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Scientific Documentation of Malhargad, Pune District, Maharahstra

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Abstract

The study of any heritage encompassing tangible structures and intangible traditions is highly important for fostering personal identity, promoting social cohesion, and guiding sustainable future planning. The Historical fort heritage are more than relics; they are dynamic entities that *contribute to cultural continuity, educational enrichment, and economic vitality*. In the present context, to understand the present status of the Malhar fort site, in Puarandar tehsil of Pune District, a detail documentation of were carried out. After understanding the various causes of damages, some remedial measures were suggested for the long sustainable development of this heritage structure.

Keywords: Heritage importance, Fort structures, present status, damages, documentation, remedial measures.

Introduction

Documentation of fort in structural interpretation of its all sides of structure is a complex process. Structural deuteriation develop due to the effect of physical, chemical and biological weathering as well as from the human influence and its acute interpretation based on systematic and inadequate documentation is highly needed. Otherwise, nonscientific and misleading documentation can result in an undervalued understanding of historic significance and, consequently, flawed or failed conservation projects.

The systematic and scientific documentation provides valuable evidences and rationale for past creations. Hence, it is the process which gives the foundational aspect of the heritage conservation discourse. The method employed for the quality of documentation impacts the interpretation of the surviving ruins and subsequent stages of conservation.

Any heritage is an invaluable asset of the society, which portrays his achievement over centuries. Fort is one of the important structures which represents the physical, strategic, and cultural legacy of defensive architecture. Its architectural configuration is

one of the pivotal factors that contribute to its performance. Therefore, it is need of hour to preserve such historical identity, a typical art and architect, showcasing advanced engineering, and driving local tourism.

There are several hill forts western Maharashtra which are present in the off-shoots of Sahyadri and are bounded by plains. Such structures are neglected from the scientific conservation due to a lack of documentation and inadequate systematic treatment, therefore these structures are facing challenges in the Deccan land.

The individual fort structure required a set of investigations, such as historical interpretation, typical depictions of art, and architectural understanding. Therefore, such structure needs to employ systematic fieldwork, mapping, and very detail documentation techniques to understand the deterioration of the structure.

Previous work:

Various workers earlier documented the fort sites in Maharashtra. In which the hillforts of Sahyadri's are having special importance because of their very attractive landforms. Since such landforms are belongs to the escarpment- peaks of Sahyadri, their rate of deterioration from the natural agencies (Atmospheric agents) and anthropogenic activities can be study. In order to find out the maintenance of the fort structure, the detail documentation of the structure is very much important. Such detail documentation to quantify the deterioration were scientifically carried out by following scholars:

Patil (2020) carried out very detailed documentation of Panhala fort to quantify various maintenance develop due to the natural agencies and anthropogenic activity on the fort site. To record the broken surfaces/damages on the structure, he listed systematically from the bottom of the fort and then end at the Bagh Darvaja after documentation of the each and every element of the structure. Based on scientific documentation, he listed several damages on the fort structure and finally suggested the remedial majors.

Asbe (2022) as carried of site catchment analysis and detailed documentation of Rajagad fort district Pune. As a part of site catchment analysis, he was carried out very detailed documentation of archaeological site and monuments which are directly or indirectly connected to the fort settlement. Similarly, his Ph.D. research includes the detailed documentation of each fort elements.

Agrawal and Sabale (2019) carried out very detail documentation of Raigad fort in connection of the cultural activities and water management system. This work revels the detail documentation the spread on every part of the fort.

This approach is used before going to the field, it includes: The literature review involved a critical examination of existing scholarly records, pioneer studies, and relevant literary sources related to forts in Maharashtra, with particular emphasis on classification, conservation, and documentation practices. Kamalapur (1961) provided a systematic classification of forts into three primary categories—hill forts, land forts, and sea forts—based on their physical setting, further subdividing each category into major, medium, and minor forts according to their size, strategic importance, and functional complexity. This classification framework remains foundational for fort-related studies in the Deccan region.

