REPUBLIC OF THE UNION OF MYANMAR
MINISTRY OF HEALTH

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

FEBRUARY, 2013

JAPAN INTERNATIONAL COOPERATION AGENCY

INTERNATIONAL TOTAL ENGINEERING CORPORATION

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PREFACE

Japan International Cooperation Agency (JICA) decided to conduct the preparatory survey and entrust the survey to International Total Engineering Corporation.

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, 2013

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") is located in the Indochina Peninsula, accounting its land area of 676,578 ㎢, which equivalents to 1.8 times larger than Japan's total land area. Myanmar shares borders with China, Laos, Thailand, Bangladesh and India, and its coast line 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 vertically through the center of Myanmar's land, and its mouth foams a broad delta area. Myanmar is a long land extending from north to south, and the northern area is the temperate zone, the middle area is the subtropical zone and the southern area is the tropical zone. Yangon is located in the delta zone facing to the ocean, and Mandalay is located in the central plain both belong to the subtropical zone. The total population of Myanmar as of 2010 was reported to be 62,400 thousand (2011, Government of Myanmar, estimated by IMF), and the under-15 population accounts for one-third of the total population.

GDP per capita of Myanmar in 2009 was reported to be 832 dollars per person (2011,IMF), and Myanmar is classified as a Least Developed Country (LDC) according to the national income level classification of the United Nations and the World Bank. Myanmar is abundant in socio-economic resources, especially showing strength in export of natural gas and other natural resources, and reserve of cheap labor. However, despite of its socio-economic capability, Myanmar's economic growth was limited due to the socialistic policy and closed economy dating back to 1962. In 1988, the government of Myanmar declared the transition to free economy, and Myanmar's economy showed favorable growth since 1992. Through occasional economic depression such as the Asian Currency Crisis in 1997 and the Global Recession of 2008, Myanmar again expects dramatic socio-economic development in the recent years. Beginning with the general election held in 2010, a democracy activist Aung San Suu Kyi was released from house arrest, and followed by the dissolution of the military government in March 2011, the Thein Sein civilian administration was newly established, which delivers the transition to civilian rule. Recently, internal Myanmar economy meets rapid change to democratization, open economy, and international trade climate, and Myanmar introduced a managed float system in April 2012, for a uniformed exchange rate. Myanmar's traditional trade partners are China, Thailand, South Korea, Singapore, Malaysia and other neighboring countries, receiving investments in natural gas and other resource development. Plus, other new countries are interested in the recent socio-economic transformation of Myanmar, and numbers of aid plan and investment plan for Myanmar is currently in progress by many other foreign governments.

(2) Background, Course, and the Outline of the Request for Grant Aid

The major causes of death in Myanmar in 2008 were infectious disease / parasitic insect (26.7%), cardiovascular diseases (16.2%), and trauma / intoxication / unexpected accident (10.5%), according to the governmental health statistics issued in 2008. For major health indicators, Myanmar showed comparatively good immunization coverage rate and prenatal checkup coverage rate; however under-five mortality rate and maternal mortality rate remain high.

Under this situation, the government of Myanmar formulated its mid-term health development plan called as the "National Health Plan 2006-2011" (hereafter referred to as "NHP"). Also the "Hospital Care Program" which aims for quality improvement of hospital health services was established under the scheme of NHP, and it promotes increase of hospital beds, improvement of health service performance, reduction of in-hospital death rate and other health activities. However, due to the limited health budget resulted from tight national government finance, the achievements of goals of the Hospital Care Program are limited.

Health sector of Myanmar is roughly divided into upper Myanmar centering Mandalay and lower Myanmar centering Yangon, and each region sets top referral hospitals for severe patients referred from lower hospital of each region. Top referral hospitals in upper Myanmar are Mandalay General Hospital, Central Women's Hospital in Mandalay and Mandalay Children Hospital (New), and top referral hospitals in lower Myanmar are Yangon General Hospital, New Yangon General Hospital, Central Women's Hospital in Yangon and Yangon Children Hospital. However, due to the obsoleteness and frequent technical failure of medical equipment, these top referral hospitals are difficult to provide quality health services for severe patients. Also medical equipment maintenance system for safety and long-term use is not operated at a favorable level, and training specialized engineers is urgently requested.

Under such background, the government of Myanmar requested provision of medical equipment which targets these top referral hospitals, to improve the quality of health services at these concerned hospitals. Through the procurement of concerned medical equipment, it is expected to promote quality improvement of third level health services in upper Myanmar and lower Myanmar, as well as smooth acceptance system of severe patients and stable referral system.

Among the requested target hospitals, this present Project will supply medical equipment for five prioritized hospitals: Mandalay General Hospital, Central Women's Hospital in Mandalay, Mandalay Children Hospital, Central Women's Hospital in Yangon and Yangon Children Hospital.

(3) Outline of the Survey and the Contents of the Project

In response to the request described above, the government of Japan decided on the implementation of the Preparatory Survey (Outline Design), and Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched a Preparatory Survey Team to Myanmar for 45 days from July 8 to August 21, 2012. After coming back to Japan, the Survey Team compiled a Draft Report based on the analysis of the findings in Myanmar and conducted an explanation of the Draft Report for 14 days from December 9 to 22, 2012, to explain the contents of the report to and have discussion with the Myanmar counterparts.

The equipment to be procured under the requested assistance project was designed with consideration given to the positioning of the target hospitals, the status quo of existing equipment, activities performed in existing and related facilities, technical levels, financial capacity, and so forth, so as to choose equipment that is consistent with the activities of the target hospitals, and to confirm the relevance of the soft component contents. The table below shows the major equipment planned under the Project.

Table i-1　Outline of the Major Equipment

Category	Equipment Name	Purpose of Use	Qty.	MG	MW	MP	YW	YP
Image Diag-nostics	CT	For operating image diagnosis of whole body scan.	2	2				
	Ultrasound machine (adult)	For image diagnosis of abdominal organs, superficial sites and obstetrics and gynecological examination.	8	3	3		2	
	Ultrasound machine (pediatric)	For image diagnosis of abdominal organs, superficial sites, heart area and other pediatric examination for pediatric populations.	3			1		2
	Ultrasound machine (neonate, color doppler, heart+ abdomen+ superficial)	For image diagnosis of abdominal organs, superficial sites and other examination for neonatal.	1		1			
	X-ray machine (C-arm, fluoroscopy)	For operation which requires fluoroscopy examination during operation, such as orthopedic operation and urological operation.	3	3				
	X-ray machine (fluoroscopy)	For performing fluoroscopy examination using a contrast agent.	2		1	1		
	X-ray machine (general, digital)	For general X-ray image diagnosis of four limbs or chest-abdominal area.	1					1
	X-ray machine (mobile)	For emergent and simple X-ray image diagnosis operated for patients having difficulty with body movement or positioning, at operation theater, ICU and patient ward.	2	2				
	X-ray machine (mobile, digital)	For emergent and simple X-ray image diagnosis operated for patients having difficulty with body movement or positioning, at operation theater, ICU and patient ward.	1					1
Patient Monitor	Central monitor	For operating continuous unified monitoring of multiple patients' biological information.	3	3				
	Patient monitor (adult)	For monitoring patient's biological information continuously.	49	28	21			
	Patient monitor (pediatric)	For monitoring pediatric patient's biological information continuously.	47		5	10	5	27
Perinatal	Cardiotocograph	For monitoring heart rate of fetus and transition of labor and maternal body during delivery.	10		10			
	Infant care center	For treating premature neonate and neonate with disorder under appropriate temperature and humidity.	10		5	2	3	
	Infant incubator (manual)	For treating premature neonate and neonate with disorder under appropriate temperature and humidity, until becoming adaptive to live in a normal environment.	14			4	10	

Category	Equipment Name	Purpose of Use	Qty.	MG	MW	MP	YW	YP
Perinatal	Infant incubator (manual/servo)	For treating premature neonate and neonate with disorder under appropriate temperature and humidity, until becoming adaptive to live in a normal environment.	20		7	13		
Operation Theater	Anaesthesia machine with ventilator (adult)	For giving full anesthesia for patients at the time of operation.	7		5		2	
	Anaesthesia machine with ventilator (pediatric)	For giving full anesthesia for patients at the time of operation.	3					3
	Autoclave (horizontal)	For sterilizing surgical instrument and linens by high-pressure steam.	2					2
	Autoclave (vertical, large)	For sterilizing surgical instrument and linens by high-pressure steam.	2		1	1		
	Ceiling lamp (double head)	For providing proper lighting which avoids obstacles, with enough brightness and correct color during major operation.	3					3
	Defibrillator (adult)	For restoring heart movement by delivering an electrical shock.	2	2				
	Defibrillator (pediatric)	For restoring heart movement by delivering an electrical shock.	4			2		2
	Instrument set for abdominal surgery (pediatric)	Metallic surgical instruments for open abdominal surgery.	1			1		
	Instrument set for thoracic surgery (adult)	Metallic surgical instruments for open chest surgery.	2	2				
	Operation table (motorized, neuro surgery)	For fixing patient's body in an appropriate position for various operation.	1	1				
	TURP set	A set of metallic surgical instruments, for prostatectomy surgery.	1					
	Laparoscope (adult)	A set of rigid scope for endoscopic operation of abdominal cavity.	5	2	1		2	
	Laparoscope (pediatric)	A set of rigid scope for endoscopic operation of abdominal cavity.	1			1		
	Operation table (manual)	For fixing patient's body in an appropriate position for various operation.	10		8		2	
	Operation table (motorized)	For fixing patient's body in an appropriate position for various operation.	3	3				
	Sternal Saw	For splitting the breastbone for open chest surgery.	1	1				
ICU	Ventilator (adult)	For breathing support of adult patients having difficulty with spontaneous respiration at ICU.	9	4	3		2	
	Ventilator (pediatric)	For breathing support of pediatric patients having difficulty with spontaneous respiration at ICU.	4			1		3
	Ventilator (neonatal)	For breathing support of neonatal patients having difficulty with spontaneous respiration at ICU.	7		2	2	2	1

Category	Equipment Name	Purpose of Use	Qty.	MG	MW	MP	YW	YP
ICU	Ventilator (transportation)	For breathing support of adult patients having difficulty with spontaneous respiration at ICU.	1	1				
Endoscope	Bronchoscope (adult, flexible)	For diagnosis of lung cancer, lung tuberculosis and other lung and bronchial diseases.	2	2				
	Bronchoscope (pediatric, flexible)	For diagnosis of lung cancer, lung tuberculosis and other lung and bronchial diseases.	1					1
	Colonoscope	For diagnosis and treatment of colonic disorder.	1	1				
	Colposcope with monitor	For perineal and vaginal diagnosis provided at obstetrics and gynecology department.	1				1	
	Duodenoscope	For diagnosis of stomach and duodenum, and contrast-enhanced diagnosis of biliary tract and pancreatic duct from the opening of duodenum.	1	1				
	Gastroscope	For diagnosis of disorder at esophagus, stomach and duodenum.	1	1				
	Hysteroscope (flexible)	For diagnosis of uterus disorder.	1				1	
	Hysteroscope (rigid)	For treatment of endometriosis or removal of uterus fibroid at gynecological operation.	3		2		1	
	Sigmoidoscope (pediatric, flexible)	For diagnosis of colon through rectum.	1			1		
	Ureteroscope	For diagnosis of ureter.	1	1				
Laboratory	Automatic chemistry analyzer	For measuring various enzymes extracted from blood plasma which describes organ function, as well as carbohydrate and lipid items in the blood.	1			1		
	Automatic stainer	Equipment which performs automated deparaffinization, hematoxylin-eosin stain, and Papanicolaou stain of a smear sample to a paraffin section placed on a slide glass.	1			1		
	Blood culture system	For cultivation of pathogenic germs in blood, and specify the bactreial species and effective antibiotic drug.	1	1				
	Automatic blood culture and antibiotic susceptibility system	For cultivation of pathogenic germs in blood, and specify the bactreial spesies and effective antibiotic drug.	1	1				
	Centrifuge (blood bag, type A)	For centrifugal separation of blood bags into blood cell and blood plasma.	2	2				
	Centrifuge (blood bag, type B)	For centrifugal separation of blood bags into blood cell and blood plasma.	1		1			
	Electrophoresis (hemoglobin)	For diagnosis of clinical condition, by electrophoresis fraction of serum protein and hemoglobin.	1					1
	Microscope with camera and monitor	For observing microscopic image of cell tissue by multiple physicians. Also for training of medical students by displaying the microscopic image on a monitor.	3		1	1		1

Category	Equipment Name	Purpose of Use	Qty.	MG	MW	MP	YW	YP
Laboratory	Safety cabinet	For preventing emigration of pathogenic germs when examining pathogenic samples.	1		1			
	Spectrophotometer	For diagnosis and research use, by quantitative measurement of samples and spectrum measurement.	1		1			
	Tissue processor	Equipment with necessary specification for dehydration of samples and paraffin embedding.	1			1		
Physio-logical Function Testing	ECG machine (holter)	For diagnosis of transient arrhythmia and angina.	1					1
	ECG machine (stress test system)	For definite diagnosis of effort angina and its seriousness, and rehabilitation of heart.	1	1				
	EEG machine	For diagnosis of function disorder of the central nerve, such as epilepsy, brain tumor and damaged brain blood vessel.	1					1
	Urodynamic measuring machine	For identifying the cause of urination disorder.	2		1		1	
Dialysis	Hemodialysis machine (adult)	For performing dialysis for adult patients with renal disorder.	2	2				
	Hemodialysis machine (pediatric)	For performing dialysis for pediatric patients with renal disorder.	1					1

Abbreviation of the Hospital Name

MG: Mandalay General Hospital

MW: Central Women's Hospital in Mandalay

MP: Mandalay Children Hospital

YW: Central Women's Hospital in Yangon

YP: Yangon Children Hospital

(4) Implementation Schedule and Cost Estimation

Assuming that this project is to be carried out under Japan's grant-aid assistance scheme, the total implementation period will require approximately 19.7 months, consisting of approximately 8.0 months for detailed design and approximately 11.7 months for equipment procurement.

Cost to be borne by Myanmar will be about 160 million kyats (approximately 14.7 million yen).

(5) Project Evaluation

1) Relevance

From the following considerations, it is considered that this Project is relevant for implementation as an assistance project with Japan's Grant Aid fund.

■ This Project will make a practical contribution to the quality improvement of hospital care

services mentioned in the “Quality of Health Care Services in Hospital Project” of “Hospital Care Program”, which was developed through the formulation of Myanmar’s upper health plan called as the “National Health Plan 2006-2011”, through procurement of medical equipment.

- By procuring necessary medical equipment for top referral hospitals of upper Myanmar: Mandalay General Hospital, Central Women’s Hospital in Mandalay, and Mandalay Children Hospital, and top referral hospitals of lower Myanmar: Central Women’s Hospital in Yangon and Yangon Children Hospital, this Project will provide benefits of advanced health services for people living in broader Myanmar.

- By improving third referral health services of Myanmar, this Project will assist establishment of proper referral system in upper and lower Myanmar, and encourage creation of a stable referral system for serious patients.

- Planned equipment of this Project will be selected through careful considerations including terms such as conditions of existing equipment and facility, current level of medical technique, operational and maintenance ability of each hospital, and others. Planned equipment of this Project does not associate with extremely high operational technique, and local agent are able to provide technical maintenance within Myanmar.

- With additional training on maintenance provided as a soft component, procured medical equipment of this Project will be able to operate under expected safety and long-term use.

2) Effectiveness

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

2)-1 Quantitative Effectiveness

Table i-2 Mandalay General Hospital, Quantitative Effectiveness

Indicator	Criterion Value (2011)	Target Value (2017) (3 years after project completion)
Operation (case/year)	11,631	12,266
X-ray examination (case/year)	41,422	45,742
CT examination (case/year)	3,081	7,200
Ultrasound examination (case/year)	11,751	12,565
Clinical examination (case/year)	123,430	140,869

Table i-3　Central Women's Hospital in Mandalay, Quantitative Effectiveness

Indicator	Criterion Value (2011)	Target Value (2017) (3 years after project completion)
Operation (case/year)	4,298	4,552
Delivery (case/year)	5,750	5,840
SCBU patients (person/year)	1,678	2,185
Ultrasound examination (case/year)	4,836	9,316
X-ray examination (case/year)	1,307	1,767
Clinical examination (case/year)	9,988	12,283

Table i-4　Mandalay Children Hospital, Quantitative Effectiveness

Indicator	Criterion Value (2011)	Target Value (2017) (3 years after project completion)
Operation (case/year)	930	2,153
ICU patients (person/year)	187	433
Ultrasound examination (case/year)	664	1,537
X-ray examination (case/year)	1,841	4,262
Clinical examination (case/year)	10,401	24,081

* The criterion value (2011) is the data from January 2011 to June 2011.

Table i-5　Central Women's Hospital in Yangon, Quantitative Effectiveness

Indicator	Criterion Value (2011)	Target Value (2017) (3 years after project completion)
Operation (case/year)	9,559	9,787
Ultrasound examination (case/year)	7,495	7,733
Clinical examination (case/year)	165,124	169,017

Table i-6　Yangon Children Hospital, Quantitative Effectiveness

Indicator	Criterion Value (2011)	Target Value (2017) (3 years after project completion)
Operation (case/year)	4,089	4,734
X-ray examination (case/year)	11,312	13,095
Ultrasound examination (case/year)	5,177	5,993

2)-2　Qualitative Effectiveness

By effective utilization of medical equipment at top referral hospitals in upper Myanmar: Mandalay General Hospital, Central Women's Hospital in Mandalay and Mandalay Children Hospital,

accurate diagnosis and appropriate treatment will be provided and this will improve the quality of health services in upper Myanmar.

Also by effective utilization of medical equipment at top referral hospitals in the lower and entire Myanmar: Central Women's Hospital in Yangon and Yangon Children Hospital, accurate diagnosis and appropriate treatment will be provided and this will improve the quality of perinatal and pediatric health services in the lower and entire Myanmar.

In addition, following effects are expected by the procurement of newly planned equipment.

At Mandalay General Hospital, by the new introduction of blood culture system and automatic blood culture and antibiotic susceptibility system, examination on bacterial infection and diagnosis for appropriate medicines will be improved.

At Central Women's Hospital in Mandalay and Central Women's Hospital in Yangon, by the new introduction of urodynamic measuring machine, gynecological and urological examination of bladder and ureter will be newly operated.

At Central Women's Hospital in Mandalay and Mandalay Children Hospital, by the new introduction of X-ray machine (fluoroscopy), fluoroscopy examination will be newly operated.

By implementation of soft component, the maintenance system of medical equipment will be reinforced.

Upon consideration of all the examination above, the relevance of this Project is high, and the effectiveness of this Project is prospective.

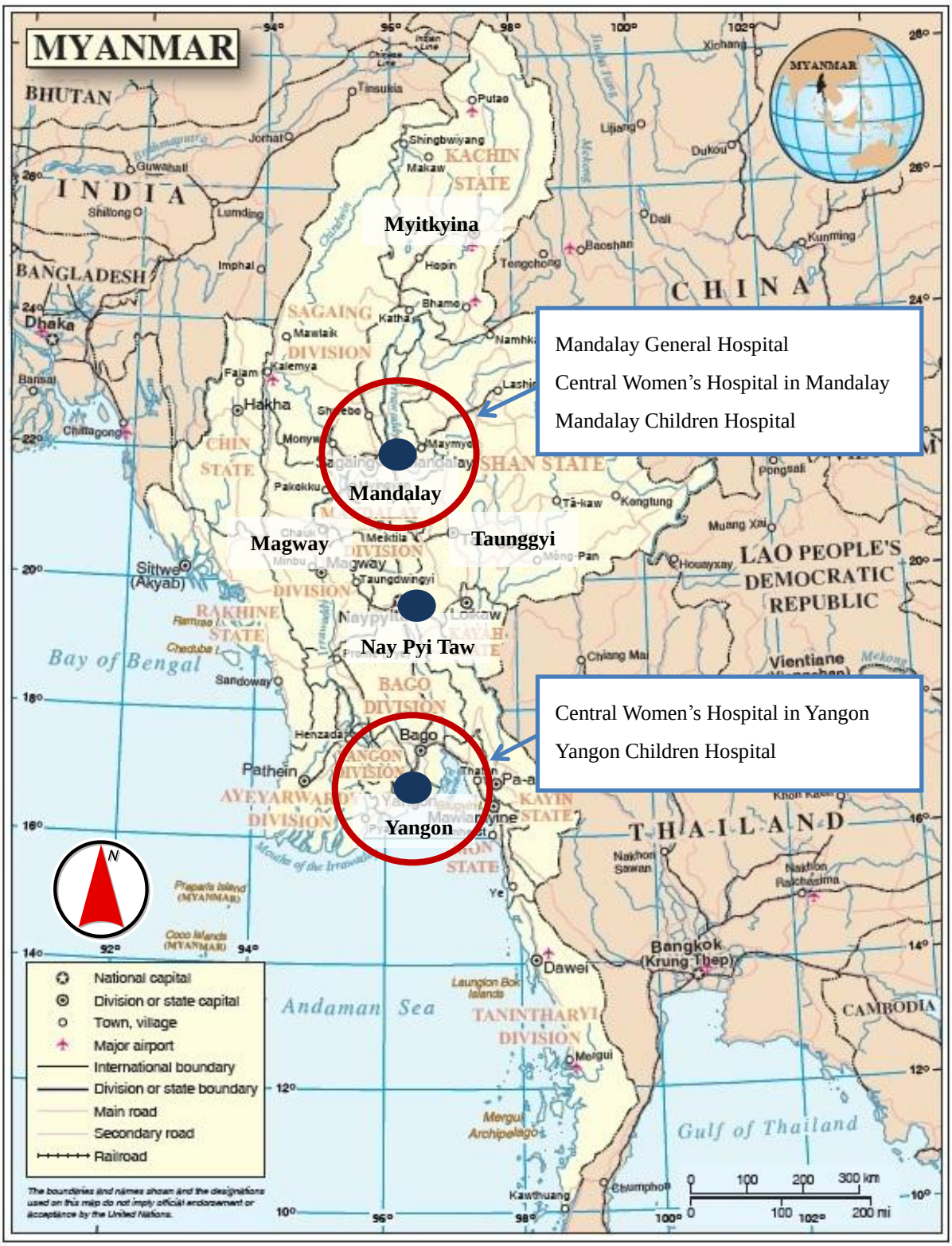
Contents

Chapter 3 Project Evaluation

［Appendices］

Location Map

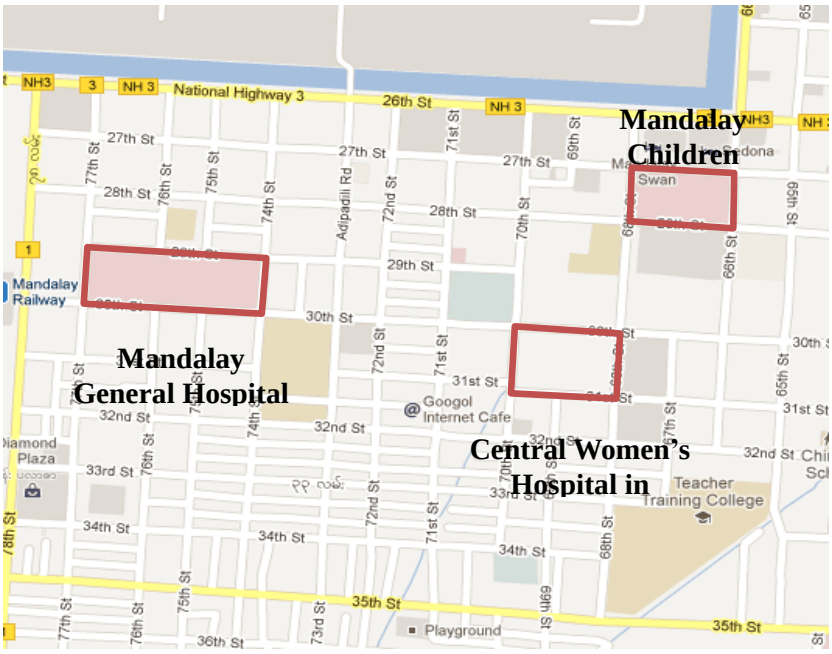
(1) Project Sites in Myanmar



Source: Map No. 4168 Rev.3 UN June 2012

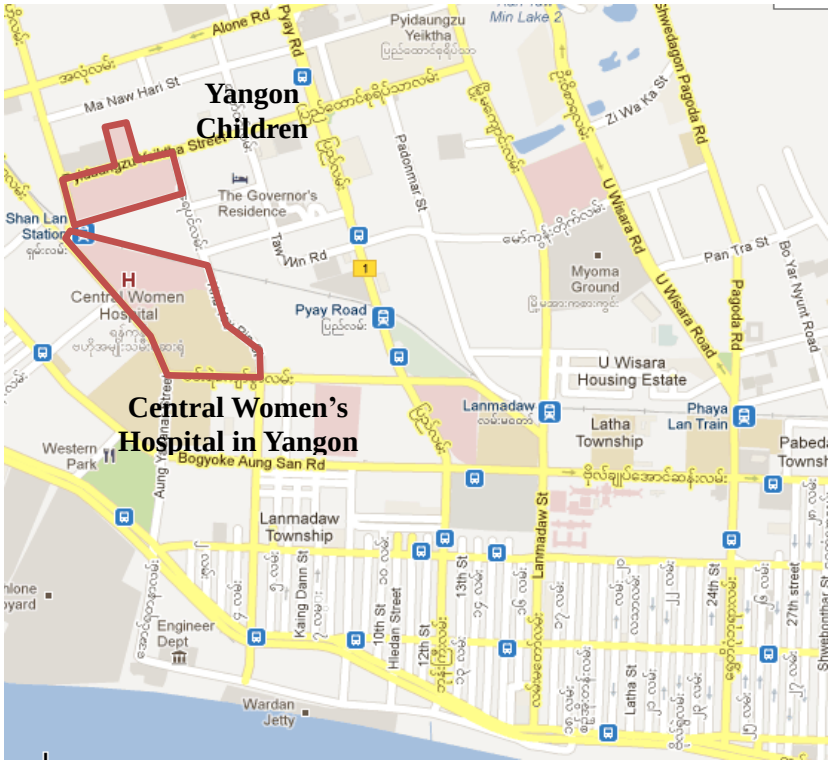
(2) Location Map of Project Sites

1) Mandalay



Source: Google map

2) Yangon



Source: Google map

List of Figures and Tables

Abbreviations

Abbreviation	Original Name
AVR	Automatic Voltage Regulator
BME	BioMedical Engineering
BS	British Standard
CCU	Coronary Care Unit
CMSD	Central Medical Store Depot
COPD	Chronic Obstructive Pulmonary Disease
CRP	C-Reactive Protein
CT	Computed Tomography
CVP	Central Venous Pressure
DIN	Deutsche Industrie Normen
E/N	Exchange of Notes
ERCP	Endoscopic Retrograde CholangioPancreatography
ETCO2	End Tidal Carbon Dioxide
G/A	Grant Agreement
GDP	Gross Domestic Product
HDU	High Dependency Unit
IBP	Invasive Blood Pressure
IMF	International Monetary Fund
JICA	Japan International Cooperation Agency
JIS	Japan Industrial Standard
LDC	Least Developed Country
M/D	Minutes of Discussion
MOH	Ministry Of Health
MRI	Magnetic Resonance Imaging
N/A	Not Applicable
NHP	National Health Plan
NIBP	Non-Invasive Blood Pressure
NICU	Neonatal Intensive Care Unit
OBGY	Obstetric and Gynecology
ODA	Official Development Assistance
OT	Operation Theater
PRP	Platelet Rich Plasma
RO	Reverse Osmosis
SCBU	Special Care Baby Unit
SCR	Special Care Room
SPO2	Saturation of Peripheral Oxygen
TTI	Transfusion Transmitted Infection
TTS	Telegraphic Transfer Selling
TURP	TransUrethral Resection of the Prostate
UL	Underwriters Laboratories
UPS	Uninterrupted Power Supply
US	UltraSound
USD	United States Dollar
WHO	World Health Organizaton
WMO	World Meteorological Organization

Chapter 1 Background of the Project

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1-1 Background, Course, and the Outline of the Request for Grant Aid

The three most common cause of death in Myanmar in 2008 were infectious disease / parasitic insect (26.7%), cardiovascular diseases (16.2%), and trauma / intoxication / unexpected accident (10.5%), according to the governmental health statistics. For major health indicators, Myanmar showed comparatively good immunization coverage rate and antenatal examination visit rate; however under-five mortality rate and maternal mortality rate remain high.

Under this situation, the government of Myanmar formulated its mid-term health development plan called as the "National Health Plan 2006-2011" (hereafter referred to as "NHP"). Also the "Hospital Care Program" which aims for quality improvement of hospital health services was established under the scheme of NHP, and it promotes increase of hospital beds, improvement of health service performance, reduction of in-hospital death rate and other health activities. However, due to the limited health budget resulted from tight national government finance, the achievements of goals of the Hospital Care Program are limited.

Health sector of Myanmar is roughly divided into upper Myanmar centering Mandalay and lower Myanmar centering Yangon, and each region sets top referral hospitals for severe patients referred from lower hospital of each region. Top referral hospitals in upper Myanmar are Mandalay General Hospital, Central Women's Hospital in Mandalay and Mandalay Children Hospital, and top referral hospitals in lower Myanmar are Yangon General Hospital, New Yangon General Hospital, Central Women's Hospital in Yangon and Yangon Children Hospital. However, due to the obsoleteness and frequent technical failure of medical equipment, these top referral hospitals are difficult to provide quality health services for severe patients. Also medical equipment maintenance system for safety and long-term use is not operated at a favorable level, and training specialized engineers is urgently requested.

Under such background, the government of Myanmar requested provision of medical equipment which targets these top referral hospitals, to improve the quality of health services at these concerned hospitals. Through the implementation of this Project, it is expected to promote quality improvement of third level health services in upper Myanmar and lower Myanmar, as well as smooth acceptance system of severe patients and stable referral system.

1-2 Natural Conditions

In Myanmar, northeast wind blows from the land to the Bay of Bengal during winter, and reversely southeast wind blows from the Bay of Bengal to the land during summer. From this effect, Myanmar experiences rainy season from May to October, and dry season from November to April. March to May is also the hot season, and the air temperature rises to more than 35 degrees. In Yangon, hot and humid southwest air from the Bay of Bengal raises precipitation rate, which reaches to annual precipitation rate of 2,700mm and humidity rate during rainy season to 70-80%. This southwest wind later reaches Rakhine Mountains, and this brings out the foehn phenomenon at the central plain area. From this phenomenon, Mandalay's air temperature is 3-4 degrees higher compared to the delta area,

but the humidity is slightly lower. Also, Mandalay is a unique subtropical area with less rain, only receives monthly precipitation day of less than 10 days, and annual precipitation rate of 850mm.

Table 1-1 Weather Data of Mandalay City

	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Average Highest Temperature (℃)	28.6	32.1	35.8	38.4	36.8	34.2	34.3	32.3	33.1	32.2	30.2	28.2
Average Lowest Temperature (℃)	13.3	14.9	19.7	24.4	25.8	25.8	25.8	25.2	24.9	23.5	19.4	14.8
Precipitation (mm)	4.0	3.0	1.0	40.0	138.0	116.0	83.0	136.0	150.0	125.0	3.8	6.0
Number of Days of Precipitation (day)	0.4	0.4	0.4	3.3	8.3	7.2	5.9	8.7	8.1	6.8	2.8	0.7

Source: World Meteorological Organization (WMO) data, Average of 1961-1990

Table 1-2 Weather Data of Yangon City

	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Average Highest Temperature (℃)	32.2	34.5	36	37	33.4	30.2	29.7	29.6	30.4	31.5	32	31.5
Average Lowest Temperature (℃)	17.9	19.3	21.6	24.3	25	24.5	24.1	24.1	24.2	24.2	22.4	19
Precipitation (mm)	5.0	2.0	7.0	15.0	303.0	547.0	559.0	602.0	368.0	206.0	60.0	7.0
Number of Days of Precipitation (day)	0.2	0.2	0.4	1.6	12.6	25.3	26.2	26.1	19.5	12.2	4.8	0.2

Source: World Meteorological Organization (WMO) data, Average of 1961-1990

1-3 Environmental and Social Considerations

This Project will conduct hospital equipment procurement for existing health facilities, and is necessary to consider environmental effects and available methods of prevention on medical waste disposed through the use of procured equipment.

The Ministry of Health Myanmar formulated the "Hospital Management Manual" in 2011, which prescribes medical waste management and expected method of waste disposal. The process of disposal is regulated as segregation (by color of waste bin), in-hospital transfer, storage, non-infectious processing (sterilization, disinfection, purification etc.), and disposal (incineration, burying etc.), to promote environmentally-friendly hospital activities.

Categories for medical waste separation are as follows:

1) Non-hazardous waste
2) Hazardous waste
3) Infectious waste
4) Sharp waste
5) Chemical waste
6) Pathological waste
7) Pharmaceutical waste

8) Radioactive waste

Dedicated disposal boxes for used syringes and garbage bins for separation are arranged at the target hospitals, and health staffs are consciously operating medical waste separation. Currently, Yangon municipality or Mandalay municipality collect separated medical waste on routine basis, also incineration and burying of the waste. In the meantime, radioactive medical equipment requested for this Project are expected to be digital type as a rule, which does not require chemical agents such as developer or fixer, thus environmental effects through the implementation of this Project is expected to be low.

Chapter 2 Contents of the Project

Chapter 2 Contents of the Project

2-1 Basic Concept of the Project

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

The Ministry of Health of the Republic of the Union of Myanmar (hereafter referred to as the "MOH") formulated its upper health development plan called as the "Myanmar Health Vision 2030" in 2000, to set a long-term goal and work for improvement of nation's health, as well as expansion and quality improvement of health service in Myanmar.

The three most common diseases (inpatients) in Myanmar during 2005 to 2009 are infectious disease/parasitic insect, pregnancy/delivery, and trauma/intoxication. These diseases comprise about 50% of total disease composition. Meanwhile, non-communicable diseases such as cancer are becoming common, which indicates the transition of disease composition and the need for improvements in diagnostic techniques. For death causes, infectious disease is always the most common death cause, and is still on increasing tendency. Diseases of cardiovascular organs, digestive organs, and malignant neoplasms follow after infectious disease, which raises the need for measures on non-infectious diseases.

Under this situation, the Ministry of Health developed the "Hospital Care Program" as a part of National Health Plan 2006-2011. This program aims for quality improvement of hospital health services, through implementing the "Project for Quality Improvement of Hospital Services" which promotes increase of hospital beds per 100,000 populations, improvement of operation indicators of health facilities, and reduction of in-hospital death rate.

Health sector of Myanmar is roughly divided into upper Myanmar centering Mandalay and lower Myanmar centering Yangon, and each region establishes first to third referral system within the region. However, top referral hospitals in Mandalay and Yangon, which are expected to provide treatment for severe patients, faces chronic issues such as obsolete health facilities or lack of medicines and medical equipment. These factors prevent provision of quality health services.

Under these conditions, this Project aims to improve the third level health services of upper Myanmar and lower Myanmar.

2-1-2 Outline of the Project

This Project aims at the achievement of above-mentioned objective, through supplying medical equipment for Mandalay General Hospital, Central Women's Hospital in Mandalay, Mandalay Children Hospital, Central Women's Hospital in Yangon and Yangon Children Hospital. Through the implementation of this Project, improvements are expected in third level health services of upper Myanmar and lower Myanmar, and also the establishment of a stable referral system for severe patients.

This Project will supply medical equipment for five prioritized hospitals: Mandalay General Hospital, Central Women's Hospital in Mandalay, Mandalay Children Hospital, Central Women's Hospital in Yangon and Yangon Children Hospital.

2-2 Outline Design of the Japanese Assistance

2-2-1 Design Policy

(1) Basic Policy

Development of the equipment plan shall be based on the comprehensive consideration of the position of each target hospital, the condition of existing equipment, technical skill levels, financial capability, the activities of existing and related facilities, the availability of consumables and spare parts, and other factors. The planned equipment shall comprise the items that are consistent with the activities of the target hospitals, and are capable of continuous maintenance.

1) Target Facilities

Requested hospitals for this Project were seven at first, however due to the budgetary constraints of Japan side, this Project will select the following five hospitals as the target hospitals, in accordance with the Myanmar's proposed priority.

- Mandalay General Hospital
- Central Women's Hospital in Mandalay
- Mandalay Children Hospital
- Central Women's Hospital in Yangon
- Yangon Children Hospital

2) Description of Planned Equipment

This cooperation project will supply medical equipment that is necessary for healthcare activities of hospitals shown above. Equipment that are with weak provision system of maintenance / parts replacement / repair in Myanmar, unmet technical capability of target hospitals, and unavailability of manufacturers' agents providing technical maintenance services in Myanmar, will be excluded from this Project.

(2) Policy Concerning Natural Environmental Conditions

During the dry season from March to May, temperature rises to more than 35 degrees in Mandalay and more than 30 degrees in Yangon. During rainy season, humidity reaches to 70 to 80%, which exceeds recommended operating range of certain medical equipment, therefore radiological equipment, laboratory equipment, and equipment for operation shall be placed in an air-conditioned room.

(3) Policy Concerning Procurement

Procured equipment shall be Japanese or Myanmar product as a rule. However, some equipment manufactured in a third country with considerable benefits of maintenance and prevalence in Myanmar, could be included in this Project after the approval of the both government. Other equipment shall be procured under the consideration of benefits in timely delivery and costs for procurement.

For effective and long-term use of procured equipment, equipment which requires consumables,

spare parts, repair and routine check by manufacturer, shall be procured from manufacturers which has a local agent in Myanmar or neighbouring countries as a rule.

(4) Policy Concerning Operation and Maintenance

Maintenance of medical equipment shall be performed firstly by the engineers of each hospital, then secondly by the engineers of the Central Medical Store Department (hereafter referred to as "CMSD") under MOH, and then by the local agents of the manufacturers providing maintenance services. However, most maintenance is provided by local agents, because of the unavailability of engineers at target hospitals except Mandalay General Hospital and Central Women's Hospital in Yangon, and also because of insufficient supports from CMSD. For this reason, equipment that will require periodical repair and maintenance, shall be procured from manufacturers that are able to provide technical services in Myanmar or from neighboring countries.

(5) Policy Concerning the Grade, Specifications, Quantity, etc. of Equipment

The quantity of equipment shall be planned appropriately, through considerations on the number of concerned health workers, rooms, and equipment that is available for continuous use.

Certain quantity of consumables and spare parts shall be included in the procurement plan, for supplementing the initial needs until settling the procurement system in Myanmar.

Measured power supply in the target regions ranged from 191 to 222V, slightly lower than the nominal voltage of 220V. Variance of measured power supply was within 10V; however AVR and UPS are necessary for equipment which is vulnerable to voltage fluctuation or blackout.

(6) Policy Concerning Overall Schedule

The work schedule of this Project shall be defined appropriately according to the mechanism of Japan's grant-aid assistance.

The construction plans of target hospitals are shown below, and it is necessary to supervise the progress of each construction plan.

Table 2-1　Building Construction Plans of Target Hospitals

Hospital Name	Building Name	# of Floor	Expected Period of Completion	Progress as of December 2012
Mandalay General Hospital	Cardiovascular Bloc (Cardiac CCU)	5	End of January 2013	Finished construction of structure, currently internal construction and finishing construction are now on progress
	Six-storied New Ward (Renal unit, Gastro-intestinal unit)	6	October 2013	Currently demolition of existing flat building is on progress. Construction will start in January 2013
Central Women's Hospital in Mandalay	A Building (Patient Ward) (Bloc No.3)	3	Will open in the beginning of 2013	Finished construction of structure except elevator. Currently internal construction and finishing construction are now on progress
	B Building (Laboratory department) (New labor room, new operation theater)	3	Undecided, planned to open in 2013	Restarted construction of structure after distribution of MOH budget. Finished concrete placement of the first floor
Mandalay Children Hospital	Blood Bank	1	Undecided, about 1 month for construction	Under financial arrangements

Also, renovation work borne on Myanmar side which shall be completed before installation, are as follows.

Table 2-2　Renovation Work to be Borne on Myanmar Side

Hospital Name	Target Equipment	Construction
Mandalay General Hospital	CT (Emergency department)	Installation of X-ray control booth Radiation protection Air conditioning
	Hemodialysis machine (adult)	Plumbing construction Electric power constuction
Central Women's Hospital in Mandalay	X-ray machine (fluoroscopy), (Image diagnosis department)	Installation of X-ray control booth Radiation protection Air conditioning
	Autoclave (vertical, large) Autoclave (laboratory)	Plumbing construction Electric power constuction
Mandalay Children Hospital	X-ray machine (fluoroscopy), (Image diagnosis department)	Installation of X-ray control booth Radiation protection Air conditioning
	Autoclave (vertical, large)	Plumbing construction Electric power constuction
Yangon Children Hospital	X-ray machine (general) (Image diagnosis department)	Electric power distribution
	Autoclave (horizontal) Hemodialysis machine (pediatric)	Plumbing construction Electric power constuction

These construction plans and renovation work to be borne on Myanmar side are expected to be completed before the arrival of procured equipment.

3-2-2 Basic Plan

(1) General Plan

The equipment to be procured for this cooperation project will be for the departments enlisted below, and the plan shall meet each department's function and activity.

Table 2-3 Target Hospitals and Departments of the Project

Hospital Name	Department
Mandalay General Hospital	Image diagnosis department, blood bank, **cardiac unit**, operation theater, uro-surgical department, ICU, CCU, maxillofacial-traumatology department, **gastro-intestinal unit**, chest unit, laboratory department, **renal unit**, emergency department
Central Women's Hospital in Mandalay	Special care baby unit, obstetrics and gynecology ICU, image diagnosis department, pathology-blood bank, operation theater, **new operation theater**, labor room, **new labor room**, patient ward 1+2, **patient ward 3**, outpatient department
Mandalay Children Hospital	Operation theater, ICU, special care baby unit, image diagnosis department, **laboratory department**, surgical unit
Central Women's Hospital in Yangon	A bloc operation theater, C bloc operation theater, Obstetrics and gynecology, special care baby unit, uro-gynecology department, ICU, image diagnosis department
Yangon Children Hospital	Operation theater, medical unit, surgical unit, neonatal unit, cardiac unit, renal unit, hematology and oncology unit, laboratory department, emergency department, physiology department, ICU, image diagnosis department

* Departments which associate with hospital side construction plans are indicated in bold letters.

(2) Evaluation of the Requested Equipment

Based on the above-mentioned policies, the necessity and reasonableness of the requested equipment were studied in detail, and the overall decision was made as follows. The evaluation result for each type of equipment is summarized in Appendices 2: Examination of Requested Equipment.

1) Classification

Table 2-4 Classification of the Requested Equipment

Classification	Description
Renewal	Renewal of existing equipment
New	Newly requested equipment. The target facility has no experience in the relevant activity and has never used the equipment.
Additional	Equipment that is similar and is intended to supplement the existing equipment.

2) Selection Criteria

Table 2-5 Selection Criteria of the Equipment

Evaluation Items	Consideration Outline	
(1) Purpose of use	○	Equipment which matches the activity of the target facility.
	△	Equipment which simpler alternatives are available. Equipment which is expected to put more consideration through dividing / integrating the content of request.

Table 2-5　Selection Criteria of the Equipment

Evaluation Items	Consideration Outline	
	×	Equipment which does not match the activity of target facilities.
(2) Necessity	○	Equipment which is considered to be essential for the target facility's activity.
	×	Equipment which the necessity is low in view of the activity. Equipment which the existing equipment are able for continuous use. Equipment that are easy to procure in the recipient country.
(3) Technical level	○	Equipment which is appropriate for the present technical level.
	×	Equipment which requires advanced operation skills. Equipment which is difficult to develop necessary technical skills at present and in the future.
(4) Operation system	○	Staff members are assigned, or expected to be assigned, to operate the equipment.
	×	No staff member is expected to be assigned to operate the equipment.
(5) Maintenance system	○	Equipment whose maintenance is easy and can be managed by the members of the hospital staff. Equipment which the manufacturer has a maintenance system. Equipment which the consumable/spare parts can be procured locally.
	×	Equipment whose maintenance is difficult, and is likely to have maintenance-related problems after introduction. Equipment whose consumables / spare parts are difficult to be procured locally.
(6) Operation and maintenance cost	○	Equipment which hardly requires operation / maintenance cost or renewal, and does not burden the budget.
	×	New or additional equipment which requires high operation / maintenance cost are necessary, and may become a budgetary strain.
(7) Overall evaluation	○	Equipment which the request is considered to be appropriate, and will be included in the plan.
	×	Equipment which will be excluded from the plan.

(3) Major equipment and Considerations Outline

Evaluation results of major equipment requested from the target departments are described as follows.

1) Mandalay General Hospital

■ Image Diagnosis Department

In 2000, Shimadzu CT scanner was installed in image diagnosis department funded by the budget of MOH, however this CT scanner have been removed in 2010 because of bulb failure. Manufacturer's local agent described that the cost for repair will be USD 300,000, and the same failure might happen after repair because of obsoleteness. The hospital has abandoned the continuous use of CT scanner, and has already removed the concerned equipment. For this reason, one CT scanner for replacement of the concerned CT scanner is planned by this Project. In addition, this CT scanner will be installed at a room currently used as the CCU, which will be renovated as a CT room after the current CCU is relocated to the New Building.

In 2007, one Shimadzu portable X-ray machine was installed and has been shared between several wards. However, sharing one X-ray machine prevents providing quality and efficient services for the entire hospital wards, therefore two X-ray machines (mobile) will be procured by this Project. These planned X-ray machines shall be used at medical unit 1 and 2, and surgical unit 1 and 2.

The image diagnosis department possesses one Chinese ultrasound machine (color doppler) procured in 2009, however this equipment has been experiencing technical failures such as blurred image or other failures of unknown cause. For this reason, one Ultrasound machine (adult, color doppler, abdomen+TV+superficial) will be included in this Project. This ultrasound machine will equip abdomen, transvaginal and superficial probes. In prior to the installation, existing equipment placed in the current unused general X-ray room shall be removed, and the concerned room will be renovated as an ultrasound examination room for installation of planned ultrasound machine.

■ Blood Bank

This blood bank supplies blood components to twelve public hospitals in Mandalay district and eight public hospitals located outside the Mandalay district. The blood bank is divided into 1) Transfusion Transmitted Infection (TTI) unit, 2) Serology unit, 3) Platelet storage unit, 4) Blood preparation unit, and 5) Central storage room.

This blood bank equips two centrifuges for blood bag (manufactured by Beckman Coulter and Kubota). Kubota centrifuge was procured through Japanese grant aid in 1986, however it is not repairable and abandoned since two years ago. Beckman Coulter centrifuge is barely available for continuous use, though the model year is not recorded. For this reason, two Centrifuges (blood bag, type A) equipped with rotors for 750ml blood bags will be included in this Project, to replace with the above-mentioned existing two centrifuges. By doing this, strengthening of basic blood bank function is expected, through promoting more efficient whole blood separation.

At this blood bank, a household refrigerator (expected to have passed more than ten years after manufacture) is used as a storage refrigerator for blood bag. This existing household refrigerator

operates well with no technical problems, however from the point of accurate temperature management and reliability of the quality of blood, this household refrigerator is not considered as appropriate for blood storage. For this reason, one Refrigerator (blood bag) with the capacity of 200 bags will be included in this Project. The existing household refrigerator is possible for continuous use, therefore this refrigerator will be used as a backup after installing the new refrigerator.

Blood plasma requires freeze storage at temperature under -20 degrees, and this blood bank holds two freezers (manufactured in 2000 and 2002) funded by MOH. Both freezers have experienced replacement of motor and compressor several times; however these freezers started to experience temperature variance due to the obsoleteness. For this reason, two Deep freezers (large) will be included in this Project, to replace with existing two freezers.

Platelet easily deteriorates through storage compared to red blood cell, though the life of platelet in living body is only about ten days. For storage of platelet, it is necessary to store in shaking motion at 20 to 24 degrees. This blood bank owns a platelet agitator, however no incubator is installed at this blood bank, therefore storage of platelet is under room temperature, resulting that the low quality of platelet and insufficient hemostatic ability. For this reason, one Platelet agitator (with incubator) will be included in this Project, for quality improvement of platelet for blood transfusion.

