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The High Rate of Traffic Accidents on BR 364 in the Section from Vilhena to Pimenta Bueno

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***Keywords*— Highway, BR-364, Accident Rate, Vilhena-RO, Pimenta Bueno-RO**

***Abstract*—** *The objective of this research was to seek to identify what makes the stretch of Highway BR-364, between the municipalities of Vilhena-RO and Pimenta Bueno-RO, with approximately 174 km, theoretically small in relation to others, have a high rate of road accidents. traffic, where almost half, about 46%, leave people injured. The data presented here were collected from the Federal Highway Police website, the body responsible for attending to and recording incidents on the country's federal highways. With statistical records of the last 10 years (2010-2020), it was found that almost half of the claims were caused by human error, mainly due to the lack of attention of drivers, as soon as they can be avoided, these numbers would be even greater if we consider defects mechanics, among others, as human error in the lack of preventive maintenance on vehicles. An interesting piece of data found in the surveys is that, contrary to popular belief, more than 75% of traffic accidents occurred in a straight line, theoretically in places with better visibility, added to this, lane departures were the most common causes among the 21 listed by the police. With this study, we seek to help authorities with jurisdiction over the road to make decisions in their public prevention policies, which can reduce accident rates and save lives in the near future. lane departures were the most common cause of the 21 listed by the police. With this study, we seek to help authorities with jurisdiction over the road to make decisions in their public prevention policies, which can reduce accident rates and save lives in the near future. lane departures were the most common cause of the 21 listed by the police. With this study, we seek to help authorities with jurisdiction over the road to make decisions in their public prevention policies, which can reduce accident rates and save lives in the near future.*

I. INTRODUCTION

Every year, Brazil accounts for a large increase in the number of deaths in traffic. For Gomes (2011, p. 01) "the tragedy generated in Brazil by traffic accidents is duly quantified". There were "about 35,000 deaths per year, 400,000 injuries, 1.5 million accidents and an average expenditure of 22 billion reais per year just to cover expenses with disasters on federal roads". It is in this context that the importance of traffic safety is analyzed, highlighting its position as a fundamental right.

Traffic safety is the right of every citizen, subscribed to paragraph 2 of article 1 of the Brazilian Traffic Code, which establishes that the bodies and entities that make up the National Traffic System must ensure, to every citizen, safe conditions to travel in the land routes.

As Arnaldo Rizzardo (2003) actually states, "traffic has become so important to national life that a new right has been instituted – that is, the guarantee of safe transit. Among the fundamental rights, which they say with their own lives, such as citizenship, sovereignty, health, freedom, housing and many others, proclaimed in art. 5 of the Federal Constitution, is the right to safe, regular, organized, planned traffic, not only in terms of the defense of life and physical safety, but also in relation to the regularity of traffic itself, in order to facilitate vehicle driving and locomotion of people".

In the police reports referring to each accident, there is no well-defined and complete characterization of the situations that result in accidents with deaths and injuries, which occur on federal highways, which would be fundamental as a starting point for an effective program of prevention and reduction of these events. For the most part, the causes of accidents are attributed to the way drivers drive their vehicles on the roads, almost always related to excessive speeds and undue overtaking, often failing to carry out an analysis and evaluation of the geometric characteristics of the roads, which are sometimes unfavorable , outside the norms, and subject to correction. Studies like these, if their results were applied, would reduce the number of victims on the highways, even if drivers did not reduce speed.

Here we will seek to identify the factors that influence a stretch of just 175 kilometers to have a high number of traffic accidents, where to apply public prevention policies, and point out culprits in an attempt to make users and public authorities aware of this serious problem, not only in the stretch in question. study, but worldwide.

What motivates this research was to analyze what causes such a small stretch in relation to others to have such a high number of traffic accidents. Therefore, the general objective focuses on identifying the possible causes of traffic accidents that occurred on the stretch between Vilhena and Pimenta Bueno, on Highway BR-364, henceforth identified only as BR-364.

The specific objectives aim to verify the collisions that happen more frequently and their reasons, identify how each driver can cooperate in order to reduce accidents and demonstrate how camaraderie in driving the vehicle can help to drastically reduce accidents on the roads.

Initially, some definitions will be made, presenting the concepts of land, traffic, traffic accidents and a small history of the BR364/RO. Soon we will bring the methodology used and finally we will look through tables and graphs to find a relationship between traffic accidents, people and the road under study.

II. THEORETICAL REFERENCE

Traffic accidents are recognized as one of the negative effects of road transport systems. Annually, these accidents result in a large number of deaths, disability and suffering for victims and their families, representing a high cost for society in general. (IPEA, 2004).

The United Nations (UN) established the period from 2011 to 2020 as the "Decade of Action for Road Safety". The document recommends that member countries prepare a master plan to guide actions in this area in the decade, with the goal of reducing traffic accidents by 50% worldwide.

The situation on our highways is becoming more alarming every day, requiring urgent measures, whether preventive or repressive, to try to reach the 50% reduction suggested by the UN. When faced with this tragic reality, several questions arise, the main one concerning the causes of accidents and deaths in traffic. For this we must understand some concepts.

2.1 Transit

For a better understanding we need to make some definitions regarding the terms used here. We will start with some definitions and concepts about transit. But what happens to traffic?

Ademir Berwing (2013) claims to be:

> It is the set of daily displacements of people in the public space that we call public goods of common use, that is, along the sidewalks and public roads. In addition to people, this general movement also encompasses different types of vehicles. This transit, which reflects the movement of multiple interests, meeting the needs of work, health, leisure, among others, usually generates conflicts of interest. As a simpler example, we cite the interests of pedestrians, cyclists, motorcyclists and

> drivers of various types of vehicles with four wheels or more.

Vasconcellos (2003) also defines that transit takes place in a conflicting physical space that needs to be divided and distributed among those who wish to use it.

This generally disputed physical space and most commonly used are the land routes that our specific and major law, which regulates the entire national transit system, claims to be: (Law No. 9503, 1997, DENATRAN) (BRASIL 2017):

> They are urban and rural land roads, streets, avenues, paths, passages, roads, and highways, which will have their use regulated by the body or entity with jurisdiction over them, according to local peculiarities and special circumstances. (BRASIL, 2017, Art. 2)

Vehicles, which would have a lot to add to human evolution, helping to move around and shorten distances, due to excessive speed or even haste and lack of attention, become a true weapon, destroying lives and also causing a series of harm to all involved. (ANTONELLO, 2014; RAMBORGER, 2014; TONIOLO, 2014 and BARCELLOS, 2014).

2.2 Traffic Accident

The moment we are inserted in this context of conflict and dispute for daily spaces, where DE SANTI (2013) also states that traffic has a power relationship over people, where pedestrians are clearly seen at one end and large vehicles at another, reflecting the social position of the individual, accidents, classified as traffic accidents, eventually occur.

Which according to NBR 10.967/89 of the Brazilian Association of Technical Standards (ABNT) is:

> ...all non-premeditated events resulting in damage to the vehicle or its cargo and/or injuries to people and/or animals, in which at least one of the parties is in motion on land roads or areas open to the public. It may originate, end or involve a vehicle partially on the public road.

A more simplified example of the problem, it can be said, accidents on our highway are nothing more than the tip of an Iceberg of a large number of errors in the interactions between road users and the environment in which they circulate as a all. (CHAGAS, NODARI, and LINDAU, 2010)

Brazil is among the countries with one of the highest traffic mortality rates. Although our data are still inconsistent, which can be said that the numbers are much higher than those presented, the statistical data on traffic accidents in Brazil, despite their recognized inconsistency, indicate the seriousness of the situation. Accident data are the cornerstone for all road safety activity and are essential for diagnosing the problems that cause accidents (CHAGAS, NODARI, and LINDAU, 2010).

SANTOS (2009) still seeks a more humane side by saying that lives are taken daily, and we are constantly bombarded with news about traffic accidents, due to the attitudes of drivers and the inertia of Organs responsible bodies. MURER (2011) quoting Oliveira (2004) clearly and concisely exposes the main causes of these accidents by saying that traffic accidents are not a fatality, as people insist on believing, they are mainly caused by human error, both pedestrians and vehicles. drivers, and secondly by lack of maintenance and conservation of vehicles and roads.

