

## SPECIAL NEEDS SCHOOL B & C WITH TROPICAL ARCHITECTURE APPROACH IN MEDAN CITY

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### Abstrak (Indonesia)

Education has an important role in the life of every human being, including children with special needs (disability) who have limitations in carrying out their daily activities. Based on data from the 2020 National Economic Survey (SUSENAS), it shows that only 29.61 percent of children with disabilities have graduated from elementary school, and almost 2 out of 10 children with disabilities have never received education. One of the causes of many children with disabilities never attending school is because of the lack of learning facilities such as special needs schools. A special needs school is an educational institution intended for children with certain special needs, which is used as a forum for learning activities and talent interest training. The design of the B & C special needs school with a Tropical Architectural Approach concentrates on creating comfort and safety in the space and building environment, both natural and artificial, by utilizing the potential of the local climate. A tropical architectural approach is applied as a solution to combine buildings, users and climatic conditions around the site.

### Sejarah Artikel

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### Kata Kunci

Disabilities children, Special Needs School, Tropical Architecture.

## 1. Introduction

In human life, education has the most important role in terms of self-development to be able to live and lead a good life. With education, a person is expected to have good intelligence, personality and spiritual education, skills that are expected to be beneficial to society and the surrounding environment, and are expected to always develop because problems regarding education will never end. Therefore, every individual has rights and obligations that they need to bear regarding education, including the rights of people with disabilities to get equal opportunities in education as a provision to help people with disabilities become independent in the future.

(1) Muhadjir Effendy as Coordinating Minister for Human Development and Culture explained that people with disabilities must have the right to receive quality education services in educational units in all pathways, levels and types of education in an inclusive and special manner. According to him, this is in accordance with the message of the President of the Republic of Indonesia Joko Widodo on International Disability Day 2021, that "Commitment and services for disabilities are a measure of the progress of a nation's civilization".

Special Needs School is an educational institution intended for children with certain disabilities. (2) Special Needs School is made as a place for children with disabilities to study and improve their certain interest and talent, so they can live independently in their future. Special Needs Schools (SLB) are divided into 6 types, including: SLB A (blind), SLB B (deaf), SLB C (intellectually disabled), SLB D (physically disabled), SLB E (behaviour disorders), and SLB G (multiple handicap). There are 2 categories of children with special needs that will be discussed, namely the deaf and the mentally retarded. These two types of ABK have different disorders, deaf, have hearing disorders and mentally retarded, have intellectual disorders, that they have intelligence below that of normal children in general and this makes it a little more difficult for them to adapt to their environment.

However, based on the indication of National Economic Survey Data (SUSENAS), by the year 2020, it shows that only 29.61 percent of children with disabilities have graduated

from elementary school, and almost 2 of 10 children with disability never really attend formal study at school. (3)

(4) The problem of the minimal and unequal existence of SLB in terms of the number of ABK and the quality of SLB that does not meet standards is one of the reasons for the need to build special needs school buildings with adequate standards to facilitate and accommodate ABK in gaining knowledge which is one of their rights as Indonesian citizens.

Tropical architecture is an architectural building concept which in its application always pays attention to the use of materials and the climate at the construction site. (5) Even so, tropical architecture is still connected to the aesthetic values. The air circulation and climate in Medan is known for its high relative air humidity, high intensity of solar radiation, and high intensity of rainfall too. The concept of tropical architecture efforts to prevent negative effects such as humidity. The use of sloping roofs, large openings for ventilation and light, and local and natural materials are very important in supporting tropical architectural buildings. Tropical architecture is expected to be able to answer all climate problems through very varied design forms with various designs various possibilities. (6)

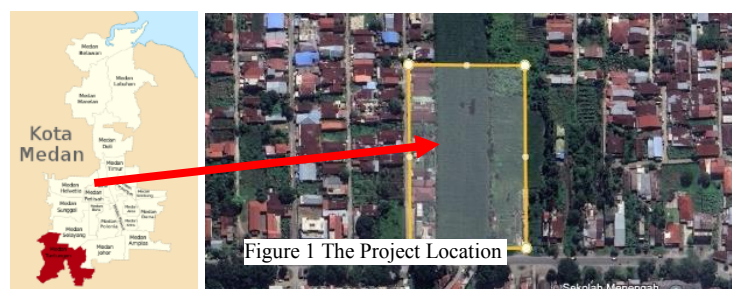
## 2. Method

The first step in design process was carried out several researches that studied how special needs school b and c in the city of Medan could use a tropical architectural approach well. The data used in the planning and design of this Special Needs School can be grouped into 2 categories, primary data and secondary data. The primary data was obtained through conducting observation and data collection directly on the location. The secondary data was obtained through literature studies that contains comparative studies of building with similar themes and functions from books and other written sources that related to the planning and design of Special Needs School B & C with Tropical Architecture in Medan City.

## 3. Figure Placement

### 3.1 Project Description

The location for this Special Needs School B & C with Tropical Architecture in Medan City project is located on Jl. Bunga Lau, Medan Tuntungan, North Sumatra. This site has a strategic location target for Special Needs School because it is close to RS. H. Adam Malik and housing, with an area  $\pm 16,000$  m<sup>2</sup>.



