

DRAFT SYLLABUS ON

HOSPITAL WASTE MANAGEMENT

UNDER
CRAFTSMANSHIP TRAINING
SCHEME

2004

Govt. of India Ministry of
Labour/DGE:&T

CENTRAL STAFF. TRAINING & RESEARCH
INSTITUTE

EN BLOC I(, SECTOR V, SALT LAKE Kolkata-
700091

LIST OF MEMBERS ATTENDED TRADE COMMITTEE MEETING

1.	Prof S. K .Basu , Director	Dept. of Health & Family Welfare	Chairman
2.	Mr. S.K.Adhikary., Sr. Engineer	West Bengal Pollution Control Board	Member
3.	Dr.R.C.Srivastava	All India Instt.of Public Health & Hygiene	Member
4.	Sri. S.C.Dutta Gupta	Instt. of Public Health & Engineering Kolkata	Member
5.	Dr. A.K.Mukherjee	Regional Occupational Health Centre Kolkata	Member
6.	Sri .T.Mukhopadhyay, .DDT	CSTARI, Kolkata	Member
7.	Sri S. Kumar., DDT	CSTARI, Kolkata	Member
8.	Sri R.B.Ram, ADT	CSTARI, Kolkata	Member
9.	Sri P.K.Kolay, T.O.	CSTARI, Kolkata	Member
10.	Sri S.B.Sardar, T.O.	CSTARI, Kolkata	Member

GENERAL INFORMATION

1. Name of Trade : Hospital Wastage Management
2. N.C.O. Code No. :
3. Entry Qualification : 10+2 with Physics, Chemistry &
& Biology
4. Duration of Craftsmen Training course: 6 month.
5. Unit size : 16 Trainees
6. Space requirement : 2000 sq. ft.

NB : Demonstration should be given in a Hospital on common facility site.

**SYALLABUS ON HOSPITAL WASTE MANAGEMENT UNDER CRAFTSMANSHIP
TRAINING SCHEME**

Week	Theory	Practical
1-2	Introduction, Definition of General and Hazardous health care waste, Infectious waste, Genotoxic waste, Waste Sharps, Biomedical waste – categories Categorization and composition of Biomedical waste. Specification of materials. Colour coding. Sources of Health care wastes, Hospitals & health care establishments & other sources.	Waste survey in a Hospital Practice on Categorization of Hospital waste
3.	Health Impacts of Biochemical waste. Direct & Indirect hazards. Potential health hazards. Persons at risk. Basic information about- What infection? Infection agents on organizations spread of infection Basic information about Hospital acquired infection.	
4	Legislation and policies on Health care waste management. Biomedical waste Management and handling Rules, 1998 and its amendment there after. CPCB guidelines. (Central pollution control board) Some idea on Safe disposal of Radioactive waste Rules, 1995 guideline of BARC	
5	International Scenario World Health Organization guidelines on a) Management of wastes from Hospital waste b) Management of hospital wastes in c) Developing countries	
6-7.	Basic steps in Health Care Waste Management Segregation at the point of generation sharp Decontaminating/ Disinfections unit container for autoclaving Sharp waste containers for storage & transportation autoclaving/shnedding /incrimination/ bio hazard symbols. Microwave, Hydropulbing, plasma tonch.	Practice (on simulated basis) on Segregation. Poly bags collection. Bin. Autoclaving Incineration Labeling Use, care & maintenance of Autoclave, Incinerator Microwave Hydropulping plasama tonch
8	Collection & Handling of waste	Practice on collection & handling of waste (Simulated) Pre-treatment

