TURF EQUIPMENT UTILIZATION USING POWER BI

POWER BI PROJECT REPORT

Submitted by

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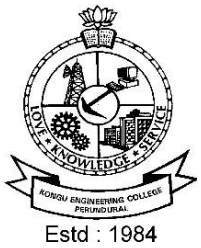

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ABSTRACT

The efficient management and utilization of turf equipment are essential for operational optimization in industries such as sports turf maintenance, landscaping, and golf course management. This study explores the application of Power BI as a dynamic and interactive tool for analyzing turf equipment utilization data. By leveraging Power BI's data integration, visualization, and real-time reporting capabilities, we aim to improve equipment management decisions, enhance operational efficiency, and reduce maintenance costs.

Data from various sources, including equipment GPS, maintenance logs, and usage schedules, were integrated into Power BI to generate key insights. The analysis includes utilization rates, downtime metrics, cost-per-use, and geographic equipment distribution. Interactive dashboards allow stakeholders to monitor trends, identify underused or overworked equipment, and optimize scheduling and maintenance planning. Our findings demonstrate that Power BI enables data-driven decision-making for turf equipment management, leading to improved resource allocation, cost savings, and extended equipment lifespan. This approach supports sustainable turf management practices through enhanced operational transparency and data insights**.**

PROBLEM STATEMENT

Efficient utilization of turf equipment is crucial in industries like sports field maintenance, golf course management, and landscaping to minimize operational costs and ensure timely maintenance. However, managing equipment usage, monitoring performance, and planning maintenance schedules are challenging due to the dispersed nature of the equipment, variable workload demands, and the lack of centralized, actionable insights.

Current tracking methods are often manual, fragmented, and lack real-time visibility, leading to issues such as unbalanced usage, excessive downtime, unexpected equipment failures, and inflated operational costs. The absence of integrated analytics tools hampers managers' ability to make informed, data-driven decisions about equipment allocation, scheduling, and maintenance prioritization.

To address this, implementing Power BI to consolidate data from GPS tracking, usage logs, maintenance records, and other equipment-related sources offers an opportunity for enhanced visibility and analytics. By creating interactive dashboards and reports, Power BI can provide

turf management teams with critical insights into utilization rates, cost efficiency, downtime reduction, and optimized maintenance scheduling. This approach aims to enable proactive equipment management, reduce costs, and improve operational effectiveness in turf management

1.Equipment Details Dashboard

The Equipment Details Dashboard is to provide a centralized view of critical information related to turf equipment, allowing managers to monitor usage, maintenance status, and availability efficiently. By visualizing key metrics and historical trends, the dashboard enables data-driven decisions to optimize equipment utilization, enhance scheduling, and reduce downtime. This proactive approach is designed to improve asset performance, extend equipment lifespan, and reduce operational costs in turf management.

Key Visuals And Purpose

Equipment Utilization Overview

- *Visual*: Bar or column chart
- *Purpose*: Displays utilization rates across different equipment types (mowers, aerators, sprayers, etc.), helping identify underused or overused assets and enabling reallocation for balanced usage.

Maintenance Status

- *Visual*: Donut or pie chart
- *Purpose*: Shows the breakdown of equipment by maintenance status (e.g., “Available,” “In Use,” “Scheduled Maintenance,” “Out of Service”), giving a quick view of current equipment availability.

Cost per Hour or Cost per Use

- *Visual*: Scatter plot or bubble chart

- *Purpose*: Plots the cost per use or per hour for each piece of equipment, helping identify high-cost assets and optimize usage for cost efficiency.

