Table of Contents

[ Purpose 2](#_Toc96258862)

[ Set up 2](#_Toc96258863)

[1. Add-Ins 2](#_Toc96258864)

[2. Naming 2](#_Toc96258865)

[ Contents 2](#_Toc96258866)

[ Sheet 1 – “Countermeasures” 4](#_Toc96258867)

[o Tag and Descriptor Columns - Data Validation 8](#_Toc96258868)

[o Tag and Descriptor Columns - Other Properties 10](#_Toc96258869)

[ Sheet 2 – “Control Center” (Macros) 11](#_Toc96258870)

[1. Create Calendar 11](#_Toc96258871)

[2. Create KPI Charts 12](#_Toc96258872)

[3. Create Tag and Descriptors 13](#_Toc96258873)

[o Main Tag Table: 14](#_Toc96258874)

[o Tag by Category Table: 14](#_Toc96258875)

[o Category Table: 15](#_Toc96258876)

[o KPI Table: 16](#_Toc96258877)

[o Entry Descriptor Table: 16](#_Toc96258878)

[4. Create Pivot Charts 16](#_Toc96258879)

[5. Generate Report 17](#_Toc96258880)

[o Monthly Report PPT Addition 17](#_Toc96258881)

[6. Add New Entries 18](#_Toc96258882)

[7. Update Countermeasures 19](#_Toc96258883)

# Purpose

This file will contain documentation for understanding and utilizing the tools within the “MDI Dashboard.xlsm” excel-macro workbook. This file is designed to help input, maintain, and interpret MDI data. Data validation macros and user-forms help maintain data integrity and consistency. Data analysis macros can create calendars, reports, tables, and graphs.

It is important for the user to experiment with the macros and user-forms to get a sense of the data and their purposes. This following document will help describe the nuances of data and macros within this sheet.

# Set up

## Add-Ins

This file requires several tools to be installed in the VBA project. To turn on the tools, go to file >> options >> customize ribbon >> and select the developer tab. After that, open the VBA window, go to tools >> references and make sure the following are selected:

* Visual Basic for Applications
* Microsoft Excel 16.0 Object Library
* OLE Automation
* Microsoft Office 16.0 Object Library
* Microsoft Forms 2.0 Object Library
* Microsoft Scripting Runtime
* Microsoft PowerPoint 16.0 Object Library

## Naming

As with all VBA applications, the consistent naming of modules, sub procedures, sheets, excel list objects, and excel table headers are important for function. If you change the naming or column header of one table, it can be difficult to know where else that name needs to be changed for the macros to function properly. It is advised that you keep as much close to the original as possible to maintain 100% functionality.

# Contents

This VBA application contains a data table and several macros for inputting and reporting. The macros consist of:

* Create Calendar
  + A report that creates an excel calendar worksheet of one year that identifies days where an incident or issue was recorded for a specified category
* Create KPI Charts
  + A report that creates a sheet and subsequent graph, which depicts what KPIs were hit over an interval of the user’s choice.
* Create Tag and Descriptors
  + A report that compiles all the tags, categories, KPIs, and other identifiers that were recorded in the MDI data table over an interval of the user’s choice.
* Create Pivot Chart
  + A report that creates a pivot chart based on the user’s choice of a column of the main data table. Features include filtering by category, by total occurrences of the event, and displaying the graph as a bar chart or running total.
* Generate Report
  + A report that transfers data from a user specified interval from the main data table to a PowerPoint presentation. A static ppt template file must be present in an adjacent folder for success. Details on implementation below.
* Add New Entries
  + Generates a user-input form to streamline data entry to the main data table. Features include dynamic drop-down lists and error handling.
* Update Countermeasures
  + A macro that reverts the main data table to the original format

