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Mechanical Analysis in Making Teh Tarik

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ABSTRACT

Teh Tarik is a tea known as one of the typical Indian drinks. The purpose of this research is to determine the GLB and GLBB resulting from the manufacture of tensile tea, to determine the magnitude of the kinematics and gravitational forces when tea is poured from one glass to another with a fairly high distance. And also to motivate the MSME industry to produce better quality. With results for GLB: 0.1541; 0.1111022224; 0.1087844444; 0.3073113139; 0.1111022224. And the results obtained for GLBB for tables one to five are 4.9142; 5.7649; 5.3892; 6.6331; 3.9648.

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1. INTRODUCTION

Teh Tarik is a tea known as one of the typical Indian drinks. In Indian history, Teh Tarik is often referred to as a traditional herb made by uncles or gentlemen around or local people there used to call it "Mamak Potion". In India itself the word mamak or mama comes from the word "Tamil" which means Uncle. Teh Tarik was first discovered in the 2nd world war, when Muslims immigrated to the Malay peninsula with a different purpose, namely to serve kings, serve thirsty workers after the 2nd world war, for provisions when they worked in the rubber plantation and mining industry, or to set up a drinking establishment at the entrance to their place of work, namely the rubber plantation. At that time, the taste of Teh Tarik was slightly bitter when drunk because Teh Tarik was produced by distilling black tea, which was of poor quality compared to other teas. Because, the slightly bitter taste is finally mixed with other ingredients, such as sweetened condensed milk or evaporated milk, after which it is added with sugar. Starting from there, appeared Teh Tarik which is liked by many people. In addition to its better taste, the way of making Teh Tarik also attracts the attention of many people because, in its manufacture, the tea is poured at a distance or high enough so that a process such as attraction occurs. The method of preparation is boiling water mixed with brown sugar, cinnamon, ginger, cardamom and cloves. When it boils add the black tea then, stir all the ingredients until dissolved and turn off the heat. To separate the spices from the tea, strain the tea. Furthermore, to produce froth in the withdrawn tea solution, pour the tea from one glass to another with a distance high enough so that kinematic forces and gravitational forces occur. Kinematic forces have been investigated by previous researchers.

Kinematic evolution of the continental collision: Constricting the Himalayan-Tibetan orogen through bulk strain rates investigated by Zuza [1]. Retrospective Robotic Measured Upper Limb Kinematic Data from Stroke Patients Is a New Biomarker Researched by Goffredo [2]. Gait pattern improvement after selective dorsal rhizotomy stems from changes in kinematic parameters in the sagittal plane investigated by [3].

Debris Flow Analyst (DA): A debris flow model that takes into account kinematic uncertainties and uses a GIS platform investigated by Wu [4]. A Realistic Reference for Vehicle Safety Evaluation Focusing

on the Head Protection of Observed Pedestrians from Real-World Collision Kinematic Reconstruction was investigated by Li [5]. The kinematics of a nine-legged parallel manipulator with a configurable platform was investigated by [6].

Changes in sprint performance and sagittal plane kinematics after strenuous sprint training in professional soccer players was investigated by Lahti [7]. Kinematic vortices caused by defects in gapless superconductors were investigated by Souto [8]. Graphical comparison of numerical analysis, slope mass ranking, and kinematic analysis for the effect of weak plane orientation on rock slope stability was investigated by [9].

The internal kinematics of the Slumgullion (AS) landslide from high-resolution InSAR UAVSAR data was investigated by Hu [10]. Revisiting the Stewart–Gough platform application: A kinematic pavilion researched by Markou [11]. The stereo vision-based kinematic calibration method for the Stewart platform was investigated by [12].

SVM-Based Weighting Scheme to Improve Positioning Accuracy of Kinematic GNSS with Low-Cost GNSS Receivers in Urban Environments was studied by Lyu [13]. Kinematics of Articulated Planar Links was investigated by Zhao [14]. The new paradigm of dual tasking with story recall shows significant differences in gait kinematics in older adults with cognitive impairment: A cross-sectional study investigated by [15].

