

# ***The Pavement Conditions Around Xi'an Jiaotong Liverpool University Town and Suggestions for Improvement***

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**Abstract:** Suzhou, known as the Land of Fish and Rice, is located in the middle of the Yangtze Delta in southern Jiangsu Province. Xi'an Jiaotong Liverpool University, located in the city of Suzhou, is currently the largest Sino-foreign cooperative university in China, with a campus built with modern infrastructures and an independent environment. However, with an increased number of citizens traveling to the university, as well as night market culture being popular at the campus, the road at the campus has been considered to become congested and accident-prone. Hence, this work evaluated the existing road construction, and the road conditions during daytime and nighttime at the university, and analyzed the possible causes of traffic jams and accidents at the campus, such as lack of driving skills for people, or weak road conditions, which further give suggestions to avoid traffic jam, such as improve road signs, construct multi-usage road, and more parking lots with advanced parking system.

**Keywords:** pavement conditions, Xi'an Jiaotong Liverpool University, suggestions

## **1. Introduction**

In the day-to-day world, road accidents have caused high mortality and morbidity rates. For example, some victims end up paralyzed or left to suffer for the rest of their lives with some major trauma. The only way to surpass these situations is by being responsible for one's life, providing safety for their betterment. People are being subjected to various rules by the government to reduce and make people aware of the disastrous nature that could occur due to such circumstances, so as citizens, we should be responsible for following the rules and regulations and abide by them.

Every country's government has taken several steps to provide safety to the citizens by imposing various laws regarding road accidents [1]. The road surface of Xi'an Jiaotong Liverpool University Town in China has taken many efficient procedures to reduce any damage to the citizens who visit the university. This benefits from proper urban planning systems arranged by the government to set up people to follow the rules.

This study describes road features and existing problems of Xi'an Jiaotong Liverpool University and proposes suggestions.

## 2. Background

### 2.1. Suzhou City

Suzhou is located in the middle of the Yangtze Delta in southern Jiangsu Province. This ancient city was built in 514 BC, with more than 2500 years of history. This city is well known as the Land of Fish and Rice due to its climate, land condition and rice products with dense lakes. This area is like a water city and a paradise of the earth. Due to its classic garden and grand canal system, and the distinctive features of the past remain the same today, it is listed as a world cultural heritage. The city's double chessboard layout, with 'streets and rivers running side by side, waterways and land routes running parallel', has been preserved intact.

The mild climate makes the city a desirable destination throughout the year. As the saying goes - 'The gardens south of the Yangtze River are the best in the world, and Suzhou Gardens are the best of them all'. These parks are not only highly acclaimed for their sheer number but also for their captivating natural beauty and harmonious construction. There are currently more than 60 parks in the city intact, the image below is the most famous park in Suzhou, known as the Humble Administrator Park (Figure 1).



Figure 1: Humble Administrator Park.

### 2.2. Xi'an Jiaotong-Liverpool University

Xi'an Jiaotong Liverpool University is located in the historic and cultural city of Suzhou, with advanced school education and technological development technology, and a campus area of 407000 square meters (Figure 2).

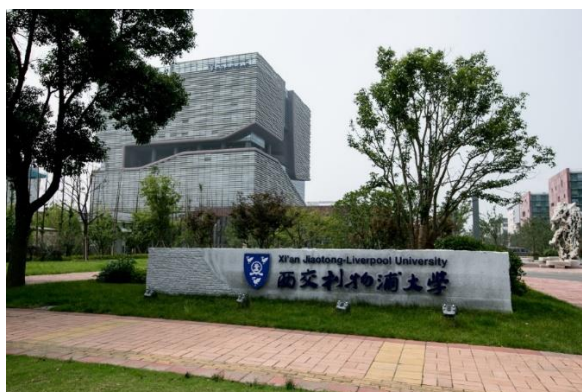


Figure 2: Xi'an Jiaotong-Liverpool University.

Xi'an Jiaotong Liverpool University was founded in 2006, pioneering modern higher education and integrating the essence of Chinese and Western cultures. It is currently the largest Sino-foreign cooperative university in China. The principal stated that the official opening of the Taicang campus in Xi'an Jiaotong Liverpool University benefits the entire diocese and greatly conceals social and economic development. Under the guidance of the integration agreement, the development of Xi'an Jiaotong Liverpool University will make significant contributions to the university area of the industrial park. They strengthen and reinforce each other, leading to significant improvements in modern infrastructure, and strengthening the special road designs created to improve people's society. The colleagues also benefit from obtaining upgraded road construction sites for their convenience.

