

Driving Behaviors at Intersections (Case Study- Tehran-Zone 3-Region 3)

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Abstract—In this article we research on the drivers' behavior at intersections. Some significant behaviors are chosen and designed a questionnaire which was about 2 pages. In this questionnaire, samples were being asked to answer by checking the box. The answers have been from always to never. This questionnaire related to our selection's behaviors. Finally it has been resulted that most of aggressive behaviors were being common in them. Also it has been suggested some solutions for each of them.

Keywords—Driver, behavior, intersection, study.

I. INTRODUCTION

ONE of the biggest traffic conflicts that many countries like Iran have, is in the intersections. If these intersections designed without any traffic lights, we'll confront with a bigger issue than others which are signalized. But in the signalized intersections, however, some conflicts are solved, if some cases weren't considered, Not only the problems won't be solved, but also we have faced with the baffles which much bigger than the simple intersections.

All of us know if the volume entered into one path which the capacity is less than its volume, we see that the cars are stuck in it. Another important fact which is being effective in traffic is conflicting between motorists and pedestrians. Hence, if we considered these two facts happening at the same time, which is very usual, our intersection is going to be locked. So, traffic signal is inevitably needed.

One of the points which are common in these two kinds of intersection is wasting time for the drivers. Especially if this intersection is located in the area which the residents have hasty character, we are going to bigger trouble.

One of the significant facts in driving behavior is about the degree of patience. This character of drivers discloses itself at intersections and other pathways which the traffic is heavy.

May be one of the facts that cause the drivers to be hurried is stress for reaching to destination on time. This mostly is common in commuters. These persons predict the traffic situation before they move and they set their time base on it. When unexpected traffic jam happens in their path, it causes some anxiety for them.

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The traffic jam costs too much for drivers and governments due to wasting the time. Wasting the time has different costs for each person. For instance, doctors visit less patients or the cabs carry fewer passengers. All of these cases lose different amounts of income.

In this view everyone wants to reach to his destination faster. Hence, it causes driving convert into the individual behavior instead of social one. In this circumstance, each driver acts complacently. This causes an accident or heavier traffic. This manner strongly depends on the culture of local people. The designers also design the path for the ideal volume, but when the discipline of the one section is broken down, the real capacity is decreased. Furthermore, It provides the atmosphere with full of stress due to everyone acts unpredictably and the probability of crashing is increased.

These problems can be generally separated into two categories, Geometric design and the culture.

If bypass sections are able to design with fewer conflicts especially in intersections, the traffic can be reduced and that area is being calmed. Unfortunately in Iran due to saving money and make a lot of benefits, the process of design is converted to trial and error process while the true method is using the models. Because if the path is just designed without using any model and just changed something real and then seen the results, although the goals may be reached, it causes some bad effect on the drivers that passing the section. If luckily the design gets good results, we save money, but when it gets bad result, for the time before they fix that bug, it causes heavy traffic and increases the mental effects in drivers which cost more than building the models.

Fortunately, nowadays with the help of technologies we can reduce using trial and error process.

Also in many cases designers won't consider demand volume in the future. In some place it will be seen in the future that no way for broadening the width of the path is existed or it may be cost a lot.

In second part which is about the culture, it's good to be described one important story about our childhood that plays most important rule in our daily life.

If we go back to our childhood, we can see that in many games which we played with our playmates, we mostly competed against each other.

One simple example is "musical chairs". This game consists of the number of chairs that are less than the number of competencies. At the start of the game, the music is starting to play and the competent just move around the chairs and as the music is stopped, the competencies must sit on the chairs and everyone who has no chair is lost.

Also this game is held in Japan in another form because they try to increase the incorporation manner. This game most likely the game in Iran, but the competitors aren't separate persons, they are divided in 2 groups. In this method every person learns both the competition and incorporation at the same time.

