

② 質問状内容及び回答（資料を含む）

2. ウガンダ国ナカワ職業訓練校事前調査時質問状に対する回答

<p>1. 復興開発計画におけるプロジェクトの位置付け Position of Proposed Project (Nakawa VTI) in the Rehabilitation and Development Plan</p> <p>(1) ナカワ職業訓練校について現行復興開発計画において記述がないが、現在の位置付けはどうなっているのか。また次の国家開発計画で取り上げられるのか。 There is no indication of Nakawa VTI Project in the Rehabilitation and Development Plan 1993/94-1995/96 Volume II. What is the present position of Nakawa VTI in the Plan ? Is the Project going to be indicated in the next national development plan ?</p>	<p>カジェ外は復興開発計画にIT-34 (N)として表れる。リハビリは交換公文が2国の政府の代表者によって署名されるまでは明確に出てこない。(別添1参照)</p> <p>カジェ外は2国の政府が交換公文に署名した後、復興開発計画に明確に表されるであろう。</p>
<p>2. 企業のニーズ (訓練ニーズ) Industrial needs (Training needs)</p> <p>(1) 向上訓練、徒弟訓練、養成訓練等、訓練ニーズはどの訓練分野で何が高いか。 In what training fields, is the training needs high ?</p> <p>(2) 上記の訓練ニーズに対応するため、ウガンダ政府の各訓練校で特段の役割分担を考えているのか。 In order to meet the needs, is there any specific division of charge of training to be taken among the training institutions ?</p> <p>(3) 訓練生は十分集まるか。授業料が高いので、十分集まらないのではないか。 In training institutions, how is the present situation of filling the number of intake capacity of trainee ? Is there any difficulty to fill the capacity because of high training fee ?</p> <p>(4) また、就職の可能性は十分あるか。 Is there high probability for the graduates of VTI to have job opportunity ?</p> <p>(5) 既存の民間訓練校の授業料、訓練科の種類、充足率、就職率の概略。 Please describe the outline of major private training institutions including training fees, training fields, rate of filling the intake capacity of trainee, rate of employment of the graduates.</p>	<p>訓練ニーズは下記の訓練において高い。 (a) 向上訓練 (b) 徒弟訓練 (c) 養成訓練</p> <p>訓練ニーズは優先順位で下記に記した分野において高い 1. 家具木工 2. ブロック建築 3. 溶接 4. 铸造铸型 5. 自動車 6. 電気 7. 機械 8. 金型 9. 電子 (ラジオ、テレビ修理) 10. 冷凍空調</p> <p>実際、ある施設は、特段の機能もしくは業務を実施する責任を伴っている。しかし、緊急のニーズを満たすために、施設の機能、もしくは業務は政府によって担うこともできる。実際、ある役割を永久に担う施設はない。例えば商業科目を運営する国立商業短大は一度は工学専門の学校であった。職業訓練センタールゴゴは向上訓練と養成訓練の両方とも運営している。ナカワ職業訓練校の場合は、当初、向上訓練と徒弟訓練を実施するために建てられた。しかし、後に、国や職訓校のニーズのためにこの機能は変化し、訓練資金不足のために消滅したが地方開発のための養成訓練であった集中訓練の実施の責任を担っていたこともある。</p> <p>現在、養成訓練への訓練生の入校率は高く、応募者は実際多い。向上訓練の入校率は通常、定員程度で低い。我が国の産業の稼働率が低かったことは、1970年代初頭に始まった内戦のため、満身に運営できなかったことによることを理解するべきである。</p> <p>現在、卒業後の就職率は高い。しかし、求人者と求職者になることのできる訓練計画を作成する必要がある。</p> <p>別添2参照。</p>

3. 加以外の具体的計画 Detail of the plan of the Project

(1) 要請された分野すべてにおいて向上訓練、徒弟訓練、養成訓練を実施するの。

Does Ugandan Government have the intention to conduct all the three types of training, namely Upgrading, Apprenticeship and Basic Training (for O level school leaver) in all requested training fields at Nakawa ?

(2) 各分野の向上訓練、徒弟訓練、養成訓練において、以下についてどのようなものを考えているか。

Please describe the following points in each type of training in each training fields.

① 訓練コースの期間 duration of training course

② 年間の訓練コースの実施回数

number of intake times of training course per year

③ 1 回当たりの訓練受け入れ人数

number of trainee per course

④ コース内容 contents of the training courses

⑤ カリキュラム curriculum

⑥ 訓練目標 (仕上がり像)

training objective (ideal figure of the graduates)

⑦ 受講資格 conditions of enrollment

実施する。 ナカワは今や、東、南アフリカでポピュラーであり、我々はケニア、タンザニア、スーダンから訓練生を受け入れるという意図を持っている。 産業界のニーズは非常に高く、求職者の数も多い。

① 期間

向上訓練：企業によるが、6週間

徒弟訓練：6週間、4年間

養成訓練：2年

② 年間の訓練コースの実施回数

向上訓練：1年5回、各分野

徒弟訓練：1年4回、各分野

養成訓練：1年1回、各分野

③ 定員：各コース16名

④ コース内容：コースのシラバスは入手可能。別添3～10参照

⑤ カリキュラム：

⑥ 訓練目標：

訓練生が各々の工場で勤務することができること。

⑦ 受講資格

向上訓練：応募者は被雇用者もしくはワークショップを持つ自営業者でなければならない。

徒弟訓練：応募者は様々な工業で働く、新たに雇用された者である。 訓練生は十分に育成されたクワトマカアサになるまで訓練することを約した合意書（契約）に雇用主と政府に署名してもらわなければならない。 契約と規則の詳細は別添11参照。

養成訓練：応募者はOレベルの証明書をもった学卒者でなければならない。しかし、Oレベルをもち既に同じ分野で働いている者もこの訓練の対象として考慮される。

4. 施設、機材 Facility and equipment

(1) 上記の訓練目標を達成するためには訓練分野ごとにどのような機材が何台必要か。

In order to attain the training objective above, what and how many equipment are necessary for each training fields ?

(2) 上記の訓練を実施するためにどの程度の広さの建物が必要か。建物の配置計画はどのようにするのか。

In order to conduct all the training course above, how much floor space are necessary ? And what is the arrangement plan of the building ?

訓練機材の数はコースによって異なる。しかし、検討材料となる訓練機材のリストは別添参照。(省略)

全てのコースを運営するために m²必要である。別添12参照。配置計画は別添。

5. カウンターパート Assignment of Ugandan Personnel

(1) 上記の訓練を実施するためには訓練分野ごとに何人のウガンダ側カウンターパートが必要か。

In order to conduct all the training course above, how many Ugandan Counterpart Personnel (Instructor) are necessary? Please describe the number and each position

要請した全てのコースを実施するために、ナカワは下記の指導員が必要である。

-シニア インストラクター	10
-インストラクター	23
-アシスタント インストラクター	23

スタッフの詳細は別添13参照。

(2) 例えばディプロマレベル等カウンターパートの資格要件について定めることができるか。

Is there any regulation on the qualification of Ugandan Counterpart Personnel (Instructor) for example, Diploma or Bachelor? And is it possible for the project to settle the regulation on it?

指導員として指名されるべき人の資格要件はある。しかし、求める人材が不足している場合、労働省はその条件を放棄することを人事院に要請する。

(3) 現在のカウンターパートの配置数と各ポジション

Please describe the number and each position of Ugandan counterpart Personnel (Instructor) who are already assigned.

(4) 上記カウンターパートの配置時期

When will all the planned Ugandan Counterpart Personnel (Instructor) be assigned?

(5) 現在の管理要員の配置数と各ポジション

Please describe the number and each position of Ugandan Administrative Personnel who are already assigned.

(6) 管理要員の配置計画と各ポジション

Please describe the planned number and each position of Ugandan Administrative Personnel who will be assigned.

(7) 管理要員の配置時期

When will all the planned Ugandan Administrative Personnel be assigned?

6. 予算 Budget

(1) 94/95 予算が承認されていたら、職業訓練局及びナカワ職業訓練の訓練予算の詳細内容。 予算の承認がまだであれば、申請予算。

If the Ugandan Government has already approved the 94/95 Budget, please describe the detailed contents of training budget for DIT and Nakawa VTI. If not yet, please describe the contents of proposed budget.

ウガンダ政府はまだ、1994/95 予算を承認していない。しかし、ナカワの申請予算の詳細は別添14参照。

(2) プロジェクト開始後の予算見積もり

Please describe the estimated budget after the Nakawa Project starts.

プロジェクト開始後のVTIナカワの推定予算は、 UShs.

7. プロジェクトを実施するにあたってランニングコストはウガンダ側が負担することになるが、職員配置数、予算、敷地面積等、プロジェクトの規模を制約する要素は何かがあるか。

Is there any factor to limit the scale of the Project? For example, in terms of difficulty of securing necessary Ugandan personnel, land, budget and the cost to run the training course (recurrent cost) which will be borne by the Ugandan side.

通常、プロジェクトの規模を制約する要素は資金不足である。ウガンダ政府と担当省は、全ての空席になっているポストを充足させるであろう。更に私は労働省が必要な場合の土地の確保については問題はないと述べたい。労働省は、次の会計年度の1995/96 にカウンターパートファンドを考慮するだろう。

<p>8. 行政組織 Administration</p> <p>(1) 労働社会省の組織 Please describe organization chart of Ministry of Labour and Social Affairs including all other directorate than DIT.</p> <p>(2) 業務 (職業訓練局以外の局、特に職業紹介担当局) Please describe the duties of other directorates, especially directorate in charge of registering and introducing employment.</p>	<p>組織図は別添15参照。</p> <p>(職業訓練政策については別添16参照。)</p>
<p>9. ナカワ訓練校の現状 Present situation of Nakawa VTI</p> <p>(1) 過去5年間の分野別定員、充足率 Please describe the number of capacity of trainee per training course and rate of filling the capacity for past five (5) years.</p>	<p>現在、ナカワは向上訓練と徒弟訓練を実施している。ナカワの正式な定員は80名である。コースは下記のとおり。</p> <ol style="list-style-type: none"> 1-自動車整備 2-電気工事、仕上げ 3-溶接、軽金属製造 4-金属機械 (機械工、一般仕上げコース) <p>過去5年間の訓練生の数は別添17参照。</p>
<p>10. ドイツの協力校の現状 Actual situation of VTC Lugogo</p> <p>(1) 訓練科別充足率、就職率、授業料補助の有無、予算</p> <p>(2) 養成訓練に伴う企業内訓練の実施方法 Please describe the following matters in each training course.</p> <ol style="list-style-type: none"> ① number of capacity of trainee ② rate of filling the capacity ③ employment rate of graduates ④ subsidy for training fee ⑤ budget ⑥ method of industrial attachment of 0 level basic training <p>(3) 修了生の就職斡旋を行っているか。行っている場合、どのようにか。 Is there any activity for employment promotion of the graduates?</p>	<p>①定員：年間312名。</p> <p>②充足率；反応と熱意は非常に高い。</p> <p>③卒業生の雇用機会； また非常に高い。現在センターは全ての訓練生を工場実習に送ることができている。実際、ただ1つの雇用主が104名の訓練生を雇うことができている。</p> <p>④政府補助； これらの訓練に補助している。現在各訓練生は1学期(3ヶ月)あたりわずか65,000、年間115,000を支払うだけである。このセンターは、寮をもたない施設であり、訓練生によって支払われる総額はコースの実際のコストに見合うには十分ではない。</p> <p>⑤予算；1994/95 予算は4億8千万US\$。別添 参照。</p> <p>⑥工場実習の方法； 通常、校長がチーフアドバイザーと連絡して、全国のような雇用主に手紙を書き、工場実習を必要としている訓練生の数を知らせる。別の方法として、チーフアドバイザーと校長が雇用主を訪問し、工場実習を依頼する。</p> <p>就職斡旋は行っていない。卒業生の雇用促進の公務員がいる。しかし、校長がチーフアドバイザーと連絡して、郡の労働担当官や郡の工務アドバイザーに手紙を書き、その郡の雇用主に卒業生を宣伝するように依頼する。</p>
<p>11. 訓練税 (LEVY) の実態。(実施されているか、実施されている場合、その概要。されていない場合、その計画) Actual situation of training levy</p>	<p>訓練税の問題は、まだ採択途中である。審議会と担当省はこの法律を実施していない。</p>
<p>12. 技能検定制度の概要 (技能検定職種、過去5年間の受験状況、合格率) Please describe the following of Trade test system</p> <p>(1) number of examinee per trade for past five (5) years</p> <p>(2) passing rate for past five (5) years</p>	<p>技能検定は、4年間の徒弟訓練や、工場実習を含んだ養成訓練を修了した者に行われる。しかし、実質的にある程度の期間、その分野を経験した在职者も受験できるウガンダでは、2種類の技能検定証書がある。</p> <ol style="list-style-type: none"> 1) クラフトマ証書 2) マスクラフトマ証書；管理者対象

TELEGRAMS: "GULCOM."
TELEPHONES: 233463/4.
233294.



MINISTRY OF LABOUR AND
SOCIAL AFFAIRS,
HEADQUARTERS,

CRESTED TOWERS,

P.O. BOX 5261,

KAMPALA, UGANDA.

IN ANY CORRESPONDENCE ON THIS SUBJECT PLEASE QUOTE NO. REH.C.35

THE REPUBLIC OF UGANDA

3rd February, 1993

The Commissioner for External Aid,
Ministry of Finance & Economic Planning,
Uganda House,
KAMPALA.


Re: REHABILITATION AND EXPANSION OF NAKAWA VOCATIONAL
TRAINING INSTITUTE UNDER JAPANESE AID GRANT TO UGANDA

As you may be aware, this Ministry has applied through your Ministry, to the Japanese Government to consider funding the rehabilitation and expansion of Nakawa Vocational Training Institute under the above mentioned Aid Grant. Your letter to the Ministry of Foreign Affairs Ref.ED/jpn/1/00 dated 2nd April 1992 on the same subject confirms this. I am herewith attaching a photocopy of the letter for ease of reference. You may also note that my Ministry has requested that the project be included in the RDP under Project IT-34(N) "Rehabilitation of Vocational Training Institute". I am attaching herewith photocopies of the submission letter together with the project profile.

The Japanese Government has shown keen interest in rehabilitating Nakawa Vocational Training Institute as it was built with Japanese assistance. The Japanese Ambassador resident in Nairobi visited it on 26th June, 1992 and pledged to assist in its rehabilitation and expansion. Thereafter two other Japanese delegations have visited the Institute.

The purpose of this letter is to kindly request you to put up the Project on the priority list of those to be considered during the forthcoming bilateral talks between the Governments of Japan Uganda.

Your kind assistance in this matter will be greatly appreciated.


H. Ntege
FOR: PERMANENT SECRETARY/LABOUR & SOCIAL AFFAIRS
Ministry of Labour and Social Affairs
P. O. Box 5261
KAMPALA
The Permanent Secretary,
Ministry of Foreign Affairs,
KAMPALA.

(FOR THE ATTENTION OF MR. KITYO BAKAYANA)

Encl:

	<u>TRADE TARGET</u>		<u>FEES</u>	<u>RATE EMPLOYMENT</u>
Vocational Training Institute, Mjeru	Carpentry/Joinery Plumbing/Fitting Brick/Block laying Electrical Inst. Cookery & Tailoring	15 Trainees 15 " 15 " 15 " 15 "	No fees	All employed
Vocational Training Centre, Mukono	Carpentry/Joinery	12 "	50,000/- per term	All employed
St. Simon Peter's Vocational Training Centre Rwekobe	Motor Vehicle Mechanics Brick/Block laying	12 " 12 "	- do -	
Hoima	Motor Vehicle Mechanics Fitter/Machinist Brick/Block laying Carpentry/Joinery	12 " 12 " 12 " 12 "	50,000/- per term	All employed
St. Joseph Technical School, Virika				
Nkurba College of Business	Economics Business Management Accountancy General Stores Management Auditing	300 students in classes	300,000/- per person per term	75% employed 25% self employed
Kanasagali College, Kamuli	English, History Geography, Physics Chemistry Mathematics Commerce Religious studies Art	600 students in all classes	219,000/- per person per term	80% go for further studies 20% employed

FITTING AND MACHINING TRAINING SYLLABUS

Duration of Training: 104 weeks or 2 years
Equivalent to 3130 Hrs.

The syllabus which follows gives the content of Training covering the following areas in theory and practice.

- (a) - Induction Training
- Safety Regulations
- Fitting and Bench work
- Machinery maintenance
- Black smithy
- Shaping
- Planning
- Turning
- Grinding
- Milling
- Drilling
- Gear Hobbing
- Boring

- (b) Workshop Calculations
- (c) Engineering Drawing
- (d) Craft Science

Course Goal No.1 - To work safely:

Upon successful completion of this module, the student will be able to:

1. Tell the importance of safety and general precautions observed in the Institute and in the Section.
2. Importance of the trade in the development of Industrial economy of the Country.
3. What is to be taught - achievement, Recreational and medical facilities provided not excluding first aid within the Section and Institute in general.
4. Describe the Principles of working safely
5. Outline basic principles of first aid.
6. Fire fighting Techniques and equipment and their operation.
7. Describe the nature and purpose of the Uganda Public health act and occupational Hygiene.
8. Explain safe handling, storage and disposal of hazardous materials.
9. Describe the application of workers compensation act in the work place.
10. Describe safe handling of tools, machines and equipment.

Course Goal No.2 - To demonstrate skills in technical drawing.

Upon completion of this module the student will be able to:

1. Demonstrate correct use of Engineering drawing
2. Identify basic lines used in Engineering drawing
 - Types of lines
 - Lettering skills
 - Dimensioning techniques

Course Goal No.2 cont....

3. Plain geometrical constructions
 - Bisect straight lines
 - Construct angles
 - Construct circles and tangents
 - Construct regular polygons.
4. Pictorial views:
 - Isometric projections
 - Oblique drawing
 - Orthographic projection 1st and 3rd Angles.
5. Machine Drawing:
 - Components/machine parts in assemble or sub-assembly
 - Sectioning
 - Free hand sketching
 - Threads, Screws and bolt connections
6. Interpretation of Standard drawing conventions and symbols:
 - Machining Symbols
 - Tolerance and fits
 - Blue print rading practice
 - Hydranlic circuit diagrams
 - Electrical circuit diagrams

Course Goal No. 3 - Trade Technology upon successful completion of this module the student will be able to:

1. Demonstrate correct use of cutting tools.
2. Describe principles and types of screw threads.
3. Identify types of measuring Instruments
4. Describe principles and procedures of forging.
5. Describe the different methods of joining metal
6. Tell the common work holding devices and tools.
7. Describe the function of the lathe machine and operations.
8. Describe the shaper machine and shaping operations.
9. Outline the milling machine operations.
10. Demonstrate the Drilling machine types and processes.
11. Describe the grinding machine, types and operations.

Course Goal No.3 cont.....

12. Describe angles and tapers
13. Describe the Heat treatment of metals.
14. Demonstrate a knowledge of basic metallurgy and appliances.
15. Tell the materials used in engineering.
16. Identify limits and fits on machined components.
17. Use of hydraulic fluids and systems.

Course Goal No.4 workshop calculations.

Upon successful completion of this module, the student will be able to:

1. Units: - F.P.S. system of units
- C.G.S system of units
- M.K.S. system of units
- Measurement of length, area, volume and weight quantities
- International system of units (S.I)
- Prefixes for multiples and submultiples
2. Simple arithmetic:
- Common fractions
 (a) Proper fractions
 (b) Improper fractions
- Index numbers
- Square and cube roots
- Highest common factor H.C.F.
- Lowest common factor L.C.F
- Addition subtraction and division of fractions
- Brackets
- Decimal fractions
- Addition, subtraction, multiplication and division of decimals.
3. Calculate percentages, Ratio and proportion, calculate speeds, feeds, and machining time turning, milking, drilling shaping and grinding:
4. - Logarithms
- Introduction
- Common logarithms
- Finding logarithms

Course Goal No.4 cont.....

4. cont.. - Reading logarithms
 Anti logarithms
 - Application of logarithms
 - Scientific culculators
5. Mensuration:
 - Introduction
 - Plane figure
 - Rectilineal place figure
 - Area
 - Solids
6. Graphs and Cordinates:
 - Introduction
 - Graph pap er
 - Dependent and Independent variables
 - Quadrants
 - Plotting of graphs
7. Trigonometry:
 - Introduction
 - Trigonometrical tables
 - Reading trigonometrical tables
 - Trigonometrical ratios of angles in
 four quadrants
 - Variation in the sine, cosine and tangent
 of an angle between 0° - 360° .
 - Some identities
 - Measure tapers
 - Angles and pythagreas theorem.
8. Algebra:
 - Definition
 - Rules and signs
 - Arithmetic operation
 - Simple equations
 - Transposition
 - Imaginary or unreal roots

Course Goal No.5

To weld Using Gas and Arc Welding.

Upon successful completion of this module the student will be able to:

1. Identify the gas welding equipment and describe the function of each component:
 - i) Cylinder valves and safety devices
 - ii) Oxy acetylene regulators
 - iii) Hoses and fittings
 - iv) Torches and nozzles
2. Demonstrate gas welding safety procedures:
 - i) Safe handling
 - ii) Transportation
 - iii) Storage of gas cylinder
 - iv) Test for leaks
3. Oxy-acetylene equipment assembly and disassembly
 - i) Assembly of the outfit
 - ii) Lighting and adjustment of flame
 - iii) Shut down and disassembly procedure
4. Demonstrate fusion welding, braze welding and brazing procedures:
 - i) Application of fusion welding on M/S sheet plates
 - ii) Application of braze welding on thin gauge plates
 - iii) Application of braze welding processes on various materials.
5. Identify welding electrodes for Arc welding:
 - Types of electrodes
 - Selection of electrodes
 - Correct handling and storage of electrodes
 - Safety when welding.
6. Correctly Arc weld beads in flat position.
7. Identify Basic joint design and weld positions.

