A brief history of the evolution of transportation over time

Since ancient times, in order to effectively move goods and people, first of all the vehicles and the infrastructure, on which the means of transport could transit, had to be made available. Hereafter a brief flashback of the way they these two variables did evolve over time.

Vehicles

The first means of transportation on land were certainly rudimentary slides, obtained from the trunks of trees, to carry heavy loads.

But the most important invention in the history of road transport was the wheel.

The introduction of the wheel, to manufacture pottery in about 3500 BC, through the work of the Sumerians, led to the development of the wheel as a means of transport. In the first carts wheels formed a single piece with the axes, which were insured under the wagon bodies by leather straps.

[Votive cart on four solid wheels drawn by a pair of cattle. Northern Syria, II mill. B.C. (Private collection Paris).]

Only later the switch to the fixed axles on which the wheels rotated separately. Since 2000 BC became commonly used, in the Middle East, a type of wheel with a hub for the axis and an outer rim.

[Spoke wheel dating back to 2000 BC exposed in the National Museum of Iran, Teheran]

For over 5000 years, then, the most efficient means of road transport, wagons and carriages, were pulled by oxen or horses.

A first revolution in transport systems only came around 1780, when James Watt built the first steam engines, that were later adopted also for the movement of vehicles, of which took advantage the first railway, which used the rails to move vehicles, locomotive-hauled. The most famous locomotive was that built in 1829 by George Stephenson.
The first public railway was opened in England in 1825, the first Italian railway line was built in the Kingdom of the Two Sicilies, between Naples and Portici, linked with a length of 8 km.

Subsequently, and for almost two centuries, the railroad was the most important mode to ensure the internal mobility of goods and people in the western world, ensuring the economic and social development.

Only in the last forty years the mobility of goods by road has gradually taken over the rail, doubling its share from 1970 to date (ITF data for the EU-26).

Meanwhile, the transport volumes have more than doubled (data ITF - billion ton / km).

The history of trucks, like that of cars, started in 1876 with the invention of the four-stroke internal combustion engine, by Nikolaus August Otto. With Karl Benz, Gottlieb Daimler and Rudolf Diesel we arrived, by the turn of the century, to vehicles engines in the configurations that even today, after more than a century, are still prevalent.

Alongside the first truck built by Daimler-Motoren-Gesellschaft in 1896.

Since then, technology has made great strides and modern trucks are equipped with clean engines, and provide a great active and passive safety, but remain driven by engines that use fuels derived from oil refining, guilty of CO2 production as well as emissions of harmful gases that pollute the environment and contribute to global warming.
Especially in the last twenty years the automotive industry has made enormous progress in the reduction of harmful gases, CO2 and enhance active and passive safety.

But the big push towards cleaner engines drives today towards the production of electric motors, hybrids or use of alternative fuels such as natural gas, biofuels and hydrogen.

Road infrastructures

The road infrastructure, intended for traffic of land vehicles, has its origin as a result of the invention of the wheel. In fact, the Incas, who knew neither the wheel nor the use of horses, even if they had, among many roads built in the pre-Columbian South America, the best road system, the largest and most advanced standards of the time (almost 40,000 km), roads were little
more than a meter wide and only traveled on foot, sometimes accompanied by herds of animals, usually 
ahamas.
The development of a road system, intended as transport infrastructure defined above, can be 
attributed to the Roman civilization.

According to Strabone: "The Romans put great care into three things, above all, that the Greeks 
neglected, i.e. opening roads, building aqueducts and disposition of sewers in the underground."
The Romans, for military, political and commercial reasons, began the construction of long straight 
routes. The Roman roads were primarily essential for the growth of their empire, as they allowed 
to move rapidly the army, but their use was extended at the same time to the movement of people and goods.

According to Wikipedia "their creation was initially spontaneous, and usually took their name from 
the city which they led to (i.e. via Ardeatina to Ardea), while others had the names of the functions 
that were needed for (via Salaria) or populations reached a (via Latina). In the fourth century BC the 
Romans started the construction of a new road system, bound for distant regions and whose duties 
were primarily military, and to which was given the name of the magistrates who realized them, 
mainly Censor and Console. A good example is the Via Appia, which began in 312 BC by Appius 
Claudius Cieco to open the road to Magna Graecia in the context of the Samnite wars. 
At the time of maximum expansion of the Roman Empire the road network measured more than 
100,000 km, divided into 29 streets radiating from Rome to Italy, and all other parts of the Empire, 
from Britain to Mesopotamia, from the Pillars' Hercules to the Caspian Sea. The streets were 
equipped with milestones indicating the distance in miles from "miliario aureo" placed in the Roman Forum. 
Since then, and especially after the invention of the railroad and later on of motorized road vehicles, road 
infrastructures had again a great development, up to the modern highways and high speed rail lines."
The real problem that affects transport nowadays is the lack of investment in the development of an adequate road network, in proportion to the development of road traffic. The result is an increasingly widespread congestion, which slows down the speed of transport, decreases the safety and increases pollution. Although these problems seem legacy of the modern era, in fact, already in ancient Rome there were similar problems: crowding, noise, traffic, pollution from smoke, dust and waste, danger of collapse and fires, which they tried to counter with ad hoc measures:

Driving restrictions.

In ancient Rome, which at the time of Augustus had a population of about one million inhabitants, the use of horses and chariots was subject to strict rules that prohibited the use in the city. Since 45 BC, Caesar had enacted a law (Lex Iulia municipalis) that introduced in the city a ban on private vehicles, except for wagons carrying materials for public housing, for moving priests, for wagons for triumphal processions, for the circus games and for the collection of waste and the tanks entered into the city without loads during the night. For all other wagons circulation was banned for about ten hours, from morning to late afternoon.

In cities traffic safety was precarious, especially for pedestrians, often overwhelmed by the carts proceeding at great speed, but also the clash among carts caused many victims. The use of vehicles, especially during the night, of course, caused loud noise, the “strepitus rotarum” that disturbed the sleep of many citizens. First example of combined transport, people who arrived in Rome on horseback or in a chariot, had to go step down at the gates of the city and walk or rent a special litter. Finally, the excrement of animals used for transport, the decay of urban waste and fumes produced by combustion for urban uses produced a large amount of CO2 and polluting gases. In other words: nothing new under the sun!

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