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Maintenance, Repair & Rehabilitation of Ageing Pipelines in old Structure

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Abstract: - This paper introduces the integrity reviews and gives outlines on how to conduct maintenance, repair & rehabilitation of ageing pipelines in old structure. Being an old structure, the pipelines i.e. water supply lines, sewerage and other plumbing lines got distressed which lead it to undergo maintenance, major repairs and restoration of those pipelines. Some of the structures were difficult to get accessed for maintenance and inspection of the pipelines due to the closed duct in the buildings. Good inspection and maintenance are essential for the safety of ageing pipelines. Any type of pipes made of the different materials can break due to extreme inner and outer pressure. Only after the thoroughly review/inspection of pipeline condition, we can ascertain that how older pipelines are and what methodology to be applied for maintenance, repair & rehabilitation. it is necessary to inspect the conditions of pipe lines and surrounding environment, which are changing with time and hence, a regular inspection and maintenance, repairs of an ageing pipeline is appropriate.

Key words: - *Old Aged Plumbing Pipelines, Type of inspection, Type of distress, methodology for repairs*

Introduction: -In the buildings/Structure of more than 25-30years old, many type and numbers of reasons are noticed like construction, quality of paint, environment and time to time maintenance, which are main reasons in affecting the long run of pipelines. Timely Maintenance/Replacement of old aged pipelines is necessary for the purpose of safety as well as to avoid anyharmful environment and precious human life. At the time of inspection of affected pipe line, we will make an assessment and decide about repairs or/and partly replacement or/and entire replacement of damaged/corroded pipes and fittings. Repairing of pipes by filling joints OR changing some part of pipe is only effective in those cases where the leakage found in very small, visible and the pipe is in good condition. Figure-1 shows the real example of pipes in bad condition.



Figure – 1 major Damaged Pipe

Repairing/Maintenance/Replacement of pipes is a very tough challenge for workmen in high-rise buildings, closed ducts and also the sewerage plumbing lines, which requires plumbing expertise and skilled labour with proper framework during renovation of old buildings which have to be repaired or equipped with new pipelines. Figure – 2 Shows Plumbing Pipes in repairable condition.



Figure – 2 repairable Pipes.

The reason for presenting this paper to study of methods for repairing sewer, storm-water and drinking-water pipes and to avoid health and environmental issues for the public.

Experimental Procedure:- After doing the actual observations on site followings are recommended as best remedial measures to meet out the type of defects with respective items, Standard specification:

REPAIRING/MAINTENANCE : in case of partly damaged and leaking areas of pipes, repairing will be conducted by replacement of joints or some part of new pipes wherever necessary considering the distress level of pipes in a planned manner to seal the leakage and also to avoid further damages of pipelines. Figure-3 shows the example of replacement of damaged portion of pipe.

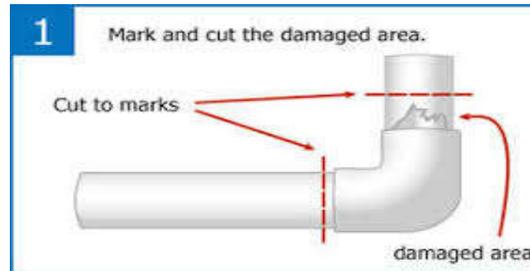


Figure-3 Damaged Part Replacement

PROVIDING AND FIXING OF NEW PIPES: In many of the old aged buildings, Existing plumbing lines are made of CI and got corroded as well as intact with the wall. So all the existing old damaged CI pipes needs to be replaced by new PVC pipes and hence, it is necessary to do the following procedures:

- a) Providing/Fixing and Erecting Scaffolding in the entire PLUMBING DUCT area or where the pipelines are located in the building as advised by the expert.
- b) Providing and fixing temporary plumbing lines as and when required, when the work in progress for changing the damaged plumbing lines.
- c) Providing and fixing new PVC pipes after removing the existing plumbing lines, filling the joints with Solvent with all fittings like connector, sleeves and Nails, cutting holes in walls.
- d) New UPVC pipes with Special PVC/ G.I bracket clamps can be provided to hold all pipes away from wall.