There are 3 thousand lives lost per day on the roads and streets or the ninth leading cause of death in the world. Traffic accidents are the first responsible for deaths in the 15 to 29 age group, the second in the 5 to 14 age group and the third in the 30 to 44 age group. Currently, these accidents already represent a cost of US$ 518 billion per year, or a percentage between 1% and 3% of the gross domestic product of each country. (Senado.gov.br)

Today, the conservation of the BR-364, especially in the section under study, contributes significantly to the high number of deaths in accidents, all of this combined with the recklessness of drivers who, knowing the precarious conditions of the roads, insist on disrespecting traffic laws.

For the purpose of this study, the concept was adopted that “a fatal accident is one in which the person involved died at the accident site” (IPEA, 2006), as adopted by the PRF for the records of police reports (IPEA, 2006). 2015b) and by the DENATRAN manual (2000).

2.3 BR 364

The first roads, as we know them today, only appeared in Brazil in the 19th century. The need to sell products and the growth of commercial exchange between localities and regions required the opening of more modern routes. (NATIONAL TRANSPORT CONFEDERATION, 2006),

Fiori (2012) makes it very clear at the beginning of his work the importance of the BR-364 for the state.

> ...importance of the BR-364 for the development process of the Western Amazon. After centuries of the most absolute isolation, the Amazon in general and Rondônia in particular arrived through it, waves of immigrants who promoted the occupation of what is now the state and began to explore all its potential... the BR-364 is the main highway connecting the huge South American continent

> from east to west, from the Atlantic to the Pacific Ocean.

With the construction of the BR-364 by the then president of the Republic Juscelino Kubitschek, Rondônia broke four decades of isolation, the construction itself already brought many workers who stayed here after the services ended (FIORI, MF. 2012).

In the same line of thought Silva (2016) shows that the cities of Rondônia only began to truly expand when the "flows" of the BR 364 were established, opening the era of outflow. With this and the fact that the BR is the main link in the north of Mato Grosso to the grain port on the Madeira River in Porto Velho que Neto, Thiago Oliveira (2009) says that the problem becomes even greater as the BR 364 receives heavy traffic with loads of agricultural production from the north of Mato Grosso and throughout the State, it still says that the highway was not designed to support the high number of heavy vehicles that travel through it today.

Fiore (2012). It clearly summarizes the importance of the BR-364 highway today.

> Today, more than 50 years after that presidential decision that started the saga of building the BR-364, the highway continues to be the main link between the Western Amazon and the rest of Brazil, plus the fact that, currently, it it also takes products and people to the other side, towards the Andean countries – the BR-364 is the main highway connecting the huge South American continent from east to west, from the Atlantic Ocean to the Pacific. (FIORI, 2012)

The BR-364 drains a good part of the Brazilian agricultural production. More than 1,300 trucks pass through the highway a day, transporting the entire 3.3 million ton harvest of grains from Mato Grosso and Rondônia to the states and ports of the North Region, a state that is already the fifth largest exporter of meat in the country. (Senate Agency).

III. METHODOLOGY

The present work was carried out through a bibliographical research that, according to Marconi and Lakatos (1992), is the survey of all the bibliography already published, in the form of books, magazines, separate publications and written press. Its purpose is to make the researcher come into direct contact with all the written material on a given subject, helping the scientist in the analysis of his research or in the manipulation of his information. It can be considered as the first step of all scientific research. Bibliographical research seeks to solve a problem (hypothesis) through published theoretical references, analyzing and discussing the various scientific contributions. This type of research will bring subsidies to the knowledge about what was researched (Boccato 2006). As for the objective of the research, it is characterized as descriptive. Descriptive research requires from the investigator a series of information about what he wants to research. This type of study intends to describe the facts and phenomena of a certain reality (TRIVIÑOS, 1987). Another characteristic of descriptive research is that the study, analysis, recording and interpretation of facts in the physical world are carried out without interference from the researcher (Barros and Lehfeld, 2007). The scientific approach method used in the research was the deductive one, which is a process of information analysis that uses logical reasoning and deduction to reach a conclusion regarding a given subject. This type of study intends to describe the facts and phenomena of a given reality (TRIVIÑOS, 1987). Another characteristic of descriptive research is that the study, analysis, recording and interpretation of facts in the physical world are carried out without interference from the researcher (Barros and Lehfeld, 2007). The scientific approach method used in the research was the deductive one, which is a process of information analysis that uses logical reasoning and deduction to reach a conclusion regarding a given subject. This type of study intends to describe the facts and phenomena of a certain reality (TRIVIÑOS, 1987). Another characteristic of descriptive research is that the study, analysis, recording and interpretation of facts in the physical world are carried out without interference from the researcher (Barros and Lehfeld, 2007). The scientific approach method used in the research was the deductive one, which is a process of information analysis that uses logical reasoning and deduction to reach a conclusion regarding a given subject.

Allied to the method are the research techniques, which are the specific instruments that help in achieving the desired objectives. The technique used in the article was the documentary survey, which consists of describing and representing the content of the documents in a way that is different from the original, aiming to guarantee the recovery of the information contained therein and to enable its exchange, dissemination and use (IGLESIAS; GÓMEZ, 2004). Such a technique is considered as the treatment of content in order to present it differently from the original, facilitating its consultation and referencing; that is, it aims to provide a convenient form and represent this information in another way, through transformation procedures (BARDIN, 1997).

The present work was carried out using statistical data, mostly extracted from the DATATRAN platform, which was later incorporated into the federal road police website within the federal government website platform. As already

detailed, the Document Survey technique was used, where within the spreadsheets of accidents from all over Brazil, several filters were made, starting with accidents within the UF RO, later selecting those events in the cities of Vilhena and Pimenta Bueno, after, only those of the BR-364, and finally, the stretch between km 17 and 192 of that highway was restricted, thus reaching the desired data for the study under analysis.

IV. RESULTS

The data on traffic accidents analyzed here are released annually by the Federal Highway Police and include accidents recorded within the approximately 175 kilometers that divide the two cities, starting at km 17 of the BR-364/RO, leaving the city of Vilhena/RO and ending at km 192, at the beginning of the town of Pimenta Bueno. When the occurrence is registered by the road police officer, he must classify it into one of the following three options, (a) accidents with fatal victims: accidents in which there is at least one dead person; (b) accidents with injured victims: accidents in which there is at least one injured person, who did not die at the scene; and (c) accidents without victims: accidents in which everyone involved was unharmed and only material damage was found at the site.

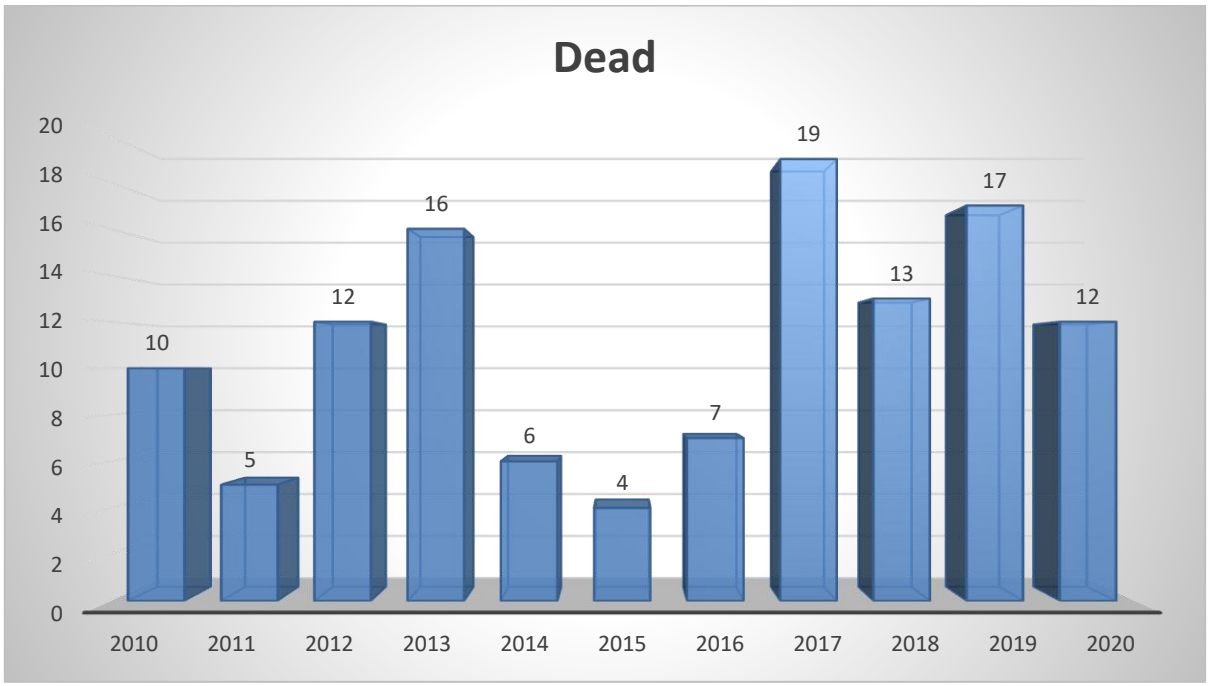
In table 1, we observe the annual quantitative variation of accidents in a historical period of 11 years, in the period from 2010 to 2020.