When these things are learned from childhood, it affects in driving behavior. For example, trying to obey the rules about the right of way and also offer the way to another driver. But in Iran everyone tries to steal the way from another, although in some conditions some exceptions can be seen. This exception is mostly pretended and also being used in the situation which isn't necessary.

Besides, Department of Transportation Safety declares following characteristics for aggressive drivers:

Their driving habits are:

- Running stop signs and red lights
- Speeding

- Tailgating
 - Weaving in-and-out of traffic
 - Passing on the right
 - Making improper and unsafe lane changes
 - Making hand and facial gestures
 - Screaming, honking, and flashing their lights
- They drive at speeds far in excess of the norm which causes them to:
- Follow too closely
 - Change lanes frequently and abruptly without notice (signals)
 - Pass on the shoulder or unpaved portions of the roadway
 - Use verbal threats or gestures at motorists in front of them [1].

A questionnaire form for 50 samples is made as you can see in Table I and required the volunteers to answer it frankly.

TABLE I
 QUESTIONNAIRE FORM (ONE FILLED SAMPLE)

Act	Always	Almost always	Often	Sometimes	Seldom	Never
1- Trying to escape from traffic light with gear number 3.					X	
2- When you want to make a left turn at intersection, using right lanes.				X		
3- You can't wait behind the slow car and pass it.			X			
4- Tailgating and warn the front driver to move away from your path.					X	
5- Waiting on the right lane for straight movement on red						X
6- Wait behind the Xing lanes on red.			X			
7- Holding the horn for showing your anger to another driver					X	
8- Suddenly notice that you can't recognize your exact location while driving.					X	
9 - In the last seconds of green light, you pass it, while you know you'll block that intersection.						X
10- On the two-ways path you stuck behind the slow car and deciding to illegal pass in the dangerous situation						X
11- You've decided to go destination 'A', but suddenly you feel that you locate on another destination.				X		
12 - Passing the light as it runs red.					X	
13- You've got angry from another driver and decided to show your anger with pursuing him.					X	
14- You didn't notice about the cars behind you or miscalculating his speed as you wanted to change your path.						X
15- You haven't signaled as you want to change your lane.						X
16- Parking parallel to another parked car when you can't find the appropriate parking.					X	
17- Noticing that due to health disadvantage (like blood pressure) can't drive appropriately.						X
18- You hadn't noticed the prohibited signs before you wanted to park.			X			
19- Due to passing the intersection quickly, you stopped on the right lanes special for right turning.					X	
20- You couldn't able to read the guidance signs and wrongly go to another path.					X	
21- Before looking at your mirrors, decided to turn left or right.						X
22- You haven't stopped for red-lights in midnights.					X	
23- You haven't noticed pedestrians as you wanted to turn right on the intersections.						X

II. BLOCK THE INTERSECTIONS

In many cases were seen that drivers wanted to pass the intersection rapidly without considering the traffic in correspondent routs due to escape the traffic light. This causes

to block the intersection and also causes to block related routs. This increases the delay time and also has the bad effect of drivers' behavior.

Statistical examination shows that about 50 % of people don't consider this happening.

Also the report in Fig. 1 from EOS Gallup report [2] shows the percentage of irritated people due to this action.

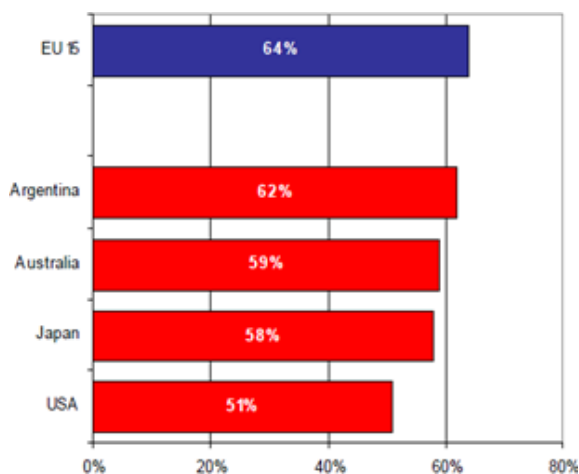


Fig. 1 Entering into a crossroads when it is congested

Solutions:

- 1- The floor of the intersections can be painted to warn the drivers and also uses police officers for controlling it and the law should be passed for giving the tickets to the offenders.
- 2- By the help of ITS (Intelligent Transportation Systems), it can be controlled in the best way. For example, the signals should be changed their timing depending on the traffic of the intersections and as the camera sees that the related route is blocked, for avoid intersections blocking, instantly changing signal to the red for this side.

III. HORN USING

Nowadays, noise pollution is being one of the crises in our daily life. One of the big sources of this kind of pollution is vehicles' horn, especially when some sensitive areas are near this source such as hospitals.

Another effect of this is related to the drivers. It affects their nerve systems and makes them angry sometimes and causes struggle between them.

Unfortunately, based on the performed research in Tehran, statistical examination shows that about 72% of the samples have been tending to hold their horn continuously for showing their anger.

Some usual reasons that may be effective in this problem are life problems, social problems, psychic problems and etc. Also sometimes drivers spend too much time behind their vehicles and they just want to arrive home early or when they want to go to their work and they are in hurry.

Solutions:

- 1- The municipal of each area shouldn't allow the engineers and other responsible persons to build hospitals near the street, especially near intersections.
- 2- Control the laws severely to reduce conflicts between vehicles.

- 3- Suggesting drivers some ways of reducing their stress as DMV in Columbia suggested [3].

IV. LEFT TURN IN A RIGHT TURN ONLY LANES

Some drivers due to passing the traffic signal faster go to right turn only lanes and as they reach to the intersection, then they turn left side. This act may cause blocking the path or accident with the vehicles who want to go straight. Also this may cause the drivers to be angry and they make a continuous honking.

Statistical examination shows about 59% of people have tended to do such an act.

One of another reason that causes this kind of happening is due to unawareness of drivers about their path and investigations are showed that just about 35% of people being aware of their location most of the time.

Solutions:

- 1- The second one can be solved with increasing the guidance placard. Even though in the future GPS can solve this problem more easily. But now, especially in Iran most of the people haven't equipped with these systems.
- 2- Solid lanes special for left turns can be drawn near the intersections and also controlled it by police officers and intelligent systems for preventing offenses. Although knowing that this solution have been performed in many places, but in Iran this kind of things are being less important for designers.

V. RUNNING THE RED LIGHT IN THE FIRST SECONDS OF BEING RED

Some drivers due to some reasons tending to run the red light as becoming red in the first seconds. This act may be caused fatal accidents sometimes.

Reference [4] in the state of Florida, the researchers based on their research between the years of 1988 to 1997, show that in 1988, the number of vehicles who passed the red light was 6584, but this number reduced to 5871 in 1997 because of more controlling. Also this statistics show that from the 6584 numbers of offenses, 6551 numbers had an accident and in 1997, from 5871 vehicles, 5844 numbers of them also had an accident.

Investigation shows that about 61% of the samples have tended to do this act.

Red light running behavior generalized across state boundaries. Based on national data, the typical red light runner has the following general characteristics:

- Is younger, is driving alone, has no children, and is in a rush to work or school in the morning hours on weekdays. If a parent, most likely has a child less than 20-years-old.
- Is employed in jobs requiring less education (i.e., blue collar, lower technology), or is unemployed.
- Is more than two miles from home and is more likely to have been ticketed for red light running (although, the rate of receiving tickets is low).
- Is not necessarily frustrated. [5]

Solutions:

- 1- Offenses can be controlled hardly, and give the offenders negative credits and heavy fines.
- 2- This act can be advertised on TV and showed the accidents related to this act may be effective.
- 3- Using intelligent traffic signal that captures the plate number when someone passes the red light.
- 4- More police officers can be located at intersections.

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