TRAFFIC ACCIDENTS & SAFETY

EXPLORATION OF INFLUENTIAL FACTORS ON MULTIPLE SEVERITY LEVELS OF TRAFFIC COLLISIONS IN SOUTHERN CALIFORNIA (ID: 186)

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Traffic accidents have become one of the most discussed topics in the transportation professional field, especially in planning. There are workshops and tools to encourage the participation of transportation planners on road safety. However, applications to predict traffic accident remain scarce at the regional planning level such as the metropolitan planning organizations (MPO).

The purpose of this research is to introduce traffic accident forecasting to the transportation planning field and that crash prediction can be consistently predicted at the regional planning level using transportation analysis zones as unit of analysis in the Southern California region. Modeling and forecasting traffic accidents at the regional planning level may potentially help identifying hot spots of accident locations, which is associated with the built environment; it may also be potential and beneficial on allocating grants, understanding the impacts of safety countermeasures and initiating other useful planning researches including, but not limit to, environmental justice analysis.

This research's framework and approach have taken under a consideration of several pioneer traffic safety planning literatures that have considered important findings and variables, which are related to the built environment. Ewing et al (2003, 2009) have stated that the urban sprawl in relation with the built environment has been an important factor in causing traffic accidents due to the density varied from urban to suburban. Additionally, Washington et al (2006) has also developed a planning level forecasting model called PLANSAFE that included built environment, demographic, socioeconomic, and weather variables. These researches have given a strong framework for modeling and forecasting traffic accidents in the Southern California region.

Descriptive statistics, multivariate regression, negative binomial, and simultaneous negative binomial regression is utilized to model and forecast the traffic accident locations. Negative binomial and simultaneous negative binomial are being incorporated into the research due to their capabilities of handling over-dispersed data and simultaneity of traffic accident outputs (Guevara et al, 2004). The data in this research will be obtained from several recognized sources such as the Southern California Association of Governments California (SCAG), Statewide Integrated Traffic Records System (SWITRS), and Census Bureau (Census).

Crash data is separated into injury and fatal traffic accidents. The explanatory variables are categorized into 'Socioeconomic Characteristics', 'Employment Characteristics', 'Diversity/Mixed Use of Land', 'Built Environment/Access to Active Transportation and Transit', 'Land Development Characteristics: TOD (HQTA/TPA)', 'Biking / Walking Related Built Environment Variable', and ' Geographic Information System (GIS) is utilized for data collection, preparation, and management to perform spatial analysis. The Statistical Package for the Social Sciences Statistics is used to perform various statistical analysis and model building. The ability of forecasting traffic accidents is crucial for long-range planning in relation to transportation and land use planning scenarios.

Fatal Traffic Accident Model

The variables that yield statistically significance at 90% an above are: intersection density; total bus stop density; bike lane density indicator; bike lane Class I; density of retail and service jobs; density of express bus stops; motorways; freeways; and major roads; local connecting roads; local roads of high importance; and local roads of minor importance; job mix of 13 sectors; secondary roads; local roads; and AM peak estimated VMT of light-medium duty vehicles.

Injured Traffic Accident Model

The variables that yield statistically significance at 90% an above are: job mix of 13 sectors; high frequency bus stop density, Class III bike lane, household density; retail job density; percentage of multi-family residential; percentage of HQTA; bike lane density indicator; motorways, freeways, and major roads; secondary roads; local connecting roads; local roads of high importance; AM peak estimated VMT of light-medium duty vehicles; and PM peak estimated VMT of heavy-heavy duty trucks

Total Traffic Accident Model

The variables that yield statistically significance at 90% an above are: population, employment, mix of 13 job sectors, percentage of multi-family residential, percentage of high-quality transit area, bike lane density indicator, block length, population density, household density, high-frequency bus stop density, local connection roads, retail and service job density, percentage of transit priority areas, street networks, and VMT by different modes and time period.

ABOUT SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS
SCAG is the nation's largest metropolitan planning organization, representing six counties, 191 cities and more than 18 million residents. SCAG undertakes a variety of planning and policy initiatives to encourage a more sustainable Southern California now and in the future.

GEOGRAPHIC INFORMATION SYSTEMS (GIS)
The SCAG GIS and Data Service Program was designed as the preferred source for customized demographic and economic studies, data and analysis, Geographic Information Systems (GIS) analysis and mapping for the Southern California region. We maintain data/information and GIS files for the counties of Imperial, Los Angeles, Orange, Riverside, San Bernardino and Ventura.

