

# **Short Term Training Program on Recent Trends in Urban Sanitation Systems**

**17<sup>th</sup> – 21<sup>st</sup> December 2018**

**Organized by  
Department of Architecture and Planning, MANIT, Bhopal**

**A Report**

## BACKGROUND

On October 10<sup>th</sup>, 2018 an agreement between NIUA, New Delhi and MANIT, Bhopal and was signed for Academia Engagement on Decentralized Sanitation. This is an SCBP initiative for providing an opportunity to students and faculty of universities and academic institutes to engage with studying and understanding urban sanitation systems in terms of centralised and decentralised sanitation system options. In the terms of reference following two specific activities and expected deliverables were finalized:

ACTIVITY NO.	SPECIFIC ACTIVITY	EXPECTED DELIVERABLES
1	<p><b>Design and roll out of Short-Term Training Program on Recent Trends in Urban Sanitation Systems</b></p> <ul style="list-style-type: none"> <li>• Course content, teaching material and exercises to be developed by MANIT in consultation with SCBP partners and NIUA.</li> <li>• Conducting of the training program for up to 40 participants</li> </ul>	<ul style="list-style-type: none"> <li>• The structure and content of the training be finalized to be finalized within 30 days after signing the agreement.</li> <li>• Five Days training will be held on mutually agreed dates during December 2018.</li> <li>• Submit report on learnings /feedback from certificate course within 45 days of conducting the program</li> </ul>
2	<p><b>One Day State Level Dissemination and Advocacy Workshop to promote Decentralized Sanitation</b></p> <ul style="list-style-type: none"> <li>• Workshop Agenda and List of invitees to be prepared in consultation with NIUA. Invitees to include city officials, state officials, experts and practitioners.</li> <li>• Conducting workshop with Presentations of select work prepared in advance of the workshop</li> <li>• Some expert presentations by SCBP partners</li> </ul>	<ul style="list-style-type: none"> <li>• Workshop agenda and list of invitees to be finalized within 30 days after signing the agreement.</li> <li>• Workshop to be held on mutually agreed date during December 2018.</li> <li>• Workshop report to be submitted after completion of the workshop within 45 days of conducting the workshop</li> </ul>

In continuation with the signing of agreement, both parties worked individually and collectively to thresh out the contents, dates, duration and other details of the one week Short-Term Training Program on Recent Trends in Urban Sanitation Systems and State-Level Workshop on

Decentralized Sanitation Systems for ULBs in Madhya Pradesh. After many telephonic communications, emails and a meeting in MANIT at 10:30 AM on 15<sup>th</sup> November 2018, the dates for the training program and one day workshop was finalized as 17<sup>th</sup> – 21<sup>st</sup> December 2018 and 22<sup>nd</sup> December respectively. Subsequently the contents and resource persons were also finalized.

The program brochure was circulated both in hard copy and soft copy. A unique feature of the brochure was printing of a QR code (refer Annexure 1), scanning which took the prospective participant to the registration link. He or she just had to fill in the details to get registered. The selection was done in a way so as to get participants from varied academic and professional backgrounds, organizations, representing diverse places. The selected applicants were then asked to communicate their confirmation; in this manner in all 63 were selected and out of those finally 50 attended the course. The participants’ profile/description is shown in figure 1. The complied list is enclosed in Annexure 2.

