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# SYNERGY BETWEEN INVESTED ENERGY AND GRAVITATION IN TWO-STAGE MECHANICAL OSCILLATOR

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## ABSTRACT

The goal of this work is to demonstrate a benefit of investing energy in accordance with gravitation in the two-stage mechanical oscillator in the case of greater amplitudes of a physical pendulum interacting with a lever. New facts with the samples and explanations are removing any doubt about the validity of previous measurements and along with some additional clarifications confirm ultra efficiency of the device.

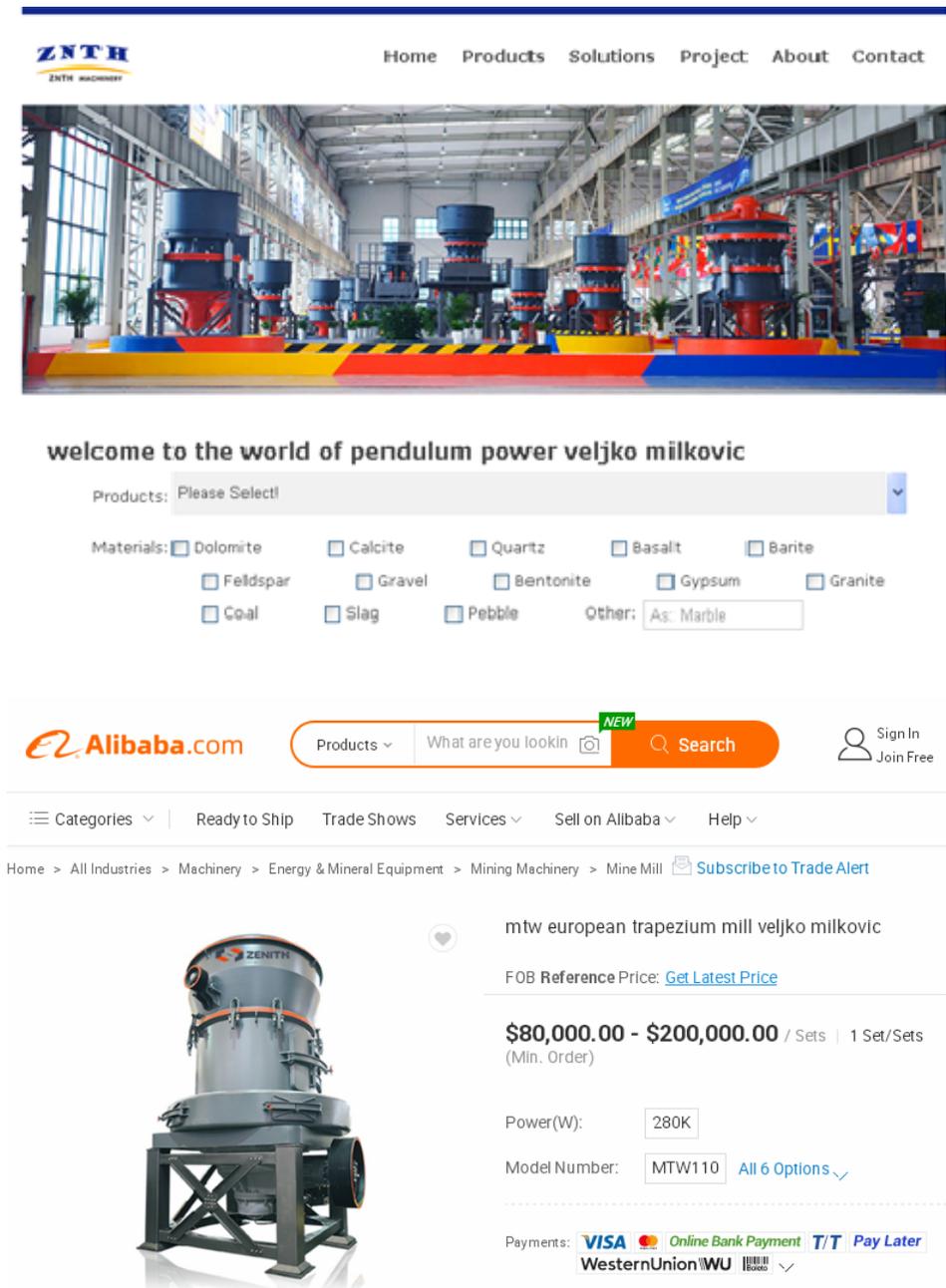
Key words: *pendulum, gravitation, efficiency, two-stage oscillator*

## INTRODUCTION

After long pause, in 1992 various experiments were intensified with the pendulum mounted on a cart or connected with a lever which resulted in a patent application in 1999 with title “Hand Water Pump with a Pendulum” (P-577/99, patent no. 49002 B), and after that another patent application for an electric generator too...