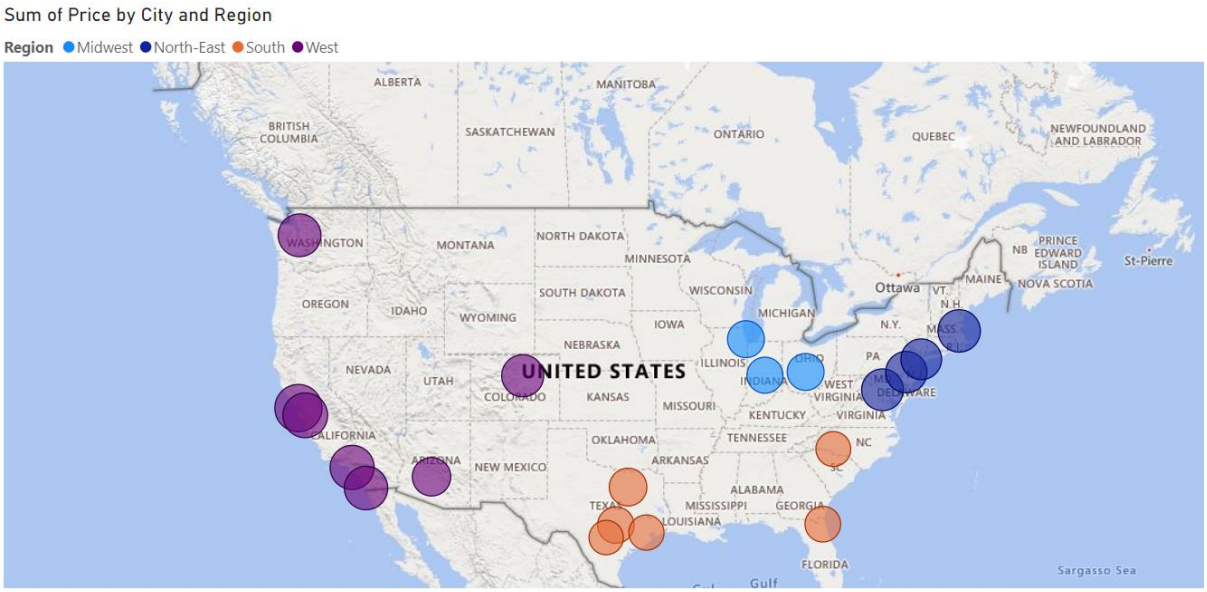
Scheduled Maintenance Calendar

- *Visual*: Calendar view or Gantt chart
- *Purpose*: Outlines maintenance schedules, showing upcoming service dates for each piece of equipment, which assists in planning usage around maintenance needs and minimizing operational disruptions.

Geographic Distribution of Equipment

- *Visual*: Map
- *Purpose*: Displays the current location of equipment across multiple sites or sections within a site, enabling quick identification of equipment proximity and aiding in optimized deployment.

City	Sum of Price	Region
Austin	195	South
Boston	275	North-East
Charlotte	175	South
Chicago	200	Midwest
Columbus	200	Midwest
Dallas	210	South
Denver	270	West
Houston	180	South
Indianapolis	190	Midwest
Jacksonville	185	South
Los Angeles	300	West
New York	250	North-East
Philadelphia	260	North-East
Phoenix	220	West
San Antonio	170	South
San Diego	290	West
San Francisco	350	West
San Jose	310	West
Seattle	280	West
Washington	265	North-East
Total	**4775**	



2.Maintenance Details Dashboard

The Maintenance Details Dashboard is designed to provide turf managers with a comprehensive view of all aspects related to equipment maintenance. By visualizing real-time and historical data, the dashboard aims to track maintenance activities, assess equipment health, monitor repair costs, and optimize maintenance schedules. This facilitates proactive decision-making, minimizes unplanned downtime, and extends equipment lifespan, ultimately leading to smoother operations and cost savings in turf management**.**

Key Visuals And Purpose

Maintenance Frequency Overview

- *Visual*: Bar or column chart
- *Purpose*: Shows the frequency of maintenance for each equipment type (e.g., mowers, aerators) or specific equipment, helping identify assets requiring frequent repairs, which may signal end-of-life or need for replacement.

