Introduction

Road safety is top priority in New Zealand. Safety for all, as transport is an essential part of daily life this includes safety of contractors working on the road network.

A safe road system is free of death and serious injury. Road travel has become far safer over the last 25 years, despite growing population and increasing number of vehicles on the road, while number of crashes has changed, there has been a downward trend since 2007.

The safe system approach reflects that the cause of road trauma have many aspects that are related to number and severity of crashes each week. Road infrastructure, vehicle safety, education and enforcement, speed, and weather are factors to increasing number of crashes.

Ministry of transport and road users will be the interested party in this report

Description & Source

Selecting the crash severity and Identifying the key issues of the cause of the accident from Crash Analysis System (CAS) data of Auckland Ministry of Transport will be used on this report as at 6 October 2020

The CAS cv file is not ready for data analysis; it has 71 columns and 731,483 rows from Year 2000 to Year 2020.

Crash Severity is identified as Non- Injury, Minor, Serious and Fatal Crash.

To prepare the data for analysis, Null data in Weather A and Weather B has been deleted in spreadsheet

```
In [58]:
df_test.shape
Out[58]:
(16338, 71)
```

Non-Injury Crash was drop from this report

```
indexNames = df_test[df_test['crashSeverity'] =='Non-Injury Crash'].index
df_test.drop(indexNames, inplace=True)
```

As well as non-relevant columns.

```
df = df_test[['crashSeverity','fatalCount', 'minorInjuryCount', 'seriousInjuryCount','c
rashYear','region','speedLimit','weatherA', 'weatherB']]
df_map = df_test[['crashSeverity','region','X','Y']]
```

Methology

Most of the non-relevant data has been removed Missing data has to be identified and replaced and correct data format as most of the features are of object data type and has to be converted to numerical value. In the original file as mentioned before crash severity was in object type, minor, serious and fatal. Crash Severity column was replaced to numerical value as below;

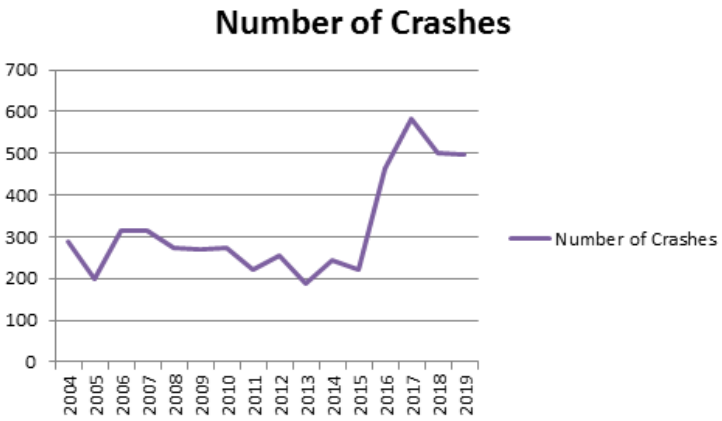
1. Minor
2. Serious
3. Fatal

```
df["crashSeverity"].replace("Minor Crash", '1', inplace=True)
df["crashSeverity"].replace("Serious Crash", '2', inplace=True)
df["crashSeverity"].replace("Fatal Crash", '3', inplace=True)
df["crashSeverity"].value_counts()
```

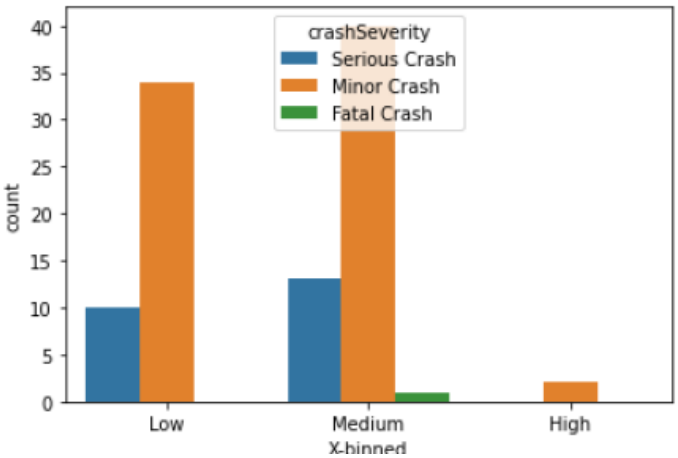
```
Out[69]:

1    4234
2    1146
3     157
Name: crashSeverity, dtype: int64
```