Deshpande (2004) studied the architectural evolution of hill forts in Maharashtra, focusing on gateways, bastions, ramparts, and internal planning. The study provides important insights into construction techniques, use of local materials, and adaptation to topography, which are particularly relevant for understanding the structural layout of forts like Malhargad.

Patil (2015) examined the impact of neglect and modern interventions on fort structures, highlighting issues such as vegetation growth, vandalism, and unregulated tourism. The study stresses the need for scientific conservation policies and community participation in heritage management.

Joshi (2018) offered a concise yet significant discussion on the importance of fort conservation, outlining preservation strategies and methodological approaches for structural documentation and site management. His work contributes valuable insights into contemporary conservation challenges and practical techniques applicable to historical fort sites. Chile (2011) presented brief but informative reviews of forts in Maharashtra, highlighting their historical context, architectural features, and regional distribution.

An important early reference is Burgess (1885), who systematically documented archaeological and architectural remains—including forts, temples, inscriptions, and water harvesting structures—across the Bombay Presidency. This work represents one of the earliest comprehensive efforts to record India's antiquarian heritage and continues to serve as a crucial baseline source for historical and comparative archaeological research. Collectively, these studies provide a strong conceptual and methodological foundation for the present research on Malhargad Fort.

Study area:

The fort is located northern extension of Purandar tehsil and south of Pune city. It is well accessible and 12 from Saswad – tehsil headquarter by State Highway and Pune Headquarter to the fort site is 27 is well connected with Pune-Pandharpur National Highway (NH) No. 965. The site is accessible through village road 2.5 kilometer from Kalewadi western side while from Sonori village eastern side by bullet cart road. The structure is lies on 18°24′44″N, 74°2′56″E geocoordinates (Fig. 1 and 2).

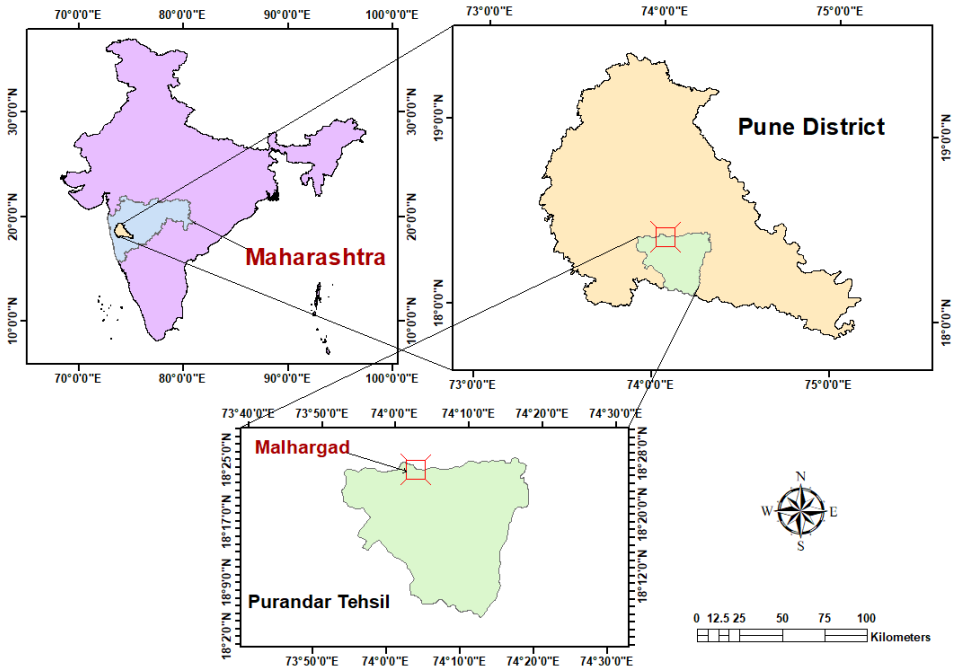


Fig. 1 Location map of the study area.



Fig. 2 View of Malhargad fort site.

Aims and Objectives:

1. To record the historical background of Malhargad fort.
2. To identify and record key architectural features.
3. To assess the current condition of the fort and identify areas that are damaged or risk.
4. To record the topography, natural features and landscape around the fort.
5. To suggest remedial majors for the development.