Scapular kinematic variability during wheelchair propulsion associated with shoulder pain in wheelchair users was studied by Briley [16]. The effect of different grip types and seat height on kinematics and plantar stress during STS in healthy young adults was investigated by Han [17]. A spatial over-constrained mechanism synthesis method based on serial manipulator kinematics was investigated by [18].

Complementarity Relations and Critical Configurations in Rigid-Body Collisions of Planar Kinematic Chains With Smooth External Contacts was investigated by Hurmuzlu [19]. Kinematic Changes in Uninjured Limb After Traumatic Brachial Plexus Injury was studied by Souza [20]. Kinematic strategies for crossing barriers in older adults with mild cognitive impairment was investigated by [21].

A method to increase the degree of ambiguity determination for post-processing kinematic GNSS data was investigated by Zhang [22]. The Fuzzy Approach to Kinematic Reliability Assessment of Robotic Manipulators was investigated by Lara-Molina [23]. Linear and Nonlinear Kinematic Design of Multilink Suspension was studied by [24].

Relative Kinematic Manipulation Accuracy by Two-Handed Robot was investigated by Vorob'ev [25]. Real-time kinematic-based foot strike detection during walking was investigated by Karakasis [26]. The validity and reliability of inertial measurement unit measurements for running kinematics on runners of different foot strike patterns was investigated by [27].

90 degree turn prediction using kinematic parameters for robotic house implementation was investigated by TAKEDA [28]. Three-dimensional kinematic analysis of upper limb movement between individuals with and without subacromial shoulder pain exploring the statistical parametric mapping investigated by Gonçalves [29]. The partitioned coupling framework to combine the kinematic hardening plasticity model and the creep model for structures in high temperature environments was investigated by Yusa [30].

Based on previous research, we can study it and hope to improve the taste quality of the extracted tea and the foam produced in the manufacturing process using kinematic forces. And also to motivate the MSME industry to produce better quality. Teh Tarik is made by dipping tea leaves in water just before boiling, but tea powder is preferred over tea leaves because it produces a stronger taste than tea leaves. For home brewing, teabags are used as an alternative if tea powder is not available. Then the tea decoction can be added with spices such as cloves, cardamom and ginger to add flavor. After that, the process of making the tea is continued by adding evaporated milk and sweetened condensed milk, then the mixture is filtered. The filtered mixture is then poured from a height of about one meter into another cup. The process of "pulling" the tea is repeated until a layer of foam forms over the drink.

2. METHODS

The research method used is group practicum experiments at their respective homes, this is due to online learning. The method of preparation is to boil water mixed with brown sugar, cinnamon, ginger, cardamom and cloves. When it boils add the black tea then, stir all the ingredients until dissolved and turn off the heat. To separate the spices from the tea, strain the tea. Furthermore, to produce froth in the withdrawn tea solution, pour the tea from one glass to another with a distance high enough so that a process such as dragging and dancing occurs. The experiment on the analysis of mechanics in the making of Tarik tea is shown in Figure 1. It can be seen that in this experiment the gravitational potential energy and uniform straight motion will be analyzed.

Fig 1. Mechanical analysis in the manufacture of tensile tea

Potential energy is the energy possessed by an object due to its position or position. Potential energy is also called rest energy because objects that are at rest can have energy. If this object moves, then the object undergoes a change in potential energy which becomes energy of motion.

2.1. Tools and Materials

- 200-300 ml brewed tea
- 60 ml evaporated mil
- 4 tablespoons of sweetened condensed milk
- Ice cubes as needed
- 2 stainless glass
- 1 plastic cups

2.2. Ways of Making

- Put the brewed tea, evaporated milk, and sweetened condensed milk into 1 stainless glass
- Then shake by pulling from 1 glass containing the drink ingredients into an empty glass repeatedly to produce froth
- When finished, put enough ice cubes into a plastic glass cup
- Put the pulled tea into the cup
- Pulled tea ready to serve

