

NETAJI SUBHASH CHANDRA BOSE  
MEDICAL COLLEGE HOSPITAL, JABALPUR (M.P.)

**PROPOSAL FOR UPGRADATION OF  
EMERGENCY MEDICAL SERVICES  
(CASUALTY)  
2005**

**Dr. P. K. Kasar  
Joint Director Health Service  
& Superintendent  
Medical College Hospital  
Jabalpur (M.P.)**

# **INTRODUCTION**

Accidents are the disease of development, The more we develop, The more accidents increase. Epidemiological research from all the world reveal that injuries are no more an act occurring without a known cause or pattern and rather precise injuring mechanism are clearly known. Whatever may be the underlying cause of an accident, the ultimate destination of injured persons is “casualty” or accident and emergency department and Trauma Unit of the nearby hospital it is known that 20-25 percent of hospital admission are constituted by injuries.

In India, there is an accident every second minute and a fatality on road every ninth minutes. Transport accidents claims nearly 1 lakh life every year and more than five lakh people get injuries in two wheeler accidents every year. More than 2000 people of road accident every year in catchments area of Medical College Hospital Jabalpur.

Medical College Hospital is largest hospital of Mahakaoshal region of Madhya Pradesh having bed strength of 850 bed. This hospital covering population of nearby 19 district of M.P., most of population are tribal population, It is situated at junction of two National High way 7 and 12. Every year average admission in this hospital are about 26000. More than 30 percent of that are through casualty. Average attendance in casualty is about 16000 per year. 150 cases are brought in dead, another 600 cases dead within 48 hours of admission. Because of lack some of facilities like C.T., MRI, well equipped emergency ward, resuscitation unit in casualty, treatment of injuries emergency cases are delayed, even the ambulance services are not fully equipped.

Medical emergency is a situation in which a patient requires urgent and high quality medical care. Due to increase in vehicular traffic and rapid industrialization, the number of accidents and emergency situations is fast increasing. Emergency Medical Services (EMS) are therefore, an important aspect of acute medical care provided by the emergency (casualty) department of the hospital. It serves the community 24 hours a day throughout the year.

The quality of emergency care declines in its efficiency ( particularly in cases of accidents ) when there is a delay in attending to these patients. In larger cities and where resources permit, such patients should be treated in Centralized Accidents and Trauma Centres (CATS).

This proposal has been developed with keeping in mind recommendation of various committee of government of India and recommendation of American College of Emergency Physician (ACEP), and recommendation of Indian standard institute (ISI).

## **GOVERNMENT COMMITTEES REGARDING EMERGENCY SERVICES IN INDIA :-**

Government of India constituted a hospital Review Committee under the chairmanship of Sh. M.M.S. Siddhu to look into the working of Delhi's hospitals. The committee submitted its report in 1979 and highlighted the inadequacies in Delhi's hospital which continue to function much below the desired level of effectiveness and efficiency and need to be strengthened substantially. Various recommendations with regard to improvement of emergency services were as follows :-

1. Strengthening of accident and emergency services by providing a whole time Additional Medical Superintendent as Officer-in-charge of the department.
2. All facilities of reception, information, diagnosis and treatment to the accident and emergency patient should be available within the accident and emergency department itself.
3. Dependence of the emergency department for other services areas on the main hospital should be reduced to minimum.
4. Patient on arrival to be dealt with extreme care and sympathy. Reception, recording and telephone system in the department need to be considerably improved.
5. Ten percent hospital beds should be provided in the emergency department, which should form an integral part of emergency department and must be under direct charge of specialist working regularly in the department.

Balu Shankaran Committee (1994) was appointed by Government of Delhi to look into the state of affairs in accident and emergency departments of various hospital in Delhi. The committee stated that a hospital of factor like posting of junior doctors in emergency department, precious time lost in completing preliminary investigations and calling senior doctors were responsible for poor emergency case. The committee observed that the emergency wards are overcrowded and even limited infrastructural facilities that hospital have not been put to optimum use because of poor maintenance of lack of trained staff.

The committee has recommended that staff of accident and emergency department to be adequately trained resuscitative procedures. Because of non observance of hygiene and certain medical procedure, patient contract new disease when they are admitted to the hospital, the committee recommended regular monitoring of infection rate in hospital must be done.