# Sheet 1 – “Countermeasures”

On this sheet there is one table, named: “Tbl\_Counter.” This table houses all the MDI data that is run through other macros throughout the file. All the naming conventions of this sheet and its contents should not be changed. In other words, the sheet name must remain “Countermeasures,” the table name must remain “Tbl\_Counter,” and the column headers should not be moved nor changed [(exceptions see Tag and Descriptor section](#_Tag_and_Descriptor)). Information on the columns and their properties is below:

| **Column Title** | **Meaning** | **Example/Format** | **Multiple entries/cell?** | **Data Validation?** |
| --- | --- | --- | --- | --- |
| Issue ID | Unique ID number. They should not repeat, even for extensions. | “221, “290”  ### | No | No |
| Issue Tier 1 Tag | A categorization word or phrase describing the general nature of the “Issue” cell.  TAG COLUMN | “Alarm,” “Substance Issue” | No | Yes |
| Issue Tier 2 Tag | A categorization word or phrase describing a more specific nature of the “Issue” cell.  TAG COLUMN | “CIP,” “Dry Link,” “Material Exposure” | No | Yes |
| Cause Category | A categorization word or phrase describing the general nature of the “Cause” cell. (These specific labels can be found in Veeva if quality event).  TAG COLUMN | “Equipment Failure,” “Insufficient Instruction” | No | Yes |
| Cause Detail | A categorization word or phrase describing a more specific nature of the “Cause” cell. (These specific labels can be found in Veeva if quality event).  TAG COLUMN | “Decision Error,” “Lacking Instruction” | No | Yes |
| Issue Date | The date of the issue recorded. | Any date data type (“21-Sep-21”) | No | No |
| Category | The category, domain, or department that oversees or is impacted by the issue. | “Quality,” “Safety,” “Delivery” | No | No |
| KPI | A specific descriptor of the problem that is unique to the associated category. | “Safety Incident”  “Osha Recordable”  “Open Deviation” | No | Yes |
| Entry Descriptor | A unique descriptor of the entry, often found in other documentation/data systems (i.e., Veeva, EHS, etc).  DESCRIPTOR COLUMN | “QE-XXXX,”  “Corp. Safety 45” | No | Yes |
| Primary Equipment | The primary equipment(s) involved in the issue. (Multiple pieces of equipment should be delimited with a (“; \_”).  DESCRIPTOR COLUMN | “X-4385,” “049,”  “X-2084”  “X-0001; X-0002” | Yes | Yes |
| Manufacturing Stage | The stage(s) involved in issue. (Multiple pieces of equipment should be delimited with a  (“;\_ ”).  DESCRIPTOR COLUMN | “Synthesis”  “Stamping”  “Trimming”  “QC; Shipping” | Yes | Yes |
| Batch | The batch(es) involved in the issue. (Multiple pieces of equipment should be delimited with a (“;\_”).  DESCRIPTOR COLUMN | “10001,”  “10002,”  “10003; 10004” | Yes | Yes |
| Quality Classification | The quality designation of the issue, found from Veeva.  DESCRIPTOR COLUMN | “Minor”  “Major” | Yes | Yes |
| Safety Tier | The safety designation of the issue, from EHS.  DESCRIPTOR COLUMN | “Safety Tier 1”  “Safety Tier 2” | No | Yes |
| Issue | A description of the issue. Filled out in complete sentences. | “A pool of a liquid was found on the floor in room number XYZ” | No | No |
| Cause | A description of the cause of the issue. Filled out in complete sentences. | “A pipe in the room on equipment X-0000 was misaligned” | No | No |
| Countermeasure | After the issue is resolved, a description of the countermeasure/resolution that went into place for the issue. | ‘Scheduled preventative maintenance under protocol XYZ” | No | No |
| Owner | The owner of the issue/event. | “First Name Last Name” | No | No |
| Date Due | The date the resolution of the issue/event is due. | Any date data type (“21-Sep-21”) | No | No |
| Date Closed | The date the issue/event was closed, and the resolution/report submitted. | Any date data type (“21-Sep-21”) | No | No |
| Status | If not yet closed, “Open.” All else “Closed.” | “Open,” or “Closed” | No | No |
| Issue Year | Auto populated from issue date. Issue year. | “2020”  “2021” | No | No |
| Issue Month | Auto populated from issue date. Issue month. | “1,” “3,” | No | No |
| Month Name | Auto populated from issue date. Issue month name. | “January” | No | No |
| Day of Month | Auto populated from issue date. Issue day of month. | “12” | No | No |
| Yr-Month | Auto populated from issue date. Concatenation of issue year and month. | “2020-7” | No | No |
| Days until Due | Days from issue date to assigned date due. | “16” | No | No |
| Day Completed | Days from issue date to date closed. | “16” | No | No |
| On Time? | If days completed < days until due -> “Yes” | “Yes,” “No” | No | No |
| Early and Overdue Differential | (-/+). (-) means entry closed before due date. (+) means entry closed after due date. | “-4,” “2” | No | No |