Geology of the area:

Malhargad fort is present in the premises of Saswad (Purandar) headquarter, on the Diveghat hill range bounded by Karha river basin. It is circumdenudation hill, shows flat top on the surface and is used for the construction of fort structure. The Sahyadri range to the west of Pune in Velha taluka is split, and the forts Rajgad and Torna are on one branch while the Malhargad on the other side. This region is a part of the Deccan Trap which formed during Upper Cretaceous to Lower Eocene (65 Ma). It is one of the largest volcanic features on Earth, covers over 500,000 sq. km of the west-central part of India.

Its thickness ranging from 2000 m in the Western Ghats to over 1000 m in eastern part of the province to less than 100 m in some southeastern regions and majority of flows are 10–50 m thick, and shows dip at < 0.5°. The Deccan trap is a complex basaltic lithology and is predominantly made of multiple layers of tholeiitic flood basaltic flows.

Historical Background

Malhargarh is a Peshwa-era fort on a hill near Sonori village near Saswad in Pune district. Malhargad was built by Sardar Bhivarao Panse to protect Sonori village and to keep an eye on Dive Ghat. As some adverse events happened at this fort, Bhibrao Panse built a temple of Khandoba at this fort, which he was building for the defense of the Maratha state, inspired by the deity Shrikhandoba on the nearby Karhe plateau. It is also recorded in history that the Peshwas paid an annual sum of three thousand to deploy an army unit at this fort for the purpose of protection. Then in the year of 1771-1772 Shrimant Madhavrao Peshwa came to inspect the fort. Such mentions are found in historical documents.

The difference in architecture between the forts built during the Shivaji Maharaj period and the forts built during the Peshwa period is evident from the study of this fort. Armored ramparts, Machi construction, Gomukhi door of the fort were the special features of the construction of the fort during the period of Chh. Shivaji Raja. Which are not seen in the construction of Malhargarh. The flaws in the construction of this fort are roughness, easily visible entrance to the fort. Therefore, from the field visit of Malhargarh, we can see that the method of fort construction which reached its climax during the Shiva period was largely lost during the Peshwa period.

The construction of the fort is generally triangular in shape. On the eastern side of the fort there is a strong gate and a small triangular area. After entering the fort, the ruins of a castle can be seen further from the left side path. There is a well near it but due to lack of use the water of that well is not potable at present. There is a water tank

on the south side of the fort and a sunken well near the ramparts on the right. On the lower side of the tower is a door half covered with mud. There is a small door on the right side.

This square-shaped fortified fort houses the temple of Shri Khandoba and Mahadev and their peaks are eye-catching. The temple of Mahadev in these two temples which are adjacent to each other is a bit spacious and there is a Shivling inside the temple. The idol in the temple of Khandoba is mounted on a horse and the sculpture of Vamangi Shrimhalsa Devi is carved. There are many small idols next to this idol. This fort got its name 'Malhargad' because of this temple of Khandoba. In the center of the fort are the remains of a Sadra building, a sunken well and a rampart.

Methodology

For the better understanding of landscape of the study region and land use – land cover studies the region has proposed to study by using available different maps such as toposheets, maps of study of survey of India, satellite maps, geological maps, geomorphological maps and slope soil maps of this area.

Based on the study of different available maps, as per the aims and objectives, thematic map of the study area was prepared. Based on the thematic maps, a detailed documentation of the fort site was carried out.

During documentation in order to quantify and collect all the essential and basic information of each and every major and micro elements of the fort structure, the list of required factors was prepared in the form of table.

Field documentation

During the field excursion, a detail documentation of the fort site was carried out by using scientific method. The work of documentation to understand the degree of degradation were carried out from the entry gate to the western boundary of the fort.



