

Re: Six lane underground rail lines

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The only way to separate the trucks is to put them on rail wagons underground. If Paris can build 70 miles of six lane underground highways for cars, why can't the US and India build 5000 miles for just trains which takes up a lot less space?

excerpts

<http://www.rppi.org/ps250.html>

C. Metroroutes—Lower-Cost Auto Tunnels

The French have gone furthest in systematically studying car/truck separation because of their determination to improve mobility inside Paris. Acquiring space for surface motorways and gaining acceptance of elevated structures were so unlikely that the French were led to look carefully at high-cost underground construction. In 1987 Francois Lemperiere of the GTM engineering company was credited with the idea of using a 34-foot (10m) diameter tunnel which could normally house just two lanes of roadway for unrestricted-size vehicles to provide a three-fold increase in capacity. He showed a design for using the same tube to provide two levels with three lanes each level for vehicles of six foot seven (2m) maximum height in lanes of about ten-foot (3m) wide (see Figure 3). He pointed out that this tripled vehicle-carrying capacity could transform the prospect of financing underground urban toll motorways. Out of Lemperiere's conceptual proposal came a government-organized commission to study safety issues and work to produce specifications for light-vehicle underground road networks.

In June 1992 the Center for the Study of Tunnels (CETU), central government officials, and city officials from Paris and Nice produced specifications translated as Recommendations on Reduced Height Urban Tunnels (known by the acronym RECTUR) suggesting three standards for what have come to be called "metroroutes." The name was a take from "Metro," the name of the Paris subway. Gerondeau and others saw this as a possible system or network of underground roads that could be applied under major cities to supplement and link together currently unconnected surface motorways.

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The three vehicle height standards set by RECTUR were:

Six foot seven (2.0m), which covers 85 percent of vehicle types in the Paris region excluding minibuses in which passengers can stand, and all existing emergency vehicles;

Eight foot ten (2.7m), which allows most ambulances and the minibuses;

Eleven and a half feet (3.5m) allows urban buses and most fire equipment, but not heavy trucks or long-distance coaches.

RECTUR recommended 20 inches (55cm) above the height of the highest allowable vehicle for hanging signs and for psychological comfort, so in the case of 2m-max vehicle tunnels the ceiling would be at eight foot four (2.55m.) The committee also researched the lane width needs and offsets from walls. Cofiroute decided on the six foot seven (2m) standard for its six-mile toll tunnel for the A-86 West project in Versailles. Cofiroute found the benefits of the larger dimensions did not come near the extra costs. Special low-height emergency vehicles will be built. The company estimates that in rush hours, when such a toll facility will be in greatest demand, well over 90 percent of potential traffic will fit into the six foot seven (2m) gauge of the tunnel portals. It estimates the tunnel's six lanes will carry up to 8,000 vehicles/hour and average daily traffic of 100,000. Posted speed limit will be 70km/hr (43 mph) with automated speed ticketing at 80km/hr (50 mph). The tight dimensions will encourage this kind of low average speed driving, but the lower speed also maximizes vehicle throughput and is considered likely to produce safe travel. Another cost saving in excluding heavy vehicles is the ability to design for steep grades and tighter curves, especially helpful in reducing costs of ramps at interchanges. A maximum grade of 12 percent was specified by the RECTUR report.

The A-86 West small gauge tunnel will use air ducts, separate for each level. In case of fire or accidents stairways will allow motorists to use the alternate level as refuge from smoke, and emergency services will be able to block off the other level and operate from there.

Cofiroute officials have said they will probably begin operations of the tunnel with only two travel lanes on each level with the third as breakdown buffer area and merge/diverge lane at interchanges, but may run all three lanes if traffic is heavy. Estimated cost of the whole project is now \$2 billion or \$360m/mile. This is about an 80 percent cost increase as compared to estimates made when the franchise was granted, though Cofiroute insists it remains financially viable.

The Paris regional plan for 2015 lays out 62-miles of metroroutes, and they have also been considered for a new motorway to the Roissy Charles de Gaulle Airport, and as additional capacity for the southern part of the Boulevard Peripherique or inner ring road. Metroroutes

seem to have considerable potential in a number of large dense European cities, especially in London. In the United States they would seem to be most applicable in developed areas with high land values and local antagonism to the

"We have to get the trucks out of lanes in which cars travel. This is the only way to make the major highways safe for small vehicles such as cars." —James Ball, Transportation International

The Pennsylvania Turnpike, which runs 25,000 heavy trucks a day (out of a total of 75,000 vehicles daily), has examined what it called a "dual/dual" concept, a 2/2/2/2 lane profile in which two lanes in each direction would be for heavy trucks and two for light vehicles, but so long as there are free parallel interstates for trucks (I-80 in the north of the state, and I-68 just south in Maryland) it seems unlikely to be a financially viable idea. John Hickey, manager of research for the turnpike, says giving heavy trucks separate roadways is a very attractive idea. He says that many motorists in their cars feel extremely uncomfortable on the four-lane turnpike driving right alongside heavy trucks, especially in bad weather when the trucks' tires spray their windshields with great showers of dirty water as they pass. The sheer size of trucks intimidates many car drivers, and Hickey thinks the turnpike loses car patrons because of the heavy concentration of trucks in its present mixed-vehicle