

Report On Seepage Assessment of Health Facilities

Introduction

Water seepage is a common problem in all buildings. Water seepage generally occurs due to non-adherence to building construction standards and poor preventive maintenance. World Health Organization has categorised seepage mainly into roof, wall, and ceiling. The seepage problem can affect the structural building, interior, fitting and furniture that lead to the “sick building syndrome”. Seepage affects the building wiring, water-soluble material, and wooden furniture and finally, it reduces the overall life of the building.

Objective: The purpose of this assessment was to identify seepage and its reasons in health facilities.

Methodology

The seepage identification and its reasons were assessed by visiting health facilities. The assessment was done through a visual inspection of the selected health facilities including the Medical College, District Hospital MCH wings, Community Health Centres, Primary Health Centres, and Sub Health Centres. The assessment of buildings was done by a team of qualified civil engineers. For the assessment purpose, building rooftops, walls, toilets, bathrooms, water storage, air conditioning unit, laundry, kitchen, laboratory, drainage system, pallor and joins of the buildings were observed. The site visit was done with the help of staff working in the same building to make an appropriate understanding of the problem and to draw conclusions thereafter. A list of the health facilities visited for the assessment is given table below:

Table 1: List of the health facilities visited for the assessment

Sr. No	Type of health facility	Name of health facility
1	Medical College	Rajnandgaon
2	District hospital and MCH wing	Raipur
		Dhamtari
		Bilaspur
		MCH Wing Raipur
		MCH wing Bilaspur
3	Civil Hospital	Kurud
4	Community Health Centre	Dharsiwa
		Abhanpur
		Aarang
5	Primary Health Centre	UPHC Bilaspur
		PHC Chatoud
		PHC Jamgaon
		HWC Godhi
		PHC Sirri
6	Sub Health Centre	Charmudia

Summary of findings –

It was found that the problem of seepage is widespread in buildings of health facilities. Most of the facilities visited had seepage problems.

Common causes of seepage:

The most common causes were:

1. **Poor upkeep of terrace** – overflowing overhead tank, stagnant water on the terrace
2. **Poor maintenance and lack of repairs in toilets** – gaps not filled between tiles, poor plumbing
3. **Poor maintenance and lack of repairs of pipelines** – poor fitting and poor maintenance, required repairs not identified, required repairs known but neglected or incomplete repairs done using short-cuts
4. **Poor construction** – improper joints when adding to the structure, porous floors

Recommendations:

1. **Regular periodic inspection** of the building especially roof, pipelines, and toilets by Facility-In-charge – to identify problems, to improve routine preventive maintenance, and to inform repair agencies.
2. **Improving fund availability** for repairs or **responsiveness** of the Public Works Department or other construction agencies
3. Improve **quality assurance at the time of construction** and hand-over

The seepage problems and their reasons are summarised here in Table 2:

Table 2: Summary of identified Seepage problems and their reasons




Sr. No.	Category	Problem	Reason
1	Roof	<ol style="list-style-type: none">1. Water lodging was found on the terrace during the visit. The stagnant water percolates from the terrace. This problem gets severe in the rainy season.2. The overflow of a storage tank at the terrace always keeps the porous terrace floor wet.3. Although the storage tanks are kept in a higher place the adjacent areas are not given proper slope to drain away the overflowed water4. Due to continuous water logging at the terrace the mould has developed on the terrace surface making an obstruction for water to freely flow to the drainage pipe.5. The overflow water drainage pipes at the terrace are blocked due to garbage, and stone.	<ol style="list-style-type: none">1. Due to the uneven terrace floor water accumulate on the porous terrace floor2. Cracks on the terrace floor.3. No proper slope for runoff of the water.4. Irregular cleaning of the terrace surface has blockage for water flow.5. Water leakage through joints of water supply pipes.