9	On site Pre-treatment of waste	Operation
10	Mechanical Treatment & Chemical Disinfections Store & Off-site transportation	Practice on -- Thermal Chemical Disinfections of (Simulated) waste.
11	Treatment- in-site & off-site(common treatment facilities) Liquid waste treatment Different technologies, cost aspect	Demonstration / Practice
12-13	Conventional Treatment Technologies a) Wet thermal technology b) Incineration - different models Alternative Treatment Technologies Microwave Technology Rotaclave system Hydro clave system Electro Thermal Reactivation (ETP) Treatment Process Electron beam Technology Plasma Pyrolysis /Gasification systems	Practice on digging Vats, Pits, trenches Demonstration/Practice on What ever is available -- -- -- -- -- --
14-15	Treatment of General/Non-infectious wastes a) Composting Rotating Jumbling system French composting b) Vermi-composting	Demonstrations/Practice on a) Composting b) Vermi Composting.
16	Disposal Technologies a) Sharp Disposal pit b) Deep- burial pit c) Secured Land fill	Demonstrations/Practice on Disposal
17	Waste Minimization Recycling, Re-use	Demonstration in Recycling
18-19	Health & Safety Practices Usage of protective equipment Occupational health programmes & safety practices Emergency measures	Occupational Safety/practices
20	Management of non-clinical support devices Pretreatment of linen, Laundry, central sterilization unit (CSSD)	Practice/Demonstration on pretreatment of line, Laundry, Central sterilization.

21-22	Estimate of various items of waste management based on no. of wards, no. of beds in each ward, other units like Laboratory, Kitchen-Waste Audit	Practice on waste Audit
23	Hospital Budget allocation for Hospital waste management. Maintenance of Records, annual Report	Estimating various items of Waste Management Practice in maintenance of records.
24	Visit to Hospitals & Health Care Units	Visit.
25-26	Revision & class test.	

TOOLS & EQUIPMENT- required for a batch of 16 trainees

S.No.	Item	Qty.
1.	Red Bins with Bio-hazard Symbol (for infectious waste)	2 nos.
2.	Black Bins (for general waste)	2 Nos.
3.	Buckets	2 Nos.
4.	Blue Bins with Bio-Hazard symbol (for sharp decontamination)	2 Nos.
5.	Syringe and Needle Cutter	16 Nos.
6.	Sieved Bucket	6 Nos.
7.	Trolleys for internal Transport of general waste	6 Nos.
8.	Trolleys for internal Transport of infectious waste with Bio-hazard symbol	6 Nos.
9.	Red bags with Bio-hazard symbol	2 Nos.
10.	Black Bags	2 Nos.
11.	Yellow Bags with Bio-hazard symbol	2 Nos.

12.	Blue Bags with Bio-hazard symbol	2 Nos.
13.	Autoclavable bags (Red with bio-hazard symbol)	2 Nos.
14.	Card board boxes	6 Nos.
15.	Gloves	16 Nos.
16.	Masks	16 Nos.
17.	Gumboots	16 Nos.
18.	Aprons	16 Nos.

b. Requirement of Materials

i. Bags and Bins

The total number of bags and bins that would be required per day may be estimated as per the following Principle:

Sl.No.	Item	Quality
1	Red Bag	6 Nos.
2	Black Bag	6 Nos.
3	Yellow Bag	6 Nos.
4	Blue Bag	6 Nos.

The consolidated annual/half yearly/quarterly estimate of number of bags and bins of different colour codes may be made from the above principle keeping a suitable buffer.

Autoclave with all accessories	.. 1 No.
Autoclavable Bags and Other Consumable for Autoclaving	6Nos.
Microwave Oven	1 No.
Water ssoftener	1 No.
Trolleys for Internal Segregated Transportation	6 Nos.
Bleaching power	6 Kgs.

The material grade and thickness of autoclavable bags has been finalized taking into consideration the high temperature & pressure conditions that these have to withstand. The size and qualitative specification of such bags are given in Table A-I.

Each autoclavable bag is expected to accommodate 5 red bags containing bio-medical waste, from which the annual requirements of autoclavable bags have been estimated. After treatment the treated autoclavable bags shall be placed in black bags of similar dimensions before storage in the black chamber of the vat. The requirement of autoclavable bags may thus be estimated.