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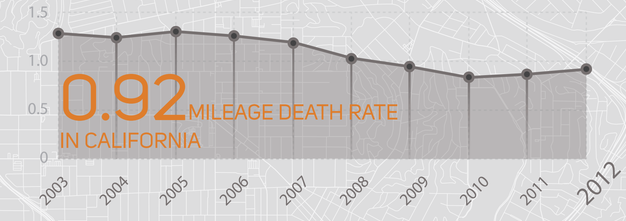
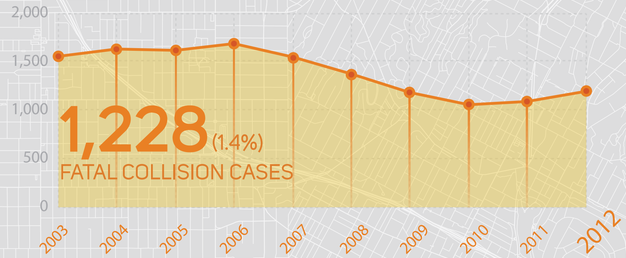
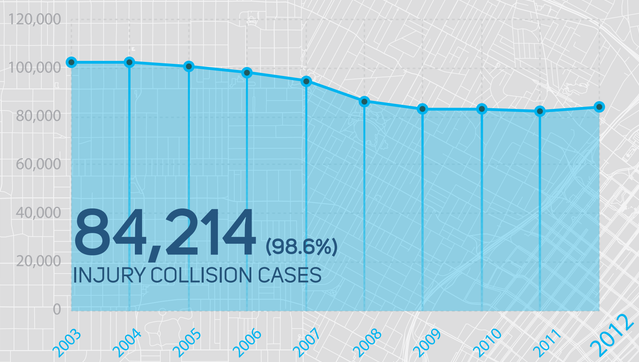
53% OF THE COLLISIONS IN THE SCAG REGION