Repair Cost by Equipment

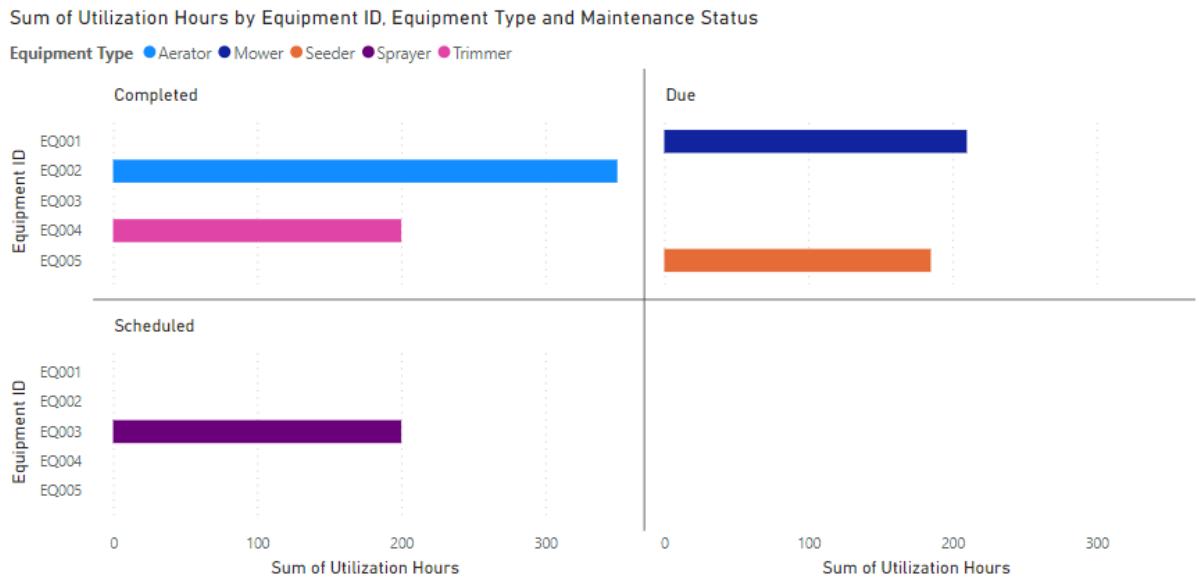
- *Visual*: Stacked bar or heatmap
- *Purpose*: Displays cumulative repair costs for each equipment unit or type, allowing for identification of high-maintenance assets and analysis of total maintenance expenditures by equipment category.

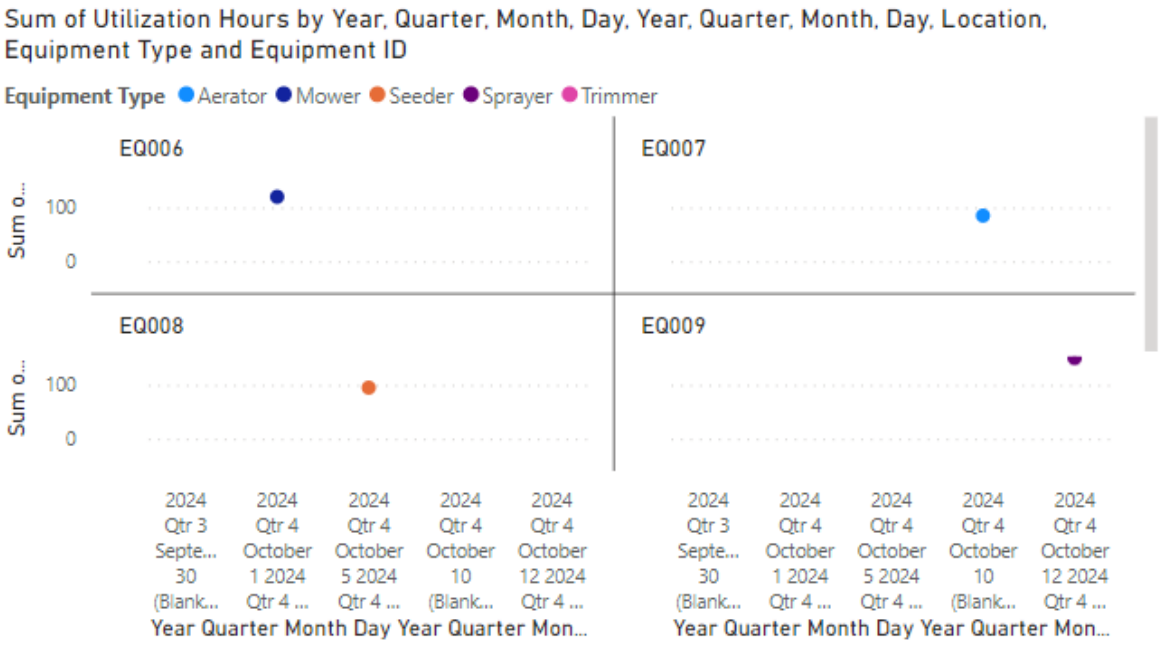
Maintenance Status Summary

- *Visual*: Donut or pie chart
- *Purpose*: Provides a quick snapshot of the maintenance status for all equipment (e.g., “Maintenance Complete,” “Scheduled,” “In Progress,” “Awaiting Parts”), enabling managers to assess current workload and asset availability at a glance.

