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No. 121

THE VOCATIONAL TRAINING CENTER PROJECT STUDY

IN

BAGHDAD AND MOSUL

THE REPUBLIC OF IRAQ

FEBRUARY, 1985

JAPAN INTERNATIONAL COOPERATION AGENCY

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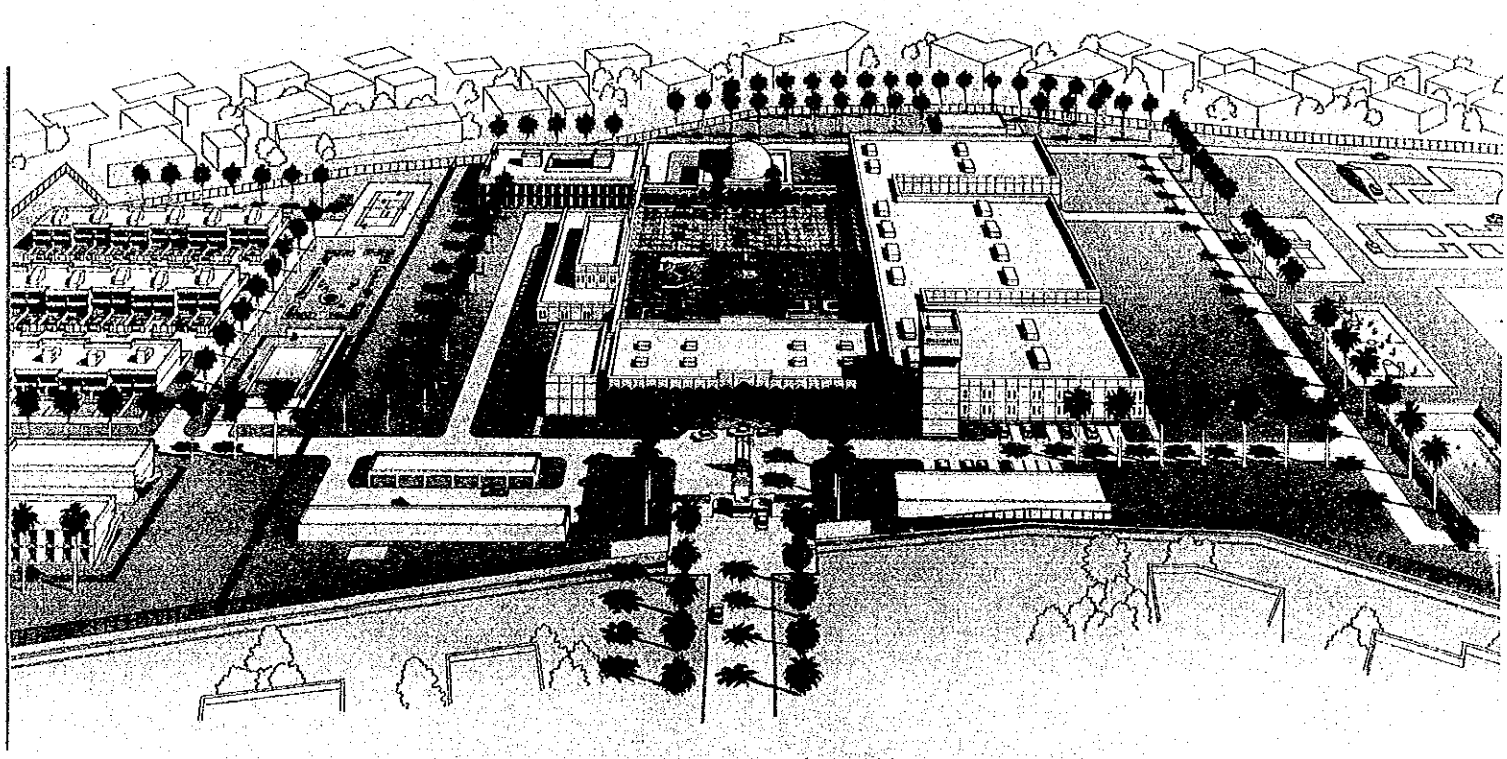


IRAQ VOCATIONAL TRAINING CENTER PROJECT STUDY

PREFACE

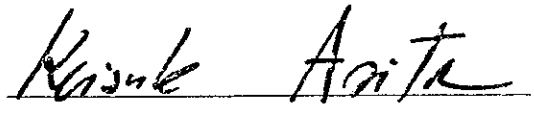
In response to the request of the Government of the Republic of Iraq, the Japanese Government decided to conduct a survey on the Vocational Training Center Project and entrusted the survey to the Japan International Cooperation Agency. The J.I.C.A. sent to Iraq a survey team headed by Mr. Kimio Ono (Overseas Vocational Training Association) from July to August , 1984.

The team had discussions on the Project with the officials concerned of the Government of Iraq and conducted a survey in Baghdad and Mosul. After the team returned to Japan, further studies were made and the present report has been prepared.

I hope that this report will serve for the development of the Project and contribute to the promotion of friendly relations between our two countries.

I wish to express my deep appreciation to the officials concerned of the Government of Iraq for their close cooperation extended to the team.

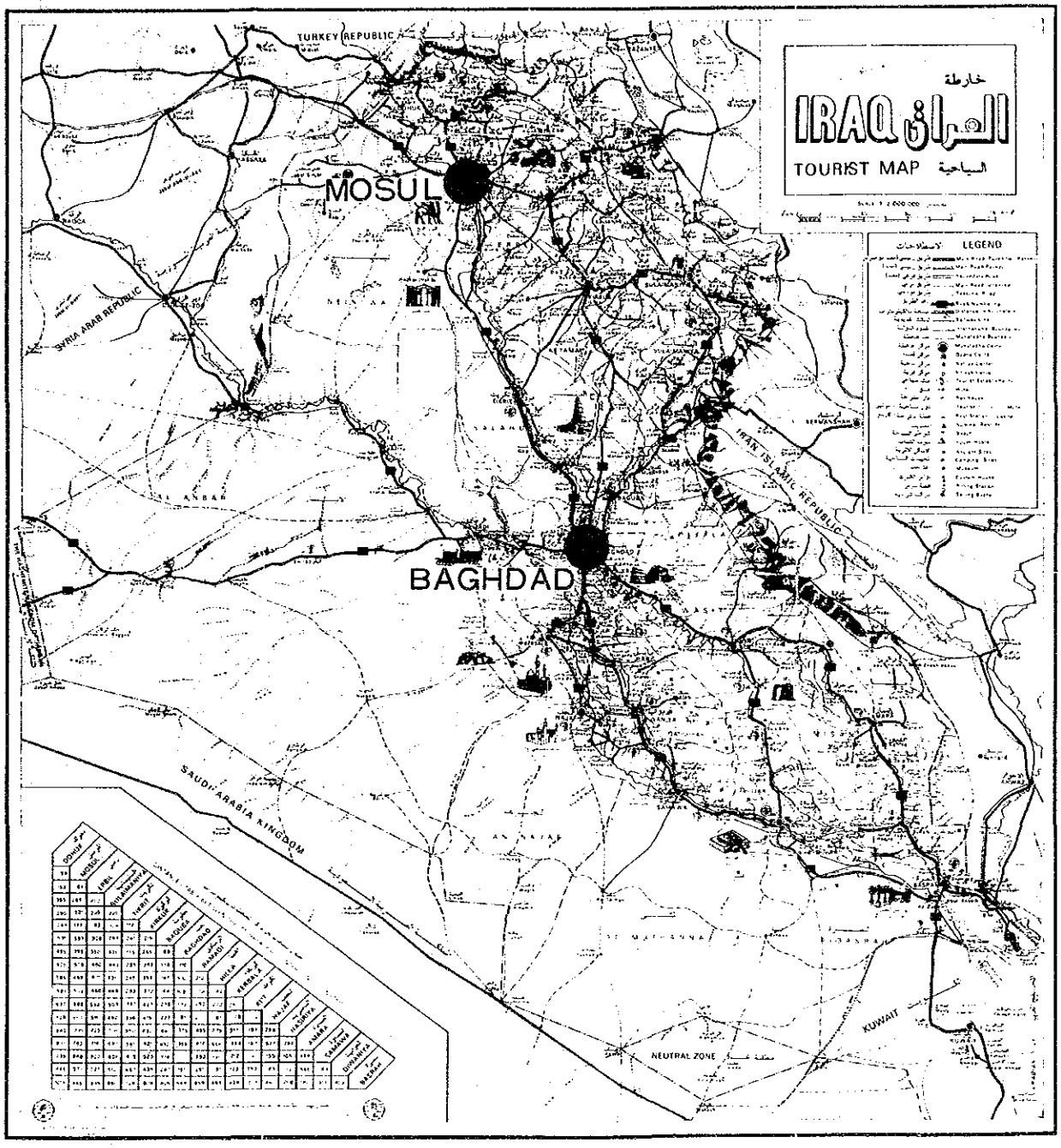
February, 1985



Keisuke Arita

President

Japan International Cooperation Agency


خارطة
IRAQ العراق
TOURIST MAP السياحية
LEGEND
MOSUL
BAGHDAD
TURKEY REPUBLIC
SYRIA ARAB REPUBLIC
IRAN ISLAMIC REPUBLIC
SAUDI ARABIA KINGDOM
KUWAIT
NEUTRAL ZONE

MAP OF IRAQ

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CHAPTER 5: VOCATIONAL TRAINING CENTER MANAGEMENT

CHAPTER 6: IMPLEMENTATION OF THE PROJECT

SUMMARY

SUMMARY

The Republic of Iraq has made remarkable economic progress since the latter part of the 1970's. This is largely due to the active development, investment and business activities, mainly in public works, based on revenue from rich oil resources.

In this period of rapid national economic development, the Government of the Republic of Iraq has been ardently pursuing its industrialization and modernization programme by introducing advanced industrial facilities, equipment and modern technology from foreign sources. As a part of this national industrialization programme, a large number of durable consumer products have been imported and these have contributed much to the improvement of the living standard of Iraqi citizens.

The rapid increase in imports, however, has resulted in a shortage of skilled maintenance and repair technicians. Thus, training of a large number of semi-skilled workers with sufficient skills to provide proper repair and maintenance services comes as a major new requirement for national industrialization.

In order to solve an urgent shortage of skilled maintenance and repair technicians, the Government of the Republic of Iraq has planned to establish modern vocational training centers from an entirely new point of view.

The objective of this Training Centers is to train fresh intermediate school graduates so as to become semi-skilled workers who can perform practical repair and maintenance work under the supervision of skilled workers. The proposed Training Centers are also desired to be a showcase of modern vocational training and proposed to utilize modern training methodology such as audio visual training materials.

Considering and honoring an unique idea of the Iraqi proposal, the Basic Design Study Team has intensively conducted a survey in the Republic of Iraq. As a result of the survey, following design principles are recommended for the establishment of the proposed Vocational Training Centers.

Proposed Project Sites;

Baghdad and Mosul, Republic of Iraq

Capacity of Training Centers;

Three hundred trainees per training center

Prospected Participants;

Intermediate school graduates, in principle.

Training Objectives;

Upon completion of the training, trainees are expected to be employable in private industries as semi-skilled workers who can perform practical daily repair and maintenance works under the supervision of skilled workers.

Training Course Offered;

Baghdad Center

1. TV/Video, Tape Recorder and Radio Repair
2. Automobile Repair
3. Air-Conditioner and Electric Appliance Repair
4. Elevator Repair and Maintenance

Mosul Center

1. TV/Video, Tape Recorder and Radio Repair

2. Automobile Repair

3. Air-Conditioner and Electric Appliance Repair

Training Duration;

Annual training hours will be 1,470 hours distributed over 42 weeks. The centers will offer 6 hour training on weekdays and 5 hours at weekends.

Proportion of Practice and Lecture;

TV/Video, Tape Recorder and Radio Repair Course,
Elevator Repair and Maintenance Course:

Lecture 30 % Practice 70 %

Automobile Repair Course,
Air-Conditioner and Electric Appliance Repair Course:

Lecture 25 % Practice 75 %

Training Curriculum;

The training curriculum includes the following major subjects;

Theory

1. General Subjects such as Mathematics, Physical Education.

2. Specialized Subjects

Practice

1. Basic Practice

2. Applied Practice

Specialized training in practice is arranged in some training courses for more specific training.

Training and Utility Facilities;

Both centers have the following facilities and the total floor areas are as follows:

Administration Building, Training Workshop, Small Gymnasium, Cafeteria, Student Dormitory, Student Plaza, Single Staff Accommodation, Married Staff Accommodation, Swimming Pool, Substation, Garage and Guard-house.

The site area of the proposed centers is estimated around 98,600 m^2 in Baghdad and 100,400 m^2 in Mosul. Both sites are owned by the Ministry of Labour and Social Affairs. The total floor area of the Baghdad Center is 28,143 m^2 and of the Mosul Center is 26,314 m^2.

Training Center Management and Personnel Plan;

As stated in the Iraqi proposal, both centers will be placed under the direct supervision of well experienced Japanese administration and technical staff, and the training will be executed by Japanese and international instructors.

In order to achieve the objectives stated above, the Baghdad center will involve 46 Japanese administrators and instructors while the Mosul center involves 42 Japanese staff.

Well qualified Japanese and international instructors will be recruited and dispatched in accordance with the training program.

Iraqi Supporting Staff;

The involvement of Iraqi supporting staff is estimated at around 145 in Baghdad and 137 in Mosul.

Training of Iraqi Staff in Japan;

Advanced Training of Iraqi staff not only for the technical but also for administrative roles will be conducted in Japan for the duration of 6 to 8 months as a selective basis.

Project Implementation;

For completion of the buildings, both centers are estimated to require 6 months for detail design and 22 months for construction. The Survey Team suggested giving priority to the construction of the Baghdad Center, with the Mosul Center to follow later.

Project Cost Estimation;

The total project costs of construction, training equipment and facilities, training materials development, management and maintenance are estimated as follows:

1. Construction Costs

			Total
Baghdad	$ 35,990,475	ID 1,465,243 ($ 4,701,773)	$ 40,692,248
Mosul	$ 34,949,158	ID 1,438,954 ($ 4,617,443)	$ 39,566,601

2. Training Equipment and Training Facilities Cost

Baghdad	$ 10,867,748	NIL	$ 10,867,748
Mosul	$ 7,852,707	NIL	$ 7,852,707

3. Training Materials Development, Management and Maintenance Costs

Baghdad	$ 36,012,508	NIL	$ 36,012,508
Mosul	$ 18,208,236	NIL	$ 18,208,236
SUB TOTAL	$ 143,880,832	ID 2,904,197 ($ 9,319,216)	**$ 153,200,048**
		Grand Total	**$ 153,200,048**

Conversion rate: 1 ID = 3.208889 US$

CHAPTER 1. INTRODUCTION

CHAPTER 1: INTRODUCTION

In response to the request of the Government of the Republic of Iraq, the Government of Japan has decided to extend its technical cooperation to undertake a basic design study for the Project within the general framework of technical cooperation between the Government of Japan and the Government of the Republic of Iraq, which is set forth in the Agreement on Economic and Technical Cooperation between the Government of Japan and the Government of the Republic of Iraq.

The Japan International Cooperation Agency undertook the Basic Design Study of the Project in close cooperation with the authorities of the government of Iraq.

The Foreign Economic Relations Committee, the responsible agency for the Project in the Republic of Iraq, acted as a coordinating body with other Iraqi government organizations for the smooth implementation of the Study.

The Basic Design Study Team headed by Mr. Kimio Ono, General Manager of the Overseas Vocational Training Association, Inc., visited Baghdad and Mosul from 29th July to 22nd August, 1984. The Study Team held discussions with Iraqi officials and conducted an intensive field survey. After the team returned to Japan, further studies and analysis were made to design most modern vocational training centers in Baghdad and Mosul.

The present report contains Vocational Training Plan, Basic Design of Facilities, Management and Administration Plan, Implementation of the Project and Project Cost Estimation.

CHAPTER 2. BACKGROUND OF THE PROJECT

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2.1 GENERAL BACKGROUND

The Republic of Iraq made remarkable economic progress in the latter part of the 1970's as shown in its Major Economic Indexes (Table 2.1). This is largely due to the active development investment and business activities, mainly in public works, based on revenue from rich oil resources.

In this period of rapid national economic development, the Government of the Republic of Iraq has been ardently pursuing its industrialization and modernization programme by introducing advanced industrial facilities, equipment and technology from foreign sources.

Particularly since 1977, a large number of durable consumer products such as radio receivers, tape-recorders, TV sets, video cassette recorders, air conditioners, automobiles and elevators have been imported as shown in Table 2.2. These have contributed much to the improvement of the living standard of Iraqi citizens.

The rapid increase in imports, however, has resulted in a shortage of skilled maintenance and repair technicians. Thus, training of a large number of semi-skilled workers with sufficient skills to provide proper repair and maintenance services comes as a major new requirement for national industrialization.

Year	1977	1978	1979	1980	1981	1982	1983
Population (thousand)	11,803	12,211	12,631	13,072	....	....	....
G N P (million US$)	18,490	22,540	34,180	39,500	....	....	....
GNP per capita (US dollars)	1,570	1,814	2,710	3,020	....	....	....
Exports (million US$)	10,304	11,814	20,310	28,608	9,372	....	....
Exports to Japan (million US$)	674	712	1,636	3,963	843	780	141
Imports (million US$)	6,481	6,269	9,990	13,920	18,907	....	....
Imports from Japan (million US$)	789	1,054	1,759	2,413	3,324	2,755	632
Foreign currency reserves (million US$)	6,820	....	....	....	.....	....	....
Balance of debt service (million US$)	1,221	1,210	....	....	....	....	....
Debt service ratio (DSR) (%)	1.1	....	....	....	....	....	....

Note: Data from IMF - IFS, IMF - DOT, World Bank
and the White Paper by MITI, Japan

Table 2.1, NATIONAL INDEXES,
The Republic of Iraq

units: 1,000 US$

item \ year	1975	1976	1977	1978	1979
TV receiver sets	1,604	6,255	14,233	11,729	26,644
Radio receivers	2,902	2,441	5,530	7,840	20,893
Air conditioners	10,302	8,615	230,087	124,196	133,499
Electric appliances	3,609	7,083	36,426	56,397	91,133
Automobiles and buses	66,701	152,053	233,387	428,520	974,520

Note: (1) Based on the statistics from Statistical Office of the United Nations.

(2) The imports from most of the East European countries are not included.

Table 2.2, TOTAL AMOUNT OF IMPORTED DURABLE CONSUMER PRODUCTS
Republic of Iraq, FY 1975 - 1979

2.2 BACKGROUND OF EDUCATION AND VOCATIONAL TRAINING SYSTEM

The organizational structure of the educational and vocational training system in the Republic of Iraq is shown in the Fig. 2.1.

