REPUBLIC OF THE UNION OF MYANMAR
MINISTRY OF HEALTH

PREPARATORY SURVEY
ON
THE PROJECT FOR IMPROVEMENT OF MEDICAL EQUIPMENT IN GENERAL HOSPITALS IN YANGON
IN
THE REPUBLIC OF THE UNION OF MYANMAR

FEBRUARY, 2014

JAPAN INTERNATIONAL COOPERATION AGENCY

CONSORTIUM OF
BINKO INTERNATIONAL LTD.
YAMASHITA SEKKEI INC.
INTERNATIONAL TECHNO CENTER CO., LTD.

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PREFACE

Japan International Cooperation Agency (JICA) decided to conduct the preparatory survey and entrust the survey to consist of Binko International Ltd., Yamashita Sekkei Inc. and International Techno Center Co., Ltd.

The survey team held a series of discussions with the officials concerned of the Government of the Republic of the Union of Myanmar, and conducted field investigations. As a result of further studies in Japan, the present report was finalized.

I hope that this report will contribute to the promotion of the project and to the enhancement of friendly relations between our two countries.

Finally, I wish to express my sincere appreciation to the officials concerned of the Government of the Republic of the Union of Myanmar for their close cooperation extended to the survey team.

February, 2014

Nobuko KAYASHIMA

Director General

Human Development Department

Japan International Cooperation Agency

Summary

Summary

1.Outline of the Country

The Republic of the Union of Myanmar (hereinafter referred to as "Myanmar"), located in the Indochina Peninsula, is populated by 63,670,000 people (as of 2012). Its total land mass is 676,578 km^2, which is1.8 times larger than that of Japan.

Myanmar shares borders with China, Laos, Thailand, Bangladesh, and India. Its coastline is bounded by the Gulf of Martaban, the Gulf of Bengal and the Indian Ocean. The capital of Myanmar is Nay Pyi Taw. The Ayeyarwady River flows from North to South through the center of Myanmar, and its mouth forms a broad delta area.

The river can be navigated by ocean-going vessels 960 km north from Yangon at the mouth of the river to Mandalay, and then another 440 km to Bhamo. The western Arakan mountains compose the border with India, while the eastern Shan hills compose the border with Thailand. Meanwhile, the northern region of Myanmar is a mountainous area. Myanmar is a long land extending from north to south, with a tropical zone in the south, a subtropical central area, and a temperate northern region. Yangon is located in the delta area, facing the ocean, while Mandalay is located in the central plain. Both are located in the subtropical zone. In 1988, the government of Myanmar declared it was transitioning to a free economy, resulting in Myanmar's economy beginning to show favorable growth in 1992. However, economic growth was stagnated by the economic depressions that followed, including the Asian Currency Crisis of 1997 and the global recession that began in 2008.

Beginning with the general election held in 2010 that led to the release of democracy activist Aung San Suu Kyi from house arrest, the dissolution of the military junta in March 2011, and the establishment of the civilian Thein Sein administration, Myanmar realized a transition to a democratic government.

The GDP per capita in 2012 in the Myanmar was reported to be 834 dollars per person (IMF estimation), which classifies it as an LDC according to the national income level classifications of the United Nations and the World Bank. In terms of the GDP composition ratio, in 2009 the industrial structure of Myanmar, agriculture, forestry, and fisheries, accounted for 38.2%, mining and manufacturing for 24.4%, while the service industry accounted for 37.4%.

Myanmar is abundant in socio-economic resources, especially showing strength in the exportation of natural gas and other natural resources, as well as its reserve of cheap labor. However, despite its socio-economic potential, Myanmar's economic growth was limited by the socialistic government and its closed economic policies dating back to 1962. Currently, Myanmar is rapidly undergoing democratization, the opening of its economy, and the improvement of its trade environment. Additionally, Myanmar introduced a managed float

system as part of a plan to unify the exchange rate in April 2012.

Myanmar's traditional trading partners include China, Thailand, South Korea, Singapore, Malaysia and other neighboring countries, and foreign investment in its natural gas and other resources development is ahead of other countries. Further, Myanmar's democratization efforts have caught the attention of nations around the world. Many of these foreign governments are now planning to invest in aid, infrastructure development, and improvements in the investment climate, etc.

2. Background, Course, and the Outline of the Request for Grand Aid

The health policy of Myanmar has been carried out based on national health plans (hereinafter referred to as NHP) which were created as part of the government's development strategy and medium-term (five-year) goals.

The "Third National Health Policy" was recently announced and is currently being promoted. NHP consists of 11 program areas. This project is related with the following three program areas: "the Improvement to Hospital Care," "the Non-Communicable Disease Control Project," and "the Development of Human Resources." Among these, the program for "the Improvement to Hospital Care" is directly related to this project. This project is positioned as one part of the operations that constitute this program, the project to "improve the quality of service in hospitals." In addition, the above project has set targets such as upgrading the organization of the medical service and upgrading the situation of facility infrastructure.

The major causes of death in Myanmar are infectious disease, parasitic insects, cardiovascular disease, trauma, poisoning, and accidents. Despite Myanmar showing a comparatively good immunization rate and prenatal examination rate, the health index is still low in comparison with other neighboring countries, as shown by the fact that the mortality rate for children under 5 and maternal mortality rate remain high.

In response to this, the government of Myanmar formulated the medium-term health development program known as "National Health Plan 2006-2011." The "Hospital Care Program" was established with objectives and countermeasure schemes to improve the quality of the hospital care, promote the increase of hospital beds, improve health service performance indicators, and reduce hospital morality rates.

NYGH and YGH are medical facilities which provide medical treatment to serious patients that would not otherwise be available at other hospitals in the country. They also provide free medical services to the poor as a public medical facility. However, their aging equipment frequently fails making it difficult to maintain the quality of medical services.

The improvement of medical services through the maintenance of equipment has become a pressing issue. Furthermore, the maintenance system for safe and long term use of medical equipment is insufficient and the need to upgrade it has become a critical issue.

Considering this situation, the government of Myanmar requested Japan to provide medical equipment to improve the quality of health care services at these hospitals.

This project to improve the medical equipment at YGH and NYGH was created to contribute to the upper-level plan of "improving the quality of hospital service" by stabilizing the referral system and improving the quality of tertiary care services in lower Myanmar.

3. Overview of survey results and details of the project

In response to the request described above, the Japanese government decided to carry out a preparatory survey. JICA dispatched a preparatory survey team for 46 days from August 4 to September 18, 2013. After returning to Japan, the survey team compiled a draft report based on the analysis of the findings in Myanmar. They later conducted a 14 day-long explanation of the draft report in Myanmar from December 15 to 28, 2013 in order to explain the content of the report, with which the Myanmar side agreed.

The project with which the Myanmar side agreed with was the strengthening of the emergency medical system, the improvement of the medical service delivery capacity of YGH, and the procurement of the medical equipment required for the improvement of medical services function of NYGH.

Equipment to be procured as part of this project was selected by taking into account the overall positioning/planned activities of the target facilities, the hospitals' current equipment, the current level of technology, and the financial ability to pay. The project also involved "soft components" such as the consulting required to smoothly introduce the equipment and strengthen their maintenance and management systems. An overview of the major equipment is as follows.

Table i-1 Outline of the Major Equipment

Section	Equipment name	Number		Use
		YGH	NYGH	
Emergency department/Radiology, Diagnostic imaging room	CT Scanner	1	1	Understand the disease and progress form tomography
Emergency department	Ultrasound machine	1	1	Use in the diagnosis of abdominal disease, chest
Operating room	Anesthetic apparatus	0	5	Painless surgery to lose awareness of patient
Operating room	Diathermy	0	4	Surgical incision device biological, hemostasis, solidifies
ICU Ward,	Patient monitor	0	23	Use surgery, postoperative management and the management of critically ill patients
Facility maintenance department	Power Generator	0	1	Emergency auxiliary power supply during power outages
Surgery	Laparoscope	2	2	Use surgery for the liver and the ulcer
Ward, Surgery	Defibrillator	4	8	Improve the circulation dynamics back to normal contraction of the heart ventricular fibrillation, atrial fibrillation
Radiology, Diagnostic imaging room	X-ray generator(digital)	0	1	Used breast shooting pneumonia patients, fractures, tuberculosis, malnutrition, respiratory disease patients, the shooting of patients with gallstones and urinary tract infection patients
ICU Ward	Ventilator	8	7	Carry out the patient's respiratory control, the auxiliary breathing, forced respiratory function
Urological surgery	Laser machine for urology	0	1	Use crushed stone or kidney stones treatment, incision of urinary tissue, hemostasis, and coagulation
Operating room	Operating Table	0	4	Positioning posture in response to surgery
Radiology, Diagnostic imaging room	NMR (Nuclear Magnetic Resonance)	0	1	Used for diagnosis to view the image information inside the living body by using nuclear magnetic resonance phenomenon, tumors, blood flow abnormality
Gastroenterological medicine	Choledocoscope	0	1	Used to gallbladder surgery, biliary tract, biliary
Gastroenterological medicine	Gastroscope	7	0	Use tumor of the upper gastrointestinal tract, the inspection of the ulcer
Gastroenterological medicine	Duodenoscope	2	0	Used to inspection to 12 tumors finger gut and chest Ulcer
Gastroenterological medicine	Colonoscope	6	0	Used for inspection of a tumor ulcer anus, such as S-shaped colon
Internal medicine chest	Bronchoscope	3	0	Observation of the bronchi, the diagnosis of disease
Facility maintenance department	Arthoroscope	1	0	Used to diagnosis and treatment of diseases of the joints of the lower limbs
Emergency department/Operating room	Autoclave	2	0	Use for sterile surgical instrument sterilization, such as linen
Clinical laboratory	Automatic biochemistry analyzer	1	0	Making a diagnosis of a disease by measuring sugar in blood sugar content, bilirubin, blood enzymes, and urine protein
Clinical laboratory	Imuno analyzer	1	0	Provide measures the increase or decrease of the hormone thyroid hormone, such as gonadal hormones, diagnosis of immune status, the diagnosis of cancer
Emergency department	Ambulance	4	0	Use transport of emergency patients

4. Project Planning and Construction Period Costs

If this project is carried out using grant aid, it will require about four months for the planning of details and 7.2 months for equipment procurement, for a total of 11.2 months. Including soft components, the project will take about 24.0 months from the start to finish. The cost to be borne by the Myanmar side is about 680,000 Japanese yen.

5. Evaluation of the project

(1) Validity

The goal of this project is to contribute to the primary program of the Myanmar health ministry's National Health Plan 2006-2011, the hospital health care program. This project intends to do so through the procurement of the medical equipment needed to improve the quality of medical services of hospitals.

In addition to the five health care facilities which were included in the project of "Improvement of Medical Equipment in Hospitals in Yangon and Mandaley" in fiscal 2012, this project will improve top-level referral hospitals NYGH and YGH, which provide tertiary medical care services in lower Myanmar. By doing so, the group of hospitals will be able to provide a package of internal, surgical, and pediatric medicine, as well as obstetrics and gynecology to both lower and upper Myanmar. Thus, it will be possible to both increase the stability of the referral system and provide wide access to high-level comprehensive medical care to the citizens of Myanmar.

Further, by improving the top-level facilities subject to this project, improvements to the tertiary medical service will lead to wide access to high-level medical care for regular citizens. As such, the project provides a high benefit effect. Also, the facilities targeted by this project are public medical facilities which are heavily relied on by Myanmar's poor.

We believe that providing advanced medical equipment will increase the public's faith in the Myanmar government's health administration, while also increasing the stability of the lives of the people of Myanmar. Therefore, we believe that the validity of the improvements planned by this project is high.

(2) Effectiveness

This project, if put into action, has the following expected 1) quantitative and 2) qualitative effects.

1) Quantitative effect

This project will directly contribute to the achievement of the "improvement of performance indicators of hospitals (Bed occupancy rate, turnover rate, and average length of stay)," and the "reduction of hospital morality rates" of hospital medical service.

In order to quantitatively measure the expected effects of the implementation of the project, we have chosen specific concrete indicators for both NYGH and YGH. They are indicators of the quality of service that will be affected by the introduction of equipment. These indicators include the number of surgical operations, the number of ICU patients, the number of CT scans, and the number of clinical laboratory tests.

The base year for assessment is 2012, which is the most recent year for which statistics are available. The evaluation is to be carried out three years after the end of the project in 2019.

Table i-2 YHT Quantitative effects

Index name	Reference value (2012year)	Target value (2019 year)
Surgical operations (number/year)	15,415 /year	16,200 /year
ICU patients (people/year)	389 people/year	400 people/year
CT scans (number/year)	10,282 /year	11,000 /year
Biochemical Lab tests (number / year)	217,820 /year	230,000 /year

Source: Reference value is based on responses of questionnaire

Table i-2 NYGH Quantitative effects

Index name	Reference value (2012year)	Target value (2019 year)
Operations (number/year)	4,362 /year	4,600 number/year
ICU/CCU patients (number/year)	478 people/year	500 people/year
X Ray Examination (number / year)	9,978 /year	10,500 /year
CT scans (number/year)	2,228 /year	2,400 /year

Source: Reference value is based on responses of questionnaire

2) Qualitative effects

The project will improve the equipment of NYGH and YGH, which is both aging and in insufficient number by providing advanced diagnostic imaging equipment, which is essential to the diagnosis of conditions such as cancer and heart disease.

With this project, the ability of the subject facilities to diagnosis and treat patients with severe infectious and non-infectious diseases will be improved. Diagnostic efficiency and the quality of treatment will also be improved. This may lead to the increase of reliance on these facilities as top referral hospitals.

Further, the introduction of CT scanners and MRI machines to YGH and NYGH as part of this project will allow both hospitals to provide medical services using this high-level medical equipment. This will have an especially powerful effect in maintaining their positions as the top

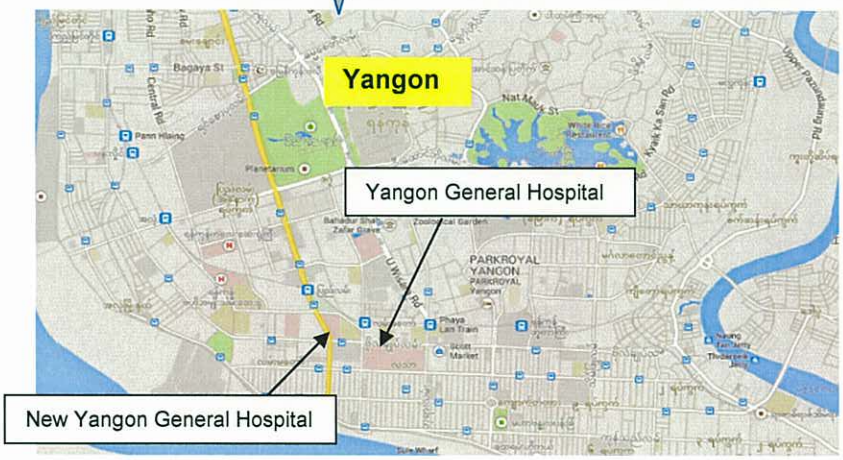
medical facilities in Myanmar.

As NYGH is already established as the diagnostic imaging center for a wide area, it is expected that this will lead to further enhancement of its functionality.

Thus, it is determined that the relevance and expected efficacy of the project are both high.

Contents

Project Site



List of Figures and Tables

Abbreviations

Abbereviations	Original Name
3DF	Three Disease Fund
3MDG Fund	Three Millennium Development Goal Fund
A/P	Account Payable
AIDS	Acquired ImmunoDeficiency Syndrome
AVR	Automatic Voltage Regulator
BME	Bio Medical Engineer
CAS	Carotid Artery Stenting
CCU	Coronary Care Unit
CMSD	Central Medical Store Depot
CT	Computed Tomography
DAC	Development Assistance Committee
DFID	Department For International Development
E/N	Exchange of Notes
ECG	Electrocardiogram
EEG	Electroencephalogram
EMG	Electromyogram
EMS	Emergency Medical Services
EMS	Emergency Medical Service
EOG	Electro-Oculogram
ESWL	Extracorporeal Shock Wave Lithotripsy
G/A	Grant Agreemet
GAVI Alliance	The Global Alliance for Vaccines and Immunization Alliance
GDP	Gross Domestic Product
HEPA	High Efficiency Particulate Air Filter
HIV	Human Immunodeficiency Virus
HSS	Health System Strengthening
ICU	Intensivie Care Unit
IMF	International Monetary Fund
JICA	Japan International Cooperation Agency
LDC	Least Developed Country
MD	Doctor of Medicine
MOH	Ministry Of Health
MRI	Magnetic Resonance Imaging
NGO	Non Gorvement Organization
NHP	National Health Plan
NMR	Nuclear magnetic resonance
NYGH	New Yangon General Hospital
OA	Other Account
RHC	Rural Health Center
UNICEF	United Nations International Children's Emergency Fund
UPS	Uninterrupted Power Supply
WMO	World Meteorological Organization
YGH	Yangon General Hospital

Charpter 1 Background of the Project

Chapter 1 Background of the Project

1-1 Introduction, Background, and History of Grant Aid Request

The main cause of death in Myanmar is communicable disease, parasitosis, circulatory organ disease, and unexpected injury, poisoning, and accident. Although the immunization rate and prenatal examination rate are relatively high, the health index is still low in comparison with neighboring countries. The challenge is high under-five mortality pregnant woman and pregnant woman mortality rate.

Considering this situation of the Myanmar Government, "National Health Plan 2006-2011" as a medium-term health development program was formulated, a hospital care program was set up, and an aims and measures scheme has been developed for improvement of the quality of hospital care service, increase in hospital bed capacity, improvement of the performance index of hospitals, and decrease the death rate at hospitals.

The health and medical care sector of Myanmar is divided into Upper Myanmar around Mandalay and Lower Myanmar around Yangon, and there are top referral hospitals (Mandalay General Hospital, Mandalay Central Women's Hospital, and Mandalay Children's Hospital in Upper Myanmar; Myanmar Yangon General Hospital, New Yangon General Hospital, Yangon Central Women's Hospital, and Yangon Children's Hospital in Lower Myanmar).These hospital cover whole country to provide medical care for serious patients.

However, due to deterioration of equipment and so on, the provision of necessary health care service and treatment of serious patients is little bit difficult in these top referral hospitals.

In order to improve the above situation, the Myanmar Government requested to Japanese Government to supply medical equipment to these hospitals. With this project, it is expected improving the quality of tertiary care services, emergency care system as well as stabilization of the referral system in the target area.

1-2 Natural Condition

Through a year, Yangon in Myanmar is High-temperature and humidity area. November to April of dry season Northeast wind blows and May to October of rainy season Southwest wind blows. in the dry season of March-May, in particular, temperature rises to 35 ℃ or more. The rainfall of rainy season is heavy and marked about 2,700 mm Annually. The humidity of the rainy season has become 70-80 percent or more. Although YGH, and NYGH both have not experienced flooding even with cyclone Nargis attack during April 2008.

Table 1.1 Weather data of Yangon

	Jun.	Feb.	Mar.	Apr.	May	Jun	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Average of Highest Temp.(℃)	32.2	34.5	36.0	37.0	33.4	30.2	29.7	29.6	30.4	31.5	32.0	31.5
Average of Lowest Temp.(℃)	17.9	19.3	21.6	24.3	25.0	24.5	24.1	24.1	24.2	24.2	22.4	19.0
Precipitation (mm)	5.0	2.0	7.0	15.0	303.0	547.0	555.0	602.0	368.0	206.0	60.0	7.0
Number of Days of Precipitation (mm)	0.2	0.2	0.4	16.0	12.6	25.3	26.2	26.1	19.5	12.2	4.8	0.2

(Reference: World Meteorological Organization)

1-3 Environmental impact assessment

The medical wastes of targeted facilities has been entrusted to outside of the disposing company, so any particular impact on the environment may not give for the implementation of the project

Chapter 2 Contents of the Project

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2-1 Basic Concept of the Project

2-1-1 Upper Health Plan and Objective of the Project

The Health Policy of Myanmar has been promoted on the basis of the midterm objective (5 years) and the national insurance plan of the development strategy. Currently, the Third National Health Policy from 2011 to 2016 has published and promoted. NHP consists of 11 program areas. This project is related to 3 of these program areas: "The Quality of Health Care Services in Hospitals Project," "The Non-Communicable Disease Control Project," and "The Development of Human Resources." In addition, this project is especially related to "The Quality of Health Care Services in Hospitals Project."

"The Quality of Healthcare Services in Hospitals Project" has 6 purposes. Through implementation of this project, 2 objectives, improvement of hospital performance indicators (bed occupancy rate, turnover rate, average days of stay, etc.) and reduction in mortality rate, could be achieved.

Myanmar has been increasing its budget for the past 2 years in order to invest in physical health assets. This increased budget is mainly concentrated on temporary supply of salary, free provision of medicine for poor and emergency patients, and improvement of infrastructure such as construction and equipment. Through the projects, currently, maintenance of buildings and equipment and the transfer of some departments are underway. This project and the infrastructure projects of the Myanmar side are carried out under such circumstances where they complement each other.

Yangon General Hospital (hereinafter referred to as "YGH") and New Yangon General Hospital (hereinafter referred to as "NYGH") are defined as the top referral hospitals in the Lower Myanmar area.

Both hospitals provide tertiary-level medical services for the poor and along with the Teaching Hospital Medical University of Yangon (1); however, decrepit equipment has become a problem in terms of quality and quantity.

To solve these problems, the goal of NHP in Myanmar is to maintain buildings and equipment of medical facilities and improve the quality of public health services. Through this project, medical equipment is established at facilities and the medical services system of the top referral medical facilities is improved.

	Purpose	Specific Description
Overall Goal	Quality of health care services given by the hospitals is improved.	1. Hospital performance indicators are increased from existing figures. 2. Mortality rates in hospitals are reduced.
Project Purpose	Quality services appropriate to top referral hospitals are provided by improved medical equipment and strengthened maintenance management capacity.	1. Capacity to treat the patients in severe condition is upgraded by improving the equipment for ICU, wards, operation theaters, etc. 2. Emergency medical service is strengthened by improving the equipment for emergency departments, ICU, operation theaters, etc. 3. Imaging diagnosis capacity is increased by improving the equipment for radiology departments and endoscopic procedures. 4. Capacity to manage equipment maintenance is upgraded through training given as the soft component of the project. 5. A preventive maintenance system is introduced for medical equipment by soft component training.

2-1-2 Outline of the Project

In order to achieve the above objectives, the project will be introduce soft components and improve medical equipment. Through this project, improvement of medical services is expected with targeted facilities. The project will procure medical equipment such as CT scanners, MRI scanners, X-ray equipment, and some endoscopes, and input technical transfer (soft component) for maintenance and management capacity building of the facilities.

2-2 Outline Design of the Japanese Assistance

2-2-1 Design policy

(1) Scope of cooperation target

1) Replacement of obsolete medical equipment not fully functioning, or frequently malfunctioning resulting in expensive repair costs
2) Supplementation of quantities based on recent active medical activities
3) The equipment available it maintenance with current budget and appreciated Sustainability maintenance financially and technically
4) Equipment which seems low frequency of use and no urgent procurement are not considered.
5) Equipment that does not have a local agent in Myanmar in terms of continuous maintenance services are not considered.
6) For smooth start-up and effective operation of planned medical equipment safely and in good condition under this project, in put a soft component named "Establishment of a Preventive Maintenance System".

(2) Target facilities

The following 2 targeted facilities have requested provision of medical equipment under Japan's grant aid.

- Yangon General Hospital (YGH)
- New Yangon General Hospital (NYGH)

(3) Policy regarding selection of equipment

In this project, the necessary diagnostic and therapeutic equipment will be procured for the main medical departments at both YGH and NYGH, which cover an area composed of Yangon City and the surrounding area, while fundamental diagnostic apparatus will be procured.

Meanwhile, the departments requesting new equipment procurement at YGH and NYGH, i.e., the Radiology Department, Surgery Department, Internal Medicine Department, Laboratory Department, and other special medical departments, are the most important departments in these hospitals.

In these departments, existing equipment was mainly procured in the past under Japan's grant aid, and much of the equipment is more than 10 years old although it is still serviceable. It was also found that some of the equipment is unable to adequately perform its prescribed functions.

As a result, medical services have become poor in terms of quantity and quality, and it is difficult for these hospitals to function effectively as top referral hospitals.

Therefore, in order to contribute to enhancing the diagnostic and therapeutic capabilities of the target facilities of this project, this project will offer assistance by replacing existing obsolete equipment and newly procuring some equipment.

(4) Policy regarding grade of equipment and setting of specifications

Some existing equipment at the targeted facilities in this project is secondhand, which was procured with the assistance of NGOs, etc., or was products manufactured in Japan and procured in the early 1980s to early 2000s under Japan's grant aid projects, and most of it is markedly deteriorated. Meanwhile, much of such equipment is now just serviceable thanks to the self-reliant efforts of Myanmar's Ministry of Health and the targeted hospitals purchasing supplies and replacement parts.

Under the above-mentioned situation, in this project, replacement of existing obsolete equipment is requested in addition to procurement of some new equipment. Based on this, it has been decided to procure equipment with specifications basically similar to the existing

equipment and of a grade that can be technically operated at the targeted facilities even in cases where new equipment will be purchased. In addition, considering that technology has improved very rapidly, plans will be made to procure equipment with specifications for high power-saving capability and operability and equipment that is easy to manage and maintain and whose supplies are easily available in Myanmar.