Course Goal No.6 To use hand tools correctly for Bench work

Upon successful completion of this module the student will be able to:

1. Identify hand tools:
 - Saws and types and uses
 - Drills and types and uses
 - Files, Bench vices, Reamers, chisels

3. Course Goal No. 6 cont.....

Tell the methods of tool grinding off hand:

- Angles of single lip cutters
- How to grind lathe cutting tool
- How to grind twist drills
- Honing and Lapping

4. Use of Non precision measuring Instruments

- Engineers rule
- Tape measures
- Gauging calipers

5. Use of precision measuring Instruments.

- Vernier calipers and types
- Micrometers and types
- Gauges

Course Goal No.7 Forging of metal

1. Identify forging equipment and simple forging operations:
2. Demonstrate ability to upset, set down conversly
3. Demonstrate bending, drawing down, punching and drifting.
4. Demonstrate hand welding

Course Goal No.8: The science of , the Trade.

1. Heat and its effects
 - Temperature
 - Expansion and contraction of liquids, solids and gas
 - Heat transfer
 - Gas laws.
2. Elasticity
 - Strain, Stress and compression forces
 - Hooke's law
3. Dynamics:
 - Speed and velocity
 - Projectiles Gravetational acceleration

Course Goal No.8 cont.....

4. Work, power, energy and types of energy
5. Simple machines
 - Types of machines
 - Transmissions
 - Gear belt and pulley drives
6. Friction:
 - Types and laws of friction
 - Advantages and disadvantages of friction
 - Practical methods of reducing friction
7. Density and Specific Gravity:
 - Definition of mass, Density and specific gravity
 - Archimedes' principle
8. Systems of Forces
 - Scalars and vector quantity
 - Triangle of forces
 - Resolucion of forces
 - Turning moments
 - Centre of gravity
9. Electricity and Magnetism
 - Basic electricity
 - Energy and power
 - Resistance and Resistivity of a conductor
 - Conductors and Insulators
 - Effects of electric current
10. Magnetion:
 - Magnetic materials, poles
 - Electromagnetism

Course Goal No.9 Trade Theory

1. Ferrous metals and alloys
 - Pig iron
 - Cast Iron
 - Wrought Iron
 - Common furnaces

Course Goal No. 9 cont.....

1. - Alloy steels and types
 - Manufacture and use of carbon steels

2. Non ferrous metals and alloys:

3. Heat treatment of metals and alloys
 - Heat treatment furnaces
 - Induction hardening

4. Common hand tools
 - Files etc
 - Bench fitting processes

5. Bench work and fitting
 - Preparation of surfaces
 - metal cutting tools
 - Work holding devices
 - Manufacture of simple hand tools

6. Limits and fits
 - Interchange ability
 - Fits and types
 - Surface finish evaluation

7. Measurement and Inspection
 - Standards of measurements
 - Comparators
 - Gauging
 - Angular measurement
 - Linear measurement.

8. Sheet metal work:
 - Hand tools and metal operations
 - Hems and beams
 - Lay out/Pattern
 - Sheet metal joints

9. Machinery maintenance:
 - Planned maintenance
 - Corrective maintenance
 - Shut down maintenance

Course Goal No.10: Lathe work

1. Lathe machine types
 - Construction
 - Industrial application
2. Demonstrate Care use and maintenance of the lathe
3. Lathe operations:
 - Drilling
 - Plain turning
 - Taper turning
 - Adjustment of speeds and feeds and time calculation.
4. Selection of cutting tools
 - H.S.S. tools
 - Carbide tools
 - H.C.S. tools
5. Tool grinding off hand
6. Use knurling tools, drills, reamers and boring bars
7. Work holding devices
8. Threading operations

Course Goal No.11 MILLING

1. Milling machines and types
 - Standard milling machines
 - Horizontal
 - Vertical
 - Universal
 - Omniversal
2. Care and maintenance of milling machines
3. Selection of milling tools
 - End mills
 - Gear cutters
 - Form milling
 - slotting
4. Speeds, feeds and time calculation

Course Goal No.11 cont.....

5. Indexing and types
6. Surface milling
7. Angular milling
8. Gear cutting
9. Gear Hobing
10. Rotary milling

Course Goal No.12 SHAPING

1. Shaping machines and types
 - Standard shapers
 - Universal shapers
 - Horizontal shaping machines
 - Vertical shapers
2. Demonstrate care, Use and maintenance of shaping machines
3. Selection of speeds, feeds and time calculation
4. Shaping operations

Course Goal No.13 GRINDING

1. Grinding machines and types
 - Surface grinders
 - Pedestrial grinders
 - Hand grinders
 - Rotary table grinders
 - Horizontal grinding machines
 - Vertical grinding machines
2. Proper Selection of grinding wheels and Indentification
3. Wheel balancing
4. Grinding operations
5. Cylindrical grinding
6. Tool grinding
7. Lapping, Honing and barnishing

Course Goal No.14 MACHINERY INSTALLATION AND MAINTENANCE

1. Installation of machines, levelling provision of safe guards and Testing.
2. Interpretation of manufacturers guide manual.
3. Lubrication and systems
4. Removal and fitting of bearings bushes
5. Assembly of meshing components
6. Describe procedures of assembly work.
7. Inspection of machines
8. Fault finding Techniques
9. Records and service code
10. Identify spare parts and placing orders.
11. Preserve service histor of machines.

Course Goal No.15 PROJECT WORK

Importance of project work

- Simple design of basic machine components and assembly
- Assembly and safe disassembly Techniques.
- Manufacture of sellable products

ELECTRICAL SECTION

SYLLABUS

TENTATIVE TRAINING PROGRAMME

DURATION:

2YEARS

VOCATIONAL TRAINING INSTITUTE, NAKAWA

TENTATIVE TRAINING PROGRAMME

BASIC ELECTRICAL INSTALLATION COURSE

NET TRAINING HOURS 2300 HOURS
THEORETICAL TRAINING 575 HOURS
INDUSTRIAL ATTACHMENT 770 HOURS
PRACTICAL TRAINING 1725 HOURS
ORIENTATION 10 HOURS
DURATION 2 YEARS

1. SAFETY (10)

Note: It is important that safety and I.E.E Regulations be introduced throughout the course at appropriate lessons or periods. The following areas of safety should be put into consideration:-

- 1.1 General introduction to workshop rules and regulations.
- 1.2 Safe handling of tools, Equipment, materials and machines.
- 1.3 Safety rules for working on electric installation
- 1.4 How to avoid electrical shocks, ^{burns} and fire.
- 1.5 Basic first Aid demonstration.

2. THEORY (ELECTRICAL PRINCIPLES)

2.1 Introduction to electricity:

Production of electricity, hydro-electric power stations, effects of electricity, heating, mechanical, chemical, energy conversion, power transmission and distribution.

2.2 Basic quantities of electricity:

Electron theory: Atomic structure of conductors and insulators; electric charge, electric pressure, electric current and its effects and electrical resistance.

2.3/2

2.3 Electric circuit and units:

Apply Principles and theory of d.c (Direct current),
Definition of Ohms Law and Kirchhoff's Law series and
parallel circuits, Kirchhoff's law in a net work, voltage
drop, resistivity.

2.4 Electrical power and Energy:

Power and energy in d.c and a.c circuits, efficiency, power
factor

2.5 Cells and Batteries:

Primary and secondary cells, mercury cells, solar cells,
^{Storage} shortage battery, cells calculations, internal resistance and
series/parallel. Efficiency and capacity.

2.6 Electrical measuring instruments:

Types of measuring instruments; moving coil instruments
(Galvanometer) moving iron Instruments; wheat stone bridge
dynamometer, instrument transformers, lightmeter.

2.7 Magnetism:

Types of magnets, Permanent magnetism, electro magnetism
strengthening magnetic fields (Introduction of iron), current
carrying conductor in magnetic field (Motor principle)
Induced voltage (EMF) (Generator principle) self induction
(Transformer action) Lenz's law /Eddy current.

2.8 Power generation and distribution

Generating plants; hydro-electric plants solar system, Nuclear
plant and diesel/steam engine.

2.9 Alternating emf and currents single phase and three phase.

2.10 D.C motors and D.C M Generators

2.11 A.C Motors single phase and A.C motors three phase

2.12 A.C Generator single phase and a.c generator three phase.

2.13 Lighting systems

Filament lamps and discharge lamps

2.14 Heating appliances

2.15 Control and protection of circuits

3. WORKSHOP PRACTICE:

3.1

- 3.1 Use and care of tools
- 3.2 Bench work involving measuring, filling, chiselling and drilling.
- 3.3 Making various cable joints, soldering terminations and soldering cable lugs using blow lamps, and electric iron
- 3.4 Wiring on board lighting circuits using P.V.O cables.
- 3.5 Wiring circuits ~~etc~~ using special cables e.g M.I.U.C and P.V.O armoured cables. *ETC*
- 3.6 Wiring bells and alarms circuit
- 3.7 Wiring domestic appliances including cookers, water heaters, Irons, washing machines.
- 3.8 Earthing, bonding and testing plug fault & finding domestic in domestic installation.
- 3.9 Wiring power signs and signalling circuits using modern systems
- 3.10 Temporary installations and installations on construction site:
- 3.11 Electric machine connections including control and power circuit starting circuits of a.c and d.c motors.
- ~~3.12~~ reversing circuits of single phase, three phase and d.c motors. speed control of d.c motors.
- 3.12 Implementation of various circuits, *looping* looping in, joint box ceiling rose in PVC surface and flush conduit and trunking systems involving one-way, two, *with* intermediate, *remote* remote multi-circuits, momentary, indicator and time switches including lighting protection.
- 3.13 Implementation of control circuits, on and off circuits, electro-thermic over current protection, interlocking by switches and contactors, sequence of control.
- 3.14 Instrumentation and measuring exercises, meter reading, measuring V, I, R, P W and pf.
- 3.15 Industrial installation
- 3.16 Single phase transformers, three *phase* and a.c and d.c motors and generators.
- 3.17 Servicing of electrical machines
- 3.18 Introduction to motor rewinding.

4. ELECTRICAL DRAWING
- 4.1 Introduction to technical drawing
- 4.2 Electrical symbols
- 4.3 Installation and wiring diagrams
- 4.4 Single ~~phas~~ pole switch~~s~~ circuits
- 4.5 Multi circuit - switch circuit
- 4.6 Two-way switch circuit
- 4.7 Intermediate switch circuit
- 4.8 Voltmeter and Ammeter circuit, and wattmeter
- 4.9 Combination of various circuits
- 4.10 Kitchen & living room, installation
- 4.11 Hall installation
- 4.12 Stair case installation
- 4.13 Installation layout of a building
- 4.14 Water heater wiring
- 4.15 Cooker wiring
- 4.16 Bells and bell indicator diagrams
- 4.17 Transformer diagrams (1 ϕ & 3 ϕ) *single and three phase*
- 4.18 Single phase motor~~s~~ diagrams and three phase
- 4.19 Motor ~~stater~~^{start}~~s~~ diagrams
- 4.20 Protective methods
- 4.21 Internal connection of moving iron and moving coil instruments
- 4.22 Filament and discharge lamps diagrams
- 4.23 Basic ^{electronic} electro~~nic~~ circuits
- 4.24 Rectification diagrams
- 4.25 Distribution systems (Single and three phase)
- 4.26 Layout diagram of factory lighting system and lightning protection.

VOCATIONAL TRAINING INSTITUTE, NAKAWA

ELECTRICAL SECTION

ELECTRICAL FITTING

TRAINING PROGRAMME

ELECTRICAL FITTING

NOTE: It is important that safety and IEE Regulations introduced throughout the course at appropriate lessons or periods.

The following areas of safety should be put into consideration.

- 1.1 General introduction to workshop rules and regulations.
- 1.2 Safety handling of tools, equipment, materials and machine
- 1.3 Safety rules for working on electrical installations/fittin
- 1.4 How to avoid electrical shocks, burns and fires.
- 1.5 Basic first aid demonstration.

2. Theory

- 2.1 Single-phase induction motors. Types of single phase motor construction, principle of operation, connectors, starting systems and application.
- 2.2 Three-phase induction motors:
Types of three-phase motors, construction, principle of operation, connections, starting systems and application.
- 2.3 D.C Motors:
Types of d.c motors, construction, principle of operation connections, application, interpoles, starting system and speed control.
- 2.4 D.C Generator
Types of d.c generators, construction, principle of operation Application, voltage regulation.
- 2.5 A.C generator single-phase:
Types of a.c generators, construction, operation, applicatio voltage regulation.

3. Workshop Practice

- 3.1 Rewinding single and three-phase motors.
Name plate data
Preliminary data taking, construction data taking and operational data taking.

3.2 Winding data

- Taking data
- Stripping windings
- Insulating the slots
- Rewinding
- Connecting the winding
- Testing
- Baking and Varnishing.

4 : Armature and Field Coil Rewinding:

4.1. Safety precautions:

4.2. Measuring instruments

- Avometer
- Growler

4.3. Types of Alternators (Field coil and armature)

4.4. Types of motor (D.C motor)
(Field coils and armatures)

4.5. Circuit diagrams and rewinding diagrams

4.6. Diodes/Rectifiers

- Types of diodes/Rectifiers
- connecting diagrams
- circuit diagrams
- Testing

4.7. Maintenance and servicing Alternators and starter motors:

4.8. Rewinding of Armature and Field coils

Types of winding (lap and wave windings)

1. Taking data
2. Stripping the windings
3. Insulating the slots
4. Rewinding (Placing coil in slots)
5. Connecting the winding
6. Testing
7. Baking and varnishing.

5: 9. *Transformers construction and Repair*

Ep. 1. *Doc. ...*

VOCATIONAL TRAINING INSTITUTE, NAKAWA
TENTATIVE TRAINING PROGRAMME
BASIC REFRIGERATION AND AIR CONDITIONING COURSE

NET TRAINING HOURS:	2300 HOURS.	THEORETICAL TRAINING:	575 HOURS
INDUSTRIAL ATTACHMENT:	770 HOURS.	PRACTICAL TRAINING:	1725 HOURS
ORIENTATION:	10 HOURS	DURATION:	2 YEARS.

SYLLABUS:Theoretical subjects:

NOTE: This syllabus is intended for courses dealing with commercial domestic refrigeration and air-cooling. This syllabus includes all the topics upon which examination questions may be set in the written question papers. No particular order of treatment in a course should be implied from the order of publication.

1. SAFETY:

NOTE: The theme of safe working practice should run throughout the educational syllabus just as it is expected to run throughout the complementary training programme. It is not intended, however, that formal instruction in safety should occupy an undue proportion of the course; instead, safety considerations should be introduced as they arise naturally in the coursework. It is especially recommended that a general revision of safety topics relating to personal safety, the need for wiring regulations, and welding hazards, as covered in subject No.833 Certificate in Basic Engineering Trade subjects, be undertaken early in the course. IEE Regulations or appropriate local electricity regulations must be introduced throughout the course as appropriate.

SYLLABUS

- 1.1 Electrical hazards.
Colour coding for electrical components and wiring.
- 1.2 Refrigerant hazards.
Safety, handling and treatment of refrigerants (Nos.12, 22, 40, 502 and 764) and gases (oxygen, hydrogen, nitrogen, acetylene and Air).
Storage of refrigerants, standing pressures (BS 341 and 401)
Colour scheme for cylinders (BS349). Disposal of refrigerants. Use of descaling fluids.
- 1.3 Pressure-relief devices.
Safety code requirements.
2. SPECIALIST TOOLS
 - 2.1 Introduction to specialist tools; their uses, care and selection.
 - 2.2 Copper and steel pipe. Methods of bending and jointing.

SYLLABUS

- 2.3 Types of hard and soft solders and brazing alloys, fluxes; Use of blow-lamps and torches including oxy-acetylene.
3. FUNDAMENTALS OF REFRIGERATION
 - 3.1 Principles of refrigeration.
Basic theory of refrigeration. Pressure and temperature scales; their application to refrigeration. Definition of latent heat and sensible heat.

Heat units; the British thermal unit (Btu), calorie (cal) and joule (j).

3.2 Refrigerants

The use of refrigerant types Nos.12, 22 and 502; advantages and disadvantages. The liquefying pressure and temperature relationship.

3.3 Use of appliances

Stowage: correct temperatures for various products, importance of good stowage. Effects of incorrect temperatures. Dangers of product refreezing. Defrosting procedures. Need for cleanliness of condensate drains.

3.4 Refrigeration plant

Simple line circuit. Identification of components and pipe lines. Effects of leaks in high and low pressure sides; remedial action.

3.5 Electrical circuits

Simple electrical circuits for refrigeration. Wiring diagrams.

4. ASSEMBLIES AND COMPONENTS

4.1 Compressors

Open type; hermetically-sealed types, serviceable-hermetically-sealed types; construction and operation.

Diagnosis and rectification of faults on serviceable-hermetically-sealed types

4.2 Electric motors

Single-phase, split-phase, capacitor-start and capacitor-start-and-run. Fan motors.

Starting relays, overload and over-temperature protectors
Diagnosis and rectification of faults.

4.3 Evaporators

Air coolers and liquid coolers; types, construction and uses, Gravity circulation, Diagnosis and rectification of faults.

4.4 Condensers and receivers

Types, construction and uses; consideration of location.

4.5 Expansion devices

Types, construction and uses. Simple introduction to capillary tubes, automatic expansion valves and thermostatic expansion valves.

4.6 Thermostats and pressure controls

Applications and adjustments for control and safety.

4.7 Valves

Reverse cycle valves, check valves, hand-operated shut-off valves and compressor service stop valves. Construction and uses.

4.8 Filters and dryers
Types, construction and uses.

5. LUBRICATION

5.1 Properties, including viscosity and miscibility, of oils used in refrigerations. Effects of moisture and air. Storage of oils. Selection of oils for given purposes.

5.2 Lubrication of compressors

6. INSULATION

SYLLABUS -

Insulating materials; brief description of materials and their purpose, vapour barriers. Insulated doors, gasketing and hardware. Simple heat leakage tests.

7. INSTALLATION AND SERVICE PROCEDURES

7.1 General installation procedure.

7.2 Component recognition and location on common appliances including domestic refrigerators, single and double compartment; domestic air conditioners (window sill units); deep freeze cabinets; beverage coolers; flake and cube ice makers, drinking water coolers; domestic dehumidifiers.

7.3 The importance of cleanliness and dryness within the system. Evacuation and dehydration. Methods of removal moisture and dirt. Acide-testing and burn-out kits.

7.4 Charging and recharging with refrigerant and oil.

7.5 Leak testing; methods involving liquid soap, lamps and electronic detectors.

7.6 Servicing procedure.
Fault-finding on complete systems; sequence of diagnosis.

COMMERCIAL REFRIGERATION CABINETS AND MECHANISMS:

Histry--Cabinet Construction--Soda Fountains--
Display Cases--Truck Bodies--Railway Cars--Com-
mercial Refrigerating Mechanisms--Refrigerant Con-
trols--Motor Controls--Cooling Coils--Water Valves
--Service Valves--Multiple Systems--Questions.

COMMERCIAL REFRIGERATION CALCULATIONS AND HEAT LOADS

Heat Leakage--Heat Usage--Balancing Heat Loads
--Baffle Design--Cooling Coil Capacities--Condens-
ing Unit Capacities--Water Cooling Loads--Ice
Cream Heat Loads--Refrigerant Properties--Com-
pressor Capacities--Motor Capacities--Condenser
Capacities--Refrigerant Line Capacities--Questions.

COMMERCIAL REFRIGERATION INSTALLATION AND SERVICING:

Non-Code Installations--Code Installations--Start-
ing Dry and Flooded Multiple Systems--Air-Conditioning
Installation--Servicing Multiple Installations--Water
Valves--Refrigerant Valves--Checking Refrigerant
Charge--Questions.

REFRIGERANTS:

Refrigerant Requirements--Sulphur Dioxide--
Methyl Chloride--Ammonia--Freon--Iso-Butane--
Ethyl Chloride--Carbon Dioxide--Methyl Formate--
Methylene Chloride--F-114--Thermon--Use of Re-
frigerant Curves--Interchanging Refrigerants--
Questions.

TECHNICAL CHARACTERISTICS:

Copper Tubing and Pipe Data--Heat Conductivity--
Cold Storage Temperatures--Motor Data--Wire
Sizes--Fuse Sizes--Compressor Data--
Data--Refrigerant Control Data--Operation of the
Thermostatic Expansion Valve--Thermographs--Belt
Data--Electric Wire Connections--Electric Refrige-
rator Power Consumption--Refrigerant Data and
Charts--National Code.

Brine

AIR CONDITIONING

Human Comfort--Humidity--Effective Temperature
--Equipment--Structures--Heating--Cooling--Air
Filtering and Circulating--Central Plant--Remote
Installation--Unit Air-Conditioners--Controls--
Questions.

COMMERCIAL REFRIGERATION CABINETS AND MECHANISMS:

History--Cabinet Construction--Soda Fountains--
Display Cases--Truck Bodies--Railway Cars--Com-
mercial Refrigerating Mechanisms--Refrigerant Con-
trols--Motor Controls--Cooling Coils--Water Valves
--Service Valves--Multiple Systems--Questions.

COMMERCIAL REFRIGERATION CALCULATIONS AND HEAT LOADS

Heat Leakage--Heat Usage--Balancing Heat Loads
--Baffle Design--Cooling Coil Capacities--Condens-
ing Unit Capacities--Water Cooling Loads--Ice
Cream Heat Loads--Refrigerant Properties--Com-
pressor Capacities--Motor Capacities--Condenser
Capacities--Refrigerant Line Capacities--Questions.

COMMERCIAL REFRIGERATION INSTALLATION AND SERVICING:

Non-Code Installations--Code Installations--Start-
ing Dry and Flooded--Multiple Systems--Air-Conditioning
Installation--Servicing Multiple Installations--Water
Valves--Refrigerant Valves--Chocking Refrigerant
Charge--Questions.

REFRIGERANTS:

Refrigerant Requirements--Sulphur Dioxide--
Methyl Chloride--Ammonia--Freon--Iso-Butane--
Ethyl Chloride--Carbon Dioxide--Methyl Formate--
Methylene Chloride--F-114--Thercon--Use of Re-
frigerant Curves--Interchanging Refrigerants--
Questions.

