

Support of the numerical mechanics in the clarification of the mysterious death of Jan Masaryk

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1. Introduction

This work describes political, social and historical situation in the Czechoslovakia in the year 1948, when the body of dead minister of foreign affair was found on the courtyard of the Černín Palace. His death is still unclear and several investigations were done. We are going to summarize them and point out some important features. In the 2019, the new investigation has begun after the new initiative documents containing newly discovered information. This document includes the numerical calculations and new measurements bringing some new aspects into the complex documentation. This initiative was supported by the UWB and their laboratories. The work here presents an application of the basic analytical mechanics and simple numerical calculations with the human body model, but applied in the forensic analysis. Although the fact, that only the elementary mechanics was used, the results can totally change the overview on this breakpoint of our modern history.

2. State of the art

Jan Masaryk was a son of the first president of Czechoslovakia, Tomáš Garrigue Masaryk. He worked as a politic and diplomat, he was an ambassador of ČSR in London in years 1925-1938, minister of foreign affair in the exile government as well in the first three governments after 1945, including the so called Klement Gottwald's government (1946-1948). In the morning of the March 10th 1948, his body was found under the window of his flat on the courtyard of the Černín Palace. He laid on his back, more than 2 meters far from the wall and laterally shifted out of the window. The political situation in that time was very complicated, and this led to very uncommon process of investigation of his death: Murder, Unfortunate Accident or Suicide??. There is number of books focused on this topic, e.g., [2, 3, 5].

Investigations:

- **1948 (StB): Suicide.** Only a few hours after the body was found, there were an official statement: suicide, even before the autopsy.
- **1968–1969 (General Prosecutor's Office): Unfortunate Accident or Suicide.** This investigation was interrupted on the 10.11.1969 by the command of the General Prosecutor after the arrival of Soviet Union army.

- **1993–1996 (J. Havel): Forced suicide.** The first investigation dealing with the uncommon final position of the body (far from the wall, out of the window) [1], but this investigation was deferred.
- **2001–2003 (UDV + prof. Strauss): Murder.** Based on the biomechanical expertise of prof. Strauss, the investigation was closed as a murder, murderer is unknown. The expertise said that Jan Masaryk was unambiguously thrown out from the window (by external loading: one or more attacker). Such conclusion was done based on the final position of the body and concluded with the fact, that it is not possible to reach such position only with "own effort", the suicide jump.
- **2019:** There were some new evidences of this case: the new audio record and a technical analysis of the fall. Based on these two initiatives, the new investigation has been open in 2019 and closed in 2021 with the support of new data presented in this paper.

3. Technical data

Final position of the body: There is a lack of photo documentation of the body (only 5 photos of the body exist). There is also a official sketch of the criminal office from the 11.3.1948. The sketch contains the draw and dimensions, which are not very consistent. To validate the data, and found out the correct position, we have done several measurements inside the Černín Palace (courtyard, window, building, inside the flat, position of the body etc.), see Fig. 1.

The criminal sketch defines the position of the body to be 2.3 m and 2.9 m from the wall, respectively and 13.1 m from the edge of the building. The first dimension (2.3 m) is the distance of the first impact of left heel, while the second dimension is the final position of the heel, see Fig. 2. Note there is an evident rearward motion of the body after the first contact with the ground. The lateral position of the body is 13.1 m from the building and with the support of the photos and own measurement, this distance indicates, that body was not found under the window, but approximately 1.6 m from its vertical axis.

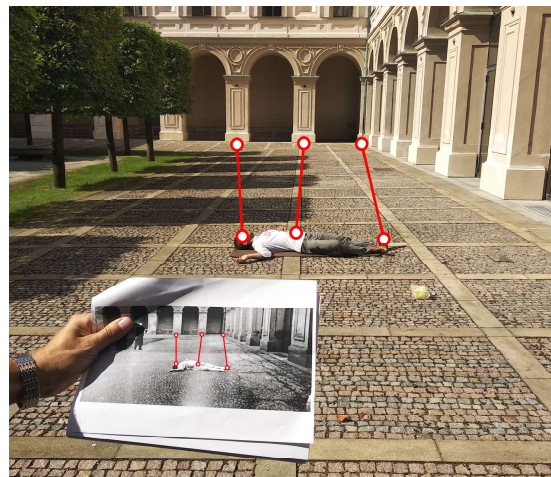
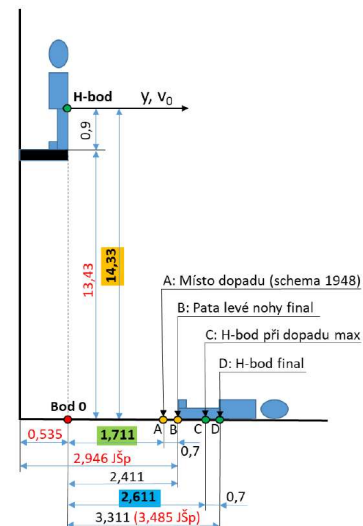
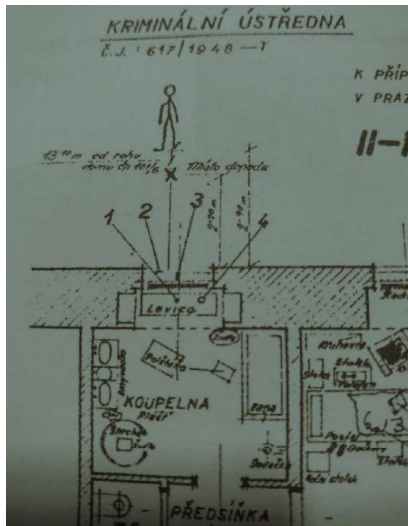