As shown in the figure, compulsory education is for the first six years at primary school from the age of six. In addition to this, three years for intermediate, three years for secondary (high schools) and four years for university or two years for college education are available.

With regard to the vocational training, there are two types of vocational training centers. These are the secondary schools for the vocational training and the vocational training centers respectively. The prospective participants of these vocational schools and centers are the graduates from intermediate schools. These schools and centers are to train them for skilled workers for the duration of three years.

The accelerated vocational training centers which are supervised by the Ministry of Labour and Social Affairs train the graduates from the primary schools or equivalent for semi-skilled workers. There are no obligations for the trainees after the completion of the training at the centers. The admittance age to the said centers is very broad (15 to 50 years old). The drop-outs from the intermediate schools are also accepted here.

In addition, other ministries related to industry also have their own accelerated vocational training courses. But the total number of the trainees of these courses are not officially announced.

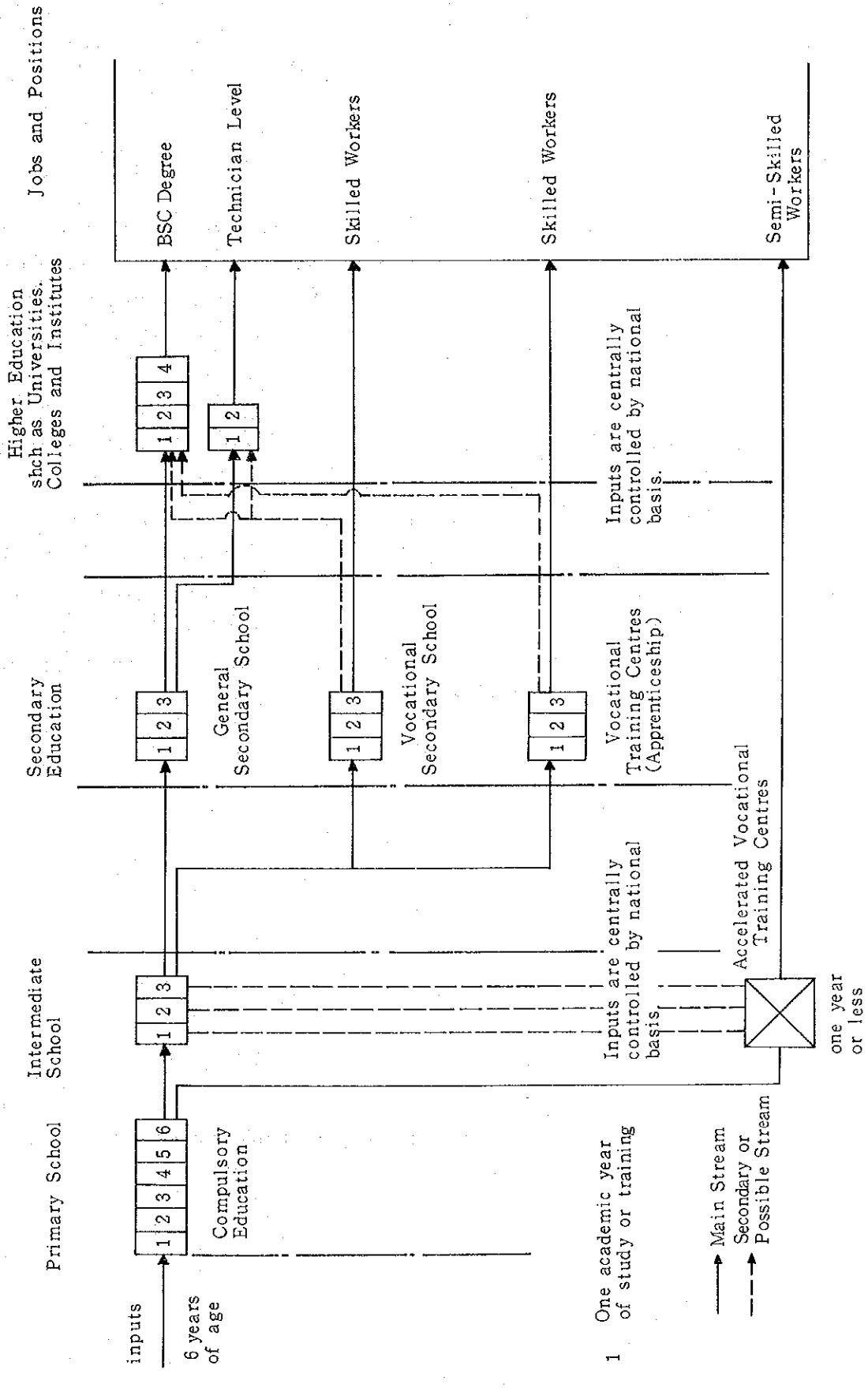


Fig. 2.1 GENERAL INFORMATION ON EDUCATIONAL SYSTEM AND VOCATIONAL TRAINING SYSTEM IN THE REPUBLIC OF IRAQ

The difference between the accelerated vocational training courses of the Ministry of Labour and Social Affairs and the training courses offered by the other Ministries is that the latter obliges the trainees to join the services of the related Ministry for a certain period after the completion of the course.

According to the Ratio of Supply/Demand of Manpower in Iraq for the Years 1976-80 shown in the Table 2.3, shortages in the level of semi-skilled workers are remarkably noted. Thus, the above mentioned accelerated vocational training courses of the Ministry of Labour and Social Affairs and other Ministries are intended to provide trainings for semi-skilled workers. Although the recent figures of Ratio of Supply/Demand of Manpower are not available, it is estimated that shortages of semi-skilled workers are not sufficiently resolved even today.

Level	Ratio of Supply/Demand (%)
1. Specialists	70.6
2. Technicians	55.0
3. Skilled Workers	36.7
4. Semi-skilled Workers	27.8
5. Secondary School Teachers	52.5
6. Primary School Teachers	58.2

Table 2.3, Ratio of Supply/Demand of Manpower of Different Level for the Year 1976-80

Especially in the field of the maintenance and repair of durable consumer products, the demand for semi-skilled workers is very high as explained at the end of Chapter 2.1. Therefore, in order to satisfy the demands, the Government of the Republic of Iraq has been imposing a series of efforts such as:

1) requiring the foreign manufacturers of these products to establish their own service centers and networks in Iraq with training courses provided for Iraqis.

2) planning to increase the number of the aforementioned vocational training centers authorized by the Ministry of Labour and Social Affairs. (Two centers were opened this spring, three others are under construction and two are in planning stage.)

3) establishing vocational training centers under the government agencies for the training of their workers.

In addition to this, the Government of the Republic of Iraq has planned to open vocational training centers from an entirely new point of view. This is the idea of the opening of the proposed vocational training centers in Baghdad and Mosul and they contain plans to train fresh intermediate school graduates so as to develop the semi-skilled workers who can perform practical daily repair and maintenance works under the supervision of skilled workers, and who also are employable even in private industries.

According to the "Annual Abstract of Statistics" (Table 2.4 and 2.5) published by the Iraqi Government, Iraq has about 200,000 fresh intermediate school graduates annually, of whom approximately 70,000 are expected to go to senior high schools, 25,000 to other vocational schools. Therefore, the remaining 100,000 or so will look for employment immediately after their graduation. Consequently, the proposed Training Centers are expected to provide them a new training opportunity.

The proposed Training Centers plan to provide one year intensive training for this prospective participants and will not interfere nor duplicate any existing vocational training centers.

NUMBER OF STUDENTS IN SECONDARY SCHOOLS BY CLASS AND SEX : 1982/1983

جدول (٩/١١)

Governorate	الصف الرابع Fourth class		مجموع المرحلة المتوسطة Intermediate Total		الصف الثالث Third Class		الصف الثاني Second Class		الصف الاول First Class		المحافظة
	اناث Female	ذكور Male	اناث Female	ذكور Male	اناث Female	ذكور Male	اناث Female	ذكور Male	اناث Female	ذكور Male	
Nineveh	1732	4184	16670	42296	3508	11416	5270	14388	7892	16492	نينوى
Salah Al-Deen	225	979	5209	13178	1310	4039	1768	4276	2131	4863	صلاح الدين
Ta'meem	844	1709	10025	19232	2579	6347	3119	6681	4327	6204	التأميم
Diala	1174	2257	12689	24933	3900	8177	4580	9309	4209	7447	ديالى
Baghdad	12225	16677	100801	145407	23456	43682	33826	49811	43519	51914	بغداد
Anbar	475	1700	6403	20154	1697	6384	2186	6859	2520	6911	الانبار
Babylon	1041	2425	15710	27973	3623	7355	5277	9449	6810	11169	بابل
Kerbela	671	1214	6979	11832	1858	3238	2393	4268	2728	4326	كربلاء
Najaf	802	1285	8375	13720	2360	3820	3064	5081	2951	4819	النجف
Qadisiya	621	948	8414	15719	2077	4431	2872	5339	3465	5949	القادسية
Muthanna	221	410	3158	6037	764	1684	1118	2072	1276	2281	المثنى
Thi-Qar	700	1592	11514	23578	3055	7321	4121	7899	4338	8358	ذي قار
Wasit	419	935	7494	16158	1984	5663	2460	5110	3050	5385	واسط
Maysan	230	604	4839	9640	1201	3024	1645	3170	1993	3446	ميسان
Basrah	2246	3758	25037	38998	5993	9993	8393	13589	10651	15416	البصرة
Autonomous Region :											منطقة الحكم الذاتي :
D'hok	143	623	2336	6759	522	1813	761	2510	1053	2436	دهوك
Arbil	807	1572	6531	16347	1764	4747	2098	5510	2669	6090	أربيل
Sulaimaniya	803	2135	9568	20745	2161	5761	3410	7753	3997	7231	السليمانية
Total	25379	45007	261752	472706	63812	138895	88361	163074	109579	170737	المجموع
	70,386				202,707						

Table 2.5

عدد المدارس المهنية وعدد طلابها حسب الجنس والمحافظة للعام الدراسي ١٩٨٢/٨٣
NUMBER OF VOCATIONAL SCHOOLS AND STUDENTS BY SEX AND GOVERNORATES : 1982/83

جدول (١٢/١١)

Governorate	Number of new students admitted عدد الطلاب المقبولين الجدد									عدد المدارس Number of Schools				المحافظة
	المجموع الكلي Grand Total			التجارية Commercial		الصناعية Technical		الزراعية Agricultural						
	المجموع Total	اناث Female	ذكور Male	اناث Female	ذكور Male	اناث Female	ذكور Male	اناث Female	ذكور Male	المجموع Total	التجارية Comm-ercial	الصناعية Techn-ical	الزراعية Agricul-tural	
Nineveh	1751	354	1397	317	177	17	1076	20	144	11	4	5	2	نينوى
Salah Al-Deen	394	9	385	7	39	1	318	1	28	6	1	3	2	صلاح الدين
Ta'meem	1021	293	728	228	108	65	538	–	82	6	2	3	1	التأميم
Diala	1103	353	750	116	125	96	465	141	160	9	2	4	3	ديالى
Baghdad	7794	3591	4203	3172	528	216	3361	203	314	43	21	19	3	بغداد
Anbar	479	26	453	25	51	1	334	–	68	6	1	3	2	الانبار
Babylon	1751	632	1119	487	344	76	524	69	251	7	3	2	2	بابل
Kerbela	795	287	508	181	115	16	254	90	139	6	2	2	2	كربلاء
Najaf	1067	425	642	300	146	47	407	78	89	7	2	4	1	النجف
Qadisiya	948	288	660	288	107	–	362	–	191	4	2	1	1	القادسية
Muthanna	307	73	234	72	18	–	206	1	10	4	1	2	1	المثنى
Thi-Qar	1073	329	744	203	159	29	470	97	115	6	2	3	1	ذي قار
Wasit	1317	444	873	341	125	24	460	79	288	7	2	3	2	واسط
Maysan	775	217	558	135	101	8	374	74	83	6	2	2	2	ميسان
Basrah	2063	793	1270	256	167	123	1024	14	79	11	5	5	1	البصرة
Autonomous Region :														منطقة الحكم الذاتي :
D'hok	196	6	190	4	52	–	108	2	30	4	1	2	1	دهوك
Arbil	1170	209	961	150	49	24	748	35	164	7	2	3	2	أربيل
Sulaimaniya	1079	175	904	99	171	58	601	18	132	7	2	3	2	السليمانية
Total	25083	8504	16579	6781	2582	801	11630	922	3367	157	57	69	31	المجموع

CHAPTER 3. VOCATIONAL TRAINING PLAN

CHAPTER 3: VOCATIONAL TRAINING PLAN

3.1 OBJECTIVE AND TRAINING DESIGN PRINCIPLE

3.1.1 Objective and Provisions

(1) Objective of training center

The objective of the Training Center is to promote education of Iraqi youths as semi-skilled workers with the skills to provide proper repair and maintenance services.

(2) Other provisions

(a) Construction sites of the proposed Training Centers are in Baghdad and Mosul.

(b) Entrance qualification of a trainee is, in principle, that he has a certificate of intermediate school or an equal certificate;

(c) Term of the training is, in principle, one year;

(d) Training courses of each Training Center are the following:

Baghdad Center:

1) TV/Video, Tape Recorder, Radio Repair Course

2) Automobile Repair Course

3) Air-Conditioner and Electric Appliances Repair Course

4) Elevator Repair and Maintenance Course.

Mosul Center:

1) TV/video, Tape Recorder, Radio Repair Course

2) Automobile Repair Course

3) Air-Conditioner and Electric Appliances Repair Course

(e) Instructing and administrative staff will be recruited from Japan and other countries.

3.1.2 Basic Conceptual Framework of Training Plan

The following Basic Conceptual Framework of the training is recommended.

(1) Capacity of Training Center and Numbers of Classes

a) Capacity of Training Center

According to the statistics released from the Statistical Office of the United Nations, the total amount of importation of durable consumer products in Iraq from 1975 to 1979 are shown in attached Table 2.2.

In this table, it is obvious that the annual increment for respective products show a geometric-proportional increase. This means that the expanding needs for repair and maintenance workers for such products cannot be compensated nor satisfied with merely a linear-functional increase by accumulating the annual graduates of the existing vocational training centers.

In addition to that, the said durable consumer products will before long be coming to the deteriorating period of their life cycle, as 7 years have elapsed since the commencement of their import in great quantity.

On the other hand, according to the Annual Abstract of Statistics of the Republic of Iraq, the number of employed personnel in manufacturing industries, inclusive of repair and maintenance services, is around 240,000 as of 1981. Comparing this figure with the Iraqi total labour population, which is estimated at more than 3 million, it is less than 10% and it is desired to increase this number from the standpoint of national industrialization.

There exists an urgent need to develop a training scheme for technicians in repair and maintenance services of durable consumer products, for which a shortage is forecast. Training of intermediate school graduate for semi skilled worker is also considered to be a timely target for the promotion of the government policy. The number of output in this Project is also desired to be as many as possible. These semi-skilled workers will assist the work of technicians when they are employed and they are future technicians by apprenticeship. At the same time, training of them is considered easier to be developed in comparison with other occupational training fields.

Regarding the employment of semi-skilled workers; trainees who have completed the automobile repair course, for instance, should have sufficient opportunities in the existing repair shops in Baghdad, where more than one thousand small repair shops are concentrated. Although the shops to repair and maintain electronic and electrical products are less compared with the ones for automobiles, present repair workshops will have enough rooms to absorb the semi-skilled workers who have finished the course at the proposed Vocational Training Centers. For the trainees, who have completed the elevator repair and maintenance course, employment opporotunities are considered quite broad as many sky scrapers are being constructed in conjunction with rapid urban development of the city of Baghdad.

As described, the training need of semi-skilled workers are great and it is desired to train as many semi-skilled workers as possible. But the capacity of the Training Center is limited from the administrative point of view. This is because the upper limit of the span of control for a unit grade of trainees in a vocational training center is considered approximately 300. The largest capacity of similar kinds of training courses for the training of intermediate school graduates in Japan is 275 for example. Considering the urgent need for maintenance and repair semi-skilled workers, it is advised to establish the proposed Vocational Training Centers with this figure as the upper limit.

The total number of youths who are graduated from intermediate schools but not proceeding to higher educational institution is estimated at far more than two thirds of the annual 100,000 intermediate school graduates as described in the background to the Project. Therefore, the young people with better school records are expected to be enrolled in the proposed vocational training centers. In this respect, the urgent opening of vocational training centers to provide better training opportunities for them is highly advised.

b) Number of Classes

The admittance of each class is 30 trainees. This is the standard number of trainees of one training course in Japan and considered adequate also even in the Republic of Iraq. Considering the present regional training needs and limiting the total admittance of one training center to 300, the number of training courses offered by the two Training Centers are the following;

	Baghdad	Mosul
TV/Video, Tape Recorder, Radio Repair Course	3	3
Automobile Repair Course	3	4
Air-Conditioner and Electric Appliance Repair Course	2	3
Elevator Repair and Maintenance Course	2	0

(2) Training courses and specialization

The training courses offered at the proposed Training Centers are shown in chapter 3.1.1(2),(d). However, in order to train a fresh intermediate school graduate to the level of employable semi-skilled workers for private industries in the limited duration of one year, the team suggested to include more specialized training in the latter part of the training. However, the Iraqi committee suggested to include the said specialized training only in the curriculum of automobile repair and air-conditioner and electric appliance repair courses.

With the adoption of the specialized training scheme in the latter part of the training course, it is expected that more practical training is to be given to the trainees. Therefore, the specialization of skill will become more specific and employment opportunities for the trainees are widened and they can be broadly accepted by even in the small scale and specialized industries in urban Baghdad and Mosul. At the same time, the trainee also is able to avail himself of the most suitable and aptitude-oriented training. Moreover, the grouping of trainees with similar aptitude will give a merit to the administration of the vocational training centers.

The following training is recommended in Baghdad and Mosul.

TV/Video, Tape Recorder, Radio Repair

(Particular specialization is not considered)

Automobile Repair

- -Engine repair
- -Chassis repair
- -Body repair

Air-Conditioner and Electric Appliance Repair

- -Air-Conditioning and Refrigeration Equipment Repair
- -Electric Appliances Repair

In addition, it is recommended to offer the following training in Baghdad;

Elevator Repair and Maintenance

(Particular specialization is not considered)

(3) Training Duration

In order to give sufficient knowledge and skills to the trainees, it is desired to provide longer training hours. The standard annual training hours of this type of training in Japan is 1,600 hours and it is distributed to 44 weeks. However considering the severe summer heat and dusty weather conditions, the equal training hours that of Japan cannot be applicable in Iraq.

It is commonly observed in Iraq that this kind of vocational training center offers 1,470 hours of training in 42 weeks. It offers 6 hour training in weekdays and 5 hours in weekends. In comparison, it is 10% less than that of Japan.

However considering the modern set-up of the proposed Vocational Training Centers and the maximum use of advanced training methodology and modern audio visual technology, the same or more quality training than that of Japan can be performed even in shorter training hours.