Table 1 . Traffic Accidents per year.

Year	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
With Victim	63	72	65	89	83	61	61	57	67	50	42
No Victim	81	64	82	96	112	86	54	67	33	18	15
Ignored	0	0	2	0	0	3	3	0	0	0	0
Fatal	9	4	9	13	4	4	6	15	10	9	7

During the period under study, 1516 traffic accidents were recorded, of the most diverse types and causes. Of these, 800 became victims at the scene, about 53% of the total, that is, more than half of them left trauma in victims there. Among these 800 accidents with victims, 90 of them resulted in fatalities, with the death of 121 people at the scene of the accident. If we take into account the victims who die after being admitted to hospitals, these numbers will be even higher.

Graph 1. Number of deaths each year.

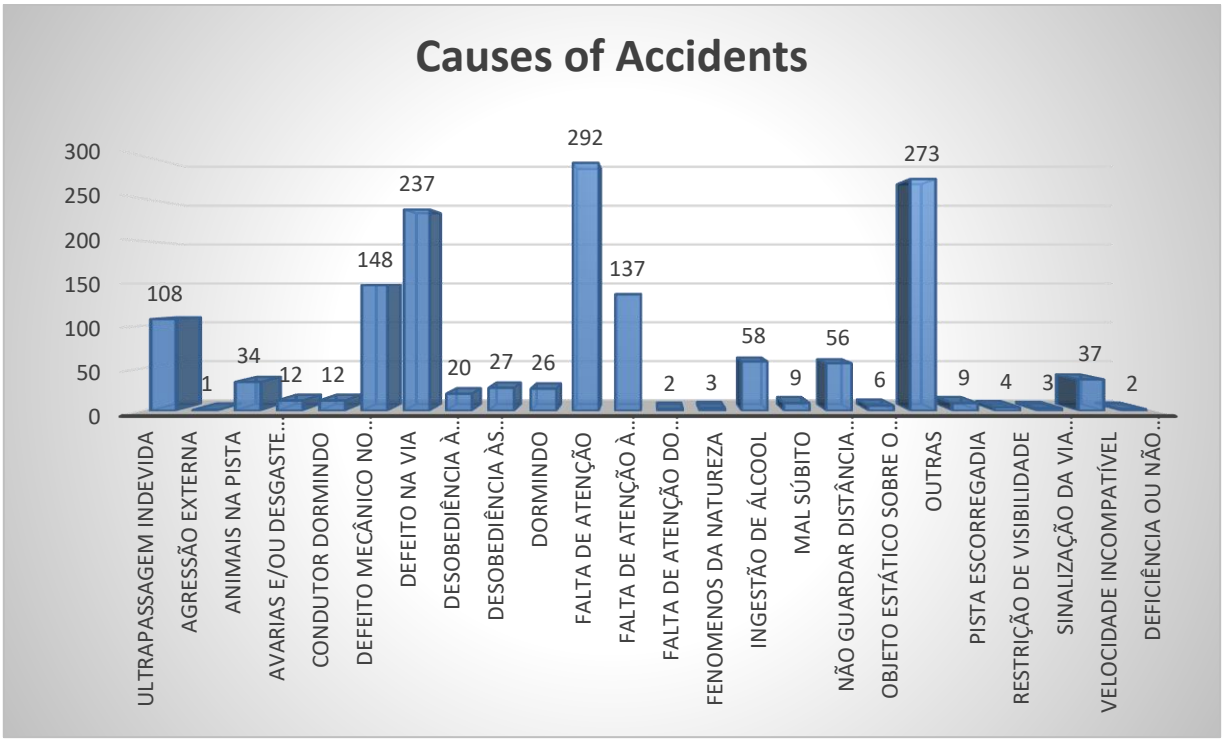


Highlighted in Graph 1 is the year 2017, with a record number of deaths totaling 19 people, followed by 2019 with 17 deaths and 2013 with 16. The year 2015 has the lowest number with only 4 deaths, followed by 2011 with 5 and 2014 with 6, estimating an average of 11 fatalities per year, a very high number for a stretch of just 175 kilometers.

In Graph 2 below, we can analyze the main causes of traffic accidents on the highway, where at the time of recording the Highway Police Officer will mark, among the 24 possible options, the one that best suits the situation he is analyzing, either through the site of the accident, or even through witness reports.

The lack of attention/driving is highlighted, which predominates in the ranking of causes of accidents, adding up to 429 causes in these 11 years of study, a cause that is the sole and exclusive fault of the driver, who is responsible for the facts and the establishment of government programs in order to raise awareness of such drivers.

Graph 2. Causes of Accidents.



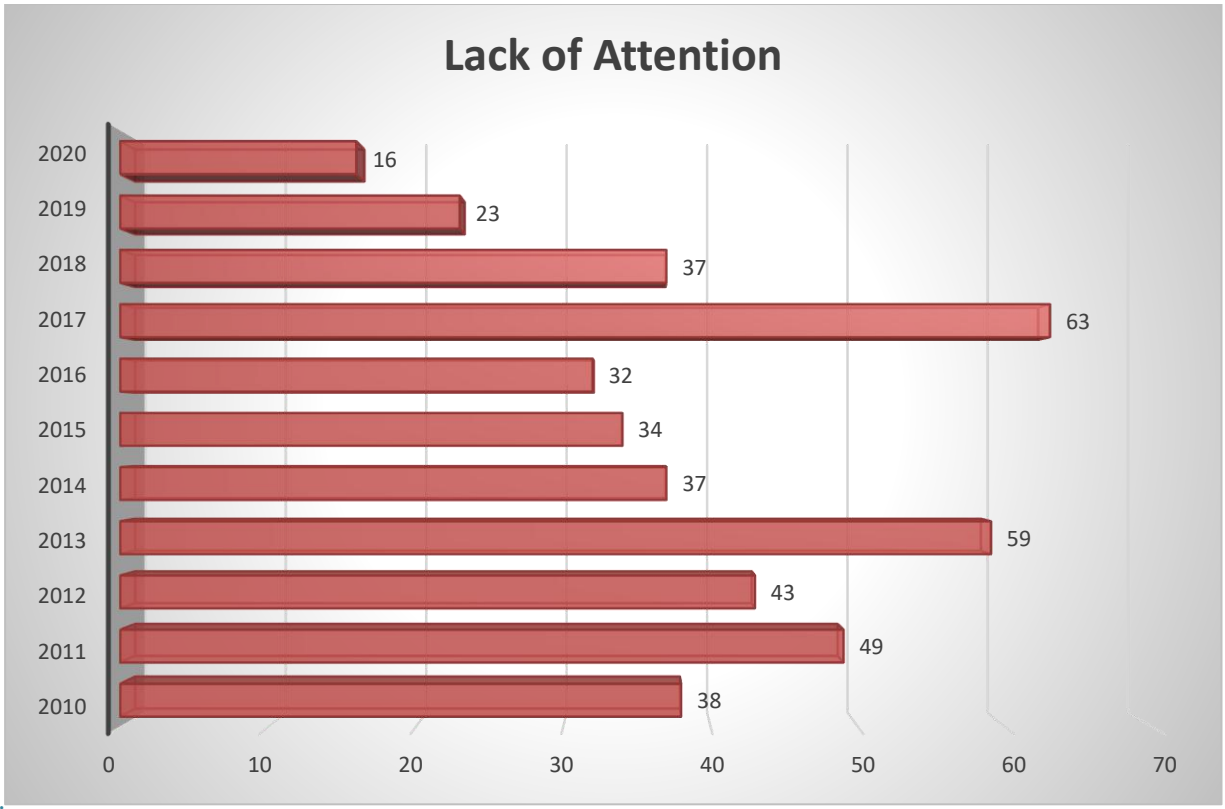
Despite the fact that the lack of attention is totally linked to the driver's attitudes, there are still other causes that can and should be attributed to them, especially when proposing public policies to prevent traffic accidents, I cite, for example, Improper Overtaking , which is still a lack of attention on the part of the driver when carrying it out without the necessary safety precautions.