■ Cardiac Unit

Cardiac unit is organized by an angiography room, ten bedded CCU, eight bedded Post Procedure Room, general patient ward (twenty beds for men, twenty beds for women), and non-invasive examination room (cardiac echo, stress test ECG examination, and 24-hour ECG examination). Among these rooms, CCU will be relocated to the new building which will complete its construction in January 2013.

The requested X-ray machine (angiography) was excluded from this Project, because the procurement of this equipment overlapped with MOH's procurement plan for 2013.

Ten bedded CCU provides treatment for patients with various heart diseases who need angiography, and eight bedded Post Procedure Room will record prognosis after angiography. Each room owns patient monitors of different manufacturers, however central management system is not available at the nurse station. For this reason, Central monitors and Patient monitors (adult, standard) will be installed to each CCU and Post Procedure Room, establishing 24-hour integrated patient management system.

Non-invasive examination room owns a Siemens ultrasound machine (color doppler) for diagnosis of blood circulation and other conditions of coronary artillery. This equipment was donated by a patient as brand-new two years ago, however this equipment started to experience technical failures of unknown origin such as reduction in sensitivity of probes or unclear image processing, and the manufacturer answered that the repair is not possible. Donation of medical equipment from patients with special interests or hospital executives is common in Myanmar, sometimes associate with large scaled donation such as facility or expensive medical equipment. Donated medical equipment sometimes shows failures from the time of installation, due to the mismanagement of procurement management, insufficient equipment operation training, or other factors. This donated ultrasound machine also showed technical

failures after several times of operation. For this reason, one Ultrasound machine (adult, color doppler, heart+TE+pencil+superficial) will be included in the Project, to replace with existing Siemens ultrasound machine. Also, the non-invasive examination room conducts stress test ECG examination, using an Italian equipment procured in 2002 with the budget of MOH. However, though some technical failures are observed from this equipment, the manufacturer does not have a local agent dealing Myanmar market, therefore repair service is not available for this equipment. For this reason, one ECG machine (stress test system) will be procured by this Project.

■ Central Operation Theater

Central operation theater is in a two-storied building located in the center of the hospital site, comprised of three operation theaters on the second floor with two operation tables each, and another three operation theaters on the first floor with one operation table each. Each operation theater is intended for particular surgery or purpose; on the second floor, the first operation theater is for general surgery and open chest surgery, the second operation theater is for general surgery, and the third operation theater is for brain surgery. On the first floor, the first operation theater is for laparoscope surgery, the second operation theater is for brachytherapy surgery, and the third operation theater is for gastrointestinal system and duodenum surgery.

Out of six operation tables placed on the second floor, four operation tables are necessary for replacement due to obsoleteness. As for the operation tables on the second floor, one operation table of the first operation theater has failure with trendelenburg positioning, both operation tables of the second operation room also have failure with trendelenburg positioning as well as up-and-down movement, and one operation table of the third operation theater has failure with up-and-down movement. For this reason, three Operation Tables (motorized) will be installed to the first and second operation theater, and one Operation Table (motorized, neuro surgery) will be installed to the third operation theater for replacement. Meanwhile, at the first and second operation theater, the need for fluoroscopy image diagnosis for liver, bladder, and biliary atresia surgery has been requested for safer operation; however the hospital did not possess any C-arm X-ray machine. Therefore, assuming the use at first and second operation theater, one X-ray machine (C arm, fluoroscopy) will be included in this Project.

The first operation theater on the first floor is specialized in laparoscopy surgery, accepting surgeries of bladder, rectum, hernia, and other similar surgeries. The existing laparoscopy is manufactured by Karl Storz, installed ten years ago by the budget of MOH. This equipment started to show leakage from trocar and air / water bulb, which prevents proper functioning at the time of surgery. For this reason, one set of Laparoscope (adult) will be included in this Project, as a replacement of existing Karl Storz model.

Operation theater 1 and 2 on the second floor equips one bronchoscope purchased ten years ago, for operating lung cancer or lung tuberculosis surgery. However, concerned surgeries are not currently operated due to safety reasons, because of reduced quality of image caused by abrasion of fiber. For this reason, one set of Bronchoscope (adult) will be procured by this Project, to conduct surgeries for bronchial diseases.

The Central Operation Theater operated 2,382 surgeries in 2011. Among these, 611 cases (about

25%) are of heart and chest surgery, comprising the highest percentage of surgery case by surgery site. The need for instrument set for heart and chest surgery is considered to be in great demand from this observation, and for this reason two sets of Instrument set for thoracic surgery (adult) and one Sternal saw will be procured by this Project.

■ Uro-Surgical Department

Surgery-related facilities of this hospital also owns several specialized surgical departments apart from the above-mentioned Central Operation Theater, placing maxillofacial-traumatology department, chest surgery department, uro-surgical department, and emergency-traumatology department. Uro-surgical department owns three operation theaters; the first and second operation theater are for major surgery, and the third operation theater is for minor surgery. By surgery cases, calculus removal surgery and prostate enlargement surgery accounts for the highest percentage of cases operated at uro-surgical department. About ten cases are operated per day at three uro-surgical operation theaters. This uro-surgical department is the only specialized uro-surgical department of all public hospitals in Mandalay district.

Prostate removal surgeries are operated about three to four cases per day, however the existing Storz TURP set reports water leakage because of obsoleteness, and this prevents proper function of TURP set. Also, the existing monitor for TURP set is a normal household television installed after the purchase of TURP set, and is not considered to be an appropriate equipment. For these reasons, one TURP set will be procured through this Project as a replacement.

Urethral calculus surgeries are operated about two to three cases per day, however the existing ureteroscope reports water leakage because of obsoleteness. As for the components of the scope, the scope is manufactured by Richard Wolf, the machine itself was manufactured by Karl Storz, and the monitor is a normal household television, all have been used for quite a long time. Due to the budgetary constraints, inefficient operation of surgical devices is forced and this jeopardizes safe operation and patient's body. For this reason, one set of Ureteroscope will be included in the Project, as a replacement of the existing ureteroscope. Meanwhile, the hospital purchased Karl Storz percutaneous nephroscope for treatment of renal calculus and cancer eleven years ago, funded by the budget of MOH. However some technical problems have been pointed out from the time of procurement, such as equipping too large scope for average Myanmar people's body, failed synchronization of some components resulted from combining components of different manufacturers, and the absence of C-arm X-ray machine. As a result of these constraints, concerned surgery is operated only a few times in a month. For these reasons, one set of Percutaneous nephroscope and one X-ray machine, (C-arm, fluoroscopy) will be included in this Project. The work station for percutaneous nephroscope will be shared with the previously described ureteroscope of this Project.

■ ICU (Intensive Care Unit)

The ICU of this hospital maintains eight beds, composed of one bed for isolated patient, two beds for patients of respiratory disease, four beds for patients of brain and chest disease, and one bed for patient of trauma. Other than those beds, two rooms with ICU functions are arranged in the hospital, one

room for chronic obstructive pulmonary disease (COPD) patient and another for patient of urological disease. Thus, total ten beds are able to function as ICU at this hospital. About thirty to forty patients are given treatment at those beds per month, and all ten beds are occupied at almost every day.

As for necessary ICU equipment for vital signs management, this ICU has no equipment other than one expiratory gas monitor purchased ten years ago, and vital signs management of patients is in fact done by visual examination of nurses. This situation easily predicts operational problems of the concerned ICU such as excess workload of nurses and incapability of adequate care at the time of emergency. For this reason, one Patient monitor (adult, standard) for eight bedded ICU, one Patient monitor (adult, ETCO2+IBP) for two beds of patients of brain and chest diseases, and one Central monitor for introducing centralized 24 hour patient management system, are planned for installation through this Project. Four ICU rooms (one isolated ICU, two respiratory ICUs and one COPD ICU) require installation of ventilator, and currently four ventilators are already in use at these ICU rooms. These four ventilators were donated by a patient three years ago as second hand, and its technical reliability is not guaranteed. For this reason, newly four Ventilators (adult) will be procured by this Project, and the existing four ventilators will be used as backup.

Also, patient transportation between this ICU and other operation theaters inside and outside hospital is operated two or three times per week, however only several ambubags are prepared for patient transportation, while ventilator is expected for this operation. For improving safety measures of patient transportation, one Ventilator (transportation) is included in this Project.

Two Chinese defibrillators were installed in this ICU for treatment of heart attack or other sudden change of patients, however these existing defibrillators were not able to synchronize with existing ECG. Besides the existing ECG monitors have been showing technical failures, which eventually forced health staffs to operate under an inefficient equipment management. For these reasons, two Defibrillators (adult) with ECG monitor and synchronizing feature will be installed though this Project.

■ Maxillofacial-Traumatology Department

This department owns a specialized operation unit, with two operation theaters furnishing three operation tables. This unit conducts surgery for patient of trauma, mainly injured by traffic accident. X-ray machine is necessary for surgery of bone fracture or contusion to ensure the accuracy and safety of surgery, however this department does not possess any X-ray machine, which increases the risk for conducting inappropriate and unnecessary surgery. For this reason, one X-ray machine (C-arm, fluoroscopy) will be installed by this Project.

■ Gastro-Intestinal Unit

Current gastro-intestinal unit is located on the second and third floor of blood bank. The second floor is organized for endoscopic examination and twenty bedded patient ward, and the third floor is for upper-gastrointestinal endoscopy, duodenoscopy, endoscopic retrograde cholangiopancreatography (hereafter referred to as "ERCP"), and colonoscopy. As for the annual record of endoscopy examination, 195 cases for upper-gastrointestinal endoscopy, 116 cases for ERCP, 403 cases of colonoscopy were conducted in 2011, and as of July 2012, 1,359 cases of upper-gastrointestinal endoscopy, 68 cases of

ERCP, and 299 cases of colonoscopy have been conducted. This unit will be relocated to the new six-storied building currently under construction, and equipment to be procured by this Project will be installed to the new building. After relocation, this unit will be allocated to the first and second floor of the six-storied building; the first floor will be used for the same endoscopic examination, and the whole second floor will be allocated for patient ward. Regarding the existing equipment, this unit possesses an upper-gastrointestinal endoscope, a duodenoscope, and a colonoscope all manufactured by Olympus, however all equipment are experiencing blurred image due to abrasion of fiber, being an obstacle to provide quality examination. For this reason, one set each of Gastroscope, Duodenoscope and Colonoscope will be included in the Project. For monitor and light source, shared use between the indicated endoscopes is possible therefore only one set will be installed by this Project.

■ Laboratory Department

The laboratory department is located on the second floor of the X-ray department building, and is comprised of examination units of hematology, biochemical pathology, tissue pathology, cell pathology, microbiology, immunohistochemistry, and emergency (24 hour). As of 2011, 25,560 cases of microbiology examination, 53,059 cases of biochemical pathology examination, 41,284 cases of hematology examination, and 3,527 cases of tissue pathology examination were conducted at this laboratory department

This laboratory department accepts examination requests of specimen from many other hospitals in Mandalay district. Especially the need for hematology examination and tissue / cell examination for bacteremia, meningitis, osteomyelitis, arthritis, pneumonia, fever of unknown origin (unobservable abscess, typhoid, brucellosis, and other fever of undefined diagnosis) is increasing in the recent years. To operate as a top examination organization in Mandalay district and deal with these arising needs, one Blood culture system, one Automatic blood culture and antibiotic susceptibility system, and two Microtomes will be installed by this Project. Procured blood culture system and automatic blood culture and antibiotic susceptibility system shall be used at the microbiology unit, and microtomes shall be used at the tissue pathology examination unit and the immunohistochemistry examination unit.

■ Renal unit

The renal unit of this hospital equips three beds and five hemodialysis machines to provide treatment. This unit will be relocated to the six-storied building currently under construction, and the construction is scheduled to be completed by February 2013. After relocation, additional hemodialysis machines are planned to be installed with total number of ten. The three most common diseases of patients visiting this unit are acute kidney failure caused by bite of poisonous snake, other kidney failure, and chronic kidney failure. These diseases rank the first three most common cases almost every year. From this fact, blood purification using hemodialysis machine is the most common treatment method of this unit. For this reason, two Hemodialysis machines (adult) will be included in this Project.

■ Emergency Department

The emergency department of this hospital is located at the side of the main gate, accepting

patients 365 days a year. In 2011, 8,172 patients (about 22 patients per day) were accepted by this department. Being the highest referral hospital in Mandalay district, this hospital is expected to provide speedy and appropriate diagnosis, and refer to a proper department to increase the life-saving possibility. Especially operating image diagnosis service is urgently requested when the image diagnosis department is closed on weekends and holidays. For these reasons, one CT Scanner will be included in the Project, which is necessary for emergent diagnosis of trauma and internal diseases. On the installation of CT scanner to this department, expansion of X-ray protective wall is necessary for protecting operator's body, and this construction will be borne on Myanmar side.

2) Central Women's Hospital in Mandalay

■ Special Care Baby Unit

Special Care Baby Unit (hereinafter referred to as "SCBU") is located on the first floor of two-storied building adjoining the delivery ward, and this unit accepts infants born in this hospital who need special treatment. The main units are: NICU (for infant less than 1.7kg weight), HDU (High Dependency Unit, weight more than 1.8kg), SCR (Special Care Room, infants of minor symptoms but still requiring nursing care), isolated room, formula room, etc.

This unit accepted total 1,678 patients in 2011, and the major cases were 904 cases of septicemia, 242 cases of jaundice, 242 cases of meconium aspiration syndrome / asphyxia of the newborn, 224 cases of infant of low birth weight / dyspnea syndrome, 27 cases of congenital abnormality, 9 cases of birth trauma, and 30 cases of other diseases. The major death causes of infant at this hospital are septicemia (54%), followed by meconium aspiration syndrome / asphyxia of the newborn (14%), jaundice (14%), and infant of low birth weight / dyspnea syndrome (13%). Septicemia is caused by transfer of bacterial infection to whole body part, resulting seriously severe condition. Patients of septicemia are likely to cause other intercurrent illnesses such as shock, multiple organ failure, or intravascular coagulation if no treatment is provided.

To plan a treatment schedule for jaundice, diagnosis using a bilirubinometer is necessary. For this reason, one Bilirubinometer (blood) will be included in the Project for definite diagnosis of jaundice. Bilirubinometer (skin) for screening will be included for obstetrics and gynecology department described later.

The minimum necessary number for infant care center is seven (three for NICU, two for HDU, and two for SCR), and existing two equipment are available for continuous use. For this reason, newly five Infant care centers will be included in this Project, and the existing two infant care centers will be relocated and used at SCR.

As for infant incubator, the minimum necessary number is nine (five for ICU, one for HDU, two for SCR, and one for isolated room), and existing two equipment are available for continuous use. For this reason, newly seven Infant incubators (manual/servo) will be included in this Project.

For treatment of septicemia or patent ductus arteriosus (one type of heart congenital abnormality), vital signs observation during infusion loading is commonly conducted. As for infusion pump, the minimum necessary number is eleven, and existing four infusion pumps are available for continuous use. For this reason, newly seven Infusion pumps (infant) will be installed in NICU and HDU by this Project.

Because of the unavailability of ventilator at SCBU, infants of meconium aspiration syndrome / asphyxia of the newborn are transported to New Yangon Children Hospital, in case those infants are in need of treatment using ventilator. However, some serious cases have been reported, resulting serious permanent damage or death, due to delayed treatment. For this reason, two Ventilators (neonatal, A) (one for isolated room) will be procured by this Project, to establish an emergency treatment system using ventilator.

Infants of septicemia are the most major patients accepted at this SCBU, in many cases with organ disorder or organ perfusion failure, caused by intravascular coagulation and reduced oxygen transportation. Also asphyxia of the newborn follows the second major disease accepted at this SCBU,

and the most cases of asphyxia of the newborn are considered to be caused by meconium aspiration from blood circulation failure of maternal body. Ultrasound machine is necessary for providing appropriate treatment for those diseases; however this SCBU does not possess the concerned equipment. For this reason, one Ultrasound machine (neonate, color doppler, heart+abdomen+superficial) will be included in this Project. Besides, at NICU and HDU of this unit, vital signs management for patients under drug therapy or follow-up is demanded. For this reason, five Patient monitors (pediatric, standard) and five Syringe pumps (pediatric) will be procured by this Project, installing two for ICU, two for HDU, and one for isolated room. The measurement parameters of patient monitor will be temperature, respiration, ECG, NIBP, and SPO2.

■ Obstetrics and Gynecology ICU

This ICU is located on the upper floor of SCBU, furnishing six beds. According to the MOH standard, operating two ICU beds per 100 hospital beds is required, however this ICU does not possess any equipment necessary for ICU operation, and in fact most patients are referred to Mandalay General Hospital. For major reasons of patient transportation, miscarriage associated with septicemia comprises 50% of total referred cases, and the rest is comprised of serious lung embolism, abnormal bleeding after delivery, and others. Under these unfavorable conditions, death cases due to delayed treatment are not negligible. For this reason, to recover the primary ICU operation of this hospital, three Patient monitors (adult, standard) and three Ventilators (adult) will be procured by this Project.

■ Image Diagnosis Department

Image diagnosis department is located in the center of the hospital site, in a flat building sitting next to the laboratory department and blood bank. This department is comprised of two general image diagnosis rooms, one ultrasound diagnosis room, and one dark room. At one of the two general image diagnosis rooms, one Shimadzu X-ray machine (manufactured in 2005) is installed, operating 1,307 cases in 2011. However, this existing X-ray machine is not equipped for diagnosis of gynecological diseases such as hysterosalpingography or intravenous urography, which implies the operational inability for being the top referral gynecological hospital in Mandalay district. For this reason, one X-ray machine (fluoroscopy) will be included in this Project. Another general image diagnosis room is currently vacant, and the planned X-ray machine will be installed to this vacant room. In prior to the installation, expansion of X-ray protective wall with observation window is necessary for installation preparation, and this construction will be borne on Myanmar side.

This department possesses one Shimadzu black and white ultrasound machine, operating 4,836 cases of obstetric diagnosis and 2,435 cases of gynecological diagnosis in 2011. This equipment is used for antenatal diagnosis of inpatients or deciding operation planning for patients expecting surgery as a rule, although diagnosis for emergency outpatients sometimes intervene the operation of this equipment. The existing X-ray machine has solely one probe for abdomen. Limited function of probes avoids providing diagnosis for some highly demanded diseases, such as deep-vein thrombosis, uterus cancer or ovary cancer. For these reasons, one Ultrasound machine (adult, color doppler, abdomen+TV+DVT) will be included in this Project.

■ Pathology-Blood Bank

Pathology-blood bank is located in a flat building next to image diagnosis department building, comprised of blood storage room, blood extraction room, pathology room, microbiology room, hematology room, sample extraction room, and biochemical pathology room. As for the results of examination in 2011, 3,981 cases of hematology examination, 4,131 cases of microbiology examination, 1,346 cases of biochemistry examination, and 530 cases of tissue pathology examination are conducted at this unit. Also, exclusive for patients of HIV living in Mandalay district, this unit sets a special HIV examination day on every Monday, accepting about 300 patients per month.

At the hematology examination room, one Coagulation analyzer will be installed by this Project. Blood coagulation examination is obliged for all patients before taking surgery, however currently all examinations are conducted manually. In 2011, the existing manual coagulation analyzer operated for 3,307 major surgeries and 991 minor surgeries. Currently, samples of patients of hemorrhagic septicemia and disseminated intravascular coagulation syndrome are referred to Mandalay General Hospital, but these examinations will be able to handle within this unit, after installing the latest equipment.

The main task of this blood bank is to extract platelet rich plasma (PRP) and other blood derivatives from donated blood, and supply to patients. For this reason, one Centrifuge (blood bag, type B), with specification of blood bag centrifugation, will be included in the Project. This unit does not possess any centrifuge, and patients requiring specific blood components are referred to Mandalay General Hospital. Likewise, one Deep freezer (small) will be included in this Project, to preserve blood components under frozen storage. To add, one Platelet agitator (with incubator) will be included in this Project, to supply PRP for patients who have caused blood platelet reduction due to severe bleeding.

■ Operation Theater

The existing operation theaters sit at the center of hospital site, located on the second floor of the building next to SCBU. The first floor serves as the delivery room. Currently a three-storied L-shaped building is under construction in an empty lot located west of the hospital site, consisted of A Building lying north and south and B Building lying west to east. As of December 2012, the A Building has finished construction of structure except elevator, and internal construction was on progress. The A Building is scheduled to open in 2013. In the meantime, the B Building has finished concrete placement of the first floor, and bar arrangement of the second floor was on progress. The B Building also plans to complete its construction including internal construction in 2013.

1) Existing Operation Theater

There are four existing operation theaters at this unit; of one is for patients of infectious diseases, of two is for planned operation, and of one is for emergency operation. One of the two planned operations theaters operates exclusively for laparoscopic surgery room. In 2011, 3,307 cases of major surgery (including 1,859 cases of gynecological surgery), 991 cases of minor surgery, and total 4,298 surgeries were operated at these operating theaters. On average 4.1 surgeries are conducted per day.

Five operation tables are equipped at those four operation theaters (two in emergency operation

theater and the rest are furnished one each). The newest operation table was manufactured in 2004, however this equipment is only operable of up-and-down motion and technical problems are also reported on other positioning. Two operation tables at emergency operation theater and one operation table at planned operation theater appear to be obsolete, expected to be used more than ten years. For these reasons, five Operation tables (manual) will be installed to this unit, to replace with existing all operation tables.

As for patient monitors, existing two patient monitors were manufactured in 2004 and shared between multiple operations theaters, resulting some operations are forced to conduct without using a patient monitor. In addition the conditions of those patient monitors are not favorable, reporting technical failures such as disconnection of SPO2 sensor cable or false alarm. For this reason, four Patient monitors (adult, standard) will be included in this Project to install one patient monitor per each operation table, and also one Patient monitor (adult, multi gas) will be included in this Project, to measure the concentration of anesthetics during operation and prevent anesthetic accidents. As for anesthesia machines, three Drager anesthesia machines used from the time of opening are still available for continuous use, therefore additional two Anaesthesia machines with ventilator (adult) will be installed by this Project.

Laparoscopic surgeries are operated at the planned operation theater, providing treatment for benign paraovarian cyst, fibroid of uterus, endometriosis, infertility, ovarian hemorrhage and other surgeries. This unit owned one laparoscope manufactured in 1998 (unknown manufacturer), however the monitor for laparoscope was absent so that the laparoscope was temporary withdrawn for a while. In May 2011, the hospital purchased a new monitor for laparoscope and restarted operating laparoscopic surgery. However, the laparoscope itself has surpassed the expected renewal date, and some technical failures such as disconnection or water leakage have been reported. For these reasons, one set of Laparoscope (adult) is included in this Project. As well as hysteroscopic surgery is operated at this unit, providing treatment for submucosal myoma, endometrial polyp, septate uterus, intrauterine adhesion, etc. However, likewise the above-mentioned laparoscope, this hysteroscope also has surpassed the expected renewal date, and some technical failures such as disconnection or water leakage have been reported. For this reason, one set of Hysteroscope (rigid) is included in this Project. Treatment for uterine related diseases such as cervical intraepithelial neoplasm and uterine cervical cancer are currently provided at the outpatient colposcopy clinic, and the need for colposcopy with a feature of electrosurgical unit is increasing for more adequate diagnosis and treatment. The hospital has a plan to establish a complete in-hospital treatment system for uterine related diseases, therefore by this reason, one Colposcope with necessary treatment equipment such as electrosurgical unit, will be included in this Project. Also, one Cryosurgery machine will be included to this Project, for treatment of uterine cervical cancer caused at unreachable narrow area where colposcope cannot diagnose.

As described before, the percentage of gynecologic operation among all major operations of this hospital surpasses 50%, and of all gynecologic operation, the percentage for urinary organs is especially high at this hospital. For appropriate operation planning of urinary organ area, urodynamics examination for determining urination disorder, causes of urination order (for instance cancer, bacterial infection, hormone disorder caused by menopause, bladder cervical sclerosis, sphincter damage caused by

caesarean operation, etc.), and post-surgery diagnosis is necessary. For this reason, one Urodynamic measuring machine will be included in this Project.

2) New Operation Theater

Three operation theaters will be newly established at the second floor of newly-constructed B Building, and of three rooms, one room will be used for patients of infectious diseases. For these new operation theaters, three Operation tables (manual) and three Anaesthesia machines with ventilator (adult) will be procured by this Project, to install one each to three operation theaters. Also, two Patient monitors (adult, standard), and one Patient monitor (adult, multi gas) will be procured by this Project, to measure the concentration of anesthetic drug during long operations and prevent anesthetic accidents.

■ Labor Department

The existing labor department is located on the lower floor of existing operation theaters, comprised of labor room (twelve beds), two delivery rooms (four beds), and postpartum room (five beds). In 2011, this department operated total 5,750 delivery cases; 2,906 cases of spontaneous delivery, 2,466 cases of caesarean operation, 356 cases of vacuum delivery, 13 cases of forceps delivery, and 9 cases of breech birth delivery. About 3.9 delivery cases are operated per one delivery bed per day. New labor department will open at the first floor of B Building currently under construction, planning seven delivery rooms (eight beds) and a labor room (eight beds).

1) Existing Labor Room

Of four existing delivery beds, two have passed ten years after procurement, and are considered to be in unfavorable conditions for proper delivery. For this reason, two Delivery beds will be included to replace with these two existing obsolete delivery beds. For high-risk pregnancy, conducting non-stress test using cardiotocograph is necessary. There are two existing cardiotocographs which were procured by Japanese grass-roots grant aid scheme in 2003; however these cardiotocographs are not appropriate for continuous use, due to obsoleteness. The ratio of high-risk delivery and spontaneous delivery at this hospital is about 1:1 at almost every year, therefore by this reason, six Cardiotocographs will be procured by this Project for twelve bedded labor room. As for other planned equipment, three Infusion pumps (adult) for postpartum patient care, one Ultrasound machine (adult, color doppler, abdomen+TV) for blood flow measurement of fetal and umbilical cord by pulse Doppler method, and one pH meter for examination of fetal and umbilical cord blood, will be included in this Project.

2) New Labor Room

As for planned equipment of new labor room, eight Delivery beds, four Cardiotocographs, one pH meter, one Doppler fetal heart detector, and one Autoclave (vertical, medium), will be procured by this Project.

■ HDU (High Dependency Unit)

HDU is comprised of HDU1, 2 and 3 (four beds each), and HDU3 will be relocated to the new

L-shaped building after completion of construction. After relocation, HDU3 will increase its bed capacity to five beds. Patient distribution to each HDU is determined by the acceptance date of each patient, not by the type of disease. This unit is specialized for patients requiring advanced monitoring before and after OB & GY operation, providing advanced treatment next to ICU. Patients requiring operation will be diagnosed at this HDU as a rule. One aim of this Project is reactivation and reinforcement of OB & GY ICU function, and to let ICU concentrate on primary ICU operations, this Project will promote strengthening of HDU functions as a supporting unit of ICU.

1) HDU1 and 2

This Project will supply four Infusion pumps and four Oxygen concentrators to install to half beds of HDU1 and 2, and two Doppler fetal heart detectors to install one each to each HDU room. Also, six Patient monitors (adult, standard) will be installed three each to HDU1 and 2, for monitoring basic vital signs (SPO2, NIBP, Temperature, Pulse rate, ECG, and Respiration).

2) HDU3

This Project will supply two Infusion pumps and two Oxygen concentrators for five beds of HDU3, and one Doppler fetal heart detectors for whole HDU3. Also, four Patient monitors (adult, standard) will be installed to five-bedded HDU3, for monitoring basic vital signs (SPO2, NIBP, Temperature, Pulse rate, ECG, and Respiration).

■ Emergency Outpatient Department

The emergency outpatient department of this hospital accepts patients 365 days a year, and in 2011, this department accepted 7,346 emergency patients. The total number of outpatients of this hospital was 15,374 in 2011, and this indicates that the number of emergency patients accounts for almost half of all outpatients. This department accepts about twenty patients per day. Major cases accepted at this department are fetal imminent asphyxia, antepartum hemorrhage, poor prognosis after operation, pregnancy-associated hypertension, etc. The referral system does function at an expected level in this district, and this hospital accepts all emergency pregnant women and gynecological patients who cannot visit private hospital. Despite of this situation, because of the limited availability of biopsy and laboratory testing, it is indicated that inappropriate operation and treatment is increasing at this department. For this reason, this Project aims for improving lifesaving probability of this department, by strengthening examination function and encourage appropriate patient distribution. Also, this project will encourage reducing tasks of image diagnosis department or examination department for outpatients, and concentrate on their primary tasks for inpatients. For this reason, one Ultrasound machine (adult, color doppler, abdomen+TV) and one Doppler fetal heart detector will be included in this Project.

3) Mandalay Children Hospital

550-bedded Mandalay Children Hospital (hereinafter referred to as the "New Hospital") opened in July 2011 through renovation of former police school building, funded by donations of private building constructors. Previously, 300-bedded former Mandalay Children Hospital (hereinafter referred to as the "Old Hospital") served as the top referral hospital of pediatric care in Mandalay district, and this function is to be inherited to the New Hospital after opening, and has already finished some part of functional relocation. The New Hospital started recording its patient data from January 2012 (some data is from February), and this Project will formulate specifications and quantity of planned equipment with considerations of inherited functions and patients from the Old Hospital.

■ Operation Theater

The operation theater of the New Hospital is comprised of four rooms (one operation table for each room); one room is for patients of infectious diseases, two rooms are for major operation, and one room is for minor operation. From February 2011 to July 2011, 930 cases of operation (including 137 emergency operations) were conducted at the New Hospital, in the meantime 2,019 cases of operation (including 1,019 major operations) were conducted at the Old Hospital in 2011. Thus, if all patients of the Old Hospital are accepted to the New Hospital, about 4,000 operations per year are estimated to be demanded at the New Hospital.

All four operation theaters of the New Hospital are equipped with operation tables, operation lamps, anesthetic machines, and other basic operation-related medical equipment. This unit owns four patient monitors, however all four equipment does not have functions necessary for operation (IBP, CO2 concentration, and anesthetic gas concentration), and are difficult to operate adequate monitoring especially during long-term operations. For this reason, two Patient monitors (pediatric, Multi Gas+IBP) will be included in this Project, to install one each to two operation theaters for major operation.

The New Hospital is targeted for patients under twelve years old, therefore temperature management during operation is especially important. The existing one patient monitor is available for continuous use, and this unit does not possess blood warmer at this time. For this reason, one Patient warmer and one Blood warmer will be included in this Project. Also, regarding defibrillator, ICU owns one existing defibrillator; however the operation theater of the New Hospital does not possess any defibrillator. For this reason, one Defibrillator will be included in this Project.

The Old Hospital conducted operations of juvenile polypectomy, acute appendicitis, ulcerative colitis, Crohn's disease, and other digestive tract related operations, about five cases per month. Also, pathological examination of tissue extracted from lower gastrointestinal tract is conducted at the Old Hospital. In 2011, ten cases of in-hospital death caused by acute gastroenteritis were reported, ranking ninth major factor of death cause. Currently this unit possesses one colonoscope, however it has passed ten years after procurement, and reporting technical failures. For this reason, one set of Sigmoidoscope (pediatric, flexible) will be included in this Project. In addition, the New Hospital plans to start providing laparoscopic surgery, and joint training with Yangon Children Hospital have been conducted several times. Acute appendicitis, Hirschsprung's disease, cryptorchidism are assumed to increase its demand at the New Hospital. The doctor in attendance of these cases is Dr. Aug Mra, who has trained

pediatric laparoscopic surgery for several years in France. For this reason, one set of Laparoscope will be included in this Project, to encourage implementation of laparoscopic surgery at the New Hospital.

Regarding the sterilization related equipment, currently this unit possesses 75L and 100L vertical autoclaves, and both equipment are like new. To deal with newly accepted patients of the Old Hospital, one additional Autoclave (vertical) with larger capacity will be included in this Project.

■ ICU

ICU is located in the west half of the building with operation theater, comprised of three rooms and 19 beds: eight-bedded large room, infant incubator room with four infant incubators and three beds, and four-bedded isolated room. The New Hospital has accepted 187 pre- and post-surgery patients from February 2012 to June 2012, accepting on average 30 to 40 patients. The Old Hospital also has an ICU, accepting about 50 patients per month.

Regarding the existing infant incubators, all four equipment are operating in a good order. To deal with newly accepted patients of the Old Hospital, additional five Infant incubators (manual/servo) will be included in this Project. Of these five new infant incubators, three will be installed to the infant incubator room, and the rest of two will be installed to the isolated room. Regarding the existing patient monitors, all six equipment are operating in a good order. At the ICU of both New and Old Hospital, about half patients require monitoring using patient monitor, therefore by this reason, additional four Patient monitors (pediatric, standard) will be procured by this Project. After procurement, total ten patient monitors will be equipped at the ICU. As well as existing infusion pumps and syringe pumps, all six equipment are operating in a good order. Based on the same policy, additional four Infusion pumps and four Syringe pumps will be procured by this Project. For treatment of septicemia, which always ranks high on major cause of death at both New and Old Hospital, vital signs observation during infusion loading is commonly conducted. For this reason, installing more of related medical equipment is considered to reduce the death rate of this unit.

Regarding the existing ventilators, this unit owns one for neonate and two for pediatric which are available for continuous use, although some technical failures such as disorder of oxygen sensor have been reported. For this reason, newly two Ventilators (neonatal, B) and one Ventilator (pediatric) will be included in this Project, to install one each to each ICU room. Also, three Oxygen concentrators will be included in this Project, to install one each to each ICU room. Securing MOH budget for laying central piping for oxygen (in most cases by cylinder) is difficult in Myanmar, and from this reason most hospitals supply oxygen to patients (of low income stratum) using oxygen concentrators. Also for treatment of patients showing jaundice symptoms, two Phototherapy units (single) will be included in this Project.

■ Special Care Baby Unit

Special Care Baby Unit (hereinafter referred to as “SCBU”) is located on the first floor of the building across the building with ICU and operation theaters. The lower floor has patient wards called as the Medical Unit. As for main rooms of SCBU, there are one treatment room, one breast-feeding room, one neonatal room (weight more than 2.5kg), one neonatal room (weight between 1.5-2.5kg), one

neonatal room (weight less than 1.5kg), one home-delivery infant room, one isolated room, and others. This unit will provide treatment for infants requiring continuous care due to low birthweight, neonatal jaundice, infectious diseases, etc., but not requiring ICU treatment. The major cause of death at both New and Old Hospital were always septicemia, low birthweight and kernicterus (serious jaundice), and strengthening ICU and SCBU is considered to be important for achieving the project goals.

The most emphasized room is the neonatal room (weight less than 1.5kg), and currently eight infant incubators are installed and operated at this room. To strengthen the acceptability of the neonatal room (weight less than 1.5kg), four Infant incubators (manual/servo) will be included in this Project, and total twelve incubators will be equipped at this room. Of those four newly introduced infant incubators, three will be installed to home-delivery infant room, and one will be installed to isolated room. Also most treatment including treatment for septicemia is operated at the neonatal room (weight less than 1.5kg), and this room currently equips only three infusion pumps which are available for continuous use. For this reason, additional four Infusion pumps will be procured by this Project, installing three to the neonatal room (weight less than 1.5kg), and one to the isolated room. As for syringe pumps, currently the neonatal room (weight less than 1.5kg) equips two syringe pumps which are available for continuous use, and newly three Syringe pumps will be procured by this Project, installing one each to neonatal room (weight less than 1.5kg), isolated room, and treatment room. Blood infusion for patients of jaundice is frequently operated at the treatment room, therefore by this reason, newly two Infant care centers will be procured by this Project, installing one each to neonatal room (weight less than 1.5kg) and treatment room.

Oxygen concentrator are necessary for treatment of respiratory problems, meconium aspiration syndrome, neonatal asphyxia, and other diseases of low birthweight infants. For this reason, total six Oxygen concentrators will be procured by this Project, installing two to neonatal room (weight less than 1.5kg), and one each to home-delivery infant room, neonatal room (weight between 1.5-2.5kg), isolated room, and treatment room.

For treatment of patients of jaundice, one Bilirubinometer (skin) for screening at reception, and one Bilirubinometer (blood) for definite diagnosis at treatment room, will be included in this Project. As for Phototherapy unit (double), this equipment will be procured as a standard single model, due to the undefined benefit for jaundice treatment, and limited availability at market which implies inappropriate for procurement by open tender.

■ Image Diagnosis Department

The image diagnosis department is comprised of general X-ray room, fluoroscopy room, and ultrasound room. From January 2012 to June 2012, this department has accepted 1,567 cases of general X-ray diagnosis and 664 cases of ultrasound diagnosis. One Hitachi 500mA X-ray machine is installed and operated at the general X-ray room. For other equipment, one X-ray machine (transportation) is equipped at this department, mainly used at the patient ward. One Chinese ultrasound machine is installed at the ultrasound room, however this equipment equips only one probe for abdomen, and this probe is used for diagnosis of all body parts. Thus, ultrasound diagnosis for head and superficial might have been imprecise, and diagnosis for infant hydrocephalus or superficial organs with about 5cm depth

is difficult despite of its high demand for treatment. Therefore, appropriateness of treatment planning is considered to be not secured, and to accept additional patients from the Old Hospital, installing appropriate medical equipment is strongly demanded. For these reasons, one Ultrasound machine (pediatric, color doppler, head+abdomen+superficial) with probes for pediatric head, abdomen, and superficial diagnosis, will be included in this Project.

The fluoroscopy room is currently used as a lecture room, and no medical equipment is installed at this room. Currently, image diagnosis of urinary organs for pediatrics is operated using a general X-ray machine, therefore capturing defined cystourethrogram is difficult and this prevents adequate diagnosis for congenital posterior urethral valves or vesicoureteric reflux. Also omitted pathological change is frequent, and this leads to conduct inappropriate operation plans or unnecessary operations. For these reasons, one X-ray machine (fluoroscopy) will be included in this Project, to strengthen diagnosis function by fluorography. In prior to the installation of X-ray machine, expansion of X-ray protective wall is necessary for protecting operator's body, and this construction will be borne on Myanmar side.

■ Laboratory Department

The laboratory department is comprised of biochemistry room, hematology room, chemical pathology room, blood bank, and other rooms. A blood bank building will be constructed on the land next to the existing building, and the current blood bank will be relocated after completion. Current blood bank will be used as a pathological histology room after relocation. From January 2012 to June 2012, this unit has operated 4,147 cases of hematology examination, 2,511 cases of biochemistry examination, 1,239 cases of parasitic insect examination, 937 cases of bacterial examination and 1,567 cases of serology examination.

The biochemistry room owns two semi-automated chemistry analyzers, however these analyzers are not designed for simultaneous testing with other examination items, and about eight hours is necessary for completing a report for one patient. Also, semi-automated analyzer is hard to deal with CRP examination which is essential for pediatric examination, and this prevents appropriate diagnosis for pneumonia or other inflammatory diseases. For these reasons, one Automatic chemistry analyzer will be included in this Project, to reinforce examination functions.

To deal with increasing number of patients accepted from the Old Hospital, pathology examination is considered to be more important, however currently almost no medical equipment is installed to this department for pathology examination. Processes of pathology examination such as extraction of tissue, fixing, cutting, paraffin embedding, thin-cutting, staining, etc. are all conducted manually. Under this situation, completing a pathology examination takes a long time at this department, not being able to catch up with increasing number of patients. For this reason, one Microtome, one Tissue processor, and one Automatic stainer will be procured by this Project, to reinforce the diagnosis function.

Starting from 2013, this laboratory department will accept about thirty students per year from University of Medical Technology, for training of examination skills. For this reason, one Microcope with camera and monitor will be included in this Project, to provide more elaborate examination training

for students.

■ Surgical Unit

Surgical unit is located in the two-storied two buildings called as the Unit 1 and the Unit 2, making a part of patient ward clusters which were newly constructed in 2011. This unit operates total 44 beds, 22 beds for each unit, and it also has a post-surgery observation room on the first floor of each building. The post-surgery observation room is used for patients after treatment at ICU, SCBU, or operation theaters, and outpatients planning a treatment plan. From January 2012 to June 2012, this unit has accepted 860 patients. As for medical equipment other than patient beds, this unit only owns several intravenous drip tables, and no other equipment is installed at this unit. For this reason, this Project will strengthen patient monitoring function of this unit, and ultimately promote task reducing of other hospital units such as ICU and operation theaters.

4）Central Women's Hospital in Yangon

■ Operation Theater

The operation theater of this hospital is located in the A bloc (second and third floor) and the C bloc (second and third floor). Operation theater in the A bloc is for obstetric operation, and the C bloc is for gynecologic operation. Operation theater 1 and 2 are located on the second floor of the A bloc, both for emergency operation. There is one operation theater on the third floor of the A bloc, and most operations conducted at this room are caesarean operation. Likewise C bloc also has operation theater 1 and 2 on the second floor; operation theater 1 is for major operation and laparoscopic operation, and operation theater 2 is for minor operation. Also there is one operation room on the third floor of C bloc, and this room is used mainly for laparoscopic and hysteroscopic operation. Regarding the laparoscopic and hysteroscopic operation, this hospital is the only public gynecological hospital conducting the concerned operation in the lower Myanmar, and from this standpoint this hospital provides practical training for trainees of Myanmar Medical University (1) every year.

In 2011, this hospital has operated 9,559 cases of operation as a whole, including 3,716 cases of major operation, and 5,843 cases of minor operation. Of all major operations, 1,361 cases are gynecological operation associated with laparoscopic operation. Meanwhile, this hospital has a high demand for operation of female urology, accounting about 60% of all gynecologic operations.

Regarding the existing anesthesia machines, one model used at the second floor of the A bloc has passed more than fifteen years after procurement, and it is unable to operate full anesthesia because its ventilator is unavailable. Another model used at third floor of the C bloc is under similar condition, and might danger proper operation. For this reason, two Anaesthesia machines with ventilator (adult) will be included in this Project, for replacement of above-mentioned existing equipment. As for operation tables, existing operation tables at operation theater 1 of A bloc second floor and operation theater 2 (minor operation room) of C bloc third floor are obsolete, only up-and-down motion is able and oscillation when lifting is strong. For this reason, two Operation tables (manual) will be included in this Project, as replacements of the above-mentioned existing equipment.

There is a vacant operation theater which was used for laparoscopic and hysteroscopic operation at the C bloc. Existing one set of hysteroscope was procured in 1990s, and is made up of combined components from different origin of manufacturers. This set of hysteroscope does not include some components necessary for treatment such as suction unit or resection forceps, and this equipment can only be used for diagnosis. For this reason, operation associated with a hysteroscope, such as uterine myomectomy, polypectomy, and endometrial hyperplasia cannot be treated at this unit, and patients of these diseases are transported to other hospitals or treated by laparotomy. For this reason, one set of Hysteroscope (rigid) will be installed to the operation theater 1 of C bloc second floor by this Project, to provide advanced gynecologic treatment. Also, one set of Colposcope will be installed to the operation theater on the third floor, for diagnosis and treatment of uterine cervical cancer.

This unit owns two sets of laparoscopes. One Olympus set was procured by Japanese grant aid in 2003 and used at the operation theater on the third floor, however this equipment is unusable since one year ago, due to failure of CO2 inflator and image deterioration from abrasion of fiber. The other Karl Storz set was procured as a donation in 1999, and this equipment is also unusable for operation because

of image deterioration resulted from obsoleteness. This equipment is presently used for diagnosis purpose. For this reason, operation associated with laparoscope, such as ovarian cyst, endometriosis, and uterine myomectomy cannot be treated at this unit, and patients of these diseases are transported to other hospitals or treated by laparotomy. For these reasons, two sets of Laparoscope (adult) will be included in this Project, to install one set each to the second and third floor of the C bloc. One laparoscopic operation will take approximately three to four hours for completion, and including the time for sterilization, two cases per one operation theater is considered to be the maximum frequency of operation.

■ Obstetrics and Gynecology Department

Colposcopy room is under the management of obstetrics and gynecology department, mainly providing diagnosis for uterine cervical cancer and uterine myomectomy. Among all reasons of visit of this hospital, medical examination of uterine cervical cancer and uterine myomectomy is the most major reason of visit, and this hospital recommends unmarried women to take routine examination of uterine cervical cancer twice in a year. For this reason, by strengthening the diagnosis function of colposcopy room, more appropriate operation planning will be possible.

For encouraging more advanced diagnosis of uterine cervical cancer, one set of Colposcope (with monitor) will be included in this Project. One existing equipment was donated as a second hand in 2010, however unclear imaging caused by mold adhesion and obsoleteness prevents precise diagnosis. For this reason, one set of Hysteroscope (flexible) will be included in this Project, for diagnosis of uterine myomectomy. This equipment will also include a video monitor, as this department provides training for trainees from Myanmar No.1 Medical University.

■ Special Care Baby Unit

Special Care Baby Unit provides treatment for neonates born in this hospital, and requiring intensive care. This unit is comprised mainly of SCBU1, SCBU2 and infectious disease room. In 2011, 7,601 cases of delivery (including 92 cases of stillbirth) are operated at this hospital as a whole, and of these cases, SCBU1 has accepted 1,012 cases of infants of low birthweight / premature and 6,434 cases of infants of normal weight but requiring special care, and SCBU2 has accepted 1,406 cases of infants with disease. Each SCBU1 and SCBU2 has two rooms for treatment, and each room is equipped with several infant incubators, cots, medical tables, and other equipment.

As for existing infant incubators, presently there are four at SCBU1 and five at SCBU2, all operating in an acceptable conditions. However, considering that these infant incubators have passed about eight to twelve years after procurement (including one infant incubator procured by Japan's Aid), some technical failures such as failure of temperature sensor or broken access ports are reported. For this reason, additional ten Infant incubators (manual) will be procured by this Project, to install five for one room of SCBU1 and another five for one room of SCBU2, to newly create infant incubator rooms for infants requiring intensive care. Existing infant incubators and cots will be relocated to the remaining one room at SCBU1 and one room at SCBU2, and these rooms will be used for patients of comparatively low intensity.

Regarding the existing patient monitors, there are one each at SCBU1 and SCBU2, and both are available for continuous use, although the measurement parameters are only SPO2 and blood pressure and probes for temperature and pulse rate are missing. For this reason, additional five Patient monitors (pediatric, standard) will be procured by this Project, to install two for one room of SCBU1, two for one room of SCBU2, and one for infectious disease room. Installing this equipment will encourage more precise vital signs management of neonates requiring intensive care, in parameters of SPO2, blood pressure, temperature, pulse rate, respiratory, etc.

The highest neonatal cause of death at this hospital is neonatal asphyxia (29.3%), and the fifth rank is respiratory distress syndrome (5.3%). The major reason of neonatal asphyxia is meconium aspiration, and for this case artificial respiration management is necessary for resuscitation. Against this situation, presently only one Drager ventilator is available for continuous use, and additional ventilator is acutely demanded. For this reason, two Ventilators (neonatal, A) will be included in this Project, installing one each for SCBU1 and SCBU2. The existing Drager ventilator will be relocated and used at the infectious disease room.

As for existing infant care centers, this unit owns three equipment that are barely available for continuous use. These equipment have passed more than ten years after procurement, and causing several failures for instance crack on acrylic wall. For this reason, three Infant care centers will be procured by this Project, installing one each for SCBU1, SCBU2, and infectious disease room.

■ Uro-Gynecology Department

Uro-gynecology department is under the management of gynecology department, located on the second floor of the E bloc. As described before, gynecologic operation accounts for almost half of all major operation conducted at this hospital, and especially operation of uro-gynecologic area is frequent. For appropriate operation planning of urinary organ area, urodynamics examination for determining urination disorder, causes of urination order (for instance cancer, bacterial infection, hormone disorder caused by menopause, bladder cervical sclerosis, sphincter damage caused by caesarean operation, etc.), and post-gynecological surgery diagnosis are necessary. For this reason, one Urodynamic measuring machine will be included in this Project.

■ ICU

ICU is located on the third floor of C bloc and operating four beds. This ICU is for patients before and after obstetrics and gynecological surgery, and is not targeted for infants. In 2011, this unit has accepted 147 patients, and the normal length of stay is from one week to one month. Estimating the average length of stay to be ten days, all beds of this ICU are constantly in full operation.

