The Traffic Fallacy

UMD PM Symposium
May 11, 2018

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lcm.io/feedback
Last Call Media enjoys work with purpose — building engaging solutions that assist and support organizations working to improve their communities.
Average of 41 min to go 28 miles from downtown Houston to Katyland
Houston, Texas
I-610 West Loop at the I-10 (Katy Fwy) Interchange

Summary

When the proposed improvements to the I-610/I-10 interchange are implemented, Houston residents will realize significant gains in safety, air quality, and overall quality of life. The Texas Department of Transportation (TxDOT) is undertaking a massive improvement project on the entire Katy Freeway from the I-610 interchange westward to the Fort Bend County line.

Over the 20-year life of the improvements planned for the interchange, there will be 9,362 fewer crashes (including 37 fewer fatalities and 4,597 fewer injuries), a 60 percent decrease in smog-causing volatile organic compounds, and an 80 percent decrease in CO₂ emissions. In addition, motorists and truckers traveling through the interchange during morning or evening rush hours will shave 27 minutes off their driving time each trip. For commuters, who typically negotiate

VITAL STATISTICS
I-610 West Loop at the I-10 Interchange

Annual Delay: 25,181,000 hours

<table>
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<tr>
<th>Year</th>
<th>2002</th>
<th>2025 (estimated)</th>
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<tbody>
<tr>
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<td>295,000</td>
<td>442,038</td>
</tr>
<tr>
<td>Peak Period Delay (minutes per vehicle per trip)</td>
<td>17.5</td>
<td>48.2</td>
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<tr>
<td>Annual Traffic Growth</td>
<td>1.77%</td>
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https://www.highways.org
### VITAL STATISTICS

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[https://www.highways.org](https://www.highways.org)
Direct economic loss:
$503,620,000/yr* ++
“Bottlenecks caused by too many cars on too little road are to blame for about half of all traffic jams. Traffic accidents, work zones, bad weather and poor signal timing account for the rest.”

- Highways.org

https://imgur.com/YN6EfV5
“Bottlenecks caused by too many cars on too little road are to blame for about half of all traffic jams. Traffic accidents, work zones, bad weather and poor signal timing account for the rest.”

- Highways.org

https://imgur.com/YN6EfV5
Conclusion: Too many cars, not enough freeway.
“Extra capacity would surely solve this problem.”
- said a reasonable person, probably
Therefore, build more freeway.
So the state of Texas spent more than $2.8 billion to widen the Katy Freeway to 26 lanes.
Average travel time increased 55%, from 41 to 64 minutes.
As the amount of freeway increased, the number of cars gradually increased too. Ratio of car to freeway remained the same.
Variation with Traffic Volume

Average Speed (MPH)

Vehicles in Progress (Thousands per hour)

Peak time

Balanced Transportation Analyzer
Variation with Traffic Volume (post capacity increase)

- Average Speed (MPH)
- Vehicles in Progress (Thousands per hour)

Peak time

Balanced Transportation Analyzer
50 lane Hong Kong-Macau Expressway

https://www.usatoday.com
Freeway engineers have the best intentions.
The real challenge for city streets is to move people, not cars, efficiently.
Despite capacity increases, too many VIP (vehicles in progress) means continued high road utilization, high throughput times, and idling vehicles.
There's no freeway-slack to handle vehicle variations.
Congested freeways need a VIP limit.
New York, NY
Governor Andrew M. Cuomo set the stage for an ambitious congestion pricing plan when he declared that it was "an idea whose time has come."

But that time is not now.
Stockholm, Sweden
Average travel time decreased 50%.

Emissions dropped by 14-18% in the inner city.
What about our “freeways”

How many of us have looked at their backlog and thought, “things are taking forever and nothing is getting done!”?

Then who thought, well maybe we need more people!

Who also had team members with >1 thing assigned to them marked as “in progress”? 
Everyone was incredibly busy and working hard, yet value was taking too long to get to the customer.
Differences in task variation makes it difficult to provide scheduling predictions, so to maintain a positive customer experience costly, secondary needs were created as tasks waited.

This is superfluous work.
Here are *just* a few more tasks...

Traditional management literature says people need to be 100% utilized in order to get more things done.

Assign work to people! Then *manage* it!

