. This one will be lined with glazed openings.

The various extensions possible provide different surfaces:

1. 30sq.m.

2.	41m^2	half extension on 1 side (opened or closed by the tent)
3.	53m^2	half extention on both sides (opened or closed by the tent)
4.	53m^2	full extension on one side
5.	75m^2	Full extension on both sides
6.	53m^2	Full extension on one sides(closed)
7.	15m^2	Full extension on both sides. (closed)

TRAILER

221 main characteristics

- total length 6m. (plus coupling)
- total width 2.5m.
- total height 3.4m.
- surface 15 to 28m^2 according to extensions
- total live load 8 tons

For this kind of units, the pedagogical part is located outside the trailer.

NOTE:

If the trailer is hauled by a lorry this one can be arranged as a workshop according to the same process. The lorry can be cross country one, which enables it to go almost anywhere. The trailer can be hauled by any other kind of tractor (agricultural one, public works, etc.). In that case, its dimension can be different.

CONSTITUTION OF THE TRAILER

The equipment corresponds to the international norms of car driving and is adapted to the highway code of the applicant country.

FRAMEWORK

It is a trailer frame of 'conveyor' type. The steel main becomes and cross beams are welded.

SUSPENSION

Suspension with variable flexibility by leaf springs.

A X L E

One front steering gear axle equipped with two simple wheels.

One rear riged axle

One spare wheel

BRAKING SYSTEM

— mechanical brakes

— compressed air brakes three lines (Direct, Emergency and Automatic).

— mechanical parking screw, brake.

ROAD BEACONAGE

Beaconage conformable to the highway code of the applicant country. Electric attachment to the trailer is made by Seven spindles joining.

ANNEX EQUIPMENT

Holder for spare wheel which will include a rim and a spare device.

ACCESSORIES

One tyre lever brace

Three pneumatic connection flexible shafts

One electrical connecting wire seven conductors

CONSTITUTION OF THE BODY

The trailers will be provided with side panels which open in two parts:

— a low part tilting down to the horizontal level, which forms the working floor; this part will be compensated to make the lifting easier.

— an upper part (compensated too) which forms the roof and covers the working area.

— This panel will be without any glaze.

Building of 'container' type. The frame work will be soldered to the mobile pannels. The sandwich panels will be constituted of galvanized steel sheets, previously coated with lac. The insulating parts of the sandwich panels may be:

— non ignitable fiber glass

— expanded polystyre foam

— polynrethame foam

The central block will be made of 60mm panels.

The front and the back, together with the side panels, will be made of 40mm. panels. An anti-skid lining will be coated inside the tilting part which will form the floor.

The upper part will not be provided with glazes to avoid an excessive heating from the sun. On the contrary, the back part will be supplied with glazes.

The handling of the upper and lower elements will be made easier by gas jacks.

The trailers will be designed with removable flights. A wide door will enable a direct access to the vehicle owing to a telescopic stours in the back side.

ACCESSORIES AND FINISHING

The exterior equipment of the trailer will include all electric systems of road signs comformable to the high-way code.

All finishing profiles will be either annodized aluminium or stainless steel. The protecting mouldings and the whole will have the same finishing.

SIDE TENT CLOTH

In case of individual use,of the trailer side tent cloth will be supplied to ensure a protection against the sun. The tent will cover the total surface of the working area.

VARIANTS

Two variants exist for 'kitchen' and 'sanitary' trailers. They will have the same basis, but the body will not include any opening pannel. A sound insultated 100 Kva generator set is also planned for small double axle trailers.

OPTIONAL EQUIPMENT

It will be possible to provide drawers fitted under the frame of the trailer as well as a double roof.

INTERMIDIARY SOLUTION

It is possible to limit the number of trailers and semi-trailers by using an intermediary solution between the mobile and semi-mobile units. In that case, the bodies are not integral with the bearing frames. They are fixed on the bearing frames only during transportation. Therefore, a trailer or semi-trailer frame can be used for several workshops. On the contrary, this solution needs loading and unloading equipments (crane, inclined plane winch, etc.). The advantage of such a solution is to decrease the number of trailers.

