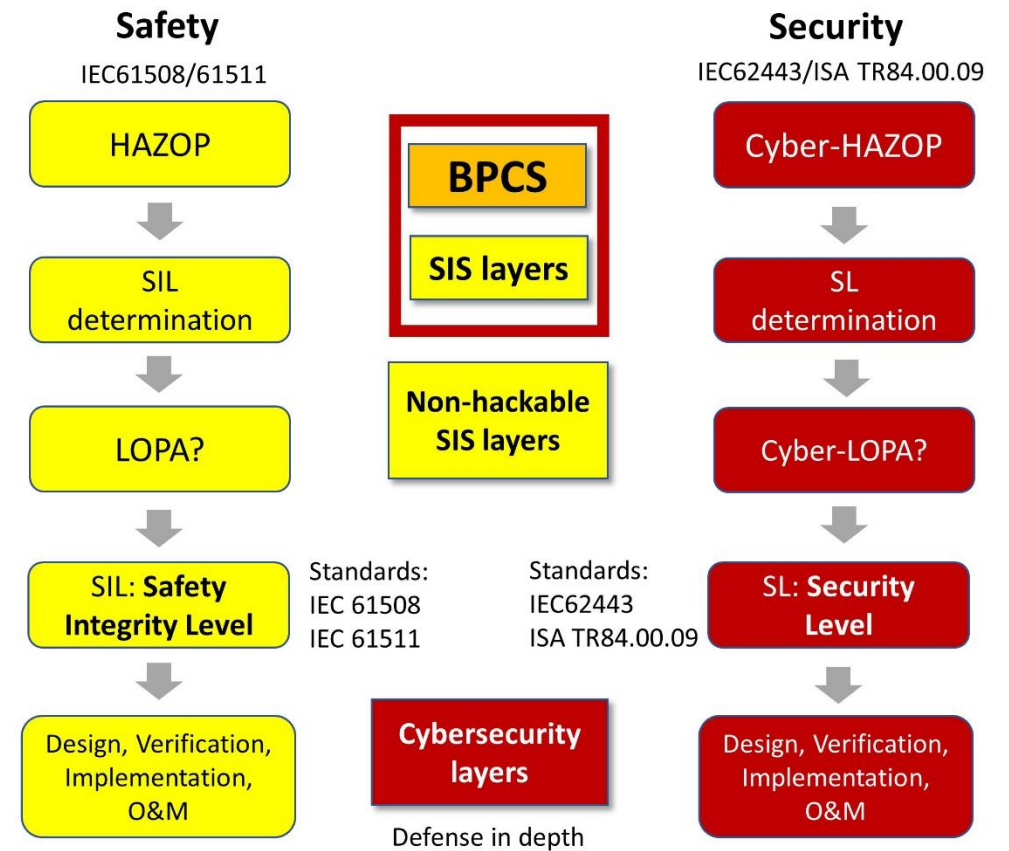


User Manual

Risk Analysis Excel Tool 1.1



Introduction

This document is a **user guide to explain the main features and options of this tool**. It does not contain descriptions or explanations about safety or cybersecurity.

When using this tool it is advisable to have some knowledge about HAZOP/LOPA methodologies.

This tool is used in the following training course:

English: “Cyber Hazop Analysis” ([read more](#))

Spanish: “Análisis Ciber HAZOP” ([leer más](#))

Technical Requirements

The tool contains macros to perform some functions such as create new templates, duplicate sheets, insert rows, generate reports, etc. To use these options it is necessary to enable macros in the Excel options. The tool can be used without macros although some functions will not work.

Technical requirements of this Excel tool (*): Windows 7 or later, and Excel 2010 SP2 or later.

(*) Important: To ensure the correct operation of Excel macros, it is very important to have the latest Office and Windows updates installed (if Office 2010 is used, it is essential to install Service Pack 2).

Minimum hardware requirements: Multi core processor, 8 GB RAM.

We recommend Windows 10 and Office 2013, 2016, 2019 or 365.