With the exception of Defect on the Road (with 237 events), we can and must somehow attribute all the others to the human being, driver of the vehicle at the time of the accident. Like Mechanical Defects, which in the years under study represented the 3rd place in the ranking of causes of accidents, adding up to 148 claims, we can say that due to a "lack of attention" on the part of the driver in carrying out preventive maintenance on the vehicle, this came to defect while driving. In the same analogy, "Do not keep a safe distance", "incompatible speed", "falling asleep at the wheel", among others.

With a very high number in all the years studied, added up to 273 events, there is the "Other" cause. This is largely due to the inability of the police to be able to define the cause of the accident on the spot, often due to lack of witnesses or tampering with the original environment of the events.

Analyzing Graph 2, and separating the "Others" classification, we see that 66% of the accidents are somehow linked to human beings, a very high number if we consider that "Defect On The Road", with 237 registered accidents, is the only cause that does not would have a connection with the driver, representing 16% of the accidents in the years of the research, even so if we combine the recklessness of the drivers who, knowing the precarious conditions of the roads, insist on disrespecting the traffic laws, almost all would have a connection with the way of driving the vehicle. vehicle.

Graph 3. Lack of attention to driving

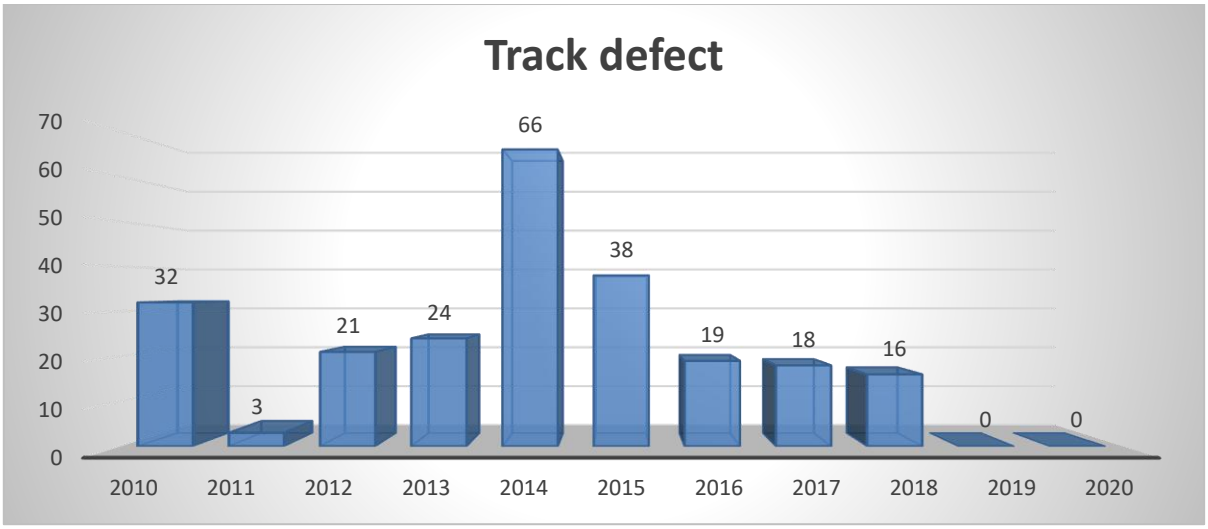


As previously mentioned, the main cause of traffic accidents in the section and period under study is "lack of attention", which according to Graph 3 gives us an average of 39 accidents per year, reaching frightening numbers in the years 2013 and 2017, with 59 and 63, respectively, with the years 2019 and 2020 showing the lowest rates, 23 and 16. We will see in the course of the studies that the reduction of accidents in the years 2019 and 2020 was quite significant, this is explained due to the impact of the pandemic of Covid-19 also reflected in traffic since, visibly, the number of vehicles circulating decreased during the period, due to restrictions on circulation.

So alarming are the numbers related to the lack of attention when driving the vehicle, that of the 121 deaths that occurred in accidents on the stretch between Vilhena/RO and Pimenta Bueno/RO, between the years 2010 to 2020, 30 of them, that is, 25% had this typification as the main cause, taking into account again the fact that we do not attribute other causes such as Improper overtaking to the lack of attention of drivers, if that were the case, the numbers would be even higher.

In second place in the causes of traffic accidents is the Defect on the Road, reaching the high number of 237 claims between the years 2010 to 2020, about 16%. Year after year, the federal government, through the National Department of Transport Infrastructure (DNIT), has been trying to maintain the road's trafficability, through periodic and punctual maintenance, which has proven to contribute to the reduction of traffic accidents caused by this situation. This fact can be seen when comparing the troubled year of 2014, which even recorded the number of 66 accidents caused by road defects, gradually reducing in subsequent years, as shown in the graph below, reaching zero in the last two years of the research.

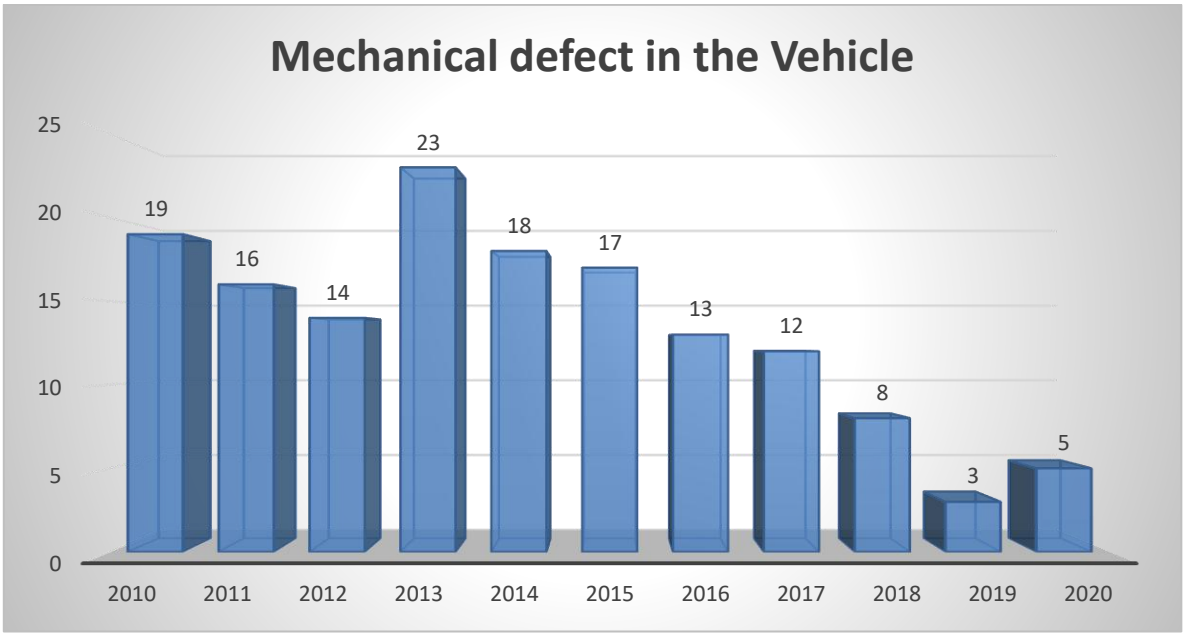
Graph 4. Track defect.



Recklessness is the main cause of accidents and deaths on federal highways in the country, which is no different from the BR 364 in Rondônia, since the events analyzed here took place on a stretch of road with good traffic conditions, that is, the biggest problem it would still be the imprudence of the driver, who, knowing the precarious conditions of the road, would insist on disrespecting the traffic rules.