Fig.3 Shows the team is busy in documentation of Eastern main gate at the fort site

Sr. No.	Chainage Sequence (mts)	Observations (Stable or unstable construction and type of effect / defects observed)	Sampling
1	Eastern side entry gate, right side of the Fort 0 –15 m	i. Extensive vegetation growth observed. ii. Growth of algae. iii. Washing of lime. iv. Displacement of building stone. v. Decomposition of binding material / cement observed. vi. Disintegration of stone and lime. vii. Effect of chemical weathering is significant.	
2	Next to Gate 15 – 30	i. Minor cracks are developed on the wall of building stone ii. Washing of lime iii. Excess vegetation growth iv. Spheroidal weathering developed on the building stone v. Open joints are developed on the wall vi. Decomposition of rock	
3	Upstairs of the gate 30-45	i. Vegetation growth is observed. ii. Minor cracks: developed on building stone and washing of lime. iii. Spheroidal weathering is developed on building stone. iv. Minor cracks; developed on building stone. v. Washing of lime along the cracks. vi. Decomposition of building stone. vii. Open joints are developed by physical weathering viii. Development of joints and cracks in the wall, resulting heavy leakages are observed. ix. Minor cracks are observed on the top surface. x. Open joints are developed on the stone surface.	
4.	Upper side wall 45-60	Repointed and reconstructed wall in intact condition, shows good stability	
5.	60-75	Repointed and reconstructed wall in intact condition, shows good stability	
6.	Inside the gate Left side 75-90	Open joints and elongated cracks developed top to bottom, washing the lime. Due to heavy leakages displacement of stone were observed.	

7.	Inside the gate Left side 90-105	Deterioration of rock by chemical weathering. Development of joints took place. iii. Heavy leakages are observed along the open joints and resulting washing the lime	
	Arch 105-120	An arch of 2.5x2.0x1.0 height, width and depth respectively were found. The surrounding region is covered with small vegetation (Fig.3).	
	Arch 120-135	The lime in the left side stony wall has been washed The joints are becoming open. The vegetation is grown along such cracks (Fig.3).	
	Verandah 135-150	The gaps in between the stepping stone are also become very wide. Cement is washed out (Fig.3).	
8	Arch 150-165	i. Arch Shows following dimension - 1.2 m., width, 1.6m. Depth and 1.9 m. Height. ii. Displacement of building stone. iii. Decomposition of binding material / cement observed. iv. Vegetational growth on the top of the wall is observed (Fig.3).	
9	Wall 165-180	i. An arch of 2.5x2.0x1.0 height, width and depth respectively were found. ii. The surrounding region is covered with small vegetation.	
10	Top fortification wall 195-210	iii. The dimension of wall is 4 ft with, 4 ft height iv. The wall is totally damaged. v.Some stones are displaced in the surrounding.	
11	Wall 210-225	i.The wall is totally damage. ii. Some building stones are spread.	
12	Wall 225-240	i. Decomposition of building stone as well as binding material ii. Effect of chemical weathering is significant. iii. The wall is totally damaged. iv.Few building stones are spread in different directions.	
13	Wall 240-255	i.The wall is totally damaged. ii.Some stones are spread. iii.The height of the wall is increased. iv.Washing of the lime and development of wide joints took place.	
14	Wall 255-270	i.The wall is totally damaged. ii.Some stones are removed and spread in surrounding areas. iii.The height of the wall is increased. iv.Washing of the lime and development of wide joints took place. v. Excess vegetational growth is observed.	

