

REPORT NR 003

**The Physics of
THE SPLITTING AXE**

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SUMMARY

This study of the Splitting Axe began spontaneously with my curiosity about the physics of a tool that could create so much power output and also it started with my concerns about the splitting axe I had bought and with my wonderings about if this tool could not also be improved...

The first series of tests was to determine the power output. High speed video camera was used to determine speed and it was then discovered that the lighter axes not only created higher speed with the same user swinging the axe, but also that the power output was higher. The test was extended and several axes was filmed, weighed and the results calculated.

After the first series there where a lot of inconsistency in the results so it was decided to make a test axe where weight could be changed on the axe head. This serie gave much more consistent results as the same handle of the axe could exclude other parameters than the weight of the axe head and the relation between weight, speed and power could be clarified. The increase in weight will result in a decrease in power output.

Another series of test was made with the goal to detemrne the parameters for the splitting axe.

Different axes where tested and evaluated. From these results it was possible to determine what made a good splitting function and every parameters where given a consideration for a setting of its values.

Also another test was made in a "giljotine", where a heavy weight dropped down on an axe on a chunk to determine differences in axe heads to its ability to split chunk. The test was not fulfilled because of problems to find homogenous splitting material. As all chunks and logs are very different and also each of them is different depending on where the axe is hitting it was too much disturbances to continue the test. It did show though that the power to split a log equals a drop of a weight and its gravitational fall of a weight about 40 kg at 0,9 m to split a small log and it confirmed the importance of speed.

From these tests, the parameters from a splitting axe could be set in all details from cheek angle of the axe head to the length of the handle.

Now a prototype could be made that corresponded to the parameters and it was tested and evaluated. A series of test confirmed every aspect of the function. The prototype axe was better than any axe tested, or as good as the best and the most dominant feature was that it was lighter and therefore faster and that it also ment considerably less effort to lift, handle and swing.

Another prototype was made from a Fiskars X25 axe head. With reshaping the head and putting on a new handle, this axe was made considerably better than the original.

Conclusions from this study is that existing construction of Splitting Axes is not optimal for a good function but is solely based on a tradition that has not been taken the laws of physics into consideration. Corresponding results has also been made from studies of golf clubs, tennis rackets, baseball bats and cricket clubs etc.

The Splitting axe can therefore easily be improved on and it can be done at no or even less production cost than the existing one. This study sets a new standard for splitting axes and much of its conclusions can be used on other type of axes, hammers and sledge hammers.

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