

Reliability Engineer's Quality Dashboard

Anshu De, Ankita Basak, Rajendra Dhage, Pramod Kanjalkar*

ABSTRACT

The Reliability Engineers, more commonly known as the RE'S, need to complete reliability work requests and handle many projects as well as develop new tools which always make quality and reliability job of the RE'S Easy. The Quality Dashboard, more commonly known as, RE: QD is going to serve as one stop report for all the RE's and then there will be future addition of tools which will be added in this one stop report, rea son why we shifted from power BI to SharePoint site dashboard making.

Keywords: Reliability Engineering, Quality Dashboard,

1. Introduction

In today's world, especially in corporate environment everyone is in a hurry to complete the work requests / task assigned because being punctual and meeting deadline is strictly obeyed. The things must be always arranged in a way that it becomes convenient for the entire team to work on the project and the deadline does not get hampered. The Reliability Engineers, more commonly known as the RE'S, need to complete reliability work requests and handle many projects as well as develop new tools which always make quality and reliability job of the RE'S Easy.

Now considering the kind of workload, it is always important the work gets done efficiently and quickly and therefore it will be convenient if there is a one stop report where all the tools and platforms RE's need to work on are available. It is not so feasible to access different tools as per the requirement from different places and therefore it is very important that there is a one stop report where all of these are segregated. The quality dashboard is one such thing where all engine platforms and tools RE's Work on, is stored in the excel file but accessing the documents and tools, separately one at a time is not feasible and besides time consuming. Therefore, Quality Dashboard tab of excel file needs to be made in a tool like power B / SharePoint site where, it will be a one stop report for all the RE's. Thus, saving out on time and make it convenient to carry out the task/work.

The aim of this work is to creates a Quality Dashboard into the latest IT platform

- This will create a one stop solution for all quality and reliability tools
- This will enable time saving
- Will serve basically as a one-stop report for all the RE Tools

2. Current Tool: Quality Dashboard excel add-in

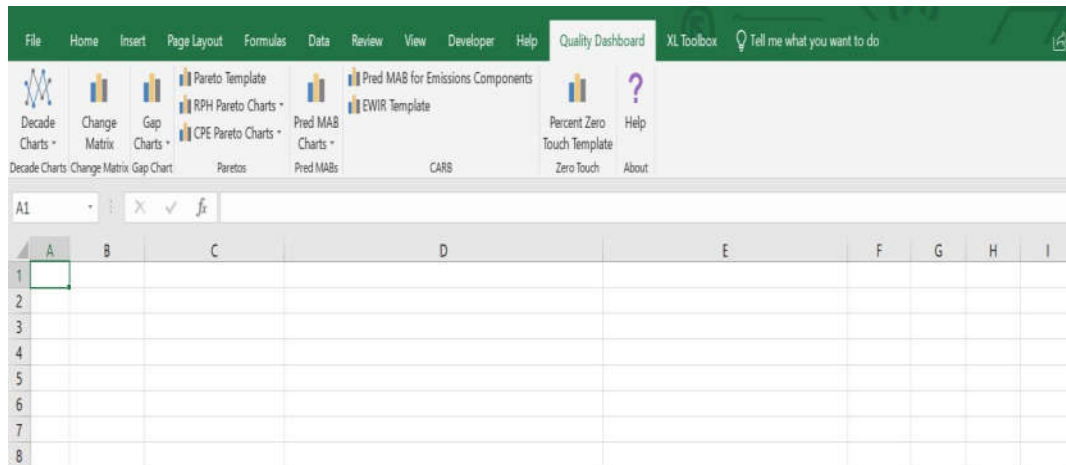


Fig 1 Quality Dashboard

Current Challenges:

- Add-in file is required to configure all reports
- All reports are based on Excel
- Need to have access to the Reliability World Drive (server)
- Take time to execute the required report
- Not user-friendly
- Problems in refreshing information every month

Planning:

Phases	Task
Phase 1	Replication of the quality dashboard by making all the buttons and linking them to the excel add-in files
Phase 2	Making of the regional tabs and adding of the required tools which will be needed by RE
Phase 3	Making of the Timeline and doing of the back end work like running the macros for monthly file updating purpose

Fig 2 Planning

Initial Decided Workflow:

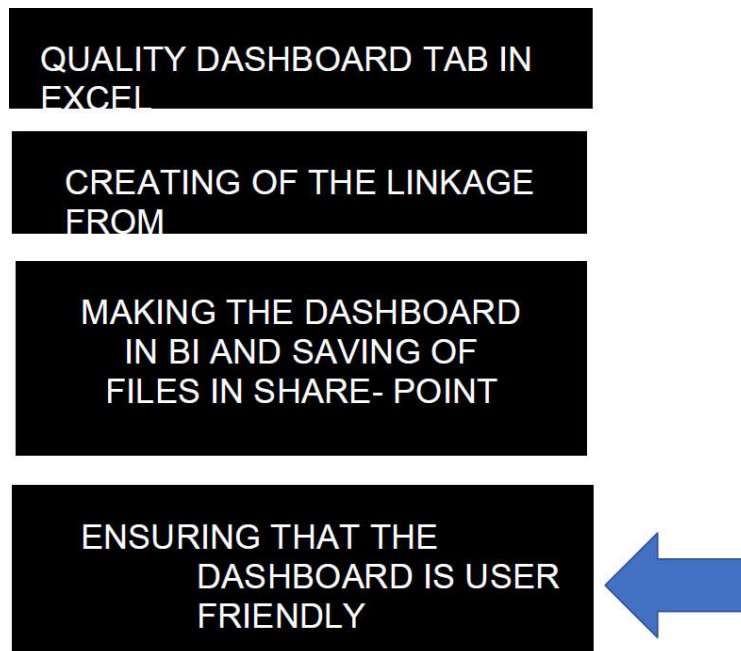


Fig 3 Workflow

Why this Project is needed:

- Saves time
- Convenient
- One stop reports for RE's
- All overview of tools and platforms at once

Challenges:

- The initial stage challenge was trying to link the folder files (Platforms and tools) with Power BI using python and R programming languages but later when it did not work we had to take help of the one drive to store the files and link with BI.
- Working in power BI and completing phase 1 of the project made us realize that the **corporate look** needed was not satisfied. (So started making the SharePoint site dashboard)
- Besides, **saving of the files** in SharePoint site was not convenient considering in future more tools can get added.
- So, after this a SharePoint site dashboard was created and there both the above challenges got solved.

2.1 Solution 1: Power BI Report Develop the Quality Dashboard in power BI

- Created linkage of reliability folder excel files to the power BI dashboard
- This linkage was initially tried with two options
 - o Coding in R
 - o Coding in Python
- Both solution not worked so after speaking with US RADAR team its created in one drive
- All reliability folder files were uploaded to one-drive and now these files could be accessed from the power BI Dashboard (web URL)
- After this the dashboard aesthetics is what needs attention along with a lot of other factors which needs to be kept in mind

Challenges while making Power BI Report?

- Linkage from excel to BI using coding language was an initial stage challenge
- Another challenge was to link two pages in same power BI report
- We had to ensure the Power BI Dashboard had all the tools and links for making it a one stop report for all reliability engineers
- The one-stop report is to be made in a way that it is easily comprehended by the user.

For making linkage possible R coding and Python coding was being tried, Files were saved in one drive and then Linkage got created in Power BI.

