Bevel angle measurements with a simple laser device

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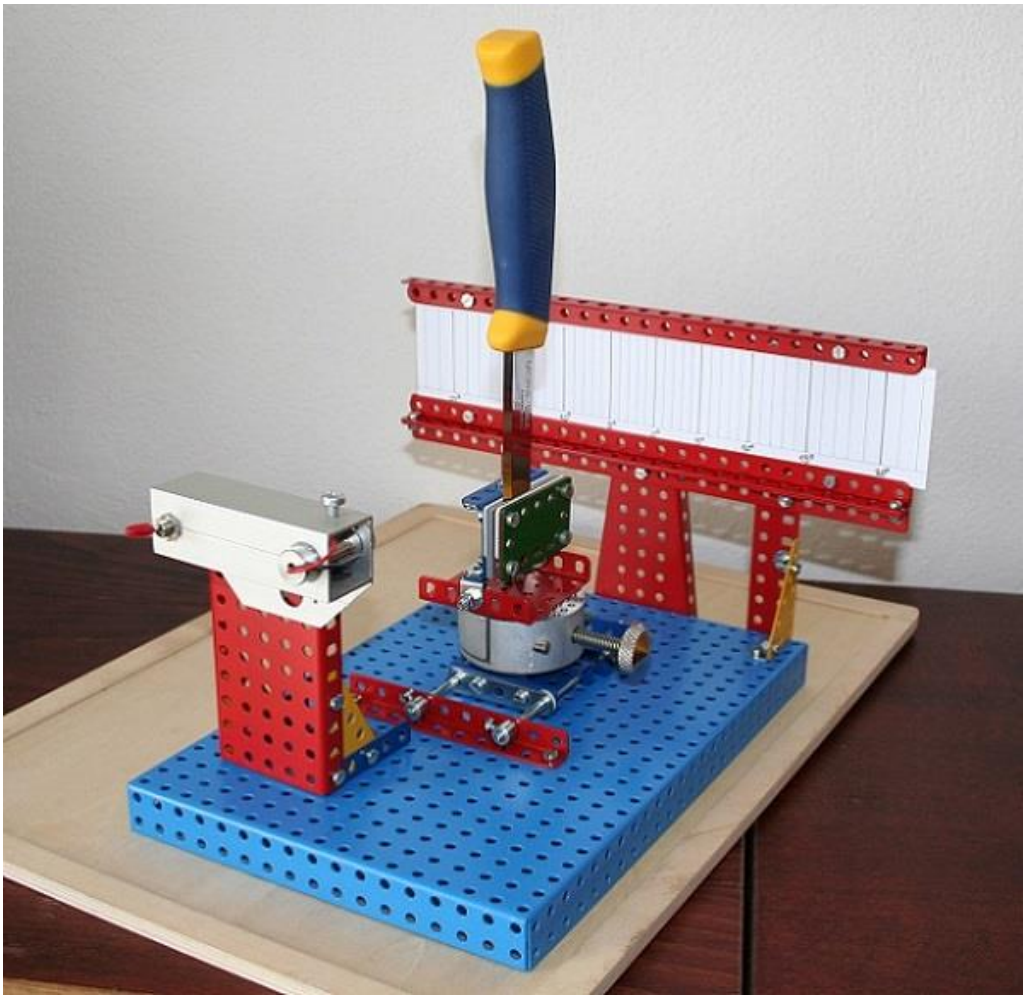
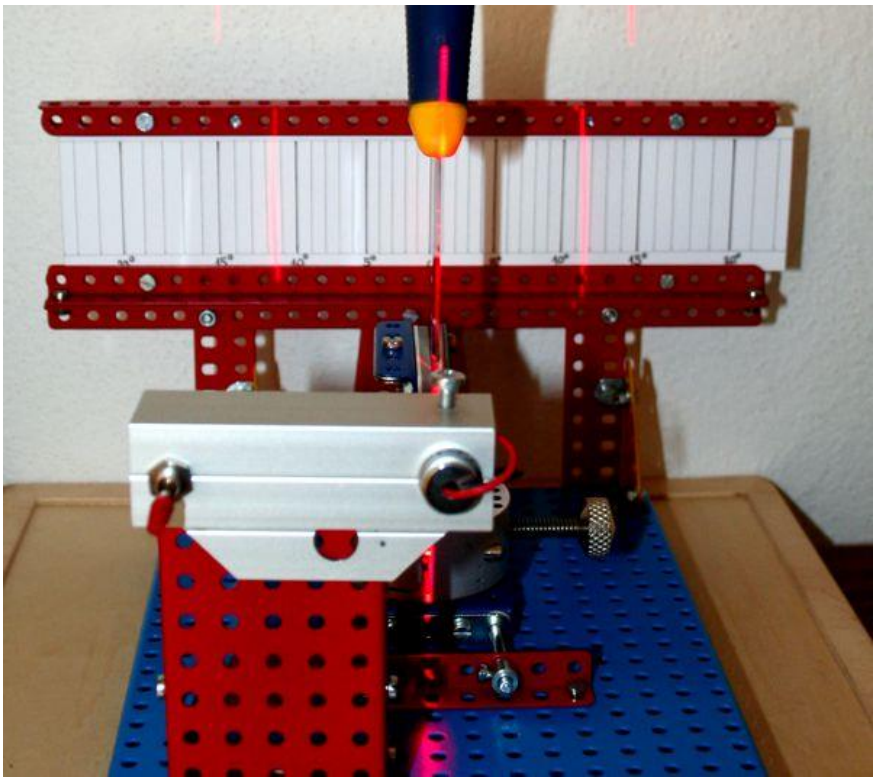
My laser device for bevel angle determination (laser goniometer) was inspired by John Verhoeven study "Experiments on Knife Sharpening". In the appendix 1 there is a sketch of a laser device for bevel angle determination. https://www.wickededgeusa.com/wp-content/uploads/2012/10/knifeshexps.pdf)