		vi.Removal of building stone took place. vii.The wall is totally damaged. viii. The height of the wall is increased. ix.Washing of the Lime and development of wide joints took place. x.Removal of some stones from upper layer up to 7 feet took place. xi.Vegetation growth is observed.
15.	Fortification wall 270-285	i.Fortification wall with damage of the building stones. ii.Excess vegetational growth. and washing of the lime.
16	Fortification wall 285-300	i.Fortification wall is continued shows some gaps due to the misplace of the building stone. ii.Cracks are developed in the wall. iii.Washing of the lime took place ix. Vegetation growth is observed.
17	Fortification wall 300-315	i.Fortification wall is continued. ii.The structure is intact except the top of the wall.
18.	Wall 315-330	i. Washing of bonding material or lime. ii. Decomposition of binding material / cement observed. iii. A significant effect of chemical weathering is observed. iv. Displacement of building stone in the wall construction. v. Building stone of the wall are mostly collapse and only the foundation remains. vi. Disintegration of stone and lime.
19	Wall 330-345	i.A significant effect of chemical weathering is observed. ii. Displacement of building stone in the wall construction. iii. Building stone of the wall are mostly collapse and only the foundation remains. iv. Disintegration of stone and lime.
20	Wall 345-360	i. Building stones are found dispersed in and around the wall. ii.Total collapse of the wall from the foundation itself.
21	Wall 360-375	i. The wall is totally damaged. ii.Building stones are found dispersed in and around the wall.
22	Wall 375-390	i. Building stones are found dispersed in and around the wall. ii.Total collapse of the wall from the foundation itself.
23	Wall 390=405	i. The collapse of the wall is observed up to the lower foundation the stones are spread along the wall. ii. A pile of the stones are found at the base.
24	Maha Darwaja Right side of the fort 405-420	i.At the entry gate, along left side wall, development of joints and fractures observed. ii. Displacement of the stones are observed at places. iii. Development of the gap in the connecting two building stones and development of fissure took place. iv. Resulting heavy leakages along the fissures are observed.

		v. Vegetation growth observed throughout the wall
25	Beginning of gate: 420-435	i. Development of joints, and fractures. ii. Development of the gap and resulting heavy leakages observed. iii. At places, the displacement of the stones is observed.
26	Road towards main Fort 435-450	i. At this chainage, the wall is intact wall and only upper portion is slide. ii. At places, washing of the lime. iii. Development of the cracks and joints are commonly observed. iv.A small amount of vegetation growth is observed
27	Road towards main Fort 450-465	I. Intact wall only upper portion is slide ii.Washing of the lime took place and resulting building stones are become unsupported. iii. Development of the joint is commonly observed. iv. A small amount of vegetation growth is observed.
28	Road towards main Fort 465-480	i. Intact wall only upper portion is slide, ii.Washing of the lime. iii.Development of the joint. iv. A small amount of vegetation growth is observed. v. Displacements of the stone at the bottom and sliding observed at the top of the wall.
29	Balekilla 480-495	i. At places the wall structure is damage. ii. Vegetation is grown along the joints. iii. The wall shows 8 feet in length and 6 feet in width. iv. Building stones are affected by chemical weathering.
30	Main fort 495-505	i. The upper part of the wall is damaged. ii. Some building stones are displaced. iii. Cement is washed out, resulting vegetation growth is observed along the gap. iv. Upper part of the wall disturbed while the lower part is intact (Fig. 4) .
31	Main fort 505-520	i. The upper part of the wall is damaged. ii. At places, stones are displaced. iii. Cement is washed out and resulting vegetation growth is observed (Fig. 4) iv. The lower part of the wall is intact while upper one is disturbed.
32	Upper terrace 520-535	i. The upper part of the wall is damaged on large scale. ii. At places, the building stones are displaced. iii. At places, the cement is washed out and resulting vegetation growth is observed in such gap. iv. The lower part of the wall is intact condition while the upper one is disturbed (Fig. 5).

33	Upper terrace 535-550	i. Intact wall throughout the area. ii. Numerous gaps are observed in between the two-building stone due to washing of lime. iii.Vegetation growth is observed on large scale. iv. Building stones are affected by chemical weathering (Fig. 5).
34	Near residential structure 550-565	i. Near the residential structure- structure shows east west wall and numerous structures are observed. ii. Along the North-South alignment, the walls of the structures are slide and are built up with stone and bricks. iii. The wall observed the height up to 6 to 7 ft. iv. Most of the part of the structure is damaged. v. The excess vegetation growth is found on the slide portion
35	Near residential structure 565-580	i. This chainage is of residential structure near the Mahadeva temple. ii. The temple complex shows 15-meter width, and 14-meter length facing towards the Mahadeva temple. iii. It shows internal structures which are having dimensions of 7×7 meter. iv. Chemical weathering is also observed.
36	Fortification wall of Mahadeva Temple 580-595	i. Beginning of fortification wall of Mahadeva temple. ii.The structures are completely collapsed and only foundation of the same are observed. iii. There is a gap in between residential structure and the Mahadeva Temple wall. iv. Some vegetation growth is found in this chainage.
37	Fortification wall of Mahadeva Temple 595-610	i.This wall is running is east waste direction. ii.It is made up of local rubbles which are just stacked one above the other. iii. It is having 4-ft height and 1.5 in width. iv.In vicinity of the fortification wall, some building stones are spread.
38	Fortification wall of Mahadeva Temple 610-625	i.This wall is running is east waste direction. ii.It is made up of local rubbles which are just stacked one above the other. iii. It is having 4-ft height and 1.5 in width. iv. Vegetation growth is observed.
39	Fortification wall with north south direction 625-640	i. It is made up of local rubbles which are just stacked one above the other. ii. It is having 4-ft height and 1.5 in width. iii. The wall is intact condition. iv.The lime is washed out and resulting gaps were developed in between the building stones. v. mega and micro cracks are observed on the wall.