Scheduled vs. Unscheduled Maintenance

- *Visual*: Bar chart with comparison groups
- *Purpose*: Compares the number of scheduled versus unscheduled maintenance activities, highlighting the effectiveness of preventative maintenance and areas where unplanned repairs are frequent**.**





3.Type Of Equipment Details Dashboard

The Types of Equipment dashboard provides turf managers with an organized view of all equipment types used in turf maintenance, landscaping, and groundskeeping. The goal is to understand the distribution, capabilities, and specific purposes of each equipment type, enabling better utilization and informed decisions regarding equipment deployment, replacement, and maintenance planning. This dashboard aims to assist in achieving balanced workloads, resource optimization, and streamlined operations.

Key Visuals And Purpose

Equipment Type Overview

- *Visual*: Donut or bar chart
- *Purpose*: Provides a breakdown of different equipment types (e.g., mowers, aerators, sprayers, utility vehicles) by quantity or percentage, giving a quick snapshot of asset distribution within the fleet**.**

Functionality and Purpose Summary

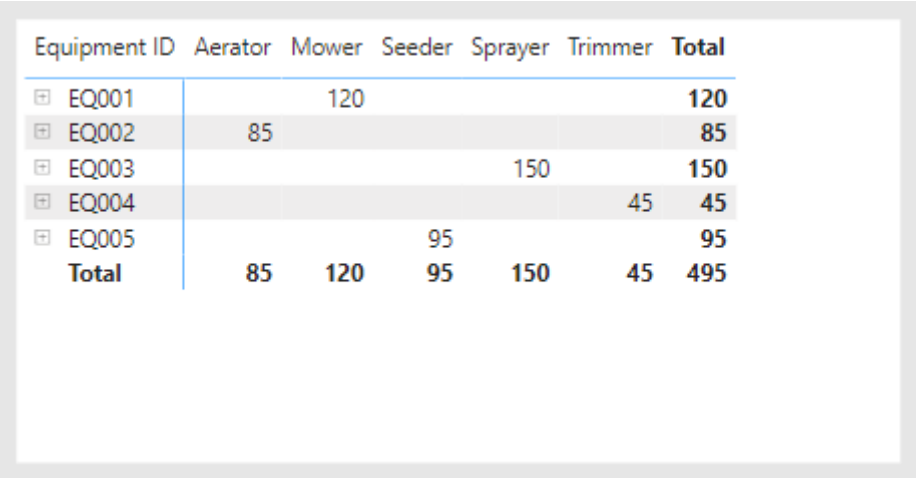
- *Visual*: Icon-based matrix or infographic-style table
- *Purpose*: Summarizes the primary function and purpose of each equipment type, helping users understand where and how each type is typically used in operations (e.g., mowing, aeration, fertilization).