FITTING AND EQUIPMENT

A mobile unit is generally equiped with 6 - 10 work posts. This no varies according to the speciality. It can reach 30 in the case of particular trades (e.g. building) for which the pratical teaching takes place at work on the outside of the trailer with a light and reduced equipment.

The mobile units have a common equipment, whatever the speciality taught may be:

— the mechanical jacks for stability when parking

— complete electric boards with:

  safety devices

  transformers

  generators/main connection

  stand-by lighting

— Optional generator set (11,22,33,44 Kva according uses) for semi-trailer units. These generators can be sound insulated, equiped with a fuel spare tank, and delivered with spare parts.

The generator is located in the unit during transports and put outside with the telescopic monovial and pulley (optional) when the unit is installed on site.

— the inside cheating depends on the use of the units

— the access devices and their closing

— the electric lighting

— ventiliation (or optional air condition)

— fitings and equipment of the pedagogical area (for semi-trailers unit)

The equipment and fitings of mobile units depend upon the speciality taught and it is impossible to give a general organisational plan including all factors and suitable for all situations.

EQUIPMENT OF THE PEDAGOGICAL PART

It consists of a teaches desk, tables for trainees, a cupboard for pedagogical documents, and one or several boards (black-baord, screan paper board). The audio-visual equipment consists of a retroprojector, different types of projectors (slides, sound super and films, etc...) and in such cases a portable video set: a black and white magnetescope half inch format, sound reproducing and registering, a camera and a television set.

The specialities that can be taught in mobile units are the following ones:

lather work	electronics
milling	radio/TV.
fithing	wood-working
maintenance mechanics	building construction
general mechanics	domestic catering
agricultural mechanics	collective catering

welding	sanitary lead works
refrigration	stock farming
electricity maintenance	agriculture
electricity of construction	cannery
machines testing	mining and excavation

Mobile units can also be needed for annex services:

- audio-visual equipment
- self service
- cold unit
- water tank
- shaver + W/C
- pedagogical material
- general set
- lodging

We shall now limit the description of mobile to two particulars and rather typical cases which gives a more precise idea of the teaching organisation; semi-trailer mobile unit for mechanics and trailer mobile unit for wood working.

INDICATIVE DESCRIPTION OF THE EQUIPMENT FOR THE MOBILE UNIT OF:

- ADJUSTING
- NUMBER OF PUPILS - 10
- SURFACE - 53m^2

INDICATIVE DESCRIPTION OF THE EQUIPMENT FOR THE MOBILE UNIT OF:-

- WOOD WORKING
- NUMBER OF PUPILS - 10 (MAXIMUM)
- SURFACE - 28m^2

DETAILED DESCRIPTION OF MOBILE UNITS OPERATION

POSITIONING

The mobile units arrive on the site by the road or helicopter (for 6m. units). Their instalations does not require any particular ground preparation, nevertheless the ground must be rather level and hard to support the stands.

When the mobile units are in the right position;

— screw the parking brake

— take the stands out and position them

— open side panels if necessary

— proceed to all annex mountings (stairs, barristers, installation of the generator set, etc...).

The mobile units are equiped with four jointed jacking shoes stands: 2 at the front and two at the back of the unit. These stands are hinged so as to be folded under the frame during transport.

NOTE:

A perfect horizontality of the unit is required for the good working condition of the machines.

In order to make the handling of the lifted part easier, compensator gass jackstare set up on the extremities and on the central poles. The inferior tilthing part is equiped with the same compensators. These are used as crutches in low position.

A series of removable crutches ensure the connection of the whole trailer and supports the positioned barristers.

ASSEMBLING OF SEVERAL UNITS

It is possible to assemble several mobile units in order to obtain bigger or communicating workshops. In this case, the instalation and positioning is the same but the positioning of one unit with regard to another unit must be precise and the grounds needs to be flat so that the units be at the same level.

OPERATIONAL OF THE UNITS

Once the units have been installed it is necessary to make the connections of:

- electricity if the generator is not used or only as stand-by.
- water if necessary.
- other connections (draining system, gases, etc..).
- compiling of units if necessary.

When all the connections are made, the units are ready to operate.

OPTIONAL UTILIZATION

The rational use of such a material involves great mobility and option utilization of premises and equipment. Thus, these two elements may imply the existence of a general organisation for a training system using a mobile unit or a fleet of mobile units, intergrating human constraits (limitation of working hours) and physical ones (maintenance, general inspection, repairs).

