AFT Impulse .inp Parser readme

Brief

AFT_Impulse_Parser is a python tool to extract engineering data from AFT Impulse `.inp` files and export them to Excel for easier analysis.

Features

Data Extraction:

- Pipe Details: Extracts pipe properties like **Name**, **Diameter**, **Length**, and **Roughness** from the Detail Summary.
- Elevation Profiles: Captures segment-by-segment elevation data, including Min/Max statistics.

Smart Connectivity:

- Reconstructs network connectivity (Upstream/Downstream nodes) for every pipe.
- Prioritizes explicit junction tables for accuracy.

Excel Export:

- Clean Formatting: Multi-line headers are merged into single, readable column names.
- Unit Awareness: detects units (e.g., "feet", "inches") and appends them to headers.
- Detailed Sheets: Separate tabs for Pipe Summaries, Elevations, and Connectivity.

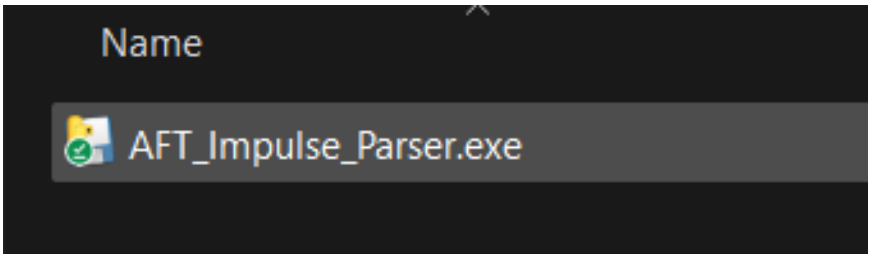
Quick Guide

Below is a quick guide on how to use the tool.

Note: The tool’s location does not affect the process, you may keep it anywhere.

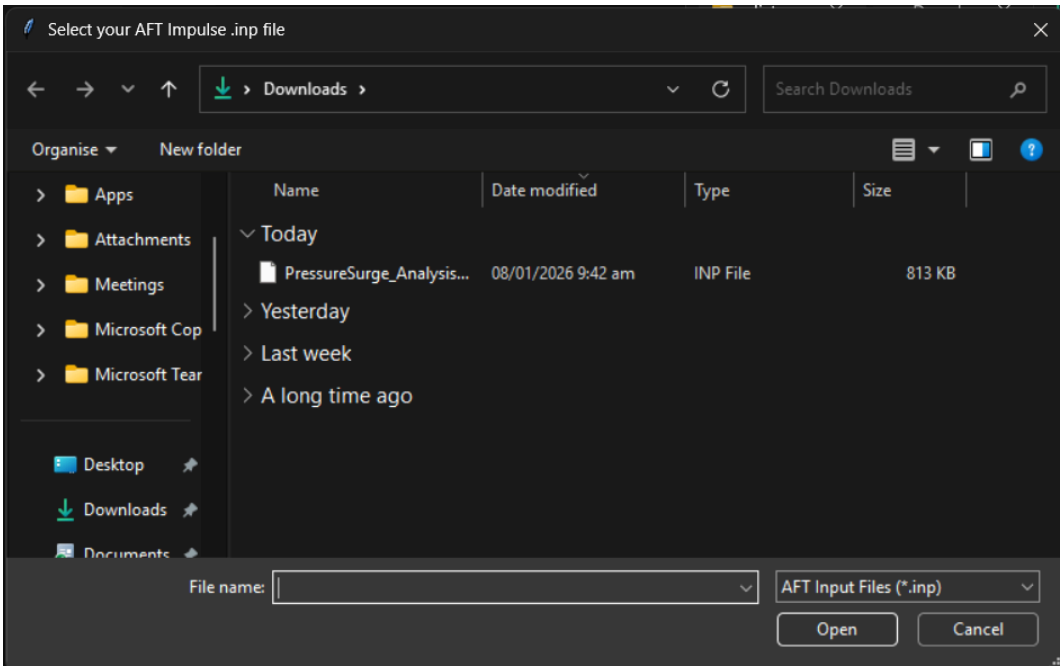
Step 1 Open the executable file

- Locate the application named “ `AFT_Impulse_Parser.exe` ” and double click on it to open the app.



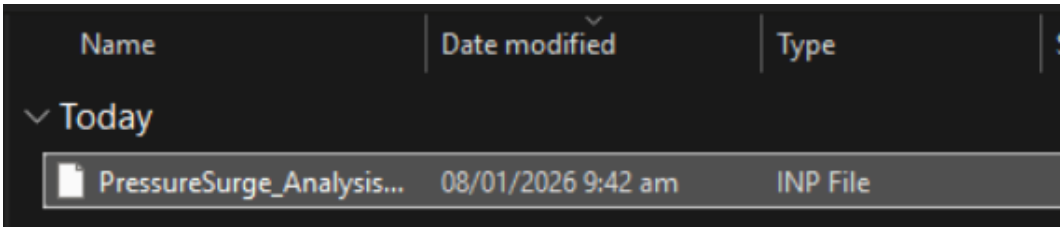
The application

- A window will pop up as shown, asking for the .inp file you would like to parse.



