CVE 413 HIGHWAY ENGINEERING

History of road development

A road is a thoroughfare, route, or way on land between two places.

Road transportation began with horses and oxen or even humans carrying goods over tracks that often followed game trails, such as the Natchez Trace

Fig 1

Fig 2

Fig 3

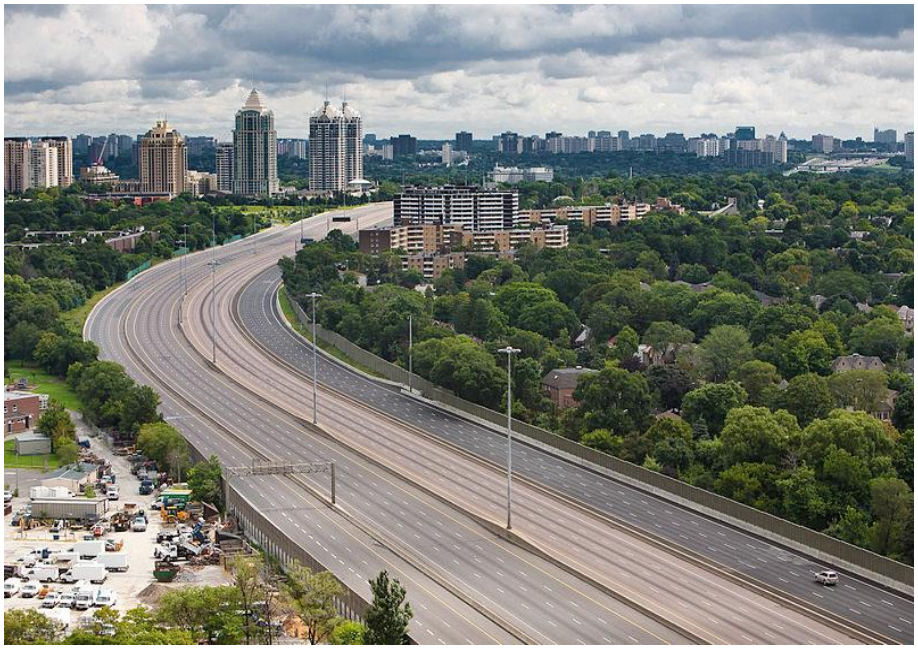
The Porta Rosa is a Greek street dating from the 3rd to 4th century BC in Velia with a paved surface and gutters.

A paved Roman road in Pompeii

Some say that the first pathways were made by animals but that assertion has not been universally accepted, since in many cases animals do not follow constant paths.

Others believe that some roads originated from following animal trails. The Icknield Way is given as an example of this type of road origination, where man and animal both selected the same natural line. By about 10,000 BC, rough pathways were used by human travelers.

- The world's oldest known paved road was laid in Egypt some time between 2600 and 2200 BC.
- Stone-paved streets are found in the city of Ur in the Middle East dating back to 4000 BC.
- Corduroy roads (log roads) are found dating to 4000 BC in Glastonbury, England.
- The timber trackway; Sweet Track causeway in England, is one of the oldest engineered roads discovered and the oldest timber trackway discovered in Northern Europe. Built in winter 3807 BC or spring 3806 BC, tree-ring dating (Dendrochronology) enabled very precise dating. It has been claimed to be the oldest road in the world. Until the 2009 discovery of a 6,000-year-old trackway in Plumstead, London.
- Brick-paved streets were used in India as early as 3000 BC.
- In 500 BC, Darius I the Great started an extensive road system for Persia (Iran), including the Royal Road, which was one of the finest highways of its time.[20] The road remained in use after Roman times.
- In ancient times, transport by river was far easier and faster than transport by road, especially considering the cost of road construction and the difference in carrying capacity between carts and river barges. A hybrid of road transport and ship transport beginning in about 1740 is the horse-drawn boat in which the horse follows a cleared path along the river bank.
- From about 312 BC, the Roman Empire built straight strong stone Roman roads throughout Europe and North Africa, in support of its military campaigns. At its peak the Roman Empire was connected by 29 major roads moving out from Rome and covering 78,000 kilometers or 52,964 Roman miles of paved roads.
- In the 8th century AD, many roads were built throughout the Arab Empire. The most sophisticated roads were those in Baghdad, which were paved with tar. Tar was derived from petroleum, accessed from oil fields in the region, through the chemical process of destructive distillation.
- The Highways Act 1555 in Britain transferred responsibility for maintaining roads from government to local parishes. This resulted in a poor and variable state of roads. To remedy this, the first of the "Turnpike trusts" was established around 1706, to build good roads and collect tolls from passing vehicles. Eventually there were approximately 1,100 trusts in Britain and some 36,800 km (22,870 miles) of engineered roads. The Rebecca Riots in Carmarthenshire and Rhayader from 1839 to 1844 contributed to a Royal Commission that led to the demise of the system in 1844,[25] which coincided with the development of the UK railway system.