There are two groups of columns that are fundamentally different from the rest. These are the tag columns and the descriptor columns. The tag columns exist between the “Issue ID” and “Issue Date” columns (exclusive). The descriptor columns exist between the “KPI” and “Issue” columns (exclusive). They have been labeled above as well. These columns have unique properties. One main property they have is dynamic data validation.

### Tag and Descriptor Columns - Data Validation

Only the tag columns, the descriptor columns, and the KPI column have data validation. The data validation is dynamic, with some restrictions. To activate data validation, double click on the cell. A drop-down menu will be produced. For the “tag” columns (“Issue ID” -> “Category”) the data validation drop down is based on the “Category” cell in that row. For example, if the cell with data validation is the “Issue Tier 1 Tag” and the row’s “Category” column is “Quality,” then the drop down will consist of “Issue Tier 1 Tag” values where the “Category” for that row was “Quality”:

Graphical user interface, application, table, Excel

Description automatically generated

Here, we can see the drop-down menu is populated with entries that match other “Quality” rows within that cells’ column. This feature is to help develop separation between tags among categories, if desired. Once the drop down is activated, the cell will not allow you to enter in something not within that specific drop down. Drop-down lists will only activate if the “Category” cell in that row is non-blank. To get rid of the drop down, simply right click the cell. Now, you should be able to enter in whatever you want into the cell as the drop down will be removed. If you wish to add something to that cell that hasn’t been used before, right click the cell to get rid of the drop down. After that, you can enter in anything into the cell. Then, if you re-double click and re-activate the data validation, the new cell value will be present within the drop-down and will be present for other drop downs in that column with that “Category”.

Graphical user interface, application, table, Excel

Description automatically generated

This feature allows great flexibility when organizing your tags, KPIs, and other entry descriptors. However, users cannot have a cell with multiple entries AND double click for a data validation drop-down. This will produce an error. If a use produces this error, they should click cancel and then right click the cell to get rid of the drop down:

Graphical user interface, application, table, Excel

Description automatically generated

A cell with multiple entries cannot populate a drop-down in the same cell, however, these multiple entries will populate in drop downs for other cells individually:

Graphical user interface, table

Description automatically generated

Although the drop-down cannot process items separated with a “;\_” in the immediate cell, the inclusion of these entries in other data validation drop-down lists helps maintain a consistent list of entries.

### Tag and Descriptor Columns - Other Properties

One final word on this table, the columns in between “Issue ID” and “Category” (Tag columns) as well between “KPI” and “Issue” (Descriptor columns) have unique properties. A lot of the macros in this workbook draw on these columns, and as such it can be useful for departments/organizations to alter these labeling conventions to fit their needs. These two groups of columns are flexible. They can be deleted, additional columns can be added, and/or their column titles can change. Changing any of these properties will not affect the component of data validation nor their interaction with the macros if the changes are contained within the column boundaries listed above. So, for example the sheet will not be damaged if you add a column in between “Issue Tier 2 Tag” and “Cause Category,” or change one of their column names, but it will be compromised if you add a column between “Category” and “KPI,” or change the “Category” column header to “New Item.” Likewise, you cannot change any column names outside of these groups of columns, otherwise the macros that refer to specific column headers will be invaluable.

However, there is an exception to this exception. The macros using the “Add New Entry (7)” user-form tie directly to the original, named columns. Changing the column names may hinder these macros’ ability to complete, without fixing the hardcoded VBA variables in the modules.

# Sheet 2 – “Control Center” (Macros)

This sheet is the center for executing macros to create calendars, reports, and tables. Because the buttons on this sheet affect many processes, the buttons’ names, the macros within them, and the sheet’s name cannot be changed. The buttons are displayed as such:

Graphical user interface, application

Description automatically generated

1. Create Calendar

This macro creates a calendar depending on a desired category. To create a calendar, select the button, type the full length of the year (e.g., “2020”) and select a category from the drop-down menu. Only categories previously entered within the “Category” column of the “Tbl\_Counter” table will populate.

