### HOSPITAL CONSTRUCTION CONCEPT & ANALYSIS



### **GURU HOSPITAL** NEW CANCER TREATMENT WITH NEW TECHNOLOGY Pandikovil Ring Road, Madurai

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### I am a Doctor

I am Planning to construct the hospital, how the hospital building should be?

#### HOW THE HOSPITAL BUILDING SHOULD BE?

It is a working environment

- To provide Best comfort zone to the doctor
- To provide best result to the patients

### • User friendly Hospital Layout

## COMPONENTS OF HOSPITAL SETUP

#### **1. EXTERNAL COMPONENT**

Building





#### **2. INTERNAL COMPONENT**

#### It is pleasant and user friendly



### **During Construction**

What are the Challenges to be faced?

#### TAMILNADU BUILDING RULES -2019 GAZETTE

#### Annexure - IX

[See rule 35 (23)]

#### **Regulations for Special Provisions for Hospital Buildings.**

- Ramps of minimum width 2.4 m and maximum slope of 1:12 shall be provided in all Hospital Buildings with Ground Floor/Stilt Floor +First Floor and above and floor area exceeding 300 sq.m. in each floor.
- (2) Set back space alround the building with access for fire fighting vehicles to operate, as already laid down in the Development Regulations shall be provided as given below:
  - (i) For buildings less than 18.30 metres height, 6.0 metres wide set back alround.
  - (ii) For buildings between 18.30 metres and 30.0 metres height, 7.0 metres set back alround.
  - (iii) Set back area should be free of any obstruction, such as fountains, statues, flower pots, decorative idols, ramps etc., to facilitate movement of vehicle and people during emergency.
- (3) Minimum of two large 'louvered windows' (with adequate safety provision) shall be provided in each floor for easy evacuation of persons, wherever the building is fully glazed.
- (4) Fire Lifts with alternate power supply outside the building shall be provided.



• This presentation is designed for a doctor who wants

to create the new setup

(30-100 bedded hospital)



### AGENDA

- **1.** HOSPITAL Components
- 2. Building Guidelines
- 3. Operation Theatre Principles
- 4. Fire & Safety Norms
- 5. Value Added Facilities
- 6. Signage's
- 7. How Hospital Owner / Surgeon Should Be?
- 8. Finance



# **BUILDING CONSTRUCTION**



#### **CERTIFICATES TO BE NEEDED BEFORE CONSTRUCTION**

#### approval



#### Pollution control board certificate



Lift license



#### Fire safety certificate



#### Generator license



#### **Temporary EB connection**



### Classification of Surgical setup

Clinic Only Out patient service 20 beds Nursing No ICU Home **No Operation Theatre** Hospital Full pledged hospital

## LAND CLASSIFICATION







## APROVAL AUTHOURITY

#### Local Body (Panchayat, Municipality, Corporation)

- Up to 2000 Sq ft Commercial building (Hospital not included)
- Up to 4000 Sq ft Residential building

#### L.P.A (Local Planning Authority) Up to 15000 sq ft

#### **DTCP (Directorate of Town and Country Planning)** Above 15000 sq ft

### WHAT IS MULTI STORIED BUILDING (M.S.B.) ?

 If the building height is more than 60 ft from the ground level is called multi storey building

Building more than 1+3 floor

• For MSB corporation and LPA will not give approval. DTCP approval is must.



# WHAT IS F.S.I. (FLOOR SPACE INDEX) ?

Ratio of the total floor area of buildings(surface area of all floor) to the size of the land.

• Thus, an FSI of 2.0 would indicate that the total floor area of a building is two times the gross area of the land on which it is constructed



### WHAT IS F.S.I.FOR HOSPITAL ?

# 1.5

Total surface area of the building is 1.5 times than the total land area.

#### **Relaxation :**

Car Parking, Stair case area, Lift area, OTS area will not be included in F.S.I Calculation.

### FLOOR AREA OF HOSPITAL

Space require for one bed - 75-100 sq ft

 Hospital Space required for each Bed 700 – 900 sq ft per bed.



### FLOOR AREA ALLOCATION

-	- 15%
-	

10%

- Diagnostic & Therapeutic 18%
- Administration 10%
- Service Departments 17%

# **CONSTRUCTION GUIDELINES**



## MINIMUM REQUIREMENT

- Corridor 8 Feet width
- Lift 8 X 4 Sq.Ft
- In Common ward , area requirement for each bed should be 7 x 8 Sq.Ft
- There should be a 3.5 Ft between each cot and the space between head end of the cot and outer wall is should be 2 ft.
- Staircase should be two in number additionally two lifts (one firelift )and ramp to be provided.