		<ol style="list-style-type: none"> 6. Almost all the health facility buildings visited have cracks on the terrace floor which makes the water easily percolate downside 7. A large number of discarded articles like beds, stretchers, non-functional equipment etc, are dumped on the terrace. Creating water resistance for the flow to the drainage pipes. It affects severely in the rainy season. 8. The uneven surface and improper slop on the terrace create an ideal condition for the seepage. 9. Water leakage through the pipe joints on the porous terrace floor. 10. Vegetation on the terrace floor or from the nearby trees does not allow water to flow toward the drain pipes. 	
2	Toilet and washing area	<ol style="list-style-type: none"> 1. The toilets' surface area is poorly cemented tiles. Big gaps are visible on the toilet floor. 2. All the walls adjacent to the toilets have a seepage problem, it is due to a pipeline leaking inside the wall. 3. Water leakage at the upper floor toilet creates a seepage problem on the lower floor. 4. The sanitary pieces of equipment are not well maintained. The outlet pipes are either not fitted well or damaged 5. Poor waterproofing in the toilet. The toilet seat pipe is not cemented properly, big gaps are visible. 6. The floor near the toilet is not cemented well therefore whenever the water flows out of the bathroom or during cleaning, water percolates through the gaps. 7. The water tap in the toilet, washing area, and bathroom is leaking all the time, making the cracked floor ideal for seepage 8. Due to a blockage at the washroom drainage pipe, the water took longer to flow down. 	<ol style="list-style-type: none"> 1. Tiles joints not fixed properly. 2. Leakage from Pipeline joints. 3. Improper maintenance of sanitary equipment. 4. Poor waterproofing in the toilet and washing area. 5. Broken tap, a water pipe in the toilet. 6. Blockage in the drainage pipe, hole.
3	Wall (structural issues)	<ol style="list-style-type: none"> 1. Cracks in the wall 2. Gaps between the wall and the pillar create seepage in the rainy season 	<ol style="list-style-type: none"> 1. Cracks in the outer wall.





			<p>Cracks are not filled up timely.</p> <ol style="list-style-type: none"> 2. Porous wall 3. The joint between the wall and the pillar is not filled properly.
4	Drainage (pipelines)	<ol style="list-style-type: none"> 1. Main drainage pipes are not jointed properly and the water is continually leaking from the joints. 	<ol style="list-style-type: none"> 1. Broken drainage pipeline 2. Leakage in the drainage pipe joints. 3. Old drainage pipe not replaced timely.
5	Plumbing	<ol style="list-style-type: none"> 1. The drainage pipe of alloy casting has disintegrated at the joints and no maintenance has ever been done to prevent it. 2. The newly instated pipe also has a similar problem of leaking at the joints, the plumbing is very poor. 3. Outside drainage pipe leakage creating seepage on the outer wall 	<ol style="list-style-type: none"> 1. Old water pipeline, drainage pipeline rusted, damaged. 2. Sticking material not used for joining two pipes
6	Structure and Construction	<ol style="list-style-type: none"> 1. The pillars extended for future construction have cracked which absorbs the rainwater and drains it down. 2. The walls of the health facilities are cracked upside down making it easy for water move to down. 3. The joint between the pillars and ceiling is not properly closed. The seepage from the upper floor affects the lower floor. 4. The cracked ceiling of the building easily allows water from the upper floor to percolate down 5. Pillars near the toilets carry water from top to down. 6. Reverse slop in the toilet is a place of seepage problem 7. Gaps between the wall and the pillar create seepage in the rainy season 	<ol style="list-style-type: none"> 1. Cracks in pillars from the terrace to the ground floor in some buildings. 2. Joint line of the pillar and ceiling is not filled properly. 3. Reversed slop in the toilet. 4. Gaps in the pillar and the wall.




