Novi Sad, Serbia
June 04, 2014
No. 1 / 06

Veljko Milkovic
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Measurement Report

On June, 02, 2014 the stop time of rotation of an electric motor without a load has been measured.

Description of the System

A mono-phase asynchronous motor with two sanding stones has been powered from the public network of 230V, 50Hz. When the motor without a load has achieved the full speed, the power was turned off and the time of its rotation has been measured until it stopped completely.

Measuring Equipment: Digital stopwatch Magma 10, Hanhart, Germany

Motor Label: (GDS 125 A, Güde, Germany)

Designated Voltage: 230 V / 50 Hz.

Designated Power: 120 W

Designated RPM: 2950

Dimension of the Sanding Stone:

ϕ 125 mm x 20 mm (two pieces, one on each side of the shaft)

Total Mass:

Motor with both sanding stones 4.5 kg

Measured Input Values:

U_1 = 239.6 V f = 50 Hz

Measured Stop Time (Time of Rotation)**:**

t = 19.06 seconds.

УНИВЕРЗИТЕТ У НОВОМ САДУ * ФАКУЛТЕТ ТЕХНИЧКИХ НАУКА * ЛАБОРАТОРИЈА ЗА МЕТРОЛОГИЈУ *

Measurement performed by

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Novi Sad, Serbia
June 04, 2014
No. 2/06

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Measurement Report

On June, 02, 2014 the stop time of oscillation of a physical pendulum #1 has been measured.

Description of the System

Physical pendulum #1 comprises a tape carrier of the pendulum cylindrical weight, stable vertical pillar and the stand. The weight has been pressed against the vertical pillar and released, allowing the pendulum to derive from the equilibrium position. The time of free oscillations has been measured until the pendulum stopped its oscillations naturally.

Measuring Equipment: Digital stopwatch Magma 10, Hanhart, Germany

Dimension of the Pendulum:

Cylindrical weight mass: 40g.

Tape - the carrier of the weight, length: 225mm, width: 2.5mm, thickness: 0.3mm.

Distance between the pillar and the edge of the weight: 55mm.

Condition of the Environment:

Temperature: 21.8 °C ± 1 °C; Relative Humidity of the Air: 52 % ± 1 %.

Measured Stop Time:

1 hour, 50 minutes, 5 seconds (Amplitudes have dropped to ± 0.5 mm from the axis of the oscillation).

Measurement performed by

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Novi Sad, Serbia
June 04, 2014
No. 3/06

Veljko Milkovic
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Measurement Report

On June, 02, 2014 the stop time of oscillation of a physical pendulum #2 has been measured.

Description of the System

Physical pendulum #2 comprises a tape carrier of the pendulum cylindrical weight, stable vertical pillar and the stand. The weight has been pressed against the vertical pillar and released, allowing the pendulum to derive from the equilibrium position. The time of free oscillations has been measured until the pendulum stopped its oscillations naturally.

Measuring Equipment: Digital stopwatch Magma 10, Hanhart, Germany

Dimension of the Pendulum:

Cylindrical weight mass: 30 g.

Tape - the carrier of the weight, length 83 mm, width: 4 mm, thickness: 0.2 mm.

Distance between the pillar and the edge of the weight: 50 mm.

Condition of the Environment:

Temperature: 21.8 °C ± 1 °C; Relative Humidity of the Air: 52 % ± 1 %.

Measured Stop Time:

49 minutes, 0 seconds (Amplitudes have dropped to ± 0.5 mm from the axis of the oscillation).

Measurement performed by

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Novi Sad, Serbia
June 16, 2014

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ENCLOSURE TO MEASUREMENT REPORT

No. 01/06, 02/06 and 03/06 from June 04, 2014

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- Complement by Veljko Milkovic -

Asynchronous electric motor *

Time till complete stop of electric motor after turning off its power:

t_{aem} = **19.06 seconds =** ~ 19 sec.

* Asynchronous motor has the smallest friction and longest time of rotation after switching off.

Synchronous electric motor (similar power as the asynchronous electric motor)

Time till complete stop of electric motor after turning off its power:

t_{sem} = **up to 10 seconds** or half of the time of asynchronous electric motor

Flexible Pendulum (No.1) – mass: 40 grams, height / length: 225 mm

Time of duration of free oscillations till stop of the pendulum:

t_{p1} = 1 hour, 50 minutes, 5 seconds = 3,600 sec. + 3,000 sec. + 5 sec.
t_{p1} = 6,605 seconds

t_{p1} : t_{aem} = 6,605 sec. : 19 sec. = **347.63158** times

Time of oscillation of flexible pendulum (No.1) is **over 340 times** or **34.000% longer** than duration of rotation of the asynchronous electric motor!

<u>Flexible Pendulum (No.2)</u> – mass: 30 grams, height / length: 83 mm

Time of duration of free oscillations till stop of the pendulum:

t_{p2} = 49 minutes = 2,940 seconds

t_{p2} : t_{aem} = 2,940 sec. : 19 sec. = **154.73684** times

Time of oscillation of flexible pendulum (No.2) is **over 150 times** or **15.000% longer** than duration of rotation of the asynchronous electric motor!

<u>NOTES</u>:

1. Besides that, the mass of the rotor and sanding wheel is at least <u>10 times</u> greater than the mass of the pendulum.

2. Speed of the rotor is greater than speed of the pendulum.