After clicking OK, the macro will create a calendar for that specific year on a sheet labeled “[Category] Calendar.” If that sheet name already exists, i.e., there is a calendar for that “Category” already within the file, this macro will delete the old one and replace it with the new one. On the top row of the sheet will be the desired “Category” along with any KPIs that were used for that “Category” within the “Tbl\_Counter” table.

Next, the macro automatically scans the “Tbl\_Counter” table for issue dates where the associated category matches the “Category” selected. If they match, the calendar turns that cell from green to red, indicated a KPI was hit on that date.

In the top right cell of the sheet is an “Update” button. If the button is pressed, it will do the scanning once again. If new dates are added in the “Tbl\_Counter” with the matching “Category” those new dates will turn red. Likewise, if a date was taken away then that date will be turned green.

Creating a new calendar for a category of a specific year does the same as updating an already made calendar for that same category and year.

1. Create KPI Charts

This macro creates a table and chart depicting the frequency of KPI’s hit within a specific length of time of a desired “Category”. Users have the option of analyzing a singular month, a quarter, a year, a customized length of time (month A year A - month B year B), or all the data in the table.

After selecting an option, like this:

Graphical user interface, application, Word

Description automatically generated

The macro will do several things. It will create monthly tables containing information of KPIs hit for individual days. The macro will also create a summary table containing holistic monthly results of KPIs as well as the running total of total KPIs hit. Lastly, it will create a chart depicting this monthly information.

For example, the result of the desired output above is:

Graphical user interface, application, table, Excel

Description automatically generated

The blue tables on the bottom are the monthly tables. This macro creates a monthly table for each month in the time frame. The tables’ columns are the days in that month, and the data range for the tables house all the KPIs that occurred on that day. The leftmost column indicates the total number of KPIs on a day. So, for example, if on October 1st both an “Open Deviation” AND a “Deviation Extended” KPI occurred, then the results would look like this:

The second KPI would be listed under the first KPI, up to 10 total KPIs in a day. That limit can be changed within the VBA procedure, but it is hardcoded. Ideally, a maximum of 10 KPIs per day is sufficient for the time being.

Lastly, if a user physically copies and pastes KPIs around within the monthly tables, the summary table will not automatically populate with results. If you wish to change results, it’s best to fix it within the “Tbl\_Counter” table and rerun the macro. Also, just like the previous macro, re-running the macro will delete any sheet titled “KPI Chart” and re-make one with the new inputs.

1. Create Tag and Descriptors

This macro creates several lists/tables outlining the different tag and descriptor columns used in the “Tbl\_Counter” table. Just like the previous macro, this macro can be completed for a set or a custom length of time. Also just like the previous macro, this macro deletes any current version of the sheet “Tag and Descriptor Tables,” and replaces it with the new data.

The macro creates 5 main tables (or groups of tables): a main tag table, a tag by category table, a category table, a KPI table, and a descriptor table. Each table depicts its data in a slightly different way. All tables have roughly the same color convention. The formatting code is always present immediately above the desired table. From left to right, we will cover the contents of the tables.

### Main Tag Table:

Chart

Description automatically generated with medium confidence

This table depicts all the different kinds of tags used within the “Tbl\_Counter” table and counts their frequency. The columns headers of this table match the column headers between the “Issue ID” and “Issue Date” columns. These columns are the tag columns.

The table populates with all the unique entries of these columns within the specific tied frame. If the time frame was selected for a specific month, quarter, year, etc, then the tags and their counts would only be present if they occurred within that time frame. This property relates to all the other tables as well.

This table is useful to see the kinds of tags used across different tag columns. Tags that are used amongst multiple Tag columns are highlighted dark blue.