In case of any error send us the following data: Operating System (Windows version, 32 or 64 bits), Office version (2010, 2013, 2016, 2019 or 365, 32 or 64 bits) and description of the error.

(email to: info@safetyandsis.com)

Note: The tool can be used on Mac computers although the macros have not been tested and may not work.

Type of sheets

Sheet name	Content	Remarks
Matrix (red tab)	Risk Matrices for Safety and for Cybersecurity (used by formulas in other sheets).	User can modified the following: -Matrices 1B, 10B, 11B, 12B. -Tables 5, 15, 20.
RiskGraph (red tab)	Typical “Calibrated Risk Graphs” for SIL determination.	-Bottom Tables are used by calculations in other sheets when “Risk Graph” is selected.
P2 (red tab)	Table to calculate cyber attack probability (mainly used for “detailed cybersecurity assessment”).	-Top Table 50 is for manual use at any moment. -Bottom cells with formulas are used by other sheets (mainly by sheets with brown tab color).
MASTER	Master Template for HAZOP-LOPA-CyberHAZOP-CyberLOPA	-Master Template used by macro “Create Template”. -Rows 5&6 are the master rows used by macro “Insert IE”.
Selections	List of options used by drop-down selections in other sheets.	User can modified the colored cells.
U1/U2/U3	Empty sheets for the user.	
M3b/M4/...	Risk Analysis Templates with examples or course exercises.	-Normally it contains the same fields as the MASTER sheet. -Use the macros “Insert row”, “Delete row”, “Insert IE”, “Delete IE” to make sure all formulas are correct.
R1/R2/... (blue tab)	The content is generated by macro “Create list on sheet Rx”.	Sheets used to generate reports from the risk analysis templates.
D-Ass (brown tab)	Template for “Detailed Cyber-Risk Assessment”.	-Enter or delete rows or columns manually. -Copy new rows or columns manually.
SLver (brown tab)	Template for “SL Verification”	-Enter or delete rows or columns manually. -Copy new rows or columns manually.

How to create a new Template

1-Click on blue button “MF” to open this user-form

2-Click on yellow button

3-Enter sheet name

This macro creates a new sheet by copying the MASTER sheet with the number of I.E. entered. Before starting a new project it is advisable to update or translate the headers of the MASTER sheet (headers in rows 2-3-4, new columns, etc.). In the MASTER sheet there must be 2 causes (or initiating events) in rows 5 and 6.

4A-Enter “Number of IPL per Initiating Event” and “Number of I.E.”
4B-Select sheet “NewTemplate”.
4C-Click on “Create Template”.

Link for Help Video [“Create new template”](#)

How to use the new Template

There are 4 areas on the sheet:

- HAZOP (marked in yellow): fill in the data in the white cells. Select the method for calculating the Risk Gap (with the safety matrix of the "Matrix" sheet, or with the Risk Graph of the "RiskGraph" sheet).
- LOPA (marked in orange): Fill in the data in the white cells.
- Cyber HAZOP (marked in dark red): Fill in the data in the white cells.
- Cyber LOPA (marked in dark red): Fill in the data in the white cells.

Safety														
Deviation	Initiating Event	Consequences	SEVERITY (UR)					UR	R.Gap method>	R.Matrix	IPL	Safety Credit	Recommendations	Action by
			Saf.	Env.	Bus.	SEV.	P							
High Pressure	Control Loop failure	Vessel explosion affecting people and environment.	5	4	4	5	4	3	PRV	1	PRV must be calibrated for this scenario.	To be checked by J.P.		
			1	1	1	1	1	0						
			1	1	1	1	1	0						
			1	1	1	1	1	0						
			1	1	1	1	1	0						

Note 1: The sheet is protected but without password to avoid unintentional modification in cells with formulas (cells normally colored).

Note 2: It is possible to insert new columns but it is not recommended if we later insert new "Initiating Events" with the macro "Insert IE" (this macro copies the IE of the "Master" sheet which should have the same columns as the new Template.).

Note 3: Insert rows or new "Initiating Events" using the macros (see next page).

