

# Modification of the Therion Protractor

by Aaron Bird  
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It is often the case that the developers of one good product have also been the inventors and/or developers of others. This is the case for the Therion software and the Therion protractor.

Of the many cave survey reduction programs out there, Therion is in a class all its own. It was developed by European cavers, Stacho Mudrak and Martin Budaj, who were attempting to draw cave maps on computers but had difficulty updating new survey with existing maps when loops were closed.

To solve the problem they made their own software, which they called Therion. It is based on METAPOST (a vector graphics language) and TEX (pronounced 'tech,' which is a typesetting language for math fonts). The survey data are entered into data files that are compiled and, viola', out pops the line plot and cave map in PDF format. Apparently, it was originally designed to run in UNIX environments, but will now run in Windows-based environments as well. I've worked with it on a limited basis to become familiar and found that it is just as good as any other software out there. The authors of Therion have clearly spent some time on it and have a nice product to be proud of. However, the software is not the only good product they have shared with the caving community.

The reason for this short article is actually to describe a protractor that the Therion authors have shared with the world and to present a slight modification that may be applicable for cavers using the English system of measurement. On their website ([therion.speleo.sk](http://therion.speleo.sk)), Stacho and Martin report that the Therion protractor was developed for cave surveyors who are not satisfied with the free-hand estimation of true horizontals on cave sketches and don't have enough time to compute the true horizontal from the trig equation. Most sketchers estimate true horizontal when plotting stations in their notes. Some tech savvy sketchers carry a table of cosine conversions and do quick math to multiply the measured length and the cosine of the inclination in order to yield an estimate of the true horizontal. Stacho and Martin have developed the Therion Protractor to make it much, much easier.

Their protractor, which I copied from their website, is graduated not only in degrees, but also in meters along the straight edge. To find the horizontal for a measurement, one needs only find the measured value on the straight edge, and then follow the arc around until the measured inclination is encountered. At the point where the arc and the angle intersect, the sketcher then goes straight back up (the dashed line their picture below) to find the true horizontal. This the amount of distance that is plotted in the sketch. For most cavers of the world,

their method and protractor are perfectly applicable. However for covers of the U.S. who do not use the metric system, another protractor is needed.

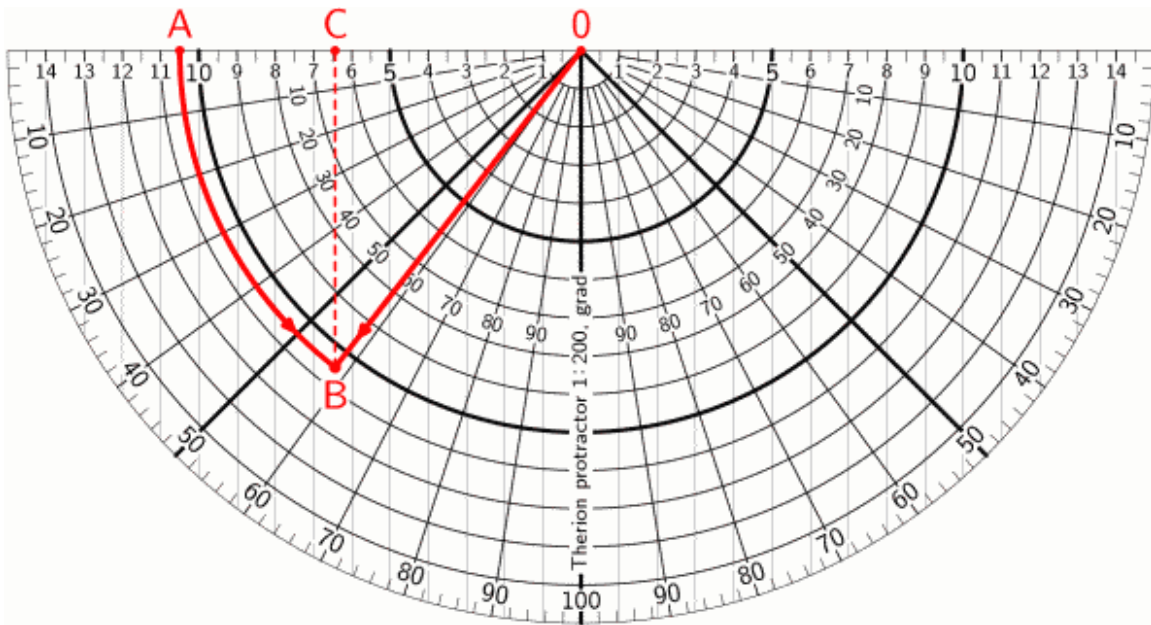


Figure 1. Therion protractor from Stacho Mudrak and Martin Budaj, graduated in gradients (%) and meters.

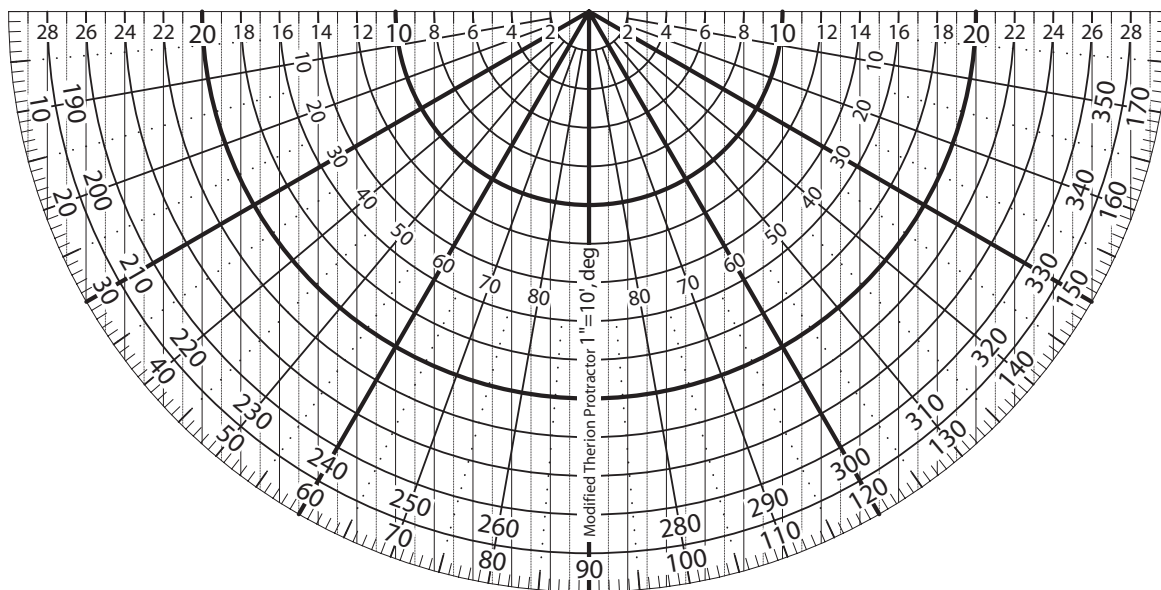
To fill this need, I copied Stacho and Martin's protractor and simply added the values in for decimal feet for distances from 0 to 30 feet and 0 to 75 feet. These protractors are included below for those who wish to use them. The best way is to print them out on mylar or overhead film and cut out the protractors. They can then be glued down onto and/or sandwiched between Plexiglas that is cut into the shape of the protractor. No more horizontal distance headaches! Yay!

Have fun sketching!!!

# Modified Therion Protractor

Distances in Decimal Feet  
(0 - 30')

Angles in Degrees



Distances in Decimal Feet  
(0 - 75')

Angles in Degrees