Another situation that has contributed a lot to the rise in accident rates is the lack of maintenance on vehicles. In the years under study, the classification "mechanical defect in the vehicle" represents 10% of all accidents, that is, 148 accidents were caused by the driver's failure to observe preventive or corrective maintenance on their vehicles. Highlights include the year 2013, which recorded 23 traffic accidents due to vehicle failure. On the other hand, as we see in the graph below, after reaching this peak in 2013, the events have been decreasing year after year, reaching the level of 5 accidents in 2021, a reduction of 26% compared to the highest level in 2013.

Graph 5. Mechanical defect in the vehicle.



Improper overtaking is today the fourth leading cause of traffic accidents on the BR 364. In the stretch under study, 108 causes were identified between the years 2010 to 2020, representing 7% of a total of 1516.

Apart from the issue of driver recklessness, another factor that contributes to this high number may be related to the fact that the BR 364/RO is a single lane, made up of a high number of sharp curves, ascents and descents, the latter with only two locations equipped with a 3rd lane for slow vehicles along the entire length of the 175 km between Vilhena/Pimenta Bueno. With a large flow of trucks with a tendency to increase in the coming years, a duplication of the BR364 is essential and necessary for the continued development of the state and the reduction of traffic accidents.

Once again, we have to comment on the problem that a highway of the size and importance of the BR 364/RO has, which drains a good part of the Brazilian agricultural production, passing through it more than 1,300 trucks per day, which transport goods to the states and ports of the Region North such as the entire 3 million ton crop of grains from Mato Grosso and Rondônia, the problem of being a single lane road. Analyzing the table below on the types of accidents, we see that the high number of rear-end collisions is mainly due to the large number of vehicles sharing the same lane.

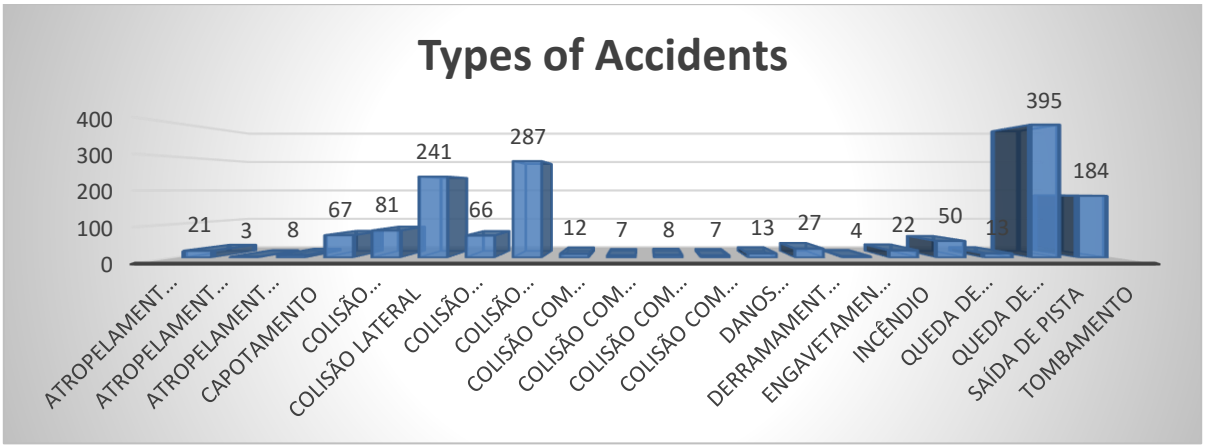
Analyzing the table, we have that rear-end collisions were the cause of 287 accidents between the years 2010 to 2020 in the stretch studied, representing 19% of the total accidents, according to the Brazilian Traffic Code it is the responsibility of the driver of the vehicle behind, to avoid collision with the vehicle in front. Another point that contributes to accidents for this high rate of rear collisions is excessive speed. Excessive speed decreases the chance of the vehicle stopping in front of an obstacle or a slower vehicle ahead, a very common situation on our BR 364 because it is a single track and has many parts with slopes, slopes and curves. We can also mention the failure of the brakes, which due to a lack of preventive/corrective maintenance, makes the situation even more uncontrollable. Therefore,

Side collisions have also been gaining prominence in statistics, as we can see in the table below, which represents 16% of the total number of incidents, with 241 records, ranking third in a ranking of 20 types of possible accidents on the Federal Highway Police form. Then we have head-on collisions, with 81 traffic accidents, around 5% of all accidents. What do these three types of accidents have in common? Apart from the fact that they are occupying the 2nd, 3rd and 4th places respectively of the most registered occurrences, what they have in common is that, the lack of attention was the cause of 42% of these accidents, that is, again the driver's imprudence and his insistence on disrespecting traffic rules has caused most accidents.

Ainda dentro da tabela de tipos de acidentes, trazemos aquela que se destaca e vem em primeiro lugar. Sozinha, a saída de pista representa 26% do total, trazendo a quantia de 395 registros. Se somada a outras causas semelhantes, como tombamento com 184 e capotamento com 67 ocorrências, temos uma somatória de 646 sinistros em apenas três tipificações, cerca de 43%. Com destaque para a causa "defeito na via" que entre os três tipos representa um percentual de 23%, seguida pela "falta de atenção" (16%), que sempre leva sua fatia em ocorrências.

We then saw that these six main causes, alone, represent 83% of all types of accidents recorded in the years and route under study, together they give a total of 1255 traffic accidents. Certainly these should receive greater attention from the authorities regarding the formation of public policies for the prevention of traffic accidents, not leaving aside the other 14 typifications that also have a certain destructive potential.

Graph 6. Types of Accidents



We tried to identify the gender of those involved in a traffic accident and the numbers. It was evidenced that people of the male gender are the most involved in traffic accidents. In the interval used in the research, 1842 males were found to be involved in some way in the records, whether they were drivers, passengers, pedestrians, among others, classified as

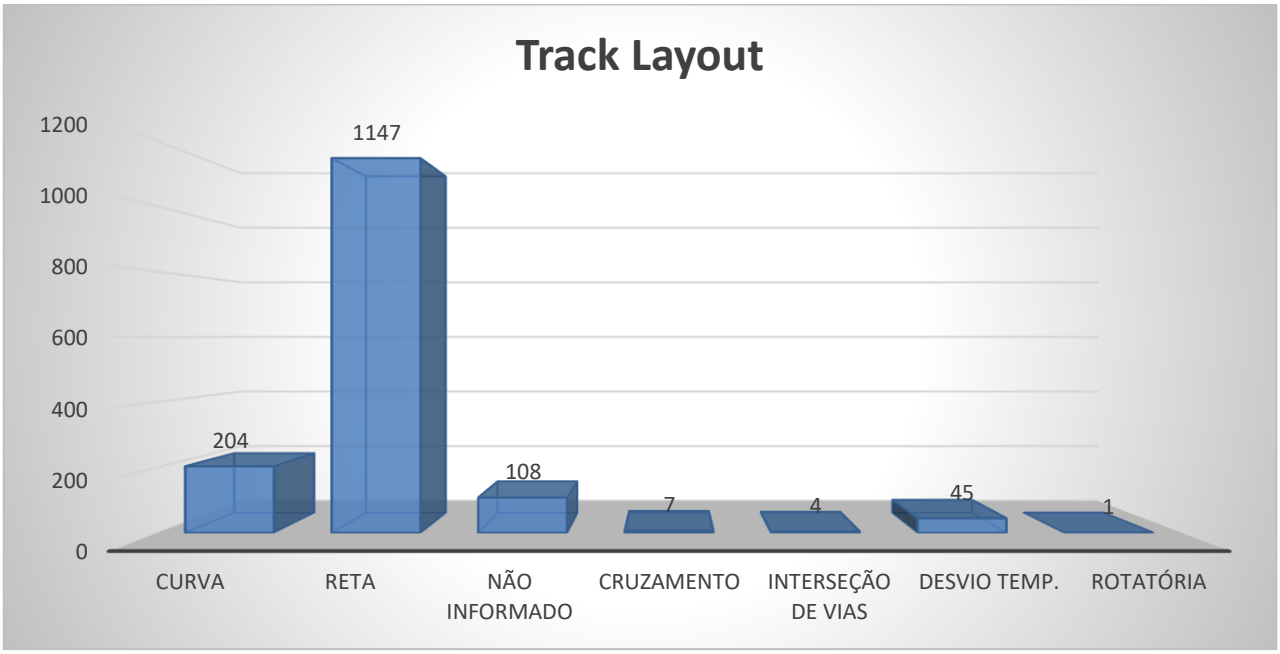
unharmed, lightly injured, seriously injured and dead, that is, 77% of those involved subject to qualification, are masculine. As for females, 562 involvements were accounted for, that is, 23% of the total. In the data collection, the qualifications “not informed” with 519, ignored with 10 and invalid with 14 were also found, these are not subject to gender identification.