## **FLOORING**

- 1. Tiles
- 2. Granites
- 3. Vinyl
- 4. Pavor block

## WALL PROTECTION

#### To maintain the wall, the wall to be covered with



## FALSE CEILING ADVANTAGE

- 1. Ambiance
- Above the false ceiling wiring need not be concealed
- Above the false ceiling plastering and painting not necessary on the wall as well as roof
- 4. Cost effective







# DOOR

#### IN OPERATION THEATRE AND OTHER STERILE AREA SS DOOR IS PREFERABLE

#### IN PATIENT ROOM DOOR SHOULD BE DIVIDED INTO 2 PARTS 20 : 80 FOR BETTER UTILITY THERE SHOULD BE A GLASS OVER THE DOOR.





 As per AERB guidelines In Radiation room (X-Rays) door should be covered with lead.



# ELECTRICAL



## ELECTRICAL - LT Vs HT

- Before Construction electrical load to be calculated
- Less than 150 HP LTCT (Low Tension Current Transformer)
- More than 150 HP HT (High Tension)
- Installation of new transformer with in the campus mandatory for HT connection.



LTCT



HTCT

## ELECTRICAL – UPS

Since hospital is loaded with Costlier Biomedical /

Electronic equipment it should be safe guarded.

#### **Online UPS :**

Since sudden cut-off of the power supply can cause damage to the equipments, All kind of supply to equipments only through the UPS. (No Direct power supply)

All equipment should be provided UPS and RAW Power Plug points.





## **ELECTRICAL – STABILIZERS**

#### Stabilizer :

To avoid equipment damage by voltage fluctuation, the stabilizer to be incorporated in all equipment - line to be passed through the stabilizer. – It will provide constant 240 V.



## NON-ELECTRICAL LINES



SPEAKER WIRING

# **OPERATION THEATRE**



# OT – THE NUMBER

BEDS	MINOR	MAJOR	EM MINOR	EM MAJOR
50	0	1	0	1
100	1	1	0	1
300	2	3	0	1
500	2	5	1	1
750	2	8	1	1
1000	2	10	1	1

## **OPERATION THEATRE**

- Complex environment of varying degree of sterility, integrating surgical and anesthetic equipment for the safe conduct of surgery.
- The goal is to ensure the safety of patients undergoing surgical procedures and protection of the surgical team.



## OPERATION THEATRE COMPLEX

- 1. Doctor's longue
- 2. OT Corridor
- 3. Operation theatre
- 4. CSSD
- 5. Scrub area
- 6. Post operative ICU


## **OPERATION THEATRE SETUP – ZONES**

### Operation theatre complex consists of 3 zone:

#### **NON-STERILE ZONE**

Doctor's longue,Unsterile room ofCSSD

#### SEMI STERILE ZONE

– OT Corridor, Scrub area, Post operative ICU

#### **STERILE ZONE**

- Operation theatre, sterile room of CSSD



### DOUBLE CORRIDER WITH UNIDIRECTIONAL FLOW



### STANDARD OT SIZE

20'x20'x10' height below the false ceiling level

### **FLOORING, WALLS**

The flooring, walls and ceiling should be non porous, smooth, without corners and should be easily cleanable repeatedly. The material should be chosen accordingly.







### LAMINOR FLOW

- Air flow is unidirectional. Air is supplied through terminal HEPA Filters in the ceiling & return air is via the return air duct situated in the corners of OT just above the floor level
- Particle allowed in the filter 0.5 microns.
- Positive Pressure Between OT and adjoining areas to prevent outside air entry into OT.





 The operating theatre should ideally have an independent air handling unit with controlled ventilation such that the lay-up room and the OT table is under positive pressure and has the most Air Changes per Hour





# **OPERATING LIGHT**

- Shadow less, mobile, hanging pendant easily maintainable OT light.
- intensity should be 4000 lux at incision and 8000 lux at 9cm deep.





### TEMPERATURE AND HUMIDITY

- The temperature should be maintained at 21 +/- 3 degrees
   Celsius inside the OT all the time with corresponding relative humidity between 50 to 60%
- Appropriate devices to monitor and display these conditions inside the OT may be installed.



