

## THE DIFFERENCE OF DRIVING AMONG THE YEARS

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**Abstract:** *This article goes through the developments made in the traffic laws over the years, starting with the first car ever made and ending with the latest technologies designed to improve the safety of the participants. It shows the initial lack of regulations that created chaos on public roads, leading to Connecticut's first ever state transportation law. The paper highlights problems faced before traffic lights were and laws against drunk driving were introduced. In the study, traffic laws from the US and Europe are compared and examine driving habits all over the world. It describes most of the advances in vehicle automatization and safety technologies, highlighting the potential of autonomous vehicles to improve road safety. In the research, are addressed problems such as drunk driving while looking ahead to a future where technological advancements will be the key to reducing traffic accidents and promoting safer, more efficient roads, and envisions transforming cities through the integration of advanced transportation solutions landscape.*

**Keywords:** *changes, evolution, improvements, roads, safety systems, technologies, vehicle.*

### Introduction

The constant creation of road safety and transport inventions by the generations fulfills our dream of having the best transport system embodied all over the era. Karl Benz, of worldwide reputation design and automotive engineer was the one who disclosed the secret of automobiles and those upgrades emerged to what we know to be cars nowadays [1]. Signalizing the duty of road users, establishing traffic laws and increasing the visibility are some of the needs that his invention has created, including the road signs, streetlights, traffic lights, brake lights, etc. To this end, the governments have been introducing progressively tighter government controls requiring that accidents and people dying or getting injured at the workplace is discouraged. Automobiles have been recently equipped with safety systems including Airbags, ABS, and ESC, but these are not the only features, and the list continues. With time, engineers are still enjoying a journey deep into the untapped depths of modern technology in the quest to minimize the numbers of road accidents around and safeguard the drivers as well as those in their near environment.

### Early Regulations in America

The first automobile in the world was developed by the old German mechanical engineer, Karl Benz, in 1886. As he did so, he would bring an unparalleled transformation to the entire world. The problem of roads and traffic began to rise as the number of people who owned cars grew not only in quantities but also in the masses of people. Afterwards, the state of Connecticut created its first-ever transportation law at the state level in 1901. Nonetheless, the law governs vehicle speed. 12 mph is the speed limit for city streets, and 15 mph is the speed limit on country roads. These numbers are equivalent to 17 and 21 kmh respectively.

In the early 1930s, along the roads, there were thousands of cars, and it was undoubtedly one of the most hazardous times United States had ever witnessed. In an article that was published in the Detroit News, traffic conditions were reported to be without any discipline in the early 1900's. It was practically a massacre within a massacre that took the lives of more than thousands of people just in the city limits.

Yet even with the vast number of automobiles that are pouring onto American streets, there're no road signs, streetlights, road laws, traffic lights, brake lights, no laws against drunk driving, on and on goes this list. There seemed to be turmoil in the streets.

In the year 1930, police engineers across the nation started using three-way traffic lights. The traffic light system has altered very little in the past, more than eighty years from the day of its inception. In 1930 it was green, yellow and red words that meant stop, slow down and go.

Consequently, drunk driving continues to be the issue of the Department of Transportation and the whole America since the emergence of thousands of traffic laws to evade safety hazards. Per the statistics of the Department of the Transportation, there was an alcohol-related traffic fatality every 48 minutes in 2017.

In 1910, New York passed its first law against drunk driving. The penalty was a \$1,000 fine and jail time. This sparked a revolution that attempted to solve problems that still exist today.

In 1936, Robert Borkenstein invented the so-called "drunk meter." Borkenstein's invention is a balloon-like device that can determine whether a driver is drunk. The device needed to be more precise, so in 1953 Borkenstein developed what we know today as the "breathalyzer." A BAC level of 0.15 was originally set as the legal upper limit but was deemed too high in 1960 and was lowered to the BAC level used in the United States today of 0.08, compared to 0.05 being the limit allowed in most of the Europe countries [2].

