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Truck Travel Cost Estimates on Tolled and Non-tolled Facilities—A Central Texas Case Study

Executive Summary

Texas has actively pursued tolling as a means to provide additional highway capacity sooner. In some cases, toll roads are motivated by the need for additional capacity to bypass congested urban areas.

This policy brief supplements the Texas A&M Transportation Institute research report titled *Incentives for Truck Use of SH 130*, which attempted to increase the understanding of the behavioral responses of the trucking industry to tolls. This supplemental effort delves deeper into the financial factors that influence the business decisions of trucking companies to use toll roads.

Factors Influencing Toll Road Use

Research has found that a number of factors influence whether a trucking company will use a tolled route alternative. These include:

- Travel time (or travel speed).
- Distance traveled.
- Toll rates and whether the toll charged can be recovered from the customer.
- Vehicle and driver costs.

Costs of Truck Travel for Various Scenarios

The study team developed a truck travel cost equation to provide a reasonable estimate of the cost of truck travel considering average travel speed, distance, applicable toll charges, and truck operating costs. The equation was applied to various scenarios:

- Making two different trips:
  - Georgetown to San Marcos.
  - Georgetown to the Austin-Bergstrom International Airport.
- Operating on two different highways:
  - The non-tolled I-35.
  - The tolled State Highway (SH) 130.
- Using various speeds and toll rates.

Different toll rate scenarios were used to determine the effect of different hypothetical toll discount programs on the costs of truck travel. The three toll rate scenarios were:

- The current truck rate.
- The current car rate.
- No toll.

The results showed that for the Georgetown to San Marcos trip, the non-tolled facility (I-35) was less expensive than the tolled facility (SH 130 and SH 45) at all times of the day and given all three toll rate scenarios (i.e., even when the tolls on SH 130 and SH 45 were removed).

On the other hand, the study found that for the Georgetown to the Austin-Bergstrom Airport trip, the tolled facility (SH 130 and SH 71) was less expensive than the non-tolled facility (I-35 and SH 71) under the following conditions:

- During the PM peak if the truck tolls were reduced to the car toll rate.
- During all times of day if the truck tolls were removed.

However, at the current truck toll rate, the tolled facility was always more expensive than using I-35 during all time periods.

Impact on Trucking Companies

Trucking companies are cost sensitive and evaluate different route options for each trip to determine the most cost-effective route given the requirements of the delivery. Tolled facilities will only be used for trips where the tolled facility is more cost effective than the non-tolled facility or in situations where the delivery requires—and the toll road offers—a faster travel speed (e.g., when the trucking company needs to meet a specific delivery window).

The calculations conducted in this study are an attempt to improve the understanding of the costs incurred by trucking companies and the associated impact on a trucker's routing decisions. Specifically, the truck travel cost equation can simulate the effect of travel speeds and toll discount programs on truck travel costs. This can give an indication of how different travel speeds and toll rates can impact truck use of tolled facilities.

Introduction

Roads are a key element of any region's transportation infrastructure. Today's road system allows unprecedented levels of mobility, accessibility, and economic growth. But costs associated with inadequate road infrastructure can amount to billions of dollars. In 2011 alone, truck congestion costs were estimated at $27 billion nationally (*1*).

Texas has actively pursued tolling as a means to provide additional highway capacity sooner. In some cases, toll roads are motivated by the need for additional capacity to bypass congested urban areas. For example, State Highway (SH) 130 was envisioned as a potential bypass around the Austin downtown area for through truck trips. Cost is often cited as a reason for trucks to not use SH 130 instead of parallel, non-tolled facilities, such as I-35.

The Texas A&M Transportation Institute research report titled *Incentives for Truck Use of SH 130* (*2*) attempted to increase the understanding of the behavioral responses of the trucking industry to tolls. In particular, the report looked at the use of SH 130 (i.e., traffic and transaction data), factors trucking companies consider in making decisions about toll road use, and past incentives or discount programs to encourage truck traffic on SH 130.

This supplemental report delves deeper into the financial factors that influence the business decisions of trucking companies to use toll roads. The study team developed a truck travel cost equation and applied it to:

- Making two different trips:
  - Georgetown to San Marcos.
  - Georgetown to the Austin-Bergstrom International Airport.
- Operating on two different highways:
  - The non-tolled I-35.
  - The tolled State Highway (SH) 130.
- Using various speeds and toll rates.

The result of this research is an attempt to improve the understanding of costs incurred by trucking companies and the associated impact on a trucker's routing decisions, specifically for SH 130 and I-35.

Factors Influencing the Decision to Use Tolled versus Non-tolled Facilities

Research has found that a number of factors influence whether a trucking company will use a tolled route facility. These include:

- Travel time (or travel speed).
- Distance traveled.
- Toll rates and whether the toll charged can be recovered from the customer.
- Vehicle and driver costs.

The literature revealed that truckers will choose to pay a toll only if it makes financial sense. That is, the rates paid by the customer must allow the trucking company to recover the increased operating costs associated with using the toll facility, or the savings in operating costs (time, fuel, etc.) must exceed the additional cost imposed by the toll. In general, the trucking sector is exceptionally cost conscious. This is because a large part of the sector is operating at low margins because it is very difficult to differentiate companies based on service performance. Hence, competition tends to focus on price. Trucking companies thus manage:

- Costs, including the price and the volume.
- Productivity, including driver and equipment utilization.
- The time required to deliver reliable service, such as given appointment times and hours of driver service, and/or better productivity (after-hour deliveries).
- The price charged to the customer, including the cost of using a tolled facility, which may not be recoverable for competitive reasons.

The following subsections examine:

- The travel speed on I-35, SH 71, SH 45, and SH 130.
- The tolls charged on SH 130.
- Truck operating costs (vehicle and driver) in the southwest United States.

Travel Speed

Travel speed influences the cost of truck travel. In general, the cost of truck travel (both fuel consumption and maintenance) increases as truck travel speed increases, but the company can make faster deliveries and/or more deliveries, increasing the productivity of the vehicle and driver. On the other hand, congestion (slower travel speeds) increases the labor costs of truck travel and reduces vehicle productivity because fewer deliveries can be made.

Table 1 lists the estimated average travel speed on I-35, SH 71, SH 130, and SH 45 in Central Texas. The INRIX data used to calculate the average travel speeds on I-35 and SH 71 represent average weekday travel speeds in 2012. The time periods are defined as follows:

- AM peak period—6:15 a.m. to 10:15 a.m.
- PM peak period—3:30 p.m. to 7:30 p.m.
- Off-peak period—all hours outside the AM and PM peak periods.

Table 1. Travel Speeds.

Road and Location*	Off-Peak (mph)	AM Peak (mph)	PM Peak (mph)
I-35**	61.3	50.5	39.3
SH 71***	54	50.3	45.6
SH 130 (5 axles)	66	66	66
SH 45	66	66	66

*Speeds on non-tolled roads are not differentiated between cars and trucks.
**Speeds were measured from SH 130 in Georgetown to SH 80 in San Marcos.
***Speeds were measured from I-35 to SH 130.

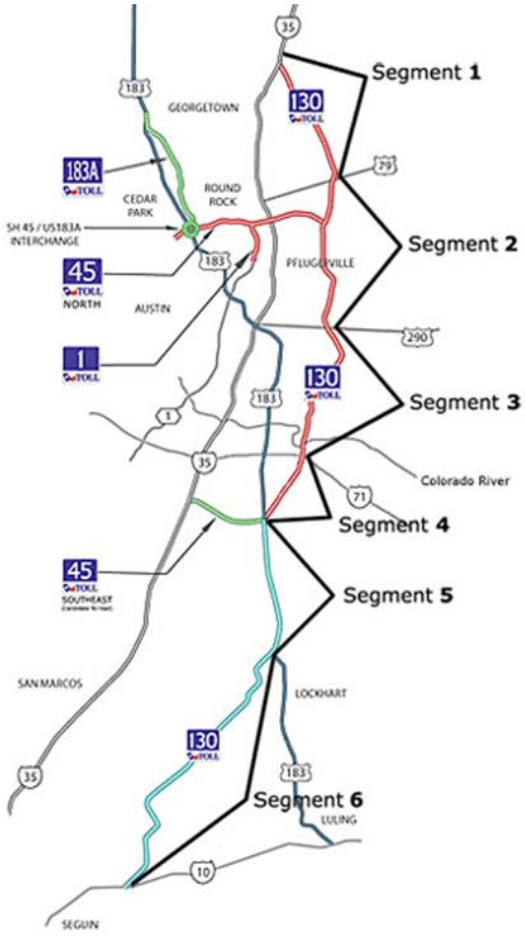
The average travel speed on SH 130 was based on toll transaction records from April 2013 when the speed limit was 80 mph on segments 1 through 4. Over 700 transactions for five-axle trucks were examined to calculate the average travel speed of 66 mph on SH 130. The average travel speeds on SH 130 for five-axle trucks were consistent throughout the day with no variation between off-peak and peak-period travel speeds. The average travel speeds on SH 45 were assumed to be the same as that on SH 130.

The travel speeds included in Table 1 were used to estimate the total driver-based.

Tolls on SH 130

Figure 1 shows a map of SH 130 and I-35 in Central Texas. I-35, the non-tolled facility, passes directly through Austin. SH 130, the tolled facility, connects with I-35 near Georgetown, goes

around Austin, and then connects to SH 45, which reconnects with I-35 south of Austin near Buda. This loop around Austin via SH 130 is 12 miles longer than the I-35 facility. SH 130 also extends further south from SH 45 to Seguin—a total distance of approximately 90 miles.



Source: (*3*)

Figure 1. Segments of SH 130 and I-35 through Austin.

SH 130 has six mainline toll plazas and is divided into segments 1 to 4 and segments 5 and 6 (see Figure 1). Segments 1 to 4 were opened in the mid-2000s, and segments 5 and 6 were opened in 2013.

Toll rates are different for each segment of SH 130 and for cars and trucks. The actual toll charged on SH 130 varies based on where traffic enters and exits the highway. The current tolls for a through trip for five-axle trucks (Class C) are:

- For segments 1 to 4 (46 miles), $21.00 with a TxTag[1] or $27.92 paying by mail (*4*).
- For segments 5 and 6 (41 miles), $27.95 with a TxTag and $32.03 paying by mail (*5*).

Trucks with six axles (Class E) often pay a slightly higher rate.

[1] A TxTag is a sticker that drivers place on their windshield that is scanned while passing through tolls without stopping. Users charge their account so that tolls are prepaid.

Truck Operating Costs

Obtaining operating costs for trucks is a complex process. There are many sources for this information, but very few are comprehensive and consider all the factors that contribute to truck operating costs. The American Transportation Research Institute (ATRI) has been conducting comprehensive research on this topic since 2008 and is the best public source for the cost of truck travel.

The 2013 ATRI study[1] on the operational costs of trucking consisted of a survey that gathered information on the cost of truck travel (*6*). It divided costs into two main categories and multiple subcategories:

- Vehicle based:
  - Fuel costs.
  - Truck/trailer lease or purchase payments.
  - Repair and maintenance.
  - Truck insurance premiums.
  - Permits and licenses.
  - Tires.
  - Tolls.[2]
- Driver based:
  - Wages.
  - Benefits.

The 2013 update grouped survey respondents based on region, with Texas included in the Southwest region.

Operating costs for Southwest region trucks, averaged across all commodities, are listed in Table 2. Specifically:

- The total 2013 operating costs were $64.31 per hour and $1.61 per mile.
- Vehicle-based costs were $42.76 per hour and $1.07 per mile.
- Driver-based costs were $21.55 per hour and $0.54 per mile.

[1] A 2014 update of *An Analysis of the Operational Costs of Trucking* exists. However, it provides marginal costs, not average costs needed for this analysis. For more information, see the 2014 update at http://atri-online.org/wp-content/uploads/2014/09/ATRI-Operational-Costs-of-Trucking-2014-FINAL.pdf.

[2] Toll costs were excluded from the operating costs listed in Table 2 because the specific toll rates in Central Texas were considered in the truck travel cost calculations.

Table 2. Truck Operating Costs for the Southwest Region.

Cost Component	$/hour[1]	$/ vehicle mile
2013		
Vehicle Based		
Fuel costs	24.39	0.61
Truck/trailer lease or purchase payments	8.46	0.212
Repair and maintenance	4.72	0.118
Truck insurance premiums	2.23	0.056
Permits and licenses	1.08	0.027
Tires	1.88	0.047
Subtotal	***42.76***	***1.07***
Driver Based		
Driver wages	16.71	0.42
Driver benefits	4.84	0.12
Subtotal	***21.55***	***0.54***
Total	**64.31**	**1.61**
2014[2]		
Vehicle-based costs per mile		1.09
Driver-based costs per hour	21.91	

Source for 2013 data: (*6*)

Truck Travel Cost Equation

An equation was developed to provide a reasonable estimate for the cost of truck travel through the Austin area considering truck operating costs, average travel speed, and applicable toll charges.

The equation is as follows:

$$Cost = \$1.09 \times miles + \frac{\$21.91 \times miles_{NT}}{\alpha_{NT}} + \frac{\$21.91 \times miles_{T}}{\alpha_{T}} + TollRate$$

Where:

Cost = cost of the trip for a five-axle truck.

[1] Operating costs per hour for the Southwest region were estimated by calculating the ratio of Southwest average cost per vehicle mile to U.S. average cost per vehicle mile and multiplying this ratio by the U.S. average cost per hour for all cost components. This assumes that the ratio of Southwest average cost per vehicle mile to U.S. average cost per vehicle mile is the same as the ratio of Southwest average cost per hour to U.S. average cost per hour across all components.

[2] Vehicle-based costs per mile and driver-based costs per hour from 2013 were inflated to estimate 2014 costs using the Producer Price Index for Truck Transportation. For more information, see http://data.bls.gov/cgi-bin/surveymost?pc.

$1.09 = vehicle-based costs per mile (see Table 2).
miles = total number of miles traveled by truck.
$_T$ = tolled road.
$_{NT}$ = non-tolled road.
$21.91 = driver-based costs per hour (see Table 2).
α = speed of travel.
TollRate = toll rate for the segment traveled on the tolled road.

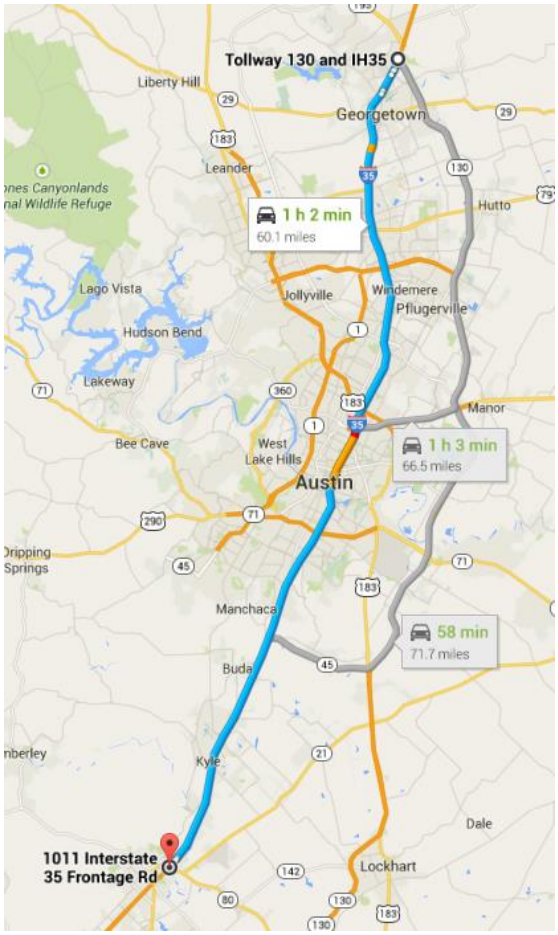
Trip Scenarios

Total truck trip costs considering truck operating costs, average travel speeds, and applicable toll rates were calculated for two trip scenarios using this equation. For each of the trip scenarios, two routes were considered: the tolled SH 130 and the non-tolled I-35.[1]

Georgetown to San Marcos

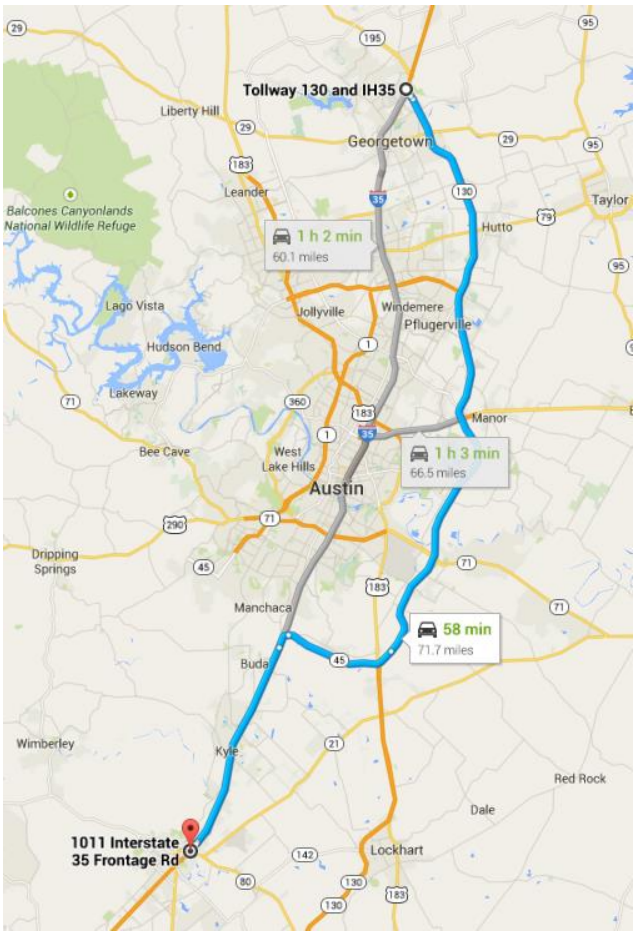
The first trip scenario starts at the north end of SH 130 in Georgetown and ends in San Marcos. Two routes are shown in Figure 2 and Figure 3.

[1] For all examples, the toll rate used was the rate with a TxTag. The toll rate is higher without a TxTag. For more information, see https://www.txtag.org/en/tollCalc/site.html.



Source: Google Maps

Figure 2. Georgetown to San Marcos Using I-35.



Source: Google Maps

Figure 3. Georgetown to San Marcos Using SH 130, SH 45, and I-35.

Cost and Travel Time on the Non-tolled Facility

In this route scenario, a five-axle truck travels from the north end of SH 130 in Georgetown to San Marcos using I-35 (see Figure 2 for a map) during the off-peak period (all hours outside of the AM [6:15 a.m. to 10:15 a.m.] and PM [3:30 p.m. to 7:30 p.m.] peak periods). This is a distance of 60.1 miles at an average travel speed of 61.3 mph (see Table 1). Using these data, the estimated travel time is 59 minutes, and the total estimated truck trip cost is $86.99, calculated as follows:

$$Cost = \$1.09 \times 60.1 + \frac{\$21.91 \times 60.1}{61.3} = \$86.99$$

Cost and Travel Time on the Tolled Facility

This trip uses SH 130 and SH 45 between Georgetown and San Marcos to bypass Austin (see Figure 3 for a map). In this route scenario, a five-axle truck travels from the north end of SH 130 in Georgetown to San Marcos using SH 130, SH 45, and a section of I-35 during the off-peak

period. This is a total distance of 71.7 miles. The distance on SH 130 and SH 45 is approximately 53.8 miles, and the average travel speed is 66 mph (see Table 1). The distance on I-35 from the end of SH 45 to San Marcos is approximately 17.9 miles, and the average travel speed is 61.3 mph. The tolls on SH 130 and SH 45 are $24.12. Using these data, the estimated travel time is 66 minutes, and the total cost of the trip is $126.53, calculated as follows:

$$Cost = \$1.09 \times 71.7 + \frac{\$21.91 \times 17.9}{61.3} + \frac{\$21.91 \times 53.8}{66} + \$24.12 = \$126.53$$

Result

Between Georgetown and San Marcos, the non-tolled facility (I-35) is faster (59 minutes versus 67 minutes) and costs less ($86.99 versus $126.53) than the tolled facility during the off-peak period.

Comparison of Travel Times

Table 3 and Figure 4 show the travel times using the non-tolled (I-35) and the tolled (SH 130, SH 45, and a section of I-35 that is not tolled) facilities between Georgetown and San Marcos. Shorter travel times are highlighted in blue in Table 3. Specifically:

- During the morning peak, travel time on the tolled facility is 1 minute faster than on I-35.
- During the evening peak, travel time on the tolled facility is 20 minutes faster than on I-35.
- During the off-peak, travel time on the tolled facility is 7 minutes slower than on I-35.

Table 3. Travel Time on Tolled and Non-tolled Facility (Georgetown to San Marcos).

Time of Day	Tolled Facility (SH 130, SH 45, and I-35)	Non-tolled Facility (I-35)
Off-peak	66 minutes	59 minutes
AM peak	70 minutes	71 minutes
PM peak	72 minutes	92 minutes

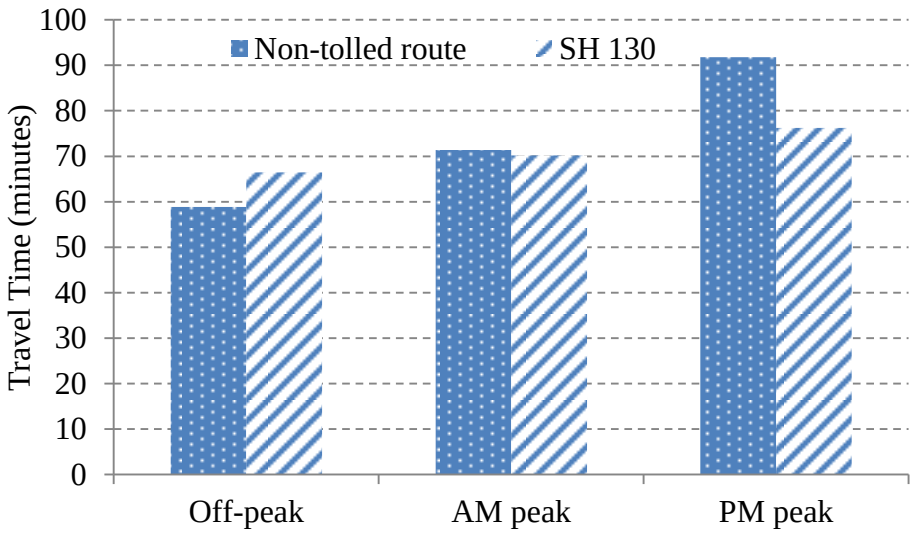


Figure 4. Travel Time on SH 130 and I-35 (Georgetown to San Marcos).

Comparison of Trip Costs

Figure 5 illustrates the cost of using the tolled and non-tolled facility from Georgetown to San Marcos during three time periods (i.e., AM peak, PM peak, and off-peak) at the current truck toll rates on SH 130 and SH 45. At current truck toll rates, using SH 130 and SH 45 is more expensive than using I-35 during all three time periods. The greatest difference is during the off-peak period when it is $39.54 more expensive to use the tolled facility than to use I-35.

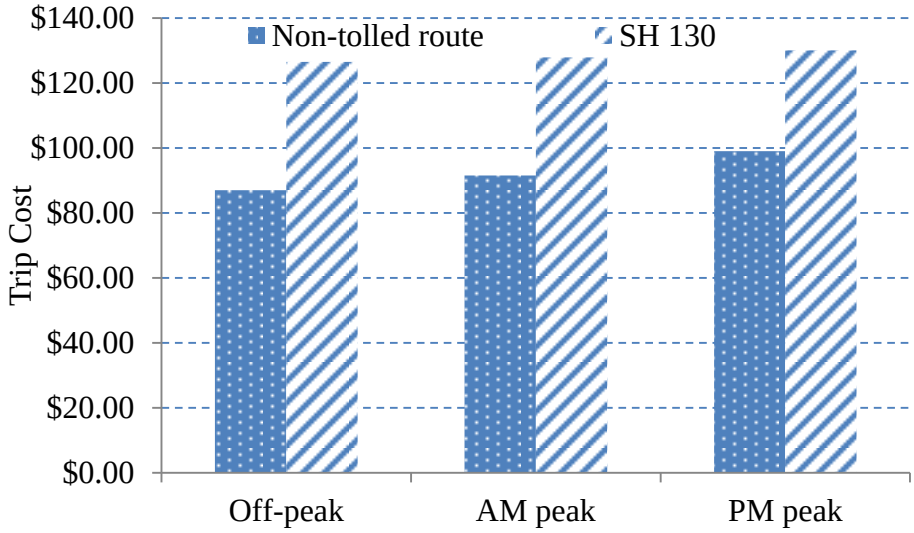


Figure 5. Trip Cost on Tolled and Non-tolled Facility at Current Truck Toll Rates (Georgetown to San Marcos).

Table 4 shows the trip cost on the tolled and non-tolled facility for three toll rate scenarios:

- The current truck rate.
- The current car rate.
- No toll.

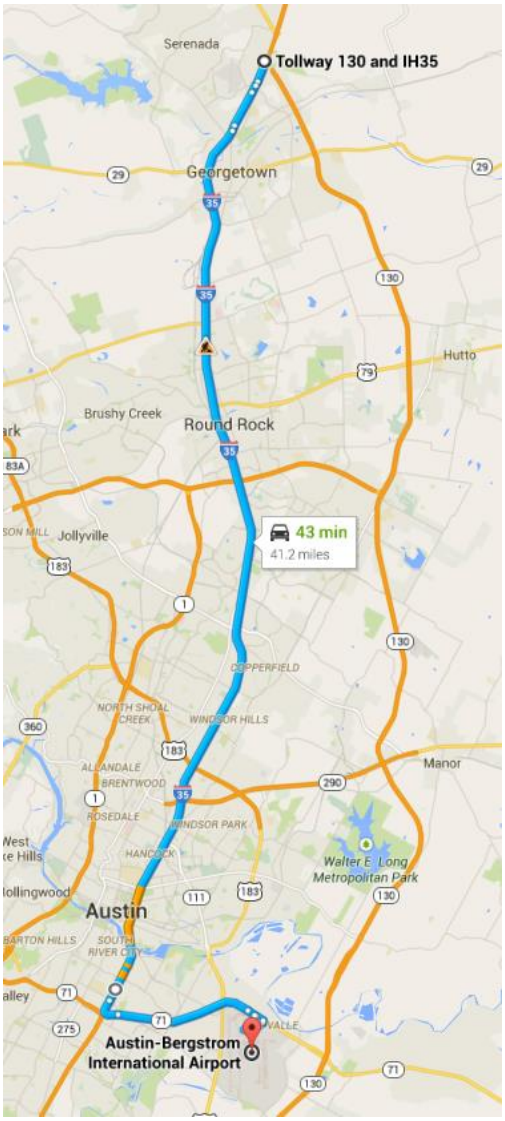
The trip cost was calculated for the off-peak, AM peak, and PM peak periods. The less expensive route choice is highlighted in blue in Table 4. In all cases, during both peak and off-peak periods, the tolled facility was more expensive than I-35, even when the truck toll was removed on SH 130 and SH 45.

Table 4. Truck Trip Cost of Tolled and Non-tolled Facility under Different Toll Rate Scenarios (Georgetown to San Marcos).

Time of Day	Truck Toll Amount	Tolled Facility (SH 130, SH 45, and I-35)	Non-tolled Facility (I-35)
Off-peak	Truck rate ($24.12)	$126.53	$86.99
	Car rate ($8.04)	$110.45	$86.99
	None ($0)	$102.41	$86.99
AM peak	Truck rate ($24.12)	$127.90	$91.58
	Car rate ($8.04)	$111.82	$91.58
	None ($0)	$103.78	$91.58
PM peak	Truck rate ($24.12)	$130.11	$99.02
	Car rate ($8.04)	$114.03	$99.02
	None ($0)	$105.99	$99.02

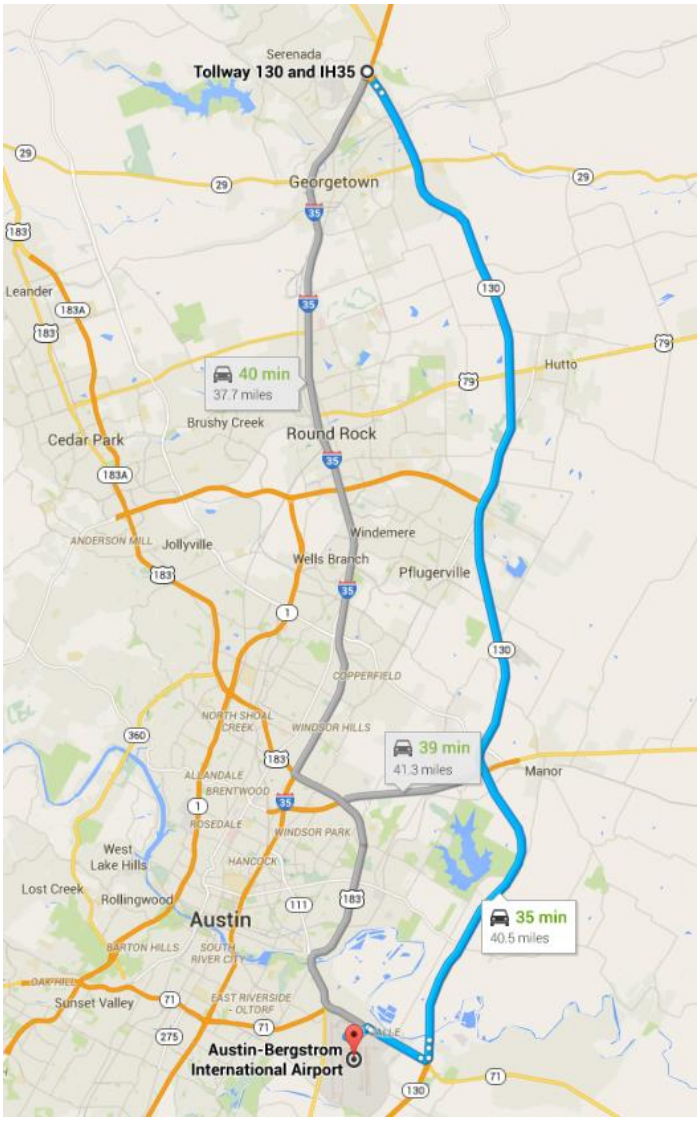
Georgetown to Austin-Bergstrom Airport

The second trip scenario starts at the north end of SH 130 in Georgetown and ends at the Austin-Bergstrom Airport. Two routes are shown in Figure 6 and Figure 7.



Source: Google Maps

Figure 6. Georgetown to the Austin-Bergstrom Airport Using I-35 and SH 71.



Source: Google Maps

Figure 7. Georgetown to the Austin-Bergstrom Airport Using SH 130 and SH 71.

Cost and Travel Time on the Non-tolled Facility

On this route, a five-axle truck travels from the north end of SH 130 in Georgetown to the Austin-Bergstrom Airport using I-35 and SH 71 (see Figure 6 for a map) during the off-peak period. This is a distance of approximately 34.5 miles on I-35 and 6.7 miles on SH 71. The average travel speed on I-35 is 61.3 mph, and the average travel speed on SH 71 is 54 mph during the off-peak period (see Table 1). Using these data, the estimated travel time is 41 minutes, and the total estimated truck trip cost is $59.96, calculated as follows:

$$Cost = \$1.09 \times 41.2 + \frac{\$21.91 \times 34.5}{61.3} + \frac{\$21.91 \times 6.7}{54} = \$59.96$$

Cost and Travel Time on the Tolled Facility

This trip uses SH 130 and SH 71 from the north end of SH 130 in Georgetown to the Austin-Bergstrom Airport (see Figure 7 for a map). In this route scenario, a five-axle truck travels approximately 37.3 miles on SH 130 and 3.2 miles on SH 71 during the off-peak period.[1] During the off-peak period, the average travel speed on SH 130 is 66 mph, and the average travel speed on SH 71 is 54 mph (see Table 1). The toll for this segment of SH 130 is $15.75. Using these data, the estimated travel time is 37 minutes, and the total cost of the trip is $73.58, calculated as follows:

$$Cost = \$1.09 \times 40.5 + \frac{\$21.91 \times 3.2}{54} + \frac{\$21.91 \times 37.3}{66} + \$15.75 = \$73.58$$

Result

Between Georgetown and the Austin-Bergstrom Airport, the tolled facility (SH 130) is faster (37 minutes versus 41 minutes) but costs more ($73.58 versus $59.96) than the tolled facility during the off-peak period.

Comparison of Travel Times

Table 5 and Figure 8 show the travel times using the non-tolled (I-35) and the tolled (SH 130) facilities between Georgetown and the Austin-Bergstrom Airport. Shorter travel times are highlighted in blue in Table 5. Specifically:

- During the morning peak, travel time on the tolled facility is 12 minutes faster than on I-35.
- During the evening peak, travel time on the tolled facility is 23 minutes faster than on I-35.
- During the off-peak, travel time on the tolled facility is 4 minutes faster than on I-35.

Table 5. Travel Time on Tolled and Non-tolled Facility (Georgetown to Austin-Bergstrom Airport).

Time of Day	Tolled Facility (SH 130 and SH 71)	Non-tolled Facility (I-35 and SH 71)
Off-Peak	37 minutes	41 minutes
AM Peak	37 minutes	49 minutes
PM Peak	38 minutes	61 minutes

[1] SH 71 is a non-tolled route. A segment of SH 71 is used in both the non-tolled option and the tolled option.

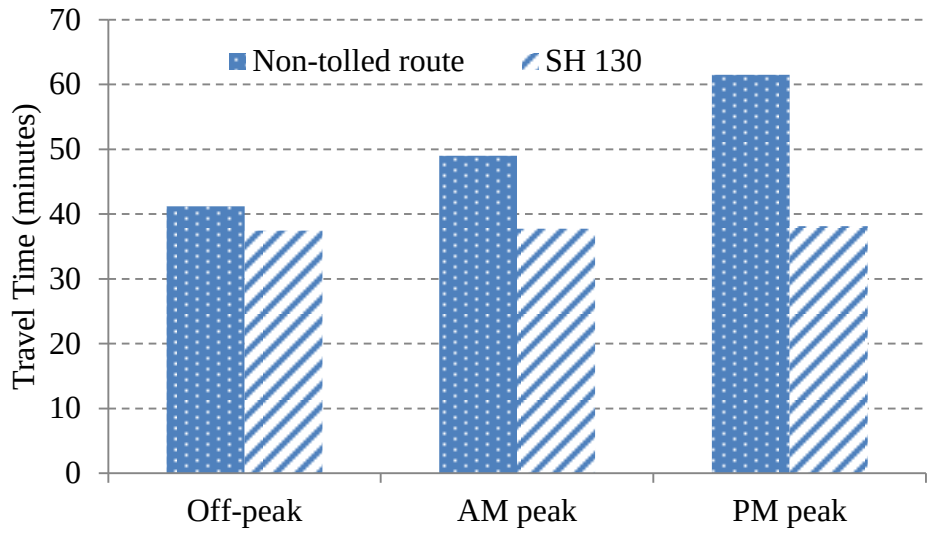


Figure 8. Travel Time on I-35 and SH 130 (Georgetown to Austin-Bergstrom Airport).

Comparison of Trip Costs

Figure 9 illustrates the cost of using the tolled and non-tolled facility from Georgetown to the Austin-Bergstrom Airport during three time periods (i.e., AM peak, PM peak, and off-peak) at the current truck toll rates on SH 130. At current truck toll rates, using SH 130 is more expensive than using I-35 during all three time periods. The greatest difference is during the off-peak period when it is $13.62 more expensive to use the tolled facility than to use I-35.

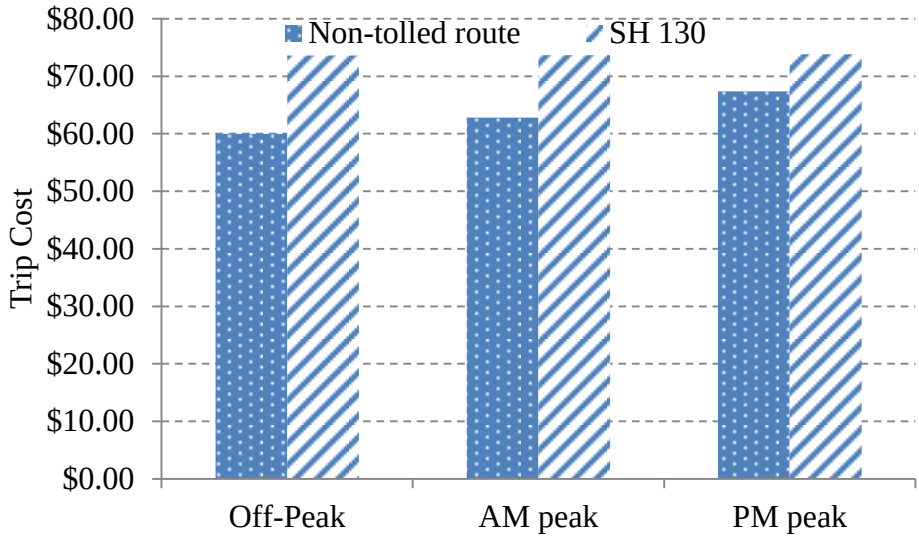


Figure 9. Trip Cost on Tolled and Non-tolled Facility at Current Truck Toll Rates (Georgetown to Austin-Bergstrom Airport).

Table 6 shows the trip cost on the tolled and non-tolled facility for three toll rate scenarios:

- The current truck rate.
- The current car rate.
- No toll.

The trip cost was calculated for the off-peak, AM peak, and PM peak periods. The less expensive route choice is highlighted in blue in Table 6. The tolled facility is more expensive than I-35 at current truck toll rates during all time periods. If the truck toll rate is reduced to the car toll rate, then the tolled facility is less expensive than the non-tolled facility during the PM peak. Similarly, if the toll is removed, then the tolled facility is less expensive during all time periods.

Table 6. Truck Trip Cost of Tolled and Non-tolled Facility under Different Toll Rate Scenarios (Georgetown to Austin-Bergstrom Airport).

Time of Day	Truck Toll Amount	Tolled Facility (SH 130 and SH 71)	Non-tolled Facility (I-35 and SH 71)
Off-peak	Truck rate ($15.75)	$73.58	$59.96
	Car rate ($5.25)	$63.08	$59.96
	No toll ($0)	$57.83	$59.96
AM peak	Truck rate ($15.75)	$73.67	$62.79
	Car rate ($5.25)	$63.17	$62.79
	None ($0)	$57.92	$62.79
PM peak	Truck rate ($15.75)	$73.82	$67.36
	Car rate ($5.25)	$63.32	$67.36
	None ($0)	$58.09	$67.36

Conclusion

This policy brief delved deeper into the financial factors that influence the use of toll roads by trucking companies. This effort aimed at further enhancing the understanding of the travel dynamics surrounding the use of toll roads by truckers.

The study team compared the trip cost and travel times for trucks traveling on non-tolled and tolled facilities in Central Texas under different trip, travel speed, and toll rate scenarios. Specifically, the study evaluated two trip scenarios: Georgetown to San Marcos and Georgetown to the Austin-Bergstrom Airport, which involved traveling on sections of I-35 and SH 130.

Prior research has found that a number of factors influence whether a trucking company will use a tolled route alternative, including:

- Travel time (or travel speed).
- Distance traveled.
- Toll rates and whether the toll charged can be recovered from the customer.
- Vehicle and driver costs.

The study team developed a truck travel cost equation that included each of these factors to simulate the financial considerations when a trucking company is faced with the decision to use a tolled (in this case SH 130) or non-tolled route. Different toll rate scenarios were used to determine the effect of different hypothetical toll discount programs on the costs of truck travel.

The results showed that for the Georgetown to San Marcos trip, the non-tolled facility (I-35) was less expensive than the tolled facility (SH 130 and SH 45) at all times of the day and given all three toll rate scenarios (i.e., even when the tolls on SH 130 and SH 45 were removed).

On the other hand, the study found that for the Georgetown to Austin-Bergstrom Airport trip, the tolled facility (SH 130 and SH 71) was less expensive than the non-tolled facility (I-35 and SH 71) under the following conditions:

- During the PM peak if the truck tolls were reduced to the car toll rate.
- During all times of day if the truck tolls were removed.

However, at the current truck toll rate, the tolled facility was always more expensive than using I-35 during all time periods.

Trucking companies are cost sensitive and evaluate different route options for each trip to determine the most cost-effective route given the requirements of the delivery. Tolled facilities will only be used for trips where the tolled facility is more cost effective than the non-tolled facility or in situations where the delivery requires—and the toll road offers—a faster travel speed (e.g., when the trucking company needs to meet a specific delivery window).

The calculations conducted in this study can be used to simulate the effect of travel speeds and toll discount programs on truck travel costs and therefore the truck use of tolled facilities.

References

1. D. Schrank, B. Eisele, and T. Lomax. *2012 Urban Mobility Report*. Texas A&M Transportation Institute, College Station, Texas, 2012. http://tti.tamu.edu/documents/mobility-report-2012.pdf. Accessed February 2015.
2. T. Geiselbrecht, T. Baker, C. Beaty, N. Wood, B. Chigoy, S. Overmyer, and J. Prozzi. *Incentives for Truck Use of SH 130*. PRC 14-23F, Texas A&M Transportation Institute, College Station, Texas, 2015. http://tti.tamu.edu/documents/PRC-14-23-F.pdf. Accessed February 2015.
3. Texas Department of Transportation. Private Partnership Approved for State Highway 130. July 3, 2006. http://www.ntxe-news.com/cgi-bin/artman/exec/view.cgi?archive=21&num=35193. Accessed February 2015.
4. TxTag. Toll Calculator. https://www.txtag.org/en/tollCalc/site.html. Accessed February 2015.

5. SH 130 Toll. Toll Calculator. http://mySH 130.com/segments-5-6/toll-calculator. Accessed March 2015.

6. K. J. Fender and D. A. Pierce. *An Analysis of the Operational Costs of Trucking: A 2013 Update.* American Transportation Research Institute, Arlington, Virginia, September 2013. http://truckexec.typepad.com/files/atri-operational-costs-of-trucking-2013-final.pdf. Accessed February 2015.