Xi'an Jiaotong Liverpool University is upgraded and constructed with the most exquisite architectural technology, providing students with comprehensive educational facilities. The geographical location of this university provides a unique and independent environment for students and Suzhou citizens, enabling them to have a sustainable environment. The surrounding roads are mainly composed of motor vehicle lanes and non-motor vehicle lanes, and in daily life, the traffic around universities is not affected.



Figure 3: School road in daytime.

From the perspective of life in the region, it is mainly college students near universities, as well as a few international students and lecture groups residing in the region. Due to the unique nature of the university environment, the internal environment of the school is beautiful without any external walls, and most tourists are also attracted. During non-holiday periods, night market culture occurs every night. Therefore, it is necessary to manage road traffic to avoid waiting in traffic congestion clearly. Therefore, roadside parking and night time functions need to be carefully arranged to balance culture (Figure 4).



Figure 4: Night time road-blocking.

### 3. Road Features and Existing Problems

#### 3.1. Road Features

The construction plan of university habitats for children and people to park and drive vehicles are been built conveniently (Figure 5). The arrangement of the parking nature has been made friendly toward the children who learn at the university to reduce harm to the students by any vehicle at their premises with mischievous drivers.



Figure 5: Daytime parking at University.

Within the past few days, we could observe many road accidents caused due to poor driving skills of drivers or errors in the infrastructure of roads by lack of skilled engineers, but if we turn towards the urban planning of Beijing it provides sufficient facts as to why they have such a low rate in road accidents.

Recently, it's been reported that weak road conditions could impact the decisions of people to lose out the normal patterns of their daily traveling. Sometimes wrong parking problems cause some accidents. When someone parked near the roadside (Figure 6), it is invisible to pedestrians and cycle users, facing accidents and injuries. Parking spaces are required to stop traffic. If parking is not done properly, it can cause traffic jams and congestion. Parking problems are often caused by roadside parking. This type of parking causes loss to the driver as well as the public, if not properly managed. Road closures lead to road reductions and hamper traffic performance [2].



Figure 6: Roadside parking.

In order to prevent such occurrences, the government of Suzhou has taken measures to develop their construction with an enormous number of well-employed engineers to surpass the current situation. The government has also implemented new restrictions to carry out a well-planned project to decrease the effect caused by road rage of certain people and traffic jams. Certain measures are being also taken into consideration with the traffic to reduce its impact and maintain consistency in speed of vehicles so as to not affect the citizens in the public travelling around. Another main factor that needs to consider is improving the public transport system to reduce the vehicle coming into the city [2]. There will reduce the parking problem as well as traffic in the city.

### 3.2. Existing Problems

It is noted that transportation needs parking space; otherwise, it could block the roads due to roadside parking and traffic connections. This university's roads are built with a variety of modern facilities for withdrawing a better path, reducing road accidents and their risks. The government points out a path to enhance social safety by improving their technology as well as by imposing laws meant to reduce mischievous road accidents.

Citizens of any area are been used to parking their vehicles at a convenient place without any further reference, which could lead to some drastic consequences of unexpected accidents. Parking vehicles on the roadside also leads to traffic jams, which increase the rate of collisions of vehicles due to the frustration people get by staying in vehicles without any proper transportation infrastructure [3].

Even though a government is capable of punching down the brakes on citizens not parking, still it would occur as a worse scenario for the citizens not being able to park their vehicles at any place. Even when a lane is been reserved for parking it still acts uncertain for people with the daily dose of occupants that go to their relevant destinations for being able to surpass such lanes with ease at heavy working hours. This can use different technics to avoid roadside parking by constructing parking buildings and parking spaces for users.

The night market is one of the unique cultures and now becoming very popular among the countries [4,5]. The people or students roaming around and tasting food and releasing their stress, which is gained during the day working (Figure 7). This is a unique life experience and we need to maintain it without damaging society and road users at night time. The night market on the roadside is one of the most common experiences in Suzhou go through due to the road being completely blocked due to the buyers and sellers. Even though it provides a surrounding for citizens to get better deals at the market, it still acts as a pain to the residents who live there and for the citizens who travel. It is not any error in the infrastructure or the government for not implementing any laws against it but just some area for citizens to enhance a free trade with their economy they process.



Figure 7: Road in night time and daytime.

The night market completely blocks the road and couldn't move any vehicle, it is suggested to use a separate road or alternative road at night time. This could consume more time for road users at night time and disturbance night time users. In different communities, the night time market is useful for night culture and benefits buyers and sellers. It needs to think about how we can manage both without disturbing one kind of it.

#### 4. Suggestions

Traffic problems act as major problems all around the globe, and they have been severely increased in modern society with such a densely populated metropolis [6,7]. The rise of vehicles made causes road accidents to increase even further. An anonymous no of people are been affected by such incidents by being injured or some being reported dead [8,9]. So the government of Suzhou has performed their best to provide the environment with a safe place for the citizens.

Considering roadside parking gain a lot of problems and violations, at the same time it could reduce the usage space for vehicles and accidents may occur for pedestrians, cyclists, and other users. There are several ways to avoid this problem. One is we can reduce the vehicle coming to the location by improving public transport by using the park and ride method which is used in some countries to avoid traffic congestion in main cities. Second is the public parking area for vehicles, which can be arranged if there are more lands. otherwise, we can use parking buildings with charges. Thirdly, we can use a fine system for public parking nearby the road. This solution may not improve the quality of life, if someone could not find a parking space. However, it can reduce the violations.

It is suggested to use some other technic to benefit all users, by converting the road multi usage road. Which is parking plus road for pedestrians, cycle users, and vehicles moving (Figure 8). Marking lines and the space could be allocated for different functions could guide for better usage of the road. And we can use some parking fee system to reduce the unnecessary parking in these locations. Those are some suggestions for better road usage in the university by using same space without expending money on development.



Figure 8: Well-organized road with parking.

Another main problem is the night market on main roads, those are not permeant structures, and many of them are mobile carts (Figure 9). Some are changed vehicles as small food processing and selling stole. To reduce the road traffic and congestion due to this night market, we can identify different methods such as allocating some special road which is not more congested by traffic can be used for this purpose. It is suggested to select one or two roads in the university area and make night time traffic plan and aware the users regarding this. The following figure shows that the night market

is organized according to road conditions. Mobile carts and modified vehicles for as stole are used for selling food and other items.

This can keep stress releasing night time enjoyment and avoidance of traffic due to the night time market by suggesting alternative roads.



Figure 9: Organized night market.

## 5. Conclusion

The road structure around Xi'an Jiaotong Liverpool University makes a great impact as I mentioned earlier for better convenience for citizens as well for the colleagues who educate at the university. The university itself has taken steps to build impressive parking to make the university a reliable asset to the government by making it a peaceful environment for whoever visits the university or any colleague who educates at the university.

The advancement in their planning considers the basic requirements of citizens to make them satisfied with the basis of life when traveling on a road. It also provides the foundation for sustainable economic growth. The advancement of technology is wisely taken under control by the Beijing Government to provide citizens with the freedom to travel on roads without any risk.

The roads around Xi'an Jiaotong Liverpool University are built in a significant way that it does make a great impact for a relaxed travelling experience beside the roadside. Within China, roads play a major role in its advancements since it enhances and provides convenience for its citizens to travel with no traffic jams or neither road accidents.

Even though the road architecture is advanced, there would be certain issues when referring to different perspectives of people. Going through such an advanced road structure is quite impressive but still doesn't make it 100 percent harmless nature. There would be any instance of a spontaneous road accident due to the carelessness of people or due to some sort of error in the perfection of architecture.

As for the discussed nighttime road and daytime road usage, the suggestions are as follows.

Here we first discussed the road network and overall area picture near the Xi'an Jiaotong Liverpool university, to understand the road uses in daytime and nighttime. In both periods, two different cultures should be ongoing and need to continue without disturbing them. Therefore, the most feasible method is to keep both by avoiding problems gain due to changes. First, we discussed the legal condition and laws applicable to the road users and vehicle owners. In addition, we suggest using the road as a parking space and some other suggestions for avoiding conflict between the users. Finally, we argue using some simple technics to avoid problems without wasting money. It could be used to clearly define the purpose of the road.

Considering the nighttime culture, it is a requirement in now a day to attract people for nighttime living. That could benefit sellers' life conditions and same time stress release during daytime work. However, here we need to consider the people living in this area. If this night culture is disturbing their life, it needs to be considered carefully to reduce such damage to living conditions. We propose to keep this night culture up to 11.00 pm or midnight after that, it needs to finish for a calm environment. Conflict should not occur among the people.

This city is a world cultural heritage city listed by UNESCO, therefore we need to protect the heritage without disturbing them, and every development should be under the recommendation of the Suzhou government. Therefore, both nighttime culture and daytime road safety should be under the regulations. As people are busier with their schedules and they are hurrying to work, the roads must be clear with the suggestions. That could lead to the esthetic beauty of the city and less congestion in the city. Considering nighttime culture create more benefit because as I said previously it will benefit sellers well as buyers because they can take foods and other items at very cheap price from the night time market and university student can earn some money during this night time market and save some money by eating there.

The suggestion might be appropriate for this city, as it could modify the city by keeping the same development without constructing new things. In addition, modifying the existing system by using new kinds of thinking and technical ways could lead to reducing traffic jams and road accidents. At the same time improving the architectural view of the city without disturbing to cultural heritage city.

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