

## ORIGINAL ARTICLE

## EVALUATION OF UNIVERSAL DESIGN REQUIREMENTS APPLICATION IN PUBLIC MOSQUES IN BANDUNG

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## ABSTRACT

*A Number of studies have found the cases of facilities in public buildings which are inaccessible by users & visitors with different abilities. Thus, constructing user friendly and barrier-free architecture-interior design is necessary in the built environment. This research will evaluate the requirements for ease of access in public mosques with study cases Pusedai Mosque & Grand Mosque of Bandung in accordance with the Regulation of the Ministry of Public Works and Public Housing of the Republic of Indonesia No.14 2017. The regulation which stipulates the provision of facilities in buildings and environments that suit the needs of all age groups, conditions of physical; mental; and intellectual; or sensory limitations based on the buildings' function to provide user and visitor convenience in doing activities in the buildings. Both mosques, the Pusedai Mosque and Grand Mosque have not entirely fulfilled the standards of universal design in the interior in term of ease of access, safety and autonomy of space use, safety and security for all. From 7 universal design standard requirements, both mosques of study case only fulfill less than 50% of the requirements*

*Keywords: public mosques, universal design, facilities accessibility, Bandung*

## INTRODUCTION

Based on Islamic definition<sup>1</sup>, mosques are defined as places where praying activities take place while prayer is one of the worship services. In other definition, a mosque is a place that is devoted and has a special law other than as a place of worship, not only as a place of worship but it also covers a function of social-community<sup>2</sup> & political, public governing activities. From the Islamic perspective, providing universal design principal standard in mosque design in considering the need to provide for persons with disabilities has deliberately made mosque a place of ease and convenience for all people to come to Masjid.

The population demography of the City is divided into several age groups. The group of 0 - 14 is approximately around 500.000 people or constitutes 20% of the total population, while age group over 65 is estimated around 120.000 people or 4.8% of the population. Thus, based on the figure, it can be said that about a quarter of the population is children and the elderly people<sup>3</sup>. Considering such a fact of the population, it is necessary for Bandung municipal to pay more attention to providing universal designs to accommodate young children and the elderly who naturally have different ability with the rest of the population to access and utilize the public buildings. One of the most frequently used public building typologies is the religious

one. Since majority of the population is Muslim, thus mosques are a kind of religious building which is most occupied at all time. There are several types of mosques, such as a community mosque and a grand mosque. In fact, the latter is the most occupied mosques within the city context with various users coming not only from the city residents but also from the city outskirts.

## METHODS

The study used a literature review on universal design in general & referring to relevant government regulations in Indonesia. Furthermore, the variables which were used to evaluate the application of universal design standards were obtained in two predetermined samples. Subsequently, in the next stage, the study carried out preliminary observations in both research sampling. Based on the results of preliminary observations of the study associated with previous literature studies, there is one group of age category of space users selected, i.e. the elderly group. Furthermore, the space of interest in this study is the main room, ablution room, & toilet.

There are two important aspects for data analysis to be carried out, i.e. first concluding the evaluation results of the application of universal design standards for the user category of the elderly. Later on, the analysis on the findings of the elderly congregation activities

(prayer patterns) and the needs of facility related to these activities is carried out. This is considered important since prayer (shalat) activities are the main worship performed in the mosque and an important priority for observation.

Study cases objects were chosen for the following reasons 1) Moslem population in Bandung, 2) the study objects are categorized jamik or grand mosques, 3) building capacity is over 1000 people and located in the city center, therefore are relevant to be evaluated on universal design standard implementation. Masjid Raya Bandung Jawa Barat (Grand Mosque of West Java) previously known as Masjid Agung Bandung, was first established in 1812 which can accommodate around 5,000 people in congregation. Through the time, it had experienced several redesigns until the current appearance. The mosque is located in the heart of city on the West side of alun-alun (city square). As a grand mosque, Masjid Raya Bandung has large capacity in accommodating congregation. Meanwhile, Masjid Pusdai (Pusat Dakwah Islam Jawa Barat) or Pusdai Jabar Mosque was established in 2017 as center for Islamic study which can accommodate around 4,000 people in congregation. Currently, the premises are managed by West Java Provincial government.