BASIC DATES

Cycle of Initiation to Mechanics

training duration - 400 Hours

work schedule - workshop - morning 5-13 hours

(session of 8 hours) evening 13 - 21 hours.

— Classroom 8 - 18 hours

Using the above theories, it would be possible to organise four training cycles a year, taking into account the three groups trained by cycle. It would give:

— 1 Mobile Unit + 3 Monitors = 120 trained students a year

COMBINED SYSTEM

From the proceeding example, it is possible to imagine other cases which can involve:

— either an arrangement of training cycles in the same speciality.

— or an arrangement of means (workshop, mobile, semi-mobile or permanent premises).

— or an arrangement of various cycles and specialities which can step in an industrial sector or region or use common means.

COMPLIMENTARY LOGISTIC MEANS

A training system which uses a certain number of mobile units moving in a region or in various regions of same country will be soon confronted with problems of organ and legistics peenliar to this type of material.

Thus from the beginning, the building and fitting of a secondary base must be planned (and possibly of secondary bases) whose main function will be to ensure:-

— the links between the units and the central base

— the pedagogical follow up of the units

— the administrative management of personnel

— the logistic follow up: parking of tractors, provision and distribution of motions follow-up and preparation of material necessary to probation periods, keeping and management e.g. spare parts, maintenance of material and vehicles.

UP-GRADING

Generally the up-grading in a particular trade requires more sophisticated machines which might be heavier and clumsier. It will be then necessary to limit the number of tools. In this case the previous knowledge required depends on the up-grading level.

TRAINING DURATION

As explained previously, for reason of profitability, It is advisable that units do not remain more than three months on the same place.

It is convenient to underline the mobile units, taken separately, can sometimes represent an expensive solution to certain training problems. However, thanks to the mobility and easy operation, they remain, integrated to a diversitied whole of centre and means the essential complementary tool which enables a rapid distribution of short-training anywhere in a country. Therefore, in many cases they can play an important role regarding human and social plans.

TRAINING PROGRAMMES

The training programme another level obtained are the same as the ones in typical centres. In units equiped with pedagogical parts, the promiscultly of practical and theoritical trainings is an arrangement indeed. This makes it possible to go rapidly from the explanation to demonstration and vice-visa.

INSTRUCTORS

The technical and pedagogical knowledge required for instructors in mobile units are the same as the instructors ones in other types of center. But existing centre in case of numediate and temporary need.

— For the up-grading training and workers in a factory.
— For the introduction and training to new processes in a factory.
— For the selection of orientation.
— As life-base.

Obviously, the uses of a mobile units are extremely varied. The fittings of each mobile units depends on several factors which requires each time a particular survey.

Our experience in that field is base upon surveys and realization carried out all over the world. Venezuala, Argentina, Saudi Arabia etc...

CHAPTER-SIX

ACCOMMODATION AND SPACE REQUIREMENT

Since the school is a non-boarding institution, facilities to be provided are:

- Administrative Facilities
- Teaching
- Social

ADMINISTRATIVE FACILITIES

It serves as the focal point for organisation or the centre and as the initial point of contact for visitors. Rooms required are as follows:

	Space Required
Entrance Hall/Reception	$54m^2$
Exhibition Hall	$96m^2$
Principal's Office	$34m^2$
Principal's Store Room	$11m^2$
Principal's Toilet	$11m^2$
Secretary's Office	$24m^2$
Vice Principal's Office	$24m^2$
Clerical Staff Office	$24m^2$
Bursar's Office	$24m^2$

	Space Required
Accounts Staff Office	$34m^2$
Security Duplicating Room	$20m^2$
Clinic	$24m^2$
Board Room	$96m^2$
Counselling and Placement Office	$45m^2$
Staff Common Room	$32m^2$
Staff Offices	$24m^2$
Staff Toilets (Male & Female)	$24m^2$

ADMINISTRATIVE FACILITIES EXPLAINED

Principal

Is the over-all administrator of the centre. His office is located on the first floor of the administrative building and is furnished with a desk, chest of drawers, cupboards easy chairs,etc.

