

AVOID EXCEL HORROR STORIES

How to excel at creating reliable,
user-friendly spreadsheets



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CHECKLIST

Here is a complete checklist of all the main tips from the book organised by chapter. You can print this out for reference and add notes to it if you wish. If you need to refresh your memory on any point, then please refer to the relevant chapter in the book.

Chapter 1: Be prepared

- Decide if a spreadsheet is the best solution
- Get trained
- Plan your spreadsheet and consider:
 - Purpose and scope
 - Users
 - Language
 - Reporting currency and units
 - Time, budget and data available
 - Content and functionality
 - Period structure
- Document your design

Chapter 2: Follow Gary's Golden Ground Rules

Rule #1 – Use a clear, logical workbook structure

- Spread content logically over worksheets
- Include a cover sheet, ideally with hypertext links to facilitate navigation
- Separate inputs, calculations and outputs

Rule #2 – Keep your worksheets as clear and simple as possible

- Use a logical structure within each worksheet
- Use consistent columns, row, formulas and whole sheets
- Formulas
 - Ensure calculations flow from left to right and from top to bottom
 - Use the KISS principle: keep it short and simple
 - Follow formula priorities: (i) correct, (ii) understandable and (iii) short
 - Follow the COUNT principle: calculate once, use numerous times

Rule #3 – Use a clear, clean, consistent design

- Use consistent (company-defined) fonts, colours and styles
- Use the four key design principles: contrast, repetition, alignment and proximity

- Clearly mark all inputs, for example as grey cells
- Minimise non-data ink e.g., borders

Rule #4 – Restrict access, inputs and changes

- Restrict access to the spreadsheet using folders with restricted access and passwords
- Use data validation where relevant to help ensure inputs are valid
- Consider protecting workbooks so that changes can only be made in input cells

Rule #5 – Write instructions for users

- Create a worksheet with an action list for users to follow
- Add a status column to ensure progress is clear

Chapter 3: Learn from horror stories

Get the basics right

- Decide if a spreadsheet is the right tool for the job
- Do not be complacent and think ‘it will never happen to me’
- Get trained or use suitably trained staff
- Follow the Golden Ground Rules
- Always review and test your spreadsheets and ideally have someone else do that as well (so-called ‘four eyes principle’)

Mistakes in usage

- Organise your data well
 - Do not use hidden rows or hidden columns or otherwise hide data; use row/column groupings
 - If appropriate, group data into separate blocks
 - Consider extra column(s) for filtering
- Special tips for sensitive/confidential data
 - Be aware of the risks
 - Separate such data from the rest; if appropriate, store such data in a separate file with restricted access
 - Never send or publish Excel files with pivot tables based on sensitive/personal data; do not rely on pivot table options to protect this data
 - If you want to send or publish aggregated results (only), use PDFs or create a ‘sent version’ with only outputs and no data details; break all links to source files
- Use clear version control to ensure only the latest version of a spreadsheet file is used

- Store spreadsheets on the server or in the cloud (OneDrive) and do not send via e-mail if you can avoid it
- Use an agreed folder structure and an agreed model naming convention
- If files are sent back and forth, be clear who has the ‘master version’

Incorrect inputs

- Get the basics right
 - Know your business and train your users
 - Implement checks early in your spreadsheet development
 - Implement controls also in the surrounding processes e.g., expert review
- Organise your inputs and source documents
 - Obtain and store source documents
 - Clearly mark input data and quote your sources
- Avoid input errors
 - Follow the Golden Ground Rules, notably #4
 - Choose a suitable standard currency and unit for monetary values in your workbook and use it consistently throughout e.g., thousands of US dollars
 - Only vary from the standard unit for good reason, and in such cases (i) clearly state the units used and (ii) always use the standard unit for results
 - Use clear labelling including units
 - Define and use a sign convention, e.g., income and cash inflows positive, costs and cash outflows negative, all balance sheet values generally positive
 - Construct your spreadsheet to reduce the risk of sign errors, e.g., inputs generally positive or use separate rows for positive and negative number inputs
 - Clearly mark any missing, uncertain or unknown inputs, for example, you can make the text red or the background yellow; review and update these before spreadsheet completion
 - Use data validation
 - Do not ‘right align’ cells with numbers or dates because this hide text numbers that you want to identify and correct
 - Convert any numeric data stored as text to numbers: either multiply by one or use ‘convert text to columns’
- Check for errors
 - Increase the visibility of significant inputs by showing them on the dashboard or cockpit
 - Use Excel background checks (‘green corners’)
 - Add checks on your totals
 - Check, validate and sense-check your inputs: ideally, get someone else to check them too

- Review your results and if possible, compare to prior data: large, odd results or variances could indicate incorrect inputs

