

## Accessibility of World Heritage Site:

### A survey of physical accessibility of Angkor Wat temple, Cambodia

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#### Abstract

*The physical accessibility status of Angkor Wat temple was quantitatively measured. In comparison with the standard of Japanese law, physical barriers which existed in stairs, toilets and fences in the main visiting route were identified. Further, examining possible improvements that could be implemented considering the perspective of cultural property protection, specially selected visitation routes could be constructed for visitors for tourism and for visitors for worship were suggested.*

#### Keywords

*accessibility, tourists, local residents, world heritage site, accessible tourism*

#### 1. Introduction

The Angkor complex in Cambodia is a generic name for the temples, royal palaces, and other stone structures left behind by the Angkor Dynasty, which flourished from the 9th to 15th centuries under the rule of the entire Indochinese Peninsula, with its capital in present-day Siem Reap and its suburbs. The Angkor complex was inscribed on the list of UNESCO World Cultural Heritage Sites in 1992.

Cambodia, which has the Angkor complex, continued to be isolated from the international community and suffered from civil wars even after the period of large-scale civil wars and massacres from 1970 to 1979. However, due to the success of the general election in 1993, support from the international community, and the efforts of the people, the socio-economy stabilized and recovered steadily, and entered the era of development from reconstruction around 2004 when the throne was replaced by the current king.

With the socio-economic development of Cambodia, the number of tourists visiting the Angkor World Heritage Site has increased dramatically, and as of 2018, 6.2 million tourists visited the site annually [Ministry of Tourism, 2018]. The country's economy, which is not yet mature in terms of manufacturing and other economic infrastructure, relies on the tourism industry at a much higher rate than other ASEAN countries. The ratio of international tourism income to nominal GDP in Cambodia is 17.4 % as of 2015. Comparing the ratio of international tourism income to GDP among the ASEAN countries, Thailand ranked second with 11.3 %, which indicates that Cambodia has by far the highest ratio. In Siem Reap Province, where the Angkor World Heritage Site is located, the proportion of workers engaged in the service industry, including tourism, accounted for 68.7 % as of 2016 [World Bank Group, 2018]. Since this industrial structure is expected to remain unchanged in the Post-Covid19 period, it can be assumed that

how to grow the tourism industry in Cambodia is an extremely important issue for the maintenance and development of the nation.

On the other hand, about 130,000 local residents still live their traditional lives in the Angkor site area, and the coexistence of tourists and local residents is an important issue.

Therefore, the key to the development of the Angkor area is to realize the two characteristics of being a comfortable place for local residents to live and being attractive as a tourist destination.

The Angkor Wat temple, which is the subject of this survey, is the most visited temple by tourists in the Angkor complex. According to the statistics, approximately 2.6 million foreign tourists visited the Angkor World Heritage Site in 2018 [Ministry of Tourism, 2018].

The temple, now one of the most famous tourist attractions in the world, is a Hindu temple built by Suryavarman II, who ascended the throne in the first half of the 12th century and was converted to a Buddhist temple in the late 16th century.

This temple, which is also depicted on the Cambodian national flag, has played an important role as a pilgrimage destination for the Cambodian people and a symbol of pride in their country. The temple has attracted a diverse range of visitors as a sacred place of worship for local residents and as a tourist destination for tourists.

On the other hand, it can be pointed out that the rapid development of the temple as a tourist destination may have a negative impact on local worshippers, such as decreased well-being, diminished sense of belonging and sense of reluctance to visit due to the large number of tourists who visit for other purposes than a pilgrimage. In such a situation, it is assumed that the temple's sufficient readiness to accept a variety of visitors will have a desirable impact on the psychological state of the local residents who visit the temple for worship as well as on the further growth of the tourism industry.

For accepting a variety of visitors, the degree of accessibility is one of the effective measures. For example, Takayama City in Gifu Prefecture, which is a successful example of attracting

foreign tourists in Japan, has promoted a barrier-free tourism system that aims to free foreign tourists from both physical barriers that restrict their movement and information barriers such as language barriers [e.g., Morita and Kawahara, 2013]. As a result, the number of foreign tourists increased rapidly from about 90,000 in 2005 to more than 360,000 in 2015.