Secretary

Assists the Principal in the day-to-day running of the Centre. He functions as the receptionist for the Principal.

Vice Principal

Is the second in command. He acts on-behalf and in the principal's absence.

Bursar

Responsible for the accounting and administration of clerical staff.

Clerical Staff Office

Has a capacity of Ten Staff. It is furnished with desk, typewriters, filing cabinets and duplicating machine, etc.

Board Room

Will be for BOARD MEETING.

Counselling and Placement

With the aid of counselling, most of the social problems connected with any occupational preparation can be solved. Planning helps in employment processing at the end of a Student's Course.

TEACHING FACILITIES	Space Required
Class Rooms	$48m^2$ each class
Library - for Staff and Students	$315m^2$
WORK-SHOPS	
1. Motor/Vehicle Mechanic Workshop	$240m^2$
2. Air-conditioning and Refrigeration Work-shop	$180m^2$

3.	Technical Drawing	200m^2
4.	Electrical Workshop	180m^2
5.	Woodwork Workshop	200m^2
6.	Metalwork (fitting and sheet metal)	240m^2
7.	Masonry and Building Construction	180m^2
8.	Tailoring Workshop	180m^2

SOCIAL FACILITIES

Multi-purpose Hall - Use for assemblies and as dinning hall.

1.	Main Hall	432m^2
2.	Stage	36m^2
3.	Stage Storage Spaces	18m^2
4.	Male and Female Toilets	18m^2
5.	Male and Female Changing Room	18m^2
6.	Circulation	40m^2
7.	Kitchen Store and Cold Room	30m^2
8.	Bulk and Fuel Store	16m^2
9.	Kitchen	80m^2
10.	Male and Female Staff Toilets	40m^2

WORKSHOP REQUIREMENTS

1. The Workshop should be placed in such a way that the noiseir ones (like woodwork, and metal work) are further away from the quieter zone of the school (like the administration and classrooms).
2. Workshops should be on ground floor level to save cost in terms of structures.
3. There should be adequate lighting in the workshop (natural or artificial). For natural lighting, window sills above bench height (800 - 1100mm).
4. Machines should be arranged in such a way that movement is minimised in the workshop. This is achieved by following the process of production in workshop.

FINISHES

— Hardwood floor finishes is most common

— Concrete floor is given preference where automobile mechanics, heavy mechines are used.

— For walls, 1,500mm wainscoat, easily cleared, matt glaze to avoid reflection.

5. In every workshop, these basic spaces are required.

— Storage space for Raw Materials.

— Storage space for Finished Work.

— Storage space for tools and small movable equipment.

— A work room for the teachers.

— An area in which a group of students can watch a demonstration given by the teacher.

— Spaces for fixed machinery.

— Work space for individuals (not at machinery)

— Common work places to which all students may come.

— A space for students to plan projects (making drawings, estimates, etc.)

— A place for changing into working overalls and for washing at the end of the period.

— Storage space for students books and belongings.

SPACE REQUIREMENT

For good attention from a teacher, the size of workshop class should not be more than fifteen (15). It may be up to 20 students. The completion of areas is thus based on a class population of 20.

Wood-work - $9.4m^2$ per place

Total area required = $188m^2$

Metal Work (Fitting and Sheet Metal) - 12.2 per place

Total Area Required = $244m^2$

Motor/Vehicle Mechanic - $12.2m^2$ per place

Total Area Required = $244m^2$

Air-conditioning and Refrigeration - $9.1m^2$per place

Total Area Required = $182m^2$

Electricity/Electronics - $6.7m^2$per place

Total Area Required = $134m^2$

Technical Drawing - $4.25m^2$ per place

Total Area Required = $90m^2$ x 2

(for two drawing rooms)

Tailoring - $9.0m^2$ per place

Total Area Required = $184m^2$

Mesonry and Building Construction - 9.2m^2

Total Area Required = 184m^2

The per place work space calculation for any field of activity will have to take into account:

i. Individual work space area plus circulation about the area.

ii. The areas for common activities (such as the glueing table in wood work or the forge in metal work plus the associated circulation areas.

iii. An area near one of the individual or other work spaces for demonstration to small groups.

iv. An area for work space storage facilities which is separate.

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