Pictorial report of the Seepage Assessment




1. Seepage from the terrace

Picture number	Picture of problem	Reason of seepage
<p>Picture No. 1.1 Medical College, Rajnandgaon</p>		<p>Continues water lodging at the terrace in the rain and summer season too.</p>
<p>Picture No. 1.2 CHC Dharsiwa</p>		<p>The same problem of water lodging on the terrace</p>
<p>Picture No. 1.3 CHC Abhanpur</p>		<p>The same problem of water lodging on the terrace</p>



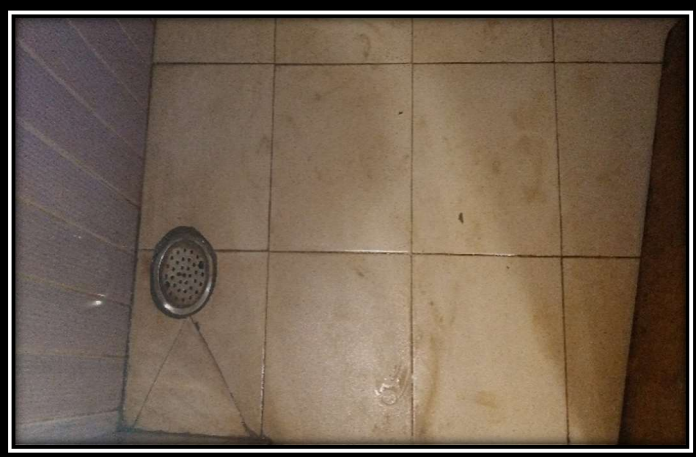
<p>Picture No. 1.4 CHC Dharsiwa</p>		<p>The overflow of a storage tank at the terrace always keeps the terrace floor wet.</p>
<p>Picture No. 1.5 CHC Dharsiwa</p>		<p>Although the storage tanks are kept on a high surface the adjacent areas are not made to drain away the overflowed water</p>
<p>Picture No. 1.6 CHC Dharsiwa</p>		<p>Due to continues water logging at the site of the water storage tank, the mould has developed making the surface uneven to flow the water</p>




<p>Picture No. 1.7 CHC Dharsiwa</p>		<p>The overflow water outlets at the terrace are blocked making it a place for water stagnation</p>
<p>Picture No. 1.8 CHC Dharsiwa</p>		<p>Almost all the health facility buildings visited have cracks on the terrace floor which makes the water easily percolate downside</p>
<p>Picture No. 1.9 DH Bilaspur</p>		<p>Bad practice of making terrace space a dumping place creating it resistant for water to flow to the drainage pipes particularly, in the rainy season.</p>
<p>Picture No. 1.10 Medical College, Rajnandgaon</p>		<p>The uneven surface and improper slop on the terrace are ideal conditions for the seepage.</p>


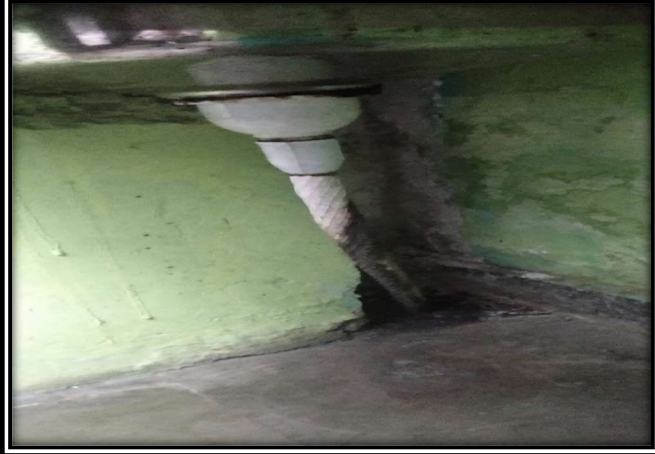


<p>Picture No. 1.11 Medical College, Rajnandgaon</p>		<p>Water leakage through the pipe joints leaking the water on the porous terrace floor</p>
<p>Picture No. 1.12 HWC Bilaspur</p>		<p>Vegetation on the terrace floor or from the nearby trees does not allow water to flow toward the drain pipes</p>
<p>Picture No. 1.13 Medical College, Rajnandgaon</p>		<p>The same problem of seepage from the terrace</p>

<p>Picture No. 1.14 Sub Health Centre, Charmudia</p>		<p>The problem of the broken ceiling and leaking pipe</p>
<p>Picture No. 1.15 Civil Hospital, Kurud</p>		<p>The same problem of seepage from the terrace</p>
<p>Picture No. 1.16 HWC Godhi</p>		<p>The same problem of seepage from the terrace</p>




