



HAAT INCINERATORS INDIA PVT LTD

- BANGALORE BASED COMPANY WITH 65 EMPLOYEES, ASSOCIATED WITH BIO-MEDICAL WASTE MANAGEMENT FOR THE LAST 7 YEARS
- COLLABORATE WITH
 - 1) GÖK mbH FOR **CENTRALISED BIO-MEDICAL WASTE MANAGEMENT CONSULTANCY SERVICES – 15 YEARS OF EXPERIENCE AND OVER 100 PROJECTS**
 - 2) B.I.M.E. (MANUFACTURE OF AUTOCLAVES)
 - 3) ITS DRILLING (LARGE-SIZED INCINERATION SYSTEMS)
- **COMMON TREATMENT FACILITY EXPERIENCE**
 - 1) OPERATIONAL PLANT – **MUNICIPAL CORPORATION OF SHIMLA – 2 TONS/DAY CAPACITY**
 - 2) PLANT UNDER ESTABLISHMENT – **REWARI, HARYANA – 2 TONS/DAY CAPACITY**
 - 3) MACHINES IN USE IN **COMMON FACILITIES OF VIJAYWADA, PUNE AND HYDERABAD**
 - 4) INTERACTED WITH MANY RESEARCH INSTITUTES ON **ORGANISATION OF COMMON BIO-MEDICAL FACILITIES**

STEPS IN THE HANDLING OF BIO-MEDICAL WASTE

STEP 1 – Training on segregation to all hospitals

STEP 2 – Process of collection, labelling and handling

STEP 3 - Transportation

STEP 4 – Disposal of waste strictly as per Bio-Medical Waste (Management & Handling) Rules

STEP 1 – TRAINING ON SEGREGATION

- The **key to effective** biomedical and healthcare **waste management**.
- Ensures that correct disposal routes are taken
- Maintenance of **personnel safety**
- Environmental harm is minimised
- Least resources for re-cycling can be used.
- Should be done according to the specific treatment or disposal requirements.
- Must be **done at source** by generator.
- A waste plan coupled with **rigorous training and education** is necessary.

YELLOW	RED
Category # 1	Category # 3
Category # 2	Category # 6
Category # 3	Category # 7
Category # 6	
Blue/ White	Black
Category # 4	Category # 5
Category # 7	Category # 9
	Category # 10

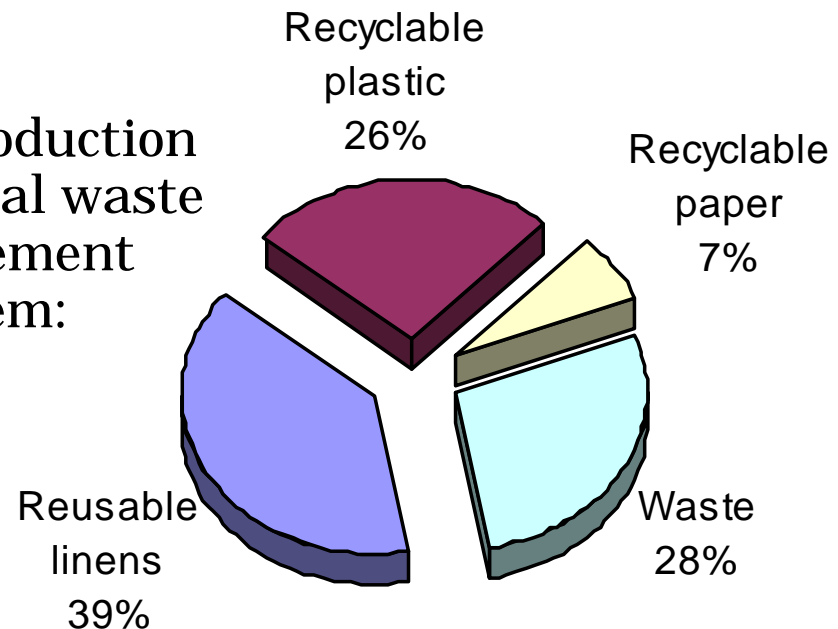
WASTE MANAGEMENT AUDITING

- Purpose - to determine which initiatives will be most beneficial.
- The three main steps are information gathering, waste stream analysis and development of action plans.
- Information must be collected on volume of each type of waste in each specific area.
- To determine the current costs associated with disposal of each type of waste.
- To determine waste management initiatives like reduction, recycling, reuse and recovery that are currently in place.