		vi. Numerous vegetation growth is observed on the wall surface. vii. Some dark-coloured patches are developed on the building stone by the effect of chemical weathering.
40	Fortification wall with north south direction 640-655	i. The wall is constructed with the of local building stones, which includes rubbles-cobbles-pebbles and cemented with sandy-silt mortar. ii. The building stones which are just stacked one above the other. iii. It is having 4-ft height and 1.5 in width. iv. Numerous vegetation growth is observed on the wall surface. v. Some dark-coloured patches are developed on the building stone by the effect of chemical weathering. v. Numerous vegetation growth is observed on the wall surface.
41	Fortification wall with north south direction 655-670	i. The wall is made up of rubbles-cobbles-pebbles and cemented with sandy-silt mortar. ii. The wall structure is of stone which are stacked one above the other. iii. Numerous vegetation growth is observed on the wall surface. iv. Numerous vegetation growth is observed on the wall surface. v. Some dark-coloured patches are developed on the building stone by the effect of chemical weathering.
42	Beginning of main fortification wall of the Fort 670-685	i. The wall is sound in condition as compare to the previous wall. ii. It is constructed by using well-dressed stone. iii. Lime is washed out at places and gaps are developed in between the two building stones. iv. Numerous, micro cracks are observed in the wall. v. Numerous vegetation growth is observed on the wall surface.
43	Eastern main Gate (towards Kalewadi) 685-700	i. A small gate is observed along the Eastern Boundary it is bounded by both sides fortified huge wall. ii. The wall is made of very well-dressed stone. iii.The structure is intact condition. iv. Some vegetation growth is found in this chainage. v. At places, the binding stones are shows dark colour patches due to chemical weathering.
44	South Eastern fortification wall 700-715	i.It is a huge wall constructed by dressed stone and it is intact in condition. ii. At places the cracks are developed due to the washing of the lime.

		iii. Vegetation growth is found along search cracks. iv.The wall is intact from top to bottom. v. Lime is washed out at places and gaps are developed in between the two building stones.
45	South Eastern fortification wall 715-730	i. It is a huge wall constructed by dressed stone. ii. Most of the part of the wall is intact in condition. iii. At places, the cracks are developed due to the washing of the lime. iv. Vegetation growth is found along search cracks. v. The wall is made up of well-dressed stone from top to bottom.
46	South Eastern fortification wall 730-745	i. It is a huge wall constructed by dressed stone and it is intact in condition. ii. At places, the cracks are developed due to the washing of the lime. iii.Vegetation growth is found along search cracks. iv. The wall is intact from top to bottom.
47	South Eastern fortification wall 745-760	i. It is a huge wall constructed by dressed stone and it is intact in condition. ii. At places the cracks are developed due to the washing of the lime. iii.Vegetation growth is found along search cracks. iv. The wall is intact from top to bottom.
48	South Eastern fortification wall 760-785	i.It is a huge wall constructed by dressed stone and it is intact in condition. ii. At places the cracks are developed due to the washing of the lime. iii.Vegetation growth is found along search cracks. iv.The wall is intact from top to bottom.
49	Before main gate, towards Sonori village South Eastern fortification wall 785-800	i. It is a huge wall constructed by dressed stone and it is intact in condition. ii. At places the cracks are developed due to the washing of the lime. iii.Vegetation growth is found along search cracks. iv. The wall is intact from top to bottom.
50	Men Gate towards Sonori village 815-830	i. Southern fortified wall bounded by this huge Gate towards Sonori village. ii.Most of the part of the wall is intact condition while few part is damaged because of the displacement of the stone. iii. Some vegetation growth is found in this chainage. iv. Numerous, micro cracks are observed in the wall.
51	Western fortified wall 830-845	i. It is a huge wall constructed towards Sonori village. ii. Most of the part of the wall is intact condition while few part is damaged because of the displacement of the stone. iii. Some vegetation growth is found in this chainage.