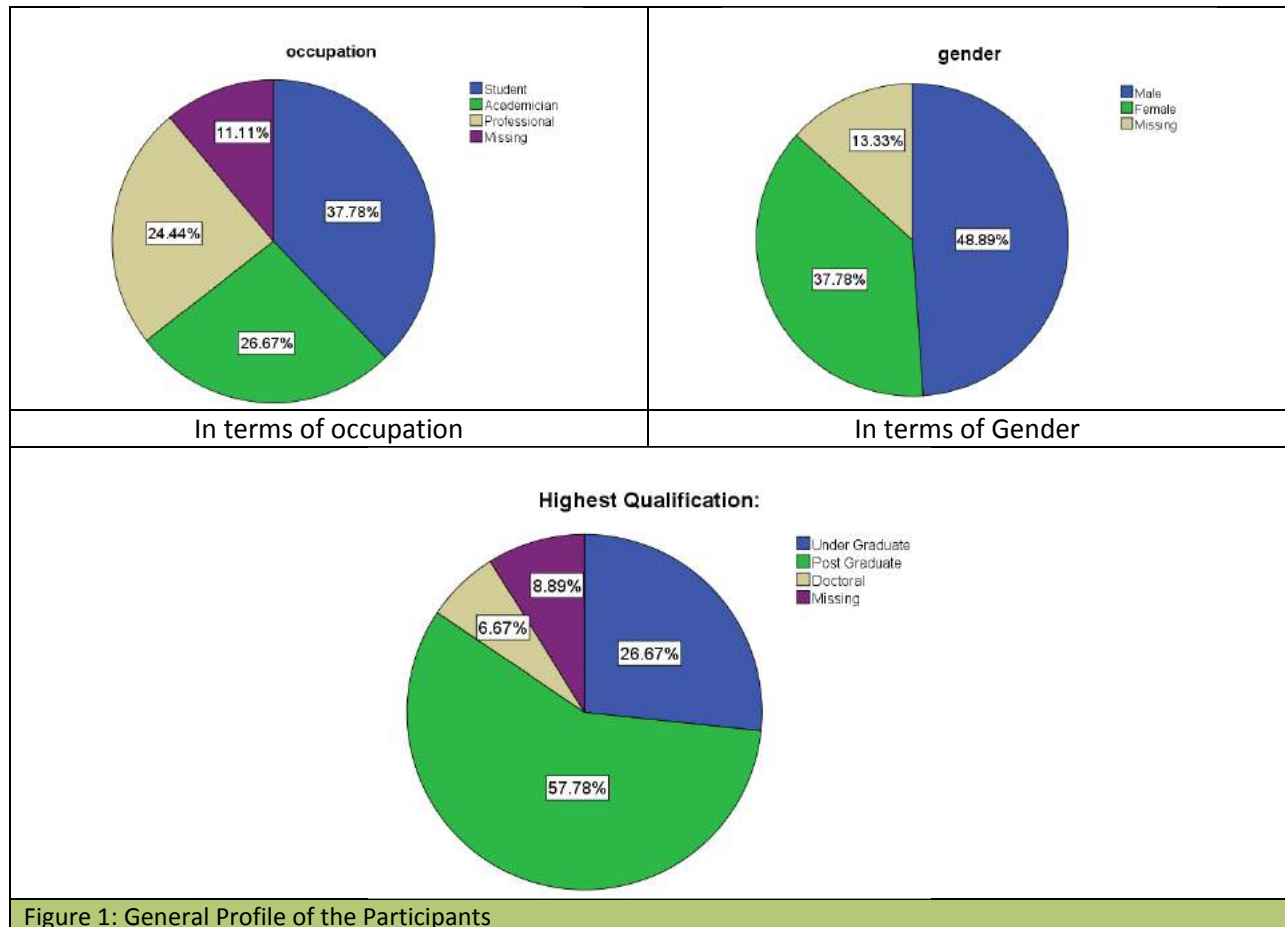


Figure 1: General Profile of the Participants

## INAUGURAL SESSION:

Dr. Nakul Dhagat, Course Coordinator welcomed all to Bhopal and to the short term training program and conveyed the aims and objectives of the program. Dr. Yogesh K. Garg, HoD, Department of Architecture and Planning, MANIT, Bhopal dwelt upon the relevance of the topic. He also pointed out that environmental and public health challenges need to be addressed for the full cycle of sanitation starting from access to toilets to all and treatment of waste. Another concern raised by him was the scale of the problem wherein it has become extremely difficult to manage such a huge volume if collected at Central locations. Therefore a shift is necessary to adopt decentralization system to achieve sustainable sanitation system. In his keynote address Mr. Rahul Sachdeva, Senior Programme Manager, NIUA, informed the participants about the aims and objectives of NIUA, SCBP and also the need for conducting such training programs.