As for existing ventilators, there are two Acoma ventilators which were procured by Japanese assistance in 2003, and one Drager ventilator which the procurement year is unknown. About half patients will require treatment using ventilator at this unit, however all existing ventilators are obsolete and require replacement. For this reason, two Ventilators (adult) will be included in this Project, for four beds of this ICU.

■ Ultrasound Examination Unit

The ultrasound examination unit is located on the first floor of E bloc, comprised of two obstetrics sections and one obstetrics and gynecology section. Two Hitachi ultrasound machines were installed at obstetrics section; one was procured in 2003 by Japanese aid, and the other was procured in 2010. The ultrasound machine procured in 2003 is at replacement period; reporting cracks on input panel, scratch on abdomen probe, and broken cables. This unit has operated 7,495 cases of ultrasound examination in 2011, accepting about 30 cases per day. Each equipment is operating about ten cases per day, however existing equipment are not capable of additional examination. In case if the 2003 ultrasound machine became inactivate, many patients must be sent to other external hospitals. Therefore by this reason, one Ultrasound machine (OBGY, abdominal+TV) will be included in this Project as a replacement for 2003 Hitachi ultrasound machine, to maintain current operation capability.

The obstetrics and gynecology section installed a Chinese ultrasound machine procured in 2011, however this equipment only equips one abdomen probe and is not capable of examination for other gynecology area. Currently this abdomen probe is used for diagnosis of uterine cancer, uterine cervical cancer, hydatidiform mole, hydatid pregnancy, umbilical blood flow and deep vein, and precise diagnosis and operation planning is made difficult. For this reason, one Ultrasound machine (adult, color doppler, abdomen+TV+superficial) will be included in this Project, to reinforce the obstetrics and gynecological examination function of this unit.

5) Yangon Children Hospital

■ Operation Theater

Operation theater of this hospital is located on the second floor of C bloc, operating five operation theaters; operation theater No. 1 to 4 and a operation theater for patients of infectious diseases. Operation theater No.1 and 4 equips two operation tables and two operation lamps, and other operation theaters equip one operation table and one operation lamp each, total seven operation tables and seven operation lamps are installed to this operation theater. Operation theater No.1 and 3 operate for major operation, No.2 operates for endoscopic operation, and No.4 operates for minor operation. In 2011, 4,089 cases of operation were conducted at this department, and of these, 1,544 cases were major operation.

There is a sterilization room on the same floor of the operation theater, and this room has one autoclave (horizontal, 225L) which was granted by Japanese aid in 2003. For other equipment, one vertical autoclave and two boiling instrument sterilizers are installed for operation of this four-bedded operation theater. The autoclave (horizontal, 225L) requires replacement due to obsoleteness, and this hospital plans to expand its number of beds from current 550 beds to 750 beds, therefore by these reasons, two Autoclaves (horizontal) will be procured by this Project.

Pediatric is comparatively active in water metabolism and is likely to cause moisture and electrolyte disorder, thus infusion management is considered to be the most important matter of pediatric care. For this reason, total ten Syringe pumps and ten Infusion pumps will be procured by this Project, installing two each for three operation tables of major operation theater, and one each for other operation tables. There are three existing syringe pumps at this department, however these equipment are not available for continuous use due to its obsolete unrechargeable batteries, therefore these existing equipment will be used as reserves.

Body temperature management is considered to be an important matter during operation, as body temperature of patients likely to decrease after anesthesia. Neonates and infants have broader body surface area but lesser subcutaneous structures, therefore these patients are vulnerable to sudden temperature change, and close temperature monitoring is necessary. Low body temperature during and after operation may associate with some disorders such as decline in immune function or blood coagulation disorder, and recovery from these cases takes longer time. At this department, room temperature of operation theater is kept at 22 degrees during operation, and body heat is preserved by using blankets or warm-air heating devices. The existing patient warmer was manufactured in Israel in 1993, and this equipment is considered to be not available for continuous use. Existing three blood warmers were procured by Japanese aid in 2003, and only one out of three is available for continuous use. For these reasons, four Patient warmers with specification of liquid circulation insulation, and four Blood warmers for warming blood for transfusion, will be included in this Project. Three sets of above equipment will be installed to three operation tables for major operation, and the remaining one set will be installed to the operation table for endoscopic operation. The available blood warmer will be relocated and used at the minor operation theater.

As for vital signs management of patients during operation, this unit uses four patient monitors which were procured by Japanese aid in 2003. These equipment are already obsolete, and report failure

of end-expiratory carbonic acid concentration sensor socket. Besides its batteries became unrechargeable and these equipment are operated by AC power supply. In fact, this model is unable to measure CVP, IBP, and anesthetic gas, and is considered to be not appropriate for pediatric operation theater from the time of procurement. As described before, infusion management is one of the most important matters of pediatric operation. Excess infusion or loss of body fluid (bleeding, body extracts, or digestive fluid) during operation can cause change in the volume of circulating blood, and to prevent unstable blood volume or reduction of cardiac function, it is necessary to monitor CVP and IBP during operation. For this reason, four Patient monitors (pediatric, Multi Gas+IBP+CVP) will be included in this Project, installing one each for three operation tables of major operation theater, and one for operation table of endoscopic surgery. Existing four patient monitors will be relocated and used at the minor operation theater.

There are three existing anesthetic machines which were procured by Japanese aid in 2003, and these three machines are for shared use of seven operation tables. However, some technical failures have been reported due to obsoleteness, and it is supposed to be not adequate for long operation. For this reason, three Anaesthesia machines with ventilator (pediatric) will be included in this Project, to install one each to three operation tables of major operation theater. Existing three anesthetic machines will be relocated and used at the minor operation theater and the endoscopic operation theater.

Each operation theater installs a ceiling type operation lamp. Operation theater No.1, 2 and 3 install one Skylux operation lamp each (as well as one small French operation lamp at operation theater No.1) procured by Japanese aid in 2003, and operation theater No.4 also installs one Skylux operation lamp which the procurement year is unknown and another small operation lamp. This Project plans to replace the operation lamp of operation theater No.1 and 3, where comparatively more important operations are conducted. For this reason, three Ceiling lamps (double head) will be included in this Project, to replace the existing two Skylux and French operation lamps at operation theater No.1, and one operation lamp at operation theater No.3. The small French operation lamp at operation theater No.1 will also be replaced, as its illuminance level is not enough and was not appropriate for long operation.

Endoscopic operations are conducted at operation theater No.2, and this room equips one set of laparoscope and one set of bronchoscope both manufactured by Karl Storz. The bronchoscope has passed more than 20 years after procurement, and is not appropriate for continuous use due to adhesion of molds. Pneumonia and bronchitis always ranks within the top five factors of death at this hospital every year, and diagnosis / treatment for respiratory diseases are in absolutely high demand. For this reason, one set of Bronchoscope (pediatric, flexible) will be procured by this Project, as a replacement of the existing equipment.

To add, one Ultrasound machine (pediatric, color doppler, vascular) will also be included in this Project, for high calorie infusion (feeding tube), CVP measurement, and continuous drop dosing of cardiovascular agent for conducting CVP catheter treatment.

A fumigation machine was also requested for sterilization of whole operation theater, however this equipment will be excluded from this Project, because of the unclear benefit of sterilizing the whole operation theater, very few manufacturers producing this equipment, and concerns on the environmental impacts by the use of this equipment.

Also, a table top autoclave (ethylene oxide) was also requested, however manufacturers producing table top type are very few at this time, and the use of ethylene oxide are concerned to impose environment impacts, therefore this equipment will also be excluded from this Project.

■ Medical Unit

There are three medical units (M1, M2, and M3) at this hospital; M2 and M3 are located at the A bloc, and M1was relocated from the A bloc to the Extended Building which sits across the C bloc after the completion its construction in 2009. From the hospital's record, each unit operates about 60 beds each, however these units normally accept 80 patients and it sometimes increase to more than 100 patients. Patients are sorted to each unit by the date of acceptance, and each unit does not have any difference in terms of treatment. In 2011, this unit has accepted 16,089 neonatal and infant patients.

Pediatric is active in water metabolism and is likely to cause moisture and electrolyte disorder, thus infusion management is considered to be the most important matter of pediatric care. As for existing equipment for infusion management, there are two existing syringe pumps, three existing infusion pumps, and one patient monitor at these units. For this reason, additional seven Syringe pumps and six Infusion pumps will be procured by this Project, to maintain three equipment for each unit. Also, five Patient monitors (pediatric, standard) will be included in this Project, to maintain two equipment for each unit, for monitoring infusion management, temperature, pulse rate, respiration, and SPO2.

■ Surgical Unit

Three surgical units (S1, S2, and S3) used to locate at the A bloc, and S1 and S2 has been relocated to the Extended Building which after the completion its construction in 2009. S3 still operates at the A bloc. Each unit is reported to operate 50 beds each, and S1 also operates sixteen bedded burn injury unit. In 2011, this unit has accepted 4,362 neonatal and infant patients. This Project will plan procurement especially for S1 and S3, as S2 has already been supplied necessary medical equipment by Australian aid.

The target patients of this unit are neonatal and infants, and it is necessary to reinforce infusion management function of this unit. For this reason, two Syringe pumps and two Infusion pumps will be procured by this Project, to maintain one equipment for each unit. S3 already equips necessary number of those equipment, therefore these planned equipment will be installed one each to S1 and burn injury unit. Also, two Patient monitors (pediatric, standard) will be included in this Project, for monitoring infusion management, temperature, pulse rate, respiration, and SPO2. There is no existing patient monitor at this unit.

■ Neonatal Unit

Neonatal unit is located on the fourth floor of B bloc, comprised of four-bedded NICU (cot), nine-bedded premature neonatal room (infant incubator), five-bedded isolated room (cot), nursing room, individual rooms, and so forth. In 2011, this unit has accepted 1,350 neonatal patients. Major diseases accepted at this unit are neonatal jaundice, neonates of low birthweight, umbilical cord sepsis, neonatal asphyxia, respiratory disorders and others. For existing equipment that is available for continuous use,

this unit owns several infant incubators and phototherapy units.

The strengthening point of NICU is the infusion management of neonatal. Infusion pumps are essestial for treatment of septicemia and other various diseases, and its need is high at this unit. For this reason, three Infusion pumps will be procured by this Project, installing two for the isolated room and one for NICU, as supplementary to existing three infusion pumps that are available for continuous use. There are five infusion pumps that are available for continuous use, and these will be relocated to the isolated room (one equipment) and the premature neonatal room (four equipment). Then, additional five Syringe pumps will be included in this Project, to install more to the premature neonatal room. Also, five Patient monitors (pediatric, standard) will be included in this Project, for monitoring infusion management, temperature, pulse rate, respiration, and SPO2. These planned patient monitors will be placed to the premature neonatal room, and existing five monitors will be relocated to other rooms of this unit; one for the isolated room and four for NICU.

Because of the unavailability of ventilator, infants of meconium aspiration syndrome / asphyxia of the newborn are transported to Yangon General Hospital, in case those infants are in need of treatment using ventilator. However, some serious cases have been reported resulting serious permanent damage or death, due to delayed treatment. For this reason, one Ventilator (neonatal, A) will be procured by this Project, to establish an emergency treatment system using ventilator.

Infants of septicemia are the most major patients accepted at this unit, in many cases with organ disorders or organ perfusion failures, caused by intravascular coagulation and reduced oxygen transportation. Also, asphyxia of the newborn follows after, and the most cases of asphyxia of the newborn are considered to be caused by meconium aspiration from blood circulation failure of maternal body. Ultrasound machine is necessary for providing appropriate treatment for those diseases; however this unit does not own the concerned equipment. For this reason, one Ultrasound machine (neonate, color doppler, heart+abdomen+superficial) will be included in this Project.

■ Cardiac Unit

Cardiac unit is located on the first floor of the New Extended Building, which was newly opened in July 2011. This unit is comprised of twelve bedded heart unit, twelve bedded cranial nerve unit, five bedded shared High Dependency Unit (HDU), EEG examination room, treatment room, physical therapy room, and so forth. This unit is targeted for patients who are referred from lower hospitals in Yangon district, with suspicion of cardiac and cranial nerve diseases. These patients are given diagnosis and treatment at this unit, and after planning a treatment plan, these patients are referred to Yangon General Hospital where specialized doctors are assigned. This unit also operates monitoring and treatment for patients after operation. In 2011, 250 cases of ECG examination and 93 cases of EEG examination were conducted at this unit.

At the heart unit, to provide monitoring for congenital heart disease before and after operation, definite diagnosis for arrhythmia, treatment for cardiac muscle / coronary artery diseases, pulmonary hypertension, and other treatment for acquired heart diseases, one ECG machine will be included in this Project. Coronary spastic angina, which is caused by arrhythmia and vibration of coronary artery, is found more during night and morning. Therefore it is difficult to define this disease by short-term ECG

examination or stressed ECG examination, and periodical ECG recording during real life is necessary. For this reason, one ECG machine (holter) will be included in this Project.

The cranial nerve unit operates EEG examination for infants and pediatric at the EEG examination room. The EEG examination room is designed to be a relaxing room for pediatric, and is equipped with an EEG machine (manufactured by Deltamed, France), computer, and a printer. The major disease treated at this unit is epilepsy, and this unit provides definite diagnosis of epilepsy using an EEG machine. Patients suspicious of epilepsy are transported to Yangon General Hospital if needed, for more detailed examination of deformed brain or blood vein disorder using CT or MRI. Existing EEG machine has passed eight years since procurement, and this machine reports unknown noise at specific channels, and adequate diagnosis is difficult. The manufacturer of this equipment does not have a local agent in Myanmar, therefore repair is not possible. For these reasons, one EEG machine will be included in this Project as a replacement of existing equipment, for appropriate treatment planning at this unit, and establish an appropriate treatment system coped with Yangon General Hospital.

At the HDU, one Defibrillator (pediatric) and one Oxygen concentrator will be introduced by this Project, to deal with heart attack or other sudden change of patients. Also, to reinforce infusion management of patients, two Infusion pumps and two Patient monitors (pediatric, standard) will also be included in this Project.

■ Renal Unit

Renal unit is located on the third floor of the New Extended Building. This unit is comprised of two renal rooms (sixteen beds each), one shared HDU (seven beds), three isolated rooms (five beds each), one treatment room, one peritoneal dialysis room (four beds), dialysis rooms (four beds total, one bed for individual room), RO water (water processed through reverse osmosis membrane) production room, and other rooms. This unit is targeted for patients who are referred from lower hospitals in Yangon district with suspicion of renal diseases. These patients are given diagnosis and treatment at this unit, and after planning a treatment plan, these patients are given operation at this hospital or referred to Yangon General Hospital. This unit also operates monitoring and treatment for patients after operation. RO water for diluting dialysis fluid of hemodialysis machine is produced and supplied from the RO room, by removing impure substances from tap water.

There is one existing Fresenius hemodialysis machine which is able for continuous use, and this equipment will be used at the individual room of dialysis room. Then, additional one Hemodialysis machine will be procured by this Project, to install to the four bedded dialysis room. Also, this treatment is targeted for infant and pediatric patients, and to maintain infusion management of patients during hemodialysis, one Infusion pump and one Patient monitor (pediatric, standard) will also be included in this Project.

■ Hematology and Oncology Department

Hematology and oncology department is located on the fourth floor of the New Extended Building. This department is comprised of two shared patient wards (twenty four beds), shared HDU (fourteen beds), four isolated rooms (one bed each), one treatment room, one chemotherapy preparation

room, and other rooms. This unit is targeted for patients who are referred from lower hospitals in Yangon district, with suspicion of aplastic anemia, thalassemia (anemia caused by genetic defect, also called as Mediterranean anemia, which is increasingly found in malaria proliferated area including Myanmar), hemophilia, thrombocytopenia, acute and chronic myeloid leukemia, acute and chronic lymphatic leukemia, and other diseases. These patients are given diagnosis and treatment at this department, and after planning a chemotherapy plan, these patients are given treatment at this hospital or referred to Yangon General Hospital. Patients requiring radioactive treatment will be transported to Yangon General Hospital.

This department is targeted for infant and pediatric patients, and major treatment given at this department is infusion management. As for existing usable equipment, there are three syringe pumps, three small patient monitors (manufactured in Korea in 2004), and several nebulizers. For this reason, two Infusion pumps and two Patient monitors (pediatric, standard) will be included in this Project, to reinforce infusion management system of this unit.

■ Laboratory Department

Laboratory department is located on the first floor of B bloc, comprised of hematology room, histopathology room, biochemical pathology room, microorganism room, parasitic insect room, blood bank, lecture room for students, and others. In 2011, this unit conducted 32,048 cases of biochemical pathology examination, 25,820 cases of hematology examination, 18,834 cases of microorganism/parasitic insect examination, 18,485 cases of post-blood transfusion infectious disease examination, and 891 cases of histopathology examination. Also, this hospital accepts trainees of clinical laboratory technician from Myanmar Medical University (1) every year, and provides practical training at this laboratory department.

At the hematology room, examination on blood diseases derived from hemoglobin disorder, such as thalassemia, is frequently conducted. This department owns an electrophoresis machine which was procured by Japanese aid in 2003, however this equipment requires repair since several years ago, and currently this examination is outsourced. For this reason, one Electrophoresis (hemoglobin) will be procured by this Project as a replacement, to enhance the partnerships with hematology and oncology department.

Two existing microscopes of this department are available for continuous use, and these are shared among the whole department. For this reason, two additional Microscopes will be procured by this Project, to raise the examination ability. Also for training of students, one Microcope with camera and monitor will be included in this Project, to provide more elaborate training for students.

■ Emergency Department

Emergency department is located in a building called as the “old hospital building”, and is comprised of triage room, treatment room, diagnosis room, and eight-bedded Day Care Center. In 2011, this department accepted 46,411 emergency patients, and these patients are given treatment at this department or transferred to Yangon General Hospital.

To improve the vital signs management of patients, two Patient monitors (pediatric, standard) will

be included in this Project. There is no existing patient monitor at this department. Additionally, one Defibrillator (pediatric) will be introduced by this Project, to deal with heart attack or other sudden change of patients. Existing defibrillator of this department has passed more than 15 years after procurement, and continuous use is not considered to be possible. As for oxygen concentrators, many patients accepted at this department require concentrated oxygen, and existing two oxygen concentrators are at almost full operation. For this reason, additional four Oxygen concentrators will be included in this Project, to place at the Day Care Center.

■ Physiology Department

Physiology department is located in a flat building near the B bloc, providing rehabilitation treatment for patients of orthopedics department before and after operation, as well as ambulation and standing training for physically challenged children. This department is comprised of treatment room and exercise therapy room, and has accepted 1,556 patients in 2011. The treatment room equips one infrared lay lamp, one shortwave therapy apparatus, etc., and the exercise therapy room equips mats, parallel bars, balance balls and other therapy equipment. To improve the function of these rooms, this Project plans procurement of one Ultrasound therapy machine, one Paraffin bath for therapy, and one Spirometer for the treatment room, and also one Wedge, one Standing table and one Bicycle exercise machine (pediatric) for the exercise therapy room.

■ ICU

ICU is located on the third floor of B bloc, operating six-bedded general patient ward and two isolated rooms (one bed each), total eight beds. This unit provides concentrated care for patients before and after operation, and has accepted 491 infant and pediatric patients in 2011. The average length of stay of this ICU is reported to be about seven days, and all beds are full at almost every day.

Regarding the patient monitors, this equipment is essential for vital signs management of patients, and this ICU owns three models that are able to measure ETCO2 (of two is procured by Japanese aid in 2003). For this reason, five additional Patient monitors (pediatric, ETCO2) will be included in this Project, to establish a system that is able to evaluate ventilation volume and function of trachea / bronchus, and monitor the condition of patients at each patient bed.

As for ventilators, two existing ventilators are available for continuous use, and these equipment are shared among the whole unit including the isolated rooms. For this reason, existing two ventilator will only be used at the isolated rooms, and additional two Ventilators (pediatric, A) will be newly procured by this Project for the general patient ward.

■ Image Diagnosis Department

Image diagnosis department is located on the first floor of C bloc, comprised of one ultrasound examination room, two general image diagnosis rooms and one fluoroscopy room. In 2011, this department conducted 11,312 cases of radioactive image diagnosis and 5,177 cases of ultrasound examination. Ultrasound examination room installs two ultrasound machines, both are operating in good condition. Each general image diagnosis room owns one X-ray machine for general image diagnosis,

one is manufactured by Shimadzu and procured in 2003 by Japanese aid, and the other X-ray machine is procured in 1980s. Both X-ray machines at general image diagnosis rooms are still operating. At the fluoroscopy room, there is one Shimadzu X-ray machine procured by Japanese aid in 2003, however this equipment shows technical failures and not is used for diagnosis at this time. For this reason, to replace the 1980 general X-ray machine, one X-ray machine (general, digital) will be procured by this Project. Also, for pediatric patients having difficulty with transfer, one X-ray machine (mobile, digital) will be included in this project.

(4) Equipment Plan

See Appendices for the Equipment List (Appendices 6), Outline of the Major Equipment (Appendices 7), and Location Plan of Planned Equipment (Appendices 8).

2-2-3 Outline Design Drawing

The following diagrams show the outline design drawing of each target hospital, and installation plan of the equipment which requires installation.

Example: Existing Equipment

Planned Equipment

(1) Mandalay General Hospital

1) Hospital Outline Design Drawing

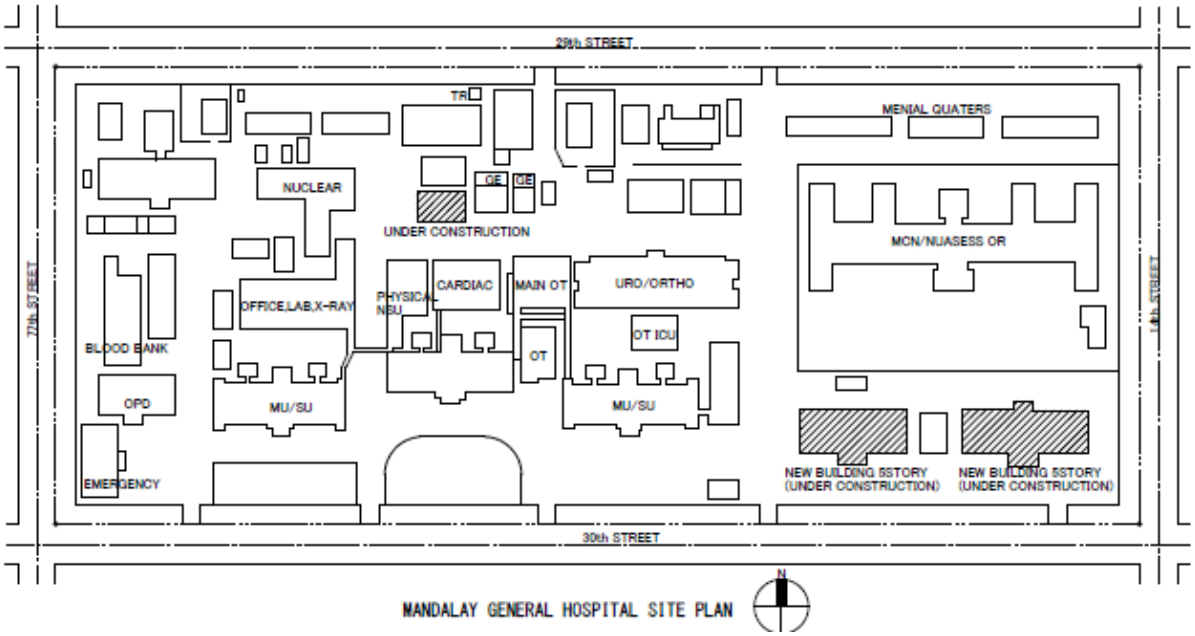


Figure 2-1 Mandalay General Hospital, Hospital Outline Design Drawing

2) Image Diagnosis Department, CT Scanner

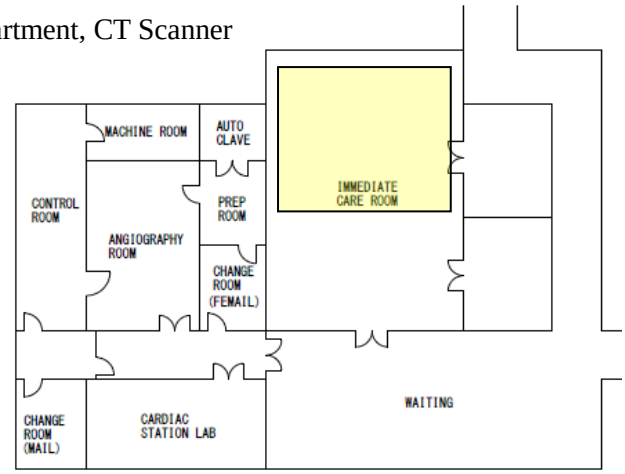


Figure 2-2 Image Diagnosis Department

(Current CCU will be renovated as a new Image Diagnosis Department after opening of the New Building)

3) Emergency Department, CT Scanner

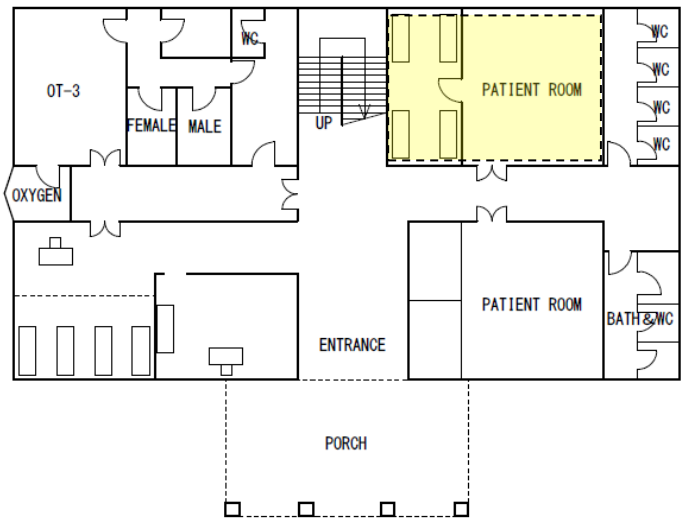


Figure 2-3　Emergency Department

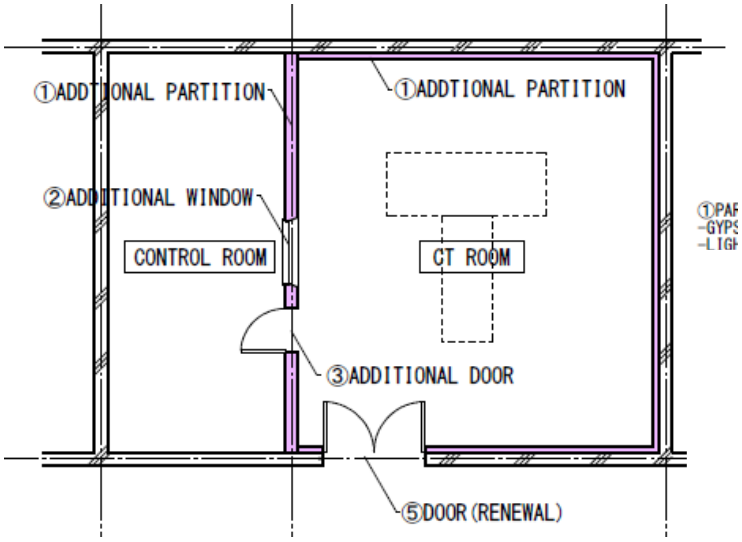


Figure 2-4　CT Room

(Current patient ward will be renovated)

(2) Central Women's Hospital in Mandalay

1) Hospital Outline Design Drawing

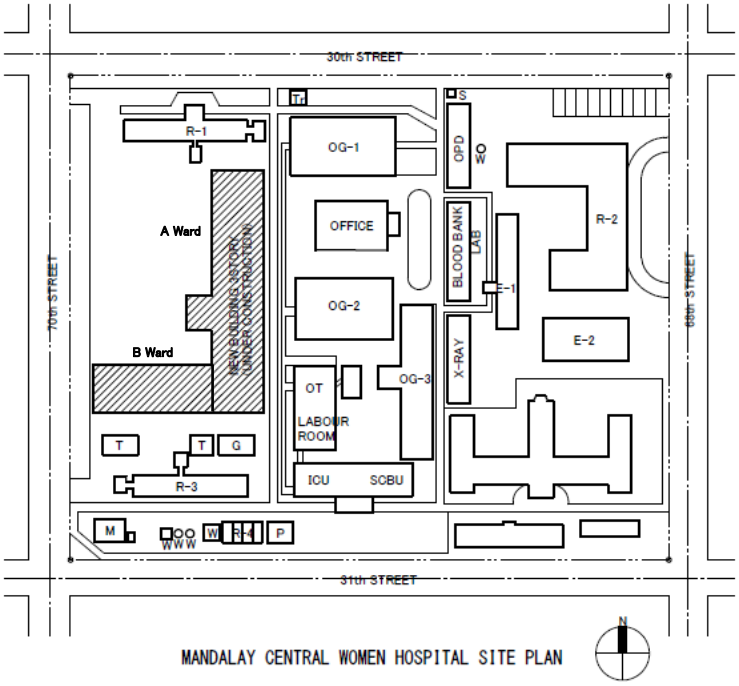


Figure 2-5　Central Women's Hospital in Mandalay, Hospital Outline Design Drawing

2) Image Diagnosis Department, X-ray machine (fluoroscopy)

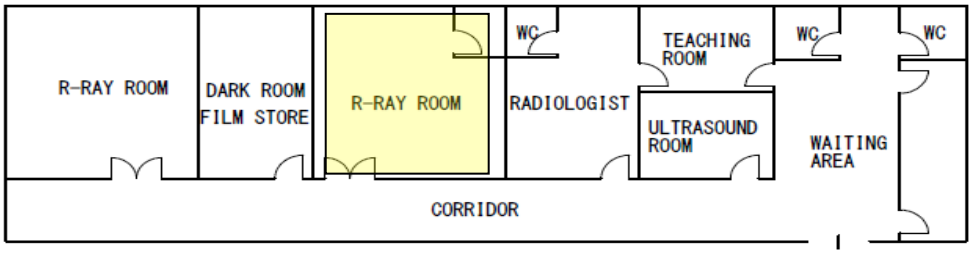


Figure 2-6　Image Diagnosis Department

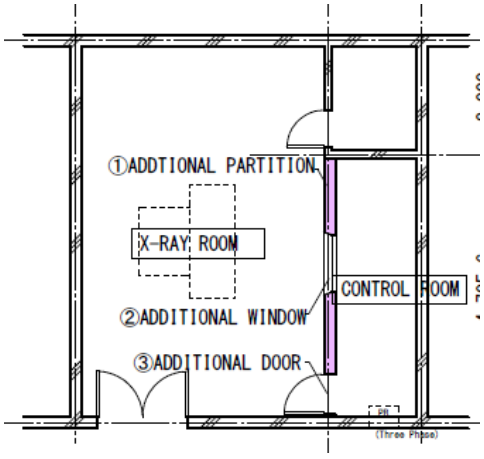


Figure 2-7　X-ray Room (fluoroscopy)

(Current storage will be renovated as a X-ray room)

3) Operation Theater, Autoclave (vertical, large)

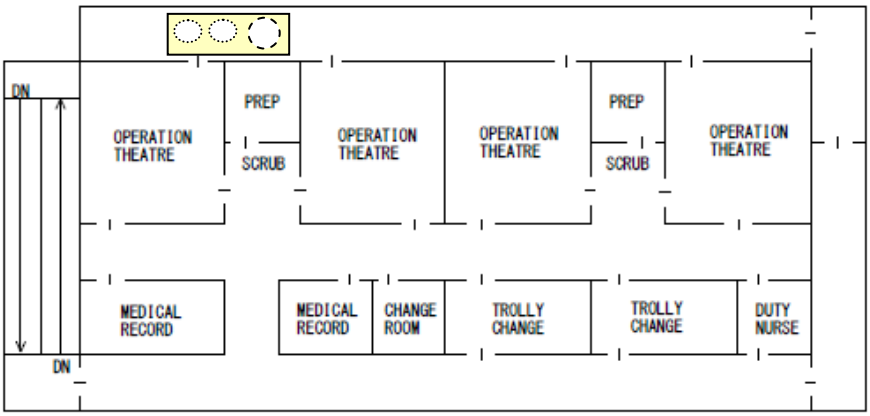


Figure 2-8 Operation Theater

4) New Operation Theater, Autoclave (vertical, medium)

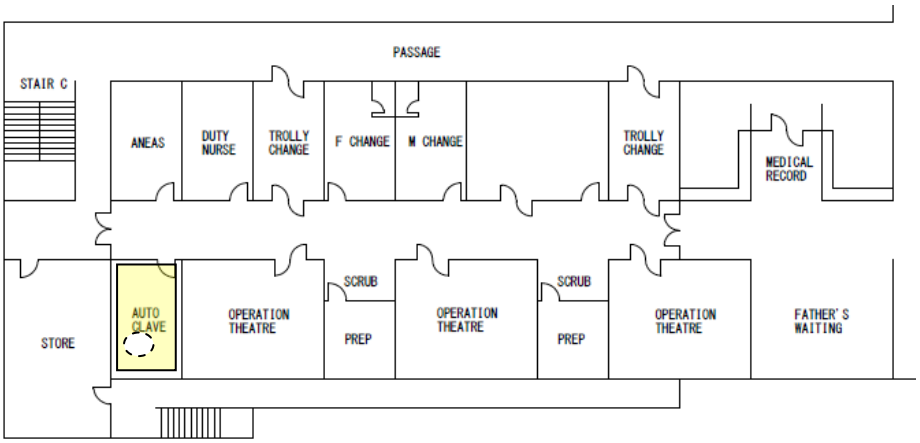


Figure 2-9 New Operation Theater

5) Labor Room, Autoclave (vertical, medium)

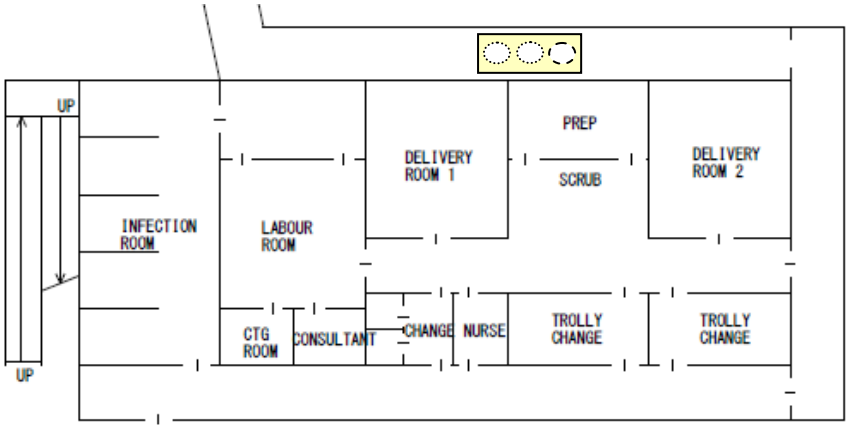


Figure 2-10 Labor Room

6) New Labor Room, Autoclave (vertical, medium)

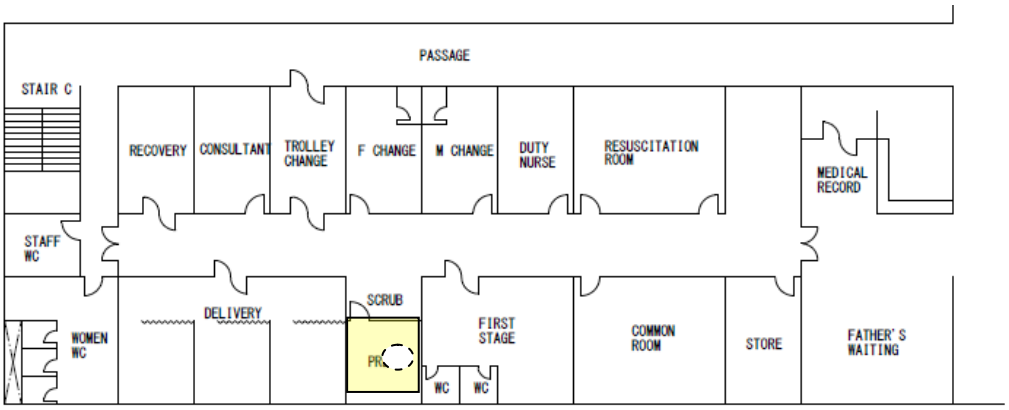


Figure 2-11 New Labor Room

7) Laboratory Department, Safety Cabinet, Autoclave (laboratory)

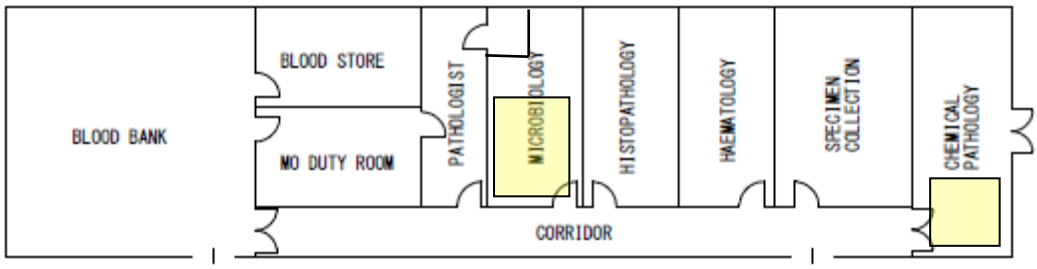


Figure 2-12 Laboratory Department

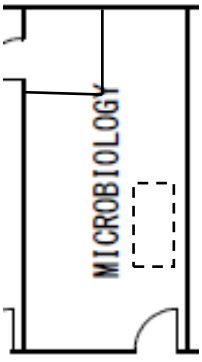


Figure 2-13 Microbiology Laboratory
(Safety Cabinet)

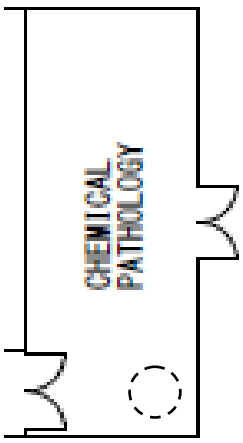


Figure 2-14 Chemical Pathology Laboratory
(Autoclave, laboratory)

(3) Mandalay Children Hospital

1) Hospital Outline Design Drawing

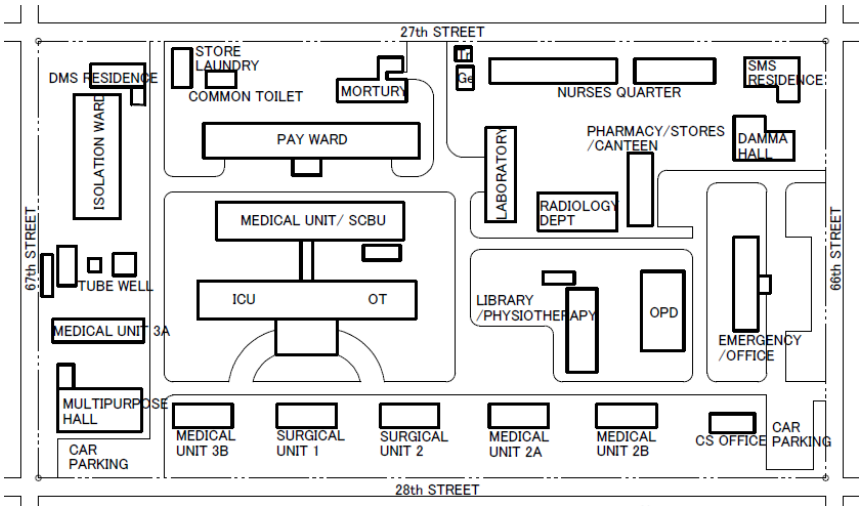


Figure 2-15　Mandalay Children Hospital, Hospital Outline Design Drawing

2) Image Diagnosis Department, X-ray machine

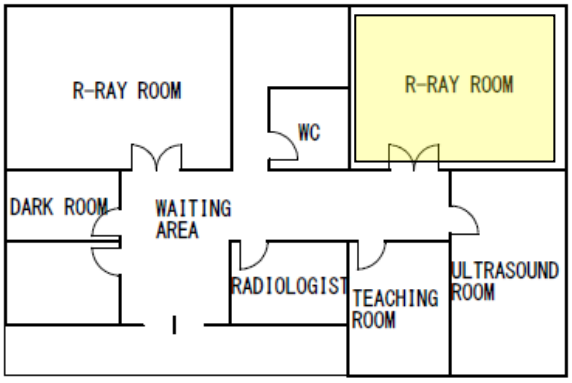


Figure 2-16　Image Diagnosis Department

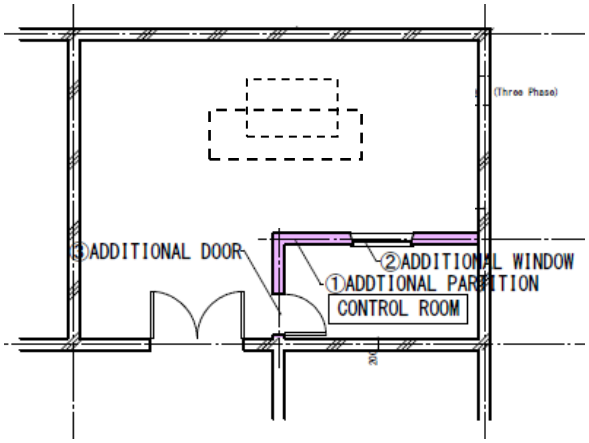


Figure 2-17　X-ray Room (Fluoroscopy)

(Currently vacant, X-ray control booth is to be installed)

3) Operation Theater, Autoclave (vertical)

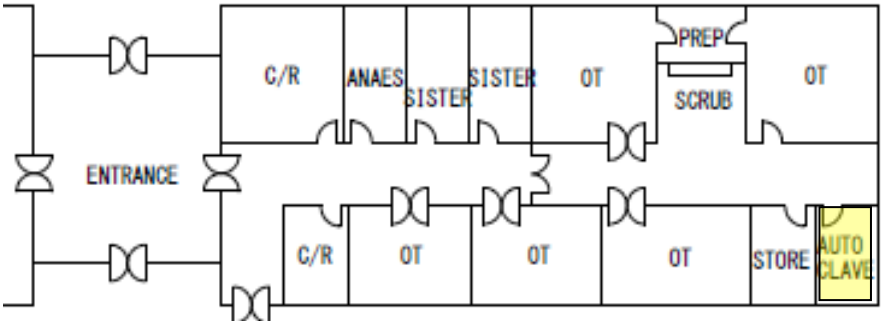


Figure 2-18 Operation Theater

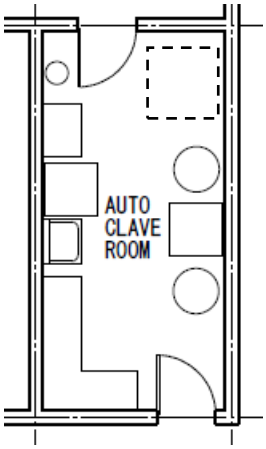


Figure 2-19 Autoclave Room

(4) Central Women's Hospital in Yangon

1) Hospital Outline Design Drawing

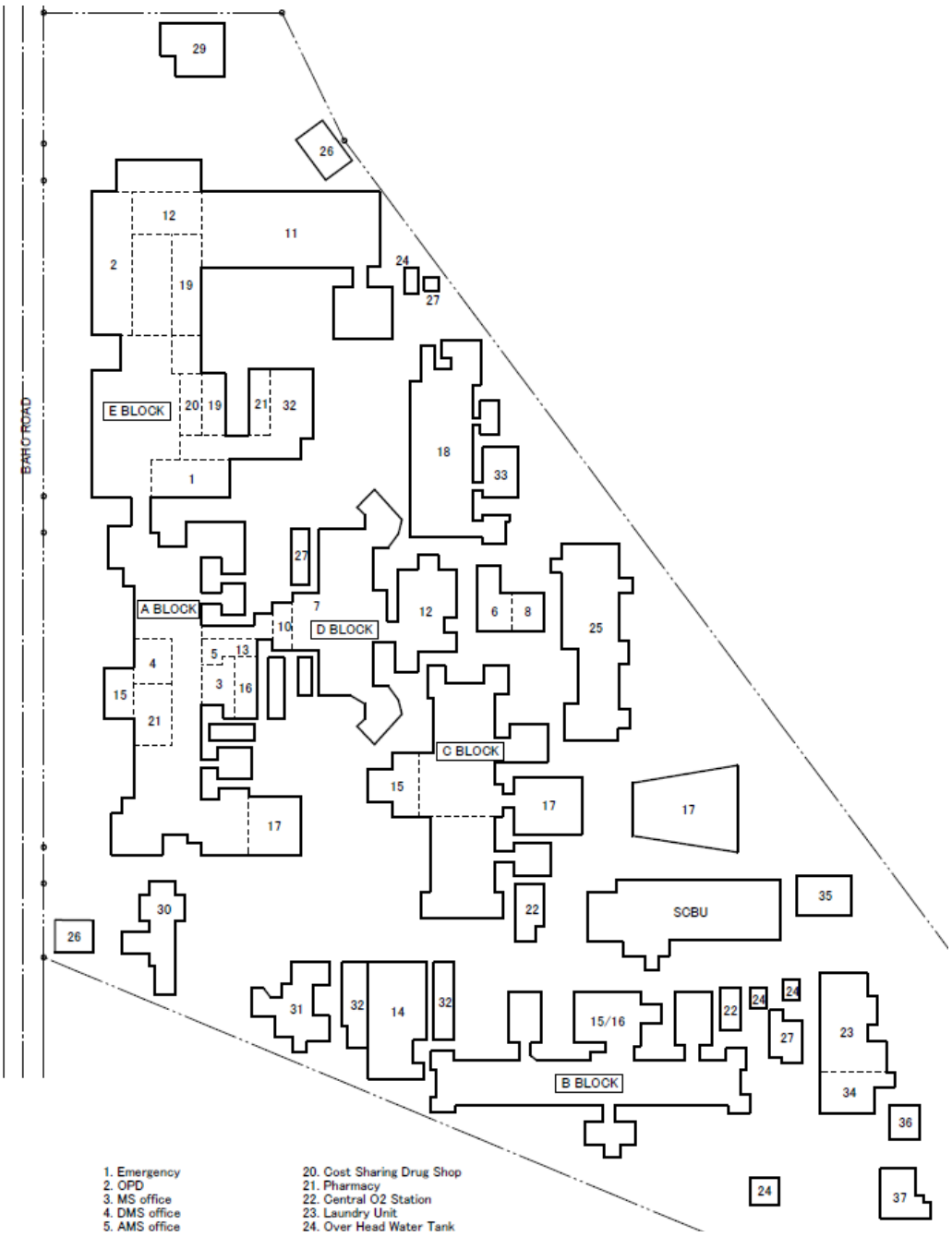


Figure 2-20 Central Women's Hospital in Yangon, Hospital Outline Design Drawing

(5) Yangon Children Hospital

1) Hospital Outline Design Drawing

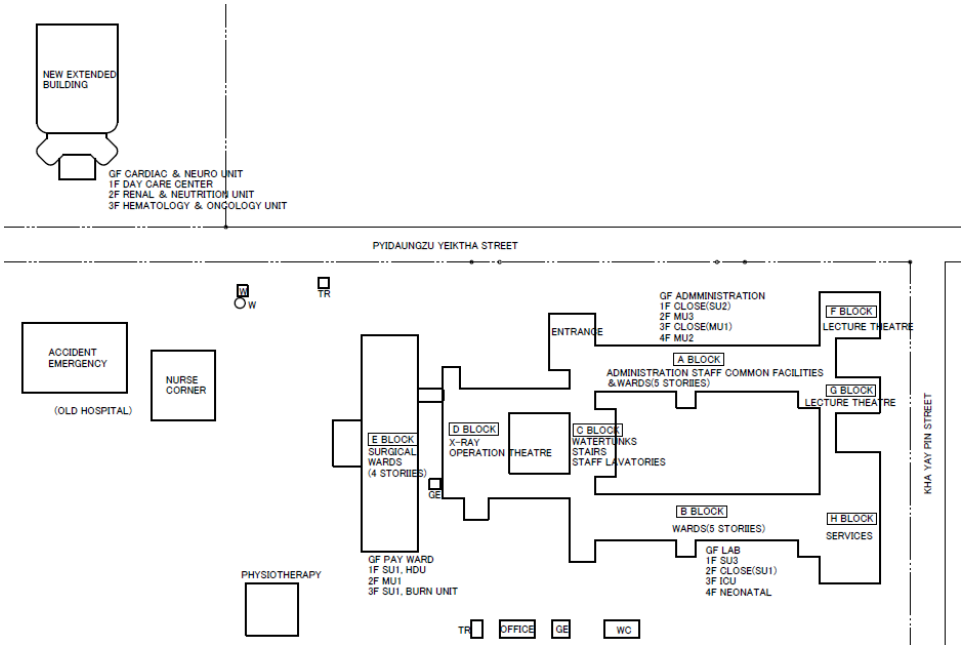


Figure 2-21　Yangon Children Hospital, Hospital Outline Design Drawing

2) Image Diagnosis Department, X-ray machine (general, digital)

