

CDM Podcasts: Cities of the Future

A Conversation with Ed Regan

PAUL: I'm Paul Brown, Executive Vice President and host of our podcast series, Cities of the Future. Today we're speaking with senior vice president, Ed Regan. Ed is a preeminent thought leader on transportation finance and planning with over 40 years of dedicated service to the toll road industry. He joins us today from our Columbia, South Carolina office. Welcome, Ed.

ED: Thank you, Paul

PAUL: Ed, can you tell us how you found this whole area of tolling as a focus for a lot of your practice over the years?

ED: It goes way back. Toll road studies were done dating back to the 1950s for some major state-wide toll facility systems, such as Illinois toll way, Indiana toll road, the Jersey turnpike. I kind of stumbled into this particular niche practice area and I wound up leading it for about over 20 yrs. We currently have about 100 people dedicated to studies services for the toll industry both traffic and revenue forecasting, which is a corner stone of our work, as well as technology and operations advisory services and so forth.

PAUL: What kinds of roads initially were developed as toll roads? What drove the industry in that direction?

ED: Tolls are certainly not new. In the United States, if you go back to the 1600s, some of the first toll roads actually were built by private entrepreneurs trying to find a way to get wagons out of the mud. The term turnpike actually was developed back the 1600s because these private entrepreneurs had to have a plank across a road called the pike and once you paid your toll, they'd turn the pike and let you use their roads. The more modern heyday in the 20th century for tolling was between the late 1930s through about the mid 1960s. Many of the major national turnpike that we see in Pennsylvania and Massachusetts, New Jersey, etc. were all developed and planned and financed between the 30s and the last 50s, early 60s; then came the interstate system. The use of tolls was not as strong after that point and time because we had a plan for a

48,000 mile system that was only partially funded by toll most was funded by the federal gas tax without the use of tolls. More recently, we had a very strong resurgence in the use of tolling and pricing probably beginning about the mid-80s, continuing through today. These are mostly urban projects, congestion reliever projects, manage lanes, new types of facilities in cities both as a mechanism to raise revenue and finance projects but also to manage demand and deal with congestion.

PAUL: Can I ask you about the relationship between the interstate highway system and those earlier toll roads? Did that change America's view of whether or not people should be paying by the mile for their driving experience on a high speed road?

ED: That's a good question. The original way of developing limited access facilities—the kind of forerunners of our system today—was through tolls. But when the interstate system was being contemplated—the national system of connecting all of our cities together—it was originally planned going back to Franklin Roosevelt as a potentially nationwide toll system. But, eventually, it was determined that many parts of the system would not be financially feasible, not enough traffic demand as a toll road. So they passed the gas tax and the federal gas tax created the interstate the high way trust fund in which was used to build the interstate system. Only about 7 % of the interstate system or the freeways in this country have tolls. In many parts of this country, tolls are not common. And the belief is that people historically have grown to oppose this tolling and they viewed the freeways as free roads. The problem is that view is actually changing considerably. Now, the public has actually changed their attitude substantially and in favor of increased use of tolling and user fees, at least on new capacity. There's still a lot of resistance for trying to put tolls on existing free roads.

PAUL: Yes, you raise a very interesting point that we come to think of much of the interstate highway system as freeways and that in itself implies that tolling is not acceptable. What's going to cause us to move in that direction?

ED: What's going to cause us to move in that direction is quite simply we're running out of other revenue options to finance transportation. Transportation is grossly underfunded in the United States as compared

to other countries. That's been well publicized in recent months and years that the United States is actually falling behind many other countries, including some emerging economies, in terms of its investment in infrastructure. Our interstate system was built as a free system. But our interstate system is 50 years old, or more in many cases. They don't last forever. The interstate system cost the American drivers—through their gas tax—about \$135 billion dollars to build 48K miles. In the next 50 years, we will need to spend about \$2.5 trillion dollars on rebuilding and maintaining those critical interstate highways and expanding those critical interstate highways. The federal government paid for 90% of the original cost but it doesn't own any of those interstate miles. They're all owned by the states. The states are left to pay the enormous cost of rebuilding and reinvesting in our infrastructure. I think that's going to be a big factor. The other thing is that the gas tax itself—the primary source of transportation funding in this country—is beginning to lose its luster because of political resistance to raise tax rates but also because of increased fuel efficiency. Cars are getting more and more miles per gallon, which means people can be driving more and consuming more transportation capacity and wear and tear on the roads but will actually be paying less because they'll be consuming less gas. We have real problem—the very heart of our transportation funding system in this country is based on the taxation of a commodity which the government is actually trying to discourage the use of.

