Crash Research Network: A Retrospective Approach to Vision Zero

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I. INTRODUCTION

Vision Zero is a global paradigm within the transportation community centered around ending road traffic fatalities and serious injuries [1,2]. Vision Zero was initially a national road policy implemented in Sweden in 1997 and has become a global movement [1,2]. The strategic design of Vision Zero is to establish an integrated Safe System approach, which is built upon an interdisciplinary team of all stakeholders of roadway safety [3-6]. The Safe Systems approach is built upon six principles: deaths and serious injuries are unacceptable, humans make mistakes, humans are vulnerable, responsibility is shared, safety is proactive, and redundancy is critical; and focuses on five elements: safe road users, safe vehicles, safe speeds, safe roads, and post-crash care [7]. While not specifically addressed in the Safe Systems approach, an understanding of current, real-world road traffic crashes is critical to successfully adapting and implementing proactive solutions. This gap in traffic crash knowledge is a barrier in achieving Vision Zero, given that improvements cannot be made without knowing where the problems exist. The objective of this research is to utilize a multidisciplinary team from government, industry, and academia to evaluate the applicability of extrapolating data from an established traffic crash report database to address gaps in current knowledge of Honda and Acura motor vehicle crash data, specifically within Ohio, USA.

II. METHODS

Data from motor vehicle crashes (MVC) were collected from the Ohio Statistics and Analytics for Traffic Safety (OSTATS) database [8]. This database contains data from all Traffic Crash Reports throughout the state of Ohio. Every crash reported to law enforcement within Ohio is included in the OSTATS database (i.e., property damage only, injury possible, minor injury suspected, serious injury suspected, and fatal crash severities). OSTATS contains five years of Ohio crash data, including crash (e.g., crash severity, location of first harmful event, manner of crash, weather), unit (e.g., make, model, year, vehicle defects), and person (e.g., age, sex, seating position, safety equipment used) data. Complete crash data from 2017–2021 were provided via the Ohio Department of Public Safety and were subsequently filtered for crashes involving Hondas and/or Acuras. Vehicle data (year, make, model, type) were verified using the National Highway Traffic Safety Administration's VIN decoder [9]. Any vehicle data that could not be verified, due to missing or inaccurate data, were removed from the dataset. Analyses are ongoing; however, descriptive statistics and five-year trend analyses of crash and unit data are completed.

III. INITIAL FINDINGS

From 2017–2021, 171,211 verified Hondas/Acuras were involved in crashes in Ohio, USA. Vehicles included in this study demonstrated the following crash severities: Property Damage Only (n=123,822), Injury Possible (n=21,810), Minor Injury Suspected (n=21,501), Serious Injury Suspected (n=3,511), and Fatal (n=567) over the five-year period (Fig. 1). Incidences of crash severity by vehicle type were analyzed and demonstrated passenger cars have the highest number of crashes in all crash severity categories, which was expected due to the high number of passenger cars registered in Ohio, USA. Unit data were then evaluated to detect trends between model, model year, and crash severity. Preliminary trends in crash severity by model year were observed. Crash severities, specifically Serious Injury Suspected and Fatal, demonstrated peaks in vehicles approximately 10–15 years old at the time of the crash (Fig. 2). Similar trends were observed in each crash year over the five-year period (Fig. 2).

IV. DISCUSSION

Crash severities, specifically Serious Injury Suspected and Fatal, demonstrated peaks in crashes involving vehicles 10–15 years old at the time of the crash. While these data demonstrate the overall crash severity and may or may not be associated with the Honda/Acura occupants, they do highlight potential crash severity predictors. The trend of older model vehicles in more severe crashes may be related to outdated vehicle safety technologies or an increase of younger drivers in these model year vehicles. Current and ongoing research will evaluate person data (e.g., age, sex, seating position, distracted driving status, etc.) with crash and injury severity to further explore these relationships. Additionally, relationships between vehicle types, model, and model year of all units involved and injury severity will be analyzed to identify factors contributing to increased severities.

The knowledge of current road traffic crashes is a critical component of identifying road user populations, evaluating vehicle safety, identifying relationships between improved vehicle safety standards and injury severity, and supporting the global Vision Zero initiative. While global and regional data are important to understand trends in traffic crashes, local data are equally, if not more, informative in the effort to prevent fatalities and serious injuries in MVCs. Differences in infrastructure, weather, regulations, etc. may be predictors of crash/injury severity and these data may not be captured in larger databases. Future work will continue to analyze crash, unit, and person data to identify significant relationships with crash severity and identify specific predictive variables (e.g., driver age, model year, weather, time of crash, etc.) within and between injury severity categories.