(4) Proportion of Practice and Lectures

Priority should be given to the practice work considering the objective of the proposed Training Centers. However for the course in electrical and electronic trades, the theoretical lectures should be more emphasized.

In overall consideration of the discussion with Iraqi instructors on the occasion of the site survey and views of Japanese vocational training experts, the following proportions are recommended for respective courses.

(a) TV/Video, Tape Recorder and Radio Repair Course

Lecture	30 %	Practice	70 %

(b) Automobile Repair Course

Lecture	25 %	Practice	75 %

(c) Air-Conditioner and Electric Appliances Repair Course

Lecture	25 %	Practice	75 %

(d) Elevator Repair and Maintenance Course

Lecture	30 %	Practice	70 %

(5) Targets of Training

The trainees are expected to become semi-skilled workers after the one year training and are desired to be employable immediately after the completion of the training. Considering these facts, the training targets and plans of the courses are as follows.

1. TV/Video, Tape Recorder and Radio Repair Course

The trainees are able to perform the following jobs under the supervision of skilled workers.

1) Assembly, disassembly, repair and adjustment of monochrome TV receivers, radio sets, tape recorders, etc.

2) Assembly, disassembly, repair and adjustment of the major troubles of colour television sets.

3) Simple repair and adjustment of video cassette recorders.

2. Automobile Repair Course

The trainees are able to perform the following jobs under the supervision of the skilled workers.

1) Inspection, disassembly, assembly, adjustment and repair of the major parts of automobiles such as engines, chassis, etc.

2) Repair of electric wiring and instruments of automobiles.

3) Simple repair of body and painting.

3. Air-Conditioner and Electric Appliance Repair Course.

The trainees are able to perform the following jobs under the supervision of the skilled workers.

1) Installation and maintenance of small air conditioning units and air coolers.

2) Maintenance of small packaged air-conditioning units used in offices.

3) Disassembly, assembly and repair of electric appliances such as washing machines, vacuum cleaners, etc.

4) Disassembly, assembly and repair of refrigerators, freezers, etc.

4. Elevator Repair and Maintenance Course

Trainees are able to perform the following jobs under the supervision of skilled workers.

1) Maintenance (Inspection, cleaning, oiling, etc) and replacement of spare parts, simple repair and adjustment of AC elevators.

2) Assembly of simple electronic/electrical control circuits.

3.2 TRAINING CURRICULUM

In order to train intermediate school graduates to the level of semi-skilled workers in the duration of one year, development of the training curriculum of the proposed Centers must be well studied.

Considering the educational attainments of intermediate school graduates and the requisite required for the graduates from the proposed Training Centers who are expected to work in the private industries as semi-skilled workers, the training curriculum must be practice-oriented.

The following curriculum is a suitable training curriculum for the proposed four training courses. The contents of them are well designed to cover the entire related technology and skill. Therefore, upon completion of one year's training, the trainees are expected to reach the level of semi-skilled workers.

3.2.1 TV/Video, Tape Recorder and Radio Repair Course, Curriculum

1.Theory **470 hrs**

1) General Subjects **60 hrs**

1. Mathematics
   Addition, Subtraction,
   Multiplication and Division

2. Physical Education
   Athletics

2) Specialized Subjects **410 hrs**

1. Production Technology
   Factory organization and discipline
   in work

2. Electronics Technology
   Electron and its function
   Electron tubes
   Semi-conductors
   Electronic circuits

3. Theory in Electricity

Basic theory

DC circuit

Current and magnetism

Static electricity

AC characteristics

AC circuit

4. Electronic Equipment

Propagation of radio wave

Audio frequency equipment

Electronically controlled equipment

Digital circuit fundamentals

Radio communication equipment

Electronic equipment assembling

Cable connections

Wiring and assembling procedures

5. Measurement and Testing Procedures

Voltage and current measurement

Resistance measurement

Electrical power measurement

L.C.R measurement

Measurement in RF circuit

Frequency measurement

Magnetism measurement

Applied industrial measurements

6. Materials

Electrical materials

Electronic materials

7. Drawing

Basic drawing

Instrumental drawing

Symbols

Blue print reading

8. Laws

Concerned laws and regulations

2. Practice 1,000 hrs

1) Basic Practice 520 hrs

1. Basic Measurement

Use of V.O.M

Resistance measurement procedures

Characteristic measurement procedures

Voltage measurement

Electron tube static characteristics

Semi-conductor static characteristics

Automation control circuit characteristics

L.C.R measurement

L.C oscillator circuit

Reasonance circuit

AF amplifier circuit

RF amplifier circuit

Detector circuit

Modulator circuit

Characteristic measurement

2. Basic Assembling Practice

Use of hand tools

Drilling and sheet metal work

Soldering technique

Electronic appalatus assembly and reassembly

3. Schematic Diagramme

Pictorial circuit diagramme

Schematic diagramme

Schematic diagramme reading

4. Assembly and Inspection of Basic Electronic Circuit

Power supply circuit

Amplifier circuit

Oscillator circuit

Detector circuit

Modurator circuit

Pulse circuit

5. Work Safety

Hazard prevention in work

First aid

2) Applied Practice **480 hrs**

1. Assembly and Reassembly

   Radio receivers

   TV receivers

   Tape recorders

   Video Cassette Recorders (VCR)

2. Repair and Adjustment

   Radio receivers

   TV receivers

   Tape recorders

   Video Cassette Recorders (VCR)

3.2.2 Automobile Repair Course, Curriculum

1. Common Subjects 830 hrs

(1) Theory 200 hrs

1) General Subjects (60 hrs)

1. Mathematics
   Addition, Subtraction,
   Multiplication and Division

2. Physical Education
   Athletics

2) Specialized Subjects (140 hrs)

1. Production Technology

Factory organization and discipline in work

2. Structure of Automobile

Outline of automobile

Performance of automobile

Mechanical elements

Transmission

Front axle and steering device

Suspension

Brake

Frame and body

Wheel and tire

3. Structure of Internal Combustion Engine

Outline of internal combustion engine

Performance of internal combustion engine

Fuel and combustion

Lubrication, lubricant oil and operation oil

Gasoline engine and its auxiliary apparatus

Diesel engine

Rotary engine

4. Electric Apparatus

Basic theory

Electric apparatus for engines

Electric apparatus for engine and body

Automobile instrument

5. Fabrication

Fabrication and measurement

Hand finishing

Welding

6. Work Safety

Hazard prevention in work

First aid

7. Drawing

Basic drawing

Instrumental drawing

Symbols

Blue print reading

8. Laws

Concerned laws and regulations

(2)Basic Practice Work 630 hrs

1. Basic Measurement

Length, plane, angle

Use of automobile measurement instrument

2. Basic Manual Work

Marking-off, chiselling, filing, etc

Use of drill press, grinder

3. Basic Automobile Repair and Maintenance

Disassembly and assembly of gasoline engine and its auxiliary apparatus

Disassembly and assembly of power train

Disassembly and assembly of front axle and steering device

Disassembly and assembly of suspension

Wheels and tires

4. Welding

Gas welding

Gas cutting

Arc welding

5. Driving Skill

Forward, reverse and stop

Basic steering practice in practice course

2. Specialized Training 640 hrs

(1) Engine Repair Course 640 hrs

Theory **140 hrs**

1. Repair Procedures
   - Procedures of gasoline engine repair
   - Procedures of diesel engine repair
   - Procedures of automobile electric apparatus repair

2. Work Safety and Sanitation
   - Safety procedures in engine repair
   - First aid

Practice **500 hrs**

1. Mounting and Dismantling of Gasoline Engine and its Auxiliary Apparatus
2. Inspection, Disassembly, Assembly and Adjustment of Gasoline Engine
3. Inspection, Disassembly, Assembly and Adjustment of Auxiliary Equipment of Gasoline Engine
4. Inspection, Disassembly, Assembly and Adjustment of Gasoline Engine Fuel System
5. Inspection and Adjustment of Lublication System Gasoline Engine

6. Inspection and Adjustment of Cooling System of Gasoline Engine
7. Inspection and Adjustment of Exhaust System of Gasoline Engine
8. Trouble and Trouble-shooting of Gasoline Engine
9. Inspection and Adjustment of Diesel Engine and its Auxiliary Apparatus
10. Adjustment and Testing of Diesel Engine Fuel System such as Injection Pump, Nozzle, etc.
11. Trouble and Trouble-shooting of Diesel Engine

(2) Chassis Repair Course **640 hrs**

Theory **140 hrs**

1. Chassis Maintenance Procedure

   Maintenance procedure of chassis electric apparatus

   Maintenance procedure of chassis

2. Work Safety

   Work safety in chassis maintenance

Practice **500 hrs**

1. Disassembly, Inspection, Assembly and Adjustment of the following Automobile Chassis Parts

   1. Clutch
   2. Transmission
   3. Propeller shaft and universal joint
   4. Rear axle and differential gear
   5. Brakes
   6. Steering mechanism
   7. Front axle
   8. Independent suspension
   9. Frame and chassis spring
   10. Wheels and tires
   11. Automobile inspection

(3) Automobile Body Repair Course 640 hrs

Theory 140 hrs

1. Automobile Body Repair Maintenance Procedures
   Automobile Electricity Repair Procedure
   Automobile Body Repair Procedure

2. Safety in Work
   Safety in automobile body repair

3. Automobile Body Repair and Painting
   Kind of tools and its function
   Kind of paint used for automobile painting
   Metal painting procedures

Practice 500 hrs

1. Use and Application of Special Tools used for Automobile Body Building and Repair
2. Soldering Technique for Body Re-building
3. Dis-assembly, Assembly and Adjustment of Automobile Lighting Apparatus
4. Dis-assembly, Assembly and Adjustment of Automobile Body Auxiliary Apparatus
5. Use of Equipment used for Automobile Body Building
6. Automobile Body Repair, Adjustment and Assembly

3.2.3 Air-conditioner and Electric Appliance Repair Course, Curriculum

1. Common Subjects 700 hrs

(1) Theory 200 hrs

1) General Subjects (60 hrs)

1. Mathematics
   Addition, Subtraction,
   Multiplication and Division

2. Physical Education
   Athletics

2) Specialized Subjects (140 hrs)

1. Production Technology
   Factory organization and discipline
   in work

2. Mechanical Technology
   Materials, Machine Element
   Mechanism and Motion
   Machinery, Heat Engine, etc

3. Electrical Technology

   DC circuit

   AC Circuit

   Electrical Control

   Application of Electricity

   Circuit Diagramme, etc

4. Drawing

   Basic drawing

   Instrumental drawing

   Symbols

   Blue print reading

5. Working Safety

   Hazard prevention in work

   First aid

6. Laws

   Concerned laws and regulations

(2) Basic Practice Work **500 hrs**

1. Basic Bench Work
   - Marking-off
   - Use of files and hand finishing
   - Drilling, grinding
   - Tapping, etc

2. Basic Pipe Processing
   - Use of tools and equipment used for pipe process
   - Cutting, bending, tapping, jointing
   - Assembling
   - Heat insulation and painting, etc

3. Welding
   - Gas welding
   - Gas cutting
   - Arc welding
   - Brazing, etc

4. Basic Sheet Metal Work
   - Mark-off
   - Development, cutting
   - shearing, bending, Duct making, etc

5. Electrical Wiring
   - Electrical Measurement
   - Wiring and Connections
   - Experiment in Control Circuit

6. Measurement

   Length, Pressure

   Voltage and Current

   Temperatures

7. Work Safety and Sanitation

   Safety precautions

   First aid

2. Specialized Training 770 hrs

(1) Refrigeration and Air-Conditioning Course 770 hrs

Theory 150 hrs

1. Refrigeration Principles
   - Principle of refrigeration
   - Refrigerants and Oils
   - Refrigerator compressor, evaporator
   - Various kind of refrigeration
   - Controlling Cooling Mechanism
   - Refrigeration piping, etc

2. Air-Conditioning
   - Principle of air-conditioning
   - Air-conditioning equipment
   - Piping and duct, etc

3. Installation and Metal-work
   - Pipe bending
   - Refrigerant piping
   - Pressurized pipe arrangements
   - Welding and gas cutting
   - Sheet metal work
   - Building structure principles of sheet metal work

4. Safety

Work safety and sanitation

Safety precaution

First aid

5. Laws and Regulations

Practice **620 hrs**

1. Refrigeration Piping
   Pipe bending and piping
   Heat insulation

2. Electrical Wiring
   Electrical installation of refrigeration
   and air-conditioning equipemnt
   Control circuit and its components, etc

3. Dis-assembly and Assembly Refrigeration
   and Air-conditioning Equipment
   Compressors, evaporators, condensers, etc

4. Installation of Refrigeration and
   Air-conditioning Equipment

5. Operation and Maintenance

(2) Electric Appliance Repair Course 770 hrs

Theory 150 hrs

1. Application of Electricity
   - Basic electricity and
   - Electronic circuits and its application
   - Control circuit,
   - Induction, DC, AC motors

2. Electrical Household Appliances
   - Refrigerator, water cooler,
   - Washing machine, Electric Fan
   - Electric Iron, Oven, Hair dryer,
   - Air-cooler, etc

3. Repair Procedures
   - Kind of troubleshooting tools
   - *and equipment*
   - Troubleshooting procedures

4. Work Safety and Sanitation
   - Safety precautions
   - First aid

5. Laws and Regulations

Practice **620 hrs**

1. Electrical Wiring
   - Use of measurement equipment
   - Wiring of electrical appliances

2. Dis-assembly and Assembly

3. Repair and Adjustment
   - Troubleshooting procedures
   - Repair technique
   - Adjustment

4. Inspection
   - Inspection of electrical appliances

5. Installation and Mounting

3.2.4 Elevator Repair and Maintenance Course, Curriculum

1. Theory **470 hrs**

1) General Subjects **80 hrs**

1. Mathematics
   Addition, Subtraction,
   Multiplication and Division

2. Physics
   Materials
   Force and movement

3. Physical Education
   Athletics

2) Specialized Subjects **390 hrs**

1. Production Technology
   Factory organization and discipline
   in work

2. Outline of Elevators
   Kind of elevators and its application
   Codes and standards used in elevators
   Maintenance, inspection and repair

3. Elevator Mechanism
   Mechanical parts
   Electrical parts

4. Electrical Circuit

Electrical fundamentals

Current and magnetism

Static electricity

AC characteristics

DC circuit

AC circuit

5. Basic Assembling Practice

Assembly and scale measurement

Hand finishing

6. Drawing

Basic drawing

Instrumental drawing

Symbols

Blue print reading

7. Laws

Concerned laws and regulations

8. Working Safety

Hazard prevention in work

First aid

2. Practice 1,000 hrs

1) Basic Practice 600 hrs

1. Basic Measurement

   Length, Surface and Angles

   Elevator maintenance measurement equipment

2. Basic Assembling Practice

   Chipping

   Filing

3. Elevator Parts Maintenance

   Disassembly, reassembly and adjustment of winding machine

   Disassembly, reassembly and adjustment of electro magnetic brake

   Disassembly, reassembly and adjustment of sensor switch

   Disassembly, reassembly and adjustment of counter weight

   Disassembly, reassembly and adjustment of door

   Wire rope Maintenance

4. Elevator Safety Features Maintenance

   Maintenance procedures of safety features

5. Electrical Control Circuit and Its Maintenance

   Disassembly, reassembly and adjustment of control panel

   Signal board operations

   Operation board operations

6. General Operation, Maintenance and Adjustment of Elevators

   AC operated elevators

   DC operated elevators

7. Working Safety

   Hazard prevention in work

   First aid

2) **Applied Practice** **400 hrs**

1. Maintenance of Elevators

   Practice in elevator tower
   (Maintenance procedures, operation)
   Maintenance, inspection, troubleshooting
   trouble prevention, repair and adjustment

2. Work Administration

   Inventory of technical drawings, files,
   components, materials and tools
   Report and technical writing

3.2.5 TRAINING FLOW CHART

note's 1) _____ : PRACTICE
2) ..... : THEORY
3) ( ) : TRAINING HOURS

COURSE \ MONTH	1	2	3	4	5	6	7	8	9	10	11	12
TV/Video, Tape Recorder Radio Repair Course							(1000h)					
							(470h)					
Automobile Repair Course	COMMON SUBJECT				(630h)		SPECIALIZED TRAINING	Engine Repair Course				(500h)
					(200h)							(140h)
								Chassis Repair Course				(500h)
												(140h)
								Body Repair Course				(500h)
												(140h)
Air Conditioner & Electric Appliance Repair Course	COMMON SUBJECT			(500h)		SPECIALIZED TRAINING	Refrigeration & Air Conditioning Course					(620h))
			(200h)									(150h)
							Electric Appliance Repair Course					(620h)
												(150h)
Elevator Repair & Maintenance Course							(1000h)					
							(470h)					

3.3 TRAINING EQUIPMENT AND WORKSHOP LAYOUT

The major equipment for the respective training courses in the proposed Training Centers are selected and shown in the following Tables 3.5 to 3.11.