Figure 2: The inaugural session of the Training Program

The sessions in the Training program comprised of presentations from the subject experts, who came from different organizations. These were coupled with few hands on exercises for the participants during the respective sessions.

## DAY 1, MORNING SESSION, SPEAKER: MR. MOHIT KAPOOR (NIUA, NEW DELHI)

### TOPIC: INTRODUCTION TO SANITATION

Mohit Kapoor introduced the participants about the objective of the workshop, scope and the fields of study to be covered in this training program (Figure 3). He informed that the main area of training was on wastewater management, liquid waste, fecal sludge, and septage in urban context. The participants were also asked about their expectation from the workshop and basic ground rules for conduct of the sessions communicated.



Figure 3: Mohit Kapoor, NIUA



Figure 4: Rahul Sachdeva, NIUA SCBP

## DAY 1, AFTERNOON SESSION, SPEAKER: MR. RAHUL SACHDEVA (NIUA, NEW DELHI)

### TOPIC: URBANIZATION AND SANITATION

Mr. Rahul Sachdeva presented the status of urbanization trends in India and the estimated funds required for sanitation (Figure 4). He also dwelt in length upon definition of sanitation as per National Urban Sanitation Policy the objectives of sanitation systems. Census data was also presented by him regarding sanitation and where India stands in terms of sanitation. The relation of public health and sanitation was also highlighted in the context in Indian towns and cities.

The centralized, decentralized and on-site systems of sanitation were presented, their characteristics like capital costs, operation and management costs, skills, scalability and treatment cost were discussed. The challenges in providing sanitation infrastructure were also presented. Need, benefits and concepts on fecal sludge and septage management were communicated. The classification, process of wastewater treatment from containment to treatment and reuse or disposal was elucidated.

The next segment started with a brief introduction to sanitation value chain. Roles of governance and institutional framework in the form of various acts, laws and programs like Manual Scavenging Act 2013, *Svachchha Sarvekshana* were discussed. The concept of ODF, ODF + and ODF ++ cities were also explained. The session ended with a brief group discussion and question-answer round.

**DAY 2, MORNING SESSION, SPEAKER: MR. SAURABH KALE (ECOSAN FOUNDATION, BANGALURU)**

**TOPIC: SUSTAINABLE SANITATION AND WATER MANAGEMENT.**

The presentation started with slides on various types of waste products, such as, black water, grey water, excreta etc. Next the categorization of different types of sanitation waste based on its components like solids, organic matter, nutrients, pathogens, heavy metals were discussed. The features Ecological sanitation was also presented. In the end, aspects of resource management and planning of sanitation system in various practices was also presented. Three case studies of Tadipati, Tirupati (A.P.) and Mancherial (Telangana) were presented and discussed.

The next section was on safe management of excreta through various sanitation techniques and technologies. He explained the objectives of Sanitation, which are, to protect the environment, promote health, be simple, affordable, and culturally acceptable and should work for everyone. The 'hardware'; toilets and sewer, 'software'; sanitation regulations were also explained. The components of sanitation value chain were explained with the help of a flowchart.



Figure 5: Saurabh Kale, ECOSAN FOUNDATION, Bangaluru



Figure 6: Akshay D. Shende, NEERI, Nagpur

**DAY 2, AFTERNOON SESSION, SPEAKER: MR. AKSHAY D. SHENDE (NEERI, NAGPUR)**

**TOPIC: SEWAGE TREATMENT**

Mr. Akshay Shende from NEERI, Nagpur began his presentation with regulations governing Sewage treatment. He then expounded about various types of sewage treatment processes;

aerobic, anaerobic, baffled etc. Next the treatment techniques prevalent in India were discussed. The provisions given in the 74<sup>th</sup> Constitution Amendment act were also discussed. In the end there was a detailed discussion on each type of secondary technology, its costs, design requirements and process of functioning.

The second segment of the presentation included calculating methods for sewage quantity. The treatment processes were presented in detail like; physical, biological, chemical and photolytic and the categorization of the same into primary, secondary and tertiary treatments. The information communicated was augmented with case studies of Raipur, Sangvi and Pimpri.