TECHNICAL CHARACTERISTICS:

Copper Tubing and Pipe Data--Heat Conductivity--
Cold Storage Temperatures--Motor Data--Wire
Sizes--Fuse Sizes--Compressor Data Brine
Data--Refrigerant Control Data--Operation of the
Thermostatic Expansion Valve--Thermographs--Belt
Data--Electric Wire Connections--Electric Refrige-
rator Power Consumption--Refrigerant Data and
Charts--National Code.

AIR CONDITIONING

Human Comfort--Humidity--Effective Temperature
--Equipment--Structures--Heating--Cooling--Air
Filtering and Circulating--Central Plant--Remote
Installation--Unit Air-Conditioners--Controls--
Questions.

VOCATIONAL TRAINING INSTITUTE, NAKAWATENTATIVE TRAINING PROGRAMMEBASIC RADIO AND TELEVISION

NET TRAINING HOURS	2300 HOURS
ORIENTATION	10 HOURS
THEORETICAL TRAINING	575 HOURS
PRACTICAL TRAINING	1725 HOURS
DURATION	2 YEARS.

SYLLABUS:Theoretical Subject:

- 1.1. Radio Broadcasting and communication
- 1.2. Wave length
- 1.3. Radio wave ranges
- 1.4. Questions and Exercise.

2. OSCILLATORY CIRCUITS:
 - 2.1. Free Electrical Oscillations
 - 2.2. Amplitude and frequency of the free oscillations in a circuit.
 - 2.3. Damped and continuous oscillations
 - 2.4. Forced oscillations and resonance
 - 2.5. Series resonance
 - 2.6. Parallel resonance
 - 2.7. Band width of a tuned circuit
 - 2.8. Coupled circuits
 - 2.9. Shielding
 - 2.10. Types of tuned circuits and their components
 - 2.11. Simplified design of tuned circuits and their components,
 - 2.12. Questions and exercises.

3. TRANSMISSION LINES, WAVE AND REASONANT CAVITIES:
 - 3.1. Electromagnetic waves
 - 3.2. Travelling waves in transmission lines
 - 3.3. Basic transmission lines types
 - 3.4. Standing waves in transmission lines
 - 3.5. Effects of various line loads
 - 3.6. Wave guides
 - 3.7. Oscillatory systems - using resonant
 - 3.3. Resonant cavities
 - 3.9. Questions and exercise.

4. AERIAL AND PROPAGATION OF RADIO WAVES
 - 4.1. The Aerial as an open oscillation circuit
 - 4.2. A symmetrical half-wave vibrator
 - 4.3. Natural frequency and the wave-length of an Aerial
 - 4.4. The simplest receiving and transmitting aerial grounding and counterpoise
 - 4.5. Loop and Magnetic Aerials
 - 4.6. Feeder Lines.

- 4.7. The Directivity of a single vibrator and a system of several vibrators.
- 4.8. Aerials for the HF and VHF Bands (Short and Metre waves)
- 4.9. Special Antenna Types of Decimetre and Centimetre waves
- 4.10. Propagation of Radio waves
- 4.11. Questions and Exercises.

5. ELECTRON AND GAS VALVES

- 5.1. General information on electron and Ionic devices
- 5.2. Electron motion in electric and magnetic fields
- 5.3. Design and operating principle of the two-electrode valve
- 5.4. Diode circuits
- 5.5. Cathode types
- 5.6. Diode characteristics
- 5.7. Diode parameters
- 5.8. Types and design of diodes
- 5.9. Triode
- 5.10. The Triode as an Amplifier
- 5.11. The Triode as an Oscillator
- 5.12. Triode characteristics
- 5.13. Triode parameters
- 5.14. Dynamic operating conditions of valves
- 5.15. Receiving Triodes
- 5.16. Disadvantages of Triodes
- 5.17. Design and operation of a Tetrode
- 5.18. Tetrode connections
- 5.19. Grid characteristics and parameters of a tetrode
- 5.20. Dynatron effect in tetrodes
- 5.21. Design and operation of a pentode
- 5.22. Beam power tetrodes
- 5.23. Variable Mu valves
- 5.24. Receiving and low-power amplifying tetrodes and pentode
- 5.25. Mult-electrode complex valves
- 5.26. Inherent valve Noise
- 5.27. New types of receiving valves
- 5.28. Interchangeability of valves
- 5.29. Valve testing
- 5.30. Cathode-Ray Tubes CRT

- 5.31. Electric discharge in gases
- 5.32. Neon Lamps
- 5.33. Stabilivolts
- 5.34. Arc-Discharge Rectifiers and thyratrons
- 5.35. Glow-discharge tyratrons
- 5.36. Microwave electron valves
- 5.3 5.37. Klystrons
- 5.38. Magnetrons
- 5.39. Backward-wave and travelling-wave tubes
- 5.40. Questions and Exercises.

6. SEMICONDUCTOR DEVICES:

- 6.1. General
- 6.2. Conduction in semiconductors
- 6.3. Electron-hole junctions in the presense of External field.
- 6.4. Electron-hole junctions in the absence of an external field.
- 6.5. Solid-state diode current-voltage characteristics
- 6.6. The capacitance of semiconductor diode
- 6.7. Thermal ~~propy~~ properties of semiconductor diode
- 6.8. A.C Rectification by semiconductor diodes
- 6.9. Series and parallel connection of diodes
- 6.10. Pulse operation of semiconductor diodes
- 6.11. Major solid-state deode types
- 6.12. General data of transistors
- 6.13. Physical process in a transistor
- 6.14. Amplification by means of transistor
- 6.15. Basic transistor circuit diagrams
- 6.16. Transistor characteristics
- 6.17. Transistor static parameters and equivalent circuits
- 6.18. Temperature effect on operation of transistor
- 6.19. Transistor frequency characteristics
- 6.20. Transistor pulse operation
- 6.21. Inherent transistor noise
- 6.22. Basic transistor types
- 6.23. Tunnel diodes
- 6.24. Four-layer diodes and transistor
- 6.25. Field-effect transistor
- 6.26. Operating instructions for semiconductor devices

7. RECTIFIERS:

- 7.1. Basic rectifier circuits
- 7.2. Smoothing filters
- 7.3. Rectifier components
- 7.4. Fundamentals of power transformer design
- 7.5. Transistorised voltage transducers
- 7.6. Voltage regulators
- 7.7. Current stabilisers (Batteters)
- 7.8. Questions and exercises.

8. ELECTROACOUSTIC DEVICES

- 8.1. Properties of sound, The sense of hearing
- 8.2. Microphone and Earphone
- 8.3. Loudspeakers
- 8.4. Gramophone pickups
- 8.5. The decibel
- 8.6. Questions and exercises.

9. AUDIO-FREQUENCY AMPLIFIERS

- 9.1. The basic parameters of Amplifiers
- 9.2. Voltage amplifiers and power amplifiers
- 9.3. A Triode amplifier stage
- 9.4. Grid bias voltage in amplifiers
- 9.5. Transistorised amplifier stage
- 9.6. Power supplies and stabilisation of transistor operating conditions
- 9.7. Resistance coupled amplifiers
- 9.8. Choke coupled amplifiers
- 9.9. Transformer coupled amplifiers
- 9.10. Single ended output stage of amplification
- 9.11. Balanced or push-pull output stage
- 9.12. Output stage without transformers
- 9.13. Mult-stage amplifiers
- 9.14. Cascode amplifiers
- 9.15. Wide-band amplifiers
- 9.16. Negative feedback in amplifiers
- 9.17. Questions and exercises.

10. OSCILLATORS AND TRANSMITTERS:

- 10.1. Self-excited valve oscillators
- 10.2. Operating conditions, power and efficiency of a valve oscillator
- 10.3. Self-excited valve oscillator circuits
- 10.4. Transistor self-excited oscillators
- 10.5. Self-excited oscillators employing No feedback
- 10.6. A self-excited valve transmitter
- 10.7. M.O.P.A Transmitters
- 10.8. Electron-coupled oscillation
- 10.9. Frequency stabilisation
- 10.10. Telegraph keying of radio transmitters
- 10.11. Transmitting valves and transistors
- 10.12. The principle of modulation
- 10.13. Modulated oscillations spectrum
- 10.14. Grid modulation
- 10.15. Modulation of tetrodes and pentodes
- 10.16. Modulation in transistor amplifiers and oscillators
- 10.17. Anode modulation
- 10.18. Frequency modulation
- 10.19. Questions and exercises.

11. RADIO RECEIVERS:

- 11.1 General definition
- 11.2 The basic parameters of radio receivers
- 11.3 Straight amplification receivers
- 11.4 The diode detector
- 11.5 Crystal receivers
- 11.6 Grid detector
- 11.7 Anode and cathode detectors
- 11.8 Transistor signal detector
- 11.9 The receiver input circuit
- 11.10 Valve high-frequency amplifier
- 11.11 High-frequency amplifiers
- 11.12 Transistor H.F amplifiers
- 11.13 Superheterodyne reception
- 11.14 Frequency conversion
- 11.15 UHF Frequency convertors

- 11.16 Transistor frequency convertors
- 11.17 Intermediate frequency amplification
- 11.18 The detector, second local oscillator and low-frequency amplification
- 11.19 Gains, Tone and selectivity control
- 11.20 The "Magic Eye"
- 11.21 Interference and methods of elimination
- 11.22 The reception of frequency modulated signals
- 11.23 Automatic frequency control
- 11.23 Questions and exercises

12. RADIO MEASUREMENTS

- 12.1 Current measurements
- 12.2 Voltage measurements
- 12.3 Resistance measurements
- 12.4 Audio-frequency oscillators
- 12.5 Signal sources
- 12.6 Electron oscillographs
- 12.7 Frequency measurements
- 12.8 Capacitance and inductance measurements
- 12.9 Q-Factor measurements
- 12.10 Questions and exercises

RADIO - PRACTICAL TRAINING SYLLABUS

1. Handling of circuit tester (voltage measurement)
2. Method of using test oscillator (adjustment of tuning circuit).
3. Method of using test oscillator (Measurement of unknown frequency)
4. Method of handling signal tracer (trouble-shooting (trouble-shooting))
5. Method of using cathode-ray oscilloscope (wave form observation)
6. Method of using Q-meter (measurement of Q of series -connected coil)
7. Setting up parts of RF receiver kit (wiring and cautions on part arrangement)
8. Wiring usual RF radio (wiring work)
9. Adjustment of usual RF receiver-grid detection (inspection and adjustment of circuit)
10. Adjustment of superheterodyne receiver I.F.T (adjustment of I.F.T. by means of test oscillator).
11. Adjustment of super heterodyne receiver - I.F.T (Adjustment of I.F.T by means of sweep generator)
12. Adjustment of super heterodyne receiver (3-point adjustment) (Tracking)

TELEVISION - PRACTICAL TRAINING SYLLABUS

1. Wiring T.V set (wiring order)
2. Wiring method of TV set (heater wiring)
3. Wiring method of TV set (wiring of I.F amplifier circuit)
4. Wiring method of TV set and cathode-ray tube circuit (detection and video amplifier circuit)
5. Wiring of TV set (deflection circuit)
6. Adjustment of RF circuit-tuner circuit (method of adjustment by sweep generator)
7. Adjustment of video signal amplifier circuit (overall characteristics)
8. Adjustment of IF amplifier circuit
9. Adjustment of video signal amplifier circuit (method of using square wave generator)
10. Adjustment of audio amplifier circuit (intermediate frequency circuit and ratio detector circuit)
11. Adjustment of audio amplifier circuit and detector circuit
12. Adjustment of sync. circuit (adjustment of wave form)
13. Adjustment of deflection circuit (adjustment of output circuit waveform)
14. Adjustment of horizontal deflection circuit (adjustment of pulse width AFC)
15. Adjustment of horizontal deflection circuit (adjustment of toothwave AFC circuit)
16. Adjustment of horizontal deflection circuit (adjustment of output circuit)
17. Adjustment of high voltage rectifier circuit (voltage measurement)
18. Adjustment of cathode-ray tube (adjustment of cathode-ray tube)
19. Adjustment of gated beam detector circuit.

RADIO - PRACTICAL TRAINING SYLLABUS

1. Handling of circuit tester (voltage measurement)
2. Method of using test oscillator (adjustment of tuning circuit).
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19. Adjustment of gated beam detector circuit.

VOCATIONAL TRAINING INSTITUTE, NAKAWATENTATIVE TRAINING PROGRAMMEBASIC CARPENTRY AND JOINERY COURSE

NET TRAINING HOURS	2300 HOURS
INDUSTRIAL ATTACHMENT:	770 HOURS
ORIENTATION	10 HOURS
THEORETICAL TRAINING	575 HOURS
PRACTICAL TRAINING	1725 HOURS
DURATION	2 YEARS

SYLLABUS:THEORY AND DRAWING 1

1. Common hand tools and their uses.
2. Common softwood and hardwood timbers. Their characteristic methods of seasoning, merchantable conversion, and uses in the light of modern needs and availability.
3. Density, or weight per foot cube of various timbers in general use, hardwood and softwood. Standard methods of measuring timber i.e the cubic feet for hardwood; the standard of 165 cubic feet for softwood. Methods of cubing timber quantities from cutting lists.
4. Animal and synthetic glues, their preparation and uses. Fixing materials such as nails, screws, bolts, timber connectors, straps, wedges.
5. Common joints, their representation and particular uses.
6. Types and uses of ordinary ironmongery.
7. Ground and upper floor in timber. Single floors, with trimming and strutting.
8. Single roofs - including ceiling joists - their general construction and erection, Battening and boarding for roof coverings in tiles, slates, asbestos, roofing felts, use of sproketa, tilting pieces, fascia boards, soffits and bracketing for rain water gutters.

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- 9 Doors, ledged, braced and ledged, and the more common forms of panel doors; solid door frames. Ordinary finishings.
- 10 Single casement sash window in solid frame, and finishings thereto.
- 11 Ordinary stud partition, with doorway linings and finishings.
- 12 The fixing of wood to brick, stone and concrete. Wood fibre, and metal plugs, grounds, built-in blocks.

THEORY AND DRAWING 11

- 1 Further study of hand-tools for special purposes
- 2 Further study of available hardwood timbers. Comparison with softwoods; characteristics, seasoning, conversion and uses.
- 3 More elaborate forms of ironmongery in hinges, fasteners, stays, latches, locks, handles and striking plates.
- 4 Double floors in timber, but with steel main beams. Cradling of beams and stanchions for various finishings in wood and other associated materials.
- 5 Sound and heat insulation to partitions and floors. Use of slag-wood, fibreboard, asbestos-blanket and similar materials.
- 6 Double roofs. Trussed and lattice roof principals up to 30 feet span. Elementary principles of trussing. Introduction to prefabrication and modern assembly methods applicable to trussing.
- 7 Woodwork construction in flats and gutters; preparation for the plumber. Cat ladders, duckboards, simple trimming around chimneys at roof level.
- 8 Centres for arches up to 15 feet span; their support and provision for casing; centering for brick and concrete sewers.
- 9 Formwork and supports thereto for lintels, square columns and small independent floor slabs.
- 10 Doors; frame ledges and braced doors. Panelled doors, linings, plain finishings, including grounds, skirting and architraves.
- 11 Sashes and frames. Folding casements; double-hung sliding sashes, with their frames, casings and finishings.
- 12 Wood skylights; with roof trimming, preparation for plumber, fittings and finishings.
- 13 Stairs in straight flights, between walls or with open string. Newel and bullnose step.

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- 14 Miscellaneous work in pipe casing, supports to cisterns, shelving cupboards and fittings.
- 15 The uses of the principal machines in the preparation of joinery. Dangers and precautions. Study of machine operations involved in preparation of general domestic joinery. Reduction in sizes from nominal or sawn sizes to finished sizes; manufacture of purpose made and standard fittings.

THEORY AND DRAWING 111

- 1 Materials of construction. Imported timbers in general use. Plywood, blockboards, lamiboards, armoured ply, veneers and their uses. Insulation boards, wood-wool, cork slabs and similar preparations.
- 2 Temporary carpentry, including timbering for excavations.
- 3 Dead, raking and flying shores; their erection and stability. Temporary and portable buildings, including hoardings, huts and fittings for use on building sites.
- 4 Centering for arches up to 25 ft. span. supported from the ground or from abutments.
- 5 Formwork for reinforced concrete floors, with main and secondary beams and columns having any shape of cross-section.
- 6 Trussed and latyice roofs up to 45 ft. span. Hip and wavy valley roofs over rectangular plans; bevels, erection and fixing, and preparation for different forms of covering.
- 7 Dormer windows; their arrangement, roof trimming, construction and finishings.
- 8 Doors and windows of any type, with shaped heads, including frames, grounds, linings, finishings, folding partitions, sliding doors, fire resisting flush doors, roller shutters in wood, and associated fastening and fittings.
- 9 Methods of framing and fixing panelling, pilasters, cornices and pediments, second fixings for joinery, use of battening, plaster screeds and groundings, soldiers for skirtings and cornices. Use of datum lines above finished floors.

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- 10 Stairs; dog-legged and open newel types, arrangement, construction ~~pediments, second-handings-for-joinery~~ (including handrails) and fixing. Cut and mitres strings. Winders, framing of landing joists, trimmers and housing of newels to same.
- 11 Introduction to the study of measurement of work and the preparation of quantities in relation to joinery..
- 12 Woodworking machines in general use, selection of equipment, systematic planning and handling of work

APPLIED GEOMETRY:

Applications of Geometry to advanced problems of sitting out. Auxiliary projection for specific purposes; the obtaining of moulds, bevels, and developments in connection with roofing, centring, windows and doorways, stairs and machine setting. The steel square, its principle and its general uses in beveled work, and roofs rectangular in plan and of equal pitch.

THEORY AND DRAWING IV:

1. Formwork for concrete construction in stairs, hoods, balconies, vaults and domes. Knock-down mould boxes for repetition casting of concrete beams, posts, lintels and panels.
- 2 Ornamental open roof trusses, including the hammer-beam type. Laminated trusses for various types of special roofs. False work in covering of steel trusses.
- 3 Lantern lights, continuous roof lights and turrets.
4. High-class joinery for public and ecclesiastical buildings, theatres licensed premises, restaurants and shops.
- 5 Work of double \neq curvature in doors, frames and sashes, including the preparation of drums and formwork for curved work.
- 6 Stair building; the planning and construction of first-class newel and geometrical stairs.
- 7 Handrailing; built-up handrails and newels with softwood cores. Bends, knees and ramps with curvature in one plane. Wreathed handrails for the simpler conditions arising in geometrical stairs. Fixing of handrails to wall brackets and core rails.

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- 8 Interpretation and writing of specifications for Carpentry Joinery. Preparation of estimates for woodwork. Measuring up finished work for checking the original bill of quantities.
- 9 The protection of joinery during manufacture, during transit and on the site. The importance of ventilation and protection of floor joists and hardwood in confined spaces.
- 10 The economical use of timber in building, and a further study of world timbers in general use.

APPLIED GEOMETRY;

Applied geometry, including sections and interpenetrations of solids arising in the above construction. The setting out and development of curved ribs in vaults, groins, niches, domes and pendentives; handrailing problems. Uses of steel square for roofs irregular in plan and of unequal pitch .

WORKSHOP PRACTICE I

- 1 The selection and care of general tools. Sharpening and upkeep. The making of wood tools, care and rectification, also the making of boxes and other ancillary equipment.
- 2 Tool processes and the principles underlying them. Attention should be drawn to the use of winding sticks, the sequence of making out, and the subsequent operations.
- 3 Common woodwork joints; housing, halving, notching, mortise and tenon, dovetail, mitreing.
- 4 Panelling (including doors) of simple design; flush panel doors.
- 5 Small sashes and casement frames; full size sections.
- 6 Setting out. Full-size rods for all the above constructions with cutting list.
- 7 Demonstrations by the Teacher. To include tool sharpening tool operation; reverse rubbers for cleaning up mouldings; the use of the sandpaper rubber for flat surfaces. Identification of common softwood and hardwood timbers. Setting out and preparing exercises relating to the above course.

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WORKSHOP PRACTICE II

In this year, group working can often be arranged to advantage e.g. several students working on individual pieces of a complete example requiring accuracy of dimensions and form to obtain successful assembly.

Practical examples should lie within the syllabus for Theory and Drawing II, should include setting out, and may be selected from:-

Simple formwork, lattice or trussed roof frames; centres, doors and frames; window frames and sashes; drawer dovetail; table construction; cupboards; large details of a straight stair; with newel and bullnose step.

Demonstration by the Instructor: To include selections from: scribing and mitreing, dovetailing, fitting and hanging a door, use of pitchboard for a stair, preparation of closed string, assembling a stair. The use of handrail bolts and timber connectors. Further identification of timbers. Saw setting and sharpening.

WORKSHOP PRACTICE III

Group working may be developed. Examples should lie within the syllabus for Theory and Drawing III, should include setting out, and may be selected from:-

Formwork for columns and beam floors; moulds for precast concrete; large scale models of roofs with intersecting surfaces use of steel square for roofs of rectangular plan and uniform pitch; dragon tie for hipped first-class examples of door and window construction; bending by kerfing or trenching; veneering of curved step; secret or slot screwing. Setting out on rods in preparation for work to be machined; providing cutting lists and sections or other templates.

The preparation of framed joinery for different finishes, viz- painting, polishing, veneering and laminating, also the preparation cutting and laying of veneers for flat and curved surfaces.

Demonstration by The Instructor:- To include selections from Scribing for inclined joints, bending, veneering on step, setting out strings for housing and wedging, splayed tenon joints, cut strings and jointing of risers, fitting of balusters, setting out newel and strings for winders; bevelling for splayed work,

including the use of the steel square. Special tools used by the stair and handrail specialists.

WORKSHOP PRACTICE IV

The work in this year should be individual and should embody a large amount of full-size setting out in addition to bench work. Where practicable students should be encouraged and enabled to carry to completion at least one piece of selected craftsmanship.

The scope is wide and selections might be made from the following subjects depending upon the experience and aims of the individual students:-

Curved work, plan or framed, in linings for door and window openings; roofs of irregular plan and unequal pitch, including the use of the steel square; dormers, turrets, open roof trusses, high class joinery - e.g. bank fittings, shop counters, show cases, vestibule screens, stairs and accessories, irregular penelling; flush and framed doors; circular work in frames, louvre ventilators, e.t.c.

