# Summary of GLM Results and Their Discussion

## 2.1 Accident Types

**Intercept (const):**  
The intercept of -41.5336 suggests a very low baseline count of accidents when all other factors are at their reference levels. This large negative value, along with a high standard error (248.943), indicates substantial variability and potential model instability around this estimate.

**Year:**  
The coefficient for the year is 0.0208, indicating a slight increase in the number of accidents over time. However, the high p-value (0.866) suggests this trend is not statistically significant, meaning we cannot confidently say that the number of accidents is increasing yearly based on this model.

**Derailments:**  
With a coefficient of 0.5946, derailments appear to contribute positively to the accident count. This suggests that as derailments increase, the overall number of accidents also rises, highlighting the critical impact of derailments on safety.

**Collisions:**  
The coefficient of 0.3039 for collisions implies that collisions also add to the accident count. Although the p-value is high (0.444), indicating low statistical significance, the positive sign shows that collisions are likely associated with an increased number of accidents.

**Collisions at Level Crossings (CollisionsAtLC):**  
A coefficient of 0.2671 indicates that accidents at level crossings contribute to the total number of accidents. Similar to general collisions, the p-value is high (0.472), suggesting the effect is not statistically significant, but the positive coefficient indicates a likely association.

**Fire Accidents:**  
Fire accidents have a coefficient of 0.4962, suggesting they increase the number of accidents. Although the p-value (0.430) shows low statistical significance, fire accidents' positive coefficient points to their contribution to overall accident counts.

**Overshooting:**  
The coefficient for overshooting is -1.9866, indicating a decrease in the number of accidents when overshooting incidents occur. Despite the p-value (0.385) indicating low statistical significance, the negative coefficient suggests that overshooting might be associated with fewer accidents.

**Accidents at Track:**  
With a coefficient of -0.1429, accidents occurring on the track are associated with a reduction in total accidents. The high p-value (0.638) shows this is not statistically significant, but the negative coefficient suggests these incidents might reduce overall accident numbers.

**Accidents in Station Limits:**  
A coefficient of -0.1819 indicates that accidents within station limits tend to reduce the total accident count. The p-value (0.425) shows this is not statistically significant, but the negative sign suggests a possible reduction in accidents due to incidents within station limits.

**Passenger Train Accidents:**  
The coefficient of 0.1450 for passenger train accidents suggests a slight increase in the total number of accidents. The high p-value (0.641) indicates low statistical significance, but the positive coefficient suggests a possible contribution to overall accidents from passenger train incidents.

**Goods Train Accidents:**  
A negative coefficient of -0.0706 indicates that accidents involving goods trains are associated with a reduction in the total number of accidents. The high p-value (0.819) suggests this is not statistically significant, but the negative sign points to a potential decrease in accidents involving goods trains.

**Other Train Accidents:**  
The coefficient of -0.3992 for other train accidents indicates a reduction in the total number of accidents when these types of incidents occur. Although the p-value (0.645) shows low statistical significance, the negative coefficient suggests a likely reduction in overall accidents from other train incidents.

**No Damage to Public Property (NoDamgeToPR):**  
With a coefficient of -0.0568, the absence of damage to public property is associated with a reduction in the number of accidents. The high p-value (0.676) indicates low statistical significance, but the negative coefficient suggests fewer accidents when public property is not damaged.

**Damage to Public Property (CauseDamgeToPR):**  
The coefficient for causing damage to public property is -0.2680, indicating a reduction in accident counts when such damage occurs. The p-value (0.495) shows low statistical significance, but the negative sign suggests a potential decrease in accidents associated with public property damage.

**Cost of Damage:**  
A very small positive coefficient (1.478e-07) suggests that higher costs of damage are associated with more accidents. The p-value (0.410) indicates this is not statistically significant, but the positive coefficient points to a possible correlation between damage costs and accident frequency.

**Number of Casualties (NoCasulties):**  
The coefficient of -0.0120 indicates fewer accidents when there are no casualties. The high p-value (0.859) shows low statistical significance, but the negative sign suggests a potential decrease in accidents when no casualties occur.