2. Seepage due to toilet and faulty plumbing

Picture number	Picture of problem	Reason of seepage
<p>Picture No. 2.1 District Hospital Bilaspur</p>		<p>The Surface area of the toilets tiles they are not properly cemented during the construction time. Big gaps are visible on the floor</p>
<p>Picture No. 2.2 Medical College, Rajnandgaon</p>		<p>The problem of gaps in the washing area tiles</p>
<p>Picture No. 2.3 MCH Wing, Bilaspur</p>		<p>Broken tiles in the washing area.</p>




<p>Picture No. 2.4 PHC Sirri</p>		<p>The problem of gaps in the tiles</p>
<p>Picture No. 2.5 PHC Sirri</p>		<p>All the walls adjacent to the toilets have a seepage problem, it is due to a pipeline leaking inside the wall.</p>
<p>Picture No. 2.6 Medical College, Rajnand gaon</p>		<p>Water leakage at the upper floor toilet creates a seepage problem on the lower floor</p>



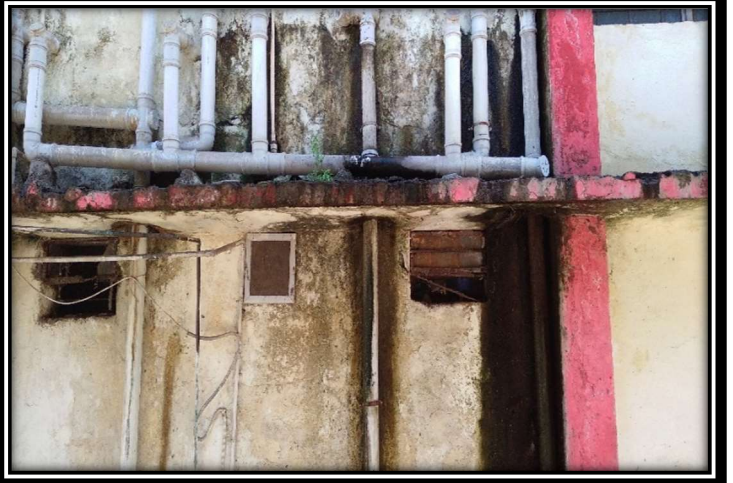
<p>Picture No. 2.7 District hospital Bilaspur</p>		<p>Water leakage at the upper floor toilet creates a seepage problem on the lower floor</p>
<p>Picture No. 2.8 CHC Dharsiw a</p>		<p>The sanitary pieces of equipment are not well maintained. The outlet pipes are either not fitted well or damaged.</p>
<p>Picture No. 2.9 District hospital Bilaspur</p>		<p>Leakage from the washbasin</p>
<p>Picture No. 2.10 CHC Dharsiw a</p>		<p>The same problem of poor maintenance of sanitary equipment.</p>




<p>Picture No. 2.11 Medical College, Rajnandgaon</p>		<p>Poor waterproofing in the toilet. The toilet seat pipe is not cemented properly, a big gap is visible.</p>
<p>Picture No. 2.12 CHC Dharsiwara</p>		<p>The floor near the toilet is not cemented well therefore whenever the water flows out of the bathroom or during cleaning, water percolates through the gaps.</p>
<p>Picture No. 2.13 District Hospital Dhamtari</p>		<p>The water tab in the toilet, washing area, and bathroom is leaking all the time making the cracked floor ideal for seepage</p>





<p>Picture No. 2.14 CHC Dharsiw a</p>		<p>Brocken tiles in the washing area, and bathroom.</p>
<p>Picture No. 2.15 Civil Hospital , Kurud</p>		<p>Brocken tiles in the washing area, and bathroom.</p>
<p>Picture No. 2.16 District Hospital Bilaspur</p>		<p>Due to a blockage at the washroom drainage pipe, water took longer to flow down.</p>