3. RESULTS AND DISCUSSION

In the GLB and GLBB experiments it was said that the initial angular velocity and elevation angle were related to the determination angle. In this experiment, objects were spilled from a height and then received by another glass and repeatedly like that with random heights so that the foam produced was not much and the flavors obtained did not blend well between the tea milk and the others. Therefore, we need to find the right point and the right time to produce Teh Tarik, which has the right taste and produces more foam. There are five experiments to find the results of a delicious tea taste. Experiment 1 with ten trials is shown in Table 1. The table shows that the experiments were carried out with a height range from 0.4 meters to 0.78 meters. At the highest altitude, it takes time to pour tea of 0.371. The speed of tea flowing is 0.888 and the acceleration is 5.503.

Table 1. The results of the analysis using the tracker on the 1st tea withdrawal experiment

No	Time (s)	Height (m)	Speed (m/s)	Acceleration (m/s^2)
1	0,068	0,400	1,302	6,092
2	0,101	0,448	1,125	2,514
3	0,135	0,476	1,007	0,513
4	0,169	0,516	1,234	4,573
5	0,203	0,560	1,303	4,031
6	0,236	0,604	1,483	5,671
7	0,270	0,660	1,723	2,128
8	0,304	0,720	1,422	10,04
9	0,338	0,720	0,946	8,077
10	0,371	0,784	0,888	5,503

Experiment 2 with ten trials is shown in Table 2. The table shows that the experiments were carried out with a height range from 0.397 meters to 0.847 meters. At the highest altitude it takes 0.371 times to pour tea. The speed of tea flowing is 2,345 and the acceleration is 1,230.

Table 2. The results of the analysis using the tracker on the 2nd tea withdrawal experiment

No	Time (s)	Height (m)	Speed (m/s)	Acceleration (m/s^2)
1	0,068	0,397	1,149	1,403
2	0,101	0,438	1,242	2,962
3	0,135	0,481	1,012	1,945
4	0,169	0,506	1,011	5,501
5	0,203	0,549	1,472	14,91
6	0,236	0,605	1,979	0,389
7	0,270	0,683	1,658	9,368
8	0,304	0,717	1,103	4,981
9	0,338	0,758	1,933	14,78
10	0,371	0,847	2,345	1,230

Percobaan 3 dengan sepuluh kali percobaan ditunjukkan pada Tabel 3. Tabel tersebut terlihat bahwa percobaan dilakukan dengan range ketinggian dari 0.593 meter sampai 1.094 meter. Pada ketinggian tertinggi membutuhkan waktu untuk menuangkan teh sebesar 0.574. Kecepatan teh mengalir sebesar 1.634 dan percepatan sebesar 12.84.

Table 3. The results of the analysis using the tracker on the 3rd tea withdrawal experiment

No	Time (s)	Height (m)	Speed (m/s)	Acceleration (m/s^2)
1	0,270	0,593	1,140	7,314
2	0,304	0,634	1,302	6,042
3	0,338	0,681	1,301	2,168
4	0,372	0,722	1,408	2,030
5	0,405	0,777	1,682	3,297
6	0,439	0,835	1,519	4,890
7	0,473	0,888	1,915	6,969
8	0,507	0,960	2,203	1,107
9	0,540	1,036	1,990	7,235
10	0,574	1,094	1,634	12,84

Experiment 4 with ten trials is shown in Table 4. The table shows that the experiments were carried out with an altitude range from 0.535 meters to 1.000 meters. At the highest altitude it takes 0.372 to pour tea. The speed of tea flowing is 1,003 and the acceleration is 5,064.

Table 4. the results of the analysis using the tracker on the 4th tea withdrawal experiment

No	Time (s)	Height (m)	Speed (m/s)	Acceleration (m/s^2)
1	0,068	0,535	1,815	1,617
2	0,101	0,603	1,815	10,54
3	0,135	0,658	2,341	5,392
4	0,169	0,761	2,484	8,900
5	0,203	0,826	1,529	18,59
6	0,236	0,864	1,195	10,16
7	0,270	0,906	0,954	1,804
8	0,304	0,929	1,002	1,712
9	0,338	0,974	1,055	2,552
10	0,372	1,000	1,003	5,064

Experiment 5 with ten trials is shown in Table 5. The table shows that the experiments were carried out with a height range from 0.445 meters to 0.860 meters. At the highest altitude it takes 0.405 to pour tea. The speed of tea flowing is 1,382 and the acceleration is 5,335.