Starting
Situation:



After introduction
of a hospital waste
management
system:



EDUCATION & TRAINING

- No **waste management policy** will be effective unless applied daily by all involved staff, consistently and accurately.
- Aim of training is to develop awareness in participants for health, safety and environmental protection issues.
- Training activities should be designed for four main categories of personnel - managers and regulatory staff, medical doctors, nurses, hospital cleaners, waste handlers and drivers.
- Training should cover healthcare waste policy, responsibility, instructions on the application of practices.
- **Practical, hands-on approach** to training in small groups would be preferred.
- **Periodical repetition** of courses

STEP 2 - COLLECTION, LABELLING & HANDLING

- Containers will be identifiable and **suited to waste type**
- Waste bags to be removed and sealed when they are not more than three quarters full
- To be **collected daily** from the wards or as frequently as required and transported to the central storage place
- Immediate **replacement of bags** or containers with new ones of the same type
- No bags should be removed without labelling containing point of generation (hospital and ward) and content



STEP 3 - TRANSPORTATION

- Packaged in **resistant and sealed containers** to prevent spilling.
- Ideally every container should have 3 layers, inner packing of waste with a leak proof seal, absorbent material in sufficient quantity, and the outer body.
- Will comply with regulations regarding transport of hazardous wastes.
- Will be accompanied by a consignment note from production to final disposal
- Documentation and transmission of waste will comply with national regulations.



EMERGENCY RESPONSE

- Evacuate the contaminated area
- Eye and skin decontamination (disinfection) of exposed personnel
- Determine the nature of the spill
- Evacuate all the people not involved in cleaning-up if particularly hazardous agent
- Provide first aid and medical care to injured persons
- Secure the area to prevent additional exposure of persons
- Provide adequate clothing to personnel involved in cleaning-up
- Limit the spread of the spill
- Neutralise or disinfect the spill or contaminated material if indicated
- Collect the spill and the contaminated material
- Sharps should never be picked up by hand, but with tools, e.g. pans or brushes.
- Spilled material and contaminated items used for cleaning should be placed into the appropriate bags or containers

STEP 4 - DISPOSAL TECHNOLOGIES

Good Disposal Options

- **Autoclaving** - the safest method of treatment as only steam sterilisation takes place with no change in chemical structure of waste.
- **Incineration** - the only solution for pathological wastes.

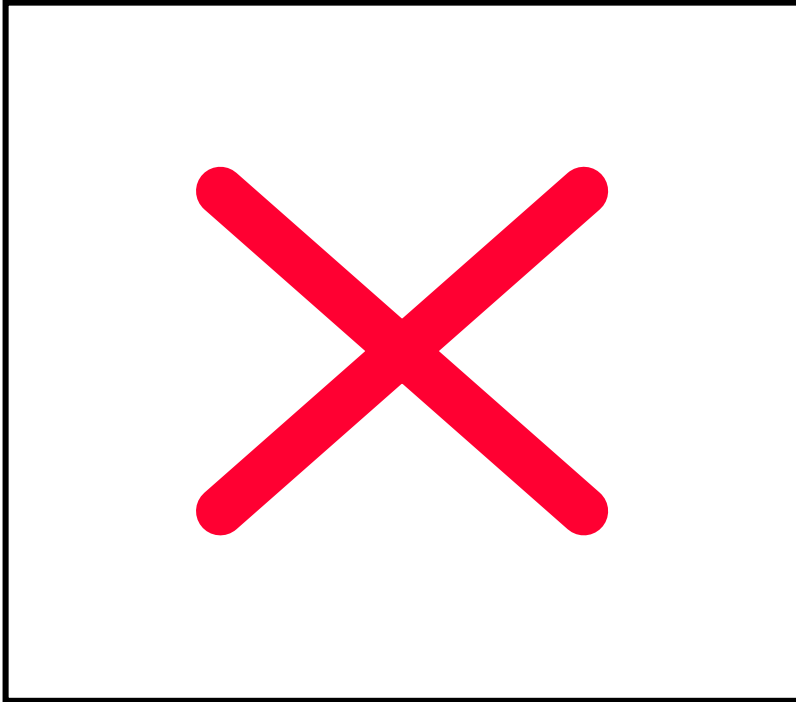
Other Disposal Options

- **Microwaving** - also a steam sterilisation method, but discarded after trials in countries like Germany because of high operation costs and inability to handle metals.
- **Hydroclaving** - a method of indirect steam sterilisation, but effectiveness as opposed to autoclaving (which is direct) needs to be looked into.

