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CFD for Smart City (Thermal Comfort and Wind Comfort)

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Abstract: *A fluid mechanics branch that takes the help of numerical and algorithms to solve and analyse problems related to fluid flow. Integration of Computational fluid dynamics (CFD) into urban design processes provides a platform for detecting air flow and heat transfer patterns and their effects on the environment. CFD performs simulations to investigate complex fluid flow patterns and resources in providing suggestions that may increase thermal comfort in public spaces. Assessment of a variety of problems including speed and air movement, air comfort, thermal comfort etc, can be visualized and studied using the CFD simulation method. The CFD approach unlocks the potential to improve the overall level of comfort within the indoor and outdoor environment through suggestions and improvements in city planning. Suggestions such as changes in construction and positioning aspect ratios, shading elements, step-by-step placement etc., can be easily implemented and read at the appropriate cost using the CFD method compared to time-consuming and expensive physical examination. Thermal comfort is a major factor to consider when planning city development plans. Outdoor areas are always an indicator of social status and it is important to promote appropriate urban open spaces to create positive social change. As a result of changes in underground features such as reduced vegetation, the use of low- intensity light sources, urban landscapes have led to the creation of urban tropical islands. Thermal comfort testing is done by analyzing parameters such as temperature variations, wind speed, turbulence etc. The cooling effects created by the shady narrow streets, the warmth of the surrounding buildings, the direct orientation of the existing wind ways are some of the few ways to improve thermal comfort. These recommendations are included in the CFD model to ensure that the improvement can meet the indicator of thermal comfort indicators such as PET (equivalent Physiological temperature) and SET (standard operating temperature) in urban areas. Standards like the NEN8100 air comfort and air hazard.*

Keywords: CFD, Smart City

REFERENCES

[1]. Sven Schneider, Thunyathep Santhanavanich, Athanasios Koukofikis, Volker Coors,
[2]. Exploring Schemes For Visualizing Urban Wind Fields Based On CFD Simulations By Employing OGC Standards, ISPRS Ann.
[3]. Photogramm. Remote Sens. Spatial Inf. Sci., VI- 4/W2-2020, 157–163, 2020,
[4]. https://doi.org/10.5194/isprs-annals-VI-4-W2-2020- 157-2020
[5]. Martina E. Deininger, Maximilian von der Grün, Raul Piepereit, Sven Schneider,
[6]. Thunyathep Santhanavanich, Volker Coors and Ursula Voß, A Continuous, Semi-
[7]. Automated Workflow: From 3D City Models with Geometric Optimization and CFD
[8]. Simulations to Visualization of Wind in an Urban Environment, ISPRS Int. J. Geo-Inf. 2020, 9(11), 657;
[9]. https://doi.org/10.3390/ijgi9110657