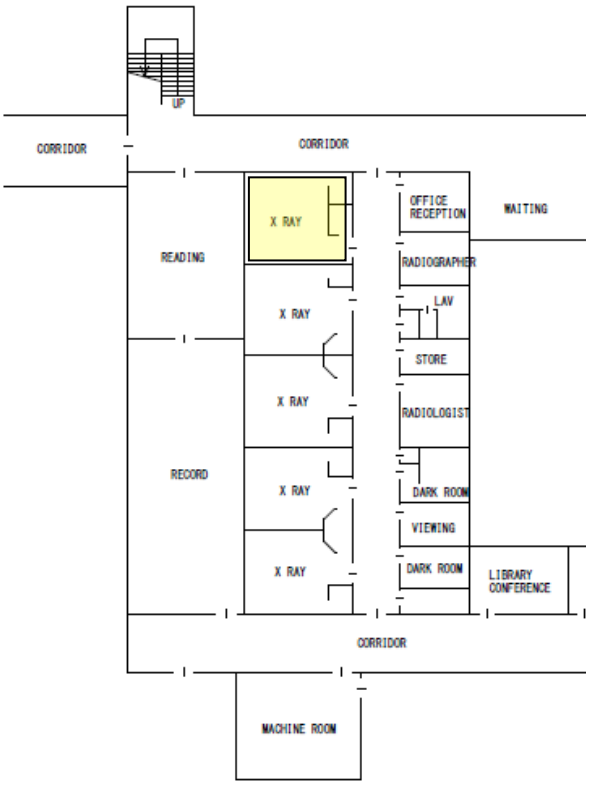


Figure 2-22　Image Diagnosis Department

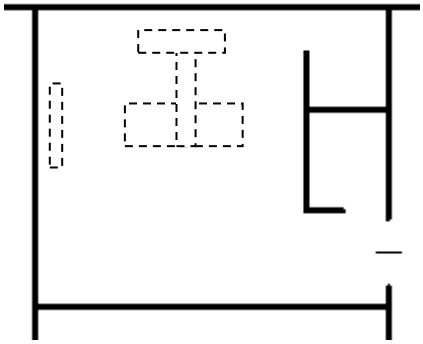


Figure 2-23　X-ray Room 1

3) Operation Theater, Ceiling Lamp (double head), Autoclave (horizontal)

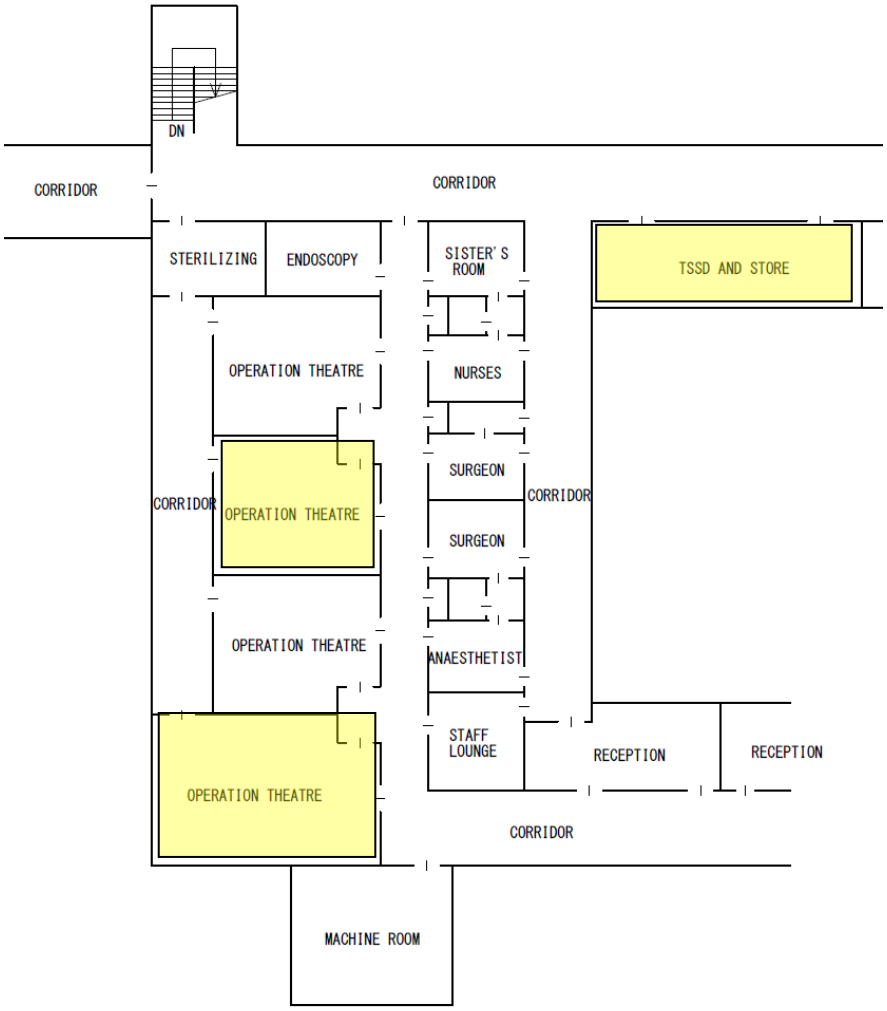


Figure 2-24　Operation Theater

4) Operation Theater, Ceiling Lamp (double head)

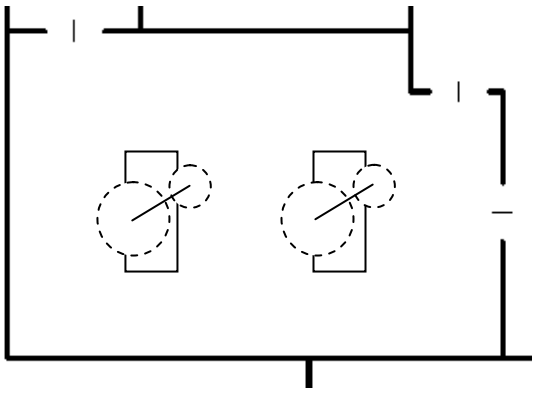


Figure 2-25 Operation Theater 1

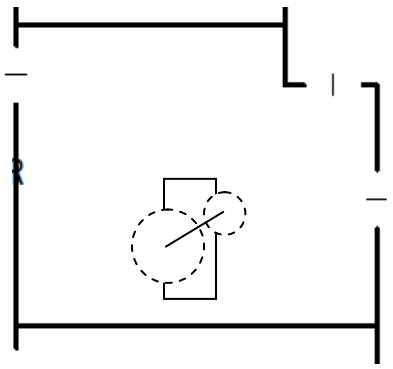


Figure 2-26 Operation Theater 3

5) Operation Theater, Autoclave (horizontal)

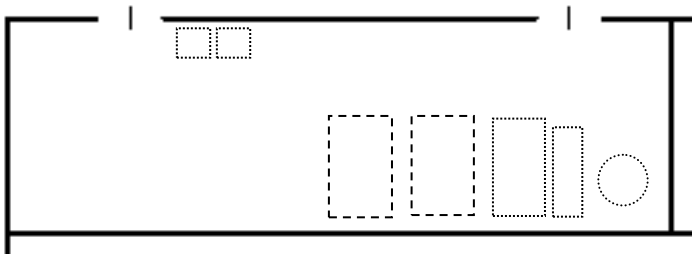


Figure 2-27 Autoclave Room

2-2-4 Implementation Plan

2-2-4-1 Implementation Policy

This cooperation project is implemented according to the framework of grant-aid assistance of the Japanese government. Therefore, the project officially initiates after an approval of both the government of Japan and the government of Myanmar, concluded with an official agreement of the Exchange of Notes (E/N) and the Grant Agreement (G/A). Thereafter, the Consultant (a Japanese legal person) conducts detailed design work (preparation of detailed design documents) based on the contract with the Myanmar side. In addition, the Supplier, which is the Japanese legal persons assigned by bidding, conducts delivery and installation of equipment.

The examination concerning the work plan is conducted between the Consultant and the responsible persons from the Myanmar implementing organizations within the period of detailed design. In addition, consultation is held to ensure smooth execution of the work that are borne on Japan or Myanmar side, based on the implementation schedule described in this Report.

(1) Implementation System

The governmental organization in charge of this Project is the Myanmar Ministry of Health (MOH), and the implementing organization is Department of Health, Medical Care Division. Operation and maintenance after implementation of project will be in charge of the five target hospitals; Mandalay General Hospital, Central Women's Hospital in Mandalay, Mandalay Children Hospital, Central Women's Hospital in Yangon, and Yangon Children Hospital.

(2) Consultant

After the conclusion of E/N and G/A between the government of Japan and the government of Myanmar, the Japanese Consultant enters into a consultant contract with the Myanmar implementing organizations according to the procedures of Japan's grant-aid assistance. Based on this contract, the Consultant performs the following works:

- Detailed design: Preparation of detailed design documents (specifications and other technical information)
- Bidding: Selection of Supplier and work assistance related to procurement contract
- Procurement supervision: Supervision of equipment procurement, installation, and operation and maintenance training

Detailed design includes detailed procurement planning based on this Outline Design, and the preparation of bidding documents which is necessary for bidding of Japanese Supplier selection, comprised of specifications, instruction to bidder, and draft supplier contract.

In conducting bidding, the Consultant performs bidding work including invitation to bid, reception of bidding applications, qualification review, distribution of bidding documents, reception of bids, and evaluation of bidding result. The Consultant also provides advice on equipment procurement

contract between Myanmar implementing organizations and the Supplier, and provides work assistance such as reporting to the Japanese government.

Procurement supervision is to supervise the performance of Supplier's work as specified in the contract, and to confirm the appropriate execution of the contract. In addition, to promote the implementation of the Project, the Consultant conducts the following work from an impartial standpoint.

1) Guidance, advice, and coordination concerning equipment procurement

The Consultant examines the schedule and plan of equipment procurement, and provides guidance, advice, and coordination to the Supplier.

2) Inspection and approval of installation drawings

The Consultant inspects and gives advice on the installation drawings and other documents submitted by the Supplier, and grants approval.

3) Confirmation and approval of equipment

The Consultant confirms that the equipment which the Supplier plans to procure is consistent with the contract documents, and the Consultant grants approval for adoption of the equipment.

4) Inspection

The Consultant attends inspection in the manufacturing process of equipment as needed, to ensure required product quality and performance.

5) Reporting on the progress of installation work

The Consultant supervises the work processes and the situation of work sites, and reports the progress of installation work to the both countries.

6) Equipment operation training

Some equipment planned in this Project requires knowledge on maintenance. For this reason, the Supplier needs to provide on-site training during the period of installation, adjustment, and test runs, so that the responsible persons of the Myanmar side learn the techniques for operation, recovery from failure, and repair. The Consultant provides guidance and advice on this training plan.

(3) Supplier

The Supplier selected by bidding concludes a contract with the Myanmar side. Based on this contract, the Supplier conducts procurement, delivery, and installation of equipment, and also gives trainings on the operation and maintenance of the procured equipment to the Myanmar side. The Supplier also constructs a system that enables the Myanmar side to purchase spare parts and consumables for the equipment, and receive continued training after equipment delivery.

2-2-4-2 Implementation Conditions

(1) Procurement of Equipment

1) Schedule Management of Equipment Installation

The installation work, operation training, and other work for equipment procurement are conducted while the target health facilities are in normal work. Therefore, work must be conducted with close communication between the Myanmar side and the Consultant, and detailed schedule management is essential.

2) Import License

Medical equipment used in Myanmar is essentially foreign products including products of Japan. To use those foreign medical equipment in Myanmar, it is necessary to obtain import license from Myanmar Commerce Department in prior to shipping. At this time, no other application for import license is required, and approximately seven days are necessary for obtaining an import license.

3) Tax Exemption Procedure

The tax exemption procedure is as follows, and is expected to take two to three weeks for completion.

1. The Supplier submits an application for tax exemption to MOH Myanmar.
2. MOH submits an application based on the application of the Supplier to the Ministry of Finance.
3. For the application of 2., the Minister of Finance issues an approval letter for tax exemption.
4. A copy of 3. letter is submitted to the Customs Department, and necessary procedure of Myanmar side is completed.

After the tax exemption procedure, the Supplier will prepare shipping documents, import license, approval letter for tax exemption, and other necessary documents and proceed customs clearance. Approximately five to seven days are necessary for obtaining customs clearance.

2-2-4-3 Scope of Works

(1) Japan Side

- Procurement of equipment included in the Project, and the air and/or marine transportation to the landing site
- Inland transportation from the landing site to the delivery sites
- Installation, test run, and adjustment of the equipment included in the Project
- Explanation and training in the operation and maintenance of the equipment included in the Project

(2) Myanmar Side

- Construction and renovation work of new buildings

- Relocation of existing equipment for the installation of procured equipment, and preparing the site for installation of procured equipment
- Securement of the route for installing equipment into the site
- Securement of the place for temporary storage of equipment within the site
- Provision of water supply (valve-stopped), drainage (cap-stopped), electricity (outlets and breakers), medical gas supply, building foundation reinforcement (water plumbing reinforcement, radiation protection, etc.), and other infrastructure that are necessary for the installation of equipment.

2-2-4-4 Consultant Supervision

(1) Procurement Supervision Policy

Based on the scheme of grant-aid assistance conducted by the government of Japan, the Consultant organizes a persistent project execution team for detailed design and ensures smooth execution of work respecting the principles of the basic design. The policy concerning procurement supervision is as follows:

- The Consultant keeps close communication with the responsible persons from the relevant organizations of the both countries, and aims at punctual completion of equipment procurement.
- The Consultant provides timely and appropriate guidance and advice to the Supplier and other persons in charge of procurement, from an impartial standpoint.
- The Consultant provides appropriate guidance and advice on equipment management after delivery.
- The Consultant witnesses and confirms the delivery of equipment, and by confirming the execution of the contract conditions, it completes the work by obtaining the acknowledgement of receipt from the Myanmar side.

(2) Procurement Supervision Plan

In performing the above work, the Consultant conducts supervision using procurement supervision engineers and inspection engineers. In addition, engineers are sent to the sites as necessary according to the progress of work, and perform necessary inspection, guidance, and coordination. The Consultant also assigns responsible engineers in Japan to establish a system for communicating with the sites and providing backup. Also, the Consultant reports various important matters including the progress of the Project, payment procedures, and other terms to relevant persons of the government of Japan.

As for installation work, to shorten the work schedule, installation team will be divided into two groups; one group for three hospitals in Mandalay and the other group for two hospitals in Yangon. The Consultant will also dispatch two people for installation supervision, one for Mandalay and the other for Yangon.

2-2-4-5 Quality Control Plan

The equipment to be procured by this Project shall be ready-made products, with past delivery records to medical institutions in various countries. Regarding the manufacturing standards of individual item, products complying with JIS, BS, UL, DIN, or other general standards shall be selected.

2-2-4-6 Procurement Plan

(1) Equipment Procurement Plan

The procured equipment shall be products of Japan or Myanmar as a rule. For equipment associated with consumables or reagents, equipment which the consumables and reagents are common and available for procurement in Myanmar, will be included in the Project. Certain amount of consumables and reagents will be included in the specification beforehand, and the amount is estimated to be enough for six months of operation. As for spare parts, recommended replacement time is based on the standards of each manufacturer.

Warranty of each equipment is set to be one year. The warranty will start from the day of completion of equipment installation, considering the day of delivery may vary within the installation schedule.

(2) Third Country Procurement

As mentioned before, the procured equipment shall be products of Japan or Myanmar as a rule. However, in the case where third-country products are considered to be desirable in terms of superiority in pricing, superiority in maintenance, the common use in Myanmar, and other conditions, procurement from a third country may be considered after the consent of both countries and the review of conditions outlined below. The procurement plan for other equipment shall be developed considering the certainty of delivery time and the superiority in procurement price.

- A branch office or local agent is available in Myanmar, and the product has superiority in maintenance.
- The product is low in incidence of technical failure, and its maintenance cost is low.
- No similar Japanese or Myanmar product is available, or does not meet required specifications.
- The product is easy to service and inspect, and is a product of a manufacturer with a well-developed maintenance system.
- The equipment is commonly used in Myanmar.
- The equipment can be procured and delivered within the schedule agreed on E/N and G/A.

Equipment with a probability of third country procurement in this Project is as listed below.

Table 2-6 Equipment with a Probability of Third Country Procurement

No.	Name of Equipment
1	Anaesthesia machine with ventilator (adult)
2	Anaesthesia machine with ventilator (pediatric)
3	Autoclave (horizontal)
4	Autoclave (vertical, large)
8	Automatic chemistry analyzer
12	Balance (digital)
15	Bilirubinometer (skin)
16	Blood pressure monitoring machine
20	Cardiotocograph
22	Central monitor
24	Centrifuge (blood bag, type A)
25	Centrifuge (blood bag, type B)
30	Colposcope
32	Cryosurgery machine
33	Electrosurgical unit for LEEP
34	CT
35	Deep freezer (large)
36	Deep freezer (small)
37	Defibrillator (adult)
38	Defibrillator (pediatric)
42	ECG machine
43	ECG machine (holter)
44	ECG machine (stress test system)
45	EEG machine
48	Hemodialysis machine (adult)
52	Hysteroscope (rigid)
55	Infant incubator (manual)
62	Laparoscope (adult)
63	Laparoscope (pediatric)
71	Oxygen concentrator (single)
73	Patient monitor (adult, standard)
74	Patient monitor (pediatric, standard)
75	Patient monitor (adult, multi gas)
76	Patient monitor (adult, ETCO2+IBP)
77	Patient monitor (pediatric, ETCO2)
78	Patient monitor (pediatric, Multi Gas+IBP)
79	Patient monitor (pediatric, Multi Gas+IBP+CVP)
80	Patient warmer
81	Percutaneous nephroscope
87	Refrigerator (blood bag)
89	Sigmoidoscope (pediatric, flexible)
90	Spectrophotometer
96	TURP set
106	Ultrasound therapy machine

No.	Name of Equipment
107	Ureteroscope
108	Urodynamic measuring machine
109	Ventilator (adult)
110	Ventilator (pediatric, A)
111	Ventilator (pediatric, B)
114	Ventilator (transportation)
115	Wedge

(3) Transport Plan

Medical equipment procured from Japan or third country will be packed in moisture-prevented sealed container, to reduce the climate and humidity change during transportation. Each packed medical equipment will be assembled in a container at each export port, and transported to Yangon Port which is the major trading port of Myanmar.

After custom clearance, medical equipment will be sorted at specified warehouse as needed, and transported to each site in Yangon by truck.

Likewise for sites in Mandalay, medical equipment will be transported to Yangon port, sorted at specified warehouse as needed, and transported to each site in Mandalay by truck.

Necessary number of days for transportation is estimated to be the same day for Yangon, and two days for Mandalay. The roadway condition is favorable, and there will be no problem for transportation by 40 feet container.

- Yangon: Yangon Port – Target hospitals in Yangon (Approx. several 10 km)
- Mandalay: Yangon Port – (Nay Pyi Taw) – Target hospitals in Mandalay (Approx. 500km)

2-2-4-7 Operation Guidance Plan

To ensure appropriate use and maintenance of procured medical equipment, the Supplier shall conduct the following training at the time of delivery, and provide documents necessary for technical maintenance, such as an operation and servicing manual or a contact list of local agents and manufacturers. It is desirable that the training is conducted by the manufacturer or engineers of its local agent.

- Method of operation (equipment summary, procedures, checkpoints, etc.)
- Method of regular servicing and maintenance (cleaning and adjustment, repair of minor troubles, etc.)

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

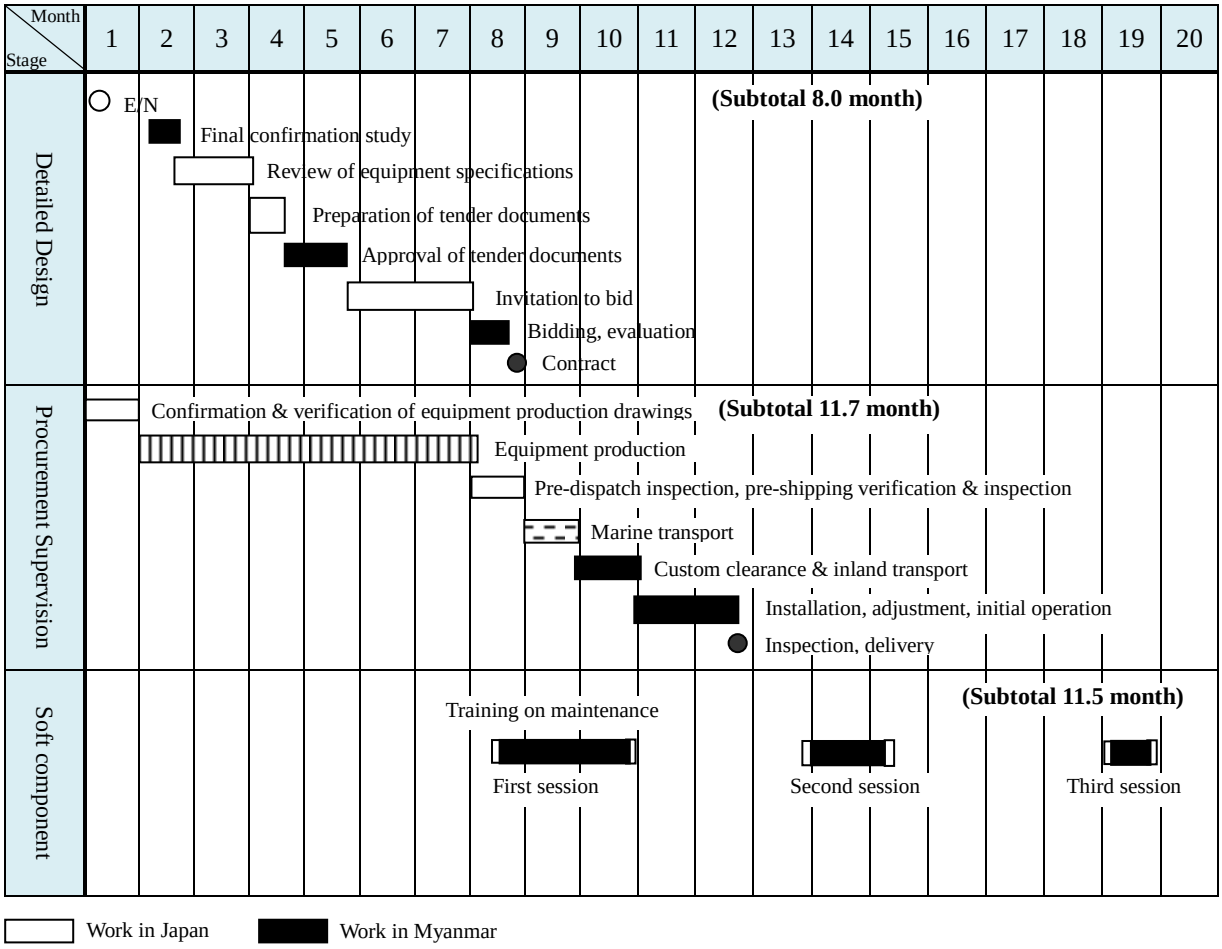
The Consultant assists establishing a maintenance system, by providing training on basic maintenance method, and giving advice on correct use of medical equipment through soft component.

This soft component plan aims at utilizing procured medical equipment for longer period, and this program is implemented for operators of target hospitals and CMSD.

2-2-4-9 Implementation Schedule

After the conclusion of the Exchange of Notes of the Project between Japan and Myanmar, equipment procurement of this Project will be implemented following the steps illustrated below.

Table 2-7 Work Implementation Schedule



2-3 Obligations of Recipient Country

Matters that are borne on the implementing organization of Myanmar for implementation this Project are as listed below.

(1) Transport and Installation of Equipment

- Relocation of existing equipment for the installation of procured equipment, and preparation of the site for installation of procured equipment
- Reinforcement work of rooms installing X-ray machines (CT, X-ray machine (fluoroscopy)), including construction of an operation room, X-ray protective wall, and air conditioning system

- Securement of the route for installing equipment into the site
- Securement of the place for temporary storage of equipment within the site
- Provision of water supply (valve-stopped), drainage (cap-stopped), electricity (outlets and breakers), medical gas supply, building foundation reinforcement (water plumbing reinforcement, radiation protection, etc.), and other infrastructure that are necessary for the installation of equipment.

Table 2-8 Renovation Work Borne on Myanmar Side

Hospital Name	Target Equipment	Description of Work
Mandalay General Hospital	CT (Emergency department)	Operation room installation X-ray protective wall Air conditioning system Power distribution work
	Hemodialysis machine (adult)	Plumbing and drainage work Power distribution work
Central Women's Hospital in Mandalay	X-ray machine (fluoroscopy) (Image diagnosis department)	Operation room installation X-ray protective wall Air conditioning system Power distribution work
	Autoclave (vertical, large) Autoclave (laboratory)	Plumbing and drainage work Power distribution work
Mandalay Children Hospital	X-ray machine (fluoroscopy) (Image diagnosis department)	Operation room installation X-ray protective wall Air conditioning system Power distribution work
	Autoclave (vertical, large)	Plumbing and drainage work Power distribution work
Yangon Children Hospital	X-ray machine (digital) (Image diagnosis department)	Power distribution work
	Autoclave (horizontal) Hemodialysis machine (periatric)	Plumbing and drainage work Power distribution work

(2) Facilities and Operation

- Appropriate allocation of equipment operators at target facilities
- Securement of budget for maintenance of procured equipment

(3) Others

- Payment for Authorization to Pay according to Banking Arrangements
- Prompt landing and completion of customs clearance procedures for the products purchased based on the grant
- Exemption from customs duties, value-added tax, and other surcharges that are imposed on Japanese citizens, regarding the products and services procured based on a verified contract
- Provision of convenience for Japanese citizens to enter and stay in the country for the execution of the Project, based on the verified contract
- Permissions, licenses, and other necessary measures that are necessary for the implementation of this Project
- Payment of all other costs that are not covered by the grant-aid assistance but are necessary for the execution of this Project

2-4 Project Operation Plan

2-4-1 Operation Plan

The organization in charge of operation and maintenance after the implementation of this Project are the target five hospitals. Medical equipment to be procured by this Project will be placed to the existing hospital or department, and these equipment will be used under the responsibility of each department managers, with a concent of concerned hospital directors.

Table 2-9 Number of Staffs at Target Hospitals (as of 2011)

Hospital Name	Mandalay General Hospital 1000 beds	Central Women's Hospital in Mandalay 300 beds	Mandalay Children Hospital 550 beds	Central Women's Hospital in Yangon 800 beds	Yangon Children Hospital 550 beds
Staffs					
Doctor / Professor	143	87	70	95	74
Nurse	354	101	123	137	157
Technician	86	26	16	30	32
Clerk, Others	375	87	11	233	201

Source: Questionnaire

Medical equipment planned in this Project are carefully planned based on the current utilization of existing equipment, as well as the scale, function, contents and records of medical treatment, and personnel distribution of target hospitals. These planned equipment are expected to be fully utilizable under the current operation system. In addition, most planned medical equipment are planned as a supplementary or replacement of existing equipment, and these planned equipment will not require additional training or special medical technology after installation. Thus current doctors, nurses and technicians will be able to handle these planned equipment. Also, equipment that is newly introduced through this Project is also confirmed to be usable by basic medical skills, and there will be no issue on operation of planned equipment.

2-4-2 Maintenance Plan

Medical equipment installed at public hospitals in Myanmar is under the management of CMSD as a rule, and the planned equipment of this Project will also be included in this scheme. Equipment maintenance is in charge of technicians of each hospital, and if the hospital has no assigned technician, managers of each hospital will deal with the necessary clerical work. In case of serious technical failure and the hospital is not capable of self-maintenance, firstly the engineer department of CMSD will deal with the problem, and if the problem was not solved, the problem is referred to the local agent of concerning manufacturer.

Under this system, Department of Health of MOH launched a training course on Bio-Medical Engineer (BME) for engineers of CMSD and existing hospitals in October 2012 and December 2012, to deal with the problem of limited number of technicians by improving knowledge and techniques on medical equipment.

2-5 Project Cost Estimation

2-5-1 Initial Cost Estimation

(1) Costs to be Borne on Myanmar Side: About 161million Kyats

Table 2-10 Costs to be Borne on Myanmar Side (Facility Renovation) (Unit: Kyat)

Item \ Hospital	Mandalay General Hospital		Central Women's Hospital in Mandalay		Mandalay Children Hospital		Central Women's Hospital in Yangon	Yangon Children Hospital		Subtotal
Renovation work of X-ray rooms	Expansion of a CT room at emergency department	38,185,484	Renovation of fluoroscopy room	15,335,813	Renovation of fluoroscopy room	17,109,144	N/A	Power distribution work of existing X-ray room	13,280,060	83,910,501
Autoclave	Operation theater		OT：15m Lab：5m		Operation theater		N/A	Operation theater		
Water supply and drainage work	15m	2,456,811	20m	3,275,748	10m	1,637,874		10m	1,637,874	
Power distribution work	15m	9,960,045	20m	13,280,060	10m	6,640,030		10m	6,640,030	
	Subtotal	12,416,856	Subtotal	16,555,808	Subtotal	8,277,904		Subtotal	8,277,904	45,528,472
Hemodialysis machine	Dialysis room		N/A		N/A		N/A	Dialysis room		
Water supply and drainage work	10m	1,637,874						10m	1,637,874	
Power distribution work	10m	6,640,030						10m	6,640,030	
	Subtotal	8,277,904						Subtotal	8,277,904	16,555,808
Total		58,880,244		31,891,621		25,387,048	0		29,835,868	145,994,781

(Each item includes cost for material)

Table 2-11 Costs to be Borne on Myanmar Side (Unit: Kyat)

Item of Expense	Subtotal
Fee on Banking Arrangements	14,989,829
Renovation work for X-ray examination rooms (X-ray protective wall, power distribution work, air conditioning system)	83,910,501
Water supply and drainage work, and power distribution work for Autoclaves	45,528,472
Water supply and drainage work, and power distribution work for Hemodialysis machines	16,555,808
Total	160,984,610

(2) Conditions for Cost Estimation

1) Estimation as of: August 2012

2) Exchange rate: (6 months average TTS)

- US Dollar US$ 1.00=JPY81.06
- Euro EUR1.00=JPY104.48
- Kyat Kyat 1.00=JPY0.0916

3) Period of procurement: Periods of detailed design and equipment procurement are as shown in the work implementation schedule.

4) Other: Cost estimation shall be based on the grand aid system of the Japanese government.

2-5-2 Operation and Maintenance Cost

(1) Operation and Maintenance Costs for the Project

After implementation of this Project, the yearly cost for consumables, spare parts and reagents necessary for procured equipment is estimated as follows. More detailed cost estimation will be described in the Appendices 9. Operation and Maintenance Cost for the Equipment. Running costs for equipment of replacement are estimated to be the same scale as the current equipment, and costs for consumables and maintenance on newly introduced / supplementary equipment are estimated as below.

Table 2-12 Operation and Maintenance Cost (Unit: Kyat)

Hospital	Item	1st Year	2nd Year	3rd Year	4th Year	5th Year	6th Year	7th Year
Mandalay General Hospital	Consumables / Reagents	156,358,525	156,358,525	156,358,525	156,358,525	156,358,525	156,358,525	156,358,525
	Utility Costs	3,442,050	3,442,050	3,442,050	3,442,050	3,442,050	3,442,050	3,442,050
	Maintenance Fee	0	71,622,193	71,622,193	107,433,289	107,433,289	107,433,289	179,055,482
	Subtotal	159,800,575	231,422,768	231,422,768	267,233,864	267,233,864	267,233,864	338,856,057
Central Women's Hospital in Mandalay	Consumables / Reagents	180,633,088	180,633,088	180,633,088	180,633,088	180,633,088	180,633,088	180,633,088
	Utility Costs	4,784,050	4,784,050	4,784,050	4,784,050	4,784,050	4,784,050	4,784,050
	Maintenance Fee	0	35,956,558	35,956,558	53,934,837	53,934,837	53,934,837	89,891,395
	Subtotal	185,417,138	221,373,696	221,373,696	239,351,975	239,351,975	239,351,975	275,308,533
Mandalay Children Hospital	Consumables / Reagents	237,342,655	237,342,655	237,342,655	237,342,655	237,342,655	237,342,655	237,342,655
	Utility Costs	5,566,375	5,566,375	5,566,375	5,566,375	5,566,375	5,566,375	5,566,375
	Maintenance Fee	0	17,793,246	17,793,246	26,689,870	26,689,870	26,689,870	44,483,116
	Subtotal	242,909,030	260,702,276	260,702,276	269,598,900	269,598,900	269,598,900	287,392,146
Central Women's Hospital in Yangon	Consumables / Reagents	45,718,623	45,718,623	45,718,623	45,718,623	45,718,623	45,718,623	45,718,623
	Utility Costs	1,900,750	1,900,750	1,900,750	1,900,750	1,900,750	1,900,750	1,900,750
	Maintenance Fee	0	17,280,926	17,280,926	25,921,389	25,921,389	25,921,389	43,202,316
	Subtotal	47,619,373	64,900,299	64,900,299	73,540,762	73,540,762	73,540,762	90,821,689
Yangon Children Hospital	Consumables / Reagents	70,053,289	70,053,289	70,053,289	70,053,289	70,053,289	70,053,289	70,053,289
	Utility Costs	1,715,700	1,715,700	1,715,700	1,715,700	1,715,700	1,715,700	1,715,700
	Maintenance Fee	0	19,455,674	19,455,674	29,183,511	29,183,511	29,183,511	48,639,185
	Subtotal	71,768,989	91,224,663	91,224,663	100,952,500	100,952,500	100,952,500	120,408,174
Total		707,515,105	869,623,702	869,623,702	950,678,001	950,678,001	950,678,001	1,112,786,598

Conditions:

- Increase of patients is not included.
- Inflation rate is not included.
- The maintenance cost is estimated for major equipment, and the first year does not incur any maintenance cost as the warranty covers the first year. The frequency of failure is estimated to increase as the year of operation increases.

(2) Budget for Operation and Maintenance Costs

At health facilities in Myanmar, basically the budget for operation and maintenance cost on medical equipment and facilities is funded by the Department of Health of MOH. Each health facilities earn income from patient treatment fees such as examination fee or charged hospital bed fee, and the

income is deposited to the state coffers and bank accounts of each health facility. However, a permission of MOH is necessary to withdraw their income from bank account, unless the amount of withdraw is considerably small. Therefore practically it is not possible for each health facility to use the income by their judgment. For this reason, examination on the budget for operation and maintenance cost of this Project is based on the budget of MOH.

Following is the budget of MOH, the organization responsible for this Project, from 2010 to 2013.

The budget of MOH for 2012 is increased to a large extent compared to the previous fiscal year; 2.6 times increase in current expenditure, 8.4 times increase in equipment and facility investment, and total 4.2 times increase as a whole. This is considered to be resulted from Myanmar government's budget reallocation, motivated by increased foreign aids and more vigorous investments in social infrastructure (education, health services).

Table 2-13 Budget of MOH (2010-2013) (Unit: million Kyat)

Item		2010-2011	2011-2012	2012-2013	%
Current Expenditure		54,925	66,727	176,935	45.31
	Wage, Salary, and others	40,575	45,959	75,749	19.40
	Transportation expenses	538	1,531	1,558	0.40
	Material/Outsourcing expenses	6,907	12,658	84,538	21.65
	Maintenance fee	4,320	3,166	5,519	1.41
	Relocation expenditure	2,568	3,386	9,433	2.41
	Others	17	27	138	0.04
Facility / Equipment Investment		22,097	25,278	213,535	54.69
	Facility	19,445	20,144	107,000	27.40
	Equipment	2,451	4,996	105,966	27.14
	Others	201	138	569	0.15
Total		77,022	92,005	390,470	100.00

Operation and maintenance costs (consumables, spare parts, maintenance fee, etc.) are expended from material / outsourcing expenses of current expenditure. The ratio of current expenditure out of all expenditures amounts to 20.4% in 2010-2011, 23.7% in 2011-2012, and it increased to about 50% in 2012-2013.

(3) Expectations on Operation and Maintenance Cost

The budget of MOH for 2012-2013 has shown a dramatic rise over the previous year, however Myanmar's expenditure on health services out of all governmental expenditure still remains around 2%, and is quite low compared to other neighbouring countries (14.2% in Thailand, 9.3% in Vietnam). The government of Myanmar is conscious about this situation, and the budget for health expenditure is expected to increase in the future.

Following is the expected budget for current expenditures of MOH after 2013. The coefficient for expenditure increase is set to be 21%, which is the increase rate between 2010 and 2011. Medical

equipment procured by this Project is predicted to be delivered in the late 2014, thus the operation and maintenance cost is examined based on the budget for 2014-2015, and also based on the budget for 2015-2016, the year the warranty period expires.

Table 2-14 Expected Budget of MOH (Unit: million Kyat)

Item		2012-2013	2013-2014	2014-2015	2015-2016
Current Expenditure		176,935	214,954	261,142	317,255
	Wage, Salary, and others	75,749	92,026	111,800	135,822
	Transportation expenses	1,558	1,893	2,299	2,794
	Material/Outsourcing expenses	84,538	102,703	124,771	151,582
	Maintenance fee	5,519	6,705	8,146	9,896
	Relocation expenditure	9,433	11,460	13,922	16,914
	Others	138	168	204	247

The sum of material/outsourcing expenses of 2014-2015 is estimated to be 132,917 million kyats (about 13 billion yen). The operation and maintenance cost for medical equipment procured by this Project is estimated to be 707 million kyats per year, which will impose additional 0.53% increase in the material/outsourcing expenses of MOH. Likewise for budget of 2015-2016, the sum of material/outsourcing expenses is estimated to be 161,478 million kyats, and the increased operating and maintenance cost by this Project is estimated to be 869 million kyats, which will be 0.54% increase of MOH budget. Overall, this increase is considered to be acceptable in the term of budget. Also, if the ratio of health sector expenditure out of all governmental expenditure is increased, more stable reserve of operation and maintenance cost is expected to be possible.

(4) Depreciation

Maintaining the safeness and accuracy of medical equipment is extremely important when providing treatment. Therefore, using obsolete medical equipment raises the risk for technical failure during treatment or diagnosis error, sometimes jeopardizing patients' body or life. The expected lifetime of medical equipment procured by this cooperation project will be seven to ten years, under continuous maintenance. Thus, before the expected lifetime expires, it is expected to reserve enough depreciation funds for replacement of medical equipment procured by this cooperation project.

As for reserving depreciation funds, one method is to systematically include the necessary amount into MOH budget, and also reserving the medical treatment fee earned at each health facility is conceivable. Medical treatment fee is the remuneration for health services provided at each health facility, and this can be also described as the income generated by the use of medical equipment. Currently many health facilities are being provided their medical equipment from MOH. By introducing additional medical equipment through this Project, target health facilities will be able to increase its income by medical treatment fee, and ultimately they will be able to reserve the necessary replacement fee by themselves. This will also be expected to lead more careful use of medical equipment, as well as increased motivation of managers and other facility-related personnel.

Chapter 3 Project Evaluation

Chapter 3 Project Evaluation

3-1 Preconditions

(1) Completion of construction work borne on Myanmar side

1) Completion of new buildings

Some target hospitals have plans for new construction and relocation of hospital facilities, and some equipment requested for this Project are planned to install in these newly constructed buildings. Therefore, these construction plans must be completed before the installation phase of this Project starts.

Following is the building construction plans of target hospitals and its brief schedule as of December 2012.

Table 3-1 Building Construction Plans of Target Hospitals

Hospital Name	Building Name	# of Floor	Expected Period of Completion	Progress as of December 2012
Mandalay General Hospital	Cardiovascular Ward (Cardiac CCU)	5	End of January 2013	Finished construction of structure, currently internal construction and finishing construction are now on progress
	Six-storied New Ward (Renal unit, Gastro-intestinal unit)	6	October 2013	Currently demolition of existing flat building is on progress. Construction will start in January 2013
Central Women's Hospital in Mandalay	A Building (Patient Ward) (Bloc No.3)	3	Will open in the beginning of 2013	Finished construction of structure except elevator. Currently internal construction and finishing construction are now on progress
	B Building (Laboratory department) (New labor room, new operation theater)	3	Undecided, planned to open in 2013	Restarted construction of structure after distribution of MOH budget. Finished concrete placement of the first floor
Mandalay Children Hospital	Blood Bank	1	Undecided, about 1 month for construction	Under financial arrangements

2) Facility improvement and reinforcement of existing buildings

In prior to the installation phase of this Project, some existing facilities require facility reinforcement for accepting new medical equipment. These renovation works are borne on Myanmar side, and its implementation has been requested to the government of Myanmar and each target hospital.

Following is a list of conditions necessary for project implementation that are borne on Myanmar side, in the area of equipment transportation, installation, and facility renovation work.

- Relocation of existing equipment for the installation of procured equipment, and preparing the site for installation of procured equipment
- Securement of the route for installing equipment into the site
- Securement of the place for temporary storage of equipment within the site
- Reinforcement work of rooms installing X-ray machines (CT, X-ray machine (fluoroscopy)), including construction of an operation room, X-ray protective wall, and air conditioning system
- Provision of water supply (valve-stopped), drainage (cap-stopped), electricity (outlets and breakers), medical gas supply, building foundation reinforcement (water plumbing reinforcement, radiation protection, etc.), and other infrastructure that are necessary for the installation of equipment.

Renovation works that are borne on Myanmar side, for installation of equipment associate with facility reinforcement, are as follows.

Table 3-2　Renovation Work to be Borne on Myanmar Side

Hospital Name	Target Equipment	Details
Mandalay General Hospital	CT (Emergency Department)	Installation of X-ray control booth Radiation protection Air conditioning
	Hemodialysis machine (adult)	Plumbing construction Electric power constuction
Central Women's Hospital in Mandalay	X-ray Machine (fluoroscopy), (Image Diagnosis Unit)	Installation of X-ray control booth Radiation protection Air conditioning
	Autoclave (vertical, large) Autoclave (laboratory)	Plumbing construction Electric power constuction
Mandalay Children Hospital	X-ray Machine (Fluoroscopy), (Image Diagnosis Department)	Installation of X-ray control booth Radiation protection Air conditioning
	Autoclave (vertical, large)	Plumbing construction Electric power constuction
Yangon Children Hospital	X-ray machine (general) (Image diagnosis department)	Electric power distribution
	Autoclave (horizontal) Hemodialysis machine (pediatric)	Plumbing construction Electric power constuction

(2) Procedures for customs clearance and tax exemption

In Myanmar, it is able to obtain tax exemption for equipment procured through an assistance project. As for general procedure of tax exemption, firstly the Supplier submits an application for tax exemption to MOH, and MOH forwards the application to the Ministry of Finance and the Ministry of Commerce, then the application is forwarded to the Customs Department for confirmation and approval of tax exemption. This procedure is necessary for equipment procurement of this Project, therefore it is essential to cope with the government of Myanmar for prompt procedure of customs clearance and tax exemption.

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

- Payment for Authorization to Pay according to Banking Arrangements
- Prompt landing and completion of customs clearance procedures for the products purchased based on the grant
- Exemption from customs duties, value-added tax, and other surcharges that are imposed on Japanese citizens, regarding the products and services procured based on a verified contract
- Provision of convenience for Japanese citizens to enter and stay in the country for the execution of the Project, based on the verified contract
- Permissions, licenses, and other necessary measures that are necessary for the implementation of this Project
- Payment of all other costs that are not covered by the grant-aid assistance but are necessary for the execution of this Project

3-2 Necessary Inputs by Recipient Country

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

(1) Training

Department of Health of MOH shall continue to conduct Bio-Medical Engineer (BME) training for hospital engineers and engineers of CMSD, to improve in knowledge and technique on medical equipment and increase the number of specialized staffs.

(2) Equipment maintenance

Planned equipment of this Project is considered to be able to conduct normal operation and maintenance by current technical capability of operators and maintenance staffs. Additional training on operation and maintenance for newly introduced equipment of this Project will be held at the time of installation, to assist proper and long-term use of planned equipment. Therefore these trained operators and maintenance staffs shall be assigned in an appropriate manner, and training for cultivating new trained staffs shall be conducted as needed.

3-3 Important Assumptions

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

(1) Continued implementation of the National Health Plan 2006-2011 and the Hospital Care Program

This Project will contribute the achievement of Hospital Care Program, one of 12 programs developed through the formulation of the National Health Plan 2006-2011. The Hospital Care Program aims at quality improvement of hospital care services, through efforts in increase of hospital beds, review of hospital performance indicators and decrease of in-hospital death rate. Therefore, the policy of the National Health Plan 2006-2011 and the Hospital Care Program shall continue after the

implementation of this Project.

(2) Budget for operation and maintenance of procured equipment

The budget for maintenance on medical equipment is funded by the Department of Health of MOH, together with other hospital operation costs. Some planned equipment require periodical procurement of consumables and spare parts, and the budget for procurement of these running costs shall be secured as before. Also, for other source of budget, each target hospital shall withdraw profits from patient treatment fee actively, for independent securing of running costs.

3-4 Project Evaluation

3-4-1 Relevance

This Project is considered to be relevant for launching as a cooperation project, funded by Japanese grand aid.

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

- By procuring necessary medical equipment for top referral hospitals of upper Myanmar: Mandalay General Hospital, Central Women's Hospital in Mandalay, and Mandalay Children Hospital, and top referral hospitals of lower Myanmar: Central Women's Hospital in Yangon and Yangon Children Hospital, this Project will provide benefits of advanced health services for people living in broader Myanmar.

- By improving third referral health services of Myanmar, this Project will assist establishment of proper referral system in upper and lower Myanmar, and encourage creation of a stable referral system for serious patients.

- Planned equipment of this Project will be selected through careful considerations including terms such as conditions of existing equipment and facility, current level of medical technique, operational and maintenance ability of each hospital, and others. Planned equipment of this Project does not associate with extremely high operational technique, and local agents are able to provide technical maintenance within Myanmar.

- With additional training on maintenance provided as a soft component, procured medical equipment of this Project will be able to operate under expected safety and long-term use.

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 effectiveness

Table 3-3 Mandalay General Hospital, Quantitative Effectiveness

Indicator	Criterion Value (2011)	Target Value (2017) (3 years after project completion)
Operation (case/year)	11,631	12,266
X-ray examination (case/year)	41,422	45,742
CT examination (case/year)	3,081	7,200
Ultrasound examination (case/year)	11,751	12,565
Clinical examination (case/year)	123,430	140,869

Table 3-4 Central Women's Hospital in Mandalay, Quantitative Effectiveness

Indicator	Criterion Value (2011)	Target Value (2017) (3 years after project completion)
Operation (case/year)	4,298	4,552
Delivery (case/year)	5,750	5,840
SCBU patients (person/year)	1,678	2,185
Ultrasound examination (case/year)	4,836	9,316
X-ray examination (case/year)	1,307	1,767
Clinical examination (case/year)	9,988	12,283

Table 3-5 Mandalay Children Hospital, Quantitative Effectiveness

Indicator	Criterion Value (2011)	Target Value (2017) (3 years after project completion)
Operation (case/year)	930	2,153
ICU patients (person/year)	187	433
Ultrasound examination (case/year)	664	1,537
X-ray examination (case/year)	1,841	4,262
Clinical examination (case/year)	10,401	24,081

* The criterion value (2011) is the data from January 2011 to June 2011.