Link for Help Video ["Create new template"](#)

How to insert a row or a new Initiating Event

First select the sheet where you want to insert or delete.

Change Risk Matrix				HAZOP-LOPA sheets				
Scr.	Sht	Rx	Safety 0	Security 0	Vul.-Threat Matrix 0	Row	Insert row	Delete row
Add/Delete sheet			T.Freq. 1	Toler.Freq. 1	Target Attractiveness 0	14	Insert IE	Delete IE

Note: Please note that the HAZOP template uses merged cells and single cells with cross-referenced formulas. If a row is inserted **manually** some formulas on the right side of the sheet are **not modified correctly**. **If we use the macro to insert rows the macro automatically corrects the formulas.**

Empty rows can be inserted between I.E. or between groups of I.E. to create titles or headers (enter the letter "h" in column C to fill in the row of the selected color).

Link for Help Video [“Create new template”](#)

How to duplicate an existing sheet

1-Click on blue button “MF” to open this user-form

2-Click on yellow button

3-Select sheet to be duplicated

This macro creates a new sheet by copying the “sheet to be duplicated”.

4A-Enter name of new sheet (e.g.: “HAZOP2”).

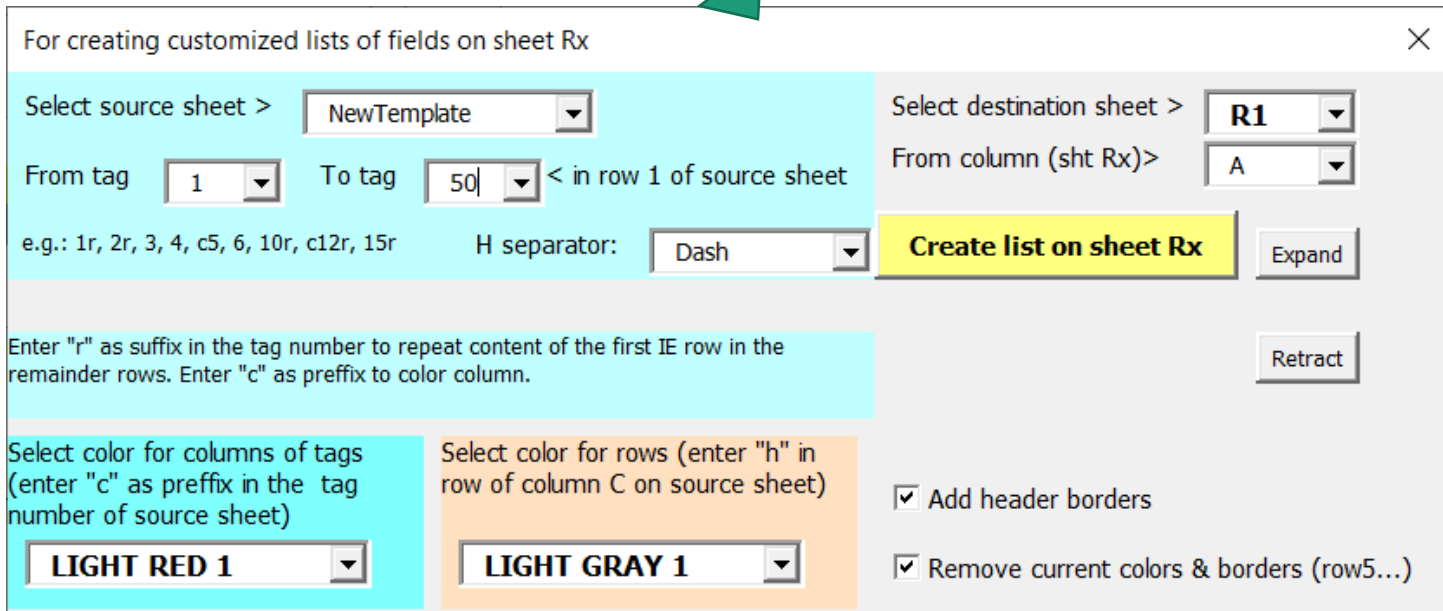
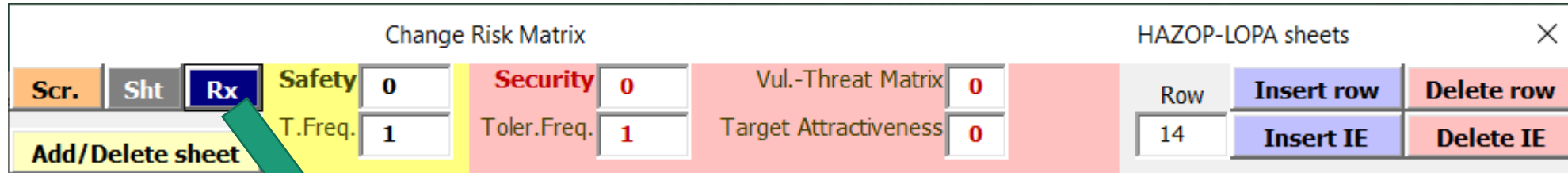
4B-Select “Duplicate after sheet” (e.g.: “NewTemplate”).