3.3.1 Training Equipment

Table 3.5
List of Training Equipment
TV/Video, Tape Recorder and Radio Repair Course
(Baghdad Center)

No.	Description	Specification	Qty
1.	Work Bench with Radio and TV Antenna Terminals	1800 X 900, Wood	45
2.	Chairs for Trainees	420W X 450L X 740 to 845H	90
3.	Learning Kit,	Basic Electricity and Electronics, Transistors, Digital, Circuit, etc	45
4.	Radio Repairing Simulator	40 Trouble Positions	45
5.	Tape Recorder Simulator	50 Trouble Positions	15

6.	TV Repairing Simulator	Parts Replacement Simulation, Answer Indication for Instructors	10
7.	Transistor Circuit Trainer	5 Panel System	10
8.	Digital Circuit Trainer	Gate Circuit, Flip-Flop Circuit, etc	10
9.	Oscilloscope	Dual Trace, 30 MHz	45
10.	Function Generator	2Hz-200kHz, Sine, Square, Triangle, Pulse Waves, etc	3
11.	Electronic Counter	10-500MHz	15
12.	Sweep-Marker Generator	AM, 405kHz-11.2MHz	3
13.	Sweep-Marker Generator	FM, 0.1-110MHz	3
14.	Distortion Meter	5Hz-199.9kHz	3
15.	RC Oscillator	5Hz-500kHz, Sine and Square Waves	15
16.	Radio IF Sweeper Scope	455kHz-10.7MHz	3
17.	AC Milivolt Meter	300uV-100V	15
18.	TV Field Checker	VHF, UHF	15
19.	Oscilloscope	3 Trace, 100MHz	3

20.	Color TV Monitor	PAL	30
21.	Curve Tracer	Measurement of Transistors, FET and Diodes	3
22.	TV Sweep Generator	VHF, 10-250MHz	3
23.	Attenuator	DC-50MHz, 75 Ohm	3
24.	AC Volt, Ammeter	45-65Hz, 0.15-30A, 30-750 ACV	15
25.	DC Volt, Ammeter	1-300mA, 3-1000 DCV	15
26.	Watt Meter	Single Phase, 25Hz-1kHz	3
27.	Frequency Meter	45-500Hz	3
28.	Q Meter	Frequency: 15.5kHz - 50MHz Q : 5 - 750	3
29.	LCR Meter (Universal Bridge)	L:0.1uH-9999H C:0.1pF-9999uF R:0.01 to 9.999 M Ohm	3
30.	Wheatstone Bridge	0.01 Ohm to 9.99 M Ohm	3
31.	Pocket Thermo-meter	-50 to 99.9 Degrees Celsius	3

32.	Insulation Resistance Measuring Set	Test Voltage: 100, 250 500V	3
33.	DC Power Supply	0-250V	45
34.	CRT Tester/Rejuvenator	Emission Test, etc	2
35.	Transistor Checker	Transistor, J-FET, MOS-FET, SCR, etc	3
36.	Signal Injector/Tracer	0.455-110MHz	30
37.	Centralized TV Signal Generator System	TV Sync Generator SECAM B, Digital Test Pattern Generator	1
38.	Radio Set	FM/AM	90
39.	Tape Recorder Set	With Tone Controls	90
40.	Radio Cassette Recorder	4 band, AM/FM/SW1-2	90
41.	B/W Television set	CCIR	90
42.	Colour TV Set	Shadow Mask, 14in 3 Colour Systems PAL, SECAM, NTSC	45
43.	Colour TV Set	Trinitron, 14in 3 Colour Systems PAL, SECAM, NTSC	45

44.	Video Cassette Recorder	Colour 2 Systems, PAL, SECAM Beta Max	45
45.	Video Cassette Recorder	Colour 2 Systems, PAL, SECAM VHS	45
46.	Tape Recorder Repair Jigs and Tools	Standard Tapes, Torque Meter, Tension Meter, etc	60
47.	VCR Repair Jigs and Tools	For VHS and BETA	
48.	Storage Shelves	Steel	6
49.	Sequential Control Training Trainer	Plug-in System	8
50.	Automatic Control System Trainer	Temperature, Pressure, Flux Control, etc	5
51.	Modulation/Demodulation Trainer	For Experiments in Modulation	5
52.	Pulse Circuit Trainer	Differentiation, Integration, Astable Monostable, etc	5

53.	Measurement Instruments and Equipment	VOM, High Voltage Meter, etc
54.	Tools	Screw Drivers, Cutter, etc
55.	Spare parts	Good For 5 Years

Table 3.6

List of Training Equipment
TV/Video, Tape Recorder and Radio Repair Course
(Mosul Center)

No.	Description	Specification	Qty
1.	Work Bench with Radio and TV Antenna Terminals	1800 X 900, Wood	45
2.	Chairs for Trainees	420W X 450L X 740 to 845H	90
3.	Learning Kit	Basic Electricity and Electronics. Transistors, Digital Circuit, etc	45
4.	Radio Repairing Simulator	40 Trouble Positions	45
5.	Tape Recorder Simulator	50 Trouble Positions	15
6.	TV Repairing Simulator	Parts Replacement Simulation. Answer Indication for Instructors	10
7.	Transistor Circuit Trainer	5 Panel System	10

8.	Digital Circuit Trainer	Gate Circuit, Flip-Flop Circuit, etc	10
9.	Oscilloscope	Dual Trace, 30 MHz	45
10.	Function Generator	2Hz-200kHz, Sine, Square, Triangle, Pulse Waves, etc	3
11.	Electronic Counter	10-500MHz	15
12.	Sweep-Marker Generator	AM, 405kHz-11.2MHz	3
13.	Sweep-Marker Generator	FM, 0.1-110MHz	3
14.	Distortion Meter	5Hz-199.9kHz	3
15.	RC Oscillator	5Hz-500kHz, Sine and Square Waves	15
16.	Radio IF Sweeper Scope	455kHz-10.7MHz	3
17.	AC Milivolt Meter	300uV-100V	15
18.	TV Field Checker	VHF, UHF	15
19.	Oscilloscope	3 Trace, 100MHz	3
20.	Color TV Monitor	PAL	30

21.	Curve Tracer	Measurement of Transistors, FET and Diodes	3
22.	TV Sweep Generator	VHF, 10-250MHz	3
23.	Attenuator	DC-50MHz, 75 Ohm	3
24.	AC Volt, Ammeter	45-65Hz, 0.15-30A, 30-750 ACV	15
25.	DC Volt, Ammeter	1-300mA, 3-1000 DCV	15
26.	Watt Meter	Single Phase, 25Hz-1kHz	3
27.	Frequency Meter	45-500Hz	3
28.	Q Meter	Frequency: 15.5kHz - 50MHz Q: 5 - 750	3
29.	LCR Meter (Universal Bridge)	L:0.1uH-9999H C:0.1pF-9999uF R:0.01 to 9.999 M Ohm	3
30.	Wheatstone Bridge	0.01 Ohm to 9.99 M Ohm	3
31.	Pocket Thermo-meter	-50 to 99.9 Degrees Celsius	3
32.	Insulation Resistance Measuring Set	Test Voltage: 100, 250, 500V	3

33.	DC Power Supply	0-250V	45
34.	CRT Tester/Rejuvenator	Emission Test, etc	2
35.	Transistor Checker	Transistor, J-FET, MOS-FET, SCR, etc	3
36.	Signal Injector/Tracer	0.455-110MHz	30
37.	Centralized TV Signal Generator System	TV Sync Generator SECAM B, Digital Test Pattern Generator	1
38.	Radio Set	FM/AM	90
39.	Tape Recorder Set	With Tone Controls	90
40.	Radio Cassette Recorder	4 band, AM/FM/SW1-2	90
41.	B/W Television set	CCIR	90
42.	Colour TV Set	Shadow Mask, 14in 3 Colour Systems PAL, SECAM, NTSC	45
43.	Colour TV Set	Trinitron, 14in 3 Colour Systems PAL, SECAM, NTSC	45
44.	Video Cassette Recorder	Colour 2 Systems, PAL, SECAM Beta Max	45

45.	Video Cassette Recorder	Colour 2 Systems, PAL, SECAM VHS	45
46.	Tape Recorder Repair Jigs and Tools	Standard Tapes, Torque Meter, Tension Meter, etc	60
47.	VCR Repair Jigs and Tools	For VHS and BETA	
48.	Storage Shelves	Steel	6
49.	Sequential Control Training Trainer	Plug-in System	8
50.	Automatic Control System Trainer	Temperature, Pressure, Flux Control, etc	5
51.	Modulation/Demodulation Trainer	For Modulation Experiments	5
52.	Pulse Circuit Trainer	Differentiation, Integration, Astable Monostable, etc	5
53.	Measurement Instruments and Equipment	VOM, High Voltage Meter, etc	
54.	Tools	Cutter, Screw Driver, etc	
55.	Spare parts	Good For 5 Years	

Table 3.7

List of Training Equipment
Automobile Repair Course
(Baghdad Center)

No.	Description	Specifications	Qty
1	Cylinder Boring Machine	81- 165 mm	1
		67 - 130 mm	1
		38 - 60 mm	1
2.	Cylinder Honing Machine	25 - 150 mm	1
3.	Conrod Aligner	35 - 64 mm	3
4.	Surface Grinder	1.5 kW	1
5.	Valve Refacer	Double Ended Collet Type	3
6.	Valve Seat Grinder	Eccentric Type	3
7.	Charging, Starting Battery Analyzer	DC 0-100A, 0-600A, DC 0-4V, 0-40V	3

8.	Engine Tune-up Master	Coil, Capacitor Tester, etc	3
9.	Big Scope	CRT 20in	1
10.	Emission Tester	MEXA-324F	1
11.	Universal Test Bench	Testing of Distributor, Generator, Regulator, Starter, Ignission Coil, Capacitors	1
12.	Commutator Mica Cutter and Lathe	340 mm	1
13.	Air Filter Tester	Vacuum Type	3
14.	Spark Plug Cleaner	10,12,14,18 mm	3
15.	Battery Quick Charger	0-50A/0-25A	3
16.	Silicon Battery Charger	0-15A	3
17.	Piston Pin-hole Honing Machine	1.2 - 80 mm	1
18.	Engine Dynamo Meter	W/Gasoline Engine	1
19.	Flow Detector	Magnetic	1
20.	Diesel Smoke Meter	0-100%	1

21.	Injection Pump Tester	8 Cylinders	1
22.	Diesel Timing and Tachometer	4 Cycles	3
23.	Side Slip Tester	3t	1
24.	Chassis Dynamo Meter	3t	1
25.	Turning Radius Gauge	+/-50 Degrees	3
26.	Wheel Aligner	950-1680 mm	1
27.	Camber, Caster, Kingpin Gauge	Magnetic Type	3
28.	Sound Level Meter	35-103 Hone	3
29.	Portable Load Meter	2t	1
30.	Head Light tester	3m	1
31.	Brake Tester	3t	1
32.	Wheel Balancer	0.75kW	2
33.	Tire Changer	3-12in	2
34.	Tube Test Tank	20in	1
35.	Brake Drum and Cluch Lathe	130-380 mm	1

36.	Brake Shoe Grinder	150-360 mm	3
37.	Air Hydro Rivetter	5t	1
38.	Air Fix	0 - 10 kg/cm^2	1
39.	Test Lift	2t	1
40.	Twin Post Lift	2.5t	2
41.	Lift Master	4 Poles, 3t	1
42.	Frame Lift	8t	1
43.	Air Lift	1300kg	3
		2500kg	1
44.	Garage Jack	3t	3
		5t	3
		10t	2
45.	Baby Crane	1t	3
46.	Shock Absorber Tester	500kg	1
47.	Chain Block	Trolly, Hoist 2t	1
48.	Chassis Lublicator	350g/mm	2

49.	Oil Drain	30 litres	2
50.	Oil Changer	100 litres	2
51.	Car Washer	1450 litres/H	3
52.	Parts Washer	190 litres	6
53.	Air Compressor	7.5kW	1
54.	Port Power Set	4t	1
		5t	1
55.	Spot Welder	16kVA	1
56.	Arc Welder	250A	1
57.	Acetilene Gas Welding Equipment	Cutting Torch, Welding Torch, etc	3
58.	Colour Regulator		1
59.	Foot Shear	Hydraulic, Manual	1
60.	Painting Booth	Dry Type	1
61.	Hydraulic Press	15t	1
62.	Bench Drilling Machine	13 mm	3

63.	High Speed Cutter	405 mm	2
64.	Surface Plate	900 X 600 X 100 mm	3
65.	Universal Engine Stand	With Caster	15
66.	Lathe	500 mm	1
67.	Work Bench	900 X 1800	21
68.	Fork Lift	1t	1
69.	Measurement Instruments		
70.	Hand Tools		
71.	Training Materials		
	1) Training Vehicles		
	2) Engines		
72.	Spare Parts	Good For 5 Years	

Table 3.8

List of Training Equipment
Automobile Repair Course
(Mosul Center)

No.	Description	Specifications	Qty
1	Cylinder Boring Machine	81- 165 mm	1
		67 - 130 mm	1
		38 - 60 mm	1
2.	Cylinder Honing Machine	25 - 150 mm	1
3.	Conrod Aligner	35 - 64 mm	3
4.	Surface Grinder	1.5 kW	1
5.	Valve Refacer	Double Ended Collet Type	3
6.	Valve Seat Grinder	Eccentric Type	3
7.	Charging, Starting Battery Analyzer	DC 0-100A, 0-600A, DC 0-4V, 0-40V	3

8.	Engine Tune-up Master	Coil, Capacitor Tester, etc	3
9.	Big Scope	CRT 20in	1
10.	Emission Tester	MEXA-324F	1
11.	Universal Test Bench	Testing of Distributor, Generator, Regulator, Starter, Ignission Coil, Capacitors	1
12.	Commutator Mica Cutter and Lathe	340 mm	1
13.	Air Filter Tester	Vacuum Type	3
14.	Spark Plug Cleaner	10,12,14,18 mm	3
15.	Battery Quick Charger	0-50A/0-25A	3
16.	Silicon Battery Charger	0-15A	3
17.	Piston Pin-hole Honing Machine	1.2 - 80 mm	1
18.	Engine Dynamo Meter	W/Gasoline Engine	1
19.	Flow Detector	Magnetic	1
20.	Diesel Smoke Meter	0-100%	1

21.	Injection Pump Tester	8 Cylinders	1
22.	Diesel Timing and Tachometer	4 Cycles	3
23.	Side Slip Tester	3t	1
24.	Chassis Dynamo Meter	3t	1
25.	Turning Radius Gauge	+/-50 Degrees	3
26.	Wheel Aligner	950-1680 mm	1
27.	Camber, Caster, Kingpin Gauge	Magnetic Type	3
28.	Sound Level Meter	35-103 Hone	3
29.	Portable Load Meter	2t	1
30.	Head Light tester	3m	1
31.	Brake Tester	3t	1
32.	Wheel Balancer	0.75kW	2
33.	Tire Changer	3-12in	2
34.	Tube Test Tank	20in	1
35.	Brake Drum and Cluch Lathe	130-380 mm	1

36.	Brake Shoe Grinder	150-360 mm	3
37.	Air Hydro Rivetter	5t	1
38.	Air Fix	0 - 10 kg/cm^2	1
39.	Test Lift	2t	1
40.	Twin Post Lift	2.5t	2
41.	Lift Master	4 Poles, 3t	1
42.	Frame Lift	8t	1
43.	Air Lift	1300kg	3
		2500kg	1
44.	Garage Jack	3t	3
		5t	3
		10t	2
45.	Baby Crane	1t	3
46.	Shock Absorber Tester	500kg	1
47.	Chain Block	Trolly, Hoist 2t	1
48.	Chassis Lublicator	350g/mm	2

49.	Oil Drain	30 litres	2
50.	Oil Changer	100 litres	2
51.	Car Washer	1450 litres/H	3
52.	Parts Washer	190 litres	8
53.	Air Compressor	7.5kW	1
54.	Port Power Set	4t	1
		5t	1
55.	Spot Welder	16kVA	1
56.	Arc Welder	250A	1
57.	Acetilene Gas Welding Equipment	Cutting Torch, Welding Torch, etc	3
58.	Colour Regulator		1
59.	Foot Shear	Hydraulic, Manual	1
60.	Painting Booth	Dry Type	1
61.	Hydraulic Press	15t	1
62.	Bench Drilling Machine	13 mm	4

63.	High Speed Cutter	405 mm	2
64.	Surface Plate	900 X 600 X 100 mm	4
65.	Universal Engine Stand	With Caster	15
66.	Lathe	500 mm	1
67.	Work Bench	900 X 1800	23
68.	Fork Lift	1t	1
69.	Measurement Instruments		
70.	Hand Tools		
71.	Training Materials		
	1) Training Vehicles		
	2) Engines		
72.	Spare Parts	Good For 5 Years	

Table 3.9

List of Equipment
Air-conditioner and Electric Appliances Repair Course
(Baghdad Center)

No.	Description	Specification	Qty
1.	Packaged Air-conditioner	7,100kcal/h	6
2.	Packaged Air-conditioner	13,000kcal/h	2
3.	Window Type Room Air-conditioner	4,000kcal/h	10
4.	Window Type Room Air-conditioner	3,000kcal/h	20
5.	Split System Room Air-conditioner	3,000kcal/h	5
6.	Multi System Room Air-conditioner	500kcal/h	3
7.	Air-conditioner Training Unit	0.4kW	4
8.	Air-conditioner Testing Unit	For Performance Test	1

9.	Commercial Refrigeration Training Unit	-30 Degrees Celsius 2 Refrigeration Units	1
10.	Open Type Condensing Unit	R-12, Air Cool, 0.4kW	2
11.	Semi Hermetic Condensing Unit	R-12, Air Cool, 0.4kW	2
12.	Hermetic Condensing Unit	R-12, Air Cool, 0.4kW	2
13.	Ice Maker	53Kg/day, 0.3kW	2
14.	Compressor Cut-out Model	Open, Semi Open, Sealded Type	1
15.	Refrigerator Training Unit	R-12, 0.4kW	4
16.	Thermal-humidity Control Unit	Standard Type	2
17.	Air-conditioner Electric Wiring Training Unit	For Demonstration	20
18.	Room Air-conditioner Training Simulator	Standard Type	6

19.	Refrigerator Simulator	Standard Type	4
20.	Air-cooler	Standard Type	4
21.	Refrigerator	150 litles	15
22.	Arc Welding Machine	200A	15
23.	CO_2 Arc Welding Machine	100A	2
24.	Edge Planer	340rpm, 30-60 Degrees	1
25.	Welding Hume Collector		10
26.	Bench Drill Machine	13mm	4
27.	High Speed Cutter	130mm	1
28.	Bench Grinder	305 X 32 X 25.4 mm	2
29.	Air Compressor	$14kg/cm^2$	1
30.	Spot Welding Machine	Condenser Type	1
31.	Portable Spot Welding Machine	Max. 2.0 + 2.0 mm	1
32.	Automatic Gas Cutting Machine	5-100mm	2

33.	Welding Rod Box	75kg, -400 Degrees Celsius	1
34.	Electric Appliance Simulators	Standard Type	15
35.	DC Generator	DC 2.2 kW, 220V	30
36.	DC Motor	DC 2.2 kW, 220V	30
37.	Triple Roll Machine	Manual, 1000mm	1
38.	Treadle Shearing	1000mm	1
39.	Hand Universal Brake	Manual, 1250mm	1
40.	Roll Forming Machine	320 X 30 mm	1
41.	Lever Shear	220mm	1
42.	Work Bench	900 X 1,800 mm	21
43.	Measurement Instruments		
44.	Tools		
45.	Training Materials		
46.	Spare Parts	Good for 5 Years	

Table 3.10

List of Equipment
Air-conditioner and Electric Appliances Repair Course
(Mosul Center)

No.	Description	Specification	Qty
1.	Packaged Air-conditioner	7,100kcal/h	10
2.	Packaged Air-conditioner	13,000kcal/h	2
3.	Window Type Room Air-conditioner	4,000kcal/h	15
4.	Window Type Room Air-conditioner	3,000kcal/h	30
5.	Split System Room Air-conditioner	3,000kcal/h	5
6.	Multi System Room Air-conditioner	500kcal/h	5
7.	Air-conditioner Training Unit	0.4kW	4
8.	Air-conditioner Testing Unit	For Performance Test	1