**DAY 3, MORNING SESSION, SPEAKER: MR. DHRUV BHAVSAR (C-WAS, CEPT)**

**TOPIC: CHALLENGES AND OPPORTUNITIES FOR FSSM.**

Mr. Dhruv Bhavsar started his presentation with an introduction to sanitation service chain and the challenges faced at every stage of service chain or treatment process. He also presented the current data on the sanitation scenario in India with an emphasis on the septage management in small and medium towns. Then the service performance assessment tools were introduced by him. Assessment of enabling environment through national and state level policies, regulations, acts, programs and institutes were discussed. Tools for policy, emptying services and conveyance assessment were also presented. In the end the financial assessment parameters were also discussed.

In the second segment was on challenges and opportunities in FSSM. A video depicting the sanitation situation in New Delhi from the perspective of government officials, general public and other stakeholders was shown. The video explained the process of collection, conveyance and treatment of sewerage. The challenges faced in the entire process were also presented in the video.

**DAY 3, AFTERNOON SESSION, SPEAKER: MR. DHRUV BHAVSAR, (C-WAS, CEPT)**

**TOPIC: PLANNING TECHNOLOGY OPTIONS FOR FSSM**

The technological options of tools for assessment of sanitation system were presented in detail. Assessment tools: SANITAB, SANIPLAN, SANI Benchmark were explained with the help of a video. The implementation of sanitation system plan in Wai and Sinnar towns was explained with a video presentation. The opinions of citizens and the members of the service providers were also shown which added to the ease of understanding.



The last segment of the day was a session on do's and don'ts for septic tanks. Septic tank planning and emptying services were also covered. The occupational safety aspects during monitoring and emptying of septic tanks were also discussed and its importance emphasized.



Figure 7: DHRUV BHAVSAR, C-WAS, CEPT



Figure 8: Presentation through Case Study video

#### **DAY 4, MORNING SESSION, SPEAKER: MR. DHRUV BHAVSAR (C-WAS, CEPT)**

##### **TOPIC: FINANCING OF FSSM.**

Mr. Dhruv Bhavsar started his presentation with details on funding alternatives available for sanitation projects. He also highlighted the benefits of Escrow account form of contract as one of the methods for implementation of sanitation projects. He also informed about the taxes, charges and other options for recovery of investment and running costs.

In the next segment the need for private sector partnership in FSSM services was discussed. The challenges and opportunities for PSPs were also discussed which included assessment of potential service providers, role of contractors etc. The session concluded with questions, answers and discussions.

#### **DAY 4, AFTERNOON SESSION, SITE VISIT TO STP**

To get a first hand exposure of the subject matter a site visit to two sewage treatment plants were arranged. The first one was a 16MLD capacity primary treatment plan in Badwai and a 5MLD decentralized sewerage treatment for tertiary treatment located in Gandhi Medical College campus, Bhopal.





Figure 9: Visit to Sewage Treatment Plant, Badwai, Near New Jail, Bhopal



Figure 10: Visit to Liquid Waste Treatment Plant, Hamidia Hospital, Bhopal

**DAY 4, MORNING SESSION I, SPEAKER: MR. ARJUN SHARMA, (NIUA, NEW DELHI)**

Mr. Arjun Sharma conducted an interactive session with the participants to augment the knowledge gained in the site visit and clear the doubts of participants.

**DAY 4, MORNING SESSION II, SPEAKER: MR. S. B. PHADKE, (SANITATION CONSULTANT, BHOPAL)**

**TOPIC: SANITATION SYSTEMS; A CASE STUDY OF BHOPAL**

Mr. S. B. Phadke, consultant Sanitation engineer, Bhopal presented case studies of many sanitation projects executed in Bhopal. He also explained the Bhoj Wetland project in detail and the current status of Upper and Lower lakes of Bhopal. Design parameters and components like terrain, effect of development activities, population, treatment plants etc. were also discussed by him.



