AERODYNAMIC STUDY OF MODERN SEPAK TAKRAW BALL: FLOW VISUALIZATION TEST APPROACH

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INTRODUCTION: The aerodynamics of sports ball, plays a prominent role in determining the outcome of the sport especially in the ball’s trajectory owing to its different shape and size. One of the uniqueness of a sepak takraw ball is its geometry. Its hollow spherical shape consist of several pentagon holes differs the ball from any other sports. The ball also is made of several spherical hoops which intertwines with each other. One of the methods in analysing the aerodynamics of sports ball is via wind tunnel experiment. Through this experimentation, the aerodynamics can be analysed through flow visualisation analysis. Flow visualisation technique has been employed in tennis [1], soccer [2, 3] and golf [4]. The objective of this research is to investigate the flow field produced by sepak takraw ball from an aerodynamics standpoint. Since the experiment focusses on using smoke visualisation. hence the speed is limited to 3 m/s and the ball is in static position.

METHODS: The test was conducted in an open type wind tunnel at International Islamic University Malaysia (IIUM). The wind speed set up for the experiment is approximately 3 m/s with the size of opening 40 cm x 40 cm with turbulence intensity of 0.1% or less. Computational Fluid Dynamic (CFD) analysis was also conducted by means of ANSYS CFX to compare the results obtained from CFD as well as experimentally.

RESULTS AND DISCUSSION:

![Flow comparison between experiment and CFD.](image)

The holes in a sepak takraw ball delays the transition of the reduction of drag. The significant effect from the holes is illustrated in Fig. 1 where the air passes through the ball makes the wake more chaotic which in turn delays the turbulence transition.

CONCLUSION: The study indicates that the sepak takraw at the speed of 3 m/s falls under the subcritical flow field category where turbulence transition does not occur. This phenomenon in turn suggests that drag does not transpire at that speed.

REFERENCES: