

Final Paper: Traffic Counting

Traffic on the Lehigh University campus rivals that of any small city. The constant flow of students, alumni, parents and service vehicles that travel through our campus is becoming a major problem. The ecological dangers associated with our current travel patterns have a direct relationship to our everyday travel decisions. There has definitely been an attempt to change things. Until recent years there has never been a carpool lane or passenger minimums, and if we did have them in place in the past they definitely were not enforced like they are today. This is why the task of traffic counting is so important. If we can work at a smaller grass-roots level focusing on the problems on our campus, hopefully we can generate a plan that others can follow. The problems here at Lehigh parallel the problems of similar universities across the country. The following is a summary of how we went about gathering our important data.

We chose the following eight intersections located on and off campus: Taylor/Packard, Fairmart Bus Stop, Middle Hill, Hillside/Thomas, Zoellner, Dravo, Memorial/University and the Gates to the Hill. Each member of our group went to a designated location at a specific time ensuring that we accumulate data at key times of the day. The times that we selected were what we thought to be the busiest times of the day. We felt that each of these intersections represented a major segment of the overall traffic patterns here at Lehigh. We recorded the number of cars that traveled through each of these intersections, the type of vehicle (TRACS, Buses, Police etc...), and finally the number of people in each. Our data yielded some astonishing points about our current traffic patterns, and clearly distinguished some of the strengths and weaknesses with our existing system. As I stated earlier, we feel that with the information we

gathered and analyzed would be extremely useful for both Lehigh University parking and transportation services and other similar universities. If we do not implement a new plan here at Lehigh, we are essentially putting ourselves in a very dangerous situation.

Students are beginning to understand the long-term effects of their decision, and we can only hope that this continues.

Traffic flows on and around campus in what can be best described as somewhat of a rectangle, with numerous off shoots that lead vehicles in multiple directions around campus. There are multiple start locations that feed traffic onto Lehigh's campus. The first major intersection that leads cars onto campus is located at the top of the hill. There are two entrances from mountaintop that allow cars to enter campus. This entrance and roadway is used primarily by fraternity and sorority drivers and anyone entering campus from Route 78 (faculty, potential students, and school bus transportation). This traffic makes its way down the hill, and depending on which side of campus people have class determines which direction they take out of "the gate" intersection. The traffic that flows towards the western side of campus either continues in the rectangle down towards Rauch or they continue straight towards the Ulrich Center. As for the traffic that goes down the other side of campus, drivers either go towards the Admissions building, head off campus, or continue down the Packard bus stop intersection. People head off campus to return to their off campus apartments or use this road as a shortcut to Route 378.

Traffic flows up campus in a similar direction. A majority of the traffic that exits the Zoellner parking garage takes left hand turns, meaning that a majority of them are students and returning to either their off campus apartment or on campus residence. In the early mornings and late afternoon hours (before class begins and after it ends) you see

a pickup off drivers who are not associated with Lehigh. In comparison during the school time hours, a large majority of the people driving are students, a majority of them drive alone in hopes of finding a parking spot somewhere along Packard Avenue and or the two parking garages. Since Lehigh has many more cars that drive then it does parking on the lower half of campus, you see numerous cars driving in loops in order to ascertain a parking spot as close as possible to their particular building. All in all, the traffic here on campus flows fairly well except for a few hot spot intersections. These locations are spoken about in more detail in other sections of this report.

We decided that it was very important to do multiple cross analyses with the traffic flow data that we collected. We took the data for each traffic stop and compared the number of cars, Lehigh Buses/TRACS, and Other (Delivery vehicles, police, maintenance, etc...) that traveled through each stop during the weekdays with the flow that took place during the weekend. Of the eight stop that we took data from, only two of the stops had more car traffic on weekends when compared to weekdays. These were Hillside/Thomas and Middle Hill (Chi Psi). Hillside and Thomas had a relatively large increase with the number of cars during the weekend (ave.21.5/hour to ave. 45/hour). The Middle Hill stop increased only slightly (ave. 63.5/hour to ave. 66/hour). For the most part at the other six stops the trend shows more cars flowing through them during the weekdays as opposed to weekends. When looking at LU and other types of vehicles we found that the same trend of more traffic flowed through during the weekdays then the weekends. The only exceptions were Chi Psi and Hillside/Thomas. Attached are the bar graphs labeled Traffic Distribution from excel that supports these conclusions.

Another key factor to take into consideration when trying to develop campus traffic trends was to count and show the distribution relative to the number of passengers per car that traveled through each stop. When recording our data, we broke the distribution down between 1-passenger cars, 2, 3, 4, and 5 passengers per car. However to more accurately portray the amount of car-pooling taking place we compared 1 passenger cars versus 2 + passenger cars. These comparisons were done by stop and compared from weekend to weekday volume. When making these calculations and graphs (which are attached labeled Passenger Distribution) we found an interesting trend developed. For the Memorial/University stop and the Middle Hill Stop there were more combined car pool cars than single passenger cars for both weekdays and weekends. All of the other six stops had a strong majority of single passenger cars during the weekdays, but for Fairmart and Taylor/Packard and Zoellner the weekend car-pooling gap was greatly decreased on the weekends. I think one of the reasons for the Middle Hill stop and the Memorial/University stop had more car-pooling was because they had much less non-Lehigh student traffic during the week. Lehigh students seemed to car-pool more while they were on campus and especially on the weekend, because they weren't going to classes. When students travel to class many do it alone because they may have back-to-back classes and can't car-pool both ways with other students due to schedule conflicts. Overall, I think that car-pooling is the best method to decreasing the amount of traffic on campus since from our results it is proven that the majority of traffic is from cars and not buses or outside vehicles. This will also help to alleviate the parking situation, which is not in line with our schools traffic pattern. On any given day three hundred or more cars could pass in front of the library in any hour. If only half of these people parked in that

area, there would still not even be close to enough spaces for those people only in that one-hour time span. As students each year bring more cars to school than the year before, parking will become more scarce and the traffic problem will then start to rival the parking problem. As discussed later, the only way to stop this problem is to have less people driving, and those who do must carpool.

In an attempt to identify the heaviest and lightest traffic areas and ascertain a general snapshot of the traffic pattern at Lehigh University it seemed most advantageous to select a sample of around ten key intersections and traffic locations. The eight locations we chose to analyze were selected so they covered both the interior and exterior of Lehigh's campus and so that we could gauge the general direction of the traffic flow with some accuracy. The above coupled with our personal experiences regarding traffic congestion at Lehigh University resulted in the eight locations as follows:

Taylor/Packard, Fairmart Bus Stop, Zoellnor Stop, Dravo Stop, Hill Gates, Memorial/University Dr., Hillside/Thomas St., and the intersection at Middle Hill (Chi Psi). In addition, these eight locations were targeted because of their reputation as being well traveled traffic points on and around campus. After selecting these locations we were confident that it would be quite difficult to avoid passing through one of these target locations while driving either to or from campus.

Next in the decision process was the allocation of at least three hourly time slots per location. For the most part our times were selected so they would be unique to each spot. For example when looking at the intersection at Zoellnor Art Center it seemed wise to get a morning, afternoon, evening and weekend sample. Weekends and evenings are key because of performances and other extracurricular activities that occur at Zoellnor on

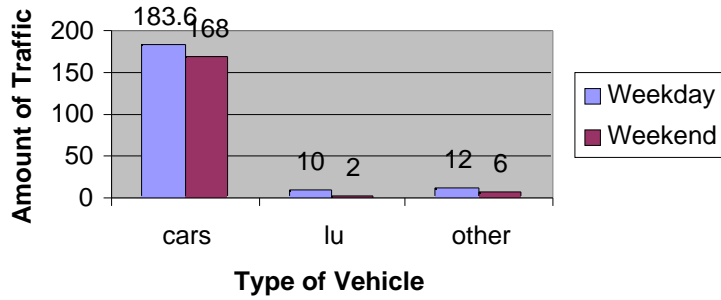
these off peak days and hours. And since this intersection is a gateway to Rausch Business Center and Packard Ave., we sampled data from both the morning and the afternoon hours so more comparative data and a wider time spread could be covered for the weekday motorists traveling both east and west through this location. Extremely busy intersections such as the Fairmart Bus stop and Taylor and Packard Ave. were assigned a noon to one o'clock time slot because this seems to be when most people are free thus these highly congested locations were hypothesized to be at their full potential during this time slot. For the same reason, the Middle Hill intersection was studied during an approximate hour between noon and one-thirty. Seeing as how students trek up to their respective housing developments during this time to eat or socialize, it seemed like a good place and time to view a distinctive and repeated traffic pattern. Intersections such as the gates to the Hill and the Dravo Stop were sampled in both the afternoon and the evening so a comparison could be seen between those who travel at night to the fraternities and sororities and the number who travel through the intersection during the day for perhaps more academic reasons. Primarily speaking, the time slots allocated to these locations were done methodically and with specific purpose as described.

Overall, we learned several things about the amount of traffic and the direction of traffic flow here at Lehigh. After choosing the eight most popular intersections, we were able to conclude the when and why the busiest time periods occurred. We found the most traffic occurred in the peak afternoon hours, and the most traffic was on a Friday afternoon. A reason for the high afternoon traffic is drivers looping around streets and intersections because they are searching for a parking spot. There are only a few streets to park on the lower campus in front of academic buildings and only one parking garage

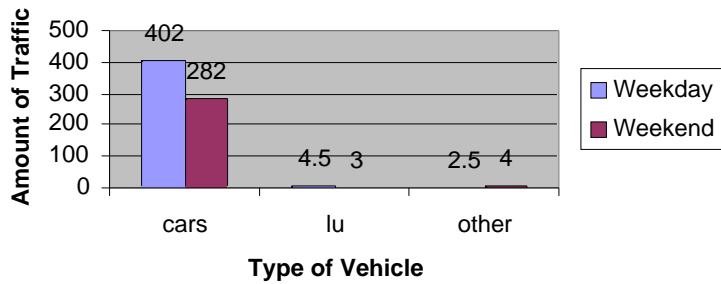
so many people circle the area several times before they find a spot. Also we discovered that the weekday travel was at a much higher frequency than the weekends due to classes and business hours. On the weekend we noticed how there was much more carpooling and the intersections were not as crowded. Also during the weekend there were less Lehigh affiliated vehicles due to different bus schedules and trucks not delivering on weekends.

In addition, there were many single passenger drivers in each of the intersections observed. The single drivers outweighed the multiple passengers at most of the time periods. We realized there needs to be an incentive for drivers to carpool because right now there are not many students who engage in it. We became aware of how important it is to emphasize carpooling due to the increase in pollution because of all the single passenger drivers. If there were more carpooling on this campus the traffic rate would be greatly altered to the benefit of our health. What really needs to happen to improve the flow of traffic is to decrease traffic itself. We feel that carpooling is the key to this issue. If there were to be some reward system or special lot for carpoolers this would decrease the number of cars on the road without really changing very much in the students daily life. We also considered the idea of extending driving restrictions to sophomores as well. This would decrease the driving population by one third and it would force people to carpool more often. Our last to suggestions would be our hardest to implement because of how fop a it has become to ride public transportation. We recommend that TRACS/Bus schedules be printed and distributed around campus. There should also be greater availability of the public transportation at school as well as adding additional stops on the bus route to greater assist student needs on campus.

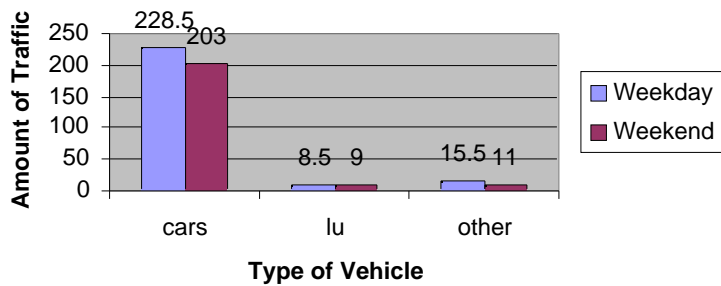
Memorial / University Traffic Distribution



Taylor/Packard Traffic Distribution



Dravo Traffic Distribution



Gates to Hill Traffic Distribution

