

Smart Tool Analyzer

A Smart tool holder analyzer is a software program that can analyze data collected by a Smart sensory toolholder to help users optimize cutting and milling processes. Here's what it does:



The Smart tool holder analyzer can help users:

- Increase tool life and productivity
- Solve problems faster
- Diagnose processes
- Improve the quality of tool pieces

The Smart sensory toolholder is a wireless force sensor used for tool monitoring. During the machining process (e.g., drilling or milling), it can measure the generated force and torque directly at the toolholder. The occurring data is transmitted wirelessly to the receiver and the tool measurement software.

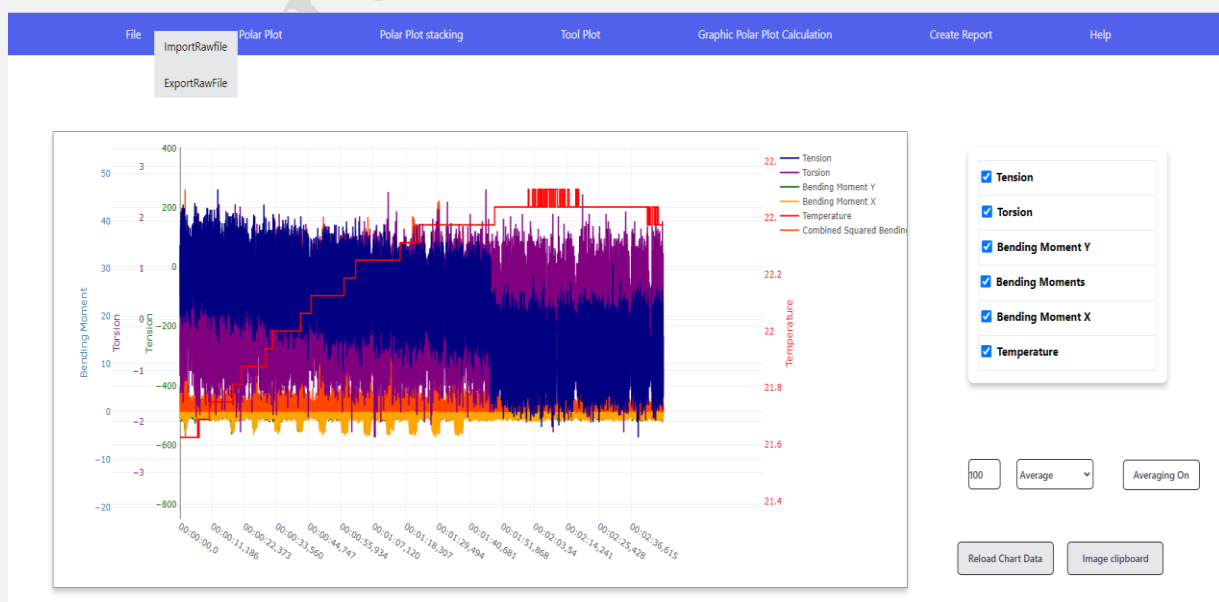
Smart Tool Analyzer Dashboard:

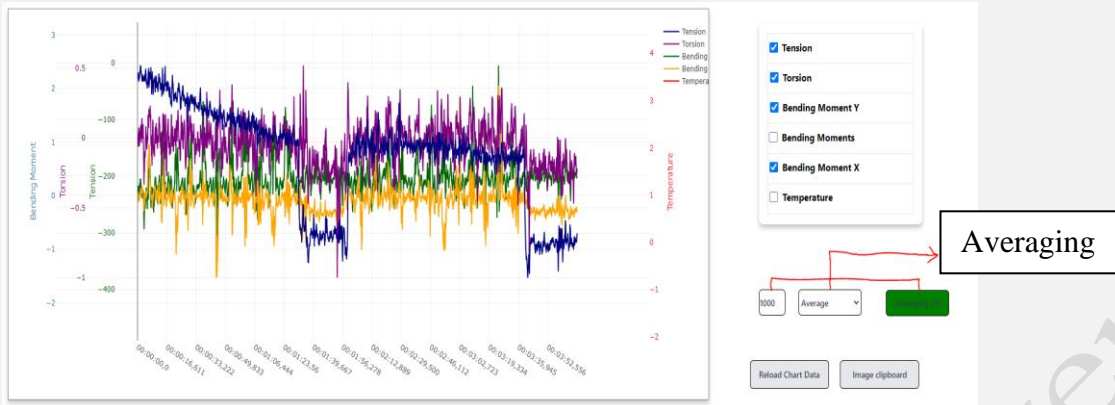
The main window of the software is divided into seven areas:

