

# Design and Construction of Pedestrian Pathway on Tourism Area Based on Local Wisdom Approach

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**Keywords:** Pedestrian Pathway, Tourism, Design, Construction.

**Abstract:** The Pedestrian pathway in the public area needs to be designed and constructed for comfort and easily accessible. In the tourist attraction areas, pedestrian access is to the facility available as well as the tourism spot areas. Tourism spot areas can be classified as nature tourism and the man-made built environment. The nature of the area needs to be considered to achieve a pedestrian pathway with good quality material and design. This research is aim to identify the design and construction of pedestrian pathways in tourist areas. The method used is a survey and computer laboratory design approach. The result shows that pedestrian pathways for tourist areas need to consider material, culture, local wisdom, and environmental impact. This research is aim to identify and propose a design and construction system for pedestrian pathways in tourist areas. The method used surveys on potential tourism areas and design tests on computer laboratories using AutoCAD as a design program. For further research is suggested to test material in the laboratory for the preparation of a prototype of the pedestrian pathway in the tourism area. Research needs to develop the system based on the charateristics, types, and natural resources.


## 1 INTRODUCTION


Tourism areas need facilities and infrastructure which provide easy access for the visitor to do their activities and enjoy tourist objects available. Four guides of tourism are including accessibility, attraction, amenities, and ancillary. Accessibility is including access to the area and access to and from the area surrounding.


Accessibility is important for tourist areas that support activities along different tourist spots. Good planning helps the user of the area in visiting potential tourist location and their facilities. Tourism areas are varied in terms of natural characteristics such as mountain and beach areas. Access to places with nature challenges needs to be safe, comfortable, and environment-friendly. Pedestrian pathways in these areas need to be designed and constructed considering the impact on the existing environment.

Pedestrian pathway with local wisdom concept has not optimally implemented in the study area of

the tourist destination. Environment degradation and overland capacity have interrupted the ecosystem and its natural area. Local wisdom considers local culture which protects its environment, rule, and local design and construction. The culture of Minahasa, in general, has its local characteristic related to coconut wood, local stone, and other local material, design and local construction systems to be implemented in the pedestrian pathways. The nature of the tourist area Product of Coconut and its families such as coconut wood, coconut fibers, and composite material with coconut as based material has natural characteristic and therefore need to be treated with adequate design and construction technology. Moreover, the development of local materials including coconut and its product and other natural material support the potential local resources and local wisdom. The nature of local material needs to consider its natural quality.

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## 2 LITERATURE REVIEW

Access to the facility in the public area needs to consider movement patterns and easy access. Pedestrian movement, available space, and facilities with a large number of pedestrians need to be included in the planning of an area (Makalew et al 2017, 2018, 2019, Makalew 2020).

For tourism areas, facilities needed in the pedestrian pathway along the beach area are functioning as access for jogging, biking, and safety (Salain et al, 2015). Planning for the pedestrian in a tourism area includes a vision plan, concept design, route concept, and improvement of the tourism potential object of the area (ibid). Accessibility to the obstacle is due to unconnected tourism objects and pedestrian circulation (Sinurat et al, 2019). Planning of beach area with integrated pedestrian pathway creates easy access for tourists (ibid).

Design coconut wood for building on a small scale consider the treatment for coconut wood and railing design model based on the development model used according to the survey (Makalew et al 2015). The example of railing design is including cross railing, perpendicular railing, combine of cross railing and coconut wood board, combine of perpendicular railing and coconut wood board, and a combination of those three types (Makalew et al, 2015). The production process in material coconut wood selection, model to finishing is to avoid bad product choices.

Coconut wood used for a public building in Manado and its surrounding area show the weakness of wood such as crack and space between join whilst the advantages is the texture and color are attractive (Makalew et al, 2015). The use of coconut wood for Minahasa traditional houses based on laboratory test results with SNI 03-3527-1994, the strength of coconut wood can be used for wood construction with load and non-structural construction as temporary building (Rumbayan et al, 2019).

Research related to coconut wood as the material for construction deals with the development of design gazebos (Makalew 2015, 2020, 2021), characteristics of coconut wood (Runtunuwu et al, 2015), and traditional houses with coconut wood as building material (Rumbayan et al 2019, Makalew et al 2020) and shelter for pedestrian with material composite coconut wood.