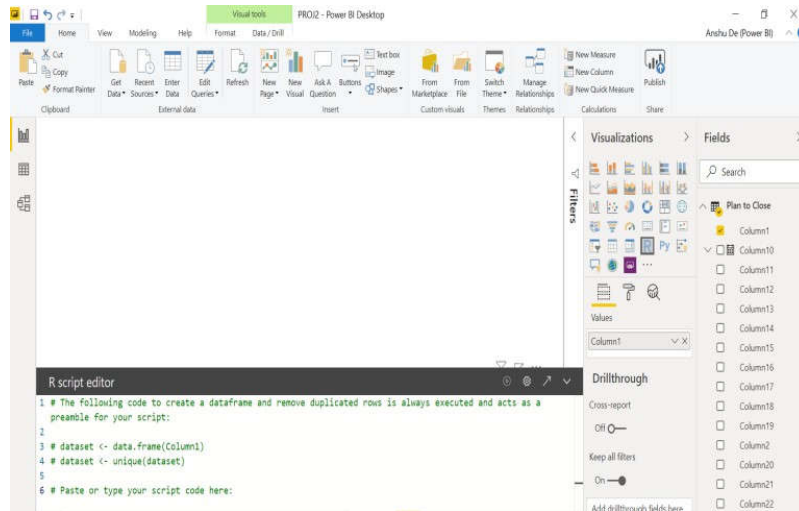


Fig 4 Coding

In power BI we used bookmarks and use web URL to link BI with one-drive

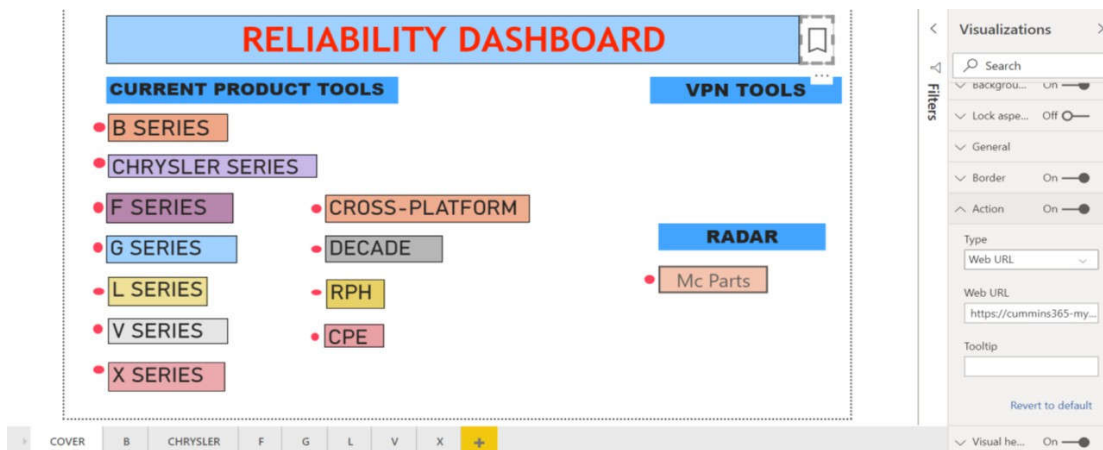


Fig 5 Dashboard

Solution 2: SharePoint Report Develop the Quality Dashboard in SharePoint

The Purpose of shifting this project from Power Bi to SharePoint:

- Maintenance of a power Bi report is a tedious job
- Developer need to update the report every month with power BI Pro license
- The saving of the excel add-in files was a challenge and limited scope for future development
- Power Bi tool is not suitable for our purpose to link analysis report

Challenges when working in SharePoint?

- When working with SharePoint in later stages , we saw that there were some minor issues encountered here
- The bordering for the texts and buttons were not being possible
- Adding timeline tasks bar to the SharePoint in the home page itself
- Adding of “dynamic” Claim WIP file to the SharePoint was another minor challenge

Methodology:

- All the pages were created in the SharePoint site
- All the platforms and tools were created
- Levels and sublevels were made for every platform
- Gap charts , decade charts , PRED MABS , Paretos for each platform was put
- Tools such as Weibull in R , Radar , QBR , Claim WIP have been put as well
- Monthly Update : We need to run the macro to streamline all the filenames in the constant format and then save it from reliability world drive to SharePoint documents folder

Features of the SharePoint site:

- This user friendly SharePoint site has many features
- Many tools are available which help one make it look good visually for the customer
- Engine model and platform wise tabs created
- Regional tabs separately created , using the drop down feature sub levels are created
- Tools have been added like – Weibull in R, QBR, Radar Claim WIP etc.

Major Problem : Share point site need common file name every month

Reliability associate create file with month in its naming. To solve the file renaming problem developed macro so in one click all files are renamed with standard name.