Practical demonstration: of any tool operation or craft process should be made as required, whether arising immediately out of a selected example or kindred to it. Demonstrations of machine operations and knowledge, capacities are germane to this stage for the purpose of acquiring general knowledge of the possibilities and limitations of machine work.

TENTATIVE TRAINING SYLLABUS

COURSE: Basic Training in Welding and Fabrication skills

DURATION: 2 Years

TARGET GROUP: Senior 4 (or Senior 6) school leavers

ELIGIBILITY FOR THE COURSE:
Senior 4 completion with passes in Metal work, Mathematics, English, Physical science.

THE COURSE: Consists of 2 years full-time study both in theory (25%) and practicals (75%) with an Industrial attachment, as outlined here under.

NET TRAINING HOURS: 2300 HOURS

INDUSTRIAL ATTACHMENT: 770 HOURS

ORIENTATION: 10 HOURS

THEORETICAL TRAINING: 575 HOURS

PRACTICAL TRAINING: 1725 HOURS

DURATION: 2 YEARS

SYLLABUS: Theoretical Subjects -

- 1) Safety Regulations
- 2) Workshop Calculations
- 3) Engineering Drawing
- 4) Materials Science
- 5) Trade Theory (Gas and Arc)
- 6) Light Sheet Metal Fabrication
- 7) Foundry Work (Black Smith)
- 8) Workshop Organisation and Management.

MODULE 4: TO WORK SAFELY.

- 1) The workers' Compensation Act.
 - Responsibilities of the Labour Department regarding (Workman's Compensation Act).
 - Responsibilities of employers in the workplace
 - Responsibilities of the worker in the workplace
 - Contravention of regulations.
 - Workers who are not covered by the Act.
 - Reporting injury or industrial disease
 - Circumstances for compensation.

- 2) General safety precautions for welding.
 - General procedures for shop safety
 - Safe procedures for welding
 - Safety requirements for ladders and scaffold
 - Safety requirements for handrails and guard rails.

- 3) Protective Equipment and clothing for welding.
 - Protective clothing.
 - Leathers.
 - Hand protection.
 - Head protection.
 - Foot protection.
 - Eye protection.
 - Eye protection for the electrical welding processes.
 - Flash goggles and screens.
 - Welding helmets.
 - Goggles for Oxy-fuel welding and cutting.
 - Hearing protection.

- 4) Safety precautions for hazardous and toxic materials.
 - Employer's responsibility.
 - Corrosive hazards.
 - Flammable/Inflammable hazards.
 - Explosive hazards.
 - Containers that previously held flammable materials.
 - Toxic hazards.
 - Safe handling of toxic materials.
 - Ventilation.
 - Working in confined areas.
 - Respiratory protective equipment.

- 5) Fire hazards and methods of fire prevention.
 - Fire triangle.
 - Fire prevention.

MODULE 2: WORKSHOP CALCULATIONS.

1. Applied workshop problems involving -
 - multiplication and division of numbers.
 - Common fractions - Addition, subtractions, multiplication and division, application of fractions to solve shop problems.
 - Averages, ratios and proportions.

2. Simple arithmetic.
 - Squares and cube roots.
 - Highest common factor (HCF) and lowest common multiple (LCM).
 - Multiplication and division of decimals to 4 significant figures.

3. Units. -
 - Foot pound seconds system of units (FPS).
 - Centimeters, Grams and seconds system of units (CGS).
 - Meter, Kilograms and seconds system of units (MKS).
 - International system of units (SI).
 - Conversion of units from imperial to metric.

4. Mensuration.
 - Measurement of length, area, volume and Perimeters of solids e.g. Rectangular prism, cube and cylinders.

5. Application of percentages, ratios and proportions in solving shop problems.

6. Algebra
 - Simple algebraic equations.
 - Simple formulae and solving for unknown factors.

7. Geometry
 - Trigonometry
 - Introduction.
 - Angles and phthogoras theorem.
 - Reading and interpretation of trigonometrical tables and appliances.
 - Trigonometrical ratios.

MODULE 3: ENGINEERING DRAWING.

- 1) Introduction.
 - Use/importance of Engineering drawings,
 - Identification of drawing instruments and their usage.
 - Freehand sketching of straight lines, rectangles, squares, circles etc.

- 2) Lines and Lettering.
 - Types of lines: centre lines, outlines, projection lines, hatching lines etc. and their identification.
 - Lettering style and layout as applied to Engineering drawings.

- 3) Geometrical constructions.
 - Bisecting a line.
 - Dividing a line into a number of equal parts.
 - Dividing a line in a given proportion
 - Bisecting an angle.
 - Finding centre of an arc.
 - Inscribing a circle in a triangle, square, etc.
 - Circumscribing circle of a triangle.
 - Drawing regular polygons given distance across flats, corners and given length of sides.

- 4) Principles of Tangency.
 - Drawing an arc of given radius to touch a given straight line.
 - Drawing an arc of given radius to touch a given arc externally.
 - Drawing an arc of given radius to touch an arc internally.
 - Application to practical problems.

- 5) Orthographic Projection.
 - Purpose and positioning of views.
 - Orthographic projection of a point
 - do - line.
 - " solid object.
 - Principle planes of projection

Application to practical problems cont;

- First angle orthographic projection.
 - Practical representation of orthographic views in first angle projection.
 - Third angle orthographic projection.
 - Practical representation of orthographic views in third angle projection.

- 6) Dimensioning.
 - Selection of dimensions.
 - Size dimensions.
 - Location dimensions.
 - Unnecessary dimensions.

- 7) Drawing Pictorial Views.
 - Isometric drawings.
 - Oblique drawings.

- 8) Sectional views.
 - Full sections
 - Section lines
 - Half sections
 - Broken out sections
 - Removed section.
 - Features from which section lines are omitted.

- 9) Developments (stretch-outs).
 - Development (stretch-out) of solid objects e.g. boxes, right cylinders, right prisms, elbows, etc.
 - Development of right cones and their frustums.
 - Preparation of pattern development and templates for practical fabricated components.

- 10) Tolerance.
 - Identifying tolerance of dimensions
 - Interpreting ISO symbols for tolerance
 - Interpreting the welding symbols and their practical application.

MODULE 4: SCIENCE (METALLURGY).

- 1) Introduction to Engineering materials.
 - Classification of Engineering materials (metals and non-metals, ferrous and non-ferrous)
 - Characteristics and properties of metals in general-physical and mechanical properties.
- 2) Forms of supply and production of metals
 - Extraction of metals - ores
 - Types of furnaces - Blast furnace, Foundry cupola, Bessemer converter, electric furnace etc.
- 3) Basic knowledge in primary working processes.
 - Uses and limitation of each form of manufacturing purpose.
 - Manufacturing processes both cold working and Hot working - forging, rolling, drawing etc.
- 4) General characteristics of metals.
 - Description of general properties/characteristics of metals i.e. strength, ductility, malleability, hardness, toughness, etc. in relation to applications in the working processes.
- 5) Applications of Engineering Materials.
 - Common uses of cast iron, low carbon steel, Austenitic stainless steel, copper and its alloys Aluminium and its common alloys.
 - Common forms of supply and general limitations.
- 6) Effect of heat on metals.
 - Physical, chemical, mechanical properties.
 - Methods of heat treatment of metals.
 - The heat treatment of carbon steels.
 - Processes of heat treatment, e.g. hardening, annealing, normalising, tempering etc.
- 7) Principles/effects of forces on metals.
 - Principle of moments
 - Nature of forces i.e. tensile, compressive, shearing.
 - Representation of resolution of forces.

Science (Metallurgy) Cont:

- 8) Basic knowledge of friction.
 - Effects of friction.
 - Types of wear.
 - Remedies to wear.

- 9) Methods of testing metals.
 - Workshop tests.
 - Visual tests.
 - Laboratory tests.

- 10) Introduction to basic chemistry.
 - Production of killed spirits/~~zinc~~ zinc chloride.
 - Smelting.
 - Physical/Chemical reactions.
 - Combustion, corrosion, their effects and limitations.
 - Oxidation, ^{reduction} its merits and demerits.

- 11) Introduction to metal protection processes.
 - The application of red oxide, paint etc.
 - galvanizing, spraying, cladding, tin plating etc.
 - Advantages and disadvantages of each process.

MODULE 5: GAS WELDING SKILLS.

1. Care, use and maintenance of gas welding equipment.
 - Safe handling, transportation and storing of gas cylinders.
 - Cylinder valves and safety devices, and their identification colours
 - Oxy-acetylene regulators
 - Oxy-acetylene hoses and fittings.
 - Torch assembly and disassembly.

2. Oxy-Acetylene equipment assembly and disassembly.
 - Assembling the outfit.
 - Test for leaks.
 - Light and adjust the torch.
 - Shut down the outfit.
 - Disassemble the outfit.

3. Identify filler rods, fluxes and tips.
 - Filler rods for fusion welding.
 - Brazing and braze welding alloys (rods).
 - Welding fluxes.
 - Brazing fluxes.
 - Selecting the correct welding tips.
 - Welding tip maintenance.

4. Fusion welding, braze welding and brazing processes and their applications.
 - Application of fusion welding.
 - Application of braze welding.
 - Application of brazing processes.

5. Fusion welding straight beads in flat position on mild steel sheet.
 - Main factors in gas fusion welding.
 - Faults in gas welding processes.

6. Fusion weld fillet welds on mild steel sheet
 - Weld positions and joint design for fillet welds.

7. Fusion weld groove welds on mild steel sheet
 - Weld positions and joint design for butt joints.

Gas welding skill cont:

8. Fusion weld groove welds on mild steel pipes.
 - Weld positions and joint designs for pipe welding.
9. Braze weld fillet welds on mild steel sheet
 - Procedures for braze welding mild steel.
10. Braze weld groove welds on mild steel plate.
 - Braze weld groove welds in flat position.
11. Braze weld and fusion weld groove welds on grey cast iron.
 - Procedures for braze welding and fusion welding of gray cast iron.
 - Braze weld groove welds in the flat position.
 - Fusion weld groove welds in the flat position.
12. Silver braze on similar and dissimilar metals.
 - Main factors of silver brazing.
 - Silver braze Tee joints in horizontal position.

MODULE: 5 ARC WELDING SKILLS.

1. Use and maintenance of the arc welding equipment and accessories.
 - Oil cooled transformers.
 - Air cooled transformers.
 - Tungsten arc (TIG)
 - Metal arc (MIG/MAG)
 - Resistance arc.

2. The welding electrodes for Arc welding.
 - Types of electrodes.
 - Common electrodes and their classification.
 - Selection of electrodes.
 - Correct handling and storage of electrodes.

3. Basic joint design and weld positions.
 - Weld types, their sizes and profiles.
 - Welding position for plates.

4. Faults and distortions in welds.
 - Identify causes of faults and distortions in welds and methods of their prevention and control.

5. Correctly Arc weld beads in the flat position.
 - Main factor to consider when Arc welding.
 - Procedure to strike an Arc and weld beads in flat position on mild steel plates.

6. Correctly Arc weld fillet welds on mild steel plates.
 - Weld fillet welds in the flat position of lap, tee and corner joints.
 - Weld fillet welds in the horizontal position on lap, tee and corner joints.
 - Fillet welds in the vertical position (up-hill) of lap, tee and corner joints.
 - Fillet welds in the overhead position on lap, tee and corner joints.

7. Arc welding fillet welds on mild steel sheets.
 - Weld fillet welds in the horizontal position on lap and tee joints on metal steel sheets

Arc welding skills cont:

- Fillet weld in the vertical position of lap and tee joints.
 - Weld edge of flange welds in all positions.
8. Groove welds on mild steel plates
- Weld groove welds in flat position on butt joints
 - Weld groove welds in the horizontal position on butt joints
 - Weld groove welds in the vertical position (up-hill) on butt joints.
 - Weld groove welds in overhead position on butt joints.
 - Weld groove welds in the horizontal position on Tee joints
 - Weld groove welds in the vertical position (up-hill) on Tee joints
 - Weld groove welds in overhead position on Tee joints
9. Hard surfacing or hardfacing on mild steel plate
- Hard surfacing procedures
 - Building up and hard surfacing mild steel plates in flat position.
10. Groove welds on grey cast iron
- Procedures for Arc welding grey cast iron
 - Weld groove welds in flat position on grey cast iron
11. Groove welds using low-alloy electrodes on steel plate
- Identify low-alloy electrodes for arc welding
 - Weld groove welds in the horizontal, vertical (up-hill), and overhead positions on steel plates
12. Groove welds using stainless steel electrodes on steel plate
- Identifying stainless electrodes for Arc welding
 - Weld groove welds in the vertical position (up-hill) on steel plates.

MODULES: SHEET METAL FABRICATION SKILLS.

1. Identifying the metal stock.
 - Types of sheet metal stock.
 - Advantages/disadvantages of each metal.
 - Selection of the proper material for a job.

2. Identifying sheet metal tools.
 - Measuring, marking, bench, metal piercing, special job and joining tools e.g. scribe, try square, center punch, snips, punch, mallet etc.
 - Care and maintenance of sheet metal tools.

3. Demonstrating Layout and Pattern Development.
 - Types of seams e.g. lap seam, riveted seam, grooved seam etc.
 - Application of the parallel line, radial line and triangulation methods to make development of simple objects in the form of cylinders, round taper, uniform and tapering elbows, uniform offset pipes, tees etc.

4. Demonstrate cutting sheet metal.
 - Cutting sheet metal with manual machines and equipment i.e. snips, slitting shears, squaring shears, ring and circle shears etc.
 - Cutting sheet metal with power-driven machines and equipment e.g. the guillotine.

5. Demonstrate Piercing sheet metal.
 - Identifying metal piercing and special job tools e.g. solid/hollow punches, hand drill, and notchers, seamers, and crimpers.
 - Selecting the proper type and size of tool for the job.
 - Using the tools correctly.

Sheet Metal Fab. cont:

6. Demonstrate bending sheet metal correctly
 - Bending an off-center eye, a centered eye, scroll, channel etc. using hand operated machines and equipment e.g. the DL-Acro bender and the bar folder.
 - Care and maintenance of the machines and equipment

7. Demonstrate folding sheet metal correctly
 - Folding light sheet metal cylinders and cones (with or without wire) by hand operated machines and equipments e.g. the slip roll bending machine
 - Bending sheet metal cylinders and cones (with or without wire) with power driven machines and equipments, e.g. the power-driven rolling machine
 - Care and maintenance of the machines and equipments.

8. Demonstrate Beading
 - Identify purpose for beading
 - Identify types of beads-single, ogee, and triple beads.
 - Crimping
 - Combination beading and crimping

9. Demonstrate Forming sheet metal by hand.
 - Folding sheet metal to produce boxes, containers, fittings, ducts, etc. with hand brakes e.g. the standard brake, the Universal hand brake etc.
 - Forming sheet metal by power-driven machines and equipment e.g. the Hydraulic Power Brake.
 - Care and maintenance of the machines and equipment.

10. Demonstrate Edge Treatment.
 - Identifying purpose for edge treatment
 - Identifying types of edges (safe edge, wired edge)
 - Computing wire edge allowances
 - Demonstrate edge wiring on square and round jobs.

Sheet Metal Fab. Cont:

11. Demonstrate Flanging
 - Identify purpose of flanging e.g. stiffening, making connections with other pieces,
 - Making an inside and outside flange.
12. Demonstrate Shrinking.
 - Identify purpose for shrinking.
 - Shrinking in the Turning machine.
13. Demonstrate Beaten Metal work
 - Demonstrate Beaten Metalwork (sinking, hollowing and raising) light sheet metal with mallets, stakes and wooden blocks
14. Demonstrate Stiffening sheet metal.
 - Identifying purpose for stiffening sheet metal.
 - Identifying methods of imparting stiffness e.g. edge treatment, flanging, beading etc.
15. Demonstrate Joining sheet metal.
 - Identifying the various stakes used for sheet metal joining e.g. the hatchet stake, conductor stake, blowhorn stake etc.
 - Describing the types of forming that can be done on t stakes e.g. the paned down joint, the knocked up joint clent on double grooved joint, etc.
 - Riveting,
 - Soldering,
16. Application of the Standard Power-Diven machines.
 - Identifying safety rules for the use of power tools.
 - Demonstrating the proper and safe use of hand-and power-operated sheet metal tools and machines.

7. COURSE GOALS; To Forge Metal.

U.1 Identify forging equipments and their uses.

- Manual blow pipe, forge
- Electrical furnaces
- Types of fuels (energy sources)
- Construction and maintenance of furnaces
- Operating procedures
- Identify forging temperatures/colours of metals

U.2 Identify and demonstrate safe use of forging equipment/
tools

- Care and maintenance of the equipment.

U.3 Forging Techniques (processes)

e.g. upset, draw down, set down, bending, punching,
drifting, hand welding.

U.4 Application of Power assisted forging processes

- Introduction to the Electrical/Pneumatic equipment.

AUXILIARY MODULES: WORKSHOP ORGANIZATION

1. Organization.
 - Introduction to the production function and organization.

2. The Product.
 - Choice of the product for rural area.
 - Design of the choice of the product.

3. Location of the Workshop.
 - Location of the metal working workshop.
 - Design of the Metal working workshop.
 - Layout of the metal working workshop.

4. Equipment.
 - Choice of equipment to suit rural areas.
 - How to plan equipment requirements.

5. Maintenance.
 - Maintenance of metal working workshop.

6. Costing.
 - Identifying production cost.

VOCATIONAL TRAINING INSTITUTE, NAKAWATENTATIVE PROGRAMMEBASIC BRICKWORK COURSE

NET TRAINING HOURS:	2300 HOURS
INDUSTRIAL ATTACHMENT	770 HOURS
ORIENTATION	10 HOURS
THEORETICAL TRAINING	575 HOURS
PRACTICAL TRAINING	1725 HOURS
DURATION	2 YEARS.

SYLLABUSES:

THEORY AND DRAWING I.

1. Tools and equipment in general use by the bricklayer.
2. Materials. General information concerning bricks; types in common use, characteristics and sizes. Sand, lime and cement; methods of storage, practical tests; mixing of mortar and concrete.
3. Wall construction. Principles of bonding; English and Flemish bonds applied to square angles and walls up to two bricks thick. Isolated and attached piers. Tothing and racking back. Garden wall bonds.
4. Foundations and footings, standard types. Site concrete, sleeper walls, horizontal damp-proof courses, under-floor ventilation.
5. Door and window openings; square and recessed jambs. Thresholds, sills, heads and lintels.
6. Broken and reverse bonds, block bonding, junctions. Simple construction of cavity walls and use of wall ties.
7. Application of heading bond to walls curved on plan.
8. Fireplace openings, ground and first floor chimney breasts, fender wall.
9. Ringed, axed and soldier arches. Segmental and semicircular arches of small span. Turning pieces and wood centers.

THEORY AND DRAWING II:

1. Further tools used by the bricklayer and the explanation of craft processes.
2. Materials. Special types and varieties of bricks. Outlines of

the manufacture of bricks, limes and cements. Preparation of mortars and concretes; use of gauge boxes, shrinkage of bulk in mixing.

3. Further examples of face bonds and their application to thick walls and angles. Jointing and pointing. Copings, parapets and tile creasing. The lengthening and thickening of walls, and repairs.
4. Foundations and footings for thick walls and piers. Model By-law or London Building Act requirements. Setting out and levelling foundations. Timbering to shallow trenches.
5. Cavity walls; treatment at foundations and eaves and round door and window openings. Dry areas, damp rooting; half-basements with wood or concrete floors.
6. Reinforced concrete lintels, pre-cast and cast in situ, with the necessary moulds or formwork.
7. Reinforced brickwork; use of wire mesh and hoop iron.
8. Setting out, preparing templates for, and cutting brick arches, Camber, elliptical and pointed arches. Construction, support and removal of wood centers up to 9 ft. span.
9. Brick, stone and other dressings at quoins, and at window and door openings. Flinths, string courses and cornices. Cutting for gables; over-sailings and corbelling.
10. Special hollow block and breeze partitions. Brick paving and panelling. Quarry paving. Fixing of fittings and equipment to walls.
11. Domestic fireplaces, grouped flues and chimney stacks. Model By-law or London Building Act requirements.
12. Stoneware drains; the jointing of pipes and construction of inspection chambers.

THEORY AND DRAWING III:

1. Scaffolding in timber and in steel for two-storey buildings. Use of lifts and lifting appliances. Safety measures and regulations. Timbering for deep trenches.
2. Materials. Further details of brick manufacture. Composition of brick earths and their effect on colour and texture. Clay bricks for special purposes. Partition blocks, terra-cotta, sand-lime and cement bricks, pre-cast stone. Manufacture, composition and testing of limes and cements. Mixing and testing of concrete; preparation of test specimens.

Theory and Drawing III cont.

3. Transfer of load to foundations; safe pressure on various soils. Trial holes and tests. Made ground, sloping sites, stepped foundations.
4. Construction of basements, timbering for excavations; methods of damp-proofing, tanking for water-logged soils. Underpinning of foundations.
5. Drainage. The essentials and construction of good domestic schemes. Drain testing. Sub-soil drainage.
6. Setting out and construction of all forms of large span arches, straight on plan. Centers and their support, on posts or from abutments.
7. Brick walls with ashlar facings or with stone or terra-cotta dressings. Other composite walls. Methods of bonding.
8. Preparation for and the fixing of pre-cast concrete or stone stairs and landings.
9. Fireplace, flue and stack construction for large buildings. Angle fireplaces. Bonding and gathoring; damp proofing of stacks.
10. A general knowledge of the "standard method of measurement" as applied to brickwork, concrete, excavations and associated items.

THEORY AND DRAWING IV:

1. Preliminary operations, lay-out of sites for stores, equipment, workshops, offices and huts. Organization of contract work; safety and welfare provisions.
2. Foundations, sheet and other forms of piling. Deep basements and timbering of deep excavations. Collection and disposal of seepage water. Sewers and tunnelling.
3. Dead, raking and flying shores; their construction and stability.
4. Tall chimney construction. Boiler setting and furnace work; fixing of grates, ranges and stoves.
5. Intersecting vaults, brick niches, and arches curved on plan.
6. Stability of walls, piers, retaining walls and arches. Elementary principles of reinforced concrete construction; general position of the steel in walls, beams, slabs and pillars.
7. The construction, in brickwork, of large retaining walls, battered walls, and buttresses.
8. Fire-resisting construction. Hollow block floors and partitions; casing of columns, stanchions and floor beams. Head, fire and sound resisting brickwork.