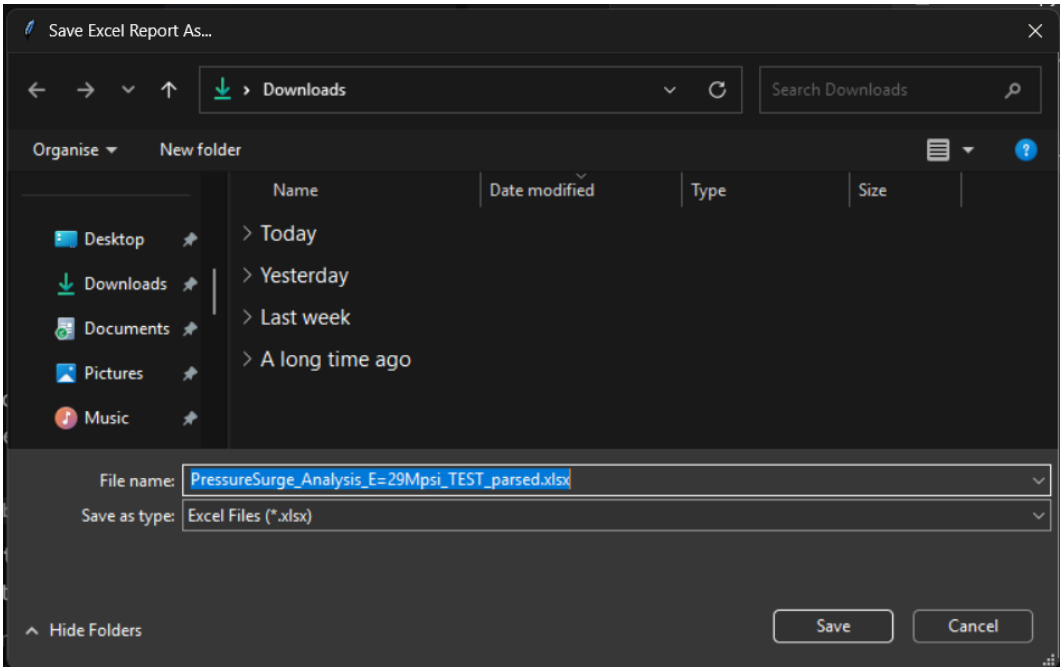
Step 2 Select Your .inp File

- Navigate to your chosen .inp file and select it.



Step 3 Choose an Output location

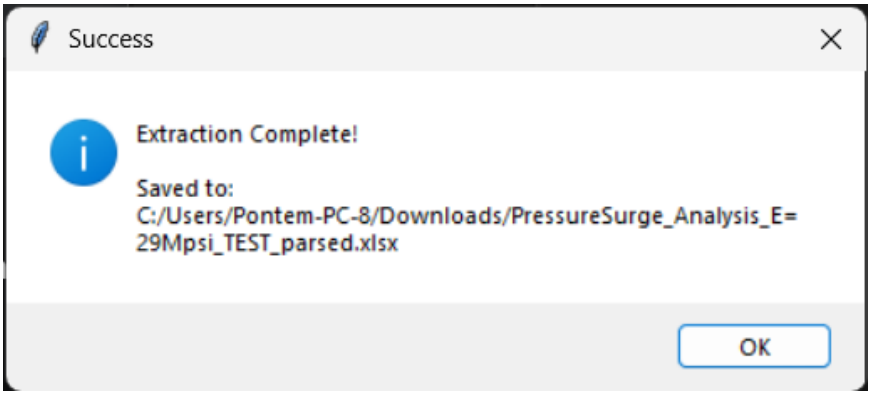
- Once you've selected your file, another window will appear in which you are free to choose where to store the parsed excel file.
- **Note:** It will save the excel file in <Downloads>by default.



- ⚠️ **Important:** Ensure the output Excel file is **closed** before running the parser. If the file is open in Excel, the extraction will fail.

Step 4 Extraction

- The extraction process will take a few mins and when complete it will output this message.
- You will find the parsed Excel file in the output location previously specified.



Excel File Structure

The parsed Excel file is organized into distinct sheets to separate connectivity, physics, and component data. Here is a breakdown of the sheets you will find:

1. Network Topology

- Sheet Name: `Network_Connectivity`
- Description: A master map of the system's layout. It explicitly links every pipe to its start and end nodes, making it easy to trace flow paths.
- Key Columns:
  - `Pipe Name` : The identifier for the pipe.
  - `Upstream Node` : The junction or component feeding the pipe.
  - `Downstream Node` : The junction or component receiving flow.

2. Pipe Physics & Geometry

- Sheet Name: `Pipe_Detail_Summary`
- Description: Contains the core physical attributes for every pipe in the model.
- Key Columns:
  - `Name` : Pipe identifier.
  - `Hydraulic Diameter` : Inner diameter used for calculation (includes units).
  - `Length` : Total length of the pipe segment.
  - `Absolute Roughness` : Internal pipe roughness factor.

3. Elevation Profile (Summary)

- Sheet Name: `Pipe_Elevations_Summary`
- Description: A high-level vertical profile analysis for each pipe, useful for spotting high points or elevation drops quickly.
- Key Columns:
  - `Start Elevation` & `End Elevation`: Vertical position at endpoints.
  - `Max Elevation`: The highest point along the pipe (critical for identifying cavitation risks).
  - `Elevation Change`: Net vertical difference.

4. Component Tables

- Sheet Names: `Control_Valve_Table`, `Assigned_Pressure_Table`, `Valve_Table`
- Description: Specific configuration data for active components.
- Key Columns:
  - `Name` : Control Valve identifiers
  - `Initial Pressure` : Initial pressure of the valve

5. Detailed Elevation Segments

- Sheet Name: `Elev_[PipeName]` (e.g., `Elev_P101`)
- Description: These sheets provide row-by-row data for every calculation segment along the pipe.
- Usage: Perfect for generating precise "Distance vs. Elevation" profile graphs in Excel.

Happy Parsing!