Table 5. the results of the analysis using the tracker on the 5th tea withdrawal experiment

No	Time (s)	Height (m)	Speed (m/s)	Acceleration (m/s^2)
1	0,101	0,445	1,005	1,064
2	0,135	0,474	1,069	4,782
3	0,169	0,517	1,380	7,515
4	0,203	0,568	1,567	0,750
5	0,236	0,623	1,443	3,858
6	0,270	0,665	1,256	3,229
7	0,304	0,707	1,632	4,536
8	0,338	0,775	1,695	4,043
9	0,371	0,822	1,256	4,536
10	0,405	0,860	1,382	5,335

Based on the analysis results that have been obtained both by calculation and using a tracker, the results of GLB and GLBB are obtained respectively for tables one to table five, for GLB: 0.1541; 0.1111022224; 0.1087844444; 0.3073113139; 0.1111022224. And the results obtained for GLBB for tables one to five are 4.9142; 5.7649; 5.3892; 6.6331; 3.9648. Then after being observed, the most foam was found in the fourth tea withdrawal which had the greatest acceleration and the highest height. From the results above, it can be seen that the best position when pouring tea from one glass to another is that the higher the tea is poured, the faster the foam will be produced, which will make the tea taste more "balanced" and of course tastier. For the pulling tea withdrawal system, from the video we took and after that it was compared by watching expert videos and reading various articles, how to pour the withdrawn tea, first by pouring it from a low height and then gradually increasing the height and speeding up the time when pouring it to produce tea Tarik which has a lot of foam and good taste. However, in the video of making the Tarik tea that we took, there were a number of errors which resulted in the foam in the Tarik only appearing a little, the reasons for this were, among other things, the pouring of the Tarik directly from a height starting from a medium altitude not from a low altitude, the lack of heat of the milk that was made for mixed teas, the maker's lack of speed in pouring the tea from one glass to another. Making pulling tea requires skill and also has to withstand heat because pouring hot drag tea from a glass into another glass. However, in the process of making pulling tea this time it can be said to be quite successful because it produces foam, usually many traders just call it pulling tea but are careless in making it by not pouring it in the right way and only doing it once to three withdrawals. . Suggestions for making tea pulling more delicious that can be conveyed is to pull it from a low altitude slowly, then increase the height gradually and speed up the time, and don't forget to heat the water for brewing tea and milk up to the maximum temperature so that the resulting foam is more Lots. Teh Tarik itself can be innovated to make it more attractive apart from making an open kitchen, the color of the Teh Tarik is not only brown, maybe new variants such as Greentea Teh Tarik can be added to make it more attractive to buyers.

4. CONCLUSION

Based on the experiments in the research that has been done, it can be concluded that the speed and height when pulling the tea is very influential on the taste and foam produced. If it is related to physics, in its manufacture it uses the GLB and GLBB systems which have been calculated and obtained successive results from table one to table five, namely for GLB: 0.1541; 0.1111022224; 0.1087844444; 0.3073113139; 0.1111022224. And the results obtained for GLBB for tables one to five are 4.9142; 5.7649; 5.3892; 6.6331; 3.9648. From the data above, the best results are obtained, namely in table four, with a short time and maximum height it produces more foam. For other innovations from pulling tea apart from making an open kitchen, the colors of the pulled tea are not only brown, maybe new variants can be added, such as Greentea Teh Tarik to make it more attractive to buyers.

DECLARATION

Author Contribution

The research method used was an experimental analysis of the mechanics of making tea. Pull and analyzed the gravitational potential energy and uniform straight motion..

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Conflict of Interest
The authors declare no conflict of interest.

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