रिसावग्रस्त छत का निरीक्षण और रखरखाव
Inspection and Maintenance of Leaky Roof

1. परिचय / Introduction:

Leaky roof is a most common but serious problem in any building. It creates unhygienic condition for occupants as well as affects the life of building.

It is necessary that the roofs are inspected thoroughly. Inspection should be preferably being done during rainy season.

Based on the observations, future course of action should be decided depending upon the condition of leakage in roofs.

Minor repairs at isolated locations may be carried out immediately on dry day and performance of repair should be observed after next rainfall.

2. संपूर्ण निरीक्षण / Thorough Inspection:

Roofs are thoroughly inspected and cover the aspects which may affect water proofing and cause leakage in roofs.

Specially following aspects should be covered:-

- Availability of adequate slope (Minimum 1 in 100).
- Provision of 75 mm fillet at the junction of roof and parapet walls.
- Provision of adequate numbers and size of opening.
- Provision of slope and drip course in copings.
- Undulations/ minor depression in roof surface where water may be stagnate.
- Any source of permanent leakage of water like over head water tanks, leaking water supply pipe line, broken down water drainage pipe and leakage at joints of down water drainage pipes.
- Growth of vegetation on the roofs.
- Condition of water proofing treatment, especially developments of cracks/ de-bounding.
- Condition of ceiling and walls below roof etc.

3. पृथक बिंदुओं पर ध्यान / Attention at isolated points:

During inspection if it is found that leakage through roof is at isolated points/ locations, then such location should be carefully studied.

- It should be examined weather basic requirement for water proofing has been fulfilled as per above.
- If above requirement is not full filled, any type of water proofing system will not work satisfactorily. Leakage at isolated locations may be due to some defects at the particular location. Action to be taken to rectify the defect.
- In case of roof provided with bitumen felt there may be de-bounding or leakage through joints. In that case, defective location have to be identified, cut and removed and new layer of bitumen felt may be provided dully keeping desired over lap length.

  Similarly, in other bituminous treatment, existing bituminous layer may be removed and fresh layer may be laid.

- In case of roof provided with lime terracing with tiles, these may be depression on roof surface or loss of cement mortar between tiles.
  - Such defects may be rectified by fresh pointing/ plastering. Preferably pointing should be done with non shrink polymer modified cement mortar.
- In case of wetness is observed on the wall just below the junction of roof and parapet wall, condition of fillet & drain outlets need to be examined.
- Broken pipes may be replaced and fillet may be constructed again after dismantling old fillet. Plaster on walls and coping should also be examined and repaired if necessary.

4. पृथक बिंदुओं पर लीक होने वाली छतों के लिए कार्रवाई का तरीका / Course of action for roofs leaking at isolated points.

Following course of action should normally be followed for repairs of leaking at isolated points.

a) **छत की सतह एवं निकासी छिद्रों की सफाई /Cleaning of roof surface and opening:** First of all, entire roof surface and all the opening should be cleaned so as to ensure effective and un-obstructed flow of rain water through the opening provided on the roofs. Weeds and any other foreign material on roof surface should be removed.

The blockage in the opening should be cleared. It should be ensured that opening are functional.

b) **पानी के स्थायी रिसाव को इसके स्रोतों से रोकने की व्यवस्था करना/ Arresting permanent leakage of water from its sources:** If continuous leakage of water is observed on roof from any source, like over head water storage tank or leaking water supply pipe lines etc., the same should be arrested by repairing over head water storage tank/ pipeline.

c) **पानी के भराव स्थानों को पहचानना और ध्यान देना/ Identification and attention to locations of stagnated water:** Leakage of roofs takes place only when water does not drain off quickly and stagnates over the roof surface. Generally, water stagnates over depression formed in the roof surface. Thus location having depression in roof surface should be attended. Subsequently, it should be ensured that there is no location on roofs where water stagnates.

d) **पैरापेट दीवार और छत के जंक्शन पर गोले की मरम्मत / Repair of fillet at junction of roof on parapet wall:** Condition of fillet at junction of roofs on parapet wall should be examined and any damage/ defective portion should be repaired with Polymer Modified Cement Mortar (PMC Mortar) of any standard company. (1 part acrylic polymer: 2 part cement : 5 part sand)

e) **टाइल्स के जोड़ों की मरम्मत / Repair to joints of tiles:** Condition of pointing at joints in between tiles should be examined and wherever mortar has come out, fresh pointing in cement mortar 1:3 should be done. After pointing curing should also be ensured or Tile grout (of any standard company) may be used.

f) **पैरापेट दीवार और कोपिंग पर प्लास्टर की मरम्मत / Repair to plaster and coping on parapet:** Broken/decayed plaster on parapet wall should be replaced by fresh plaster admixed with integral waterproofing compound of any standard company. Coping should also be attended along with provision of slope.

g) After taking above steps, behavior of roof surface should be watched and if leakage is still persists, following steps have to be taken.

i) **पूर्ण शीर्ष सतह को हटाने और चूना कंक्रीट की मरम्मत / Removal of complete top surface and repair of lime concrete:** Entire top surface which may be consisting of tiles and bitumen felts etc. should be removed and condition of the layer below it i.e. lime concrete/mud plaster should be examined. Minor cracks should be sealed with cement sand slurry or bitumen compounds after making V groove in case of lime concrete.

In case of mud phuska, minor cracks may be filled up by bituminous compound. Decay mud plaster and mud phuska should be replaced by fresh mud phuska and mud plaster.

ii) **पर्याप्त ढलान का प्रावधान / Provision of adequate slope:** Many of the old roofs may not have adequate slope. For lime concrete terracing, a minimum slope of 1 in 60 is necessary. Therefore, after removal of top surface, slope of existing roof should be examined and if necessary, re-grading of roof surface should be carried out using lime concrete/cement concrete.