### Cntd⋯

- The design should be made in such a way that Post operative intensive care unit should be adjacent to the theatre having 2 entrances,
- 1. One from OT &
- 2. Another from IP block



### CENTRAL STERILE SUPPLY DEPARTMENT

"A service, within the hospital, catering for the sterile supplies to all departments, both to specialized units as well as general wards and OPD's "



# Manifold



# FIRE AND SAFETY



### **DURING CONSTRUCATION**

### **EMERGENCY EXIT EVACUATION PLAN**

- Emergency exit direction board UPS Operator
- It should glow during power shutdown
- RAMP



EMERGENCY EXIT ONLY

### WATER SUPPLY & HYDRANT SYSTEM (FIRE DUCT WITH HIGH PRESSURE PUMP)

- Underground water tank, Terrace tank connected with vertical water duct, Operated by high pressure pump
- In high raising building both tanks are mandatory.



### SMOKE DETECTOR FIRE ALARAM

"Automatic sensor system connected to electrical panel and it gives alarm whenever it comes in contact with smoke"



## FIRE EXTINGUISHER

- A manually operating fire extinguisher used for small scale fire
- It should be fitted in Lab, UPS area, Power House & near the High Cost Equipment



# SIGNAGES



## INSTRUCTION SIGNAGES





# DIRECTION -SIGNAGES





- CT Scan
- Radiotherapy
- Brachytherapy
- Treatment Planning System
- Chiller Plant





## PATIENT RIGHTS & RESPONSIBILITIES -





#### Patient Responsibilities / நோயாளிகளின் கடமைகள்

#### Patient responsible include

- Giving respect and treating with dignity all health care workers, other paitent and visitors.
- Giving as much information as possible about their present health, past illness allergies and any other relevant details
  including family histroy of disesses and allergies.
- Following the prescribed and agreed treatment plan and complying with the instruction given.
- Not taking medication without medical advice.
- Keeping up appointments made and notifying the hospital, as early as possible if unable to do so.
- Not littering the hospital and help in keeping the premises clean.
- Using garbage bins.
- Keeping toilets clean after use.
- Not drinking alcohol, smoking or spitting inside the hospital premises.
- Not asking for or giving inaccurate information for incorrect certificates.
- Maintaining silence in hospital.
- Accepting responsibility for their actions if they refuse treatment.
- Accepting responsibility for the safekeeping of their valuables and possessions.
- Respecting the property of other and that of the hospital.
- Abiding by all applicable National, state and local Laws.

#### நோயாளிகளின் கடமைகளின் இவை அடங்கும்

- உடல்நல பராமரிப்பு பணியாளர்கள், மற்ற நோயாளிகள் மற்றும் பார்வையாளர்களுக்கு மதிப்பளித்தல் மற்றும் அவர்களை கண்ணியத்துடன் நடத்தல்.
- நோயாளிகளின் உடல்நலம், முந்தைய நோய்கள், ஒவ்வாமைகள் மற்றும் குடும்பத்தீனர்களுக்கு இருந்த நோய்கள் மற்றும் ஒவ்வாமைகள் போன்ற மற்ற உகந்த அனைத்து விவரங்களையும் முடிந்தவரை அளித்தல்.
- பரிந்துரைக்கப்பட்ட, ஒப்புக்கொண்ட சிகீச்சை தீட்டத்தை பின்பற்றுதல் மற்றும் அளிக்கப்பட்டுள்ள அறிவுறுத்தலுக்கு இணாங்கீ நடத்தல்.
- மருத்துவ ஆலோசனை இல்லாமல் மருந்துகள் உட்கொள்வதை தவிர்த்தல்.
- நீயம சந்தீப்புகளை (அப்பாய்ன்ட்மென்ட்களை) தவறாமல் இருத்தல், நீயம சந்தீப்பின்படி வர இயலவில்லை என்றால் முடிந்தவரை முன்கூட்டியே மருத்துவமனைக்கு தெரிவிக்க வேண்டும்.
- மருத்துவமனை வளாகத்தை சுத்தமாக வைத்தீருக்க உதவுதல்.
- குப்பை தொட்டிகளை பயன்படுத்துதல்.
- கழிவறைகளை பயன்படுத்திய பிறகு சுத்தமாக வைத்திருத்தல்.
- மருத்துவமனை வளாகத்திற்குள் மது அருந்தாமல், புகைப்பிடிக்காமல், எச்சில் துப்பாமல் இருத்தல்.
- தவறான சான்றிதழ்களுக்கான தவறான தகவல்களை அளிக்க வேண்டுமென்று கேட்காமல் இருத்தல்.