**Casualties:**  
A negative coefficient of -0.3128 suggests that the presence of casualties is associated with a reduction in the total number of accidents. The p-value (0.507) indicates low statistical significance, but the negative sign points to a possible decrease in accidents when casualties are reported.

**Number of Deaths (NoOfDeaths):**  
The coefficient of 0.2765 indicates an increase in accidents when there are deaths. The high p-value (0.463) shows this is not statistically significant, but the positive coefficient suggests a possible increase in accident counts with fatalities.

**Number of Injuries (NoOfInjuries):**  
A negative coefficient of -0.0249 suggests that injuries are associated with a reduction in the total number of accidents. The p-value (0.553) indicates low statistical significance, but the negative sign points to a potential decrease in accidents with injuries.

## 2.1 Accident Causes

**Intercept (const):**  
The intercept of 1.0498 represents a baseline number of accidents when all predictors are at their reference levels. This coefficient, with a high z-value of 4.695, provides a strong baseline estimate.

**Mechanical Defect:**  
The coefficient for mechanical defects is 0.2814, suggesting that mechanical defects are associated with an increase in the number of accidents. The coefficient's standard error is 0.262, and the z-value is 1.072, indicating the relationship's variability. The p-value of 0.284 suggests that this effect is not statistically robust in this model.

## 2.3 Branch Line Accidents

**Intercept (const):**  
The intercept of 2.6391 represents the baseline number of branch line accidents when all other factors are held at their reference levels. This value provides a starting point for understanding the number of accidents, and the high z-value indicates a robust baseline estimate.

**CHM to QTA:**  
The coefficient of -1.0296 for CHM to QTA suggests a decrease in branch line accidents between these locations. This negative coefficient implies that moving from CHM to QTA may be associated with fewer accidents, though the exact impact should be interpreted with consideration of the broader context.

**Jhand to Kundian:**  
With a coefficient of 0.1942, Jhand to Kundian indicates a positive association with branch line accidents. This implies that the presence or increase in this category might be linked to more accidents, although the practical significance of this relationship requires further investigation.

**Other:**  
The coefficient for Other is -0.8473, suggesting that this category is associated with a reduction in branch line accidents. This negative value indicates that incidents classified under "Other" may contribute to fewer accidents on branch lines.

## 2.4 Main Line Accidents

**Intercept (const):**  
The intercept of -21.4836 provides a baseline number of main line accidents. The large standard error associated with this estimate reflects high variability, suggesting that the baseline estimate might fluctuate significantly.

**CHM to QTA:**  
The coefficient for CHM to QTA is -1.571e-05, indicating a very minor effect on main line accidents. The tiny coefficient suggests that any change related to this factor is extremely small.

**Jhand to Kundian:**  
Similar to CHM to QTA, Jhand to Kundian has a coefficient of -1.402e-05. This value implies a very slight impact on main line accidents, though the magnitude of this effect is minimal.

**Other:**  
The coefficient of 24.1462 for Other implies a positive association with main line accidents. This suggests that incidents categorized as "Other" might be related to an increase in accidents, though the practical implications should be further explored.

## 2.5 Seasonal Accidents

**Intercept (const):**  
The intercept of 1.9459 represents the baseline number of accidents when all seasonal factors are at their reference levels. This positive coefficient suggests a starting point for the number of accidents and indicates a solid estimate with a high z-value, reflecting its reliability.

**Spring:**  
The coefficient for Spring is -0.1542, indicating a decrease in accidents during this season compared to the reference. The negative coefficient suggests that Spring is associated with fewer accidents, though the degree of impact is relatively small.

**Summer:**  
With a coefficient of 0.7841, Summer shows a positive association with the number of accidents. This implies that accidents tend to be higher during Summer compared to the reference season. The positive coefficient reflects a notable increase in accidents during this period.

**Winter:**  
The coefficient for Winter is 0.8873, suggesting a higher number of accidents in Winter compared to the reference season. This positive value indicates that Winter is associated with more accidents, pointing to a significant seasonal effect on accident frequency.