American College of Emergency Physician (ACEP) have recommended certain basic requirements of emergency services of a 500 bedded hospital which are as follows :-

1. There should be a policies and procedures manual. Updated at least yearly, reflecting policies and procedures to be followed in the department and its relationship with other departments in the hospital.
2. The department should have a full time director and be staffed 24 hours daily by qualified emergency physicians.
3. The department should be accessible to ground transportation in all kinds of weather. If possible arrangements should be made to receive and dispatch patients by way of air-transportation.
4. Round the clock availability of laboratory personnel capable of performing rapid analysis of blood gas pH, serum electrolytes and other body fluids.
5. The department should be equipped with ventilator, cardiac monitor, defibrillator, pace maker apparatus to establish central venous pressure, sterile surgical sets, gastric lavage equipments, intravenous fluid and devices to administer the same and life saving drugs.
6. Radiological investigation services should be within of easily accessible to emergency department.

7. There be a predetermined plan for the diagnosis and treatment of alcoholic or drug abuse patients.
8. Operation Theater (O.T.) should be within or easily accessible to Accident and Emergency department with availability of operating room personnel within a reasonable period of time.
9. Blood bank or blood storage facilities should be easily accessible to Accident & Emergency department.
10. Special training in life saving procedures should be provided to all categories of staff.
11. There should be a continuing medical education (CME) programme for all category of personnel.
12. A list of on call specialist, with their availability location and telephone number should be maintained and easily accessible in Accident & Emergency Department .
13. There should be availability of emergency care reference material such as for tetanus, burns and poisoning and emergency medical identification and treatment manuals and text books.
14. There should be patient/ visitor waiting area, separate from the emergency treatment area.
15. There should be isolation area/ ward for patients suffering disease like rabies, tetanus and burns.
16. Medical record should be reviewed regularly by Emergency Medical Committee.
17. There should be a periodic and comprehensive review of services jointly by the emergency department and ambulance personnel.
18. Communication equipments for intra- hospital co-ordination should be available either for immediate medical consultation with a specialist to assist in resuscitation of referral to other appropriate hospital.
19. Public information services should include markings on the hospital indicating to the general public the scope of emergency medical services available.
20. A disaster plan should be prepared. Annually updated and well rehearsed in order to deal with mass casualties.

Emergency care is not simply pre-hospital transport and hospital based facility. Rather it is a complex issue involving many other agencies like police, rescue agencies like fire services, social organization, communication department etc. In such a multi-disciplinary inter-sectoral subject a system approach is mandatory requirement for smooth and efficient service. A lot is to be done to educate the masses and the providers to be compassionate towards victims of accidents and to provide quality care.

### **Recommendation of Medical Council of India**

Medical council of India in his recommendation for undergraduate admission of 150 student/ 750 bed hospital recommended as-:

“There shall be a central casualty department wherein consultancy services shall be provided by the teachers of relevant departments.

Accommodation for Resuscitation Services including Oxygen supply, ventilators, defibrillator and two fully equipped disaster trolleys (Emergency trolley), Emergency X-ray, investigative facilities, operation theatre etc., shall be provided. These shall all be fully equipped.

A casualty ward with at least twenty five beds is also necessary. Accommodation for staff on duty (Doctors, Nurses, Students and others) shall be provided. Adequate sanitary arrangements (toilets and bath rooms) & drinking water facilities for patients, their attendants and the staff of the department shall be provided in the respective blocks.”

### **ESSENTIAL REQUIREMENTS OF EMERGENCY MEDICAL SERVICES :-**

- It must be efficient and effective at all times and for all purposes for which it is meant as the condition of patients deteriorates very fast from the time of accident.
- It must be on the right cost-benefit basis.

### **EFFICIENT EMS SHOULD HAVE :-**

- Speedy transportation of the victim to the emergency centre.
- Pre-hospital therapy in the form of immediate first aid and registration, starting from the site of accident.
- Prompt and quick service with an efficient and foolproof communication system.
- Adequate physical facilities, equipments and stores.
- Alert, well-trained and sympathetic staff who can render immediate and appropriate life-saving treatment and also meet the emotional requirements of the patients and his attendants.

### **SUBSIDIARY FUNCTIONS OF THE ACCIDENT AND EMERGENCY DEPARTMENT :-**

- Collection of casualties.
- Information centre to render advice on telephone or in person for simple medical queries.
- Establish a reception centre in case of a disaster.
- Liaison with police in medico-legal cases.
- Education, training and research activities.

## **PLANNING AND DESIGN CONSIDERATION :-**

The primary role of the emergency is care of the critically ill patients. This is the main consideration while planning. Other factors to be kept in mind while planning EMS include location, patient-load, architectural design, traffic control, communication system, space for future expansion.

