Academic Department.....74

	Professor	Lecturer	Assistant Lecturer	Instructor	Assistant	Officer	Engineer	Assistant Engineer
Internal Medicine	1	1	2	2	3	5		
Surgery	1	1	2	2	3	5		
Obstetrics& Gynaecology	1	1	2	2	3	5		
Paediatrics	1	1	2	2	3	5		
Projection							4	2
Photography							2	2
Publicity							2	2
Library							2(Librarian)	2 (Asst.Librarian)
Total	4	4	8	8	12	20	10	8

The quality of the personnel is a critical factor for the success of the Project. In full recognition of this fact, the Department of Health, having control over the nation's medical personnel, is determined to exercise its right of personnel management, which is supported by the national constitution, to provide personnel of high quality for the Hospital.

At present in Burma, there are 5,223 doctors whose places of service are officially appointed and who are working at their assigned public hospitals. Among them, there are many who would like to work in a large city such as Rangoon or Mandalay. Also, among the 4,808 licensed doctors who are not in a public position, there are many who desire to work for a hospital in Rangoon or Mandalay. Therefore, the recruitment of new staff members for the Hospital, except for special paramedics, should present no problem, either qualitatively or quantitatively.

3-3-2 Medical plan

Medical activities of the Mandalay Teaching Hospital are to be executed in the departments mentioned in Table 3-1. Medical plan for each department and each division is as follows:

Table 3-1 Constitution of medical department

Departemt	Division, Section
(1) Outpatient Department	1) Outpatient Division 2) Emergency Division
(2) Central Diagnosis & Treatment Department	1) Medical Laboratory Division 2) Diagnostic Division 3) X-ray Division 4) Operation Division 5) Delivery Division 6) ICU·CCU Division 7) Central Sterilizing Supply Division 8) Blood Bank Division 9) Physiotherapy Division 10) Forensic Medicine Division 11) Mortuary Division
(3) Ward Department	1) Internal Medicine Ward Division 2) Surgery Ward Division 3) Obstetrics and Gynaecology Ward Division 4) Paediatrics Ward Division
(4) Medical Administration Department	1) Personnel Section 2) Information Section 3) Patient Record Section 4) Supply and Pharmacy Section 5) Repair Section
(5) Administration & Service Department	1) Accounts Section 2) General Affairs Section 3) Meal Section 4) Laundry Section 5) Cleaning Section 6) Maintenance Section

(1) Outpatient Department

1) Outpatient Division

Every new patient from other medical facilities under the referral system comes to the reception office, to be sent to a specific

examination room according to his/her disease. A doctor in the examination room diagnoses the disease, based on the preliminary examination of the lower level medical facility, observing the patient's mental and physical conditions and through the patient's responses to questions. In internal medicine, simple examination instruments such as stethoscopes and thermometers are first used to efficiently collect data on the condition of the disease. The doctor also pays attention to the patient's manner of walking, general appearance, skin color, abnormal swelling, breath smell, decline in hearing ability, sweating and so on. Then the doctor decides, based on his long experience and the patient's medical record, how to deal with the case and to give treatment.

In surgery, causes of external injury, contusion, laceration or fracture and the extent thereof are examined for both children and adults. For patients with minor injuries who can be treated as outpatients, except for emergency cases, simple surgical implements (i.e., for stitching up, removing stitches, etc.) or tourniquets are used. A patient who is instructed by the doctor to undergo instillation after the outpatient examination, receives such treatment in a treatment room. Also a patient who needs a blood test has his/her blood collected in the central treatment room. The blood taken in the room is transferred to the Medical Laboratory Division.

In obstetrics and gynaecology, medical activities are performed in the following manner. Any pregnant woman needs monitoring and assistance from a doctor or a midwife even in case of normal pregnancy when pregnancy progresses and she begins to feel her fetus move in her abdomen. Any abnormality during the pregnancy period must be dealt with as an obstetrical case. Troubles in the digestive system or in the kidneys are especially serious. If the mother's health is in danger, interrupted pregnancy must be chosen. Complications involved in pregnancy such as extrauterine pregnancy, premature delivery, miscarriage, contracted pelvis and fetus malposition must be discovered at an early stage and the necessary steps taken to assure the mother's and the expected child's safety. Gynaecological examination tables, gynaecological examination units and colposcopes for internal examinations are effective instruments for correct diagnosis and

treatment of such gynaecological diseases as trichomoniasis, uterine retroflexion, endometritis, hysteromyoma, uterine cancer, etc. and to better diagnostic ability. An early diagnosis of premature delivery and miscarriage is performed by means of a 3-channel electrocardiograph and doppler fetus detector, in the examination of functions of the mother's heart and the fetus heart. Ultrasound diagnosis equipment is provided to examine any presence of extrauterine pregnancy or malposition of the expected baby. This equipment is presently regarded as the most effective and safest instrument of this sort, and is widely in use in the leading hospitals in Burma with little problem in handling.

In paediatrics of the Outpatient Department, examinations are executed mainly in cases of high fever, convulsive attacks, loss of consciousness, acute respiratory insufficiency, vomiting, diarrhea, swallowing things by accident, external injuries, and burns. These patients are often carried into the Emergency Division as emergency cases. "Pyrexia of unknown origin" ranks first in the statistics on morbidity in Burma. Anxious parents bring their children to hospital day and night complaining of fever attacks to which children are easily susceptible. In most cases no particular emergency treatment is necessary, however a sudden worsening in their conditions should be expected at any time. In the case of a fever attack, identification and treatment of the original disease are most important.

Table 3-2 Causes of fever attacks

① Infection Disease	Bacterial, Viral, Others
② Allergic Illness and Collagen Disease	
③ Blood or Neoplastic Illness	Leukemia, Neuroblastoma
④ Dehydration	Infant Diarrhea, Diabetes Insipidus
⑤ Immunoreaction	Fever Attack after taking Vaccination
⑥ Supraneural Disturbance	Bleeding, Inflammation, Nuclear Jaundice, Acute Encephalosis
⑦ High Environmental Temperature	Over-warming, Summer Fever
⑧ Others	

Children are attacked with fever from various causes, as shown in Table3-2. In most cases their fever results from infection especially

a "cold syndrome" among others. A "cold syndrome", however, is sometimes difficult to diagnose due to lack of scientific knowledge on the early stage of the fever. "Pyrexia of unknown origin" in the disease statistics of Burma may come under this category. In identifying an original disease, it is necessary to examine hemogram and erythrocyte sedimentation rate in the Outpatient Division. Data on urinalysis, chest radiography, marrow juice examinations, etc. must be obtained as quickly as possible through liaison with the Central Diagnosis and Treatment Department (the Medical Laboratory Division and the X-ray Division, among others) to better ability to make diagnosis on children whose conditions are changeable, unlike adults, and to expedite diagnosis and treatment.

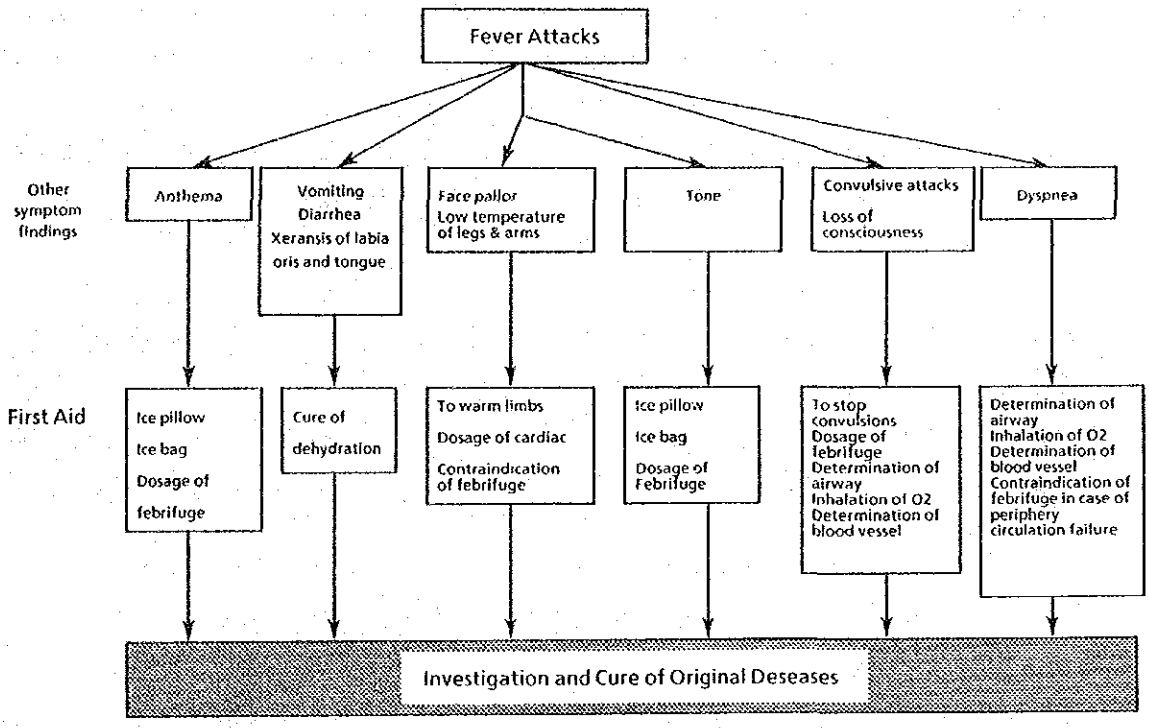


Fig.3-2 Early steps in dealing with a fever attack

Tablets, liquid medicines and ointments should be kept in the dispensary according to their classification. The administration of these medicines to outpatients must be made in accordance with prescriptions from the doctors.

2) Emergency Division

Emergency medical care covers diseases of a very wide scope, including light cases such as a slight cut and fever attack, as well as severe cases such as cardiac arrest from myocardiac infarction and respiratory standstill from airway obstruction. It is not too much to say that in serious cases resulting in acute troubles in respiration or circulation, patients' lives depend on whether or not proper first aid is given. The Emergency Division will have a basic emergency system capable of providing quick and proper first aid whenever it receives a serious patient whose life is endangered.

It is important to ascertain four vital signs (consciousness, respiration, pulse and blood pressure) as soon as possible, when an emergency patient, especially a serious patient, is carried in. In ascertaining these signs, a sphygmomanometer and a stethoscope are used as well as palpation to determine the patient's condition. An unconscious patient is given treatment according to the procedure of cardiopulmonary resuscitation. The most pressing case is a situation where respiration or heart is arrested.
A large number of persons including doctors, nurses and paramedical staff, and a large quantity of medical equipment and first-aid medicines are necessary in order to effectively execute cardiopulmonary resuscitation. For patients who need not immediately undergo such treatment, an appropriate method of treatment and examination is selected.

- To determine venous ways and begin instillation.
- To begin diagnosis by examining the vital signs and to perform necessary examinations and treatment as well as to get the patient's past medical record.
- To put an electrocardiograph monitor on the patient to determine the condition of heart functions.
- To quickly examine any abnormality in the organs, fractures, position where any foreign matter is found, through simple radiography to draw up a treatment plan.

- In a blood test, to examine the patient's blood type and to execute a cross matching and examine the number of red corpuscles, the number of white corpuscles, the quantity of hemoglobin, hematocrit value and so on.
- To select appropriate examination items according to the patient's condition to execute emergency clinical chemical examinations using a blood chemistry analyzer and an Sodium-Potassium-Chlor analyzer.
- To execute blood gas analysis on oxygen partial pressure (PaO2), carbon dioxide partial pressure (PaCO2), pH value, etc. as well as acid-base balance analysis.

It is planned that examination rooms and operation rooms be equipped with operating light, universal operating table, anesthesia apparatus, suction apparatuses, electro-surgical units, and surgical operating instrument sets. A defibrillator will be installed in order to cope with the case of ventricular fibrillation, ventricular flutter or ventricular tachycardia in the patient.

It is also necessary to plan measures for neonatal emergency cases. Since severe cases are most likely to suffer from polypnea, apnea, neonatal monitors will be installed to monitor neonate breathing, heart beat and electrocardiogram. Further, infant incubators will be installed to control temperature, to shut off outside air and to supply oxygen, because immature or premature babies generally have a low temperature, are weak in immunity and resistance to germs, or sometimes need oxygen supply on account of arrested development of the respiratory organs.

(2) Central Diagnosis & Treatment Department

1) Medical Laboratory Division

Activities of the Medical Laboratory Division of the Teaching Hospital are classified into biochemical examinations, blood tests, bacteriological examinations and pathological examinations. General examinations (urinalysis and stool test) are important to determine the general condition of the patients' health. Of these, urinalysis will be included in the biochemical examinations, while stool test in the bacteriological examinations. A serum test is executed as part of the blood tests.

1)-1 Biochemical examinations and blood tests

Specimen blood collected in the Outpatient Department, the Central Diagnosis and Treatment Department and Ward Department is received at the reception counter of the Medical Laboratory Division. The specimen is centrifuged into form and formless constituents then is preserved for examination at any time. Examinations on blood gases in serums such as oxygen and carbon dioxide, on organic substances such as glucose and lipid, and on inorganic substances such as sodium and potassium are included in the biochemical examinations. Red corpuscles, white corpuscles, platelets, etc., which are blood constituents with form, are dealt with in blood tests. Blood plasma or serum, which is a formless blood constituent, is dealt with in serum examination to examine blood type or antibodies generated against germ infections.

● Biochemical examination

A biochemical examination deals with the examination of blood plasma. The biochemical examinations frequently used in daily diagnosis are classified as follows:

1. Nonprotein nitrogen constituents examination
2. Serum protein examination
3. Serum bilirubin examination
4. Serum lipid examination
5. Serum oxygen examination
6. Blood sugar examination
7. Serum electrolyte examination
8. Serum iron examination
9. Examination of medicine concentration in blood

10. Examination of substances existing in blood in extremely small quantities such as hormones.

11. Examination of blood gases

As a special case of the Teaching Hospital, urinalysis, which is ordinarily executed in the area of general examination, is handled by the Medical Laboratories Division. Urine specific gravity, pH value, any presence of urobilinogen, protein, sugar, occult blood, etc. are examined.

Considerable automation has been introduced in these examinations, making it possible to obtain exact value easily and quickly. Major general hospitals in Burma have introduced automatic biochemical analysis systems, automatic electrolyte analyzers (Na, K and Cl) and blood gas analyzers for use in normal routine work. Major mechanical troubles have seldom occured with these systems and apparatus except for minor ones resulting from mishandling in the early stage of introduction. However, the operation of these systems and apparatuses was obliged to stop occasionally due to an insufficient supply of necessary reagents. The situation of reagent supplies must therefore be taken into account when contemplating the installation of medical equipment requiring reagent.

- Blood tests

The purpose of blood test covers a wide range. The test is executed mainly in order to judge for any presence of anemia and its type, any presence of inflammatory poisoning, any presence of hemorrhagic diathesis and its type, and any presence of leukaemia and its type. The test is designed for such diseases as secondary anemia from chronic infection, chronic myelocytic leukaemia, pernicious anemia, acute hepatitis and so on.

Hemocytes, the number of red corpuscles, the quantity of hemoglobin, the number of white corpuscles and the number of platelets are calculated per square milimeter by means of general hemocyte calculation. Stained smears are prepared to be microscopically

examined on hemogram.
The test consists of the following items:

1. Hemocyte calculation

2. Smear examination (hemogram examination)

At least two units of hemocyte calculators are necessary for routine work in the hemocyte examination. Thomas hemocytometers are considered to be most suitable for the teaching of basic skill to medical students, interns and laboratory staff. Blood smearing instruments and slide warmers will be adopted for the preparation of melanjeol for hemocyte calculation. Automatic smear stainers which are capable of dealing with a large number of specimens will be adopted for staining. Manual staining method will also be used.

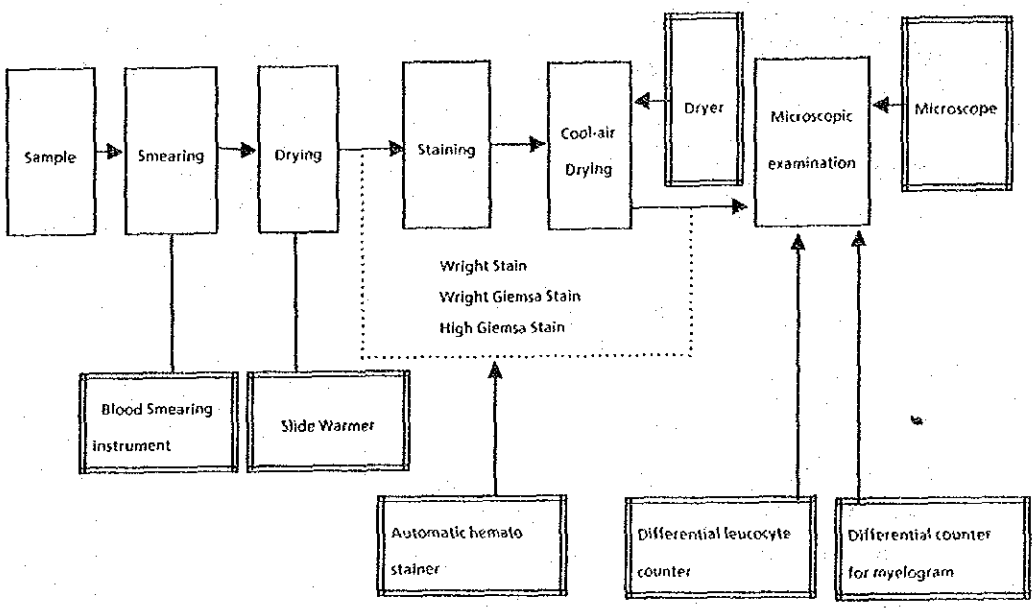


Fig.3-3 Blood test system (Hemocyte calculation)

A coagulation test is executed in the examination of hemorrhagic diathesis; calculation and smear examination are carried out in the platelet examination. Also examined are bleeding time, partial thromboplastin time (PTT), the quantity of fibrinogen, etc. A blood coagulometer is effective in these examinations.

In the serum examination, antigen-antibody reaction is applied using plasma (serum), sometimes marrow juice or other body fluids. Qualitative and quantitative analysis is executed along with blood type examinations, syphilis examination, immune examination for tuberculosis, auto-antibody detection examination, and examination of special constituents in serum. Main materials for these examinations are a variety of antiserum agents. Main appliances are glass implements for ABO/Rh formula blood typing, a constant-temperature water bath, a microtray and a shaker for the syphilis examination.

1)-2 Cleaning

Glassware is cleaned and sterilized after biochemical examinations and blood test (including serum examination). Containers contaminated with disease germs undergo sterilization through an autoclave. Then organic substances are washed out of the glassware by means of an ultrasonic cleaner or by hand. The cleaned glassware, after being rinsed with purified water, dried and sterilized, is kept until the next examinations. Installation of the water purifier is planned with the capacity of 200 liters per hour so as to cover the requirements of all the laboratories in the Medical Laboratory Division.

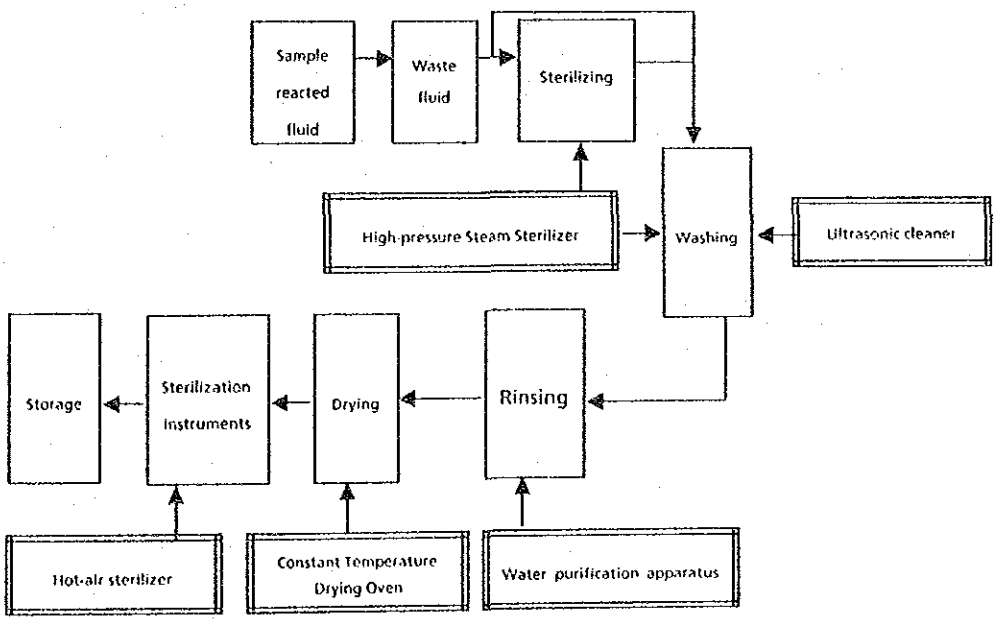


Fig.3-4 Cleaning system (blood, serum, biochemistry)

1)-3 Bacteriological examinations

Bacteriological examination is an examination for any presence of bacteria, their constant quality and constant quantity, using the blood, marrow juice, urine, phlegm and fecal matter of living things. Pathogens discovered from the samples are examined with regard to their species and types, and subsequently their sensitivity to specific chemotherapeutic agents, for reference in treatment.

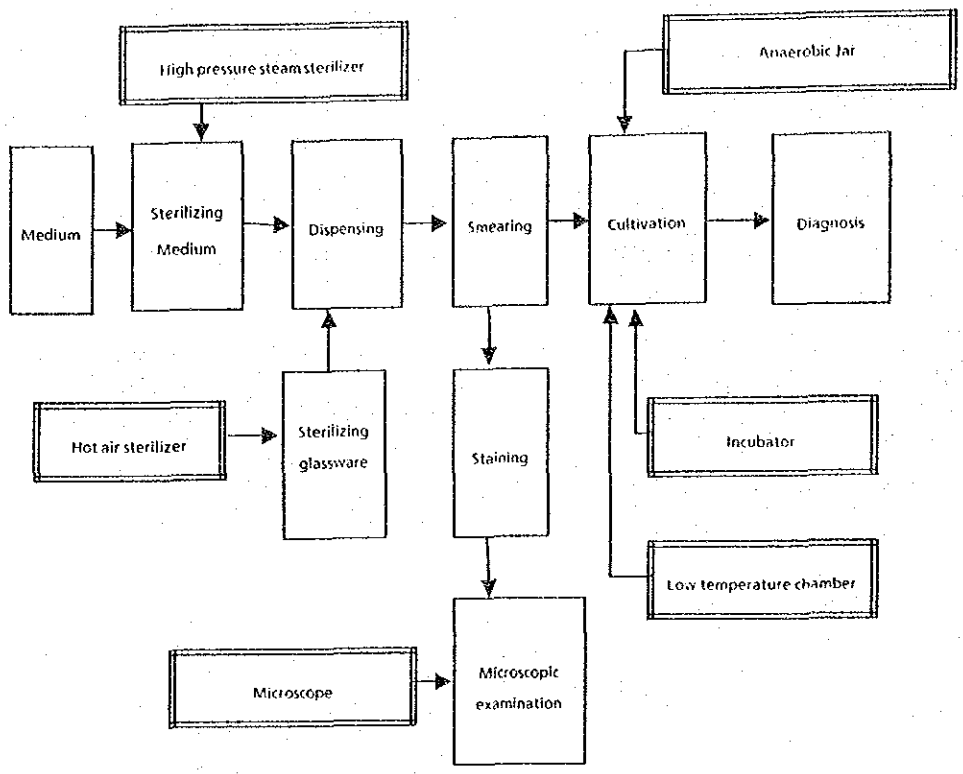


Fig.3-5 Bacteriological examination room system (Cultivation/Staining Diagnosis)

In dealing with glassware which has been used in bacteriological examinations, special care must be taken in order to prevent the contamination of other appliances. Used culture media must first undergo autoclaving, and then be divided into those for burning in an incinerator and those for reuse. Those for reuse are stored after sterilization, cleaning and resterilization.