Concerning local wisdom, the cultural value of North Sulawesi Sitou Tumou Tumou Tou with the meaning of human life is to humanize other humans, Mapalus or Working together and Torang samua basudara or we all family create community with the

value of tolerance (Pangalila et al, 2020). In terms of building construction, local wisdom in building a traditional Minahasa house is through a traditional ceremony led by Walian a community idol, with the help of the community (Gosal, 2012).

There is a need for easy, comfortable, and safe access for visitors in tourist areas to use it. The research on the pedestrian pathways in tourism areas also can use local materials in construction systems, and implement the value of method used for this research are including a survey on the area with destinations for visitors in the tourism areas.

## 3 METHOD

For The method uses for this research are including a survey on the area with destinations for visitors in the tourism areas. Selected areas are including water areas such as beaches and waterfront areas as well as the area near mountains with different levels of contour. Identifying the design concept and construction system on the pedestrian pathways in tourist areas can help in preparing a proposed plan for accessibility and circulation in tourist destinations.

Though available in tourism areas in selected places including in North Sulawesi, Central Sulawesi and Java, the pedestrian pathway is listed in several types based on design and construction system. The survey is conducted to evaluate the existing design and construction of pedestrian pathways in terms of material use, design concept, and construction.

Data on the design and construction system of the pedestrian pathway in tourist areas are identified in terms of their characteristics and obstacle during the period visitors use them. The design and construction are drawn using the drawing program AutoCAD to create types of a pedestrian pathways based on the floor plan, front elevation, and side elevation. The detail of the material and concept are described through the drawing result. The proposed plan and design for pedestrian pathways in the tourism area are drawn with descriptions of the potential location of tourist spots.

The study area for evaluating the design and construction system of the tourism area is Kaki Dian or Candle Foot in North Minahasa, North Sulawesi. The location can be seen in Figure 1.



Figure 1: Map of Kaki Dian North Minahasa (Google Map, 2022).

## 4 RESULT AND DISCUSSION

In planning the design and construction of the pedestrian pathway, the main consideration is understanding the natural characteristic of the pathway in the tourist area. Based on literature studies, the characteristic of the pedestrian pathway can be seen in table 1.

Table 1: The characteristic of the pedestrian pathway in the tourist area.

Characteristic	Source
Access	(Salain et al, 2015). Sinurat et al, 2019). (Makalew et al 2017, 2018, 2019, Makalew 2020). Norafendi et al (2020)
For jogging, biking	(Salain et al, 2015).
safety	(Salain et al, 2015).
vision plan, concept design, route concept	(Salain et al, 2015).
Access to tourism object/potential object	(Sinurat et al, 2019). (Salain et al, 2015).
pedestrian circulation/movement	(Sinurat et al, 2019). (Makalew et al 2017, 2018, 2019, Makalew 2020).
An integrated pedestrian pathway easy access	(Sinurat et al, 2019).
Available space and facility	(Makalew et al 2017, 2018, 2019, Makalew 2020).
pedestrian preferences, paths, trajectories, and orientation	Asriana (2021)
Good surface condition Encroachment-free	Das, Priyanka and Maitra, Swati (2021),
Security CCTV camera, Safety crossing facility	Das, Priyanka and Maitra, Swati (2021),
designated walkways Barrier-free facility Traffic calm	Das, Priyanka and Maitra, Swati (2021),
Connectivity continuity	Norafendi et al (2020)

Tourism destinations are varied based on location, type of attraction, and nature available. Examples of the pedestrian pathways in tourism areas based on a

survey in many places can be classified including a pathway in mountain areas, pathways in beach areas, and pathways in urban areas. The types of pathway areas include pathways on the ground and pathways in the water area. The different types of pathways and Evaluations for example the pedestrian pathways on beaches and waterfront areas can be seen in Table 2.

Table 2: The design and construction of pedestrian pathway in the water area.








Picture	Design and construction
 <p>Private port Wori</p>	<p>Access to a water area surrounded by mangroves is set from the main building to entertain and a small port at the end part. The color is blue paint along the pathway with the pattern of the water wave on the beach. The lamp is available. Material use is concrete for foundation, column, and floor. Pedestrian bridge on top of the water pond.</p>
 <p>Kinunang Beach Marinsow</p>	<p>Nature beach access from the public facility to the beach. No man-made in the beach area. The pathway is nature beach sand and ground soil. The area is wet during the rainy season</p>
 <p>Casabaio Hotel</p>	<p>Access to the area for special occasions and public areas on top of the beach. Pathway construction Material from concrete for the column as the foundation to the water and steel for the railing</p>
 <p>Floating Market Bandung</p>	<p>Pedestrian bridge on top of water pond. Natural color brown from material bamboo. for floor, column, and railing. Access to the area for special occasions and public areas on top of the beach.</p>
Picture	Design and construction

Table 2: The design and construction of pedestrian pathway in the water area. (cont.)