Table 3-6 Central Women's Hospital in Yangon, Quantitative Effectiveness

Indicator	Criterion Value (2011)	Target Value (2017) (3 years after project completion)
Operation (case/year)	9,559	9,787
Ultrasound examination (case/year)	7,495	7,733
Clinical examination (case/year)	165,124	169,017

Table 3-7　Yangon Children Hospital, Quantitative Effectiveness

Indicator	Criterion Value (2011)	Target Value (2017) (3 years after project completion)
Operation (case/year)	4,089	4,734
X-ray examination (case/year)	11,312	13,095
Ultrasound examination (case/year)	5,177	5,993

(2) Qualitative effectiveness

By effective utilization of medical equipment at top referral hospitals in upper Myanmar: Mandalay General Hospital, Central Women's Hospital in Mandalay and Mandalay Children Hospital, accurate diagnosis and appropriate treatment will be provided and this will improve the quality of health services in upper Myanmar.

Also by effective utilization of medical equipment at top referral hospitals in the lower and entire Myanmar: Central Women's Hospital in Yangon and Yangon Children Hospital, accurate diagnosis and appropriate treatment will be provided and this will improve the quality of perinatal and pediatric health services in the lower and entire Myanmar.

In addition, following effects are expected by the procurement of newly planned equipment.

At Mandalay General Hospital, by the new introduction of blood culture system and automatic blood culture and antibiotic susceptibility system, examination on bacterial infection and diagnosis for appropriate medicines will be improved.

At Central Women's Hospital in Mandalay and Central Women's Hospital in Yangon, by the new introduction of urodynamic measuring machine, gynecological and urological examination of bladder and ureter will be newly operated.

At Central Women's Hospital in Mandalay and Mandalay Children Hospital, by the new introduction of X-ray machine (fluoroscopy), fluoroscopy examination will be newly operated.

By implementation of soft component, the maintenance system of medical equipment will be reinforced.

Upon consideration of all the examination above, the relevance of this Project is high, and the effectiveness of this Project is prospective.

[Appendices]

1. **Member List of the Study Team**
2. **Study Schedule**
3. **List of Parties Concerned in the Recipient Country**
4. **Minutes of Discussions**
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6. **Equipment List**
7. **Outline of Major Equipment**
8. **Equipment Delivery List**
9. **Operation and Maintenance Cost for the Equipment**
10. **Soft Component (Technical Assistance) Plan**
11. **References**

1. Member List of the Study Team

Member List of the Study Team (Outline Design)

Name		Title	Organization
1	Ms. Saeda MAKIMOTO	Team Leader	Director, Health Division 3, Health Group 2, Human Development Department, Japan International Cooperation Agency
2	Prof. Shigeru OKADA	Technical Advisor 1	Emeritus Professor, University of Okayama
3	Dr. Hideki MIYAMOTO	Technical Advisor 2	National Center for Global Health and Medicine
4	Mr. Shinobu YOSHIZAWA	Planning Cooperation	Deputy Director, Health Division 3, Health Group 2, Human Development Department, Japan International Cooperation Agency
5	Mr. Shigehito AKAGI	Chief / Hospital Management	International Total Engineering Corporation (ITEC)
6	Mr. Hironori NAKAJIMA	Sub-Chief / Health Planning / Equipment Planning 1	International Total Engineering Corporation (ITEC)
7	Mr. Katsuro YAJIMA	Equipment Planning 2 / Operation and Maintenance Planning	International Total Engineering Corporation (ITEC)
8	Mr. Jun NAKANO	Facility Planning	International Total Engineering Corporation (ITEC)
9	Ms. Reiko SUMI	Procurement Planning / Cost Estimation	International Total Engineering Corporation (ITEC)

1-4: Official member　5-9: Consultant member

Member List of the Study Team (Detailed Design)

Name		Title	Organization
1	Ms. Ritsuko SAKAMOTO	Team Leader	Advisor, Health Division 3, Health Group 2, Human Development Department, Japan International Cooperation Agency
2	Mr. Hironori NAKAJIMA	Sub-Chief / Health Planning / Equipment Planning 1	International Total Engineering Corporation (ITEC)
3	Mr. Katsuro YAJIMA	Equipment Planning 2 / Operation and Maintenance Planning	International Total Engineering Corporation (ITEC)
4	Ms. Reiko SUMI	Procurement Planning / Cost Estimation	International Total Engineering Corporation (ITEC)

1: Official member　2-4: Consultant member

2. Study Schedule

Study Schedule (Outline Design)

			Outline Design Study Schedule							
			TL	T2	T1	PM	E2	FP	SP	CP
			Official member (Team Leader)	Official Member (Technical 1 / Planning Cooperation)	Official Member (Technical 2)	Chief / Hospital Management	Equipment Planning 2 / Operation and Maintenance	Facility Planning	Sub-Chief / Health Planning / Equipment Planning	Procurement Planning / Cost Estimation
	7/7	Sat								
1	7/8	Sun				Intl FLT (NRT-YNG)	Same as PM		Same as PM	
2	7/9	Mon				Coutesy call at JICA, discuss local consultant, Move (YNG-NPT)	Same as PM		Same as PM	
3	7/10	Tue				Coutesy call, discussion at MOH, Move (NPT-YNG)	Same as PM	Intl FLT (NRT-YNG)	Same as PM	Same as FP
4	7/11	Wed				Survey YG	Survey YG			
5	7/12	Thu				Survey YN	Survey YG			
6	7/13	Fri				Survey YW	Survey YN			
7	7/14	Sat				Survey YP	Survey YN			
8	7/15	Sun				Internal meeting				
9	7/16	Mon				Other facility survey Dms FLT (YNG-MDL)	Survey YW			
10	7/17	Tue				Survey MG	Survey YW			
11	7/18	Wed				Survey MW	Survey YP			
12	7/19	Thu				Survey MP	Survey YP			
13	7/20	Fri				Other facility survey	To be arranged (YNG)			
14	7/21	Sat				Move (MDL-NPT)	To be arranged (YNG)			
15	7/22	Sun				Internal meeting	Dms FLT (YNG-MDL)			
16	7/23	Mon				Survey MOH Move (NPT-YNG)	Survey MG			
17	7/24	Tue				Intl FLT (YNG-NRT)	Survey MG			
18	7/25	Wed					Survey MW			
19	7/26	Thu					Survey MW			
20	7/27	Fri					Survey MP			
21	7/28	Sat					Survey MP Dms FLT (MDL-YNG)			
22	7/29	Sun					Same as SP	Internal meeting	Intl FLT (YNG-NRT)	Same as FP
23	7/30	Mon						To be arranged (MDL)		To be arranged (MDL)
24	7/31	Tue						To be arranged (MDL)		To be arranged (MDL)
25	8/1	Wed						Infrastructure survey		Local agent survey
26	8/2	Thu						Dms FLT (MDL-YNG)		Same as FP
27	8/3	Fri						Contractor survey		Local agent survey
28	8/4	Sat		Intl FLT (NRT-YNG)		Same as T1		Infrastructure survey		Transporter survey
29	8/5	Sun		YNG-MDL		Same as T1		Internal meeting		Same as FP
30	8/6	Mon		Survey MDL		Same as T1		Intl FLT (YNG-NRT)		Same as FP
31	8/7	Tue	Intl FLT (NRT-YNG)	Survey MDL MDL-YNG	Intl FLT (NRT-YNG)	Same as TL				
32	8/8	Wed	Survey YNG			Same as TL	Same as SP		Intl FLT (NRT-YNG)	
33	8/9	Thu	Survey YNG／Internal meeting			Same as TL	Same as SP		Survey YNG	
34	8/10	Fri	Discusstion at JICA, EOJ		Discusstion at JICA, EOJ, Leave YNG	Same as TL	Same as SP		Survey YNG Dms FLT (YNG-MDL)	
35	8/11	Sat	Internal meeting			Same as TL	Same as SP		Survey MDL	
36	8/12	Sun	YNG-NPT			Same as TL	Same as SP		Move (MDL-NPT)	
37	8/13	Mon	Discussion on MOM			Same as TL	Same as TL		Same as TL	
38	8/14	Tue	Discussion on MOM			Same as TL	Same as TL		Same as TL	
39	8/15	Wed	Signing of MOM NPT-YNG			Same as TL	Same as SP		Move (NPT-YNG)	
40	8/16	Thu	Reporting at JICA, EOJ Leave YNG			Same as TL	Same as SP		Extra survey (YNG)	
41	8/17	Fri	Arrive NRT			Extra survey	Same as SP		Extra survey (YNG)	
42	8/18	Sat				Extra survey	Same as SP		Extra survey (YNG)	
43	8/19	Sun				Extra survey	Same as SP		Extra survey (YNG)	
44	8/20	Mon				Extra survey	Same as SP		Intl FLT (YNG-NRT)	
45	8/21	Tue				Intl FLT (YNG-NRT)				

Abbreviation

TL=Team Leader
T1=Official Member Technical 1
T2=Official Member Technical 2
PM=Project manager
E2=Equipment planner2
FP=Facility planner
SP=Sub project manager
CP=Procurement/cost planner

YNG=Yangon
MDL=Mandalay
NPT=Nay Pyi Taw
YG=Yangon General Hospital
YN=New Yangon General Hospital
YW=Central Women's Hospital in Yangon
YP=Yangon Children Hospital
MG=Manadaly General Hospital

MW=Central Women's Hospital in Mandalay
MP=Mandalay Children Hospital
MOH=Ministry of Health
EOJ=Embassy of Japan
JICA=Japan International Cooperation Agency
MOM=Minutes of Memorandum
FLT=Flight
Intl=International
Dms=Domestic

Study Schedule (Detailed Design)

			Official Member (Team Leader)	Detailed Design Study Schedule		
				Sub-Chief / Health Planning / Equipment Planning 1	Equipment Planning 2 / Operation and Maintenance Planning	Procurement Planning / Cost Estimation
1	12/9	Sun		International Flight (Tokyo-Yangon)		
2	12/10	Mon		AM: Meeting with JICA PM: Move to Nay Pyi Taw		
3	12/11	Tue		AM: Meeting with MOH PM: Move to Mandalay		
4	12/12	Wed		AM: Mandalay General Hospital PM: Central Women's Hospital in Mandalay		
5	12/13	Thu		AM: Mandalay Children Hospital PM: Move to Yangon		
6	12/14	Fri		AM: Central Women's Hospital in Yangon PM: Yangon Children Hospital		
7	12/15	Sat		Internal meeting (Supplementary survey)		
8	12/16	Sun	Arrive in Yangon	Internal meeting (Interim report)		
9	12/17	Mon	AM: Meeting with JICA PM: Move to Nay Pyi Taw	Same as Team Leader		
10	12/18	Tue	Explanation of Draft Report in MOH	Same as Team Leader		
11	12/19	Wed	Discussion about MOM in MOH	Same as Team Leader		
12	12/20	Thu	AM: Signing of MOM PM: Move to Yangon	Same as Team Leader		
13	12/21	Fri	AM: Report to JICA PM: Intl Flight (Yangon-Tokyo)	Same as Team Leader		
14	12/22	Sat	Arrive in Tokyo	Same as Team Leader		

Abbreviation

MOH=Ministry of Health

JICA=Japan International Cooperation Agency

MOM=Minutes of Memorandum

3. List of Parties Concerned in the Recipient Country

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

1. Yangon General Hospital
   - 1-1. Dr. Than Win / Medical Superintendent
   - 1-2. Dr. Thein Lwin / Prof / Surgery
   - 1-3. Dr. Thit Lwin / Professor & Head of Department Orthopedic
   - 1-4. Dr. Thet Khaing Win / Professor of Medicine
   - 1-5. Dr. Khin Than Mon / Deputy Medical Superintendent
   - 1-6. Dr. Nay Win Thein / Assistant Medical Superintendent
   - 1-7. Dr. SK Saing Khum / Assistant Surgeon
   - 1-8. Dr. Khine Wai Mon / Assistant Surgeon
   - 1-9. Ms. Khin Than New / Nursing Superintendent
   - 1-10. Eng. Zaw Min Oo / AE (Electrical Department)
   - 1-11. Eng. Tin Tun Oo / SAE Bioengineering Department
   - 1-12. Ms. Nwe New Soe / Assistant Nursing Superintendent
   - 1-13. Dr. Han Htay / ICU
   - 1-14. Dr. Thein Myint / Respiratory Medicine
   - 1-15. Dr. Win Naing / Respiratory Medicine
   - 1-16. Dr. Kyin Myint / Nuclear Medicine
   - 1-17. Dr. Aye Aye Myint / Pathology / Lab
   - 1-18. Dr. Moe Myint / General Surgery

2. New Yangon General Hospital
   - 2-1. Dr. Kyaw Kyaw / Senior Medical Superintendent
   - 2-2. Dr. Tin Tin Yee / Senior Deputy Medical Superintendent
   - 2-3. Dr. Yi Yi Lwin / Associate Professor
   - 2-4. Dr. Tin Tin Mar / Associate Professor
   - 2-5. Dr. Soe Nyunt / Senior Consultant Anesthesiologist
   - 2-6. Dr. Myint Myint Yee / Pathologist
   - 2-7. Dr. Hein Yarzar Aung / Consultant Physician
   - 2-8. Dr. Laitin Loin / Consultant

3. Central Women's Hospital in Yangon
   - 3-1. Dr. Tin Nyo Latt / Medical Superintendent
   - 3-2. Dr. Aye Aye Thein / Professor / Head, Neonatologist
   - 3-3. Dr. Khin Lay Kywe / Professor (OB/GY)
   - 3-4. Dr. Aye Aye Lwin / Senior Consultant, Anesthetist

3-5. Dr. Khin Shwe Mar / Senior Consultant, Pathologist
3-6. Dr. Hla Hla Myaing / Associate Professor, Radiologist
3-7. Dr. Tin Hla / Deputy Medical Superintendent
3-8. Eng. U Myo Chit / Assistant Engineer (Electrical)

4. Yangon Children Hospital
   4-1. Dr. Than Htaik / Medical Superintendent
   4-2. Dr. Aye Nhe Nhe / Radiology Department
   4-3. Dr. Kyi May Oo / Meditech
   4-4. Dr. Mya Soe / Anesthesiologist
   4-5. Dr. Nang Yin Mu Aye / Intensive care Unit
   4-6. Dr. Htay Htay Tin / Department of Clinical Pathology
   4-7. Dr. Kay Thwe Naing / Department of Physical Medicine & Rehabilitation
   4-8. Dr. Aye Thiri Nalng / Emergency & Outpatient Department
   4-9. Dr. Aye Aye Khaing / Outpatient Department
   4-10. Dr. May Lwin / Neonatal Unit
   4-11. Dr. Maung Maung Soe / Medical Unit 3 / Consultant Pediatric Surgeon
   4-12. Dr. Thazin Mon / Medical Unit 3/ Senior Consultant Pediatric
   4-13. Dr. Khin Maung Oo / Consultant Pediatric Cardiology
   4-14. Dr. Aye Aye Myint / Clinic Professor
   4-15. Dr. May Thwe Su / Specialist Assistant Surgeon

5. Mandalay General Hospital
   5-1. Dr. U Maung Win / Senior Medical Superintendent
   5-2. Dr. Win Maung Maung / Assistant Medical Superintendent
   5-3. Dr. Myint Soe / Medical Superintendent
   5-4. Dr. Khin Myint / Medical Superintendent
   5-5. Dr. Mg Mg Soe / Professor/ Head, Radiology
   5-6. Dr. Khin Seiw Win / Senior Consultant, Pathologist / Blood Bank & Laboratory
   5-7. Dr. Khin Meya Mon / Senior Consultant, Pathologist / Blood Bank & Laboratory
   5-8. Dr. Myint Ngwe / Senior Consultant, Cardiologist, Cardiovascular Medicine Dept
   5-9. Dr. Ah Yu Ah Yu / Operation Theatre
   5-10. Dr. Tin Maunh Lin / Senior Consultant, Urologist
   5-11. Dr. Tun Tun Oo / Consultant General Surgeon
   5-12. Dr. Kyaw Zwa Hlaing / Professor / Head, Department of Urology
   5-13. Dr. Shwe Win / Consultant, Urologist
   5-14. Dr. Tint Zan Oo / Thoracic Surgery

5-15. Dr. Ni Ni Aye / Intensive Care Unit
5-16. Dr. Tin Maung Nyunt / Associate Professor / Main Operation Theatre
5-17. Dr. Nwe Ni / Professor / Head, Gashoenferology
5-18. Dr. Ye Tun / Professor, Chest Medical Unit

6. Central Women's Hospital in Mandalay
   6-1. Dr. Kyan Shloe / Senior Medical Superintendent
   6-2. Dr. Soe Naing / Medical Superintendent
   6-3. Dr. Nilar Aung / Senior Consultant/ Special Care Baby Unit
   6-4. Dr. Khin Marswe / Associate Professor / SCS Pathologist / Blood Bank & Clinical Pathology
   6-5. Dr. Hla Hla Yi / Obstetrician & Gynecologist
   6-6. Dr. Khine Thin New / Radiology
   6-7. Dr. Moe Thida / Anesthesiologist

7. Mandalay Children Hospital (New)
   7-1. Dr. Aung Kyaw Myint / Senior Medical Superintendent
   7-2. Dr. Myat Soe / Medical Superintendent
   7-3. Dr. Maung Oo / Senior Consultant, Aesthesia
   7-4. Dr. Thura Oo / Senior Consultant, Surgeon / Operation Theatre, ICU
   7-5. Dr. Khaing Win / Senior Consultant, Pediatrician
   7-6. Dr. Thi Tar / Clinical Professor
   7-7. Dr. Khin Ohnmar Aye / Senior Consultant, Radiology
   7-8. Dr. Ye Thu Win / Consultant, Pathologist

8. Ministry of Health (Department of Health)
   8-1. Dr. Min Than Nyunt / Director Geneal Department of Health
   8-2. Dr. Htay Nawy / Director Medical care
   8-3. Dr. Hla Mying / Director, Public Health Acting Director, Medical Care
   8-4. Dr. Khin Win Thet / Deputy Director, Medical care
   8-5. Dr. Moe Khaing / Deputy Director, Medical care
   8-6. Dr. U Kyaw Htay / Director, Finance
   8-7. Mr. Win Oo / Deputy Directo, Finance

9. Central Medical Store Depot (CMSD)
   9-1. Dr. Myo Win / Deputy Director CMSD
   9-2. Eng. Hninn Hninn Lwin / Assistant Engineer (Electrical)
   9-3. Eng. Kyw Zaw Oo / Assistant Engineer (Electronic)

9-4. Dr. Paw Htun / Assistant Director

10. Embassy of Japan in Myanmar

10-1. Mr. Hideaki Matsuo / Counselor

10-2. Mr. Tsuyoshi Nakaya / Second Secretary

10-3. Mr. Hideki Wada / Second Secretary

11. Japan International Cooperation Agency (JICA) Myanmar Office

11-1. Mr. Katsuyoshi Saito / Deputy Director General

11-2. Ms. Kayo Yokomori / Assistant Director

11-3. Mr. Gen Matsuoka / Employee

11-4. Ms. Myat Thuzar / Program Officer

12. Local Consultant

12-1. Mr. Soe Hlaing / Managing Director, Mandalay Strength Construction Co., Ltd.

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

1. Mandalay General Hospital
   - 1-1. Dr. U Maung Win / Senior Medical Superintendent
   - 1-2. Dr. Win Maung Maung / Assistant Medical Superintendent
   - 1-3. Dr. Ah Yu Ah Yu / Operation Theatre
   - 1-4. Dr. Tin Maunh Lin / Senior Consultant, Urologist
   - 1-5. Dr. Tin Maung Nyunt / Associate Professor / Main Operation Theatre
   - 1-6. Dr. Khin Maug Kgeun / C.S. Renal Medical Unit
   - 1-7. Dr. Kyaw Soe Win / Associate Professor / Cardiac Medical Unit

2. Central Women's Hospital in Mandalay
   - 2-1. Dr. Kyan Shloe / Senior Medical Superintendent
   - 2-2. Dr. Soe Naing / Medical Superintendent
   - 2-3. Dr. Nilar Aung / Senior Consultant / Special Care Baby Unit
   - 2-4. Dr. Khin Mar Swe / Associate Professor / SCS Pathologist / Blood Bank & Clinical Pathology
   - 2-5. Dr. Hla Hla Yi / Obstetrician & Gynecologist
   - 2-6. Dr. Khine Thin New / Radiology
   - 2-7. Dr. Moe Thida / Anesthesiologist
   - 2-8. Dr. Myint Myint Aye / C.S. OG unit II

3. Mandalay Children Hospital
   - 3-1. Dr. Aung Kyaw Myint / Senior Medical Superintendent
   - 3-2. Dr. Maung Oo / Senior Consultant, Aesthesia
   - 3-3. Dr. Khaing Win / Senior Consultant, Pediatrician
   - 3-4. Dr. Khin Ohnmar Aye / Senior Consultant, Radiology
   - 3-5. Dr. Ye Thu Win / Consultant, Pathologist
   - 3-6. Dr. Aung Mre / Professor, Pediatric Surgeon

4. Central Women's Hospital in Yangon
   - 4-1. Dr. Tin Nyo Latt / Medical Superintendent
   - 4-2. Dr. Tin Hla / Deputy Medical Superintendent
   - 4-3. Eng. U Myo Chit / Assistant Engineer (Electrical)
   - 4-4. Eng. Daw Cho Cho Mar / Assistant Engineer (Civil)
   - 4-5. Ms. Daw Kyi Sem / Matron, Chief nurse

5. Yangon Children Hospital
   - 5-1. Dr. Than Htaik / Medical Superintendent

5-2. Dr. Tun Tun / Medical Superintendent

5-3. Dr. Yi Yi Khin / Consultant Pediatrician, Renal unit

6. Ministry of Health (Department of Health)

6-1. Dr. Htay Nauug / Director Medical Care

6-2. Dr. Than Win / Deputy Director General, Medical Care

6-3. Dr. Khin Win Thet / Deputy Director, Medical Care

6-4. Dr. Moe Khaing / Deputy Director, Medical Care

7. Central Medical Store Depot (CMSD)

7-1. Dr. Myo Win / Deputy Director CMSD

8. Embassy of Japan in Myanmar

8-1. Mr. Hideaki Matsuo / Counselor

8-2. Mr. Tsuyoshi Nakaya / Second Secretary

9. Japan International Cooperation Agency (JICA) Myanmar Office

9-1. Mr. Katsuyoshi Saito / Deputy Director General

9-2. Ms. Kayo Yokomori / Assistant Director

9-3. Ms. Myat Thuzar / Program Officer

9-4. Ms. Myat Thazin / Secretary

4. Minutes of Discussions

Minutes of Discussions (Outline Design)

MINUTES OF DISCUSSIONS
PREPARATORY SURVEY ON THE PROJECT FOR IMPROVEMENT OF MEDICAL EQUIPMENT IN HOSPITALS IN YANGON AND MANDALAY
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 in Yangon and Mandalay (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 8 July to 21 August 2012.

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.

Nay Pyi Taw, 15 August 2012

牧本小枝

Ms. Saeda Makimoto
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

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.

2. Project sites

The sites of the Project are the seven (7) hospitals in Yangon Region and Mandalay Region: Yangon General Hospital, New Yangon General Hospital, Central Women's Hospital in Yangon, Yangon Children Hospital(old hospital, including extension building), Mandalay General Hospital, Central Women's Hospital in Mandalay and Mandalay Children Hospital(new hospital) .

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 seven (7) hospitals 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 early in December 2012.

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 2013.

7. Other relevant issues

7-1 Targeted Hospitals in the Project

Although the Team confirmed strong needs to improve medical equipment in each hospital, the Team also explained that we would have to select some hospitals from the 7 targeted hospitals because of the limitation of the budget for the Project. Both sides agreed that the Project sites would be selected according to the priority below if necessity arises.

1) Mandalay General Hospital, Central Women's Hospital in Mandalay and Mandalay Children Hospital
2) Central Women's Hospital in Yangon
3) Yangon Children Hospital
4) New Yangon General Hospital
5) Yangon General Hospital

7-2 Necessary Renovation of Rooms and Construction of Buildings

The Team requested to renovate rooms and construct new buildings to install the equipment procured by the Project as described in Annex-4 before procurement and installation of the equipment. The Myanmar side agreed to take necessary measures to finish them on time.

7-3 Allocation of the Cost for Operation and Maintenance

The Myanmar side agreed to secure and allocate the enough budgets strategically to operate and maintain the medical equipment procured under the Project effectively and if it is possible, to save the cost to continue the diagnostic and treatment function of the hospitals after expiratory period of equipment procured by the Project.

7-4 Development of Biomedical Engineers

Both side recognized the necessity and importance of development of biomedical engineers and allocation of those professionals to major hospitals and the Central Medical Store Depot (CMSD), as well as setting up of a new Biomedical Department in CMSD in the future.

7-5 Necessity of Soft Component

Both side confirmed the necessity of soft component on basic maintenance skill of the equipment. The Team will examine the appropriateness and make the detailed plan by early in December 2012 if approved by the Government of Japan.

7-6 Necessity of Technical Assistance

Both sides agreed that there were necessities to acquire advanced skill of imaging and diagnosis using computed tomography (CT) and Ultrasound Machine for technicians and/or radiologists. The Team will examine the possibility after going back to Japan to conduct technical assistance such as related trainings in 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
Annex-4 Necessary Renovation of Rooms and Construction of Buildings

Requested Equipment List

Annex-1

Yangon General Hospital	
No.	Description
1	X-ray machine (digital, general)
2	X-ray machine (digital, mobile)
3	CR machine
4	PACS
5	X-ray machine (digital, angiography)
6	X-ray machine (digital, C-arm, fluoroscopy)
7	Gastroscope
8	Duodenoscope
9	Colonoscope
10	Bronchoscope (flexible)
11	Bronchoscope (rigid)
12	Laparoscope
13	SPECT
14	Gamma counter
15	Defibrillator
16	Patient monitor
17	Ventilator
18	Instrument set for microsurgery
19	Arthoscope
20	Autoclave (vertical)
21	Automatic biochemical analyzer
22	Immuno analyzer
23	Ambulance
24	Polysonographic machine
25	MRI
26	Linear accelerator

Note1: No. is order priority
Note2: Japanese side confirmed that the radiology department changed the priority of PACS from No.4 to lower priority.

1/7

Repuested Equipment List

Annex-1

New Yangon General Hospital	
No.	Description
1	Autoclave
2	CT
3	Anaesthesia machine with ventilator
4	Diathermy
5	Patient monitor
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
19	Ultrasound machine, (B/W)
20	Ultrasound machine. (doppler)
21	MRI

Note1: No. is order priority

Repuested Equipment List

Annex-1

Central Women's Hospital, Yangon	
No.	Description
1	Anaesthesia machine with ventilator
2	Operation table
3	Colposcope
4	Hysteroscope (rigid)
5	Hysteroscope (flexible)
6	Infant incubator
7	Ventilator (neonate)
8	Patient monitor (neonate)
9	Urodynamic measuring machine
10	Ventilator
11	Infant care center
12	Laparoscope
13	Ultrasound machine (doppler)
14	Ultrasound machine (B/W)

Note1: No. is order priority

Repuested Equipment List

Annex-1

Yangon Children Hospital	
No.	Description
1	Autoclave
2	Infusion pump
3	Syringe pump
4	X-ray machine (digital, general)
5	X-ray machine (digital, mobile)
6	Patient monitor
7	Electrophoresis (hemoglobin)
8	Patient warmer
9	Microscope with camera and monitor
10	Patient monitor (OT)
11	Ventilator
12	EEG machine
13	Ultrasound machine
14	ECG machine (holter)
15	Hemodialysis Machine
16	Anaesthesia machine with ventilator
17	Bronchoscope (flexible)
18	Microscope
19	Ventilator (neonate)
20	Ceiling lamp (double head)
21	Defibrillator
22	Wedge
23	Fumigation machine
24	Ultrasound therapy machine
25	Paraffin bath for therapy
26	Prone stander
27	Spirometer
28	Bicycle Exercise machine (child)
29	Autoclave (ethylen oxide)
30	Blood warmer
31	Oxygen concentrator
32	ECG machine

Note1: No. is order priority

Repuested Equipment List

Annex-1

Mandalay General Hospital	
No.	Description
1	CT
2	X-ray machine (digital, mobile)
3	Ultrasound machine, doppler (Radiology)
4	Centrifuge (blood bag)
5	Refrigerator (blood bag)
6	Deep freezer
7	Platelet Agitator
8	X-ray machine (digital, angiography)
9	Central monitor
10	Ultrasound machine, doppler (CCU)
11	ECG machine (Stress Test System)
12	Operation table, multi poupose
13	Diathermy
14	X-ray machine (digital, C-arm, fluoroscopy)
15	Laparoscopic surgical set
16	Instrument set for thoracic surgery
17	Bronchoscope
18	Sternal Saw
19	TURP set
20	Ureteroscope
21	Percutaneous Nephroscope
22	Patient Monitor
23	Ventilator
24	Ventilator (transportation)
25	Defibrillator
26	Autoclave (table top)
27	Gastroscope
28	Colonoscope
29	Duodenoscope
30	Bronchoscope (flexible)
31	Microtome
32	Bacterial Culture Analyzer
33	Haemodialysis Machine (SLED)
34	Ultrasound machine (Renal)

Note1: No. is order priority

Repuested Equipment List

Annex-1

Central Women's Hospital, Mandalay	
No.	Description
1	Bilinometer (blood)
2	Patient monitor (OBGY ICU)
3	Ventilator (OBGY ICU)
4	Ultrasound machine (SCBU)
5	Spectrophotometer
6	Bilinometer (skin)
7	Autoclave (vertical) 150L
8	Cardiotocograph
9	Ultrasound machine (Labor)
10	Infusion pump (ICU, Labour, OG)
11	Centrifuge (blood bag)
12	Colposcope
13	Infant incubator
14	Patient monitor (neonate)
15	Anaesthesia machine with ventilator
16	Infant care center
17	Ultrasound machine (Imaging)
18	Patient monitor
19	Infusion pump (SCBU)
20	Patient monitor (OT)
21	X-ray machine (digital, fluoroscopy)
22	pH Meter
23	Urodynamic measuring machine
24	Operation table
25	Ventilator (Neonate)
26	Laparoscope
27	Hysteroscope
28	Cryotherapy machine
29	Deep freezer
30	Centrifuge
31	Coagulation analyzer
32	Ultrasound machine (neonate)
33	Balance (digital)
34	Platelet agitator
35	Syringe pump
36	Autoclave (vertical) 50L
37	Autoclave (laboratory) 50L
38	Incubator
39	ECG machine (neonate)
40	Pulse oxymeter
41	Suction unit (low pressure)
42	Centrifuge (hematocrit)
43	Patient monitor (OBGY 1,2,3)
44	Oxygen concentrator (OT)
45	Sterilizer
46	Doppler fetal heart detector
47	Oxygen concentrator (OBGY 1,2,3)
48	Microscope
49	Hot air oven
50	Delivery bed
51	Safety cabinet

Note1: No. is order priority

Repuested Equipment List

Annex-1

Mandalay Children's Hospital	
No.	Description
1	Autoclave (vertical)
2	Patient monitor (OT)
3	Instrument set for pediatric abdominal surgery
4	Instrument set pediatric thoracic surgical set
5	Sigmoidoscope (child, flixible)
6	Defibrillator
7	Patient warmer
8	Blood warmer
9	Laryngoscope
10	Defibrillator
11	Ventilator (neonate)
12	Ventilator (child)
13	Patient monitor (neonate to child)
14	Infant incubator (ICU)
15	Oxygen concentrator (ICU)
16	Infusion pump (ICU)
17	Syringe pump (ICU)
18	Infusion pump (SCBU)
19	Syringe pump (SCBU)
20	Bilirubinometer (blood)
21	C-PAP machine
22	Oxygen concentrator (SCBU)
23	Blood pressure machine
24	Infant care center
25	Infant incubator (SCBU)
26	Ultrasound machine
27	Automatic chemistry analyzer
28	Microtome
29	Laparoscope
30	Phototherapy Unit
31	Phototherapy Unit (double)
32	Bilirubinometer (skin)
33	Suction unit (low pressure)
34	X-ray machine (digital, fluoroscopy)
35	CO2 incubator
36	Microcope with camera and monitor
37	Tissue processor
38	Automatic stainer
39	Patient monitor (Surgical UNIT)
40	Infant incubator (Surgical UNIT)
41	Oxygen concentrator (Surgical UNIT)
42	ECG machine

Note1: No. is order priority

1/1

Annex-2

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.

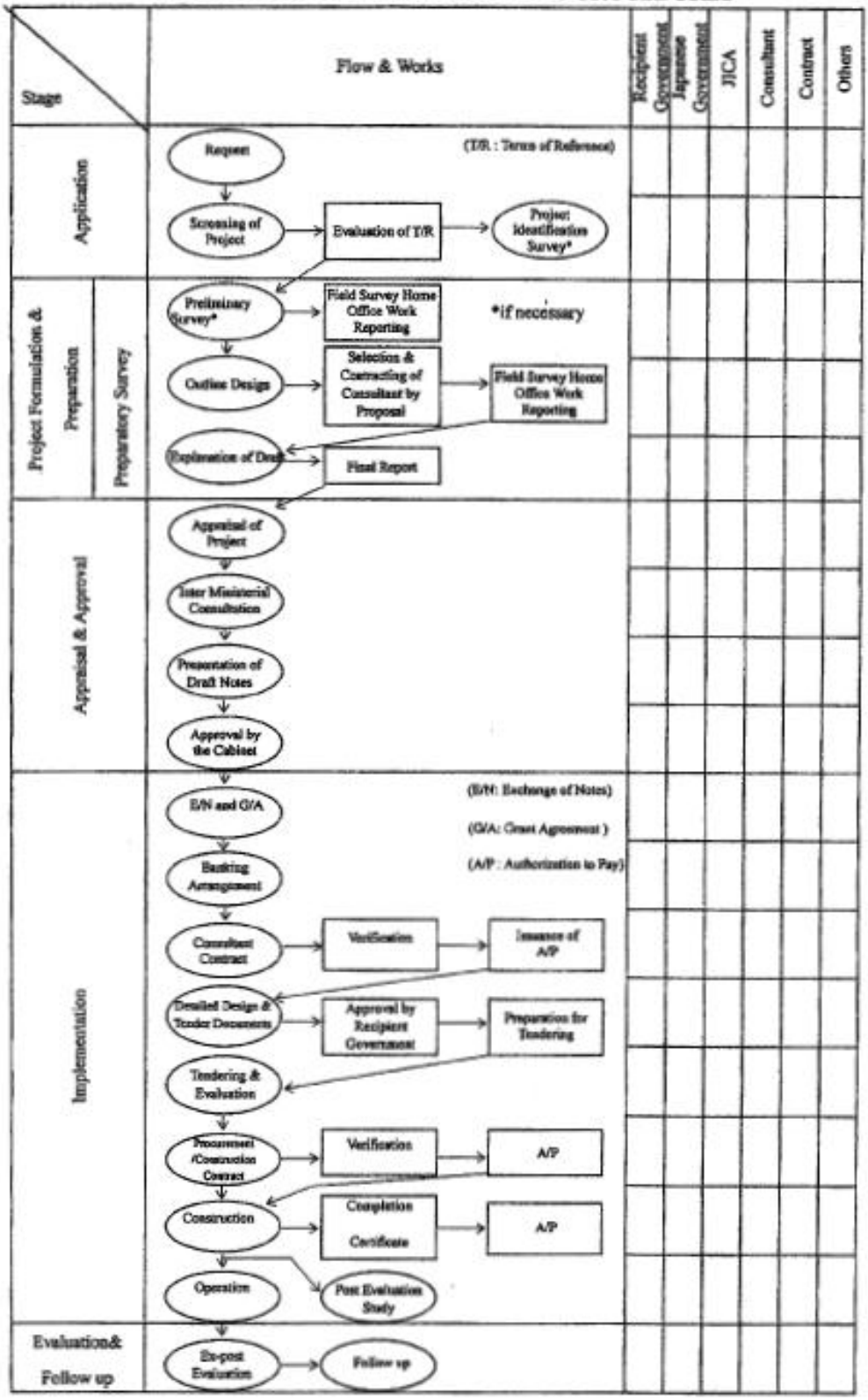
(9) Authorization to Pay (A/P)

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)

Annex-4

Necessary Renovation of Rooms and Construction of Buildings

Target Hospital	Contents of additional construction
Yangon General Hospital	Construction of a new building for Linear Accelerator
	Construction of a new building for MRI
New Yangon General Hospital	Rehabilitation of CT room to build partition, window and door for the control room
Mandalay General Hospital	Rehabilitation of CT room to build partition, window and door for the control room
	Construction of a new 5-storeyed building for cardiology
	Construction of a new 6-storeyed building for haemodialysis, ICU, Neuro medical
Mandalay Central Women's Hospital	Rehabilitation of X-ray room to build partition, window and door for the control room
	Construction of new A-building and B-building
New Mandalay Children's Hospital	Rehabilitation of fluorocsopy room to build partition, window and door for the control room
	Construction of a new blood bank building and transfer of the existing blood bank to the new building

Minutes of Discussions (Detailed Design)

MINUTES OF DISCUSSIONS
PREPARATORY SURVEY ON THE PROJECT FOR IMPROVEMENT OF MEDICAL EQUIPMENT IN HOSPITALS IN YANGON AND MANDALAY
IN
THE REPUBLIC OF THE UNION OF MYANMAR
(EXPLANATION OF THE PREPARATORY SURVEY REPORT)

In August 2012, 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 in Yangon and Mandalay (hereinafter referred to as "the Project") to The Republic of Union of Myanmar (hereinafter referred to as " Myanmar "), and through discussions, field 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 Ms.Ritsuko Sakamoto, Advisor, Health Division III, Human Development Department, JICA, and is scheduled to stay in the country from 9 December to 21 December 2012.

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

Nay Pyi Taw, 20 December 2012

坂元律子

Ms. Ritsuko Sakamoto
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

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ATTACHMENT

1 Components of the Draft Report
The Government of Myanmar agreed and accepted in principle the components of the draft report explained by the Team.

2 Japan's Grant Aid scheme
Myanmar side understands the Japan's Grant Aid Scheme and the necessary measures to be taken by the Government of Myanmar as explained by the Team and described in Annex-2 and Annex-3 of the Minutes of Discussions signed by both parties on August 15 , 2012.

3 Schedule of the Study
JICA will complete the preparatory survey report in accordance with the confirmed items and send it to the Government of Myanmar by the end of March, 2013.

4. Confidentiality of the Project
Both sides confirmed that all information related to the Project including detailed specifications of the equipment and other technical information shall not be released to any outside party before the signing of all the Contract(s) for the Project.

5. Other relevant issues

5-1. Confidentiality of the Project Cost Estimation
The Team explained the cost estimation of the Project as described in Annex-1. Both sides agreed that the Project Cost Estimation should never be duplicated or released to any outside parties before signing of all the Contract(s) for the Project. Myanmar side understood that the Project Cost Estimation attached as Annex-1 is not final and is subject to change.

5-2. Project sites

The sites of the Project are the five (5) hospitals in Yangon Region and Mandalay Region: Central Women Hospital in Yangon, Yangon Children Hospital(old hospital, including extension building), Mandalay General Hospital, Central Women Hospital in Mandalay and Mandalay Children Hospital(new hospital) .

5-3. List of Medical Equipment provided by the Project

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

5-4.Necessary Renovation of Rooms and Construction of Buildings

Myanmar side agreed to finish the renovation of rooms and construction of buildings as described in Annex-3., and other work necessary for installation of the equipment.

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

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. Myanmar side also agreed to install devices or facilities necessary to protect the medical equipment from lightening damage, especially for Mandalay Children Hospital and Central Women hospital in Mandalay, which do not currently have such device.

5-6. Allocation of the Cost for Operation and Maintenance

Myanmar side agreed to secure and allocate the enough budgets to the targeted 5 hospitals strategically to operate and maintain the medical equipment procured under the Project effectively. Furthermore, both sides discussed the necessities of securing the cost for renewal of those equipment after expiratory period and Myanmar side agreed to take necessary measures.

5-7 Development and allocation of Biomedical Engineers

Based on the recognition of the necessity and importance of biomedical engineers, Myanmar side agreed to allocate those professionals, including at least one biomedical engineers, to the five targeted hospitals and the Central Medical Store Depot (CMSD) before the commencement of soft component program (May, 2014). Furthermore, Myanmar side promised to establish Biomedical Engineering Department in CMSD, to be responsible for maintenance and management of the medical equipment procured under this Project for the targeted 5 hospitals.

5-8 Plan of Soft Component

Both sides agreed the necessities of soft component to upgrade the maintenance skill of the engineers in the targeted five hospitals, which is described on the draft report.

Annex-1 Project Cost Estimation
Annex-2 List of Medical Equipment
Annex-3 Necessary Renovation of Rooms and Construction of Buildings

Annex-1 Project Cost Estimation

Borne by the Japanese Side

Item	Amount (Thousand Japanese Yen)
Equipment Procurement	This section is closed due to confidentiality.
Consultant Fee	
Soft Component	
Total	

Borne by the Myanmar Side (Costs in USD)

Items of Expense	Mandalay General Hospital	Central Women's Hospital in Mandalay	Mandalay Children Hospital	Central Women's Hospital in Yangon	Yangon Children Hospital	**Subtotal**
Renovation of radioactive examination room	Expansion work of a CT room at the emergency department	Renovation of fluoroscopy room	Renovation of fluoroscopy room	N/A	Electric work at existing general image diagnosis room	-
	43,131	17,322	19,325	-	15,000	94,778
Sterilization machine	OT: 15m	OT: 15m Lab: 5m	OT: 10m	N/A	OT: 10m	-
Dialysis machine	N/A	N/A	N/A	N/A	10m	-
Water supply and drainage work	4,625	3,700	1,850	-	3,700	13,875
Electric work	18,750	15,000	7,500	-	15,000	56,250
Total	66,506	36,022	28,675	0	33,700	164,903

Annex-2 List of Medical Equipment

Mandalay General Hospital

Project No.	Descriptions	Planned Qty.
MG-01	CT	2
MG-02	X-ray machine (mobile)	2
MG-03	Ultrasound machine (adult, color doppler, abdomen+TV+superficial)	1
MG-04	Centrifuge (blood bag, type A)	2
MG-05	Refrigerator (blood bag)	1
MG-06	Deep freezer (large)	2
MG-07	Platelet agitator	1
MG-08	Central monitor	3
MG-09	Patient monitor (adult, standard)	22
MG-10	Ultrasound machine (adult, color doppler, heart+TE+pencil+superficial)	1
MG-11	ECG machine (stress test system)	1
MG-12	Operation table (motorized)	3
MG-13	Operation table (motorized, neuro surgery)	1
MG-14	X-ray machine (C-arm, fluoroscopy)	3
MG-15	Laparoscope (adult)	2
MG-16	Instrument set for thoracic surgery (adult)	2
MG-17	Bronchoscope (adult, flexible)	2
MG-18	Sternal Saw	1
MG-19	TURP set	1
MG-20	Ureteroscope	1
MG-21	Percutaneous Nephroscope	1
MG-22	Patient monitor (adult, ETCO2+IBP)	6
MG-23	Ventilator (adult)	4
MG-24	Ventilator (transportation)	1
MG-25	Defibrillator (adult)	2
MG-26	Autoclave (table top)	12
MG-27	Gastroscope	1
MG-28	Colonoscope	1
MG-29	Duodenoscope	1

Project No.	Descriptions	Planned Qty.
MG-30	Microtome	2
MG-31	Blood culture system	1
MG-32	Automatic blood culture and antibotic susceptibility system	1
MG-33	Hemodialysis machine (adult)	2
MG-34	Ultrasound machine (adult, color doppler, kidney+insertion)	1

Central Women Hospital in Mandalay

Project No.	Descriptions	Planned Qty.
MW-01	Bilirubinometer (blood)	1
MW-02	Patient monitor (adult, standard)	19
MW-03	Ventilator (adult)	3
MW-04	Ultrasound machine (adult, color doppler, abdomen+TV+DVT)	1
MW-05	Spectrophotometer	1
MW-06	Bilirubinometer (skin)	1
MW-07	Autoclave (vertical, large)	1
MW-08	Cardiotocograph	10
MW-09	Ultrasound machine (OBGY, abdominal+TV)	1
MW-10	Infusion pump (adult)	10
MW-11	Centrifuge (blood bag, type B)	1
MW-12	Colposcope	1
MW-13	Infant incubator (manual/servo)	7
MW-14	Patient monitor (pediatric, standard)	5
MW-15	Anaesthesia machine with ventilator (adult)	5
MW-16	Infant care center	5
MW-17	Ultrasound machine (adult, color doppler, abdomen+TV)	1
MW-18	Infusion pump (pediatric)	7
MW-19	Patient monitor (adult, multi gas)	2
MW-20	X-ray machine (fluoroscopy)	1
MW-21	pH Meter	2
MW-22	Urodynamic measuring machine	1
MW-23	Operation table (manual)	8
MW-24	Ventilator (neonatal A)	2
MW-25	Laparoscope (adult)	1
MW-26	Hysteroscope (rigid)	2
MW-27	Cryosurgery machine	1
MW-28	Deep freezer (small)	1
MW-29	Centrifuge (table top)	1
MW-30	Coagulation analyzer	1
MW-31	Ultrasound machine (neonate, color doppler, heart+abdomen+superficial)	1
MW-32	Balance (digital)	1
MW-33	Platelet agitator	1

Project No.	Descriptions	Planned Qty.
MW-34	Syringe pump (pediatric)	5
MW-35	Autoclave (vertical, medium)	4
MW-36	Autoclave (laboratory)	1
MW-37	Incubator	1
MW-38	ECG machine	1
MW-39	Pulse oxymeter	4
MW-40	Suction unit	5
MW-41	Centrifuge (hematocrit)	2
MW-42	Oxygen concentrator	11
MW-43	Doppler fetal heart detector	5
MW-44	Microcope with camera and monitor	1
MW-45	Hot air oven	1
MW-46	Delivery bed	10
MW-47	Safety cabinet	1
MW-48	Electrosurgical unit for LEEP	1

Mandalay Children Hospital

Project No.	Descriptions	Planned Qty.
MP-01	Autoclave (vertical)	1
MP-02	Patient monitor (pediatric, Multi Gas+IBP)	2
MP-03	Instrument set for pediatric abdominal surgery	1
MP-04	Instrument set pediatric thoracic surgical set	1
MP-05	Sigmoidoscope (pediatric, flixible)	1
MP-06	Defibrillator	2
MP-07	Patient warmer	1
MP-08	Blood warmer	2
MP-09	Laryngoscope	2
MP-10	Ventilator (neonate B)	2
MP-11	Ventilator (periatric B)	1
MP-12	Patient monitor (pediatric, standard)	8
MP-13	Infant incubator (manual/servo)	13
MP-14	Oxygen concentrator	11
MP-15	Infusion pump (pediatric)	8
MP-16	Syringe pump (pediatric)	7
MP-17	Bilirubinometer (blood)	1
MP-18	Blood pressure monitoring machine	2
MP-19	Infant care center	2
MP-20	Ultrasound machine (pediatric, color doppler, head+abdomen+superficial)	1
MP-21	Automatic chemistry analyzer	1
MP-22	Microtome	1
MP-23	Laparoscope (pediatric)	1
MP-24	Phototherapy Unit	4
MP-25	Bilirubinometer (skin)	1
MP-26	Suction unit	4
MP-27	X-ray machine (fluoroscopy)	1
MP-28	CO2 incubator	1
MP-29	Microcope with camera and monitor	1
MP-30	Tissue processor	1

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Project No.	Descriptions	Planned Qty.
MP-31	Automatic stainer	1
MP-32	Infant incubator (manual)	4
MP-33	ECG machine	1

Central Women Hospital in Yangon

Project No.	Descriptions	Planned Qty.
YW-01	Anaesthesia machine with ventilator (adult)	2
YW-02	Operation table (manual)	2
YW-03	Colposcope	1
YW-04	Colposcope with monitor	1
YW-05	Hysteroscope (rigid)	1
YW-06	Hysteroscope (flexible)	1
YW-07	Infant incubator (manual)	10
YW-08	Ventilator (neonatal A)	2
YW-09	Patient monitor (pediatric, standard)	5
YW-10	Urodynamic measuring machine	1
YW-11	Ventilator (adult)	2
YW-12	Infant care center	3
YW-13	Laparoscope (adult)	2
YW-14	Ultrasound machine (adult, color doppler, abdomen+TV+superficial)	1
YW-15	Ultrasound machine (OBGY, abdominal+TV)	1
YW-16	Electrosurgical unit for LEEP	1

Yangon Children Hospital

Project No.	Descriptions	Planned Qty.
YP-01	Autoclave (horizontal)	2
YP-02	Infusion pump (pediatric)	26
YP-03	Syringe pump (pediatric)	24
YP-04	X-ray machine (general, digital)	1
YP-05	X-ray machine (mobile, digital)	1
YP-06	Patient monitor (pediatric, standard)	18
YP-07	Patient monitor (pediatric, ETCO2)	5
YP-08	Electrophoresis (hemoglobin)	1
YP-09	Patient warmer	4
YP-10	Microcope with camera and monitor	1
YP-11	Patient monitor (pediatric, Multi Gas+IBP+CVP)	4
YP-12	Ventilator (pediatric A)	3
YP-13	EEG machine	1
YP-14	Ultrasound machine (pediatric, color doppler, head+abdomen+superficial)	1
YP-15	Ultrasound machine (pediatric, color doppler, insertion)	1
YP-16	ECG machine (holter)	1
YP-17	Hemodialysis machine (pediatric)	1
YP-18	Anaesthesia machine with ventilator (pediatric)	3
YP-19	Bronchoscope (pediatric, flexible)	1
YP-20	Microscope	2
YP-21	Ventilator (neonatal A)	1
YP-22	Ceiling lamp (double head)	3
YP-23	Defibrillator (pediatric)	2
YP-24	Wedge	1
YP-25	Ultrasound therapy machine	1
YP-26	Paraffin bath for therapy	1
YP-27	Standing table	1
YP-28	Spirometer	1
YP-29	Bicycle Exercise machine (pediatric)	1
YP-30	Blood warmer	4
YP-31	Oxygen concentrator	8

Project No.	Descriptions	Planned Qty.
YP-32	ECG machine	1

Annex-3 Necessary Renovation of Rooms and Construction of Buildings

Construction

Hospital Name	Building Name	Floor	Expected Period of Completion	Progress as of December 2012
Mandalay General Hospital	Cardiovascular Bloc (Cardiac CCU)	6	End of January 2013	Finished construction of structure, interior and finishing work in progress
	New Ward, 5th floor (Renal unit, Gastro-intestinal unit)	6	October 2013	Progress in demolition work of existing flat building, construction will start in January 2013
Central Women Hospital in Mandalay	A bloc (Patient Ward) (Bloc No.3)	3	Will open in the beginning of 2013	Completed the construction of structure except elevator, interior and finishing work in progress
	B Ward (Laboratory department) (New labor room, new operation theater)	3	Undecided (2013)	Restart of the construction of structure by MOH budget, finished concrete placement of ground floor

Renovation

Hospital Name	Target Equipment	Construction
Mandalay General Hospital	CT (Emergency Department)	Installation of X-ray control booth Radiation protection, Air conditioning and Power supply line (3ph. 1ph.)
	CT (Renovation of exiting CCU area)	Installation of CT room and X-ray control booth Radiation protection, Air conditioning and Power supply line (3ph. 1ph.)
Central Women Hospital in Mandalay	X-ray Machine (Fluoroscopy), (Image Diagnosis Unit)	Installation of X-ray control booth Radiation protection, Additional Air conditioning and Power supply line (3ph. 1ph.)
Mandalay Children Hospital	X-ray Machine (Fluoroscopy), (Image Diagnosis Department)	Installation of X-ray control booth Radiation protection, Additional Air conditioning and Power supply line (3ph. 1ph.)
Yangon Children Hospital	X-ray Machine (General, digital), (Image Diagnosis Department)	Power supply line (3ph. 1ph)
Mandalay General Hospital	Hemodialysis machine (adult)	Water supply (included RO) and drain line, Strengthening capacity of power supply line
Central Women's Hospital in Mandalay	Autoclave	Water supply and drain line, Strengthening capacity of power supply line, (3ph. 1ph.)
Mandalay Children Hospital	Autoclave	Water supply and drain line, Strengthening capacity of power supply line, (3ph. 1ph.)