Figure 11: Mr. S. B. Phadke, Cili Engineer and Sanitation Expert



Figure 12: Arjun Sharma and Mohit Kapoor explain answers after the quiz

**DAY 4, PRE-LUNCH SESSION**

**ACTIVITY: FEEDBACK AND QUIZ.**

For any training program feedback of participants is an important tool to assess the efficacy of the course. It is also a mechanism for improving future training programs. To address these two objectives, the participants were given a feedback form to fill. A blank form is enclosed in Annexure 3.

A mini test was also carried out to sum up the training program. A short, twenty question objective type quiz was circulated and the participants asked to fill in their responses. After the stipulated time each question was taken up for discussion and participants self-assessed their responses. Any doubts were cleared and as the questions were from all sessions it acted as a summing up session. A copy of the test is enclosed in annexure 4





Figure 13: Participants attempting the quiz

#### ACTIVITY: VALEDICTORY.

The lunch was delayed and the valedictory session shifted before lunch so that the participants could be free post lunch. In this session certificate of participation were distributed by HoD, Department of Architecture and Planning, MANIT to the participants. A specimen copy of the certificate is enclosed in annexure 5. The session concluded with a vote of thanks by Dr. Nakul Dhagat, coordinator of the course.



Figure 14: Certificate of completion of Training were distributed by Dr. Yogesh K. Garg and Mr. Mohit Kapoor

## CONCLUSION:

In summary, the training program was a success as it was able to achieve all the objectives. Participants were from all over the country and of different professional backgrounds. The resource persons were able to deliver their subject matter and also answer the queries and doubts raised by the participants. In their feedback the participants gave a very high rating to the program. The logistics of the program were also highly appreciated by the participants. There is scope for improvement both in the method of conducting individual sessions and time allocation for constituent topics.



Figure 15: The participants

# ANNEXURES

# ANNEXURE-1: The brochure of the Training program

**SHORT TERM TRAINING PROGRAM ON  
RECENT TRENDS IN  
URBAN SANITATION SYSTEMS**

**17<sup>th</sup> - 21<sup>st</sup> DECEMBER, 2018**



SPONSORED BY  
**SANITATION CAPACITY BUILDING PLATFORM  
&  
NATIONAL INSTITUTE OF URBAN AFFAIRS  
NEW DELHI, INDIA**





Organized by  
Department of Architecture and Planning  
**MAULANA AZAD  
NATIONAL INSTITUTE OF TECHNOLOGY  
BHOPAL, M. P. 462003**

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**NOTE -**

- There is no registration fee for the participants.
- The boarding, lodging and travel expenses shall be covered by NIUA.
- The seats are limited and selection of candidates will be done on the basis of their profession so as to ensure participation from all domains listed in the brochure.

**ORGANISING COMMITTEE**

**PATRON** : Dr. N. S. Raghuvanshi  
Director, MANT, Bhopal

**CHAIRPERSON** : Dr. Yogesh K. Garg  
HOD Architecture & Planning, MANT

**ADVISORY COMMITTEE** : Dr. Manmohan Kapshe  
Dr. Vinay Mohan Das  
Dr. Navneet Munoth

**CONVENOR** : Dr. Nakul Dhagat  
Dr. Sonia Taneja  
Dr. Charumitra Kapshe

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**ADDRESS FOR CORRESPONDENCE**

E-mail : [manititusa@gmail.com](mailto:manititusa@gmail.com)

**CONTACT PERSON**

Dr. Nakul Dhagat +91-9407278399  
Dr. Sonia Taneja +91-9826325411  
Dr. Charumitra Kapshe +91-9425013045

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**WHO CAN ATTEND ?**  
Engineers, Architects, Urban Planners,  
Research Scholars, Students





#### About MANIT

Maulana Azad National Institute of Technology (MANIT) is an Institute of National Importance. It was formerly known as Maulana Azad College of Technology (MACT). It was among the first eight Regional Engineering Colleges of India. Presently, along with about 200 faculty members and 4000 students, the institute is successfully meeting the objective of producing skilled manpower of the highest quality to cope with challenges of ever evolving industrial needs of the country. The institute is situated in the heart of Bhopal on a beautiful plateau with a verdant 650 acre campus.