### **First traffic laws in Europe**

On the heels of the year 1909, Germany saw the introduction of the world's pioneer national traffic regulations, along with a statutory test and driving license. As streets became more dangerous, further changes were introduced: UK was the cradle of the first ever pedestrian crossings in the 1930s and the establishment of speed limit on German roads had been made in 1934; however, it was 60 kmph limit exclusively for urban streets. A relative abolishment of this rule occurred in the western part of Germany in the 1950s, and after 5 years of the rise in road traffic injuries, it was reintroduced.

It is fascinating that the seatbelt, that is one of the most crucial security elements on roads, was only available after a rather lengthy period. In the 10s of 50s, car makers started installing them as optional accessories, but their popularity was low to the bone. The first standard seat belt regulation, in Australia, was approved only in 1970 (laws in the United States were adopted during the late '60s). For some countries, this regulation was adopted for all (sic!) passengers in the 1980s, while in others this regulation was introduced only for pilots in the 1930s as well as for other passengers only in the 1980s [3].

### **Right-hand and left-hand driving**

Today, most countries drive on the right side of the road and follow right-hand traffic (RHT) rules, including the United States, Canada, Russia, and much of Europe. But about a third of the world's countries are bucking the trend and implementing left-hand traffic (LHT). The UK is one of these countries. In fact, compliance with LHT in the UK has a long history, stretching back into British history and even back to ancient Rome.

There is one of the widely accepted theories which states the origin of the British driving on the left tailing back to ancestral Roman times. During those days, horseback travelers' movement through these wide plains was threatened by invasion or attack. Many Romans dominated their left hand, which is why they would rather poise in a position where their dominant right hand is free to act should an opponent suddenly occur. The past demonstrated that there was a tradition among the Romans to always move as a group toward their left hand, nevertheless Romans still drove their carts and chariots to their left. This is a practice that the subsequent societies have adopted from previous empires and carried over the centuries.

Because the left side of the road was typical in almost every part of the Roman Empire for centuries, this remains the European custom. Nevertheless, in 1792, the preservation of law act

was annexed in Pennsylvania which was later followed by many other states in U S and Canada. Concurrently in France, however, Napoleon arranged for driving on the right side in any French part of the world and these areas mostly drive on the right to date.

The first document which was officially approved that driving on the left was prohibited during the time of the Pope Boniface VIII in 1300 AD when declared that all pilgrims coming from the Roman Empire to travel on the left. In 1773, with the general upkeep of the roads administered by the government and the streets overcrowded, the General Highways Act was passed to help ensure that people, open hackney-coachmen, hoodened unidentified highwaymen and all other riders should drive on the left-hand side of the road to effect collision-free movements. Here was the first of its kind, the titless eye, before the car manufacturer. During the past century, the case proved the highlighted legislation enabling Britain's driving rules to be a national law, and anyone driving in the wrong direction clearly committed an offense [4].

### **Digital technologies and the road to automation**

The city streets of today are substantially different from the disorganized scenes of a century ago, even though they may occasionally appear chaotic. Crosswalks and designated bike lanes are typical, pedestrians stay on the sidewalk, and traffic flows are closely observed and managed.

However, safety remains a major concern. More people than ever before are driving due to population increase and rising car ownership. Road traffic crashes claim the lives of about 1.3 million people annually [5]. More than half of these are more susceptible users of the road, such as bicycles, motorcyclists, and pedestrians.

Thankfully, technical advancement and digital change are making smart city infrastructure safer, developing a variety of clever solutions.

### **Technological Advances in Self-Driving Cars**

**Sensor Technology:** The self-driving vehicles leverage various sensors such as cameras, radars and GPS to "see" and comprehend the world around them. This type of sensors functions as the sight and hearing of the driverless vehicle, alerting the car to stationary objects, other vehicles, or pedestrians that may be on the road. At the same time, these cars can transcend the restrictions by integrating data from multiple sensors thereby generating an image of the surrounding area which enables them to make a more prudent move.