### **1. SPACE :-**

The space requirement of the emergency department depends of the number of casualties, size of hospital and types of diagnostic and therapeutic facilities. As a rule of thumb, daily patient load of a hundred in the casualty department requires a space of 1000m<sup>2</sup>. To this 20% - 25% must be added to account for the load at completion and another 25% should be added to avoid overcrowding in the first 4-5 years of operation.

### **2. LOCATION :-**

The emergency department should.

- be located on the ground floor;
- have direct access from the main road ( easy accessibility for ambulance ); and
- have adequate space for the passage of vehicles and covered area for patients to alight at the entrance.

Though the EMS should be physically and administratively separated from other services in a hospital; at the same time, it should be readily accessible from the OT, X-ray department, blood bank, laboratories, intensive-care and treatment units, obstetric unit, burns unit, medical records department and morgue.

### **3. ENTRANCE :-**

The emergency department should have a separate entrance for an ambulance with adequate space for free passage of vehicles. The entrance should have ramps and a two- way swinging door for easy patient flow. There should be a separate arrangement for receiving ambulance patients and those on trolleys.

### **4. WAITING AREA :-**

The entrance of the emergency department should lead to a lobby with the following facilities :-

- A reception and information desk.
- A comfortable and well furnished waiting area for the relatives of patients.
- Separate toilets for both sexes.
- A public telephone.
- A place for keeping wheelchairs and trolleys.

**5. TRIAGE STATION :-**

The triage station should be located where patient in both critical and non-critical conditions can be assessed prior to their entry into the acute treatment area.

**6. TREATMENT AREA :-**

The treatment area should be designed with the right combination of maximum observation and privacy in mind. This can be done by arranging cubicles in full view of the nurses station. The front curtain of the cubicle can be left open in case of patients who require frequent observation.

**7. COMMUNICATION :-**

An effective and efficient communication system is the back bone of the accident and emergency services. The emergency department should be well connected to other departments, intensive care centres, consultant and senior doctors through telephones, intercoms or a paging system.

The stages which a patient may pass through in an accident and emergency department are given in fig. 6.1. The provision of various physical facilities required in an accident and emergency department and their scale of accommodation recommended by the ISI is given in table given below

## **FLOOR AREA FOR VARIOUS PHYSICAL FACILITIES :-**

As per Indian Standard Institute (ISI) Indian standard recommendation for basic requirements of General hospital building, floor area for 500- 950 beds hospital is :-