In addition to foreign tourists with linguistic difficulties, tourists with disabilities represent a significant proportion of the cultural tourism group, and the importance of accessible tourism in the development of the tourism industry has been analysed in terms of its economic impact [e.g., Domínguez *et al.*, 2013]. Although there are no official statistics on the number of disabled visitors to the Angkor complex, it is strongly suggested that improving accessibility and other support to accommodate visitors with special needs is an essential factor for the future development of the tourism industry in Cambodia.

Accessibility studies on world heritage sites have also been reported. For example, Ghani *et al.* [2015] reported results of quantitative research on pedestrian accessibility in Malacca world heritage site, Malaysia. Meskele *et al.* [2018] also reported an accessibility study of a tourist hotel in Amhara State, Ethiopia, which holds several World Heritage Sites.

The Angkor Wat temple is a stone temple with many damages caused by centuries of weathering, and it is highly probable that there are many physical barriers not only for tourists but also for local residents such as the elderly, pregnant women, and the disabled. Therefore, it would be significant to survey objectively the status of physical barriers in Angkor Wat temple to consider the future development of the tourism industry

of Cambodia. However, Cambodia is lagging behind in the development of accessibility laws, and it can be pointed out that fostering awareness of accessibility and taking concrete steps to improve accessibility are issues that need to be addressed in the future.

On the other hand, the World Heritage Site is a common property of mankind, and the permanent preservation of the buildings is essential. In order to start considering the accessibility of the World Heritage sites, it is necessary to deal with the different aspects of public interest such as cultural heritage protection, tourism development, and residents' welfare at the same time.

Since the Angkor World Heritage Site is maintained and managed by the Authority for the Protection of the Site and Management of the Region of Angkor (APSARA National Authority) and International Coordinating Committee for the Safeguarding and Development of the Historic Site of Angkor (UNESCO/ICC-Angkor), it was decided to conduct this survey jointly with the authority and to consider feasible improvements in consideration of various related issues.

Through this study, we aimed to clarify the problems of physical accessibility of the Angkor Wat temple and to propose feasible improvements beneficial to both tourists and local residents.

## 2. Methods

### 2.1 Survey spot

Survey spots are shown in Figure 1. A qualitative survey was conducted at five spots. Entrance to the western causeway