So the goal of project management was to make sure everyone always had a full plate of work assigned to them.
Is being busy and delivering value with predictability mutually exclusive?
What would it look like if instead of focusing on keeping people busy, we focused on delivering work to the customer as quickly as possible?
Goal:
Put our good ideas into action quickly.
Why?
1. Visualize our process
2. Limit our work in progress
3. Improve as a team
1. Visualized our process

- Helped us see the system as a whole.
- Physical board with columns representing work states
- High level visibility for team
- Bottlenecks become easier to see, for us to either respect or change them as a team
- Makes hidden work apparent
We started having conversations.
2. Limit Work in Progress (WIP)

- How many things can you really work on at one time?
2. Limit Work in Progress (WIP)

- How many things can you really work on at one time?
- Excessive WIP heightens distraction, decreases concentration, increases task abandonment.
- Bottlenecks, again, become clear fast.
- Marked WIP Limits on board.
2. Limit Work in Progress (WIP)

- There’s no one right WIP limit for a team, however:
  - A lower WIP is generally better.
  - Too-high WIP leaves work idle.
  - Too-low WIP leaves people idle.
- WIP limits are not rules
Variation with Traffic Volume

- WIP Limit
- Peak time

Balanced Transportation Analyzer
Throughput = # of Flow Units x Cycle Time
Card as a flow unit

Card acts as a signal. Signals are in different states.

Common attributes are:

- Description of the work item
- ID in electronic systems (JIRA, etc)
- Deadlines
- Who’s working on the item
- Type of work (bug or normal, for example)
- Color

JIRA #: JRA-134  DUE: July 31, 2017

TITLE: Expanding tokens
DESCRIPTION:
As a VIP user, when I have not logged in for 120-days, my tokens expire, so that I can’t be inactive and carry a token balance indefinitely.
Getting started

- Take a list of work
- Prioritize it based on business value (1, 2, 3,...)
- That’s a backlog
- Teams work from top to bottom
- Team self organizes to figure out how to pull the work through the queue
A simple board

<table>
<thead>
<tr>
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What happened?

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<td></td>
<td></td>
</tr>
<tr>
<td>JRA-107</td>
<td></td>
<td></td>
</tr>
<tr>
<td>To Do</td>
<td>Analyze (4)</td>
<td>Selected for Dev (4)</td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
<td>----------------------</td>
</tr>
<tr>
<td>CUP-134</td>
<td>CUP-132</td>
<td>CUP-147</td>
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<tr>
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Attach people to work
“Flow efficiency is the sum of value adding activities in relation to throughput time.”

- This is Lean
Flow efficiency = \( \frac{\text{Value-adding activities}}{\text{Throughput time}} \)
Flow efficiency is about *reducing non-value adding* activities, like flow units waiting.
100% resource efficiency

Need:
As an admin, I want to be able to enable site-wide notifications, so visitors can see important alerts like changes to the schedule.

Value-adding time: Time spent with creative and development (8 hours)

Time period: From request submitted to being live on production (120 hours)

Flow efficiency: $6.6\% = 100\% \times (8/120)$
Shift to flow efficiency

**Need:**
As an admin, I want to be able to enable site-wide notifications, so visitors can see important alerts like changes to the schedule.

**Value-adding time:** Time spent with creative and development (8 hours)

**Time period:** From request submitted to being live on production (24 hours)

**Flow efficiency:** $33.3\% = 100 \times \frac{8}{24}$
<table>
<thead>
<tr>
<th>To Do</th>
<th>Analyze (4)</th>
<th>Selected for Dev (4)</th>
<th>In Progress (4)</th>
<th>UAT (5)</th>
<th>Ready for Deploy (4)</th>
<th>Done</th>
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@LASTCALLMEDIA
<table>
<thead>
<tr>
<th>What stayed the same</th>
<th>What changed</th>
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<tr>
<td>- Multifunctional team</td>
<td>- Optimizing for getting a single work unit through the process as quickly as possible.</td>
</tr>
<tr>
<td>- Dedicated team (not on project work)</td>
<td>- Team member attached to work</td>
</tr>
<tr>
<td>- Queue hygiene</td>
<td>- Team members pull work</td>
</tr>
<tr>
<td>- Daily stand ups</td>
<td></td>
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<td>- Retrospectives</td>
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Good to great

What about how we work should change and what should stay the same?

1. Set the stage
2. Gather data
3. Generate insights
4. Decide what to do
5. Close the retrospective
What we learned

- Start with what we have (People, tools, space)
- Prioritize our work
- Visual our process
- Limit our WIP
- Retrospectives are how we improve as a team
- To deliver value to customers faster
Agile and Lean, after all, are all about experimentation and learning. Enjoy the trip.
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When variation in flow units is low, adding more resources may improve throughput.
300,000

Throughput time

BEFORE
Cars per hour = Amount of road / Cars on the road at any given time.

AFTER
Cars per hour = Amount of road / Cars on the road at any given time.