9.	Commercial Refrigeration Training Unit	-30 Degrees Celsius 2 Refrigeration Units	1
10.	Open Type Condensing Unit	R-12, Air Cool, 0.4kW	3
11.	Semi Hermetic Condensing Unit	R-12, Air Cool, 0.4kW	3
12.	Hermetic Condensing Unit	R-12, Air Cool, 0.4kW	3
13.	Ice Maker	53Kg/day, 0.3kW	2
14.	Compressor Cut-out Model	Open, Semi Open, Sealded Type	1
15.	Refrigerator Training Unit	R-12, 0.4kW	6
16.	Thermal Humidity Control Unit	Standard Type	2
17.	Air-conditioner Electric Wiring Training Unit	For Demonstration	20
18.	Room Air-conditioner Training Simulator	Standard Type	6

19.	Refrigerator Simulator	Standard Type	6
20.	Air-cooler	Standard Type	4
21.	Refrigerator	150 litles	20
22.	Arc Welding Machine	200A	15
23.	CO_2 Arc Welding Machine	100A	2
24.	Edge Planer	340rpm, 30-60 Degrees	1
25.	Welding Hume Collector		10
26.	Bench Drill Machine	13mm	6
27.	High Speed Cutter	130mm	1
28.	Bench Grinder	305 X 32 X 25.4 mm	2
29.	Air Compressor	$14kg/cm^2$	1
30.	Spot Welding Machine	Condenser Type	1
31.	Portable Spot Welding Machine	Max. 2.0 + 2.0 mm	1
32.	Automatic Gas Cutting Machine	5-100mm	2

33.	Welding Rod Box	75kg, -400 Degrees Celsius	1
34.	Electric Appliance Simulators	Standard Type	15
35.	DC Generator	DC 2.2 kW, 220V	30
36.	DC Motor	DC 2.2 kW, 220V	30
37.	Triple Roll Machine	Manual, 1000mm	1
38.	Treadle Shearing	1000mm	1
39.	Hand Universal Brake	Manual, 1250mm	1
40.	Roll Forming Machine	320 X 30 mm	1
41.	Lever Shear	220mm	1
42.	Work Bench	900 X 1,800 mm	21
43.	Measurement Instruments		
44.	Tools		
45.	Training Materials		
46.	Spare Parts	Good for 5 Years	

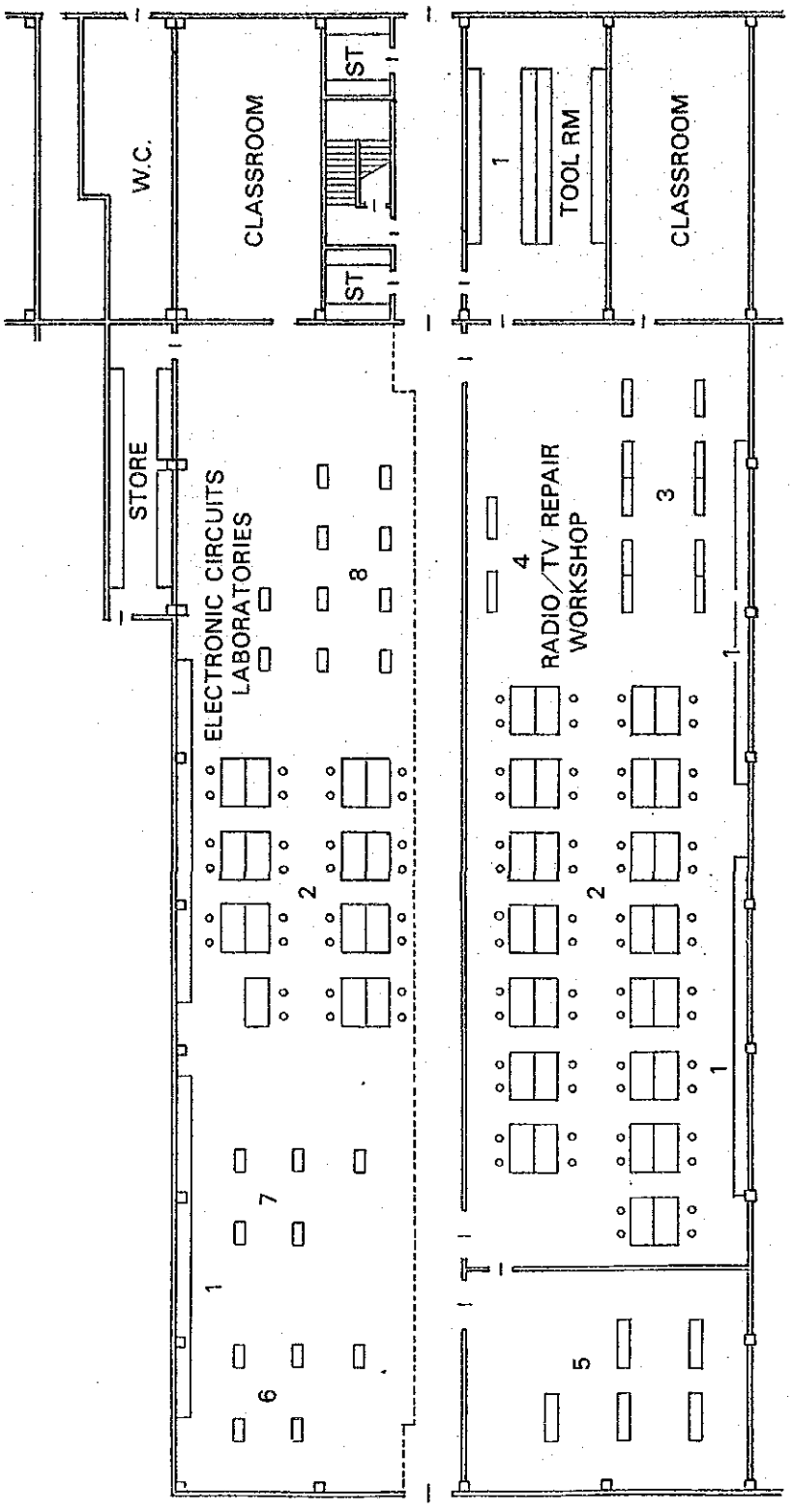
Table 3.11
List of Training Equipment
Elevator Repair and Maintenance Course
Baghdad Center

No.	Description	Specification	Qty
1.	Elevator	AC-2, 60m/min, 3.7kW 4 Stops/Opening, 11 Persons AC-2: AC Dia-Glide Control with Geared Traction System	1
2.	Elevator	DC-GD, 105m/min, 11kW, 4 Stops/Opening DC-GD: DC Motor Speed Control with Geared Traction System	1
3.	Training Elevator	DC-GD, 90m/min, 11kW, 2 Stops, Travel Distance less than 4.5M	1
4.	Training Elevator	AC-D, 60m/min, 3.7kW, 2 Stops, Travel Distance less than 4.5M	1
5.	Traction Machine Unit	Motor Capacity 3.7kW	3

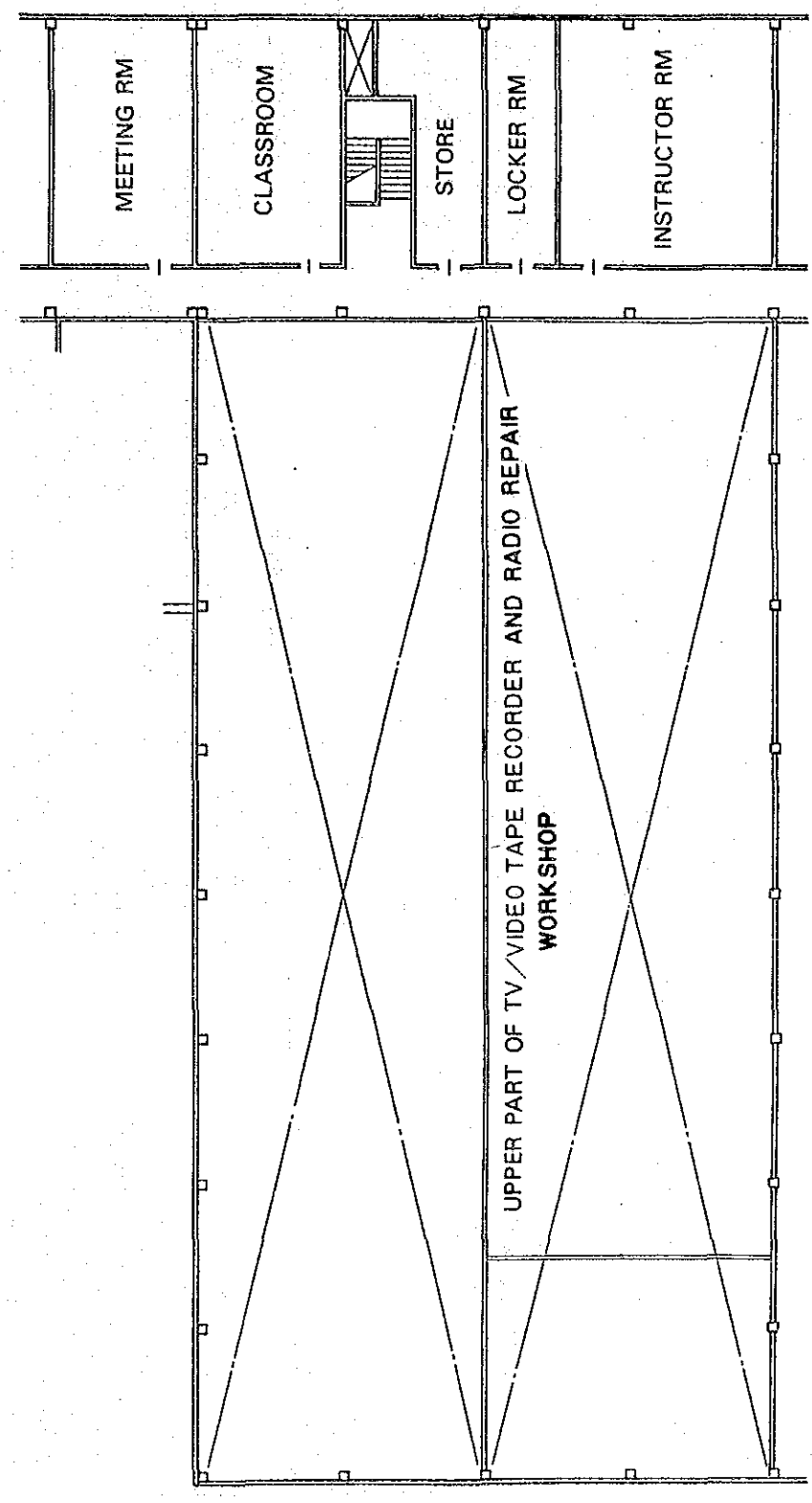
6.	Traction Motor Unit	Motor Capacity 5.0kW	3
7.	Door Mechanism Simulator	Landing Door Mechanism	6
8.	Relay Control Simulators	AC Elevator Type	15
9.	Component Unit for Elevators		
	Governers		9
	Landing Unit	Mechanical Landing Switch Relay for DC Elevators	9
	Door Machine		6
	Guide Shoes		40
	Door Interlock With Switches		30

10.	DC power Supply Training Unit	DC 125V,	1
11.	Cut-out Models		
	Traction		1
	Generator		1
12.	Fork Lift	1.5 t	1
13.	Tools	Hammer, Wrench, etc	
14.	Measurement Instruments	Voltage Meter, Current Meter, etc	
15.	Spare Parts		Good for 5 years