**Artificial Intelligence (AI) Systems:** In reality, these cars are so complex behind covers as they use the latest AI technologies to scan and analyze sensor information for timely reactions. AI systems in this regard intimately study the characteristics of the road, headway and detect hazards to subsequently predict the optimal route. These machines can learn from and is able to better perform their driving tasks using the experience/instruction of past events and information obtained from the environment.

**Connectivity and Communication:** Automated cars from the viewpoint of the communication stand would have different kinds of talk to the other vehicles and roads. Through the use of Vehicle-to-Vehicle (V2V) and Vehicle-to-Infrastructure (V2I) communications, self-driving vehicles can share information such as their planned location, speed, and actions simultaneously, thus improving traffic flow and avoiding collisions as well as congestion. **High-Definition Mapping:** The detailing provided by high-definition mapping is very useful in the management of self-driving cars which tells the vehicle how the road is shaped, marked, and what signals are around. These maps that merge or overlay with real-time data allow these self-driving vehicles to guide through intricate cityscapes with high accuracy even when they update to real time data.

## **Safety Features and Considerations**

**AEB - Automatic Emergency Braking Systems:** The automatic emergency braking systems, or AEB, category includes two types of brake assistance technology. These two technological innovations are intended to help reduce the number of people injured in rear-end collisions. Approximately one-third of all car accidents that are recorded each year are usually rear-end collisions.

Crash About to Happen Braking senses when a collision with another car is likely to happen sooner than expected and applies brakes or applies the brakes even if the driver doesn't do anything. When the driver applies the brakes, Dynamic Brake Support will engage, but it won't exert enough force to prevent an accident.

**Backup Cameras:** Rearview video systems, another name for backup cameras, are devices that are used to stop accidents that happen when a motorist is backing up. This kind of mishap frequently involves a car pulling out of a driveway or parking space striking a pedestrian or bicyclist.

The driver will be able to see immediately behind the vehicle thanks to this camera, which will activate whenever the car is in reverse. This technology has been so successful in preventing auto accidents that it is now required for all new cars made after May 2018.

**Blind Spot Detection:** When changing lanes, blind spot detection can assist a driver in making sure no other cars are in their blind area. Certain models of this technology enable drivers to get real-time updates on the condition of their blind spot, while others restrict information and alerts to when the driver's turn signal is activated.

**Lane Departure Warnings:** This new safety system uses cameras to track the position of the vehicle within the lane markings. When a car with lane departure warnings begins to stray while its turn signal is off, an alert will go out from the car. This is an excellent technique to help a distracted motorist refocus on the road. One excellent method to prevent a sideswipe mishap is to heed this advice. Certain iterations of this technology can even assume control of the car and make sure the driver keeps it in the designated lane.

**FCS: Forward Collision Systems:** Many people have been involved in rear-end collisions just because they were staring at their phone or the opposite side of the road when they did so. Forward Collision Systems, or FCS, come to the rescue in this case. This technology enables an automobile to automatically calculate the distance between it and the vehicle ahead of it. Based on this information, the car can reduce its speed, lessening the force of an impact accident [6].

**Adaptive Headlights:** Adaptive headlights are a novel and remarkable technology that is demonstrating its worth by significantly reducing traffic accidents. When the steering wheel is turned, this particular style of car lamp will turn on. So, how does this contribute to preventing accidents? Think about the times when you are driving on a dark road and a deer suddenly appears in your way or when a car cuts you off. You will always be able to see anything on the road if you use adaptable headlights [7].

**ECS - Electronic Stability Control:** A technological marvel, Electronic Stability Control, or ECS for short, effectively prevents cars from losing control, even in somewhat hazardous weather conditions. In the event of a run-off-road accident, this technology reduces the vehicle's engine power by applying the brakes to the wheels. Since ECS can probably avert around half of all rollovers and auto accidents, it has shown to be incredibly helpful.

**Vehicle Communication (V2V):** In the auto industry, self-driving cars have recently received a lot of attention. With this kind of technology, it would be necessary for cars to communicate with one another in order to avoid collisions.