9. Use of brickwork in connection with steel-framed and reinforced concrete structures.
10. Setting out large buildings. Use of dumpy level. Levelling of site, bench marks, obtaining levels and gradients, setting out angles and curves.
11. Method of preparing bills of quantities. Interpretation of specifications. Preparation of estimates. These items should embrace all the general work of the bricklayer, including concrete and drainage work. Measuring up finished work for checking against the original quantities.

NOTE: Students should be encouraged to read as widely as possible and to interest themselves in the history of Building, and of Brickwork in particular. Constructional materials and processes should be seen and their significance emphasized by frequent visits to manufacturing works and to buildings in progress.

WORKSHOP PRACTICE:

Practical exercises and problems should be set with the object of improving the student's dexterity with his tools, increasing his knowledge of craft operations and giving experience of normal setting out, rather than the setting of intricate problems of unusual bonding

WORKSHOP PRACTICE I.

1. Use of line, level, plumb rule and common tools.
2. Straight lengths of wall in English and Flemish bond up to two bricks thick with square corners; sloped ends, tothing and racking back.
3. Sleeper walls; simple cavity walls; small isolated and attached piers.
4. Standard footings; offsets for wall plates, air bricks or grates, and damp-proof course.
5. Small openings with square and recessed jambs.
6. Setting out and constructing ringed segmental and semicircular arches.
7. Single fireplace opening with foundations and chimney breast.
8. Ordinary corbelling and oversailing courses.
9. Preparation of mortars for various purposes.

WORKSHOP PRACTICE II:

1. Further examples of bonding. Types of bond in general use.
2. Acute and obtuse angle quoins and junctions. Use of purpose-made bricks.
3. Back-to-back fireplaces, chimneys and breasts.
4. Axed segmental and semicircular arches; bull's-eye window openings.
5. Damp prevention. Construction of cavity walls, parapets, copings and the creasing.
6. Selected facings plain walls; jointing and pointing.
7. Flush, recessed and projecting panels.

WORKSHOP PRACTICE III:

1. Bonding of buttress weatherings and of walls curved on plan.
2. Preparation and setting of gauged and rubbed brickwork.
3. Further examples of axed work in cambered, pointed and approximate elliptical arches.
4. Moulded brick cornices, plinths and string courses.
5. Brickwork for special purposes in glazed, engineering and fire brick.
6. Fixing gullies, laying drains and building manholes, including branches and benching.
7. Demonstrations of the erection of tubular and other scaffolding for building and repairs.

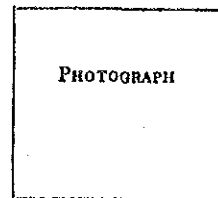
WORKSHOP PRACTICE IV:

1. Advanced work on constructional details outlined in the work of previous years.
2. Mullioned, transomed and tracery windows.
3. Special corbelling; splay to square and round to square.
4. Raking mouldings; pediments; circle on circle work of a simple character; niches.
5. Circular and egg-shaped sewers. Small skew arches.
6. Decorative brickwork; panels, piers and chimney stacks.
7. Demonstrations of the setting out of angles and curves and the more intricate features in the general lay-out of a building. Applications involving the use of the dumpy level.



REGISTRATION No.

THE REPUBLIC OF UGANDA
 MINISTRY OF LABOUR
 DIRECTORATE OF INDUSTRIAL TRAINING



APPLICATION FOR TRAINING

This form when completed must be forwarded, together with two unglazed passport-sized photographs to:

PRINCIPAL, VOCATIONAL
 TRAINING INSTITUTE (NARAWA),
 P.O. Box 20121, KAMPALA.

*PART A.

(To be completed by Candidate)

1. Name:
 (Surname) (First Name)
2. Nationality 3. Village
4. Sub-County 5. County 6. District
7. Present Postal Address
8. Trade in which Training is required
9. (a) Have you been tested by a Uganda Trade Testing Officer before? Yes/No.
 (b) If so, what was the last test?
10. Present Employer
- Postal Address
11. Education (circle the appropriate numbers):
 (a) Primary 1 2 3 4 5 6 7.
 Name of School
- Certificate awarded
- (b) Secondary: 1 2 3 4 5 6
 Name of School
- Certificate awarded
- (c) Technical School :
 1 year, 2 years, 3 years and 4 years.
 Name of School
- Certificate awarded

†PART B

(To be completed by the Employer)

I, _____
of _____
Recommend/do not recommend that _____
an employee of this company, he given the Training indicated in this application. He/She has been employed
by me/us as a _____
for a period of _____

2. The following is the type of work on which he/she has been engaged and which has/has not been
carried out satisfactorily (should be filled in as fully as possible—if necessary continued on a further sheet. If an
employer is unable to recommend an applicant, the reasons should be clearly stated).

3. Special areas in which Training should be emphasized: _____

I/We confirm that I/we shall be liable for payment of fees, etc.

Signature _____

Position Held _____

Date _____

PART I

THIS CONTRACT OF APPRENTICESHIP

Made the day of 19
Between
of (address)
carrying on business as
hereinafter called the employer (which expression shall include his executi-
ons or assigns or any other person or persons approved by his Minister who
from time to time carry on the said business either in partnership or with
or in place him/her) and
.....
of (address)
aged (or apparent age) hereinafter called the apprentice.

WITNESS AS FOLLOWS:-

I. That the apprentice, in consideration of the agreements hereinafter
contained and on the part of the employer to be performed, and having
produced satisfactory certificates of attendance and proficiency from an
approval technical training institution covering a period of years
which is to be taken to be equivalent to years of apprentice-
ship, does of his/her own will agree,

(a) to bind himself/herself as an apprentice to the said employer in the
trade of for years commencing on the
..... day of 19

(b) to obey all lawful and reasonable demands and requirements of the
employer or those whom places the employer places in authority over him/
her; not to misconduct himself/herself nor absent himself/herself from
work without his/her employer's permission except in the event of sickness
certified by a registered medical practitioner;

(c) to render faithful, honest and diligent service to his/her employer
and generally to comply with the provisions of this agreement;

(d) where practicable, regularly to attend classes for technical
instruction and workshop practice and diligently to study the subject that
are applicable to his/her trade;

(e) to submit to trade tests and other proficiency tests as provided
under the Industrial Training (Apprenticeship) Regulations at such periods
and places as may be ordered;

(f) to show due regard for the equipment and goods of the employer and
avoid damage to and waste of such equipment and goods;

...../2

(g) to notify the Superintendent of Apprenticeship immediately of any difficulty that occurs to interfere with the carrying out of the terms of his/her contract;

(h) not to disclose or divulge any of the the employer's secrets.

2. That the employer, in consideration of the agreements hereinafter contained and on the part of the apprentice to be performed, agree;

(a) during the term of the apprenticeship to the best of his/her skill and ability, to teach or cause the apprentice to be taught and instructed in the trade specified;

(b) to arrange for the apprentice to attend such classes in trade training and related subjects as may be prescribed by the Superintendent of Apprenticeship;

(c) to provide all necessary fees and time for the apprentice to attend the aforesaid classes and trade tests;

(d) to pay the said apprentice wages at not less than rates specified in schedule 2;

(e) to provide said apprentice with personal tools for the carrying out his/her work as may be prescribed by the Superintendent of Apprenticeship and to recover the cost of such personal tools from the apprentice by appropriate monthly instalments spread over the period of apprenticeship;

(f) to co-operate with the Superintendent of Apprenticeship in the transfer of the said apprentices; to notify and obtain the approval of the Superintendent before making any change in the contract of apprenticeship; and to notify the Superintendent immediately when, for any justification reason, the said apprentice has been suspended in accordance with section 16 of the Industrial Training Decree;

(g) to notify the Superintendent of Apprenticeship immediately of any difficulty that occurs to interfere with the carrying out the terms of the contract.

3. General conditions applicable to the contract:-

(a) This contract shall be read together with the provisions of the Industrial Training Decree and the Industrial Training (Apprenticeship) Regulations.

(b) The general conditions of employment relating to the hours of work, overtime and care of employees under the Uganda Employment Act and the Employment Rules shall apply to this contract.

.... / 3

4. IN WITNESS WHEREOF the contracting parties have hereunder set their hand this day of 19

AS WITNESS:

Name
Employer

Occupation

Name

Occupation

Apprentice

APPROVED

Reg. No.

Date SUPERINTENDENT OF APPRENTICESHIP

PART 2

The service of the apprentice and the responsibilities of the employer are hereby transferred to with effect from the date of registration thereof. IN WITNESS WHEREOF the contracting parties hereby affix their signatures on this day of 19

AS WITNESS:

Name
Employer

Occupation

Name

Occupation ;;;;;;;;;;;;;;

Now employer

Apprentice

I HEREBY CERTIFY that all parties to this contract appear fully to understand the meaning of the contract and I approve.

THE INDUSTRIAL TRAINING (APPRENTICESHIP)
REGULATIONS, 1973.

Handwritten:
S. M. M.
S. M. M. (17)
July, 1978

ARRANGEMENT OF SECTIONS.

Regulations.

1. Qualifications of apprenticeship.
2. Contract of apprenticeship.
3. Execution of apprenticeship contract.
4. Procedure for the suspension of contracts.
5. Temporary transfer.
6. Termination of contract.
7. An apprentice to sit for Uganda Craftsman Trade Test after termination of contract.
8. Rates of wages.
9. Period of apprenticeship.
10. Craft training courses.
11. In-plant training.
12. Personal tools.
13. Supervision, control and inspection of apprentices.
14. Appointment of Advisory Training Committees.
15. Functions of Advisory Training Committees.
16. Trade testing.
17. Persons eligible for taking Uganda Craftsman Trade Test.
18. Master Craftsman Certificate.
19. Trade Test.
20. Fees for Craftsman Test.
21. Application for Trade Test.
22. Citation.

Schedules.

STATUTORY INSTRUMENTS.

1973 No. 32.

The Industrial Training (Apprenticeship) Regulations, 1973.

Decree 2
of 1972.

IN EXERCISE of the powers conferred upon the Minister by section 21 of the Industrial Training Decree, 1972, these Regulations are hereby made this 20th day of March, 1973.

Qualifica-
tions of
apprentice-
ship
contract.

1. Any person in order to bind himself as an apprentice shall have acquired a minimum educational standard of senior secondary two or its equivalent for any designated trade.

Contract
of Appren-
ticeship.

2. (1) Every apprentice shall enter into a probationary contract with the employer of apprenticeship on Form I specified in Schedule 1 to these Regulations which shall be executed by the employer and the apprentice and shall be registered by the Superintendent of Apprenticeship.

(2) After the successful completion of the three months' probationary period, a firm contract of apprenticeship shall, within a period of twenty-one days, be entered into by the apprentice and his employer on Part 1 of Form II specified in Schedule 1 to these Regulations.

(3) When a contract of apprenticeship is transferred from one employer to another under section 12 of the Decree, the transfer shall be evidenced by Part 2 of Form II specified in Schedule 1 to these Regulations signed by the apprentice, the employer and the Superintendent of Apprenticeship.

Execution
of appren-
ticeship
contract.

3. (1) After a contract of apprenticeship has been registered by the Superintendent of Apprenticeship three copies of the contract shall be signed and shall be distributed as follows,

- (a) one copy to the employer;
- (b) one copy to the apprentice; and
- (c) one copy to the Superintendent of Apprenticeship.

(2) Any Contract of Apprenticeship following a probationary period shall be dated to include any period of probation and the time spent by the apprentice in attending the pre-apprenticeship course for the trade.

4. (1) Where an employer of an apprentice suspends an apprentice under section 16 of the Decree, he shall send a report to the Superintendent of Apprenticeship or an inspector within forty-eight hours from the time of the suspension.

Proceed
for the
suspension
of
contracts

(2) The Superintendent of Apprenticeship shall, as soon as is practicable, inquire into the matter and, after hearing the apprentice, the employer and any other person who may be able to assist him in his inquiries, either authorise the employer to dismiss the apprentice, in which case the contract shall be terminated, or require the employer to re-instate the apprentice.

(3) When an employer suspends an apprentice, he shall be entitled, pending the decision of the Superintendent of Apprenticeship, to withhold the wages of the apprentice during the period of his suspension and if the Superintendent of Apprenticeship decides that,

(a) the apprentice shall be dismissed then the wages withheld shall not be paid; or

(b) the employer shall re-instate the apprentice then the wages shall be paid to the apprentice.

5. (1) If the Superintendent of Apprenticeship is satisfied that an employer is unable to provide an aspect of training to his apprentice, he may, with the approval of the Advisory Training Committee, transfer the apprentice for such period as he may specify to another employer in order for the apprentice to undergo that aspect of training after which he shall return to his original employer.

Temporary
transfer.

(2) Where a transfer is made under sub-regulation (1) of this regulation, the original contractual employer shall be responsible for paying the wages and other benefits to the apprentice during the period of the transfer.

6. (1) A contract of apprenticeship shall be completed and terminated when,

Termination
of Contract.

(a) the Superintendent of Apprenticeship is satisfied with the record of the performance of the apprentice as submitted to him by the employer;

(b) the termination section of the contract has been signed by the employer and the apprentice; and

(c) the signed contract has been entered in the register and the original file by the Superintendent of Apprenticeship.

(2) The original copy of the signed contract shall be given to the apprentice together with a qualifying certificate if any and the copy shall be retained by the employer.

An apprentice to sit for Uganda Craftsman Trade Test after termination of contract.

7. Every apprentice whose contract has been completed under sub-regulation (1) of regulation 6 of these Regulations shall take the Uganda Craftsman Trade Test.

Rates of wages.

8. (1) The minimum wages per day of apprentices in the years specified in column 1 of Schedule 2 to these Regulations shall be the amount specified in column 2 of the said Schedule.

Cap. 192.

(2) The conditions and hours of work and payment for overtime as provided for under the Uganda Employment Act and the Employment Rules shall be applicable to apprentices.

Period of Apprenticeship.

9. (1) The period of apprenticeship for each trade shall be determined by the Industrial Training Council after consultation with the relevant Advisory Training Committee.

(2) The period of apprenticeship may be extended by the Superintendent of Apprenticeship for unsatisfactory performance by the apprentice.

Craft training courses.

10. During the period of apprenticeship the apprentice shall be required to undergo craft training courses comprising of both practical and theoretical instructions as may be prescribed by the Superintendent of Apprenticeship in consultation with the relevant Advisory Training Committee.

In-plant training.

11. (1) The employer shall ensure that the in-plant training provided for the apprentice shall comprise of both skills and operations pertaining to that trade in accordance with the in-plant training programme prescribed by the Superintendent of Apprenticeship in consultation with the relevant Advisory Training Committee.

(2) Every apprentice shall be issued with a log book in the form prescribed for recording the in-plant training undertaken throughout the period of his apprenticeship and the employer shall ensure that the log book is kept up-to-date by the apprentice and is made available for inspection as may be required.

Personal tools.

12. The employer shall provide the apprentice with personal tools for the purposes of carrying out his work as may be prescribed by the relevant Advisory Training Committee. The cost of such personal tools shall be recovered from the apprentice by appropriate monthly instalments.

13. (1) The proper and efficient supervision, direction and control of an apprentice and his training shall be ensured by the employer and for this purpose the employer shall appoint from among his employees a suitable person to be responsible for supervising generally the training of apprentices.

Supervision,
control and
inspection
of
apprentices.

(2) Every apprentice and his employer shall be subject to an inspection at least once every year by an inspector appointed under section 20 of the Decree in order to ensure that the prescribed training and the terms and conditions of the contract are complied with.

(3) The inspector shall submit a report on a form prescribed by the Superintendent of Apprenticeship on each apprentice inspected by him.

(4) Every employer shall submit an annual report on the progress and conduct of each apprentice on a form prescribed by the Superintendent of Apprenticeship.

(5) A progress report on the performance of an apprentice shall be prepared and submitted to the employer and to the Superintendent of Apprenticeship on completion of each craft training course at a vocational training centre or other training institutions approved by the Industrial Training Council.

14. At the coming into force of these Regulations the Council shall appoint Advisory Training Committees as provided for under section 4 of the Decree.

Appointment
of Advisory
Training
Committees.

15. The functions of each Advisory Training Committee shall be,

Functions
of Advisory
Training
Committees.

- (a) to assist and advise on the development of the trade regulations for their trade and the administration thereof;
- (b) to assist in the establishment and revision from time to time of,
 - (i) trade tests and examinations;
 - (ii) certification standards;
 - (iii) training objectives and duration of courses;
 - (iv) apprenticeship training programmes;
 - (v) pre-requisites for eligibility for training courses;
 - (vi) credits to be allowed for previous trade experience and training courses completed; and

- (c) to make such recommendations to the Industrial Training Council in respect of trade training needs and changing methods as may be deemed necessary for the proper operation of training schemes or programmes.

Trade testing.

16. (1) For each designated trade, there shall be a trade test in order to establish the knowledge, skill and standard achieved by the craftsman.

(2) Every craftsman who has undertaken a course of at least two years of apprenticeship or technical course approved by the Industrial Training Council and has successfully completed the requirements of the trade test in his trade shall be issued with the Uganda Intermediate craftsman certificate.

(3) Every apprentice upon completion of his contract of apprenticeship shall take the Uganda Craftsman Trade Test for his trade, and if successful, he shall be issued with the Uganda Craftsman Certificate.

(4) Any person who has taken the Uganda Craftsman Trade Test and has not been successful at his first attempt may apply to take it for a second time and he shall be permitted to take the test if he can prove that he has acquired the necessary additional experience and skills to enable him to pass the test and that he has had at least one year's experience in an industry after the first sitting for the test.

Persons eligible for taking Uganda Craftsman Trade Test.

17. Any person who,

- (a) has completed the terms and conditions of his contract of apprenticeship; or
- (b) holds a former Grade II Trade Test Certificate or the Uganda Intermediate Craftsman Certificate in a designated trade for at least one year after gaining the certificate,

shall be eligible to apply for the Uganda Craftsman Trade Test for that trade.

Master Craftsman Certificate.

18. Any person who,

- (a) has held a Uganda Craftsman Certificate or the former Grade I Trade Test Certificate for at least two years;
- (b) has continuously worked in an industry in his trade since obtaining the Uganda Craftsman Certificate or the former Grade I Trade Test Certificate; and
- (c) has sufficient proof that he has completed the prescribed training in his trade after gaining the

Uganda Craftsman Certificate or the former
Grade I Trade Test Certificate,
may apply for taking the Uganda Master Craftsman Test.

19. (1) A Uganda Craftsman Test shall consist of a written examination and a practical test. Trade Test.

(2) In cases where an applicant passes one part and fails the other part, he shall only be required to take the part he has failed after conditions prescribed for his eligibility have been complied with.

20. The fees to be charged for a trade test shall be twenty-five shillings for the Intermediate Craftsman Test, forty shillings for a Uganda Craftsman Test and sixty shillings for a Uganda Master Craftsman Test. Fees for Craftsman Test.

21. (1) An application for taking a Trade Test shall be made on Form III specified in Schedule 1 to these Regulations which can be obtained from the Superintendent of Trade Testing or a district Labour Officer. Application for Trade Test.

(2) Part A of the application shall be filled by the applicant and Part B by the employer and where the applicant is unemployed, it shall be filled by an officer in the Ministry of Labour, Employment Section, with whom the applicant is registered.

(3) After completing the form it shall, together with two passport sized photographs of the applicant, be forwarded to the Superintendent of Trade Testing or the nearest Labour Officer.

(4) Upon receipt of the application, the Superintendent of Trade Testing shall inform the applicant an acknowledgment or receipt of the application.

(5) If the application is approved, the Superintendent of Trade Testing shall inform the applicant, by writing, the acceptance of his application and the date set for the test.

(6) Any accepted candidate who is unable to report for the test on the date assigned shall inform the Superintendent of Trade Testing, at least two weeks before such test date, and a later date shall then be assigned to him.

22. These Regulations may be cited as the Industrial Training (Apprenticeship) Regulations, 1973. Citation.

L. KATAGYIRA,
*Minister (holding the portfolio of
the Minister of Labour).*

SCHEDULES.

SCHEDULE 1.

FORMS

CONTRACT No.....

FORM I

THE REPUBLIC OF UGANDA

THE INDUSTRIAL TRAINING (APPRENTICESHIP)
REGULATIONS, 1972.

PROBATIONARY CONTRACT OF APPRENTICESHIP

THIS PROBATIONARY CONTRACT OF APPRENTICESHIP made the
..... day of, 19.....
between
of (address)
carrying on business as
hereinafter called the employer (which expression shall include his
executors or assigns or any other person or persons approved by the
Minister who may from time to time carry on the said business either
in partnership with or in place of him) and
of (address)
aged (or apparent age) hereinafter called the
apprentice.

WITNESSETH as follows,

1. That the employer does by these presents agree,
 - (a) to receive and train the apprentice on probation in the trade
of
 - (b) to pay the apprentice not less than the minimum rate of pay
as prescribed in Schedule 2.
2. That the apprentice does of his own free will agree,
 - (a) to obey all lawful and reasonable demands and requirements
of the employer or those whom the employer places in
authority over him;
 - (b) not to misconduct himself nor absent himself from work
without his employer's permission except in the event of
sickness certified by a registered medical practitioner.

3. That the employer and the apprentice each for himself does further agree,

- (a) that the life of this probationary contract shall not exceed three months from the date hereof, and during this period all obligations herein contained may be terminated by either party by giving proper notice;
- (b) that any notice of intention to terminate the probationary contract and the reason or reasons thereof shall be communicated to the Superintendent of Apprenticeship within fourteen days of the date of such termination.

(Signed)
Employer.

(Signed)
Apprentice.

FORM II

THE REPUBLIC OF UGANDA
THE INDUSTRIAL TRAINING (APPRENTICESHIP)
REGULATIONS, 1972.
CONTRACT OF APPRENTICESHIP.