**Table Floor Areas of Various Physical Facilities in the Accident and Emergency Department**

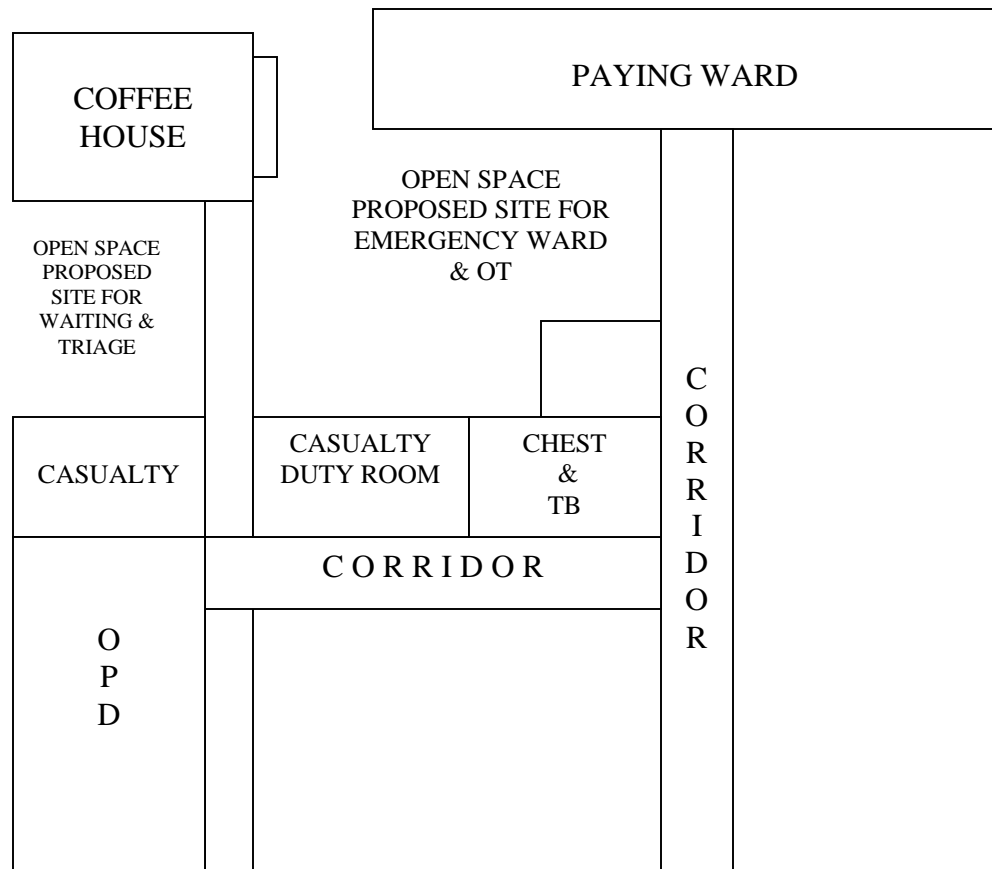
<b>S.No.</b>	<b>Facility</b>	<b>No. of Rooms</b>	<b>Bedded /Area (m2)</b>
1.	Drive-in ambulance ( reception, public telephone booths, trolley bay, waiting areas with toilets for relatives, staff toilets, police, special worker room, etc. )	1	126
2.	Doctors duty room with toilet	1	17.5
3.	Examination cubicles	4 to 6	10.5
4.	Medico-legal specimen and record room	1	10.5
5.	Brought-in-dead room	1	10.5
6.	Retiring room for ambulance drivers and nursing assistant	1	17.5
7.	ECG room	1	14
8.	Fracture treatment room with plaster preparation	1	17.5
9.	Treatment room	1	14
10.	Operation theatre unit		
	a.) Operation theatre	1	35
		+	+
		1	28
	b.) Instrument sterilization	1	10.5
	c.) Scrubbing room	1	10.5
	d.) Dirty wash room	1	10.5
	e.) Anesthesia room	1	10.5
11.	Resuscitation room	1	63 (6 beds)
12.	X-ray room with dark room facility	1	35
13.	Clinical laboratory	1	21
14.	Blood storage area	1	10.5
15.	Drug dispensing facilities	1	10.5
16.	Stores	2	14
17.	Sluice room and janitor closer	1	10.5
18.	Nurses station with toilet	1	17.5
19.	Observation room	1	52.2 (6 beds)
20.	Emergency ward	1	24-30 beds
21.	Pantry	1	10.5



Present area of Emergency Medical Services (Casualty) of our hospital is insufficient, actually is less than 10 percent. We can not develop Present building structure and its distribution, hence it is recommended that following area should be taken over and constructed for development / Upgradation of Emergency Medical Services and Trauma Unit.

1. Present casualty and duty room will be utilized.
2. Coffee House will be taken over for casualty services.
3. Open space between coffee house and casualty will be develop after renovation for Drive in ambulance.
4. Construction of emergency ward, observation ward & resuscitation ward can be constructed in open area which available behind Coffee House and paying ward. (Ground Floor)
5. Construction of emergency operation theatre will be taken in first floor of emergency ward.

Emergency ward will be well connected with main corridor of hospital.



**BUDGET REQUIRMENT FOR UPGRADATION OF EMERGENCY**  
**MEDICAL SERVICES (CASULTY)**

**EQUIPMENT REQUIREMENT INCLUDING APPROX COST:-**

Some of essential equipment required in the emergency department are :-

- |   |   |           |            |
|---|---|-----------|------------|
| 1. Central piped oxygen and suction supply. | - | App. Cost | 3000000.00 |
| 2. Wall mounted manometer.                  | - | App. Cost | 200000.00  |