Prior to re-grading of roof surface, level should be marked on roof and parapet. Subsequently, existing lime concrete surface should be made rough. After that re-grading work should be taken up. After re-grading, top surface should be made smooth using cement plaster 1:3 and surface should be cured for 7 days.

Similarly, on mud phuska roofs a slope of 1in 40 shall be ensured. If necessary, roof surface should be re-graded using mud phuska and mud plaster. After re-grading, layer of mud plaster should be allowed to dry before relaying of top surface.

iii) **शीर्ष सतह को पुनः बनाना / Re-laying of top surface:** After completion of re-grading, a layer of burnt clay tiles should be laid. Old tiles may be used, if they are in good condition. Tiles should be laid over 20 mm cement mortar 1:3. The top surface of this mortar be coated with acrylic polymer. Tiles should be joined with impervious cement mortar, tile adhesive or Tile grout of any standard company.

5. भारी रिसाव वाली छतों पर ध्यान देना / Attention to roofs leaking heavily:

If heavy leakage is observed at large no. of location on the walls and on the ceiling, it is an indication of ineffective water proofing treatment.

In such cases, it will be necessary to remove entire existing water proofing material like bitumen felts/ mastic etc. After removing the existing water proofing material, fresh water

proofing treatment has to be provided.

In case of lime concrete terracing, tiles needs to be removed first. After removal of tiles, condition of lime concrete should be examined. If large no. of cracks is observed, it is desirable to remove complete lime concrete.

If lime concrete is in good condition with few isolated cracks, these cracks are to be filled up with cement slurry or bituminous caulking compound confirming to IS 1580.

Subsequently, if necessary, re-grading of roof should be done as suggested under Para 4 (g) above. After re-grading, fresh water proofing system may be provided.

Water proofing treatment may be any among various systems as mentioned in Para 3 of above except bituminous felt treatment.

While providing fresh water proofing system, care should be taken that instructions as given in relevant standard/ literature are strictly followed. Prior to provision of fresh water proofing system, provision of basic requirement of water proofing of roof should be also be ensured.

Now a days new generation water proofing systems like cementitious elastomeric water proofing i.e.

(i) Single component (water based) liquid applied PU dispersed bituminous membrane
(ii) Single component solvent based liquid applied PU membrane for water proofing, are available in the market.

6.0 Firms/Manufacturers dealing in Chemical Products Commercially Available in Indian Market

Some of the Firms/ Manufacturers are listed as a reference for the user who may contact to get desired information in details about their products to be used as a waterproofing material for leaky roofs.

1. PERMA Construction Aids Pvt. Ltd 611/612, Nirmal Corporate Centre, L.B.S. Marg, Mulund (W), Mumbai – 400080 Maharashtra, India https://www.permaindia.in
   Email Address : info@permaindia.com
2. STP Limited: Sri Hasan Rizvi (Sr. VP STP Ltd.), 707, Chiranjiv Tower, 43, Nehru Place, New Delhi - 110019, Delhi, India
   Telephone: +(91)-(11)-46561359, Fax: +(91)-(11)-46561358
   Email address: hasan@ stpltd.com
3. Krishna Conchem Products Pvt. Ltd. (KCPPL).Building Number 6, Millenium Business Park, MIDC Industrial Area, Sector 3, Kopar Khairane, Navi Mumbai, Maharashtra 400710
   Telephone/Fax: 022-27782923/24
   Email Address: info@krishnaconchem.com
4. Cera-Chem Private Limited, No.9, Sterling road, first cross street, Nungambakkam, Chennai-600034, Tamil Nadu.
   Email: corporate@cerachemindia.com
5. CICO Technologies Limited, C-44/2, 1st & 2nd Floor, Okhala Industrial Area, Phase-II, New Delhi
   Tel: 011-40509400 Email: cicotech@cicogroup.com
6. Sika India Pvt. Ltd. 501 & 502, B Wing, Lotus Corporate Park, Off. Western Express Highway, Goregaon East Mumbai – 400063, Tel: +91 2262704038, Fax: +91 2262704039, Email: info.india@in.sika.com

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गुणवत्ता नीति

आर. डी. एस. ओ. लखनऊ में हम सतत सुधार और ग्राहक मूल्यांकन प्राप्त करने हेतु गुणवत्ता प्रबंध प्रणालियों की आवधिक समीक्षा के माध्यम से रेलों में यात्री और माल यातायात की बढ़ती आवश्यकताओं, माँग और अपेक्षाओं को पूरा करने के लिए गुणवत्ता प्रबंध प्रणाली की व्यवहारिक आवश्यकताओं और अनवरत सुधारों को पूरा करने के समर्पण गुणवत्ता उद्देश्यों को निर्धारित करके अनुसंधान, अभिकल्पों और मानकों में उत्कृष्टता के माध्यम से वैधानिक और नियामक अपेक्षाओं का अनुपालन करते हुए सुरक्षित, आधुनिक और किफ़ायती रेल प्रौद्योगिकी विकसित करने हेतु सेवाओं को बनाए रखने और अद्यतन पारदर्शी मानकों हेतु प्रतिबद्ध हैं। इसे संगठन के अंदर संसूचित एवं लागू किया गया है तथा सभी संबंधित पक्षकारों को भी उपलब्ध कराया गया है।

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भारत सरकार. रेल मंत्रालय

GOVERNMENT OF INDIA - MINISTRY OF RAILWAYS

केवल कार्यालयीन उपयोग हेतु

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Inspection and maintenance of Leaky Roof



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