(5) Policy regarding procurement

In this project, the equipment will be products of Japan or Myanmar to be procured under Japan's grant aid project scheme. However, the source of the equipment will be extended to third countries including Europe and the U.S., by closely examining price advantages, usability by medical experts, and available management and maintenance services. Equipment will be procured as far as there are agents who offer maintenance services in Myanmar and it is manufactured by businesses that are able to supply replacement parts and supplies in a stable manner.

(6) Policy regarding management and maintenance capabilities of the executing agency

Equipment for which CMSDs in charge of management and maintenance of public medical facilities in Myanmar can offer repair services includes sterilizers, examination lamps, ECG, oxygen concentrators, generators, central gas piping systems, etc. Management and maintenance services for equipment such as electronic medical equipment and diagnostic imaging systems are offered by the local agents of the manufacturers. The scope of the specifications and functions of the medical equipment planned to be procured in this project will not exceed the management and maintenance and functional capabilities of CMSD and such local agents. Maintenance capability of YGH is similar to CMSD. Thus, same policy needs to be applied.

(7) Policy regarding consumable supplies/spare parts

In accordance with the basic policy for grant aid projects, replacement parts such as maintenance parts will not be included in the scope of this project.

Only consumables need for initial operation and start-up training will be included. And also consumables based on the regular assumptions that can be procured with Myanmar's budget for the next fiscal year will be included. In this connection, consumable for 6 months use will be included, also in consideration with that many of equipment will need be procured from Japan or third countries through local agents and it will take 3 to 4 months to be delivered.

(8) Policy concerning the operation guidance of the equipment (Soft component)

For the smooth start-up and effective utilization of procured equipment, a soft component for operation technical guidance by consultants will be planned at the time of delivery of equipment. A soft component will be put on CT scanners, MRI scanners, digital X-ray equipment, etc., which are developed with recent modern technology and have high performance in diagnostic functions. A soft component will also be employed for preventive maintenance, daily maintenance, and strengthening of user training for procured equipment as well as establishment of a defective equipment repair route.

(9) Policy concerning Natural Environment Condition

During the dry season from March to May in Yangon, the temperature rises to more than 35 degrees. Annual rainfall in Yangon is high at approximately 2,700 mm, and humidity in the rainy season is 70 to 80%, which exceeds the recommended operating range of certain medical equipment; therefore, imaging diagnostic equipment, laboratory equipment, and equipment for operation shall be placed in an air-conditioned room.

(10) Policy concerning the Power Supply Condition

Measured power supply ranged from 210 to 215 V in YGH and from 185 to 220 V in NYGH, which were lower than the nominal voltage of 220 V. Variance of measured power supply is within 2.5 V and 17.5 V respectively; however, AVR and UPS are necessary for equipment that is vulnerable to voltage fluctuation or blackout.

(11) Policy concerning implementation

This project will require approval by a cabinet meeting of the Japanese government in accordance with the framework of grant aid of the Japanese government, and will be implemented after the Exchange of Notes (E/N) concerning the project between the Japanese and the Myanmar governments. After the conclusion of the E/N between the two governments, the Grant Agreement (G/A) will be concluded between JICA and the Myanmar government.

After the conclusion of both E/N and G/A, a Japanese consultant company recommended by JICA will conclude a consultant agreement with the Ministry of Health of Myanmar in accordance with the procedures of Japanese Grant Aid. The agreement will come to effect upon verification of JICA. The consultant will implement duties related to tender and supervision of procurement and soft component on the basis of the agreement.

The procurement of equipment is implemented by Japanese corporate companies selected by tender, they will conclude contracts with the Ministry of Health of Myanmar, and these contracts will also come into effect upon approval of JICA. The Japanese companies will be responsible for the procurement, carriage and installation of the necessary equipment, the provision of technical training concerning the operation and maintenance of individual equipment. Consultant will conduct technical training for equipment operation and establishment of maintenance management system.

The whole process of this project will take approximately 24 months, including the Exchange of Notes (E/N) and Grant Agreement (G/A)

2-2-2 Basic Plan (Equipment Plan)

(1) Overall plan

1) Target facilities

Equipment to be procured under this project will be distributed to the following departments shown in Table 2.1. Equipment is either replacement or supplementary equipment. Thus, the infrastructure for equipment has already been settled.

Table 2.1 Project facilities, departments

Yangon General Hospital	New Yangon General Hospital
Gastroenterology	Operation Theater
Chest Medicine	Radiological and Image Diagnosis
Chest Surgery	ICU
General Surgery	Medical Ward
Main Operation Room	Surgical Ward
ICU	Paying Ward
Orthopedic	Laboratory
Laboratory	Urology
Emergency (CT-Image Diagnosis)	Other (Power Generator)

In addition, some of the departments mentioned below in the targeted facilities are planned to be moved to specialist hospitals.

YGH : Chest Surgery, Chest Medicine, Urology, Liver Disease, Rheumatology, and Digestive Endoscopy

NYGH: Urology Surgery

2) Equipment distribution plan

Table 2.2 YGH Equipment distribution plan

Equipment	Total Quant.	Department									
		RAD	GI	CM	CS	GSU	MOT	ICU	ORT	LAB	EM
CT Scanner	1	1									
Ultrasound machine	1										1
Gastroscope	7		3		1	3					
Duodenoscope	2		2								
Colonoscope	6		3			3					
Bronchoscope (flexible)	3			2	1						
Bronchoscope(rigid)	0										
Laparoscope	2					2					
Defibrillator	4						4				
Ventilator	8							6	1		1
Instrument set for microsurgery	2								2		
Arthroscope	1								1		
Autoclave	2						1				1
Automatic biochemical analyzer	1									1	
Immuno analyzer	1									1	
Ambulance	4										4
Polysomnographic machine	1			1							

Table 2.3 NYGH Equipment distribution plan

Equipment	Total Quant.	Department								
		OT	RAD	ICU	MW	SW	PW	LAB	URO	OTH
CT Scanner	1		1							
Anesthesia machine with ventilator	5	5								
Diathermy	4	4								
Patient monitor	23	5		6	6	4	2			
Power Generator	1									1
Laparoscope	2					1			1	
Defibrillator	8			2	2	2	2			
X-ray machine (digital, general)	1		1							
Safety cabinet	1							1		
Ventilator	7			6			1			
Laser machine for urology	1								1	
Operation table	4	4								
Refrigerator (blood bag)	1							1		
Blood gas analyzer	1			1						
Oxygen concentrator	8				6	2				
Syringe pump	20			6	10	4				
Infusion pump	18			6	6	6				
Microtome (Rotary type)	1							1		
Ultrasound machine	1		1							
MRI	1		1							
Choledococoscope	1					1				
Video Laryngoscope (New request)	1	1								

・Abbrivations

YGH		NYGH	
RAD	Radiological and Image Diagnosis	OT	Operation Theater
GI	Gastroenterology	RAD	Radiological and Image Diagnosis
CM	Chest Medicine	ICU	ICU
CS	Chest Surgery	MW	Medical Ward
GSU	General Surgery	SW	Surgical Ward
MOT	Main Operation Room	PW	Paying Ward
ICU	ICU	LAB	Laboratory
ORT	Orthopedic	URO	Urology
LAB	Laboratory	OTH	Others
EM	Emergency		

(2) Criteria for equipment selection

Requested units of equipment in this project were investigated and the results are shown in the Table attached at the back of this report.

[Study in supply aspect]

◎: Urgent renewal is called for.

○: Urgent replenishing is called for.

●: Procurement is planned anew.

X: Necessity of procurement is not recognized.

[Study in demand aspect]

①: Function deteriorated due to obsoleteness and malfunction, etc.

②: Quantitative shortage due to expanded medical service activities.

③: New medical service activities are planned.

④: Existing equipment can be used continuously.

⑤: Other equipment can be used.

⑥: Self-Procurement is possible .

[Technical study]

a: Operation is possible at the current technical level.

b: Since the equipment specifications are different from those of the existing equipment (enhanced function), initial guidance by experts is required.

c: On-the-job training is required when the equipment is installed.

(3) Main equipment

The attached material and Table 2.4 show main equipment to be procured in this project for summary of targeted facilities. The results of investigation for planned equipment are as follows.

YGH (Yangon General Hospital)

(1) Radiological and Image Diagnosis Department

Since the requested equipment, a CT scanner, is planned to be installed in the Emergency Department, the condition of existing facilities and equipment and an equipment plan are described in "(10) Emergency" below.

(2) Gastroenterology (Annex, 1st Floor)

-Existing facility and equipment

The Gastroenterology Department is located on the 1st floor of a building separate from the Main Building and has an examination room where 2 fiberscopes can be used at one time, in addition to a reception area and a lobby. At the back of the examination room, there is a fiberscope washing room, where the fiberscopes are washed with water that has passed through a soft water filter. Currently, the department has 3 sets of gastroscopes, 1 set of duodenoscope, and 1 set of colonoscope, which were procured in 1980 and/or 1990 and are now kept in a locally manufactured fiberscope cabinet. All the fiberscopes, however, are deteriorated and fiber breakage is also found. Therefore, replacement of the old fiberscopes is urgently required.

Digestive disease is ranked 4th of all diseases in Myanmar. The total number of examinations performed in 2012 for digestive diseases was 1,321 cases, while on a daily average, 15 to 20 examinations were conducted using a gastroscope and 3 to 5 examinations were conducted using a duodenoscope or colonoscope. Of these examinations, 30% were conducted as new cases. Although the above medical equipment is serviceable on a daily basis, it is clear that the existing equipment is aged and in poor condition due to fiber breakage, etc. because approximately 15 to 20 years have passed since the equipment was procured. The same situation is found with the existing duodenoscope.

-Equipment plan

Each gastroscope is expected to be used for 5 cases per day as it needs time for washing, and based on the expected number of cases per day, it is planned to replace the existing 3 units. A

duodenoscopic examination takes roughly twice the time of a gastroscopic examination, and each duodenoscope is expected to be used for 2 examinations per day. Based on this expectation, it is planned to replace the 2 duodenoscopes. Each colonoscope can be used to examine 3 cases per day and the number of patients for colonoscopy is expected to increase. Based on the assumption that the colonoscopes will be used for 8 cases per day, it is planned to replace the 3 colonoscopes.

(3) Chest Medicine (Main, 2nd Floor)

-Existing facility and equipment

The Chest Medicine Department has an endoscopy examination room and a respiratory function examination room. Currently, the department has 2 bronchoscopes (flexible) manufactured in 2008 but it is 5 years since they were procured. Fiber breakage is found in them and they are in poor condition and are only just able to make diagnoses. In the respiratory function examination room, there is an obsolete simple polysomnographic machine, but could not be used due to malfunction.

In addition, the department is planning to move to the newly constructed Chest Center by the end of FY2013. Currently, in the Chest Medicine Department, a total of 60 to 80 cases are examined per month with 2 bronchoscopes (flexible). Due to breakage of the fiber, however, the viewing field is small for both units and it poses an obstacle to the examination process. In addition, after breakage occurred in the original equipment's light source, an inexpensive Chinese-manufactured product was procured, but the problem are caused by such lack of brightness or unstable lighting intensity.

-Equipment plan

Based on this, it is planned to replace the 2 bronchoscopes. A polysomnographic machine is necessary for diagnosis of apnea syndrome because of malfunction of the existing one. It is, therefore, planned to replace the polysomnographic machine.

(4) Chest Surgery (Main, 2nd Floor)

-Existing facility and equipment

The Chest Surgery Department has 1 bronchoscope (flexible) procured 10 years ago and 2 gastroscopes procured 5 years ago. In addition to these flexible fiberscopes, 2 bronchoscopes (rigid) are kept in this department but it is already 5 years since they were procured and they are

markedly deteriorated.

The department is planning to move to the newly constructed Chest Center by the end of FY2013.

-Equipment plan

The total number of 507 surgical operations using bronchoscopes (flexible) were performed in 2012, including 145 lung operations and 78 esophagus operations. Based on this, it is planned to replace the existing deteriorated bronchoscope and gastroscope with 1 unit of each.

Meanwhile, with respect to the bronchoscope (rigid) recorded in the Minutes of Discussion, it was found later as a result of a supplementary survey that only 1 surgical operation using the equipment was performed per year and it was judged that there is no urgent necessary for replacing it.

(5) General Surgery (Main, 2nd Floor)

-Existing facility and equipment

The General Surgery Department is composed of 3 wards with a total of 195 beds. Ward No. 7-8 has 74 beds, ward No. 9-10 has 44 beds, and ward No. 13-14 has 77 beds. These wards, however, have extra beds, as a result of which a total of about 230 patients are accepted on a regular basis. This time, it is requested that the existing equipment necessary to treat patients with digestive disease commonly found in these 3 wards should be replaced. Currently, there are 5 gastroscopes procured in the 1980s, of which 2 are broken, while 2 colonoscopes owned by the department are both markedly deteriorated. Two sets of laparoscopes are shared by the 3 surgery operation rooms. They were procured in the 1980s and are markedly deteriorated. Components for 1 of the 2 laparoscopes such as the light source have been replaced whenever they have broken. As a result, it has a mixture of components manufactured in Japan, Germany, and China and now it is unable to perform.

An accurate vision of surgery, suction/pressure, and function of illumination standards cannot be obtained.

-Equipment plan

A total of 3 gastroscopes and a total of 2 colonoscopes function very poorly due to fiber breakage resulting in restricted vision. It is considered that the 3 gastroscopes should be replaced urgently. Meanwhile, the colonoscopes are used for 7 to 8 cases per day, based on

which each colonoscope can be used at a frequency of 3 cases per day when washing time is taken into account. Therefore, it is planned to replace the 2 colonoscopes and to procure 1 colonoscope as supplementary.

At the General Surgery Department, which is in charge of digestive diseases, in Surgery Ward No. 7-8, 15,414 operations were performed in year 2012. Among these, 200 laparoscopic operations were performed in 3 surgery wards. However, the existing functional laparoscope is only 1 unit. As a result, 600 emergency open abdominal operations were conducted in the last 4 months. Under this project, it is planned to procure 2 sets of laparoscopes, in total 3 sets considering reduction of burden on the body and the number of medical staff (3 staff members) enabling laparoscopic operation to be performed in 3 wards. As a result, it is expected that the number of admission days will be reduced through reduction in the number of open abdominal surgeries, which place a high burden on the patient's body.

(6) Main Operation Room (Main, 2nd Floor and 3rd Floor)

There are a total of 4 operation rooms in the Main Building, with 2 operation rooms each on the 2nd and 3rd floors. They are mainly used by the 3 General Surgery Departments and the Orthopedics Department. Existing equipment has been procured recently by the Ministry of Health and procured under Japan's grant aid 10 or more years ago.

1) Operation Room 1 (Main Building, 2nd Floor)

-Existing facility and equipment

There are operating tables (2), shadowless OT lights (2), anesthesia apparatus(2), diathermy units (2), patient monitor (2), defibrillator (2), and suction units (3), all procured in 1985 and 2003 under Japan's grant aid and they are all markedly deteriorated. Even through this equipment is obsolete, it is still serviceable except for the defibrillators. There are 2 defibrillator units procured in 1985, but continuous use is difficult especially for emergency cases use due to malfunction of battery function and deterioration of output function. Regarding defibrillators, 1 unit can provide medical service. Thus, the 2 units that are in good condition can provide service from time to time.

- Equipment plan

Under this project, it is planned to replace at least 1 defibrillator of the 2 existing units.

2) Operation Room 2 (Main Building, 2nd Floor)

-Existing facility and equipment

There are operating tables (2), shadowless OT lights (2), anesthesia apparatus (2), diathermy units (2), defibrillator (1), patient monitor (1), and suction units (2). This operation room is able to perform normal operation procedures. Even through this equipment is obsolete, it is still serviceable except for the defibrillator. There is 1 defibrillator unit procured in 1985, but continuous use is difficult especially for emergency cases use due to malfunction of battery function and deterioration of output function.

- Equipment plan

Under this project, 1 defibrillator needs to be replaced.

3) Operation Room 3 (Main Building, 3rd Floor)

-Existing facility and equipment

There are operating tables (2), shadowless OT lights (2), anesthesia apparatus (2), diathermy units (2), defibrillator (1), patient monitor (1), and suction units (4). This operation room is able to perform normal operation procedures. Even through this equipment is obsolete, it is still serviceable except for the defibrillator. There is 1 defibrillator unit procured in 1985, but continuous use is difficult especially for emergency use due to malfunction of battery function and deterioration of output function.

- Equipment plan

Under this project, 1 defibrillator needs to be replaced.

4) Operation Room 4 (Main Building, 3rd Floor)

-Existing facility and equipment

There are operating tables (2), shadowless OT lights (2), anesthesia apparatus (3), laparoscope set (1), arthroscope set (1), patient monitor (1), defibrillator (1), and suction units (4). This operation room is mainly used for laparoscopic and arthroscopic operations. Even through this equipment is obsolete, it is still serviceable except for the defibrillator. There is 1 defibrillator unit procured in 1985, but continuous use is difficult especially for emergency cases use due to malfunction of battery function and deterioration of output function.

- Equipment plan

Under this project, 1 defibrillator needs to be replaced.

5) Operation Room (Autoclave room)

-Existing facility and equipment

Autoclaves are not around the area near the operation rooms but located in a separate building away from the Main Building. A total of 2 autoclaves operate 5 times a day, 1 of which was procured in 1984 under Japan's grant aid project and the other of which was procured by Myanmar's Ministry of Health. The one procured under Japan's grant aid has problems of an attached outside boiler, adjustment of temperature setting, and sterilization time, resulting in urgent replacement.

- Equipment plan

There are 2 autoclaves already installed, which are sterilized with a total 4,000 liters per day. In this project, it is planned to replace the existing highly deteriorated autoclave with one whose capacity is equivalent to 440 L.

(7) ICUs

-Existing facility and equipment

Currently, the ICU area has a total of 20 beds. The area is composed of 2 rooms (2 beds each) that can be used for patient isolation and another 2 sections with 10 beds and 6 beds, respectively. The 10-bed section is for caring for patients with relatively minor symptoms. There are patient monitors, defibrillators, syringe pumps, and infusion pumps, but all of these have become obsolete. In addition, 2 defibrillators also procured in the 1980s and 4 patient monitors procured in 2002 are all markedly deteriorated. Insufficient equipment is planned to be supplemented, procured by the budget of the Ministry of Health. There are a total of 15 ventilators including 6 procured by the Ministry of Health in 2013. Of the 15, 5 procured in the 1980s are no longer serviceable, while 10 are still serviceable.

-Equipment plan

In 2012, of the patients treated in the ICUs, 389 patients, or 30%, were postoperative patients, followed by 19% who had been bitten by snakes and 11% who were patients with tetanus. There are ventilators in a total of 10 units for 20 beds including 6 units procured by the Ministry of

Health in 2013. Even through the number of ventilators is insufficient for 10 units compared with the number of beds, the utilization rate of the ventilators is about 80%. Thus, a total of 16 units need to be procured. This department receives postoperative patients, so it is necessary to set up an appropriate environment. Under this project, 4 units for replacement and 2 units for new acquirement are planned.

(8) Orthopedics (Main, 2nd Floor)

-Existing facility and equipment

In Ward No.4-5 mainly for patients with external injuries and orthopedics, there are in total 135 beds. Currently, there is a ventilator and 1 arthroscope, which specializes in hip joint operations and is not applicable for knee operation and diagnosis procedures. It is required to procure an arthroscope set for knee operations.

-Equipment plan

According to the 2009 statistics, the number of patients accepted by the department was 3,784 per year, including 1,414 patients with upper body problems (shoulders, arms, elbows, and wrists) and 1,773 patients with lower body problems (buttocks, thighs, legs, and ankles). The number of urgent surgical operations performed per year was 2,173, of which operations under anesthesia accounted for approximately 60 cases per year and knee surgical operations accounted for as many as 150 cases per year. Thus, replacement of ventilators is urgently required. Based on this, taking into account the time needed to sterilize the equipment, it is planned to procure an arthroscope set and 2 sets of micrographic surgery equipment for performing microscopic surgery, particularly for the treatment of knee problems. Under this project, it is planned to procure 1 ventilator unit, 1 arthroscope set, and 2 sets of microsurgical operation equipment considering the sterilization cycle.

(9) Laboratory (Annex, 2nd Floor)

-Existing facility and equipment

In this room, pathological, hematological, tissue, and microbiological examinations are performed. In 2003, an automatic biochemical analyzer was procured but it is no longer kept in this room because of equipment failure.

Currently, an automatic biochemical analyzer is leased from the agent of a medical equipment manufacturer without any charge, but the prices of the test reagents are high in terms of

financial sustainability. In addition, there is 1 immuno-analyzer in the Emergency Department but not in the Laboratory. As a result, the analyzer cannot be used effectively when an investigation is urgently required.

-Equipment plan

In 2012, pathological examinations were performed in 217,820 cases, hematological examinations in 90,410 cases, tissue examinations in 2,980 cases, and microorganism examinations in 63,417 cases, and the total number of examinations performed during the year was 374,627. Currently, an automatic biochemical analyzer is leased from a medical equipment manufacturer's agent without any charge. It uses close-type test reagents designated by the manufacturer, which are highly expensive, creating an obstacle to the laboratory's investigation service. In this project, it is planned to procure a biochemical analyzer for which open-type test reagents can be partially used and which can process 200 to 300 tests substances per hour and 1 immuno-analyzer that can process 60 tests per hour.

(10) Emergency

-Existing facility and equipment

In this hospital, there are a total of 3 CT scanners. The Emergency Department has 1 16-slice and 1 single-slice CT scanner and the Neurology Department has 1 32-slice CT scanner. The 16-slice CT scanner was procured in 2008 with funds from the Ministry of Health, while the single-slice CT scanner was procured in 2000 under Japan's grant aid project. The single-slice CT scanner is still serviceable for emergency treatment (free of charge for the poor) but it is markedly deteriorated and overdue for renewal. In 2012, the number of examinations performed using CT scanners was 10,282, of which about 3,500 cases, or 30%, were performed with the CT scanners installed in the Emergency Department. Of the patients examined, 50 to 80% were in the poverty group and the examinations were performed without any charge. The CT scanners are 10 years old and the X-ray tubes have once been replaced.

There are a total of 6 ambulances. One was procured in 2012 from WHO. Although there is no travel distance data available, 5 vehicles were secondhand (year of manufacture is unknown) and their travel distance seems to be over 100,000 km. Of these 5 vehicles, 2 are ready to be scrapped. These ambulances are used to transport patients to the hospital premises as well as from the hospital to outside specialist hospitals. Between 6 and 7 times a day, they are mobilized to transport patients to the premises and between 3 and 4 times a day to transport patients to

other hospitals.

Currently, 3 drivers and 3 supporting workers are deployed on a round-the-clock basis. Last year, when an airplane accident occurred in Myanmar, the hospital's ambulances transported patients from Yangon International Airport to this hospital. These vehicles are considered to be an important transport tool for emergency response.

Separately, the Ministry of Health purchased 60 ambulances for the SEA Games to be held in December 2013 (20 vehicles are rapid-response cars, or so-called Japanese "doctor cars," and 40 are regular ambulances to transport patients). Several of these ambulances are planned to be assigned to the hospital later and will be in the charge of the hospital's Emergency Department.

These ambulances are for the EMS (emergency medical service) system currently being promoted by the Ministry of Health and they are planned to be used to transport patients from traffic accident sites or their home.

A total of 2 autoclaves for sterilizing medical instruments were procured in 1984 under Japan's grant aid project but 1 broke down and became unserviceable. To date, the remaining 1 autoclave is serviceable, using parts from the other for repairs.

Currently, there is no ventilator installed. Patients who require a ventilation are approximately 30-40 cases per year, and transport to ICUs.

There is 1 ultrasound machine manufactured in Japan at the beginning of 2000. Its probes and console panel are significantly deteriorated and repeatedly break down. In addition, the monitor is also small, and probe connection is not good resulting in no clear picture on the screen for proper diagnosis.

-Equipment plan

In this project, it is planned to replace the existing scanners with multi-slice CT scanners that require less irradiation and shorter examination time and will reduce the physical burden on patients and for high-accuracy diagnosis.

At Yangon General Hospital, it is increasingly necessary to transport patients by ambulance to other hospitals, for example, to an affiliated specialist hospital to be established in the neighborhood. Currently, patients are transported to 15 to 18 other hospitals including other affiliated hospitals, while the above-mentioned specialist hospital will have 6 specialty departments and by simple calculation, it is expected that the number of patients to be transported will increase by 30 to 40% in the future. Based on this calculation, it is considered

that the number of ambulances should be increased from the current 3 vehicles to 4 vehicles. The Ministry of Health purchased a total of 60 ambulances, and several vehicles will be supplied to the targeted facilities after the SEA Games end in 2013. This is part of the Ministry's plan to construct a new, comprehensive metropolitan emergency service structure. It is considered, however, that there is no discrepancy or duplication between the Ministry of Health's plan and this project's plan to enhance the emergency structure for inter-hospital patient transport.

There is 1 autoclave already installed, which is operated 3 times a day, with daily sterilization equivalent to 1,200 liters, or 400-liter sterilization capacity at 1 time. In this project, it is planned to replace the existing highly deteriorated autoclave with equipment with similar capacity. Although the ultrasound machine is used to examine 30 to 50 cases per day on a round-the-clock basis, it is difficult to make quick and accurate diagnoses due to the machine's functional defectiveness. Due to the lack of ventilator in this department, quick medical services cannot be provided. In this project, it is planned to replace the insufficient 1 unit of ventilator and the ultrasound machine that is markedly deteriorated.