		iv. At places, the binding stones are shows dark colour patches due to chemical weathering.
52	Western fortified wall 845-860	i. It is a huge wall constructed towards Sonori village. ii. Most of the part of the wall is intact condition while few part is damaged because of the displacement of the stone. iii. The wall is made of very well-dressed stone. iv. Numerous, micro cracks are observed in the wall. v. Vegetation growth is found.
53	Western fortified wall 860-885	i. It is a huge wall constructed towards Sonori village. ii. Most of the part of the wall is intact condition while few part is damaged because of the displacement of the stone. iii. At places, the cracks are developed due to the washing of the lime. iv. Vegetation growth is found along search cracks.
54	Step well one 885-900	i. The whale is having into 13 m dimension. ii.It is a very well-constructed step well located in between the Sonori gate and South Eastern Gate behind the Mahadeva temple. iii. In the present condition, it is showing full of water. iv. It is having the technology to lift the well water to outskirt similarly there is a provision of steps which goes up to the dipper portion of the well. v. Therefore, we can collect the water by manually as well as by lifting process. vi. On the basis of large-scale dimension of the well as well as its capacity to provide the water. vii. To provide the water bulk scale anyone can't understand that it is the only one source of water for drinking and domestic on the fort site (Fig. 6).
55	Dug-well 900-915	i. Dug-well is present in between Mahadeva temple and the residential structure as well as the step well structure. ii. It is having radius of 7 feet and the depth approximately goes up to 40 feet. iii. In the present condition it is also showing 4 to 5 feet of water. iv. Therefore, it is also a good source of water for the drinking purpose. v. It is constructed by using well-dressed stone. vi. At very few places, lime is washed out at places and gaps are developed in between the two building stones (Fig. 6).



Fig. 4 Picture of the street at the eastern main gate



Fig. 5 Picture of the bastion at the eastern main gate



Fig. 6 Picture of the step well located near the Mahadeo temple

Result and Discussion

It is commonly observed that most of part of the heritage structure is destructed due to natural and artificial causes / reasons.

1. Natural causes: weathering

a. The effect of physical weathering results into the disintegration of the building stone and binding material used in the constructions of the heritage. These caracks are ranging from micro to macro level. According to their increase in their dimensions, these can be categories in to micro cracks, cracks, joints and fractures.

b. The chemical weathering results into the decomposition of rocks. Due to chemical weathering, the patches of grey, black, brown and red are developed on the surface of building stones.

c. Similarly, the complete dissolution of building stone during the rainy season. Therefore, the strength of the stone is lowered and its is converted into the porous and permeable of the body. Especially, the stones which exposed to the open atmosphere on the upper surface of the heritage are facing affectively converting into deeply weathered rock.

d. Such building stones which are used in the construction of the fort structures are pinched and bulged due to the overlying load of floor. Resulting, the deeply weathered such stones are washed out slowly and are converted into the decay and finally soil.