## RESULTS

The implementation of universal design and its concept gained attention in the 90's in several European countries. The concept was initially introduced by Ronald L. Mace in 1980's. Referring to the UN Convention on the Rights of People with Disabilities, universal design means the design of products, environments, programs and services to be usable by all people, to the greatest possible extent, without the need for adaptation or specialized design. The National Organization on Disability's Accessible Congregations Campaign (ACC) has initiated ACC standard as a national effort in the USA to increase congregational inclusion of people with disabilities. Based on data from the World Health Organization (WHO) in 2011, there are at least one billion people with disabilities living in the world<sup>4</sup>. However, we often find people with disabilities less facilitated especially in public buildings because of environmental barriers.

The universal design shall not exclude assistive devices for particular groups of persons with disabilities where this is needed. Universal design should be accepted as an approach that values and celebrates human diversity<sup>5</sup>. Universal design requirements include three elements. The first is that it will be of genuine value to the disabled people it is intended to benefit. The second one is that it does not

inconvenience other users; and the third is that it is warranted as a rule<sup>6</sup>.

The approach to design building that accommodates people with functional limitations has changed from narrow code compliance to meet the specialized needs of a few to a more inclusive design process for everybody. There are four characteristics of accessible designs: perceptibility, operability, simplicity, and forgiveness. Perceptibility is achieved when everyone can perceive the design regardless of sensory abilities. Furthermore, operability is achieved when everyone can use the design regardless of physical abilities while simplicity is achieved when everyone can easily understand and use the design regardless of experience, literacy, or concentration level. Forgiveness is achieved when designs minimize the occurrence and consequences of errors<sup>7</sup>.

The issues the researchers discussed in evaluating universal design in mosques are the accessibility and usability of mosques for the people with disabilities<sup>8</sup>, accessibility & comfort for congregation<sup>9</sup>, accessibility of toilet and ablution to praying hall<sup>10</sup>, constraints of access of wheelchair to mosque<sup>11</sup>, level of accessibility of mosques<sup>12</sup>, and principal dimensions of an accessible mosque<sup>13</sup>. All of the studies discussed the accessibility for people with disabilities, which in their case, people with physical limitation. Yet, none of the study has done any observation on accessibility for children and the elderly, to which the study aims to fill the gap. The following table (Table 1) presents some studies which specifically focused on the evaluation of universal design standards in mosque and their findings.

In Indonesia, universal design standard is regulated by the Regulation of Ministry of Public Works & Housing (PUPR) No.14/PRT/M/2017 concerning the Requirements of Building Accessibility. In general, the universal design principles contained in the regulation has considered the needs and capability of groups of the disabled, children, the elderly, and pregnant women. It consists of the equality of utility of space, safety and security for all, ease of access and barrier-free, ease of information access, autonomy of space use, user effort efficient, and conformity with ergonomically space-dimension<sup>13</sup>.

Rahim emphasized that mosques must be designed by implementing universal design standards so that they can accommodate all types of users, including persons with disabilities, the elderly, as well as children. It is expected that these can accommodate the congregation to perform worship activities in the mosque<sup>9</sup>. According to observation in two study objects in two different locations for four consecutive months from February - May 2019, it

was found that numbers of pilgrims from adult women were dominant because the mosques are located nearby shopping centers and recitation activity dominated by adult women. Pilgrims were generally dominated by mature adults. From questionnaires and interview, it was found that the lack of a number of pilgrim from a young age and elderly was caused by the lack of supporting facilities that ease pilgrims of both categories in accordance with Perpu no.14.

**Table 1. Researches on the evaluation of universal design standards in mosque buildings**

No	Name of researcher	Title	Results
1	Nangkula Utaberta (2018)	Universal design & accessibility for people with disabilities in Masjid Negara, Malaysia	The results of the study confirmed two propositions which emphasized both on inaccessibility of Malaysian mosque buildings & incomprehensiveness of available guidelines & standards.
2	A.Rahim (2018)	Universal Design from Islamic Perspective: Malaysian Masjid	Accessibility factor is important for users since it greatly relates to degree of comfort the congregation to perform prayer at mosque
3	M. Niya (2015)	Significance of the Application of Universal Design in Mosque Buildings in Malaysia	Available guidelines and regulations in support of accessibility consideration are only limited to the Malaysian Standard legislations.
4	Tariah (2018)	Wheelchair accessibility of mosques in Riyadh.	Mosques were found not to be accessible for wheelchair users. The current situation forces wheelchair users to pray in isolation in their houses, preventing them from participating in an important part of their faith
5	Maftuhin, Arif. 2017	Aksesibilitas Ibadah bagi Difabel: Studi atas Empat Masjid di Yogyakarta.	This study found that most mosques are not accessible for the disabled and one mosque is less accessible, meaning that no mosque in Yogyakarta are fully accessible for the disabled
6	Yesserie. 2015	Usability & Accessibility for People with Disabilities in Malaysian Mosques.	The principal dimensions of an accessible mosque is introduced by this study, including their access to building, horizontal circulation, vertical circulation, and toilet and wet areas.