TREATMENT OF 10 TONS/DAY

- Predominantly **non-burn** technology
- Will follow the Final Draft of the Basel Convention - Technical Guideline on the Environmentally Sound Management of Biomedical and Healthcare waste.
- Autoclave system proposed **approved by Greenpeace**
- System proposed has been established and proven **over 15 years**
- **Autoclaving** – 70-75% (categories 3,4,6 and 7)
- Shredding (categories 3, 4, 6, 7)
- **Incineration** – 15-20% (categories 1 and 2)
- **Chemical treatment** – 05-10% (categories 8 and 10)
- Landfill (categories 5 and 9)

GÖK TWINCLAVE SYSTEM



The Twinclave system :
(stationary system)

TC- 1 = capacity of ~**140 kg/h**

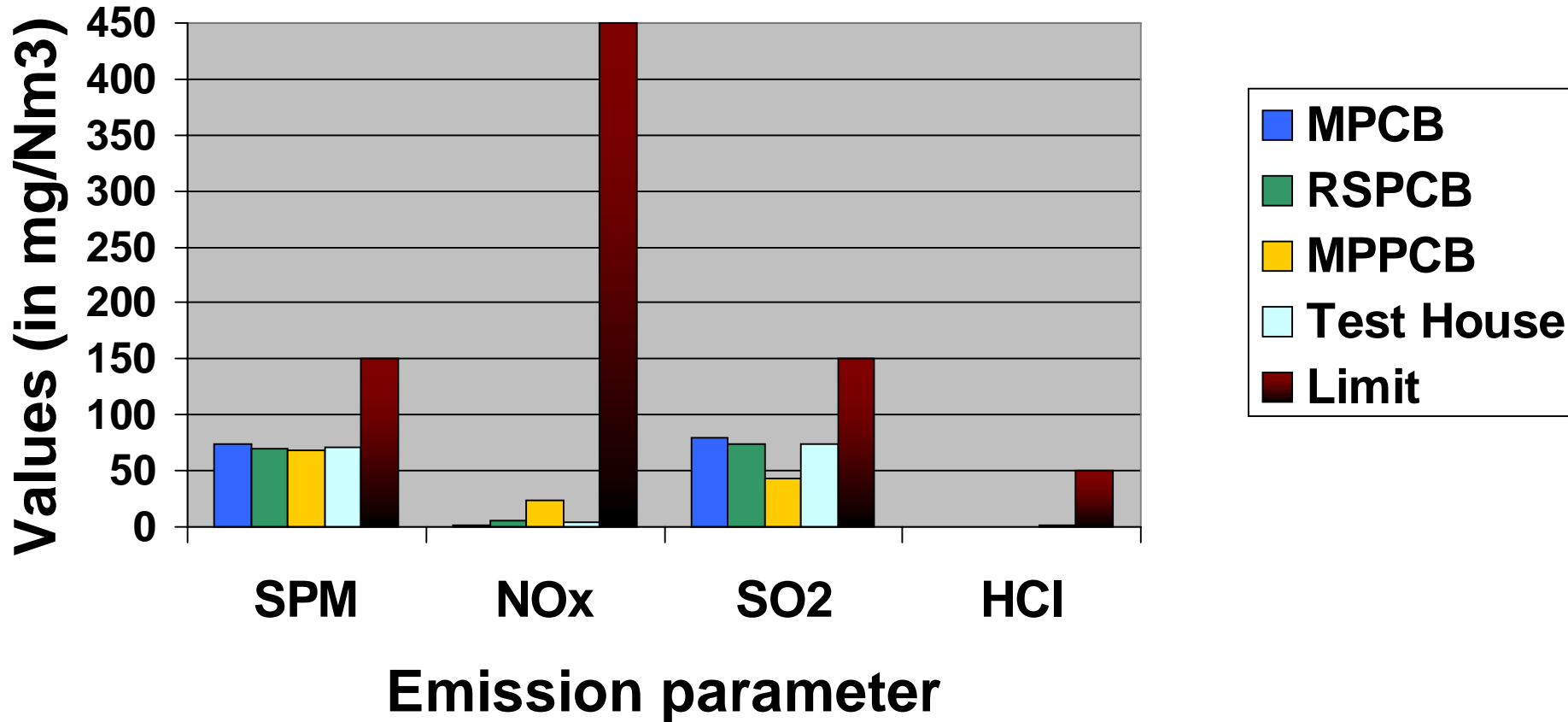
TC- 2 = capacity of ~**333 kg/h**

TC- 6 = capacity of ~**800 kg/h**

TC-11= capacity of ~**1450 kg/h**

EMISSION VALUES OF HAAT INCINERATORS

(Based on test reports from different State Pollution Control Boards and Authorised Test Houses)



PROJECT IMPLEMENTATION SCHEDULE

- Approvals / Clearances from Regulatory Authorities – 2 months
- Civil work – 3 months
- Supply of equipment – 4 months (parallel to civil work)
- Erection and installation of equipment – 2 months
- Provision of logistics – 3 months (parallel to erection)
- Commissioning of plant – 2 months

TOTAL TIME – 11 Months