

Self Healing Roads In India

Why In News

- **National Highways Authority of India (NHAI)** is delving into innovative technology that could transform road maintenance nationwide. The focus is on **self-healing roads**, a groundbreaking solution to combat potholes, a leading cause of road accidents and fatalities in India. Here's how it will work.

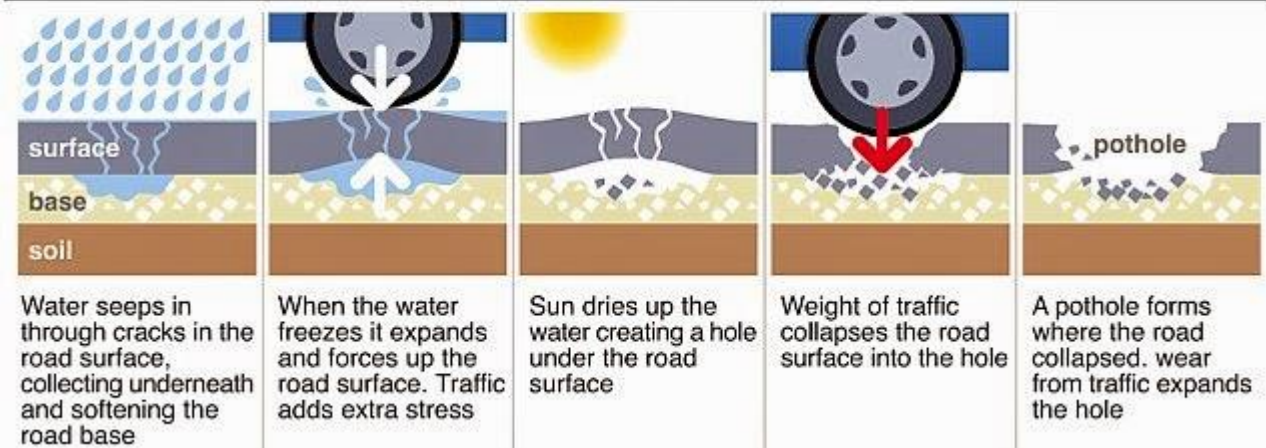


- This technology will enable a **road to 'repair' itself** using a new type of asphalt. This material will be infused with steel fibre and bitumen. If a gap emerges on the road, the bitumen will spread to cover it and along with steel threads, fill the potholes.

How Potholes Are Formed

- Several factors play a role in **forming potholes** and the biggest enemy here is water when accumulated beneath the **pavement water weakens** the underlying soil and then the sustained stress due to the flow of vehicular traffic weakens it further when it crosses the breaking point it leads to the formation of pothole.

How a pothole forms

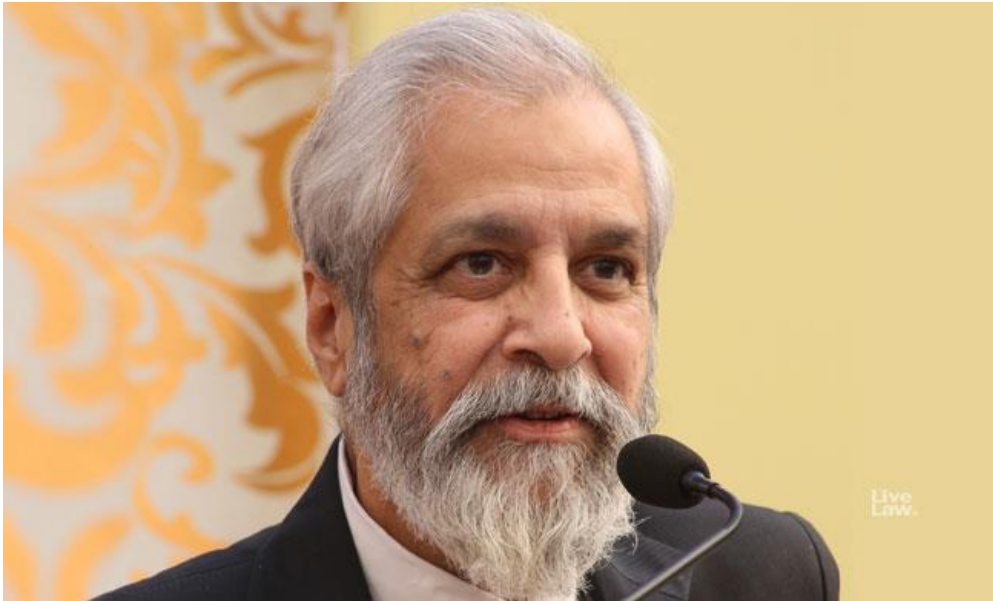


India's Pothole Problems

- **Self-healing roads** could be the answer for India, which struggles with potholes. In fact, cratered roads across the country have been the cause of several road accidents.
- **In 2022, government** data reveals that there were **4,446 accidents** due to potholes, which led to the deaths of 1,856 people and caused injuries to 3,734 others.