It was also verified that proportionally men are more involved in accidents when they are driving vehicles than women, of the 1842 male people involved in accidents, 1490 were driving the vehicles that were involved in the accident, the frightening amount of 81% of the cases. Of the total, 101 died on the spot. With emphasis on Improper overtaking, which represented 22.8% of the causes of accidents that claimed the lives of those men (22), followed by lack of attention with 18.8%, 19 accidents, and disobedience to traffic rules by the driver with 16 .8%, that is, 17 occurrences, showing once again that driver imprudence has been the cause of most accidents and consequently of deaths in traffic.

When women are driving their vehicles, they are less involved in traffic accidents, as the survey shows, only 92 of them were driving the vehicle at the time of the accident, representing only 16% of the total number of involvements. 33 women were victimized in these accidents, of which only two were driving the vehicles at the time, with one due to drinking alcohol while driving and the other due to Deficiency or non-activation of the Vehicle Lighting/Signaling System.

When talking about places of traffic accidents on highways, one immediately thinks of sharp curves with no visibility, dangerous intersections, among others. However, what the following table shows surprises us, regarding the track layout. What we least imagine is that in a straight line there could be an accident, because theoretically the conditions are much more conducive to better drivability, which proves to be a mistake. In the graph below, claims in a straight line represent 76% of the total recorded, with an exorbitant amount of 1147 accidents, the straight line leaves the “curve” classification far behind, which occupies second place with 204 records, with 13% of the total of locations. The rest of the track layouts and those not informed, add up to only 4% of the total.

Graph 7. Track Layout

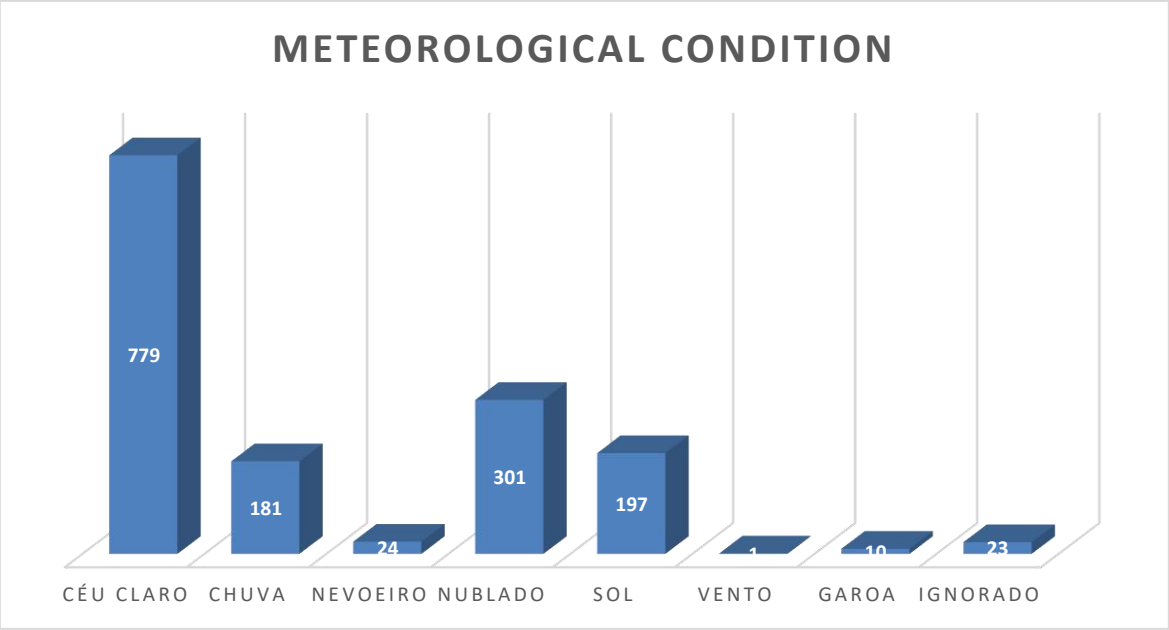


This shows once again that the high number of accidents is closely linked to the driver's recklessness.

Another situation that comes to break some popular thoughts in relation to traffic accidents is the meteorological condition of the day in which the most accidents occur. When we think that the weather may have negatively interfered with the accident, we soon imagine heavy rain or heavy fog that makes it difficult for the driver to see, a very strong wind or even a light drizzle. But once again, this popular thinking is shown to be wrong. The graph below shows that combining the conditions clear sky, sun and cloudy, these perhaps the most favorable and "perfect" for driving vehicles on highways, together, represent the important amount of 84%, that is, of the 1516 accidents recorded , 1277 were in good weather conditions, which could be excluded from having caused the event. The rain,

which would be one of the most adverse conditions for driving, represents only 12% of the weather at the time of the accident, with only 181 moments. Another very unfavorable climate is fog, but this one with only 24 records out of a possible 1516.

Graph 8. Meteorological Condition



Another important factor to be taken into account is the phase of the day when most traffic accidents occur. Of the 1516 records, 879 happened in broad daylight, adding this with dawn and dusk, with 115 and 104 respectively, we have that 72% of the accidents happened while there was good light for driving, therefore, the phase of the day also does not have a great contribution in the causes of traffic accidents. Driving at night is certainly a little more complicated, despite the lower vehicle traffic it is more difficult to measure spaces, distances and speeds. In addition to many unlit stretches and lack of signage. Even so, nighttime accidents represent only 28% of the total recorded.

It is important and necessary to identify the critical months in which the highest accident rates occur. If they are identified and also the periods of the year, it is easier to develop programs to combat and prevent accidents. For example, as shown in the table below, we see that the months in which there are school holidays are those with the highest accident rates, due to the significant increase in the flow of vehicles on the highway, with July being the period mid-year vacation, which carries the highest percentage of accidents in the ten years studied, representing almost 11% of the total number of accidents, that is, 163 of the 1516 recorded. Likewise, the month of December presented the amount of 146 claims, totaling almost 10% of the total. The table below clearly expresses.

It is noticed that while traffic in cities is a little calmer during the holiday period, on the roads, the situation is different, in this period the number and flow of vehicles grows and the risk of accidents as well.

Table 2 . Months of the year

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Total	%
JAN	10	8	15	15	17	16	13	13	10	6	5	128	8,44
FEB	21	11	9	18	10	11	17	14	13	9	4	137	9,04
MAR	12	11	20	20	15	16	17	14	10	7	4	146	9,63
APR	11	17	13	16	23	15	7	13	10	9	4	138	9,10
MAY	13	8	8	10	19	14	12	12	6	5	6	113	7,45
JUN	15	12	14	14	14	11	6	13	9	5	4	117	7,72
JUL	25	13	20	18	20	17	11	10	13	11	5	163	10,75

AGO	12	14	11	13	13	15	5	8	8	5	9	113	7,45
SEP	5	6	6	14	17	7	11	10	6	5	8	95	6,27
OCT	9	7	13	11	18	7	9	10	12	5	5	106	6,99
NOV	8	13	9	19	14	15	10	10	9	3	4	114	7,52
DEC	12	20	20	30	19	10	6	12	4	7	6	146	9,63
TOTAL	153	140	158	198	199	154	124	139	110	77	64	1516	

Not far behind in the statistics was the month of March, equaling in quantity the month of December, but showing a significant drop in recent years, when it reached its peak in 2013, with 18 claims, reduced about 78% of cases, registering only 4 occurrences.

Despite being the second month with the highest number of accidents in the last year (8), surpassing even the champion month of July (5), the month of September has the lowest average of occurrences among the months studied, with 8.6 yearly, 42% below the 14.8 yearly registered in July and 13.2 in December.

Since it is important to identify the months that most need attention when creating public policies aimed at reducing traffic accidents, we could not fail to identify the days of the week with the highest incidence of occurrences. We see that the end of the week is a critical period for accidents, a period in which inspection and accident prevention actions must be reinforced

By analyzing the table below, it can be seen that Friday and Saturday together account for 31.73% of the total accidents recorded between the years 2010 to 2020, with 255 and 214 events respectively. If we consider that the year 2013 had 52 Saturdays, and that this year 39 traffic accidents were recorded on the day in question, we have that every Saturday there were 0.75 accidents, almost one per day. Of the 16 people who lost their lives in 2013 on the stretch under study, 4 of them were on Saturday, that is, 25%, a very high number, making it clear that measures are needed, but punctual to reduce these numbers.