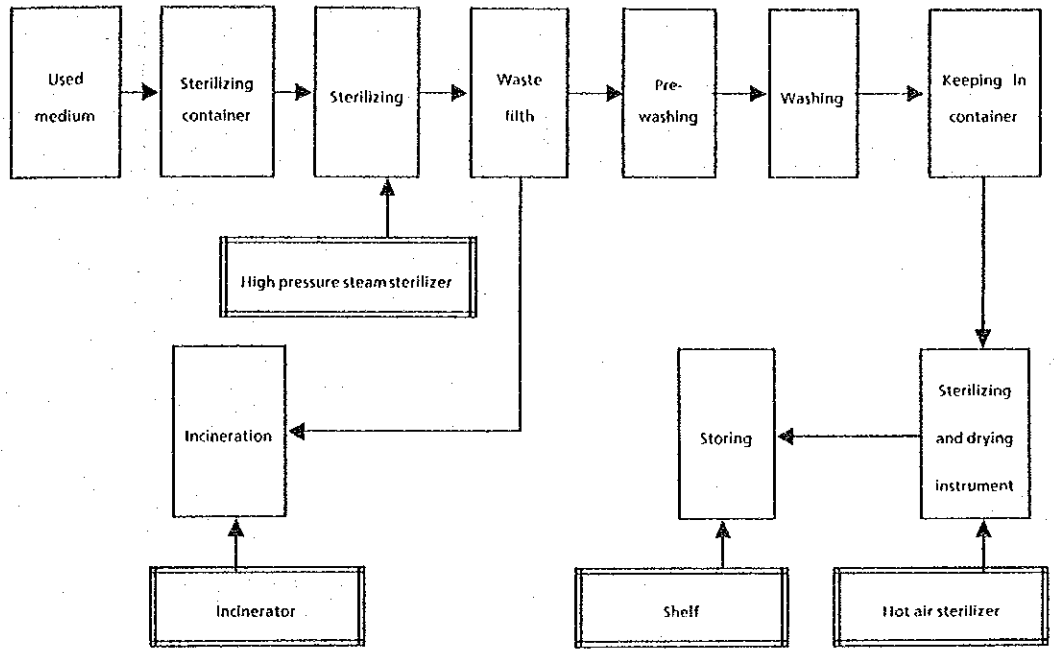


Fig.3-6 Bacteriological examination room system (sterilizing, washing)

1)-4 Pathological examination

Pathological examinations mostly consisted of the preparation of specimens from operative materials, experimental cuttings and materials of pathological anatomy,and diagnosis thereof based on microscopic examination. However, shares in needle biopsy, endoscopic biopsy and cytodiagnosis have been increasing in the pathological examinations. The pathological examination section in this Hospital has been planned to be able to deal with these examinations. Standard pathological specimen preparation is to make specimen slide. They are usually made according to the following procedure:

1. Tissue cutting
2. Fixation

3. Drying and embedding
4. Slicing
5. Staining
6. Mounting

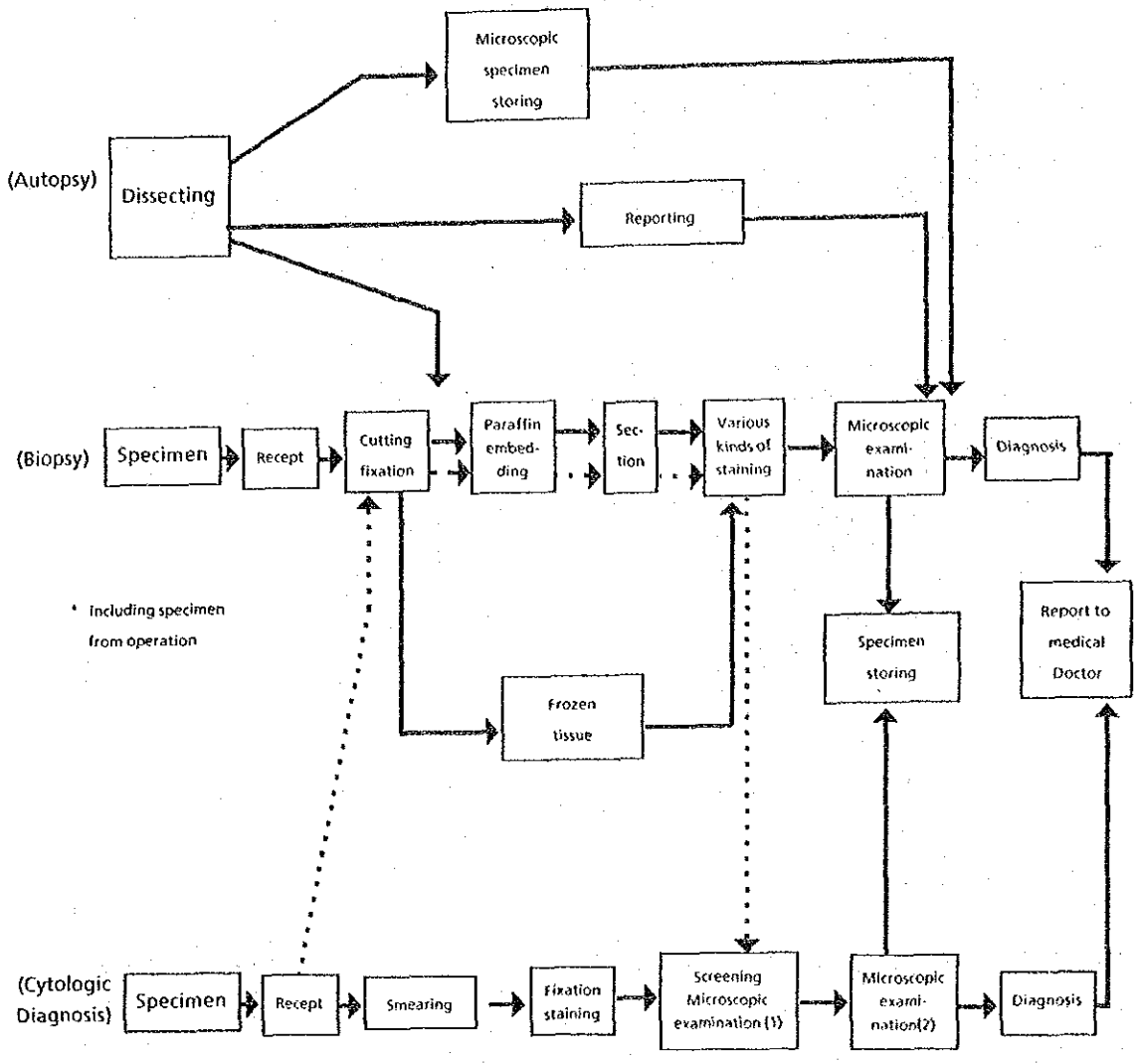


Fig.3-7 Flow of pathological examination procedure

The pathological examination system and the grade of equipment thereof for the Teaching Hospital are almost the same as those of the Mandalay General Hospital and the New Rangoon General Hospital. But the quantity of equipment will be a little greater than for ordinary general hospitals in consideration of the purpose of medical education. For example, the type of microscopes is set to enable six persons including a doctor to simultaneously examine a same specimen. Such quantitywise consideration enables five or six students to receive training together to obtain skills in cutting, fixing and processing.

2) Diagnostic Division

The activities in the Diagnostic Division consist of physiological function examinations, ultrasonic diagnoses and endoscopic examinations. Taking into consideration the actual situation of medical consultation and treatment in Burma and the level that medical standards of the country could reach, the following examinations will be executed in this Division:

1. Heart functions
   - Electrocardiography
   - Echocardiography (ultrasonic diagnosis on the heart)

2. Lung functions
   - Spirometry
   - Arterial blood gas analysis (A specimen collected in the Outpatient Division or the Ward Department is examined in the Biochemistry Laboratory of the Medical Laboratory Division by means of a blood gas analyzer.)

3. Electroencephalography

4. Ultrasound diagnosis on digestive organs

5. Endoscopy

- Electrocardiography

In the examination of heart functions, electrocardiography is most frequently employed. Electric terminals of a 6-ch electrocardiograph are respectively put on the right hand, the left hand and the

left foot, with 12 standard leads (I to III lead) and unipolar leads (aV_R, aV_L and aV_F) as a standard. In cases where a symptom is not clear in a rest-electrocardiogram despite suspicion of stenocardia in view of the patient's medical record, the electrocardiogram, pulsation and blood pressure are observed, giving movement load by means of a master two-stage load tester an ergometer and treadmill in combination.

- Echocardiography

Diagnosis of various valve disorders, ischemic heart diseases, diseases in the pericardial cavity and congenital heart disease, and the measurement of cardiac structure are carried out in echocardiography.

- Spirometry

Spirometers are widely used to examine the patient's lung function, as well as for physical check-up and health care for ordinary healthy persons, and especially for the rehabilitation and preoperative examinations of patients who have respiratory diseases.

- Electroencephalography

An elctroencephalograph is indispensable in physiological examination to directly determine the condition of brain functions. It is widely in use for the examination of troubles in the central nervous system such as epilepsy, cerebral tumour, external injury in the head, encephalitis and cerebral palsy. It is also used to monitor consciousness conditions.

- Ultrasound diagnostic equipment for digestive organs

Diagnosis by means of an ultrasound diagnostic apparatuses is performed for gallbladder disease such as gallbladder lithiasis, bile duct lithiasis and bile duct tumours, etc., for liver diseases such as hepatitis, hepatocirrhosis and abscess in the liver, etc., for pancreatic diseases such as chronic pancreatitis and pancreatic tumours, for lymphadenitis, for tumour in the large intestine ligament and for aneurysm.

- Endoscopy

Endoscopy is applied to the upper digestive tract, duodenum and lower digestive tract. Internal Medicine takes charge of it as a rule. An upper digestive tract fiberscope is used for routine examinations mainly consisting of the screening of diseases in the upper digestive tract ranging from the esophagus through the stomach to the duodenum. Introduction of a electrosurgical units is planned to be able to perform fulguration operations such as polypectomy (polyp cutting by means of an endoscope) and hemostasis. A duodenum fiberscope is instrumental in duodenal ulcer diagnosis where radiographical diagnosis is difficult, and is indispensable to the observation of treatment results and to judging whether or not the disease has been cured. A lower digestive tract fiberscope is used for disease observation and biopsy in the lower digestive tract ranging from the sigmoid colon to the ileocecum; it also enables polypectomy to be carried out. A children's fiberscope is used for endoscopy on children whose physical sizes are different from those of adults.

3) X-ray Division

For the confirmation of diagnosis on outpatients and inpatients, as well as for postoperative care and grasp of conditions of inpatients, six different types of X-ray diagnostic system are planned for installation in the Teaching Hospital.

- Diagnostic X-ray Equipment

This equipment is for universal purposes with no specific diagnostic objectives. Simple radiography, a basic X-ray examination, is easy in handling, can provide plenty of diagnostic data, and is most widely used centering on the diagnosis on the chest, the abdominal part and bones. It is possible to build up diagnosis from reading simple radiographs. Simple radiography can provide necessary data in planning other radiography and examination procedures.

- Remote control type X-ray TV system

In this system, the person to be examined is observed from a separate control room through a lead-glass window. By conversation through an

intercom and from an X-ray TV monitor, remote controlled examination is possible for the change of postures, fluoroscopy, the selection of glancing fields, pressure operations and snapshotting,as well as the selection of fluoroscopic conditions, film change and film marking. Being able to watch fluoroscopy in the room completely shut off from the X-rays without wearing protective gear and being released from manual operation at a short distance, operators can be almost completely protected from exposure to X-rays and can carry out examinations in comfort.

- Tomographic X-ray equipment

A simple radiograph shows on one film all the tissues and organs of the part that has undergone simple radiography, over-lapped in the X-ray direction. A tomograph gives approximately cross sectional photographs with a sharp image of the section to be examined with its front and rear being obscured. That is, tomography is a technique in which cross sections to be examined in the human body are exclusively X-rayed. With tomography, it has become possible to perform those examinations of enhanced diagnostic ability such as examinations on the position and the form of lung diseases, on the paranasal sinuses, on the bone structure of the temporal bone, etc. on nephrotomograms, on the adrenal and the gallbladder tracts etc. through X-rays.

- Mammographic X-ray system

Breast examinations through X-rays are executed effectively using low-energy X-rays that show a high weakening at soft tissue parts. The description of minute bodies in the soft tissue is essential with this system for correct diagnosis. Therefore, a slight difference in absorption is visible described in as high sharpness and contrast as possible.

A mammographic system is effective for the diagnosis, especially for the early detection, of breast carcinoma (for differentiation between cancer and benign breast diseases such as mastopathy and fibroacenoma, and differentiation of nodular goiter, especially thyroid gland cancer, from adenoid tumour and adenomatous goiter).

The system is necessary for X-ray diagnosis in the gynaecological field.

- Circulatory organ diagnostic X-ray system (Single Plane)

Circulatory organ examinations to be executed in X-ray rooms are divided into two categories, i.e., angiocardiography and cardiac catheterization. Angiocardiography is a technique in which blood flow conditions, movement and form of blood vessels, valve movements, etc. are X-rayed, after the injection of iodine contrast medium of high X-ray absorption rating into the heart's or the blood vessels' lumen. The technique is applied to the whole body area from the heart to lower limb blood vessels.

Cardiac catheterization is a blood observing type of examination, in which blood movement and the cardiac functions are examined, quantitatively measuring the pressure and the amount of the blood flowing through a catheter put in the heart or a large artery.

In addition to the detection of heart diseases (both congenital and acquired), the system is indispensable in abdominal angiography and selective angiography of the neck.
In this Division, the system will be given only the function of conventional one-way photographing in view of reduction of maintenance load on the Burmese side. But the system will be planned in such a way that the simultaneous two-way photographing function and the basic performance needed by cineangiocardiography can be added in future with the advance in local medical skill.

- Mobile type X-ray equipment

Introduction of electronics into mobile X-ray equipment has made it possible to produce X-ray photographs comparable in quality with those of a large-size system, through high output and short-time exposure control. With its versatile functions based on mechanical safety considerations and its mobility, this equipment occupies an indispensable position in the overall medical scheme as the equipment capable of providing exact information of the conditions of the disease while requiring only simple handling.

4) Operation Division

The Operation Division is planned to be able to deal with ordinary surgical operations organized in internal medicine, surgery, obstetrics & gynaecology and paediatrics of the Teaching Hospital. The proposed contents will not exceed the present levels of surgical operations in Burma. Basically the number of apparatuses and equipment will be matched to the number of operation rooms. Regarding equipment which is indispensable to save the patients' lives, but is not frequently used and can be shared, one set for every three operation rooms will be provided. The number of surgical operation instruments will be provided on the following formula:

3 cases/day × 4 operation rooms = 12 cases (of surgical operation)

5) Delivery Division

As a referral hospital, the Teaching Hospital is expected to deal with more abnormal deliveries than those in ordinary general hospitals. It is highly probable that immature or premature babies will suffer from disorders of breathing, jaundice, brain troubles, low blood sugar or congenital heart diseases (which result in sudden death of the newborn).

- Infant incubator

  Immature or premature babies generally have low temperature, are weak in immunity to germs, or sometimes need an oxygen supply on account of their underdeveloped respiratory organs. Closed type infant incubators will be installed for the purpose of controlling the temperature of the newborn, shutting off the outside air and supplying oxygen.

- Bilirubin measuring, phototherapeutic unit and exchange transfusion set

  Most newborn babies show transient jaundice whether or not immature or premature. Jaundice occurs as increased bilirubin in the blood, making the skin look yellow. As jaundice advances, bilirubin in the blood gets into the cerebral nerve cells and destroys them. This is

called nuclear jaundice. Even if the child's life is saved, permanent brain impairments result. Jaundice in the newborn is of vital problem. A correction bilirubin meter by which the bilirubin value in the blood is measured, and a phototherapeutic unit will be installed. In cases where phototherapy is not effective, exchange transfusion will be executed using an exchange transfusion pump. Phototherapy is a clinical application of the high photosensitivity of bilirubin in the blood.

- Infusion Pump Therapy

Infusion pumps are effective when a patient has high bloodstream pressure or when medicine must be infused in a very small amount at a constant quantity. They are highly useful for newborn treatment where medicines are used in small quantities.

- Gynaecological ultrasound diagnostic system

A clinical application of ultrasonic tomography into the fields of obstetrics and gynaecology has made it possible to make early and exact diagnoses of troubles which so far had entirely been left to doctors' conjecture. Among other benefits, it has made possible the easier detection of any abnormality in the early stage of pregnancy. For example, it is possible to judge whether a fetus is dead or alive (fetal heartbeat can be almost unerringly confirmed in the seventh or eighth week of pregnancy) and to detect hydatid moles, extrauterine pregnancy, etc. at an early stage. Also the correction of the number of weeks of pregnancy is done in general by measuring uterine dimensions and longitude lines of the fetus. Further, along with the recent progress in equipment technology, it has become possible to clearly know the conditions inside of the uterus, e.g., estimated fetus weight, polyembryony, abnormal placents, malformation and so on. Ultrasound diagnosis has proved itself as an effective measure in everyday gynaecological screening. Several units of ultrasound diagnostic apparatuses are in use in the Mandalay General Hospital, contributing to everyday diagnoses without serious handling problems.

• Vacuum extraction

Vacuum extraction which does not call for such a high level of skill as forceps delivery is simple in handling and does less injury to the birth canal and the baby. Consequently, vacuum extractors are indispensable to obstetricians. Vacuum extraction is widely adopted even in normal deliveries if somewhat delayed, to lighten the parturient women's load, as well as in painless deliveries where delivering force tends to become weak.

6) ICU·CCU Division

Patients admitted to the ICU Division include those suffering from external injuries that call for emergency lifesaving treatment, from acute respiratory insufficiency, shock, cerebrovascular trouble, unconsciousness due to a severe disease, and patients who have undergone a major operation. The CCU Division takes in patients suffering from cardiovascular diseases. Since these patients' lives are endangered, strict monitoring, quick and appropriate care and treatment are necessary. To that end, the Division should be equipped with a 24 hour basis patient monitoring system that continuously watches and records patients' vital signs such as electrocardiogram, blood pressure, pulse, respiration, temperature, etc. and with apparatuses for the treatment of severe troubles in respiration, circulation or metabolism (including ventilators, apparatuses for surgical treatment such as tracheotomy, infant incubators, defibrillators, etc.) to be utilized based on data from the monitoring system. Though apparatuses for emergency examinations (including blood gas analyzers, electrolyte analyzers, etc.) are indispensable in order to quickly grasp the patients' condition, such examinations shall be executed in the emergency examination rooms of the Emergency Division.

7) Central Sterilizing Supply Division

The Central Sterilizing Supply Division takes charge of cleaning, sterilizing of instruments for treatment and surgery that had been used in the Operation Division, Ward Department and Outpatient Division and their storing and administration. The Division maintains close liaison with the Laundry Section especially with regard to linens that had been

used in the Outpatient Division and the Operation Division. The above procedures call for the installation of ultrasonic cleaners (especially needed in removing organic substances adhering to surgical instruments) and high pressure steam sterilizers. Further, a surgical glove conditioner will be installed for recycling used surgical rubber gloves.

8) Blood Bank Division

Blood is preserved in the Blood Bank Division for transfusion to inpatients, emergency patients, and patients with copious bleeding resulting from a surgical operation.

- Refrigerator for blood storing

Blood for transfusions must be kept in cold storage much more strictly than ordinary specimens. Every procedure is carried out on the premise that blood is correctly preserved and pre-transfusion cross-matching test is executed with a pilot tube attached to the blood bag, hence the use of a refrigerator must be exclusive to avoid mixed storing with other things. The refrigerator must function precisly to maintain an inside temperature of 4°C to 6°C with allowable variation of only 2°C throughout the inside space. A thermo-recorder, an alarm device (for any troubles or abnormal temperature), etc. should be installed for safety.

- Deep-freezer

The spread of the use of frozen blood plasma calls for large-sized refrigerators with thermo-recorder for specimens and reagents(-20°C) and for frozen plasma (-60°C).

- Centrifuge

Centrifuge for blood cell washing:

Blood cell washing, which is not done in other examinations, occupies a large part of the blood examination. A multi-rack type centrifuge with proper revolution speed and maximum stability will be installed

to wash serum, plasma, red corpuscles, platelets, white corpuscles and separated blood cells.

Centrifuge for agglutination:
Most important in the blood examination is to make correct judgment of agglutination. The installation of a highly precise centrifuge is planned to keep prescribed conditions uniform.

Refrigerated centrifuge:
The planned refrigerated centrifuge is of a temperature adjustable type that can deal with a smaller volume by changing its arm adapters, though a wide range of revolution speed is not necessarily called for.

- Water Bath:

A water bath is used for incubation, complement inactivation, thaw of frozen plasma and so on.

9) Physiotherapy Division

The objective of the Physiotherapy Division is to help patients of cerebral apoplexy or post-operative patients to return to their communities as early as possible through early rehabilitation or training, using physiotherapeutic devices and equipment. Some rehabilitation devices are the same as or similar to daily necessities (e.g. toys for child and cooking utensils). Appropriate devices will be selected, considering that the essence of the rehabilitation is a medical treatment aimed to help patients return to their respective communities.

As part of physiotherapy, electric therapy appliances (e.g. a low-frequency therapy apparatus) are used to move paralyzed muscles electrically thereby preventing their atrophy, to improve blood circulation, to ease pain or to cure arthralgia.

10) Forensic Medicine Division

In the Forensic Medicine Division, diagnoses are performed on poisonings which can happen in everyday life, from the unintentional swallowing of toxic substances or deadly poison, as well as on

alcoholism, and identifications are made on deaths. Also doctors' views are given on traffic accidents, homicides, sex crimes, forensic medical postmortem and so on. Since cases of sex crimes, rape and unnatural offences are dominant, the examination table as used in gynaecology for internal examination will be installed to give legal views on sex distinction and abortion. An ultra-low temperature freezer will be installed to store a variety of specimens for forensic medical pathological diagnosis.

11) Mortuary Division

Human anatomy is executed in this Division which is classified into the following four categories:

1. Systemic anatomy to be executed dividing the human body into the skeletal system, the nervous system and so on, as is executed for student education.

2. Pathologic anatomy to be executed on the bodies of persons who died from sickness with a specified clinical diagnosis.

3. Administrative anatomy to be executed compulsorily on the bodies of persons who died from unknown causes.

4. Judicial anatomy to be executed on the bodies of persons who died from any crime.

Systemic anatomy is mainly executed in a lecture theater, while pathologic anatomy is executed in a autopsy room in connection with pathological examinations of the Medical Lab. Division. Administrative anatomy and judicial anatomy are executed in the autopsy room in connection with the Forensic Medicine Division. Though it is pathologic anatomy that will be mainly executed in the Teaching Hospital, its basic principles examination apply to other anatomies.

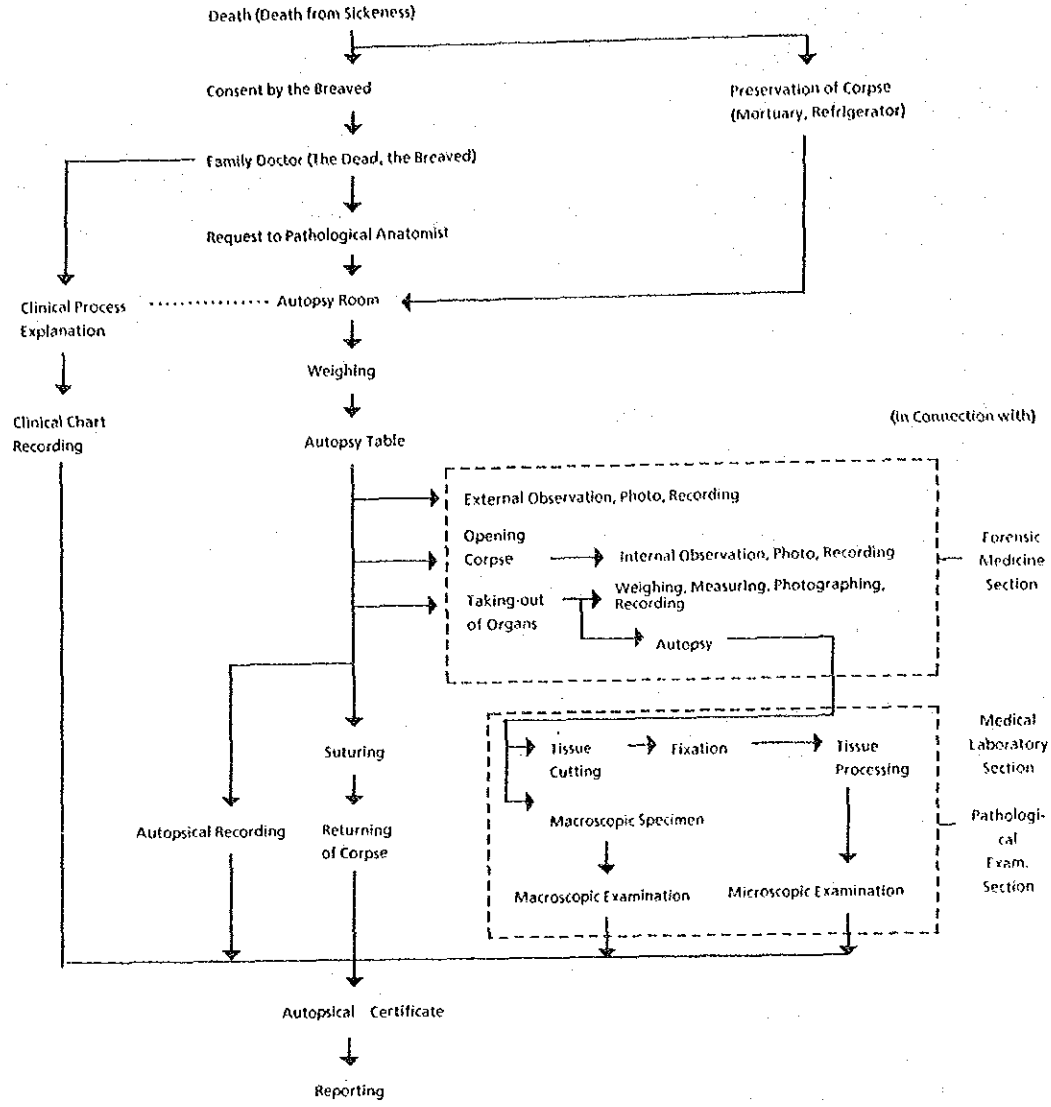


Fig.3-8 Process of autopsy

(3) Ward Department

1) Internal Medicine Ward

Each bed room will be furnished with gatch beds for adults, bedside tables, overbed tables and irrigator stands. Nurse stations and treatment rooms will be equipped with defibrillators, oxygen tents,

emergency carts, electrocardiographs, etc. to deal with any sudden changes in patients' conditions (i.e. emergencies such as heart seizures, difficulty in breathing, respiratory-standstill, etc.). Bedside patient monitors will be installed for postoperative patients who need higher care than ordinary inpatients. Ice makers will be installed in the nurse station for feverish patients.