#### About the Department

The department of architecture was established in 1963 and is one of the oldest in the country. It started the Bachelor of Architecture programme with intake of 15 students which has now increased to 80. In 1992, the department was renamed as Department of Architecture and Planning when a post graduate programme in Urban Development Planning was started. In 2007, department also started an under graduate programme in Bachelor of Planning.

#### About NIUA

National Institute of Urban Affairs (NIUA) is a premier institute for research, capacity building and dissemination of knowledge for the urban sector in India. It conducts research on urbanization, urban policy and planning, municipal finance and governance, land economics, transit-oriented development, urban livelihoods, environment & climate change and smart cities. It contributed to the National Commission on Urbanization, participated in drafting the 74<sup>th</sup> Constitutional Amendment of 1992, prepared the Draft National Urban Policy and other documents for the roll out of the Jawaharlal Nehru National Urban Renewal Mission (JNNURM).

#### Objectives of the program

To sensitize professionals and students about the growing problems of urban sanitation and the new approaches to address these problems. The programme has been envisaged as a five days course with sessions for theory inputs, practical applications through workshop exercise and field trips.

#### Course Content

- 21<sup>st</sup> Century Urban Sanitation Needs and Issues.
- Policy and Guidelines for Decentralized Sanitation.
- Regulations for Decentralized Sanitation.
- Financial Resources and Planning for Decentralized Sanitation.
- Expected Social and Economic Impact of Decentralized Sanitation.
- Introduction to Principles of Centralized and Decentralized Sanitation.
- Decentralized Sanitation in India; Lessons Learnt & Case Examples.
- Planning for Decentralized Sanitation.



National Institute of Urban Affairs

Venue - Hotel Palash Residency, Bhopal

#### Important dates

Last date of registration : 13-Dec-2018  
Programme dates : 17-21 Dec-2018

MAULANA AZAD  
NATIONAL INSTITUTE OF TECHNOLOGY  
BHOPAL M.P. 462003  
Department of Architecture and Planning

SHORT TERM TRAINING PROGRAM ON  
**RECENT TRENDS IN  
URBAN SANITATION SYSTEMS**  
17<sup>th</sup> - 21<sup>st</sup> DECEMBER, 2018

#### REGISTRATION FORM

Name : \_\_\_\_\_  
Designation : \_\_\_\_\_  
Affiliation : \_\_\_\_\_  
Mailing Address : \_\_\_\_\_  
Contact No. : \_\_\_\_\_  
Fax : \_\_\_\_\_  
E-mail : \_\_\_\_\_

Date : / / 2018 Signature of Applicant

Scan to Register



Last date of registration  
13-12-2018

Signature of Competent  
Authority with seal



## ANNEXURE- 2: List of Participants

**SHORT TERM TRAINING PROGRAM ON  
RECENT TRENDS IN  
URBAN SANITATION SYSTEMS**  
17<sup>th</sup> - 21<sup>st</sup> December, 2018





National Institute of Urban Affairs

**ATTENDANCE SHEET**

Date: \_\_\_\_\_ Session: \_\_\_\_\_

S.No.	Name	Signature	Remarks if any
1.	Abhishek Ghorpade		
2.	Abhishek Jain		
3.	Akshay Gupta (Ajmer)		
4.	Akshay Gupta (Jaipur)		
5.	Alok Kumar Tripathi		
6.	Anil Kumar		
7.	Ankita Srivastava		
8.	Anuphav Srivastava		
9.	Anubhuti Srivastava		
10.	Apoorv Kumar Gupta		
11.	Ar. Anand Upadhyay		
12.	Abhishek Kumar		
13.	B Adwin Kumar		
14.	Bhavna Srivastava		
15.	Chandra Sekar N		
16.	Dakshin Kothekar		
17.	Dvya Malakar		
18.	Dvyanishi Vyas		
19.	Dr. Mukesh Kumar Lajji		
20.	Karamjit Singh Sandhu		
21.	Kishore Shaikhyawar		
22.	Kruti Barpete		
23.	Lakshya Sharma		
24.	Leena Thombre		
25.	Mahendra Abirwar		
26.	Meena R.S		
27.	Mohammed Athar Mansaury		
28.	Neha Pareek		
29.	Neha Pranav Kolhe		
30.	Neha Yadav		
31.	Nikhil Senigar		
32.	Pooja Gupta		
33.	Prakrat Srivastava		
34.	Pransav Gupta		
35.	Prin. Shukla		