3. Drainage system (a problem in pipelines)




Picture number	Picture of problem	Reason of seepage
<p>Picture No. 3.1 Medical College, Rajnandgaon</p>		<p>Drainage pipes are not jointed properly (tied with cloth), and the water is continually leaking from the joints</p>
<p>Picture No. 3.2 Medical College, Rajnandgaon</p>		<p>Sticking material not used for joining two pipes</p>
<p>Picture No. 3.3 District Hospital, Bilaspur</p>		<p>The drainage pipe of alloy casting disintegrated at the joints and no maintenance has ever been done to prevent it.</p>



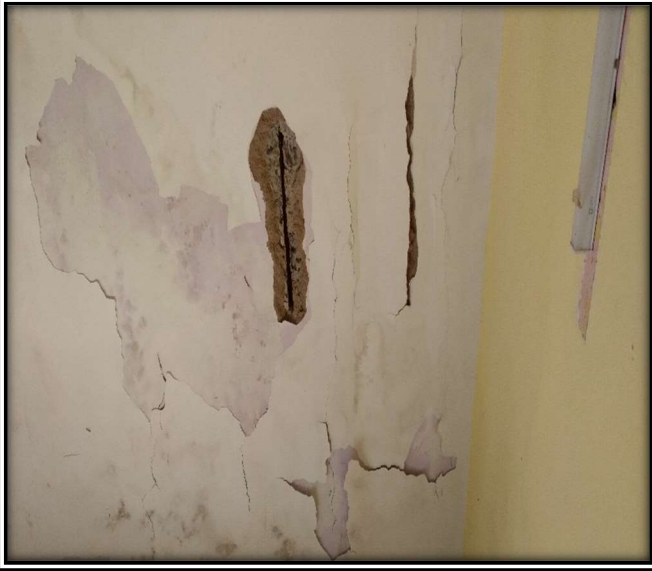
<p>Picture No. 3.4 District Hospital, Bilaspur</p>		<p>Almost every joint of the training pipe is an area of the seepage</p>
<p>Picture No. 3.5 District Hospital, Bilaspur</p>		<p>Brocken drainage pipes replaced or fixed</p>
<p>Picture No. 3.6 District Hospital, Bilaspur</p>		<p>The newly instated pipe also has a similar problem of leaking at the joints, the plumbing is very poor.</p>




<p>Picture No. 3.7 District Hospital, Bilaspur</p>		<p>Brocken drainage pipe and leaking water</p>
<p>Picture No. 3.8 CHC Abhanpur</p>		<p>Outside drainage pipe leakage and cracks on the wall</p>
<p>Picture No. 3.9 CHC Dharsiwa</p>		<p>Drainage pipe leakage at the joint.</p>

<p>Picture No. 3.10 MCH Wing, Raipur</p>		<p>Leakage in the drainage pipe.</p>
<p>Picture No. 3.11 MCH Wing, Raipur</p>		<p>Toilet area drainage pipes leakage at the joints</p>
<p>Picture No. 3.12 MCH Wing, Raipur</p>		<p>Water supply pipe leakage in the wall</p>
<p>Picture No. 3.13 District Hospital, Raipur</p>		<p>Drainage pipe leakage at the joints.</p>



