On The Right Track: Unifying and Analysing KiwiRail Maintenance Data for Improved Outcomes

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ABSTRACT

This paper provides details for the On The Right Track project. This project involved utilising KiwiRail data to create Power BI visualisations which inform maintenance decisions and provide insights into the health of all KiwiRail's key locomotives. Broadly, this encapsulated 300 Industry hours and 150 Academic hours and the use of an Agile Methodology throughout development.

Keywords: KiwiRail, Locomotives, Power BI, Visualisations, Insights

1. INTRODUCTION

The goal of the On The Right Track project was to provide KiwiRail insights into the efficiency of their locomotives, utilising insightful and effective data visualisations created in Power BI.

These visualisations utilised data from KiwiRail's pre-existing systems, namely Amicus and SAP for Kilometres data, and Everlink for Fuel and Oil data, in various instances this data was cleaned and filtered to better reflect reality.

Key metrics explored within visualisations were Diesel consumed per 100KM, Oil consumed per 100KM, and Oil consumed per 100 Litres of Diesel. Each of these were explored as an average and median, the former enabling the exploration of extreme values and the latter being more stable and displaying more typical data.

Another project goal was the creation of a data repository, where key locomotive data would be stored, enabling long-term value in the analysis of maintenance outcomes through accelerating the development of data analysis outcomes, this was seen in the utilisation of a SharePoint file directory, which enables the automatic importing of data within Power BI.

Ultimately the focus was on producing visualisations and dashboards that the Rolling Stock Asset Services team at KiwiRail could use to support maintenance outcomes and provide supplementary insights into locomotives.

2. BACKGROUND

The client for this project is KiwiRail Holdings Limited, who are the result of a 2008 purchase of New Zealand Rail and Ferry interests from Toll Holdings (KiwiRail, 2021).

Today, KiwiRail is New Zealand's national rail transport operator in New Zealand, operating The Great Journeys of New Zealand, its tourist division and the Interislander, a ferry service across the Cook Straight (KiwiRail, 2021).

As of October 2021, KiwiRail has 65 locomotives within the South Island (KiwiRail, 2021), the majority are within the DX class. It was these locomotives which were initially explored, with visualizations used to explore key performance indicators and display the effectiveness of various KiwiRail trials.

The scope of the project than grew to encapsulate not just the South Island fleet, but the North Island fleet as well, which is mostly DL locomotives.
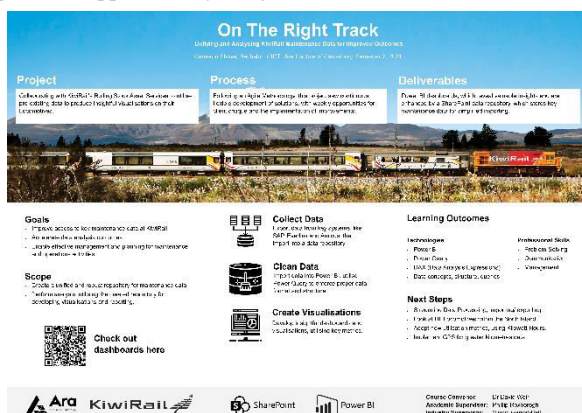
3. PROCESS

This Capstone Project utilised an Agile methodology, meaning it utilised the four values and twelve principles outlined within the Agile Manifesto, to quickly summarise Agile outlines a flexible and adaptive approach to project work, which prioritises client satisfaction, with quick and frequent solutions delivered instead of a large amount of documentation (Agile Alliance, 2021).

This was very much the case within this project as solutions were created weekly and were informed by the critique and input of key stakeholders, being continuously improved (Atlassian, 2021).

Additionally, an ETL (Extract, Transform, Load) process was employed, meaning data was extracted from Everlink, Amicus and SAP, then transformed/ cleaned for loading into Power BI.

4. CONCLUSION

In conclusion, the On The Right Track project has seen the creation of an array of Power BI dashboards and a SharePoint data repository, of course following Agile principles improvements will still be sought out and a possible next step for this project will be exploring Kilowatt hours as the next metric, enabling an improved exploration of the efficiency of various locomotives.

5. REFERENCES

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