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All-inclusive tolling

Making the case for optimization, not maximization, of tolling.

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The advent of Multi-Lane Free Flow (MLFF) tolling or All-Electronic, Cashless Tolling (AECT) has meant that paying customers can drive through tolling points at highway speeds. Electronic transponder technology enables throughputs of thousands of vehicles per lane per hour and because vehicles do not need to stop or slow down traffic queues are eliminated.

New toll roads conceived since the turn of the century, such as the Melbourne CityLink in Australia, the Singapore Electronic Road Pricing scheme and Canada's Toronto 407 ETR, have employed AECT system design and the rest of the toll industry is following suit.

It is easy to understand operationally how AECT is maximizing benefits and revenues for toll operators but how does it affect travelers?

Elimination of barriers, stop-and-go traffic and queues at tolling plazas are certainly positive benefits. While the higher rate of revenue collection is opaque to the traveler, the convenience of paying through an account reduces the need to have cash readily available. All the traveler has to do is set up an account, validate a debit/credit card for billing and place an initial charge against it. He or she is occasionally informed of a low account balance and given notice that the validated card is being charged a top-up fee.

Certainly, for most people, this is simple and straightforward. But what of others?

Optimization versus maximization

Older toll roads were not specifically designed for AECT and older toll operations typically had a mixture of manual lanes, semi-automatic lanes with coin machines and Electronic Toll Collection (ETC) lanes. To use the ETC lanes, as with AECT, the traveler needed to establish an account using a debit/credit card. In some toll facilities, manual card payments could also be made in the lanes. In any case, a traveler could choose to make cash or cashless payments.

As these older, mixed tolling facilities look to maximize benefits and revenues, they are transitioning to AECT. Tolling operators can see the benefits and, as transportation funding is taking center stage within many state governments, the need to maximize toll revenues is foremost in the minds of tolling managers and individuals at senior state government levels.

But is maximizing myopic?

'Maximizing' refers to a primary focus on the immediate benefits in your own domain — your own organization, your own toll road's needs, or your own reputation as an organization or manager. 'Optimization', on the other hand, refers to the recognition and actualization of benefits to the larger system or ecosystem as a whole. While AECT or MLFF tolling may maximize revenues and benefits for the toll organization, optimization may increase benefits to both the toll organization and the traveler. In many ways, 'optimize not maximize' is the golden rule that toll organizations should employ today.

The essential flaw in maximizing toll operations by AECT or MLFF tolling is absolute reliance upon tag-based transactions. While electronic transactions offer the lowest transaction costs, require fewer toll collection operatives and minimize organizational overheads, travelers/road users are not necessarily considered.

Inclusion, not exclusion

To ensure the low cost of transactions in an AECT maximization, all users of the system must have a transponder or tag. To be provided with a tag, a user must have an associated toll account and a bank account with a debit/credit card with which to anchor it. Otherwise, excessive costs are incurred in chasing down negative balances and non-paying travelers. Additional processing costs are incurred through frequent changes in card handling due to identity theft and cards being suspended due to fraudulent or suspicious charges.

Unbankable travelers are an issue. 'Unbankable' is a recognised term used to describe people who are not acceptable for processing by a bank or who choose to live outside the banking system and exist on a straight-cash basis. Others have few assets or do not receive a steady enough stream of income to be deemed stable or reliable enough to have a credit card. This percentage of users exists in our society in varying degrees by location. In California, for example, the unbankable level is estimated by some to be as high as 30%. In other locations in the US the figure is 8-14%.

Another percentage of toll road users or travelers may not be credit-worthy and may have had their credit cards limited or withdrawn by the banks. This situation exists when the card user oversteps his/her credit limits or fails to make timely payments. In this case, while the individual holds a bank account and is 'bankable' he/she is a poor credit risk and loses the ability to secure a toll account. Millennials are prominent in this category since they are now our largest unemployed demographic grouping. This grouping of people may be 5-8% of the population but as the economy or the job market struggles their numbers tend to rise.