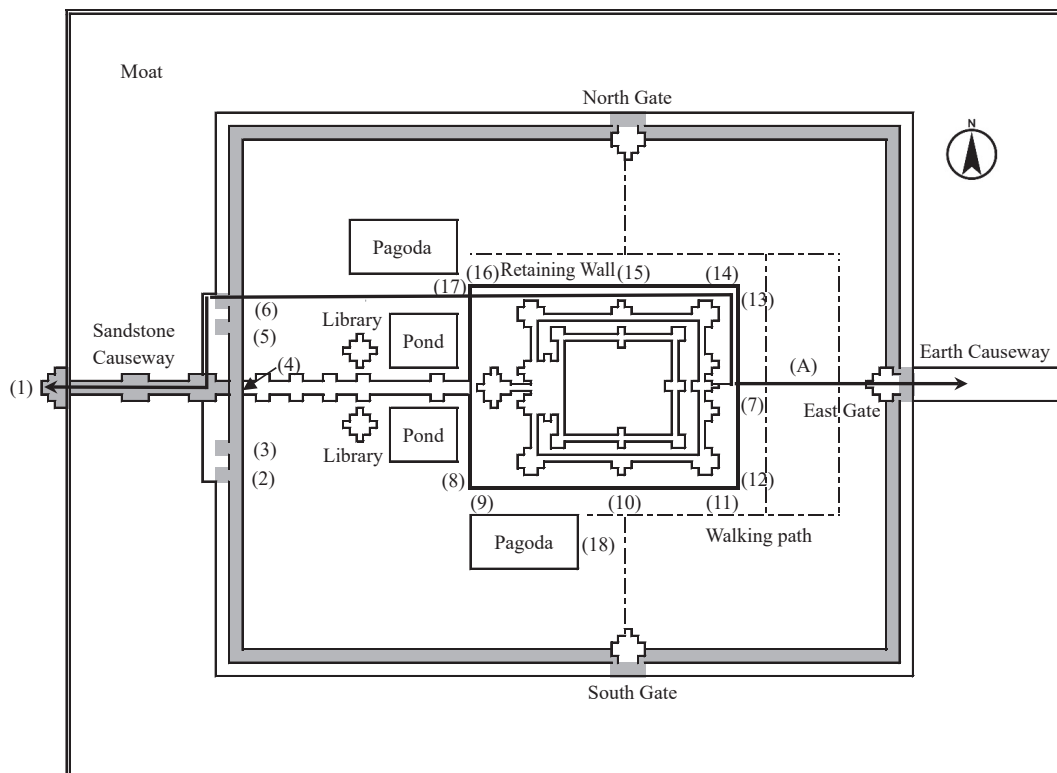


Figure 1: Survey spots

(1), which is used by a great number of visitors as an entrance to the Angkor Wat temple site. West tower gates (2), (3), (4), (5) and (6), that serve as entrances to the front approach to the temple. Eastside of retaining wall (7), that leads to the back approach to the temple. Stairs installed in the retaining wall (8), (9), (10), (11), (12), (13), (14), (15), (16) and (17) used for access to the inside of the temple. Finally restroom on the premises (18).

## 2.2 Survey period

This survey was conducted six times between August 2015 and September 2019. During the survey period, no renovation work was carried out at the survey spots. The surveyors also visited all the survey spots during each survey, but no changes were observed.

## 2.3 Measurement

From existing guidelines in Japanese law, "Act for Promoting Easily Accessible Public Transportation and Facilities for the Aged and the Disabled" enforced in 2006 [Ministry of Land, Infrastructure and Transport, 2006], items that are considered relevant to visitors who have special needs were selected and used as evaluation criteria. The criteria are as shown in Table 1.

## 2.4 Procedure

At each survey point, the measurements were performed, and results were checked to see if they met the criteria. The measurements were recorded with the consent of the two or three surveyors. During this survey, surveyors wore the entrance permit issued by APSARA authority. The instruments used for the measurements were a video camera, a digital camera with GPS function, and a measuring tape.

## 3. Results

Results of measurement at the entrance to the western causeway, the west tower gates, the east side of retaining wall and the stairs of retaining wall are shown in Table 2. The stairs of entrance to western causeway were compliant with the criteria, but there was no ramp for wheelchair users (Figure 2). The west tower gates can be accessed from each of the five gates,

but gates (3), (4), and (5) were not included in the accessibility evaluation because a large statue of the deity was placed in the center of the passage inside the gate, and also because the number of steps in the staircase was much larger (Range: 13-17) than gates (2) and (6) (Figure 3). Each of the west tower gates has stairs on the east and west sides. For gates (2) and (6), it was confirmed that the structure was relatively close to the criteria (Figure 4). On the other hand, there are no ramps or flat walkways accessible to wheelchair users.

For the east side of the retaining wall (7), a wooden fence was installed, and the height and width of the accessible space in the center of the fence were measured (Figure 5).

The width of the space for passage was much lower than the criteria, and it was not possible for wheelchair users to pass through.

Most of the stairs installed on the retaining wall used for access to the temple interior were made of stone and were noticeably weathered and damaged. Therefore, For the stairs at this location (from (8) to (17)) was measured as first step, the highest step, and the deepest and shallowest treads. As a result, it was found that only stairs (8) was compliant with the criteria.

Results of measurement on the restroom for women and on the ramp leads to the restroom (18) are shown in Figure 6. The layout of restroom for men is almost the same as that of for women except for the kind of toilet. The restroom for men consists of three urinate, one squat toilet, one western toilet and one accessible toilet. Both the men's and women's restrooms had one accessible toilet. However, the width of the entrance and exit did not meet the criteria. Ramp (18) is installed beside the restroom. The gradient of the ramp is  $3.57^\circ$  and it was compliant with the criteria. However, there is no handrail installed, and the width of the slope is 94 cm, which is far below the criteria of 120 cm or more.