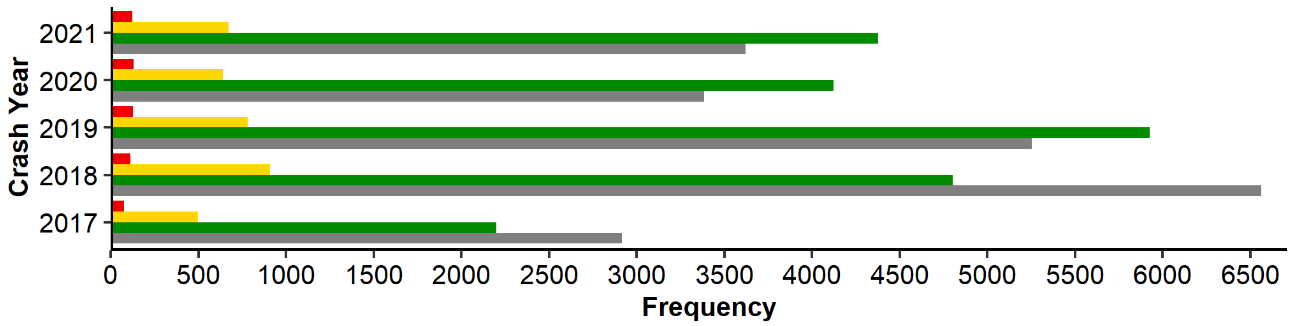

Fig. 1. Five-year crash severity (Fatal [red], Serious Injury Suspected [yellow], Minor Injury Suspected [green], Injury Possible [gray]) of crashes involving Hondas/Acuras. Property Damage Only crashes were excluded from this visualization.

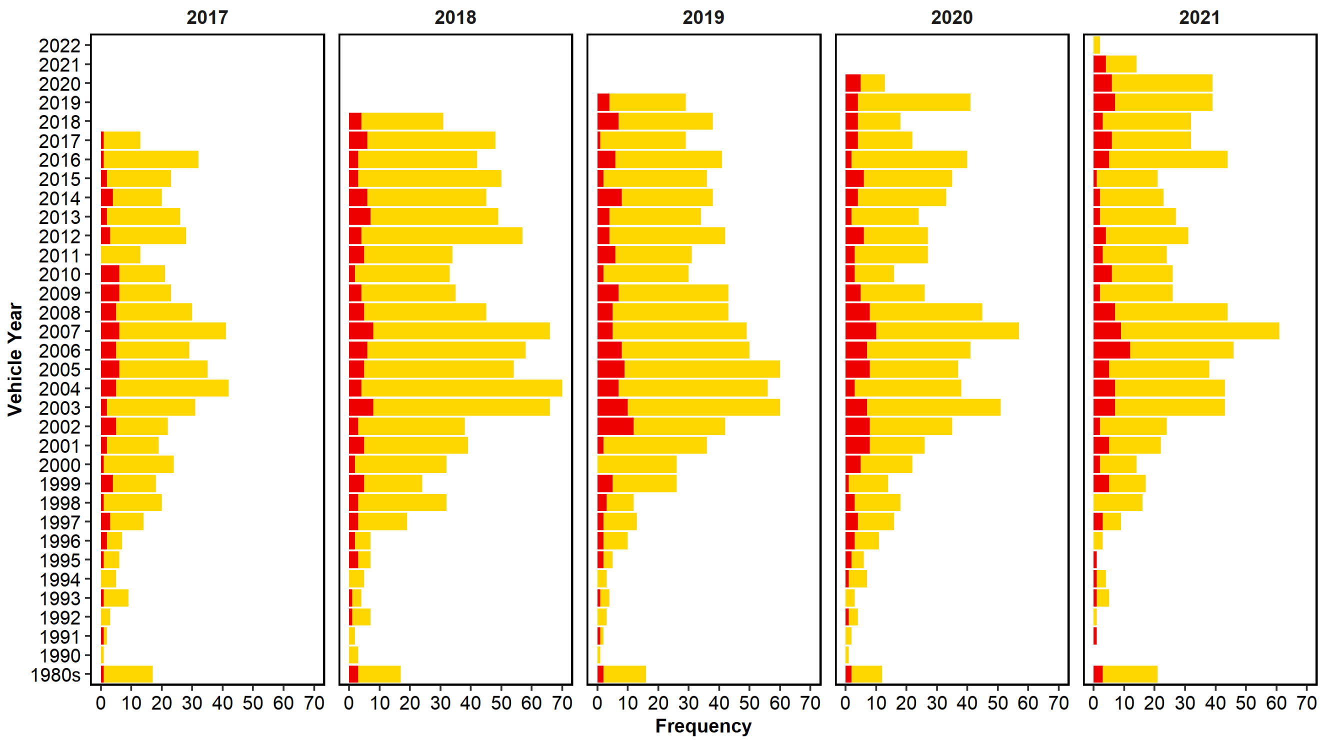

Fig. 2. Five-year summary of crash severity (Fatal [red], Serious Injury Suspected [yellow]) by vehicle year.

V. REFERENCES

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