36.	Priya Assudani		
37.	Priyanka Pawar Srivastava		
38.	Priyanka Yadav		
39.	Prof. Mrunal Galkwad		
40.	Rajankant Swami		
41.	Ruchi Jain		
42.	Richa Ankush Pathe		
43.	Rudrapriya Yadav		
44.	Sagar Gandhi		
45.	Sahil Harbanshi		
46.	Sakshi Agrawal		
47.	Shirani Singh		
48.	Shrikant Chaurasia		
49.	Sumant Kumar		
50.	Sushama Gokhale		
51.	Sushil Kumar Solanki		
52.	Tarun Srivastava		
53.	Tarun Yadav		
54.	Usama Aziz Khan		
55.	Vandana Tiwari Srivastava		
56.	Vikrant Dubey		
57.	Vinod Sharma		
58.	Vishnu Bala B		
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Signature of coordinator

## ANNEXURE- 3: The feedback form

SHORT TERM TRAINING PROGRAM ON  
**RECENT TRENDS IN URBAN SANITATION SYSTEMS**  
 17<sup>th</sup> - 21<sup>st</sup> December, 2018


  
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**NATIONAL INSTITUTE OF URBAN AFFAIRS NEW DELHI, INDIA**


 Organized by  
 Department of Architecture and Planning  
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### FEEDBACK FORM

#### General Information

Occupation: Student / Academician / Professional	Gender: Male / Female	Highest Qualification: Under Graduate / Post Graduate / Doctoral
How did you come to know about the course		

#### Course Contents

Please select the rating for the each Question:

S.N.	Question	Strongly agree		Agree		Neutral		Disagree		Strongly disagree	
1	Objectives of the training were met	10	9	8	7	6	5	4	3	2	1
2	Sessions were interactive	10	9	8	7	6	5	4	3	2	1
3	Presentation materials were relevant and sufficient information	10	9	8	7	6	5	4	3	2	1
4	Sequence of presentation is maintained	10	9	8	7	6	5	4	3	2	1
5	Satisfied with course coverage	10	9	8	7	6	5	4	3	2	1
6	Course helped me to acquire knowledge and skills	10	9	8	7	6	5	4	3	2	1
7	The course length was appropriate	10	9	8	7	6	5	4	3	2	1
8	This training was appropriate for your level of experience	10	9	8	7	6	5	4	3	2	1
9	Training experience will be useful in my work	10	9	8	7	6	5	4	3	2	1
10	The instructor was well prepared and presented the content effectively	10	9	8	7	6	5	4	3	2	1
11	The instructor encouraged the student's participation and interacted in the training program	10	9	8	7	6	5	4	3	2	1
12	The instructor generated interest in the topic	10	9	8	7	6	5	4	3	2	1

13	Literature distributed in the thumb drive is	Relevant	Not relevant	Not yet seen
14	Literature displayed at the venue is	Relevant	Not relevant	

### Logistics

Please select the rating

S.N.	Facility	Excellent		Good		Average		Fair		Poor	
1	Training lecture hall	10	9	8	7	6	5	4	3	2	1
2	Accommodation / Stay	10	9	8	7	6	5	4	3	2	1
3	Food	10	9	8	7	6	5	4	3	2	1
4	Overall ambience	10	9	8	7	6	5	4	3	2	1

What was most useful content of the training program?

Are there any other topics that you would like to be offered training courses in?