2) Surgery Ward

In addition to such general materials as those for the Internal Medicine Ward, simple surgical equipment will be specially installed in treatment rooms for changing bandages and extraction of stitches. And traction frame (those attached to beds) will be installed as bedside auxiliaries.

3) Obstetrics and Gynaecology Ward

A hysteroscope, fetus monitors, breast pumps for after delivery, and beds for the newborn will be installed beside mother's beds.

4) Paediatrics Ward

The Paediatrics Ward will be equipped with, in addition to beds for paediatrics, infant incubators in which premature babies are taken care of until they can return to their mothers.

(4) Medical Administration Department

1) Repair Section

In the Repair Section, Burmese engineers and technicians execute maintenance of the various items of medical equipment installed in the Hospital. Tools for repair and inspection of the equipment, testers and meters such as an oscilloscope will be secured. Maintenance manuals are kept and utilized for the installed equipment in this section. Spare parts will be kept in an adjacent room.

2) Supply and Pharmacy Section

Storing of medicines sent from the Central Medical Store Depot (CMSD), and preparation and supply of some infusions and reagents are to be

carried out. This Section also makes and supplies medical oxygen which is difficult to procure in Mandalay.

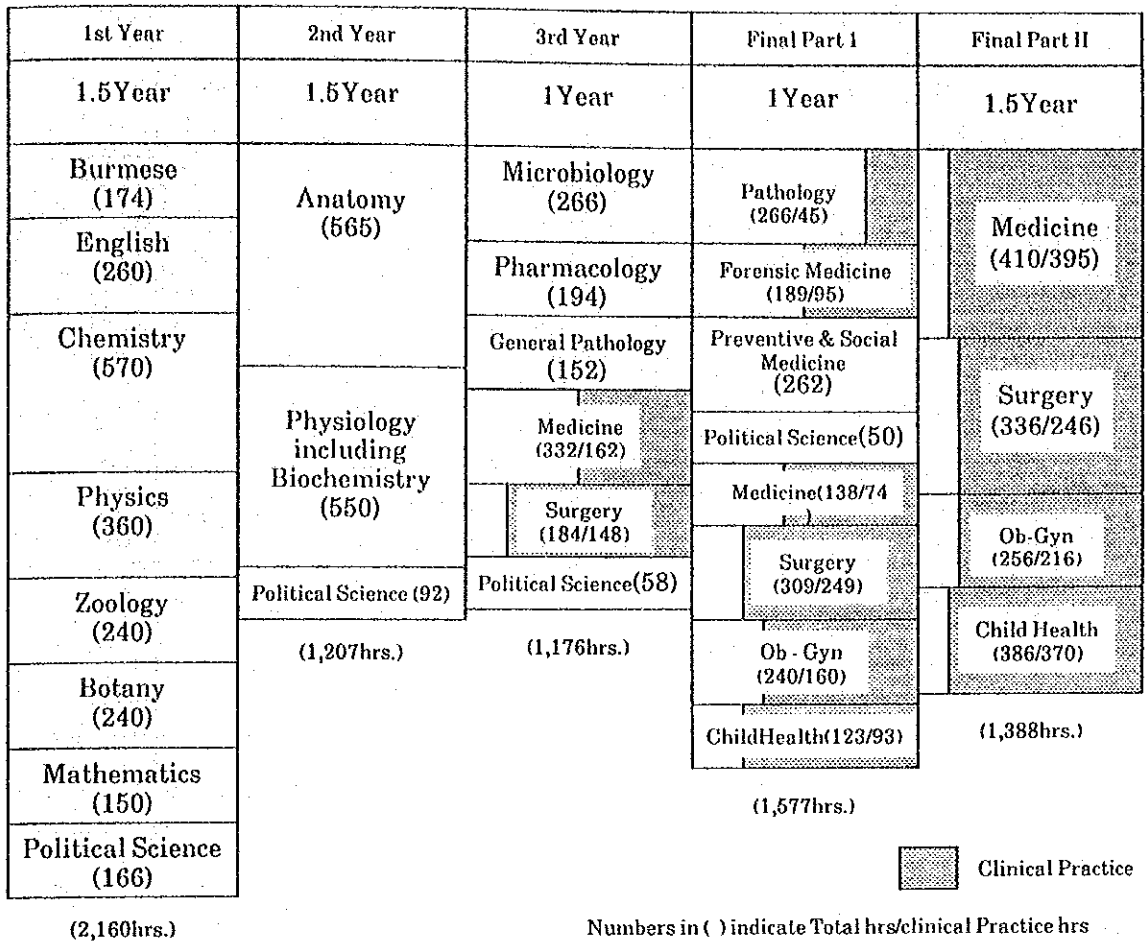
(5) Academic Department

To deepen the knowledge of medical students by means of audio-visual aids as well as doctors' lectures is the starting point for upgrading basic medical level. Overhead projectors, slide projectors, and projection microscopes will be used to enhance educational effects.

3-3-3 Education program

The Institute of Medicine, Mandalay was founded in 1954 as a branch school to the Medical Faculty of the University of Rangoon. In 1958, it was changed to the Medical Faculty of the University of Mandalay. Following to the change in educational policy of the government in 1964, it was separated from the University to function as an independent Institute of Medicine, Mandalay (IMM).

IMM provides education for undergraduates and postgraduates in master courses. Five courses (internal medicine, surgery, obstetrics and gynaecology, physiology and biochemistry) are offered in the postgraduate course. The number of undergraduate students admitted per school year had been fixed at 150. But in 1986, a plan was drawn up to transfer 50 students from Rangoon to increase the limit of the number of students of the Institute of Medicine, Mandalay to 200. The undergraduate education of the Institute is based on a 5-academic year, but actually 6.5 years are required for completion of the regular undergraduate course because it takes 1.5 years for a student to complete the curriculum for each of the 1st, 2nd and 5th school years.



(Source: MOH)

Fig.3-9 Curricula by school year (offered by the Institute of Medicine, Mandalay)

Lectures are given mainly in the main campus in the central area of the city of Mandalay. Clinical practice has so far been conducted at Mandalay General Hospital (800 beds) and EENT Hospital (100 beds) but, in future, will be conducted also in Worker's Hospital (150 beds), currently under construction in Mandalay, and in this Teaching Hospital. Undergraduate education at the Institute consists of lectures and practicals for 1st-year and 2nd-year students; and clinical practice is provided for students in their 3rd-year and higher (200×3=600 students). In principle, third and fourth year students receive clinical practice in the morning and lectures and practicals in the afternoon, and fifth year students are given clinical practice in both the morning and afternoon. The subjects, and the practice hours included in the major courses offered in the third through the fifth years of undergraduate education are as listed in Table 3-3.

Table 3-3 Subjects and number of hours by school year and terms

Grade	Subject	1st Term		2nd Term				3rd Term						1st		2nd				Total
		11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	
3rd M.B. B.S.	Microbiology	66		100				100												266
	Pharmacology	48		73				73												194
	General Pathology	38		57				57												152
	Medicine	80 (40/40)		121 (60/61)				121 (60/61)												322 (160/162)
	Surgery	46 (6/40)		69 (15/54)				69 (15/54)												184 (36/148)
	Total	278 (46/80)		420(75/115)				420 (75/115)												1118 (196/310)
Final Part I	Pathology	66 (-/15)		100 (-/15)				100 (-/15)												266 (-/45)
	Preventive	47 (24/23)		71 (35/36)				71 (35/36)												189 (94/95)
	Forensic Medicine	40		118				104												262
	Medicine	34 (16/18)		52 (24/28)				52 (24/28)												138 (64/74)
	Surgery	77 (14/63)		116 (23/93)				116 (23/93)												309 (60/249)
	Ob & Gy	60 (16/44)		90 (32/58)				90 (32/58)												240 (80/160)
	Child Health	31 (8/23)		46 (11/35)				46 (11/35)												123 (30/93)
	Total	355 (78/186)		593 (125/265)				579 (125/265)												1527 (328/716)
Final Part II	Medicine																			410 (48/362)
	Inte. Medicine	40 (20/20)		103 (28/75)				142 (-/142)						55 (-/55)		46 (-/46)				386 (48/338)
	Mental Disease	4 (4/-)		4 (4/-)																8 (8/-)
	Tuberculosis	4 (4/-)		4 (4/-)																8 (8/-)
	Skin & Venereal	4 (4/-)		4 (4/-)																8 (8/-)
	Surgery																			336 (70/246)
	Surgery	34 (20/14)		60 (20/40)				76 (-/76)						34 (-/34)		30 (-/30)				234 (40/194)
	Anaesthesia	6 (2/4)		6 (2/4)																12 (4/8)
	Ophthalmology	12 (2/10)		12 (3/9)																24 (5/19)
	Otolaryngology	12 (2/10)		12 (3/9)																24 (5/19)
	Orthopedics	6 (2/4)		6 (2/4)																12 (4/8)
	Radiology	4 (2/2)		4 (2/2)																8 (4/4)
	Radiotheraphy	4 (2/2)		4 (2/2)																8 (4/4)
	Urology	4 (2/2)		4 (2/2)																8 (4/4)
	Dentistry	3 (-/3)		3 (-/3)																6 (-/6)
	Ob & Gyn	32 (20/12)		64 (20/44)				96 (-/96)						32 (-/32)		32 (-/32)				256 (40/216)
	Child Health	48 (6/42)		96 (10/86)				146 (-/146)						48 (-/48)		48 (-/48)				386 (16/370)
	Total	226 (92/125)		386 (106/280)				460 (-/460)						169(/169)		156 (-/156)				1388(198/1190)

• Hours in ( ) indicate (Lecture/practice) in thsi hospital (Source: MOH)

Clinical practice for the third through fifth year students (600) will be offered in the aforesaid four hospitals in turns. However, as seen from the above table, the four subjects of internal medicine, surgery, obstetrics and gynaecology, and paediatrics account for the majority of the subjects in both the number of subjects and the number of hours, and seeing that Worker's Hospital is not under the jurisdiction of the Ministry of Health, most of the clinical training of the undergraduate students will actually be undertaken by the Mandalay General Hospital and this Teaching Hospital. It is projected that, of the total of 600 students in the third through 5th grades after the increase in the limit of the number of students, the total increase of 150 students, comprised of 50 students in each of the three grades, will take their clinical practice at this Teaching Hospital.

The maximum of 200 students in each of the third, fourth and fifth school years will be divided into 4 classes, 50 students per class, and the total of 600 students in the three school years, in 12 classes, will take clinical practice and lecture at the two hospitals. Each lecture at this hospital will be given to a class of 50 students, but for clinical practice, each class of 50 students will be subdivided into 4 groups, each group comprised of 12 to 15 students, to better education effect. At this Teaching Hospital, 2.12 beds per student (318/150) will be available for clinical practice, and less than 2.56 beds per student (1,150/600-150) at the Mandalay General Hospital. Inevitably, however, the burden on the newly established Teaching Hospital will become heavier when the rather old facilities and equipment and the congested beds at the Mandalay General Hospital are taken into consideration.

It is compulsory for every graduate student to take internship training for one year, consisting of clinical training for 3 months each in internal medicine, surgery, and obstetrics and gynaecology, for 2.5 months in paediatrics, and 0.5 months in community health. The internship training will be given at the Mandalay General Hospital, this Teaching Hospital, and at central hospitals in Maymyo in Mandalay Division, Magwe in Magwe Division, Taunggyi in Shan State, and Myitkyina in Kachin State. This Teaching Hospital is scheduled to accept 16 to 28 interns. An intern, upon completion of the one-year internship training, will be granted a national physician's license as a general doctor. Any student

who, having completed the one-year internship training, desires to further pursue specialized studies, can enter the postgraduate course after obtaining qualification for admission examination by working for at least two years at public medical institutions to acquire practical experience. Candidates passing the examinations will be enrolled in the postgraduate courses of the Institutes. Postgraduates who have completed a one-year diploma course or a two-year master course will be entitled to take examinations for specialists, and can be certified as specialists after passing the examinations. Currently, the Institute of Medicine, Mandalay, offers 5 master courses for 10 to 15 postgraduates (2 to 3 postgraduates per course), for specialized education.

This Hospital will also be used for the clinical education of postgraduates. As for the education of medical personnel other than physicians in Mandalay, there is one nursing school (3.5-year, with a capacity for 80 students per grade) and two midwife schools (1.5-year, with a maximum of 85 students per grade, altogether). The clinical practice of about one-fourth of the students of these schools will also be conducted at this Hospital.

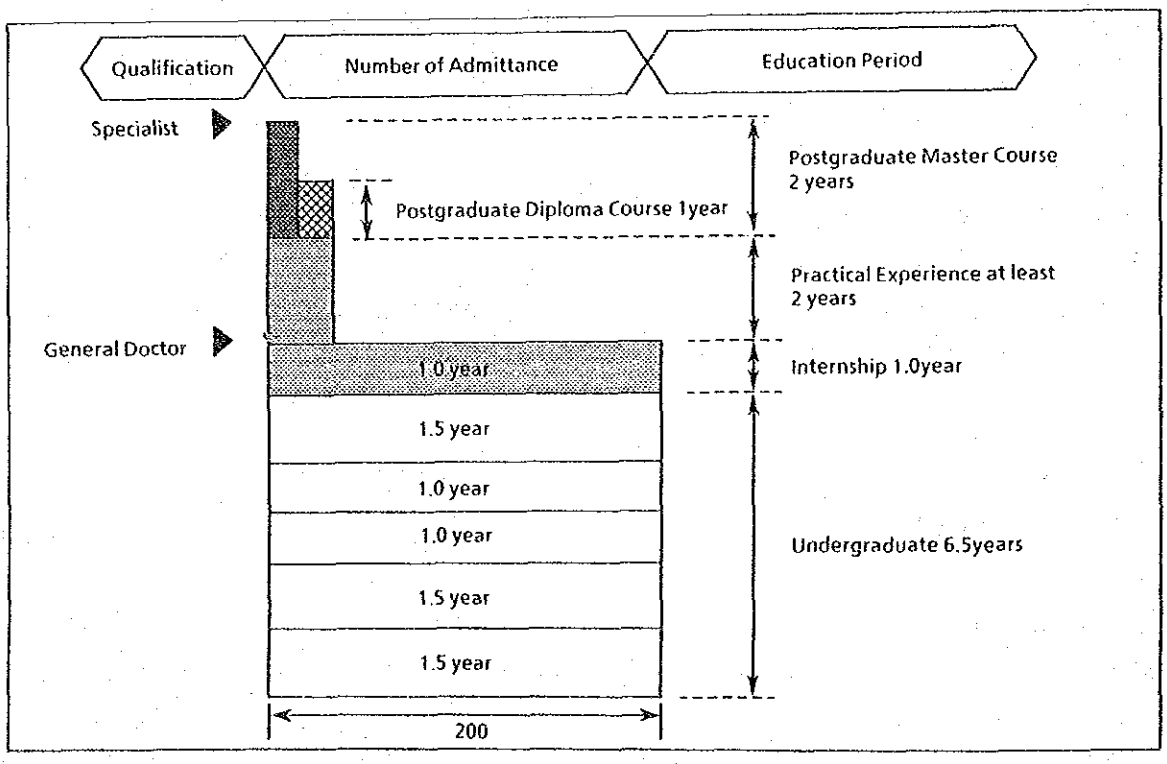


Fig. 3-10 Education System for Physicians

3-3-4 Outline of the proposed construction site

(1) Location of the proposed construction site

The proposed construction site for the Mandalay Teaching Hospital is located in a southeastern part of the city of Mandalay, approximately 4km or about a 15 minute car ride from the central area of the city, and nearly 3.5km from the Institute of Medicine, Mandalay (IMM).

The site for the Hospital was formerly a paddy field and is now in the property of the Ministry of Health. The cultivation rights of the former owner of the paddy field was terminated in January 1987. The site is temporarily fenced along the boundary with wooden piles and bamboo and iron wire.

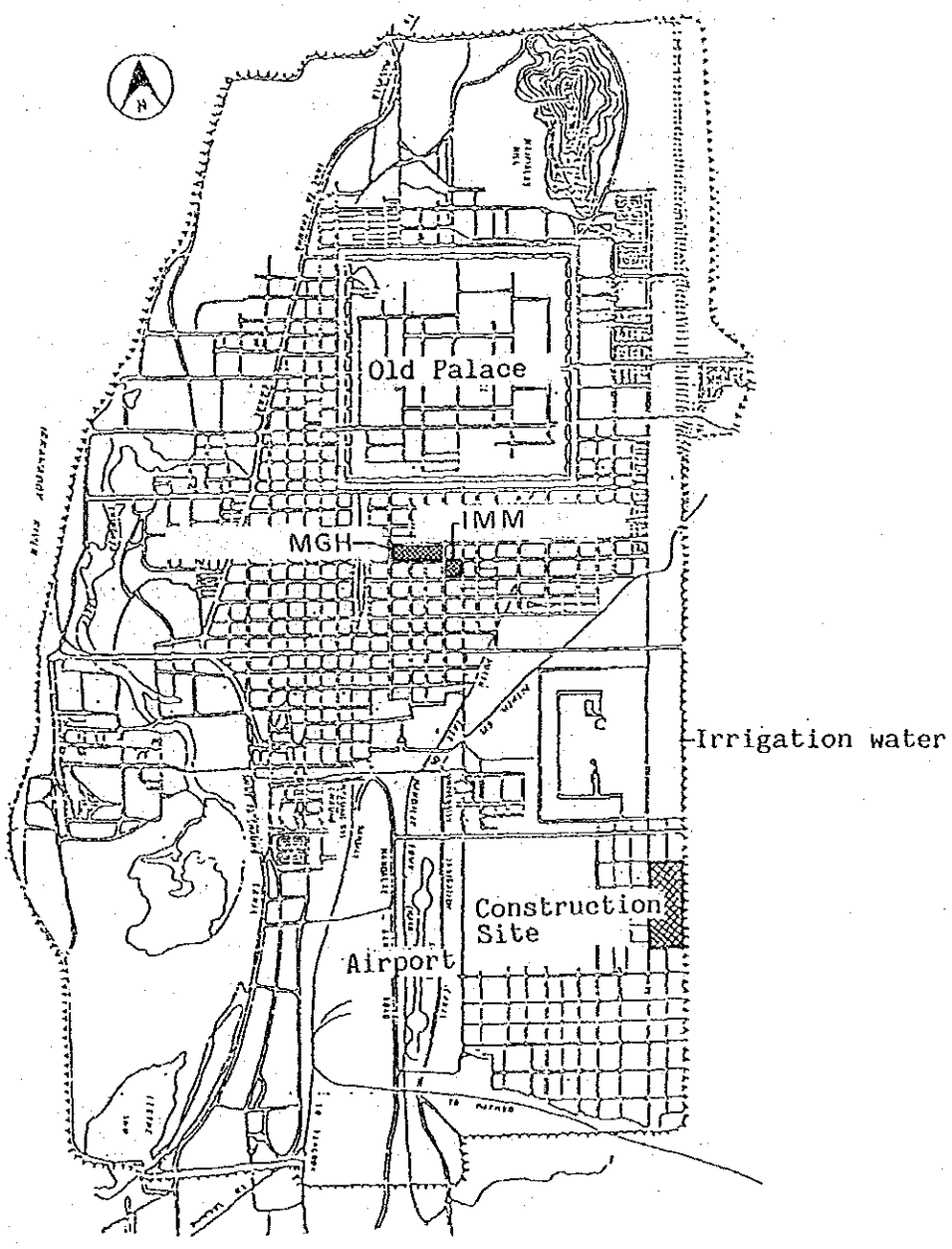


Fig.3-11 Mandalay City

(2) Natural Conditions

1) Topography

The proposed construction site is a rectangular lot having an area of about 29ha, running approximately 850m north to south and 330m east to west. An irrigation ditch runs from north to south in the central part of the site, and a 3m to 5m wide farm road lies along the ditch at an elevation 1 to 1.5m above the average ground level of the land.
The entire area has a gentle downward slope from north to south.

2) Soil condition

The geological survey data furnished by the Ministry of Health show that the surface stratum to a depth of about 2.5m consists of stiff, dark gray silty clay of N value 10 to 25, below which lies a layer of solidly compacted silty clay mixed with yellowish brown sand of N value more than 20. The dark gray silty clay forming the surface stratum, generally called black cotton soil, has a very high strength when it is dry but this strength decreases remarkably when the soil becomes wet. Since this soil becomes swollen with water and the swelling pressure can be high enough to affect buildings, attention should be given.

(3) Surrounding Area

A piece of land for public officials' housing lies north of the site, and strips of land with existing house are scattered to the east and an irrigation ditch of about 3m wide separates the strips of land from paddy fields. Adjacent to the south side of the site is proposed construction site for public facility owned by the Mandalay City Development Corporation. Beyond the west side of the site, separated by a road, spread paddy fields which are planned to be converted to a park and a housing area.

(4) Infrastructure

1) Electric Power

33kV and 11kV overhead electric power transmission lines are installed along road which is located north of the site.
The 33kV line has already been constructed for the Project, and is

possible to supply electric power for the Project. The 11kV line is used for general demands in the city, and can not afford to distribute to the Project because of its insufficient capacity. Since power failure including scheduled power-cut is often caused in Mandalay, it is necessary to take measures against power failure. Furthermore, it is also necessary to take measures against voltage regulation because voltage regulation is often over ±5% which is target value of local Electric Corporation.

2) Telephone

50-circuite cables are installed running under the ground at approximately 2.0km away from the road north of the site. Trunk lines (COL) for the Project will be led in from the cables at this point.

3) Water Supply

The two major sources for city water supply to the city of Mandalay are wells and the moat of the old palace whose water originates from a water reserving dam. About 40 percent of the population of Mandalay is supplied the city water service.
At present, no city water service is available near the site, and the residents in the adjacent areas use wells. However the construction of new waterworks to supply city water to the Mandalay city under a project funded by the Asian Development Bank and the OPEC Fund for International Development is currently in progress under the supervision of the Mandalay City Development Committee, and 150mm dia. water supply piping will be installed near the site.

The new water supply project under construction is expected to increase in the current water supply capacity of 20,000m^3/day to 117,000m^3/day to cover 90% of the water service demand of the Mandalay townspeople. Construction is scheduled to be completed by March 31, 1988 (construction term: 4 years and 7 months), authorities concerned will be required to make an enormous effort in order to complete the construction of all service pipings throughout the city within the remaining period.

4) Sewerage

Public sewerage system is not available in Mandalay. Sewage from buildings in the city is treated in septic tanks and is then permeated through soak wells into the earth.
Rainwater and waste water are discharged through drainage directly into the Irrawaddy River.

The areas surrounding the site currently have no drainage system, but there are rainwater and waste water gutters (open type) constructed down to the residential area to the south of the site, and gutters will be constructed along 60, 61 and 62 streets which are the surrounding roads of the site.

5) Roads

The 6m-wide 62 Street is under construction by the Construction Corporation along the west boundary of the site.
In future, this road will be trunk road connecting Mandalay and Rangoon. Another road from Mandalay, intersecting 62 Street to the north of the site, is being constructed by the Mandalay City Development Corporation, and the construction, 80 percent of which is already completed, will be finished before the commencement of the construction of the Project. Thus, the road network in the vicinity of the Site is in the process of development, and necessary roads for traffic from the central area of Mandalay to the Hospital during its construction period and after its opening will be secured.

