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Summary of Work Order and Maintenance Escalation Data Analysis

The methodology used to complete the analysis:

1. Data cleaning

- Empty rows were deleted.

- Date and time column header was split into date column and time column.

- Arrival and completion times were changed into minutes. Time on job was obtained by taking the difference between completion time and arrival time in minutes. Points were calculated by dividing time on job by 5. (1 point = 5 minutes)

- A filter for time on job was created. Range of values was set to at least 1 minute, eliminating negative and zero values. This action is important to make sure that any mistakes in reporting arrival time and dismissal time are excluded.

2. Data analysis

- The line graph and histogram were analyzed using field tech work order data while the rest of the visuals were results of a left join between data sets.

- Since a sizeable portion of the arrival and completion times were inaccurately reported by the technicians, calculations with a period of 10 hours or more were considered as outliers. This action helps to accurately average out technicians' working hours.

- In order to identify the technicians that utilized the maintenance code when completing the work order, but did not create escalation tickets, the "issues" column was used as the center of the analysis.

  This column was picked due to some missing data in the date column.

  Even though, there were some missing data in the "issues" column, this column better represented the non-null values in the data.

- 3 sets were created to filter the data in the joined tables. The sets were:

  1) Maintenance finding codes (Z5-9, ZA-ZC and ZE-ZH)
  2) Null values from the "issues" column
  3) The top 10 technicians that failed to follow the protocol

- A calculated field was created to find the average time on the job. The calculated field filtered out outliers, misreported data and overtime hours. Only technicians with maximum of 12 working hours without any zero time on the job were selected.

{FIXED [Tech Id] : (IF MAX([Time on Job]) < 720 THEN AVG([Time on Job]) ELSE 0 END)}

This action makes sure that only data from reliable technicians are used to obtain average working hours.

3. Findings:

- The total number of work orders by week, best fit a polynomial model with the degree of freedom of 8. (P-value = 0.0001 << 0.005 and R squared = 0.9559 ~ 1.0). This model is a good representation of the work orders of the client.

- The histogram has a range of 2 points or 10 minutes. With outliers excluded, the data distribution was skewed to the right. Using the calculated field, the average time on the job was 58 minutes which is in the range of 10-12 points on the histogram.

Average = SUM([Time on Job per Tech ID]) / COUNTD([Tech Id])

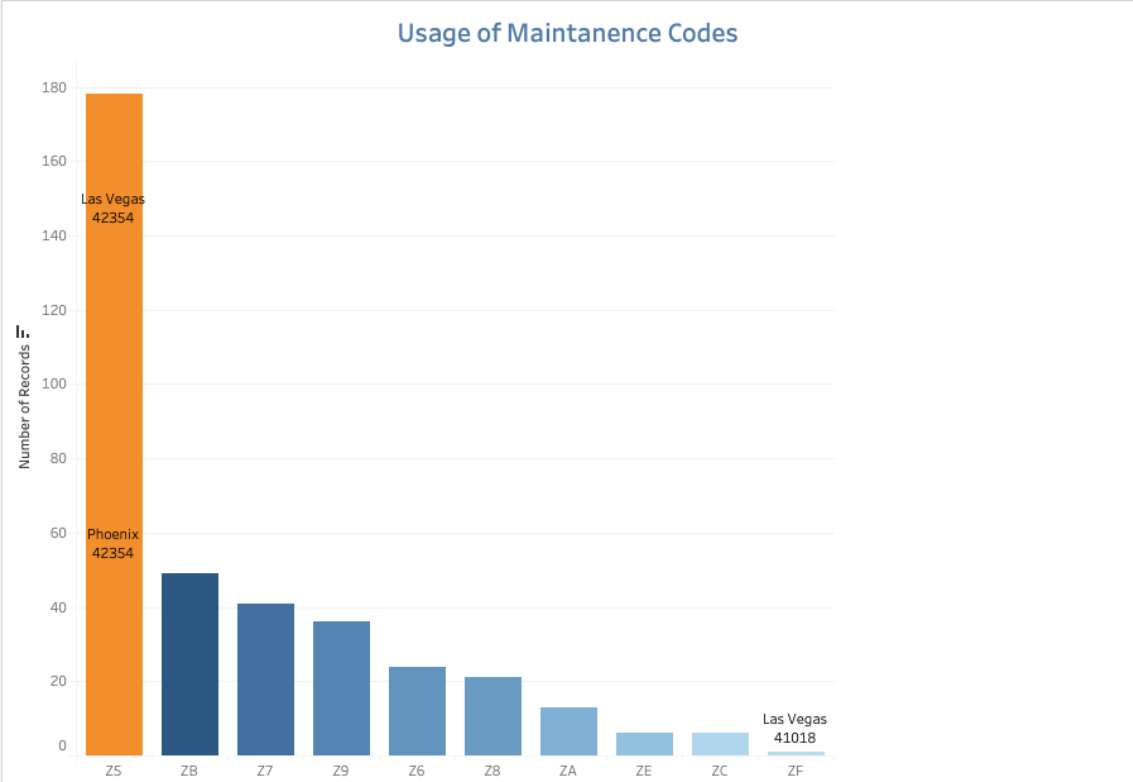
Tech Id	Average Time on Job in Minutes	Time on Job per Tech ID
42650	123	123
62095	113	113
41035	90	90
62146	86	86
61485	82	82
61386	71	71
40405	68	68
62113	64	64
62075	63	63
62129	60	60
62116	54	54
62086	52	52
62073	39	39
61423	36	36
40401	25	25
42963	23	23
62066	21	21
40404	20	20
42256	13	13
Grand Total	58	1,101

- Technicians that utilized the maintenance code without creating maintenance escalation tickets were identified in worksheet titled “Missing Escalation Tickets by Technicians”. The top 10 technicians’ IDs with the above violation are as follows.

42354
42563
42564
42854
43269
41105
40412
42555
41116
42163

- According to the analysis on the worksheet “Usage of Maintenance Codes”, one particular technician stood out from the rest in term of the usage frequency of specific maintenance codes in particular regions.

Technician ID: 42354



The technician used finding code Z5 frequently and failed to create escalation maintenance tickets. The technician used this code mostly in the Southwest Region (Las Vegas and Phoenix).

4. Recommendations

- How do you improve tech escalation processes in order to ensure compliance?

Introduce a manager to oversee the usage of the finding codes. Once a technician identifies a specific finding code, especially maintenance codes, the manager must follow up with the maintenance worker to check for accuracy on their report. The arrival and completion times must also thoroughly be checked as they are the source of evaluating the technicians' performance.

- How would you encourage technicians to adhere to your new process?

Introduce a system that reports when technicians with X amount of maintenance codes go over the limit. After evaluating the report, decide if additional training should be given to ensure that protocols are followed accordingly.

- What would you recommend the client do in order to address the technicians that were identified to be the worst followers of the current process?

I would recommend for the client to retrain the technicians and make sure that they are supervised while on site by a supervisor. If infractions continue after that, they should be removed.