Many expert opinions, analyses and private measurements were published on internet sites [www.veljkomilkovic.com](http://www.veljkomilkovic.com), [www.pendulum-lever.com](http://www.pendulum-lever.com) and [www.milkovicpendulum.com](http://www.milkovicpendulum.com) along with two official measurements conducted by the Faculty of Technical Sciences of University of Novi Sad. Besides that, several scientific works and expert books were published sharing a common idea that new oscillator devices were superior in comparison with existing rotational devices like wheels, rotors, gears, flywheels, turbines etc.

Mostly thanks to Internet, interest for the usage of the oscillations in energetics was expanded, so that new researchers were multiplied across the globe in the last two decades. From recently, special websites are presented on Internet<sup>1</sup> about more than 300 companies which use or apply or make the two-stage mechanical oscillator (figure 1).



The screenshot displays the Alibaba.com interface for a Zenith trapezium mill. At the top, the ZNTH logo and navigation menu are visible. Below is a large image of the factory floor with several machines. The main heading reads "welcome to the world of pendulum power veljko milkovic". A search bar and material selection options (Dolomite, Calcite, Quartz, Basalt, Barite, Feldspar, Gravel, Bentonite, Gypsum, Granite, Coal, Slag, Pebble, and Other: As: Marble) are present. The product listing shows "mtw european trapezium mill veljko milkovic" with a price range of "\$80,000.00 - \$200,000.00 / Sets | 1 Set/Sets (Min. Order)". The power is listed as "280K" and the model number as "MTW110". Payment methods include VISA, Online Bank Payment, T/T, Pay Later, WesternUnion, and WU.

Figure 1.

<sup>1</sup> <https://www.facebook.com/Veljko-Milkovic-pronalazac-48882721985/>  
<https://dimenzijasite.wordpress.com/2019/12/19/linkovi-kompanija>  
<https://kompanije.blogspot.com>  
<https://companyveljkomilkovic.wordpress.com>

## PRECONDITIONS FOR SYNERGY AT A PHYSICAL PENDULUM

An interesting example is represented by a child on the swing when it swings itself by flapping the legs or the body and this way the harmony between invested energy and gravitation is achieved. The author has been observed some stable metal frames along with a partially loosed construction made from wooden beams where a child was swinging and was able to achieve amplitude near 180°. The creak of beams has released some energy as sound and heat produced by the friction. It seems that strong creaking gave the satisfaction to the child to continue the swinging.

Similar unstable construction made out of wood are probably not so rare and they can give the opportunity to the interested people to observe the above mentioned effects (*figure 2*).