NYGH (New Yangon General Hospital)

(1) Operation Rooms (Main No. 2, 2nd Floor)

There are 4 operation rooms, of which 3 (Operation Rooms 1 to 3) are used for scheduled operations and the remaining room (Operation Room 4) is used for emergency operations or for operations on patients suspected to have infectious diseases. This operation room 4 has a different access route to the other 3 operation rooms. In all the operation rooms, the wall-mount-type air conditioning is out of order and floor air conditioners are installed in each room.

The Recovery Room is also used for storage of equipment such as the ultrasound machine, infusion pumps, and endoscopic accessories. Each operation room has an endoscopy room attached, and a gastroscope and colonoscope are kept in the endoscopy cabinet.

In the Operation Room, a total of 4,362 surgical and urological operations were performed in 2012, of which 126 used laparoscopy. Meanwhile, a total of 1,009 full-anesthetic operations were performed, which include 713 surgical operations and 296 urological operations, in addition to operations requiring spinal anesthesia and local anesthesia. At this hospital, kidney and liver transplant operations are performed, which require sensitive positioning by the electric

operating table.

1) Operation Room 1

-Existing facility and equipment

There is 1 operating table, a shadowless OT light, anesthesia apparatus, patient monitor, and suction unit, procured in 1984 and 2003 under Japan's grant aid. The shadowless OT light and suction unit are still serviceable, while the operating table is deteriorated and cannot be adjusted precisely to the right position, which makes microsurgery or newly introduced organ transplant surgery impossible. In addition, the anesthesia apparatus, diathermy unit, and the patient monitor are markedly deteriorated because of aged parts. (Below, each operation room is equipped under Japan's grant aid in 1984 and 2003, and equipment conditions are similar.)

-Equipment plan

The anesthesia apparatus, diathermy unit, patient monitor, and electric operating table, which are markedly deteriorated, will be replaced with 1 unit each.

2) Operation Room 2

-Existing facility and equipment

The shadowless OT light and suction unit are still serviceable, while the operating table is deteriorated and unable to be adjusted precisely to the right position, which makes microsurgery or newly introduced organ transplant surgery, impossible.
In addition, the anesthesia apparatus, diathermy unit, and patient monitor are markedly deteriorated because of aged parts.

-Equipment plan

The anesthesia apparatus, diathermy unit patient monitor, and electric operating table, which are markedly deteriorated, will be replaced with 1 unit each.

3) Operation Room 3

-Existing facility and equipment

The shadowless OT light and suction unit are still serviceable, while the operating table is deteriorated and unable to be adjusted precisely to the right position, which makes microsurgery

or newly introduced organ transplant surgery impossible. In addition, the anesthesia apparatus, diathermy unit, and patient monitor are markedly deteriorated because of aged parts.

-Equipment plan

The anesthesia apparatus, diathermy unit patient monitor, and electric operating table, which are markedly deteriorated, will be replaced with 1 unit each.

4) Operation Room 4

-Existing facility and equipment

There is 1 operating table, a shadowless OT light, anesthesia apparatus, patient monitor, ultrasound machine, suction pump, and syringe pump, in addition to 2 diathermy units and defibrillators, respectively.

The shadowless OT light and suction unit are still serviceable, while the operating table is deteriorated and unable to be adjusted precisely to the right position, which makes microsurgery or newly introduced organ transplant surgery impossible. In addition, the operating table, anesthesia apparatus, diathermy unit, and patient monitor are markedly deteriorated because of aged parts. A video laryngoscope, which is effective with patients for whom intubation is difficult, is not installed.

-Equipment plan

The anesthesia apparatus, diathermy unit, patient monitor, and manually driven operating table, which are markedly deteriorated, will be replaced with 1 unit each. In addition, a video laryngoscope will be supplied in order to secure the airway and intubation in emergency cases.

5) Endoscopic examination room

A gastroscope, colonoscope, and laparoscope are installed. Pediatric patients and emergency patients requiring full anesthesia whose numbers are approx. 2 to 4 cases per month are examined by using equipment installed in the Operation Theater because there are no anesthesia apparatus nor patient monitors.

-Equipment plan

One unit of anesthesia apparatus and patient monitor are installed for quick examination services.

(2) Radiological and Image Diagnosis Department

A CT scanner, MRI scanner, X-ray apparatus, and ultrasound machine related to diagnostic imaging are concentrated on the first floor of Building 2 and 3.

1) X-ray Rooms No. 4 and No. 5 (a connected room with 2 doors)

-Existing facility and equipment

There are 2 general X-ray machines procured in 1984 and 2003 under Japan's grant aid, both of which are just serviceable, having been repaired from time to time, but they are markedly deteriorated.

- Equipment plan

One general X-ray machine will be scrapped and the other X-ray machine will be relocated (relocation costs are borne by the Myanmar side) and procuring 1 multi-slice CT scanner is being considered.

2) X-ray Rooms No. 6 and No. 7

-Existing facility and equipment

There are 2 general X-ray machines. One is a fluoroscopy machine procured in 1984 under Japan's grant aid but it is broken and beyond repair. The other is a general X-ray machine (manufactured in Japan) in serviceable condition, which was procured in 2011 with funds from the Ministry of Health.

-Equipment plan

In 2012, the general X-ray machine was used in as many as 9,370 cases. A total of 38 cases per day are examined on average, and this number is beyond the capacity and function of the existing X-ray unit. Procuring 1 general X-ray machine for replacement is being considered.

3) MRI Room

-Existing facility and equipment

There is a broken Japanese-manufactured MRI system (Hitachi MRP-7000) and it has been left unrepaired. The system was procured under Japan's grant aid. It was delivered on June 24, 1996 and later on January 16, 2004, the first problem occurred with the power source and repairs were carried out more than 10 times. On September 25, 2005, however, it stopped

working completely and has remained so to date. (As for replacement parts, the accumulator has been discontinued, and it has become impossible to repair.)

-Equipment plan

The existing broken MRI machine was used in a total of 1,671 cases (734 for head examinations, 537 for spine examinations, 359 for limb examinations, and 41 for blood vessel examinations) in 2002 according to the 2002 statistics, when it operated normally before it stopped working completely in 2005. It was found that a total of 645 of the cases examined were patients at this hospital, while 1,026 cases, or more than 60%, were patients referred to the hospital by 10 other medical facilities in Yangon City and the surrounding area. Currently, patients are treated at YGH (they have to wait a long time for treatment) or private medical facilities. One unit of MRI scanner is to be procured for recovery of the function as a top referral hospital and strengthening of diagnostic services.

4) CT Room

-Existing facility and equipment

The 1-slice unit procured in 2003 under Japan's grant aid is still serviceable. Once in 2009, the X-ray tubes were replaced with hospital funds but no other repairs were done. Due to the obsoleteness, image processing movement is unstable, and continuous use is difficult. CT scanners were used in a total of 2,014 cases in 2012 (998 for head examinations, 456 for abdominal examinations, 302 for chest examinations, and 248 for pelvic examinations) was Among above total number of examination,754 cases were patients at YGH, while 1,225 cases, of about 60%, were patients referred to the hospital by other medical facilities in Yangon City and the surrounding area (10 medical facilities comprising East Yangon General Hospital, West Yangon General Hospital, and 8 other hospitals).

-Equipment plan

Because the existing CT scanner is beyond its life span, replacement new unit is planned after renovation of X-ray Room No. 4 and 5. (Renovation costs are borne by the Myanmar side).

The grade of equipment is a multi-slice CT scanner appropriate for kidney and liver transplant operation planning. Multi-slice CT scanners are core equipment in transplant surgery since they can diagnose microlesions in patients and create elaborate 3D images. In addition, compared with 1-slice CT scanners, this type of CT scanner requires less radiation and shorter examination

time, which reduces the physical burden on patients and improves diagnostic accuracy.

5) Ultrasound Diagnostic Rooms

-Existing facility and equipment

The ultrasound machine (Doppler) procured in 2003 under Japan's grant aid broke down in 2008. With hospital funds, another machine manufactured in Japan was installed but it does not currently provide clear images and cannot be repaired. In 2013, 1 ultrasound machine (manufactured in South Korea) was procured with funding from the Ministry of Health and only this machine is currently serviceable and used for makeing diagnoses.

-Equipment plan

According to the 2012 statistics, the number of ultrasound diagnostic examinations performed in 2012 was 7,002. A total of 140 out of 7,002 cases, or about 2%, were cases referred to the hospital by 10 other medical facilities in Yangon City and the surrounding area and they were mostly cases of examination by Doppler ultrasound equipment.

(3) ICUs (Main No. 4, 2nd Floor)

-Existing facility and equipment

The number of beds in the ICU area is 8 in total, including 2 beds in 2 single-bed rooms (each accommodating 1 patient while the rooms were originally for 2 patients) and 6 beds in a shared room. There are 6 patient monitors (currently serviceable but the blood pressure determination function does not work efficiently and the battery is markedly deteriorated), 5 ventilators (of which 3 are broken due to oxygen leakage, etc.), 1 defibrillator (the battery cannot be charged), 3 syringe pumps, 3 infusion pumps, and 1 blood gas analyzer (in poor condition due to aging since 2008 and currently kept in the warehouse), all procured in 1984 and 2003 under Japan's grant aid. According to the statistics in 2012, 478 patients per year (ICU/141, CCU/337) are received. Among these patients, many patients have cardiac disease problems, while slightly ill patients are admitted to the Internal Medicine Ward or Surgical Ward. Up to end of August 2013 during the preparatory survey period, 2 liver transplant cases have been performed, and postoperative transplant patients have been admitted to the individual rooms of same department.

-Equipment plan

According to the department's request, 6 deteriorated patient monitors for monitoring critically ill patients' electrocardiograms, blood pressure, and respiration will be replaced. The defibrillators perform defibrillation or synchronized cardioversion through electric stimulation in cases such as ventricular fibrillation (VF) and ventricular tachycardia (VT).

Due to impossibility of charging the battery, the 1 existing piece of equipment needs to be replaced and another needs to supplement it, so in total 2 units are planned. There are 2 functioning ventilators; however, their function is deteriorated. It is time for replacement. Under this project, 3 new and 3 replacements, in total 6 units, are procured for 8 beds together with the existing 2 units. As a result, 1 bed is equipped 1 ventilator unit.

Since blood gas analyzers are extremely important for monitoring the respiratory function of postoperative patients, it is planned to replace the existing broken one. Syringe and infusion pumps are fundamental equipment for ICUs, as they are used to inject a predetermined amount of medical solution into poisoned patients or patients with an infection. In this project, it is planned to replace the existing 3 units that are in too poor a condition to manage the medical solution accurately as well as to procure 3 new ones to meet needs.

(4) Medical Ward (Main No. 1, 3rd Floor)

-Existing facility and equipment

Major equipment installed in the Medical Ward includes patient monitors (2), suction units (2), oxygen concentrators (2), infusion pump (1), syringe pumps (2), defibrillators (2), and nebulizers (4). Similarly, they were procured in 2003 under Japan's grant aid and are markedly deteriorated. This ward has a capacity of 76 beds, but it also has 30 extra beds to be used when more than 76 patients need to be hospitalized. As a result, the ward can in fact accept more than 100 patients. In addition, when there are no ICUs available for seriously ill patients, this ward is used as a recovery room for postoperative patients.

-Equipment plan

A total of 6 patient monitors will be replaced or newly procured, so each patient monitor will service about 15 beds. A total of 2 defibrillators will be replaced, 1 each for the male ward and the female ward. A total of 6 oxygen concentrators will be procured, including replacement of the existing ones in both the male and female wards and new procurement. A total of approx. 10

syringe pumps will be procured including replacement of the existing ones, so each syringe pump will service about 8 beds in both the male and female wards. A total of 6 infusion pumps will be procured including replacement of the existing ones, so each infusion pump will service about 14 beds in both the male and female wards.

(5) Surgery Ward (Main No. 1, 2nd floor)

-Existing facility and equipment

Major equipment installed in the Surgery Ward includes patient monitors (2), suction units (2), oxygen concentrators (2), infusion pump (1), syringe pumps (2), ECG machine (1), and nebulizers (4). Similarly, they were procured in 2003 under Japan's grant aid and are markedly deteriorated. At the Surgery Ward, gallstone patients have to be referred to outside private hospitals because of the lack of choledochoscope and laparoscopes. The Surgery Ward has a capacity of 76 beds and it also has 30 extra beds to be used when more than 76 patients need to be hospitalized. As a result, the ward can in fact accept more than 100 patients as is the case with the Medical Ward. In addition, when there are no ICUs available for seriously ill patients, this ward functions as a recovery room for postoperative patients.

-Equipment plan

A total of 4 patient monitors will be replaced or newly added, so each patient monitor will service about 20 beds. A total of 2 defibrillators will be replaced, 1 each in the male and female wards. A total of 2 oxygen concentrators will be replaced, 1 each in the male and female wards. About 4 syringe pumps including replacements will be procured and added to the 2 existing units to make a total of 6 units, so each one will service about 13 beds in both the male and female wards. A total of 6 infusion pumps including replacements will be procured, so each one will service about 14 beds in both the male and female wards.

Demand for choledocoscopic examination is about 5 to 7 cases per month, and it is planned to procure 1 unit of laparascope and choledochoscope each resulting in improvement of medical services.

(6) Pay Ward

-Existing facility and equipment

The current new Pay Ward was constructed in 2012 and there are now a total of 50 beds (47 in single-bed rooms and 3 in special rooms). A single-bed room costs $30/day, while a special room costs $40/day. Major equipment installed in this ward includes an ECG machine, infusion pump, syringe pump, emergency cart, instrument table, and defibrillator. Since there is no ventilator, serious patients need to be shifted to ICUs in the Main Building.

-Equipment plan

In this ward, on average, 15 to 20 patients are hospitalized daily. It is requested that 2 patient monitors and 2 defibrillators be procured since the ward is located on 2 floors, respectively. One unit of ventilator is installed to cover the whole Pay Ward.

(7) Clinical Laboratory (Main No. 4, 1st Floor)

-Existing facility and equipment

The blood refrigerator (blood bag) procured in 1984 under Japan's grant aid is broken and not serviceable. Currently, blood is kept in a substitute medicine refrigerator, which is just operable and markedly deteriorated resulting in inappropriate blood bag storage. A sliding microtome also procured under Japan's grant aid is serviceable but it is unable to provide evenly cut thin sections (prepared slides for microscopy) necessary for pathological examinations. Under the name of the Pathology Department, this laboratory performs biochemical, histopathological, microorganism, and hematological examinations. The number of examinations performed in 2012 was 63,997. The department also functions as a blood bank and the National Blood Center, under the auspices of YGH, supplies blood for storage (up to 21 days) as necessary.

-Equipment plan

Rotary microtomes requested to be procured in this project cut out continuous pieces of tissue to create tissues through which light can penetrate for observation under a microscope. There is 1 sliding microtome that has been used for more than 25 years and it cannot create pieces of evenly cut tissue because of shaking of the frame caused by galling. In this project, it is planned to replace the existing unit.

Since no safety cabinet has been installed in this hospital (currently substituted by a clean bench), one will be procured for the first time. The safety cabinet will have a structure whereby

an air barrier is created at the front opening and the air flowing into the cabinet is sterilized by a HEPA filter in order to protect laboratory workers and the samples/materials inside. It is planned to procure 1 safety cabinet as a new procurement and the specifications will be class II type A to deal with cultivation of bacteria of hazard risk degree 2 or 3 contained in vomit, blood, and urine.

For the storage of blood, since the existing blood refrigerator (blood bag) is out of order, a medicine refrigerator is used as a substitute. The 2 refrigerators have different temperature settings and the medicine refrigerator now in use cannot maintain a temperature of 4°C because of functional defectiveness. In addition, no alarm system is provided, which makes it impossible to manage the temperature inside on a regular basis. The capacity is not large enough and only 50 blood supply bags (450 cc) can be stored, which creates an obstacle to urgent surgery. A blood refrigerator with the capacity to store up to 200 bags is necessary. It is planned to procure a blood refrigerator to replace the existing one.

(8) Urology (Main No. 1, 4th Floor)

-Existing facility and equipment

In the Urology Department, suction units (2) and oxygen concentrators (2) procured in 1984 under Japan's grant aid have no particular problems and are serviceable but they are markedly deteriorated. There is a fiberscope for urology that is used for urological examinations in the operation room but it has no laser system. As a result, open abdominal operations are performed for prostate surgery, etc.

-Equipment plan

The number of surgical operations performed in this department in 2012 was 2,093, of which many were abdominal surgeries because there is no laparoscope. The department requested procurement of 1 laparoscope and urethroscope as well as laser equipment necessary to break up stones and treat prostate treatment. The professor in charge of the department performs 20 to 30 laparoscopy operations with a laparoscope he privately owns. He also uses laser equipment installed at a private hospital after the hospital's business hours.

(9) Other (Generator room)

-Existing facility and equipment

Currently, 1 power generator (200 kVA) procured in 1984 under Japan's grant aid is serviceable with no particular problems and it is maintained with technically high-quality maintenance.

But, because of chronic power shortage due to the increase in electrical and electronic medical equipment in recent years and further, to cover the electrical consumption of electronic medical devices that has increased rapidly due to the activation of medical services and back-up in case of a chance blackout during organ transplant surgery that has started in recent years, a generator having large-capacity stable operation is required.

-Equipment plan

Currently, an emergency power generator (200 kVA) is deployed (procured in 1984 when the hospital opened), but it is markedly deteriorated and unable to provide power in a stable manner. In addition, since air conditioners and medical equipment have recently been installed at the hospital, the current capacity of the generator cannot meet the most recent power need.

In this project, it is planned to replace and procure a new emergency power generator (400 kVA) in the expectation that power demand will grow further in the future.

Table2.4 Major Equipment List

No.	Equipment	Main Specification/Composition	Quant.	Purpose of use Validity of the equipment level
1	CT Scanner	Field of view : φ500mm or more Scanning range : Whole body, head scan Scan system : 360°continuous /spiral rotate X-ray generator : 0.8－72 k W or more	2	The X-rays are irradiated from multiple directions to the body, to determine the extent of the X-ray absorption.The computer processes the absorption value is a device for obtaining a tomographic image of the examining area.
2	Ultrasound machine	Display modes : B, B/B, M, B/M Convex Transducer Linear Transducer	2	Detecting and observing the echoes. Degeneration of the muscle tissue, diagnosable area widely intracranial, thoracic organs, abdominal organs also,, utility also very high.
3	Anesthetic apparatus	1)Main unit 2)Vaporizer 3)Anesthetic Ventilator 4)Other necessary items	5	To anesthetize gas to a patient in need of surgery under general anesthesia.In order to put the patient an anesthetic vaporized by the vaporizer will lead to loss of consciousness of the patient, performing surgery while painless. The operating room for tertiary medical facilities, is machine versatile, responding to all cases are possible.
4	Diathermy	Coagulation:200 Watts or more Cutting:250 Watts or more Monopolar:120 Watts or more Bipolar: 18 Watts or more	4	Used in surgery to perform incisions in living tissue, hemostasis cutting, coagulation The equipment is suitable for the surgery site especially with many small vessels, particularly.
5-1	Patient monitor (for OT and ICU)	Parameters : ECG, Respiration, Temperature, SPO2, NIBP、IBP, CO(Cardiac Output), Heart rate, Multigas module	11	It is used primarily to notify the doctor or nurse in an alarm or the like, to record value of biological information of the patient by monitoring respiratory or circulatory system of critically ill patients. The equipment is to act that the doctors and nurses to monitor the patient at all times.
5-2	Patient monitor (for ward)	Parameters : ECG, Respiration, Temperature, SPO2, NIBP or more	12	It is used primarily to notify the doctor or nurse in an alarm or the like, to record value of biological information of the patient by monitoring respiratory or circulatory system of critically ill patients. The equipment is to act that the doctors and nurses to monitor the patient at all times.
6	Power Generator	Output rating : 400 kVA or more Engine : Diesel Fuel or Equivalent、Inlined	1	Emergency auxiliary power supply during power cut offoutages, as deployed as a back-up auxiliary power supply of emergency surgery and increase in power consumption of the hospital.
7	Laparoscope	Telescop : 5~5.4mm and 10mm (line of sight 0°) Telescop : 5~5.4mm and 10mm (line of sight 30°) Trocar :5.5-7mm	4	By the puncture in the abdominal trocar, to insert a surgical instrument and the telescope through the trocar, to be used in the treatment of organ and diagnosis of the abdominal cavity.
8	Defibrillator/Type	Type : Biphasic or monophasic Manual, Synchronized Max output energy : 2～200Jor wider	12	It is used for the resuscitation in the cardiac arrest, used for flow transdermally a direct current to a patient caused the atrial fibrillation or ventricular fibrillation, and to improve hemodynamics returned to normal contraction of the heart.It made available in an emergency, such as a patient abrupt change.It is indispensable to the general hospital.
9	X-ray machine (digital, general)/Type	Type : High frequency inverter type Maximum tube voltage : 150kVor more Maximum tube current : 630mAor more	1	To be used diagnostis of pneumonia patients, fractures, tuberculosis, malnutrition, respiratory disease patients, in general radiography of patients with gallstones and urinary tract infection patients. Has the advantage of being able to make the diagnosis instantly with Film-less, DR system. The equipment is a reasonable grade for the top referral hospitals'.
11	Ventilator/Type	Ventilation control : Volume limited control and Pressure limited control Ventilation mode : IMV,SIMV, PSV, CPAP or more O2 concentration : 21～100%	15	It is used to be a controlled ventilation to a patient in need of labored breathing and assisted respiration and to a patient with spontaneous respiration.
12	Laser machine for urology	Type : Holmium Yag laser Output : 20W or more	1	Subjecting dissection of living tissue, hemostasis, and coagulation in general surgery, and crushed stone treatment in urology.
13-1	Operating Table (electronic)	Elevation Type : Electro hydraulic Elevation range : 770 mm～950 mm or wider Trendelenburg : 20°or more Reverse trendelenburg : 20°or more	2	To be used to perform the surgery. It can be adjusted up and down the platform by site and type of operation and overturned lay the patient during the surgery, It is an essential equipment in the operating room. To plan the electro-hydraulic elevating model available for fine positioning of organ transplant surgery and microsurgery.
13-2	Operating Table (Oil Hydraulic)	Elevation Type : Oil Hydraulic Elevation range : 770 mm～950 mm or wider Trendelenburg : 20°or more Reverse trendelenburg : 20°or more	2	To be used to perform the surgery. It can be adjusted up and down the platform by site and type of operation and overturned lay the patient during the surgery, Itis an essential equipment in the operating room.To plan the manual hydraulic Elevation model possible to cope with general surgery.
14	Refrigerator (blood bag)/Type	Capacity : 489Lor more Operating temp. : 4℃ within±1℃ Alarm: Audible,visible	1	It is used to be stored each blood type for transfusion at the proper temperature . Is a general-purpose models.
15	Blood gas analyzer	Measurement Parameter : pH,PCO^2,PO2,Na+,K+,Ca++,Cl-,Glu,Hct or more Sample Capacity : 75～600 tests/month	1	To analyzes the oxygen saturation concentration , H2O, the electrolyte concentration in the blood or the like, is performed to examine the patient's respiratory function. .
19	Microtome (Rotary Type)	Distance of specimen block holder : 50mm or more Sectioning range : 1～40μm or wider	1	To cut specimens with blade continuously to observe under the microscope. Model is general level one to be used in the pathology laboratory.
20	NMR (nuclear magnetic resonance)	Operation field : 1.5 Tesra or more Magnet coil : Superconducting magnet EMIShield:99% Shield Element	1	By using (nuclear magnetic resonance, NMR) and nuclear magnetic resonance phenomenon examine the inside of living body through image information. Analysis high precision, three-dimensional image which confirm the soft tissue lesions.
21	Choledocoscope	View angle : 110°or more Depth of field : 3～50mm or wider Effective length : 350mmor more	1	To the diagnosis and treatment of endoscopic biliary tract. To be used with gallbladder, biliary tract, bile duct surgery, etc., drill a small hole in the abdomen, through a video camera.