### Tag by Category Table:

The next table links the tag columns with all the used “Categories”. So, for example if the “Tbl\_Counter” table contains 4 tag columns: “Issue Tier 1 Tag,” Issue Tier 2 Tag,” “Cause Category,” and “Cause Detail,” and actively utilizes 3 categories: “Cat1,” “Cat2,” and “Cat3,” then this table will have 4 sections (one for each tag), each with 6 columns (2 per category – one for category title, one for count). So, for example, in the “Issue Tier 1” section there will be columns of:

* “Cat1 – Issue Tier 1 Tag,”
  + “Cat1 – Count,”
* “Cat2 – Issue Tier 1 Tag,”
  + “Cat2 – Count,”
* “Cat3 – Issue Tier 1 Tag,”
  + “Cat3 – Count”

The contents of these columns will consist of the “Issue Tier 1” tags where “Cats 1/2/3” were used. Again, the time frame is chosen at the beginning of the macro.

These groups of tables are the longest in the sheet and can increase in size depending on if an additional “Category” was added or a new tag column was added.

Table

Description automatically generated

These tables are useful in observing which tags are used by which categories. Tags that are used within multiple “Categories” are highlighted gold. Tags that are used amongst multiple Tag columns are highlighted dark blue.

### Category Table:

A table depicting the different categories and their total counts for the desired time frame.

Table

Description automatically generated

### KPI Table:

A table depicting the different KPIs and their total counts for the desired time frame.

Table

Description automatically generated

### Entry Descriptor Table:

A table that depicts the different entry descriptors (Primary Equipment, Batch, etc) used within the desired time frame. This table can accommodate any added or deleted entry descriptor columns within the “Tbl\_Counter” as defined in the [Tag and Descriptors section](#_Tag_and_Descriptor).

A picture containing chart

Description automatically generated

### Tag Search Feature

On the left of the sheet is a button labeled “Test for Tag.” In this cell, you can type words and if you press the button, it will show you exact matches and matches partially containing your query below it, and where on the sheet it is located.

1. Create Pivot Charts

This macro populates a user-form that identifies a certain column in the “Tbl\_Counter” table and asks to create a pivot table or chart depending on the desired “Category.” The user-form also asks what threshold of frequency to pull data from:

Graphical user interface, application

Description automatically generated

This^ resulting pivot table will depict the different “Issue Tier 1 Tags” used for Quality where they occurred at least once:

Chart, bar chart, box and whisker chart

Description automatically generated

The macro replaces any sheet named “Trend Table” if “trend summary” selected, and same with “Running Total Table” if “running total” selected. The data pulled into these charts is from the entire “Tbl\_Counter” table, but these pivot tables can always be amended afterwards to reduce or increase the time frame, among other properties.

1. Generate Report

This macro asks for a specific time frame and essentially populates important information from the “Tbl\_Counter” into a new sheet. The macro also produces a summary table of categories and KPI’s hit. This macro deletes and replaces any sheet named “Monthly Report.”