## 4. Conclusion

In this survey, we obtained quantitative data on the accessibility status of the Angkor Wat temple. Since the Angkor Wat temple is a world heritage site and there are many restrictions on the construction that can be implemented, we will propose an accessibility improvement plan that is considered feasible

Table 1: Criteria for accessibility assessment

Entrance	Width	Longer than 80 cm
Access aisle	Width	Longer than 120 cm
	Handrail	At least on one side
Ramp	Width	Longer than 120 cm
	Gradient	Less than $4.8^\circ$
Restroom	Equipment	At least one restroom for wheelchair users
	Entrance Width	longer than 80 cm
Stairs	Width	Longer than 140 cm
	Rise	Shorter than 16 cm
	Tread	Longer than 30 cm

Table 2: Results of measurement

Entrance to western causeway				
Survey point	Number of steps	Rise of stair	Tread of stair	Width of stair
(1)	8	15 cm	30 cm	505 cm
West tower gates				
Survey point	Number of steps	Rise of stair	Tread of stair	Width of stair
(2)-west	3	17 cm	29 cm	235 cm
(2)-east	2	18 cm	30 cm	244 cm
(6)-west	3	20 cm	28 cm	267 cm
(6)-east	3	16 cm	31 cm	274 cm
East side of retaining wall				
Survey point	Height		Width	
(7)	23 cm		59 cm	
Stairs of retaining wall				
Survey point	Rise		Tread	
	First step face	Highest step face	Maximum	Minimum
(8)	15 cm	16 cm	30 cm	30 cm
(9)	7 cm	17 cm	30 cm	30 cm
(10)	12 cm	17.5 cm	30 cm	30 cm
(11)	18 cm	34 cm	12 cm	30 cm
(12)	18 cm	40 cm	15 cm	26 cm
(13)	10 cm	38 cm	20 cm	78 cm
(14)	35 cm	38 cm	18 cm	30 cm
(15)	51 cm	51 cm	5 cm	26 cm
(16)	9 cm	24 cm	15 cm	36 cm
(17)	12 cm	19.5 cm	29 cm	56.5 cm

with minimal construction based on the results of this survey. As for the entrance to the western causeway (indicated as (1) in Figure 1), which many visitors use as an entrance to the temple, the structure of the stairs meets the standards of Japanese law, and installation of a ramp is expected to further improve accessibility. The sandstone causeway leading to the west tower gates is currently under construction and a temporary floating bridge has been installed. Although the floating bridge was not included in this survey because it was temporarily installed, it is highly desirable that the renovated sandstone causeway is designed with consideration for accessibility, because visitors must pass through the sandstone causeway in order to visit the temple from the western entrance. For the west tower gates, it was confirmed that the structures of Gate (2) and Gate (6) are close to the criteria, but considering that many of the visitors who visit for sightseeing purposes come to take pictures of the upside-down Angkor Wat reflected in the sacred pond near Stairs (17), the installation of a ramp at Gate (6) would be the minimum and effective accessibility improvement. As for the stairs of the retaining wall, the only staircase (8) was found to meet the criteria. However, since most of the visitors, especially tourists, visit restaurants and souvenir shops near stairways (17), it is expected that few visitors use stairway (8). Therefore, it would be effective to install a ramp at the point of stairway

(17), which is close to the sacred pond on the north side and also close to the restaurants and souvenir shops. A wooden fence was installed on the east side of the retaining wall, which made it difficult for wheelchair users to pass through. It is expected to be improved relatively easily with the installation of a new fence that meets accessibility standards. Regarding the restroom, it was found that some improvements are needed, especially in the width of the ramp. However, considering the route of visitors, the location of the restroom also needs to be considered. The current location of the restroom is on the south side of the temple, opposite the sacred pond, restaurants, and souvenir shops that many tourists visit. Considering the travel routes of visitors, it would be desirable to install a restroom that meets the criteria on the north side of the temple as well.

With the improvements described above, the visitor's route indicated as (A) in Figure 1 is implemented. The development of this route is considered significant not only for the improvement of the accessibility of the Angkor Wat temple but also for the coexistence of tourists and local residents. This is because the route (A) facilitates access to tourist spots that attract tourists. In other words, the route (A) can be described as a tourism-oriented visitation route.