2. Artificial causes

a. In the present condition, no human population is observed on the fort site. Therefore, the rate deterioration from human influence is nil or very negligible.
b. The fort site is lack of proper vigilance and security. Therefore, due to the lack of rules and regulations and mismanagement, the tourist visiting this fort are throwing lot of debris on the various areas of the site.
c. The fort site is lack of infrastructure management; at places the deterioration of the heritage structure is found at several localities.
d. Similarly, the fort site is free from preservation-conservation-restoration activities. Therefore, nobody is responsible carry out the regular maintenance of the fort structure.
e. At places, some fort lovers were carried out construction of damaged part of the fort structure. But this construction was not as per the norms, they have carried out very construction, without taking the know how of culture, art, architect and style of construction. Therefore, it is not matches with the previous construction of the fort site.
f. It is understood from the local sources, the southwestern part of fort towards the Kalewadi village is the main entry gate of the fort. It was extended up to approximately 50 mts towards southwest corner. But the whole construction is removed from the base. Therefore, the important part of the fort structure is damaged due to the human influence. Due to lack of lower foundation support due to the damage of the entry gate, the cracks are developing on fortification wall, while at places the wall is fall down.

Remedial Measures

As stated above, in the present context detail documentation of the fort were carried out. The overall conclusion of field survey reveals that the present fort is a unique, late medieval- colonial period heritage structure. Therefore, it is highly essential to conserve and preserve the whole structure. In this connection, some important remedial measures are suggested for the long sustainable of this structure.

1. The structure is located on the flat upper terrace of Dive ghat hill, therefore in addition to the cultural importance, the area is exhibit beautiful natural heritage. Hence, the overall protection of the fort landscape is highly essential for its long existence.
2. At places, the structure is deteriorated due to natural and artificial reasons. Therefore, at the places of heavy damages, structural conservation / repair of structure is highly essential.
3. At the time of repair, maintenance work based on improper or non-scientific techniques should be avoided and adequate - scientific methods should be applied.
4. Human interference at the fort can be curtailed through legal provisions.
5. Either central or State governments should adopt the fort structure for is proper protection, preservation-conservation and overall development of this structure of the fort
6. To promote historical tourism, adequate infrastructure should be developed in the vicinity of Malhargad adopted instead.

Conclusion

The hill fort studies of Deccan regions of Maharashtra are critical for understanding ancient military strategy, social hierarchy, and landscape organization, as these structures served as defensive strongholds, economic hubs, and symbols of power from the Iron Age to the medieval period. These studies of sites reveal insights into ancient engineering, water management, and community life.

In the present context, a study of fort heritage which is located in vicinity of the Pune city but it little popular as compare to the other well-known forts of Maharashtra. Similarly, at such neglected heritage site, so far, no any efforts have been taken to document the fort site from conservation – preservation – restoration point of view. Similarly, there are so many connected sites to this fort sites are also totally neglected in vicinity of this heritage.

To understand the present status of the fort site, a detailed documentation from the eastern side main door to the western side door, which covers complete built structure of the fort were carried out. A detailed observations in connection of repair of different elements of fort structure carefully observed and recorded in the field note nook during investigations. To understand the composition and strength properties, the samples of different building stones, lime, mortar and other objects were studied in the lab.

The investigations study reveals that the fort has been constructed with the help of high-quality building stone and binding materials (lime). Since the structure is present in the semi-arid regions, on the Dive ghat hill range, it is slightly affected by chemical weathering but most of the part of the heritage which is affected by physical weathering. The important sign observed on the building stone are development of micro, mega cracks, joints and fractures. At places, the building was cracked to the overlying load. Heay leakages are observed along the such cracks, which develop the chemical weathering up to the bottom portion. Along such channel of leakages, vegetation growth is found.

In the fort site, various anthropogenic activities and natural activities are causing significant damage to hill fort heritage. These threats today are range from small day to day activities and unregulated development to irresponsible tourism which affected on the keeping of the heritage structure.

As per as the conservation and preservation of the present hill forts those observed on the off-shoots of Sahyadri hills and plateau part of Deccan land are essential to protect irreplaceable historical, cultural, and architectural heritage from degradation, natural decay, and human encroachment. This huge fort structure, constructed on the large areas and are belongs to the Late Medieval era, require specialized care to maintain their structural integrity, boost regional tourism, and preserve regional biodiversity.

Therefore, by studying the above features which damaging the part of heritage, there is need of immediate conservation and preservation of the heritage. Still, a detail work is required for the analysis of the heritage.

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