It is noticed, however, that the variation in the number of accidents between the days, are not so far apart from one another in order to leave aside the days with fewer occurrences, being, for example, only 58 the difference between Saturday (255), champion of records, and Thursday (197), appearing as the "quietest" day to travel the stretch, and on that day only one person lost his life and was run over.

Table 3. Days of the week

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	TOTAL	%
MON	22	15	26	24	26	24	17	17	14	9	10	204	13,46
TUE	19	17	26	32	32	22	19	18	23	9	5	222	14,64
WED	19	18	16	20	29	25	13	23	21	8	6	198	13,06
THU	25	23	21	23	22	20	15	22	16	8	2	197	12,99
FRI	24	27	15	30	26	19	21	21	11	14	18	226	14,91
SAT	26	18	30	39	32	22	17	23	14	20	14	255	16,82
SUN	18	22	24	30	32	22	22	15	11	9	9	214	14,12
TOTAL	153	140	158	198	199	154	124	139	110	77	64	1516	

Now that we've quantified the days of the week and the most critical months, we can now analyze the following table that seeks to identify the times with the highest incidence of accidents, so that we can, in a more timely manner, direct efforts in the right measure to try to reduce these events.

It is clear from the table that the 16:00 hours show the highest number of claims, representing almost 8% of the total. One fact that draws a lot of attention at this time of 4 pm is that, of the 118 accidents recorded in the 11 years of research, 46 of them are classified between Runway Departures and Overturning/Rolling Over, that is, 39% of the 21 possible types of accidents, followed by rear collision 28, side collision 19 and transverse collision with 7 occurrences.

It was also identified, and worryingly, that the afternoon, between 12:00 and 18:59, carries an alarming number of 647 traffic accidents, against 425 in the morning (from 06:00 to 11:59) and 444 in the morning night period (from 19:00 to 05:59). That is, in just 6 hours, 43% of the 1516 accidents that occurred between the years 2010 and 2020 were recorded in the stretch on BR-364 that connects the cities of Vilhena/RO to Pimenta Bueno/RO.

This fact may be linked to the sleepiness and fatigue that the driver feels after a few hours of travel, according to a study carried out by the Associação Brasileira de Medicina do Tráfego (ABRAMET) in 2017, driving while drowsy presents the same risk as driving drunk car. This factor, however, is left in the background by many drivers who do not understand the dangers it poses to their lives and to the lives of others. The same study revealed that 42% of traffic accidents are related to sleep.

Table 4. ***Times of Day***

ANO	10	11	12	13	14	15	16	17	18	19	20	TOTALL	%
23	4	10	1	2	3	1	2	3	1	3	3	33	2,18
22	7	3	4	4	4	2	4	4	2	2	2	38	2,51
21	5	2	3	6	7	5	2	8	3	2	2	45	2,97
20	7	10	7	7	7	1	6	5	5	2	1	58	3,83
19	15	6	11	12	9	10	4	9	2	2	3	83	5,47
18	8	13	4	9	16	10	7	7	9	6	3	92	6,07
17	8	6	8	14	15	14	10	9	10	4	4	102	6,73
16	9	7	7	18	19	16	12	12	9	7	2	118	7,78
15	1	9	10	13	4	10	8	9	7	5	3	79	5,21
14	7	6	8	13	11	16	12	8	7	6	5	99	6,53
13	12	8	14	17	15	5	6	5	8	6	8	104	6,86
12	2	2	4	7	5	8	2	9	8	2	4	53	3,50
11	10	8	9	9	7	0	3	7	2	5	1	61	4,02
10	6	8	5	10	12	6	6	7	5	3	3	71	4,68
09	6	6	6	8	12	10	11	9	4	2	3	77	5,08
08	10	9	14	7	6	11	5	4	7	2	6	81	5,34
07	9	6	6	9	10	8	9	5	8	3	3	76	5,01
06	5	3	8	6	15	5	4	5	3	3	2	59	3,89
05	4	6	8	6	7	5	4	4	5	5	4	58	3,83
04	6	0	12	12	3	4	1	4	1	4	1	48	3,17
03	2	4	1	1	3	2	1	0	0	0	0	14	0,92
02	5	1	2	2	3	0	2	2	4	1	0	22	1,45
01	2	0	3	3	4	4	2	1	0	1	1	21	1,39
Total	153	140	158	198	199	154	124	139	110	77	64	1516	

Fonte: Planilha Datatran

Let us now analyze a data that until now has never been different, the result, if we look at previous statistics, whatever it may be, the data will be the same, which is the fact that the man is always ahead of the woman when it comes to victims of traffic accident. This always figures as the protagonist of the accident.

Let's look at the data collected from the PRF, referring to accidents on the BR 364 stretch, between Vilhena/RO and Pimenta Bueno/RO between the years 2010 to 2020.

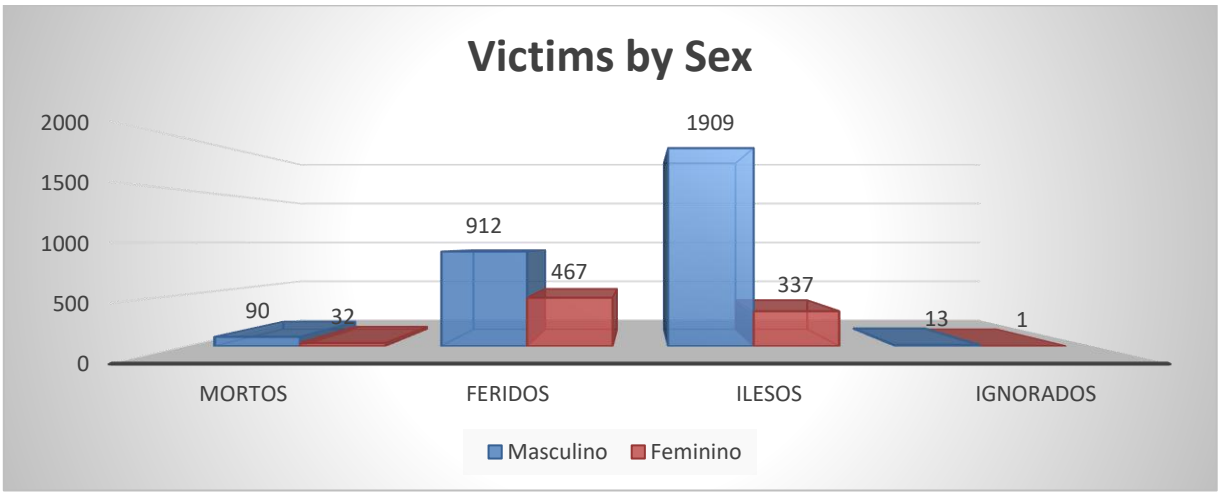
Looking at the graph superficially, it can be seen that the number of accidents in males is much higher than in females in all respects.

By the way, the number of female victims, both deaths and injuries, is well below the numbers of males, and of the total involvement, 78% are men and 22% are only women. Bringing to the number of deaths we have that of the 2924 men in accidents, 90 died on the spot, about 3%. As for females, there were 32 deaths at the site, that is, 4%. So we see that the death rate of women is slightly higher than that of men. But an interesting fact has to be taken into account when analyzing these numbers, of all the deaths of women in accidents, only three were driving the vehicle at the time of the accident, the others were passengers or pedestrians. The disparity is even greater when we look for the difference between the 2,587 drivers involved in accidents, the data shows that of this total, only 7% were women who were driving the vehicles at the time of the accident, that is, 178 female drivers. The numbers of men far exceed those mentioned above, and of the total

number of drivers, 2,409 were men, 93%. As most of the identified causes of accidents were related to the behavior of the person driving the vehicle (incompatible speed, lack of attention, not keeping a safe distance, disobeying signs, sleeping, drinking alcohol and undue overtaking), it is proved that men drive less defensively than women.