**Auto-Steering:** Certain modern cars are equipped with autosteer technology. This does not imply that your automobile can drive itself entirely, but rather that it has the ability to take over the steering wheel in certain circumstances in order to avoid an accident. The car will maintain its

current lane of travel while applying the brakes and swerving to avoid any possible objects or pedestrians in its path. Numerous automated steering systems are compatible with automated braking systems.

### **Vision for the Future**

Smart infrastructure and vehicles no longer having humans as drive may result in the streets getting safer. After all, human error is at blame for almost 90% of traffic accidents (source: Another priority of these international bodies is to create a roadmap for recovering from the crisis along with economic and social policies and support for the development of the new green Agenda (EC). Imagine a city where the only accident involving a vehicle would have to read about it in newspapers. In recent years, such links as 5G will be made between car motorists and the infrastructure that can link in milliseconds without double-checking other drivers and securing their driving lane. A wide circulation of the area will be filmed by the couple of cameras as well as the motion-detection radar that is highly sensitive to pinpointing pedestrians, cyclists, and any potential threat to the machine.

Some roads may need to be narrowed as the connected cars will travel closer to each other because they can safely go close to one another. E-scooters, bikes, and people will be able to share the roads more comfortably with this set up. Maybe as in on the road people will co-exist peacefully and, most importantly, safely, they will no longer be segregated by never-ending traffic jam and a long-awaited reminiscence since now the time when vehicle users are not segregated by the long traffic jams and at the end be able to align peacefully.

### **Conclusions**

To sum up, the history of road safety and transport indicates to the entire population the incredible ability of human abilities in engineering to get over obstacles and create safer roads for each participant in traffic. The development of self-driving automobiles, fully electric cars, and advanced safety technology, as well as the implementing traffic lights, pedestrian crossings in the early 20th century, have all Served a role to continue developing new inventions and mastering the ones which are already available. All the technologies already implemented contributed to reducing the number of victims in road crashes throughout the years. Governments should keep investing in infrastructure, technology, and research to guarantee that all roads continue to be safe for all users. It should be proved that all the progress made not only satisfies the demands of the present but also prepares the way for a better future by constantly using the power of innovation and cooperation.

### **References**

- [1] Mercedes-Benz Group, "The first automobile 1885-1886," The Mercedes-Benz Group, 2022. [Online]. Available: <https://group.mercedes-benz.com/company/tradition/company-history/1885-1886.html#:~:text=On%20January%2029%2C%201886%2C%20Carl,birth%20certificate%20of%20the%20automobile>
- [2] D. Patrascu, "Road Traffic History – Before the Streets Got Swamped," 2019. [Online]. Available: <https://www.autoevolution.com/news/road-traffic-history-before-the-streets-got-swamped-12954.html>.
- [3] A. Nowek, "European guide to traffic laws and rules of the road," Expatica, 2024. [Online]. Available: <https://www.expatica.com/global/living/transportation/european-traffic-laws-505512/>.
- [4] International Driving Authority, "The history of left- and right-hand traffic," IDA Office, 2017. [Online]. Available: <https://idaoffice.org/posts/the-history-of-left-and-right-hand-traffic-en/>.

- [5] World Health Organization, "Road Traffic Injuries," WHO, 2023. [Online]. Available: <https://www.who.int/news-room/fact-sheets/detail/road-traffic-injuries>.
- [6] Einfach Technik / Easy Tech, "The Active Distance Assist DISTRONIC," Mercedes-Benz Group, 2020. [Online]. Available: <https://group.mercedes-benz.com/company/magazine/technology-innovation/easy-tech-distronic.html#:~:text=just%20one%20car!-,DISTRONIC%3A%20How%20does%20it%20work%3F,system%20brakes%20and%20accelerates%20automatically>.
- [7] BlogAutomobile, "Mercedes Benz Multibeam LED," YouTube, 2016. [Online]. Available: [https://www.youtube.com/watch?v=x3cmLmS\\_KMs](https://www.youtube.com/watch?v=x3cmLmS_KMs).