Hospital Name	Target Equipment	Construction
Yangon Children Hospital	Autoclave (horizontal),(OT)	Water supply and drain line, Strengthening capacity of power supply line, (3ph. 1ph.)
	Hemodialysis machine (pediatric)	Water supply (included RO) and drain line, Strengthening capacity of power supply line

5. Examination of the Requested Equipment

Examination of the Requested Equipment

Mandalay General Hospital

Req. No.	Requested Equipment	Purpose	Necessity	Tech. Level	Operation	Maintenance	Judgement	Notes	Project No.	Planned Qty.	Type
1	CT	○	○	○	○	○	○	1 unit is for renewal of Shimadzu equipment procured in 2001. and 1 unit is to be placed at emergency department	MG-01	2	Renewal/ Addition
2	X-ray machine (mobile)	○	○	○	○	○	○	To be placed at medicine unit 1 and 2, and surgical unit 1 and 2	MG-02	2	Addition
3	Ultrasound machine (adult, color doppler, abdomen+TV+superficial)	○	○	○	○	○	○	With probes for abdomen, TV, and superficial use	MG-03	1	Addition
4	Centrifuge (blood bag, type A)	○	○	○	○	○	○	For platelet separation of whole blood	MG-04	2	Renewal
5	Refrigerator (blood bag)	○	○	○	○	○	○	For storage of donated blood, to replace with existing household refrigerator	MG-05	1	Addition
6	Deep freezer (large)	○	○	○	○	○	○	For cold storage of blood plasma	MG-06	2	Renewal
7	Platelet agitator	○	○	○	○	○	○	For storage of platelet under shaking condition, at 20-24 degrees	MG-07	1	New
8	X-ray machine (angiography)	○	×	○	○	○	×	Excluded from the Project, because MOH also had a procurement plan of an angiography for Mandalay General Hospital		1	Renewal
9	Central monitor	○	○	○	○	○	○	1 set each at CCU, PPR, and ICU	MG-08	3	New
	Patient monitor (adult, standard)	○	○	○	○	○	○	To be used concurrently with central monitor (adult, standard). 6 units for CCU, 8 units for PPR, and 8 units for ICU	MG-09	22	Addition/ New
10	Ultrasound machine (adult, color doppler, heart+TE+pencil+superficial)	○	○	○	○	○	○	For diagnosis of blood flow of coronary artery at non-invasive treatment department	MG-10	1	Renewal
11	ECG machine (stress test system)	○	○	○	○	○	○	For replacement of Italian equipment procured in 2001	MG-11	1	Renewal
12	Operation table (motorized)	○	○	○	○	○	○	For renewal of existing equipment with failure of up-and-down motion	MG-12	3	Renewal
	Operation table (motorized, neuro surgery)	○	○	○	○	○	○	To be placed at No.3 operation theater for brain surgery	MG-13	1	Renewal
14	X-ray machine (C-arm, fluoroscopy)	○	○	○	○	○	○	1 unit each for central operation theater, urological surgery, and maxillofacial traumatology department	MG-14	3	New
15	Laparoscope (adult)	○	○	○	○	○	○	1 unit each for central operation theater and urological surgery unit	MG-15	2	Renewal
16	Instrument set for thoracic surgery (adult)	○	○	○	○	○	○	Basic forceps set for surgery	MG-16	2	Renewal
17	Bronchoscope (adult, flexible)	○	○	○	○	○	○	1 unit each for central operation theater and chest unit	MG-17	2	Renewal
18	Sternal Saw	○	○	○	○	○	○	To replace with existing manual sternal saw, electrical saw is to be prepared	MG-18	1	New
19	TURP set	○	○	○	○	○	○	For stone extraction surgery and enlarged prostate surgery etc., to replace with the obsolete existing equipment	MG-19	1	Renewal
20	Ureteroscope	○	○	○	○	○	○	For urethral stone surgery, to replace with the obsolete existing equipment	MG-20	1	Renewal
21	Percutaneous Nephroscope	○	○	○	○	○	○	For kidney stone surgery and cancer treatment, to replace with the obsolete existing equipment	MG-21	1	Renewal
22	Patient monitor (adult, ETCO2+IBP)	○	○	○	○	○	○	To be used concurrently with central monitor. 4 units for CCU and 2 units for ICU	MG-22	6	Renewal
23	Ventilator (adult)	○	○	○	○	○	○	Existing 4 units are to be used for backup, and another 4 units are to be prepared	MG-23	4	Addition
24	Ventilator (transportation)	○	○	○	○	○	○	For patient transportation between ICU and operation theater, or ICU and facilities ourside the hospital	MG-24	1	New
25	Defibrillator (adult)	○	○	○	○	○	○	To be prepared as existing equipment is not compatible with ECG	MG-25	2	Renewal
26	Autoclave (table top)	○	○	○	○	○	○	To be placed at each department, for occational disinfection and sterilization of apparatus	MG-26	12	Addition
27	Gastroscope	○	○	○	○	○	○	To be prepared as existing equipment shows blurred image due to abration of fiber	MG-27	1	Renewal
28	Colonoscope	○	○	○	○	○	○	To be prepared as existing equipment shows blurred image due to abration of fiber	MG-28	1	Renewal
29	Duodenoscope	○	○	○	○	○	○	To be prepared as existing equipment shows blurred image due to abration of fiber	MG-29	1	Renewal
30	Bronchoscope (adult, flexible)	○	○	○	○	○	△	To be prepared as "MG-18"			-
31	Microtome	○	○	○	○	○	○	2 units for cytopathology examination unit	MG-30	2	Addition
32	Blood culture system	○	○	○	○	○	○	For blood examination and cell tissue examination of patients showing signs of bacteremia, meningitis, myelitis, joint inflammation, pneumonia, and fever of unknown origin	MG-31	1	New
	Automatic blood culture and antibotic susceptibility system	○	○	○	○	○	○	For blood examination and cell tissue examination of patients showing signs of bacteremia, meningitis, myelitis, joint inflammation, pneumonia, and fever of unknown origin	MG-32	1	New
33	Hemodialysis machine (adult)	○	○	○	○	○	○	For artificial dialysis of patients with unstable hemodynamics due to acute kidney failure or chronic	MG-33	2	Addition
34	Ultrasound machine (adult, color doppler, kidney+insertion)	○	○	○	○	○	○	For diagnosis of kidney function for patients with acute kidney failure caused by toxic snake bite	MG-34	1	New

Examination of the Requested Equipment

Central Women's Hospital in Mandalay

Req. No.	Requested Equipment	Purpose	Necessity	Tech. Level	Operation	Maintenance	Judgement	Notes	Project No.	Planned Qty.	Type
1	Bilirubinometer (blood)	○	○	○	○	○	○	To be used at infant special care unit, for definitive diagnosis	MW-01	1	Renewal
2	Patient monitor (adult, standard)	○	○	○	○	○	○	Equipment with general measurement indicators	MW-02	19	New/ Renewal
3	Ventilator (adult)	○	○	○	○	○	○	To be placed at OB & GY ICU, for adult	MW-03	3	New
4	Ultrasound machine (adult, color doppler, abdomen+TV+DVT)	○	○	○	○	○	○	With probes for diagnosis of gynecology diseases, such as DVT, uterus cancer, or ovary cancer	MW-04	1	Addition
5	Spectrophotometer	○	○	○	○	○	○	Full automatic model is to be prepared to deal with increasing samples	MW-05	1	Addition
6	Bilirubinometer (skin)	○	○	○	○	○	○	For screening, to be placed at outpatient clinic	MW-06	1	New
7	Autoclave (vertical, large)	○	○	○	○	○	○	To be placed at existing operation theater, for replacement of obsolete existing equipment	MW-07	1	New
8	Cardiotocograph	○	○	○	○	○	○	6 units for existing delivery room, and 4 units for new delivery room	MW-08	10	Addition
9	Ultrasound machine (OBGY, abdominal+TV)	○	○	○	○	○	○	For OB & GY use, to be placed at existing delivery department	MW-09	1	Addition
10	Infusion pump (adult)	○	○	○	○	○	○	For adult, to be used at ICU, delivery room, and patient ward	MW-10	10	Addition
11	Centrifuge (blood bag, type B)	○	○	○	○	○	○	For centrifugal separation of donated blood into necessary blood components	MW-11	1	New
12	Colposcope	○	○	○	○	○	○	For diagnosis and treatment of uterine cervical cancer, to be placed at operation theater	MW-12	1	Renewal
13	Infant incubator (manual/servo)	○	○	○	○	○	○	Total 9 units are necessary; 2 units are currently available and 7 units are to be prepared	MW-13	7	Addition
14	Patient monitor (pediatric, standard)	○	○	○	○	○	○	With general specification for infant, to be placed at special care baby unit	MW-14	5	New
15	Anaesthesia machine with ventilator (adult)	○	○	○	○	○	○	2 units for existing operation theater, and 3 units for new operation theater	MW-15	5	Renewal/ New
16	Infant care center	○	○	○	○	○	○	Total 7 units are necessary; 2 units are currently available and 5 units are to be prepared	MW-16	5	Addition
17	Ultrasound machine (adult, color doppler, abdomen+TV)	○	○	○	○	○	○	To be prepared for emergency department available 365 days a year	MW-17	1	New
18	Patient monitor (adult, standard)	○	○	○	○	○	△	To be prepared as "MW-02"			-
19	Infusion pump (pediatric)	○	○	○	○	○	○	For pediatric, to be placed at SCBU	MW-18	7	Addition
20	Patient monitor (adult, multi gas)	○	○	○	○	○	○	With specification that meets the use at operation theater, including anesthetic gas monitor	MW-19	2	New
21	X-ray machine (fluoroscopy)	○	○	○	○	○	○	Radioprotective wall with observation window is to be constructed, by funds provided from the hospital	MW-20	1	New
22	pH Meter	○	○	○	○	○	○	For examination of fetus and umbilical cord blood, 1 unit each are to be placed at existing and new delivery room	MW-21	2	New
23	Urodynamic measuring machine	○	○	○	○	○	○	For proper operation planning of urinary organs	MW-22	1	New
24	Operation table (manual)	○	○	○	○	○	○	5 units for existing operation theater, and 3 units for new operation theater	MW-23	8	Renewal/ New
25	Ventilator (neonatal A)	○	○	○	○	○	○	For neonatal, to be placed at SCBU	MW-24	2	New
26	Laparoscope (adult)	○	○	○	○	○	○	1 unit is to be prepared due to obsoleteness of existing equipment	MW-25	1	Renewal
27	Hysteroscope (rigid)	○	○	○	○	○	○	1 unit each for existing and new operation theater	MW-26	2	New
28	Cryosurgery machine	○	○	○	○	○	○	For specific site of uterine cervical cancer treatment, where colposcope cannot reach	MW-27	1	New
29	Deep freezer (small)	○	○	○	○	○	○	For storage of blood components	MW-28	1	New
30	Centrifuge (table top)	○	○	○	○	○	○	To be shared between all examination unit, with specification for general use	MW-29	1	Addition
31	Coagulation analyzer	○	○	○	○	○	○	All patients are obliged to take blood coagulation examination before operation	MW-30	1	New
32	Ultrasound machine (neonate, color doppler, heart+abdomen+superficial)	○	○	○	○	○	○	For neonatal, to be placed at SCBU	MW-31	1	New
33	Balance (digital)	○	○	○	○	○	○	To be used at all examination unit, with specification for general use	MW-32	1	Addition
34	Platelet agitator	○	○	○	○	○	○	To be prepared for storage of platelet for blood infusion under shaking condition, to preserve quality	MW-33	1	New
35	Syringe pump (pediatric)	○	○	○	○	○	○	For pediatric, to be placed at SCBU	MW-34	5	New
36	Autoclave (vertical, medium)	○	○	○	○	○	○	To be placed at new operation theater and existing/new delivery room	MW-35	4	Addition/ New
37	Autoclave (laboratory)	○	○	○	○	○	○	To be used at all examination unit, with specification for general use	MW-36	1	New
38	Incubator	○	○	○	○	○	○	To be used at microorganism room of exanimation room	MW-37	1	New
39	ECG machine	○	○	○	○	○	○	To be prepared for SCBU	MW-38	1	Addition
40	Pulse oxymeter	○	○	○	○	○	○	For measuring oxygen saturation of neonatal at SCBU	MW-39	4	Addition
41	Suction unit	○	○	○	○	○	○	For general use at SCBU	MW-40	5	Addition
42	Centrifuge (hematocrit)	○	○	○	○	○	○	For examination of umbilical cord blood at SCBU	MW-41	2	Addition
43	Patient monitor (adult, standard)	○	○	○	○	○	△	To be prepared as "MW-02"			-
44	Oxygen concentrator	○	○	○	○	○	○	2 units for existing operation theater, 3 units for new operation theater, and Total 6 units are to be prepared; 2	MW-42	11	Addition
45	Autoclave (vertical, medium)	○	○	○	○	○	△	To be prepared as "MW-35"			-
46	Doppler fetal heart detector	○	○	○	○	○	○	Total 5 units are to be prepared; 1 each for patient ward 1, 2, 3, delivery room, and outpatient ward	MW-43	5	Addition
47	Oxygen concentrator	○	○	○	○	○	△	To be prepared as MW-42			-
48	Microcope with camera and monitor	○	○	○	○	○	○	To be placed at hematology room of examination department	MW-44	1	Addition
49	Hot air oven	○	○	○	○	○	○	To be placed at microorganism room of examination department	MW-45	1	Addition
50	Delivery bed	○	○	○	○	○	○	2 units for existing delivery room and 8 units for new delivery room	MW-46	10	Renewal/ Addition
51	Safety cabinet	○	○	○	○	○	○	To be placed at microorganism room of examination department	MW-47	1	New
	Electrosurgical unit for LEEP	○	○	○	○	○	○	Equipment for LEEP is to be prepared for treatment of uterine cervical cancer	MW-48	1	New

Examination of the Requested Equipment

Mandalay Children Hospital

Req. No.	Requested Equipment	Purpose	Necessity	Tech. Level	Operation	Maintenance	Judgement	Notes	Project No.	Planned Qty.	Type
1	Autoclave (vertical)	○	○	○	○	○	○	1 unit is to be added for dealing with treatment for patients at old hospital	MP-01	1	Addition
2	Patient monitor (pediatric, Multi Gas+IBP)	○	○	○	○	○	○	With specifications that is able to measure IBP, CO2 concentration, and anesthetic gas concentration	MP-02	2	New
3	Instrument set for pediatric abdominal surgery	○	○	○	○	○	○	Basic forceps set for surgery	MP-03	1	Addition
4	Instrument set pediatric thoracic surgical set	○	○	○	○	○	○	Basic forceps set for surgery	MP-04	1	New
5	Sigmoidoscope (pediatric, flixible)	○	○	○	○	○	○	To be replaced with existing obsolete sigmoidscope	MP-05	1	New
6	Defibrillator	○	○	○	○	○	○	To be prepared as current operation theater does not equip defibrillator	MP-06	2	Renewal/ New
7	Patient warmer	○	○	○	○	○	○	For body temperature management of pediatric patient during operation	MP-07	1	Addition
8	Blood warmer	○	○	○	○	○	○	For insulation of blood for infusion, for pediatric patient during operation	MP-08	2	New
9	Laryngoscope	○	○	○	○	○	○	For opening airway and tracheal cannulation	MP-09	2	Addition
10	Defibrillator	○	○	○	○	○	△	To be placed at ICU, as "MP-06"			-
11	Ventilator (neonate B)	○	○	○	○	○	○	To be placed at ICU, 1 unit each for 3 rooms	MP-10	2	Addition
12	Ventilator (periatric B)	○	○	○	○	○	○	To be placed at ICU, 1 unit each for 3 rooms	MP-11	1	Addition
13	Patient monitor (pediatric, standard)	○	○	○	○	○	○	With specifications that meets measurement of general indicators	MP-12	8	Addition/ New
14	Infant incubator (manual/servo)	○	○	○	○	○	○	To be added to existing incubators to deal with treatment for patients at old hospital	MP-13	13	Addition/ New
15	Oxygen concentrator	○	○	○	○	○	○	For the use of patients at low income stratum	MP-14	11	Addition/ New
16	Infusion pump (pediatric)	○	○	○	○	○	○	To be added to existing infusion pumps to deal with treatment for patients at old hospital	MP-15	8	Addition
17	Syringe pump (pediatric)	○	○	○	○	○	○	To be added to existing syringe pumps to deal with treatment for patients at old hospital	MP-16	7	Addition
18	Infusion pump (pediatric)	○	○	○	○	○	△	To be added to existing infusion pumps to deal with treatment for patients at old hospital			-
19	Syringe pump (pediatric)	○	○	○	○	○	△	To be added to existing syringe pumps to deal with treatment for patients at old hospital			-
20	Bilirubinometer (blood)	○	○	○	○	○	○	For definitive diagnosis of jaundice, to be placed at SCBU	MP-17	1	Addition
21	C-PAP machine	○	×	○	○	○	×	To be excluded as procurement by the Government of Myanmar is possible		5	New
22	Oxygen concentrator	○	○	○	○	○	△	For the use of patients in low income stratum, as "MP-14"			-
23	Blood pressure monitoring machine	○	○	○	○	○	○	To be prepared for reducing tasks of health staffs	MP-18	2	New
24	Infant care center	○	○	○	○	○	○	For insulation of infant during care	MP-19	2	Addition
25	Infant incubator (manual/servo)	○	○	○	○	○	△	To be added to existing incubators to deal with treatment for patients at old hospital, as "MP-13"			-
26	Ultrasound machine (pediatric, color doppler, head+abdomen+superficial)	○	○	○	○	○	○	With probes for diagnosis of head, skin, and abdomen of pediatric	MP-20	1	Addition
27	Automatic chemistry analyzer	○	○	○	○	○	○	To be prepared as current equipment is half-automatic and less efficient	MP-21	1	Addition
28	Microtome	○	○	○	○	○	○	To be prepared as current pathological examination is all conducted by manual method	MP-22	1	New
29	Laparoscope (pediatric)	○	○	○	○	○	○	To be prepared for laparoscopic surgery at new hospital	MP-23	1	New
30	Phototherapy Unit	○	○	○	○	○	○	For treatment of jaundice, to be placed at SCBU	MP-24	4	Addition/ New
31	Phototherapy Unit	△	○	○	○	○	△	To be prepared as "MP-25" as single light model, as double light model is not common at market and its benefit is ambiguous			-
32	Bilirubinometer (skin)	○	○	○	○	○	○	For screening of jaundice	MP-25	1	New
33	Suction unit	○	○	○	○	○	○	For suctioning of sputum, nasal secretion, etc. of neonatal	MP-26	4	Addition
34	X-ray machine (fluoroscopy)	○	○	○	○	○	○	For imaging diagnosis of urinary organs for pediatric patients	MP-27	1	New
35	CO2 incubator	○	○	○	○	○	○	To be used at bacteria laboratory of exanimation room	MP-28	1	New
36	Microcope with camera and monitor	○	○	○	○	○	○	For training of students from University of Medical Technology at laboratory department	MP-29	1	New
37	Tissue processor	○	○	○	○	○	○	To be prepared as current pathological examination is all conducted by manual method	MP-30	1	New
38	Automatic stainer	○	○	○	○	○	○	To be prepared as current pathological examination is all conducted by manual method	MP-31	1	New
39	Patient monitor (pediatric, standard)	○	○	○	○	○	△	With specification that is able to measure general indicators. as "MP-12"			-
40	Infant incubator (manual)	○	○	○	○	○	○	2 units each for 2 buildings of surgical unit	MP-32	4	New
41	Oxygen concentrator	○	○	○	○	○	△	1 unit each for 2 buildings of surgical unit, as "MP-14"			-
42	ECG machine	○	○	○	○	○	○	1 unit is to be shared between all surgical unit	MP-33	1	Addition

Examination of the Requested Equipment

Central Women's Hospital in Yangon

Req. No.	Requested Equipment	Purpose	Necessity	Tech. Level	Operation	Maintenance	Judgement	Notes	Project No.	Planned Qty.	Type
1	Anaesthesia machine with ventilator (adult)	○	○	○	○	○	○	For renewal of obsolete equipment at A bloc and C bloc	YW-01	2	Renewal
2	Operation table (manual)	○	○	○	○	○	○	For renewal of obsolete equipment at A bloc and C bloc	YW-02	2	Renewal
3	Colposcope	○	○	○	○	○	○	For treatment of uterine cervical cancer during operation	YW-03	1	Renewal
	Colposcope with monitor	○	○	○	○	○	○	For clinical examination at OB & GY, with monitor	YW-04	1	New
4	Hysteroscope (rigid)	○	○	○	○	○	○	With specification that meets procedures of uterine fibroid, polypectomy, and endometrial hyperplasia	YW-05	1	Renewal
5	Hysteroscope (flexible)	○	○	○	○	○	○	For diagnosis of uterine fibroid	YW-06	1	New
6	Infant incubator (manual)	○	○	○	○	○	○	5 units each for SCBU1 and SCBU2	YW-07	10	Renewal
7	Ventilator (neonatal A)	○	○	○	○	○	○	To be included as currently only one equipment out of all existing equipment is available for continuous use	YW-08	2	Addition
8	Patient monitor (pediatric, standard)	○	○	○	○	○	○	With specification that is able to measure basic indicators	YW-09	5	Addition
9	Urodynamic measuring machine	○	○	○	○	○	○	For proper operation planning of urinary organs	YW-10	1	New
10	Ventilator (adult)	○	○	○	○	○	○	2 units for ICU (4 beds)	YW-11	2	Addition
11	Infant care center	○	○	○	○	○	○	For insulation of infant during care	YW-12	3	Addition
12	Laparoscope (adult)	○	○	○	○	○	○	1 set each for second and third floor of C bloc	YW-13	2	Renewal
13	Ultrasound machine (adult, color doppler, abdomen+TV+superficial)	○	○	○	○	○	○	For diagnosis of uterine cancer, uterine cervical cancer and uterine deformity at OB & GY section	YW-14	1	Addition
14	Ultrasound machine (OBGY, abdominal+TV)	○	○	○	○	○	○	For renewal of Hitachi equipment, one of the two equipment at OB & GY section	YW-15	1	Renewal
	Electrosurgical unit for LEEP	○	○	○	○	○	○	Equipment for LEEP is to be prepared for treatment of uterine cervical cancer	YW-16	1	New

Examination of the Requested Equipment

Yangon Children Hospital

Req. No.	Requested Equipment	Purpose	Necessity	Tech. Level	Operation	Maintenance	Judgement	Notes	Project No.	Planned Qty.	Type
1	Autoclave (horizontal)	○	○	○	○	○	○	2 units are prepared for renewal of obsolete equipment and support for bed expansion plan	YP-01	2	Addition
2	Infusion pump (pediatric)	○	○	○	○	○	○	To be placed at each department for infusion management of infant and pediatric	YP-02	26	Addition
3	Syringe pump (pediatric)	○	○	○	○	○	○	To be placed at each department for infusion management of infant and pediatric	YP-03	24	Addition
4	X-ray machine (general, digital)	○	○	○	○	○	○	For renewal of existing general X-ray machine manufactured in 1980	YP-04	1	Renewal
5	X-ray machine (mobile, digital)	○	○	○	○	○	○	For the use at internal medicine unit, trauma unit, neonatal section and ICU	YP-05	1	New
6	Patient monitor (pediatric, standard)	○	○	○	○	○	○	To be placed at each section, with specification that is able to measure basic indicators	YP-06	18	Addition
	Patient monitor (pediatric, ETCO2)	○	○	○	○	○	○	With specification that is able to measure ETCO2 necessary at ICU operation	YP-07	5	Addition
7	Electrophoresis (hemoglobin)	○	○	○	○	○	○	For examination of blood disease, particularly hemoglobin disorder such as thalassemia	YP-08	1	Renewal
8	Patient warmer	○	○	○	○	○	○	With specification which insulates patient by circulating liquid, by placing on operation table	YP-09	4	Renewal
9	Microcope with camera and monitor	○	○	○	○	○	○	For training of students under clinical laboratory technician course at Myanmar Medical University (1)	YP-10	1	New
10	Patient monitor (pediatric, Multi Gas+IBP+CVP)	○	○	○	○	○	○	With specification that is able to measure CVP, IBP, and anesthetic gas	YP-11	4	Renewal
11	Ventilator (pediatric A)	○	○	○	○	○	○	3 units will be prepared by this project, and existing 2 equipment which fits for continuous use will be used at isolated beds	YP-12	3	Addition
12	EEG machine	○	○	○	○	○	○	To be replaced as existing EEG shows technical failures	YP-13	1	Addition
13	Ultrasound machine (pediatric, color doppler, head+abdomen+superficial)	○	○	○	○	○	○	For diagnosis of meconium suctioning occurred by maternal blood circulation disorder	YP-14	1	Addition
	Ultrasound machine (pediatric, color doppler, insertion)	○	○	○	○	○	○	For diganosis of high calorie infusion, CVP, CV catheter treatment, DVT, hydrencephalus etc.	YP-15	1	Addition
14	ECG machine (holter)	○	○	○	○	○	○	For diganosis of coronary spastic angina which is caused by arrhythmia and cramping coronary artery	YP-16	1	New
15	Hemodialysis machine (pediatric)	○	○	○	○	○	○	1 unit for dialysis room (4 beds)	YP-17	1	Addition
16	Anaesthesia machine with ventilator (pediatric)	○	○	○	○	○	○	1 unit each for 3 operation tables, especially for major operation	YP-18	3	Addition
17	Bronchoscope (pediatric, flexible)	○	○	○	○	○	○	To be included as existing equipment is used more than 20 years and is unfit for continuous use	YP-19	1	New
18	Microscope	○	○	○	○	○	○	To be shared among all laboratory department	YP-20	2	Renewal
19	Ventilator (neonatal A)	○	○	○	○	○	○	To be included as currently no ventilator is available at neonatal section, and patients who requires ventilator are referred to Yangon General Hospital	YP-21	1	New
20	Ceiling lamp (double head)	○	○	○	○	○	○	For replacement of existing equipment at operation theater 1 (2 operation tables) and and operation theater 3, both for major operation	YP-22	3	Renewal
21	Defibrillator (pediatric)	○	○	○	○	○	○	For dealing with sudden change of patient's condition or heart attack	YP-23	2	Renewal
22	Wedge	○	○	○	○	○	○	For positioning of pediatric patient under rehabilitation	YP-24	1	Addition
23	Fumigation machine	×	○	○	○	○	×	To be excluded, as its benefit is ambiguous and environmental effects by the use of this equipment is			-
24	Ultrasound therapy machine	○	○	○	○	○	○	For treatment of acute disorders such as bruise or sprain, and for relieving pain	YP-25	1	New
25	Paraffin bath for therapy	○	○	○	○	○	○	For alleviation of muscle tension, pain relief and efficient metabolism	YP-26	1	New
26	Standing table	○	○	○	○	○	○	For ambulation training of patients having problem with walking	YP-27	1	New
27	Spirometer	○	○	○	○	○	○	For diagnosis of postoperative observation for patients with respiratory and allergic diseases	YP-28	1	New
28	Bicycle Exercise machine (pediatric)	○	○	○	○	○	○	For supporting recovery of patients after operation	YP-29	1	New
29	Chinese walker	○	×	○	○	○	×	To be excluded as procurement by the Government of Myanmar is possible			-
30	Autoclave (ethylen oxide)	×	○	○	×	○	×	To be excluded because of unavailability of manufacturer producing table top type, and concerns in environmental effects through the use of ethylene oxide gas			-
31	Blood warmer	○	○	○	○	○	○	For insulation of blood for infusion for pediatric patients, during operation	YP-30	4	Addition
32	Oxygen concentrator	○	○	○	○	○	○	For the use of patients at low income stratum	YP-31	8	Addition
33	ECG machine	○	○	○	○	○	○	For pre and postsurgical management of congenital heart disease, definitive diagnosis of arrhythmia, heart muscle disease, and coronary artery disease	YP-32	1	Addition

6. Equipment List

Equipment List

No.	Description	Total	MG	MW	MP	YW	YP
1	Anaesthesia machine with ventilator (adult)	7		5		2	
2	Anaesthesia machine with ventilator (pediatric)	3					3
3	Autoclave (horizontal)	2					2
4	Autoclave (vertical, large)	2		1	1		
5	Autoclave (vertical, medium)	4		4			
6	Autoclave (table top)	12	12				
7	Autoclave (laboratory)	1		1			
8	Automatic chemistry analyzer	1			1		
9	Automatic stainer	1			1		
10	Blood culture system	1	1				
11	Automatic blood culture and antibiotic susceptibility system	1	1				
12	Balance (digital)	1		1			
13	Bicycle exercise machine (pediatric)	1					1
14	Bilirubinometer (blood)	2		1	1		
15	Bilirubinometer (skin)	2		1	1		
16	Blood pressure machine	2			2		
17	Blood warmer	6			2		4
18	Bronchoscope (adult, flexible)	2	2				
19	Bronchoscope (pediatric, flexible)	1					1
20	Cardiotocograph	10		10			
21	Ceiling lamp (double head)	3					3
22	Central monitor	3	3				
23	Centrifuge (table top)	1		1			
24	Centrifuge (blood bag, type A)	2	2				
25	Centrifuge (blood bag, type B)	1		1			
26	Centrifuge (hematocrit)	2		2			
27	CO2 incubator	1			1		
28	Coagulation analyzer	1		1			
29	Colonoscope	1	1				
30	Colposcope	2		1		1	
31	Colposcope with monitor	1				1	
32	Cryotherapy machine	1		1			
33	Electrosurgical unit for LEEP	2		1		1	
34	CT	2	2				
35	Deep freezer (large)	2	2				
36	Deep freezer (small)	1		1			
37	Defibrillator (adult)	2	2				
38	Defibrillator (pediatric)	4			2		2
39	Delivery bed	10		10			
40	Doppler fetal heart detector	5		5			
41	Duodenoscope	1	1				
42	ECG machine	3		1	1		1
43	ECG machine (holter)	1					1
44	ECG machine (stress test system)	1	1				
45	EEG machine	1					1
46	Electrophoresis (hemoglobin)	1					1
47	Gastroscope	1	1				
48	Hemodialysis machine (adult)	2	2				
49	Hemodialysis machine (pediatric)	1					1
50	Hot air oven	1		1			
51	Hysteroscope (flexible)	1				1	
52	Hysteroscope (rigid)	3		2		1	
53	Incubator	1		1			
54	Infant care center	10		5	2	3	
55	Infant incubator (manual)	14			4	10	
56	Infant incubator (manual/servo)	20		7	13		
57	Infusion pump (adult)	10		10			
58	Infusion pump (pediatric)	41		7	8		26
59	Instrument set for abdominal surgery (pediatric)	1			1		
60	Instrument set for thoracic surgery (adult)	2	2				

No.	Description	Total	MG	MW	MP	YW	YP
61	Instrument set for thoracic surgery (pediatric)	1			1		
62	Laparoscope (adult)	5	2	1		2	
63	Laparoscope (pediatric)	1			1		
64	Laryngoscope	2			2		
65	Microcope with camera and monitor	3		1	1		1
66	Microscope	2					2
67	Microtome	3	2		1		
68	Operation table (manual)	10		8		2	
69	Operation table (motorized)	3	3				
70	Operation table (motorized, neuro surgery)	1	1				
71	Oxygen concentrator (single)	30		11	11		8
72	Paraffin bath for therapy	1					1
73	Patient monitor (adult, standard)	41	22	19			
74	Patient monitor (pediatric, standard)	36		5	8	5	18
75	Patient monitor (adult, multi gas)	2		2			
76	Patient monitor (adult, ETCO2+IBP)	6	6				
77	Patient monitor (pediatric, ETCO2)	5					5
78	Patient monitor (pediatric, Multi Gas+IBP)	2			2		
79	Patient monitor (pediatric, Multi Gas+IBP+CVP)	4					4
80	Patient warmer	5			1		4
81	Percutaneous Nephroscope	1	1				
82	pH Meter	2		2			
83	Phototherapy unit (single)	4			4		
84	Platelet agitator	2	1	1			
85	Prone stander	1					1
86	Pulse oxymeter	4		4			
87	Refrigerator (blood bag)	1	1				
88	Safety cabinet	1		1			
89	Sigmoidoscope (pediatric, flexible)	1			1		
90	Spectrophotometer	1		1			
91	Spirometer	1					1
92	Sternal Saw	1	1				
93	Suction unit	9		5	4		
94	Syringe pump (pediatric)	36		5	7		24
95	Tissue processor	1			1		
96	TURP set	1	1				
97	Ultrasound machine (OBGY, abdominal+TV)	2		1		1	
98	Ultrasound machine (pediatric, color doppler, head+abdomen+superficial)	2			1		1
99	Ultrasound machine (adult, color doppler, abdomen+TV)	1		1			
100	Ultrasound machine (adult, color doppler, abdomen+TV+DVT)	1		1			
101	Ultrasound machine (adult, color doppler, abdomen+TV+superficial)	2	1			1	
102	Ultrasound machine (adult, color doppler, heart+TE+pencil+superficial)	1	1				
103	Ultrasound machine (adult, color doppler, kidney+vascular)	1	1				
104	Ultrasound machine (neonate, color doppler, heart+abdomen+superficial)	1		1			
105	Ultrasound machine (pediatric, color doppler, vascular)	1					1
106	Ultrasound therapy machine	1					1
107	Ureteroscope	1	1				
108	Urodynamic measuring machine	2		1		1	
109	Ventilator (adult)	9	4	3		2	
110	Ventilator (pediatric, A)	3					3
111	Ventilator (pediatric, B)	1			1		
112	Ventilator (neonatal, A)	5		2		2	1
113	Ventilator (neonatal, B)	2			2		
114	Ventilator (transportation)	1	1				
115	Wedge	1					1
117	X-ray machine (C-arm, fluoroscopy)	3	3				
118	X-ray machine (fluoroscopy)	2		1	1		
119	X-ray machine (general, digital)	1					1
120	X-ray machine (mobile)	2	2				
121	X-ray machine (mobile, digital)	1					1

Abbreviations

MG: Mandalay General Hospital, MW: Central Women's Hospital in Mandalay, MP: Mandalay Children Hospital
YW: Central Women's Hospital in Yangon, YP: Yangon Children Hospital

7. Outline of Major Equipment

Outline of Major Equipment

No.	Name of Equipment	Country of Procurement	Country of Origin	Major Specification / Component	Level of Equipment	Qty.	Purpose of Use Relevance of the Level of Equipment
1	Anaesthesia machine with ventilator (adult)	Japan	Germany	1. Anesthesia machine 1) Anesthesia circuit: Closed or semi closed type 2) O2 Flow meter range Min. 0.2L/min or less Max. 10L/Min. or more 3) N2O Flow meter range Min. 0.5L/min or less Max. 10L/Min. or more 4) Anesthesia gas: Halothane, Isoflurane 2. With ventilator 1) Ventilation mode: Pressure control, Volume control 2) Tidal Volume: Min. 50ml or less Max. 1400ml or more	Medium Level	7	For giving full anesthesia for patients at the time of operation.
2	Anaesthesia machine with ventilator (pediatric)	Japan	Germany	1. Anesthesia machine 1) Anesthesia circuit: Closed or semi closed type 2) O2Flow meter range Min. 0.2L/min or less Max. 10L/Min. or more 3) N2OFlow meter range Min. 0.5L/min or less Max. 10L/Min. or more 4) Anesthesia gas: Halothane, Sevoflurane 2. With ventilator 1) Ventilation mode: Pressure control, Volume control 2) Tidal Volume: Min. 45ml or less Max. 1400ml or more	Medium Level	3	For giving full anesthesia for patients at the time of operation.
3	Autoclave (horizontal)	Sweden	Sweden	1. Door type: Single door type 2. Chamber capacity: 200-250L 3. Working pressure: 2.4Kg/cm2 or more 4. Sterilizing temperature: 132℃ or more	Medium Level	2	For sterilizing surgical instrument and linens by high-pressure steam.
4	Autoclave (vertical, large)	Sweden	Sweden	1. Chamber capacity: 130L 2. Sterilizing temperature: 105-135℃ or more (For metallic material)	Medium Level	2	For sterilizing surgical instrument and linens by high-pressure steam.
8	Automatic chemistry analyzer	United States	Japan/EU	1. Test throughput: 400test/hour or more 2. On-board reagents: 40reagents or more 3. Auto sampler: Built in type 4. Printer: Equipped	Medium Level	1	For measuring hematology items, liver function items, and lipid items in the blood.
9	Automatic stainer	Myanmar	United States	1. Solution reservoir tank:18pcs. or more 2. Capacity of slide glass per hanging basket: 20pcs. or more 3. Memorized program operation: Equipped	Medium Level	1	Equipment which performs automated deparaffinization, hematoxylin-eosin stain, and Papanicolaou stain of a smear sample to a paraffin section placed on a slide glass.
10	Blood culture system	Myanmar	France	1. Purppose of use: Blood culture and test for microbial detection 2. Capacity: 60 blood culture bottles or more	Medium Level	1	For cultivation of pathogenic germs in blood, and specify the bactreial spesies and effective antibiotic drug.
11	Automatic blood culture and antibiotic susceptibility system	Myanmar	France	1. Purppose of use: Test for Identification and Antibiotic susceptibility 2.Number of loadable reagent cards: 40 or more 3. Target fungus: Gram-positive bacteria, Gram-negative bacteria, Neisseria, Haemophilus, Anaerobic bacteria and Yeast-like fungus	Medium Level	1	For cultivation of pathogenic germs in blood, and specify the bactreial spesies and effective antibiotic drug.
18	Bronchoscope (adult, flexible)	Japan	Japan	1. Field of view: 120 degree or wider 2. Depth of field: 3-50mm or more 3. Working length: 600mm or more 4. Outer diameter of distal end: 5.5mm or less	Medium Level	2	For diagnosis of lung cancer, lung tuberculosis and other lung and bronchial diseases.
19	Bronchoscope (pediatric, flexible)	Japan	Japan	1. Field of view: 90 degree or wider 2. Depth of field: 3-50mm or more 3. Working length: 600mm or more 4. Outer diameter of distal end: 3.0mm or less	Medium Level	1	For diagnostic of lung cancer, lung tuberculosis and other lung and bronchial diseases.
20	Cardiotocograph	Japan	Japan	1. Measuring item: Fetal heart rate and uterine activity 2. Measuring range: 50-210 bpm or wider range 3. Displayed item: Fetal heart rate and uterine activity	Medium Level	10	For monitoring heart rate of fetus and transition of labor and maternal body during delivery.
21	Ceiling lamp (double head)	Japan	Germany	1. Lamp intensity 1) Main light: 130,000lux 2) Minor light: 80,000lux or more 2. LED Lamp 3. Ceiling type 4.Intensity adjustment: Possible	Medium Level	3	For providing proper lighting which avoids obstacles, with enough brightness and correct color during major operation.
22	Central monitor	Japan	Japan	1. Number of patient (1 unit): 16 patient or more 2. Display: 15inch or more 3. Waveform display items: ECG, Respiration, SpO2, IBP, CO2 4. Alphanumeric display items: Heart rate or pulse rate, VPC rate, ST level, respiration rate, SpO2, NIBP, IBP, Temperature, etCO2, CO 5. UPS	Medium Level	3	For operating continuous unified monitoring of multiple patients' biological information.

No.	Name of Equipment	Country of Procurement	Country of Origin	Major Specification / Component	Level of Equipment	Qty.	Purpose of Use Relevance of the Level of Equipment
24	Centrifuge (blood bag, type A)	Japan	Japan	1. Floor-standing type 2. Maximum speed: 6000rpm or more (without rotor) 3. Maximum force: 6800 x g or more (without rotor) 4. Maximum speed: 4200rpm or more (with rotor) 5. Maximum force: 5020 x g or more (with rotor) 6. Temperature setting range: -20℃ to +40℃ or wider	Medium Level	2	For centrifugal separation of blood bags.
25	Centrifuge (blood bag, type B)	Japan	Japan	1. Floor-standing type 2. Maximum speed: 6000rpm or more (without rotor) 3. Maximum force: 6800 x g or more (without rotor) 4. Maximum speed: 4200rpm or more (with rotor) 5. Maximum force: 4900 x g or more (with rotor) 6. Temperature setting range: -9℃ to +40℃ or wider	Medium Level	1	For centrifugal separation of blood bags.
29	Colonoscope	Japan	Japan	1. Field of view: 140 degree or wider 2. Depth of field: 3-100mm 3. Working length: 1600mm or more 4. Outer diameter of distal end: 13. 2mm	Medium Level	1	For diagnosis of colonic disorder.
31	Colposcope with monitor	Japan	Japan	1. Colposcope 1) Eyepiece: 10X or more 2) Objective lens: F=250mm or more 3) Magnification change: 3 steps or more 2. Video processor with CCD camera (converter): NTSC or PAL, 1CCD or more 1) Monitor: 15inch or more	Medium Level	1	For various diagnosis provided at obstetrics and gynecology department.
34	CT	Japan	Japan	1. Number of detectors: 16-detector rows or more 2. Object for scanning: Whole body including head 3. Scanning system: Continuous rotation system 4. Maximum number of slice: 16 slice/1 scan	Medium Level	2	For operating image diagnosis of whole body scan.
37	Defibrillator (adult)	Japan	Japan	1. Defibrillation: Monophasic or Biphasic waveform 2. Maximum output energy: 360/270 joules or more 3. ECG amplifier: 3-lead or more 4. DC batteries: Equipped	Medium Level	2	For restoring heart movement by delivering an electrical shock.
38	Defibrillator (pediatric)	Japan	Japan	1. Defibrillation: Monophasic or Biphasic waveform 2. Maximum output energy: 360/270 joules or more 3. ECG amplifier: 3-lead or more 4. DC batteries: Equipped	Medium Level	4	For restoring heart movement by delivering an electrical shock.
41	Duodenoscope	Japan	Japan	1. Field of view: 100 degree or more 2. Depth of field: 5-60mm or more 3. Working length: 1240mm or more 4. Outer diameter of distal end: 13.7mm or less	Medium Level	1	For contrast-enhanced diagnosis of biliary tract and pancreatic duct from the opening of duodenum.
43	ECG machine (holter)	Japan	Japan	1. Recording media: Memory card 2. Leads: 3 channels or more 3. Measurement item: Arrhythmia, ST, HRV and Pacemaker	Medium Level	1	For diagnosis of transient arrhythmia and angina.
44	ECG machine (stress test system)	Japan	Japan	1. Channels: 12 lead or more 2. Measurement item: ST 3. Stress treadmill: Belt drive	Medium Level	1	For definite diagnosis of heart disorder and its seriousness, and rehabilitation of heart.
45	EEG machine	Japan	Japan	1. EEG inputs on electrode position layout: 25 or more 2. Extra inputs: 4 or more 3. Respiration inputs: 3 or more 4. Lighting fuction: Equipped	Medium Level	1	For diagnosis of function disorder of the central nerve, such as epilepsy, brain tumor and damaged brain blood vessel.
46	Electrophoresis (hemoglobin)	Myanmar	France	1. Purpose of use: Cellulose acetate membrane 2. Composition: Electrophoresis kit and power source	Medium Level	1	For diagnosis of clinical condition, by electrophoresis fraction of serum protein and hemoglobin.
47	Gastroscope	Japan	Japan	1. Field of view: 120 degree or more 2. Depth of field: 5mm or less-100mm or more 3. Working length: 1030mm or more 4. Outer diameter of distal end: 10. 2mm or less 5. Light source: Xenon/Halogen/LED 100W or more	Medium Level	1	For diagnosis of disorder at esophagus, stomach and duodenum.
48	Hemodialysis machine (adult)	Germany	Germany	1. Blood flow control 1) Blood flow: Single needle, single pump 2) Blood flow rate: 50 to 500ml/min or wider range 3) Venous pressure control: - 50 to 400mmHg or wider range 2. Dialysate control 1) Flow rate: 300 to 500ml/min. or wider range 2) Temperature: 35.0 to 39.0 degrees or wider range	Medium Level	2	For performing dialysis for patients with renal disorder and/or low blood flow.
49	Hemodialysis machine (pediatric)	Myanmar	Japan	1. Blood flow control 1) Blood flow: Single needle, single pump 2) Blood flow rate: 50 to 500ml/min or wider range 3) Venous pressure control: - 50 to 400mmHg or wider range 2. Dialysate control 1) Flow rate: 300 to 500ml/min. or wider range 2) Temperature: 35.0 to 39.0 degrees or wider range	Medium Level	1	For performing dialysis for patients with renal disorder.