3.3.2 WORKSHOP EQUIPMENT LAYOUT

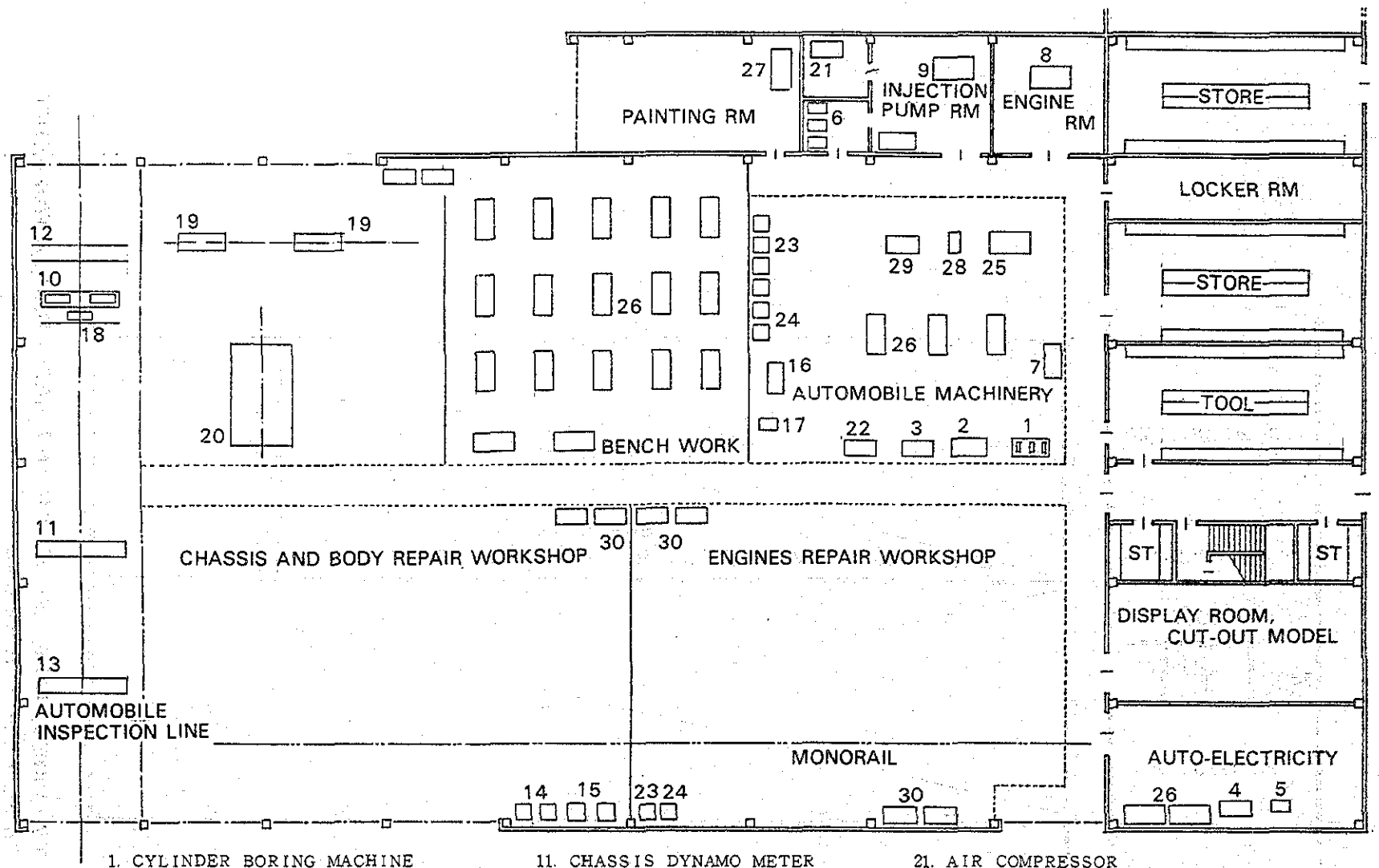


TV/VIDEO, TAPE RECORDER AND RADIO REPAIR WORKSHOP, GROUND FLOOR, BAGHDAD

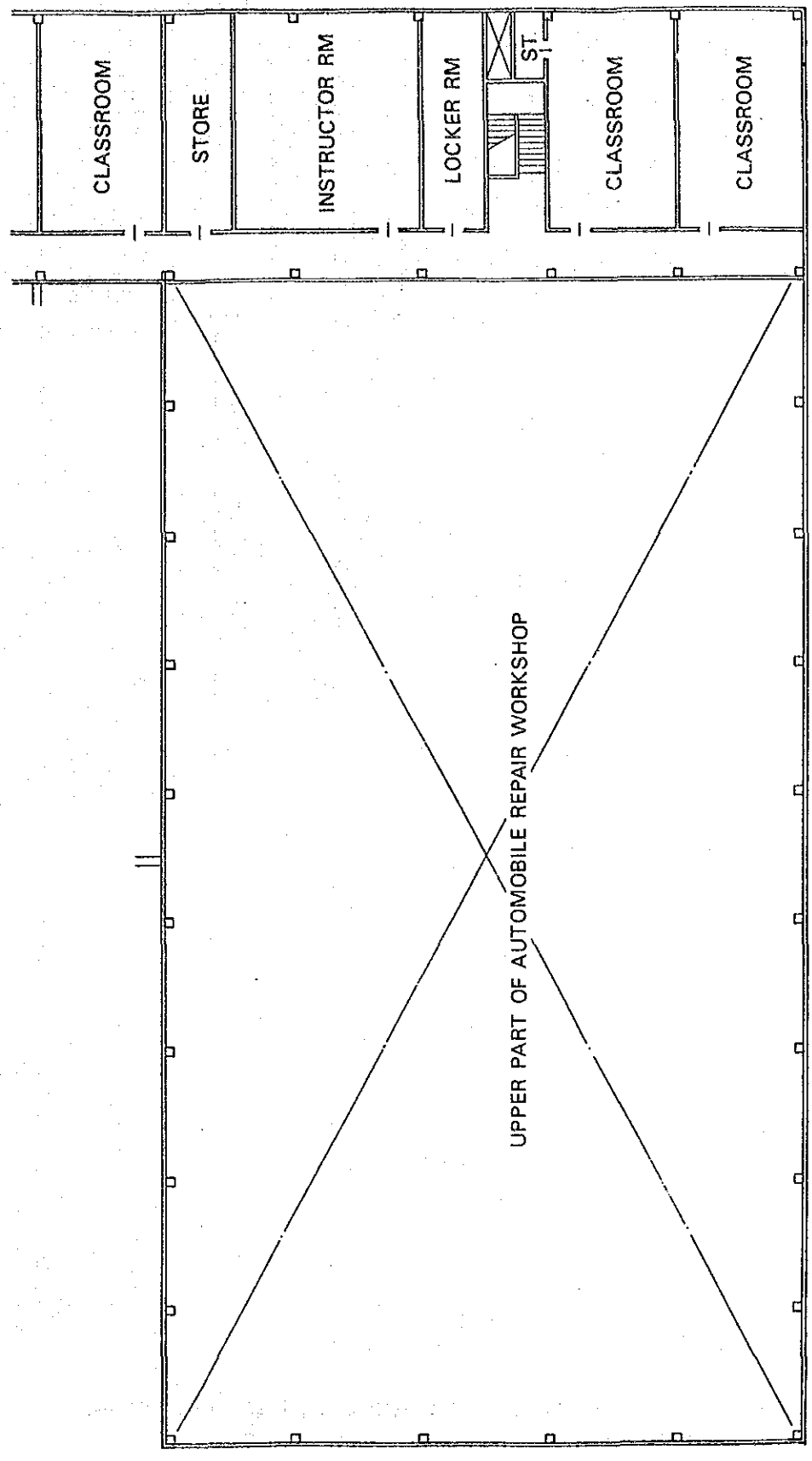


TV/VIDEO, TAPE RECORDER AND RADIO REPAIR WORKSHOP, FIRST FLOOR, BAGHDAD

AUTOMOBILE REPAIR WORKSHOP, GROUND FLOOR, BAGHDAD

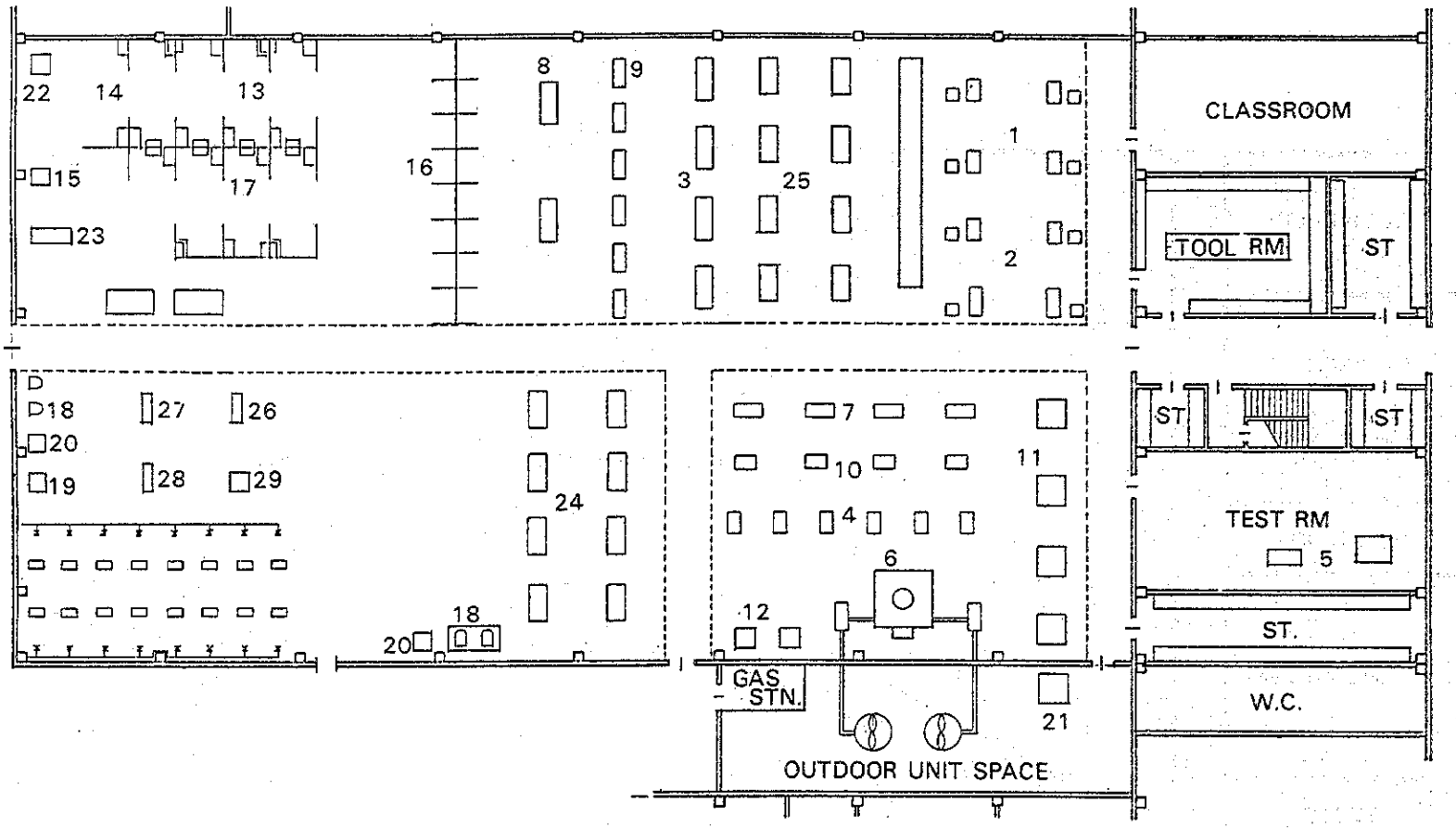


1. CYLINDER BORING MACHINE
2. CYLINDER HONING MACHINE
3. SURFACE GRINDER
4. UNIVERSAL TEST BENCH
5. MICA CUTTER LATHE
6. BATTERY CHARGER
7. PISTON PIN-HOLE HONING MACHINE
8. ENGINE DYNAMO METER
9. INJECTION PUMP TESTER
10. SIDE SLIP TESTER
11. CHASSIS DYNAMO METER
12. HEAD LICHT TESTER
13. BRAKE TESTER
14. WHEEL BALANCER
15. TIRE CHANGER
16. BRAKE DRUM AND CLUCH LATHE
17. AIR HYDRO RIVETTER
18. TEST LIFT
19. TWIN POST LIFT
20. LIFT MASTER
21. AIR COMPRESSOR
22. HYDRAULIC PRESS
23. BENCH DRILLING MACHINE
24. BENCH GRINDER
25. LATHE
26. WORK BENCH
27. PAINTING BOOTH
28. ARC WELDER
29. FOOT SHEAR
30. PARTS WASHER

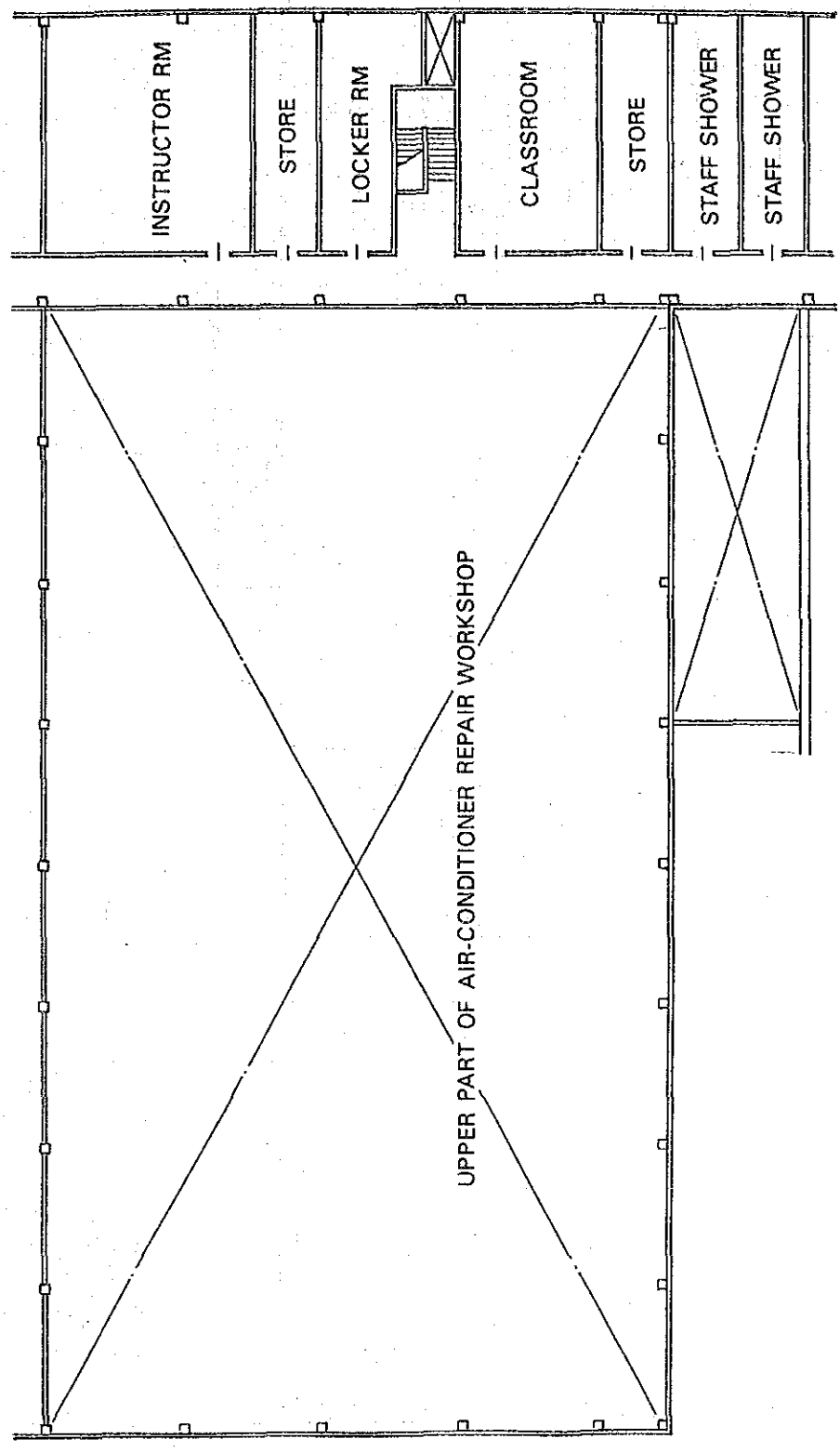


**AUTOMOBILE REPAIR WORKSHOP,
FIRST FLOOR, BAGHDAD**

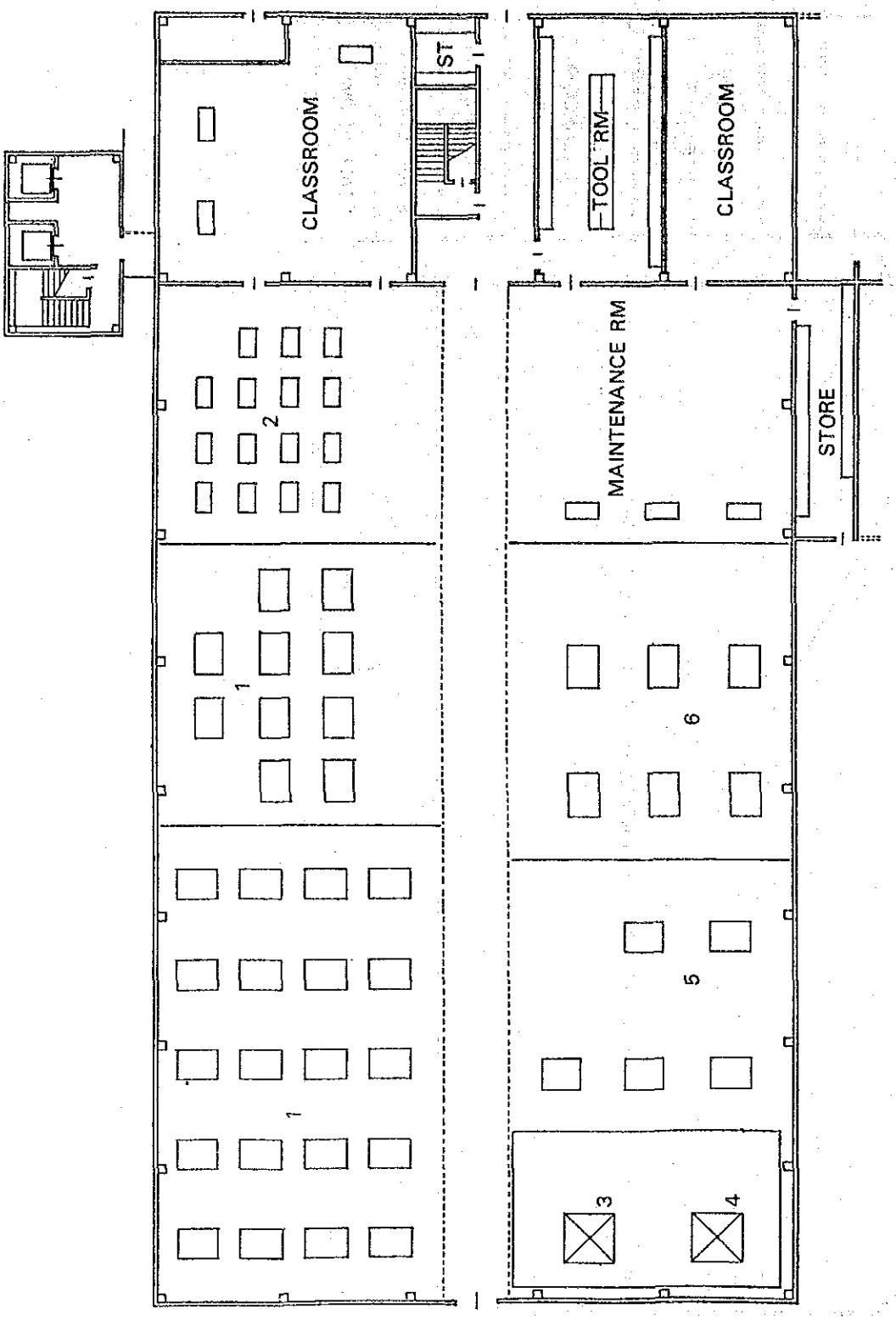
AIR-CONDITIONER AND ELECTRIC APPLIANCE REPAIR WORKSHOP, GROUND FLOOR, BAGHDAD



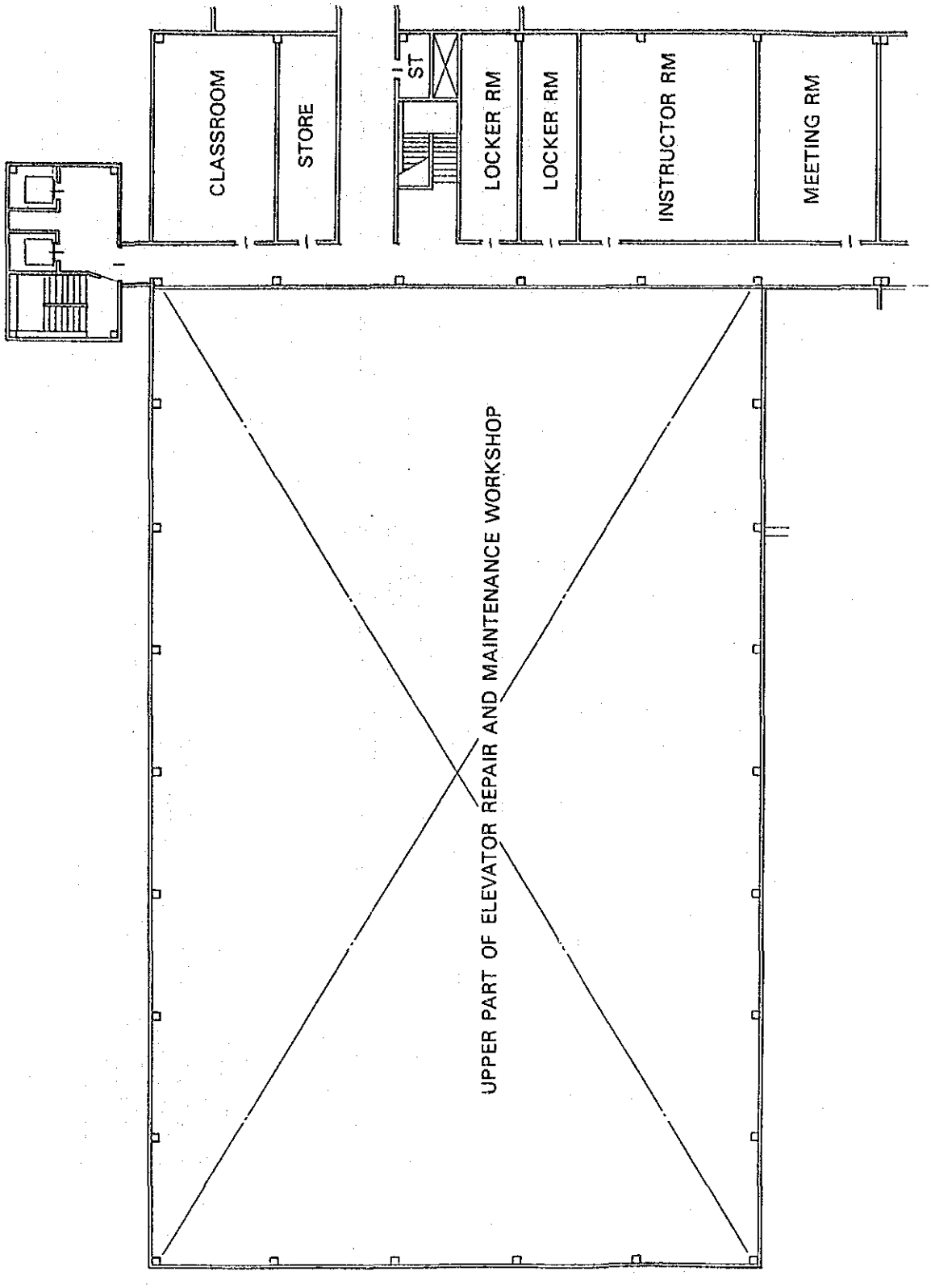
1. PACKAGED AIR CONDITIONERS
2. PACKAGED AIR CONDITIONERS
3. AIR CONDITIONER TRAINING UNIT
4. OPEN TYPE CONDENSING UNIT
5. AIR CONDITIONING TESTING UNIT
6. COMMERCIAL REFRIGERATION TRAINING UNIT
7. BASIC REFRIGERATION TRAINING UNIT
8. THERMAL HUMIDITY CONTROL TRAINING UNIT
9. ROOM AIR CONDITIONER SIMULATOR
10. REFRIGERATOR SIMULATOR
11. AIR COOLER
12. ICE MAKER
13. ARC WELDING MACHINE
14. CO_2 ARC WELDING MACHINE
15. EDGE PREPARATION MACHINE
16. AIR CONDITIONER ELECTRIC WIRING TRAINING UNIT
17. WELDING HUME COLLECTOR
18. BENCH DORILL MACHINE
19. HIGH SPEED CUTTER
20. BENCH GRINDER
21. AIR COMPRESSOR
22. WELIDNG ROD BOX
23. SPOT WELDING MACHINE
24. WORK BENCH (1)
25. WORK BENCH (2)
26. TRIPLE ROLL
27. HAND UNIVERSAL BRAKE
28. TREADLE SHEARING MACHINE
29. ROLL FORMING MACHINE