 <p>Reconnect Island, Central Sulawesi</p>	<p>Pathway design. Nature beach color and material. Access is set in the area around the room for guests and public facility Material for the pathway is made of beach sand and stone for the boundary of the pathway. Nature stone for the dining area and concrete for access from the port to the beach</p>
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Table 3: The design and construction of pedestrian pathway in the mountain area.

Picture	Design and construction
 <p>Kaisanti Garden</p>	<p>Pathway design: Adjust the nature land contour Construction: Natural stone Wood Grass</p>
 <p>Pelangi garden</p>	<p>Access from the entrance to the public facility including the garden and sight seeing the area Wood and bamboo for pedestrian pathway above ground Grass and natural stone for ground-level pathway</p>
 <p>Lembang Farm Bandung</p>	<p>Design man-made access along public facilities and spots in the tourist area Construction made of paving blocks from different patterns</p>

From the evaluation of the pedestrian pathways, there is a need to construct the facility with materials and design which protect the pedestrian and create a comfortable area. The impact of salt water on construction as well as mangrove area to be protected

is important to be considered in creating pedestrian pathways areas on the waterfront areas.

Table 4: Design pedestrian pathway based on the survey.

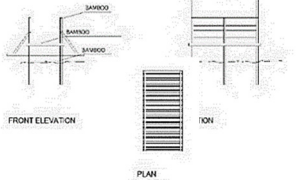
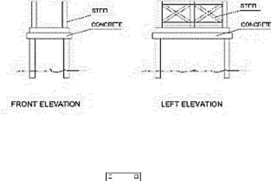

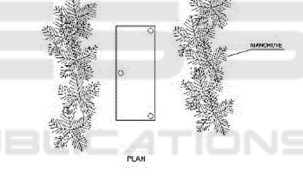
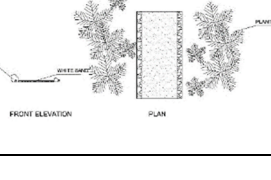
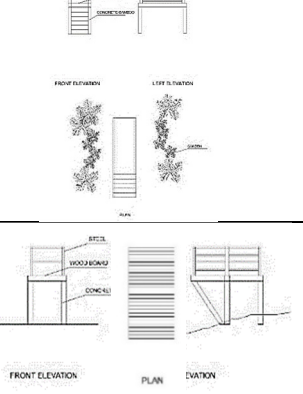
Pedestrian pathway type	Elevation and Plan
The elevated pathway on the river	
The elevated pathway on the beach	
The elevated pathway on the mangrove area	
The ground pathway on the beach	
The elevated pathway on the garden mountain area	
The elevated pathway on the mountain garden area	



Table 4: Design pedestrian pathway based on the survey. (cont.)

Pedestrian pathway type	Elevation and Plan
The ground pathways in the garden area	
The ground pathway on the flat visitor area	
The ground pathway on the flat visitor area	

Evaluation of existing conditions in the case study area shows the different types of design and construction of pedestrian pathways. The characteristic of the area is including contour land, large rocks, large trees, and the potential view from the top of the area. A landscape with a large area of plants and trees produces a large number of dry leaves which influence the surface condition of the pedestrian pathways. The evaluation of the design and construction system in the study area can be seen in Table 5.

Table 5: Evaluation of design and construction system in Kaki Dian area.

Location	Evaluation of material and design
 Main street	Paving block on the main street
 Access to a higher level	Material ceramic on stairs with moist Not maintain well stairs area Easily slippery for tourist

Location	Evaluation of material and design
 pedestrian pathways from a different facility	The Different materials ceramic and stone
 pedestrian pathways from a different facility	The Different surface treatments with grass and stone
 Entrance	Material Asphalt for the main street in the entrance area No clear sign for the entrance. The street surface is uneven and uncomfortable for driving and walking
 Access to facility	Material Ceramic Not maintained well, grass grow between ceramic
 pedestrian pathways from a different facility	The Different material paving blocks and stone
 pedestrian pathways from a different facility	The Different materials concrete and stone

Table 5: Evaluation of design and construction system in Kaki Dian area. (cont.)