Hard-coded values

- Do not hard-code
- Always show data, assumptions, adjustments and factors clearly as inputs
- Clearly mark any temporary hard-coding used for test purposes and remove after testing

SUM and other calculation errors

- Use AutoSum, AutoAverage etc. to help you select the correct range but always check the range selected by Excel; in particular, watch out if you have gaps in your data
- For added rows (or columns) of data:
 - Avoid adding new data above the first data row or below the last data row as these may well be excluded from the SUM
 - Use automatic range extension (Excel 2013 onwards) for rows added at the end
 - Alternatively, insert a blank line before the total and include this in the range for SUM, AVERAGE etc. so that row insertions at the end of the data are always included in the selected range
- Consider using an Excel table: new entries are automatically included in SUMs etc.
- Keep data and calculations together for clarity
 - Keep formulas next to the data used
 - Avoid cross-sheet calculations - use simple links only
- Avoid mathematical errors
 - Establish and use a sign convention consistently (already recommended)
 - Understand mathematical operator precedence: BODMAS = brackets, order (power of), division/multiplication, addition/subtraction
- Use the Warren Buffet rule of modelling: only model what you understand
- As always, test your model and review your results
- Interpretation: Even if your ranges and formulas are correct, always remember that correlation does not prove causality

Copy & paste and cut & paste errors

- General tips
 - Reduce the need for copy and paste actions e.g., by keeping everything you need in one file
 - Reduce the need for cut and paste actions by using alternative functionality such as sorting, filtering and ranks or dynamic arrays, if available

- Do not use hidden rows or columns: these can be easily overlooked when copy & pasting, cut & pasting and analysing
- Copying data
 - Paste as values, not formulas
 - Ensure source and destination areas have the same structure and consider protecting sheets to prevent structural changes
 - Copy and paste the correct rows and columns: This is best achieved using range names
- Copying formulas
 - Test your calculations, especially if a section is to be copied; test it thoroughly to be as sure as you can that it is free of material error
 - Learn and correctly use \$ cell-fixing (anchoring): as a general rule, fix as much as necessary but as little as possible
 - Check your data in sections copy-pasted from somewhere else: are inputs and assumptions valid for the new area?

Incorrect links

- Follow Golden Ground Rules #2 and #3 to ensure simplicity and consistency and so reduce the risk of in-sheet and cross-sheet link errors
- Add checks e.g., to test if totals on input and calculation sheets agree in actual periods, where there should be no difference
- Avoid or minimise links to external files

Circular errors and mistakes in logic

- General tips
 - Build in error checks where possible
 - Never do calculations in output sheets other than plus/minus, SUM and possibly simple KPIs
 - Calculate KPIs to act as sense-checkers
- Circular references
 - Design calculation logic in order to avoid circular references
 - Be aware of potential issues caused by using the iterations option or copy-paste macros
- Mixing up real and nominal figures or different currencies
 - Understand the terms real and nominal
 - As a general rule, always calculate and use nominal numbers (i.e., including inflation effects)
 - Agree on and clearly state the currency and units in use
- Double counting
 - Understand how double counting can occur

- Calculate figures for the outputs in the same order as the outputs; if you break this rule, only do so for a valid reason and make it clear

Chapter 4: Avoid common function errors

- VLOOKUP and HLOOKUP: Avoid these functions and use XLOOKUP, INDEX and MATCH, or SUMIFS instead
- INDEX and MATCH: Ensure INDEX and MATCH ranges use the same rows (or columns)
- SUMIF/SUMIFS:
 - As a rule, use SUMIFS in preference to SUMIF, to avoid a change in the order of arguments if you add more criteria
 - Ensure sum range and criteria range use the same rows (or columns)
- NPV: Ensure there are no gaps in your cash flows; do not discount cash flows at time zero
- IRR: Be aware of the limitations of IRR, most notably that it takes no account of size; use modified versions XIRR and MIRR if appropriate and do not use IRR on its own, only in addition to other results, typically NPV
- IFERROR: Avoid using IFERROR if you can, use with caution if you can't, as it can hide errors that you should know about and correct; instead, test for the potential error e.g., the divisor is zero

Chapter 5: Detect errors

- Build in error checks throughout your model and a master check
- Review and test your content at all stages of development
- Get an independent/peer review, at least for 'high value' workbooks

Chapter 6: Find and correct errors

- Learn to use both the standard (built-in) tools and third-party tools to help you review and test your workbooks and also to find errors in them.
- Try out various third-party tools to find ones which you find effective; as a minimum, these should offer better precedent tracing and maps.

Finally, please use the how2excel tips scattered throughout the book or on www.how2excel.com.