



**SOCIETY OF
ACTUARIES**

Article from
CompAct
October 2019
Issue 63

Spreadsheet Controls Add Risk Resilience— Part Two

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In part one of this two-part series on spreadsheet risk resilience, we discussed how Excel spreadsheets, despite years of rumors predicting their demise, continue to be the go-to tool that actuaries use to get the job done. Common causes of data integrity issues relative to spreadsheets were spotlighted, along with insight into controls to help actuaries solve these issues. Part two of this series offers a more detailed look at these issues, using a real-world problem/solution example related to spreadsheet risk, with a special focus on the insurance industry.

MODEL SIZE AND COMPLEXITY

Actuaries are frequently tasked with creating sophisticated models to assist with risk calculations, valuations and pricing. The number of workbooks, spreadsheets, formulas and coding vary depending on the complexity of the model. Actuaries generally think of model size and complexity in terms of the number of worksheets or file size, primarily because these metrics are the most readily available. As the actuarial pricing team at Safety National learned from researching best practices in model governance and solutions for spreadsheet version control, there are many additional metrics for evaluating the size and complexity of a model. Examples include:

- Number of populated cells
- Number of formulas
- Number of unique formulas
- Number of external references
- Number of formulas with nested IF statements

Having these metrics changes one's perspective on how to manage spreadsheet risk effectively and helps explain the practical limitations of trying to review changes manually.

In the case of Safety National, the actuarial team created a model for underwriters to use in pricing business. Given the large size of the model and small size of the pricing division, the team needed an efficient way to review and test model changes. While the model has a relatively small file size, learning the number of

populated cells (about 1.5 million) and the number of formulas (about 65,000) highlighted the challenges of trying to review all of the revisions manually.

INSIDE THE NUMBERS

Actuaries either create or work on hundreds of spreadsheets in a single year. While this number may not seem overwhelming, ponder the following. A single Excel worksheet can have 1 million rows and more than 16,000 columns. Again, that is worksheet, not workbook. In addition, the size of a workbook is only limited by memory and system resources.

Another jaw-dropping Excel spreadsheet stat is that the length of a formula can be as high as 8,129 characters. That is about the same as the average length of a paragraph. Editing and troubleshooting these long formulas can quickly become a challenge because they will wrap a few times. As a work-around, users typically copy and paste the large formula into a notepad, apply indentation for readability, and then copy and paste it back into Excel. Beyond the sheer amount of time it takes to manually cut and paste each formula, it is very easy for errors to be introduced during this process.

Other interesting stats include such things as cross-worksheet dependency, in which 64,000 worksheets can refer to other sheets. Keeping track of which worksheets link to the active worksheet and whether that worksheet contains formulas that reference other sheets can quickly become an overwhelming, if not impossible, task when relying on manual methods. Do not forget that four billion formulas can depend on a single cell. That is a lot of information.

There is great value in deploying software solutions that allows users to easily drill down into complex Excel formulas.

LEVERAGING TECHNOLOGY FOR EFFICIENCY

While the numbers cited above may seem extreme, users do not need to get anywhere near the limits for spreadsheets to become unwieldy. In an effort to manage risks, many actuaries turn to the troubleshooting capabilities within Microsoft Excel. Unfortunately, while adequate for the casual user, these tools are not enough for power users—like actuaries—who often encounter a single formula that is more than 8,000 characters.

Actuaries require advanced troubleshooting solutions that make the processes of monitoring and managing spreadsheets significantly easier. As the team at Safety National quickly realized,



there is great value in deploying software solutions like Incisive's Xcellerator that allows users to easily drill down into complex Excel formulas, visually see when formulas are different among contiguous cells, and run a comparison between two workbooks. Necessary capabilities for Excel power users include performing quick scans of a spreadsheet for cell references and properties that are not in the working area, cells having different formulas pointing to them, and the ability to highlight potential errors nested within complex formulas. This is particularly helpful when working on large and complex models like the one created at Safety National. In addition to reducing risk exposure, the accuracy achieved using automated spreadsheet risk management software helps lay the foundation for good business decisions.

Ensuring the integrity of spreadsheet data is an arduous task. Oftentimes a search for a better solution does not begin until an issue occurs or an internal audit identifies the need for more stringent controls around the actual versioning of a spreadsheet. In the meantime, actuaries spend countless hours trying to detect hidden errors that might exist. Rather than implementing

these tools because it is required, actuaries should take a proactive approach. In addition to greatly reducing risk and exposure, spreadsheet risk management technology enables actuaries to do their job more efficiently and with a higher degree of accuracy. Spreadsheet controls also add risk resilience, a state in which actuaries are able to quickly iterate processes in a way that boosts flexibility and agility, no matter what changes occur. ■



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