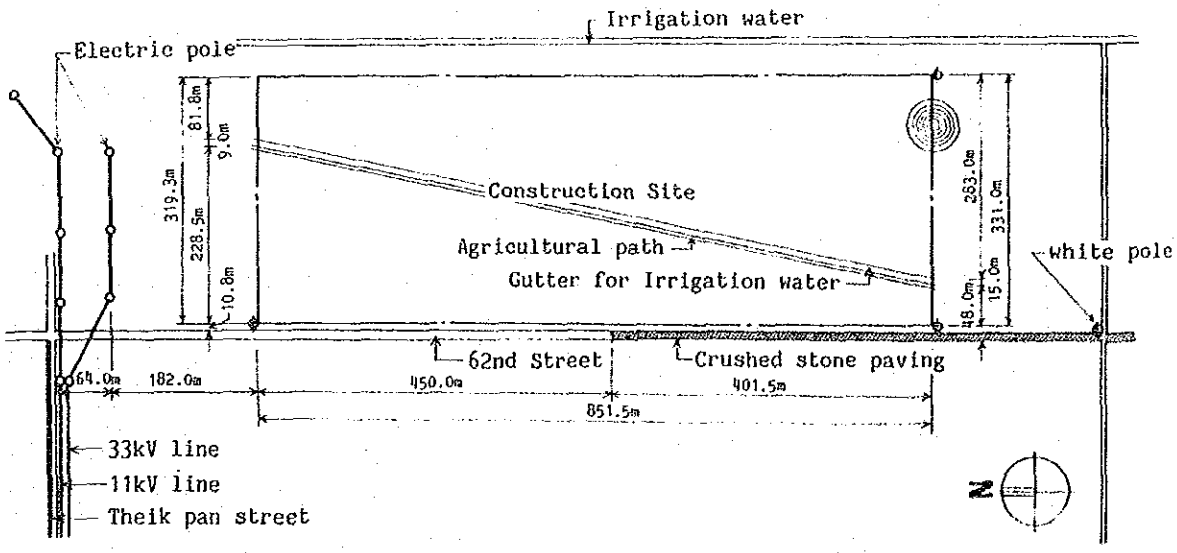


Fig.3-12 Current Condition of the Proposed Construction Site

3-3-5 Outline of facilities and equipment

While this Hospital is to be a general hospital having the four disciplines of internal medicine, surgery, obstetrics and gynaecology, and paediatrics, it is also a teaching hospital for the Institute of Medicine, Mandalay, and is therefore required to have the facilities and equipment necessary for clinical practice, lectures, discussions and other educational activities. In addition, since this Hospital is intended also to function as a central referral hospital in Upper Burma, it needs to be furnished with diagnostic and examination facilities and equipment at levels somewhat higher than those of ordinary general hospitals in Burma. Functionally, the Hospital is planned to comprise Out-patient Department, Central Diagnosis & Treatment Department, Ward Department, Medical Administration Department, Administration & Service Department and Academic Department. Most of the facility elements for each of these departments will be located in the same building, but some of them will be provided in independent buildings in consideration of their accessibility and function.

(1) Facilities

Floor areas of each department are tabulated as follows.

Table 3-4 Floor areas of each department

Department	Floor Area (m^2)
Outpatient Department	1,781
Central Diagnosis & Treatment Department	4,103
Ward Department	6,130
Medical Administration Department	1,287
Administration & Service Department	3,792
Academic Department	898
Total	17,991 m^2

1) Outpatient Dept.

- Main Building

  Outpatient Division : Internal medicine examination room, treatment room, surgery examination room, obstetrics and gynaecology examination room, treatment room, paediatrics examination room, central treatment room, waiting area, dispensary, etc.

  Emergency Division : Waiting room, examination room, emergency treatment room, observation room, emergency lab.

2) Central Diagnosis & Treatment Department

- Main Building

  Medical Lab. Division: Biochemistry and haematology lab., washing room, bacteriology lab., pathology lab., etc.

  Diagnostic Division : Physiological examination room, endoscope room, etc.

  X-ray Division : X-ray rooms, control corridor, reading room, doctor's room, etc.

  Operation Division : Operation rooms, anaesthetic room, recovery room, etc.

  Delivery Division : Labor room, delivery supply room, recovery room, new born baby room, nurse station, etc.

  ICU·CCU Division : ICU·CCU, doctor's room, nurse's room, etc.

  Central Sterilizing Supply Division: Central sterilizing room, sterilized store, staff room, etc.

  Blood Bank Division : Blood collecting room, blood store, examination room, etc.

Physiotherapy Division:

Physiotherapy room, etc.

Forensic Medicine Division:

Forensic medicine room, officer's room, laboratory, etc.

- Mortuary Building

Mortuary Division : Mortuary, autopsy, preparation room, etc.

3) Ward Department

- Main Building

Internal Medicine Ward (78 beds):

6-bed room, 1-bed room, treatment room, nurse station, doctor's room, etc.

Surgery Ward (78 beds):

6-bed room, 1-bed room, treatment room, nurse station, doctor's room, etc.

Obstetrics & Gynaecology Ward:

6-bed room, 1-bed room, treatment room, nurse station, doctor's room, etc.

Paediatrics Ward (78 beds):

6-bed room, 1-bed room, treatment room, nurse station, doctor's room, etc.

4) Medical Administration Department

- Main Building

Superintendent room, matron's room, conference room, officer's room, repair shop, solution making room, reagent room, etc.

- Oxygen mini plant

5) Administration & Service Department

- Main Building
  Cafeteria, electrical room, etc.
- Kitchen and Laundry Building
  Kitchen, laundry, etc.
- Boiler Building
  Boiler room, wood store, etc.
- Incinerator Building
- Pump House
  Pump room
- Maintenance Building
  Building maintenance room, C.C. store, garage, etc.
- Guest House
  Single room (×4)

6) Academic Department

- Main Building
  Lecture room, student lounge, library, doctor's lounge, seminar room, etc.
- Mortuary Building
  Lecture theater, doctor's room

(2) Equipment

The outline and main equipment for the specific departments are as follows.

1) Outpatient Department

- Outpatient Division

  As a referral hospital and a teaching hospital, the equipment for this Division will enable accurate and efficient diagnosis of patients who

cannot be well coped with at township hospital levels, and support necessary education of students.

1. Sphygmomanometer
2. 3-ch. electrocardiograph
3. Resuscitator
4. Stethoscope
5. Gynaecological examining table
6. Gynaecological examining unit
7. Ultrasound diagnostic equipment
8. Dispensary table for powder, liquid and tablet medicine

- Emergency Division

This Division, open 24 hours every day for emergency cases, must have the function to promptly provide life-saving treatment to patients. The equipment will, therefore, include apparatuses capable of quickly performing examinations and diagnoses of diseases or injuries in emergencies, quickly providing pertinent treatments and operations, being prepared at all times.
And the organization of this division enables communication with other division and departments for the control of treated or operated patients.

1. 3-ch. electrocardiograph
2. Universal operating table
3. Anesthesia apparatus
4. Defibrillator
5. Surgical X-ray apparatus
6. Blood chemistry analyzer
7. Bilirubin analyzer
8. Ventilator

2) Central Diagnosis & Treatment Dept.

- Medical Lab. Division

The functions of the Medical Lab. Division of this Hospital will cover biochemistry, haematology, bacteriology and pathology. The biochemistry lab. will chemically analyze specimens (serums and plasma in the main) of cases to determine the functional conditions of organs and to provide effective data for the early discovery and early treatment of diseases. The haematology lab. will take blood counts and do blood coagulation and blood type examinations. The bacteriology

lab. will conduct cultures, separation and identification, and sensitivity tests of bacteria. The pathology lab. will make microscopic tissue samples, and will conduct cytological examinations, histological examinations and tissue cultures. The quantities and capacities of the equipment for this Medical Lab. Division will be determined depending on the scope of these routine examinations as well as on the necessity for the education of students and the estimated number of cases treated.

1. Refrigerated full auto centrifuge
2. Table top ultrasonic cleaner
3. Medical refrigerator
4. Research microscope
5. Blood cell counter
6. Automatic hematostainer
7. Coagulo meter
8. Hemoglobin analyzer
9. Blood chemistry analyzer
10. Anaerobic jar
11. Automatic tissue processor
12. Paraffin oven
13. Automatic slide stainer
14. Sledge microtome

- Diagnostic Division

The physiological examinations are broadly classified into circulatory physiology examinations, nervous and muscular physiology examinations, and respiratory physiology examinations. Electrocardiographs and sphygmographs (cardiac functional diagrams) will be used for circulator physiology examinations. Electroencephalographs will be used for nervous and muscular physiology examinations. Graded pulmometric and dynamo-ventilometric measurements will be done in the respiratory physiology examination. In this Division, ultrasound examinations will also be conducted to examine functions and changes in the diseases of patients. Endoscopes will be used for diagnosing the condition of internal maladies of patients and are available in two types of rigid endoscopes and fiberscopes. By joint use with physiological examinations, cytodiagnosis, observation under magnification, and/or pigment spraying, they can display better performance of examination.

1. Autospirometer
2. Rotary wet spirometer
3. 6-ch electrocardiograph
4. 13-ch electroencephalograph
5. Ultrasound diagnostic equipment
6. Fiberscope, assorted (upper, lower, duodeno)
7. Cold light supply
8. Endoscope table
9. Endoscope washer
10. Fiberscope, child model
11. Electro surgical unit
12. Suction unit, portable
13. Laparoscope/Lecture scope/ Light source

- X-ray Division

X-ray apparatuses including peripheral and relevant equipment, parts and materials necessary for X-ray diagnosis of the human anatomy and organs will be provided. Fluoroscopy and tomography as well as general diagnostic X-ray will be available in the X-ray rooms. The X-ray apparatuses will also be planned to have capacities to cover paediatric and gynaecological patients. The use of X-ray TVs will reduce the consumption of X-ray films that are not easily available in Mandalay.

1. Diagnostic X-ray equipment
2. Remote control type X-ray TV system
3. Tomographic X-ray equipment
4. Mammographic X-ray system
5. Angiocardio diagnostic X-ray system
6. Mobile type X-ray equipment
7. X-ray film auto development processor
8. X-ray film viewer

- Operation Division

This Division will be equipped to ensure capabilities to conduct general operations of surgical, paediatric and gynaecological cases.

1. Operating light
2. Anesthesia apparatus
3. Electro-surgical unit
4. Operating microscope with teaching head
5. Surgical X-ray TV system
6. Anesthesia apparatus with ventilator
7. Defibrillator
8. Surgical instrument set
9. Fiberscope
10. Light source

- Delivery Division

The equipment will have capabilities to secure the safety of mothers' bodies and to diagnose, treat and monitor newborns.

1. Obstetric delivery table
2. Infant incubator
3. Vacuum extractor
4. Infant resuscitator
5. Nursing bottle sterilizer
6. Infant warmer
7. Phototherapy unit
8. Fetal monitor
9. Correction bilirubin meter
10. Neonatal monitor

- ICU·CCU Division

The equipment of this Division will be principally for the life sustainment and resuscitation of patients and will consist mainly of apparatuses for providing centralized treatment and monitoring for patients who require urgent life-sustaining treatment as the result of heavy injuries, shock, cerebrovascular failures or loss of consciousness, or after having undergone a serious operation.

1. Patient monitoring system
2. Neonatal monitor
3. Thermo dilution cardiac output measurement
4. Lung ventilator
5. Oxygen tent
6. Defibrillator
7. Infant incubator
8. Continuous suction unit
9. Pacemaker, external type

- Central Sterilizing Supply Division

This Division will be equipped principally with sterilizing apparatuses for operations, diagnoses and examinations. Only high-pressure steam sterilizer will be equipped, seeing that special sterilizing gas for medical purposes is not easily available in Mandalay.

1. Ultrasonic cleaner
2. High pressure steam sterilizer
3. Washing machine
4. Dryer
5. Cabinet

- Blood Bank Division

The equipment of this Division will be used for collecting blood, examining blood types and examining for syphilis, immunologically examining tuberculoses, detecting and examining autoantibodies and for storing good-quality blood to be transfused in sequence to patients of the Hospital.

1. Refrigerator for blood storaging
2. Microscope, binocular
3. Blood taking bed
4. Centrifuge
5. Water bath
6. Hot air sterilizer
7. Incubator
8. Deep freezer
9. Electric slide rotator

- Physiotherapy Division

The purpose of this Division is to assist in the prompt rehabilitation of patients who have suffered from cerebral apoplexy, arthritis or other nervous failures, or orthopaedic diseases. The physiotherapic equipment will consist mainly of apparatuses for function-recovering treatment and training.

1. Massage bed
2. Training mat
3. Ultra shortwave diathermy unit
4. Ultrasonic therapy apparatus
5. Dragging exercise chair
6. Bicycle exercise
7. Lower limbs extension & flexion exercise chair
8. Low frequency therapy apparatus
9. Exercise equipment set

- Forensic Medicine Division

This Division will examine not only specimens but victims of criminal cases as well. The reception of patients to this Division and the preservation of medical records will be handled independently from those of outpatients and inpatients of the Hospital.

- Mortuary Division

Refrigerator to accommodate 8 corpses and autopsy apparatus will be provided.

1. Mortuary refrigerator
2. Autopsy table
3. Major shadowless operating light
4. Intestine photographic unit

3) Ward Department

- Internal Medicine, Surgery, Obstetrics & Gynaecology and Paediatrics

Each of these wards will be equipped with the appropriate treatment and nursing apparatuses for each purpose. Emergency lifesaving equipment for postoperative care or for treatment of sudden change for worse conditions of patients will also be provided.

1. Gatch bed for adults
2. Bed for paediatrics
3. Infant incubator
4. 3-ch electrocardiography
5. Defibrillator
6. Ultrasonic nebulizer
7. Emergency cart
8. Monitor for fetal
9. Breast pump
10. Ice maker

4) Medical Administration Department

- Repair Section

Instruments and tools necessary for inspecting and repairing medical equipment within the Hospital will be furnished.

1. Oscilloscope
2. Tester
3. Instrument set for repairing

- Supply & Pharmacy Section

This Section will be furnished with equipment for making medical solutions necessary for the treatment of patients operated on or to be operated on at this Hospital. Some solutions are currently made at Mandalay General Hospital for its internal use, and will also be made at this Teaching Hospital in the same way to the same extent. The solutions are distilled water for injection, physiological saline

solution, 5% glucose solution, and 5% glucose + physiological saline solution. Also, apparatus for preparing reagents for measuring and testing equipment, which can be made in this Hospital, will also be furnished to save the Hospital operation costs. Since medical oxygen necessary for hospital operation is not easily available in Mandalay, a system to produce medical oxygen at the minimum necessary level will be provided.

1. Water distilling apparatus
2. Bottle washer
3. Autoclave for bottles
4. Electric balance
5. pH meter
6. Water softner
7. Pipette washer
8. Oxygen production plant
9. Oxygen cylinder

5) Academic Dept.

Teaching equipment to strengthen educational effect for medical students will be provided.

1. Overhead projector
2. Slide projector
3. Video apparatus
4. Projection microscope
5. Photography technic instrument set
6. Darkroom instrument set

3-4 Technical Cooperation

In order to ensure the effective medical services and education at the Mandalay Teaching Hospital after its inauguration, the Government of Burma requested the Government of Japan to extend Project-type Technical Cooperation. In response to this request, the government of Japan decided to conduct a study for technical cooperation, and Japan International Cooperation Agency (JICA) dispatched the Technical Cooperation Survey Team to Burma in August, 1986. The team confirmed and evaluated the content of the request and gained a general information about related plans, and discussed possible outline of the cooperation with the Burmese authorities concerned.

An outline of Project-type Technical Cooperation that the Japanese government at present considers offerable is as follows,

(1) Objectives of Technical Cooperation

Transfer from Japan to Burma of the knowledge, information and skill necessary for medical diagnosis and treatment of patients for internal medicine, surgery, obstetrics and gynaecology, and paediatrics and the operation and maintenance of medical equipment.

(2) Period of Technical Cooperation

The necessary period (5 years at the longest) after signing of the Record of Discussions on the Technical Cooperation.

(3) Contents of Technical Cooperation

1) Dispatch of Japanese Experts

Experts will be dispatched on a long-term or short-term basis, if necessary.

2) Training of Burmese Counterparts in Japan

Burmese counterparts will be trained in Japan during the term of the Technical Cooperation, if necessary.

3) Supply of Equipment

Supplementary equipment required during the technical cooperation period will be supplied, if necessary.

3-5 Estimate of Project Costs to be Borne by the Burmese Government

Considering the contents and scale of the facilities and the extent of the necessary equipment, the project costs to be borne by the Burmese Government can be roughly estimated as follows.

1. Site lveling and soil filling work	3,100,000Ks
2. Temporary water supply work	150,000Ks
3. Temporary electric power supply work	100,000Ks
4. Permanent electric power supply work	400,000Ks
5. Telephone installation work	54,000Ks
6. Exterior work (fence, gate, planting, etc.)	1,200,000Ks
7. Linens, general furniture & fittings	650,000Ks
Total	5,654,000Ks

In addition to the above estimated costs, Burmese Government is required to prepare and bear the costs of taxes for the construction materials and medical equipment which are to be imported from Japan for the project.

CHAPTER 4
BASIC DESIGN

CHAPTER 4 BASIC DESIGN

4-1 Design Policy

Following policies are set up for the basic design of the facilities.

(1) To make the facilities compatible with the local climatic conditions

1) Measures against rain

Mandalay is an area with comparatively less rainfall than the rest of Burma; nevertheless, it rains considerably during the rainy season from May to October, so measures should be considered against damage due to flooding and inundation. Full attention should be given to the setting of ground level and level of the ground floor from ground surface to be based on drainage plan. The safety of roof drainage and depth of eaves to prevent rain from blowing inside should be considered as well.

2) Coping with high temperature and humidity in the rainy season

In Mandalay, the wind blows from the south during the rainy season and from the north or northeast during the dry season. For this reason, it is necessary, in order to keep rooms well-ventilated and in comfortable condition, that a building be on the east-west axis to situate windows on the south and north sides. Furthermore, measures which reduce maintenance outlay against high temperature and humidity such as configuration and positioning of windows and installation of ceiling fans should be taken to keep patients' living space and staff's working space be comfortable.

3) Taking measures to deal with sunlight during the dry season

During the dry season, fine weather with temperature above 33°C occurs every day; therefore, the plan should be made to pay enough attention to the directions of windows, providing eaves, the insulation of roofs and so forth. Besides, since clouds of sand are expected to occur owing to such weather conditions, it is also necessary to take measures to deal with sand in accordance with the functions of each room.

(2) To design facilities suitable to the local conditions

1) To reduce the maintenance and operation costs of the facilities

In Burma, medical care is free and a budget of every hospital is limited both in operation expenses and medical equipment maintenance expenses. In hospitals which are operated with a limited budget, an increase in maintenance and operation expenses results in deteriorated medical services. Besides adoption of natural lighting and natural ventilation, flow of patients, personnel and things should be mainly horizontal and flow plan that requires the minimum use of mechanical power should be employed. Also, building materials and construction methods which could result in easy maintenance and operation of the Burmese side should be selected.

2) To take local situations of medical care and education into consideration in operational aspects

Medicines will be supplied from the Central Medical Store Depot (CMSD) of the Ministry of Health and, in a hospital, received and controlled by the Supply & Pharmacy Section of Medical Administration Department and distributed to each division that will require them. Patients provided with meals from the hospital make up merely 25% of the total due to budget restrictions. Others should rely on meals carried in by their families. Since this hospital is a teaching hospital, it is necessary to furnish seminar rooms for students throughout the various divisions, including the wards in addition to providing lecture rooms in the hospital. Unless these local situations are considered, routine services will naturally be interfered with and useless uneconomical space will be generated.

4-2 Site Plan

(1) Site Use plan

The 62nd street, which is under construction along the west side of the site, will be the front road of the site. This road goes north and crosses the east-west road approximately 250m ahead of the north-side boundary of the site. Power transmission line has already been laid along the east-west road and will be branched off to be led into the site. Water supply will also be taken from this direction in the future. Patients, personnel and students from the central district will approach from the 62nd street southward to get to this hospital. For traffic specifically going to and from the Institute of Medicine, Mandalay (IMM), this street will be used mostly by bicycles and partly by automobiles. Considering these circumstances, it is reasonable to position the hospital buildings near the north side of the whole site which is approximately 850m from south to north and 330m from east to west.

The main entrance to the site will be planned on northwestern side of the site facing the 62nd street. The rotary and parking area for outpatients and visitors will be provided near the main entrance.
The main building of the hospital will be arranged on the northwestern end of the site along the rotary. Service related annex buildings will be gathered on the east side of the main building and guest house at the east side of the annex buildings independently.

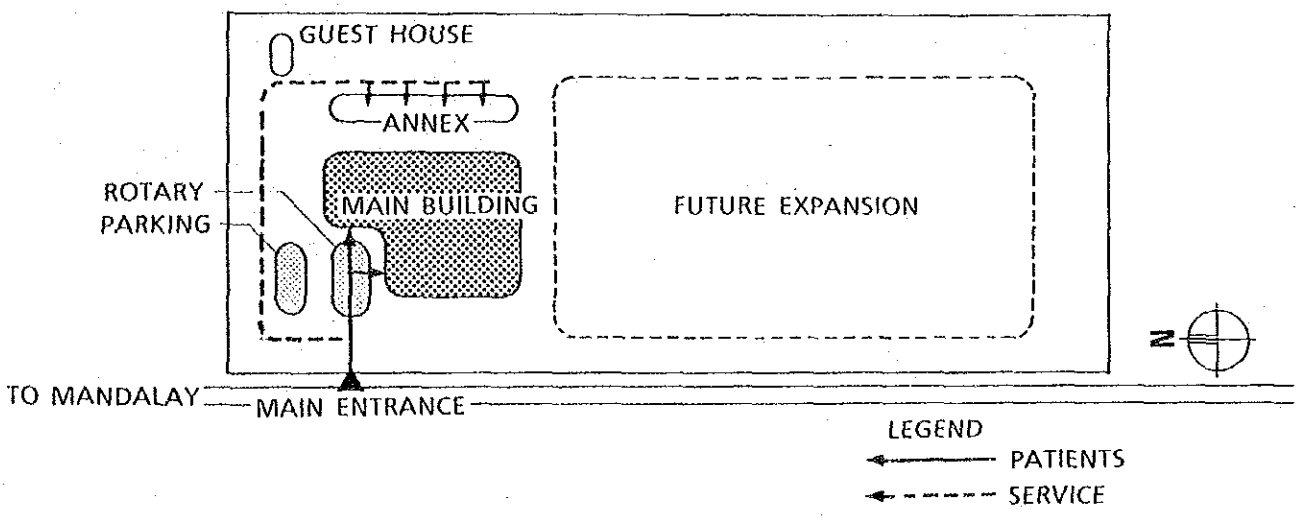


Fig. 4-1 Site use plan

Installation of infrastructure will be planned as shown in Fig.4-2.

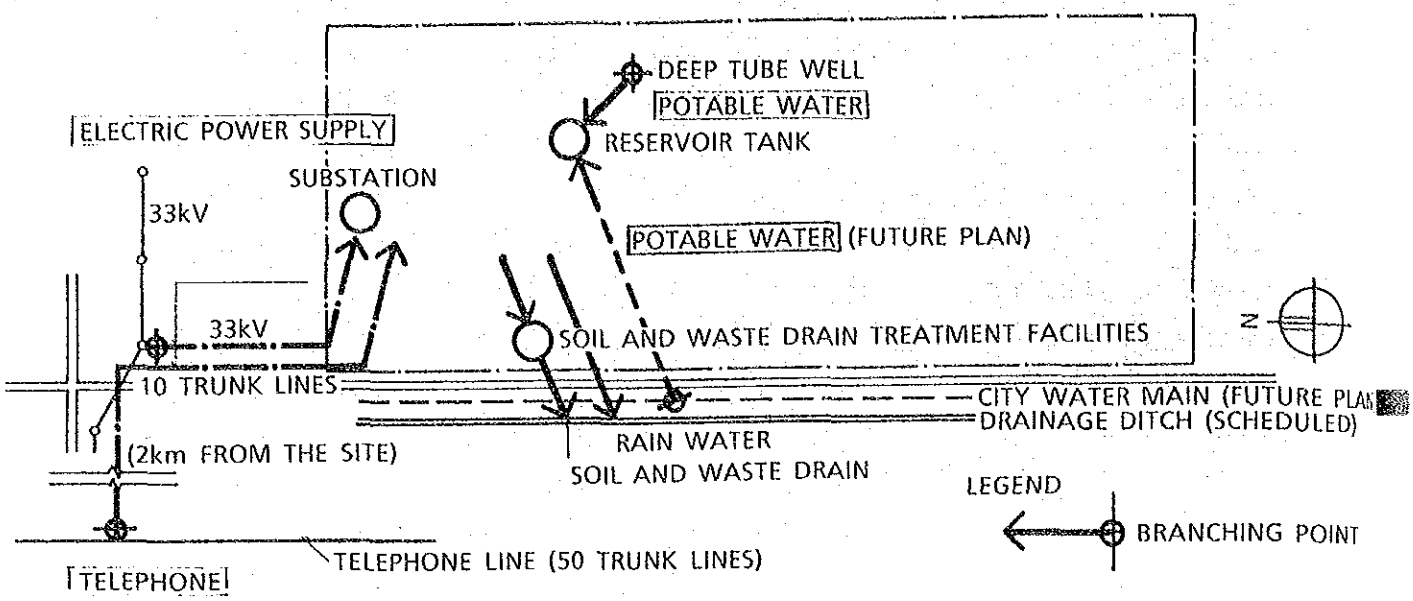


Fig. 4-2 Infrastructure installation plan

As mentioned above, by concentrating the required facilities necessary for the project, approximately 75% (approx. 22ha) of the entire site area (approx. 29ha) is secured for future expansion.

4-3 Architectural Plan

4-3-1 Floor plan

(1) Block plan

Following policies were set up for the consideration of block plan and to make comparison between the alternatives.