Modern tarred roads were the result of the work of two Scottish engineers. They are Thomas Telford and John Loudon McAdam.

John Metcalfe (1717–1810)

John Metcalfe, a Scot, built about 180 miles of roads in Yorkshire, England (even though he was blind). His well drained roads were built with three layers: large stones; excavated road material; and a layer of gravel.

Thomas Telford (1757–1834)

Telford designed the system of raising the foundation of the road in the center to act as a drain for water. Thomas Telford improved the method of building roads with broken stones by analyzing stone thickness, road traffic, road alignment and gradient slopes. Eventually his design became the norm for all roads everywhere

John Loudon McAdam. (21 September 1756 – 26 November 1836)

John Loudon McAdam designed roads using broken stones laid in symmetrical, tight patterns and covered with small stones to create a hard surface. McAdam's design, called "macadam roads," provided the greatest advancement in road construction.

Pierre-Marie-Jérôme Trésaguet (1716 - 1796)

Pierre-Marie-Jérôme Trésaguet was a French engineer. He is widely credited with establishing the first scientific approach to road building about the year 1764. Among his innovations was the use of a base layer of large stone covered with a thin layer of smaller stone. The advantage of this two-layer configuration was that when rammed or rolled by traffic the stones jammed into one another forming a strong wear resistant surface which offered less obstruction to traffic.

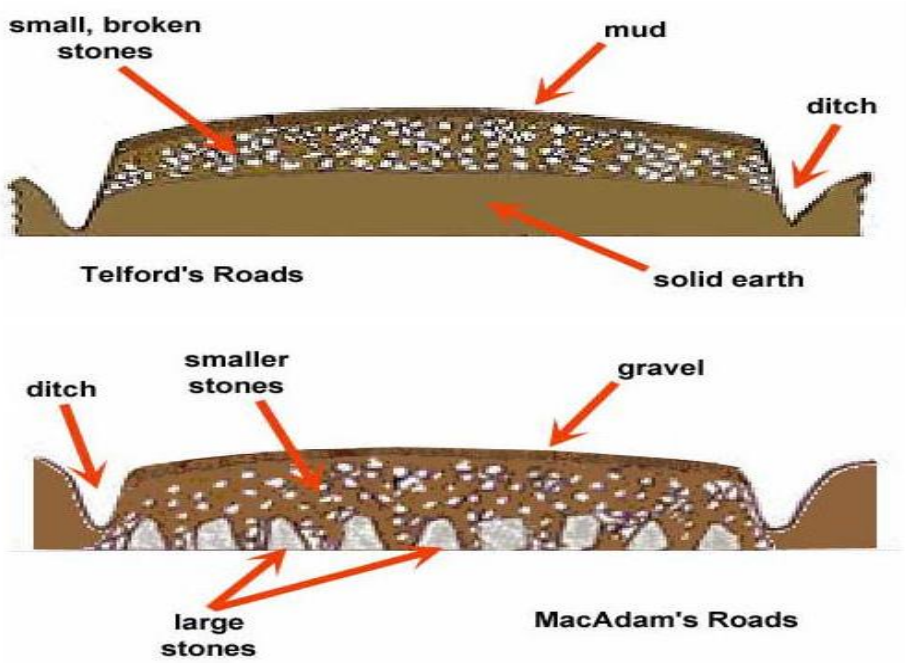
Trésaguet was the youngest son from a family of engineers. He began his career as a sub inspector in the Corps des Ponts et Chaussées (Bridges and Highways Corps), in Paris. He later moved to Limoges, Haute-Vienne as chief engineer in 1764. In 1775 he was appointed inspector general of roads and bridges for all of France. He published a paper describing his road building methods.

First of all an earth foundation was excavated parallel with but about ten inches below the finished surface of the new road. This was convex in cross section to encourage water to drain off the finished surface.

Next, large stones were laid on edge and any protruding pieces on their upper edges broken off to leave an even surface. This stone foundation was covered with a second course of smaller rounded stones.

Finally a third layer of hard broken stone, (about the size of walnuts) was spread by a shovel to produce the surface layer.

This system was used continuously in France from 1775 until 1820 when the country changed to the cheaper Macadam method.



Ngeria Road


FG Kicks Off N11bn Kogi-Benin Road Dualisation Project