Results

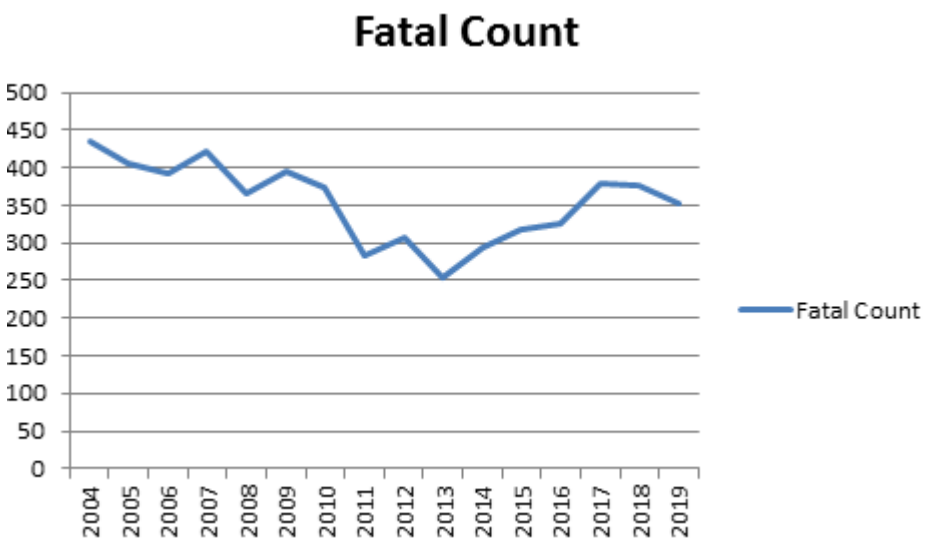
Road travel has become far safer over the last 25 years despite the growing population and increasing numbers of vehicles on the road. Number of crashes was in a decrease from 2005 to 2015 and increase from 2015 to 2019. Factors related to number of crashes are due to increase in vehicle travelled and increase in motorcycle registrations.



Factors related to severity of crashes are due to increase in vehicle kilometres travelled, decrease in speed camera detectors and decrease in advertising expenditure



While fatalities was on a downward trend from 2004 to 2013, it peak again from 2014 to 2017.



Road safety works are influence by following causes;

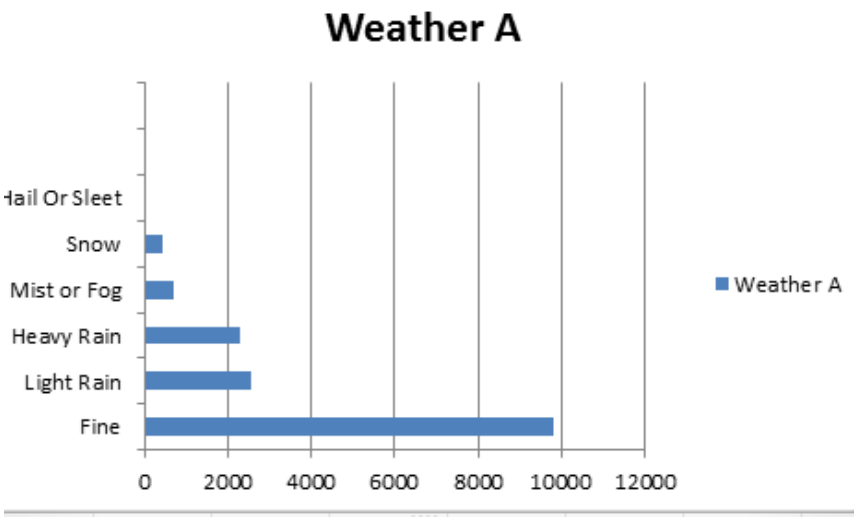
- Road Infrastructure
- Vehicle Safety
- Type of Vehicle
- Public education and enforcement
- Weather, season and time of day
- Overseas license holder

Weather condition in CAS report has Weather A and Weather B as mentioned earlier Null data has been removed.

Weather A value count are Fine, Light rain, Heavy Rain, Mist or Fog and Hail or Sleet

```
df['weatherA'].value_counts()
```

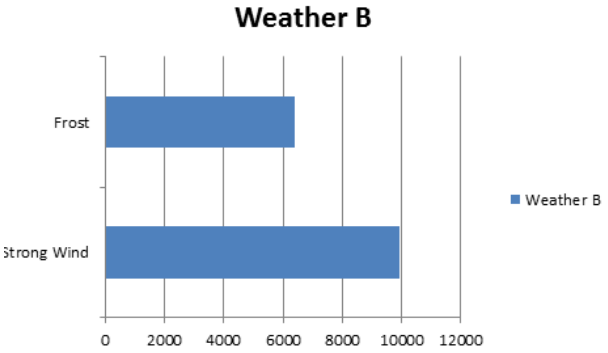
```
Out[37]:

Fine             9802
Light rain       2538
Heavy rain       2289
Mist or Fog       686
Null              560
Snow              452
Hail or Sleet      11
Name: weatherA, dtype: int64
```



Weather B value count is Strong wind and Frost

```
df['weatherB'].value_counts()
```

```
Out[38]:

Strong wind    9929
Frost          6409
Name: weatherB, dtype: int64
```



Poor weather conditions most of the time associated to be related with crash severity. But, report notes that the impact of poor weather on fatalities is not theoretically clear – bad weather could result in more difficult vehicle control but also results in more careful driving as drivers adapt to the road conditions or fewer kilometres travelled as persons may delay or cancel travel.