

PROJECT REPORT: ROAD ACCIDENT ANALYSIS DASHBOARD

Author: Nilesh Patil

Objective: Road Safety Intelligence & Risk Factor Identification

1. EXECUTIVE SUMMARY

This project involves a deep-dive analysis of multi-year road accident data to identify casualty trends and risk factors. By leveraging **MS Excel** for data cleaning, pivot table analysis, and interactive dashboarding, the study provides a roadmap for data-driven road safety decisions.

Key Performance Indicators (KPIs)

- **Total Fatal Casualties:** 2,855
- **Total Serious Casualties:** 27,045
- **Total Slight Casualties:** 1,658
- **Primary Vehicle Contributor:** Cars (15,580 casualties)
- **Current Year (CY) vs. Previous Year (PY) Comparison:** Automated trend analysis implemented via calculated fields.

Central Business Challenge: “How can historical accident data be used to identify high-risk road conditions and vehicle types to improve public safety?”

2. BUSINESS PROBLEM STATEMENT

Road safety authorities require clear visibility into the causes of accidents to allocate resources effectively. This project seeks to:

- **Quantify** casualty severity across different road types.
- **Identify** environmental factors (lighting, road surface) contributing to accidents.
- **Compare** urban versus rural accident concentrations.
- **Evaluate** the performance of safety measures by comparing yearly casualty rates.

3. TECHNICAL METHODOLOGY (MS EXCEL)

3.1 Data Preparation

Raw accident data often contains inconsistencies. The following ETL (Extract, Transform, Load) steps were performed in Excel:

- **Data Cleaning:** Standardized date formats and handled null values in categorical fields.
- **Feature Engineering:** Created calculated columns for Year, Month, and specific Casualty Severity categories.

- **Consistency Checks:** Removed duplicate records to ensure the integrity of the total casualty counts.

3.2 Data Analysis & Pivot Logic

Using Excel's advanced analytical tools, the data was segmented to find hidden patterns:

- **Severity Mapping:** Distributed casualties into Fatal, Serious, and Slight categories using Pivot Tables.
- **Environmental Analysis:** Cross-tabulated casualties against Light Conditions (Daylight vs. Dark) and Road Surface (Wet vs. Dry).
- **Geographic Segmentation:** Divided data into Urban vs. Rural to identify local risk clusters.

3.3 Dashboard Design & Interactivity

A dynamic executive dashboard was built to provide a "single pane of glass" view:

- **Dynamic Slicers:** Included Year and Month slicers for on-the-fly temporal filtering.
- **Trend Visuals:** Line charts to show the fluctuation of casualties over time.
- **Categorical Breakdown:** Bar and Doughnut charts representing casualties by Road Type and Vehicle Type.

4. KEY INSIGHTS

Infrastructure & Road Type

- **Single Carriageway Risk:** The majority of casualties are concentrated on single carriageways, suggesting a need for better lane separation or speed enforcement.
- **Urban Concentration:** Urban areas show a significantly higher density of accidents compared to rural routes, likely due to traffic volume and intersections.

Vehicle & Environmental Factors

- **Dominant Vehicle Type:** Cars contribute to over 50% of the total casualties (15,580), making them the primary focus for safety campaigns.
- **Daylight Paradox:** Accidents are notably high during daylight hours, suggesting that traffic volume and driver distraction may outweigh poor visibility as a risk factor.

5. STRATEGIC RECOMMENDATIONS

1 Infrastructure Safety

- **Single Carriageway Audit:** Implement "Traffic Calming" measures and improved signage on high-casualty single carriageways.
- **Urban Traffic Management:** Increase the frequency of safety patrols and camera enforcement in high-density urban zones.

2 Awareness & Education

- **Car Safety Campaigns:** Focus public safety messaging on car drivers, particularly regarding urban driving and distraction-free daylight driving.

3 Data-Driven Monitoring

- **Continuous Tracking:** Use the CY vs. PY comparison feature of this dashboard to monitor the effectiveness of new safety regulations in real-time.

6. CONCLUSION

The **Road Accident Analysis Dashboard** transforms a complex dataset into an actionable safety tool. By utilizing Excel's Pivot Table and Dashboarding capabilities, this project identifies that infrastructure type and urban density are the primary drivers of accident severity. These insights empower authorities to move from reactive reporting to proactive safety planning.



Deliverables

- **Interactive Excel Dashboard (.xlsx):** Featuring Slicers, Pivot Charts, and KPI cards.
- **Processed Dataset:** Cleaned and structured road accident data.
- **Project Summary:** Key findings and safety recommendations.