Based on the explanation above, the mosque building is classified into the category of public buildings which must be accessible and to serve all types of people including those with disabilities & the elderly. Based on the results of periodic observations by taking 2 samples of mosques in the city of Bandung, the number of the congregation was dominated by those age group into the elderly during five times daily prayers, Friday prayers, and Islamic recitations. In this research, the authors are focused on

evaluating the universal design standard available for congregation of the elderly to easily utilize and access various facilities during their activities at mosques.

According to the table presenting results of observation above, both mosques do not provide automatic door for ease of use; instead, the doors are permanently open. This assist as part of application of universal design. In term of flexibility, both mosques have not applied flexibility of use since there is no direct access to toilets and ablution areas. Meanwhile, at the Grand Mosque, toilets and ablution area are located in the basement which is only accessible through stairs; thus are not friendly to the disabled. On the other hand, at Pusdai Mosque (Islamic Center) the praying room is accessible through stairs without any ramp facility. The toilet rooms and ablution areas are easily accessed but there are no dedicated toilets nor ablution area for specific disabled users. In both mosques, there are seating facilities within the ablution area, but no visual signage is found to support it.

**Table 2: Accessibility evaluation dimension, items & checkpoints of Grand Mosque**

No	Accessibility Dimension	No	Items Included	Number of Checkpoints	Total Checkpoints
1	Access to Building	1	Arrival by Motor Vehicle	2	9
		2	Parking	1	
		3	Path to Building	3	
		4	Entrance and Final Free Exit	3	
2	Horizontal Circulation	1	Reception	3	38
		2	Horizontal Circulation	3	
		3	Guarding Along Paths & Ramps	0	
		4	Terrace, Verandas, and Balconies	1	
		5	Doors	9	
		6	Floor and Wall Surface	2	
		7	Signage and Graphic Symbols	20	
3	Vertical Circulation	1	Ramp	0	11
		2	Stair	9	
4	Toilet and Wet Areas	1	Toilet	48	48
		2	Toilet for Ambulant Disabled People	0	
		3	Wheelchair Accessible Toilet	0	
		4	Individual Shower Room	0	
Total				106	

**Table 3: Accessibility evaluation dimension, items, and checkpoints of Pusdai Mosque**

No	Accessibility Dimension	No	Items Included	Number of Checkpoints	Total Checkpoints
1	Access to Building	1	Arrival by Motor Vehicle	2	8
		2	Parking	2	
		3	Path to Building	2	
		4	Entrance and Final Free Exit	2	
2	Horizontal Circulation	1	Reception	1	38
		2	Horizontal Circulation	6	
		3	Guarding Along Paths & Ramps	0	
		4	Terrace, Verandas, and Balconies	1	
		5	Doors	5	
		6	Floor and Wall Surface	3	
		7	Signage and Graphic Symbols	20	
3	Vertical Circulation	1	Ramp	0	6
		2	Stair	5	
		3	Lift	0	
		1	Vertical and Inclined Lifting Platform	0	
		0	Escalator and Moving Walks	0	
4	Toilet and Wet Areas	1	Toilet	16	16
		2	Toilet for Ambulant Disabled People	0	
		3	Wheelchair Accessible Toilet	0	
		4	Individual Shower Room	0	
Total				66	

As the buildings and premises are dedicated for praying, Grand Mosque and Pusdai provide specific area for ablution and toilet. Yet, these different functionalities, for the ease of access, both mosques do not apply different colors or materials to separate the areas. Both mosques provide signage directing to ablution area and properly provide the ease of access to exit the room. At the Grand Mosque, the way to ablution area and toilets are not easily accessed because they must be reached through stairs while no ramp is available. The ablution area is located in the basement while the praying room is located on one level above.