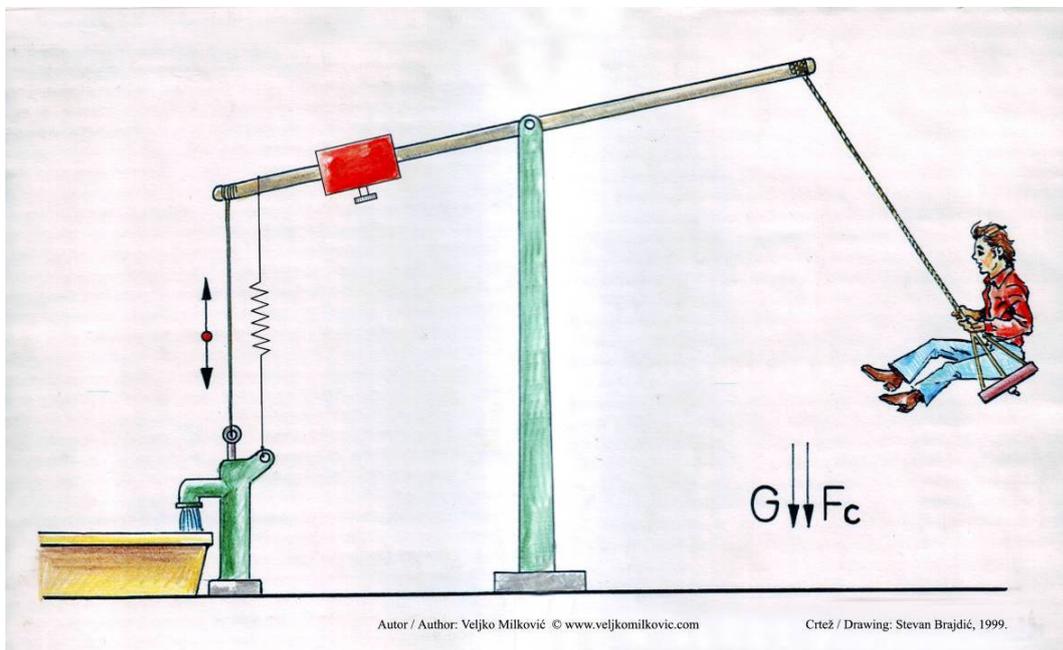


Figure 2. A child on the swing

Gottfried Wilhelm Leibniz (1646–1716) has found well-known mathematical formula for kinetic energy:  $E_k = \frac{1}{2} m \cdot v^2$  which has wide application. However, if some energy was invested in the upper position of the pendulum in the direction of the gravitation, for the case of great amplitude of the pendulum, an energy synergy appears and new formula is now:  $E_k = \frac{1}{2} m \cdot (v_1 + v_2)^2$ . Invested energy causes velocity  $v_1$ , and gravitation causes additional velocity  $v_2$ . Besides that, there is a harmony between gravitation  $G$  and centrifugal force  $F_c$  as displayed in *figure 2*.

This energy synergy cannot be achieved by flapping the legs or body if the swing was at rest in low position, the same on the horizontal surface for the cart, bicycle or sledge. This means that only with careful investment of the energy, when the swing is in movement and with amplitude greater than 90° can be realized significant kinetic energy thanks to the synergy with gravitation.

Up to 20 years ago only small amplitudes of the pendulum were examined. However, for the practical usage of the pendulum e.g. for easy driving of the pendulum pump, compressor, presses... the greater amplitudes than  $90^\circ$  are necessary since in the case of a great amplitude the pendulum bob is moving faster and kinetic energy is also greater (figure 3). The figure displays a pendulum with a small amplitude and small velocity (left side) and the same pendulum with a great amplitude (right side) where kinetic energy is considerably greater thanks to faster movement of pendulum bob (m).

It is true that the frequency does not depend on the amplitude, but in the case of pendulum drive the greater amplitude is significant and so much greater velocity and kinetic energy which is proportional to the velocity squared.

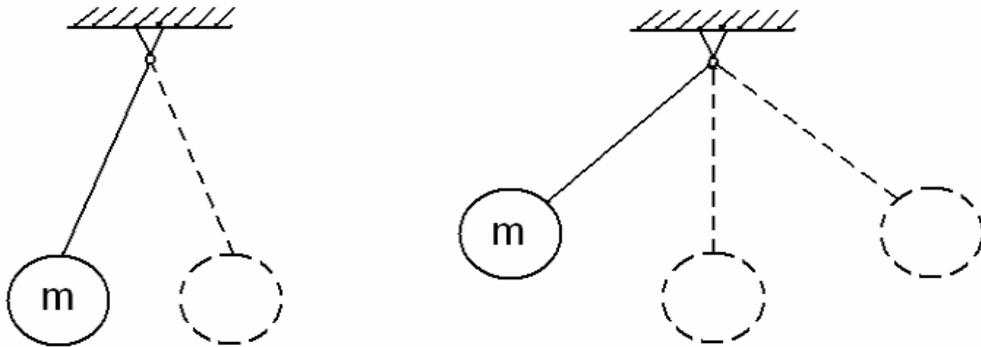


Figure 3.

For the sake of greater clarity, a vertical missile in vacuum chamber (1) can be examined. Ball (m) is shot by a weak spring (2) in gravitational field (figure 4). The ball shot upwards on the left side keeps slowing down after being separated from the spring because of its own weight. The opposite case is shooting the ball downwards from the top side of the chamber where it keeps accelerating after being separated from the spring – see the right side.

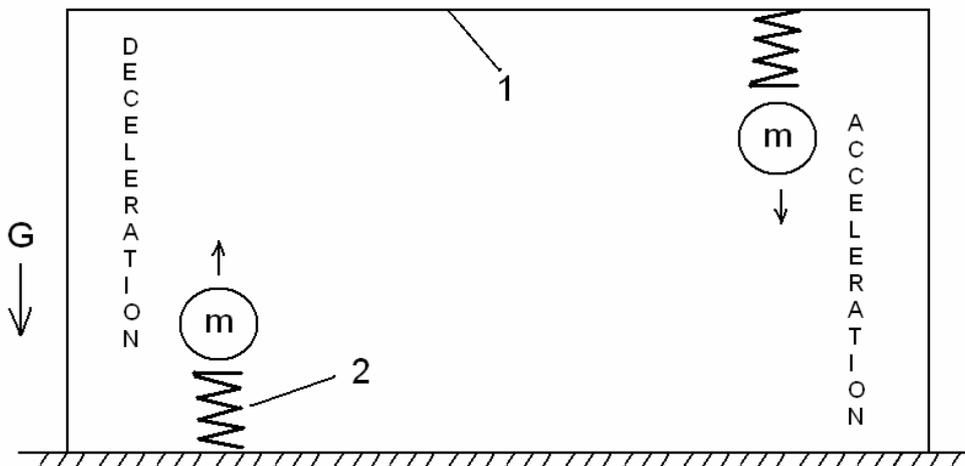


Figure 4.





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