No.	Name of Equipment	Country of Procurement	Country of Origin	Major Specification / Component	Level of Equipment	Qty.	Purpose of Use Relevance of the Level of Equipment
51	Hysteroscope (flexible)	Japan	Japan	1. Type: Fiberscope or Videoscope 2. Field of view: 90 degree or more 3. Outer diameter of distal end: 4.9mm or less 4. Working length: 205mm or more	Medium Level	1	For diagnosis of uterus disorder.
52	Hysteroscope (rigid)	Germany	Germany	1. Telescope for resectoscope 1) Outer diameter: 4mm 2) Field of view: 12 or 30 degree 2. Sheath diameter: 18Fr or less 3. Lamp: Xenon 300W or better	Medium Level	3	For treatment of endometriosis or removal of uterus fibroid at gynecological operation.
54	Infant care center	Japan	Japan	1. Skin temperature control: From 35.0 °C to 37.5 °C or wider, adjustable 2. Bed tilting: Trendelenberg and Reverse Trendelenberg 3. Heater output: Equipped, Adjustable 4. Alarm: Probe failure and others	Medium Level	10	For treating premature neonate and neonate with disorder under appropriate temperature and humidity.
55	Infant incubator (manual)	Japan	Japan	1. Temperature setting range (manual): 25.0 to 37.0°C or wider range 2. Display: Setting temp., Air temp. and Humidity 3. Humidity system: Equipped	Medium Level	14	For treating premature neonate and neonate with disorder under appropriate temperature and humidity, until becoming adaptive to live in a normal environment.
56	Infant incubator (manual/servo)	Japan	Japan	1. Temperature control: Manual and servo control 2. Temperature setting range 1) Air temperature (manual control): 25.0 to 37.0°C or wider range 2) Skin temperature (servo control): 35.0 to 37.0°C or wider range 3. Display: Setting temp., Air temp., Skin temp. and Humidity 4. Humidity system: Equipped	Medium Level	20	For treating premature neonate and neonate with disorder under appropriate temperature and humidity, until becoming adaptive to live in a normal environment.
59	Instrument set for abdominal surgery (pediatric)	Japan	Japan	1. 34 items 2. Stainless steel	Medium Level	1	Metallic surgical instruments for open abdominal surgery.
60	Instrument set for thoracic surgery (adult)	Japan	Japan	1. 69 items 2. Stainless steel	Medium Level	2	Metallic surgical instruments for open chest surgery.
62	Laparoscope (adult)	Germany	Germany	1. Telescope A 1) Field of view: 0 degree 2. Telescope B 1) Field of view: 25 degree or 30 degree 3. Trocar sleeve and spike A 1) Spike: Conical tip 4. Trocar sleeve and spike B 1) Spike: Conical tip 5. Suction-irrigation pump unit: Equipped 6. Lamp: Xenon 300W or better 7. Insufflation unit: Carbon dioxide system 8. Video monitor system: Equipped 9. Electrosurgical unit: Cutting, coagulation	Medium Level	5	A set of rigid scope for endoscopic operation of abdominal cavity.
63	Laparoscope (pediatric)	Germany	Germany	1. Telescope A 1) Field of view: 0 degree 2. Telescope B 1) Field of view: 25 degree or 30 degree 3. Trocar sleeve and spike A 1) Diameter: 6. 0 to 11. 0mm 2) Spike: Conical tip 4. Trocar sleeve and spike B 1) Diameter: 6. 0 to 11. 0mm 2) Spike: Conical tip or Triangular tip 5. Suction-irrigation pump unit: Equipped 6. Lamp: Xenon 300W or better 7. Insufflation unit: Equipped 8. Video monitor system: Equipped 9. Electrosurgical unit: Cutting, coagulation	Medium Level	1	A set of rigid scope for endoscopic operation of abdominal cavity.
65	Microscope with camera and monitor	Japan	Japan	1. Total magnification: 40 to 1,000X or more 2. Anti-fungus system: Fungus proof for binocular tube, eyepiece and objective lens 3. Binocular tube (depression): 25 degree or more 4. Interpupilary distance (Min.): 50mm or less 5. Interpupilary distance (Max.): 75mm or more 6. Mechanical stage (X-direction): 76mm or more 7. Mechanical stage (Y-direction): 52mm or more	Medium Level	3	For observing microscopic image of cell tissue by multiple physicians. Also for training of medical students by displaying the microscopic image on a monitor.
68	Operation table (manual)	Japan	Japan	1. Dimension: 1900(L) x 500(W) mm or more ±10% 2. Radio translucence: Possible 3. Height adjustment (lowest): 770mm or less 4. Height adjustment (highest): 980mm or more 5. Trendelenberg: 12 degree or more 6. Reverse Trendelenberg: 20 degree or more	Medium Level	10	For fixing patient's body in an appropriate position for various operation.

No.	Name of Equipment	Country of Procurement	Country of Origin	Major Specification / Component	Level of Equipment	Qty.	Purpose of Use Relevance of the Level of Equipment
69	Operation table (motorized)	Japan	Japan	1. Dimension: 1900(L) x 490(W) mm or more 2. Radio translucence: Possible 3. Height adjustment (lowest): 730mm or less 4. Height adjustment (highest): 950mm or more 5. Trendelenberg: 20 degree or more 6. Reverse Trendelenberg: 20 degree or more	Medium Level	3	For fixing patient's body in an appropriate position for various operation.
70	Operation table (motorized, neuro surgery)	Japan	Japan	1. Dimension: 1900(L) x 490(W) mm or more 2. Radio translucence: Possible 3. Height adjustment (lowest): 730mm or less 4. Height adjustment (highest): 950mm or more 5. Trendelenberg: 20 degree or more 6. Reverse Trendelenberg: 20 degree or more	Medium Level	1	For fixing patient's body in an appropriate position for various operation.
73	Patient monitor (adult, standard)	Singapore	China	1. Measurement parameter: ECG, Respiration, SPO2, NIBP, Temperature 2. Heart rate range 1) Min.: 30bpm or less 2) Max.: 250bpm or more 3. Respiration rate range 1) Min.: 4 resp./min. 2) Max.: 120 resp./min.or more	Medium Level	41	For monitoring patient's biological information continuously.
74	Patient monitor (pediatric, standard)	Singapore	China	1. Measurement parameter: ECG, Respiration, SPO2, NIBP, Temperature 2. Heart rate range 1) Min.: 30bpm or less 2) Max.: 250bpm or more 3. Respiration rate range 1) Min.: 4 resp./min. 2) Max.: 120 resp./min.or more	Medium Level	36	For monitoring pediatric patient's biological information continuously.
75	Patient monitor (adult, multi gas)	Japan	Japan	1. Measurement parameter: ECG, Respiration, SPO2, NIBP, Temperature, Multi gas (CO2, N2O, O2, HAL, ISO, SEV, others) 2. Heart rate range 1) Min.: 30bpm or less 2) Max.: 250bpm or more 3. Respiration rate range 1) Min.: 4 resp./min. 2) Max.: 120 resp./min.or more	Medium Level	2	For monitoring patient's biological information continuously.
76	Patient monitor (adult, ETCO2+IBP)	Japan	Japan	1. Measurement parameter: ECG, Respiration, SpO2, NIBP, Temperature, CO2(ETCO2) , IBP, CO(Cardiac output) 2. Heart rate range 1) Min.: 30bpm or less 2) Max.: 250bpm or more 3. Respiration rate range 1) Min.: 0 resp./min. 2) Max.: 120 resp./min.or more	Medium Level	6	For monitoring patient's biological information continuously.
77	Patient monitor (pediatric, ETCO2)	Singapore	China	1. Measurement parameter: ECG, Respiration, SpO2, NIBP, Temperature, ETCO2 2. Heart rate range 1) Min.: 30bpm or less 2) Max.: 250bpm or more 3. Respiration rate range 1) Min.: 0 resp./min. 2) Max.: 120 resp./min.or more	Medium Level	5	For monitoring pediatric patient's biological information continuously.
78	Patient monitor (pediatric, Multi Gas+IBP)	Japan	Japan	1. Measurement parameter: ECG, Respiration, SpO2, NIBP, Temperature, IBP, CO(Cardiac output), Multi gas 2. Heart rate range 1) Min.: 30bpm or less 2) Max.: 250bpm or more 3. Respiration rate range 1) Min.: 1 resp./min. 2) Max.: 120 resp./min.or more	Medium Level	2	For monitoring pediatric patient's biological information continuously.
79	Patient monitor (pediatric, Multi Gas+IBP+CVP)	Singapore	Finland	1. Measurement parameter: ECG, Respiration, SpO2, NIBP, Temperature, IBPx2, CO(Cardiac output), Multi gas（CO2, N2O, O2, HAL, ISO, SEV, others） 2. Heart rate range 1) Min.: 30bpm or less 2) Max.: 250bpm or more 3. Respiration rate range 1) Min.: 1 resp./min. 2) Max.: 120 resp./min.or more	Medium Level	4	For monitoring pediatric patient's biological information continuously.
88	Safety cabinet	Japan	Japan	1. Type: Class II A2, indoor exhaust type 2. Filter efficiency: 99.99% or more(at 0.3μm particle) 3. Inflow air velocity: 0.5m/sec. or more 4. Working space dimensions: 900-1100mm(W)x500-650mm(D)x640-750mm(H)	Medium Level	1	For preventing emigration of pathogenic germs when examining pathogenic samples.

No.	Name of Equipment	Country of Procurement	Country of Origin	Major Specification / Component	Level of Equipment	Qty.	Purpose of Use Relevance of the Level of Equipment
89	Sigmoidoscope (pediatric, flexible)	Germany	Germany	1. Field of view: 140 degree or wider 2. Depth of field: 3-100mm 3. Working length: 700mm or more 4. Outer diameter of distal end: 13mm	Medium Level	1	For diagnosis of colon through rectum.
90	Spectrophotometer	United States	United States/Germany	1. Wavelength range: 190nm or less, 1,100nm or more 2. Wavelength accuracy: ±0.1nm or less 3. Wavelength resolution: 0.1, 0.2, 0.5, 1.0nm 4. Band width: 3nm or less 5. Wavelength repeatability: Within ±0.5nm or less	Medium Level	1	For diagnosis and research use, by quantitative measurement of samples and spectrum measurement.
92	Sternal Saw	Japan	United States	1. Purpose of use: Cutting sternal bone 2. Type: Reciprocating saw 3. Stroke speed: Max. 14,500cpm or more	Medium Level	1	For splitting the breastbone for open chest surgery.
95	Tissue processor	Japan	Japan	1. Type: Enclosed type 2. Cassette capacity: 80 pcs. or more per each basket 3. Number of beaker: 10pcs. or more 4. Number of paraffin pot: 2pcs. or more	Medium Level	1	Equipment with necessary specification for dehydration of samples and paraffin embedding.
96	TURP set	Germany	Germany	1. Telescope for resectoscope 1) Field of view: 30 degrees or 12 degrees 2) Outer diameter: 3-4mm 2. Outer sheath 1) Type: 2 stopcocks, rotatable (TURP & TURis) 2) Diameter: 26Fr. 3. Inner sheath 1) Type: For 26 Fr. Outer sheath 4. Electrosurgical unit 1) Mode: Monopolar-200W or more, Bipolar-mix 90W or more 2) Function: Cutting, coagulation (monopolar and bipolar)	Medium Level	1	A set of metallic surgical instruments, for prostatectomy surgery.
97	Ultrasound machine (OBGY, abdominal+TV)	Japan	Japan	1. Type: Floor type with caster 2. Scanning method: Electronic sector, Electronic convex, Electronic linear 3. Image mode: B, B/B(Dual B), M, B/M, Pulsed Wave Doppler mode (PWD) 4. B-Mode 1) Gray scale: 256 levels or more 2) Max. depth: 24cm or more 5. Doppler methods: Pulsed Wave Doppler mode (PWD) 6. Connecting probe: Electronic convex, probe for abdomen (adult) and probe for transvaginal (adult) 7. Monitor size: 15inch or more	Medium Level	2	For image diagnosis of abdominal organs, superficial sites and obstetrics and gynecological examination.
98	Ultrasound machine (pediatric, color doppler, head+abdomen+superficial)	Japan	Japan	1. Type: Floor type with caster 2. Scanning method: Electronic sector, Electronic convex, Electronic linear 3. Image mode: B, B/B(Dual B), M, B/M, Color Doppler (CDI), Pulsed Wave Doppler mode (PWD) 4. B-Mode 1) Gray scale: 256 levels or more 2) Max. depth: 24cm or more 5. Doppler methods: Pulsed Wave Doppler mode (PWD), Color Doppler (CDI) 6. Connecting probe: Electronic convex, probe for abdomen (pediatric), probe for superficial (pediatric), probe for head (neonatal) 7. Monitor size: 15inch or more	Medium Level	2	For image diagnosis of abdominal organs, superficial sites, heart area and other pediatric examination for pediatric populations.
99	Ultrasound machine (adult, color doppler, abdomen+TV)	Japan	Japan	1. Type: Floor type with caster 2. Scanning method: Electronic sector, Electronic convex, Electronic linear 3. Image mode: B, B/B(Dual B), M, B/M, Color Doppler (CDI), Pulsed Wave Doppler mode (PWD) 4. B-Mode 1) Gray scale: 256 levels or more 2) Max. depth: 24cm or more 5. Doppler methods: Pulsed Wave Doppler mode (PWD), Color Doppler (CDI) 6. Connecting probe: Electronic convex, probe for abdomen (adult), probe for transvaginal (adult) 7. Monitor size: 15inch or more	Medium Level	1	For image diagnosis of abdominal organs, superficial sites and obstetrics and gynecological examination.
100	Ultrasound machine (adult, color doppler, abdomen+TV+DVT)	Japan	Japan	1. Type: Floor type with caster 2. Scanning method: Electronic sector, Electronic convex, Electronic linear 3. Image mode: B, B/B(Dual B), M, B/M, Pulsed Wave Doppler mode (PWD), Color Doppler (CDI), Elastography 4. B-Mode 1) Gray scale: 256 levels or more 2) Max. depth: 24cm or more 5. Doppler methods: Pulsed Wave Doppler mode (PWD), Color Doppler (CDI) 6. Connecting probe: Electronic convex, probe for abdomen (adult), probe for transvaginal (adult), probe for deep vein thrombosis (adult) 7. Monitor size: 15inch or more	Medium Level	1	For image diagnosis of abdominal organs, superficial sites and obstetrics and gynecological examination.

No.	Name of Equipment	Country of Procurement	Country of Origin	Major Specification / Component	Level of Equipment	Qty.	Purpose of Use Relevance of the Level of Equipment
101	Ultrasound machine (adult, color doppler, abdomen+TV+superficial)	Japan	Japan	1. Type: Floor type with caster 2. Scanning method: Electronic sector, Electronic convex, Electronic linear 3. Image mode: B, B/B(Dual B), M, B/M, Pulsed Wave Doppler mode (PWD), Color Doppler (CDI), Elastography 4. B-Mode 1) Gray scale: 256 levels or more 2) Max. depth: 24cm or more 5. Doppler methods: Pulsed Wave Doppler mode (PWD), Color Doppler (CDI) 6. Connecting probe: Electronic convex, probe for abdomen (adult), probe for transvaginal (adult), probe for superficial(adult) 7. Monitor size: 15inch or more	Medium Level	2	For image diagnosis of abdominal organs, superficial sites and obstetrics and gynecological examination.
102	Ultrasound machine (adult, color doppler, heart+TE+pencil+superficial)	Japan	Japan	1. Type: Floor type with caster 2. Scanning method: Electronic sector, Electronic convex, Electronic linear 3. Image mode: B, B/B(Dual B), M, B/M, Pulsed Wave Doppler mode (PWD), Color Doppler (CDI) 4. B-Mode 1) Gray scale: 256 levels or more 2) Max. depth: 24cm or more 5. Doppler methods: Pulsed Wave Doppler mode (PWD), Color Doppler (CDI) 6. Connecting probe: probe for heart (adult, pediatric), probe for transesophagus (adult, pediatric), probe for superficial (adult), and pencil probe for heart peripheral vascular 7. Monitor size: 15inch or more	Medium Level	1	For image diagnosis of heart area.
103	Ultrasound machine (adult, color doppler, kidney+vascular)	Japan	Japan	1. Type: Floor type with caster 2. Scanning method: Electronic sector, Electronic convex, Electronic linear 3. Image mode: B, B/B(Dual B), M, B/M, Pulsed Wave Doppler mode (PWD), Color Doppler (CDI), Elastography 4. B-Mode 1) Gray scale: 256 levels or more 2) Max. depth: 24cm or more 5. Doppler methods: Pulsed Wave Doppler mode (PWD), Color Doppler (CDI) 6. Connecting probe: probe for kidney (adult), probe for vascular (adult, internal jugular catheterization) 7. Monitor size: 15inch or more	Medium Level	1	For image diagnosis of abdominal organs and superficial sites.
104	Ultrasound machine (neonate, color doppler, heart+abdomen+superficial)	Japan	Japan	1. Type: Floor type with caster 2. Scanning method: Electronic sector, Electronic convex, Electronic linear 3. Image mode: B, B/B(Dual B), M, B/M, Pulsed Wave Doppler mode (PWD), Color Doppler (CDI), Elastgraphy 4. B-Mode 1) Gray scale: 256 levels or more 2) Max. depth: 24cm or more 5. Doppler methods: Pulsed Wave Doppler mode (PWD), Color Doppler (CDI) 6. Connecting probe: for abdomen (neonatal), probe for superficial (neonatal), probe for heart (neonatal) 7. Monitor size: 15inch or more	Medium Level	1	For image diagnosis of abdominal organs, superficial sites and other examination for neonatal.
105	Ultrasound machine (pediatric, color doppler, vascular)	Japan	Japan	1. Type: Floor type with caster 2. Scanning method: Electronic sector, Electronic convex, Electronic linear 3. Image mode: B, B/B(Dual B), M, B/M, Pulsed Wave Doppler mode (PWD), Color Doppler (CDI) 4. B-Mode 1) Gray scale: 256 levels or more 2) Max. depth: 24cm or more 5. Doppler methods: Pulsed Wave Doppler mode (PWD), Color Doppler (CDI) 6. Connecting probe: probe for vascular (pediatric) 7. Monitor size: 15inch or more	Medium Level	1	For image diagnosis of abdominal organs, superficial sites and pediatric examination.
107	Ureteroscope	Germany	Germany	1. Ureteroscope: Within 6.0 to 7.0 / 7.5 to 9.9 Fr., 430mm, 3.6Fr. or wider Channel 2. Field of view: Within 5 to 7 degrees	Medium Level	1	For diagnosis of ureter.
108	Urodynamic measuring machine	Canada	Canada	1. Output channels: 4 pressures and 1 EMG 2. Test menu: Vesical pressure (Cystometography: CMG), Abdominal (Rectal) pressure, Urethral pressure profiles (UPP), Detrusor muscle pressure (calculated value), Electromyomgraphy (EMG), Uroflowmetry (UFM) 3. Pressure range: -50-+200cmH2O or wider range 4. EMG range: 100-1000μV or wider range	Medium Level	2	For identifying the cause of urination disorder.
109	Ventilator (adult)	Japan	Japan	1. Type: For adult 2. Mode: Volume control, pressure control, CMV, SIMV（IDV), CPAP/PEEP 3. Tidal volume: 100-2000mL or more 4. PEEP: 0-20cmH2O or more 5. Inspiratory pressure: 5-40cmH2O or more 6. Pressure support: 1-35cmH2O or more 7. Oxygen concentration: 21-100%	Medium Level	9	For breathing support of adult patients having difficulty with spontaneous respiration at ICU.

No.	Name of Equipment	Country of Procurement	Country of Origin	Major Specification / Component	Level of Equipment	Qty.	Purpose of Use Relevance of the Level of Equipment
110	Ventilator (pediatric, A)	Japan	Japan	1. Type: For neonatal and pediatric 2. Mode: Volume control, pressure control, IMV, CMV, CPAP/PEEP 3. Tidal volume: 20-999mL or more 4. PEEP: 0-20cmH2O or more 5. Inspiratory pressure: 5-40cmH2O or more 6. Oxygen concentration: 21-100% 7. Compressor: Equipped	Medium Level	3	For breathing support of pediatric patients having difficulty with spontaneous respiration at ICU.
111	Ventilator (pediatric, B)	Japan	Japan	1. Type: For neonatal and pediatric 2. Mode: Volume control, pressure control, IMV, CMV, CPAP/PEEP 3. Tidal volume: 20-999mL or more 4. PEEP: 0-20cmH2O or more 5. Inspiratory pressure: 5-40cmH2O or more 6. Oxygen concentration: 21-100%	Medium Level	1	For breathing support of pediatric patients having difficulty with spontaneous respiration at ICU.
112	Ventilator (neonatal, A)	Japan	Germany	1. Type: For premature infant and neonatal 2. Mode: Volume control, pressure control, IMV, CMV, CPAP/PEEP, HFO 3. Tidal volume: 20-80mL or more 4. PEEP: 5-20cmH2O or more 5. Inspiratory pressure: 5-40cmH2O or more 6. Oxygen concentration: 21-100% 7. Compressor: Equipped	Medium Level	5	For breathing support of neonatal patients having difficulty with spontaneous respiration at ICU.
113	Ventilator (neonatal, B)	Japan	Germany	1. Type: For premature infant and neonatal 2. Mode: Volume control, pressure control, IMV, CMV, CPAP/PEEP, HFO 3. Tidal volume: 20-80mL or more 4. PEEP: 5-20cmH2O or more 5. Inspiratory pressure: 5-40cmH2O or more 6. Oxygen concentration: 21-100%	Medium Level	2	For breathing support of neonatal patients having difficulty with spontaneous respiration at ICU.
114	Ventilator (transportation)	Japan	Germany	1. Type: For adult and pediatric 2. Mode: Volume control, CMV, SIMV（IDV), CPAP/PEEP 3. Tidal volume: 100-2000mL or more 4. PEEP: 0-20cmH2O or more 5. Inspiratory pressure: 5-40cmH2O or more 6. Oxygen concentration: 21-100%	Medium Level	1	For breathing support of adult patients having difficulty with spontaneous respiration at ICU.
117	X-ray machine (C-arm, fluoroscopy)	Japan	Japan	1. X-ray generator 1) Tube voltage: Max. 110kV or wider range 2) Tube current: Max. 16mA or wider range 2. Fluoroscopy 1) Tube voltage: Max. 110kV or wider range 2) Tube current: Max. 3mA or wider range 3. Number of monitor: 2 4. Monitor size: LCD 17inch or more	Medium Level	3	For operation which requires fluoroscopy examination during operation, such as orthopedic operation and urological operation.
118	X-ray machine (fluoroscopy)	Japan	Japan	1. X-ray generator 1) Tube voltage: 40-150kV or wider range 2) Tube current: 10-500mA or wider range 3) mAs: 0.5-600mAs or more 2. Fluoroscopy 1) Tube voltage: 50-120kV or wider range 2) Tube current: 0.5-4mA or wider range 3. Monitor size: 12inch or more	Medium Level	2	For performing fluoroscopy examination using a contrast agent.
119	X-ray machine (general, digital)	Japan	Japan	1. Type: High frequency inverter system 2. Tube voltage: 40-150 k V or wider range 3. Tube current: 10-630mA or wider range 4. Anode heat capacity: 200kHU or more	Medium Level	1	For general X-ray image diagnosis of bone fracture or chest-abdominal area.
120	X-ray machine (mobile)	Japan	Japan	1. Type: Inverter 2. Tube voltage: Max. 125kV or wider range 3. Tube current: Max. 250mA or wider range 4. Anode heat capacity: Max. 140kHU or more	Medium Level	2	For emergent and simple X-ray image diagnosis operated for patients having difficulty with body movement or positioning, at operation theater, ICU and patient ward.
121	X-ray machine (mobile, digital)	Japan	Japan	1. Type: Inverter 2. Tube voltage: Max. 125kV or wider range 3. Tube current: Max. 250mA or wider range 4. Anode heat capacity: Max. 140kHU or more	Medium Level	1	For emergent and simple X-ray image diagnosis operated for patients having difficulty with body movement or positioning, at operation theater, ICU and patient ward.

8. Equipment Delivery List

Equipment Delivery List
Mandalay General Hospital

Project No.	Modified Description	Planned Qty.	Radio-logy	Blood Bank	Cardiac unit	OT	Uro-Surg	ICU	CCU	Maxi-Trauma	GI	Chest	Labo-ratory	Renal Unit	Emer-gency
MG-01	CT	2	1												1
MG-02	X-ray machine (mobile, digital)	2	2												
MG-03	Ultrasound machine (adult, color doppler, abdomen+TV+superficial)	1	1												
MG-04	Centrifuge (blood bag, type A)	2		2											
MG-05	Refrigerator (blood bag)	1		1											
MG-06	Deep freezer (large)	2		2											
MG-07	Platelet agitator	1		1											
MG-08	Central monitor	3			1			1	1						
MG-09	Patient monitor (adult, standard)	22													
MG-10	Ultrasound machine (adult, color doppler, heart+TE+pencil+superficial)	1			1										
MG-11	ECG machine (stress test system)	1			1										
MG-12	Operation table (motorized)	3				3									
MG-13	Operation table (motorized, neuro surgery)	1				1									
MG-14	X-ray machine (C-arm, fluoroscopy)	3				1	1			1					
MG-15	Laparoscope (adult)	2				1	1								
MG-16	Instrument set for thoracic surgery (adult)	2				2									
MG-17	Bronchoscope (adult, flexible)	2				1						1			
MG-18	Sternal Saw	1				1									
MG-19	TURP set	1					1								
MG-20	Ureteroscope	1					1								
MG-21	Percutaneous Nephroscope	1					1								
MG-22	Patient monitor (adult, ETCO2+IBP)	6						2	4						
MG-23	Ventilator (adult)	4						4							
MG-24	Ventilator (transportation)	1						1							
MG-25	Defibrillator (adult)	2						2							
MG-26	Autoclave (table top)	12			2	3	2	1	1	1	1				1
MG-27	Gastroscope	1									1				
MG-28	Colonoscope	1									1				
MG-29	Duodenoscope	1									1				
MG-30	Microtome	2											2		
MG-31	Blood culture system	1											1		
MG-32	Automatic blood culture and antibotic susceptibility system	1											1		
MG-33	Hemodialysis machine (SLED)	2												2	
MG-34	Ultrasound machine (adult, color doppler, kidney+insertion)	1												1	

Equipment Delivery List

Central Women's Hospital in Mandalay

Project No.	Modified Description	Planned Qty.	SCBU	ICU	Image DX	Patho-BB	OT	New OT	Labour room	New Labor room	HDU1+2	HDU3	OPD
MW-01	Bilirubinometer (blood)	1	1										
MW-02	Patient monitor (adult, standard)	19		3			4	2			6	4	
MW-03	Ventilator (adult)	3		3									
MW-04	Ultrasound machine (adult, color doppler, abdomen+TV+DVT)	1			1								
MW-05	Spectrophotometer	1				1							
MW-06	Bilirubinometer (skin)	1											1
MW-07	Autoclave (vertical, large)	1					1						
MW-08	Cardiotocograph	10							6	4			
MW-09	Ultrasound machine (OBGY, abdominal+TV)	1							1				
MW-10	Infusion pump (adult)	10		1					3		4	2	
MW-11	Centrifuge (blood bag, type B)	1				1							
MW-12	Colposcope	1					1						
MW-13	Infant incubator (manual/servo)	7	7										
MW-14	Patient monitor (pediatric, standard)	5	5										
MW-15	Anaesthesia machine with ventilator (adult)	5					2	3					
MW-16	Infant care center	5	5										
MW-17	Ultrasound machine (adult, color doppler, abdomen+TV)	1											1
MW-18	Infusion pump (pediatric)	7	7										
MW-19	Patient monitor (adult, multi gas)	2					1	1					
MW-20	X-ray machine (fluoroscopy)	1			1								
MW-21	pH Meter	2							1	1			
MW-22	Urodynamic measuring machine	1					1						
MW-23	Operation table (manual)	8					5	3					
MW-24	Ventilator (neonatal A)	2	2										
MW-25	Laparoscope (adult)	1					1						
MW-26	Hysteroscope (rigid)	2					1	1					
MW-27	Cryotherapy machine	1					1						
MW-28	Deep freezer (small)	1				1							
MW-29	Centrifuge (table top)	1				1							
MW-30	Coagulation analyzer	1				1							
MW-31	Ultrasound machine (neonate, color doppler, heart+abdomen+superficial)	1	1										
MW-32	Balance (digital)	1				1							
MW-33	Platelet agitator	1				1							
MW-34	Syringe pump (pediatric)	5	5										
MW-35	Autoclave (vertical, medium)	4						1	2	1			
MW-36	Autoclave (laboratory)	1				1							
MW-37	Incubator	1				1							
MW-38	ECG machine	1	1										
MW-39	Pulse oxymeter	4	4										
MW-40	Suction unit	5	5										
MW-41	Centrifuge (hematocrit)	2	2										

Project No.	Modified Description	Planned Qty.	SCBU	ICU	Image DX	Patho-BB	OT	New OT	Labour room	New Labor room	HDU1+2	HDU3	OPD
MW-42	Oxygen concentrator	11					2	3			4	2	
MW-43	Doppler fetal heart detector	5								1	2	1	1
MW-44	Microcope with camera and monitor	1				1							
MW-45	Hot air oven	1				1							
MW-46	Delivery bed	10							2	8			
MW-47	Safety cabinet	1				1							
MW-48	Electrosurgical unit for LEEP	1					1						

Equipment Delivery List
Mandalay Children Hospital

Project No.	Modified Description	Planned Qty.	OT	ICU	SCBU	Image DX	Labora-tory	Surg Unit
MP-01	Autoclave (vertical)	1	1					
MP-02	Patient monitor (pediatric, Multi Gas+IBP)	2	2					
MP-03	Instrument set for pediatric abdominal surgery	1	1					
MP-04	Instrument set pediatric thoracic surgical set	1	1					
MP-05	Sigmoidoscope (pediatric, flixible)	1	1					
MP-06	Defibrillator	2	1	1				
MP-07	Patient warmer	1	1					
MP-08	Blood warmer	2	2					
MP-09	Laryngoscope	2	2					
MP-10	Ventilator (neonate B)	2		2				
MP-11	Ventilator (periatric B)	1		1				
MP-12	Patient monitor (pediatric, standard)	8		4				4
MP-13	Infant incubator (manual/servo)	13		5	8			
MP-14	Oxygen concentrator	11		3	6			2
MP-15	Infusion pump (pediatric)	8		4	4			
MP-16	Syringe pump (pediatric)	7		4	3			
MP-17	Bilirubinometer (blood)	1			1			
MP-18	Blood pressure machine	2			2			
MP-19	Infant care center	2			2			
MP-20	Ultrasound machine (pediatric, color doppler, head+abdomen+superficial)	1				1		
MP-21	Automatic chemistry analyzer	1					1	
MP-22	Microtome	1					1	
MP-23	Laparoscope (pediatric)	1	1					
MP-24	Phototherapy Unit	4		2	2			
MP-25	Bilirubinometer (skin)	1			1			
MP-26	Suction unit	4			4			
MP-27	X-ray machine (fluoroscopy)	1				1		
MP-28	CO2 incubator	1					1	
MP-29	Microcope with camera and monitor	1					1	
MP-30	Tissue processor	1					1	
MP-31	Automatic stainer	1					1	
MP-32	Infant incubator (manual)	4						4
MP-33	ECG machine	1						1

Equipment Delivery List

Central Women's Hospital in Yangon

Project No.	Modified Description	Planned Qty.	A Bloc OT	C Bloc OT	OB & GY	SCBU	Uro-GN	ICU	U/S unit
YW-01	Anaesthesia machine with ventilator (adult)	2	1	1					
YW-02	Operation table (manual)	2	1	1					
YW-03	Colposcope	1		1					
YW-04	Colposcope with monitor	1			1				
YW-05	Hysteroscope (rigid)	1		1					
YW-06	Hysteroscope (flexible)	1			1				
YW-07	Infant incubator (manual)	10				10			
YW-08	Ventilator (neonatal A)	2				2			
YW-09	Patient monitor (pediatric, standard)	5				5			
YW-10	Urodynamic measuring machine	1					1		
YW-11	Ventilator (adult)	2						2	
YW-12	Infant care center	3				3			
YW-13	Laparoscope (adult)	2		2					
YW-14	Ultrasound machine (adult, color doppler, abdomen+TV+superficial)	1							1
YW-15	Ultrasound machine (OBGY, abdominal+TV)	1		1					
YW-16	Electrosurgical unit for LEEP	1		1					

Equipment Delivery List
Yangon Children Hospital

Project No.	Modified Description	Planned Qty.	OT	M Unit	S Unit	Neonatal Unit	Cardiac Unit	Renal Unit	H & O Unit	Labo-ratory	Emer-gency	Neuro-logy	Physio-logy	ICU	Image DX
YP-01	Autoclave (horizontal)	2	2												
YP-02	Infusion pump (pediatric)	26	10	6	2	3	2	1	2						
YP-03	Syringe pump (pediatric)	24	10	7		5									
YP-04	X-ray machine (general, digital)	1													1
YP-05	X-ray machine (mobile, digital)	1													1
YP-06	Patient monitor (pediatric, standard)	18		5	1	5	2	1	2		2				
YP-07	Patient monitor (pediatric, ETCO2)	5												5	
YP-08	Electrophoresis (hemoglobin)	1								1					
YP-09	Patient warmer	4	4												
YP-10	Microcope with camera and monitor	1								1					
YP-11	Patient monitor (pediatric, Multi Gas+IBP+CVP)	4	4												
YP-12	Ventilator (pediatric A)	3	1											2	
YP-13	EEG machine	1										1			
YP-14	Ultrasound machine (pediatric, color doppler, head+abdomen+superficial)	1				1									
YP-15	Ultrasound machine (pediatric, color doppler, insertion)	1	1												
YP-16	ECG machine (holter)	1					1								
YP-17	Hemodialysis machine	1						1							
YP-18	Anaesthesia machine with ventilator (pediatric)	3	3												
YP-19	Bronchoscope (pediatric, flexible)	1	1												
YP-20	Microscope	2								2					
YP-21	Ventilator (neonatal A)	1				1									
YP-22	Ceiling lamp (double head)	3	3												
YP-23	Defibrillator (pediatric)	2					1				1				
YP-24	Wedge	1											1		
YP-25	Ultrasound therapy machine	1											1		
YP-26	Paraffin bath for therapy	1											1		
YP-27	Prone stander	1											1		
YP-28	Spirometer	1											1		
YP-29	Bicycle Exercise machine (pediatric)	1											1		
YP-30	Blood warmer	4	4												
YP-31	Oxygen concentrator	8					2				6				
YP-32	ECG machine	1					1								

9. Operation and Maintenance Cost for the Equipment

Operation and Management Cost for the Equipment

Mandalay General Hospital

Project No.	Requested Equipment	Consumables	Quantity/Unit	Basis for the Calculation of Quantity	Annual Quantity	Unit Price KYS	Planned Quantity	Subtotal KYS	Type
MG-01	CT			10people/day			2		Addition
		Film for dry imager	50pcs./pack	4pcs./patient：240days×10patients/day×4pcs.÷50pcs.＝192	192	26,333	2	10,111,850	Addition
MG-02	X-ray machine (mobile)			8people/day			2		Addition
		Film	100pcs./pack	4pcs./patient：240days×8patients/day×2pcs.÷100pcs.＝38.4	39	469,646	2	36,632,388	Addition
MG-03	Ultrasound machine (adult, color doppler, abdomen+TV+superficial)			18people/day			1		Addition
		Gel	250mL/pc.	10mL/patient：240days×18patients×10mL÷250mL＝172.8	173	12,779	1	2,210,722	Addition
		Recording paper	300pcs./set	2pcs./patient：240days×18patients×2pcs.÷300pcs.＝28.8	29	70,993	1	2,058,797	Addition
MG-08	Central monitor						3		New
		Recording paper	20m･10pcs./set	8m/day：365days×8m÷200m/pack＝14.6	15	37,604	3	1,692,200	New
MG-09	Patient monitor (adult, standard)			7days/patient：365days÷7days＝52.1patients			22		New
		Electrode set	150pcs./set	3pcs./patient：52patients× 3 pcs.÷150pcs./set＝1.04	2	89,702	22	3,946,905	New
		Recording paper	20m･10pcs./set	Records will be printed by central monitor, no recording paper is necessary for patient monitor	0	38,500	22	0	New
MG-10	Ultrasound machine (adult, color doppler, heart+TE+pencil+superficial)			18people/day			1		Renewal
		Gel	250mL/pc.	10mL/patient：240days×18patients×10mL÷250mL＝172.8	173	12,779	1	2,210,722	Renewal
		Recording paper	300pcs./set	2pcs./patient：240days×18patients×2pcs.÷300pcs.＝28.8	29	70,993	1	2,058,797	Renewal
MG-11	ECG machine (stress test system)			8people/day			1		Renewal
		Electrode set	150pcs./set	5pcs./patient：240days×8patients×5pcs.÷150pcs./set＝64	64	147,447	1	9,436,608	Renewal
		Recording paper	100m/pc.	240days×8patients×2m÷100m/pc.＝38.4	39	38,751	1	1,511,299	Renewal
MG-14	X-ray machine (C-arm, fluoroscopy)			8people/day			3		New
		Film	100pcs./box	3pcs./patient：240days×8patients×3pcs.÷300pcs./set＝19.2	20	469,646	3	28,178,760	New
MG-15	Laparoscope (adult)			2people/day			2		Renewal
		CO2 gas	1500L/pc.	Estimated to be 1.5L/min×90min＝135L/patient：240days×2patients×135L÷1500L/pc.＝43.2	44	65,532	2	5,766,816	Renewal
MG-17	Bronchoscope (adult, flexible)			2people/day			2		Renewal
		Recording paper	300pcs./set	4pcs./patient：240days×2patients/day×4pcs.÷300pcs./set＝6.4	7	697,203	2	9,760,844	Renewal
MG-18	Sternal Saw						1		New
		Spare blade	1pc.	About 1pc./patient	50	49,149	1	2,457,450	New
MG-19	TURP set						1		Renewal
		Patient electrode, with cable	1pc.	3pcs./year	3	22,891	1	68,673	Renewal
MG-20	Ureteroscope	N/A, shared use with other units					1		Renewal
MG-21	Percutaneous Nephroscope	N/A, shared use with other units					1		Renewal
MG-22	Patient monitor (adult, ETCO2+IBP)			7days/patient：365days÷7days＝52.1patients			6		Renewal
		Electrode set	150pcs./set	3pcs./patient：52patients× 3 pcs.÷150pcs.＝1.04	2	89,702	6	1,076,429	Renewal
		Nasal-oral adapter	30pcs./set	1pc./patient：Used for 25% of all patients：52patients×25%＝13patients	1	417,767	6	2,506,599	Renewal
		Air way adapter	30pcs./set	1pc./patient：Used for 25% of all patients：52patients×25%＝13patients	1	294,894	6	1,769,364	Renewal
		IBP transducer	1set	2sets/year	2	1,810,322	6	21,723,858	Renewal
		IBP dome kit	5pcs./set	1pc./patient：Used for 10% of all patients：52patients×10%＝5.2patients	2	245,745	6	2,948,940	Renewal
		Swan-Ganz catheter, 7.5Fr	5pcs./set	1pc./patient：Used for 10% of all patients：52patients×10%＝5.2patients	2	2,019,205	6	24,230,457	Renewal
		Recording paper	20m･10pcs./set	1m/patient：52patients×1m÷200m/set＝0.26	1	38,500	6	231,000	Renewal
MG-23	Ventilator (adult)						4		Addition
		Patient circuit tube set	1set	1set/year	1	614,363	4	2,457,450	Addition
		Endotracheal tube set with cuff	1set	1set/year	1	688,086	4	2,752,344	Addition
MG-24	Ventilator (transportation)			1people/day			1		New
		Patient circuit tube set	1set	1set/year	1	1,515,428	1	1,515,428	New
		Bacteria filter	100pcs./set	1pc./patient：240days×1patients÷100pcs./set＝2.4	3	573,405	1	1,720,215	New
MG-25	Defibrillator (adult)			100cases/year			2		Renewal
		Electrode set (for monitor)	150pcs./set	3pcs./patient：100patients× 3 pcs.÷150pcs./set＝2	2	89,702	2	358,810	Renewal
		Gel	100g/pc.	30g/patient：100patients×30g÷300g/pc.＝10	10	4,096	2	81,915	Renewal
		Recording paper	20m･10pcs./set	1m/patient：100patients×1m÷200m/set＝0.5	1	28,255	2	56,510	Renewal
MG-27	Gastroscope			4patients/day			1		Renewal
		Recording paper	300pcs./set	4pcs./patient：240days×4patients×4pcs.÷300pcs./set＝12.8	13	697,203	1	9,063,641	Renewal
MG-28	Colonoscope	N/A, shared use with other units					1		Renewal
MG-29	Duodenoscope	N/A, shared use with other units					1		Renewal
MG-30	Microtome						2		Addition
		Spare blade	1000pcs./set	1pc./patient for 5days, capacity is 50pcs. and max. 25patients, 365days÷5days＝73patients, 1825tests	1	1,669,474	2	3,338,948	Addition
MG-31	Blood culture system						1		New
		Blood culture bottles, for aerobic	100pcs./set	For 1000 tests	10	336,428	1	3,364,282	New
		Blood culture bottles, for anaerobic	100pcs./set	For 1000 tests	10	336,428	1	3,364,282	New
		Blood culture bottles, for pediatric	100pcs./set	For 500 tests	5	336,428	1	1,682,141	New
MG-32	Automatic blood culture and antibotic susceptibility system			Either positive or negative reagent is used per one examination, 750 tests each			1		New
		Reagent card (for Positive)	150pcs./set	For 750 tests	5	538,285	1	2,691,425	New
		Reagent card (for Negative)	150pcs./set	For 750 tests	5	538,285	1	2,691,425	New
MG-33	Hemodialysis machine (adult)	Dializer, patient circuit	1set	1set/patient：240days×2patients＝480			2		Addition
					480	44,267	2	42,496,191	Addition
MG-34	Ultrasound machine (adult, color doppler, kidney+insertion)			4people/day			1		New
		Gel	250mL/pc.	10mL/patient：240days×4patients×10mL÷250ml＝38.4	39	12,779	1	498,371	New
		Recording paper	300pcs./set	2pcs./patient：240days×4patients×2pcs.÷300pcs./set＝6.4	7	70,993	1	496,951	New
							Total	251,219,807	Kyats
						Of Renewal		94,861,282	Kyats
						Of Addition/New		156,358,525	Kyats