The other requirements for effective functioning of the autoclave are:

1	Annual Maintenance Contract with the supplier for regular maintenance of Equipment, servicing, providing consumables such as water softener, printer cartridge, paper roll, etc.	
2	Fuel- High Speed Diesel (HSD)- 3 Litres per cycle (Taking into consideration the power -cut, which compels a new cycle). Considering 4 autoclavable bags per cycle, 2 cycles of operation is envisaged per day requiring 11 litres per day or about 4,015 litres per year. Also a drum or container shall be required for storing the fuel. This is applicable wherever the fuel to run the boiler is HSD (not applicable where operated by electricity)	10 litres
3	One large size bin (60 litre capacity) for collecting the treated bags from the autoclave before these are transported to the vat.	1 No.
4	Water Softener - for supply of boiler feed water of required quality for the autoclave about 20-25 ml of softener is required per day. Thus 2 cans of 5 litre.capacity would be required in a year.	1 No.
5	Jute Rag - to be placed under the autoclavable bag in the treatment chamber (5ft x 4 ft in size) . Each rag can be used for 2 days.	2 Nos.
6	Electric and water supply connection inside autoclave room.	
7	Mechanical and electrical tools such as electric tester, Wrench (for opening the chamber), Wire Brush (for cleaning the chamber after each cycle) etc.	2 each
8	Printer cartridge and paper (3" wide) for the printer of the autoclave. It is envisaged that 3 printer cartridges and 6 rolls or paper shall be required in year.	6 rolls
9	Grease for lubricating the machine parts for mooth functioning. About 1 kg. grease shall be required per month.	
10	Heavy duty gloves, apron, mask, gumboot for safety of the operators.	2 each
11	Register for keeping records	16 Nos.

iii. Syringe & Needle Cutter, Sieved Bucket, Blue Bin and Card-board Box

The basis of requirements of syringe & needle cutters, blue bin and sieved bucket depends on the number of wards/units where disposable syringes are in use. These shall be installed in the nursing stations within the wards and other units such as aT, Labour room, Emergency Pathological Laboratory (where blood is collected to carry out tests), Vaccination units, etc and wherever injections are being administered. The installation of these have to be optimised wherever possible. The requirement of cardboard boxes, shall be similar to the requirement of blue bags. Based on this principle, the consolidated annual/half yearly/quarterly requirements of all these above items may be prepared inclusive of 10% buffer stock.

iv. Trolleys for Internal Segregated Transportation

Internal transportation of waste from the wards and other units to the temporary storage area/on-site disposal area is to be carried in dedicated trolleys. The general waste shall be transported in black coloured trolleys and the bio-medical waste in red coloured covered trolleys marked with bio-hazard symbol. While procuring the trolleys, it should be kept in mind that the trolleys should have the following features.

- . Easy to load and unload
- . Easy to clean/disinfect
- . No sharp edges for preventing damage/tearing of waste bags

While estimating number of trolleys that would be required for segregated internal transport, the following features should be taken into consideration:

- . Layout of the hospital building
- . Ease of operating the trolleys
- . Time required for internal transport
- . Expected number of bags to be generated daily

v. Personal Protective Equipment

Personal protective equipment (PPE) such as, gloves, masks, gum boots, and aprons are to be provided to each of the sweepers of the hospital. The following table gives an indicative estimate of annual requirement of PPEs for the sweepers of hospital with buffer stock

Estimates of PPE for the Waste Handlers in the hospital

Gloves	6 Nos.
Masks	6 Nos.
Gumboots	6 pairs
Aprons	6 Nos.
vi. Bleaching Power	6 Kgs.

The quantity of bleaching power that would be required annually for chemical treatment of sharp waste, and laboratory wastes in the hospital can be estimated as follows:

Total Amount of Bleaching Power (in Kg.) = (20 gms* x number of wards/units using needle cutter + 200 **x number of laboratories) x 365x1000 + Buffer Stock.

- Amount (gm) of bleaching power required at each ward/unit per day considering change of the 1 % bleach solution, 2 litre in volume, once in a day.

** Amount (gm) of bleaching power required at the laboratory considering change of the 10% bleach solution, 2 litre in volume, once in a day.

The consolidated annual/half yearly/quarterly requirement of bleaching powder for chemical disinfections may be estimated based on the above principle with buffer stock.

.. 6 Nos.

...1 No.

...1No.

..6Nos.

..6Kgs.

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NB: The syllabus for SOCIAL STUDIES is approved and common for all trades.

.. 6 Nos.

...1 No.

...1No.

..6Nos.

..6Kgs.