This user interface is a data analysis tool designed for monitoring and analyzing machining parameters like tension, torsion, bending moments, and temperature over time. The central graph visualizes these metrics, while the side panels allow users to select specific metrics to display, adjust averaging settings, and perform statistical analysis. The top navigation bar offers access to various features, including file management, polar plot analysis, tool life plotting, and graph settings, making it suitable for optimizing machining processes.

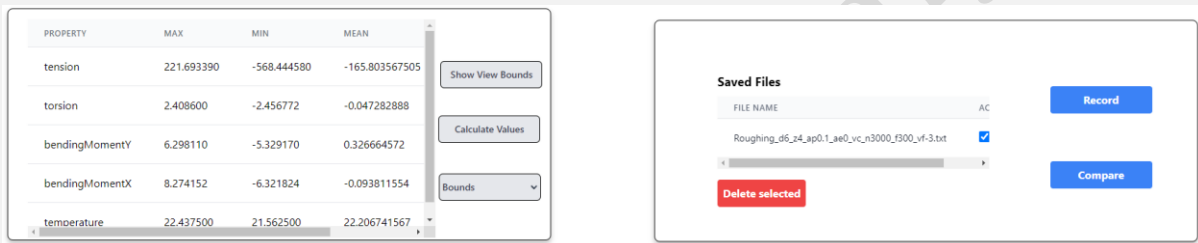
- - Menu bar: File, View, Graph, and Help.
- - Graph: Displays the graphical representation of all the different signal curves. To the left are the scales for the Tension force, Torsion, and Bending moments. The right scale displays temperature (if present).
- - Cursor: Gives x and y values at a position on the graph.
- - Display: The window chosen with the cursor.
- - Data average: Data Filter option with different filters.
- - Compare: Different saved data can be overlaid for comparison.
- - Statistics: Statistical evaluation of defined data areas.

Line Graph:

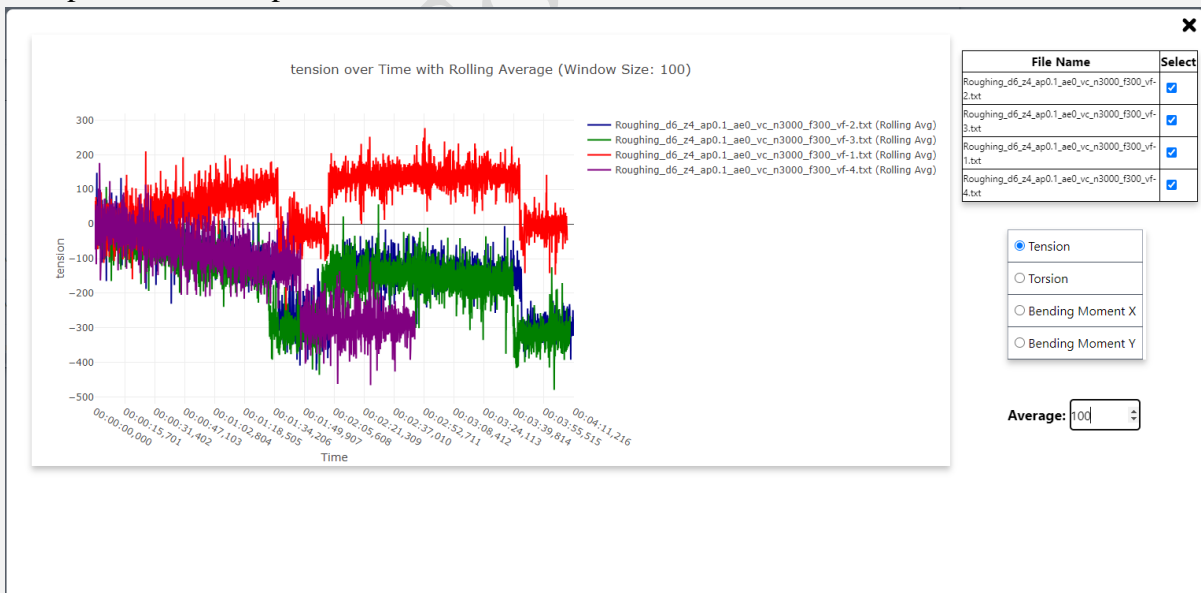




The bottom section features a table of calculated values and a file management system for recording and comparing datasets.

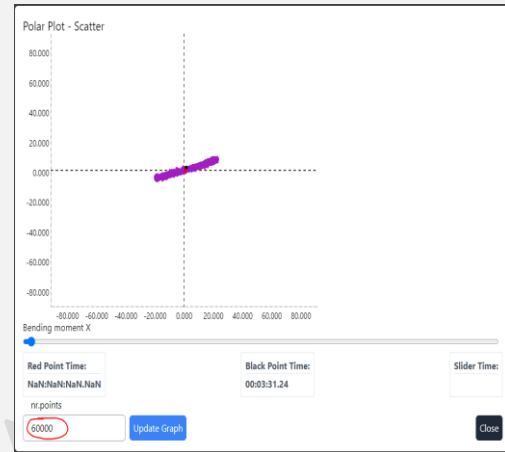
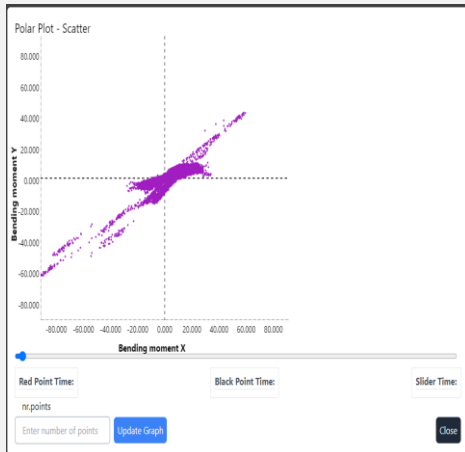


Comparison of multiple recorded file data:



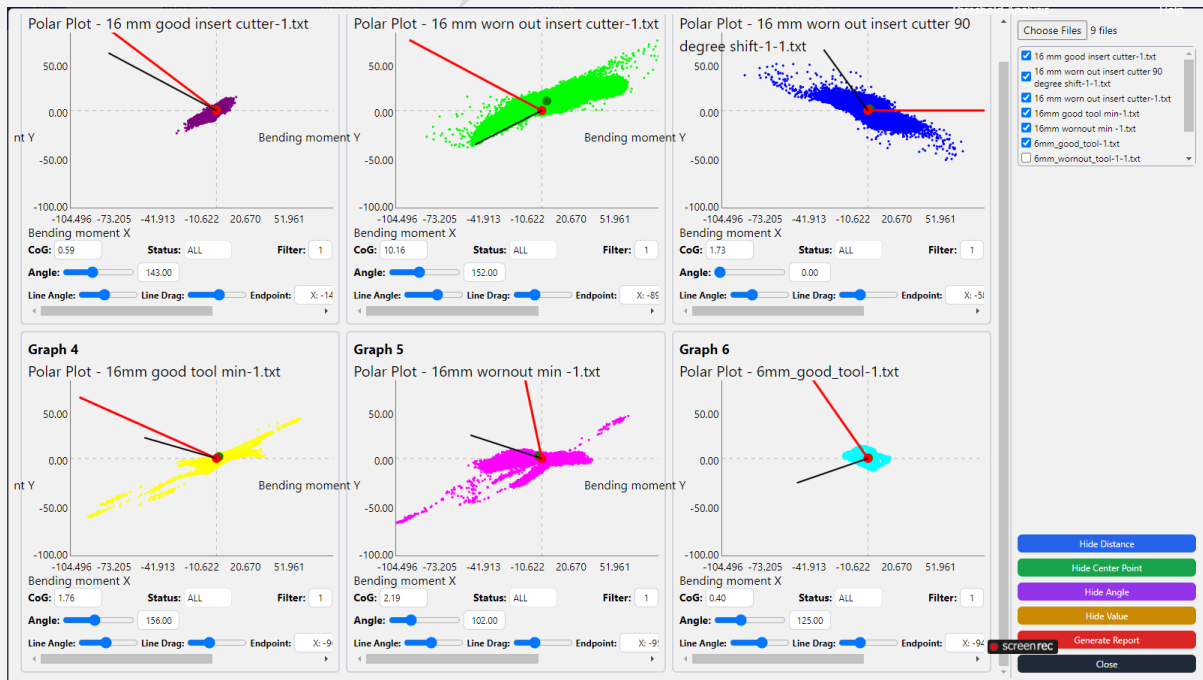
Polar Plot:

The image shows a scatter plot labelled "Polar Plot - Scatter," displaying data points for "Bending moment X" and "Bending moment Y" on the x and y axes, respectively. The graph includes a central crosshair, a slider for adjusting data points, and input fields for point times. Additional controls include options to update the graph, zoom in/out, copy the image to the clipboard, and close the window.