PAUL: I suppose if we were all using electric vehicles, we wouldn't have any funds.

ED: Well, we might get there because of the strong push for reducing greenhouse gas emissions and for energy independence. We may not all be driving electric vehicles but there's going to be a greater number of people driving alternative fuel vehicles, including electric vehicles in years to come.

PAUL: Well, if you were thinking of ways to transition us from where we are to where perhaps we need to be in order to obtain the level of funding just to maintain and the infrastructure we have, what would we do—put toll booths up all over the country on interstate highways?

ED: No. That's the key thing that's changed in this business. That certainly was the case when we first built toll roads in the 50s and the 60s. Today almost all the new toll facilities being planned are being designed

from day one with what we call AET (all electronic toll) collection, where tolls are collected by a gantry across the road, basically like a sign bridge across the road. Nobody stops. Vehicles are tolled at full freeway speed and devices are hung on these gantries which classify the vehicle—whether it’s a car or truck and the size of the truck—and what the toll rate should be. Tolls are collected through electronic transponders on the vehicles. And those cars that don’t have transponders can still use the roads and are still pay the toll through a billing system by capturing images of license plates and paying by mail. This is the new way of doing things its certainly emerging in the toll industry now. It’s become a major market of studies and so forth for our firm. But it has the potential to greatly reduce the negatives associated with tolling: namely waiting in line to pay your toll, environmental damage done by toll booth and so forth, and greatly reducing the cost of collection over time.

PAUL: Now, it’s an interstate system. So what about those vehicles that are on a road but outside of their own state?

ED: That’s one of the biggest challenges, especially if we do see broader use of tolling use in our interstate system. Right now, the International Bridge, Tunnel and Turnpike Association is actively engaged in the development of a program of true national inter-operability at least for electronic toll users. They’d like to extend that to license plate type toll users as well. It’s more problematic for the license plate users because license plate records are maintained by each of the 50 states. That’s the challenge but the goal is to get nationwide inter-operability within the next 5 years.

PAUL: We’ve talked a lot here about what’s going on in the United States and the need to transition from a system that funds the infrastructure with a gas tax toward some other means and tolls to look like a very a reasonable and promising way to go. What’s happening outside of the United States?

ED: With the exception of Germany, virtually all of the freeways in continental Europe were originally constructed as toll facilities, most of those by private concessions under concession arrangement and they’re still operated that way today. We’re actually a little more advanced in terms of technology and operation than some of the other countries in terms of moving to electronic and cashless collection but

they were ahead of the United States in making maximum use of tolling on premium type facilities, such as freeways. You're now seeing the motor way system being developed in East Bloc countries as they as they shift in their economic system from the days of communism to their current economic structure. India is building a vast network of toll facilities including a project known as the golden quadra-lateral which is about 8700 kilometers in length—that's about the total length end-to-end of every toll facility in the United States that has been developed in the last 50 years—on one network of facilities now under development in India. Japan has a nationwide network of toll facilities. China—pricing is being used on almost every new facility being built in China.

PAUL: Now, at that level of development, I'd presume that there's a fair amount of effort that needs to go into forecasting what the actual traffic is going to be; what the toll price should be; how much revenue can you really create in advance of building a road. In new roads, what goes into the forecast of traffic and revenue?

ED: That's a good question, Paul. The traffic and revenue forecast that we develop are used in support of the bond financing. There are actually three levels of studies. We can do sketch level studies, which are preliminary planning efforts—more or less to determine if it's worth doing more serious studies. Another level is the preliminary feasibility assessment, which involves some level of travel demand modeling but it's not to a level of detail that we use in financing. And then the full detail study—often referred to as investment grade study—is the full detailed project which is used in the actual support of the financing itself. We put a lot of emphasis on data collection to go out and measure that demand today and conditions on alternative routes and time savings for the new facility versus the existing roads and congestion level and so forth. There's a big emphasis on economic growth forecast and in days past those economic growth forecasts were simply developed by regional planning agencies and they're still developed by them. The financial community the rating agencies institutional investors in these roads now insist that we get independent forecast and have an independent opinions on the economic growth estimates that's so critical to the future viability of the toll facility. We put a lot of effort into measuring people's value of time and willingness to pay tolls to what we call standard preference surveys. We just completed one of those over

4000 people participated in behavioral research we did in the Los Angeles area on pricing studies in that region. We use of course complex travel demand modeling. These are models used to simulate growth conditions and congestion levels and for all of the potential movements in an urban area and we estimate the share of traffic which would be expected to use to use the road. At the end of it all—even though we put a whole lot of effort into trying to leave no stone unturned—we do recognize that there’s uncertainty inherent in any forecast of the future, especially to a forecast that has so many moving parts as traffic and revenue estimate for a toll facility especially a road that’s not even there yet. And, therefore, we do also extensive sensitivity testing, risk analysis try to deal with those uncertainties of the future.

