Road Safety Analysis: Summary Report

Analysis Objective

The goal of this project was to analyze road accident data to identify key patterns, risk factors, and trends that contribute to road accidents and casualties. The findings aim to assist stakeholders in designing better road safety measures and policies.
We developed an interactive Power BI dashboard that presents actionable insights through clear KPIs, visualizations, and recommendations.

Analysis Approach

1. Data Preparation

- Imported the provided dataset into Power BI.
- Cleaned the data by:
  • Handling missing and inconsistent values.
  • Removing obvious outliers.
  • Standardizing categorical fields (e.g., day of week, junction control types).
- Created calculated columns:
  • Additional date-related columns for trend analysis (month, year, day name).
  • Measures like average casualties and avg accidents per day for cards.
- Ensured data types and formatting were consistent.

2. Exploratory Data Analysis (EDA)

- Explored temporal, geographical, and categorical variables.
- Identified correlations between accident severity and factors such as:
  • Road conditions.
  • Weather conditions.
  • Junction control types.
  • Time of week and time of day.

3. Dashboard Design

- Designed a 4-page, intuitive and visually appealing dashboard with:
  • Page 1: Overview & Trends – KPIs, monthly and daily accident trends.
  • Page 2: Accident Hotspots & Junction Analysis – Map of accident locations and casualties by junction control.
  • Page 3: Severity & Risk Factors – Severity distribution and impact of road/weather conditions.
  • Page 4: Hourly Trends- Hourly analysis of accidents and casualties.
- Incorporated slicers for Year, Month, and Day of Week to allow dynamic filtering.

Key Findings

✅ Temporal Patterns

- Friday witness higher accident severity compared to other days.
- November records the highest monthly spike in accidents.
- Accidents are more frequent in the evenings.

✅ Geographical & Junction Insights

- Accident hotspots are concentrated in urban and high-traffic areas.
- Over 70% of junction-related casualties occur at “Give Way or Uncontrolled” junctions.

✅ Severity & Risk Factors

- While most accidents are categorized as “Slight,” serious and fatal accidents still represent a significant number.
- Wet or damp road conditions contribute to nearly 30% of total casualties.
- Snow, frost, and flooding, though rare, show high fatality rates.

Insights & Recommendations

💡 Insights

- Temporal and environmental factors significantly influence accident frequency and severity.
- Inadequate junction controls contribute disproportionately to casualties.
- Seasonal effects (winter and rainy months) require targeted interventions.

📌 Recommendations

- Improve junction control infrastructure (signals, signage) at uncontrolled junctions.
- Enhance Road maintenance and drainage, especially in areas prone to wet or icy conditions.
- Implement targeted public awareness campaigns for weekend and evening commuters.
- Increase enforcement and monitoring at high-risk times and locations.
- Seasonal preparedness such as salting and snow removal during winters.

Deliverable

An interactive Power BI dashboard with:
- KPI cards and trend charts.
- Drill-down capability through slicers.
- Geographical hotspot mapping.
- Segmented analysis by severity, road type, and weather conditions.
- Dedicated insights & recommendations page.