Usage by Equipment Type

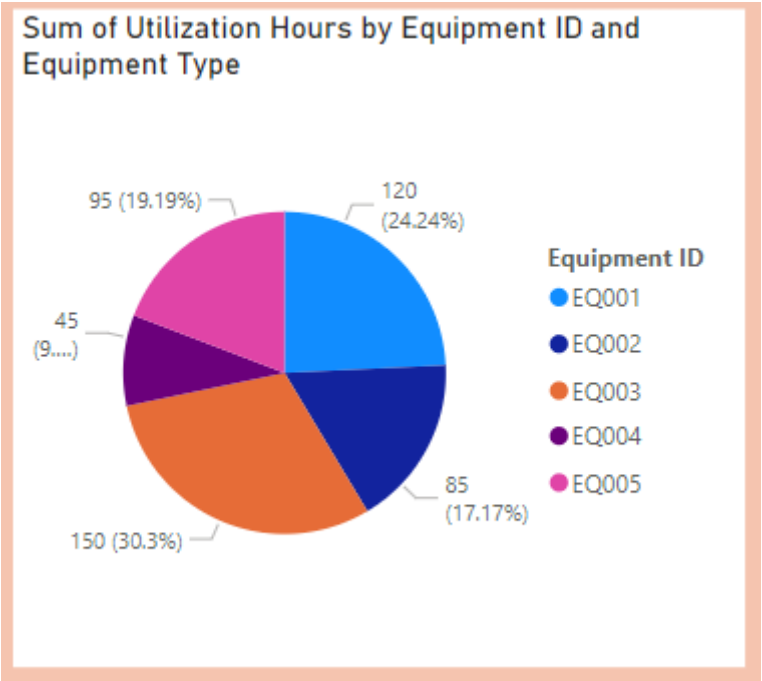
- *Visual*: Stacked bar chart
- *Purpose*: Displays usage hours by equipment type, showing which types are used most frequently and may require more frequent maintenance or additional assets to meet demand.

Average Cost per Type

- *Visual*: Horizontal bar chart with drill-down capabilities
- *Purpose*: Compares average costs (acquisition, maintenance, and operational) for each equipment type, supporting cost analysis and budgeting decisions for future acquisitions.



Equipment ID	Aerator	Mower	Seeder	Sprayer	Trimmer	**Total**
EQ001		120				**120**
EQ002	85					**85**
EQ003				150		**150**
EQ004					45	**45**
EQ005			95			**95**
Total	**85**	**120**	**95**	**150**	**45**	**495**



Utilization Details Dashboard

The Utilization Details dashboard provides a focused view of how turf equipment is used across various operations, sites, and periods. This dashboard aims to help managers understand utilization patterns, identify under- or over-utilized assets, and make data-driven decisions on equipment allocation, scheduling, and maintenance needs. By tracking utilization closely, the dashboard aids in optimizing equipment performance, reducing wear and tear, and enhancing overall operational efficiency.

Key Visuals And Purpose

Overall Utilization Rate

- *Visual*: KPI card or gauge chart
- *Purpose*: Displays the overall utilization rate for all equipment, summarizing the percentage of time equipment is actively used versus idle, providing a quick snapshot of efficiency.

Utilization by Equipment Type

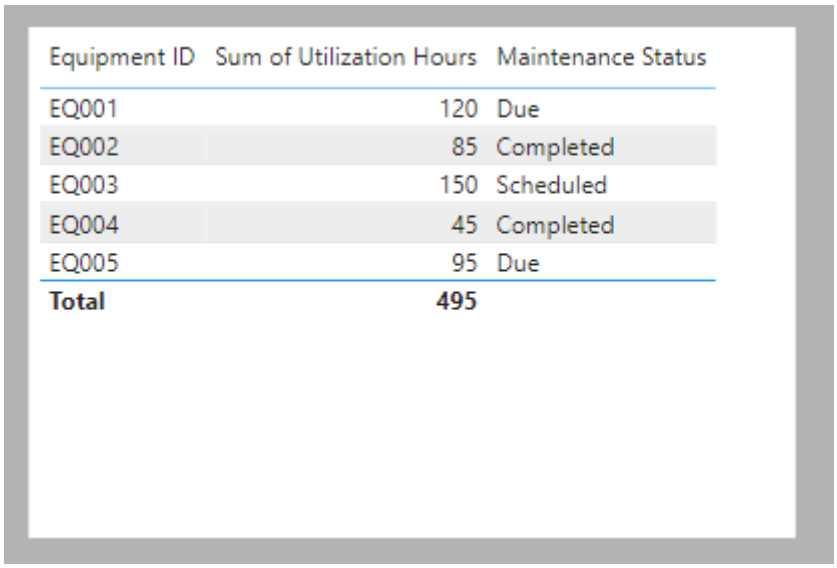
- *Visual*: Stacked bar or column chart
- *Purpose*: Shows utilization rates across different equipment types (e.g., mowers, sprayers, aerators), enabling managers to identify which types are most and least utilized, supporting reallocation and scheduling decisions.