### Monthly Report PPT Addition

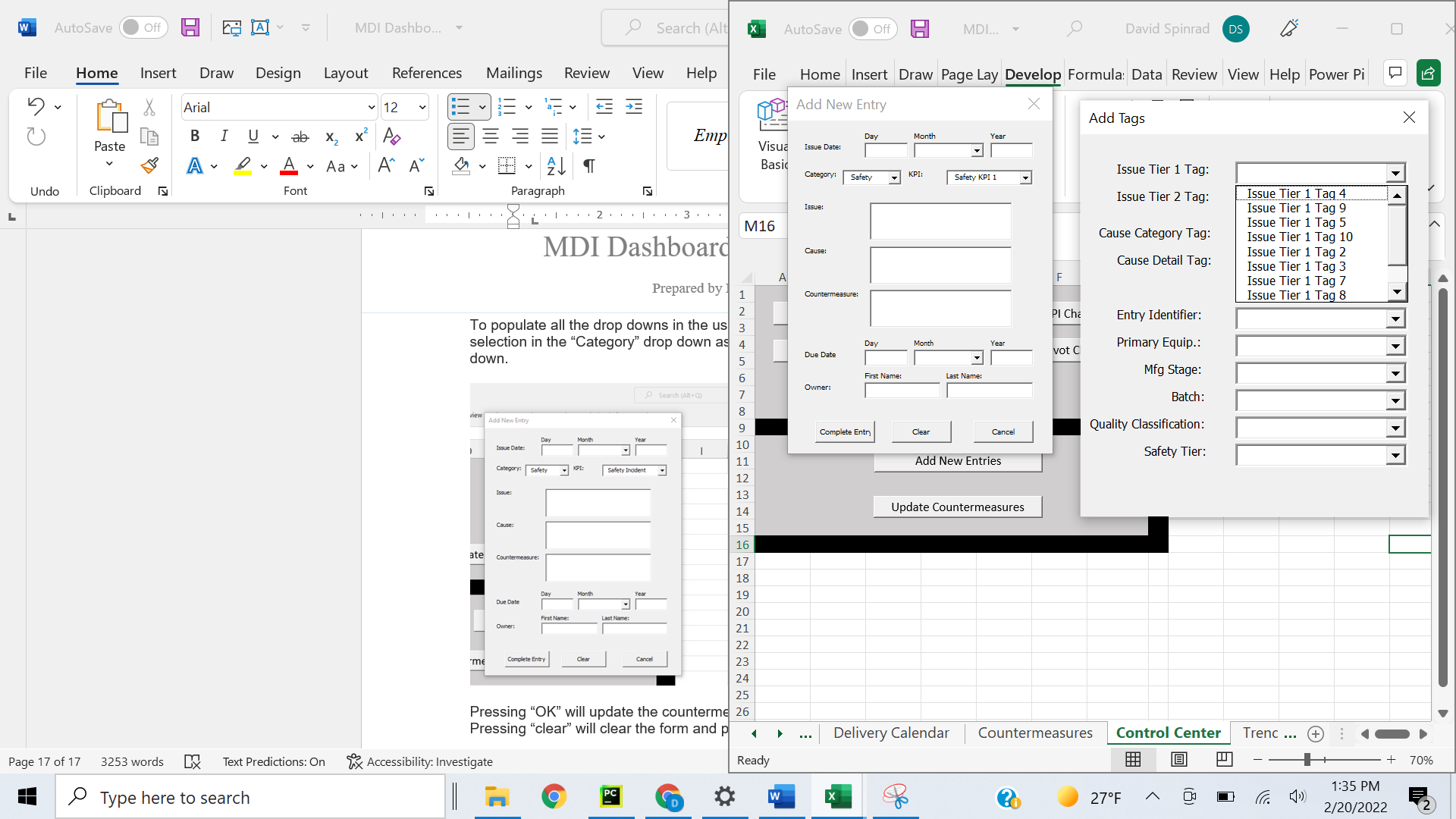
Running this macro will also produce a PowerPoint displaying open and closed MDI entries catalogued within that month. The macro uses a PPT Template (.potx) file to produce a presentation of the data selected. The file path of the .potx file must be manually inserted into the subroutine. In The Basic\_Reports Module >> CreatePPTReport subroutine, scroll down and you will see a comment " 'link new PowerPoint presentation to template." Directly below that you will see the string to input the file path of the .potx file. If the user does not have access to that folder, the latter half of this macro will produce an error.

1. Add New Entries

This macro is useful to streamline the addition of new entries into the “Tbl\_Counter” so people do not have to figure out how to use the table. The macro populates a user-form that is largely validated. It requires entries the following sections to be filled in to avoid errors:

| **Entry** | **Datatype** |
| --- | --- |
| Issue Date - Day | DD |
| Issue Date - Month | String |
| Issue Date - Year | YYYY |
| Category | String |
| KPI | String |
| Issue | String |
| Cause | String |
| Due Date - Day | MM |
| Due Date - Month | String |
| Due Date - Year | YYYY |
| Owner - First Name | String |
| Owner - Last Name | String |

To populate all the drop downs in the user-form, the user must make a non-blank selection in the “Category” drop down as well as a non-blank section in the KPI drop down.



Pressing “OK” will update the countermeasures table with the info in the user-form. Pressing “clear” will clear the form and pressing “cancel” will cancel the form.

If the user changed the Tag or Descriptor columns, running this macro may produce an error, but the main data will still be entered.

1. Update Countermeasures

This macro updates the “Tbl\_Counter” table to conform with the conditional formatting standards. In the tag and descriptor columns, empty cells are turned orange. In the KPI column, empty cells are turned red. “Open” status cells are turned red, “Closed” status cells are turned green.