Still yet another class of toll facility users are senior citizens who are bankable, have financial resources and have credit cards assigned to them, but loathe using them. Fixed incomes for this demographic tend to generate very conservative behavior and any added percentage of charge or cost above face value is shunned. As a result, this demographic may not mind paying for a toll but will avoid an ETC transaction and account for either the added credit transaction cost or perception of costs incurred above the stated toll. On the other end of the demographic spectrum are Millennials. They tend to want to pay per transaction rather than a large charge into an account that debits down with usage. Again, both of these bookends in the demographic are typically only 4-9% of the total populations.

The net effect of unbankable, non-credit-worthy and fiscally conservative travelers on a toll road can be approximated at 20% of the total number of travelers. This percentage is meaningful. Firstly, it can mean that AECT and MLFF tolling is excluding 20% of the potential users of a facility. Again, while AECT and MLFF maximize the operations and transaction rates, the toll road is unknowingly discouraging potential users that previously paid by cash.

A reflection of this exclusion is high violation rates after an AECT conversion. New York State recently suffered from such an effect when customers wanted to pay their tolls but did not have ETC accounts for the newly installed AECT system. They simply used the toll facilities and were cited as toll violators. In the end, the New York State toll authorities were forced to pardon the transgressions and write-off millions of dollars in unpaid tolls and fines. While appeasement calmed the situation, this magnanimous action does not address the alienated customers, bad public relations, and future avoidance of service by these affected drivers who are still excluded.

It is probably the case that maximizing operations rather than optimizing the overall toll ecosystem is discriminatory. Steps should be taken to be all-inclusive and not prejudiced against any demographic which has a right to the mobility and services provided on a toll road. Yet, this element of AECT or MLFF is seldom considered or applied in either the rush to maximize operations rather than taking a holistic look at the impact on all potential users of the toll facility.


Semi-automation

What is the solution? It certainly is not returning to or maintaining manual toll collection. These transactions can be five to eight times more expensive to collect than ETC transactions. The middle ground appears to be semi-automatic toll collection.

In the past this term implied the use of automatic coin machines as a self-service toll collection method that did not employ a toll collector. Unfortunately, such a self-service methodology, like all such methodologies, results in stop-and-go traffic in the payment lanes — and tailbacks or back-ups. Additionally, inflation and toll increases have made automatic coin machines obsolete due to the high number of coins necessary to make up a cash transaction greater than \$1.00. Toll authorities have in the past adapted by employing 'hybrid' configurations with dedicated AECT and MLFF lanes and another set of lanes for manual or semi-automatic operations. In this case, the manual lanes can be eliminated and the self-service lanes can handle the percentage of travelers who do not want to be 'burdened' by a toll account.

A new generation of self-service or semi-automatic toll collection machines has entered the market. These have been used in Europe for years and are now finding their way onto US toll roads wishing to optimize rather than maximize. In locations in the South West, Automatic Toll Payment Machines (ATPMs) are already employed and recently the Illinois Toll Road installed units by A-to-Be.

Unlike their semi-automatic predecessors, the new class of ATPMs cater for all payment methods — cash/coins, credit/debit/special gift cards, and digital payments through payment smart phone apps



such as ApplePay. In short, they do not discriminate against any method of payment. Even if the traveler is without cash or coins and without his or her wallet/purse, they can pay via a digital application. If all means to pay are lacking at the time of the transaction, it is even feasible for the traveler to be issued a uniquely coded non-payment slip which they can reference and send into the toll authority via mail, or else pay online via the toll authority's website.

Conclusion

ATPMs represent a new generation of self service for toll facilities. While conventional wisdom envisages a future cashless society, the interim or transition period until we reach that nirvana is the reality with which toll operators must work. Rather than ignoring travelers without toll accounts and focusing on maximization with tags and transponders, it may be better to optimize operations to the realities of the transition period and provide both AETC/MLFF tolling and ATPMs. After all, optimization is the golden rule, not maximization!