23	Gastroscope	View angle : 140°or more Working length : 1,030mm or more Outer diameter : within 9.2~9.8mm	7	To be used in the treatment and observation of the upper gastrointestinal tract (esophagus, stomach) section. Equipped with forceps channel, treatment with endoscopic becomes possible various treatments ..
24	Duodenoscope	View angle : 100° Outer diameter : 10~14 mm Effective length : 1,240mm or more Distal end bentrange : Upper120°Down90°	2	To be used for internal inspection of the upper gastrointestinal tract (duodenum). It is useful for the diagnosis of tumors or ulcers in particular. Treatment with endoscopic is made possible various treatments.
25	Colonoscope	View angle : 140° Working length : 1,630mmer more Tip outer diameter : 12.8mm~13.2mm Tip range of motion : Upper180°Down180°	6	To observelower digestive insert from the anus, rectum, colon, or large intestine. It is subjected to a diagnosis of the disease through collected tissues and cells. It is at a general level as colonoscopy
26	Bronschoscope(flexible)	View angle : within 120°~140° Working length : 600mm or more Tip outer diameter : 4.9~5.3m m Tip range of motion: Upper180° Down130° or more	3	To be used in the treatment and observation, such as bronchi. Treatment with endoscopic is made possible by the use of the treatment instrument of variety.
28	Arthoroscope/Type	Main unit, Instruments for knee sterilization container	1	Observation of lesions of the joints of the knee joint, such as the lower extremities and treatment. To be performed by inserting the endoscopic a small hole near the affected area, observation, diagnosis, and treatment. It is a general level as an Arthoroscope.
29	Autoclave	Open door:One side door Capacity : 440L or more Temperature : 121~134℃	2	The basic equipment of the central medical supply, it is a Device is for surgical instrumentation To be used for sterilization of surgical instrument, and linens in hospital by a high-pressure steam in a short period of time.
30	Automatic biochemistry analyzer	Reagent : Semi-open Type Measurement:End point、Time fixed、 Absorbance difference Wavelength : 340 ~ 700nm or more Throughput Capacity : 280 test／hour or more Amount of sample : 2-99μl or less	1	To be used for overall judgment of the condition of internal medicine disease, in addition to measurement of bilirubin level, a variety of blood enzyme levels and glucose measurement of endocrine disease patient. For diagnosis of various diseases and diagnosis of liver hepatitis, cirrhosis, and fatty liver.
31	Immuno analyzer	Maximum processing capacity : 86 test／houror more Maximum number of items analysis : 15 Item Maximumer more Reaction time : 18 minutes or less Measurement item : Tumor marker、Myocardial markers、Bone-related, etc.	1	For measuring more accurately the concentration of a particular component in the serum, such as antigen-antibody. To be used to examine tumor, thyroid hormone, and gonadal hormones. It is a general state of a device to be used in tertiary medical facility.
32	Ambulance	Body: High roof Type : Diesel Engine Body size : 4600 x 1600 x 1900mm or more Wheelbase : 2570mm or more Displacement : 2,200 cc or more	4	To transport of emergency patients. Emergency medical personnel attend to transport passengers. Equipped with equipment such as portable suction machine and demand resuscitation set. It is a general purpose machine.
33	Polysomnographic machine	Input impedance : 100Ω±20% Cart : with caster Monitor:LCD 10 Inch or more	1	To examine of sleeping brain waves during sleep (EEG), eye movements (EOG), respiratory muscles, expiratory flow, electrocardiogram (ECG)]), (EMG) (submental muscle, tibialis anterior), the arterial oxygen partial pressure EMG by method for simultaneous recording continuously. It is useful for the diagnosis of sleep apnea syndrome. It is common as a grade of equipment provided to the tertiary medical facilities.
34	AVR for digital X-ray machine	Input voltage : AC420V50Hz Input voltage variation value : ±10 %or more Output rating : 100kVAor more	1	Digital X-ray equipment is vulnerable to a sudden voltage fluctuations. Voltage fluctuation range of installation target medical facilities is over (10% ±)the body of the medical device can withstand.
36	UPS for CT scanner	Output rating : 125kVA or more Battery backup time : 10 minutes or more Input voltage variation value : ±10 %or more	2	Risks, such as infrastructure damage is high due to rapid voltage variation for CT which is computer internal organs product. To protect against a sudden voltage fluctuation the equipment body, equip the Uninterrupted Power Supply.
37	UPS for MRI	Output rating : 150kVA or more Battery backup time : 10 minutes or more Input voltage variation value : ±10 %or more	1	Deploy the Uninterrupted Power Supply for prevent evaporation due to the voltage fluctuation of (helium gas) cooling medium of the superconducting magnet, electricity will go to over device, also in the event of a power failure.

2-2-3 Outline Design Drawing

The following diagrams show the outline design drawings of YGH and NYGH, and installation plan of the equipment which requires installation.

Example : Existing Equipment

Planned Equipment

(1) Yangon General Hospital (YGH)

1) Hospital Outline Design Drawing

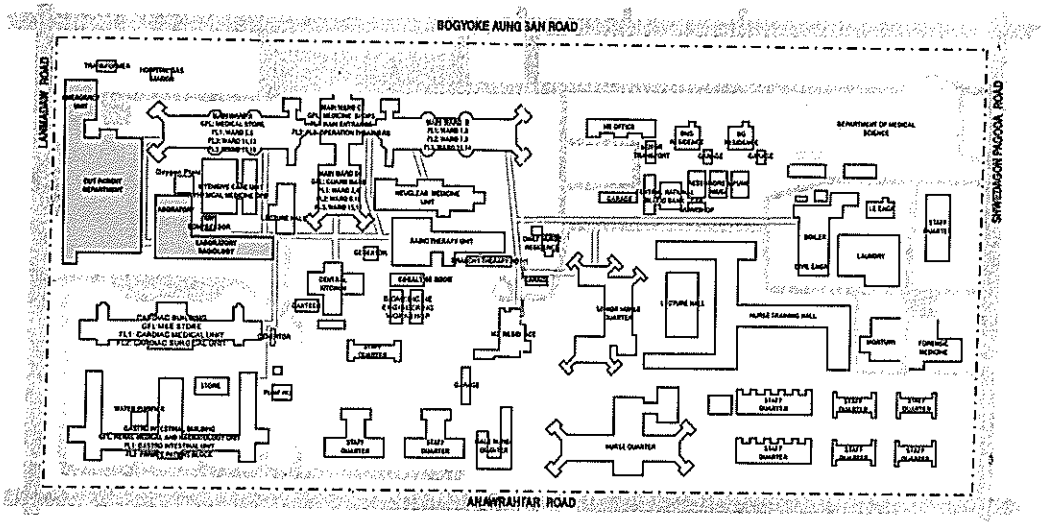


Figure 2.1 Layout of Yangon General Hospital

2) Emergency Department: CT Scanner Replace

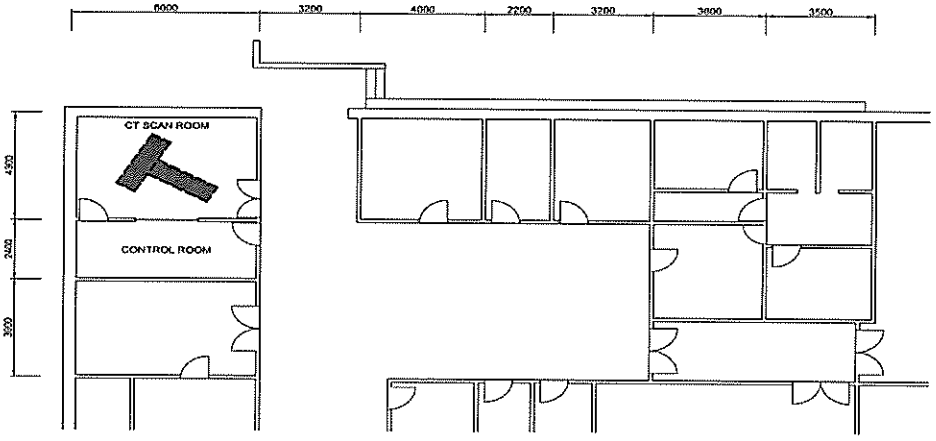
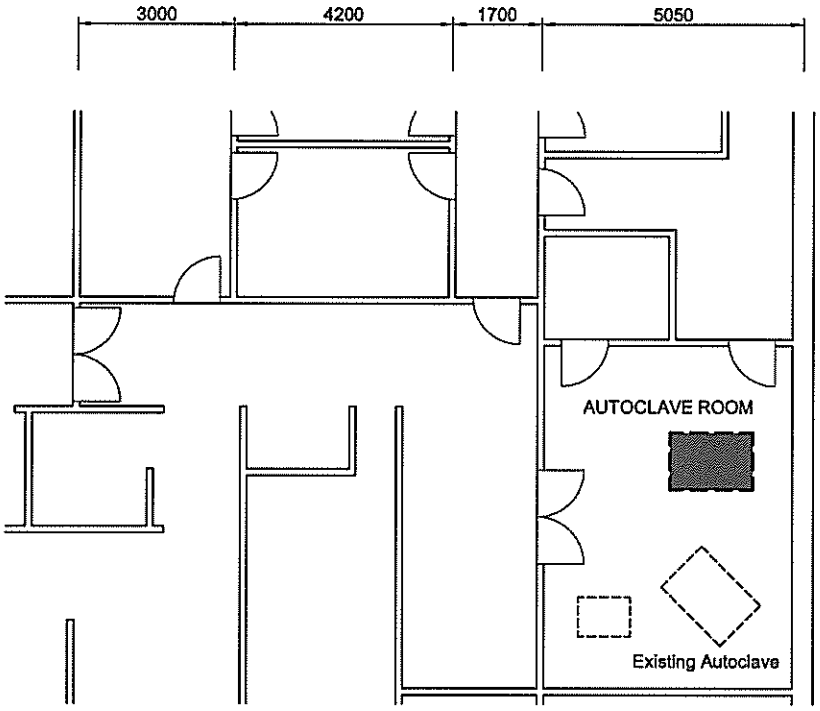


Figure 2.2 Emergency Department, CT Scan Room

3) Emergency Department: Autoclave

Figure 2.3 Emergency Department,Autoclave Room

(Move the existing arrangement)



4) Main O.T.A

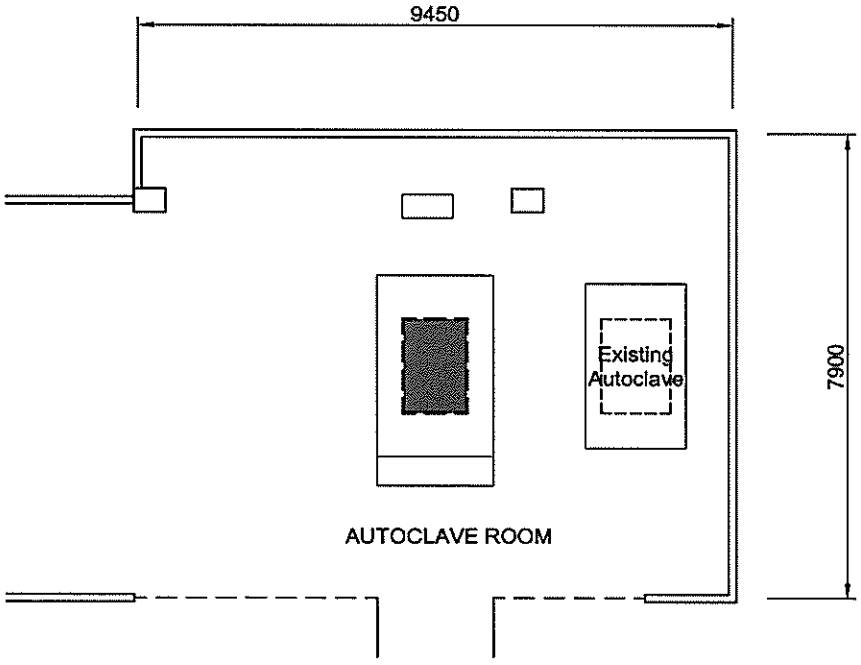


Figure 2.4 Main OT Autoclave room

(1 Newly install, 1Existing removal)

5) Laboratory : Automatic Biochemistry Analyzer and Immuno Analyzer newly install

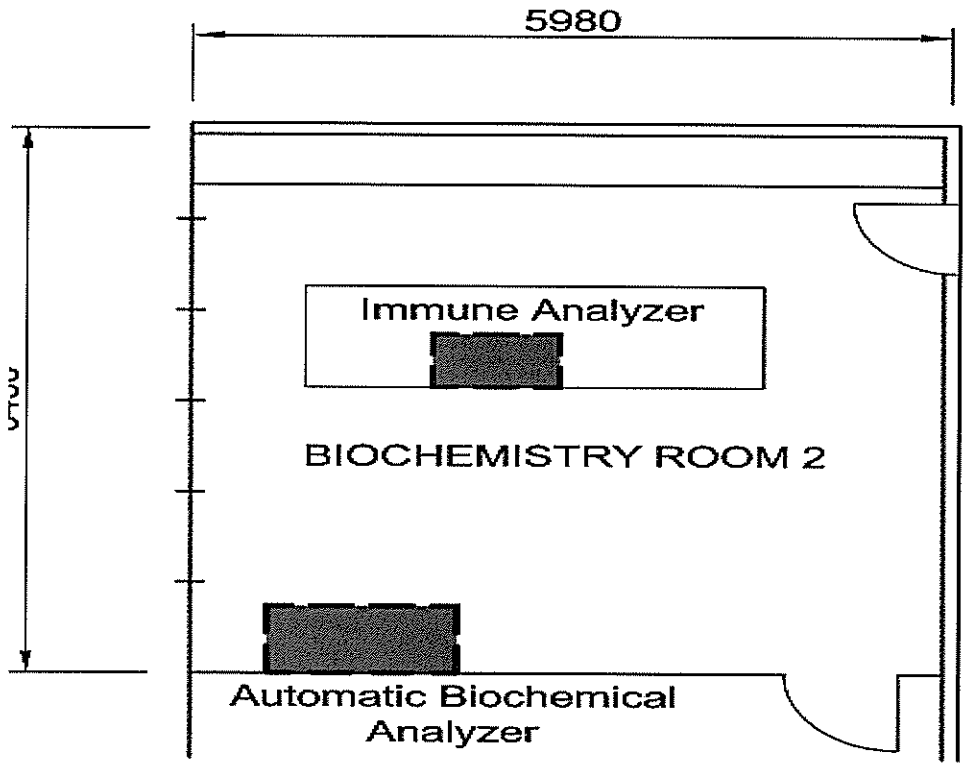


Figure 2.5 Biochemistry laboratory Analyzer Newly installed

(One unit of Automatic Biochemistry Analyzer and Immuno Analyzer are replaced, respectvly)

(2) New Yangon General Hospital (NYGH)

1) Hospital Outline Design Drawing

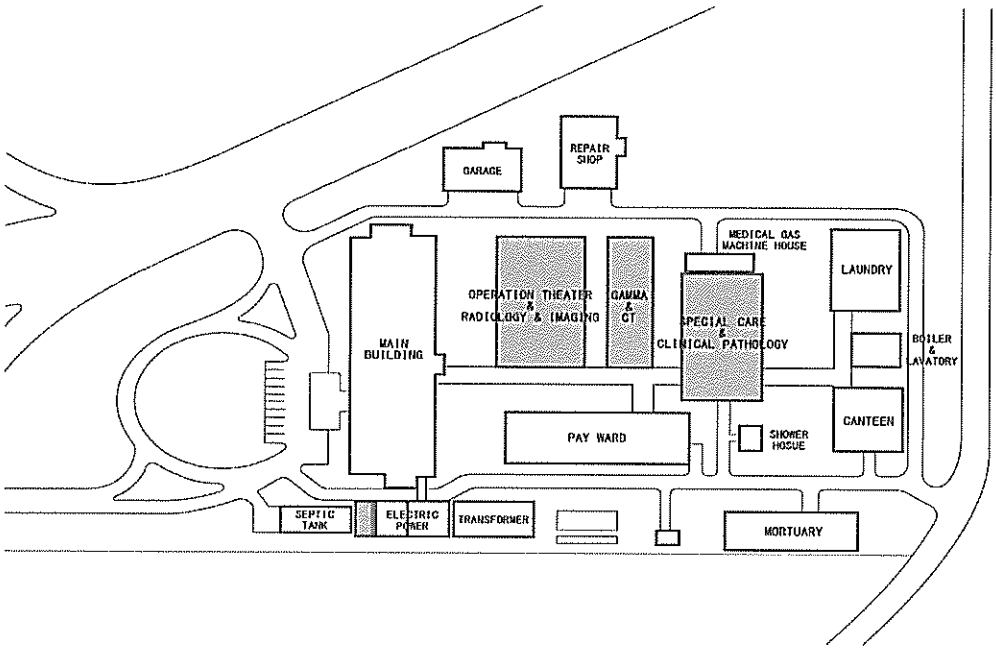


Figure 2.6 Layout of New Yangon General Hospital

2) Imaging Department: CT Scanner Newly Install, X-Ray Machine (Digital, General) and MRI Replace

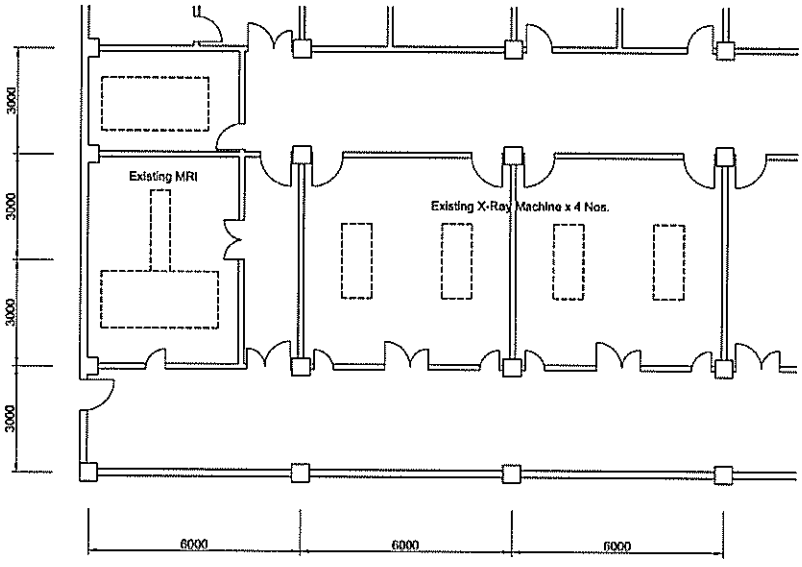


Figure 2.7 Imaging Department, Existing Equipment Layout

(A MRI and four X-ray machines are exist)

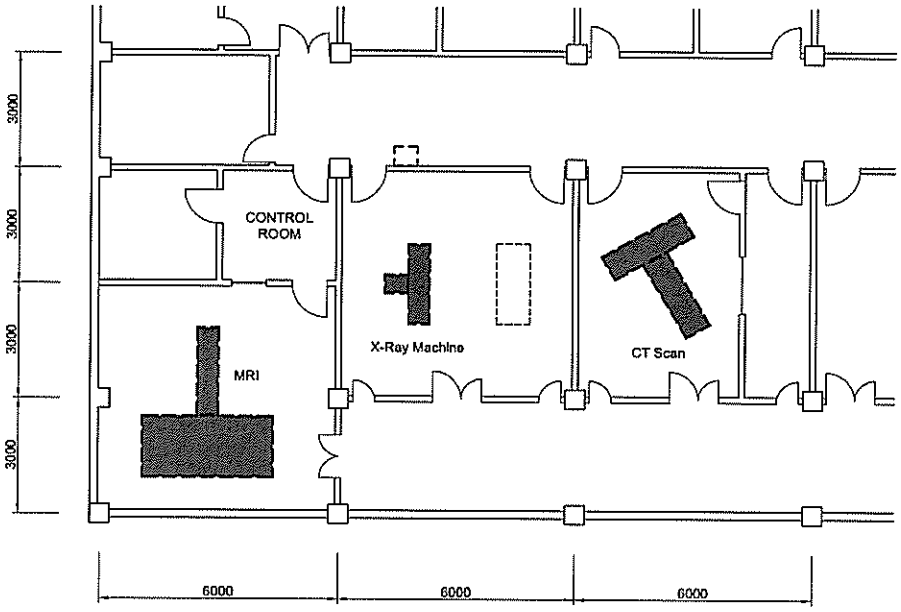


Figure 2.8 Imaging Department, New Equipment Layout

(Nuclear magnet and radiation protection, control room construction will be prepared)

3) Electrical Room: Power Generator Newly Install

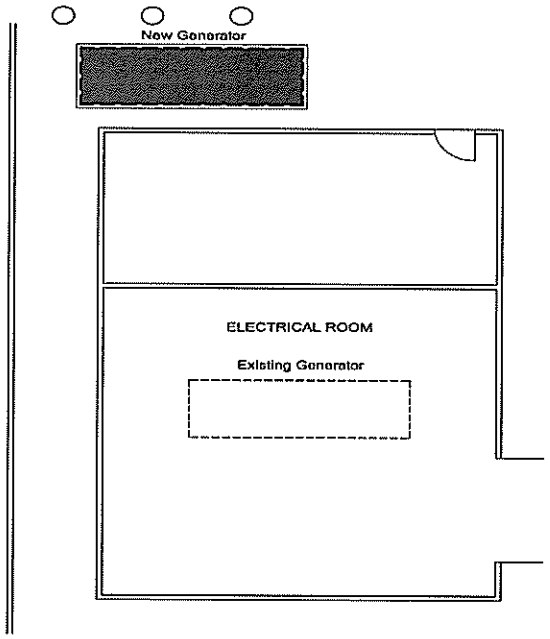


Figure 2.9 Outside Next to Electrical Room

(Concrete base will be constructed)

4) Pathology Department and Blood Bank: Safety Cabinet Newly Install and Refrigerators Replace.

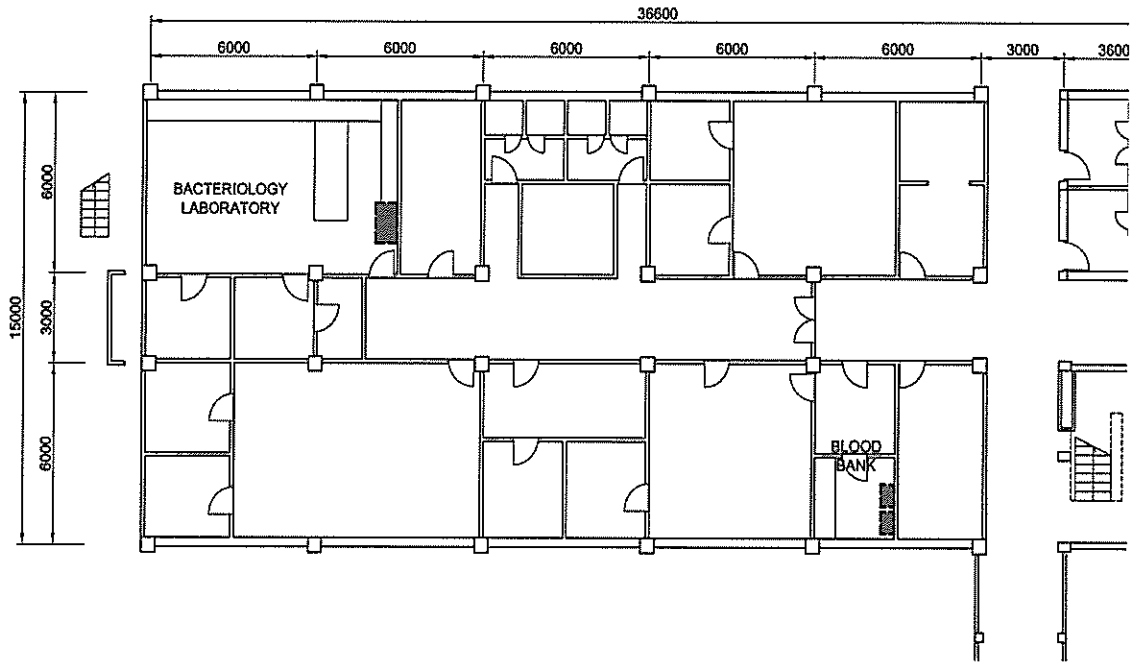


Figure 2.10 Bacteriology Laboratory, Blood Bank

2-2-4 Implementation Plan

2-2-4-1 Implementation Policy

As for the execution of work in this project, the work plan is formulated with attention paid to the following items bearing in mind that this project is implemented in accordance with the framework of the Grant Aid scheme of the Government of Japan.

① The implementation items are investigated among personnel in charge of the Government of Myanmar, implementation institution, consultants on the Japanese side, and supplier, and the range of work burdens of the Japanese side and Myanmar side and the commencing timing of each process are set. The Work commencing time and completion time are adjusted so that the works of both sides will not be complicated.

② To minimize the term of work, the supplier investigates each subject facility by two (2) months before the delivery of the equipment, check the route of brining in the equipment, scheduled installation place, conditions of power supply and water supply/discharge, etc., prepares the schedules for bringing in and installing the equipment, before starting the actual work.

③ To complete the equipment delivery and installation before the rainy season starts in

Myanmar, three (3) teams for delivery/installation are arranged, and the delivery/installation work at the sites of YGH and NYGH are simultaneously carried out in parallel.

④ As for equipment requiring training/guidance for operation and maintenance/ management, the procurement manufacturer implements the initial operation guidance/training for equipment operators in Myanmar.

⑤ As to the renovation work of the X-ray room, MRI room and CT scanner room, work portions in charge of the Government of Myanmar, accurate work costs and drawings of the equipment shall be submitted immediately after the model of the equipment to be procured is defined, to avoid any delay of the work by the Government of Myanmar and promote the work progress on the Myanmar side.

⑥ Installation and operation training works for equipment procured from Japan will be done by Japanese engineers.

2-2-4-2 Implementation Conditions

Bearing in mind that the subject facilities are presently active, the delivery schedule, delivery route and storage place shall be checked and sufficient discussion shall be made with persons in concerned on the procedures for installing the equipment so that the daily medical activities will not be stopped. Especially in the case of replacement equipment such as X-ray unit, sufficient discussion should be made on the removal timing of the existing equipment and due consideration should be given so that the diagnostic/treatment activities will not be hindered due to big time gap between the operation of the old equipment and installation of the new equipment.

2-2-4-3 Scope of Works

The following table shows scope of Japan Myanmar.

Table 2.5 Japan burden matters and Myanmar burden matters.