PART I.

THIS CONTRACT OF APPRENTICESHIP made the day
of, 19.....
between
of (*address*)
carrying on business as
hereinafter called the employer (which expression shall include his
executors or assigns or any other person or persons approved by the
Minister who may from time to time carry on the said business either
in partnership with or in place of him) and
of (*address*)
aged (or apparent age) hereinafter called the
apprentice.

WITNESSETH as follows:—

1. That the apprentice, in consideration of the agreements hereinafter contained and on the part of the employer to be performed, and having produced satisfactory certificates of attendance and proficiency from an approved technical training institution covering a period of years which is to be taken to be equivalent to years of apprenticeship, does of his own free will agree,

- (a) to bind himself as an apprentice to the said employer in the trade of for years commencing on the day of, 19.....;
- (b) to obey all lawful and reasonable demands and requirements of the employer or those whom the employer places in authority over him; not to misconduct himself nor absent himself from work without his employer's permission except in the event of sickness certified by a registered medical practitioner;
- (c) to render faithful, honest and diligent service to his employer and generally to comply with the provisions of this agreement;
- (d) where practicable regularly to attend classes for technical instruction and workshop practice and diligently to study the subjects that are applicable to his trade;
- (e) to submit to trade tests and other proficiency tests as provided under the Industrial Training (Apprenticeship) Regulations at such periods and places as may be ordered;
- (f) to show due regard for the equipment and goods of the employer and avoid damage to and waste of such equipment and goods;
- (g) to notify the Superintendent of Apprenticeship immediately of any difficulty that occurs to interfere with the carrying out of the terms of his contract;
- (h) not to disclose or divulge any of the employer's secrets.

2. That the employer, in consideration of the agreements herein contained and on the part of the apprentice to be performed, agrees,

- (a) during the term of the apprenticeship to the best of his skill and ability to teach or cause the apprentice to be taught and instructed in the trade specified;

- (b) to arrange for the apprentice to attend such classes in trade training and related subjects as may be prescribed by the Superintendent of Apprenticeship;
- (c) to provide all necessary fees and time for the apprentice to attend the aforesaid classes and tests;
- (d) to pay the said apprentice wages at not less than the rates specified in Schedule 2;
- (e) to provide the said apprentice with personal tools for the purposes of carrying out his work as may be prescribed by the Superintendent of Apprenticeship and to recover the cost of such personal tools from the apprentice by appropriate monthly instalments spread over the period of apprenticeship;
- (f) to co-operate with the Superintendent of Apprenticeship in the transfer of the said apprentice; to notify and obtain the approval of the Superintendent before making any change in the contract of apprenticeship; and to notify the Superintendent immediately when, for any justifiable reason, the said apprentice has been suspended in accordance with section 16 of the Industrial Training Decree;
- (g) to notify the Superintendent of Apprenticeship immediately of any difficulty that occurs to interfere with the carrying out of the terms of the contract.

3. General conditions applicable to the contract:

- (a) This contract shall be read together with the provisions of the Industrial Training Decree and the Industrial Training (Apprenticeship) Regulations.
- (b) The general conditions of employment relating to the hours of work, overtime and care of employees under the Uganda Employment Act and the Employment Rules shall apply to this contract.

4. IN WITNESS whereof the contracting parties have hereunder set their hand this day of 19.....

AS WITNESSES:

Name	}
Occupation		<i>Employer.</i>
Name	}
Occupation		<i>Apprentice.</i>

APPROVED

Reg. No.
10

Superintendent of Apprenticeship.

Dated

PART 2.

The service of the apprentice and the responsibilities of the employer are hereby transferred to
.....with effect from the date of registration thereof. In witness whereof the contracting parties hereby affix their signatures on this day of, 19.....

AS WITNESSES:

Name }
Occupation } *Employer.*

Name }
Occupation } *New Employer.*

Name }
Occupation } *Apprentice.*

I HEREBY CERTIFY that all parties to this contract appear fully to understand the meaning of the contract and I approve.

.....
Superintendent of Apprenticeship.

- (d) Technical School,
 1 year, 2 years, 3 years and 4 years.
 Name of School
 Certificate awarded
- (e) Technical College,
 1 year and 2 years.
 Name of School
 Certificate awarded
- (f) Other
 Certificate awarded

11. (a) Industrial Experience in this Trade:

Name and Address of Employer	<i>From</i>		<i>To</i>		<i>Period</i>	
	Month and Year	Month and Year	Month and Year	Month and Year	Years	Months
.....						
.....						
.....						
.....						
.....						
.....						
.....						
.....						
TOTAL PERIOD						

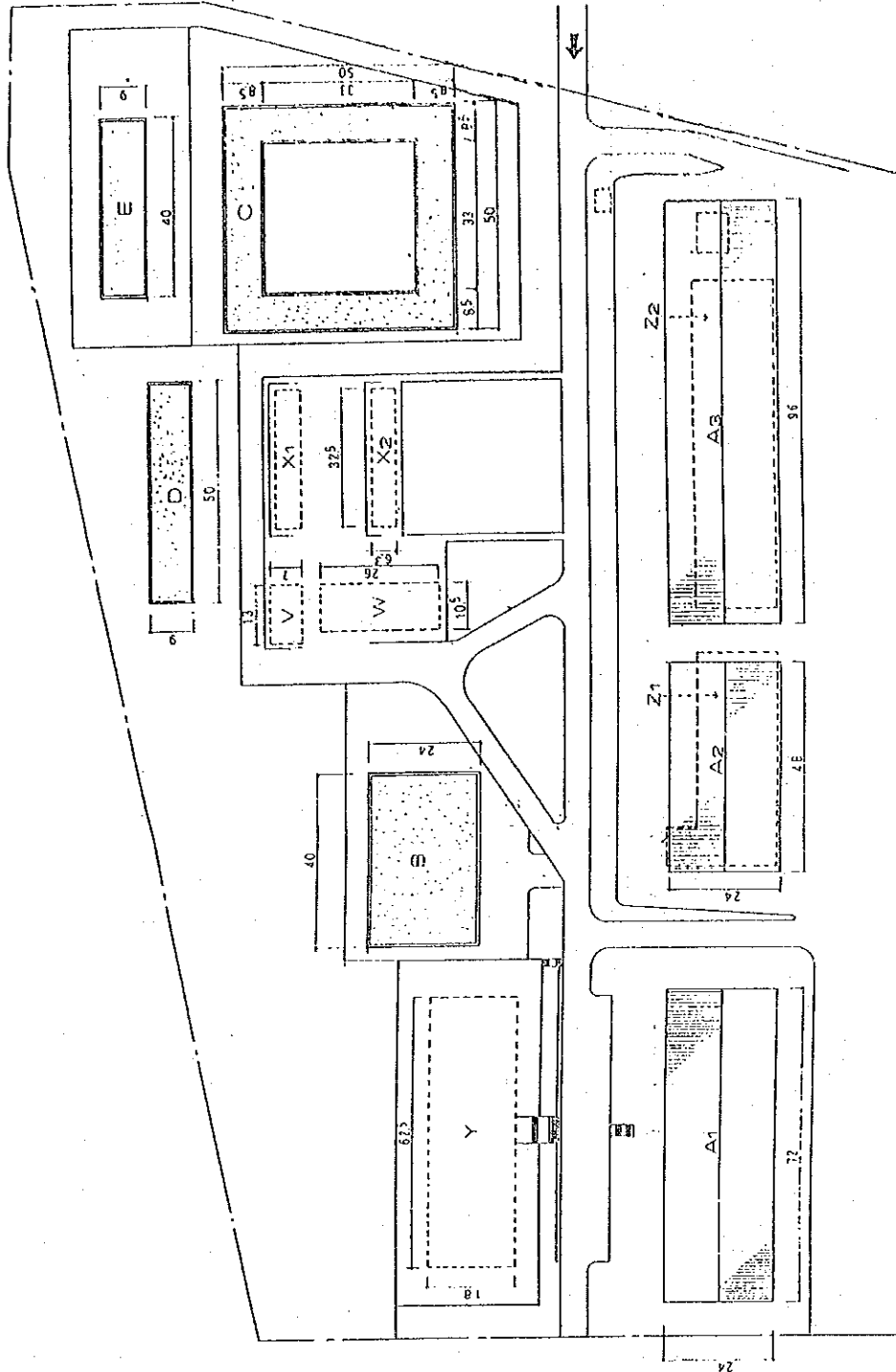
Continue on separate sheet if necessary. A candidate may be required to produce supporting evidence before commencing his trade test.

- (b) If completing apprenticeship,
 Registration Number
 Date commenced
 Employer (if not as stated in 9 above)
 Completion date

I CERTIFY that to the best of my knowledge and belief the above-mentioned particulars are correct.

.....
Applicant's Signature.

Date



- : EXISTING BLD.
- : NEW BLD.
- : NEW WORK SHOP

- A.1 : NEW WORK SHOP
- A.2 : DITTO
- A.3 : DITTO
- B : NEW ADMINISTRATION BLD. (2STORIES)
- C : NEW HOSTEL FOR 150 PERSONS (3STORIES)
- D : NEW STAFF HOUSE
- E : NEW EXPERTS HOUSE

- V : EXISTING LAUNDRY HOUSE
- W : EXISTING CANTINE
- X : EXISTING HOSTEL 2BLD × 2STORIES (FOR 80P)
- Y : EXISTING ADM. BLD. CHANGE TO CLASS ROOM
- Z.1 : EXISTING WORK SHOP
- Z.2 : DITTO

PROPOSE PLAN FOR NAKAWA V. T. I. SCALE: 1/1,000

VOCATIONAL TRAINING INSTITUTE, NAKAWA

Administration	(New)	1900 m ²
"	(Rehabilitation)	1200 m ²
Workshop	(New)	5300 m ²
Dormitory	(New)	4000 m ²
"	(Rehabilitation)	800 m ²
Staff housing		500 m ²
Canteen e.t.c		400 m ²
	TOTAL	14100 m ²

VOCATIONAL TRAINING INSTITUTE, NAKAMAUP-TO-DATE STAFF LIST

<u>ADMINISTRATIVE:</u>			
<u>DETAILS OF POSTS</u>	<u>APPROVED POSTS</u>	<u>POSTS FILLED</u>	<u>NAME</u>
Principal	1	1	Mr. G.K. Kūlinamanyiro
Deputy Principal	1	1	Mr. A. Tuzinde
R.E.C./Bursar	1	1	Mr. Turyagyenda F.
Office/Supervisor/Supt.	1	1	Mr. Balyejusa H.
Personal Secretary	1	-	- Vacant
A/cs Assistant (Book-keeper)	1	1	Mr. Yeheyo G.K.
Catering Officer	1	-	- vacant
Warden	-	-	- vacant
Assistant Warden	1	1	Ms Nabwire J.
Supplies Officer	1	-	- vacant
Asst. Supplies Officer	1	1	Mr. Mutumba
Nursing Officer	1	-	- vacant
Clerical Officer	1	1	Mr. Mugawa S.
Tyrists	3	3	1) Miss Busingye V 2) M/s Izimba L 3) Ms Luyiga S.
Cleaners	3	3	1) Namusoke A 2) Namasaba K 3) Sebabi
Driver	2	1	Cuma J.

UP-TO-DATE STAFF LIST (TECHNICAL) EXISTING SECTIONS

<u>Mechanical SECTION:</u>			
<u>EMPLOYED POSTS</u>	<u>APPROVED POSTS</u>	<u>POSTS FILLED</u>	<u>NAME</u>
Senior Instructor	1	-	- vacant
Instructor	2	1	Mr. Mukasa-Kiyaya
Assistant Instructors	4	2	(1) -Tukei C. (2) Mubiru D.
<u>ELECTRICAL INSTALLATION, FITTING</u>			
Senior Instructor	1	-	- vacant
Instructor	4	3	(1) Mr. Oteka A (2) Mr. Mwesigye G (3) Mr. Sempala C.
Assistant Instructors	4	1	Mr. Rudasingwa J.

TECHNICAL EXISTING SECTIONS:

WELDING & FABRICATION SECTION:

<u>ESTABLISHED POSTS</u>	<u>APPROVED POSTS</u>	<u>POSTS FILLED</u>	<u>NAME</u>	
Senior Instructor	1	-	-	vacant
Instructor	2	2	1) Mr. Kakooko 2) Mr. Mujulizi R.	
Assistant Instructor	2	1	Mr. Waiswa	

MACHINERY FITTING

Senior Instructor	1	-	-	vacant
Instructor	2	2	1) Mr. Masolo J.S. 2) Mr. Katongole	
Assistant Instructor	2	1	Mr. Ahangana B.	

AUDIO VISUAL AID SECTION:

Senior Instructor	1	-	-	vacant
Instructor	2	1	Kirya J.P.N.	
Assistant Instructor	2	-	-	vacant

SHEET METAL SECTION:

Instructor	2	1	Muwanga F.	
Assistant Instructor	2	-	-	vacant

NEW SECTIONS

FOUNDRY SECTION:

Instructor	2	1	Mr. Makabi E.	
Assistant Instructor	2	-	-	vacant

ELECTRONICS SECTION:

Senior Instructor	1	-	-	vacant
Instructor	2	-	-	vacant
Assistant Instructor	2	-	-	vacant

BRICK/BLOCK AND CONCRETE PRACTICE SECTION:

Senior Instructor	-	-	-	vacant
Instructor	2	-	-	vacant
Assistant Instructor	2	-	-	vacant

CARPENTRY/JOINERY SECTION:

Senior Instructor	1	-	-	vacant
Instructor	2	-	-	vacant
Assistant Instructor	2	-	-	vacant

New Sections cont:

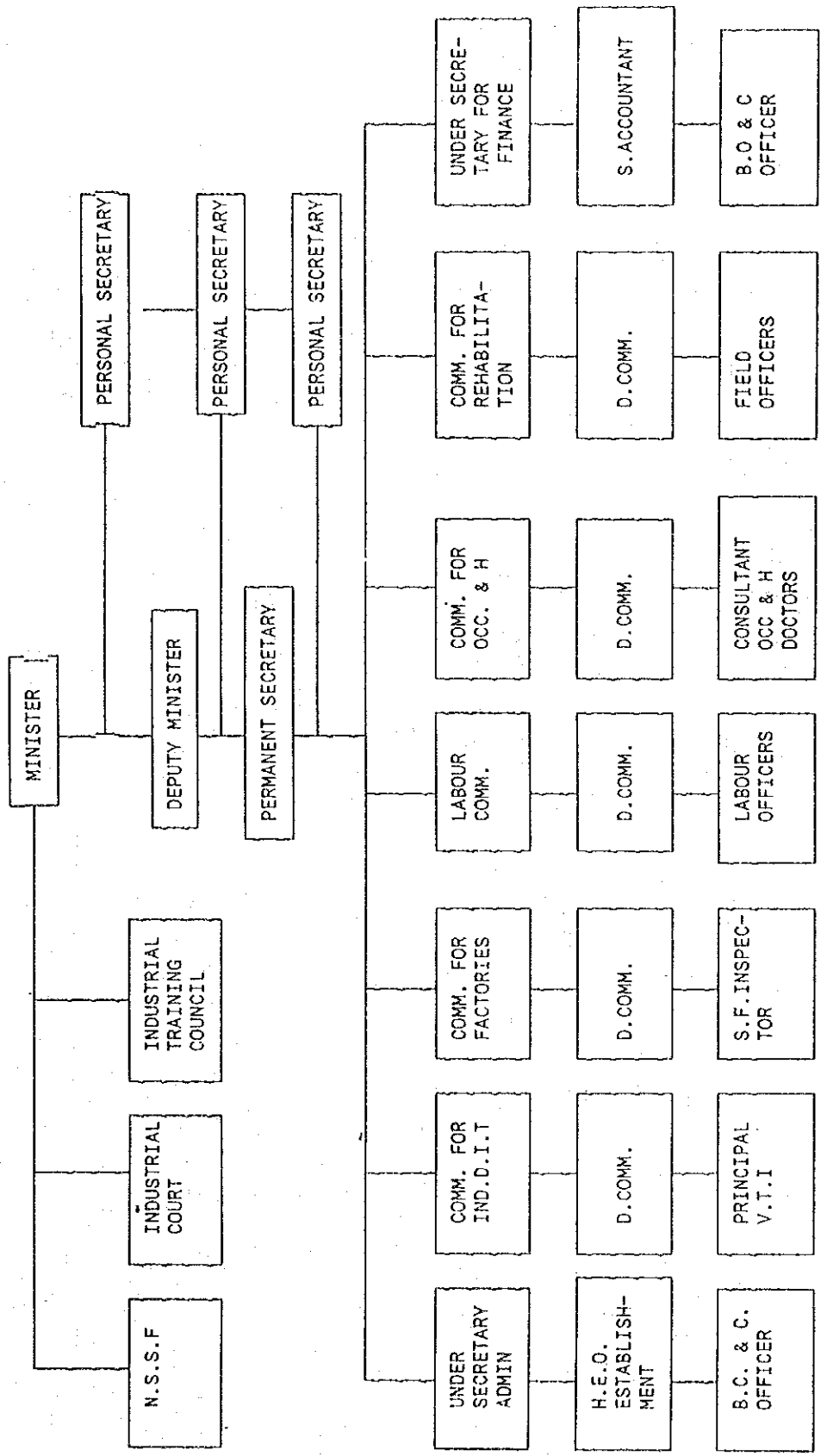
<u>REFRIGERATION:</u>	<u>APPROVED ICSTS</u>	<u>ICSTS FILLED</u>	<u>NAME</u>	
Instructor	2	-	-	vacant
Assistant Instructor	2	-	-	vacant
 <u>TOOL & DIE MAKING</u>				
Instructor	2	-	-	vacant
Assistant Instructor	2	-	-	vacant
 <u>ELECTRONICS:</u>				
Senior Instructor	1	-	-	vacant
Instructor	2	2	-	vacant
Assistant Instructor	2	2	-	vacant.

VOCATIONAL TRAINING INSTITUTE, NAIROBI

RECURRENT ESTIMATE

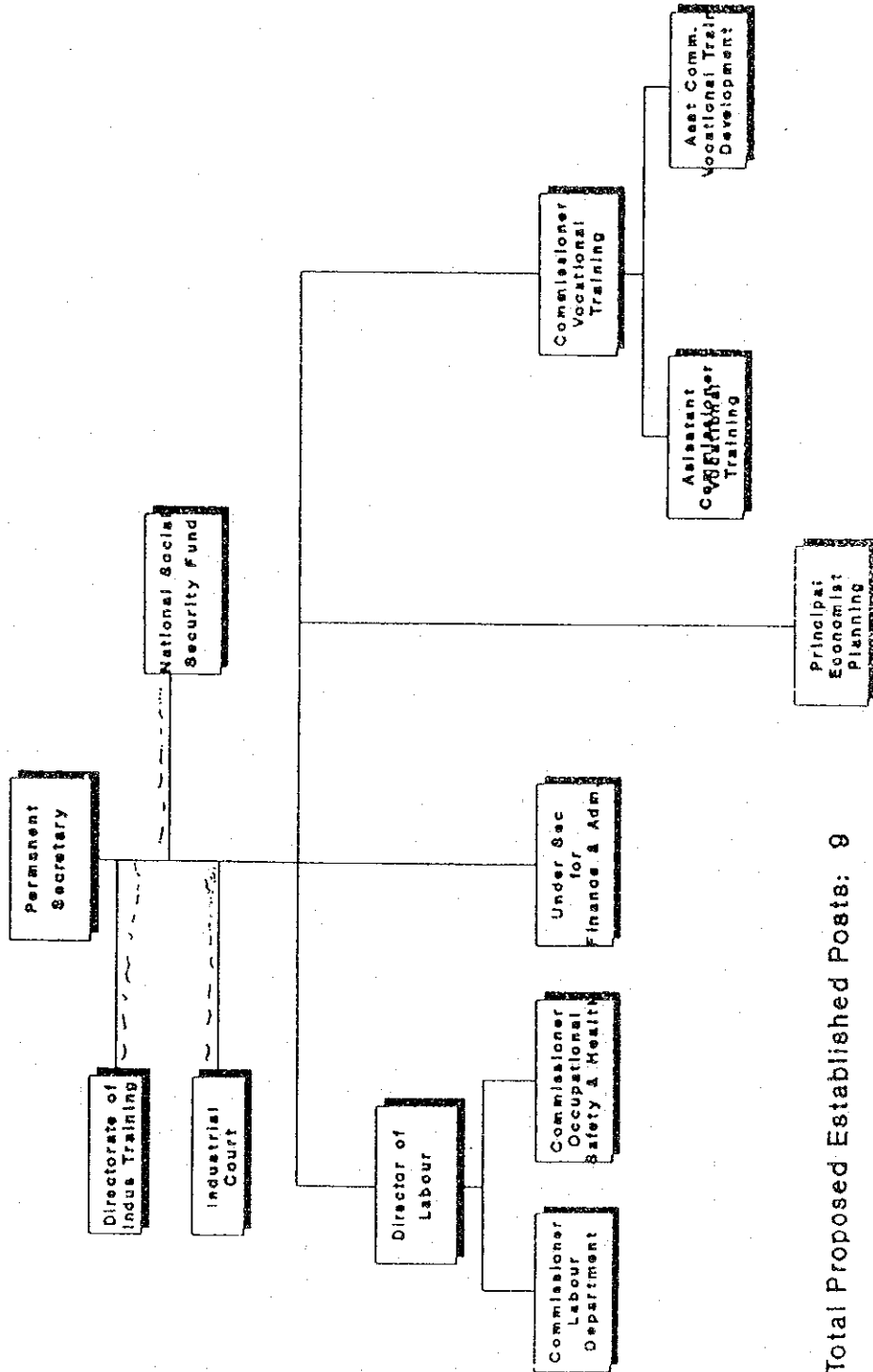
Programme	Item	Expenditure	Details	Estimate 1993/94 USHS,000	Estimates 1994/95 UGSHS,000	Estimate 1995/96 UGSHS,000	Estimate 1996/97 UGSHS,000
07 -01	1						
07 -01	10	1010	staff	90,452	110,935	235,750	571,500
		1020	Group Employess	24,000	44,000	78,000	109,200
		4040	Allowances	17,085	57,650	187,350	375,700
		1060	Travelling & Tran- port Inland	37,957	22,167	72,000	144,000
			Recreation welfare & entertainment	4,825	30,285	51,374	71,924
20		2010	Office expenses	10,996	9,667	17,861	25,005
		2030	Advertising & Public relations	3,250	13,000	14,520	20,328
30		3030	Supplies & Services	67,194	138,850	389,152	796,304
40		4010	Operation & Maintain- ance of vehicle	58,300	55,450	82,560	165,120
50		5010	Utilities	26,550	25,000	64,230	89,922
		5020	Maintenance of Buildings and Equipment	50,300	42,500	72,380	101,332
60		6010	Payment of other Agencies	48,000	34,616	65,362	91,507
70		7011	Other expenditure (unclassified)	2,000	16,480	25,643	35,900
				490,344	600,000	1,406,682	2,527,742