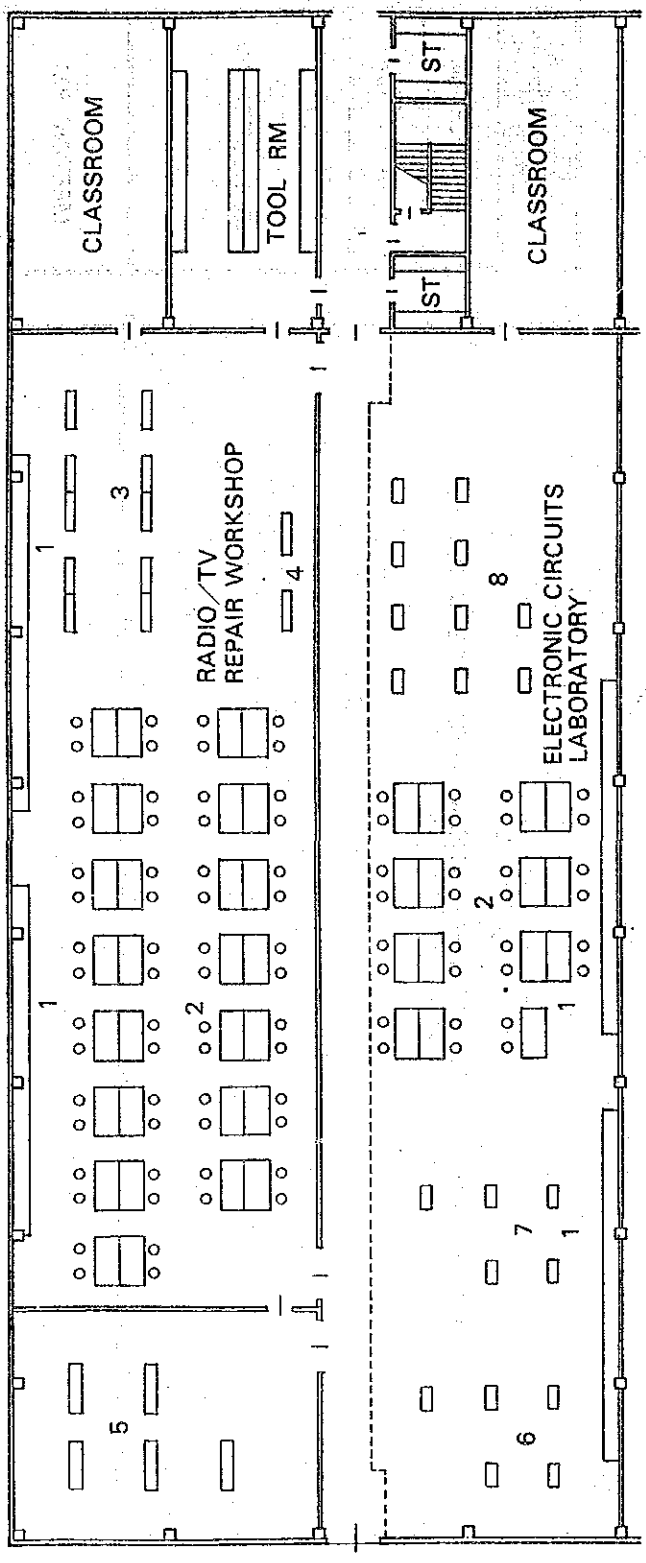
AIR-CONDITIONER AND ELECTRIC APPLIANCE REPAIR WORKSHOP, FIRST FLOOR, BAGHDAD



ELEVATOR REPAIR AND MAINTENANCE WORKSHOP, GROUND FLOOR, BAGHDAD

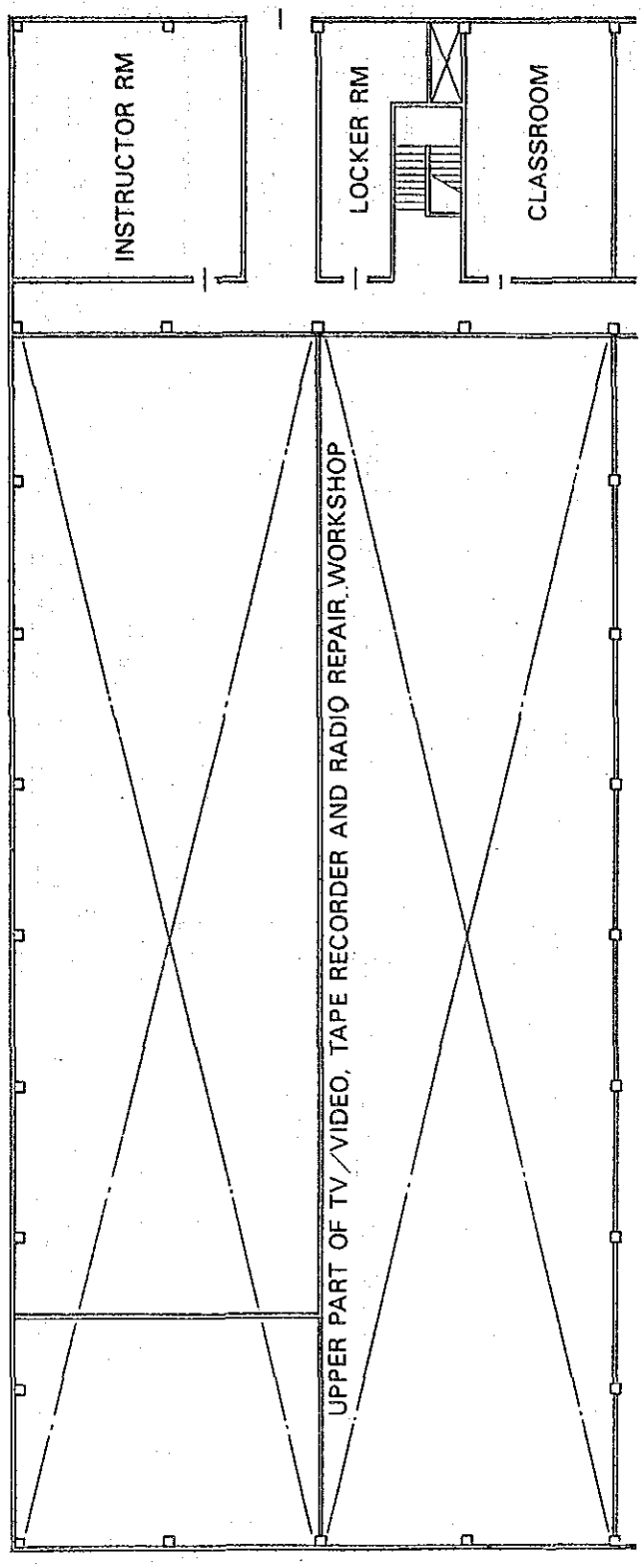


ELEVATOR REPAIR AND MAINTENANCE WORKSHOP, FIRST FLOOR, BAGHDAD



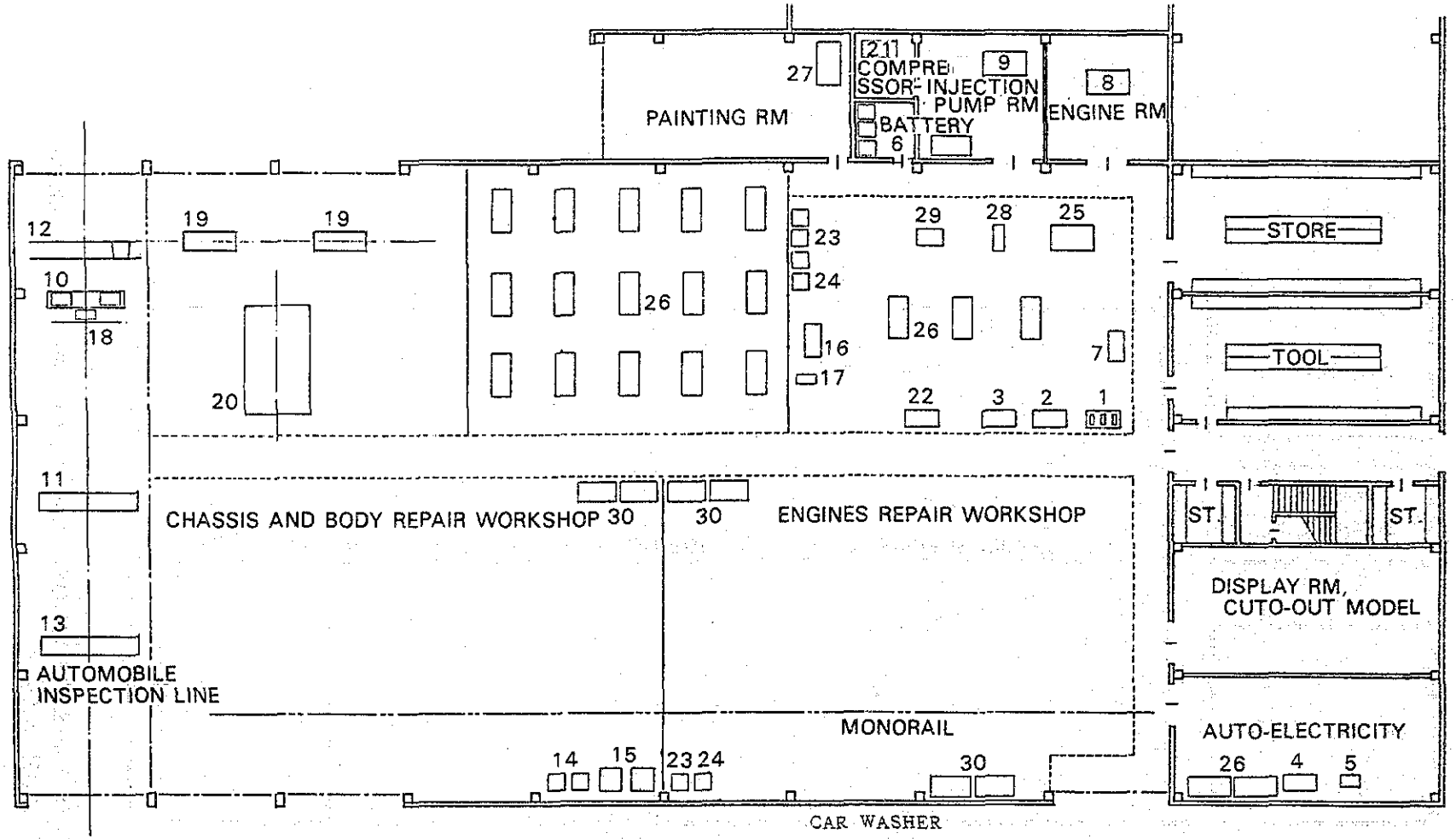
1. SHELVES FOR STORAGE
2. WORKSHOP BENCH
3. TV REPAIRING SIMULATOR
4. SEQUENTIAL CONTROL SYSTEM TRAINER
5. AUTOMATIC CONTROL SYSTEM TRAINER
6. PULSE CIRCUIT TRAINER
7. MODULATION/DEMODULATION CIRCUIT TRAINER
8. DIGITAL CIRCUIT TRAINER

TV/VIDEO, TAPE RECORDER AND RADIO REPAIR WORKSHOP, GROUND FLOOR, MOSUL



TV/VIDEO, TAPE RECORDER AND RADIO REPAIR WORKSHOP, FIRST FLOOR, MOSUL

AUTOMOBILE REPAIR WORKSHOP, GROUND FLOOR, MOSUL



1. CYLINDER BORING MACHINE
2. CYLINDER HONING MACHINE
3. SURFACE GRINDER
4. UNIVERSAL TEST BENCH
5. MICA CUTTER LATHE
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7. PISTON PIN-HOLE HONING MACHINE
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12. HEAD LIGHT TESTER
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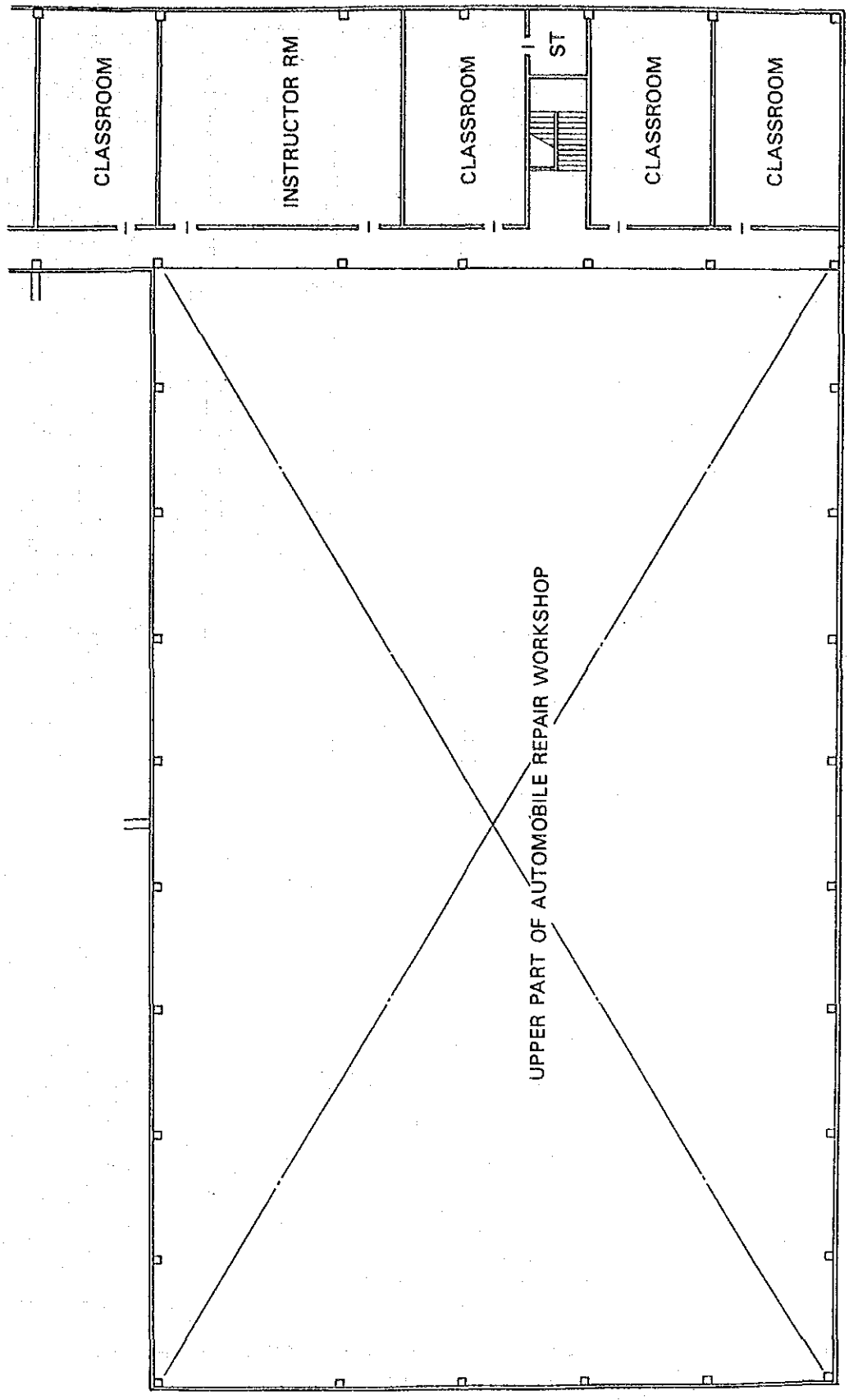
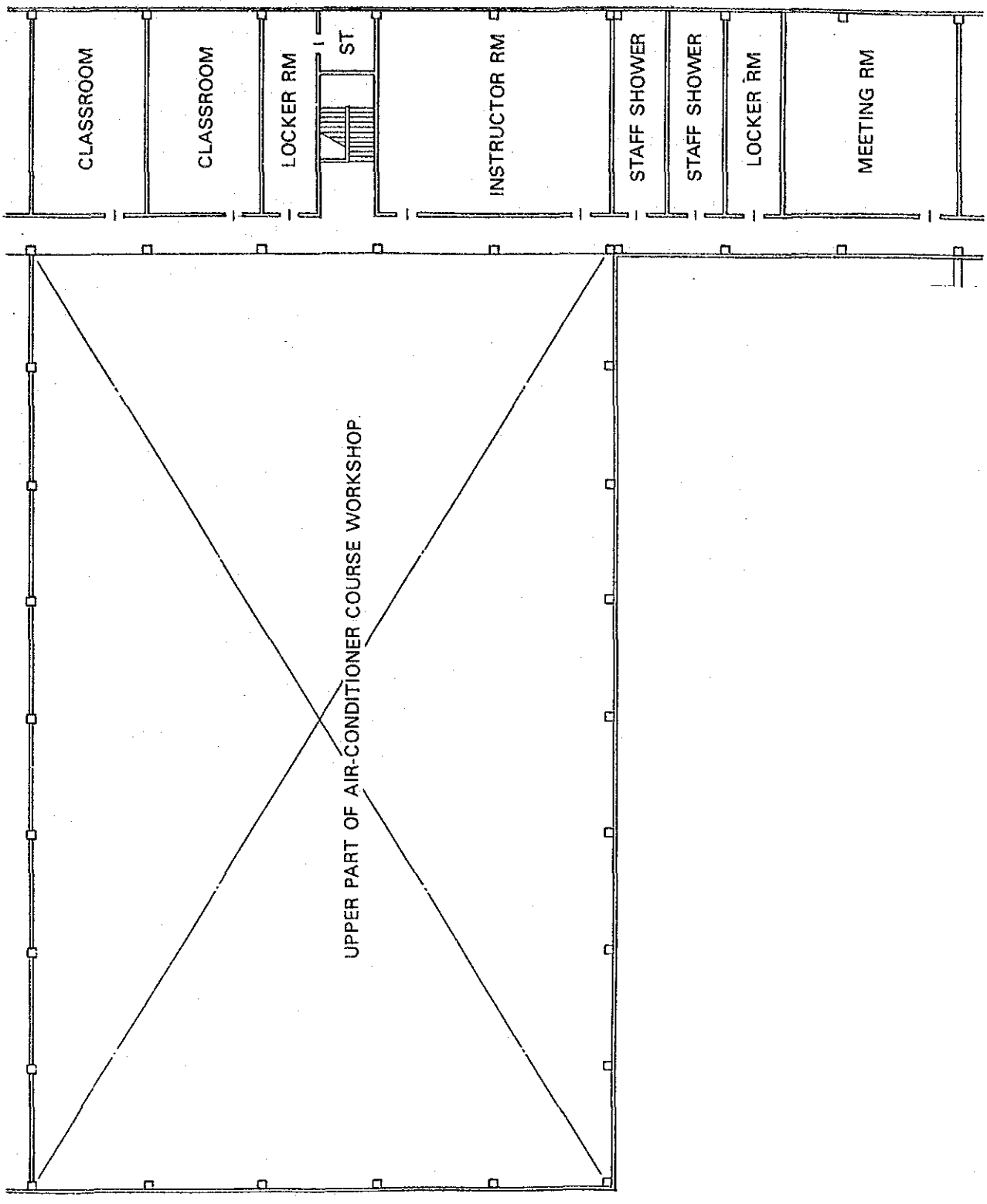
27. PAINTING BOOTH
28. ARC WELDER
29. FOOT SHEAR
30. PARTS WASHER



**AUTOMOBILE REPAIR WORKSHOP,
FIRST FLOOR, MOSUL**

AIR-CONDITIONER AND ELECTRIC APPLIANCE REPAIR WORKSHOP, GROUND FLOOR, MOSUL



AIR-CONDITIONER AND ELECTRIC APPLIANCE REPAIR WORKSHOP, FIRST FLOOR, MOSUL

3.3.3 Area of Workshop

1. TV/Video, Tape Recorder and Radio Repair Workshop

	Baghdad	Mosul
1. Workshop	1152	1152
2. Lecture room 1 (2 rooms, @ 77m^2)	144	144
3. Lecture room 2	60	60
4. Instructors room	90	90
5. Tool room	72	72
6. Locker room	30	34.5
7. Storage 1	36	72
Storage 2	34.5	9
Storage 3	9	
Storage 4	9	

unit: m^2

2. Automobile Repair Workshop

	Baghdad	Mosul
1. Workshop	1620	1782
2. Lecture room (Baghdad 3 rooms, Mosul 4 rooms, @ 60m^2)	180	240
3. Instructor room	90	120
4. Tool room	72	72
5. Locker room	30	36
6. Auto-electricity	72	72
7. Display room, (cut-out models)	72	72
8. Injection pump room	36	36
9. Painting room	72	72
10. Engine dynamo testing room	36	36
11. Compressor room	9	9
12. Battery charging room	9	9
13. Storage 1	72	72
Storage 2	30	9
Storage 3	9	
Storage 4	9	
Storage 5	4.5	

unit: m^2

3. Air-Conditionaing and Electric Appliance Repair Workshop

	Baghdad	Mosul
1. Workshop	1404	1548
2. Lecture room 1	72	72
3. 2 (Mosul, 2 rooms, @ 60M^2)	60	120
4. Instructors room	90	120
5. Tool room	48	72
6. Locker room	30	34.5
7. Test room	72	72
8. Storage 1	36	72
Storage 2	34.5	9
Storage 3	30	9
Storage 4	9	9
Storage 5	9	

unit: m^2

4. Elevator Repair and Maintenance Workshop

	Baghdad
1. Workshop	1440
2. Lecture room 1	72
3. 2	60
4. Instructors room	90
5. Tool room	72
6. Locker room 1	30
2	30
7. Electrical equipment room	132
8. Elevator tower	330
9. Storage 1	36
Storage 2	9
Storage 3	4.5

unit: m^2

3.4 TRAINING MATERIAL DEVELOPMENT PLAN

3.4.1 Design Principles Of Training Material Development Plan

In order to materialize the effective training in limited training duration, the following recommendations should be emphasized for the development of training materials.