	Kind	Burden of Japan	Burden of Myanmar
1	Commission of the Japanese Bank		
	Notification Commission of A/P		●
	Commission paid		●
2	Marine transportation, unloading, customs clearance, domestic transportation materials and equipment		
	Martime transport coasts by airplane or ship to other countries from third country or Japan	●	
	The materials and equipment duty-free import measures in port of discharge		●
	Domestic transport to the project site from the port of discharge	●	
3	Procedures relating to customs clearance and domestic equipment tax exemption		●
4	The entry and stay for the Japanese project stakeholders		●
5	Ensure the proper use of equipment by grant aid		●
6	Renovation work costs related with procured equipment.		●
7	Burden of necessary expenses according to the present other		●

2-2-4-4 Consultant Supervision

1) Implementation system

This project is implemented by the following 4 parties, from ①to④

① Project implementation body

The responsible institution, main body in this project, is the Ministry of Health of Myanmar (hereinafter called "the MOH Myanmar"), and the implementation institutions are 2 General Hospitals, YGH, and NYGH in Yangon.

② Consultant

Since this project is implemented through Japanese Grant Aid, the Japanese consultant makes guidance, advice, and coordination throughout the stages of bidding/procuring, from a fair position, in accordance with the contracts with the implementation institutions in Myanmar and performs necessary works to promote a smooth implementation of this project. Specific work

are as follows.

- Confirmation of Tender documents

Checking work of tender documents for equipment procurement (tender conditions, equipment specifications, engineer's estimation cost for bidding)

- Promotion of bidding/supplier's contracts

Decision of procuring contract system, preparation of procuring contract draft, content investigation of equipment installation work document, selection of supplier (tender announcement, bidding and evaluation of tender proposal, contract negotiation and contract witnessing)

- Examination and approval of drawings, etc.

Examination and approval of equipment specification and procurement plan submitted from the supplier

- Report of procurement situation

Supervising and reporting of procurement progress situation to the MOH Myanmar and related Institutions

- Cooperation for payment approval procedure

Cooperation for content investigation and procedure of bills, etc. related to payment to be made after shipping

- Consultant works for procurement

Supervision of various operations from commencement to completion

③ Equipment Supplier

The equipment is procured by a Japanese trading firm selected through tendering The supplier is in charge of equipment manufacturing, supplying, delivering and installing in accordance with the contract concluded with the Myanmar side and gives guidance on initial operation and maintenance/management of the equipment to the Myanmar side.

④ Japan International Cooperation Agency (JICA)

JICA, an independent administrative institution, advises the consultant so that this project will be properly implemented in accordance with the scheme of Grant Aid. As required, it discusses with the main body and promotes the implementation of this project.

2) Personnel plan

Those who are engaged in the consulting work as to the implementation design and supervision of the work execution are as follows:

1) Project Manager (Procurement Supervision Engineer) (Japanese consultant): 1 person
2) Procurement supervision engineer (Japanese consultant): 1 person
3)Inspection engineer (Japanese consultant): 1 person

2-2-4-5 Quality Control Plan

The equipment to be procured by this Project shall be JIS, CE, FDA or TUC. Manufacturing plant has met the criteria medical equipment quality control standards of ISO13485 or Japanese Pharmaceutical Affairs Act of Japan product on GMP and GQP.

In addition to these criteria, It is consideration of the overall sales performance in the public health care facilities of local distributors, availability of parts and consumables, and enrollment status of the service engineers trained

2-2-4-6 Procument Plan

1) Eligible procurement source countries of equipment

The equipment shall be Japanese or Myanmar origin. However, incase if ①～④condition would be applicable, third country's procurement may be acceptable.

① The equipment to be procured is not manufactured in Japan.

② While the equipment is manufactured in Japan, competitiveness is not expected in tender, and fairness of tender may not be secured by restricting the procurement source to Japan.

③ If the equipment is restricted to the Japanese product, the transportation costs are very expensive, lessening the effect of aid. Alternatively, the equipment manufacturer and the local agent do not have their own maintenance network, and the equipment cannot be maintained properly. This may lessen the effect of the project.

④ There are unavoidable circumstances, such as urgency of procurement.

2) Procurement of spare parts

With Japanese products and third country's products, it is planned the procurement of periodical replacement parts can be easily made through manufacturer's agencies existing in Myanmar.

3) Method of delivering equipment

Products procured outside of Myanmar are passed through the Customs at Yangon Port, Myanmar, and then transported to each subject facility by land. The equipment is contained in a wooden box or container for each subject facility so as to prevent wrong delivery.

2-2-4-7 Operational Guidance Plan

Supplier should be secured to conduct operation guidance to end-users at each facility by local agent engineers at the time of installation and setting-up.

2-2-4-8 Soft Component (Technical Assistant) Plan

Image diagnostic equipment which contains various diagnostic applications by high computer processing technology is planned to be procured under this project. In order to utilize those applications fully for improvement of accuracy of diagnoses, it is planned to give technical training by engineers.

In addition, Medical personnel working at medical facilities in Myanmar understood the necessity of maintenance for prolonging life span of equipment, concept of preventive maintenance is not applied yet.

Under this project, soft component :technical training is planned at 2-3 weeks before procurement, 6 months after procurement and 11months after procurement for smooth start-up and long life of procured equipment. Duration of soft component is 2.03 months before procurement, 0.9 months after 6 months from procurement, and 0.7 months after 11months from procurement, respectively.

2-2-4-9 Implementation Schedule

1) Implementation Schedule

When this project is approved in the Cabinet meeting of the Government of Japan and the Exchange of Notes is concluded between both countries, the project shall be conducted according to the following procedures:

1. Conclusion of the Exchange of Notes between both relevant governments
2. Conclusion of the Grant Agreement between the Japan International Cooperation agency (JICA) and the Government of Myanmar
3. Conclusion of agreement between the responsible agency and a bank in Japan on payment of the Japan's Grant Aid for implementation of this project (Banking Arrangement B/A)
4. Conclusion of the consultancy agreement between the responsible agency and the Japanese consultant
5. Issuance of the Authorization to Pay by the responsible agency according to the consultancy agreement
6. Verification of the above agreement by the Japan International Cooperation agency (JICA)
7. Preparation of tender documents by the consultant

8. Approval of the tender documents by the responsible agency and preparation for tendering by the consultant
9. Implementation of tender, and evaluation of tender proposal
10. Conclusion of supply contract between the responsible agency and the Japanese supplier
11. Verification of the above contract by the Japan International Cooperation agency (JICA)
12. Issuance guidance of the Authorization to Pay (A/P) by the responsible agency according to the supply contract
13. Witnessing for equipment inspection

    (The consultant witnesses factory inspection before shipment, if necessary, and approves the inspection on behalf of the responsible agency) Installation conditions, distribution plan of the equipment, and adjustment of the work schedule
14. Supervision of work execution

    (In accordance with the contract, the consultant, on behalf of the responsible agency, conducts inspection and approval of the equipment's specifications, inspection and approval of equipment, supervision and instruction of inland-transport, and supervision of the works covered by the recipient country)
15. Progress Control

    (The consultant supervises work progress and gives necessary instruction to the supplier so that the supply contract may be completed within the period stated in the Exchange of Notes)
16. Inspection, operation guidance and commissioning

    (The consultant performs a final inspection and test-run to the equipment to be procured, confirms that the performance is as described in the specifications, and submits a certificate of completion of inspection to the responsible agency).
17. Hand-over of the equipment and Completion of the Project.

2) Implementation Works Schedule

Executing Works Schedule after conclusion of the Exchange of Note is shown.

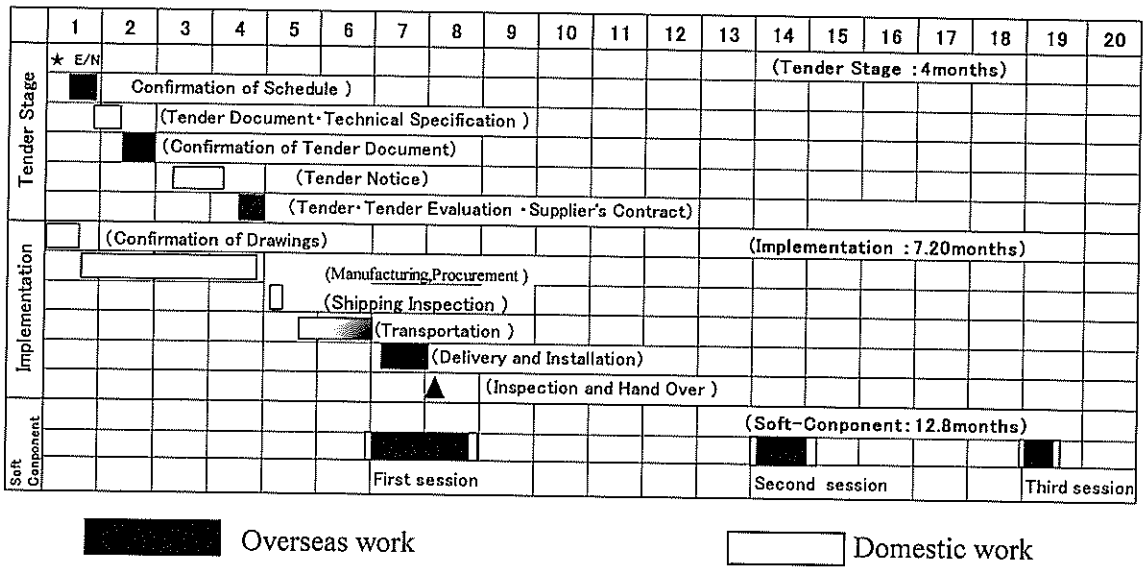


Figure 2.11Executing Works Schedule

2-3 Obligations of Recipient Country

According to an exemplary embodiment of the present plan, Sharing range of Myanmar are as follows.

(1) During the implementation period of the project, the Myanmar side should find a place to be used as a temporary office in each designated facility for this project.

(2) The peripheral foundations (supply of electricity and water supply, drainage, and other facilities) necessary for this project should be prepared and supplied before distribution of the equipment. In addition, the existing equipment should be removed from places where the new equipment will be installed before the distribution.

(3) The equipment imported for this project should be unloaded without any delay, and necessary measures for customs clearance and inland transportation of the equipment should be taken. Tax exemption certificates should be arranged before arrival of containers in Myanmar.

(4) Payments of customs duties and other taxes should be exempted for the Japanese nationals who stay in Myanmar to fulfill their mission in this project.

(5) For the Japanese nationals who participate in the supply of the necessary equipment and who participate in implementation of this project, necessary conveniences for their stay in Myanmar be provided and sufficient consideration made for their security.

(6) Pay fee of bank to pay issue and Bank fee arrangements

(7) The equipment to be procured under the Japan's Grant Aid should be maintained properly and used effectively. For this purpose, necessary budget and personnel should be secured.

(8) The equipment to be procured under the Japan's Grant Aid should be maintained properly and used effectively. In addition, the utilization and condition of the equipment should be reported to the Government of Japan.

(9) The Myanmar side should bear the cost of preparatory works of prevention of the X-ray room's radiation leakage where the introduction of the X-ray Unit, MRI and CT-scanner is planned.

(10) Medical Equipment, which requires for special technique for maintenance and management, should be engaged maintenance agreement with manufacturer's agents etc.

(11) For implementation of this project, all the expenses other than those covered by Japan's Grant Aid should be borne by the Myanmar side.

(1) Related work for equipment installation

・Transfer and removal of existing equipment for installation of procured equipment (including X-ray leakage protection and installation of an air conditioner for the image diagnostic equipment installation room)

・Securing of a delivery route

・Provision of a temporary storage place for equipment

・Supply of water (valve-stopped), drainage (cap-stopped), electricity (receptacles and breakers) and medical gas, and construction of a concrete base, which are necessary for the installation of equipment

Table 2.6 Preparations to be borne by the Myanmar Side

Hospital Name	Target Equipment	Preparations
Yangon General Hospital (YGH)	CT (Emergency Department)	Existing CT removal
	Autoclave (Emergency Department)	Existing autoclave position change; Water supply and drainage; Electricity supply; Door removal and re-installation (for equipment carry-in)
	Autoclave (Main O.T.)	Existing autoclave removal
	Automatic biochemical analyzer (Biochemistry Lab.)	Air conditioner installation; Electricity supply
	Immuno-analyzer (Biochemistry Lab.)	
New Yangon General Hospital (NYGH)	CT (Imaging Department)	Existing X-ray machine transfer and removal; Control room construction; Radiation protection; Electricity supply; Door removal and re-installation (for equipment carry in)
	X-ray machine (digital, general) (Imaging Department)	Existing X-ray machine removal
	MRI (Radiological Imaging Department)	Existing MRI removal; Unclear magnet protection, control room and machine room construction with air conditioner; Electricity supply
	Power generator (Electrical Room)	Concrete base construction
	Safety cabinet (Pathology Department)	Existing clean bench removal
	Refrigerator (blood bag)	Existing refrigerator removal

2-4 Project Operation Plan

Currently, maintenance of medical equipment installed at public health facilities is under the charge of CMSD. There are 3 engineers of CMSD as medical equipment maintenance engineers. YGH has established a unique maintenance system, and has assigned 1 medical equipment maintenance engineer. Thus, CMSD does not provide maintenance service to YGH. Among public health facilities including the 2 targeted facilities, maintenance service between the local agent and health facilities is not yet concluded for specific and continuous maintenance service for sophisticated medical equipment.

In order to use equipment for a long time in good condition, periodical check-up by specialists is critically important. It is a precondition that a maintenance service contract should be concluded for X-ray units, CT scanners, and MRI scanners.

In the following table, contract contents, condition, and cost for annual maintenance contracts

are shown for equipment planned to be procured under this project.

Table 2.7 Estimated cost for the maintenance service of advanced medical equipment

Equipment	Facilities	Quant.	Content of Maintenance Service Service Contract	Terms of Contract	Amount of contract fee by year (estimated)
CT-Scanner	YGH	1	Half-year periodical maintenance service and also repair service whenit breaks down	Technical support only (Replacement parts cost is an additional cost)	Approx 0.375 million yen
CT-Scanner	NYGH	1	Half-year periodical maintenance service and also repair service when it breaks down	Technical support only (Replacement parts cost is an additional cost)	Approx 0.375 million yen
Digital X-ray Equipment	NYGH	1	Half-year periodical maintenance service and also repair service when it breaks down	Technical support only (Replacement parts cost is an additional cost)	Approx 0.5 million yen
MRI (Nuclear Magnetic Resonance)	NYGH	1	Half-year periodical maintenance service and also repair service when it breaks down	Technical support only (Replacement parts cost is an additional cost)	Approx 0.65 million yen
					Approx 19.0 million kyat (Approx 19.0 million yen)

2-5 Project Cost Estimation

2-5-1 Initial Cost Estimation

Shown below is a breakdown of the costs to be borne by the Myanmar side, estimated in accordance with the scope of work mentioned in 2) below.

1) Cost to be borne by the Myanmar side:

Approximately 6.77 million Kyat (7,030 US dollar)

Table 2.8 Estimated cost borne by Myanmar side (unit US dollar)

Facilities/Department	Installation	Preparations	Cost (US$)
YGH			
Emergency Department			
CT Room	Replace a CT scanner	・Existing CT removal	357.50
Autoclave Room	Newly install an autoclave	・Existing autoclave position change ・Water supply and drainage ・Electricity supply ・Door removal and installation	169.50
			Main O.T.
Autoclave Room	Replace an autoclave	・Existing autoclave removal	242.60
Biochemistry Lab.	Newly install 2 analyzers	・Air conditioner installation ・Electricity supply	2,486.8
NYGH			
Radiological Imaging Department			
X-Ray Room 1	Newly install a CT scanner	・Existing X-ray machine Transfer ・Existing X-ray machine removal ・Door removal and re-installation ・Control room construction. Radiation protection. Electricity (not included)	398.80
X-Ray Room 2	Replace an X-ray machine	・Existing X-ray machine removal	233.30
MRI Room	Replace an MRI scanner	・Existing MRI scanner removal ・Nuclear magnet protection, control room and machine room construction ,air conditioner. Electricity(not included)	1,053.70
Pathology Department	Newly install a safety cabinet	・Existing a clean bench removal	233.30
Blood Bank	Replace 2 refrigerators	・Existing 2 refrigerators removal	233.30
Electrical Room	Newly install a power generator	・Concrete base construction	1,621.20
Total (Japanese Yen: approx. 677,130; Myanmar Kyat: approx. 6.77 million)			7,030.00

3) Condition for Cost Estimation

1. Estimation as of: September 2013
2. Exchange rate : (6 month average TTS)
   - ・US Dollar US$1.00 =99.38 円
   - ・Kyat Kyat 1.00＝0. 1 円
3. Period of procurement: Periods of detailed design and equipment procurement are as shown in the implementation schedule.
4. Other: This project is implemented in accordance with the Grant Aid scheme by the Government of Japan.

2-5-2 Operation and Maintenance Cost

(1) Operation and maintenance costs for the project

The following table shows annual operation and maintenance costs for the procured equipment such as reactive reagents, consumables, and spare parts, etc.

Table 2.9 Operation and maintenance cost for YGH

Equipment	Consumables	Amount (Kyat)
CT-Scanner.	Contrast medium, Film, etc.	691,000
Ventilator, Gastroscope, Arthroscope, etc.	Respiratory circuit, Xenon lamp	5,043,000
Ultrasound machine, Defibrillator, etc.	Electrode, Paper, Contact gel, etc.	1,476,000
Safety cabinet, Blood gas analyzer, etc.	Bulb, Reagent, Electrode, etc.	7,505,000
Ambulance.	Filter, Lubricant oil, Fuel	3,331,000
Total Annual Operation Cost	(Approx. 1.8 million yen)	18,046,000

Table 2.10 Operation and maintenance cost for NYGH

Equipment	Consumables	Amount (Kyat)
CT scanner, MRI scanner, X-ray machine, etc.	Contrast medium, Film, etc.	7,632,000
Anesthesia machine, Syringe pump, Patient monitor, etc.	Anesthetic gas, Oxygen, N_2O, Syringe, etc.	20,776,000
Ultrasound machine, Defibrillator, etc.	Contact gel, Paper, Electrode, etc.	991,000
Automatic biochemistry analyzer, Immunoassay analyzer, etc.	Bulb, Reagent, Electrode, etc.	518,000
Power generator	Filter, Lubricant oil, Fuel	4,752,000
Total Annual Operation Cost	(Approx. 3.46 million yen)	34,669,000

Estimated conditions:
- No increase in the number of patients
- No increase in the price increase
- Consumable price estimated through local distribution

Most of the equipment to be procured in this project is intended for replacement and supplementation of equipment currently in operation at the targeted facilities; hence, there is thought to be no major issues in terms of the operation and maintenance/management expenses. It is, however, expected that the replacement and supplementation of some equipment will result in an expanded range of medical activities and increased operating expenses, making it necessary for the Myanmar side to take budget measures.

As shown in table 5.3 and 5.4 above concerning annual operation and maintenance, management expenses needed for the equipment to be procured in this project are calculated to be about 1.8 million yen (about 18.0 million kyat) for YGH and 3.46 million yen (about 34.6

million kyat) for NYGH. Among these expenses, the expected operation and maintenance costs to be added by supplementation for increase in quantity is 26%, or 46.9 million yen (about 47.8 million kyat), for YGH, and 31%, or about 107 million yen (about 10.7 million kyat), for NYGH. The following table shows the trend of income for the previous 3 years.

The following table shows the transition of revenue over the past 3 years of YGH and NYGH.

Table 2.11 Transition of revenue over the past 3 years for YGH

YGH Annual Budget (Income)

(Kyat)

Fiscal year	2010-2011	2011-2012	2012-2013
Gross Income (I + II + III)	*2,465,200,070*	*3,885,951,230*	*4,928,873,170*
I. From central government	1,353,714,770	1,430,281,290	3,318,384,450
II. From service fees	1,080,470,300	1,380,802,940	1,598,684,720
III. Contribution	31,015,000	1,074,867,000	11,804,000

Table 2.12 Transition of revenue over the past 3 years for NYGH

NYGH Annual Budget (Income)

(Kyat)

Fiscal year	2010-2011	2011-2012	2012-2013
Gross Income (I + II)	*375,627,100*	*384,903,282*	*932,242,788*
I. From cetral government	259,625,900	247,692,982	703,399,732
II. From service fees	116,001,200	137,210,300	228,843,056

In comparison with the revenue of 2009/2010, 2011/2012, and 2012/2013 FY, there is growth of 200% and 240% in 3 years.

This is due to the fact that there was a significant increase in the special budget set for the health sector in 2012/2013. It is not certain whether such budget increase will be implemented in the future, but the increase in operation and maintenance costs is 0.96% of the YGH income and 1.18% of the NYGH income in FY 2011/2012, it is considered that there are no particular problems in covering these operation and maintenance costs.

With this project, medical services will also be improved by the replacement and

supplementation of equipment, and revenue growth of paid-for medical care can be expected by enhancing reform of hospital management medical service activity. So the sustainability of financial independence is secured.

Chapter 3 Project Evaluation

Chapter 3 Project Evaluation

3-1 Preconditions

(1) Completion of construction work borne by the Myanmar side

Renovation work of existing facilities prior to installation of updated equipment is required. The works shall be done by the Government of Myanmar and the project target facilities. The preconditions for delivery and installation of the equipment are as follows ;

・Existing equipment must be moved due to equipment procurement, installation, removal, and preparation of the site.

・A equipment introduction passage must be ensured.

・A temporary storage location for equipment procurement must be provided.

・Renovation and air conditioning work of the rooms for CT scanner and MRI (X-ray protection and reinforcement work) must be undertaken.

・Water supply, drainage, and electricity (outlets and breakers) due to equipment installation must be provided.

(2) Customs clearance for equipment and exemption procedure

In Myanmar, tax exemption for equipment procured through an assistance project is available. As for the general procedure for tax exemption, the supplier first submits an application for tax exemption to MOH, MOH forwards the application to the Ministry of Finance and the Ministry of Commerce, and the application is then forwarded to the Customs Department for confirmation and approval of tax exemption. This procedure is necessary for the equipment procurement of this project; therefore, it is essential to request that the Government of Myanmar promptly deal with the procedure for customs clearance and tax exemption.

The following is a list of conditions necessary for project implementation, in the area of customs clearance, tax exemption, and import permissions.

・Prompt landing and completion of customs clearance procedures for the products purchased under the Grant Aid

・Exemption from customs duties, value-added tax, and other surcharges that are imposed on Japanese citizens, regarding products and services procured based on a verified contract

・Import permission and other necessary measures that may be necessary for the implementation of the project based on a verified contract

3-2 Necessary Inputs by the Recipient Country

Necessary inputs of the Myanmar side for achievement of the whole project plan are as follows.

(1) Budget for operation and maintenance of medical equipment

Some planned equipment requires periodical procurement of consumables and spare parts, and the budget for procurement of these running costs shall be secured as before. Also, for other sources of budget, each target hospital shall withdraw profits from patient treatment fees actively, for the independent securing of running costs. However, the operating budget will increase for purchase of other general consumables, repair costs of equipment failure, and fuel cost, such as for heavy oil. The Ministry of Health is required to guarantee the budget to cover these costs of the hospital that will surely increase.

(2) Improvement of the maintenance management system of medical equipment

Establishment of the Maintenance Department, which is planned for Yangon General Hospital, and assignment of biomedical engineers to Yangon General Hospital, New Yangon General Hospital, and CMSD are requested by the completion of the project.

(3) Budgetary provision for an annual maintenance contract for advanced medical equipment

If advanced medical equipment such as the CT scanner and MRI planned in this survey is procured, the engagement of an annual maintenance contract with a local distributor is strongly required as a precondition. The Ministry of Health should measure the necessary budget for the engagement of maintenance contracts.

(4) Implementation of ongoing (continuous) training for medical equipment maintenance technicians

The Ministry of Health shall continue to conduct bio-medical engineer (BME) training for engineers of CMSD and hospital engineers across the country.

The training to be conducted for every year, but no training was conducted in 2013. The latest medical equipment has been procured in large quantities for the public health care facilities across the country in 2012, and improvement is necessary on an ongoing basis with the knowledge and skills of maintenance technicians.

3-3 Important Assumptions

Important assumptions for effective and sustainable project effects are as follows.

(1) Continued implementation of the National Health Plan 2011-2016

The number of patients at YGH and NYGH has steadily been increasing since the 2000s. It is difficult to accept more inpatients. The phenomenon whereby patients concentrate at a particular hospital is considered to occur when medical institutions in the lower level do not play their original role or there is an insufficient number compared with demand in many cases. These excessive patient loads are a major obstacle to improving the quality of the service in the two hospitals. In order to continue to solve this problem in the long term, there is no choice but to steadily progress with the 11 programs of the National Health Plan 2011-2016 and improve the

health of the entire nation. It is require the National Health Plan 2011-1016 to resolve this problem in the long term. Especially, the continued implementation has becomes essential of ① measures against non infectious diseases, ②improvement of hospital care, ③training of human resources of health.

(2) Increase in the operating budget of the entire hospital

YGH has purchased a lot of advanced equipment in the two years of fiscal 2012 and 2013. The amount is estimated to be well over 1 billion yen. In addition, the extension of four facilities including the surgical building and renovation of existing buildings is planned or is being executed by spending 1 billion yen in Yangon General Hospital. No little expense may be required for operation and maintenance when these buildings and equipment are used in the future. It is difficult to predict what the amount will be. However, if the budget is insufficient, it will not be possible to provide the medical service expected, and the equipment that is procured under this project will not be fully utilized. Therefore, the Ministry of Health is required to employ significant increase measures to pay the operating and maintenance costs for not only the equipment under this project but also the equipment purchased and facilities constructed through the own budget.