ORGANISATIONAL STRUCTURE OF MINISTRY OF LABOUR & SOCIAL AFFAIRS



PROPOSED ORGANISATION CHART MINISTRY OF LABOUR

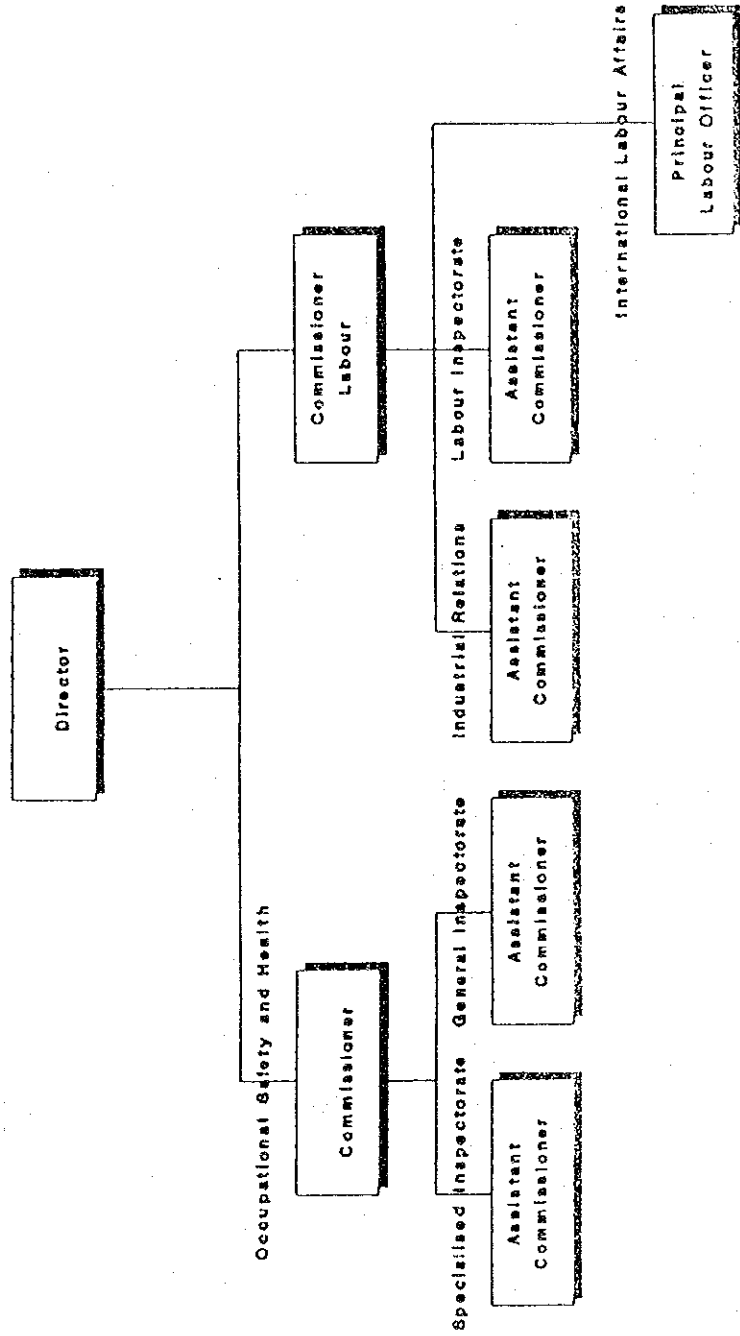
B-1



Total Proposed Established Posts: 9

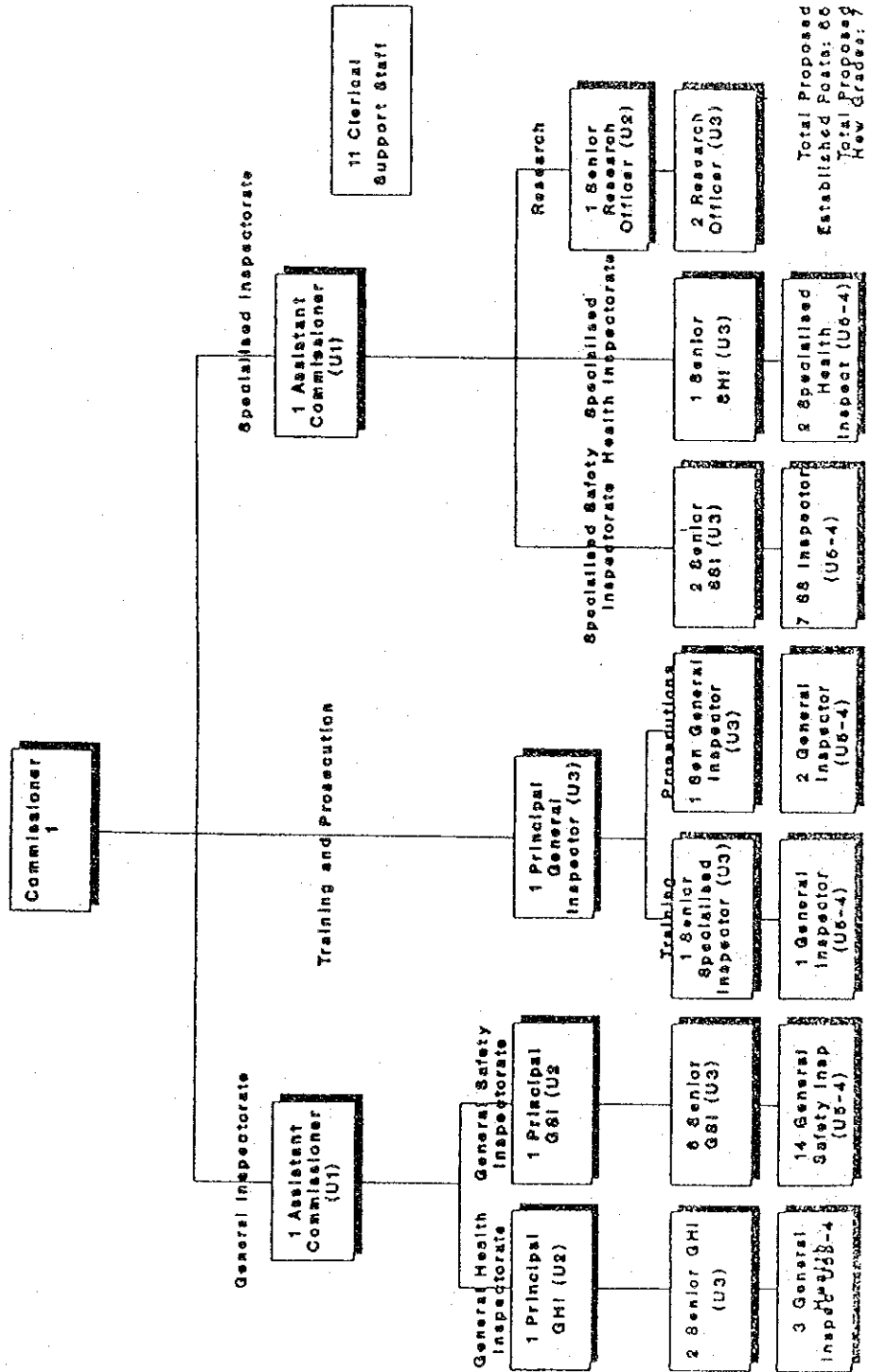
PROPOSED ORGANISATION CHART - DIRECTORATE OF LABOUR

B-2



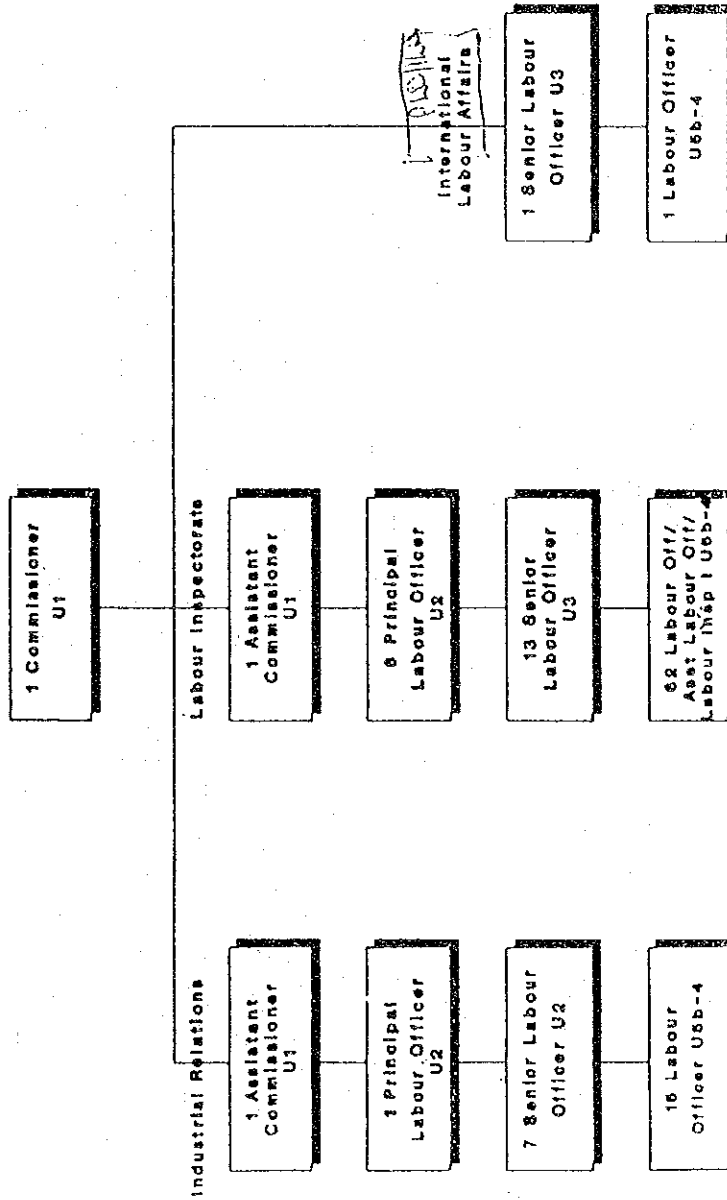
PROPOSED ORGANISATION CHART OCCUPATIONAL SAFETY HEALTH DEPARTMENT

B-3



PROPOSED ORGANISATION STRUCTURE LABOUR DEPARTMENT

B-4



Total Proposed Established Posts: 220

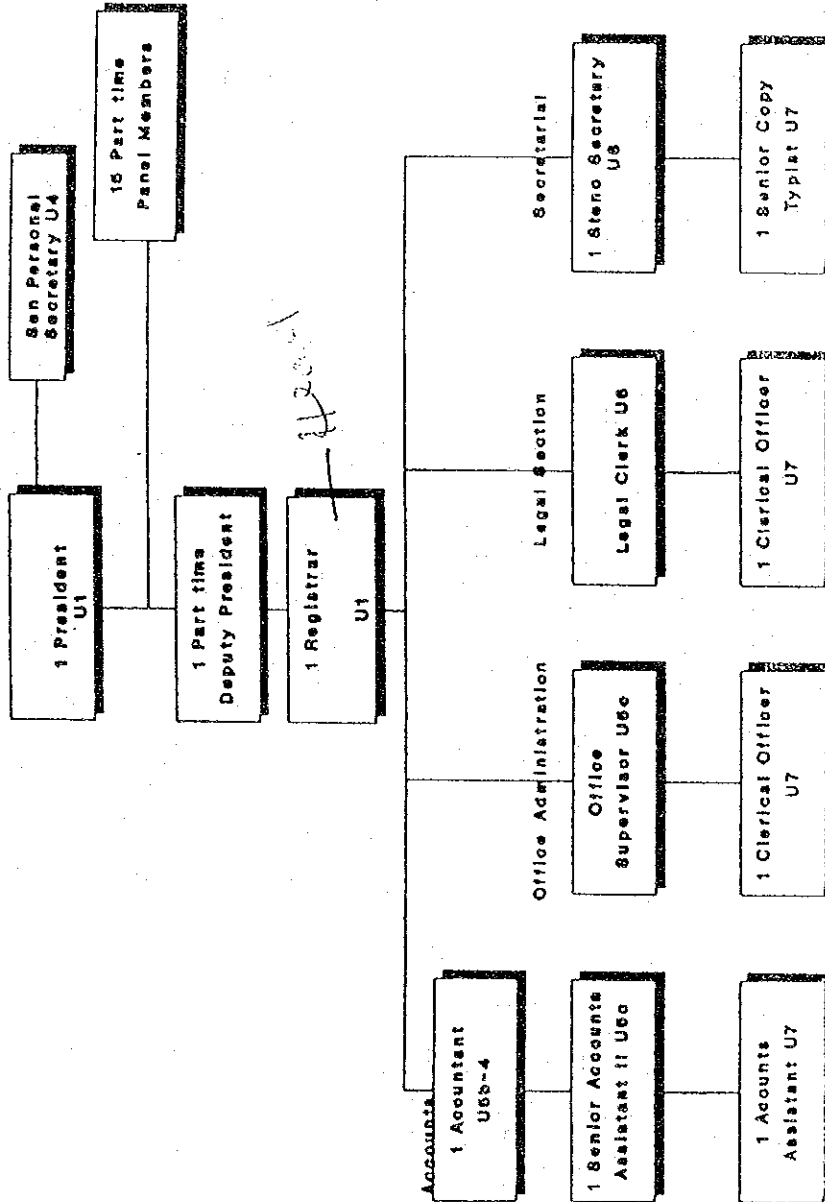
Total Proposed New Grades: 76

76 Group Staff

80 Clerical Support Staff

PROPOSED ORGANISATION CHART - INDUSTRIAL COURT

B-6

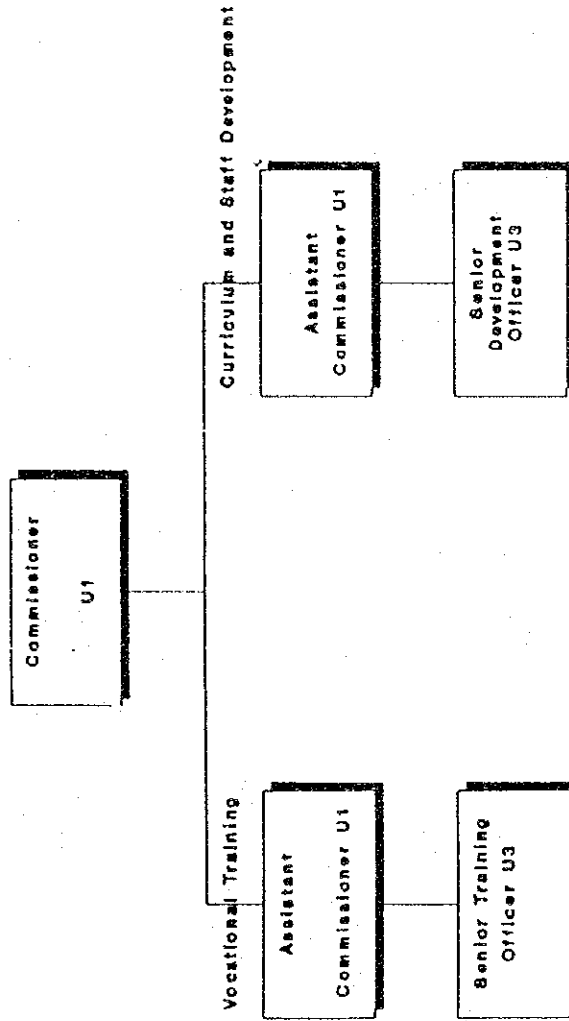


Total Established Posts: 11
Total New Grades: 2

Part Time Members have been excluded from establishment:

**PROPOSED ORGANISATION CHART -
VOCATIONAL TRAINING DEPARTMENT**

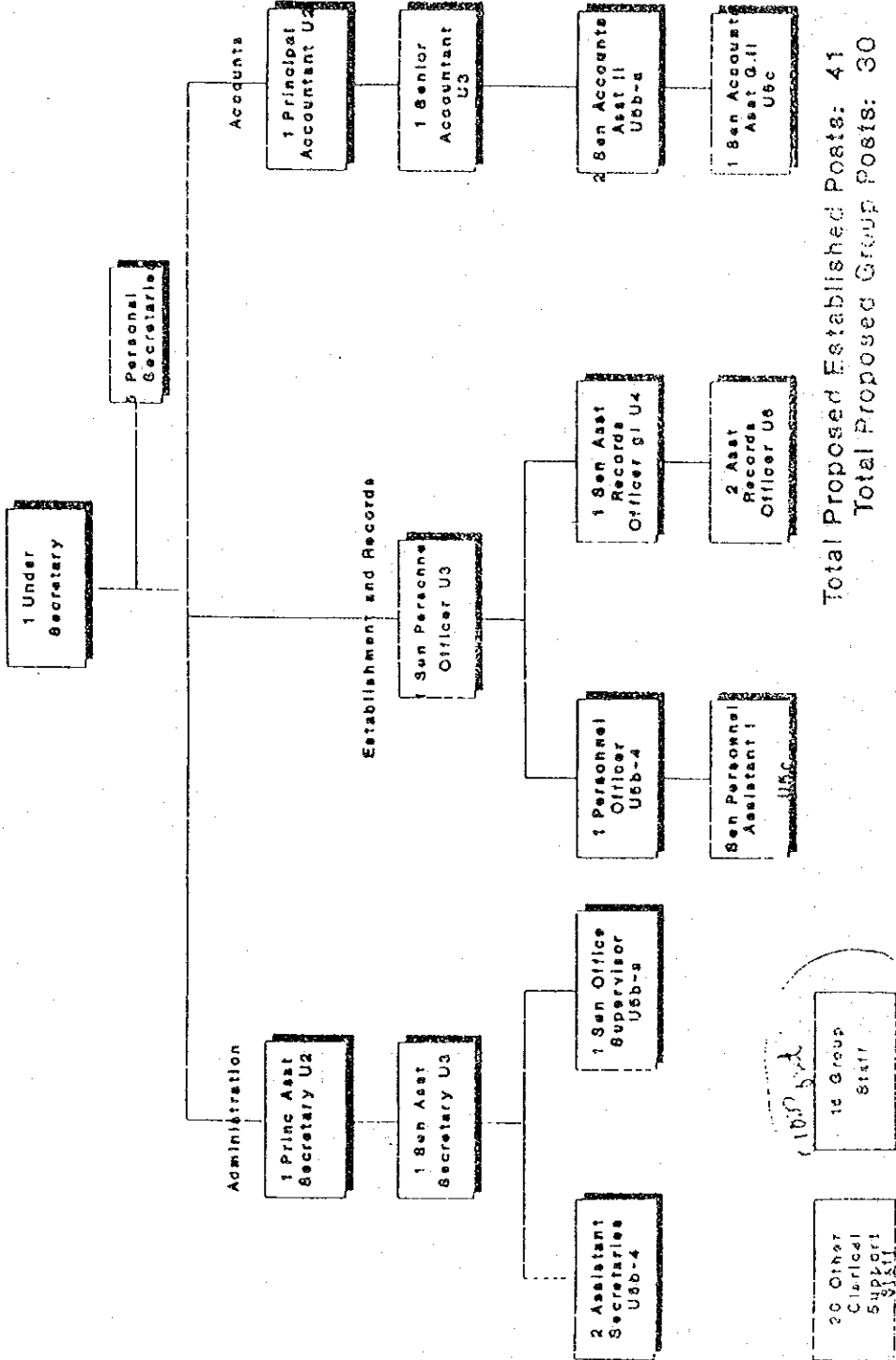
B-6



Total Proposed Establishment Posts: 5
Total Proposed New Grades: 0

PROPOSED ORGANISATION CHART ADMINISTRATION AND FINANCE DEPARTMENT

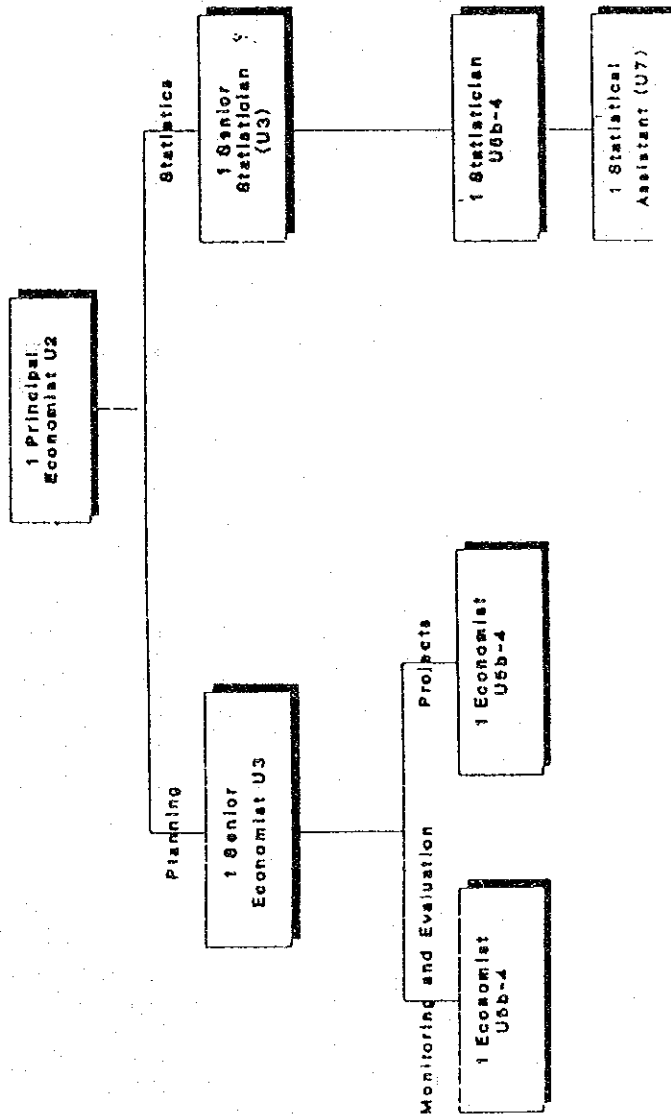
B-7



Total Proposed Established Posts: 41
Total Proposed Group Posts: 30

PROPOSED ORGANISATION CHART - PLANNING DIVISION

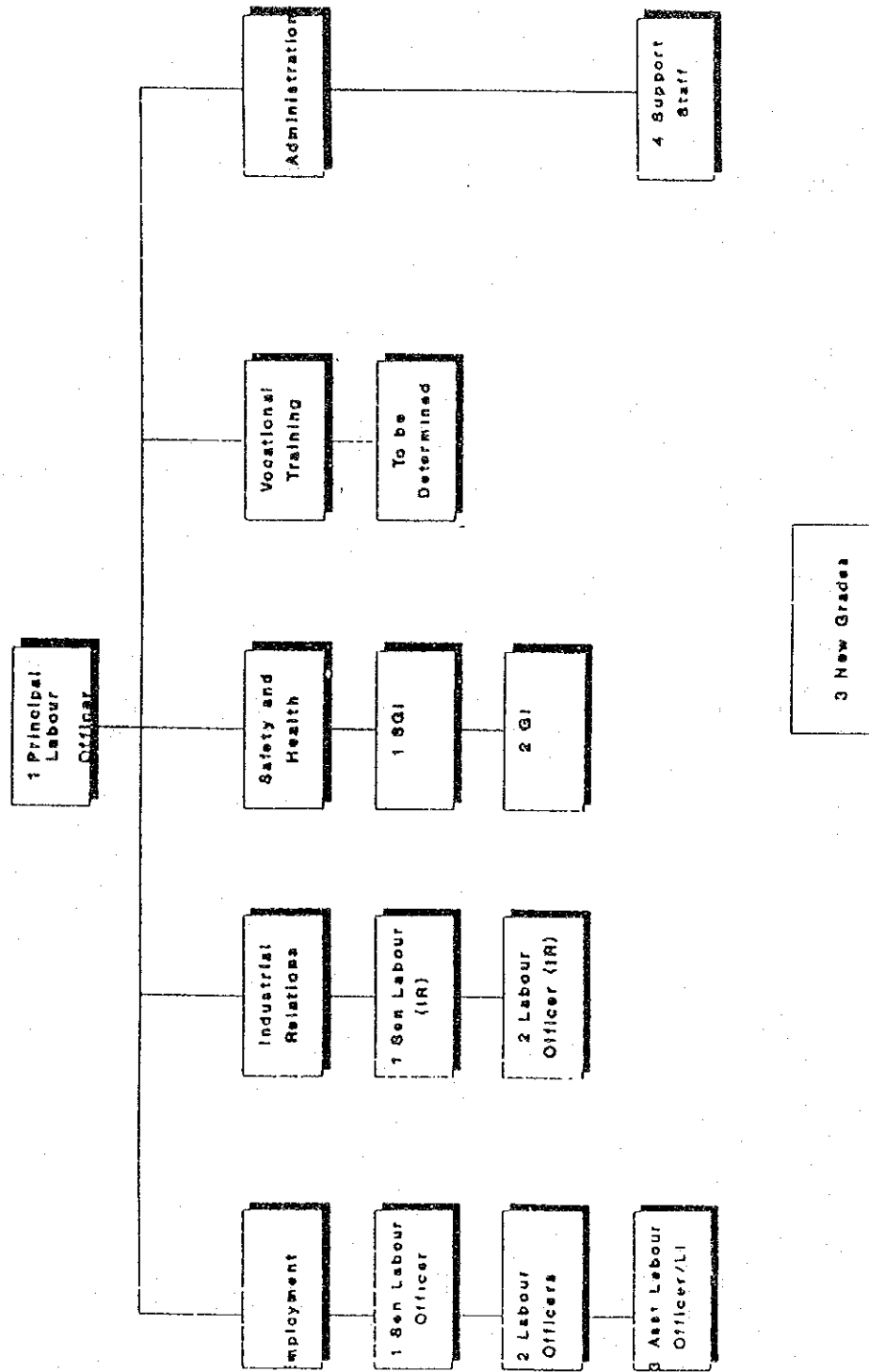
B-8



Total Proposed Established Posts: 7
Total Proposed New Grades: 1

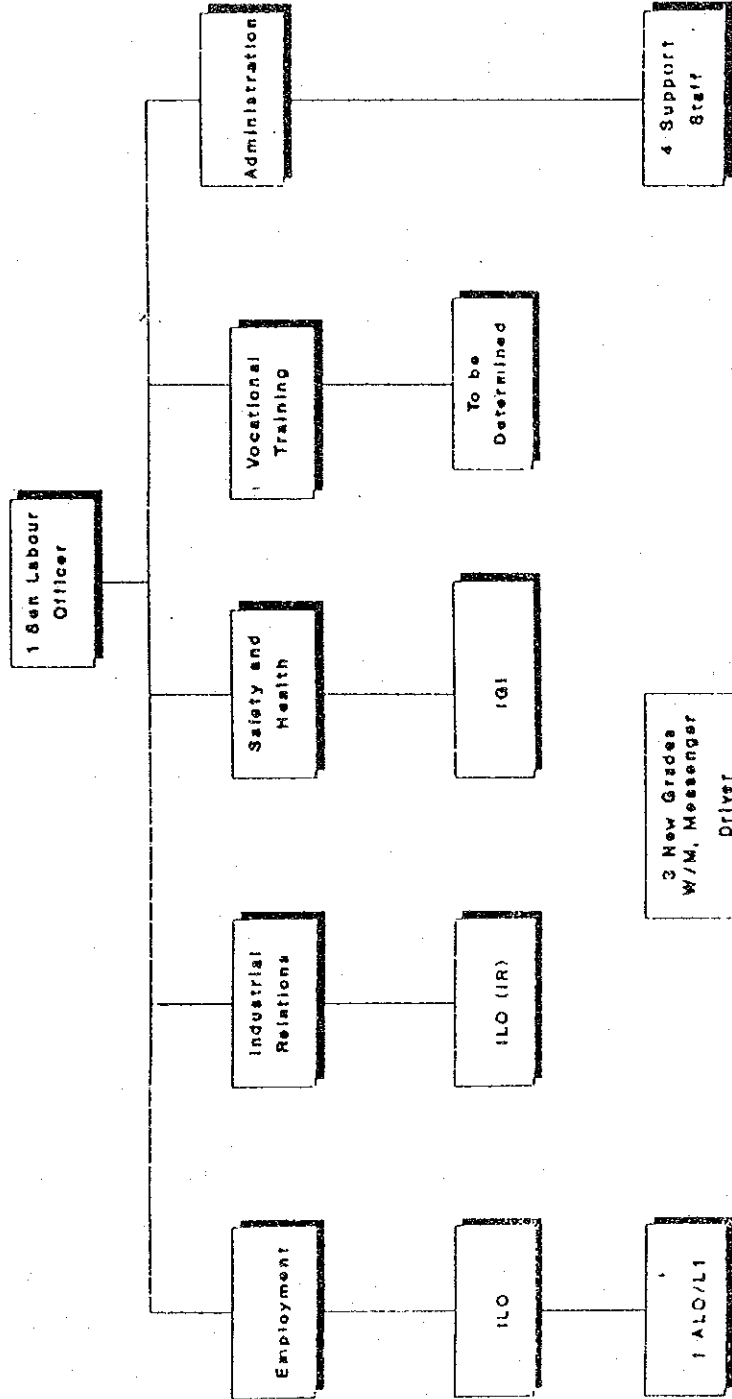
MANAGEMENT OF HIGHLY INDUSTRIALISED DISTRICT (e.g. JINJA)

B-9



MANAGEMENT OF MEDIUM INDUSTRIALISED DISTRICT (e.g. MASAKA)

B-9



POLICY STATEMENT OF THE DIRECTORATE OF INDUSTRIAL TRAINING

The Directorate of Industrial Training operates to develop and promote an effective and efficient system of Industrial Vocational and Apprenticeship training on local levels, for continued production and sustained skilled manpower development in this country. For the same cause, the D.I.T is supervising five vocational training institutions with one in the rural areas. These are:-

Masuliita VTC	-	Mpigi District.
Lugogo VTC	-	Lugogo - Kampala District.
Nakawa VTI	-	Nakawa - "
Jinja VTI	-	Jinja.
Jinja YMCA VTC	-	Jinja.

Through the same Institutions, the D.I.T Policy is being realised with various approaches of training as follows;

- (a) Training of school leavers "O" and "A" levels without chances of continuing to higher Institutions of learning, full time courses and part time evening classes are conducted especially at Lugogo VTC and Jinja IDA.
- (b) Apprenticeship and In-plant training. These are conducted in Lugogo VTC, Nakawa VTI, and Jinja VTI Institutions.
- (c) Training of school drop outs without "O" and "A" level qualifications is done in Masuliita .

To promote further, the D.I.T Policy and realisation of tangible economic development of this country, the D.I.T has encouraged the opening of as many private vocational training centres as possible. Also an advisory body, the ITC was ^{put}_A in place to help in achieving the objectives.

ACHIEVEMENTS - FINANCIAL YEAR 1993/94:

Training: The Directorate of Industrial Training has handled 516 trainees. 128 of these apprentices, 388 trainees started as school leavers. All the Institutions have been operating below 50% except Lugogo VTC which has operated at around 90%. Jinja YMCA has been dormant due to condemnation of the buildings there. Funds were required to enable its start but budget cuts have hindered this. Lugogo was rehabilitated by the Germany Government through its Agency the GTZ and properly equipped. All the remaining Institutions have been operating below capacity due to lack of funds, training materials and Instructors.

However, after a long period of lack of staff, the Public Service recruited an eighth of the required proportion of the instructing staff. These were posted to upcountry training institutions.

Lugogo VTC entered its third year during the same financial year after its renovation. Hence the third year students were dispatched to different industries for their industrial training attachments. They were dispatched to the following industries; M/S Kinyara Sugar Works, UEB, National Water and Sewerage Corporation, Government consolidated properties, M/S Lukwago Construction Company and Picfare.

IDA Jinja also started full time training for O and A level school leavers to meet the number of boys and girls who leave school.

Opening of new private vocational training institutions:

In the same financial year, the D.I.T has received many individuals willing to open up private institutions from far and near. The places were inspected by Officials from the DIT. These were Kabasanda Kayunga - Bugerere, Lugazi, Bira and Lubaya in Kabale District.

All these were stimulated by the formerly organised National Conference which was also organised within the same financial year.

There was an Instructor Training course conducted at the D.I.T to promote the capability of the Instructors. This was done under the BCIT Canada.

PROBLEMS:

In the previous financial year there were a lot of constraints called home by financial limitations. Many training programmes were delayed or not effected. There are many outstanding bills for suppliers, electricity, water, gas and industrial Training Council. All the remaining problems are called by lack of funds.

FUTURE PLANS FOR 1994/95:

JICA Project: The Government of Uganda and that of Japan will co-operate, whereby the Government of Japan will renovate and equip Nakawa Vocational Training Institute. This is to be realised through JICA. The Ministry of Labour and Social Affairs through the D.I.T has to partly see that the project is a success.

A Show room at UMA: The D.I.T is intending to build a show room at UMA show grounds as another way of advertising the activities of the D.I.T. Already plots were made available by the same association.

Training: The D.I.T would like to realise increased number of skilled manpower for both the industries and self employment. To achieve this, there is need for allocation of more funds.

VOCATIONAL TRAINING INSTITUTE, NAKAZA

Total number of Trainees attended the course in 1993 from January to December were 324.

The breakdown is as follows -

1.	Candidates Trade Tested	- 63
2.	Apprentices	61
3.	Upgrading	180
	TOTAL	<u>324</u>

Apprentices Programmes

<u>Section</u>	<u>8-03-93</u>	<u>14-06-93</u>	<u>20-09-93</u>
Motor Vehicle	8	6	9
Electrical	10	5	10
Welding and Fabrication	6	7	5
Machinshop	7	4	5
"	<u>31</u>	<u>22</u>	<u>29</u>

Upgrading

<u>Section</u>	<u>19-01-93</u>	<u>26-04-93</u>	<u>2-08-93</u>
Electrical	18	17	21
Motor Vehicle	15	20	12
Welding & Fabrication	11	10	9
Machinshop	16	13	18
"	<u>60</u>	<u>60</u>	<u>60</u>
TOTAL			

VOCATIONAL TRAINING INSTITUTE, NAKAJI

Total number of trainees who attended the courses in 1992 from January to December were 306.

The breakdown is as follows -

1.	Candidates for Upgrading	164
2.	Candidates for Apprentices	89
3.	Candidates for Trade Test	53
		<u>306</u>

Upgrading Programme

<u>Section</u>	<u>January, 92</u>	<u>May, 92</u>	<u>Sept. 92</u>
Motor Vehicle	13	24	14
Electrical	19	16	12
Welding/Fabrication	5	22	10
Machining	8	15	9
	<u>42</u>	<u>77</u>	<u>45 /164</u>

APPRENTICES

<u>Section</u>	<u>March, 92</u>	<u>June, 92</u>	<u>Sept. 92</u>
Motor Vehicle	12	9	5
Electrical	15	8	6
Welding/Fab.	8	5	4
Machine shop	4	6	7
	<u>39</u>	<u>28</u>	<u>22 /89</u>

VOCATIONAL TRAINING INSTITUTE, HAKAWA

The number of trainees who attended courses and trade tested for the year 1991 were = 247.

The breakdown is as follows -

1.	Upgrading programme	118
2.	Apprentices	79
3.	Trade Test	50
		<u>247</u>

Upgrading Programme

<u>Section</u>	<u>January, 91</u>	<u>May, 1991</u>	<u>Sept. 91</u>
Motor Vehicle	10	20	10
Electrical	16	13	9
Welding/Fab.	2	19	7
Machinshop	5	5	4
	<u>33</u>	<u>53</u>	<u>32</u>

Apprentices

<u>Section</u>	<u>March, 1991</u>	<u>June, 1991</u>	<u>Sept., 92</u>
Motor Vehicle	10	7	3
Electrical	13	8	6
Welding/Fab.	8	5	5
Machinshop	5	5	4
	<u>36</u>	<u>25</u>	<u>18</u>

VOCATIONAL TRAINING INSTITUTE, NAKAWA

Total number of trainees who attended the courses in 1990 from January to December were 239.

The breakdown is as follows -

1.	Trade Test	- 48
2.	Apprentices	72
3.	Upgrading	119
		<u>239</u>

Apprentices

<u>Section</u>	<u>March 1990</u>	<u>June 1990</u>	<u>September 1990</u>
Motor Vehicle	8	6	3
Electrical	12	8	6
Welding/Fabrication	7	5	4
Machinshop	5	4	4
"	<u>32</u>	<u>23</u>	<u>17</u>

Upgrading

<u>Section</u>	<u>Jan. 1990</u>	<u>May 1990</u>	<u>Sept. 1990</u>
Motor Vehicle	9	" 18	10
Electrical	15	12	7
Welding/Fab.	3	16	8
Machinshop	5	10	6
"	<u>32</u>	<u>56</u>	<u>31</u>

VOCATIONAL TRAINING INSTITUTE, NAKAWA

The number of trainees who attended the courses in 1989 from January to December, were 221.

The breakdown is as below:-

1.	Candidates for	Upgrading	120
2.	- do -	Apprentices	56
3.	"	Trade Test	45
			<u>221</u>

UPGRADING:

<u>Section</u>	<u>January</u>	<u>May</u>	<u>September</u>
Motor Vehicle	8	15	11
Electrical	14	12	8
Welding/Fab.	5	15	9
Machinshop	5	11	7
m	<u>32</u>	<u>53</u>	<u>35</u>

Apprentices

Motor Vehicle	7	5	3
Electrical	11	7	5
Welding/Fab.	6	5	4
Machinshop	5	4	4
m	<u>29</u>	<u>21</u>	<u>16</u>

③ 収集資料リスト

3. 収集資料リスト

資料名	ページ数・備考
<p>「検定関係」 / TRADE STANDARDS FITTERS(GENERAL) 検定基準 (組立) / TRADE TESTS-UGANDA FITTER(MEINTENACE) etc. / UGANDA CRAFTSMAN CERTIFICATE TRADE TEST 技能検定 (組立) / NATIONAL INDUSTRIAL TRADE STANDARS TRADE TESTING AND CERTIFICATION CARPENTARY AND JOINERY 技能検定 (木工) / NATIONAL INDUSTRIAL TRADE STANDARS TRADE TESTING AND CERTIFICATION BRICK/BLOCK LAYING 技能検定 (煉瓦・ブロック建築)</p>	<p>3 7 6 16 17</p>
<p>「キャンボゴ技術短大」 / BROCHURE UGANDA POLYTECHNIC KYAMBOGO ポリテク・キャンボゴ小冊子 / Higher Technician Diploma in Mecanical Engineering SYLABUSES シラバス (ハイアー・テクニシャン・ダイプロマ)</p>	<p>2 13</p>
<p>「ルゴゴ職業訓練校」 / Directorate of Industrial Training Vocational Training Centre Luggo/Kampala 職業訓練校lugogo小冊子 / ORGANISATION CHART FOR VOCATIONAL TRAINING CENTRE LUGOGO ルゴゴ職業訓練センター組織図 / Timetable VTC lugogo 1st year 1993/1994 週間計画表 (ルゴゴ: 1年次) / Timetable VTC lugogo 2nd year 1993/1994 週間計画表 (ルゴゴ: 2年次) / Vocational Training Centre - lugogo Terminal Examination Construction ルゴゴ最終試験 (建築) / Directorate of Industrial Training Kampala/UGANDA Curriculum of Bricklaying & Plastering Training カリキュラム (: 建築)</p>	<p>2 1 1 1 5 4</p>

資料名	ページ数	ページ数・備考
/ Directorate of Industrial Training Kampala/UGANDA Curriculum of Painting & Decorating Training カリキュラム (: 塗装)		4
/ Directorate of Industrial Training Kampala/UGANDA Curriculum of Fitting & Machining Training カリキュラム (: 機械)		4
/ Directorate of Industrial Training Kampala/UGANDA Curriculum of Carpenter & Joining Training カリキュラム (: 木工)		4
「企業」 / UGMA ENGINEERING CORPORATION UGMA 企業案内		3
/ List of Timber in UGANDA ウガンダ製材品一覧		1
「ナカワ職業訓練校」 / VOCATIONAL TRAINING INSTITUTE, NAKAWA TRAINING PROGRAM FOR 1994 1994年度訓練計画 (ナカワ)		10
/ VOCATIONAL TRAINING INSTITUTE NAKAWA LESSON PLAN 学科・実技指導案様式		2
/ TRAINEE'S DIARY 訓練日誌 方式		1
/ PERFORMANCE SHEET 進度表		1
/ METAL MACHINING AND MACHINERY FITTING SECTION TRAINING PROGRAMME 機械・組立コース訓練計画 (徒弟訓練 6WEEKS)		4
/ METAL MACHINING AND MACHINERY FITTING SECTION 機械・組立コース訓練計画 (向上訓練 6WEEKS)		4
/ METAL MACHINING AND MACHINERY FITTING SECTION TRAINING PROGRAMME 機械・組立コース訓練計画 (特別訓練 13WEEKS)		7
/ TRAINING PROGRAMME: MACHINERY FITTING COURSE TRAINING CURRICULUM 機械組立カリキュラム (400hrs.)		2

資料名	ページ数	ページ数・備考
/ Total number of Tranees attended the course in '89-'93 訓練受講者数		5
「養成訓練－1995年」 / TRAINING PROGRAMME(BASIC TRAINING)		25
/ FITING AND MACHINING TRAINING SYLABUS 機械科訓練計画		12
/ LIST OF EQUIPMENT AND MEASURING TOOLS 設備・測定工具一覧表（機械科）		
/ TENTATIVE TRAINING PROGRAMME(BASIC TRAINING) BASIC CARPENTRY AND JOINERY COURSE 木工科養成訓練計画		10
/ TENTATIVE TRAINING PROGRAMME(BASIC TRAINING) BASIC BRICKWORK COURSE 建築科養成訓練計画		7
/ MACHINERY REQUIRED LIST FOR TOOL AND DIE MAKING 工具・金型製作に必要な機器リスト		2
/ STORE REQUISITION/ISSUE FORM 伺い書（教材・器具）		1
/ Training Timetable VTI nakawa 1994 週間計画表（ナカワ）		1
/ Training contents under tool and die making programme 工具・金型製作訓練内容		2
/ 評価基準		1
/ List of Trade Tested Candidates during the year 1993 1993技能検定受験者表		2
「使用テキスト」 / ILO LEARNING ELEMENT TITLE Reading Technical Drawings-interpreting Simplified Drawings of Components ILO実技教科書（機械要素／読図・製図）		45
/ ILO LEARNING ELEMENT TITLE Milling a tee-Slot ILO実技教科書（フライスT溝加工）		14
/ ILO LEARNING ELEMENT TITLE Reading Technical Drawing-Identifying Components on Assembly Drawings ILO実技教科書（組立図における部品製図）		16

資料名	ページ数・備考
/ ILO LEARNING ELEMENT TITLE Selecting Cutting Speed, Feed and Depth of Cut for Milling	12
ILO実技教科書（フライス加工における切削条件の設定）	
/ 実技課題図面	9

メモ、パンフレットおよび内部資料を除く。順不同。

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