Critical Study of Road Traffic Noise and Land uses of Larkana City

Imtiaz Ahmed CHANDIO
Department of City and Regional Planning, Mehran University of Engineering and Technology, Jamshoro, Pakistan, imtiazchandio2000@yahoo.com

Khan Muhammad BROHI
Mechanical Engineering Department, Mehran University of Engineering and Technology, Jamshoro, Pakistan, kbrohi@hotmail.com

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Abstract: Land-use activities and transportation activities play an important role in function of city. Land-use planning is a most important factor of urban environment and management of cities, which provides legal framework for future development and improvement of urban environment. In this study, Larkana city was selected as the study area where the goal and objectives were achieved. The goal is to find sustainable development approach in planning cities to reduce road traffic noise pollution at Larkana City. The objectives are the study of current road network system along with traffic characteristics, traffic flow volume and land use pattern. Second, is to monitor the traffic noise level at various points of the city.

The methodology of this study was accomplished in main following stages, which are literature review, traffic noise data was collected by using Digital Sound level Meter (AR824) and flow of traffic volume was collected by survey. These results may be useful inputs in the planning of accessible transportation and implementation sustainable land use planning in Larkana city.

Keywords: land-use, sustainable, accessible

1. INTRODUCTION

The environmental quality of developing cities is gradually being degraded by an incessant growth in the number of vehicles, population and the ever-expanding road infrastructure, resulting in increases in traffic noise. Environmental managers and urban planners are facing a big challenge undertaking to manage road traffic noise in cities [1]. Noise is intolerable level of sound that creates irritation, hampers mental and physical peace, and may induce severe damage to the health. Along with the increasing degree of air and water pollution, noise pollution is also rising as a new warning to the inhabitants of Larkana city. Exposure to high level of noise may cause severe stress on the auditory and nervous system of the city dwellers, particularly the children. Road traffic is one of the main sources of noise pollution in urban areas [2]. Noise pollution is an interfering air-pollutant which contains both auditory and a host of non-auditory effects on the exposed population [3]. Traffic noise along roads is constantly increasing; with the expected growth in future traffic use, mostly near developing urban areas. Road traffic noise emission from various transportation modes have become a foremost cause to environmental great annoyance they cause to surrounding residents. Traffic noise is generated at three stages: poor condition of engine, exhaust, and tire-pavement interface [4]. Table 1.1 states that national environmental quality standards for motor vehicle exhaust and noise of Pakistan.

<table>
<thead>
<tr>
<th>S. No</th>
<th>Parameter</th>
<th>Standards (maximum permissible limit)</th>
<th>Measuring Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Smoke</td>
<td>40% or 2 on the Ringelmann scale during engine acceleration mode</td>
<td>To compare with Ringelmann Chart at distance of 6 meters or more.</td>
</tr>
<tr>
<td>2</td>
<td>Carbon monoxide</td>
<td>Emission Standards: New Vehicles</td>
<td>Under idling conditions: Non dispersive in infrared detection through gas analyzer.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Used Vehicles</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4.5%</td>
<td>6%</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Noise</td>
<td>85 dB (A)</td>
<td>Sound meter at 7.5 meters from the source.</td>
</tr>
</tbody>
</table>

Source: Position paper for environmental quality standards of noise in Pakistan.
2. GOAL AND OBJECTIVES

The following main goal and objectives of this study are as follows:

The goal of this study is:

“To find sustainable development approach in planning of cities to reduce road traffic noise pollution”

To achieve this goal, the objectives of this study are:

i. Baseline study of road network system along with study traffic characteristics, traffic flow volume and land use pattern.

ii. To monitor the traffic noise levels various points of the city.

3. METHODOLOGY

This study was accomplished into main four stages, which are literature review, data collection and analysis and lastly the findings of the study.

Data was collected to the day time at nine points of city along with busiest roads by using Digital Sound level Meter (AR824). Noise levels were recorded 3 meter at the distance from source.

4. STUDY AREA

Larkana city is the headquarters of Larkana District. Centrally located with respect to its district, Larkana lies on 27º 33´-north latitudes and 68º 12´-east longitudes. The city is also located in upper Sindh at a distance of about 300 km to the north of Hyderabad and about 460 km from Karachi. Karachi is the capital city of Sindh province which is located southern part of the Pakistan. Larkana is the third largest populated city of Sindh. Figure 4.1 presents location map of Pakistan.