Location	Evaluation of material and design
 <p>Pedestrian pathway</p>	Material Concrete
 <p>Pedestrian pathway access to higher location walking track</p>	Material concretes and stone
 <p>Public facility shopping area</p>	Material Wood for access to the higher location Damage wood construction and needs to be repaired
 <p>Public facility restaurant and view seeing</p>	Ceramic
 <p>Pedestrian pathway to view seeing</p>	Concrete panel
 <p>Restaurant and view seeing area</p>	Connection to different material

Table 6: Types of the pedestrian pathways in the tourist areas.

Type design and construction	Location
Natural stone with cement as joint	On the ground, the mountain
Ceramic	On the ground, the mountain
Wood	On the ground, the mountain
Concrete no paint, grey	Above the ground, the beach
Concrete with colourful paint	Above ground, beach/mangrove area
Wood	Above ground, beach/mangrove area

The design proposed for pedestrian pathways in the study area of tourism is described through concept and drawing. Types of the pedestrian pathway, circulation system on site, and alternative design and construction are offered to improve the quality of pedestrian facilities in the area.

The proposed circulation for the pedestrian in the study area can be seen in Figure 2.

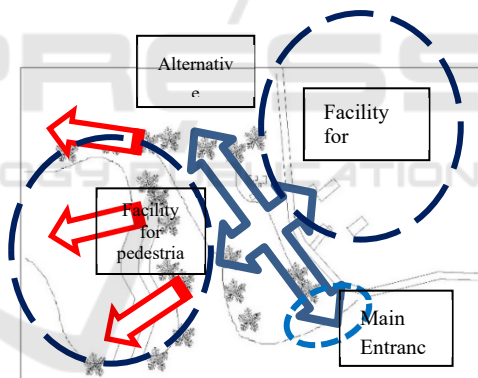


Figure 2: Proposed circulation Plan for pedestrian.

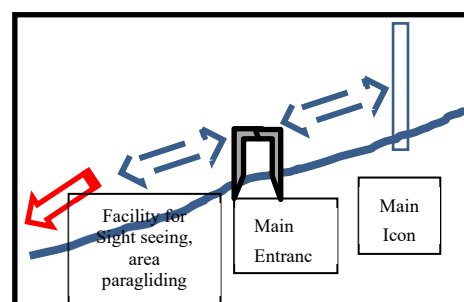


Figure 3: Proposed circulation section for pedestrian.

Access for the pedestrian in the study area including access from the entrance and main street to

the main icon Candle foot and walking track on its surroundings and access to the facility for spot tourism sight seeing and paragliding.

Table 7: Type of alternatives design and construction of study area.

Section	Design Approach	Construction
Entrance	Easily to be seen, name of the place, rich in texture	Gate made of local material
Tourist information	Attractive Available sign and route	The pathway at the public facility with modern materials and local stone and wood
Main icon	The main area, wide and or multiple access	The pathway on the ground around the main icon
Flat area	Ground level Safe surface for walking. Easily maintenance	Ground pathway
Contour area	Follow contour line Less cut and fill Easily flow	Elevated pathway
Intersection pathway	Different designs from all directions of the pathway Easily flow from all direction	Strong joint for different material Ground or elevated construction
Area circulation	Concept of nature eco-tourism to and from the major spot	Pathway, route sign

The design and construction system of the study area is the tourism area with the characteristic of mountains rich in the natural environment. The concept design proposed is to provide access with safety and comfortable concept and use local material. The main consideration is the surface of the pedestrian pathway should be rich in texture and reduce the groundwork of cut and fill by providing a ground pathway for the flat area and an elevated pathway for the contour area. The use of potential

tourism spots including a walking track, main icon, building for a meeting, sight seeing area, and flying sports area can improve the quality of the whole area.

## 5 CONCLUSIONS

Accessibility as the main consideration for pedestrian pathways in tourism areas needs to be improved in the study area of Kaki Dian North Minahasa. Through study and proposed design concept and construction system, the quality of the pathway can be improved. Local material is highly recommended to protect the environment which supports the local wisdom concept. Potential tourism spot areas need to be improved in terms of activity and design of the pathway. Further research can develop the design and construction system with varied approaches and materials used.

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