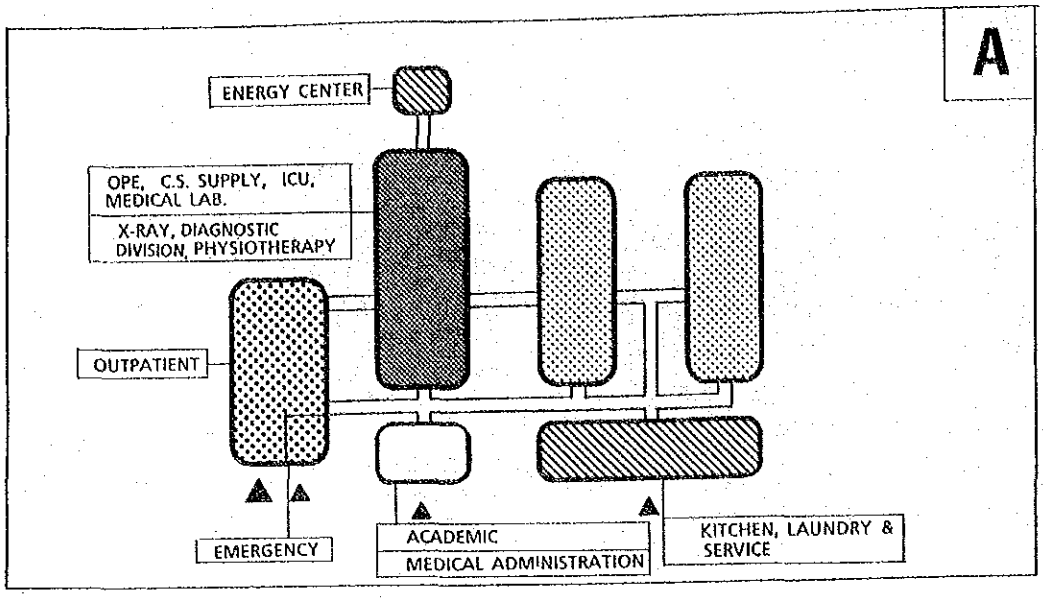
1. All buildings will be planned low-rise in order to minimize the vertical flow of patients and to reduce the maintenance and operation cost of the hospital.

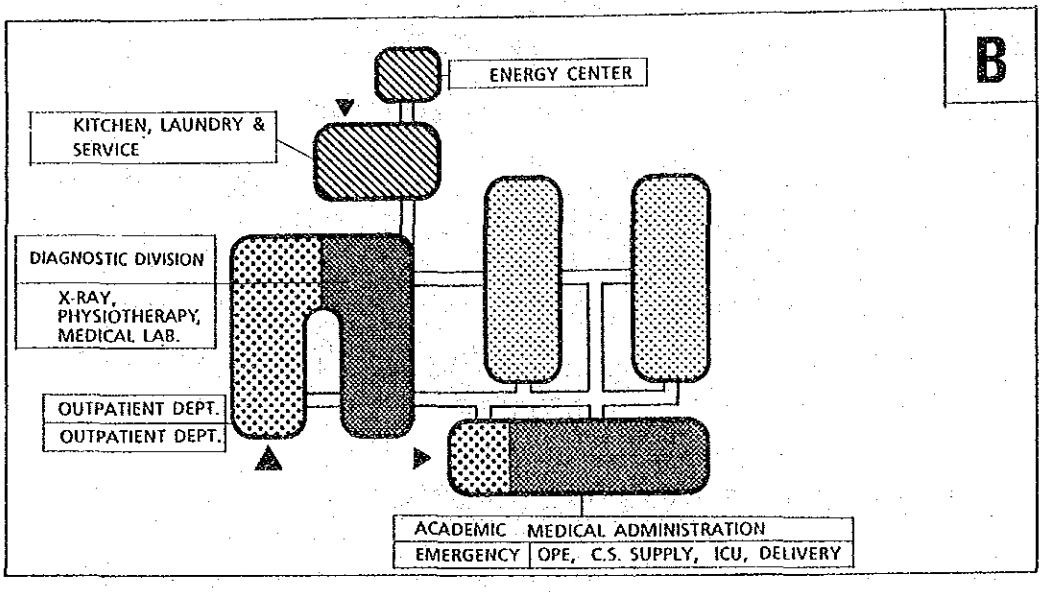
2. The buildings which are spread by making low-rise will be arranged considering the functional connection between each department to consolidate and minimize the path of flow inside the buildings.

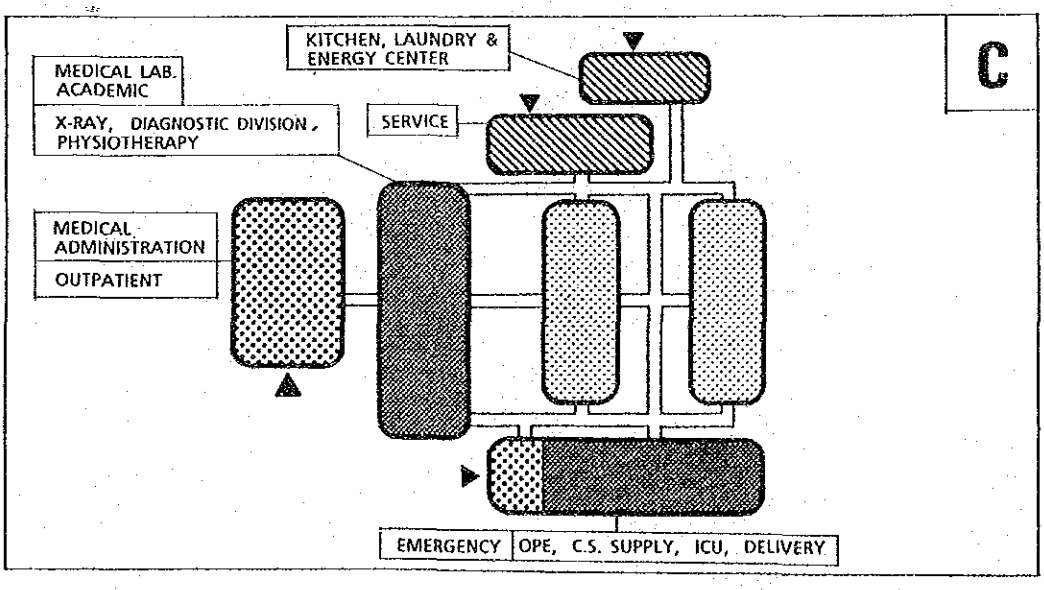
3. Outpatient Department will be arranged at the north side near the main entrance of the site and wards at the south.

4. The wards will be arranged on the east-west axis so that natural ventilation and sunlight control can be maintained satisfactorily all the year around by providing windows on the south and north sides. Natural ventilation system will be adopted wherever possible also in other departments except where it is functionally unsuitable.

5. The area for future expansion will be secured for each department.







OPE: OPERATION
C.S. SUPPLY: CENTRAL STERILIZING SUPLY

Alternative A

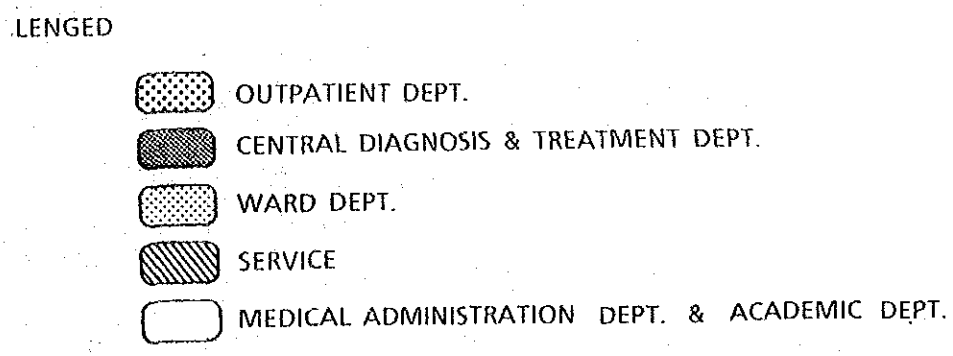
- Locate outpatient block, administration and academic block, and service block on the west side of the site and approach from the west side respectively.
- Locate the Central Diagnosis and Treatment Department between the Outpatient Department and the Ward Department.

Alternative B

- Locate the Operation Division, the Central Sterilizing Supply Division and the Delivery Division of Central Diagnosis and Treatment Department which have close relations with Ward Department and have less relations with Outpatient Department on the ground floor at the west side of the wards.
- Locate the service block on the east side of the site

Alternative C

- Locate the buildings around the courtyard to limit the access of outside people and to make open to inside people.
- Locate the Outpatient Department independently.



Comparison of three alternatives is shown in Table 4-1.

Table 4-1 Comparison of 3 alternatives

	A	B	C
1. Reduction of vertical flow of path	○	○	◎
2. Future expansion	○	○	◎
3. Control of outside people coming in and out	△	△	◎
4. Relations between Outpatient Department and Central Diagnosis & Treatment Department	◎	◎	◎
5. Relations between Wards and Central Diagnosis and Treatment Department	○	◎	◎
6. Relations between Emergency Division and Operation Division	△	◎	◎
7. Relations between Central Sterilizing Supply Division and Operation Division, ICU·CCU Division, Delivery Division	△	◎	◎
8. Relations between Medical Administration Dept. and Administration & Service Dept.	△	△	◎
9. Relations between each Service Section	△	△	◎
Total Result	△	○	◎

From the above comparison result, alternative C was adopted for the block plan of the Project.

The concept of each department composition is shown in Fig.4-3.

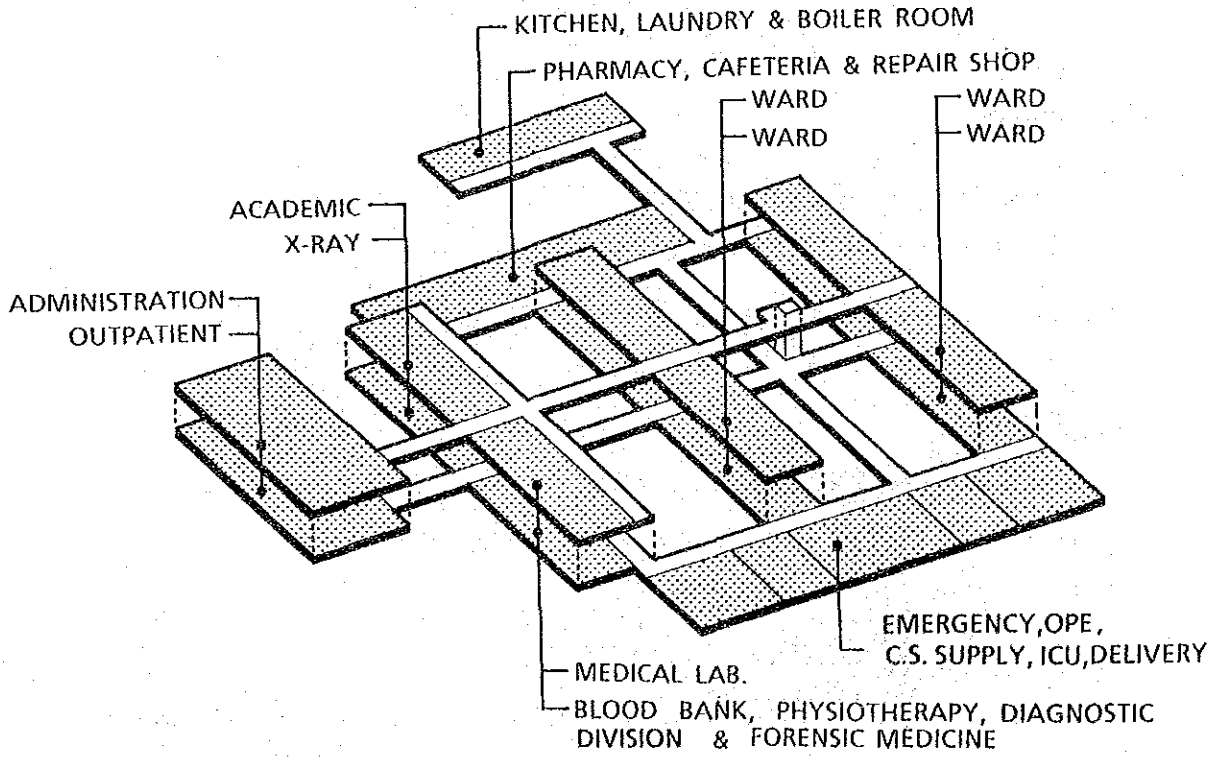


Fig.4-3 Concept of each department composition

(2) Interior flow plan

1) Flow of outpatients

The Outpatient Department forms an independent building and outpatients will be led to the each discipline's examination room through the entrance hall. The X-ray Division, Diagnostic Division, Physiotherapy Division of Central Diagnosis & Treatment Department will be arranged contiguous to Outpatient Department, connected by corridor. Therefore, the outpatients are able to receive their examination and diagnosis without passing through the other departments so that they would have less chance to be infected with other diseases.

The emergency examinations and treatment will be given in the Emergency Division located on the northwestern end of the main building. The examinaiton, X-ray diagnosis, minor operation, etc. for emergency can be done independently in the Emergency Division since they require 24-hour activities. Moreover, when an emergency operation is required, the patient will be carried to the emergency operation room adjacent to the Emergency Division.

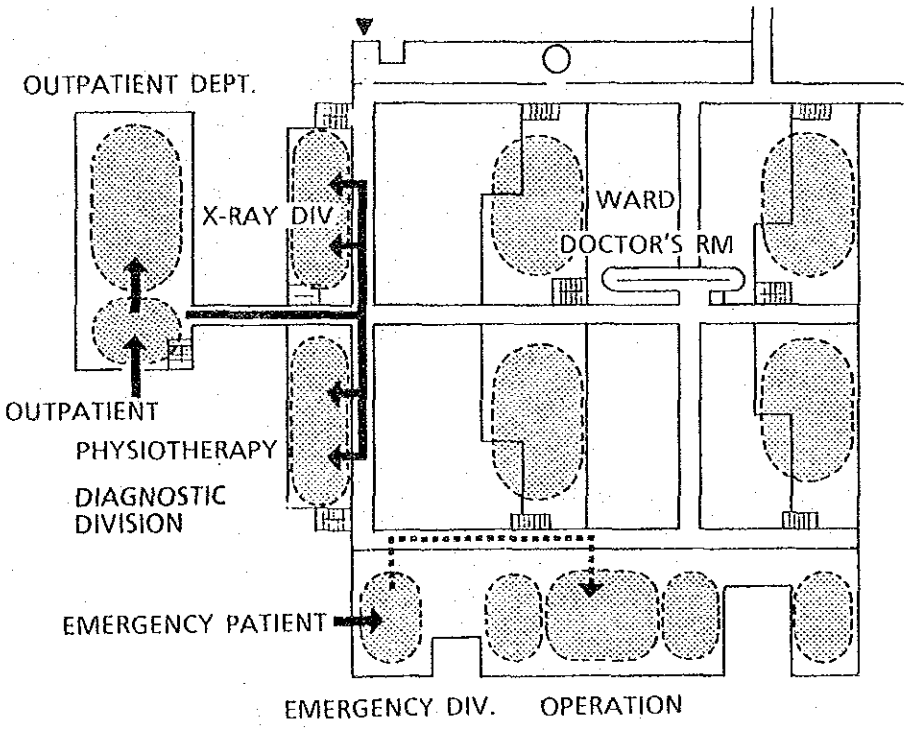


Fig.4-4 Flow of outpatients

2) Flow of inpatients and doctors·staff·students

The Surgery Ward and the Obstetrics & Gynaecology Ward will be arranged on the ground floor adjacent to the Operation Division and the Delivery Division considering their respective relations and minimizing the flow of patients. The Obstetrics & Gynaecology Ward and the Delivery Division are connected with an interior corridor. The move from each ward to Operation Division, X-ray Division, Diagnostic Division and Physiotherapy Division is planned basically not to pass through the other wards. A lift and a slope will be installed to connect the ward on the first floor and each diagnosis and treatment division on the ground floor.

Doctors, staff and students will move complicatedly between their related departments. To cope with their activities, a central corridor which cuts through the hospital in south-north axis will be provided on the ground and the first floor. From the central corridor the secondary corridors will be provided on both sides to consolidate and minimize the flow.

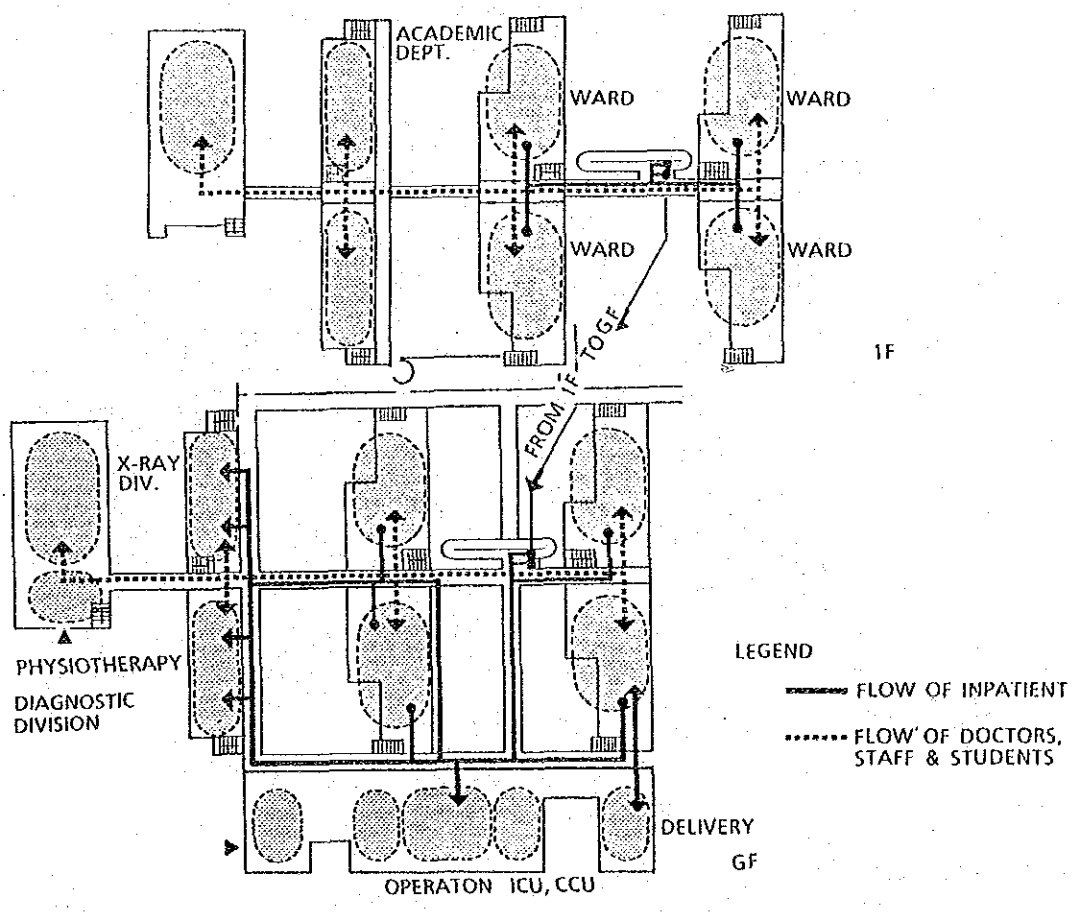


Fig.4-5 Flow of inpatients and doctors·staff·students

3) Flow of service

The service related sections such as kitchen, laundry, solution and reagent making, etc. are arranged on the east side of the hospital. From there, meals, linens, pharmaceuticals, etc. will be supplied to each related section through the corridor which runs south to north on the east side of the hospital.

The Central Sterilizing Supply Division which supplies sterilized materials and instruments is arranged adjacent to the Operation Division where the large part of sterilized materials and instruments are used. Those materials and instruments are directly supplied to the Operation Division.

As for the Delivery Division, ICU·CCU Division, Emergency Division, etc. they are supplied through the corridor which runs south to north on the west side of the wards.

The specimens from Operation Division which need to be urgently tested are transported to Medical Laboratory Division on the first floor also through this corridor.

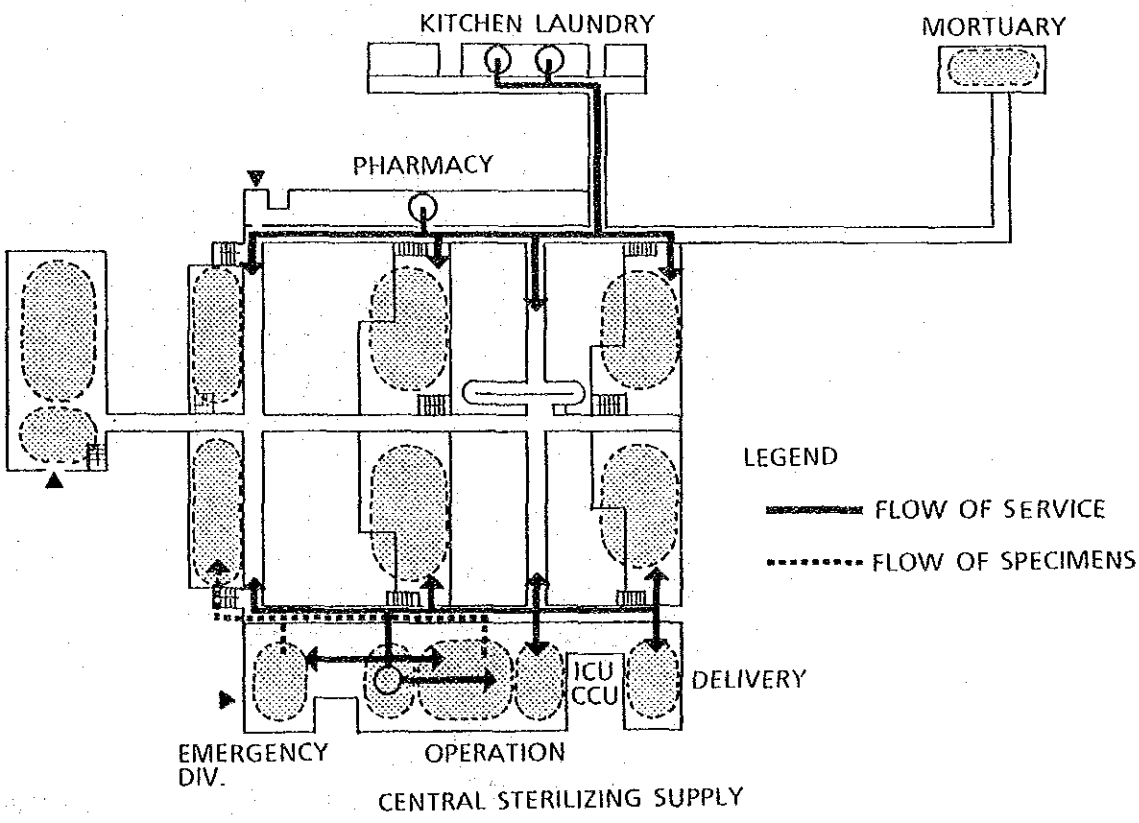


Fig. 4-6 Flow of service

(3) Floor plan of each department

1) Outpatient Department

The Outpatient Department forms an independent building to be connected to other divisions by corridors. Examination rooms of each discipline are to be arranged in two rows on both sides of the light court. Staff passages around the light court connect examination rooms directly to the reception office and the dispensary. The path of flow which is convenient for distributing the patients' medical record files to the examination rooms of each discipline and is also convenient for sending prescriptions to the dispensary. The medical record room which keeps the medical record files of patients who have not come to hospital for certain period will be arranged on the first floor and make relations with the said reception office. The Emergency Division has many patients and is closely related to the Operation Division, then it will be arranged in the northwest end of the main building which is adjacent to the Operation Division to have advantage for contact with the outside. The Emergency Division is composed of emergency diagnosis room, examination room, laboratory, treatment room, etc., where a 24-hour service will be done.