Equipment Usage by Site/Location

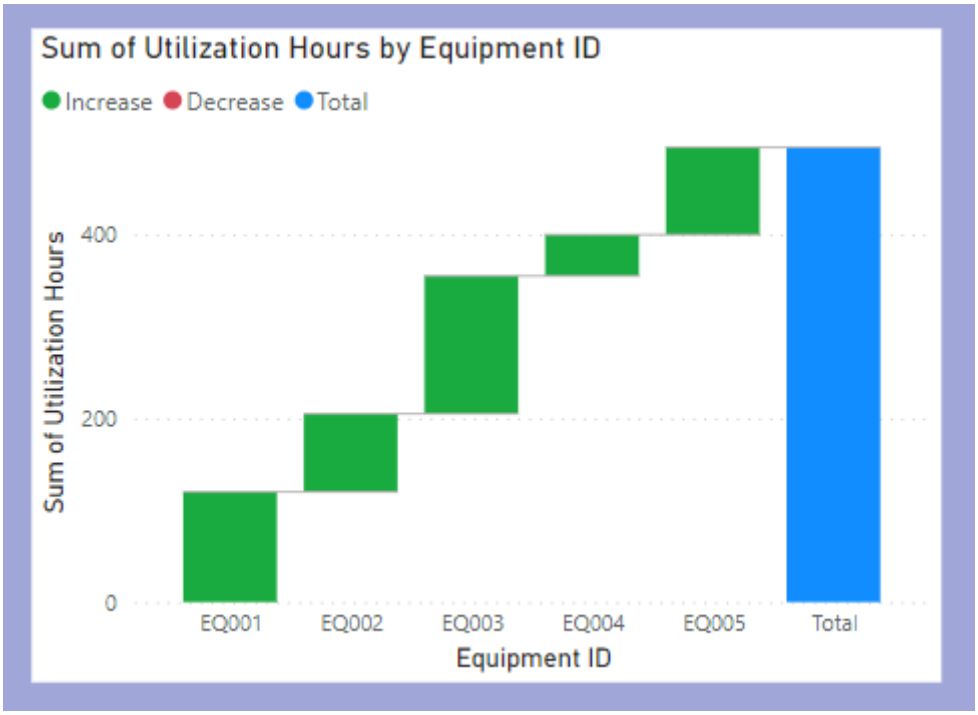
- *Visual*: Map with heat map overlay or bar chart
- *Purpose*: Highlights usage across different sites or fields, identifying high-use and low-use locations to optimize deployment and identify potential areas for equipment rotation.

Daily/Weekly/Monthly Utilization Trend

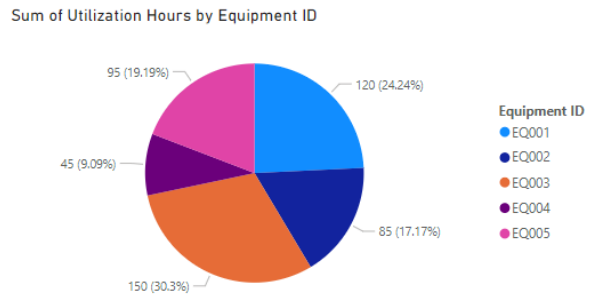
- *Visual*: Line chart with time filters
- *Purpose*: Tracks utilization trends over various time periods, helping managers identify seasonal or operational peaks and plan for periods of high or low demand.