Figure-4 Fixing of New Plumbing line

REPAIR A DAMAGED SEWER LINE: After the thoroughly inspection of the sewer line to locate the damages, the process of repairing will done with the help of camera by applying the epoxy at the affected area or in case of major damaged pipe, it can be replaced by new salt-glazed stoneware pipe of required size. The stoneware pipe shall be joined by forcing two strands of tarred gaskets into the joints, the strands to be sufficiently thick to tightly fit the annular space between the sockets and spigots. The annular space shall then be solidly filled with neat Portland cement which shall be forced into the socket, so as to fill it and fillet of cement shall then be worked round the outside of the joint. This fillet shall be kept in position by a bend of coarse cloth, which shall be kept moist until the cement has set. Every joint of the earthenware pipes, which is not concreted shall be further protected by placing, on the outside of the joint of cement, well tempered and tenacious clay, so as to completely surround the joint. For this purpose, not less than the following quantities of clay shall be used for every joint on a (6 inch) 152.397 mm. pipe, 1/2 cubic feet 14158.0 c.c; 8 inch 203.196 mm. pipe, (3/4" cubic feet) 21237.00 c.c. 9 inch 228.586 mm. pipe, 1 cubic feet 28317 c.c.: (10 inch) 253.995 mm. pipe, (1 1/4 cubic feet) 35400.0 c.c.

Ultimately, you'll need to rely on a trusted expert to advise you whether it's time for a pipe replacement. And it's always good to get a second and even third opinion before you embark on a replacement project. But there are a few ways you can mitigate the cost and hassle of the job. Figure -5 shows the replacement of new sewer pipe.



Figure –5 New Sewer Pipe

For a structure with plaster walls, wood paneling, or other features that make it difficult to gain access to in-wall pipes, considers at least replacing pipes that aren't buried in the walls. Although it's a big job, replacing exposed pipes in a basement, crawlspace, or utility room is fairly straightforward, because the plumber can easily get at the pipes.

DETAILS OF PVC PIPES: UPVC pipes shall conform to IS specification for high-density polyethylene pipes for drainage work. The pipes shall have smooth internal and external surfaces. Slight shallow longitudinal grooves or irregularities in the wall thickness shall be permissible provided that the wall thickness remains within the permissible limits .PVC pipes shall be pressure ratings (working pressure) as indicated. The pipes shall carry color bands to indicate the class of pipes.

Table-1 Pressure ratings (working pressure)

| Class of pipes | Working pressure | Color |
|-----------------------|-------------------------|--------------|
| | MPa | |
| class 1 | 0.2 | Orange |
| class 2 | 0.25 | Red |
| class 3 | 0.4 | Blue |
| class 4 | 0.6 | Green |
| class 5 | 1 | Yellow |

CPVC pipes: - PVC pipes shall confirm to IS 4985 - 1981, Specification for PVC pipes for potable water supply. The pipes shall be reasonably round. Internal and external surfaces of the pipes shall be smooth and clean, PVC pipes shall be pressure ratings (working pressure) as 2 - 5, 4.5 and 10Kg / sq cm. as indicated.

SALT GLAZED STONEWARE (GSW) PIPES:- Salt glazed stoneware pipes and fittings shall comply with the requirement of IS 651 - 1980, specification for salt glazed stoneware pipes and fittings. Pipes and fittings shall be of quality Grade A or Grade AA where indicated.

Note: Grade A pipes and fittings: Pipes which comply in every respect with the requirement of IS 651 - 1980, but of which only 5% have been submitted to hydraulic test by the manufacture and found satisfactory, shall be classified as Grade A fittings in this class are not subject to hydraulic test.



Figure-6- Salt Glazed Stoneware Pipe

Note 2 : Grade AA pipes and fitting : Pipes and fittings normally forming part of a pipe line such as tapers ,bends ,junctions etc. which comply in every respect with the requirements of IS 651-1980 and all of which have satisfactorily passed the hydraulic test conducted by the manufacturer , shall be classified as Grade AA . Such pipes and fittings shall bear the word Grade AA.

Note 3: Classification of Grade A and Grade AA does not apply to fittings which do not form part of normal pipe line such as channels and their junctions and bends, intercepts and gully traps.

All pipes and fittings shall be sound, free from visible defects which may affect their strength, durability and serviceability. The glaze shall be free from crazing. The pipes shall give a sharp, clear note when struck with a light hammer. The acceptance criteria shall be as per IS 651 - 1980.

Conclusions

Plumbing repair should not have to be a headache for a homeowner or user. All it takes for your plumbing repairs to get done is a call to your trusted and local plumbing professional. You can expect to get a free quote on the work at hand, have the ability to schedule regular maintenance, and can feel confident the repairs will get done in a timely manner. You should not let plumbing repairs go untreated for too long because all that will cause is more problems down the road.

Giving plumbing a little regular attention can prolong its life, prevent leaks, and avoid costly repairs. Smart homeowners/ know how to spot and resolve small plumbing problems before they become major issues.

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