Portfolio Paper

Flying Characteristics of the New Official Rubber Baseball

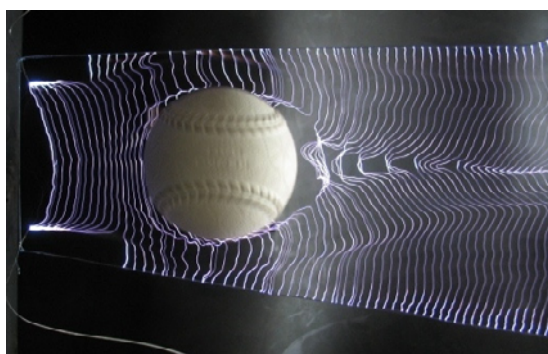Aoki, K.*[1], Nagase, J.*[2] and Nakayama, Y*[1]

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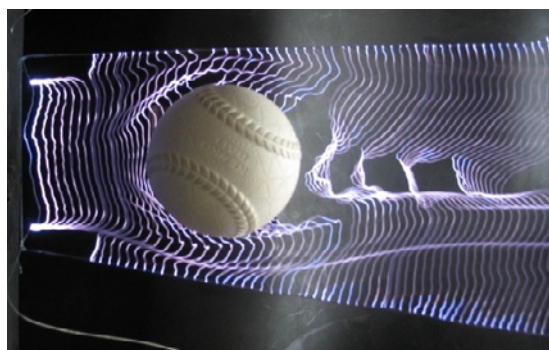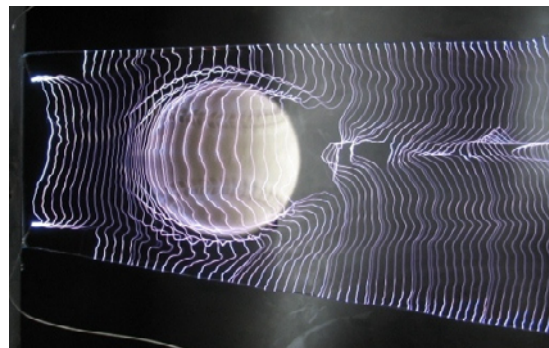   1117 Kitakaname, Hiratsuka-shi, Kanagawa, 259-1292, Japan
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(a) Seam angle 0^0

(b) Seam angle 30^0

The Spark Tracing Method was applied to visualize the around flow of the new official rubber baseball. These figures show the around flow and surface flow of the ball at the flying speed 108km/h, Re=1.5×10^5. This ball is a pretty one that the design of the surface consists of original ideas based on aerodynamics and the flying characteristic is excellent.

Figures (a) and (b) show the flow at seam angle $\theta=0^0$ and 30^0 respectively. About the position of separation points, these two points are symmetric with respect to the x-axis in Fig. (a) but in Fig.(b) the separation point of upper side lies the down stream side compares with lower side. As the result, the lift acts upward and the back flow inclines to lower right. And it is clear that by the flow along to the surface, the flow goes to down stream accelerating and at the place over 90^0 a bit slow down the speed and flow to the region of back of the ball. Furthermore, it is understand that the velocity distribution in the down stream is formed to push the ball.

In the case of the seam angle 90^0, the separation points locates little bits upstream sides compares with $\theta=0^0$ and are symmetric with respect to the x-axis. The velocity distribution is made to push the ball. Therefore the value of the drag coefficient is nearly equal of the value of $\theta=0^0$ and the lift does not occur.

References : (1) Kompenhans, J., Journal of Visualization, 10-1 (2007), 123-1298   (2) Chen, C.J., Huang, W., Chan, A. and Shih, C.,.Journal of Visualization, 11-1(2008) 102-108   (3) Prenel, J.P., Journal of Visualization, 11-4 (2008), 395-400