PAUL: Do communities ever look at these roads and think that they really provide advantages for wealthy commuters that are not affordable for those in lower income brackets?

ED: The equity question is always brought up, particularly with a new brand so to speak of toll roads and pricing which are called managed lanes – express toll lanes SR 91 in Orange County California was the first for those but the concept is sweeping the country. Now, I think you’re going to see a lot of these managed-lane networks in cities like Los Angeles and Seattle and Houston and San Diego. Those managed lanes, in which case you’re only pricing part of the lanes—if you have 6 travel lanes on a freeway in one direction, two of them may be priced and four are free. The lanes are typically priced to manage the demand so that those toll lanes are always kept free flowing even at types of peak congestion and those cases they charge toll rates that are that are higher than typical average values of time and many cases people have complained this only benefits the wealthy and so forth. The reality is, if you look at managed lane projects, such as SR91 in Orange County or I15 in San Diego County there in California, or almost any other one that’s operating around the country, you find that people that actually use these lanes cover all income classes. Basically, it’s driven by the situation. You know a medium or even lower income person that is running late to pick up a child after daycare, for example, they have a higher value of time than a \$500,000 a year executive because the \$5 toll could save them a \$50 penalty for picking up their child. So, what you’ll find is that it’s not really as much an equity issue as people bring up. Toll facilities benefit users but they

also typically provide a choice where people don't have to use them if they don't really need them at that particular time.

PAUL: It sounds like this whole field is becoming increasingly innovative, new technologies that are opening up all kinds of possibilities that maybe no one dreamed of in the past. What do you think the future holds in terms of how we're going to finance roads using tolls?

ED: Well, I think there's going to be big growth in the use of tolling. I think, in the near-term, we're going to see significant expansion of these priced express lanes, managed-lane networks. Let me just give you a quick recent example. We just did a project in Miami last year as part of an urban partnership agreement program, federal funded demonstration project we have been working for Florida department transportation and it involved initially about an 8- or 9-mile section of I95 in Dade County, just north of downtown Miami which carries about 300,000 vehicles a day on it congested most hours during the day and it had in each direction four general purpose lanes and one high occupancy vehicle lane. Because of the total overload of traffic including the HOV traffic that carpool lane was running at 20mi and hour the general purpose lanes were running at 19 miles per hour. Based on studies we performed, they went in. They restriped the lanes. They narrowed the lanes and did a little minor construction work, and converted it to a total of six lanes: four general purpose lanes (the same as they had before), two express lanes, put tolls on the express lanes to manage the demand and they're generating about \$18 million dollars of revenue, which is more than will pay for all the projects and demonstration costs of the facility but more importantly everybody won in this example. The people using the tolled express lanes are now going 60mi/hr and have cut their travel their time by 2/3rds but people that aren't even paying the tolls in the general purpose lanes had their speeds go from 19mi/hr to 41 mi/hr and cut their travel time in half. These are examples of congestion reduction, self financing strategies in major urban areas, and just shows why I think you're going to see many more cities look for this type of option. In the slightly longer term interstate system: as I said before its 50 yrs old it's going to cost \$2.5 trillion dollars to rebuild and maintain it over the next 50 years. Right now, there's currently a federal prohibition on the use of tolls on the existing free interstate highways. Gradually, I think you'll see those restrictions go away, and the day and age of fully

electronic, cashless collection. I think it's likely that you're going to see different state departments and transportation use electronic tolling as a way to finance the rebuilding the expansion, the reconstruction of our interstate system for the next 50 or 100 years.

PAUL: Well that, in a world where we're confronted every day with the problems of meeting revenue, needs and fiscal challenges, this sounds like one of the most promising directions we can head in. Thank you very much for being with us, Ed. This is Paul Brown. Join us for our next Cities of the Future podcast.