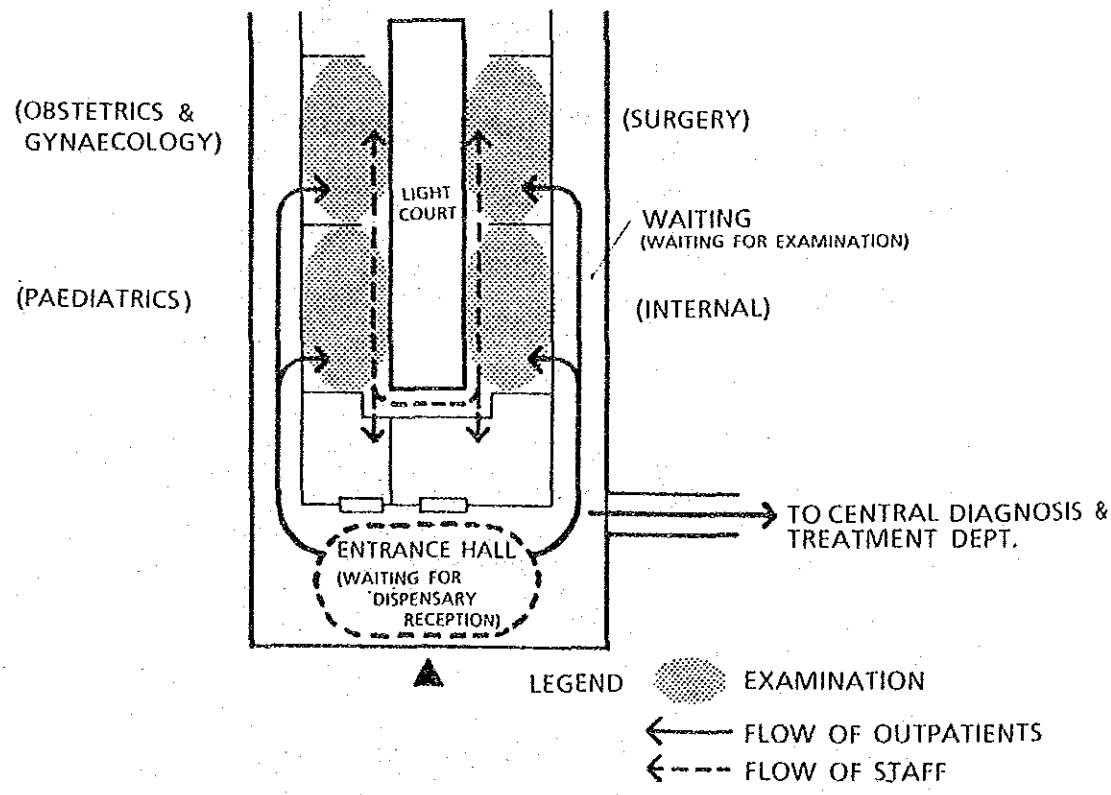


Fig. 4-7 Conceptional plan of Outpatient Department

2) Central Diagnosis and Treatment Department

The Diagnostic Division, X-ray Division, Blood Bank Division, Physiotherapy Division and Forensic Medicine Division where the patients come will be arranged on the ground floor between the Outpatient Department and the Wards, and the Medical Laboratory Division will be arranged on the first floor. The Operation Division will be arranged close to the Emergency Division having the Central Sterilizing Supply Division in between and should be in a position with good connections to the wards. The ICU·CCU Division also should be contiguous to the Operation Division to facilitate its management.

Further, while the Delivery Division should also be arranged to facilitate its receiving services from the Central Sterilizing Supply Division, it should be adjacent to the Obstetrics and Gynaecology Ward. The Mortuary Division should be in an independent building kept apart from other facilities and its paths of flows from the wards should be planned not to intersect with the flow of patients. Autopsy rooms for forensic medicine and pathological anatomy room should be provided; the latter should be attached to the Academic Department and be provided with an observation seats for students.

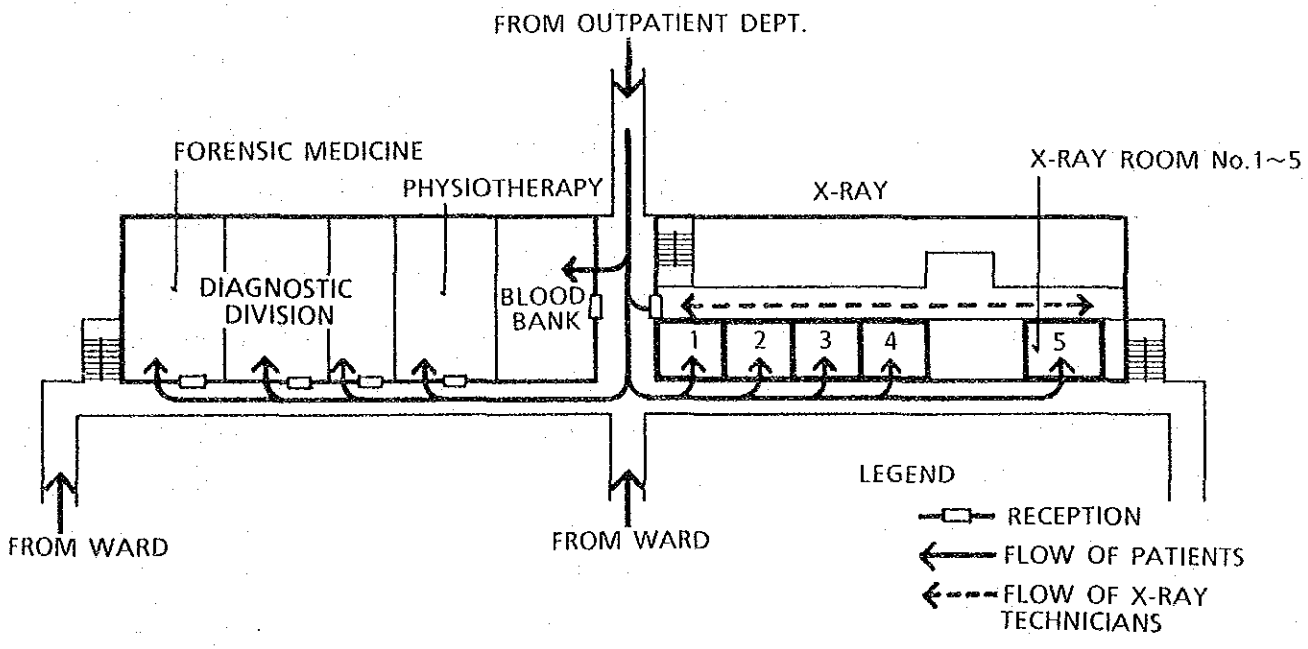


Fig.4-8 Conceptional plan of Central Diagnosis & Treatment Department (1)

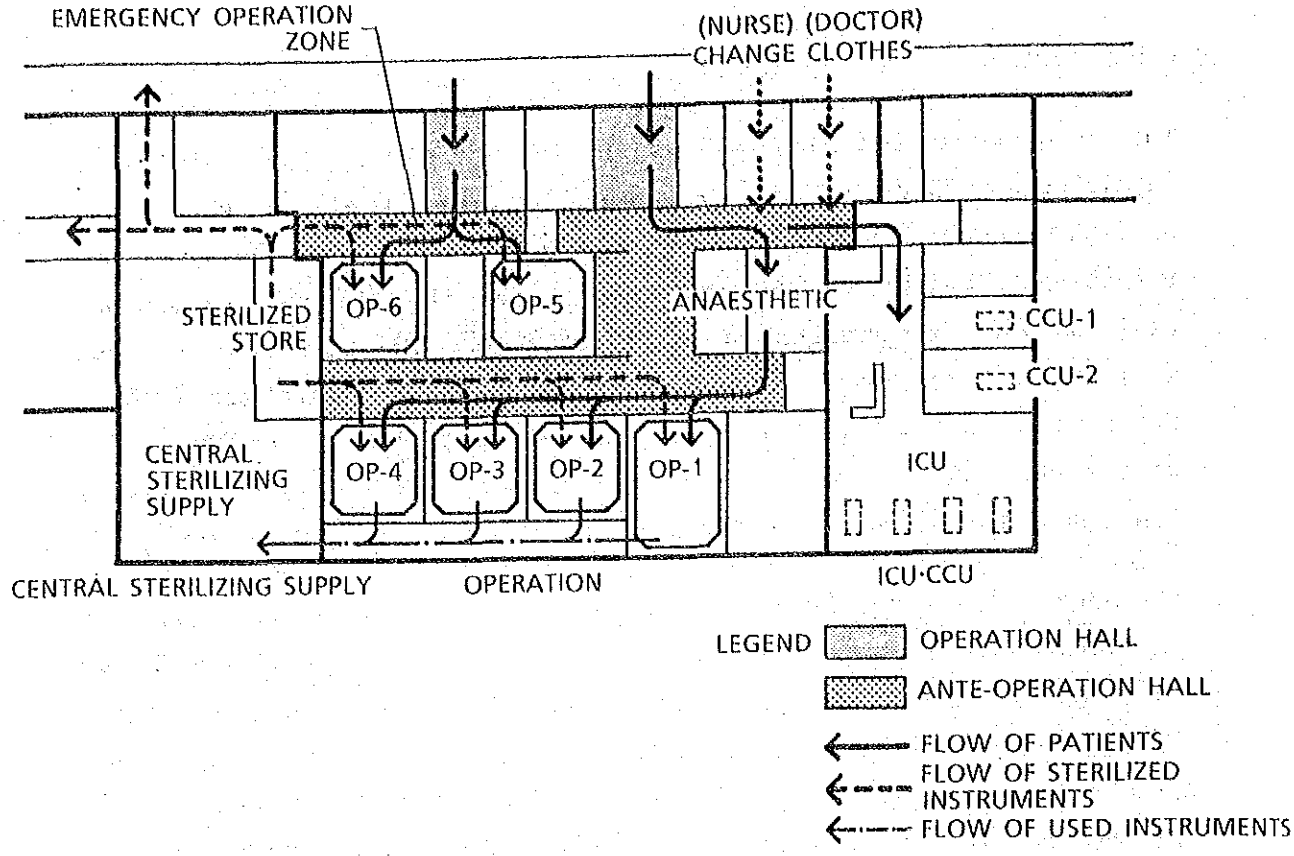


Fig.4-9 Conceptional plan of Central Diagnosis & Treatment Department (2)

3) Ward Department

The Surgery Ward and Obstetrics & Gynaecology Ward, which have frequent connections with the Operation Division and the Emergency Division on the ground floor, should be located on the same floor so that it will be convenient for patients to move between them. The Delivery Division will be arranged contiguous to the Obstetrics & Gynaecology Ward connected by an internal corridor.

On the first floor, the Internal Medicine Ward and the Paediatrics Ward will be planned. For connection between the first floor and the second floor, a lift will be provided, but considering the unavailability of the lift during periodic maintenance and inspection, a slope will also be provided. One nursing unit in the hospital will consist of thirty-nine beds. Each of the four divisions will be composed of two nursing units. Two nursing units will share a pantry and a seminar room. In the Internal Medicine Ward and the Surgery Ward, one nursing unit should further be divided between males and females. Rooms for high care and for patients with infectious diseases should be separated as

single bedrooms; however, the others will be large rooms which are advantageous for natural ventilation and observation of patients.

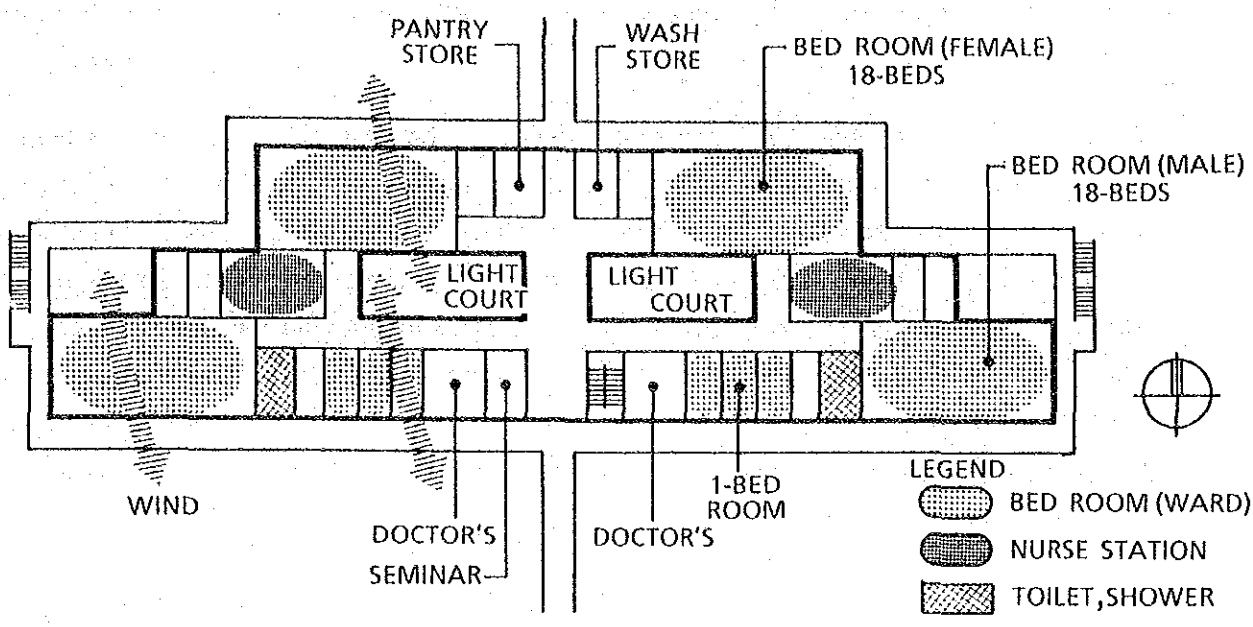


Fig. 4-10 Conceptional plan of Ward

4) Medical Administration Department and Administration & Service Department

Offices of each section, etc., are to be arranged on the first floor of the Outpatient Department, and the Repair Section, Supply and Pharmacy Section are to be arranged on the east side of the main building. It is planned to arrange the Kitchen, Laundry, Maintenance Sections in separate buildings, considering the effects of noise and odors. The guest house is a resting place and has different functions from the hospital facilities; therefore, the guest house will be located in the east end of the site apart from the main building.

5) Academic Department

The lecture rooms can be a noise emitting source to a certain degree and thus should be distant from the wards. However, considering accessibility for clinical practice in each division, they should be located on the first floor of the X-ray Division in the main building.

The related students' lounge, library and doctor's lounge will be arranged around the lecture rooms. Besides, seminar rooms for discoussions at clinical practice will be dispersed in each division.

(4) The number of principal rooms and the basis for calculating their floor areas

In hospitals, rooms for various purposes having diverse relationships among them are required. When deciding what rooms are to be provided, rooms will be selected in accordance with kinds of clinical treatments along with the particular circumstances of each hospital so that the optimum performance of various medical equipment can be assured. Further, the whole floor plan is to be made to facilitate relationships between rooms suitable to the circumstances of each hospital. The reasons for the estimated number of rooms, floor areas, etc., of the principal rooms of the hospital are as follows.

1) Emergency Division (Outpatient Department)

It is required that the Emergency Division, which must be ready to receive patients twenty-four hours a day, be able to function independently even when other divisions are closed. In this connection, at the emergency section of the Rangoon General Hospital, the number of patients increases after 4:30p.m. when the other medical facilities close. In the Mandalay General Hospital, an emergency section has not been established. And two doctors and two assistants are to be on duty of a twenty-four hour system in three shifts at the outpatient department. In the planning of this hospital, two examination rooms (6m×3m) and one treatment room (8m×3m) will be provided. In addition to these rooms, the following rooms will be necessary: one emergency treatment room (8m×6m) with a preparation room where simple operations and plaster cast treatment can be performed in urgent situations, one emergency laboratory (6m×6m) as a facility that can be used as a medical laboratory for general and basic tests including those from after-hour wards, one observation room (6m×9m, about 7 beds) for patients who need post-treatment observations and who wait for being accepted to wards, rooms to support the above-mentioned rooms such as an equipment room for a mobile type X-ray equipment, etc., doctor's room, nurse station, reception office

and waiting room.

The total area of the Emergency Division including the above rooms, etc. will be approximately 600m^2.(Refer to Layout Plan 3.)

2) Medical Laboratory Division, Diagnostic Division (Central Diagnosis and Treatment Department)

Laboratories for performing various tests are planned to be centralized in Japan because quality can be improved by specializing and utilizing advanced equipment and facilities efficiently. In existing hospitals in Burma, the present condition is that centralization is to a low degree. However, the Medical Laboratory Division and Diagnostic Division will be utilized for both Ward Department and Outpatient Department, therefore, it is preferable that they be centralized.

This part includes the Medical Lab. Division for the testing of specimens and the Diagnostic Division for patients.

The following four tests will be performed in the Medical Lab. Division.

Biochemistry test : Fixed quality and quantity tests of various chemical constitutents in the blood and body fluids

Haematology test : Calculation of the numbers of various blood corpuscles, morphological tests of such bodies as white corpuscles, tests of coagulation factor, tests for antigens and antibodies and tests for some viruses

Bacteriology test : Bacterial culture, fixation, tolerance and sensitivity tests of blood, secretions, various body fluids, etc.

Pathology test : Morphological test of changes to morbid states of various tissues, microscope diagnosis of various cells

The biochemistry test and the haematology test will be performed in one room in consideration of convenience of use and that there is thereby

little risk of inter-contamination.
Central laboratory tables (3m×1.5m) should be placed at uniform intervals and side laboratory tables should be placed agafnst the wall. On the laboratory tables, testing and analyzing apparatuses required for testing should be set up to perform the tests. The various apparatuses required by every testing procedure should be set up along the flows of the tests. Shared apparatuses should be located in positions easy to use for staff. In total, the biochemistry and haematology lab. will be approximately 220m^2. (Refer to Layout Plan 7.)

The bacteriology lab. should be independent in consideration of infection and dissemination, and the total area will be approximately 90m^2. In the laboratory, various equipment for testing, analysing and incubating should be set up on laboratory tables. Also a washing room shared with the bacteriology lab. and biochemistry & haematology lab. will be provided.(Refer to Layout Plan 5.)

The pathology lab. will be approximately 130m^2 including a tissue cutting room, a sample room and a microscope room. Since this laboratory will be used frequently for student education, a large working space is required for this division. This laboratoly is also the area to which specimen that need to be urgently tested are sent from the Operation Division. (Refer to Layout Plan 4.)

At the Diagnostic Division, typical test items are electrocardiograph examinations, electroencephalograph examinations, function tests of lungs, ultrasound examinations, endoscopic examinations. The electrocardiograph examinations will be performed by installing one bed and one set of testing equipment in 5.5m×4m corner. The electroencephalograph diagnosis will require a 3m×4m diagnosis booth and an operating corner. The lung function test will be performed by setting a bed and various measurement equipment in a 3m×4m space. Two corners will be provided for the ultrasound examinations due to its high frequency of use. The total area will be approximately 130m^2 including a preparation corner, etc. (Refer to Layout Plan 6.)

Two 3m×4m rooms for endoscopic examinations will be provided. One of the rooms will be used for performing endscopic examinations of various kinds such as on the stomach, trachea, etc. The other room will be

used for intestinal endoscopy. The total area will be approximately 90m^2 including a recovery room, etc.(Refer to Layout Plan 8.)

3) X-ray Division (Central Diagnosis & Treatment Department)

As also mentioned in 3-3-2 Medical Plan, X-ray apparatuses which satisfy the testing purposes and testing items in accordance with the functions of this hospital are selected as follows.

Table 4-2 Estimated number of cases of X-rays examination

Type of X-ray apparatus	No.	Assumed No. of cases per day	Average minutes per case	Total minutes per day
Diagnostic X-ray equipment	2	25 persons×2= 50 persons	10	250
Remote control type X-ray TV system	1	11 persons	15	165
Tomographic X-ray equipment	1	6 persons	20	120
Mammographic X-ray system	1	2 persons	10	20
Angio cardio diagnostic X-ray system	1	1 person	30	30
Total	6	70persons per day		

*Preparation time is included in "average minutes per case".

The required X-ray apparatuses are six units, and the estimated number of tanking X-rays are decided taking into account the number in the Mandalay General Hospital. The estimated number, other than of diagnostic X-ray equipment, counts rather low, however, these units are special shooting apparatuses that cannot be substituted for by other apparatuses to accomplish diagnosis purposes. Thus the apparatuses are judged as necessary in order to assure the function as one of the leading referral hospitals in Upper Burma.

On the other hand, the number of X-ray films used in the Mandalay General Hospital is 121 pieces a day or 1.2 pieces for a single case which is an extremely small quantity. Therefore, considering the securing of X-ray films, more apparatuses than those proposed are assumed to be load on the hospital operation.

The required X-ray rooms for these six X-ray apparatuses total five rooms. Diagnostic X-ray equipment, remote control type X-ray TV system, tomographic X-ray equipment require 5.5m×6m shooting room for each unit.(Refer to Layout Plan 9.) Angio cardio diagnostic X-ray

system requires a 5.5m×9m space including a preparation room. (Refer to Layout Plan 10.) Mammographic X-ray system which is small and is not used frequently should be installed together with tomographic X-ray equipment in the same room for efficiency of space.

Five X-ray rooms is fewer than the average of ordinary 300-bed general hospitals in Japan which is about eight rooms (Architectural Institute of Japan, Thesis Report, Nov., 1981). This is because of lower frequency of shooting and less consumption of X-ray films. The X-ray rooms will be arranged in a line. A waiting area will be laid out on one side, and a control corridor with control tables will be provided on the other side of the X-ray rooms, being separated by observation windows of lead glass, so that a floor plan is easy to use. The control corridor will be 3m wide for layout of equipment.

In addition to above rooms, there are other rooms required for this Division such as a dark room for developing film (6m×6m)(Refer to Layout Plan 11.), a reading room (6m×3m), store, reception office, a seminar room and a doctor's room. The total area of the X-ray Division will be approximately 720m^2.

4) Operation Division (Central Diagnosis and Treatment Department)

In the Mandalay General Hospital which has approx. 1,300 inpatients, 9,371 regular operations and 6,028 emergency operations were performed in 1985. When estimating the number of operations in this teaching hospital with 318 beds (24.5% of the number of the Mandalay General Hospital), annually, 2,295 regular operations (9,371×0.245) and 1,476 emergency operations (6,028×0.245) are estimated. The regular operations are supposed to be performed roughly five times a week or 260 days a year at the rate of 8.8 operations a day (2,295÷260). The operation hours will be six hours a day from 8 a.m. to 2 p.m. Two or three operations a day (average:2.5) will be performed in one operation room. Therefore, in order to perform 8.8 operations a day, four operation rooms (8.8÷2.5=3.52) will be necessary.

The Operation Division requires a high state of cleanliness. Therefore, in the floor plan, it has to be divided into zones according to levels of cleanliness, and transporting routes for equipment after operation

has to be separated. In this hospital as well, four regular operation rooms should be planned according to this zoning system. The emergency operation rooms which have high frequency of use should be planned in a different zone not to disturb other zones. The emergency operations which may occur everyday will number four cases a day (1,476÷365=4.04). In Burma operations of remarkable infectious diseases are performed in emergency operation zones to prevent infection to the regular operation zones. After the operation of infectious diseases, the operation room has to be sterilized.
Since, the need for emergency operations occurs at any time, one room is not enough. Therefore, there should be two operation rooms in this zone.

In Japanese hospitals, the number of operation rooms are generally one for 60 to 70 beds and 5 operation rooms for a hospital with 300 beds (Architectural Institute of Japan, Thesis Report, Nov., 1981). However, in Burma, average duration of stay of inpatients is shorter than the Japanese average, and the number of operations carried out per number of beds is more than that of Japan. In consideration of these local situations, the necessary number of operation rooms was determined to be 6. In addition, an Operation Division of this scale is usually provided with one sterile operation room of which cleanliness of the air is especially improved. However, it is not proposed in this hospital because it would cause certain problems in terms of management and operation. The size of one operation room will be 6m×6m as a standard and an anesthetic room, recovery room, an equipment room, locker rooms for males and females, etc., will be required in this division.(Refer to Layout Plan 12.)

The total area of the Operation Division will be approximately 860m^2 including corridors.

5) Delivery Division (Central Diagnosis and Treatment Department)

The number of deliveries in the Mandalay General Hospital, which has 156 beds (78 beds×2) for its obstetrics and gynaecology ward, is 20 a day with a total of 15 normal deliveries and 5 abnormal deliveries. Based upon this data, when estimating the number of deliveries at this hospital, which will have 78 beds for the obstetrics and gynaecology

ward, it will be 6 a day with a total of 4.5 normal deliveries and 1.5 abnormal deliveries. (20 deliveries×78 beds/(156 beds×1.6)=6 deliveries. This is calculated considering that actual inpatients of the Mandalay General Hospital are 1.6 times the nominal number of beds.) This makes the monthly rotation number of beds 4.6 times, assuming that 39 beds are used for the obstetrics discipline out of the 78 beds in the obstetrics and gynaecology ward. (39 beds × 4.6=180 deliveries (per month)= 6 deliveries × 30 days)

For the above reasons, two delivery rooms (6m×6m, 4m×6m) will be provided. The Larger room will cope with abnormal deliveries with necessary equipment. In addition to the above-mentioned two delivery rooms, the Delivery Division requires a preparation room, two labor rooms, a recovery room, a newborn baby room (24 newborn baby cots = 6 deliveries/day × 4 days), a nurse station and other auxiliary rooms to facilitate the function of the above-mentioned rooms.(Refer to Layout Plan 14.)

The total area of the Delivery Division will be approximately 340m^2.

6) ICU·CCU Division (Central Diagnosis and Treatment Department)

ICU (Intensive Care Unit) is a nursing unit aimed at treating critical patients requiring first aid and lifesaving who suffer from external injuries, acute dyspnea, shock, cerebral-vascular failures and loss of consciousness and who have undergone major operations. Twenty-four hours a day, a doctor and one nurse (for every two patients) will be on duty in the unit. A CCU (Coronary Care Unit) for patients who suffer from circulatory organ diseases will require a private room because the patients are conscious and are affected by their surroundings. There are various estimates of number of beds for an ICU; they vary from 1 to 5% of the total number of beds of respective hospitals. In this project, 6 beds, which is 2% of 318 beds will be provided. It is desired that the ICU should have many beds in consideration of the fact that it is a nursing unit where patients are nursed with special care. From the aspect of hospital operation, however, there is a practical limit to the number of beds since the unit requires many nurses. On

the contrary, too small number of beds in a unit causes unefficiency of the facility due to various auxiliary rooms to form a nursing unit.