Operation and Management Cost for the Equipment

Central Women's Hospital in Mandalay

Project No.	Requested Equipment	Consumables	Quantity/Unit	Basis for the Calculation of Quantity	Annual Quantity	Unit Price KYS	Planned Quantity	Subtotal KYS	Type
MW-01	Bilirubinometer (blood)			10people/day			1		Renewal
		Heparin-modified capillary tube	100pcs./set	365days×10patients÷100pcs./set＝36.5	37	22,117	1	818,331	Renewal
		Capillary plain tube	100pcs./set	365days×1pc.÷100pcs./set＝3.65	4	18,436	1	73,745	Renewal
		Control	5pcs./set		5	573,405	1	2,867,025	Renewal
MW-02	Patient monitor (adult, standard)			5days/patient : 365days÷5days＝52.1			19		New
		Electrode set	150pcs./set	3pcs./patient : 52patients×3pcs.÷150pcs./set＝1.04	2	89,702	19	3,408,691	New
		Recording paper	20m･10pcs./set	1m/patient : 52patients×1m÷200m/set＝0.52	1	38,500	19	731,501	New
MW-03	Ventilator (adult)						3		New
		Patient circuit tube set	1set	1set/year	1	614,363	3	1,843,088	New
		Endotracheal tube set with cuff	1set	1set/year	1	688,086	3	2,064,258	New
MW-04	Ultrasound machine (adult, color doppler, abdomen+TV+DVT)			16people/day			1		Addition
		Gel	250mL/pc.	10mL/patient : 240days×16patients×10mL÷250mL/pc.＝153.6	154	12,779	1	1,967,926	Addition
		Recording paper	300pcs./set	2pcs./patient : 240days×16patients×2pcs.÷300pcs./set＝25.6	26	35,497	1	922,909	Addition
MW-05	Spectrophotometer						1		Addition
		Recording paper	20m/pc.	5cm/examination : 240days×20cases×0.05m÷20m＝7.2	8	39,840	1	318,721	Addition
MW-08	Cardiotocograph			16people/day			10		Addition
		Recording paper	20m/pc.	60cm/patient : 240days×16patients×0.6m÷20m/pc.＝115.2	116	13,926	10	16,153,638	Addition
		Gel	250mL/pc.	10mL/patient : 240days×16patients×10mL÷250mL/pc.＝153.6	154	8,192	10	12,614,910	Addition
MW-09	Ultrasound machine (OBGY, abdominal+TV)			12people/day			1		Addition
		Gel	250mL/pc.	10mL/patient : 240days×12patients×10mL÷250mL/pc.＝115.2	116	12,779	1	1,482,334	Addition
		Recording paper	300pcs./set	4pcs/patient : 240days×12patients×4pcs.÷300pcs./set＝38.4	39	35,497	1	1,384,364	Addition
MW-10	Infusion pump (adult)			3days/patient : 365days÷3days＝121.6patients			10		Addition
		Infusion tube	100pcs./set	1set/patient : 122patients÷100pcs./set＝1.22	2	185,674	10	3,713,480	Addition
MW-13	Infant incubator (manual/servo)			7days/patient : 365days÷7days＝52.1patients			7		Addition
		Air micro filter	5pcs./set	Replace 1pc. every 2months : 6pcs.÷5pcs./set＝1.2	2	91,745	7	1,284,427	Addition
		Adhesive collar	100pcs./set	1pc./patient : 52patients÷100pcs./set＝0.52	1	93,929	7	657,504	Addition
MW-14	Patient monitor (pediatric, standard)			7days/patient : 365days÷7days＝52.1patients			5		New
		Electrode set	150pcs./set	3pcs./patient : 52patients×3pcs.÷150pcs./set＝1.04	2	110,585	5	1,105,853	New
		Recording paper	20m･10pcs./set	1m/patient : 52patients×1m÷200m/set＝0.26	1	38,500	5	192,500	New
MW-15	Anaesthesia machine with ventilator (adult)			2times/day, 6hours each			5		Renewal
		CO2 absorber tablets	4.5kg/set	6hours×240days×0.05kg/hour÷4.5kg/set＝16	16	64,713	5	5,177,028	Renewal
		Patient circuit set	1set	1set/year	1	491,490	5	2,457,450	Renewal
		Mask set	1set	1set/year	1	245,745	5	1,228,725	Renewal
MW-17	Ultrasound machine (adult, color doppler, abdomen+TV)			12people/day		0	1		New
		Gel	250mL/pc.	10mL/patient : 365days×12patients×10mL÷250mL/pc.＝175.2	176	12,779	1	2,249,058	New
		Recording paper	300pcs./set	4pcs./patient : 365days×12patients×4pcs.÷300pcs./set＝58.4	59	35,497	1	2,094,294	New
MW-18	Infusion pump (pediatric)			5days/patient : 365days÷5days＝73patients			7		Addition
		Infusion tube	100pcs./set	1pc./patient : 73patients×1pc.÷100pcs./set=0.73	1	185,674	7	1,299,718	Addition
MW-19	Patient monitor (adult, multi gas)			2people/day			2		New
		Electrode set	150pcs./set	3pcs./patient : 240days×2patients×3pcs.÷150pcs./set=9.6	10	89,702	2	1,794,048	New
		Recording paper	20m･10pcs./set	1m/patient : 240days×2patients×1m÷200m/set=2.4	2	38,500	2	154,000	New
		Connection cable, 2.5m	1set	2sets/year	2	204,788	2	819,150	New
		Water trap	12pcs./set	Used for 25% of all patients : 240days×2patients×25%÷12pcs./set=10	10	294,894	2	5,897,880	New
		T-piece (straight & elbow)	25pcs./set	Used for 25% of all patients : 240days×2patients×25%÷25pcs./set=4.8	5	184,309	2	1,843,088	New
		Sampling line	25pcs./set	Used for 25% of all patients : 240days×2patients×25%÷25pcs./set=4.8	5	184,309	2	1,843,088	New
MW-20	X-ray machine (fluoroscopy)			15people/day			1		New
		Film	100pcs./box	3pcs./patient : 240days×15patients/day×3pcs.÷100pcs.＝108	108	469,646	1	50,721,768	New
MW-21	pH Meter			Calibrate every 2 days			2		New
		Standard solution pH4	500mL/pcs.	120days×15mL÷500mL＝3.6	4	10,649	2	85,192	New
		Standard solution pH7	500mL/pcs.	120days×15mL÷500mL＝3.6	4	10,649	2	85,192	New
		Standard solution pH9/10	500mL/pcs.	120days×15mL÷500mL＝3.6	4	10,649	2	85,192	New
		Saturated solution, KCL	250mL/pcs.	As necessary	4	65,532	2	524,256	New
MW-22	Urodynamic measuring machine			2people/day, 480cases/year			1		New
		Tube kit for saline injection	25pcs./set	Necessary for all patients, 480cases÷25＝19.2	20	0	1	0	New
		Transducer, CMG	25pcs./set	┐	20	0	1	0	New
		Transducer, rectal pressure	25pcs./set	├ Estimated that 60% of all examination will examine CMG and rectal pressure,	20	252,321	1	5,046,423	New
		Transducer, UPP	25pcs./set	┘ and 40% of all examination will use all 3 types of transducer	4	252,321	1	1,009,285	New
		Catheter, 2 channnel	10pcs./set	For 2 channel : 480cases×60%＝288cases	29	131,207	1	3,805,003	New
		Catheter, 3 channnel	10pcs./set	For 3 channel : 480cases×40%＝192cases	20	196,810	1	3,936,210	New
		Catheter, Rectal ballon	10pcs./set	Applicable to transducer, rectal pressure	48	153,075	1	7,347,591	New
		EMG electrode set	100pcs./set	400pcs./year, not necessary for all patients	4	481,092	1	1,924,369	New
MW-24	Ventilator (neonatal A)			7days/patient : 365days÷7days＝52.1patients			2		New
		Humidifier chamber	100pcs./set	1pc./patient : 52patients×1pc.÷100pcs./set=0.52	1	122,873	2	245,745	New
		Patient circuit tube set	1set	1set/year	1	1,515,428	2	3,030,855	New
		Endotracheal tube set w/o cuff	1set	1set/year	1	368,618	2	737,235	New
		Bacteria filter	100pcs./set	1pc./patient : 52patients×1pc.÷100pcs./set=0.52	1	573,405	2	1,146,810	New
MW-25	Laparoscope (adult)			2people/day			1		Renewal
		CO2 gas	1500L/pc.	Estimated to be 1.5L/min×90min＝135L/patient : □	44	65,532	1	2,883,408	Renewal
MW-26	Hysteroscope (rigid)			240days×2patients×135L÷1500L/pc.＝43.2			2		New
		Patient electrode, with cable	1pc.	3sets/year	3	102,987	2	617,922	New
MW-27	Cryosurgery machine						1		New
		CO2 gas	1500L/pc.	2pcs./month	24	65,532	1	1,572,768	New
		Replaceable tip (5 kinds/set)	1set	3sets/year	3	503,777	1	1,511,332	New
MW-30	Coagulation analyzer						1		New
		Reagent PT, 1500 tests	1set	10tests/day : 240days×10tests÷1500＝1.6	2	132,801	1	265,601	New
		Reagent APTT, 500 tests	1set	5tests/day : 240days×5tests/500＝2.4	3	252,321	1	756,963	New
		Reagent FBg, 500 tests	1set	5tests/day : 240days×5tests/500＝2.4	3	239,041	1	717,123	New
		Reagent TT, 300 tests	1set	3tests/day : 240days×3tests/500＝2.4	3	770,243	1	2,310,730	New
		Extrinsic factors (II, V, VII, X)	1set	60cases/year	4	597,603	1	2,390,411	New
		Intrinsic factors (VIII, IX, XI, XII)	1set	60cases/year	4	630,803	1	2,523,211	New
		Recording paper	1set	For 5640tests : 5640÷2830＝1.99	2	434,150	1	868,299	New
MW-31	Ultrasound machine (neonate, color doppler, heart+abdomen+superficial)			240days×5patients			1		New
		Gel	250mL/pc.	240days×5patients, 10mL÷250mL/pc.＝10	10	12,779	1	127,787	New
		Recording paper	300pcs./set	240days×5patients×3pcs.÷300pcs./set＝12	12	35,497	1	425,958	New
MW-34	Syringe pump (pediatric)			1set/patient, 5days, 365days÷5days＝73patients			5		New
		Infusion tube	100pcs./pack	73patients÷100pcs./pack＝0.73	1	185,674	5	928,370	New
		Syringe 10mL	100pcs./pack	100pcs.÷100pcs./pack＝1	1	30,582	5	152,908	New
		Syringe 20mL	50pcs./pack	100pcs.÷50pcs./pack＝2	2	19,114	5	191,135	New
		Syringe 30mL	50pcs./pack	100pcs.÷50pcs./pack＝2	2	49,149	5	491,490	New

Project No.	Requested Equipment	Consumables	Quantity/Unit	Basis for the Calculation of Quantity	Annual Quantity	Unit Price KYS	Planned Quantity	Subtotal KYS	Type
		Syringe 50mL	20pcs./pack	60pcs.÷100pcs./pack＝0.6	1	26,213	5	131,064	New
MW-38	ECG machine			5people/day			1		Addition
		Electrode cream	100g/pc.	5g/patient : 365days×5patients×5g÷100g/pc.＝91.25	92	12,287	1	1,130,427	Addition
		Recording paper	20m/pc.	50cm/patient : 365days×5patients×0.5m÷20m/pc.＝45.625	46	6,149	1	282,858	Addition
MW-41	Centrifuge (hematocrit)			10people/day			2		Addition
		Heparin-modified capillary tube	100pcs./set	365days×10patients÷100pcs./set＝36.5	37	22,117	2	1,636,662	Addition
MW-43	Doppler fetal heart detector			10people/day			5		Addition
		Gel	250mL/pc.	10g/patient : 240days×10patients×10mL÷250mL＝96	96	10,245	5	4,917,521	Addition
MW-48	Safety cabinet						1		New
		HEPA filter, supply and exhaust	1set	1set/year	1	1,761,173	1	1,761,173	New
MW-49	Electrosurgical unit for LEEP						1		New
		Electrode set	1set	3sets/year	3	97,567	1	292,700	New
		Patient electrode	1pc.	3pcs./year	3	28,186	1	84,558	New
							Total	189,166,237	Kyats
							Of Renewal	15,505,712	Kyats
							Of Addition/New	173,660,525	Kyats

Operation and Management Cost for the Equipment

Mandalay Children Hospital

Project No.	Requested Equipment	Consumables	Quantity/Unit	Basis for the Calculation of Quantity	Annual Quantity	Unit Price KYS	Planned Quantity	Subtotal KYS	Type
MP-02	Patient monitor (pediatric, Multi Gas+IBP)			2people/day			2		New
		Electrode set	150pcs./set	3pcs./patient：240days×2patients×3pcs.÷150pcs./set＝9.6	10	110,585	2	2,211,705	New
		Recording paper	20m･10pcs./set	1m/patient：240days×2patients×1m÷200m/set＝2.4	3	38,500	2	231,000	New
		IBP transducer	1pc.	2pcs./year	2	1,810,322	2	7,241,286	New
		IBP dome kit	5pcs./set	1pc./patient : Used for 10% of all patients : 73patients×10%＝7.3patients	2	245,745	2	982,980	New
		Swan-Ganz catheter, 5Fr	5pcs./set	1pc./patient : Used for 10% of all patients : 73patients×10%＝7.3patients	2	1,875,854	2	7,503,414	New
		Connection cable	1pc.	2pcs./year	2	204,788	2	819,150	New
		Water trap	12pcs./set	1pc./patient : Used for 10% of all patients : 73patients×10%＝7.3patients	1	294,894	2	589,788	New
		T-piece (straight & elbow)	25pcs./set	1pc./patient : Used for 25% of all patients : 73patients×25%＝18.25patients	1	184,309	2	368,618	New
		Sampling Line	25pcs./set	1pc./patient : Used for 25% of all patients : 73patients×25%＝18.25patients	1	184,309	2	368,618	New
MP-05	Sigmoidoscope (pediatric, flixible)			2people/day			1		New
		Recording paper	200pcs./set	4pcs./patient：240days×2patients×4pcs.÷200pcs.＝9.6	10	84,107	1	841,070	New
MP-06	Defibrillator			100cases/year			2		New
		Electrode set (for monitor)	150pcs./set	3pcs./patient：100patients×3pcs.÷150pcs./set＝2	1	110,585	2	221,171	New
		Gel	100g/pc.	10g/patient：100patients×10g÷100g/set＝3	1	4,096	2	8,192	New
		Recording paper	20m･10pcs./set	1m/patient：100patients×1m÷200m/set＝3	1	28,255	2	56,510	New
MP-07	Patient warmer						1		Addition
		Blanket	1pc.	2pcs./year	2	633,476	1	1,266,952	Addition
MP-08	Blood warmer						2		New
		Infusion tube	100pcs./set	200cases/year	2	185,674	2	742,696	New
MP-10	Ventilator (neonate B)			5days/patient：365days÷5days＝73patients			2		Addition
		Humidifier chamber	100pcs./set	1pc./patient：73patients×1pc.÷100pcs./set＝0.73	1	122,873	2	245,745	Addition
		Patient circuit tube set	1set	1set/year	1	1,515,428	2	3,030,855	Addition
		Endotracheal tube set w/o cuff	1set	1set/year	1	368,618	2	737,235	Addition
		Bacteria filter	100pcs./set	1pc./patient：73patients×1pc.÷100pcs./set＝0.73	1	573,405	2	1,146,810	Addition
MP-11	Ventilator (periatric B)						1		Addition
		Patient circuit tube set	1set	1set/year	1	901,065	1	901,065	Addition
		Endotracheal tube set w/o cuff	1set	1set/year	1	458,724	1	458,724	Addition
MP-12	Patient monitor (pediatric, standard)			5days/patient：365days÷5days＝73patients			8		Addition
		Electrode set	150pcs./set	3pcs./patient：73patients×3pcs.÷150pcs./set＝1.46	2	110,585	8	1,769,364	Addition
		Recording paper	20m･10pcs./set	1m/patient：73patients×1m÷200m/set＝0.365	1	38,500	8	308,000	Addition
MP-13	Infant incubator (manual/servo)			5days/patient：365days÷5days＝73patients			13		Addition
		Air micro filter	5pcs./set	Replace 1pc. every 2months：6pcs.÷5pcs.＝1.2	2	91,745	13	2,385,365	Addition
		Adhesive collar	100pcs./set	3pcs./patient：73patients×1pc.÷100pcs./set＝0.73	1	93,929	13	1,221,080	Addition
MP-15	Infusion pump (pediatric)			5days/patient：365days÷5days＝73patients			8		Addition
		Infusion tube	100pcs./set	1pc./patient：73patients×1pc.÷100pcs./set＝0.73	1	185,674	8	1,485,392	Addition
MP-16	Syringe pump (pediatric)			1set/patient, 5days			7		Addition
		Infusion tube	100pcs./pack	73patients÷100pcs./pack＝0.73	1	185,674	7	1,299,718	Addition
		Syringe 10mL	100pcs./pack	100pcs.÷100pcs./pack＝1	1	30,582	7	214,071	Addition
		Syringe 20mL	50pcs./pack	100pcs.÷50pcs./pack＝2	2	19,114	7	267,589	Addition
		Syringe 30mL	50pcs./pack	100pcs.÷50pcs./pack＝2	2	49,149	7	688,086	Addition
		Syringe 50mL	20pcs./pack	60pcs.÷100pcs./pack＝0.6	1	26,213	7	183,490	Addition
MP-17	Bilirubinometer (blood)			10people/day			1		Addition
		Capillary heparinized tube	100pcs./set	365days×10patients÷100pcs./set＝36.5	37	22,117	1	818,331	Addition
		Capillary plain tube	100pcs./set	365days×1pc.÷100pcs./set＝3.65	4	18,436	1	73,745	Addition
		Bilirubin control	5pcs./set		5	573,405	1	2,867,025	Addition
MP-21	Ultrasound machine (pediatric, color doppler, head+abdomen+superficial)			15people/day			1		Addition
		Gel	250mL/pc.	10mL/patient：240patients×15patients×10mL÷250mL/pc.＝192	144	12,779	1	1,840,139	Addition
		Recording paper	300pcs./set	4pcs./patient：240patients×15patients×4pcs.÷300pcs./set＝64	48	35,497	1	1,703,832	Addition
MP-22	Automatic chemistry analyzer			30tests/day			1		Addition
		Reagent set for 960tests	1set	240days×30tests÷960=7.5	8	20,422,076	1	163,376,608	Addition
		Consumables for 960tests	1set	240days×30tests÷960=7.5	8	351,922	1	0	Addition
MP-23	Microtome						1		New
		Spare blade	1000pcs./pack		1	1,669,474	1	1,669,474	New
MP-24	Laparoscope (pediatric)			2people/day			1		New
		CO2 gas	1500L/pc.	Estimated to be 1.5L/min×90min＝135L/patient：	44	65,532	1	2,883,408	New
MP-25	Phototherapy Unit			240days×2patients×135L÷1500L/pc.＝43.2			4		Addition
		Irradiation lamp	1set	1set/year	1	61,436	4	245,745	Addition
MP-28	X-ray machine (fluoroscopy)			8people/day			1		New
		Film for dry imager	100pcs./set	3pcs/patient：240days×8patients/day×3pcs.÷100pcs.＝57.6	58	263,308	1	15,271,839	New
MP-29	CO2 incubator						1		New
		CO2 gas	1500L/pc.	2pcs./year	2	65,532	1	131,064	New
MP-31	Tissue processor						1		New
		Sample block	250pcs./pack	5tests/day：240days×5＝4.8	5	73,724	1	368,618	New
MP-33	Infant incubator (manual)						4		New
		Air micro filter	5pcs./set	Replace 1pc. every 2months：6pcs.÷5pcs.＝1.2	2	94,202	4	753,618	New
MP-34	ECG machine			10people/day			1		Addition
		Electrode cream	100g/pc.	8g/patient：240patients×10patients×8g÷100g/pc.＝192	192	12,287	1	2,359,152	Addition
		Recording paper	20m/pc.	50cm/patient：240patients×10patients×0.5m÷20m/pc.＝60	60	6,149	1	368,945	Addition
							Total	234,527,282	Kyats
							Of Renewal	0	Kyats
							Of Addition/New	234,527,282	Kyats

Operation and Management Cost for the Equipment

Central Women's Hospital in Yangon

Project No.	Requested Equipment	Consumables	Quantity/Unit	Basis for the Calculation of Quantity	Annual Quantity	Unit Price KYS	Planned Quantity	Subtotal KYS	Type
YW-01	Anaesthesia machine with ventilator (adult)			3hours×2times/day			2		Renewal
		CO2 absorber tablets	4.5kg/set	240days×6hours×0.05kg/hour÷4.5kg/set＝16	16	64,713	2	2,070,811	Renewal
		Patient circuit tube set	1set	1set/year	1	491,490	2	982,980	Renewal
		Mask set	1set	1set/year	1	245,745	2	491,490	Renewal
YW-04	Colposcope with monitor			8people/day			1		Renewal
		Color printer paper	200pcs./set	2pcs./patient : 240days×8patients×2pcs.÷300pcs.＝12.8	13	172,022	1	2,236,280	Renewal
YW-07	Infant incubator (manual)						10		Renewal
		Air micro filter	5pcs./set	Replace once in 2months, 6pcs.÷5pcs.＝1.2	2	94,202	10	1,884,045	Renewal
YW-08	Ventilator (neonatal A)			5days/patient : 365days÷5days＝73patients			2		Addition
		Humidifier chamber	100pcs./pack	1pc./patient : 73patients÷100pcs.＝0.73	1	122,873	2	245,745	Addition
		Patient circuit tube set	1set	1set/year	1	1,515,428	2	3,030,855	Addition
		Endotracheal tube set	1set	1set/year	1	368,618	2	737,235	Addition
		Bacteria filter	100pcs./pack	1pc./patient : 73patients÷100pcs.＝0.73	1	573,405	2	1,146,810	Addition
YW-09	Patient monitor (pediatric, standard)			5days/patient : 365days÷5days＝73patients			5		Addition
		Electrode set	150pcs./pack	3pcs./patient : 73patients×3pcs.÷150pcs./set＝1.46	2	110,585	5	1,105,853	Addition
		Recording paper	20m,10pcs./pack	1m/patient : 73patients×1m÷200m/set＝0.365	1	38,500	5	192,500	Addition
YW-10	Urodynamic measuring machine			2people/day, 480cases/year			1		New
		Tube kit for saline injection	25pcs./set	Necessary for all patients, 480cases÷25＝19.2	20	96,307	1	1,926,140	New
		Transducer, CMG	25pcs./set		20	252,321	1	5,046,423	New
		Transducer, rectal pressure	25pcs./set	Estimated that 60% of all examination will examine CMG and rectal pressure,	20	252,321	1	5,046,423	New
		Transducer, UPP	25pcs./set	and 40% of all examination will use all 3 types of transducer	4	252,321	1	1,009,285	New
		Catheter, 2 channnel	10pcs./set	For 2 channel : 480cases×60%＝288cases	29	131,207	1	3,805,003	New
		Catheter, 3 channnel	10pcs./set	For 3 channel : 480cases×40%＝192cases	20	196,810	1	3,936,210	New
		Catheter, Rectal ballon	10pcs./set	Applicable to transducer, rectal pressure	48	153,075	1	7,347,591	New
		EMG electrode set	100pcs./set	400pcs./year, not necessary for all patients	4	481,092	1	1,924,369	New
YW-11	Ventilator (adult)			5days/patient : 365days÷5days＝52.1patients			2		Addition
		Patient circuit tube set	1set	1set/year	1	614,363	2	1,228,725	Addition
		Endotracheal tube set	1set	1set/year	1	688,086	2	1,376,172	Addition
YW-13	Laparoscope (adult)			2people/day, Estimated to be 1.5L/min×90min＝135L/patient :			2		Renewal
		CO2 gas	1500L/pc.	40days×2patients×135L÷1500L/pc.＝43.2	44	65,532	2	5,766,816	Renewal
YW-14	Ultrasound machine (adult, color doppler, abdomen+TV+superficial)			15people/day			1		Addition
		Gel	250mL/pc.	10mL/patient : 240days×15patients×10mL÷250mL＝144	144	12,779	1	1,840,139	Addition
		Recording paper	300pcs./set	2pcs./patient : 240days×15patients×2pcs.÷300pcs.＝24	24	70,993	1	1,703,832	Addition
YW-15	Ultrasound machine (OBGY, abdominal+TV)			15people/day			1		Addition
		Gel	250mL/pc.	10mL/patient : 240days×15patients×10mL÷250mL＝144	144	12,779	1	1,840,139	Addition
		Recording paper	300pcs./set	2pcs./patient : 240days×15patients×2pcs.÷300pcs.＝24	24	35,497	1	851,916	Addition
YW-16	Electrosurgical unit for LEEP						1		Addition
		Electrode set	1set	3sets/year	3	97,567	1	292,700	Addition
		Patient electrode	1pc.	3pcs./year	3	28,186	1	84,558	Addition
							Total	59,151,045	Kyats
						Of Renewal		13,432,422	Kyats
						Of Addition/New		45,718,623	Kyats

Operation and Management Cost for the Equipment

Yangon Children Hospital

Project No.	Requested Equipment	Consumables	Quantity/Unit	Basis for the Calculation of Quantity	Annual Quantity	Unit Price KYS	Planned Quantity	Subtotal KYS	Type
YP-01	Autoclave (horizontal)						2		Addition
		Prefilter element	1set	2sets/year	1	115,996	2	231,992	Addition
		Recording paper	1pc.	15cm/time	3	32,522	2	195,133	Addition
		Ink cartridge for recorder	1pc.	4pcs./year	4	271,019	2	2,168,148	Addition
		Resin for softener	10L/set	1set/year(60L)	6	54,204	2	650,444	Addition
		Salt	25kg/set	1set/month	12	69,381	2	1,665,138	Addition
YP-02	Infusion pump (pediatric)			1set/patient, for 5days, 365days÷5days=73patients			26		Addition
		Infusion tube	100pcs./pack	73patients÷100pcs./pack=0.73	1	185,674	26	4,827,524	Addition
YP-03	Syringe pump (pediatric)			1set/patient, for 5days			24		Addition
		Infusion tube	100pcs./pack	73patients÷100pcs./pack=0.73	1	185,674	24	4,456,176	Addition
		Syringe 10mL	100pcs./pack	100pcs.÷100pcs./pack=1	1	30,582	24	733,958	Addition
		Syringe 20mL	50pcs./pack	100pcs.÷50pcs./pack=2	2	19,114	24	917,448	Addition
		Syringe 30mL	50pcs./pack	100pcs.÷50pcs./pack=2	2	49,149	24	2,359,152	Addition
		Syringe 50mL	20pcs./pack	60pcs.÷100pcs./pack=0.6	1	26,213	24	629,107	Addition
YP-04	X-ray machine (general, digital)			20patients/day, 2pcs.			1		Renewal
		Film	100pcs./pack	240days×20patients/day×2pcs.÷100pcs.=96	96	469,646	1	45,086,016	Renewal
YP-05	X-ray machine (mobile, digital)			8people/day, 2pcs.			1		Renewal
		Film	100pcs./pack	240days×8patients/day×2pcs.÷100pcs.=38.4	39	469,646	1	18,316,194	Renewal
YP-06	Patient monitor (pediatric, standard)			5days/patient : 365days÷5days=73patients			18		Addition
		Electrode set	150pcs./set	3pcs./patient : 73patients×3pcs.÷150pcs./set=1.46	2	110,585	16	3,538,728	Addition
		Recording paper	20m･10pcs./set	1m/patient : 73patients×1m÷200m/set=0.365	1	38,500	16	616,001	Addition
YP-07	Patient monitor (pediatric, ETCO2)			5days/patient : 365days÷5days=73patients			5		Addition
		Electrode set	150pcs./set	3pcs./patient : 73patients×3pcs.÷150pcs./set=1.46	2	110,585	5	1,105,853	Addition
		Nasal-oral adapter	30pcs./set	Used for 15% of all patients : 73patients×20%=14.6patients	1	417,767	5	2,088,833	Addition
		Air way adapter	30pcs./set	Used for 15% of all patients : 73patients×20%=14.6patients	1	294,894	5	1,474,470	Addition
		Recording paper	20m･10pcs./set	1m/patient : 73patients×1m÷200m/set=0.365	1	38,500	5	192,500	Addition
YP-08	Electrophoresis (hemoglobin)						1		Renewal
		Reagent set	1set	For 3000 tests	1	4,084,828	1	4,084,828	Renewal
		Recording paper	5pcs./set		1	1,310,640	1	1,310,640	Renewal
YP-09	Patient warmer						4		Renewal
		Blanket	1pc.	2pcs./year	2	633,476	4	5,067,808	Renewal
YP-11	Patient monitor (pediatric, Multi Gas+IBP+CVP)			1people/day			4		Renewal
		Electrode set	150pcs./set	3pcs./patient : 240days×1patient×3pcs.÷150pcs./set=4.8	5	110,585	4	2,211,705	Renewal
		IBP transducer	1pc.	1pc./year	1	1,810,322	4	7,241,286	Renewal
		IBP dome kit	5pcs./set	Used for 10% of all patients : 240patients×10%=24patients	10	245,745	4	9,829,800	Renewal
		Swan-Ganz catheter, 5Fr	5pcs./set	Used for 10% of all patients : 240patients×10%=24patients	10	1,875,854	4	75,034,140	Renewal
		Recording paper	20m･10pcs./set	1m/patient : 240patients×1m÷200m=1.2	2	38,500	4	308,000	Renewal
		Water trap	12pcs./set	Used for 10% of all patients : 240patients×10%=24patients	2	294,894	4	2,359,152	Renewal
		T-piece (straight & elbow)	25pcs./set	Used for 10% of all patients : 240patients×10%=24patients	1	184,309	4	737,235	Renewal
		Sampling Line	25pcs./set	Used for 10% of all patients : 240patients×10%=24patients	1	184,309	4	737,235	Renewal
YP-12	Ventilator (pediatric A)						3		Addition
		Patient circuit tube set	1set	1set/year	1	901,065	3	2,703,195	Addition
		Endotracheal tube set w/o cuff	1set	1set/year	1	458,724	3	1,376,172	Addition
YP-13	EEG machine			5people/day			1		Addition
		EEG paste	180g	15g/patient : 240days×5patients×15g÷200g=90	90	16,383	1	1,474,470	Addition
		Recording paper A4	500pcs./pack	5pcs./patient : 240days×5patients×5pcs.÷500pcs./pack=12	12	6,007	1	72,085	Addition
YP-14	Ultrasound machine (pediatric, color doppler, head+abdomen+superficial)			(4people/day, neonatal)			1		Addition
		Gel	250mL/pc.	10mL/patient : 240days×4patients×10mL÷250mL/pc.=38.4	39	12,779	1	498,371	Addition
		Recording paper	300pcs./set	2pcs./patient : 240days×4patients×2pcs.÷300pcs./set=6.4	7	35,497	1	248,476	Addition
YP-15	Ultrasound machine (pediatric, color doppler, insertion)			(8people/day, operation theater)			1		Addition
		Gel	250mL/pc.	10mL/patient : 240days×8patients×10mL÷250mL/pc.=76.8	77	12,779	1	983,963	Addition
		Recording paper	300pcs./set		13	35,497	1	461,455	Addition
YP-16	ECG machine (holter)						1		New
		Electrode set, pediatric	150pcs./set	3pcs./patient : 200patients×3pcs.÷150pcs./set=4	4	176,936	1	707,746	New
		Recording paper A4	500pcs./pack		2	6,007	1	12,014	New
YP-17	Hemodialysis machine (pediatric)						1		Addition
		Consumables set for neonate	1set	10% of all patients, 480×0.1=48	48	29,526	1	1,417,248	Addition
		Consumables set for infant	1set	15% of all patients, 480×0.15=72	72	29,526	1	2,125,872	Addition
		Consumables set for child	1set	75% of all patients, 480×0.75=360	360	29,526	1	10,629,360	Addition
YP-18	Anaesthesia machine with ventilator (pediatric)			3hours×2times/day			3		Addition
		CO2 absorber tablets	4.5kg/set	240days×6hours×0.05kg/hour÷4.5kg/set=16	16	64,713	3	3,106,217	Addition
		Patient circuit set	1set	1set/year	1	573,405	3	1,720,215	Addition
		Mask set	1set	1set/year	1	245,745	3	737,235	Addition
YP-19	Bronchoscope (pediatric, flexible)			2people/day			1		New
		Recording paper	300pcs./set	4pcs./patient : 240days×2patients×4pcs.÷300pcs./set=6.4	7	697,203	1	4,880,422	New
YP-21	Ventilator (neonatal A)			5days/patient : 365days÷5days=73patients			1		New
		Humidifier chamber	100pcs./set	1pc./patient : 73patients×1pcs.÷100pcs./set=0.73	1	122,873	1	122,873	New
		Patient circuit tube set	1set	1set/year	1	1,515,428	1	1,515,428	New
		Endotracheal tube set	1set	1set/year	1	368,618	1	368,618	New
		Bacteria filter	100pcs./set	1pc./patient : 73patients×1pcs.÷100pcs./set=0.73	1	573,405	1	573,405	New
YP-23	Defibrillator (pediatric)			100cases/year			2		Renewal
		Electrode set (for monitor)	150pcs./set	3pcs./patient : 100patients×3pcs.÷150pcs./set= 2	2	110,585	2	442,341	Renewal
		Gel	100g/pc.	10g/patient : 100patients×10g÷100g/set=3	3	4,096	2	24,575	Renewal
		Recording paper	20m･10pcs./set	1m/patient : 100patients×1m÷200m/set=3	3	28,255	2	169,531	Renewal
YP-25	Ultrasound therapy machine			10people/day			1		New
		Gel	250mL/pcs.	5mL/patient : 240days×10patients×5mL÷250mL/pc.=48	48	12,779	1	613,380	New
YP-26	Paraffin bath for therapy						1		New
		Solid paraffin	1kg	10kg/year	10	92,837	1	928,370	New
		Liquid paraffin	250cc/pc.	Shall be replaced once in 3months	4	14,199	1	56,794	New
YP-28	Spirometer			10people/day			1		New
		Mouth piece	100pcs./box	1pc./patient : 240days×10patients÷100pcs./pack=24	24	11,468	1	275,234	New
		Recording paper	20m･10pcs./box	50cm/patient : 240days×10patients×0.5m÷200m/box=6	6	57,341	1	344,043	New
YP-30	Blood warmer						4		Addition
		Infusion tube	100pcs./pack	200pcs.	2	185,674	4	1,485,392	Addition
YP-32	ECG machine			15people/day			1		Addition
		ECG cream	100g/pc.	5g/patient : 240days×15patients×5g÷100g/pc.=180	180	12,287	1	2,211,705	Addition
		Recording paper	20m･10pcs./set	50cm/patient : 240days×15patients×0.5m÷200m/set=9	9	61,436	1	552,926	Addition
							In Yen	22,249,934	Yen
							Total	243,013,775	Kyats
						Of Renewal		172,960,486	Kyats
						Of Addition/New		70,053,289	Kyats

10. Soft Component (Technical Assistance) Plan

Soft Component Plan

1. Background of Soft Component

All medical equipment of public hospitals in Myanmar is under the control of the Central Medical Store Depot (CMSD), and maintained by the Technical Department of CMSD. The Technical Department has seven electronic or mechanical engineers, who are working in Yangon, and they also provide technical services in rural areas for business trip as necessary. Though all medical equipment is under the control of CMSD, in fact the equipment is maintained not by the CMSD but by each hospital. There is a contact office of CMSD in Mandalay, however practical maintenance service is not provided from this office.

While each hospital has a Maintenance Department providing maintenance service by its engineers including building, the electric facility and the air system, very few hospitals have Bio-medical Engineers (hereinafter referred to as "BME") specializing in medical equipment.

The maintenance service of five target hospitals of this Project (Mandalay General Hospital, Central Women's Hospital in Mandalay, Mandalay Children Hospital, Central Women's Hospital in Yangon and Yangon Children Hospital) is dealt by the Maintenance Department of each hospital, however only Mandalay General Hospital and Central Women's Hospital in Yangon assign BME.

The specializations of engineers in both CMSD and hospitals are electronic or mechanical engineering, so that regarding medical equipment, the engineers inspect and repair within their technical ability. At the hospitals not allocating BME, administrators including hospital director and deputy director ask CMSD or local agents to inspect or repair the equipment.

Recognized the scarcity and the necessity of engineers who have knowledge about medical equipment (BME), Health Directorate of MOH provided the training for the engineers in CMSD and hospitals in October 2012, to improve their technical and management skills. In case of hiring a new engineer, engineers those who finished Bio-medical course will be qualified, and also the Health Directorate is planning to set up Bio-medical Division in Technical Department in CMSD.

JICA senior volunteer staffs will be sent to Myanmar since around December, 2012, planning to work mainly at Yangon General Hospital and New Yangon General Hospital in the area of equipment maintenance. These staffs will not work directly with the target hospitals of this project.

In order to utilize the medical equipment to be procured under this cooperation Project for long period, it is necessary and significant to clarify the maintenance system of CMSD and each hospital, and arrange training medical equipment maintenance.

2. Objectives of Soft Component

I. CMSD

Standardized format on medical equipment maintenance will be developed and shared among target hospitals, and CMSD will be able to make a new format as necessary. CMSD will expand the capacity of manageable medical equipment, and will be able to instruct and supervise appropriate medical equipment maintenance at target hospitals.

II. Each Target Hospital

Maintenance system of medical equipment will be set under the person in charge of each hospital. Standardized format on medical equipment maintenance will be shared between CMSD and each target hospitals, and the daily maintenance service will be implemented appropriately using the shared format. Annual procurement plans of spare parts and consumables will be formulated by each hospital, and maintenance activity of medical equipment will be recognized as an important activity for hospital operation and management. Also, each target hospital will be able to instruct the daily inspection of medical equipment for the operators.

3. Goals of Soft Component

I. CMSD

- CMSD instructs and supervises appropriate medical equipment maintenance for target hospitals.
- CMSD develops, utilizes and introduces the standardized format to target hospitals.

II. Each Target Hospital

- Each target hospital clarifies the system, scope of service, and responsibility of medical equipment maintenance under the person in charge of maintenance.
- Each target hospital implements appropriate daily maintenance using the shared format among target hospitals.
- Each target hospital develops annual procurement plans of spare parts and consumables by their own, using register books shared among target hospitals.

4. Confirmation Methods of Achieved Goals

I. CMSD

- Number of repair work.
- The number and contents of circular instruction on medical equipment maintenance of target hospitals.
- Facts that CMSD created and introduced formats as necessary.

II. Each Target Hospital

- Existence of person in charge of the medical equipment maintenance, clarified maintenance system of medical equipment, and scope of work and responsibility.
- Whether the shared format of daily maintenance service is used or not.
- Annual procurement plans of spare parts and consumables using the register book shared among target hospitals.

5. Activities of Soft Component (Input Plan)

Activities of the soft component will be implemented under the following three sessions.

	Time Schedule	Objectives
Session 1	Starts around 2.5 months before the commencement of installation of medical equipment, and complete by the commencement of installation.	Before the procurement of medical equipment, the Consultant will prepare common equipment register book among target hospitals, provide daily maintenance sheet and standardized format, and simulate the operation of these sheets and formats.
Session 2	Starts around 1 month after the completion of the installation of medical equipment.	Maintenance of equipment will be implemented using the daily maintenance sheet and standardized format provided in session 1. Instructions on improving methods of problems will be provided during the maintenance service.
Session 3	Starts around 6 months after the completion of the installation of medical equipment.	Review of maintenance methods using daily maintenance sheet and standardized format. Instruction of improving methods of problems will be provided during the maintenance service. Instructions on how to make procurement plans of spare parts and consumables using equipment register book.

The target group will be composed of an engineer from CMSD, person in charge of medical equipment maintenance (engineer or technician level) of each target hospital (Mandalay General Hospital, Central Women's Hospital in Mandalay, Mandalay Children Hospital, Central Women's Hospital in Yangon, Yangon Children Hospital), as well as medical superintendent of each hospital. Especially for engineers in charge of medical equipment maintenance at each hospital, it is preferable that the engineers have finished the BME training course implemented by MOH. In cases where engineers are not allocated at the moment, the target hospitals are expected to select a person in charge in prior to the implementation of the sessions. This soft component will be implemented in both Yangon and Mandalay.

1) Pre-work in Japan

Before the commencement of service in Myanmar, the Consultant will select equipment to be inspected by operators and make a list of inspection items during the pre-work in Japan. As medical equipment to be procured by suppliers is determined, the Consultant will make a plan of operation and maintenance manual before shipping. At the same time, the Consultant will also check whether each hospital in Myanmar already has a person in charge of maintenance.

2) Session 1

I. Ministry of Health, CMSD

At first, the Consultant will explain the idea of this project and confirm the schedule at the MOH in Nay Pyi Taw. Then, a meeting will be held between the Consultant and the instructors of the BME training course held on October, 2012, to review the contents of the training and verify the technical and

knowledge level of the participants, and to confirm the terms which shall be reflected on the activities of soft component.

Secondly, the Consultant will explain the idea of this Project and confirm the schedule to the person in charge of medical equipment of CMSD in Yangon. Then, the Consultant will instruct the review of the BME training, management methods of maintenance service of medical equipment implemented by target hospitals, announcement of maintenance service between CMSD and each target hospitals, and work processes. Names of equipment used at each hospital will be standardized with the consent of each hospital. The Consultant will instruct individually the maintenance methods of medical equipment to be procured in this Project according to the four fields below, and provide advice on the cooperation with manufacturers' local agents.

- Medical equipment in operating room (anesthesia machine, patient monitor, ventilator, autoclave etc.)
- Diagnostic imaging equipment (X-ray machine, ultrasound machine)
- Laboratory equipment (chemistry analyzer, spectrophotometer etc.)
- Endoscope (laparoscope, gastroscope, hystereoscope, colposcope etc.)

II. Target Hospitals

The activity process at each target hospitals in Session 1 is listed below.

① The Consultant will check the handwritten equipment register books currently in use, and verify the current storage condition and recording method. Then, the Consultant will select items to be inputted to a database of equipment register book and assist creation of the database. The items of equipment register book shall be name of equipment, name of manufacturer, name of agency, the contact address and the person in charge, manufacturing date, serial number, name of spare parts and consumables, and the frequency of their replacement. The data for equipment to be procured in this project will also be included in the database.

② Since equipment names written in the equipment register book are not standardized among hospitals, the Consultant will instruct to standardize equipment names among each target hospitals and CMSD.

③ The Consultant will instruct to improve the problems that are found from current daily inspection service. Then, the Consultant will develop the daily maintenance sheet of each equipment inputted in the equipment register book, in a standardized format among target hospitals.

④ The Consultant will instruct to improve the problems that are found from current format of maintenance service used at each hospital. Then, the Consultant will develop a standardized format for target hospitals (Report of newly procured equipment, Report of disposed equipment,

Repair request form, Repair status report, Repair completion report, Request form for purchase of equipment, spare parts and consumables) in which the above-mentioned problems has been resolved.

⑤ The Consultant will simulate the inspection service using daily maintenance sheet, and maintenance service using standardized format to complete the Session 1. Additionally, the Consultant will instruct that inspection service shall be implemented using daily maintenance sheet by equipment operators, under the person in charge of maintenance, before the commencement of Session 2.

⑥ The Consultant will report the result and lessons learnt of the first session to the medical superintendent of each target hospital, and consult the coping strategy with the medical superintendent. Also, the Consultant will describe the operation of the second session, and review the lessons learnt before the second session starts.

Two Japanese Consultants will be in charge of instructions to be implemented at MOH, CMSD, and a hospital which the soft component shall be implemented first. Then, those two Consultants will instruct separately in Yangon and Mandalay. Following this way, the contents of instructions among all target hospitals will be equalized. Also for instruction in Mandalay, CMSD personnel from Yangon who is in charge of medical equipment will attend to the instruction in Mandalay, and assist the reinforcement of the cooperation with CMSD and each target hospital in Mandalay.

3) Session 2

I. CMSD

After reviewing the session 1 and explaining the idea of this project, a Consultant will assist in making a centralized management tool of the maintenance service for each target hospital, for CMSD. Then, the Consultant will simulate using the centralized management tool and assist in managing the system in target hospitals as necessary.

II. Target Hospitals

Activity process at each target hospitals in Session 2 is listed below.

① The Consultant will review inspection service using daily maintenance sheet written from the time of the completion of equipment installation, and list up problems that are found from the review. Then, the Consultant will inform the improving points after checking the usage condition of standardized format.

② After listing up the problems, the Consultant will simulate the inspection service and services using the standardized format with instructors.

③ The Consultant will assist in making the procurement plan of spare parts and consumables on the basis of equipment register book made in Session 1. The procurement plan of spare parts and consumables of selected equipment shall be made in 6 months basis based on the equipment register book.

④ The Consultant will report the result and lessons learnt of the second session to the medical superintendent of each target hospital, and consult the coping strategy with the medical superintendent. Guidance on hospital operation and management for medical superintendent will also be provided. Plus, the Consultant will describe the operation of the third session, and review the lessons learnt before the third session starts.

One Japanese Consultant will be in charge of Session 2 and Session 3. The Consultant will ask CMSD personnel in Yangon, to attend and assist the instruction held in Mandalay as well as Session 1.

4) Session 3

I. Ministry of Health, CMSD

The Consultant will explain the background and processes of the Project, check the condition of equipment that are be procured around 6 months ago, and confirm the schedule at the MOH in Nay Pyi Taw. Then, the Consultant will explain CMSD the procurement plan of spare parts and consumables to be made by each target hospital. The Consultant will also instruct the improvement method of the problems that are found from the standardized format sent from target hospitals.

II. Target Hospitals

Activity process at each target hospitals in session 3 is listed below.

① The Consultant will instruct to improve the problems that are found from the review of inspection service and usage condition of standardized format, using daily maintenance sheet recorded for around six months. Then, the Consultant will simulate the inspection methods reflected the improving methods.

② The Consultant will instruct to improve the problems that are found from the review of procurement plan of spare parts and consumables of equipment selected by the consultant. Then, the Consultant will instruct to make the above-mentioned plan of the other items, to complete the project.

③ The Consultant will report the result and lessons learnt of the third session to the medical superintendent of each target hospital, and consult the future maintenance activity with the medical superintendent. Supplementary guidance on hospital operation and management for medical

superintendent will also be provided. Also, the Consultant will report and describe the reports (daily inspection sheet and other forms) developed through this Soft Component to the medical superintendent of each target hospital, and request to share the reports among the hospital workers as a tool for better medical equipment maintenance.

Explanation of the operation by the Supplier at installation, and the scope of service of soft component are as listed below.

Facilities	Target person	Contents	Consultant	Supplier
CMSD	Engineers	Maintenance methods	○	−
Hospital	Equipment Operators	Explanation of the operation of equipment at installation	−	○
	Engineers etc.	Maintenance methods	○	−

6. Procurement Methods of Implementation Resources of Soft Component

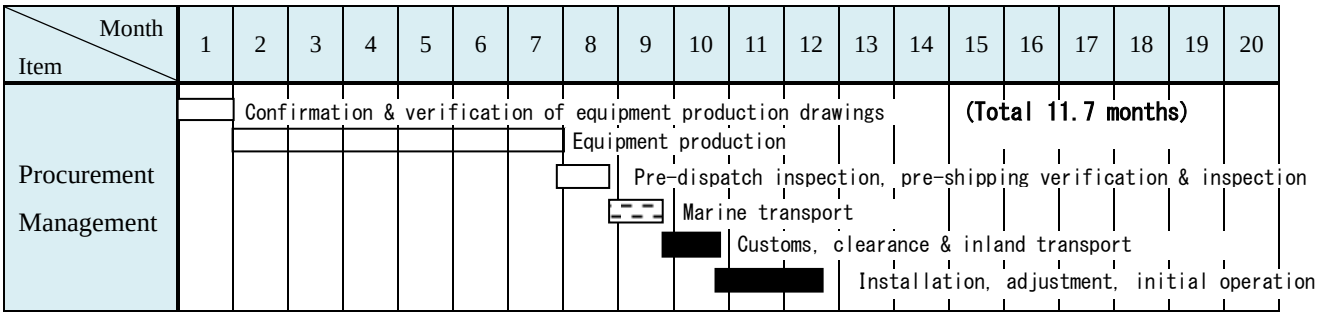
It is hard to procure human resources in Myanmar, who have great knowledge about medical equipment of hospitals and who are possible to teach maintenance methods. Currently there is no Japanese or international NGO working in this field in Myanmar, and recommission of the work is also difficult. Therefore, human resources to be supplied as instructors shall be Japanese technical consultants who have enough knowledge and experiences in the field of medical equipment maintenance and who also have similar experiences of the instruction for Projects in English speaking countries.

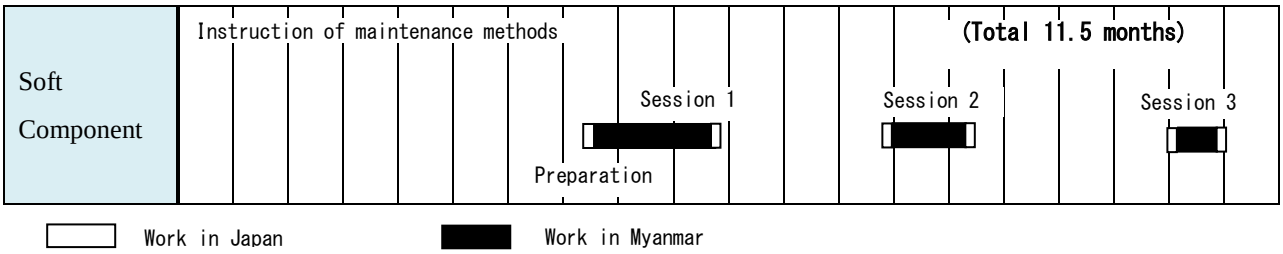
7. Implementation Schedule of Soft Component

Due to the maximum duration of stay in Myanmar for business visa is 70 days, Session 1 will be implemented by two Japanese consultants. In Session 2 and 3, one consultant will be in charge. It is premised that working hours shall be 8 hours per day, 5 days per week, following the employment system in Myanmar.

Session 1 will start around 2 month before the commencement of installation and will take around 2.3 months until the completion of installation, shown in the figure below. Session 2 will start around 1 month after the completion of installation, and will take around 1.4 months. Session 3 will start around 6 months after the completion of installation and will take around 0.9 months. It will take around 11.5 months from the commencement to the completion of soft component.

Work Implementation Schedule of Soft Component (Tentative)





8. Output of Soft Component

① Completion report of soft component
② Centralized management tool for CMSD
③ Equipment register book
④ Daily maintenance sheet
⑤ Standardized format

9. Obligations of the Myanmar side

As a prerequisite of this soft component, MOH is necessary to assist Japanese Consultants in taking visa which is valid for 10 weeks. Also, MOH is expected to allocate the participants of the BME training held in October 2012, to each target hospital and encourage them to participate in this soft component.

In order to keep producing the effects for a long period, it is preferable that MOH actively trains and allocates BME to major hospitals in Myanmar. For the future progressing operation, each maintenance document made for this soft component shall be revised timely and the contents of medical equipment shall be renewed as necessary.

11. References

References

No.	Name	Format	Original / Copy	Issuing Organization	Year of Issue
1	The State of the World's Children 2011	Book	Copy	UNICEF	2011
2	The Present State of Healthcare in the Republic of the Union of Myanmar	Book	Copy	National Center for Global Health and Medicine	2011
3	Annual Hospital Statistics Report 2009	Book	Copy	Department of Health Planning	2009
4	Health in Myanmar 2011	Book	Copy	MOH	2011
5	Hospital Management Manual	Book	Original	MOH	2011
6	Myanmar Health Statistics 2010	Book	Copy	MOH	2010
7	National Health Plan 2006-2011	Book	Copy	MOH	-
8	OECD Health Data 2012	Book	Copy	OECD	2012
9	1000 Bedded Mandalay General Hospital Profile 2012	Brochure	Original	Mandalay General Hospital	2012
10	Mandalay General Hospital Annual Statistical Report 2011	Book	Original	Mandalay General Hospital	2011
11	Mandalay General Hospital Annual Statistical Report 2010	Book	Original	Mandalay General Hospital	2010
12	Mandalay General Hospital Annual Statistical Report 2009	Book	Original	Mandalay General Hospital	2009
13	Mandalay General Hospital Annual Statistical Report 2008	Book	Original	Mandalay General Hospital	2008
14	Mandalay General Hospital Annual Statistical Report 2007	Book	Original	Mandalay General Hospital	2007
15	300 Bedded Mandalay Central Women Hospital Profile 2012	Brochure	Original	Central Women's Hospital in Mandalay	2012
16	Central Women's Hospital (Mandalay)	Book	Original	Central Women's Hospital in Mandalay	2012
17	University of Medicine, Central Women's Hospital, Vital Statistics 2011	Book	Original	Central Women's Hospital in Mandalay	2011
18	Central Women's Hospital (Yangon) 2012	Brochure	Original	Central Women's Hospital in Mandalay	2012
19	(550) Bedded Yangon Children Hospital (Teaching Hospital) 2011 - Basic Facts	Brochure	Original	Yangon Children Hospital	2011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