In addition to this route, by developing a route that is designed for visitors who are not interested in sightseeing spots,



Figure 2: The stairs of entrance to western causeway (Point (1))



Figure 3: The west tower gate (Point (4))



Figure 4: The west tower gate (Point (6))



Figure 5: Wooden fence (Point (7))

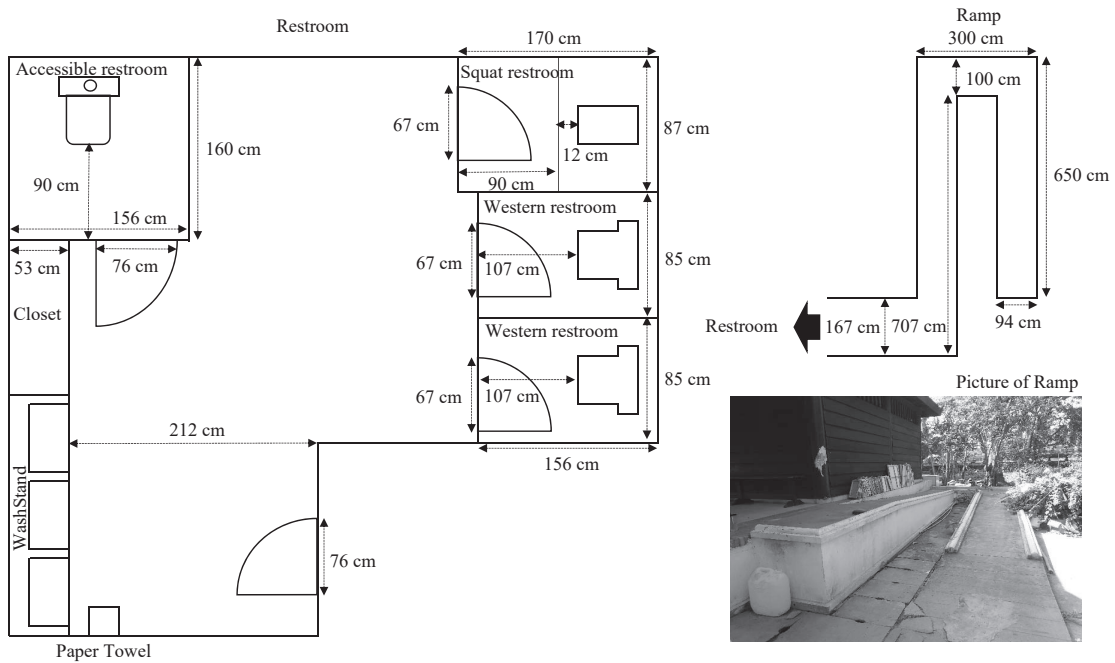


Figure 6: Structure of restroom and ramp



such as worshippers of local residents, it is expected that it will be possible to develop several routes that meet the different purposes of visitation and reduce the concentration of visitors. For example, by improving Gate (2) and Stairway (8), it seems to be feasible to develop a route that does not pass through tourist spots with only a little construction.

These improvements are expected to contribute to solving the problem of coexistence between tourists and local residents in the temple, which is a sacred place of worship for local residents and an attractive tourist destination for tourists.

With an aging population, the number of tourists with disabilities and special needs will continue to increase. The World Health Organization estimated that as of 2011, about 15 % of the total population had some form of disability. Given the high dependence of Cambodia's economy on tourism, the implementation of the concept of accessibility in tourism development will become even more important in the future.

On the other hand, the results of Aulet and Duda [2020], which examined the relationship between religious heritage sites and tourism from the perspective of spiritual sustainability, showed that the lack of accessibility positively affects the spiritual sustainability of the sites. It is also important to carefully consider the negative aspects that improving accessibility may have on the psychological state of local worshippers.

In this study, we reported the results of analysis based on quantitative data regarding the accessibility of Angkor Wat temple. However, in order to discuss the issue from the viewpoint of realizing coexistence between local residents and tourists, it is necessary to accumulate data on visitors' perceptions by conducting surveys such as questionnaires and interview targeting visitors to the temple. For further discussion, the collection of these data is essential to be conducted in future research.

Partial results of this survey were presented orally at the ICC-Angkor meeting in 2018 [Kimura *et al.*, 2018]. In response to this, in 2021, the recommendations from the group of Ad hoc experts in charge of the management and maintenance of the Angkor World Heritage Site clearly indicated that the construction of toilets at the Angkor Wat temple should take into account the perspective of accessibility [UNESCO Ad-hoc Expert Group for the ICC-Angkor, 2021].

This survey has become one of the triggers to improve the accessibility of the Angkor Wat temple. It is expected to become a model case for the improvement of accessibility in the World Heritage sites through our continuous surveys and proposals.

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