According to the survey on the number of beds actually used in ICU in Japanese hospitals, it is usually 6 to 7 beds regardless of the total hospital bed number. According to the provisional plan of the ICU study committee of the Ministry of Health and Welfare of Japan, it is recommended that the ICU of a hospital with 300 to 500 beds should have 7 beds (total area: 350m^2).
Furthermore, in the recommended design criteria of the U.S. Public Health Bureau, six beds form a unit.

In an ICU, considerable space around the beds for equipment and nursing activities is necessary for intensive nursing. In Japan, the area used exclusively to one patient in a treatment room is 15m^2 or more per bed and 90m^2 or more for 6 beds. An observation counter should be set in a position from where the whole room can be observed. In addition to that, a preparation area, doctor's room and nurse's room will be required. In this Hospital, the total area of the ICU·CCU Division will be aproximately 300m^2. (Refer to Layout Plan 15.)

4-3-2 Elevation and section plans

As mentioned in the Design Policy, it is necessary that section plans be made considering the prevention of rainwater incursion, shading from direct sunlight and measures against flood damage. Floor heights will be 4.0m on the ground floor and, on the first floor, 4.0m for the Central Diagnosis and Treatment Department and 3.6m for the Medical Administration Department, Administraiton & Service Department and Ward Department. Considering the prevention of flood damage and that almost all the ground floor will be planned with occupancy rooms, the floor should be 60cm above the ground level which will be filled by 50cm on average from the existing ground level (to be filled by the Burmese side).

The roofs will have pitch of 3.5 in 10 as a standard to discharge promptly a large quantity of rain. Asphalt shingle roofing method with insulation will be employed for the roofing material so that shape of the building will look light. As for roof drainage, water will be led off of the

building and discharged through down pipes which will be installed outside the building to prevent water from getting into the building. Window should be designed to utilize natural ventilation in both the dry and rainy seasons for occupancy rooms such as the examination rooms, laboratories, wards, etc. Transum windows will be provided on the corridor side to allow for natural ventilation. And in exterior walls where rain is expected to hit transom, windows should be provided under the eaves, so that the windows can be kept open even in rainy weather.

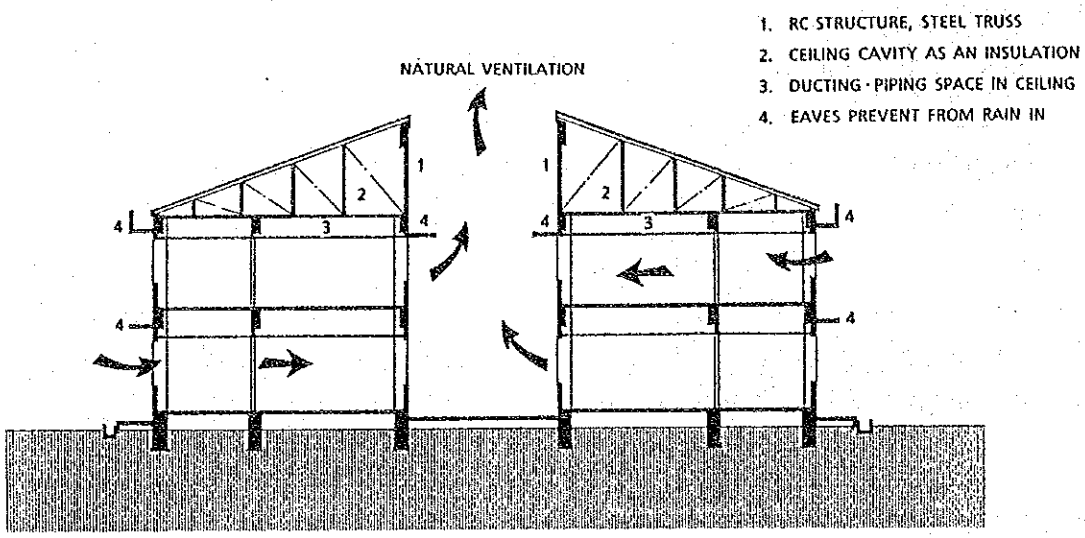


Fig. 4-11 Section plan

4-3-3 Building material plan

Overall factors such as a climate, required design conditions for each room, necessary functions, local construction situation, construction period, construction cost and low maintenance cost need to be studied for making material plan.

(1) Structural materials

The structural materials should be basically a combination of reinforced concrete structure and brick walls which is popularly used in Burma. There is not a particularly critical problem regarding the quality and quantity of production of cement, aggregate and bricks supplied locally.

(2) Finishing materials

Criteria for selection of finishing materials are their durability and easy maintainance. For major finishing materials having a significant effect upon the life span of the facilities such as exterior wall finishing and roofing, materials of which property have been proven both in economy and durability in Japan will be employed. For other parts, local materials that can be repaired by the Burmese side will be employed wherever possible.

- Exterior finishing materials

(1) Roof

In the major buildings, roof slabs will be made of reinforced concrete. Over the slabs, steel roof trusses will be placed, and the roofs will be finished with asphalt shingle with insulation on water-proof plywood sheathings so that air space in the attics will be insulation to keep down temperatures on the top floor.

(2) Exterior walls

The exterior walls that will be exposed to rain should be made of reinforced concrete considering its waterproof capacity. However, walls that will not be exposed to much rain such as walls at corridors and inside of balconies will be made of bricks to shorten the construction period and to reduce the construction cost. The exterior walls will be finished with sprayed tile on cement mortar. Sprayed tile finish is much more durable than paint finish and requires less maintenance. Therefore, it is advantageous to use the sprayed tile from the aspect of maintenance costs including temporary works such as scaffoldings for repaint, although the initial unit price of it is higher than that of paint finish.

(3) Windows and doors

Exterior windows will be aluminum sash. Maintenance for them are easier than that of steel fittings as there is no need of repainting. Moreover, unlike wooden fittings, there is no worry about termite damage. In addition, it is easy to assure airtightness for air conditioning and dustproofing.

- Interior finishing materials

(1) Floors

Basically, floors in both rooms and corridors will be finished with cast in place terrazzo. Cast in place terrazzo is most popularly used in Burma and is excellent in durability and from the aspect of maintenance. It is easy to clean and thus hygienic because it has a smooth surface. Moreover, it is rather inexpensive in Burma.

(2) Internal walls

The standard finish for the reinforced concrete walls and brick walls will be paint on cement mortar. For simple partitioning, light-gauge stud partitions will be used in order to facilitate future relocation of partitions. Walls of rooms which are often washed such as toilets, shower rooms and laundries will be finished with semi-porcelain tiles. As for the walls of operation rooms, in the double walls, various equipment, shelves, ducts and so forth should be built in so that dust will not accumulate. Therefore, the walls should be made of steel sheet panels which are suitable to adjust built-in equipment installation.

(3) Ceilings

The standard ceiling finish for general rooms will be paint on remedied soffit of concrete slabs. The seminar rooms, lecture rooms and conference rooms which require sound absorption should have suspended ceilings of mineral wool accoustic tiles. Rooms where pipes are exposed such as toilets and shower rooms should have suspended ceiling of painted calcium silicate boards.

4-3-4 Structure plan

(1) Outline of the building

This building will be used as a hospital and is specified as follows.

Number of stories	:	2 stories (partly one-storied)
Floor height	:	Ground floor - 4.0m
		First floor - 4.0m (partly 3.6m)
Floor area	:	Approx. 17,990m^2

(2) Outline of the structure

1) Structural system

This building is a low-rise building with two stories (partly one-storied) and seismic intensity in Burma is roughly half that in Japan: therefore, earthquakes are not significant factors on structural design. Moreover, when considering the Burmese climate, construction techniques, construction period and economy, it is considered to be proper to employ rigid frame reinforced concrete structures for the structural system.

2) Foundation system

According to the boring data obtained from the Burmese side, the soil of the site is a dark gray silty clay layer with N value of 10 to 20 down to 2.5m below the ground surface. Below this layer, densed yellowish brown silty clay with trace of sand and gravel with N value of 20 or more follows. The upper layer of dark gray silty clay is generally called black cotton soil. It is very hard and exhibits high strength when dry, however, the strength becomes remarkably lower when wet and moist. Moreover, this soil is expansive through the effects of water and has a great expansion pressure. So attention should be paid to this because it can have an adverse effect on the buildings.
According to the above conditions, it is proper to employ a direct footing foundation making a supporting layer deeper than 2.5m from the ground surface which is not affected by the expansive soil.

In addition, the ground floor slab should be supported by girders and beams to avoid direct contact with the ground. It is necessary to

consider such measures as making concrete walkway with 2m wide along the perimeter of the building to prevent the rainwater from penetrating into the ground under the buildings.

(3) Structural materials

Concrete : Normal concrete, Fc=180kg/cm^2 (four week age strength)

Steel bars : 16mm or less SD30, Fy=3,000kg/cm^2
19mm or more SD35, Fy=3,500kg/cm^2

Structural steel : SS41, Fy=2,400kg/cm^2

(4) Codes and standards

There are no official codes for structural design in Burma. Accordingly, the structural design in this project is planned to be based on the Japanese Structural Calculation Standard.

(5) Design load and external force

1) Dead load

Dead loads will be calculated by the weight of structural materials and finishing materials.

2) Live load

Live loads will be in accordance with the Building Code of Japan.

3) Seismic force

Burma is located in the Eurasian Earthquake Zone and disasters caused by earthquakes have been recorded in the past. Therefore, it is necessary to apply an aseismatic structural design. Calculation of seismic force is based on to the "Draft Aseismatic Design Standard of Burma."

- Design Seismic Intensity (K)

$K = \alpha \cdot \beta \cdot \gamma \cdot Ko$

K : Design seismic intensity
Ko: Standard design seismic intensity (0.1)
α : Zone coefficient (Mandalay area: 1.0)
β : Soil condition coefficient (Silty clay: 1.2)
γ : Coefficient of usage (1.0)

According to the above mentioned factors, the design seismic intensity (K) employed for the design will be:

$K = \alpha \cdot \beta \cdot \gamma \cdot Ko = 1.0 \times 1.2 \times 1.0 \times 0.1 = 0.12$

4) Allowable bearing capacity of soil

Ra = 15 t/m^2

4-3-5 Utility plan

(1) Electrical Facilities Plan

1) Power Supply System

- Substation

An outdoor type substation (having approximately 1,000kVA transformer which transforms from 33kV to 11kV) will be installed near the north boundary of the site where electric power is led in from existing 33kV 3 phase 3 wire 50Hz overhead power line which runs along the Theik Pan street north of the site.

Furthermore, an indoor type substation (having approximately 1,000kVA transformer which transforms from 11kV to 400-230V) will be installed in the Administration & Service Department of the main building from which electric power is supplied to each load.
The work from existing 33kV power line to the power receiving point located near the north boundary of the site will be executed by the Burmese side.
After the power receiving point, power supply system work for the Project will be included in the scope of the Japanese side work.

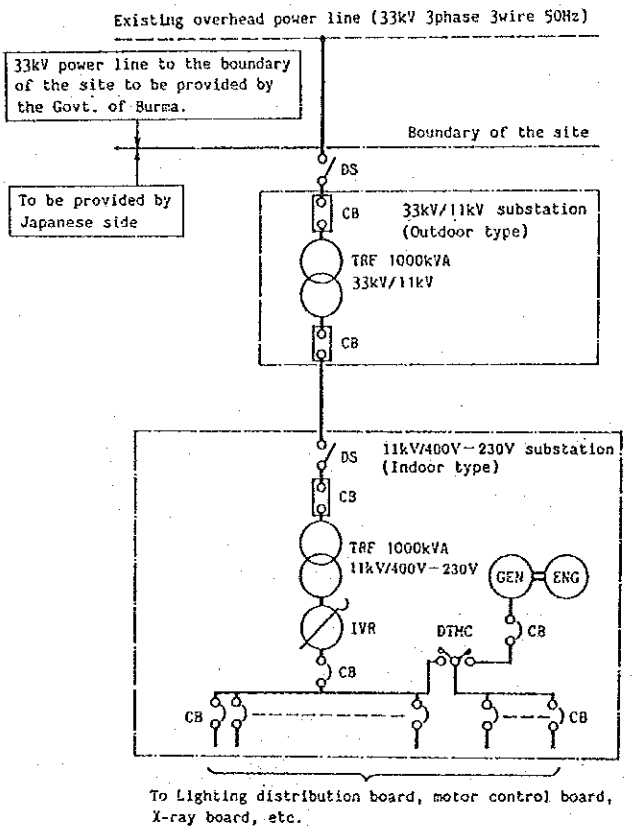
As a measure against voltage irregularity, an induction type automatic voltage regulator (IVR) will be provided at secondary side of the transformer.

• Generator System

In Mandalay, power failure which includes scheduled power cut often occurs.

In order to prevent suspension of hospital functions, a generator system will be provided as an emergency power source for minimum number of equipment in operating the necessary functions of the hospital.

Such equipment will be installed in emergency treatment room, operation rooms, delivery rooms, ICU·CCU, blood bank, mortuary, etc. The capacity of the generator will be approximately 400 kVA and the power supply system diagram is shown in Fig.4-12.



Note DS : DISCONNECTING SWITCH
CB : CIRCUIT BREAKER
TRF : TRANSFORMER
IVR : INDUCTION TYPE AUTOMATIC VOLTAGE REGULATOR
GEN : GENERATOR
ENG : ENGINE
DTMC : DOUBLE THROW MAGNETIC CONTRACTOR

Fig. 4-12 Power Supply Diagram

2) Lighting System

Fluorescent lamps will be mainly used for lighting sources and incadescent lamps will be partly used for rooms that require such lamps for their functions.

The average illumination levels for main rooms are shown in the following table.

Table 4-3 Average illumination levels

Room	Design illuminance	Standard illuminance by JIS
Outpatient examination room	300 lx	300~750 lx
Laboratory	300 lx	300~750 lx
Operation room	500 lx	750~1500 lx
Office	300 lx	300~750 lx
Bed room (Ward)	100 lx	100~200 lx
Nurse station	300 lx	300~750 lx
Service	50 lx	75~100 lx

Types of lighting fixture will be surface mounting or pipe pendant. Recessed type fixture will be installed in operation, etc.

3) Socket outlet

Socket outlets will be provided to supply electric power to small electric appliances of medical equipment. Especially, to some important equipment, power will be supplied through quick response static type automatic voltage regulators to avoid damage or misaction caused by momentary voltage irregularity.

4) Telephone system

A telephone exchange equipment and a reception telephone will be installed in an office room of the main building.

The telephone exchange equipment will have capacity of about 10 trunk line (COL) and 100 extension lines.

The extension telephone sets will be installed in offices, examination rooms, laboratories, operation rooms, nurse stations etc.

5) Electric clock system

An electric master clock will be installed in an office of the main building and slave clocks which are run by the master clock's signal will be installed in offices, examination rooms, laboratories nurse stations, etc.

An operation timer (hr, min, sec) will be installed in each operation room.

6) Public address system

An amplifier will be installed in an office of the main building to broadcast message to each department. Output of the amplifier will be about 300W with a twenty-circuit switchboard. Speakers will be installed in corridors, examination rooms, laboratories, operation rooms, nurse stations, etc.

7) Nurse call intercom system

Nurse call intercoms will have functions such as call-indication and conversation and be installed in each bed in the ward, toilet etc. connecting the nurse station.
The intercom system will be both way communication type and be installed on one channel for one bed room basis.

nurse station	:	nurse call master
each bed, toilet, shower	:	wall unit(microphone, call botton, call lamp, reset button)
bed room, toilet, shower	:	speaker

8) Fire alarm system

Fire alarm board will be installed in an office of the main building. A fire alarm bell and a indication lamp will be provided upper part of fire hydrant box and starting switch for fire hydrant pump will be installed inside the fire hydrant box.
No fire-detecting sensors will be installed.

9) Lightning protection system

Lightning arresters will be installed on each building to protect against lightning damage.

(2) Air conditioning facilities

1) Indoor and outdoor design air conditions

- Outside design air temperature
  Temperature : 40 deg.C (D.B.)
  Humidity : 27 deg.C (W.B.)
- Room design temperature (only when air conditioned)
  Temperature : 25 deg.C (D.B.)

2) Rooms to be air conditioned

Rooms to be air conditioned should be limited to the minimum that particularly require the assurance of room air cleanliness, control of air pressure and removal of equipment heat radiation in accordance with the hospital functions in order to lighten the load of hospital management caused by an increase in equipment operating costs.

In addition, individual air conditioners will be installed in the guest house, etc.

3) Air conditioning system

Air conditioning will be executed by air cooled packaged type air conditioners and individual air conditioners, considering the easy maintenance without the control of cooling water qualities.

4) Air supply, exhaust and ventilation system

In the architectural plan, natural ventilation is adopted for the air supply, exhaust and ventilation system from the point of view of reducing running costs: however, ceiling fans will be installed in the wards, etc., considering that the outside temperature is high during the dry season. In addition, exhaust air equipment will be installed in rooms where odors of chemicals, etc., are generated.

5) Automatic control system

Indoor air temperatures will be controlled by temperature detectors.

(3) Sanitary and plumbing facilities

1) Water supply system

Currently, there is no supply of city water around the site. Although the Mandalay City New Water Supply Project is under way to supply city water to the areas around the site, there is nevertheless no guarantee that construction of the city water supply will be completed by the start or completion of the building work. Therefore, well water should be used for the buildings.

In the future, when city water is supplied, the well water will be a back up water supply system. So it will be possible to prevent the stoppage of hospital functions caused by a suspension of the city water supply.

The deep well should be 150mm in diameter and approximately 122m (400 feet) in depth.

The well water pumped by a deep well pump will be stored in an FRP reservoir tank (300m3) installed on the ground after removing sand and filtering the water with a sand remover and sand filters. It will be pumped up to FRP panel tank (40m3) installed in water tank tower and then supplied to each necessary place by gravity. Further, when pumped, the water will be sterilized by a chemical pouring pump.

All tanks should be divided into two so that the water can be usable at the time of periodic cleaning. Carbon steel pipes (white) will be used for piping materials.

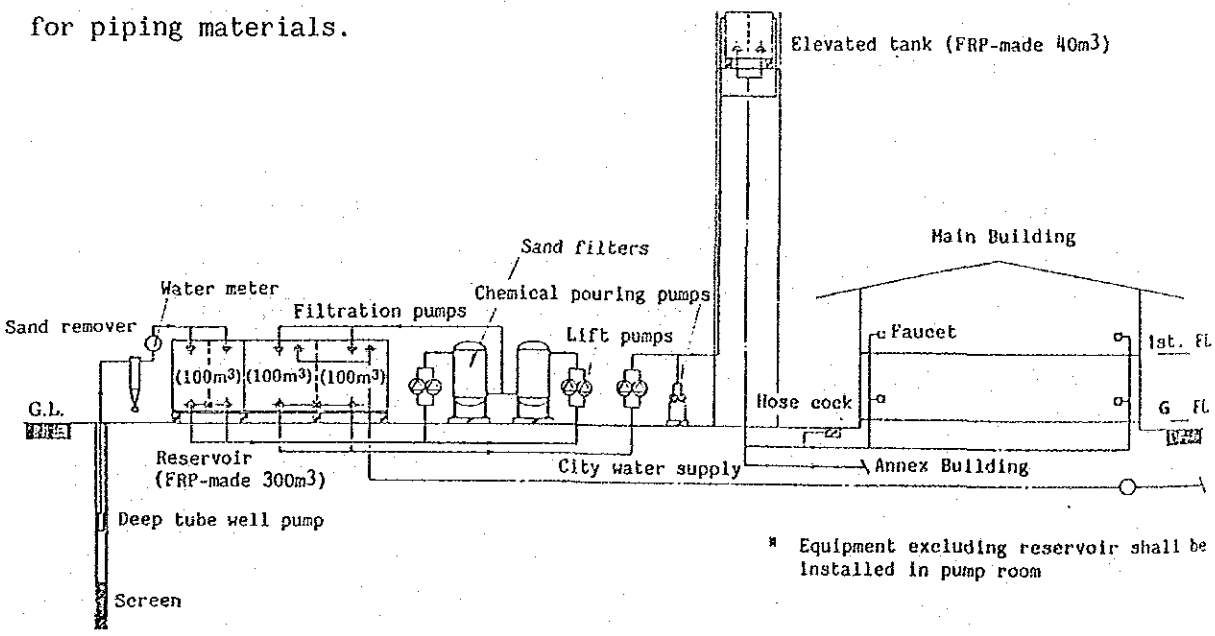


Fig.4-13 Schematic Piping Diagram of Water Supply System

2) Drainage and vent piping system

A combined sewer system will be employed for the drainage system both indoors and outdoors. Treated water by combined soil and waste water treatment facilities and rain water will be discharged respectively to draining gutters which will be constructed before the completion of this hospital.

Neutralizing equipment will be installed for control pH values. In addition, a grease trap will be installed for drainage from the kitchen connecting with the combined soil and waste water treatment facilities to be disposed of. The vent piping system should employ a circuit vent method.

3) Soil and waste water treatment facilities

Soil and waste water will be treated by the combined treatment system with long term aeration and be discharged after sterilizing treatment (chlorine liquid) so that drainage from the hospital will not pollute rivers. Target value of treated water will be BOD 20ppm and SS 50ppm: the quantity of water to be treated will be approx. 220m^3/day.

4) Domestic hot water supply system

The hot-water supply will be a centralized system. Hot water will be supplied to the central sterilizing supply room, dark room, newborn baby room, etc., but will not supply hot water to ordinary toilets, shower rooms, etc. Besides, individual hot-water supply equipment will be installed in the guest house. Non-acid copper pipes will be used for piping materials of the hot-water supply.

5) Sanitary fixture

Squatting type water closets will be installed in the Outpatient Department and Wards and sitting type water closets for required toilets. And urinals, washing basins, slope sinks, etc will be installed in toilets.

6) Kitchen equipment

Kitchen equipment will be selected considering local dietary customs for inpatients. Kitchen equipment will be composed of soup kettles, rice cooking kettles, rice containers, pantry carts, a water-pressure rice washing machine, kitchen table, sinks, working tables, a refrigerator and a freezer.
Steam will be supplied to kitchen equipment from central steam boilers.

7) Laundry equipment

Laundry equipment will be installed to keep the hospital hygienic.
Washing machines, dehydrators, dryers, a sheet roll finishing machines, irons, working tables, etc. will be installed in the laundry.

8) Incinerator

An incinerator will be installed to dispose of mixed miscellaneous refuse (refuse and garbage) discharged from the hospital. Incinerating capacity will be 350kg a day.

9) Fire extinguishing system

Indoor fire hydrant system and fire extinguisher will be installed to be based on the Japanese Fire Code.

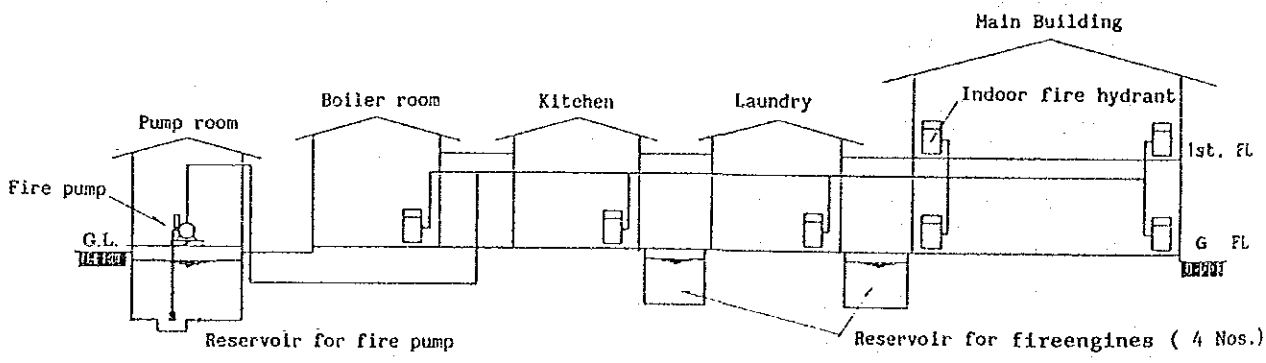


Fig 4-14 Schematic Piping Diagram of fire Extinguishing System

10)Steam supply system

Steam will be supplied to the kitchen and the laundry from the central steam boiler. Further, a back up system to the autoclave installed in the central sterilizing room will also be considered.

11)Medical gas installation

Oxygen, laughing gas, aspiration and compressed air system will be installed and supplied for various related rooms as shown in table 4-4.

Table 4-4 Rooms to be supplied with medical gas

Room	Oxygen	Laughing gas	Aspiration	Comp. air
Opoeration Rm	○	○	○	○
Delivery Rm	○	○	○	○
Recovery Rm	○		○	○
ICU·CCU	○		○	○
Premature Baby Rm Newborn Baby Rm	○		○	○
Wards	○		○	

4-3-6 Floor areas

Floor areas for each department and room are planned as follows based upon the estimated number of main rooms and floor areas as examined in 4-3-1.

