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Passive Design Strategy of Vertical Housing for Optimizing Energy Efficiency

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Introduction

- Urban growth and urban sprawl is becoming a serious problem for cities, Densification through vertical housing can be the solutions.
- In Tropical countries like Indonesia, mantainaning the optimal thermal comfort is one of the most important aspect in buildings, energy consumption for air-conditioning is by far the biggest, with 45% to 70% in electricity cost.
- Energy saving is essential, but it must not sacrifice the comfort of the occupants.

Introduction

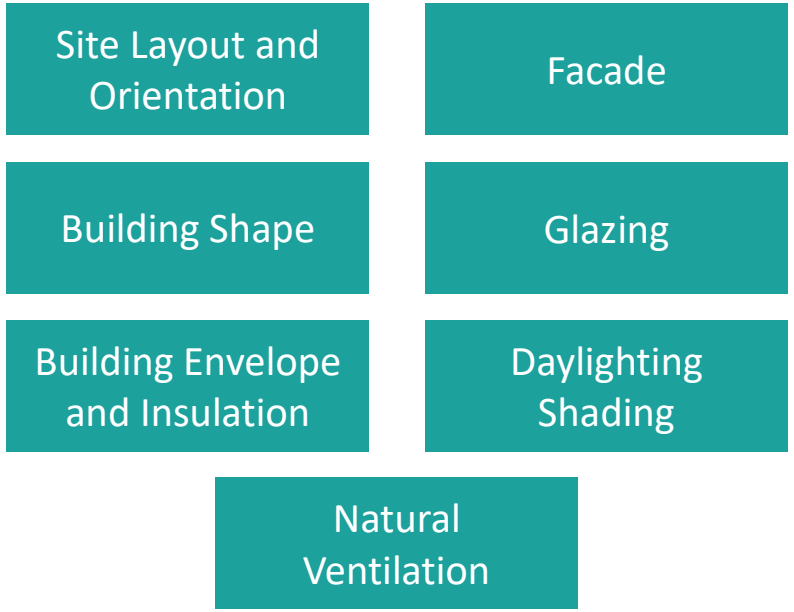
- Passive design can be the cost-effective solution for both, increased energy effeciency and reducing the electricity cost.
- Passive design involves the utilization of natural forces such as natural ventilation and daylighting without mechanical input of energy, and is a subset of environmentally sustainable design (ESD), which offers solutions for more environmentally friendly buildings.

Method

By using the principal from :

Analyzing or designing low energy buildings by C Riju

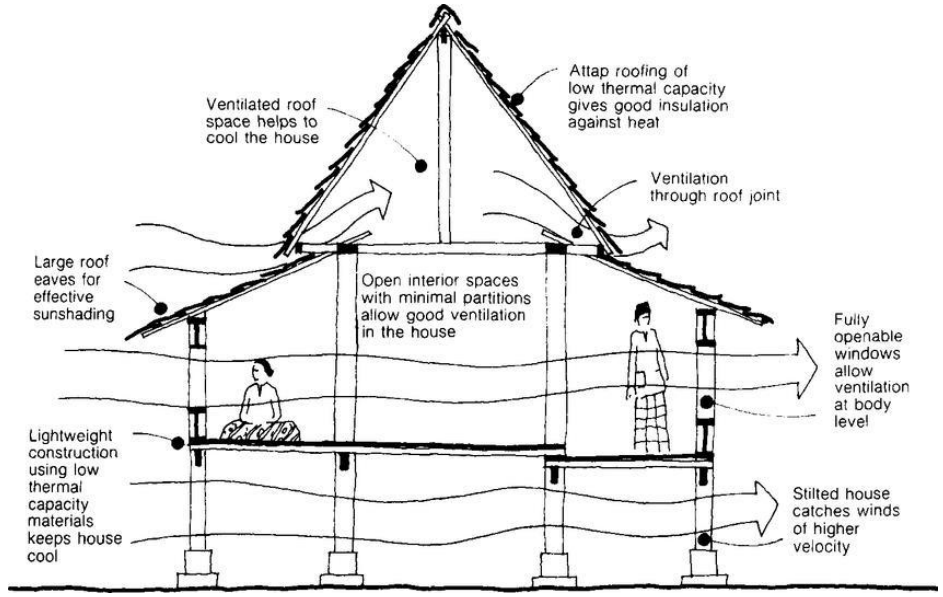
The researcher wants to explore effective passive design strategy from traditional strategy and modern strategy by using precedent study



Result and Discussion

Traditional Strategy

- Many passive design strategy are found in traditional architecture in Indonesia
- The shape expressions against the climate consist of handling, protecting, obstructing, continuing, deflecting, and strengthening
- Traditional houses typically consist of three main elements: the roof, the walls, and the foundation



Result and Discussion

Modern Strategy

- Innovation in technology and inspiration from traditional architecture increased the effectiveness of passive design
- The used of shading device varied from louvre, panel, and eggcrate
- Monsoon window is one of the example of passive design strategy inspired from traditional architecture that can be implemented in vertical housing
- Green façades serve to provide shading, which can lower the surface temperature of walls

Conclusion

- Traditional strategies are still relevant and become an inspiration for some modern passive design strategy.
- Passive design can be implemented effectively in a vertical housing.
- Passive design can be varied by it local climate conditions and by the local sun path.
- A good passive design strategy can help the buildings energy efficiency.

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