Overview of the Project

Road Accidents Dashboard – Summary Report

1. Project Overview

This dashboard provides a comprehensive visual analysis of road accident data across various dimensions such as weather, light, road conditions, junction details, and accident severity. The goal is to derive actionable insights that can help in improving road safety and understanding contributing factors to high-severity accidents.

2. Data Preparation & Transformation

a. Initial Raw Dataset(Road Accidents):

- Original dataset contained mixed attributes (dimensions and facts) in a denormalized format.
- Redundant columns and irrelevant fields were removed for performance and clarity.

b. ETL Process in Power Query:

- Cleaned and transformed data using Power Query Editor.
- Separated columns into fact table (Fact_Accident) and dimension tables:
    - dim_time – extracted from Accident_Date with fields like Year, Month, Day, Hour.
    - dim_weather, dim_light, dim_road_surface, dim_junction, and dim_severity.

c. Data Modelling:

- Created a star schema model with fact_accidents at the centre.
- All dimension tables were linked via one-to-many relationships using surrogate keys.
- Ensured single-directional filtering to preserve performance and avoid ambiguity.

3. DAX Measures Created

Custom measures using DAX:

- Total Accidents = COUNT(fact_accidents[Accident_Index])

- Total Casualties = SUM(fact_accidents[Casualties])
- Avg Vehicles per Accident = AVERAGE(fact_accidents[Number_of_Vehicles])
- Avg Casualties per Accident = AVERAGE(fact_accidents[Casualties])

These KPIs formed the core metrics to be monitored and compared across dimensions.

4. Dashboard Layout & Design Strategy

Adopted a 4-row layout, optimized for usability and storytelling:

Row 1: Vertical Filter Panel (Left)

- Used slicers for filtering: Date, Weather, Light, Road Surface, Severity, Junction.
- All slicers came from dimension tables, not measures, ensuring robust filtering.

Row 2: Top KPI Cards (Horizontal)

- 4 regular card visuals for quick-glance metrics.

Row 3: Three Analytical Charts (Side-by-Side)

1. Clustered Column Chart – Hourly distribution of accidents by severity.
    - X-axis: Hour (from dim_time)
    - Y-axis: Count of accidents (fact table)
2. Donut Chart – Light Condition distribution.
    - Used for visual appeal and contribution percentages.
    - Legend from dim_light
3. 100% Stacked Bar Chart – Road Surface Condition vs Severity
    - X-axis: Surface Types (dim_road_surface)
    - Y-axis: % distribution of each severity category

Row 4: Deeper Comparative Trends

Heatmaps

- Matrix 1: Total Accidents vs Weather Conditions

Ribbon Chart

- Trend of accident severity across road surfaces using ribbon chart.
- We included this as a second visual for variety.

5. Key Insights

- Majority of accidents occurred under "Fine + Daylight" conditions, indicating human error as a major factor.
- Dry surfaces saw a significantly higher accident count but lower fatal severity compared to wet/damp.
- Evening hours (17:00–22:00) saw increased frequency of serious and fatal accidents.
- Visual correlation observed between poor light/weather conditions and accident severity.

6. Design Decisions Justification

- Matrix visuals were chosen for high data density and clear severity comparison across categories.
- Donut and Bar charts allowed quick comparison and better visual storytelling.
- Slicers were vertically stacked to save space and align with standard analytical dashboard design.
- We avoided maps due to formatting and granularity limitations in the current dataset.