Table 4-5 The floor areas of respective departments and divisions

Outpatient Dept.	Outpatient Division Emergency Division	1,184m² 597m²	1,781m² (9.90%)
Central Diagnosis & Treatment Dept.	Medical Lab. Division Diagnostic Division X-ray Division Operation Division Delivery Division ICU·CCU Division Central Sterilizing Supply Division Blood Bank Division Physiotherapy Division Forensic Medicine Division Mortuary Division	772m² (4.29%) 243m² (1.35%) 717m² (3.99%) 858m² (4.77%) 335m² (1.86%) 305m² (1.70%) 304m² (1.69%) 133m² (0.74%) 131m² (0.73%) 107m² (0.59%) 198m² (1.10%)	4,103m² (22.81%)
Ward Dept.	Internal Medicine Ward Surgery Ward Obstetrics & Gynaecology Ward Paediatrics Ward	1,512m² 1,553m² 1,565m² 1,500m²	6,130m² (34.07%)
Medical Administration Dept.			1,359m² (7.55%)
Administration & Service Dept.			3,720m² (20.68%)
Academic Dept.			898m² (4.99%)
Total			17,991m² (100%)

(1) OUTPATIENT DEPT.

ROOM NAME	NOS	AREA(m^2)	REMARKS
1) OUTPATIENT DIVISION			
ENTRANCE HALL	1	162	
WAITING AREA	2	192	
RECEPTION OFFICE	1	84	Based on Japanese Standard ($4.0\sim7.2m^2$/person) × 8 and a space for patient record storage
DISPENSARY	1	46.7	Refer to Layout Plan 1
INTERNAL MEDICINE:			
EXAMINATION RM	2	34.8	Refer to Layout Plan 2
TREATMENT RM	1	17.4	Refer to Layout Plan 2
Dr's RM	1	17.4	Based on Japanese Standard ($10.5m^2\sim21m^2$/person)
SURGERY:			
EXAMINATION RM	2	34.8	Refer to Layout Plan 2
TREATMENT RM	1	17.4	Refer to Layout Plan 2
Dr's RM	1	17.4	Based on Japanese Standard ($10.5m^2\sim21m^2$/person)
OBSTETRICS & GYNAECOLOGY:			
EXAMINATION RM	2	34.8	Refer to Layout Plan 2
TREATMENT RM	1	17.4	Refer to Layout Plan 2
Dr's RM	1	17.4	Based on Japanese Standard ($10.5m^2\sim21m^2$/person)
GUIDANCE RM	1	17.4	
PAEDIATRICS:			
EXAMINATION RM	2	34.8	Refer to Layout Plan 2
TREATMENT RM	1	17.4	Refer to Layout Plan 2
Dr's RM	1	17.4	Based on Japanese Standard ($10.5m^2\sim21m^2$/person)
CENTRAL TREATMENT RM	1	52.2	Serving as a room for sample collecting as well
SEMINAR RM	1	34.8	Based on Japanese Standard ($1.6m^2\sim2.4m^2$/person) × 15
PREPARATION RM	1	17.4	
TOILET	2	36	Necessary area for M:WC···3, Urinal···3, F:WC···3
IN-DIVISION CORRIDOR & STAIR	-	263.1	
		1,184m^2	

ROOM NAME	NOS	AREA(m^2)	REMARKS
2) EMERGENCY DIVISION			
ENTRANCE HALL	1	50	
WAITING RM	1	24	
TOILET (FOR WAITING ROOM)	2	16	Necessary area for M:WC…2, Urinal…2, F:WC…2
RECEPTION OFFICE	1	27	Based on Japanese Standard ($4m^2$~$7.2m^2$/person)×4
NURSE STATION	1	27	
OBSERVATION RM	1	54	Refer to Layout Plan 3
EXAMINATION RM	2	48	Refer to Layout Plan 3
TREATMENT RM	1	24	Refer to Layout Plan 3
EMERGENCY TREATMENT RM	1	48	Refer to Layout Plan 3
PREPARATION RM	1	18	Refer to Layout Plan 3
SANITARY RM	1	6	
TOILET (FOR PATIENT)	2	12	Necessary area for M:WC…1, Urinal…1, F:WC…1
EMERGENCY LAB.	1	36	Refer to Layout Plan 3
EQUIPMENT RM (X-RAY)	1	24	Refer to Layout Plan 3
TOILET (FOR STAFF)	2	30	Necessary area for M:WC…2, Urinal…2, F:WC…2
Dr'S RM	1	18	Based on Japanese Standard ($10.5m^2$~$21m^2$/person)
IN-DIVISION CORRIDOR	-	135	
		$597m^2$	
SUB-TOTAL		$1,781m^2$	

(2) CENTRAL DIAGNOSIS & TREATMENT DEPT.

ROOM NAME	NOS	AREA(m^2)	REMARKS
1) MEDICAL LAB. DIVISION			
SPECIMEN RM	1	36	Refer to Layout Plan 7
BIOCHEMISTRY & HAEMATOLOGY LAB.	1	184.5	Refer to Layout Plan 7
WASHING RM	1	25.5	Refer to Layout Plan 7
R.O. RM	1	7.5	R.O./Ion Exchanger (1,100^W × 700^D × 1,750^H)
BACTERIOLOGY LAB.	1	87	Refer to Layout Plan 5
PATHOLOGY LAB.	1	51	Refer to Layout Plan 4
TISSUE CUTTING RM	1	25.5	Refer to Layout Plan 4
SAMPLE RM	1	27	Refer to Layout Plan 4
MICROSCOPE RM	1	27	Refer to Layout Plan 4
OFFICE	1	42	Based on Japanese Standard ($4m^2$~$7.2m^2$/person) × 8
CONSULTANT'S RM	1	18	Based on Japanese Standard ($10.5m^2$~$21m^2$/person)
CONFERENCE RM	1	27	Based on Japanese Standard ($1.5m^2$~$2.7m^2$/person) × 13
TOILET	2	51	Necessary area for M:WC…2, Urinal…4, F:WC…5
IN-DIVISION CORRIDOR & WAITIING CORRIDOR	-	163	
		772m^2	
2) DIAGNOSTIC DIVISION			
PHYSIOLOGICAL EXAMINATION RM	1	130.5	Refer to Layout Plan 6
ENDOSCOPE RM	1	87	Refer to Layout Plan 8
STORE	1	25.5	
		243m2	
3) X-RAY DIVISION			
RECEPTION OFFICE	1	21	Based on Japanese Standard ($4m^2$~$7.2m^2$/person) × 3
X-RAY RM-1	1	33	Same as X-ray RM-4
X-RAY RM-2	1	33	Same as X-ray RM-4
X-RAY RM-3	1	33	Same as X-ray RM-4
X-RAY RM-4	1	33	Refer to Layout Plan 9

ROOM NAME	NOS	AREA(m^2)	REMARKS
CONFERENCE RM	1	33	Based on Japanese Standard ($1.5m^2$~$2.7m^2$/person)×15
PREPARATION RM	1	13.75	
X-RAY RM-5	1	38.5	Refer to Layout Plan 10
CONTROL RM	1	13.75	Refer to Layout Plan 10
CONTROL CORRIDOR	1	108	
STAFF RM	1	18	Based on Japanese Standard ($4m^2$~$5.5m^2$/person)×3
Dr's RM	1	18	Based on Japanese Standard ($10.5m^2$~$21m^2$/person)
READING RM	1	18	
SEMINAR RM	1	36	Based on Japanese Standard ($1.6m^2$~$2.4m^2$/person)×15
DARK RM	1	36	Refer to Layout Plan 11
STORE	2	36	
MECHANICAL RM	1	36	
IN-DIVISION CORRIDOR, WAITING CORRIDOR & STAIR	-	159	
		$717m^2$	
4) OPERATION DIVISION			
ANTE RM	1	27	
RECEPTION OFFICE	1	18	Based on Japanese Standard ($4m^2$~$7.2m^2$/person)×3
SEMINAR RM	1	27	Based on Japanese Standard ($1.6m^2$~$2.4m^2$/person)×15
RECOVERY RM	1	24	Refer to Layout Plan 12
WASHING RM	1	12	Refer to Layout Plan 12
OPERATION RM-1	1	48	Refer to Layout Plan 13
OPERATION RM-2	1	36	Refer to Layout Plan 13
OPERATION RM-3	1	36	Same as Operation Rm-2
OPERATION RM-4	1	36	Same as Operation Rm-2
ANAESTHETIC RM	1	30	Refer to Layout Plan 12
MEDICINE STORE	1	12	
PLASTER RM	1	12	
EQUIPMENT RM	1	36	

ROOM NAME	NOS	AREA(m2)	REMARKS
LOCKER RM (FOR NURSES)	1	20	Locker (300W × 500D × 1,800H) × 13
LOCKER RM (FOR DOCTORS)	1	30	Locker (300W × 500D × 1,800H) × 14
RECOVERY (INCLUDING ANTE RM)	1	36	
RECEPTION OFFICE	1	18	Based on Japanese Standard (4m²~7.2m²/person) × 3
Dr's RM	1	18	Based on Japanese Standard (10.5m²~21m²/person)
EQUIPMENT RM	1	18	
OPERATION RM-5 (EMERGENCY)	1	42	Same as Operation RM-2
PREPARATION RM	1	18	
OPERATION RM-6 (EMERGENCY)	1	36	Same as Operation RM-2
MEDICINE STORE	1	9	
IN-DIVISION CORRIDOR (INCLUDING RETURN CORRIDOR)	-	259	
		858m2	
5) DELIVERY DIVISION			
NURSE's RM	1	18	Based on Japanese Standard (4m²~5.5m²/person) × 3
Dr's RM	1	18	Based on Japanese Standard (10.5m²~21m²/person) × 3
RECOVERY RM	1	24	Refer to Layout Plan 14
EQUIPMENT RM	1	9	
MEDICINE STORE	1	9	
DELIVERY RM-1	1	24	Refer to Layout Plan 14
STERILIZING RM	1	12	
DELIVERY RM-2	1	36	Refer to Layout Plan 14
PREPARATION RM	1	20	
LABOR RM	2	36	Refer to Layout Plan 14
NURSE STATION	1	28	Refer to Layout Plan 14
MILK RM	1	8	Refer to Layout Plan 14
NEWBORN BABY RM	1	42	Refer to Layout Plan 14
BATH RM	1	6	Refer to Layout Plan 14
STORE	1	6	

ROOM NAME	NOS	AREA(m^2)	REMARKS
IN-DIVISION CORRIDOR	-	39	
		335m^2	
6) ICU·CCU DIVISION			
ICU	1	96	Refer to Layout Plan 15
CCU-1	1	18	Refer to Layout Plan 15
CCU-2	1	18	Refer to Layout Plan 15
NURSE's RM (INCLUDING TOILET AND ANTE RM)	1	18	Based on Japanese Standard ($4m^2$~$5.5m^2$/person)×4
SANITARY RM	1	6	
PREPARATION RM	1	12	Refer to Layout Plan 15
MONITOR RM	1	24	Refer to Layout Plan 15
Dr's RM	1	12	Based on Japanese Standard ($10.5m^2$~$21m^2$/person)
STORE	1	36	
IN-DIVISION CORRIDOR	-	65	
		305m2	
7) CENTRAL STERILIZING SUPPLY DIVISION			
CENTRAL STERILIZING SUPPLY RM	1	143	Refer to Layout Plan 16
STERILIZED STORE	1	50	Refer to Layout Plan 16
LINEN STORE	1	12.5	Refer to Layout Plan 16
AUTOCLAVE RM	1	22.5	Refer to Layout Plan 16
STAFF RM	2	18	Based on Japanese Standard ($4m^2$~$5.5m^2$/person)×4
EQUIPMENT RM	1	18	
IN-DIVISION CORRIDOR	-	40	
		304m2	
8) BLOOD BANK DIVISION			
WAITING RM	1	19	

ROOM NAME	NOS	AREA(m^2)	REMARKS
EXAMINATION RM	1	15	Refer to Layout Plan 17
BLOOD COLLECTING RM	1	36	Refer to Layout Plan 17
BLOOD STORE	1	42	Refer to Layout Plan 17
Dr's RM	1	21	Based on Japanese Standard ($10.5m^2$~$21m^2$/person)
		133m2	
9) PHYSIOTHERAPY DIVISION			
PHYSIOTHERAPY RM	1	131	Refer to Layout Plan 18
		131m^2	
10)FORENSIC MEDICINE DIVISION			
FORENSIC MEDICINE RM	1	52	Refer to Layout Plan 19
OFFICER's RM	1	19	Based on Japanese Standard ($10.5m^2$~$21m^2$/person)
LABORATORY	1	36	Refer to Layout Plan 19
		107m2	
11)MORTUARY DIVISION			
MORTUARY	1	72	Refer to Layout Plan 20
AUTOPSY	1	36	Refer to Layout Plan 20
PREPARATION RM	1	54	Refer to Layout Plan 20
TOILET	1	9	Necessary area for WC…1, Urinal…1
IN-DIVISION CORRIDOR	1	27	
		198m2	
SUB TOTAL		4,103m^2	

(3) WARD DEPT.

ROOM NAME	NOS	AREA(m^2)	REMARKS
1) INTERNAL MEDICINE WARD			
1-BED RM	6	108	
6-BED RM	12	432	Refer to Layout Plan 22
NURSE STATION	2	72	Refer to Layout Plan 21
TREATMENT RM	2	36	Refer to Layout Plan 21
MEDICINE STORE	2	36	
NURSE'S RM	2	36	Based on Japanese Standard ($4.0m^2$~$5.5m^2$/person)×8
Dr's RM (EXAMINATION)	2	48	Based on Japanese Standard ($10.5m^2$~$21m^2$/person)×2
PANTRY	1	10	
LINEN STORE	2	18	
TOILET (INCLUDING SHOWER)	4	72	Necessary area for M:WC…4, Urinal…4, F:WC…6
SANITARY RM	2	12	
WASH RM	1	10	
STORE	2	30	
TOILET (FOR STAFF)	2	16	Necessary area for M:WC…1, Urinal…1, F:WC…1
SEMINAR RM	1	24	Based on Japanese Standard ($1.6m^2$~$2.4m^2$/person)×15
IN-DIVISION CORRIDOR & STAIR	-	552	
		$1,512m^2$	
2) SURGERY WARD			
1-BED RM	6	108	
6-BED RM	12	432	Refer to Layout Plan 22
NURSE STATION	2	72	Refer to Layout Plan 21
TREATMENT RM	2	36	Refer to Layout Plan 21
MEDICINE STORE	2	36	
NURSE's RM	2	36	Based on Japanese Standard ($4.0m^2$~$5.5m^2$/person)×8
Dr's RM (EXAMINATION)	2	48	Based on Japanese Standard ($10.5m^2$~$21m^2$/person)×2

ROOM NAME	NOS	AREA(m^2)	REMARKS
PANTRY	1	10	
LINEN STORE	2	18	
TOILET (INCLUDING SHOWER)	4	72	Necessary area for M:WC···4, Urinal···4, F:WC···6
SANITARY RM	2	12	
WASH RM	1	10	
STORE	2	30	
TOILET (FOR STAFF)	2	16	Necessary area for M:WC···1, Urinal···1, F:WC···1
SEMINAR RM	1	24	Based on Japanese Standard ($1.6m^2$~$2.4m^2$/person) × 15
IN-DIVISION CORRIDOR & STAIR	-	593	
		1,553m^2	
3)OBSTETRICS & GYNAECOLOGY WARD			
1-BED RM	6	108	
6-BED RM	12	432	Refer to Layout Plan 22
NURSE STATION	2	72	Refer to Layout Plan 21
TREATMENT RM	2	36	Refer to Layout Plan 21
MEDICINE STORE	2	36	
NURSE's RM	2	36	Based on Japanese Standard ($4.0m^2$~$5.5m^2$/person) × 2
Dr's RM (EXAMINATION)	2	48	Based on Japanese Standard ($10.5m^2$~$21m^2$/person) × 2
PANTRY	1	12	
LINEN STORE	2	36	
TOILET (INCLUDING SANITARY)	2	36	Necessary area for WC···6
SHOWER RM	2	36	
WASH RM	1	12	
TOILET (FOR STAFF)	2	16	Necessary area for M:WC···1, Urinal···1, F:WC···1
STORE	2	48	
SEMINAR RM	1	24	Based on Japanese Standard ($1.6m^2$~$2.4m^2$/person) × 15
IN-DIVISION CORRIDOR & STAIR	-	577	
		1,565m^2	

ROOM NAME	NOS	AREA(m^2)	REMARKS
4) PAEDIATRICS WARD			
1-BED RM	5	90	
6-BED RM	11	396	Refer to Layout Plan 22
PREMATURE BABY RM	2	36	Refer to Layout Plan 23
PREPARATION RM	1	18	Refer to Layout Plan 23
MEDICINE STORE	2	36	
TREATMENT RM	2	36	Refer to Layout Plan 21
NURSE STATION	2	72	Refer to Layout Plan 21
Dr's RM (EXAMINATION)	2	48	Based on Japanese Standard ($10.5m^2$~$21m^2$/person)×2
NURSE's RM	2	36	Based on Japanese Standard ($4.5m^2$~$5.5m^2$/person)×8
PLAY RM	1	24	
PANTRY	1	12	
LINEN STORE	2	36	
TOILET (FOR INPATIENT)	3	54	Necessary area for M:WC…4, Urinal…4, F:WC…6
SHOWER RM	1	18	
TOILET (FOR STAFF)	2	12	Necessary area for M:WC…1, Urinal…1, F:WC…1
WASH RM	1	12	
SEMINAR RM	1	24	Based on Japanese Standard ($1.6m^2$~$2.4m^2$/person)×15
STORE	2	48	
IN-DIVISION CORRIDOR & STAIR	-	492	
		1,500m^2	
SUB TOTAL		6,130m^2	

(4) MEDICAL ADMINISTRATION DEPT.

ROOM NAME	NOS	AREA(m^2)	REMARKS
SUPERINTENDENT RM	1	42	Based on Janese example ($35m^2$~$42m^2$)
RECEPTION RM	1	30	
DEPUTY-SUPERINTENDENT RM	1	36	Based on Janese example ($35m^2$~$42m^2$)
JAPANESE EXPERT LEADER RM	1	42	Follow Superintendent RM
JAPANESE EXPERT RM	1	48	Based on Japanese Standard ($7.2m^2$~$10.5m^2$/person) × 6
MATRON's RM (INCLUDING MEETING RM)	1	36	Based on Japanese example ($18m^2$~)
CONFERENCE RM	1	36	Based on Japanese Standard ($1.5m^2$~$2.1m^2$/person) × 22
PATIENTS' RECORD RM	1	72	Record cabinet ($900^W \times 450^D \times 1,000^H$) × 130
OFFICER's RM	1	54	Based on Japanese Standard ($4m^2$~$7.2m^2$/person) × 23
TEL. EXCHANGE RM	1	18	
OFFICE	1	108	Based on Japanese Standard ($4m^2$~$7.2m^2$/person) × 23
TABLET STORE	1	108	Based on standard of Mandalay General Hospital
INJECTION STORE	1	108	Based on standard of Mandalay General Hospital
REPAIR SHOP	1	81	Based on standard of Mandalay General Hospital
STORE	1	54	
SOLUTION MAKING RM	1	40.5	Refer to Layout Plan 24
WASH RM	1	40.5	Refer to Layout Plan 24
REAGENT RM	1	27	Refer to Layout Plan 24
TOILET	1	32	
IN-DIVISION CORRIDOR	-	274	
		1,287m^2	
OXYGEN MINI. PLANT	1	54	
STORE	1	18	
SUB TOTAL		1,359m^2	

(5) ADMINISTRATION & SERVICE DEPT.

ROOM NAME	NOS	AREA(m^2)	REMARKS
CAFETERIA	1	108	Based on Japanese Standard ($1.2m^2$~$1.5m^2$/person)×80
ELECTRICAL RM	1	108	Based on Electrical equipment layout
MECHANICAL RM	4	238	Based on Mechanical equipment layout
MANIFOLD	1	37	Based on Manifold layout
LAUNDRY	1	135	Based on Laundry equipment layout
KITCHEN	1	162	Based on Kitchen equipment layout
BOILER RM	1	108	Based on Boiler layout
WOOD STORE	1	54	
INCINERATOR RM	1	36	Based on Incinerator layout
PUMP RM	1	72	Based on Pump layout
C.C. STORE	1	36	Follow Mandalay General Hospital
BUILDING MAINTENANCE RM	1	36	Follow Mandalay General Hospital
ELECTRICAL MAINTENANCE RM	1	18	Follow Mandalay General Hospital
GARAGE	1	72	For 4 vehicles
GUARD HOUSE	1	15	
GUEST HOUSE	1	240	
CORRIDOR & STAIR	-	2,245	
		$3,720m^2$	
SUB TOTAL		$3,720m^2$	

(6) ACADEMIC DEPT.

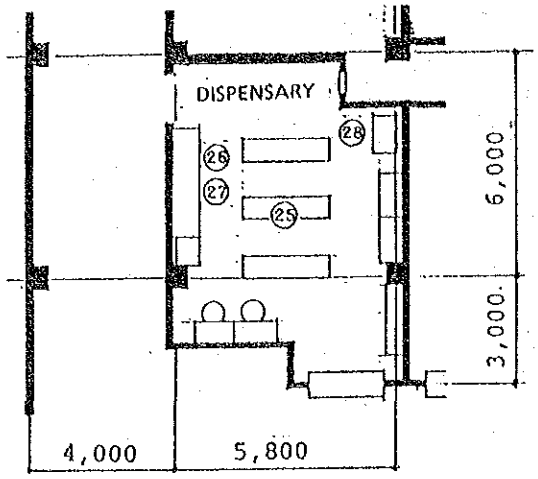
ROOM NAME	NOS	AREA(m^2)	REMARKS
LECTURE RM-1	1	174	Based on Japanese Standard ($0.82m^2$~$1.6m^2$/person) x 150
PREPARATION RM	1	25.5	
STORE	1	18	
LECTURE RM-2	1	130.5	Based on Japanese Standard ($0.82m^2$~$1.6m^2$/person) x 100
STUDENT LOUNGE	1	87	Based on Japanese Standard ($1.2m^2$~$1.8m^2$/person) x 50
LIBRARY	1	87	For 4,000 books and 30 seats
Dr's LOUNGE	1	69	Based on Japanese Standard ($4m^2$~$5.5m^2$/person) x 13
CORRIDOR	-	181	
LECTURE THEATER	1	108	Refer to Layout Plan 25
Dr's RM	1	18	Based on Japanese Standard ($10.5m^2$~$21m^2$/person)
		$898m^2$	
SUB TOTAL		$898m^2$	
GRAND TOTAL		$17,991m^2$	

Outpatient Department

LAYOUT PLAN 1

Outpatient Division

Dispensary (46.7m²)



A-25 Dispensary Table for Liquid, Tablet Medicine
A-26 Automatic Scale Balance (measuring range 0.1g)
A-27 Pharmaceutic Instrument Set
A-28 Medicine Refrigerator (500ℓ)

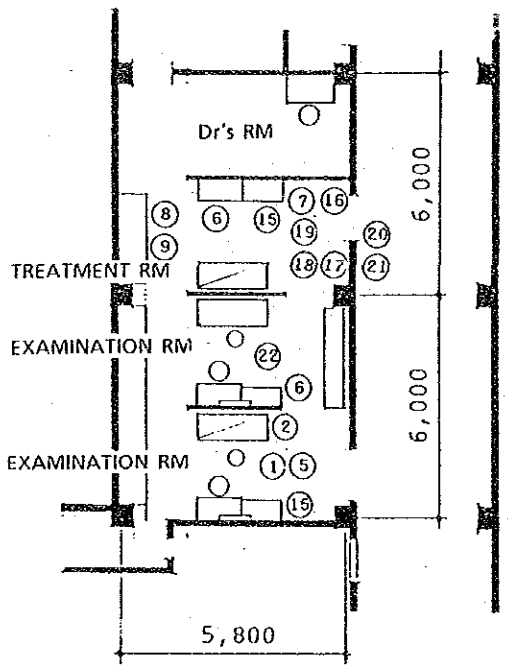
Function: Compounding medicines as prescribed

Outpatient Department

LAYOUT PLAN 2

Outpatient Division

Examination RM(17.4m²) / Treatment RM(17.4m²)/ Dr's RM(17.4m²)



A-1 Sphygmomanometer (0 - 300mmHg)
A-2 Examining Table (with a pillow)
A-5 Stethoscope (for adults, for infants, dual type)
A-6 Instrument Cabinet
A-7 Instrument Carriage
A-8 Boiling Sterilizer, Table-top type, Electric
A-9 High Pressure Sterilizer with Drying System, Table-top Type, Electric
A-15 Instrument Table
A-16 Dressing Cart
A-17 Injector Set (needle sterilizer)
A-18 Diagnostic Instrument Set
A-19 Treatment Instrument Set
A-20 Measuring Rod
A-21 Weighing Scale (capacity 100kg)
A-22 X-ray Film Viewer (for 2 films)

Function: Performing treatment for outpatients