Meanwhile, Pusdai Mosque (Islamic Center) has easy access to reach ablution area and toilets, but there is no difference in floor leveling with the praying room. The level of water tap at the Grand Mosque is on hand reach but the

circulation is narrow in the ablution area and wider at the corridor. In addition, the location of the area is quite isolated from praying room since it has different level. Likewise, Mosque of Pusdai (Islamic Center) has also water tap of hand reached level in the ablution area and provides wide circulation and corridor.

## DISCUSSION

Both mosques, the Pusdai Mosque and Grand Mosque have not entirely fulfilled standard of universal design in the interior. Lack of accessibility to main prayer hall and ablution areas are found from entrance to access to facility. Grand Mosque's ablution area is located in the basement, the accessible of which is only through the stairs. Thus, ease of access in this case is not available. Guarding along path and toilet for the disabled people are not available. At this point, the Grand Mosque failed to provide safety and autonomy of space use in the service area of the mosque.

Other issue concerning autonomy of space is only within the reach of normal adults. Meanwhile, the reach of children and others with special needs are not considered. For example, in toilets and ablution areas, facilities for children and disabled people are not provided. At Pusdai Mosque, toilets and ablution area are located at the same level as the prayer hall. However, similar deficiency as the Grand Mosque also occurs at Pusdai Mosque. It can be concluded from this point that either mosque fulfilled the requirement of universal design in terms of safety and security for all, ease of access, and autonomy of space use. Different floor leveling between area also occurs at both mosques. Different floor leveling was found from exterior access to the interior and of the different floors. Thus, both mosques need their users' effort to reach the interior and from ablution to prayer hall.

## CONCLUSION

This study aims to evaluate the requirements for easy access in public mosques with case studies of Pusdai Mosque & Bandung Great Mosque in accordance with the Regulation of the Ministry of Public Works and Public Housing of the Republic of Indonesia No.14 2017. Research results show that from 7 universal design standard requirements, both mosques of study case only fulfill less than 50% of the requirements. As conclusion, improvement and refinement are needed at both mosques in order to provide universal design standards for mosques as public space in facilitating all age and gender needs.

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#### COMPETING INTERESTS

There is no conflict of interest.

#### REFERENCES

1. F. Rangga and I. Sudarisman. 2015, Typology Of Traditional Mosque In Palembang, Case Study: Old Mosques In The City of Palembang, South Sumatra, in International Conference on Creative Industries “Strive to Improve Creativity”.
2. T. Mohamad. 1998, The Mosque As a Community Development Centre: Programme and Architectural Design Guidelines for Contemporary Muslim Societies.
3. Statistics of Bandung Municipality. 2018, Bandung Municipality in Figures.
4. World Health Organization. 2011, World report on disability 2011.
5. Goldsmith, S. 2000, UNIVERSAL DESIGN : A Manual of Practical Guidance for Architects, UNIVERSAL DESIGN : A Manual of Practical Guidance for Architects.
6. Lidwell, W., Holden, K. and Butler, J. 2010, Universal Principles of Design, Universal principles of design: 125 ways to enhance usability, influence perception, increase appeal, make better design decisions, and teach through design.
7. Smith, H., Wolfgang, F. and Koryon, P. 2012, Universal design Handbook.
8. N. Utaberta, M. D. Niya, and A. Bin Sabil. 2018, Universal Design and Accessibility for People With Disabilities in Masjid Negara, Malaysia. *J. Islam. Archit.* 4: 134-1.
9. A. A. Rahim, N. Amirah, and A. Samad. 2014, Universal design from islamic perspective : malaysian masjid. *Journal of Architecture, Planning and Construction Management.* 4: 4-1.
10. Dabbagh Niya M, Utaberta N, Maulan S. 2015, Significance of the Application of Universal Design in Mosque Buildings in Malaysia. *Applied Mechanics and Materials.* 747:72-5.
11. H. A. Tariah, N. Ghasham, M. Alolayan, B. Alahmadi, and A. Alqarni. 2018, Wheelchair accessibility of mosques in Riyadh. *Work.* 60(3): 386-04.
12. A. Maftuhin. 2017, Aksesibilitas Ibadah bagi Difabel: Studi atas Empat Masjid di Yogyakarta. *Inklusi.* 1(2), 249-07.
13. Ministry of Public Works & Housing. 2017, Peraturan Menteri Pekerjaan Umum Dan Perumahan Rakyat Republik Indonesia Nomor 14/Prt/M/2017 Tentang Persyaratan Kemudahan Bangunan Gedung.