

# Harnessing wind energy within the conduit-style tall building through the use of wind turbines

Amlan Kumar Bairagi<sup>1\*</sup> [0000-0003-4042-8805]

<sup>1</sup>Former research scholar, Department of Civil Engineering, Indian Institute of Engineering Science and Technology, Shibpur, Howrah, India.

\*Corresponding author, E-mail: [bairagiak@gmail.com](mailto:bairagiak@gmail.com)

**Keywords:** Conduit-type building, Fluid dynamics, Power output, Tall buildings, Wind energy

## 1. INTRODUCTION & OBJECTIVE

A sudden change in the flow area of the fluid increases the velocity. This is designated as the Venturi effect. Wind velocity in the environment continuously changes, and it has a large impact on building structures. While wind flows inside the conduit-type opening in the tall buildings, it increases its velocity. This study concentrated on harvesting wind energy by installing a wind turbine inside the conduit. Past research work was studied by rectangular, circular geometry conduit and placed horizontally [1], [2]. But this study considered both horizontal and vertical type conduits. Environmental wind passes through the conduit and increases its velocity.

## 2. METHODS OF ANALYSIS

A Computational Fluid Dynamics (CFD) study was implemented for the study. Considered models are simulated inside the domain, and the calculated wind velocity inside the conduit. Four different categories of square plan shape 1:1:4 tall building models are considered for the study. At first, a square foot print model was adopted for the simulation and validation purposes. Next, a 50mm × 50mm square horizontal conduit is employed inside the building. The top-opening vertical conduit is employed for the next model. Furthermore, a setback is considered at the half height of a tall building with horizontal and vertical conduits. Attacking wind angle is considered for the 0° case.

## 3. RESULTS AND/OR HIGHLIGHTS OF IMPORTANT POINTS

For implementing the wind turbine inside the conduit, it is important to know the power generation capacity due to the wind flow. To achieve this, the study calculated power generation inside the conduit by calculating wind velocity inside the different conduits.

## 4. CONCLUSIONS

After carefully studying the simulation, it was found that both horizontal and vertical top-opening conduits are efficient for the wind harvesting purpose.

## 5. REFERENCES

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