

# **Transportation Projects: Intersections of Engineering, Business and Society**

## **Executive Summary**

This paper captures the impact of four major mega-transportation projects at the intersection of history and engineering philosophy associated with major highway projects. All engineering projects were performed in different countries and we concentrate on cultural and social factors.

### **M25 Motorway (London, England)**

The 117-mile M25 Motorway encircles Great London. It is one of the busiest of the British motorway network and Europe's second longest orbital road. It is often referred to as "the world's biggest car park" on account of its frequent traffic jams. It is often considered as a principle component of Margaret Thatcher's political legacy. The 11-year construction program from 1975 to 1986 is vital to every day operation in the UK.

The Initial cost, paid for by the government, was £909m. There is continued government investment to further improve traffic flow and reduce congestion. The M25 was built under 41 separate contracts, following 39 public inquiries. The opening of the M25 in 1986 was a celebration of engineering excellence. The M25 was among the first motorways to use microprocessor technology to help keep traffic flowing, controlled from two state-of-the-art control centers today. It is also a "smart motorway" with variable speed limits first used in mid-1990.

The M25 is a vital part of Britain's motorway network. An average of 150,000-200,000 vehicles use its busiest stretches each day. M25 boosts the economy by serving all road users, both freight traffic and commuters alike. Communities, businesses and millions of road users have benefited from the vastly improved transport connections it provides for them. It was a vital transport link during the London 2012 Olympic Games. The M25 has become a visible symbol of individualism, the triumph of the car and British Engineering know how.

### **Southern California Freeways (Southern California, USA)**

The Southern California freeways are a network of interconnected freeways in the mega-region of Southern California, serving a population of 22 million people. A comprehensive freeway plan was produced in 1947 and with construction beginning in the 1950s.

Many of the freeways that were actually built ended up with traffic levels far above their original capacity because planners had expected that increased traffic would be carried by other freeways that were never built. After a deep recession in the early 1990's caused by the collapse of the defence industry at the end of the Cold War and the closure of naval bases, Southern California began to grow again in the latter part of the decade. California State Route 1 has become a beautiful coastal drive and tourism destination. However, freeway construction negatively impacted and bisected neighbourhoods.

### **Ring Roads (Beijing, China)**

In the past years, the vehicle usage rates continue to increase 15% annually. The number of vehicles in Beijing is more than 1.3 million. The average speed during rush hour is less than 20km/hour and the rush hour lasts for 10 hours per day. Beijing is a city of 487.7 square kilometers and the population and quantity of vehicle are more than it can handle. To satisfy various transportation needs, a multi-layers transportation system was built, including the Ring Road. The Ring Road system not only satisfies those making cross-regional long distance traveling, but also local needs to serve those making short distance trips. This system splits vehicles that have different needs so that the utilization rate of each section will be decreased.

There are 7 ring roads in Beijing and Ring 7 is still in constructing process. These 7 ring road system is connected to not only to downtown Beijing but also all the way to Hebei province. The ring road system was a government project initially begun to improve the traffic conditions. Along with it, it brings out a lot of social and economic benefits. One of the most important impacts is that the system leads to an integration of the greater Beijing area that connects with Hebei province, Tianjin and other nearby areas.

Traditionally and socially, most of China's cities, such as Beijing, Guangzhou, and Chengdu share the "legacy of a central-planning mindset in which all life and work was centered on a single 'work unit'. The tradition of dehumanizing architecture persists ("The great sprawl of China", 2015)".

### **400-Series Highways (Ontario, Canada)**

The 400-Series Highways refer to infrastructure in Central and Southern Ontario that is most used highway system in North America, with Highway 401 being the busiest highway in the world. The Entire system is comprised of 1915 km of highways, and sections of the highway were first built in 1917 and are still being expanded today.

The impact of the 400-series highways on Ontario's businesses, citizens and environment is high. Most of Ontario's 13M citizens live within 25KM of a highway (Cameron 2015). Additionally, the system is part of the Quebec City–Windsor Corridor, along which half of Canada's population resides and is the most heavily industrialized region of Canada.

The legacy that the current highway leaves us with is most importantly the fact that good engineering and design results in safe transportation systems. These lessons have been transferred worldwide and help create a safer transportation system. The innovations and policies that have been developed are a source of Pride for Ontario Engineers.

### **Conclusion & Recommendation**

We have compared four road systems from four different countries. We have found that there are various factors that influence how a road system is chosen for a city. For instance, the way the population is scattered, the cultural background, geographic location are all factors that have great impact on the road system.

All road systems have their unique pros and cons. Therefore, all road systems have to be carefully studied first taking a long term lifecycle approach. Afterwards, the specific factors of a city need to be studied in depth so that we can find the optimum road system for the city. And last but not the least, we recommend that the future road system should be planned as a holistic integrated public transportation system, since they are both two crucial parts that can help a city build an ideal road system that can be convenient for everyone.