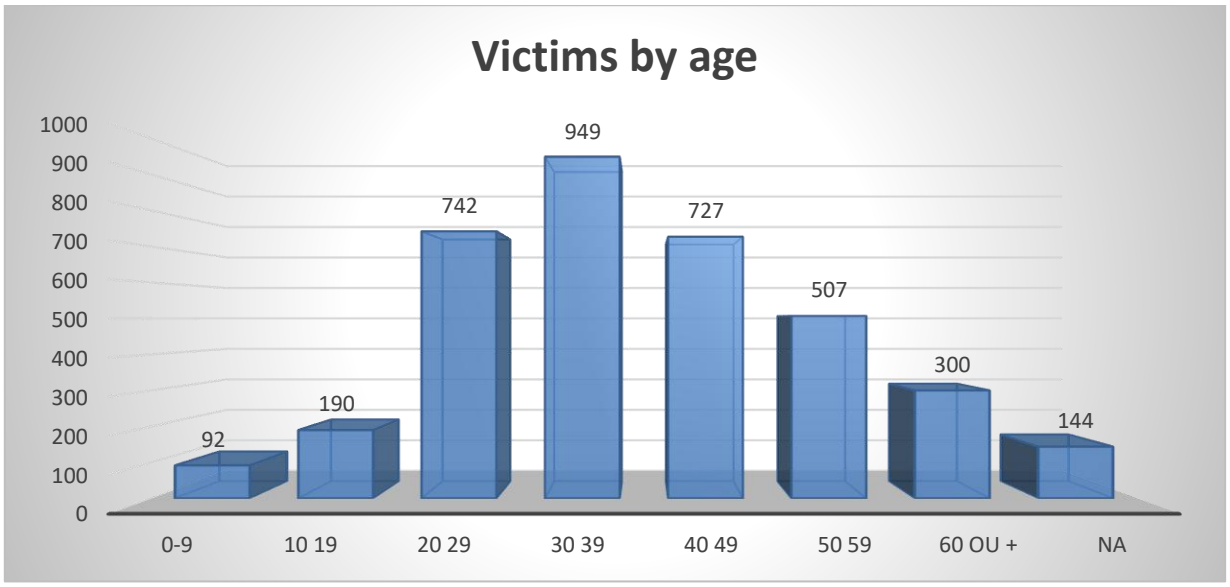
When talking about people unharmed in accidents, women have a lower rate than men. Only 40% of them leave without any kind of injury after the accident, while 65% of men suffer nothing. Once again women end up being the biggest victims of dangerous driving on the highways.

Graph 9. Victims by Sex



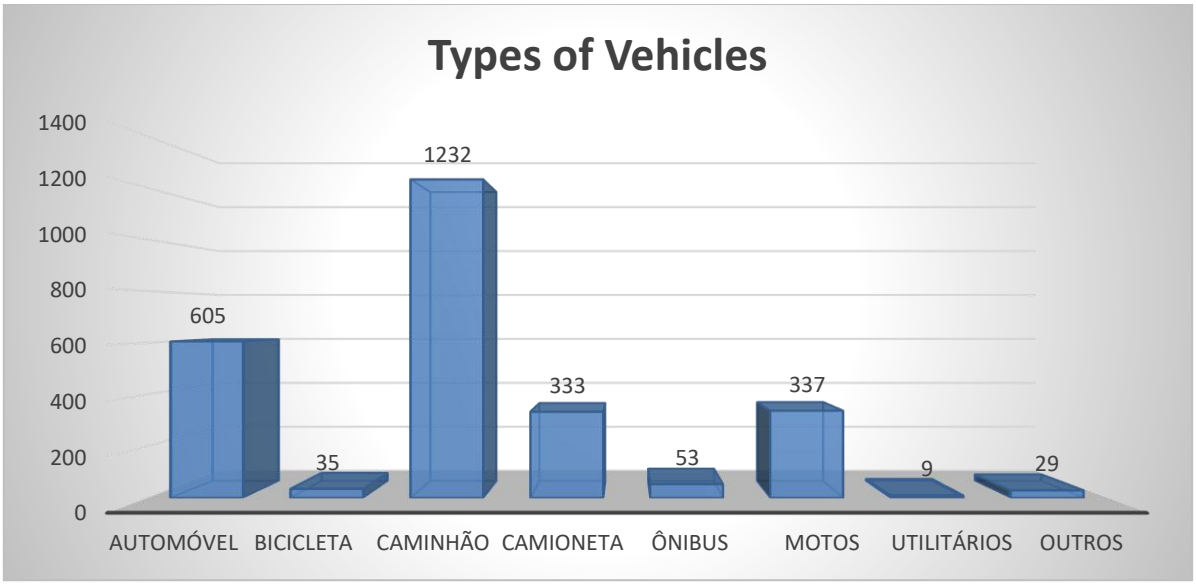
Regarding the age of those involved in traffic accidents, we have adults between 30 and 39 years old representing the majority of the numbers, 949 of the total, that is 26%. Followed by age 20 to 29 with 20.3% (742) and 40 to 49 with 19.9% (727). The remaining 44% is distributed to ages 0-9, 10-19, 50-59 and 60 years of age or older.

Graph 10. Age of victims.



Heavy vehicles represent 47% of the total involvement in traffic accidents on the highway, with 1,232 vehicles involved in accidents, these leave far behind the cars that add up to 23% of the total with less than half the number of trucks, that is, 605 cars. Motorcycles and vans are closer in numbers, the first with 337 and the second with 333 involvement in occurrences. Buses, despite the high number of people involved, only 53 vehicles were involved in accidents, accounting for only 2% of the total. The rest is up to the utilities with 9 and 35 bicycles, in addition to the 29 vehicles that were unable to qualify in the occurrences registered by the PRF.

Graph 11. Types of Vehicles



V. CONCLUSION

Through this study, it was identified that the main cause of traffic accidents on the stretch of BR 364 between the cities of Vilhena/RO and Pimenta Bueno/RO, is the human being who appears as the main responsible, adding the causes linked to driving the vehicle, we have that 66% of the accidents are linked to the human being where the factor "lack of attention" has the highest incidence.

Also proven in the information contained here that involvement in traffic accidents is always higher in the male population, which reveals that men are more exposed to this event. Perhaps because they are the absolute majority in driving vehicles, being most responsible for accidents. Among these drivers, those aged between 20 and 39 years represent the majority of cases in relation to the other five age groups with 46% of the total. Because this is the economically active population, the damage ends up being greater mainly for the families of those involved.

"Road defects" also play a significant role in the number of traffic accidents, accounting for 16% of the total number of causes. Knowing the driver that when faced with a road devoid of maintenance, he should redouble his attention and care, a fact that does not always happen.

Notably, the months in which school holidays take place are the ones with the highest incidence of traffic accidents, perhaps due to the fact that families gather for get-togethers and trips and the number of people circulating during these periods increases. Along with this, we have that Friday and Saturday are the days with the highest incidence of claims in the week, and at 4 pm, which added up to 118 accidents and is a cause for concern, also noting that the afternoon period registers the majority of accidents due to fatigue and tiredness due to the number of hours behind the wheel.

Heavy vehicles represent 47% of all traffic accidents, this is due to their heavy traffic on the stretch, which according to a study reaches 1,300 per day, draining all agricultural production in the south of the state of Rondônia and part of Mato Grosso. And despite the stretch under study being quite winding, most accidents happened in a straight line, and in good weather conditions, again making the driver responsible for the accident.

Este estudo trouxe os fatores que colaboram para o acontecimento dos acidentes de trânsito no trecho da BR364 que separa os municípios de Vilhena e Pimenta Bueno no estado de Rondônia. Houve certa dificuldade em juntar os dados devido à complexidade das tabelas, que são separadas por ocorrência e por pessoa, e também uma transição em sites do governo federal, onde anteriormente os dados sobre acidentes eram lançados na plataforma do DATATRAN e posteriormente foram anexados à página da Policia Rodoviária Federal, mais ainda assim a partir dos resultados encontrados, pode-se realizar planejamentos, desenvolvimentos e tomadas de decisões, para colaborar na formação de políticas públicas visando a prevenção e assim salvando vidas. O trabalhou visou a identificação dos fatores que mais contribuem para o acontecimento dos acidentes de trânsito, um novo estudo poderia abranger o custo que eles trazem aos cofres públicos ou os impactos sociais causados por eles nas famílias que muitas vezes perdem seu provedor o ficam com pessoas parcialmente ou totalmente invalidas.

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