$ 3.7 MILLION PER DEATH
$ 44,000 PER INJURY
$ 3,000 PER PROPERTY DAMAGE







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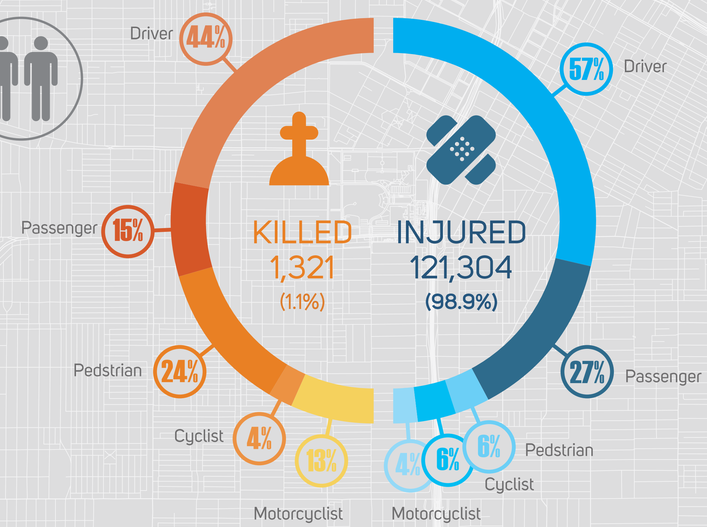
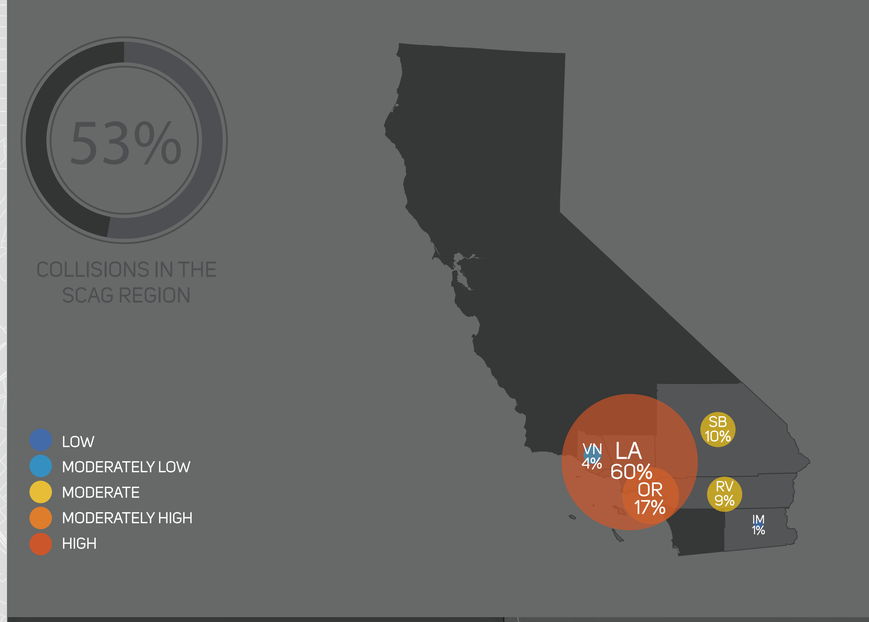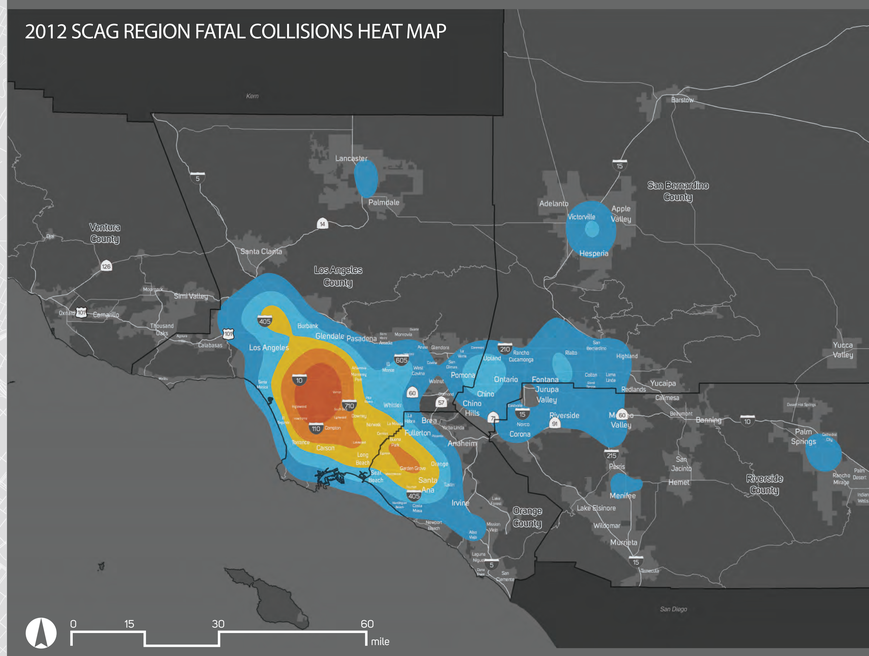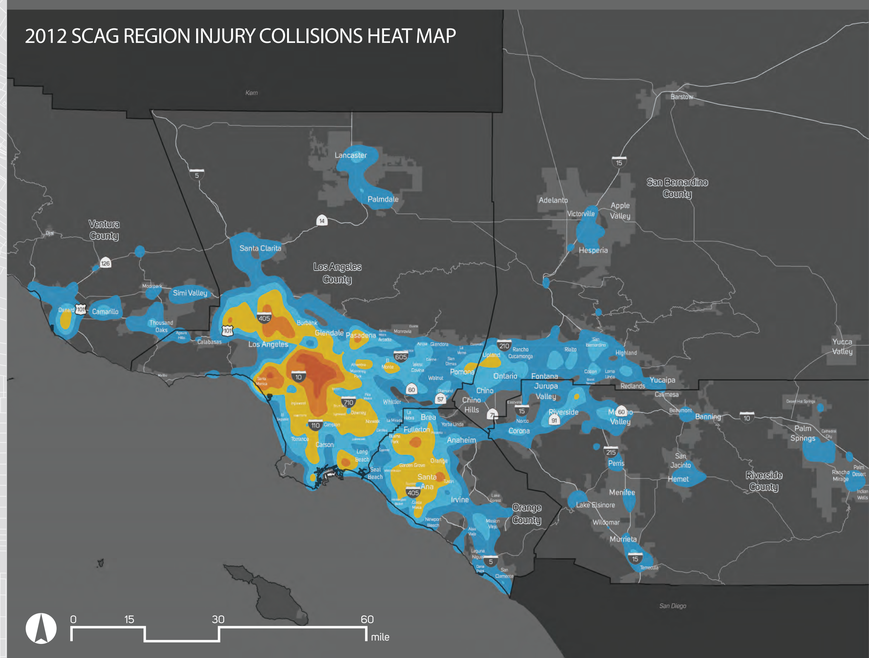
COLLISIONS IN THE SCAG REGION