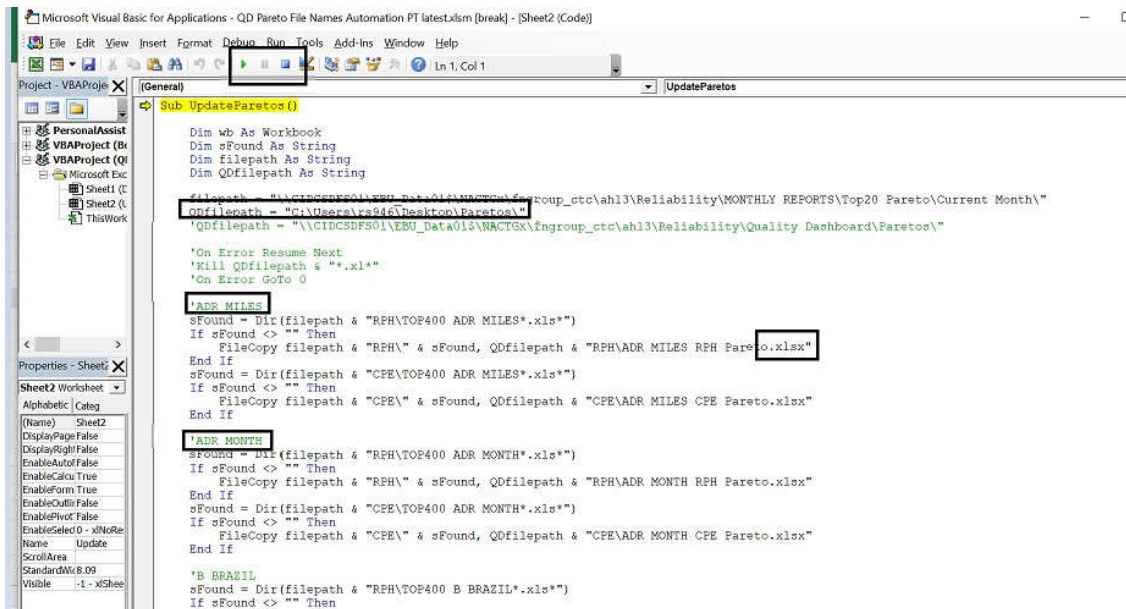
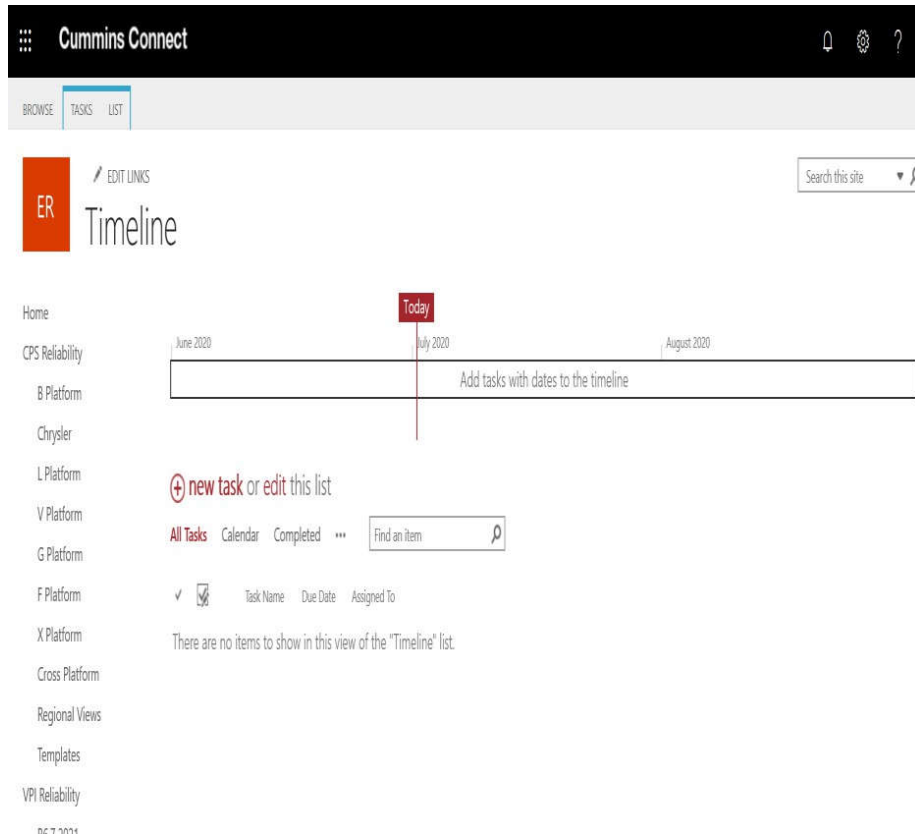
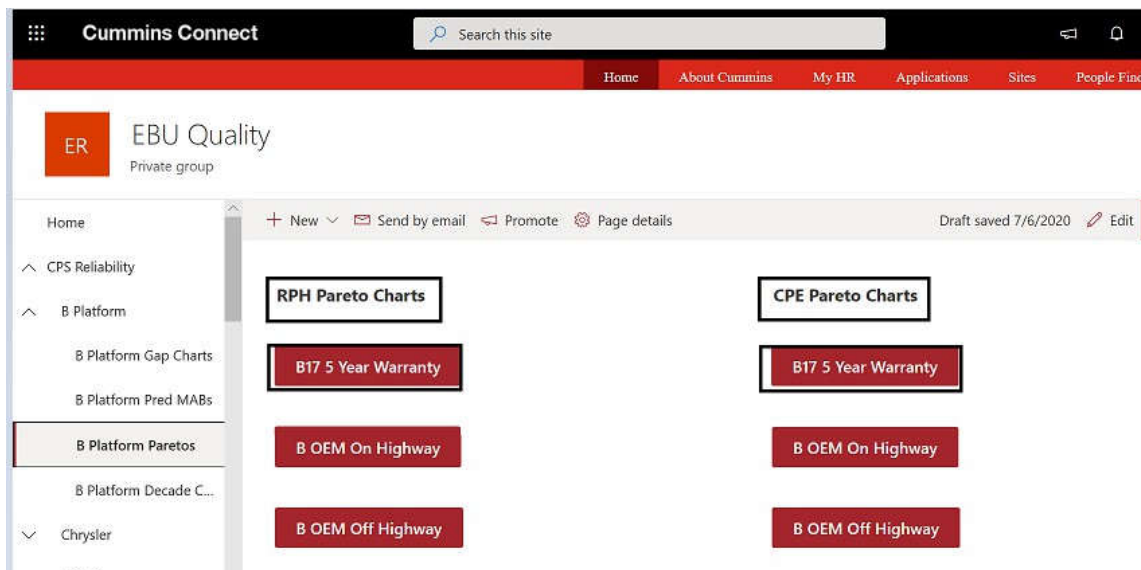