3-4 Project Evaluation

3-4-1 Relevance

This project is considered to be launched as a cooperation target project, funded by Japanese grand aid.

(1) Condition the goal achievement of the national health plan.

This project will make a practical contribution to the quality improvement of the hospital care services mentioned in the "Quality of Health Care Services in Hospital Project" of the "Hospital Care Program," which was developed through the formulation of Myanmar's overall health plan called the "National Health Plan 2006-2011," through procurement of medical equipment.

(2) Possibility to provide a high degree of overall health service.

In addition to five hospitals improved under "The Project for Improvement of Medical Equipment in Hospitals in Yangon and Mandalay" of Grand Aid in 2012, top referral hospital of YGH and NYGH which provides tertiary medical services in Lower Myanmar shall be improved with this project. This hospital group that provides internal medicine, surgical, pediatric, and obstetric, and gynecological services is developed comprehensively in each region of Upper Myanmar and the Lower Myanmar. It is possible to widely provide comprehensive support for the advancement of the public medical system and stability of the referral system.

(3) The benefit effect is high in the development plan.

The benefit effect is high. A wide range of advanced medical services is provided to the general public through the improvement of tertiary medical services from planning the development of the target facility as a top referral facility. The target facilities among public medical institutions are planned to be medical facilities that provide medical services at low cost or free to inhabitants in poverty. By the medical service system of these medical facilities being improved, high-quality medical services are enjoyed a broad public and people's confidence in the health administration of the Myanmar Government is increased, leading to stabilization of consumers in the country as a business plan.

3-4-2 Effectiveness

The expected outputs of this project are described as follows. These estimated values forecast the effectiveness of this project.

(1) Quantitative effect

This project contributes directly to the achievement of the two goals of improvement of performance indicators of the hospital (bed occupancy rate, turnover rate, and average length of stay) and reduction in mortality in hospitals among the six goals of the quality improvement project of hospital medical services, which constitutes a part of the National Health Plan. This contribution is intended to be implemented through capacity building, recruitment of human resources, and development of facilities and equipment mainly in the following three areas.

- Improvement of the response capability for ill patients
  : Improvement of ICU, ward, Operation Theater

- Improvement of emergency medical services
  : Improvement of emergency department, ICU, Operation Theater

- Improvement of diagnostic imaging capability
  : Radiology department, endoscopic and diagnostic room

Therefore, in order to measure the effects of the project quantitatively, it is necessary to set specific indicators in each of YGH and NYGH. In the case of hospitals, the crude death rate of hospital patients and average length of stay of hospitalized patients are selected as indicators of the quality of service, and the number of operations, number of ICU patients, and number of CT scanner examination are used as an index representing the amount of service. In the case of medical colleges, the number of nurses on a diploma course and the number of residents on an emergency medical master course are selected.

The base year of the evaluation is the most recent FY 2012 for gathering statistics. The evaluation period is FY 2019, three years after completion of the project. The following situations are considered, and the target value of the quantitative indicators is set at an approximate 5-6% increase from the reference value of 2012, in other words, a slight increase.

1) Part of the medical departments in both hospitals will be relocated to Yangon Special Hospital, and it is difficult to expect management structure of the hospital after moving, considering the number of patients and changes in business volume at this time.

2) As both hospitals have a strong wish to eliminate the overcrowding in the current wards after relocation of the medical departments, it is assumed that patients and amount of work will not greatly increase.

3) Shortage of staff has continued in both hospitals, and prediction of a significant increase in business volume and number of patients may be leading to a decrease in quality under such conditions.

4) On the other hand, since the number of beds per population is in the lowest level in Southeast Asia, assuming that the number of patients coming to the hospital is reduced or is not increased is not realistic.

Table 3.1 Quantitative effect of YGH

Index name	Standard value (2012)	Target value (2019): Targeted value assessment grounds, standard
Number of operations (cases / year)	15,415 cases / year	16,200 / year: Through improvement of OT equipment, an increment of about 1.0% / year is anticipated. The objective is to increase the number of operations by about 5.0% compared to now.
Number of ICU patients (persons / year)	389 persons / year	400 / year: The patient-receiving system improves, and a patient increase of about 0.05% / year is anticipated by the update of ICU medical equipment. The amount of patient medical treatment is projected to increase about 0.28%.
Number of CT examinations (cases / year)	10,282 cases / year	11,000 / year: The diagnosis function improves by the improvement of the CT scanner, and an increase in examinations of about 1.4% / year is expected. The project aims at about a 7.0%, about 720, increment in the number of examinations.
Number of clinical (biochemical) examinations (cases / year)	217,820 cases / year	230,000 / year: Examination ability improves, and about 12,000 cases of clinical examination, or a 5.6% increase, are anticipated over the current numerical value by the provision of diagnostic equipment.

Table 3.2 Quantitative effect of NYGH

Index name	Standard value (2012)	Target value (2019) : Targeted value assessment grounds, standard
Number of operations (cases / year)	4,362 cases / year	4,600 / year: Through improvement of OT equipment, an increment of about 1.1% / year is anticipated. The objective is to increase the number of operations by about 5.5% compared to now.
Number of ICU/CCU patients (persons / year)	478 persons / year	500 / year: The patient-receiving system improves, and an increment of about 0.9% / year is anticipated by the updating of ICU medical equipment. The objective is to increase the number of patients receiving medical treatment by about 4.5%.
Number of X-Ray examination (cases / year)	9,978 cases / year	10,500 / year: The diagnosis function improves by the improvement of functional radiology equipment, and it may be possible to increase the number of examinations by about 1.0% a year. The objective is to increase the number of examinations by about 5.0%.
Number of CT examinations (cases / year)	2,228 cases / year	2,400 / year: The diagnosis function improves by improvement of the high-function CT scanner, and it may be possible to increase the number of examinations by about 1.5% / year. The objective is to increase the number of examinations by approximately 7.7%.

(2) Qualitative effect

This project is planning to procure the medical equipment for updating which is insufficient number and aged as well as for development of advanced the diagnostic imaging, such as diagnosis of cancer and heart disease for YGH, and NYGH. The implementation of this plan could be lead to improvement of quality of diagnosis and treatment with severe of infection and non-infectious diseases in the targeted facilities, by ①Reducing the physical burden to patient with improvement of function of CT scanner ②Tracheal intubation with serious Patient ③will be possible to MRI examination in NYGH and through these better performance such as shortening the length of stay or reduced in-hospital, mortality improvement, will increase reliance of facilities as top referral hospital.

It is considered that the introduction of CT Scanners and MRI to YGH and NYGH is very effective, and will maintain in the future role of the top-level referral hospital in the country that allows the provision of medical services with advanced medical equipment in both hospitals. Especially, NYGH has already established its position and role as a diagnostic imaging center for wide area, it is expected that this will lead to further enhancement of its functionality.

Thus, it is determined that the relevance and expected efficacy of the project are both high.

(Appendices)

1. Member List of the Study Team

1,Reserch Members ・Name

(Outline design study)

	Name	Title	Organization
1	Ms. Saeda MAKIMOTO	Leader	Director, Health Division III Human Resource Development Dept., JICA
2	Dr. Yoshihito UJIKE	Technical Advisor 1	Professor, Emergency Dept. Okayama University
3	Dr. Yuusuke ITO	Technical Advisor 2	Osaka Prefectural Senri Critical Care Medical Center
4	Mr. Tetsuyta Yumoto	Technical Advisor 3	Department of Emergency and Critical Care Medicine Okayama University Graduate School of Medicine
5	Ms. Chiharu HOSHIAI	Planning Corporation	Myanmar Team Southeast Asia and Pacific Department,South Asia Division 4 JICA
6	Mr. Yoshihiro IKEDA	Planning Corporation	Deputy Assistant Director, Health Division 3, Health Group 2 Human Resource Development Dept., JICA
7	Mr. Shinichi KIMURA	Chief Consultant /Planning of Equipment 1	Binko International Ltd.
8	Mr. Kazuhiro ABE	Planning of equipment 2/ Hospital Operation and maintenance	International Techno Center Co., LTD.
9	Mr. Shigeru YASUMATSU	Facility and Mechanical Design	Yamashita Sekkei INC.
10	Mr. Kazumi AKITA	Medical and Health Planner/ Hospital Management	Binko International Ltd.
11	Ms. Yasuko ASAMUMA	Equipment Procurement Planner/ Cost Planner	Binko International Ltd.

(Outlined research)

	Name	Title	Organization
1	Mr. Yojiro ISHII	Leader	JICA Senior Advisor
5	Ms. Rie KOMAHASHI	Planning Corporation	JICA Health Division 3 Human Development Department
7	Mr. Shinichi KIMURA	Chief Consultant /Planning of Equipment 1	Binko International Ltd.
8	Mr. Kazuhiro ABE	Planning of equipment 2/ Hospital Operation and maintenance	International Techno Center Co., LTD.
11	Ms. Yasuko ASAMUMA	Equipment Procurement Planner/ Cost Planner	Binko International Ltd.

2. Study Schedule

Myanmmar Preparatory Survey on the Project for Improvement of Medical Equipment in General Hospitals in Yangon Ⅱ (Survey Schedule)

No.	Date	Day	Official Member	1) Chief Consultant /Planning of Equipment 1	3)Planning of equipment2/ Hospital Operation and maintenance	2)Facility and Mechanical Design	4)Medical and Health Planner/ Hospital Management	5)Equipment Procurement Planner/ Cost Planner
1	8/4	Sun		Narita→Bangkok→Yangon		Narita→Bangkok→Yangon	Narita→Bangkok→Yangon	
2	8/5	Mon		Meeting at JICA Office Yangon→Napyidaw		Meeting at JICA Office Yangon→Napyidaw	Meeting at JICA Office Yangon→Napyidaw	
3	8/6	Tue		Meeting at Health Dept. Presentation of Inception Report		Meeting at Health Dept. Presentation of Inception Report	Meeting at Health Dept. Presentation of Inception Report	
4	8/7	Wed		Meeting at Health Dept. Napyidaw→Yangon		Meeting at Health Dept. Napyidaw→Yangon	Meeting at Health Dept. Napyidaw→Yangon	
5	8/8	Thu		Survey at Yangon General Hospital		Survey at Yangon General Hospital	Survey at Yangon General Hospital	
6	8/9	Fri		Survey at New Yangon General Hospital		Survey at New Yangon General Hospital	Survey at New Yangon General Hospital	
7	8/10	Sat		Survey at University of Medicine I, Yangon		Survey at University of Medicine I, Yangon	Survey at University of Medicine I, Yangon	
8	8/11	Sun		Team meeting		Team meeting	Team meeting	
9	8/12	Mon		Survey at Yangon General Hospital		Survey at Yangon General Hospital	Survey at Yangon General Hospital	
10	8/13	Tue		Survey at Yangon General Hospital		Survey at Yangon General Hospital	Survey at Yangon General Hospital	
11	8/14	Wed		Survey at University of Medicine I, Yangon	Narita→Bangkok→Yangon	Survey at University of Medicine I, Yangon	Survey at University of Medicine I, Yangon	
12	8/15	Thu		Survey at University of Medicine I, Yangon		Survey of architectural work	Survey at University of Medicine I, Yangon	
13	8/16	Fri		Survey at New Yangon General Hospital		Survey of electricity and water	Survey at New Yangon General Hospital	
14	8/17	Sat		Survey at New Yangon General Hospital		Survey of architectural work	Survey of medical services	
15	8/18	Sun		Team meeting				
16	8/19	Mon		Survey of local public construction work		Survey of medical facility development	Survey of medical services	
17	8/20	Tue	Narita→Bangkok→Yangon	Survey at New Yangon General Hospital		Survey at New Yangon General Hospital		
18	8/21	Wed	Meeting at JICA Office Yangon General Hospital	Meeting at JICA Office Yangon General Hospital	Survey at Yangon General Hospital	Survey at Yangon General Hospital	Survey at Yangon General Hospital	
19	8/22	Thu	Survey at New Yangon General Hospital	Survey at New Yangon General Hospital	Survey for other donors and medical services	Survey of medical facility development	Survey of other donors and medical services	
20	8/23	Fri	Survey at University of Medicine I, Yangon	Survey at University of Medicine I, Yangon	Survey at New Yangon General Hospital	Survey of Construction company	Survey of medical services	
21	8/24	Sat	Team meeting					
22	8/25	Sun	Yangon→Napyidaw	Yangon→Napyidaw	Team meeting		Team meeting Yangon→Bangkok	
23	8/26	Mon	Meeting with Health Dept.	Meeting with Health Dept.	Survey at Yangon General Hospital	Survey of Construction company	→Narita	
24	8/27	Tue	Signing of Minutes of Discussions	Signing of Minutes of Discussions	Survey at Yangon General Hospital	Survey at Yangon General Hospital		
25	8/28	Wed	Discussion on Minutes Napyidaw→Yangon	Discussion on Minutes Napyidaw→Yangon	Survey at New Yangon General Hospital	Survey at University of Medicine I, Yangon		
26	8/29	Thu	Report toJICA Yangon→Bangkok	Report toJICA Yangon→Bangkok	Survey at New Yangon General Hospital	Report toJICA Yangon→Bangkok		
27	8/30	Fri	→Narita	→Narita	Survey at University of Medicine I, Yangon	→Narita		
28	8/31	Sat			Survey at Yangon General Hospital			
29	9/1	Sun			Team meeting			
30	9/2	Mon			Survey at University of Medicine I, Yangon			
31	9/3	Tue			Survey at Yangon General Hospital			
32	9/4	Wed			Survey at Yangon General Hospital			
33	9/5	Thu			Survey at New Yangon General Hospital			
34	9/6	Fri			Report to JICA			
35	9/7	Sat		Narita→Bangkok→Yangon	Yangon→Bangkok			Narita→Bangkok→Yangon
36	9/8	Sun		Team meeting	→Narita			Team meeting
37	9/9	Mon		Report to JICA				Report to JICA
38	9/10	Tue		Survey at Yangon General Hospital				Survey at Yangon General Hospital
39	9/11	Wed		Survey at New Yangon General Hospital				Survey at New Yangon General Hospital
40	9/12	Thu		Survey at Yangon General Hospital				Survey of CMSD
41	9/13	Fri		Survey at New Yangon General Hospital				Survey of equipment supplier
42	9/14	Sat		Survey at Yangon General Hospital and University of Medicine I, Yangon				Survey of equipment supplier
43	9/15	Sun		Team meeting				Team meeting
44	9/16	Mon		Report to JICA				Report to JICA
45	9/17	Tue		Yangon→Bangkok				Yangon→Bangkok
46	9/18	Wed		→Narita				→Narita

Myanmmar Preparatory Survey
on the Project for Improvement of Medical Equipment in General Hospitals in Yangon (Draft Survey)

No.	Date	Day	Official Member	1) Chief Consultant /Planning of Equipment 1	3)Planning of equipment2/ Hospital Operation and maintenance	5)Equipment Procurement Planner/ Cost Planner
1	12/15	Sun		Narita→Bangkok→Yangon		
2	12/16	Mon		Survey at Yangon General Hospital		
3	12/17	Tue		Survey at Yangon General Hospital		
4	12/18	Wed		Survey at Yangon General Hospital		
5	12/19	Thu		Survey at Yangon General Hospital		
6	12/20	Fri		Survey at Yangon General Hospital		Survey at CMSD
7	12/21	Sat		Team meeting		Survey of equipment supplier Yangonn →Bangkok →Narita
8	12/22	Sun	Team meeting			
9	12/23	Mon	Survey at Yangon General Hospital Survey at New Yangon General Hospital Yangon→Napyidaw	Survey at Yangon General Hospita lSurvey at New Yangon General Hospital		
10	12/24	Tue	Meeting with Health Dept.	Yangon→Napyidaw Meeting with Health Dept.		
11	12/25	Wed	Team meeting			
12	12/26	Thu	Signing of Minutes of Discussions			
13	12/27	Fri	Report toJICA Yangon→Bangkok			
14	12/28	Sat	→Narita			

3. List of Parties Concerned in the Recipient Country

List of Parties Concerned in the Recipient Country
(Outline Design)

1. Ministry of Health (MOH)		
1-1. Dr. Min Than Nyunt	Director General	Department of Health (DOH)
1-2. Dr. New Ni Oo	Director, Planning	Department of Health (DOH)
1-3. Dr. San San Aye	Director, Planning	Department of Health Planning
1-4. Dr. Than Win	Deputy Director General	Department of Health Medical Care
1-5. Dr..Than Zaw Myint	Director General	Department of Medical Science
1-6. Dr. Tin Tin Lay	Deputy Director General	Department of Medical Science
1-7. Dr. Kyaw Khine Oo	Assistant Director, Training	Department of Medical Science
1-8. Dr. Kyaw Soe Nyunt	Assistant Director, Foreign Relation	Department of Medical Science
2. Central Medical Supply Department (CMSD)		
2-1. Daw Hnin Hnin Lwin	Assistant Director	Engineer
2-2. U Than Hlaing	Assistant Engineer	Electrical Power
2-3. Daw Myint Myint Fee	Procurement Officer	Procurment
2-4. U Zaw Min Htike	Adominstrative Officer	Adominstration
3. Yangon General Hospital (YGH)		
3-1. Dr. Hla Myint	Medical Superintendent	
3-2. Dr. Pa Pa	Deputy Medical Superintendent	
3-3. Dr. Aye Thwin	Deputy Medical Superintendent	
3-4. Dr. Lin Tun Tun	Professor and Head	Dept. of Radiology, UM (1)
3-5. Dr. Kyi Kyi Saoo	Professor and Head	Dept. of Anesthesiology & ICU, UM (1)
3-6. Dr. Kyin Myint	Professor and Head	Dept. of Nuclear Medicine, UM(1)
3-7. Dr. Khwar Nyo Zin	Acting Head	Clinical Pathology Dept.
3-8. Dr. Mow Oo	Consultant	Orthopedics, Emergency Department
3-9. Dr. U Thein Myint	Professor and Head	Dept. of GI
3-10. Dr. U Thein Lwin	Professor and Head	General Surgery (Ward 7-8)
3-11. U Zaw Min Oo	Electrical & Biomedical Engineer	Dept. of Biomedical Engineering
3-12. U Tin Twn Oo	Civil & Biomedical Engineer	Dept. of Biomedical Engineering
3-13. Daw Thet Thet Maw	Assistant Director	Accounting

4. New Yangon General Hospital (NYGH)		
4-1. Dr. Mya Thaung	Medical Superintendent	
4-2. Dr. Tin Tin Yee	Deputy Medical Superintendent	
4-3. Dr. Yi Yi Limim	Radiologist	Department of Radiology
4-4. Dr. Myint Myint Yee	Pathologist	Department of Pathology
4-5. Dr Soe Myunt	Anaeesthesiologist	ICU
4-6. Dr.Ehin Lei Lei Anug	Physician	Medical Ward
5. University of Medicine (1)		
5-1. Professor Than Cho	Rector	
5-2. Dr. Zaw Wai Soe	Professor and Head	DOH, Dept. of Orthopedics
5-3. Dr. Nan Hla Hla Win	Professor and Head	Dept. of Pharmacology
5-4. Dr. Theigi Megi	Professor and Head	Dept. of Biochemistry
5-5. Dr. Khin Thein Oo	Associate Professor	Dept. of Pharmacology
5-6. Daw Khin Swe Aye	Head	Administration Department
5-7. Daw Thandour Soe	Registrar	Administration Department
5-8. Daw Sanda Hlaing	Assistant Registrar	Administration Department
5-9. Daw Kain Maw Maw Tun	Librarian	Administration Department
6. International Partners for Emergency Medicine		
6-1. Dr. Georgiana A. Phillips	Emergency Physician	St. Vincent's Hospital, Melbourne

7. Embassy of Japan in Myanmar		
7-1. Mr. Hideki Matsuo	Counselor	
7-2. Ms. Sumie Arima	Second Secretary	
8. Japan International Cooperation Agency(JICA) Myanmmar office		
8-1. Mr. Kyousuke Inada	Senior Representative	
8-2. Ms. kaori Nakatani	Project Formulation Adviser	
8-3. Mr. K Thwe Aung	Program Assistant	
8-4. Mr. Kazuichi Aoki	Senior volunteer	

4. Minutes of Discussions

4. Minutes of Discussion

MINUTES OF DISCUSSIONS
PREPARATORY SURVEY ON THE PROJECT FOR IMPROVEMENT OF MEDICAL EQUIPMENT IN HOSPITALS II
IN
THE REPUBLIC OF THE UNION OF MYANMAR

In response to a request from the Government of the Republic of the Union of Myanmar (hereinafter referred to as "Myanmar"), the Government of Japan decided to conduct a Preparatory Survey on the Project for Improvement of Medical Equipment in Hospitals II (hereinafter referred to as "the Project") and entrusted the survey to the Japan International Cooperation Agency (hereinafter referred to as "JICA").

JICA sent to Myanmar the Preparatory Survey Team (hereinafter referred to as "the Team"), which is headed by Ms. Saeda Makimoto, Director, Health Division III, Human Development Department, JICA, and is scheduled to stay in the country from 4 August to 18 September 2013.

The Team held discussions with the officials concerned from the Myanmar side and conducted a field survey at the survey area.

In the course of discussions and field survey, both parties confirmed the main items described in the attached sheets. The Team will proceed to further works and prepare the Preparatory Survey Report.

Yangon, 29 August 2013

Ms. Saeda Makimoto	Dr. Min Than Nyunt
Team Leader	Director General
Preparatory Survey Team	Department of Health
Japan International Cooperation Agency	Ministry of Health
Japan	Republic of the Union of Myanmar

ATTACHMENT

1. Objective of the Project

The objective of the Project is to improve the diagnostic and treatment services in targeted top referral hospitals through procurement and installation of medical equipment, and practical training equipment for emergency medical care in the University of Medicine (1), Yangon.

2. Project sites

The sites of the Project are Yangon General Hospital (hereinafter referred to as "YGH"), New Yangon General Hospital (hereinafter referred to as "NYGH"), and the University of Medicine (1), Yangon.

3. Responsible and Implementing Agency

The Responsible and Implementing Agency is the Ministry of Health.

4. Contents of the Project requested by the Government of Myanmar

After discussions with the Team, the Myanmar side requested on procurement of equipment for the YGH, NYGH, and the University of Medicine (1), Yangon described in Annex-1.

The Team will assess the appropriateness of the request and will report the findings to the Government of Japan.

5. Japan's Grant Aid Scheme

5-1 The Myanmar side understood the Japan's Grant Aid Scheme explained by the Team, as described in Annex-2

5-2 The Myanmar side will take the necessary measures, as described in Annex-3 for smooth implementation of the Project, as a condition for the Japan's Grant Aid to be implemented.

6. Schedule of the Survey

6-1 JICA will prepare the draft report in English and dispatch the mission in order to explain its contents in late December 2013.

6-2 In case that the contents of the report are accepted in principle by the Myanmar side, JICA will complete the Preparatory Survey Report and send it to the Myanmar side in March 2014.

7. Other relevant issues

7-1 Coordination of procurement plan by MOH and the Project

The Myanmar side confirmed to coordinate to avoid duplication of procurement of medical equipment to be procured by the Project and the MOH in MFY2013/14. The Team will reconfirm the MOH procurement plan during draft report explanation mission.

7-2 Upgrading plan of YGH and NYGH

The Team was informed of upgrading plan of the target hospitals as follows.

1) Expansion of departments of two hospitals (either six or seven departments: Chest Surgery, Chest Medicine, Nephrology, Hepatology, Rheumatology of YGH and Urological Surgery of NYGH, and possibly Gastro Intestinal of YGH) in a nearby renovated facility as a specialist hospital. The MOH explained that this organizational change is to improve overcrowded situation of YGH and NYGH, and that this hospital is planned to be managed as a group of teaching hospital consisted of University of Medicine (1), Yangon, YGH and NYGH. The schedule to start operation of this renovated facility is not decided yet. The Team requested MOH to inform those to JICA if decided.
2) Extension of Cardiac Operation Theatre, Main Operation Theatre Complex, Neurology Extension Building and PET/CT Extension Building
3) Repainting of external wall of main building etc.

7-3 Required preparations by the Myanmar side

The Team requested the Myanmar side to remove the existing equipment which would be replaced under the Project, and to prepare the rooms in advance, including foundation, wall, ceiling, water, drain, electricity, air conditioning, X-ray protection, radio wave shield, to install the equipment procured by the Project.

The Myanmar side agreed to take necessary measures to finish them by December 2014. The cost of removing equipment, preparing rooms shall be borne by the Myanmar side.

7-4 Budget allocations for consumables and spare parts

The Myanmar side agreed to secure the budget for consumables and spare parts from MFY2015/16.

7-5 Budget allocations for annual maintenance contract with local agents

The Team strongly requested the Myanmar side to apply "annual maintenance contracts" for the most-advanced equipment including those procured by the Grant Aid. The Myanmar side agreed to allocate the government budget to the CMSD for the targeted hospitals for annual maintenance contracts with the local agents from MFY2016/17 in order to secure long-term reliable performance of the most-advanced equipment such as multi-slice CT scanner, superconductive MRI system if those are decided to be procured. The Team will propose options of annual maintenance contracts and necessary budget in the draft report.