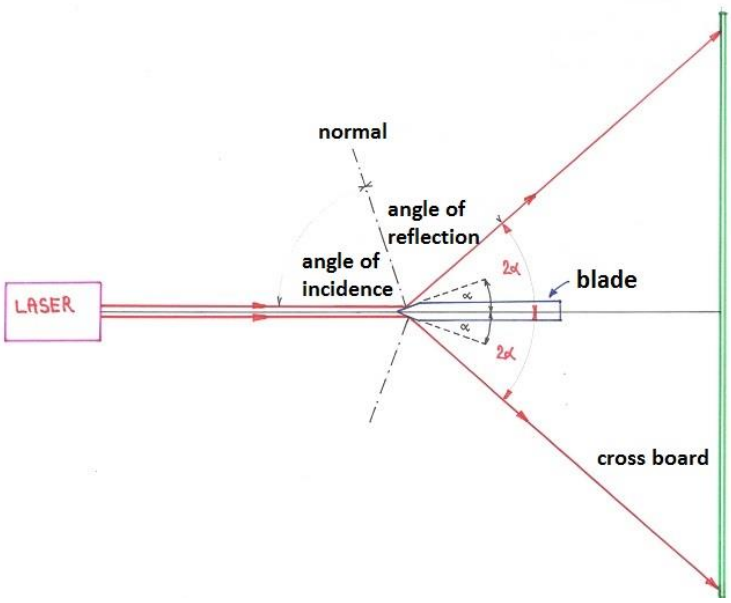
Using children mechanical construction set I prepared simple optical bench shown below. Lego or similar set can be used also. I use hand adjustable clamp for smooth centring of the blade into the laser beam. I use inexpensive 5 mW focusable laser line module and power it from 3V battery without any resistor. I use a line laser module, but dot laser module can be used also.



The laser beam (line or dot) is splited and reflected on the knife edge. The reflected rays draw two lines on the cross board. From the separation of those lines and the distance of the cross board from the edge the bevel angles can be easily calculated. The separation between the thick lines of the scale is 5° and between the thin lines 1° of bevel angle.



The laser goniometer works fine for knives with wider bevels which reflect the laser beam well. The picture shows Tormek/Mora knife with bevel angles 11.5° (edge angle 23°). When the reflections are weak it is recommended to make the measurements in a darkened room.



This sketch shows how the laser beam is splited and reflected on the knife edge.