#### Patient Rights / நோயாளிகளின் உரிமைகள்

#### Patient right include

- Respect for personal dignity and privacy during examination, procedures and treatment.
- Protection from physical abuse or neglect.
- Treating patient information as confidential.
- Obtaining informed consent before carrying out procedures.
- Obtaining information on how to voice a complaint.
- Obtaining information on the expected cost of the treatment for that particular procedure.
- Right to ask information contained in the Medical Records in the form of Discharge Summary.
- Right to accept/Reject the decision of the treating doctors.
- Right to request for second opinion.
- Right to receive a clear explanation regarding the services availble in the hospital.

#### நோயாளிகளின் உரிமைகளில் பின்வருபவை அடங்கும் :

- மரியாதையுடனும் கண்ணியத்தோடும் தனிநபரின் நம்பிக்கைகள், சிகீச்சை பெறும் போதும், சோதனை செய்யும் போதும் காக்கப்படுகிறது.
- உடலை பலாத்காரபடுத்தாதபடி காக்கப்பட வேண்டியது
- நோயாளி குறித்த தகவல்களை இரகசியமாக வைத்திருத்தல்.
- சிகீச்சைகளை மேற்கொள்வதற்கு முன் தகவலளிக்கப்பட்ட படிவத்தைக் பெறுவதற்கான உரிமை உண்டு.
- மருத்துவமனையின் குறைகளை எடுத்துரைப்பதற்கு தங்களுக்கு உரிமை உண்டு.
- குறிப்பிட்ட மருத்துவ சிகிச்சைக்கு தேவைப்படும் மருத்துவ செலவைப் பற்றி அறிந்து கொள்வதற்கான உரிமை உண்டு.
- மருத்துவ அறிக்கை/டிஸ்சார்ஜ் சம்மரி (மருத்துவமனையில் தங்கீ சீகீச்சைப் பெற்று தீரும்பும்பொழுது அளிக்கப்பட்ட சீகீச்சை குறித்து அளிக்கப்படும் தொகுப்பு)
- மருத்துவ பதிவில் குறிப்பிட்ட தகவல்களை பெறுவதற்கான உரிமை உண்டு.
- சிக்ச்சையளிக்கும் மருத்துவரின் முடிவை ஏற்பதற்கான / நீராகரிப்பதற்கான உரிமை உண்டு.
- இரண்டாவது அபிப்பிராயத்தை கோருவதற்கான உரிமை உண்டு.
- மருத்துவமனையில் கீடைக்கும் சேவைகள் தொடர்பாக தெளிவான விளக்கத்தை பெறுவதற்கான உரிமை உண்டு.

# VALUE ADDED FACILITIES



### ELBOW OPERATED TAP



# TOILET WITH HAND SUPPORT



### INTENSIVE CARE UNIT



Nurse's Station should be placed in such a way they can monitor all the patient.

## ICU - HANGING I.V STANDS



### f T.V installed in the bed, patient feels homely environment especially treatment like dialysis AND chemotherapy





# PRAYER HALL



 Estimated cost of the project for construction is approximately Rs 2000 /Sq.ft.

 To construct the full pledged hospital including land and equipment cost - 40lakhs/Bed.

Only 80% project cost should be utilized for construction, 20% for working capital.



## HOW - HOSPITAL OWNER / SURGEON SHOULD BE ?

### HOW - HOSPITAL OWNER / SURGEON SHOULD BE ?



# HOW HOSPITAL OWNER SHOULD BE?

- Professional Doctor
- CEO / Admin Head
- Finance Planner / Auditor
- Marketing Manager / Analyzer
- Public Relation Officer



### **"Owners are not replaced by anyone**

As an investor, he should be the multi- tasker"





Don't mix

### CLINICAL WORK WITH ADMIN WORK









PROFESSIONAL WORK CAN BE REPLACED, ADMIN WORK CANNOT BE REPLACED

### DOES THE FOLLOWING PROFESSION CAN BE REPLACED WITH SOME ONE?

PROFESSION	REPLACEMENT
Professional Work	Selectively
CEO / Admin Head	NO
Finance - Planner / Auditor	NO
Marketing Manager / Analyzer	NO
Public Relation Officer	NO

# TRAINNING

- SOP Standard Operating Procedure
- WI Work Instruction
- Trainer

Create the system based on

- Specialty we are treating.
- No. of beds
- Availability of staff

"Define Job responsibilities to the post not for individual staff"




NATIONAL AWARD FROM HONORABLE UNION HOME MINISTER RAJNATH SINGH IN DECEMBER 2015



Governor HIS EXCELLENCY BANWARILAL PUROHIT in the Presence of Health Minister and Health Secretary.