Fig 6 Macro

This is the timeline where one can add the start date and end date of the particular task / project.



To Improve the visual we want to highlight border around the texts & buttons, but this is not possible in the modern SharePoint site. In earlier version of SharePoint it's available.



Tools used:

Initial stage tools - R, Python and Power BI, excel

Current tools - SharePoint site and excel

3. Conclusion

So, this is a Functional Excellence (FE) Project. This Project is my major/primary internship project. The EBU Reliability FE Team works on FE Projects. And in my project, I was being completely supported by my manager, mentor and Project buddy. So basically, such kind of FE Projects are a long-term project which take months to complete mainly because the Cummins US Team needs to approve when the project phases are published / presented to them and once they approve the project is carried on forward.

These kinds of FE Projects are challenging to execute and therefore fun to work in because there are changes as per requirements from time-to-time and new things get implemented time and again. So, it tests one's patience and determination to work it out and get the determined results. The Quality Dashboard, more commonly known as, RE: QD is going to serve as one stop report for all the RE's and then there will be future addition of tools which will be added in this one stop report, reason why we shifted from power BI to SharePoint site dashboard making. There were challenges as mentioned before but they were all overcome, and status is that we are halfway into the phase 2 of the project. The dashboard which is replicated in SharePoint is now having all platforms and tools Reliability Engineer's need to work with.

REFERENCES

J.W. Hines and A. Usynin, "Current Computational Trends in Equipment Prognostics", *International Journal of Computational Intelligence Systems*, vol. 1, no. 1, 2008

M. Salgado, W. M. Caminhas and W.M Menezes, "Computational Intelligence in Reliability and Maintainability Engineering", *Annual Reliability and Maintainability Symposium -RAMS*, 2008.

Sullini, R., Dececco, E. and Diodato, C., 1984. *Quality and Reliability of an Electronic Automobile Dashboard* (No. 840491). SAE Technical Paper

Ramu G. Making the Most of Management Reviews. *Quality Progress*. 2017 Oct 1;50(10):50-4

Smith, R. and Mobley, R.K., 2011. *Rules of thumb for maintenance and reliability engineers*. Butterworth-Heinemann.