7-6 Development of maintenance systems

Both sides recognized the necessity to develop the maintenance management system at the hospitals and the Central Medical Stores Depot, since several buildings for departments/units are being newly constructed and advanced equipment/machinery is being introduced to YGH and NYGH. The Myanmar side agreed to set up the proposed maintenance department at YGH and to allocate the biomedical engineers to YGH, NYGH and CMSD to maintain equipment which is not covered by annual maintenance contracts.

7-7 Necessity of Soft Component

Both sides confirmed the necessity of soft component on basic maintenance skill and proper use of the equipment. The Team will examine the appropriateness and make the detailed plan by late December 2013 if approved by the Government of Japan.

END

Annex-1 Requested Equipment List of the Project

Annex-2 Japan's Grant Aid

Annex-3 Major Undertakings to be taken by Each Government

Requested Equipment List of the Project Annex-1

Yangon General Hospital

No	Description
1	CT Scanner (New request)
2	Ultrasound machine (New request)
3	Gastroscope
4	Duodenoscope
5	Colonoscope
6	Bronchoscope (flexible)
7	Bronchoscope(rigid)
8	Laparoscope
9	Defibrillator
10	Ventilator
11	Instrument set for microsurgery
12	Arthroscope
13	Autoclave (vertical)
14	Automatic biochemical analyzer
15	Immuno analyzer
16	Ambulance
17	Polysomnographic machine

*No. is order of priority

New Yangon General Hospital

No	Description
1	CT Scanner
2	Anesthesia machine with ventilator
3	Diathermy
4	Patient monitor
5	Power Generator (New request)
6	Laparoscope
7	Defibrillator
8	X-ray machine (digital, general)
9	Safety cabinet
10	Ventilator
11	Laser machine for urology
12	Operation table
13	Refrigerator (blood bag)
14	Blood gas analyzer
15	Oxygen concentrator
16	Syringe pump
17	Infusion pump
18	Microtome (Rotary type)
19	Ultrasound machine (Doppler)
20	MRI
21	Choledocoscope (New request)
22	Video Laryngoscope (New request)

*No. is order of priority

University of Medicine (1), Yangon

No.	Description
1	Mannequin set
2	Oxygen Cylinder with Flowmeter
3	Airway Trolley
4	Circulation Trolley
5	Drug Trolley
6	Blood Test Trolley
7	Procedure Trolely
8	Dressing Trolley
9	I.V. Pole
10	Patient Trolley
11	Diagnostic Set

*No. is order of priority

Japan's Grant Aid

The Government of Japan (hereinafter referred to as "the GOJ") is implementing the organizational reforms to improve the quality of ODA operations, and as a part of this realignment, a new JICA law was entered into effect on October 1, 2008. Based on this law and the decision of the GOJ, JICA has become the executing agency of the Grant Aid for General Projects, for Fisheries and for Cultural Cooperation, etc.

The Grant Aid is non-reimbursable fund provided to a recipient country to procure the facilities, equipment and services (engineering services and transportation of the products, etc.) for its economic and social development in accordance with the relevant laws and regulations of Japan. The Grant Aid is not supplied through the donation of materials as such.

1. Grant Aid Procedures

The Japanese Grant Aid is supplied through following procedures :

- Preparatory Survey
  - The Survey conducted by JICA
- Appraisal &Approval
  - Appraisal by the GOJ and JICA, and Approval by the Japanese Cabinet
- Authority for Determining Implementation
  - The Notes exchanged between the GOJ and a recipient country
- Grant Agreement (hereinafter referred to as "the G/A")
  - Agreement concluded between JICA and a recipient country
- Implementation
  - Implementation of the Project on the basis of the G/A

2. Preparatory Survey

(1) Contents of the Survey

The aim of the preparatory Survey is to provide a basic document necessary for the appraisal of the Project made by the GOJ and JICA. The contents of the Survey are as follows:

- Confirmation of the background, objectives, and benefits of the Project and also institutional capacity of relevant agencies of the recipient country necessary for the implementation of the Project.
- Evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from a technical, financial, social and economic point of view.
- Confirmation of items agreed between both parties concerning the basic concept of the Project.
- Preparation of a outline design of the Project.

- Estimation of costs of the Project.

The contents of the original request by the recipient country are not necessarily approved in their initial form as the contents of the Grant Aid project. The Outline Design of the Project is confirmed based on the guidelines of the Japan's Grant Aid scheme.

JICA requests the Government of the recipient country to take whatever measures necessary to achieve its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the organization of the recipient country which actually implements the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations of the recipient country based on the Minutes of Discussions.

(2) Selection of Consultants

For smooth implementation of the Survey, JICA employs (a) registered consulting firm(s). JICA selects (a) firm(s) based on proposals submitted by interested firms.

(3) Result of the Survey

JICA reviews the Report on the results of the Survey and recommends the GOJ to appraise the implementation of the Project after confirming the appropriateness of the Project.

3. Japan's Grant Aid Scheme

(1) The E/N and the G/A

After the Project is approved by the Cabinet of Japan, the Exchange of Notes(hereinafter referred to as "the E/N") will be signed between the GOJ and the Government of the recipient country to make a pledge for assistance, which is followed by the conclusion of the G/A between JICA and the Government of the recipient country to define the necessary articles to implement the Project, such as payment conditions, responsibilities of the Government of the recipient country, and procurement conditions.

(2) Selection of Consultants

In order to maintain technical consistency, the consulting firm(s) which conducted the Survey will be recommended by JICA to the recipient country to continue to work on the Project's implementation after the E/N and G/A.

(3) Eligible source country

Under the Japanese Grant Aid, in principle, Japanese products and services including transport or those of the recipient country are to be purchased. When JICA and the Government of the recipient country or its designated authority deem it necessary, the Grant Aid may be used for the purchase of the products or services of a third country. However, the prime contractors, namely, constructing and procurement firms, and the prime consulting firm are limited to "Japanese nationals".

(4) Necessity of "Verification"

The Government of the recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall

be verified by JICA. This "Verification" is deemed necessary to fulfill accountability to Japanese taxpayers.

(5) Major undertakings to be taken by the Government of the Recipient Country

In the implementation of the Grant Aid Project, the recipient country is required to undertake such necessary measures as Annex.

(6) "Proper Use"

The Government of the recipient country is required to maintain and use properly and effectively the facilities constructed and the equipment purchased under the Grant Aid, to assign staff necessary for this operation and maintenance and to bear all the expenses other than those covered by the Grant Aid.

(7) "Export and Re-export"

The products purchased under the Grant Aid should not be exported or re-exported from the recipient country.

(8) Banking Arrangements (B/A)

a) The Government of the recipient country or its designated authority should open an account under the name of the Government of the recipient country in a bank in Japan (hereinafter referred to as "the Bank"). JICA will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by the Government of the recipient country or its designated authority under the Verified Contracts.

b) The payments will be made when payment requests are presented by the Bank to JICA under an Authorization to Pay (A/P) issued by the Government of the recipient country or its designated authority.

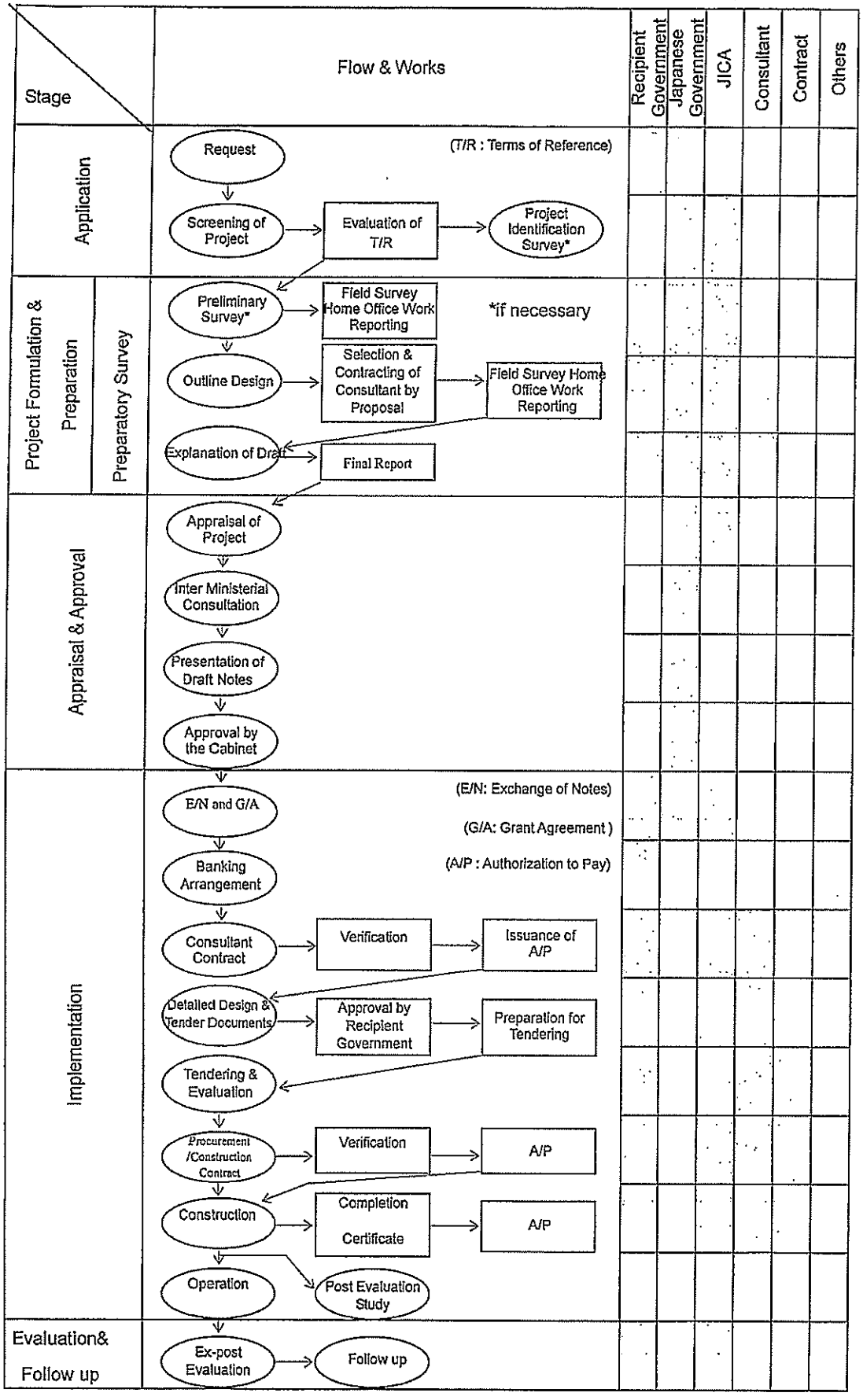
(9) Authorization to Pay (A/P)

The Government of the recipient country should bear an advising commission of an Authorization to Pay and payment commissions paid to the Bank.

(10) Social and Environmental Considerations

A recipient country must carefully consider social and environmental impacts by the Project and must comply with the environmental regulations of the recipient country and JICA socio-environmental guidelines.

FLOW CHART OF JAPAN's GRANT AID PROCEDURES



Annex-3

Major Undertakings to be taken by Each Government

No.	Items	To be covered by Grant Aid	To be covered by Recipient Side
1	To ensure prompt unloading and customs clearance of the products at ports of disembarkation in the recipient country and to assist internal transportation of the products		
	1) Marine (Air) transportation of the Products from Japan to the recipient country	●	
	2) Tax exemption and custom clearance of the Products at the port of disembarkation		●
	3) Internal transportation from the port of disembarkation to the project site	●	
2	To ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the recipient country with respect to the purchase of the products and the services be exempted		●
3	To accord Japanese nationals and / or nationals of third countries whose services may be required in connection with the supply of the products and the services such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work		●
4	To ensure that the products be maintained and used properly and effectively for the implementation of the Project		●
5	To bear all the expenses, other than those covered by the Grant, necessary for the implementation of the Project (including rehabilitation of rooms, construction of buildings and removal of the old equipment to install the equipment procured by the Project)		●
6	To bear the following commissions paid to the Japanese bank for banking services based upon the B/A		
	1) Advising commission of A/P		●
	2) Payment commission		●

(B/A : Banking Arrangement, A/P : Authorization to pay)

MINUTES OF DISCUSSIONS ON THE PREPARATORY SURVEY ON THE PROJECT FOR IMPROVEMENT OF MEDICAL EQUIPMENT IN GENERAL HOSPITALS IN YANGON IN THE REPUBLIC OF THE UNION OF MYANMAR

(EXPLANATION OF THE PREPARATORY SURVEY REPORT)

In August 2013, the Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched the Preparatory Survey Team on the Project for Improvement of Medical Equipment in Hospitals II (hereinafter referred to as "the Project") to the Republic of Union of Myanmar (hereinafter referred to as "Myanmar"), and through discussions, surveys, and technical examination of the results in Japan, JICA prepared the draft of preparatory survey report (hereinafter referred to as "the draft report ").

In order to explain and to consult the Government of Myanmar on the components of the draft report, JICA sent to Myanmar the Preparatory Survey Team (hereinafter referred to as "the Team"), which is headed by Mr. Yojiro Ishii, Senior Advisor, Human Development Department, JICA, and is scheduled to stay in the country from December 15 to December 27, 2013.

As a result of discussions, the both parties confirmed the main items described on the attached sheets.

Nay Pyi Taw, December 26, 2013

Mr. Yojiro Ishii
Team Leader
Preparatory Survey Team
Japan International Cooperation Agency
Japan

Dr. Min Than Nyunt
Director General
Department of Health
Ministry of Health
Republic of the Union of Myanmar

5-5. List of Medical Equipment provided by the Project

The both sides confirmed the list of medical equipment as described in Annex-2. The Myanmar side promised to avoid duplicated supply of medical equipment that are already included in this List.

5-6. Necessary devices for stable usage of medical equipment

The Myanmar side agreed to furnish themselves with devices or facilities, such as AVR or UPS, necessary to protect the medical equipment other than those planned with AVR or UPS by the Japanese side, from power failure or voltage fluctuation. The Myanmar side also agreed to install devices or facilities necessary to protect the medical equipment from lightening damage.

5-7. Allocation of the Cost for Operation and Maintenance

The Myanmar side agreed to secure and allocate the enough budgets to the targeted two (2) hospitals strategically to operate and maintain the medical equipment procured under the Project effectively. Furthermore, the both sides discussed the necessities of securing the cost for renewal of those equipment after expiratory period, and the Myanmar side agreed to take necessary measures.

The Team requested the Myanmar side to apply "annual maintenance contracts" for the advanced equipment procured by the Project. The Myanmar side agreed to allocate the budget to the CMSD and the YGH for annual maintenance contracts with the local agents from MFY2016/17 as described in Annex3 in order to secure long-term reliable performance of the advanced equipment such as CT-canner and MRI which require professional services for maintenance.

5-8. Development and allocation of Biomedical Engineers

Based on the recognition of the necessity and importance of biomedical engineers, the Myanmar side agreed to allocate those professionals, including at least one biomedical engineer, to the two (2) targeted hospitals and the Central Medical Store Depot (CMSD) before the commencement of soft component program.

5-9. Plan of Soft Component

The both sides agreed the necessities of soft component to upgrade the maintenance skill of the engineers and users in the targeted two (2) hospitals, which is described in the draft report.

5-10. Publicity activities

The Myanmar side agreed to promote publicity activities on Japanese cooperation under the Project and take actions to disseminate information to people of Myanmar in case that the Project is approved for implementation by the Grant Agreement.

5-11. Upgrading plan of YGH and NYGH

The Myanmar side explained that the departments of Chest Surgery and Chest Medicine in YGH and Urological Surgery in NYGH among the departments which expected to be improved by the Project will be moved to the special hospital on or around Jan 2014. And

Annex-1 Project Cost Estimation

Borne by the Japanese Side

Item	Amount (Thousand Japanese Yen)
Equipment Procurement	914,880
Consultant Fee	25,860
Soft Component	14,310
Total	982,050

Borne by the Myanmar side

Facilities/ Department	Installation	Preparation and Renovation	Cost (US$)
YGH			
Emergency Department			
CT Room	Replace a CT Scanner	・Existing CT removal	357.50
Autoclave Room	Newly install an Autoclave	・Existing autoclave position change ・Water supply and drainage ・Electricity supply ・Door removal and re-install	169.50
Main OT			
Autoclave Room	Replace an Autoclave	・Existing autoclave removal	242.60
Biochemistry Laboratory	Newly install Automatic Biochemistry Analyzers and Immuno Analyzer	・Air-conditioner installation ・Electricity supply	2,486.80
NYGH			
Imaging Department			
X-Ray Room 1	Newly install a CT Scanner	・Existing X-ray machine Transfer ・Existing X-ray machine removal ・Door removal and re-install ・Control room construction. Radiation protection. Electricity (not included)	398.80
X-Ray Room 2	Replace a X-ray machine	・Existing X-ray machine removal	233.30
MRI Room	Replace a MRI	・Existing a MRI removal ・Nuclear magnet protection, control room and machine room construction ,air conditioner Electricity(not included)	1,053.70

Annex-2 List of Medical Equipment

No.	Equipment	YGH	NYGH	Quant.
1	CT scanner	1	1	2
2	Ultrasound machine	1	1	2
3	Anesthesia machine with ventilator	0	5	5
4	Diathermy	0	4	4
5-1	Patient Monitor (for OT and ICU)	0	11	11
5-2	Patient Monitor (for Ward)	0	12	12
6	Power Generator	0	1	1
7	Laparoscope	2	2	4
8	Defibrillator	4	8	12
9	X-ray machine (digital, general)	0	1	1
10	Safety Cabinet	0	1	1
11	Ventilator	8	7	15
12	Laser Machine for Urology	0	1	1
13-1	Operation Table (Electric)	0	2	2
13-2	Operation Table (Manual)	0	2	2
14	Refrigerator(blood bag)	0	1	1
15	Blood gas analyzer	0	1	1
16	Oxygen concentrator	0	8	8
17	Syringe Pump	0	20	20
18	Infusion pump	0	18	18
19	Microtome (Rotary type)	0	1	1
20	MRI	0	1	1
21	Choledocoscope	0	1	1
22	Video Laryngoscope	0	1	1
23	Gastroscope	7	0	7
24	Duodenoscope	2	0	2
25	Colonoscope	6	0	6
26	Bronschoscope(flexible)	3	0	3
27	Instrument set for microsurgery	2	0	2
28	Arthoroscope	1	0	1
29	Autoclave	2	0	2
30	Automatic biochemistry analyzer	1	0	1
31	Immuno analyzer	1	0	1
32	Ambulance	4	0	4
33	Polysomnographic machine	1	0	1
34	AVR for digital X-ray machine	0	1	1
35	UPS for Ultrasound machine	1	1	2
36	UPS for CT scanner	1	1	2
37	UPS for MRI	0	1	1

(2) Estimated annual operation and maintenance cost

For YGH

Equipment	Consumables	Amount (Kyat)
CT-Scanner	Contrast medium, film, etc.	691,000
Ventilator, gastroscope, arthroscope, etc.	Respiratory circuit, xenon lamp	5,043,000
Ultrasound machine, defibrillator, etc.	Electrode, paper, contact gel, etc.	1,476,000
Safety cabinet, blood gas analyzer, etc.	Bulb, reagemt, electrode, etc	7,505,000
Ambulance	Filter, lubricant oil, fuel	3,331,000
Total Annual Operation Cost	(Approx.1.8Million yen)	18,046,000

For NYGH

Equipment	Consumables	Amount (Kyat)
CT-Scanner, MRI, X-Ray machine, etc.	Contrast medium, film, etc.	7,632,000
Anesthesia machine, Syringe pump, patient monitor, etc.	Anesthetic gas, oxygen、N2o, syringe, etc.	20,776,000
Ultrasound machine, defibrillator, etc.	Contact gel, paper, electrode, etc.	991,000
Automatic biochemistry analyzer, immunoassay analyzer, etc.	Bulb, reagemt, electrode, etc.	518,000
Power generator	Filter, lubricant oil, fuel	4,752,000
Total Annual Operation Cost	(Approx.3.46 Million yen)	34,669,000

5. Soft Component (Technical Assistance) Plan

5. Soft Component (Technical Assistance) Plan

1. Background of the Soft Component Input Plan

1-1 Current Status of Medical Equipment Maintenance

As of September 2013, all medical procurement, installation, and maintenance in Myanmar is under the control of the Central Medical Store Depot (hereinafter referred to as "CMSD"). CMSD has three engineers who have Electrical bachelor degree. They can repair some minor problems such as oxygen concentrators, oxygen piping, high-pressure steam sterilizers, and suction machines categorized under small general medical equipment. Local agents are in charge of maintenance of sophisticated medical equipment such as MRI, linear Accelerator, CT which were procured and distributed by the Ministry of Health in 2012, ventilators, and anesthesia machines used in the Operation Theater and ICU-related equipment.

Due to lack of technical schools for clinical engineers (*Rinsho Kougaku Gishi* in Japanese), most engineers in the local agents are occupied by Electrical bachelor degree holders.

Equipment Maintenance Department is established in the Yangon General Hospital (hereinafter referred to as "YGH"). All facilities and medical equipment in YGH are maintained by two electricians and two maintenance personnel (recognized technicians) in the department. CMSD is not responsible for the repair work for YGH. Although YGH has the department, virtual maintenance services in YGH are carried out by local agents because the maintenance personnel have no enough fundamental knowledge about medical equipment. On the other hand, with regards to the electricians in the department, they participated in the Bio-Medical Engineer (hereinafter referred to as "BME") training for three weeks in 2012.

Meanwhile, the New Yangon General Hospital (hereinafter referred to as "NYGH") posted electricians as the person in charge of whole facilities maintenance from electrical field to medical equipment field. However, due to lack of basic knowledge about medical equipment, virtual maintenance of medical equipment is practiced by CMSD.

1-2 Challenges of Medical Equipment Maintenance

Myanmar has experienced to use existing equipment well by using their accumulated knowledge and developed skills. Nevertheless, current main problem is lack of operation and handling skills for effective use of the cutting-edge medical equipment. In addition, when it comes to maintenance, there are four main problems as mentioned below;

① Equipment maintenance staff is not posted in the hospitals.
② The operational status of the machines is not centrally managed (there is no person who knows the equipment condition).
③ Repair routes have not been established systematically.
④ Lack of awareness of the importance of maintenance service contracts.

2. Objectives of the soft component

The input of this soft component is intended to be utilized for a long time through smooth start-up of procured equipment and improvement of maintenance capacity. It is expected that medical equipment will be used for a long time through operational guidance and medical equipment maintenance management.

3. Outcome of the soft component

3-1 Outcome at completion of the soft component

① To evaluate the learning degree with paper examination and practices
② To evaluate the learning degree with system of daily maintenance
③ To make simulation test for procedures of request for repair work
④ To confirm the learning degree of way of maintenance services contract

The result of the evaluation will be reported on soft component completion report.

3-2 Outcome at completion of the project

① The smooth start-up of utilization of procured equipment at YGH and NYGH is realized, resulting in improved accuracy of medical services.
② The system, scope of business, and responsibility of individual medical equipment is clarified, whereby continuous maintenance of each device is realized.
③ Each target hospital implements appropriate daily maintenance using the fixed format and CMSD can perform appropriate maintenance services for the target hospitals.
④ Each target hospital develops annual procurement plans for spare parts and consumables on their own, using register books shared among the target hospitals.
⑤ A repair history of equipment failure and repair route is established, so that it is possible to identify problems in maintenance (knowing the replacement timing and prioritizing replacements).

⑥ Recognition of the importance of maintenance service contracts is increased, leading to the promotion of maintenance contracts.

⑦ Operation of a centralized management tool at CMSD is realized.

4. Achievement evaluation methods

- Transitions of the number of medical equipment trouble and repair.
- Clarification of maintenance system of medical equipment and division of Responsibility
- Utilization rate and accuracy of daily maintenance checklists.
- Contents of annual procurement for spare parts and consumables based on fixed register book and/or inventory.

5. Activities of the Soft Component (Input Plan)

5-1 Scale and Contents of the Soft Component

The target of the soft component is equipment procured for YGH and NYGH under this project. The input plan will be implemented under the following three sessions.

Session	Input Content	Time Schedule
Session 1	• Instruction in equipment operational guidance • Maintenance of an equipment register book and daily checklist • Fixed format for consumables management and repair history register book • Guidance on appropriate maintenance service contracts • Instruction of CMSD on how to use the maintenance format	Starting around 2 weeks before the commencement of installation work for medical equipment, and completed in 3 weeks by the commencement of installation
Session 2	• Guidance of Implementation training, Identify issues and improvement of using various sheets in session1.	Starting around 6 months after completion of installation of medical equipment
Sesson3	• Review of the maintenance method using various formats. • To Instruct methods of resolving problems • To advice how to make procurement plans of spare parts and consumables using the equipment register book provided. • To advice on and promotion of maintenance service contracts with advice on repairs within the warranty period	Starting around 11 months after handing over of medical equipment (1 month before expiration of Manufacturing guarantee)

The CMSD has included as member of trainee for soft component on "The project for Improvement of Medical equipment in Hospital" on the Grant aid (March, 2013).

The above Soft Component would be planned to start on June, 2014. So it is decided that CMSD shall be excluded of soft component as they was already introduced it.