4C-Click on “Duplicate sheet”.

Link for Help Video [“Duplicate a sheet”](#)

How to create a report on "Rx" sheet

Sheets R1/R2/R3/.../R8 are used to create custom reports with data from other sheets.



Enter in row 1 of the source sheet the order number of the fields to appear on the "Rx" sheet (e.g. 1, 2, ...). This number can be preceded by the letter "c" (to fill the whole column with the selected color), or the letter "r" can be added (to repeat in the "Rx" sheet the texts of the rows with merged cells). Example row 1: 1r, 2r, 3r, 4, c5, 6, 10r, c12r

Enter the letter "h" in column C (of source sheet) to fill in the row of the selected color.

Enter "x" in column C in the rows that should not appear in the report, or hide them manually or using Excel's autofilter.

It is possible to create reports with data from different sheets.

Link for Help Video ["Create a report"](#)

How to change the position of sheets, or hide/unhide

Use button “Sht”

Change Risk Matrix

Scr.	Sht	Rx	Safety	0	Security	0	Vul.-Threat Matrix	0
Add/Delete sheet			T.Freq.	1	Toler.Freq.	1	Target Attractiveness	0

HAZOP-LOPA sheets

Row	Insert row	Delete row
14	Insert IE	Delete IE

Change position of sheets

List of Sheets

- S0
- NewTemplate
- Matrix
- P2
- RiskGraph
- M3b
- R1
- M4
- R2
- M4_2
- R3
- M5_1
- M5_2
- R4
- M5_3
- R5
- D_Ass
- R6
- SLver
- R7

Select sheet in ListBox and use buttons

Move down Move down: to move sheet to the right.

Move up Move up: to move sheet to the left.

Hide or Show selected sheet.

Hide/Show

Rapid modification of risk matrices

To modify cell M1 on "Matrix" sheet.
Values:
1: move up table.
-1: move down table.
2: move right
-2: move left
3: move up & right
-3: move down & left

To modify cell M33 on "Matrix" sheet.
Values:
1: move up table.
-1: move down table.
2: move right
-2: move left
3: move up & right
-3: move down & left

To modify cell F46 on "Matrix" sheet.
Values:
1: move up table.
-1: move down table.
2: move right
-2: move left
3: move up & right
-3: move down & left

Change Risk Matrix				HAZOP-LOPA sheets				
Scr.	Sht	Rx	Safety 0	Security 0	Vul.-Threat Matrix 0	Row	Insert row	Delete row
Add/Delete sheet		T.Freq. 1	Toler.Freq. 1	Target Attractiveness 0	14	Insert IE	Delete IE	

Cell F4: Multiplier factor of the maximum tolerable frequency per year (by default =1).

Cell F36: Multiplier factor of the maximum tolerable frequency per year (by default =1).

To modify cell N46 on "Matrix" sheet. Values:
1: move up table.
-1: move down table.

Link for Help Video "[Modify Risk Matrices](#)"