- Compare this to 2021 when there were 3,625 accidents owing to potholes, causing the deaths of 1,483 people and injuring another 3,103. In 2018, the Supreme Court had also termed the deaths caused by road accidents unacceptable.
- A bench headed by **Justice Madan B Lokur** had said the number of deaths caused due to potholes across the country was “probably more than those killed on the border or by the terrorists”.



Self Healing Roads To The Rescue

- **NHAI, which is responsible for management** of a road network of national highways in the country, is looking at the adoption of self-healing asphalt to address the persistent issue of potholes in the country.
- “We are considering ingenious and unconventional methods to improve durability and to address the issue of potholes,”.

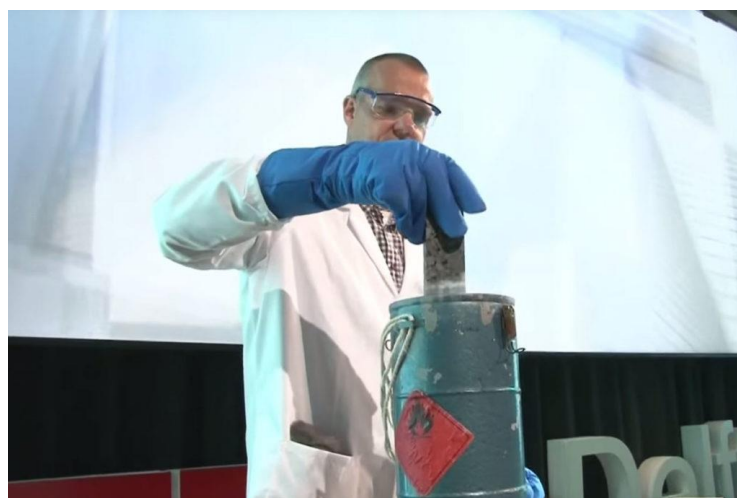


- When we say self-healing roads, we are referring to using self-healing asphalt. Asphalt is one of the key compounds that make up a road and is a naturally self-healing material. It is also referred to as smart asphalt, and it is gaining buzz in the world of road repair.

- **Self-healing roads or smart asphalt** is a ground-breaking material infused with steel fibres and epoxy capsules, which can repair small cracks and prevent water infiltration.

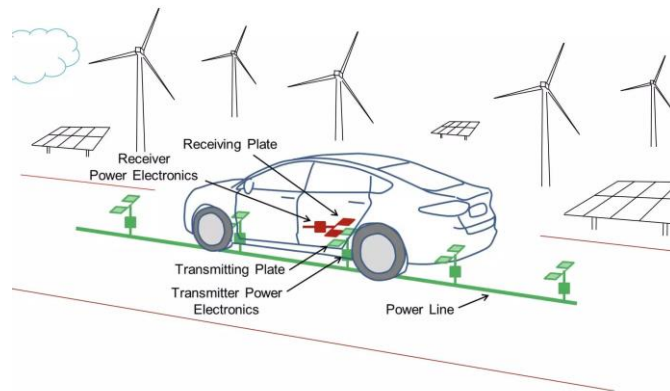


- It is done by applying heat to the steel fibres using an induction machine, which then causes the mortar with the asphalt to melt and repair itself. This technology was **developed by Erik Schlangen**, a civil engineering professor at Delft University of Technology in the Netherlands.
- In fact, researchers in the **Netherlands have created** a few so-called self-healing roads, which are capable of closing cracks without external help.



- Researchers believe that while it would be more **expensive to manufacture** these roads, the removal of maintenance costs would make them cheaper in the long run.

- Moreover, this technology would make roads long-lasting, as long as even 80 years. Schlangen also said that along with improving roads with the use of this technology, it also has other benefits.
- He said the wires can easily **conduct electricity**, giving rise to the potential of wireless driving for electric vehicles.



- “**Putting steel fibres** in the asphalt mean that you can send information to it, so it might be possible to charge electric cars on the road they’re driving on,” Schlangen has been quoted as saying.
- “This is early, but we are going to make some trials in front of traffic lights, where the idea is that you can charge your car a bit while waiting in traffic.”

Self-Healing Roads Across The World

- **Self-healing asphalt** has been tested on 12 different roads in the Netherlands, and one of these has been functioning and open to the public since 2010. All are still in perfect condition, notes Schlangen.



- Even the **United Kingdom** is considering using this technology on its roads with universities at Bath, Cardiff and Cambridge developing its own self-healing concrete.
- It will be a long road to having self-healing roads in India, but one thing is certain: if they do become a reality, it will be a farewell to bumpy, back-breaking travels and hello to smooth rides. And we are all for the latter!