(1) The composition of the training must be audio visual oriented and newly developed training materials should be used. The conventional text books and hand-outs must be used as supplementary.

(2) The training materials should be integrated into a package and it should also be designed for self-learning.

(3) The training materials should be developed by a team of specialists who have sufficient experience in training methodology and audio visual training material development.

Considering the above circumstances, the Center must be provided with modern audio-visual equipment and it is recommended to produce appropriate training materials.

The assignment of a specialist who is specialized in developing audio visual training material is also recommended. International training materials can be adjusted to the Iraqi conditions with his effort.

The following major audio-visual equipment shown in Chapter 3.4.5 is recommended for the use in proposed vocational training centers.

3.4.2 Training Materials

The use of original audio visual oriented instructional materials such as video tapes, training simulators and mock-ups are recommended in order to achieve maximum performance and most effective training in the limited training hours. Development of accompanied effective written materials is also important.

3.4.3 Kinds of Training Materials to be Developed

The following training materials and simulators should be developed for the proposed Training Centers.

1) Instructional video tapes

2) Simulators

3) Mock-ups and cut models

4) OHP transparencies, film strips, wall charts, etc

5) Instructional materials, text books and instructor manuals, etc

3.4.4 Official Language and the Language of Training Materials

English is recommended as an official language for the period of Japanese administration of the proposed vocational training centers. However, the possible maximum use of Arabic is recommended for the newly developed training materials.

3.4.5 List of Major Audio Visual Equipment

Workshop System

Baghdad Center

No.	Description	Specification	Qty
1.	Video Cassette Recorder	Colour 3 Systems PAL/SECAM/NTSC	30
2.	Video Cassette Recorder	PAL	10
3.	Colour Video Monitor	Colour 4 Systems	30
4.	Video/Audio Signal Distributor	5 outputs	10
5.	Slide Projector	35 mm	10
6.	Lecture Table	Standard	10
7.	Video Switcher	For TV camera	10

No.	Description	Specification	Qty
8.	Lighting Kit	Portable	30
9.	Console	For VCR and Camera	30
10.	Colour Video Camera	PAL/CCIR, Portable	30
11.	Tripod	Portable	30
12.	Lamps	800W,230V	30
13.	Video/Audio Switcher	For video and sound	30
14.	Cables	For video camera	60
15.	VCR Tape	1/2in	480

Class Room System

Baghdad Center

No.	Description	Specification	Qty
1.	Video Cassette Recorder	Colour 3 Systems PAL/SECAM/NTSC	30
2.	Video Cassette Recorder	PAL	10
3.	Colour Video Monitor	Colour 4 Systems	40
4.	Video/Audio Signal Distributor	5 outputs	10
5.	Slide Projector	35 mm	10
6.	Lecture Table	Standard	10
7.	Video Switcher	For video cameras	10
8.	Console	For VCR and Camera	20
9.	Video/Audio Switcher	For camera and audio	40
10.	Cables	For TV camera	40
11.	VCR Tape	1/2in	480

CCTV Monitor System

No.	Description	Specification	Qty
1.	Colour Video Monitor	PAL/SECAM, 9in Portable	11
2.	Video/Audio Selector	For camera and audio	10
3.	Connecting Panel	For mounting	11
4.	Cables and Junction Box	For wiring	10

Hall System

Baghdad Center

No.	Description	Specification	Qty
1.	Video Prjector	Trident Cinemascope	1
2.	Video Screen	For video projector	1
3.	U-Matic VCR	With Editing Features PAL	1
4.	1/2in VCR	PAL	1
5.	Video Selector	For video camera	1
6.	Power Unit	For video camera	1
7.	Colour Video Monitor	PAL/SECAM, Portable 9in	1
8.	VTR Control Unit	For VTR cameras	1
9.	Audio Mixer	For sound mixing	1

No.	Description	Specification	Qty
10.	Master Tape Recorder	Open Wheel 2 Track Stereo	1
11.	Stereo Cassette Tape Recorder	Professional use	1
12.	Stereo Turn Table	Professional use	1
13.	Stereo Amplifier	65W X 2	1
		35W X 2	1
14.	Stereo Amplifier	100W X 2	1
15.	P.A Amplifier	100W X 2	1
16.	Audio Equalizer	For stereo amplifier	1
17.	Speaker System A	For Ceiling	6
18.	Speaker System B	For stage	2

No.	Description	Specification	Qty
19.	Film Projector	16mm	1
		8 mm	1
		35mm Slides	1
20.	Projection Table	Standard	3
21.	Control Unit	For Projector	1
22.	Remote Control	For Tape Deck	1
23.	Speaker System C	Stand alone speakers	1
24.	Lecture Table	Standard	1
25.	Console and Panel	For camera and sound	5
26.	Microphone	For professional use	5
27.	Microphone Accessories	Boom, Stand, Code, etc	
28.	Head Phone	For monitoring	2
29.	Audio Cassette Tape	60 min, 90 min	200
30.	Audio Tape	For open wheel	100

Control System

Baghdad Center

No.	Description	Specification	Qty
1.	Special Effect Generator	For video editing	1
2.	Camera Control Unit	For camera control	3
3.	Video Telop System	For video editing	1
4.	Waveform Monitor	PAL	1
5.	Vector Scope	PAL	1
6.	B/W Monitor	CCIR, 9in	6
7.	High Resolution Monitor	PAL, 20in	2
8.	Colour TV set	PAL, 20in	1
9.	Signal Distributor	For signal distribution	1

Video Editing Equipment

Baghdad Center

No.	Description	Specification	Qty
1.	Editing VTR	Professional Type, PAL	2
2.	Console	For camera control	2
3.	Monitor table	For monitor TV	1
4.	Editing Desk	For video editing	1
5.	Time Cord Editing Unit	For VTR	1
6.	Time Code Generator, Reader	For video editing	2
7.	Interface	For video interfacing	2
8.	Time Base	For PAL system	2
9.	PAL Generators	For video editing	1

No.	Description	Specification	Qty
10.	Colour Bar Generator	For video editing	1
11.	Monitor Table	For monitor TV	1
12.	Audio Mixer	16 Channels	1
13.	Speaker Systems	For sound monitor	2
14.	Master Tape Recorder	Open Reel	2
15.	Cassette Tape Recorder	Stereo	1
16.	Audio Monitor and Controller	For audio monitor	1
17.	Talk Back Amplifier	For communications	1
18.	Audio Console	For audio signals	3
19.	Announcement Booth	For recording sound	1

Telecine System

Baghdad Center

No.	Description	Specification	Qty
1.	Telecine Multiplexer	For multiplexing	1
2.	Colour Camera	PAL, 3 Tubes	1
3.	Camera Control Unit	For controlling camera	1
4.	Film Projector	16 mm 25 Flames/SEC 2 Blade	1
5.	35mm Slide Projector	35 mm	2
6.	Dissolve Unit	For video signal process	1
7.	Telecine table	Standard	1
8.	Colour Video Monitor	PAL/SECAM, 9in	1
9.	Cables	For video camera	
10.	Console	For video camera	1

No.	Description	Specification	Qty
11.	Cassette Tape	60 min, high fidelity	100
		90 min, high fidelity	100
12.	Audio Tape	For open wheel	100
13.	Video Cassette Tape	For Broadcast, 60 min	60
14.	Video Cassette Tape	For Broadcast, 30 min	120

Studio System

Baghdad Center

1.	Video Equipment for Studio Use	For studio use	1 Set
	1) TV cameras	PAL	3
	2) Colour Video Monitor	20 in, 4 systems	3
2.	Studio Audio Equipment	For studio use	1 Set
	1) Microphone	For studio use	10
3.	Studio Sound Mixer	For studio use	1 Set
4.	Studio Lighting Equipment	For studio use	1 Set
5.	Portable Dimmer	For studio use	1 Set

Studio Dubbing System

Baghdad Center

1.	Standard Converter	For studio use	1 Set
2.	Editing VTR	SECAM, U-matic	1
3.	Editing VTR	PAL, U-matic	1
4.	Editing VTR	NTSC, U-matic	1
5.	Video Cassette Recorder	PAL	1
6.	Video Cassette Tape		1000

Library System

Baghdad Center

1.	Video Monitor	Colour, PAL/SECAM	20
2.	Video Cassette Player	PAL	20
3.	Library Tables	With Chairs	5
4.	Headphones	For student use	25
5.	Mini Speaker System	For Students	20

Portable System

Baghdad Center

1.	Portable Camera with accessories	PAL	1 Set
2.	Portable U-matic VTR	PAL	1
3.	Video Monitor	Portable, 9in	2
4.	Microphones	Uni-directional	1
5.	Waveform Monitor		1

Workshop Audio Visual System

Mosul Center

No.	Description	Specification	Qty
1.	Video Cassette Recorder	Colour 3 Systems PAL/SECAM/NTSC	30
2.	Video Cassette Recorder	PAL	10
3.	Colour Video Monitor	Colour 4 Systems	30
4.	Video/Audio Signal Distributor	5 outputs	10
5.	Slide Projector	35 mm	10
6.	Lecture Table	Standard	10
7.	Video Switcher	For TV camera	10

No.	Description	Specification	Qty
8.	Lighting Kit	Portable	30
9.	Console	For VCR and Camera	30
10.	Colour Video Camera	PAL/CCIR, Portable	30
11.	Tripod	Portable	30
12.	Lamps	800W,230V	30
13.	Video/Audio Switcher	For video and sound	30
14.	Cables	For video camera	60
15.	VCR Tape	1/2in	480

Class Room Audio Visual System

Mosul Center

No.	Description	Specification	Qty
1.	Video Cassette Recorder	Colour 3 Systems PAL/SECAM/NTSC	30
2.	Video Cassette Recorder	PAL	10
3.	Colour Video Monitor	Colour 4 Systems	40
4.	Video/Audio Signal Distributor	5 outputs	10
5.	Slide Projector	35 mm	10
6.	Lecture Table	Standard	10
7.	Video Switcher	For video cameras	10
8.	Console	For VCR and Camera	20
9.	Video/Audio Switcher	For camera and audio	40
10.	Cables	For TV camera	40
11.	VCR Tape	1/2in	480

CCTV Monitor System

Mosul Center

No.	Description	Specification	Qty
1.	Colour Video Monitor	PAL/SECAM, 9in Portable	11
2.	Video/Audio Selector	For camera and audio	10
3.	Connecting Panel	For mounting	11
4.	Cables and Junction Box	For wiring	10

Hall System

Mosul Center

No.	Description	Specification	Qty
1.	Video Projector	Trident CinemaScope	1
2.	Video Screen	For video projector	1
3.	U-Matic VCR	With Editing Features PAL	1
4.	1/2in VCR	PAL	1
5.	Video Selector	For video camera	1
6.	Power Unit	For video camera	2
7.	Colour Video Monitor	PAL/SECAM, Portable 9in	1
8.	VTR Control Unit	For VTR cameras	1
9.	Audio Mixer	For sound mixing	1

No.	Description	Specification	Qty
10.	Master Tape Recorder	Open Wheel 2 Track Stereo	1
11.	Stereo Cassette Tape Recorder	Professional use	1
12.	Stereo Turn Table	Professional use	1
13.	Stereo Amplifier	65W X 2	1
		35W X 2	1
14.	Stereo Amplifier	100W X 2	1
15.	P.A Amplifier	100W X 2	1
16.	Audio Equalizer	For stereo amplifier	1
17.	Speaker System A	For Ceiling	6
18.	Speaker System B	For stage	2

No.	Description	Specification	Qty
19.	Film Projector	16mm	1
		8 mm	1
		35mm Slides	1
20.	Projection Table	Standard	3
21.	Control Unit	For Projector	1
22.	Remote Control	For Tape Deck	1
23.	Speaker System C	Stand alone speakers	1
24.	Lecture Table	Standard	1
25.	Console and Panel	For camera and sound	5
26.	Microphone	For professional use	5
27.	Microphone Accessories	Boom, Stand, Code, etc	2
28.	Head Phone	For monitoring	2
29.	Audio Cassette Tape	60 min, 90 min	200
30.	Audio Tape	For open wheel	100

Mini Studio Equipment

Mosul Center

No.	Description	Specification	Qty
1.	Color TV Camera	PAL system	2
2.	View Finder	For camera	2
3.	Tripod	For camera	2
4.	Inter Communication set	For video camera	3
5.	Camera Control Unit	For video camera	2
6.	Special Effect Generator	PAL colour	1
7.	B/W video camera	Standard type	1
8.	Monochrome Monitor	CCIR	1
9.	Video Cassette Recorder	PAL	2

No.	Description	Specification	Qty
10.	Video Editing Unit	For video editing	1
11.	Colour TV	PAL	2
12.	Colour Video Monitor	Portable, PAL/SECAM	2
13.	Colour Video Monitor	PAL/SECAM/NTSC	1
14.	Portable Dimmer	Triac, 3kW	1
15.	Mixer	8 channels, audio	1
16.	Microphones	Uni-directional	5
17.	Stereo Turn Table	Front loading	1
18.	Stereo Cassette Deck	For professional use	1

No.	Description	Specification	Qty
19.	Open Wheel Master Deck	2 Track, stereo	1
20.	Stereo Amplifier	25W X 2	1
21.	Stereo Amplifier	65W X 2	1
22.	Speaker Systems	For sound monitor	1
23.	Video and Sound Distributor	5 Outputs	1
24.	Power Supply Unit	General use	2
25.	Audio Video Switcher	For V/A control	1
26.	Video Cassette Tape	30 min, VHS and Beta	500
27.	Audio Cassette Tape	High Fidelity	200
28.	Audio Tape	High Fidelity	100

Library System

Mosul Center

No.	Description	Specification	Qty
1.	Colour Video Monitor	PAL/SECAM, 6 inches	20
2.	Video Cassette Player	PAL	20
3.	Library Table	Standard type	5
4.	Chairs	Library chair	20
5.	Headphones	For student use	25
6.	Mini Speaker System	For student use	20

3.5 TECHNOLOGY TRANSFER PLAN

Development of the Project can be divided into the following four major phases:

1. Pre-opening Preparation Period
2. Initial Operation Period
3. Substantial Operation Period
4. Turn-over Period

Considering the size of the vocational training centers and the attempt to introduce modern vocational training methodology, the total transfer of technology in this Project is estimated to be completed in around six to seven years after the inauguration of the training centers. That means two years for the Initial Operation Period, two years for Substantial Operation Period and another two to three years for Turn-over Period. The Pre-opening Preparation Period is not counted in this calculation.

However, considering the financial aspect and the case of other similar projects, it is advised to complete the Project in five years. This becomes feasible by superimposing the earlier half of the Turn-over Period on the latter half of the Substantial Operation Period.

At the Pre-opening Preparation Period, while the buildings are being constructed, priority should be given to the development of the training materials. Since the Project introduces modern vocational training with use of audio visual materials and equipment, around a year and a half to two years is expected to be needed for this purpose.

The Initial Operation Period includes the function of trial run of the Center and it is expected to be done in the first two years after the inauguration. The Center will be fully operational at the end of the second year and training facilities and materials will be adjusted to perform most effective training. The majority of the training is suggested to be performed by Japanese instructors.

At the Substantial Operation Period, the Center is fully operational and a part of technology transfer will be done to the Iraqi staff. A series of instructor training programmes should be organized and the Japanese way of vocational training should be properly adjusted to the Iraqi style. Enrichment of training facilities should also be considered in this period. The fellowship programme in Japan should also start in the middle of this period. Qualified Iraqi instructors and administrative staff should gradually prepare to take over the job of the Japanese at the end of the period.

The Project will be prepared for turn-over to the Iraqi staff at the Turn-over Period. Preparation for turn-over is arranged at the middle of the Substantial Operation Period and training should be done by Iraqi staff at this period. Evaluation will be made by the authority concerned and prepared for full turn-over.

3.6 Training Plan of Iraqi Staff

The training methodology for the Iraqi instructors and administration staff should be based upon "on-the-job training" in principle. The core of the Japanese way of administration for this project is workshop oriented, and "on-the-job training" is considered the most effective for instructor training. This procedure should also be emphasized in the training of Iraqi administration staff.

Aside from the regular training programme for the trainees, training of Iraqi instructors should also be considered thoughtfully. The shortage of well experienced vocational training instructor is one of the serious problems and the proposed centers must help in solving the problem. The instructor training programme such as skills upgrading and workshop management should also be regularly offered to the Iraqi instructors. It is also suggested that further advanced training will be done in Japan for selected Iraqi instructors and administration staff. A duration of around six to eight months is considered appropriate for this purpose.