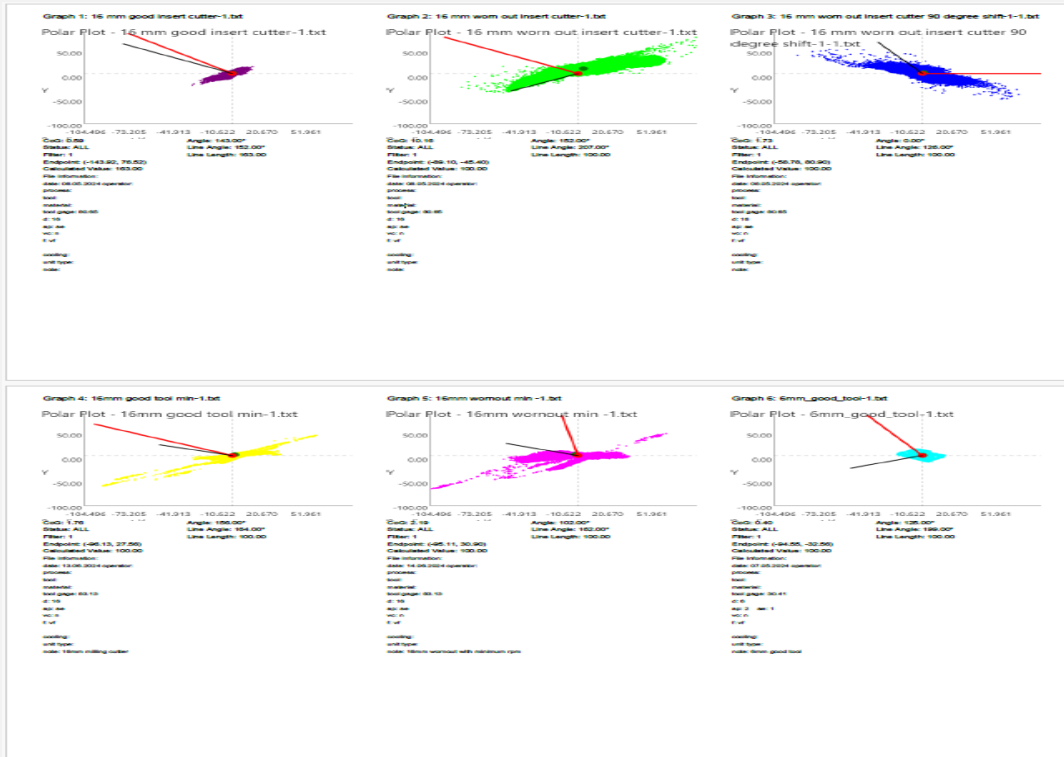


Graphic Polar Plot Calculation:

Recorded processes or process sections can be directly compared with each other using the graphical polar plot calculation in polar representation. You can also measure special values/events in a process. The "Report" function clearly and quickly documents results.

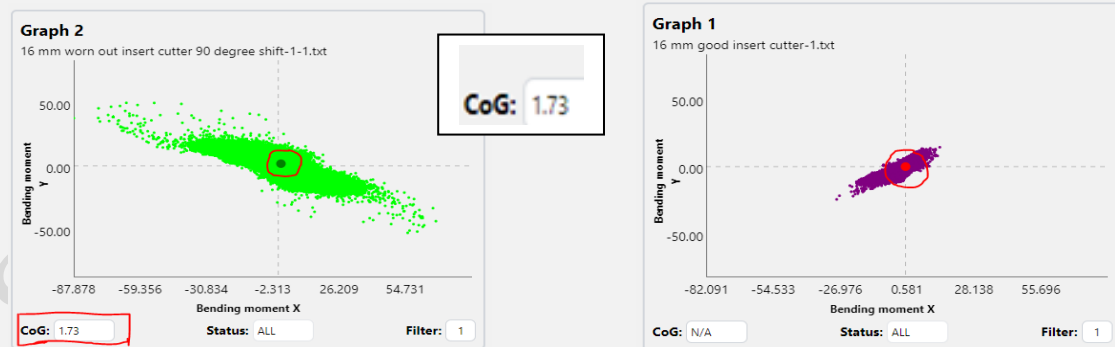


Report for Graphic Polar Plot Calculation:



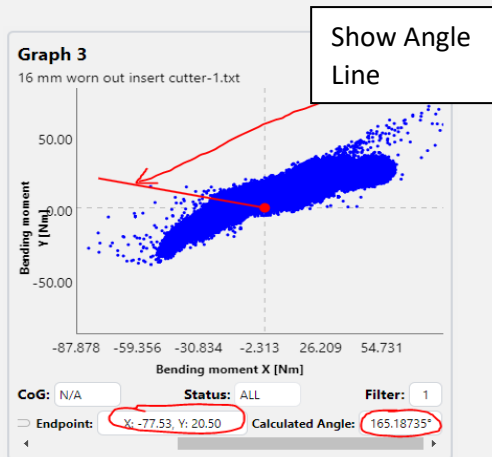
Shows the center of gravity of the displayed polar plots.

- The center of gravity is calculated from the sum of all individual vectors shown in the polar plot.
- The distance from the center point to the zero point is recorded on the side of the polar plot graph.

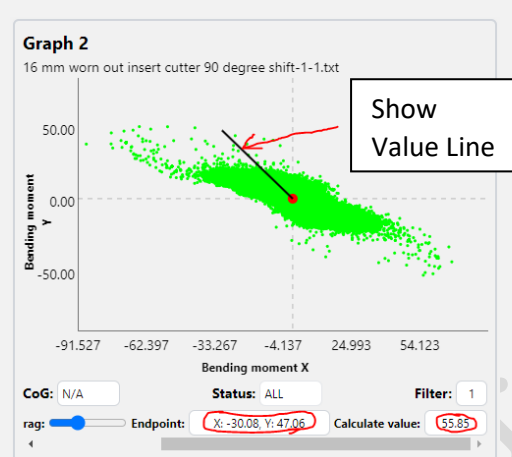


Shows Distance stress to Zero point

Show Zero point (0,0)