Fig. 1. Reconstruction of final position of the body

Injury and cause of the death: Authors used only the data from the original autopsy report from prof. Dr. Hájek (1948). This document indicates, that Jan Masaryk was alive, when he forsook the ledge/window and he fell symmetrically on his heels, pelvis and back, see Fig. 3, absent the body rotation.

Witnesses: Even the fact, there are a lot of witnesses, we have decided not to take them into account, since they might be influenced with the circumstance of their acquisition, or might changed during the time. Our goal was to use only *hard facts*, to use the new technologies and to go further logically, systematically and technical precisely.



(a) official sketch from the criminal office, 1948

(b) on suite measurement + original data

Fig. 2. Position of the body

4. Support of the mechanics

Since the final position of the body is known (the official criminal sketch and our new measurement), and since the initial position is known (ledge of the window), it is only an example of classical mechanics, to calculate, how much force, acceleration or initial velocity the body needs, to reach the final position. The simply theory of oblique throw as well as the numerical analysis with the human body model Virthuman was used.

Laboratory measurement: Since the initial conditions (acceleration or velocity) required for the model of Jan Masaryk (his weight and height) are known, the conclusion, if he could do the jump by himself seems to be a simply task. However, the data of the dynamics of a real human jump is not very well known. There are some data measured by prof. Strauss in [4], but the results contain some irregularities, that forced us, not to used them. In order to get a real data of the human jump, the laboratory measurement was done in the laboratory the University of West Bohemia. The experimental testing of the rear jump from the ledge was done with set of volunteers. Each of them jumped several times, with four level of effort (normal jump, normal jump with hand, maximum jump and spontaneous fall). The testing subject has an accelerometer fixed close to his H-point and performed a rear jump from the model of the ledge. The results of the measurement is acceleration curve of a volunteer, see Fig. 4, from which the initial values of acceleration and velocity can be identified.

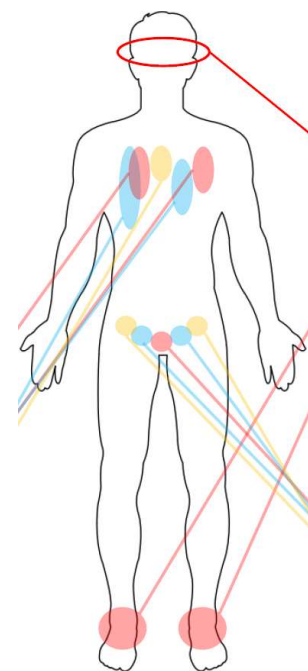


Fig. 3. Injuries sustained by Jan Masaryk

5. Conclusion

Based on a newly discovered information, with the great help of the new technologies (accelerometer, simulation software, Virthuman etc.), the authors Čermák and Špička decided to submit the initiative to open a new investigation of Jan Masaryk case. The initiative was delivered to the Municipal Public Prosecutor's Office in Prague at October 10th 2019 and then on the October, 21st, the Public Prosecutor has opened the new investigation. This investigation was officially closed in 2021 with the support of this study and with the similar results. Murder, suicide, forced suicide or unfortunate accidents are all possible scenarios and it cannot be clarified until some new evidences would be discovered. However, the error from last investigation was corrected.

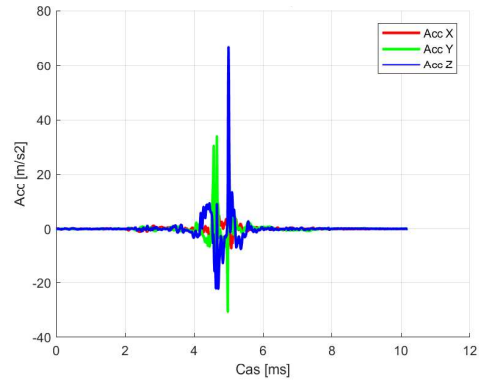


Fig. 4. Acceleration of the volunteer

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