5-2 Implementation Contents

1) Preparation in Japan (Preparation and report writing)

Before starting session, accepting system for the soft component should be confirmed. Moreover, appropriate training documents should be prepared. After the field activities, the report will be written by the consultants.

2) Implementation plan of each Session of Soft Component

Session 1 (at the time of delivery)～

Session 2 (6 months after delivery)～

Session 3 (11 months after delivery)

Before the field activity, the consultant will explain the objective and contents of the soft component, confirm the schedule and cooperation with Ministry of Health. The contents of soft component inputs for target facilities are listed below.

(1) Instruction in operation
(2) Guidance on daily inspections
(3) Management plan of consumables
(4) Equipment management system developed by the equipment register book
(5) Repair history management for understanding the equipment degradation level by the equipment register book
(6) Guidance on repair requests (Clinical department → maintenance management section manager →administration dept. → repair agent)
(7) Advice on and promotion of maintenance contracts for sophisticated equipment
(8) Promotion of a "common equipment registration tool" developed by the project for improvement of medical equipment in hospitals in phase I(2012)

＊(1) Smooth start-up of procured equipment (2)～(7) Aim to extend the life of the procured equipment

Figure 1. Outline of Soft Component for the Project.

(A) Operational guidance for the smooth start-up of equipment

Diagnostic imaging equipment is linked to image-capturing devices such as injectors, image printers, and medical image management system. Suppliers can provide simple operation guidance. However, to instruct on whole system is difficult for them. Therefore, appropriate technology transfer should be carried out by the consultants.

(B) Input for maintenance system management

Where medical equipment maintenance department is not established, equipment management should be entrusted to the end-uses such as radiology technicians, laboratory technicians, doctors and nurses.

This soft component plans inputs (1) to (8) mentioned in the figure mainly for end-users.

(C) Collaboration with the soft component of the hospital medical equipment maintenance plan of Grand Aid (2013, March) in the first phase

With "Improvement of Medical Equipment in Hospital", It is planned to introduce for "central registration management tool" in CMSD. This plan would be carried out in CMSD or Hospital maintenance personnel. These plans are follows.

a) Making medical equipment register book

b) Implementation for daily inspections and checks

c) Suggesting consumables and spare parts procurement cycle planning.

These tools are planned for input of target facilities. It would be check the development status of centralized management tool at equipment register book in cooperation with Soft Component. If there is an operational issue, it is change improvement or input content. This plans are input of Soft component of this Grand aid and input (4) to (7) in figure 1 for continuity and sustainability.

(D) Details of activities the planned facilities

● **First session (at the time of delivery)**

(1) Guidance of operation

✧ Target equipment:

Start-up operation guidance on the CT scanner for YGH, and the CT scanner, MRI scanner, and digital X-ray equipment for NYGH

✧ Guidance contents:

Myanmar is seeking to procure easy-to-use medical equipment. This includes skill transfer to medical personnel who are not familiar with the latest technology. The consultant will plan operation guidance on the target devices.

The Japanese consultant aims to promote the smooth start-up of technical personnel for imaging devices. Equipment manufacturers' teaching content is only

their own companies' equipment operation operational guidance. So, they do not provide operation guidance for support in a systematic way.

The consultant will facilitate understanding the appropriate imaging method, knowledge of shooting conditions, corresponding cases of contrast agent shooting, general radiography, application method of application soft, management of software data, image analysis, image processing, basic description of operation of the laser imager, operation of the system guidance, handling guidance, how to use the manual, and problems corresponding to power down and UPS. The Equipment manufactures are promote the Initial operation guidance of smooth start-up of the equipment.

✧ Instructor:

Soft component training engineers 1 (Image diagnostician)

An engineer whose specialty is diagnostic imaging devices and who can speak fluent English will be dispatched.

✧ Target person:

Radiology technician, Laboratory technician, Doctor.

(2) Guidance on daily inspections

✧ Target equipment:

The equipment procured under this grant aid project

(Category of Electronic Medical Equipment)

① Medical equipment in the operation room
② Diagnostic imaging equipment
③ Clinical laboratory equipment
④ ICU- and ME-related equipment

✧ Guidance contents:

It is needs to clarify the maintenance personnel in charge and their responsibilities. It is need to make the importance and necessity of daily checks and manual of trouble shooting. The consultants ask them to daily check sheet and seminars for improvement from 5S of the equipment person in charge of each department.

✧ Instructor (Translator English ⇔ Burmese):

Soft component training engineers 1 (Image diagnostician)

Soft component training engineers 2 (Clinical laboratory technologist or ME qualification acquire)

✧ Target persons:
Radiology technician, Laboratory technician, Doctor, Nurse.

(3) Management plan of consumables

✧ Target equipment:
Equipment category ①~④

✧ Guidance contents:
The consultant needs to instruction on how to analyze and record of the procurement situation of consumables and spare parts using the equipment register book and how to make procurement plans of spare parts. It would be reducing equipment downtime.

✧ Instructor (Translator English⇔Burmese):
Soft component training engineer 2
(Clinical laboratory technologist or ME qualification acquire)

✧ Target persons:
Radiology technician, Laboratory technician, Doctor, Nurse.

(4) Equipment maintenance management system by the equipment register book

✧ Target equipment:
Equipment category ①~④

The status of the installed equipment, repair history, model, company, year, spare parts, procurement of consumable goods, lead time, and quotation will be written as basic data. The equipment resister books will be prepared by the person in charge of medical equipment.

✧ Guidance contents:
The consultants will give a guidance presentation in the Excel format of the equipment register book, guidance on how to read the nameplate, method described, and check the procurement situation. The consultants will use the equipment register book developed, and give guidance on the recording of the deployment situation of existing equipment in the facility.

✧ Instructor (Translator English⇔Burmese):
Soft component training engineer 2
(Clinical laboratory technologist or ME qualification acquire)

✧ Target persons:
Radiology technician, Laboratory technician, Nurse.

(5) Repair history management, understanding of equipment degradation level, and development of an equipment renewal plan using the equipment register book

✧ Guidance contents:

The consultant will give guidance of how to make Excel format of the equipment register book. It is need to make record of note repair history, cause of trouble, repair cost, repair period and etc.

From the recording, the consultant will give guidance on estimating the degree of deterioration and failure frequency of the equipment, the timing of replacement, and repair costs. It is essential that appropriate maintenance cost be secured considering the equipment degradation level because repair costs rise in the case of major defects.

✧ Instructor (Translator English⇔Burmese):
Soft component training engineer 2
(Clinical laboratory technologist or ME qualification acquire)

✧ Target persons:
Radiology technician, Laboratory technician, Nurse.

(6) Guidance of establishment of repair request route

✧ Guidance contents:

Guidance of establishment of repair route is related to clarification of responsible area, repair history, reduction of downtime, purchase budget and replacement of the equipment. Although BME section has established at YGH, repair system is not function well. The content of repair request documents used by them has not enough information. They have simple note-book for record of repair. In most cases, the department personnel have recorded the date of receipt, name of equipment, repair department, and return date in the note-book. There were some items found

remaining more than three months un-repaired.

In regards to repair equipment system, there is in-hospital repair or out-of-hospital repair (for example, agency). Most equipment is supported by out-of-hospital repair. Nevertheless, due to lack of awareness of responsible area, contact system between hospitals and BME is not function well.

The purpose of establishment of repair request route is to grasp the repair progress and information such as quotation, contents of repair, estimated delivery date by using repair request documents. Furthermore, quick response will be realized by refer to those information. This guidance will contribute to centralization management and prevent from delay of medical actions caused by downtime of medical equipment.

Regarding NYGH, CMSD takes in charge of medical equipment maintenance because maintenance department is not established in NYGH. The maintenance system at NYGH is worse than YGH one.

Doe to the difference level of maintenance system at each target hospital, the soft component should be performed appropriately based on current circumstances at each hospital. Also, the repair request document format must contain space to write detail information.

✧ Instructor (Translator English⇔Burmese):
Soft component training engineer 2
(Clinical laboratory technologist or ME qualification acquire)

✧ Target persons:
Radiology technician, Laboratory technician, Nurse.

(7) Promotion, recommendation and advice of Maintenance service contract of expensive equipment

✧ Guidance content:

The consultant will give guidance on the development method of closing conditions of the maintenance service contracts (Annual maintenance plan/Comprehensive maintenance plan) for advanced medical equipment(MRT, CT-Scanner and X-ray machine), as well as giving advice on the selection method of warranty parts of the contract, period of the contract, guidance period, amount, contract form, etc.

✧ Instructor (Translator English⇔Burmese):
Soft component training engineer 2
(Clinical laboratory technologist or ME qualification acquire)

✧ Target persons:
Radiology technician, Laboratory technician, Nurse.

(8) Promotion of use and operation guidance on the equipment register book

✧ Guidance content:

The consultant will review the inspection to identify any problems with the "centralized equipment management tool" on the input of soft component on ''Improvement of medical equipment'' in Grant aid. It is investigating the use situation, use effect, and leverage, and give advice on improvement measures.

✧ Instructor (Translator English⇔Burmese):
Soft component training engineer 2
(Clinical laboratory technologist or ME qualification acquire)

✧ Target persons:
Radiology technician, Laboratory technician, Nurse.

● **Session 2 (6 months after delivery)**

✧ Guidance content:

The consultant will confirm utilization and make the documentation status of the equipment management ledger, and check the visibility of the daily checklist, procurement plan, manual of consumables, and utilization of repair and other documents.

The consultant will give guidance on how to resolve and extract problems using these register book through simulation. It is need to promotion and advice of agreement of the end of the warranty period for superintendent of Department of Health or director of each target hospitals.

● **Session 3 (11 months after delivery)**

✧ Guidance contents:

The consultant will report the result and problems to the Department of Health and

to the each director of target hospitals. At the same time, management method for operation and maintenance of medical equipment will be instructed by the consultant again.

Moreover, the consultant will give advice the way how to improve the problems from checking the utilization of manuals.

The consultant will encourage sharing and utilization of this Soft component.

The following shows the scope of work of each session, and the input timing.

Unit (days)

Session 1 (Time of delivery)	YGH	NYGH	Soft component instructor
①Operational guidance	6	18	Soft component training engineer 1 (Engineer from third country or local) Activity dates: 24 days+Preparation work: 2 days
②Guidance on daily inspections (including preparation)	6	6	Soft component training engineer 2 Field work: 54 days Reporting in Nay Pyi Daw: 4 days Japan⇔Yangon: 3 days Total: 61 days Domestic work: 3 days (Preparation: 1 day; Analysis: 2 days)
③Management plan of consumables	5	5	
④Equipment management by the register book	6	6	
⑤Repair history management by the register book	4	4	
⑥Repair route, request table	3	3	
⑦Maintenance contract guidance	3	3	

・① is a third-country engineer, while others are Japanese engineers.

Unit (days)

Session 2 (6 months after delivery)	YGH	NYGH	Soft component instructor
①Implementation status confirmation (Simulation)	2	2	
②Guidance on daily inspections (Including preparation)			Soft component training engineer 2 Field work: 20 days Reporting in Nay Pyi Daw: 4 days Japan⇔Yangon: 3 days Total : 27 days Domestic work: 3 days (Preparation: 1 day; Analysis: 2 days)
③Management plan of consumables	2	2	
④Equipment management by register book	2	2	
⑤Repair history management by register book	2	2	
⑥Repair route, request table	1	1	
⑦Maintenance contracts guidance	1	1	

・One Japanese engineer.

Unit (days)

Session 3 (11 months after delivery)	YGH	NYGH	Soft component instructor
①Implementation status confirmation (Follow-up)	2	2	
②Guidance on daily inspections (Including preparation)			Soft component training engineer 2 Field work: 14 days Reporting in Nay Pyi Daw: 4 days Japan⇔Yangon: 3 days Total : 21 days Domestic work (Preparation: 1 day; Analysis: 2 days)
③Management plan of consumables	1	1	
④Equipment management by the register book	1	1	
⑤Repair history management by the register book	1	1	
⑥Repair route, request table	1	1	
⑦Maintenance contract guidance	1	1	

- One Japanese engineer
- Input equipment: 2 PC＋Printer＋Digital camera (Recorded) local purchase

6. Procurement methods of implementing the resources of the soft component

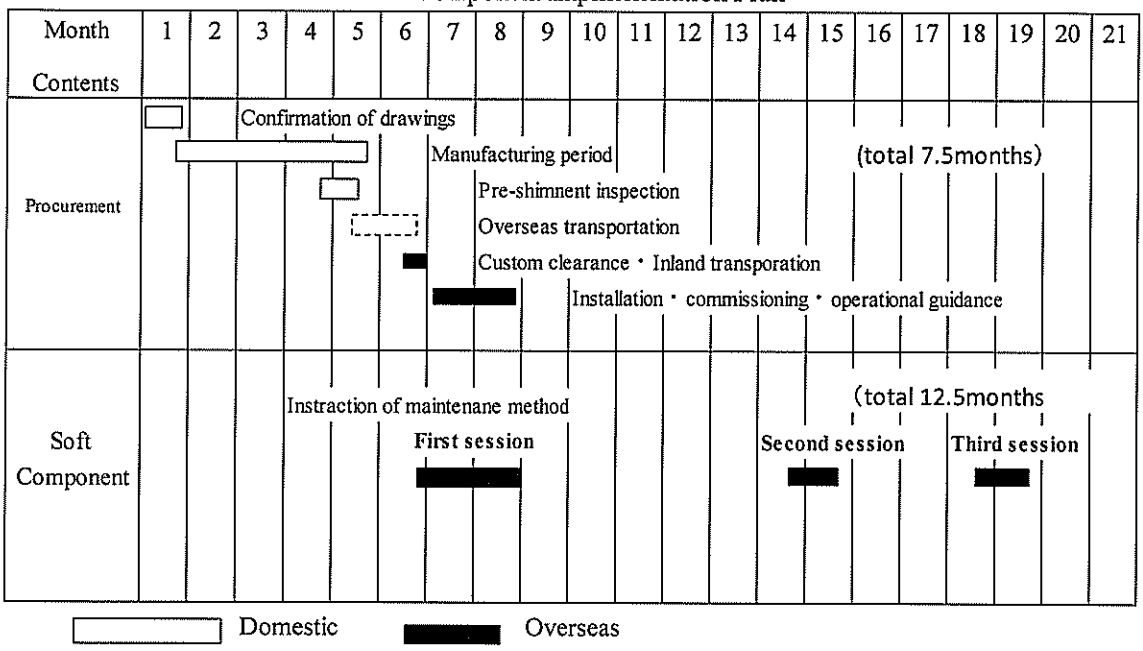
There are two soft component training engineers. One person is for operational guidance, while other is for technical training.

- Soft component training engineers 1 (From Third country)
- Soft component training engineers 2 (From Japan)

7. Implementation schedule of the soft component

Session 1 will takes around two months from two weeks before the commencement of installation to after three weeks of the completion of installation. Session 2 will be started around 6 months after completion of installation and will take around 1 month. Session 3 will be started around 11 months after completion of installation and will take around 0.8 months. It will take around 12.5 months from commencement to completion of the soft component.

Soft Component Impmenentation Plan



8. Output of the soft component

1 Daily maintenance check sheet

2 Consumables management plan format

3 Equipment register book

4 Repair history management format

5 Repair request format

6 Conclusion of maintenance service contracts

7 Others (document used in seminars)

9. Obligations of the Myanmar side

As a prerequisite for this soft component, it is necessary for Mistry of Health to assist the Japanese consultants in applying for visas in the First session that are valid for 10 weeks. In order to maintain the outcome for a long period, it is ideal that the each document of maintenance management should be revised accordance with the situation by Ministry of Health in the future.

6. References

Yangon General Hospital

No	Name of Equipment	Total	RAD						GI						CM						CS						GSU					
			Request	Analysis	Plan (Replacement/supplimentary)	Plan (Newly Procured)	No. of Existing Equipment	Planned Q'ty	Request	Analysis	Plan (Replacement/supplimentary)	Plan (Newly Procured)	No. of Existing Equipment	Planned Q'ty	Request	Analysis	Plan (Replacement/supplimentary)	Plan (Newly Procured)	No. of Existing Equipment	Planned Q'ty	Request	Analysis	Plan (Replacement/supplimentary)	Plan (Newly Procured)	No. of Existing Equipment	Planned Q'ty	Request	Analysis	Plan (Replacement/supplimentary)	Plan (Newly Procured)	No. of Existing Equipment	Planned Q'ty
1	CT Scanner	1	1	◎①(b)	1		2	1																								
2	Ultrasound machine	1																														
3	Gastroscope	7							3	◎①(a)	3		3	3							1	◎①(a)	1		2	1	3	○②(a)	3		5	3
4	Duodenoscope	2							2	◎①(a)	2		1	2																		
5	Colonoscope	6							3	◎①②(a)	3		1	3													3	◎○①②(a)	2	1	2	3
6	Bronchoscope (flexible)	3													2	◎①(a)	2		2	2	1	◎①(a)	1		2	1						
7	Bronchoscope(rigid)	0																			1	×②(a)	0		2	0						
8	Laparoscope	2																									2	◎①(a)	2		1	2
9	Defibrillator	4																														
10	Ventilator	8																														
11	Instrument set for microsurgery	2																														
12	Arthroscope	1																														
13	Autoclave	2																														
14	Automatic biochemical analyzer	1																														
15	Immuno analyzer	1																														
16	Ambulance	4																														
17	Polysomnographic machine	1													1	◎①(a)	1		1	1												

No	Name of Equipment	Total	MOT						ICU						ORT						LAB						EM					
			Request	Analysis	Plan (Replacement/supplimentary)	Plan (Newly Procured)	No. of Existing Equipment	Planned Q'ty	Request	Analysis	Plan (Replacement/supplimentary)	Plan (Newly Procured)	No. of Existing Equipment	Planned Q'ty	Request	Analysis	Plan (Replacement/supplimentary)	Plan (Newly Procured)	No. of Existing Equipment	Planned Q'ty	Request	Analysis	Plan (Replacement/supplimentary)	Plan (Newly Procured)	No. of Existing Equipment	Planned Q'ty	Request	Analysis	Plan (Replacement/supplimentary)	Plan (Newly Procured)	No. of Existing Equipment	Planned Q'ty
1	CT Scanner	1																														
2	Ultrasound machine	1																									1	◎①(a)	1		1	1
3	Gastroscope	7																														
4	Duodenoscope	2																														
5	Colonoscope	6																														
6	Bronchoscope (flexible)	3																														
7	Bronchoscope(rigid)	0																														
8	Laparoscope	2																														
9	Defibrillator	4	4	◎①(a)	4		5	4																								
10	Ventilator	8							6	◎①(a)	6		15	6	1	◎①(a)	1		1	1							1	○②(a)		1		1
11	Instrument set for microsurgery	2													2	◎○②(a)	1	1	1	2												
12	Arthroscope	1													1	●②(a)		1	1	1												
13	Autoclave	2	1	◎①(a)	1		2	1																			1	◎①(a)	1		2	1
14	Automatic biochemical analyzer	1																			1	●②(c)		1	1	1						
15	Immuno analyzer	1																			1	○②(c)	1			1						
16	Ambulance	4																									4	◎①(a)	4		6	4
17	Polysomnographic machine	1																														

Criteria for equipment selection

Study in supply aspect	Study in demand aspect	Technical study
◎ : Urgent renewal is called for. ○ : Urgent replenishing is called for. ● : Procurement is planned anew. X : Necessity of procurement is not recognized.	① : Function deteriorated due to obsoleteness, etc. ② : Quantitative shortage due to expanded medical service activities. ③ : New medical service activities are planned. ④ : Existing equipment is enough. ⑤ : Other equipment can be used. ⑥ : Procurement is possible through self-efforts.	a : Operation is possible at the current technical level. b : Since the equipment specifications are different from those of the existing equipment (enhanced function), initial guidance by experts is required. c : On-the-job training is required when the equipment is installed.

New Yangon General Hospital

No	Name of Equipment	Total	OT						RAD						ICU						MW						SW					
			Request	Analysis	Plan (Replacement/supplimentary)	Plan (Newly Procured)	No. of Existing Equipment	Planned Q'ty	Request	Analysis	Plan (Replacement/supplimentary)	Plan (Newly Procured)	No. of Existing Equipment	Planned Q'ty	Request	Analysis	Plan (Replacement/supplimentary)	Plan (Newly Procured)	No. of Existing Equipment	Planned Q'ty	Request	Analysis	Plan (Replacement/supplimentary)	Plan (Newly Procured)	No. of Existing Equipment	Planned Q'ty	Request	Analysis	Plan (Replacement/supplimentary)	Plan (Newly Procured)	No. of Existing Equipment	Planned Q'ty
1	CT Scanner	1							1	○②(b)		1	1	1																		
2	Anesthesia machine with ventilator	5	5	◎○①(a)	4	1	4	5																								
3	Diathermy	4	4	◎①(a)	4		4	4																								
4	Patient monitor	23	5	◎○①(a)	4	1	4	5							6	◎①(a)	6		6	6	6	◎○①(a)	6		2	6	4	◎①(a)	4			4
5	Power Generator	1																														
6	Laparoscope	2																									1	◎①(a)	1			1
7	Defibrillator	8													2	◎○①(a)	1	1	1	2	2	◎○①(a)	2		2	2	2	◎○①(a)	2			2
8	X-ray machine (digital, general)	1							1	◎①(b)	1		2	1																		
9	Safety cabinet	1																														
10	Ventilator	7													6	◎①(a)	6		2	6												
11	Laser machine for urology	1																														
12	Operation table	4	4	◎①(a)	4		4	4																								
13	Refrigerator (blood bag)	1																														
14	Blood gas analyzer	1													1	◎①(a)	1		1	1												
15	Oxygen concentrator	8																			6	◎○①(a)	6		2	6	2	◎○①(a)	2		2	2
16	Syringe pump	20													6	◎●①(a)	3	3	3	6	10	◎○①(a)	10		2	10	4	◎○①(a)	4		2	4
17	Infusion pump	18													6	◎●①(a)	3	3	3	6	6	◎○①(a)	6		1	6	6	◎○①(a)	6		1	6
18	Microtome (Rotary type)	1																														
19	Ultrasound machine (Doppler)	1							1	○②(a)	1		1	1																		
20	MRI	1							1	◎①(b)	1		1	1																		
21	Choledocoscope	1																									1	●③(a)		1		1
22	Video Laryngoscope (New request)	1	1	●③(a)		1		1																								

No	Name of Equipment	Total	PW						LAB						URO						OTH					
			Request	Analysis	Plan (Replacement/supplimentary)	Plan (Newly Procured)	No. of Existing Equipment	Planned Q'ty	Request	Analysis	Plan (Replacement/supplimentary)	Plan (Newly Procured)	No. of Existing Equipment	Planned Q'ty	Request	Analysis	Plan (Replacement/supplimentary)	Plan (Newly Procured)	No. of Existing Equipment	Planned Q'ty	Request	Analysis	Plan (Replacement/supplimentary)	Plan (Newly Procured)	No. of Existing Equipment	Planned Q'ty
1	CT Scanner	1																								
2	Anesthesia machine with ventilator	5																								
3	Diathermy	4																								
4	Patient monitor	23	2	●③(a)		2		2																		
5	Power Generator	1																			1	○②(a)	1		1	1
6	Laparoscope	2													1	●③(a)		1		1						
7	Defibrillator	8	2	○②(a)	2		1	2																		
8	X-ray machine (digital, general)	1																								
9	Safety cabinet	1							1	◎①(a)	1		1	1												
10	Ventilator	7	1	●③(a)		1		1																		
11	Laser machine for urology	1													1	●③(a)		1		1						
12	Operation table	4																								
13	Refrigerator (blood bag)	1							1	◎①(a)	1		1	1												
14	Blood gas analyzer	1																								
15	Oxygen concentrator	8																								
16	Syringe pump	20																								
17	Infusion pump	18																								
18	Microtome (Rotary type)	1							1	◎①(a)	1		1	1												
19	Ultrasound machine (Doppler)	1																								
20	MRI	1																								
21	Choledocoscope	1																								
22	Video Laryngoscope (New request)	1																								

Abbreviation	Facility, unit, department name
YGH	Yangon General Hospital
RAD	Radiological and Image Diagnosis
GI	Gastroenterology
CM	Chest Medicine
CS	Chest Surgery
GSU	General Surgert
MOT	Main Operation Room
ICU	Intensive Care Unit
ORT	Orthopedics
LAB	Laboratory
EM	Emergency
NYGH	New Yangon General Hospital
OT	Operation Theater
RAD	Radiological and Image Diagnosis
ICU	Intensive Care Unit
MW	Medical Ward
SW	Surgical Ward
PW	Paying Ward
LAB	Laboratory
URO	Urology
OTH	Others

Criteria for equipment selection

Study in supply aspect	Study in demand aspect	Technical study
◎ : Urgent renewal is called for. ○ : Urgent replenishing is called for. ● : Procurement is planned anew. X : Necessity of procurement is not recognized.	① : Function deteriorated due to obsoleteness, etc. ② : Quantitative shortage due to expanded medical service activities. ③ : New medical service activities are planned. ④ : Existing equipment is enough. ⑤ : Other equipment can be used. ⑥ : Procurement is possible through self-efforts.	a : Operation is possible at the current technical level. b : Since the equipment specifications are different from those of the existing equipment (enhanced function), initial guidance by experts is required. c : On-the-job training is required when the equipment is installed.