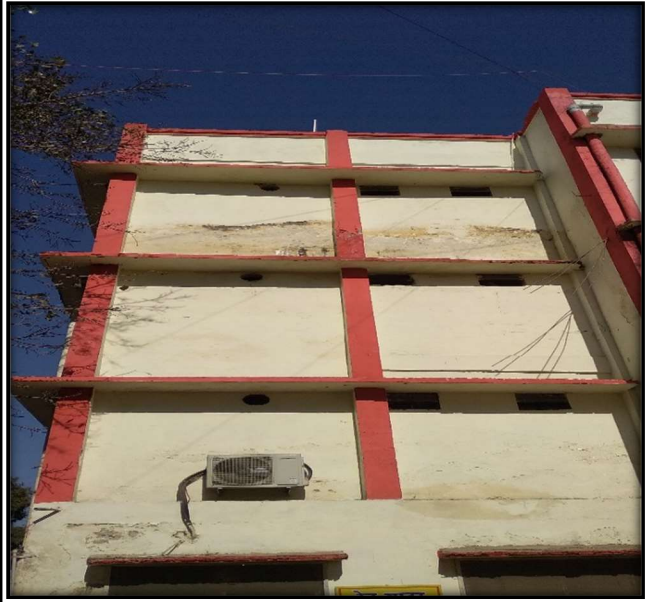
4. Structural issue




Picture number	Picture of problem	Reason of seepage
<p>Picture No. 4.1 District Hospital Bilaspur</p>		<p>The pillars extended for future construction have cracked which absorbs the rainwater and drains it downward.</p>
<p>Picture No. 4.2 Medial College , Rajnandgaon</p>		<p>The walls of the health facilities are cracks upside down making it easy for water move to down</p>
<p>Picture No. 4.3 Medical College, Rajnandgaon</p>		<p>The cracks from the terrace wall are not filled correctly and in the rainy season, the water continually downpours through this crack.</p>



<p>Picture No. 4.4 Medical College, Rajnandgaon</p>		<p>The joint between the pillars and ceiling is not properly closed. The seepage from the upper floor affects the lower floor</p>
<p>Picture No. 4.5 Medical College, Rajnandgaon</p>		<p>The joint between the pillars and ceiling is not properly closed. The seepage from the upper floor affects the lower floor</p>
<p>Picture No. 4.6 PHC Jamgaon</p>		<p>The cracked ceiling of the building easily allows water from the upper floor to percolate down.</p>




<p>Picture No. 4.7 PHC Jamgaon</p>		<p>The outer wall of the health facilities is not plastered properly.</p>
<p>Picture No. 4.8 District hospital, Bilaspur</p>		<p>Pillars near the toilets drip water at the entire pillar site</p>
<p>Picture No. 4.9 District hospital, Bilaspur</p>		<p>Cracks in the wall making seepage problems in the rainy season</p>

<p>Picture No. 4.10 Medical College, Rajnandgaon</p>		<p>Reverse slop in the toilet is a place of seepage problem</p>
<p>Picture No. 4.11 MCH Wing, Bilaspur</p>		<p>Entire pillar carrying seepage at the downside</p>
<p>Picture No. 4.12 CHC Dharsiya</p>		<p>Upper floor seepage water percolates through the crack of the wall.</p>

<p>Picture No. 4.13 UPSC Bilaspur</p>		<p>Outside wall seepage in the rainy the season</p>
<p>Picture No. 4.14 UPSC Bilaspur</p>		<p>Outside wall seepage in the rainy the season</p>
<p>Picture No. 4.15 District hospital Bilaspur</p>		<p>leakage in the water supply pipes</p>

<p>Picture No. 4.16 CHC Dharsiwa</p>		<p>Gaps between the wall and the pillar create seepage in the rainy season</p>
<p>Picture No. 4.17 CHC Dharsiwa</p>		<p>The joint of the newly constructed room is not filled properly making a seepage problem in the rainy season.</p>
<p>Picture No. 4.18 Medical College, Rajnandgaon</p>		<p>The joint of the newly constructed room was not filled properly causing seepage problem in the rainy season.</p>

<p>Picture No. 4.19 UPSC Bilaspur</p>		<p>The joint of the newly constructed room was not filled properly making a seepage problem in the rainy season.</p>
<p>Picture No. 4.20 Medical College, Rajnandgaon</p>		<p>Damaged pillar, poorly cemented</p>
<p>Picture No. 4.21 PHC Jamgaon</p>		<p>Cracks on the outer wall create seepage people in the rainy season.</p>

<p>Picture No. 4.22 HWC Godhi</p>		<p>Damaged and porous ceiling</p>
<p>Picture No. 4.23 CHC Abhanpur</p>		<p>Cracks in the wall, ceiling and roof.</p>
<p>Picture No. 4.24 District Hospital, Raipur</p>		<p>The joint of the newly constructed room is not filled properly making a seepage problem in the rainy season.</p>
