REVIEWS ON THE MANUSCRIPT [26]

Reviewer 1:

Comments:

The interesting part is the analysis of “ellipses”, the structure of the flow on a cylinder. However, the main phenomenon, water sticking to the cylinder, is not explained clearly.

The strongest and the weakest aspect of the paper:

The strongest aspect of the paper is the theoretical analysis of “ellipse”, structure.

However, the article is very far from solving the problem.

Organization and Presentation:

The structure is hard to follow.

Style:

The reviewer likes and enjoys the style and sense of humor and attitude of the author, however it makes the article very hard to understand, almost unreadable.

Additional Questions:

- What is the Coandă effect ?
- What do you mean exactly by *“force of surface interaction between them?”[water and cylinder]*
- Is the effect stable?

References:

The author doesn’t refer to any external literature.

Recommendation & Summary:

The manuscript is not recommended for publication

Reviewer 2:

The standard of English in this report is generally adequate to convey what the writer was intending to say.

However, the many attempts at humour, and the use of vernacular, are not appropriate in a scientific publication, and end up being tedious and irritating, rather than in some way enhancing communication by engaging with the reader. It just does not work.

In reading the report, I am also concerned about the lack of real detail that might facilitate the reader in actually understanding what the writer did.

There is not a single photograph or diagram showing the experimental setup, and a lot is left to the imagination of the reader.

I am intrigued by the claim that the presence of the cylinder somehow influenced the rate of outflow from the tank, but there is insufficient detail to comment further. I would however ask if the experiment was repeated many times, or just once, maybe with the tap not open the same amount?

It would have been useful to have a better (correct?) explanation of the Coanda effect – with a diagram.

I like the use of soot to produce a hydrophobic surface.

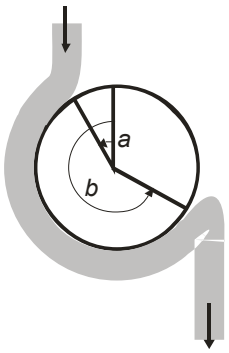

Figure 2. shows an interesting result, but it would help to have a diagram showing exactly what angles were measured, perhaps as in my diagram to the right.

The graphs shown in Figure 3. are informative, but would benefit from uncertainty bars and trendlines. I would imagine that the dimensions of the 'ellipse' would be difficult to measure precisely, as would be the angles in Figure 2.

I presume 'size' of the 'ellipse' refers to the dimension in the direction of the flow.

I do not wish to be too pedantic, but an 'ellipse' is clearly defined mathematically, and the shape of the area of contact between the water and the cylinder is definitely not an ellipse. It would be interesting perhaps to determine what shape it was.

I would also like to see some details about the rate of flow and the size of the nozzle of the tap, and more importantly perhaps, the size of the cylinder(s) used in the experiment.

The equation for critical velocity is based on quite simple assumptions, which is fine up to a point, but it does not appear to have been validated by any measurements. The polar plots in Figure 5. are gratuitous – they add little if anything.

The introduction of Laplace pressure and surface tension effects had potential, but was not pursued significantly.

There are no references listed.

There clearly was potential in this work, but it has been ruined by a frivolous style of writing, and lack of experimental details.

Reviewer 3:

Page 1 describing the experimental setup: I suggest a picture of the real setup to be shown to make it easier to imagine. Also, mention the size of different parts of the experimental setup, especially the radius of the cylinder which is an important parameter.

"However, even in such a simple scheme we can vary two main parameters of the jet: it's diameter (thanks to tap); and it's velocity (through the height of water level in the vessel)." I suggest you to correct terms velocity and diameter to initial velocity and initial diameter. Since these amounts are not constant in the entire falling jet. As we look down, velocity increases and diameter decreases.

“but if we need to get some data from experiment, we can just take a picture of the water on the cylinder, and water’s velocity at the moment will be known exactly.” Unsteadiness of the flow may affect the results. However it may be assumed insignificant. Consider mentioning.

“Unfortunately, there still is a problem about calculating velocity through the height of water level: in fact, when we place cylinder in the stream, it affects on the speed of water leaking;” the influence of this effect as a problem is unknown to me. Problems may occur if initially you measure the flow discharge as a function of the water head and calibrate the system when the cylinder does not exist, and then use the calibration to estimate the flow discharge when the cylinder is there. Mention if this is what you’ve done.

I recommend an overview on the explanation of the Coanda effect. Since I believe the proposed reasons were not correct.

“Air with higher velocity applies higher pressure to the stream; thereby, water is pushed towards the obstacle.” According to the Bernoulli Equation, this statement is incorrect.

“…To prove it, let’s put in the stream a cylinder with super-hydrophobic surface.” The relation between this experiment and the proposed hypotheses is not quite clear. I did not really understand how the result of using the hydrophobic surface proved your assumption.

“And when we place a super-hydrophobic cylinder into water stream, stream doesn’t stick to the cylinder.” I suggest you to show pictures of this experiment, comparing the hydrophilic and hydrophobic cases.

“It is a thin layer of water, surrounded by a thick water stream;” this sentence and most of the explanations on the “ellipse” were not clearly understandable. I suggest some figures to be used for illustration. Also ellipse width and height were unclear.

“Figure 2” and the results mentioned beside it leading to **“these points are almost opposite”** need more clarification regarding to the velocity and diameter at which they were obtained. I believe this result is significantly a function of the velocity, and no such general conclusions could be obtained. I also believe different behaviors would be observed in different velocities, since in the case when the velocity passes a critical amount, the effect will no longer remain stable and fluctuations will be observed. Please mention if you have observed such effects.

“Figure 3 Right”, about the Water income; mention that the change of income was made by changing the velocity or the diameter, and which was constant.

“plot proves that “ellipse’s” width isn’t eternity.” Consider checking this sentence.

Page 3, the experiments mentioned above it: Again I suggest pictures showing the experimental results.

“It is interesting, that when borders of ellipse unite back in one jet, decrease in area of surface also causes decrease in cross-section area of the overall stream;” It may not be so true. You must clarify, when the area of surface decreases because of the increase of surface tension, which parameter remains

constant? i.e. this decrease in area occurs with what limitation? In my opinion, the limitation is the cross-sectional area to be constant.

You have used this equation

$$mg \cdot \cos\alpha + F_1 - N = m\frac{v^2}{R};$$

to conclude this equation:

$$v < \sqrt{R \cdot (g\cos\alpha + \frac{F_1}{m})}$$

And further plots and conclusions were based on it.

Note that according to your hypothesis, F_1 is caused by the velocity difference between the air around the water and the cylinder. This means that F_1 is a function of stream velocity.

So considering it to be constant and deriving the limitation of velocity as a function of F_1 does not seem to be appropriate.

This also implies to the rest of you conclusions, including: **"critical velocity is lowest in the bottom point of cylinder"**.

First paragraph in page 4, consider correcting the typing error "bistability". I also suggest using subtitles to classify the contents of the manuscript, making it easier to read and understand.