### 3.2 Mass Concept

The initial form of the site is a square and this shape will become the basic shape in the design process. At this stage, there is subtraction to create green open space in the middle of the building so that a safe and comfortable environment remains for deaf & mentally retarded children. Then, a subtractive process occurs to form several building masses. In the final form, there is a combination of subtractive and additive processes which have been adapted to the behaviour of deaf & mentally retarded children

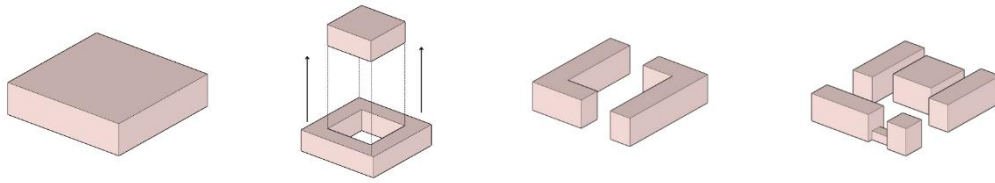


Figure 2 Massing

### 3.3 Zoning

This Special Needs School consists of 4 masses with different functions, namely the office building, lobby and hall, the deaf school building, the mentally retarded school building, and the student community centre building.



Figure 3 Ground Plan

On the first floor, there is an office area where school administration activities are carried out, the lobby as a waiting room area for parents, the hall as a multi-purpose area, the deaf school building which has junior high school classrooms and a teacher's room, the deaf school building which has junior high school classrooms. and the teacher's room, and the student community centre building as an area for deaf and mentally retarded children to carry out activities together, where there is a canteen area, therapy room, and inner swimming pools.

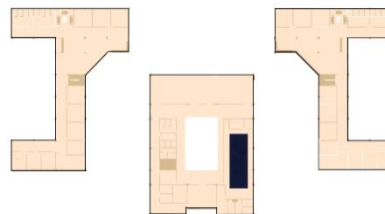


Figure 4 Second Floor Plan

On the second floor of the school for the deaf and intellectually disabled, there is a senior high school classroom, laboratory, and library. The second floor of the student community centre building, there is a therapy room, skills room, and self-development rooms such as laundry room, woodworking room, and etc.

### 3.4 Facade Concept

The south facade of this special needs school faces the main road, Bunga Lau Street. The southern facade has the most openings, for the office area, lobby area and hall. This is

because the facade that facing south tends to be shady, so making the area of the building less hot and even cooler.



Figure 5 South Elevation

The north facade of this special needs school faces the sports field area. This is considered really good because this area will get a lot of morning sunlight which is healthy for deaf and mentally retarded children.



Figure 6 North Elevation

The east facade of this special needs school is designed to have minimal openings because during the day and evening, this facade will become hot. On the walls of the inner court yard of this deaf school building, roster material is used to make it easier for air to enter this green open space. The eastern facade is also surrounded by plants to make it cooler.



Figure 7 East Elevation

The west facade of this special needs school is also designed to have minimal openings because the heat that comes to this part of the facade is unhealthy, so to overcome this, this western facade is surrounded by plants to make it cooler. On the walls of the inner court yard of this intellectual disability school building, roster material is also used to make it easier for air to enter this green open space.



Figure 8 West Elevation

### 3.5 Outdoor Concept

The design concept of the outdoor space for this project is taken from the tropical architecture concept. The use of corridors between buildings is a strategy that can be used to achieve thermal comfort for building users when moving between buildings. The use of roster material as walls in the inner courtyard of the deaf and mentally retarded school building makes it easier for air to enter this green open space area.



Figure 9 (a) Corridor; (b) Roster

### 3.6 Indoor Concept

The concept of classroom arrangement pattern uses a U/half circle shape so that it can focus attention and provide a sense of closeness between the teacher and the deaf and mentally retarded students. The using of bright colours in the classroom so that deaf and mentally retarded children can feel more positive, comfortable and calm.



Figure 10 Classroom

### 3.7 The Application of Tropical Architecture

#### 3.7.1 Sloping Roof Shape

The roofs on office buildings, lobbies, deaf and mentally retarded school buildings, and the student community centre use sloping roofs. Sloping roof has the advantage of minimizing heat so it can keep the room temperature cool and has a slope that allows rainwater to flow more easily to prevent water pooling on the roof.



Figure 11 Sloping Roof

#### 3.7.2 Cross Ventilation

There is an inner courtyard in the school building for the deaf, mentally retarded and community centre. This functions as a source of natural lighting and cross ventilation which can be obtained by almost all rooms that border the inner courtyard.



Figure 12 Inner Courtyard

### 3.7.3 Natural Ventilation

Have large window and door openings such as on the north and south facing facades, which are not exposed too much sunlight so that natural light from the sun can enter the building perfectly.



Figure 13 Large Window and Door Openings

### 3.7.4 Exterior Spaces

A good relationship between indoors and nature makes room more enjoyable to be in. Vegetation can play a role in reducing the heat of the sun, as well as reducing heat inside the buildings.



Figure 14 Vegetation

### 3.7.5 Wall Material

Use of local materials that have the best durability to deal with tropical weather and climate. Brick is a typical Indonesian material in tropical architectural buildings which is synonymous with creating comfort and beauty.



Figure 15 Local Material

## 4. Conclusion

The design of the b & c special needs school in Medan City aims to overcome the problem of the minimal and unequal existence of special needs school. This building accommodates learning activities and talent training with a tropical architectural approach which is expected to be able to create comfortable and enjoyable rooms and environments. This is done so that deaf and mentally retarded children can easily learn, adapt, interact with the surrounding environment, and hone their abilities and talents so that they can live independently. This is necessary to prove that despite their shortcomings, they are still able to compete with children in general so that they can change society's unfavourable view of children with disabilities.

## 5. Acknowledgements

This research is a study of designing a special needs school b & c with tropical architecture approach in Medan City, which aims to be a source of knowledge and information related to the special needs school b & c. The author would like to thank Department of Architecture, Faculty of Engineering, University of North Sumatra and all parties who have assisted in this research and design.

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