DESIGNING, BUILDING AND TESTING OF A NEW PROPULSION PROCESS FOR VEHICLES

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ABSTRACT
This article presents the prototypes that were designed, built and tested to demonstrate the possibility to move a vehicle without traction to the wheels (0WD), without loss of mass, and without interaction with the environment. The idea occurred to the author in 2009 and was progressively developed with prototypes of small size due to economic and technical reasons. Most successful prototypes were built in 2011 and 2014, while other models have also been fundamental to demonstrate the operating principle.

Keywords: principles of transmission and momentum conservation, and law of action and reaction-revisited, vehicles without traction wheels (0WD), safer transportation.

INTRODUCTION
There is no need for new laws of physics / mechanics to explain how it is produced thrust of a vehicle without traction to the wheels. However, since the idea and the first experiments carried out by the author, in the beginning with a wheelchair and then with a load cart, only was demonstrated the possibility of moving these vehicles. The next step was a mechanized / motorized vehicle with four free wheels. In early 2011 the first prototype 0WD-2011 demonstrated the ability to move the vehicle but using an electric motor instead of muscular effort. In 2012 a larger vehicle was constructed having in the center the engine and an actuating mechanism. This mechanism could compress two gas springs on the one hand, or actuate a platform with a circular translation movement of the other side. The results were not satisfactory with springs, but the side similar to 0WD-2011 confirmed the possibility of the author actuate the mechanism for moving the vehicle, due to the absence of an electric motor with power required.

The lessons collected in experiments by 2012 were encouraging but challenging. There were interest in obtaining continuous motion of the vehicle from the rotational mechanism-0WD. The videos of the tests were observed patiently and in detail using PowerDirector. The assumptions were mostly confirmed but it was clear that there would still be room for improvement. A new 0WD process was designed in 2013, with its prototype was built between July and October 2014, and the tests were conducted during November 2014.

RESULTS AND CONCLUSIONS
Fig. 1 illustrates the vehicles, 0WD-2011 and 0WD-2014, in movement tests, both on flat surface with the usual irregularities in tables and workshop floor. Table 1 compares the main specifications of these prototypes and the results obtained in the tests. Except engines and bearings, all other components have been constructed and assembled by welding and also with screw connections.
Table 1 - 0WD Vehicle specifications and test results

<table>
<thead>
<tr>
<th>Main specifications</th>
<th>0WD-2011</th>
<th>0WD-2014</th>
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<tbody>
<tr>
<td>Mass of the vehicle ready for operation (kg)</td>
<td>3,568</td>
<td>18,3</td>
</tr>
<tr>
<td>0WD Process</td>
<td>Platform with 1,2 kg in circular translation</td>
<td>Two rotors with 0,22 kg each</td>
</tr>
<tr>
<td>Power (W)</td>
<td>200</td>
<td>620</td>
</tr>
<tr>
<td>Angular speed (rot/min)</td>
<td>300 ou 600</td>
<td>0-870</td>
</tr>
<tr>
<td>0WD vehicle speed in flat surface (m/s):</td>
<td>0,028 @ 300 rpm</td>
<td>0,072 a 0,1</td>
</tr>
<tr>
<td></td>
<td>0,034 @ 600 rpm</td>
<td>-</td>
</tr>
</tbody>
</table>

Fig. 1 - The two tested 0WD configurations

The development and testing of these vehicles allowed to understand how the propulsive force is generated, and calculate its value. Future work will enable further improvements needed to move a vehicle without wheel drive (0WD) safely whatever the weather.

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REFERENCES