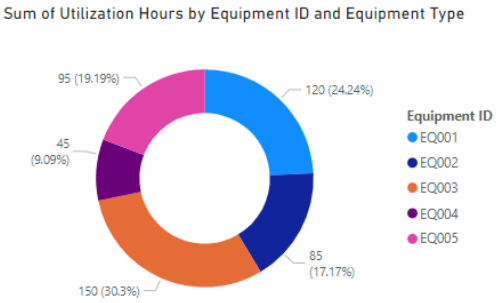


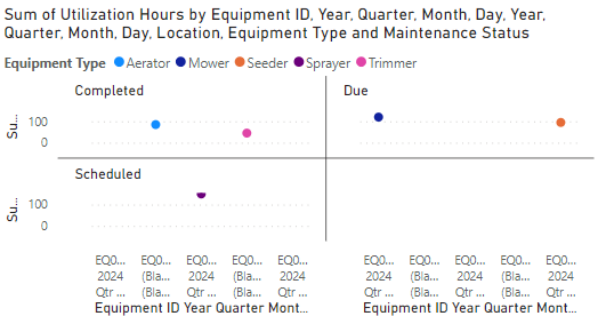
Equipment ID	Sum of Utilization Hours	Maintenance Status
EQ001	120	Due
EQ002	85	Completed
EQ003	150	Scheduled
EQ004	45	Completed
EQ005	95	Due
Total	**495**	

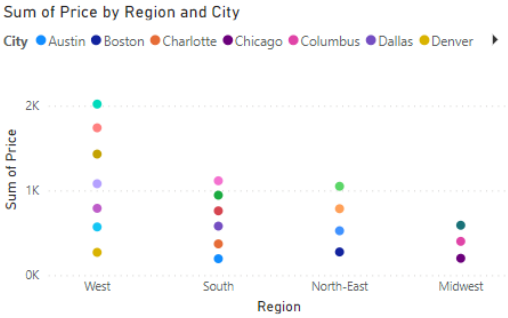


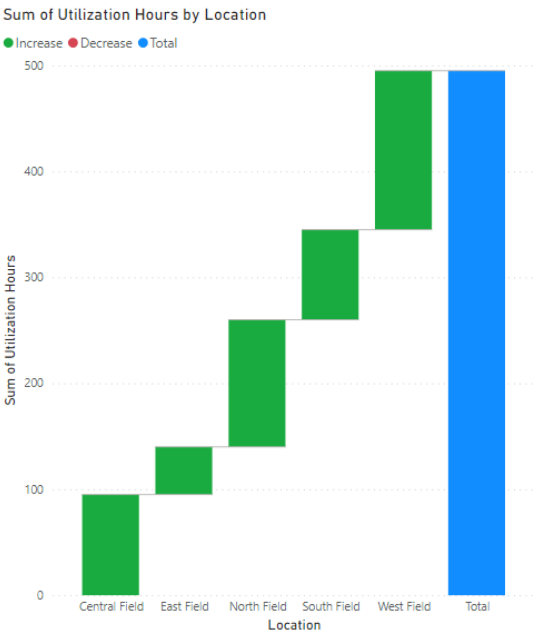
Overall Dashboard Creation











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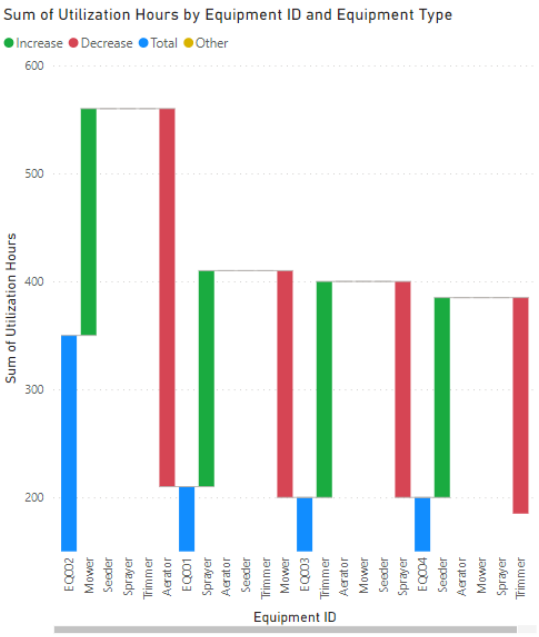

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Conclusion

The Turf Equipment Dashboard provides a comprehensive, data-driven platform for managing and optimizing equipment use in turf operations. By integrating utilization, maintenance, and cost data into one cohesive tool, this dashboard empowers managers to make informed decisions that enhance operational efficiency, extend equipment lifespan, and reduce overall costs. Key insights into utilization rates, maintenance needs, and cost-efficiency allow for balanced resource allocation, improved scheduling, and proactive maintenance planning.

The dashboard not only identifies high-usage and underutilized assets but also provides visibility into operational patterns, helping align equipment availability with peak demand periods.