S.No	Name of Equipments	Specification	Quantity	App. Cost
1.	Major Hydraulic Operation Table	With stainless steel top, side and control complete with all standard accessories	6	2400000.00
2.	Shadowless Lights	i.) Ceiling track model Size : 45 cms	2	60000.00
		ii.) Mobil model, four reflector low voltage transformer Size : 50 cms	2	32000.00
3.	X-ray Machine	i.) 200mA, Bucky table and column stand	1	850000.00
		ii.) 50 mA, Portable type	1	450000.00
4.	Boyle Apparatus	- Stainless steel frame - 2 Flowmeters each with extended range : i.) For oxygen – 0.1 to 2 and 2.5 to 15 litres / mm ii.) For nitrous oxide – 0.05 to 1 and 1.25 to 10 litres/mm	4	600000.00
	i.) Circle Absorber ii.) Cylinders iii.) Breathing systems iv.) Bains Circuit v.) Vaporizer vi.) B.P. Apparatus	- Oxygen and Nitrous Oxide - Magills - Jackson Rees - Fluotex ( Halothene ) - EMO ether vaporizer		
5	Multi channel monitor		4	700000.00
6	Suction Machine	(a) Electrically Operated Vacuum: -700 ± 10 mm hg: Regulable, flutter free vacuum control knob. Volume: 35 ltrs/min ( jars capacity 3 ltrs. ) Sound : 50 dBA ± 3 almost whispers Gauge : Bourden type 10 cms dia. 0-760 mm Hg calibration	6	21000.00

		<p>Jars : Wide mounted 2 x 1.5 ltrs. Self sealing rubber bungs with overflow safety device .</p> <p>Size : 49 cms x 38 cms x 74 cms Spot welded, over backed cabinet.</p> <p>Current:- 230 V, 50 Hz, 3.5 ± 5 Amps.</p> <p>(b) Foot Operated</p>		
7	Defibrillator / Monitor	<p>Amotating Recorder : Documents time, date and energy selection</p> <p>Heart rate Monitoring: Continuous display</p> <p>Three Leads Select : Paddle monitoring for rapid patient ECG assessment .</p> <p>Individual Batteries : for greater reliability</p> <p>Synchronizer : Reverts to a synchronizer mode</p> <p>Mine Energy Setting : Five to 360 joules</p>	1	125000.00
8.	E.C.G. Machine	<p><b>LEAD SELECTION</b></p> <p>Leads: 12-lead selection</p> <p>Selector positions: I, II, III, aVR, aVL, aVL, V, ImV</p> <p><b>FREQUENCY RESPONSE</b></p> <p>Frequency response: 0.05Hz to 100 Hz (-3dB)</p> <p>Time : 3.2 seconds (internally) adjustable to 1.6 seconds</p> <p>Filter : Muscle filter at 36 Hz (-3dB)</p> <p><b>PATIENT SAFETY</b></p> <p>Isolation : Floating input isolation</p> <p>Patient leakage current : Less than 10 UA (220V/50Hz)</p> <p><b>SENSITIVITY</b></p> <p>Sensitivity : 5mm/mV, 10mm/mV, 20mm/mV push- button selectable</p> <p>Auxiliary Input : 10mm deflection for 30 mV Input</p> <p>Scope Output : Output voltage 500mV at 1mV input voltage gain 1.</p> <p>Calibration : 1mV push button, effective at input amplifier</p> <p>CMRR: Better than 100 dB</p>	2	138000.00

9.	Instrument Sterilizer	Dimensions: 430 x 200 x 150mm Capacity : 2000w IS No. : IS 5022-1979 -220/250V, single phase, 50 cycles.	6	30000.00
10	Boiler	- Small - Big	2 2	25000.00 30000.00
11.	Dressing Drum	Stainless steel, different sizes	28	14000.00
12.	B.P. Apparatus	with stethoscope, mercurial	8	12000.00
13.	Plaster Saw	Electrically Operated	2	20000.00
14.	Oxygen Cylinders (Jumbo size)		16	192000.00
15.	Oxygen Cylinders (Small size)		20	140000.00
16.	Laryngoscope	- Adult - Paediatrics	3 1	6000.00 2000.00
17.	Oxygen Mask	- Adult - Paediatrics	20 10	1000.00 800.00
18.	Ambu bag	- Adult - Paediatrics	6 2	10800.00 4000.00
19.	Weighing Machine	- Adult - Paediatrics (10 kgs. capacity)	6 2	10800.00 3600.00
20.	Ventilator	- Adult - Paediatrics	1 1	750000.00 450000.00
21.	Hot Water Bottle		6	1000.00
22.	Water bed	- Standard	6	18000.00
23.	Refrigerator	- 265 liters	3	45000.00
24.	Generator	2.5 Kw portable type	2	90000.00
25	Pulls oximeter		8	200000.00
26	Cardiac Monitor		8	368000.00
27	Surgical O.T. Instrument		10	2000000.00
28	Orthopedic O.T. Instrument		10	2000000.00
29	Neuro surgical O.T. Instrument		5	2000000.00
30	Orthopedic splints/ Traction		20	500000.00
			Total	<b>17500000.00</b>

C.T. / MRI not includes in list as it is required in up gradation of Rediodiagnosis Department.

