

Sub: Construction Management System: Circular – 3

Ref: Guidelines for safety management during testing of sewer lines and manholes in RUIDP

The safety is one of the important components of the construction management in addition to the Cost, Time & Quality. The safety should not be compromised at any cost in any construction activity.

Personnel engaged in operation and maintenance of sewerage system including sewage pumping stations are exposed to different types of occupational hazards like physical injuries, injuries caused by chemicals and radioactive waste, infections caused by pathogenic organisms in sewage, inherent with explosive or noxious vapours and oxygen deficiency. To guard against human error and carelessness, proper job instructions and adequate effective supervision by competent personnel are most essential.

Sewer gas is a mixture of gases in sewers and manholes containing abnormally high percentage of Carbon dioxide, varying amounts of methane, hydrogen, hydrogen sulphide and low percentage of oxygen caused by septic action through the accumulation of organic matter inside the sewer. The actual hazards is due to the presence of high levels of methane, forming an explosive mixture or the oxygen deficiency or hydrogen sulphide in excess of permissible levels. Sometimes trade waste may contribute to other gases like chlorine, ammonia, sulphur dioxide etc.

Mechanical cleaning of sewers is the preferred method and shall be employed to the extent possible Manual entry for hazardous cleaning of sewers is completely banned as per the Prohibition of Employment as Manual Scavengers and their Rehabilitation Rules, 2013.

Standard Operating Procedure (SOP) for Cleaning of Sewers and Septic Tanks has already been issued by Ministry of Housing and Urban Affairs, Government of India in November 2018. However, following precautions should be taken up during testing of sewer line and manholes;

Traffic Control

- Place easily readable and clear warning sign well ahead of work area.
- Fence off adequate space around the manhole for placing equipment and deposition of silt removed.
- Place barricades or signs to channelize the traffic. If possible.
- Vehicle can be parked between the traffic and the work area.
- Use a flagman at the two ends for controlling flow of traffic from each direction and to avoid a traffic jam, if the road is narrow and only one lane of traffic is possible.

Manhole Cleaning Safety

- **Ventilate** the sewer line by opening two or three manholes on both sides starting from upstream side where work is to be carried out. Sufficient numbers of blowers to be used, without blowers no such operations to be taken up. The manholes should be opened at least one hour before start of operations. The opened manholes should be

properly fenced to prevent any person, especially children, accidentally falling into sewer. Dummy covers with BRC welded fabric can be used.

- Use the blowers, operate these for at least 30 minutes before starting and during cleaning operations to ventilate the lowest working levels.
- Use the **robotic cleaning devices** or similar human less machines for cleaning, do not allow any manual cleaning in the manholes and sewer lines.
- In extraordinary situation like interconnection of old line with new laid sewer line, cleaning of new laid sewer line etc., where it is extremely required to use manual entry;
 - (i) these circumstances need special approvals from Project implementation unit head, safety experts having sufficient experience, knowledge and limitations of such required works be deployed. Contractor shall provide all required equipment and will maintain record with photographs which will be verified by PIU/CMSC.
 - (ii) The team of approved safety experts and engineers need to be fully present during the entire such operations and prior intimations to rescue team and medical teams must be given. The ambulance and additional machineries required in case of emergencies for lifting/excavating manhole conical frames/top frame must be in place.
 - (iii) Use safety harness and lifeline before entering the sewer line. Ensure full visibility by approved lighting arrangements inside the manhole. Approved Tripod with pulley must be used for taking up and down the person, three additional helpers at the top should be provided for each person. The person standing at the top must send signals at every few minutes interval for the person in the manhole to ensure safety.
 - (iv) Test for hazardous gases before entry of a person into the sewer line and also in between if the operations are for a longer time.
 - (v) Test manhole rugs or steps for structural safety before using.
 - (vi) Ensure that where portable ladders are used they are properly sealed or fixed.
 - (vii) Ensure that no material or tools are located near the edge which can fall into manhole and injure the workman.
 - (viii) Lower all tools to the workman in a bucket.
 - (ix) Use lighting equipment which must be fire and explosion proof.
 - (x) Use the approved Gas masks with oxygen cylinders fully functional and test it before masking, when men have to enter into the sewer line.
 - (xi) **Safety Equipment:** The following equipment are required during sewer maintenance work;
 - Gas Masks
 - Breathing Apparatus
 - Oxygen Cylinders
 - Portable Lighting Equipment
 - Non sparking Tools
 - Portable Air Blowers
 - Safety Belt
 - Inhalators
 - Diver's Suit
 - Demonstrations and safety trainings for such man hole cleaning works to be conducted regularly at the sites.

Reporting the Occurrence of Accident : If one fatal accident is occurred at site then it is a huge irrecoverable loss to the deceased's family and the purpose of the development of infrastructure works & its benefit to the public is defeated. In event of any accident may be small or fatal must be reported at the earliest to the higher authorities.

- a) Whenever a worker reports that he has received an injury at the work place, the site engineer should take the following action:
- Arrange to render first aid on the spot and make an entry in the first aid register as well as the accident register.
 - Transfer the seriously injured person to the Medical Officer/dispensary/hospital in a vehicle/ambulance, accompanied by another person.
 - Render first aid and make entry in the first aid register as well as the accident register.
 - Report of accident should be sent to PMU immediately.
- b) Where any dangerous occurrence or an accident leading to the death of a worker takes place at a construction site, the site in charge should:
- Report this occurrence or fatal accident as the case may be immediately by telephone, special messenger or telegram, to SE, PIU; ACM/DCM of town; District Magistrate or Sub-Divisional Magistrate in whose jurisdiction the site lies;
 - The Officer in-charge of the nearest police station;
 - Workmen's Compensation Inspector, or in his absence the Factories Inspector concerned and;
 - The nearest relative of the deceased person, in the case of fatal accident.
 - This procedure will also apply where an accident results in loss of any part of the body or any limb, severe burns or scalds or unconsciousness.

It is hereby directed that important safety measures at construction site shall be taken care with zero tolerance. The above basic minimum precautions should be strictly ensured to be complied at all working fronts and will be closely monitored by CMSC & PIU.

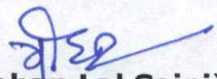

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No. F3 (301) (65)/RUIDP/PMU/Ph-IV/CMS/ 3160-63

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Copy to following for information & necessary action:-

1. PA to PD/Addl. PD/ Financial Advisor/CE/ACE/SE, PMU, RUIDP, Jaipur
2. SE/EE, PIU, RUIDP (All)
3. Team Leader/ PC/ CMS/ Dy. CM/ACM, PMCBC/CMSC-1/CMSC-2, (All)
4. ACP, RUIDP, Jaipur to send by e-mail and put up the guidelines on the website.


(Mohan Lal Saini)
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