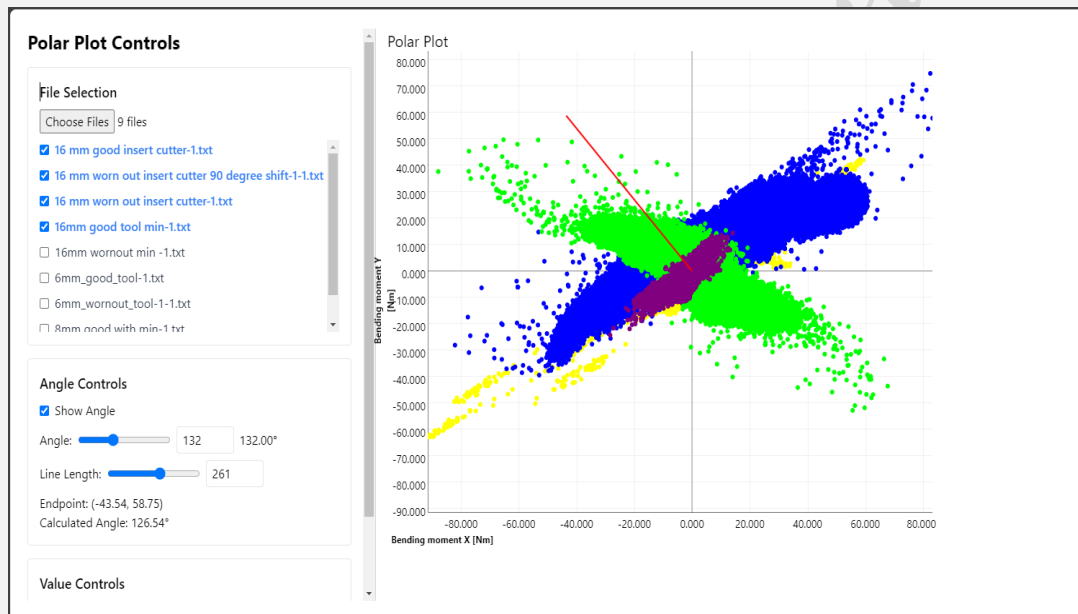


Show Angle Line



Show Value Line

Polar Stacking:



The polar plot stacking visualizes data from selected files uploaded to the system. Here's an explanation of how it's plotting and calculating:

1. Data Input:
 - Multiple files are uploaded to the system
 - Users can select which files to include in the plot using checkboxes
2. Plotting:
 - The system reads the selected files and plots the data on a polar coordinate system
 - Each data point is represented as a colored dot on the graph
 - The plot uses different colors (blue, green, yellow, red) to distinguish between data sets
 - The x and y axes range from -80,000 to 80,000
3. Interactive Elements:



- A black line and a red line are drawn on the plot, likely representing specific angles or measurements
- Sliders allow users to adjust various parameters:
 - Show Angle: Currently set to 97.00°
 - Show Value: Currently set to 107.00°
 - Length: Currently set to 244
- 4. Calculations:
 - The system performs real-time calculations based on user inputs and plotted data
 - Displayed calculations include:
 - Bending moment: Currently 0
 - Endpoint 1: (-15.69, 14.60)
 - Calculated Hypotenuse: 21.09
- 5. Data Analysis:
 - The plot allows for visual comparison of different data sets
 - Clusters and patterns in the data points can be observed
 - The spread and density of points in different regions provide insights into the underlying data
- 6. Reporting:
 - A "Generate Report" button suggests the ability to create a summary or detailed analysis of the plotted data and calculations

This polar plot serves as a tool for visualizing and analyzing complex data sets, allowing for interactive exploration and comparison of multiple variables simultaneously.