Suggestions for improving the training program:

**THANK YOU FOR COMPLETING THIS FEEDBACK FORM. FEEDBACK RECEIVED WILL BE USED TO PROVIDE IMPROVEMENTS TO FUTURE TRAINING PROGRAMS.**

## ANNEXURE- 4: The test paper

SHORT TERM TRAINING PROGRAM ON  
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17<sup>th</sup> - 21<sup>st</sup> December, 2018



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### MINI TEST

Date: 21/12/18, Time: 30 Minutes

NAME: \_\_\_\_\_

- National policy on faecal sludge and septage management, India, was published in
  - 2017
  - 2018
  - 2008
  - 2013
- Generally vacuum truck, which collects and conveys faecal sludge, has capacity
  - 3 or 5 cum
  - 3 or 7 cum
  - 5 or 7 cum
  - 7 or 10 cum
- Sanitation experts believe that user charge based model will be suitable for scheduled desludging?
  - True
  - False
- Which of the following is the call center based regulated demand based emptying services case?
  - Leh
  - Dakar
  - Sinnar
  - Puri
- Which of the following case is Performance Linked Annuity Model (PLAM) for conveyance?
  - Wai
  - Leh
  - Varanasi
  - Delhi
- What is the key purpose of ESCROW mechanism?
  - It covers the cost escalation cost during the project
  - It guarantees to recover interest fees
  - It ensures timely payment
  - It ensures quality service delivery
- SaniTab is a
  - Sanitation survey tool
  - Decision making tool
  - Technology selection tool
  - Spatial assessment tool
- Objective of a sanitation system is to
  - Protect and promote health
  - Protect the environment
  - Be Affordable
  - All of the above
- Wastewater is combination of
  - Blackwater and greywater
  - Blackwater alone
  - Greywater alone
  - None of the above
- Census towns are administered by whom?
  - Urban local body
  - Gram Panchayat
  - District administration
  - None of the above
- Liquid and solid material emptied from a septic tank is called
  - Faecal sludge
  - Sludge
  - Septage
  - None of the above

12. For same hydraulic flow:

- i. aerobic treatment takes more energy than anaerobic treatment
- ii. Anaerobic treatment takes more energy than aerobic treatment
- iii. Anaerobic treatment generates energy

Of the above, true statements are

- a. Only i and ii
- b. Only i and iii
- c. All
- d. Only ii and iii

13. What are the constituents of black water?

- a. It contains toilet flushing and waste water from other domestic uses.
- b. It contains waste water from kitchen only.
- c. It contains waste water from bathrooms, but not toilet.
- d. It contains only toilet flushing waste water.

14. What is desirable frequency of emptying the septic tank as per CPHEEO?

- A) Once in 4-5 Years
- B) Bi-annually
- C) Yearly
- D) Once in 2-3 years

15. Which of the following statement is true?

- A) SaniPlan tool is used for assessment of sanitation service delivery in the city
- B) SaniPlan tool is used for municipal finance assessment only.
- C) SaniPlan tool is used to develop the integrated sectoral solutions.

16. Approx. per capita cost for 2 decentralized wastewater treatment is

- a. INR 20,000 – 25,000
- b. INR 1,000 – 2,000
- c. INR 4,000 – 7,000
- d. None of the above

17. Which of the following statement is not false as per Landscape study on private sector in Maharashtra by CEPT?

- A) Most of the private sector players are willing to invest in integrated FSSM solutions only
- B) Private sector players are interested only in treatment of faecal sludge in Maharashtra
- C) Private sector players are insisting in collecting user charges for schedule emptying services
- D) Most of the Private sector players are willing to procure suction emptier trucks for conveyance

18. Which of the following treatment technology has end product as septage to energy?

- A) Bio-Methanation
- B) Pyrolysis
- C) Incineration
- D) All of above

19. Which of the following emptying machine is most suitable in Indian condition, where width of the road is narrow and location of septic tank is away from road?

- A) Conventional suction emptier truck
- B) Gulper
- C) Vacutag
- D) Manual auger

20. As per Census 2011, urban population of India is approximately

- a. 45%
- b. 28%
- c. 32%
- d. 50%

## ANNEXURE- 5: The Certificate given to the participants





**Report Compiled by:**

**Dr. Vinay Mohan Das**

**Dr. Nakul Dhagat**

**Maulana Azad National Institute of Technology, Bhopal**