## **STAFF REQUIREMENT :-**

Staff require for Emergency Medical Services and Trauma unit as suggested by different committee area.

- A. ADDITIONAL MEDICAL SUPERINTENDENT:-** - 1
- B. SPECIALIST :-**
1. **Surgeon :-**

Associate Prof.	- 1
Assistant Prof.	- 3
Post PG Registrar	- 4
  2. **Physician :-**

Associate Prof.	- 1
Assistant Prof.	- 3
Post PG Registrar	- 4
  3. **Orthopedics :-**

Associate Prof.	- 1
Assistant Prof.	- 4
Post PG Registrar	- 4
  4. **Neuro Surgeon :-**

Associate Prof.	- 1
Assistant Prof.	- 3
  5. **Anesthesiologist :-**

Associate Prof.	- 1
Assistant Prof.	- 6
Post PG Registrar	- 6
  6. **House Officer/ Surgeon :-** - 6 (Each Department)
- C. GENERAL DUTY MEDICAL OFFICER** - 56  
( FOR CASUALTY & EMERGENCY WARD )
- D. NURSING STAFF INCLUDING O.T. NAMES :-**
1. Assistant Matron :- - 1
  2. Nursing Sister :- - 6
  3. Staff Nurse - 36
- E. TECHNICIAN & PHARMACY :-**
1. X-ray Technician - 4
  2. E.C.G. Technician - 4
  3. Lab. Technician - 16
  4. O.T. Technician - 7
  5. Plaster Technician - 4
  6. Pharmacist - 4
- F. DRIVER:-** - 7

**G. RECORD ROOM :-**

1. M.R.O. - 1
2. Record Technician - 4
3. Record attendant - 4

**H. GROUP 'D' WORKER:-**

1. O.T. Attendant - 21
2. Ward Boy - 11
3. Sweeper - 18
4. Barber - 5
5. Ambulance Attendant - 7
6. Stretcher Bearer - 11

**FURNITURE REQUIREMENT FOR EMERGENCY MEDICAL SERVICES  
& TRAUMA UNIT :-**

			<b>App. Cost</b>
1	Fowlers Bed	50 ( 30 + 6 + 6 + 8 )	275000.00
2	Bed Side Locker	40	48000.00
3	IV. Stand	50	50000.00
4	Oxygen Stand	18	36000.00
5	Medicine Trolley	08	36000.00
6	Dressing Trolley	04	20000.00
7	Instrument Trolley	18	90000.00
8	Examination Table	12	60000.00
9	Iron Stool	50	40000.00
10	Office Table	40	200000.00
11	Office Chair	80	120000.00
12	Pantry Table	02	20000.00
13	Alma rah	20	100000.00
14	Bench	20	50000.00
15	Wheel Chair	06	18000.00
16	Patient Trolley	12	34800.00
17	Stretcher Trolley	12	34800.00
18	Transfer Trolley	06	30000.00
19	Plaster Table	04	32000.00
20	Bed for Duty Room	20	100000.00
21	Mattresses and others		105400.00
		<b>Total</b>	<b>150000.00</b>

**INSTRUMENT / MEDICINE REQUIREMENT :-**

1. Cotton, Gauze, Bandages
2. Plaster cost Bandage
3. Orthopedic implants
4. Life Saving Medicine
5. Disposables

Sufficient quantity as required  
Approx- 30 lakh Rs. per year.

**LINEN :-**

1. OT Linen - 200 set per year
2. Bed Sheet - 300 per year
6. Pillow Cover - 300 per year
3. Mattresses - 50
4. Patients OT. Dress - 100 set per year
5. Blanket - 50 per year

Approx- 5 lakh Rs. per year.

## **Budget requirement**

### **Recurring :-**

1. Salary of staff	-	26236212/-
2. Medicine & Disposable	-	3000000/-
3. Linen	-	500000/-
4. Stationary	-	120000/-
5. Maintenance of Equipment & Furniture	-	210000/-
6. Maintenance of Building	-	50000/-
7. Equipment & Instrument	-	250000/-

### **Non-Recurring:-**

1. Construction & Renovation	-	9480000/-
A. Construction of ward & OT	-	7538000.00
B. Electrification of ward & OT (New construction)-		1130000.00
C. Renovation of present casualty	-	812000.00
2. Equipment & Instrument	-	17500000/-
3. Furniture	-	1500000/-