Larkana has sustained and accelerated rate of growth during the 1961-1981 period. The population of Larkana is increased from 123,000 in 1981 to 253,908 in 2000 and recording an average yearly growth rate is 3.50%.

Dramatic increase of population, the no. of vehicles has increased to large extent. The existing no. of Rikshaw is 3000 and Chingchi is 8000 only within the city. The data is collected by the union office Rikshaw and Chingchi.

Since Larkana city is no industrial zone as such the people has emphasized on the use of vehicles (Rikshaw and Chingchi) for their source of income.

5. SUSTAINABLE LAND USE PLANNING AND TRANSPORT

Since the last two decades the term ‘sustainable’ has been increasingly integrated with ‘urban’ in a variety of ways such as sustainable cities [5], urban sustainability [6], sustainable urban development [7] and sustainable urbanisation [5]. According to the World Commission on Environment and Development [8] sustainable development is one that meets the needs of the present without compromising the ability of future generations to meet their own needs.

In the field of land use planning, transport and environment policy, there is extensive understanding that integrating decisions across these sectors is vital for sustainable development. For example, the final
Sustainability requires that policy-making for urban travel be viewed in a holistic sense: that planning for transport, land-use and the environment no longer be undertaken in isolation one from the other… Without adequate policy co-ordination, the effectiveness of the whole package of measures and their objectives is compromised [9].

Transport is an important element of any city and it should be seen as a fundamental part of the supplementary sustainable and healthy built environment, not separate from it. Sustainable land use policy plays sustaining role in improving the quality of life in the city and significant fundamentals are related with planning and designing the city, such as around urban form, density, settlement size, mixed land use developments, the location of housing and neighbourhood design to determine the characteristics of the sustainable city [10].

6. MESSAGES FROM RIO FOR LAND USE PLANNING

The procedure of raising public awareness around the world concerning the need to apply criteria of sustainable development was basically set in motion at the Rio de Janeiro Summit in 1992. There it was decided that the most suitable context for fostering the process is the local level, and the Local Action Plan forms a basic element in this process [11].

From various aspects, mostly in developing countries, the importance of land use planning by local development authorities is partial because of less concentration controlling inadequate development which is needed holistic role in sustainable urban development.

The Rio Earth Summit proclaims twenty seven principles which would make possible the evolution to sustainability while Agenda 21 declares a integral programme of action covering developmental and environmental issues in an integrated approach. Some principles from the Rio Declaration and chapters of Agenda 21 can be translated into messages for urban planning, the most directly related as illustrated in Table 6.1. In brief, it considers a sustainable land use planning and development which should achieve environmental sustainable development; environmental protection shall comprise an integral part of the development process [12].

### Table 6.1. Sustainable development process

<table>
<thead>
<tr>
<th>Planning Stages</th>
<th>Messages from Rio</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Formulation of goals and objectives</td>
<td>• Should be ‘environment-led’</td>
</tr>
<tr>
<td></td>
<td>• Strong comprehensive planning laws which as part of a wider body of</td>
</tr>
<tr>
<td></td>
<td>environmental law, reflect modern understandings of natural processes.</td>
</tr>
<tr>
<td>2. Survey, prediction and analysis</td>
<td>• Must address the meaning and consequences of sustainable development.</td>
</tr>
<tr>
<td></td>
<td>• There should be integrated planning and management resources.</td>
</tr>
<tr>
<td>3. Generation and evaluation of alternative plans</td>
<td>• Environmental statement should be used as a principal means of minimising damage</td>
</tr>
<tr>
<td></td>
<td>and uncertainty.</td>
</tr>
<tr>
<td></td>
<td>• Should include environmental resource management.</td>
</tr>
<tr>
<td></td>
<td>• Citizen participation in planning</td>
</tr>
<tr>
<td>4. Decision, implementing and monitoring</td>
<td>• Information provision, community empowerment and subsidiary in planning.</td>
</tr>
<tr>
<td></td>
<td>• Institutions and non-governmental organizations play effective and efficient</td>
</tr>
<tr>
<td></td>
<td>roles in environmental planning.</td>
</tr>
<tr>
<td></td>
<td>• Effective education, increased public awareness and training in citizen</td>
</tr>
<tr>
<td></td>
<td>participation.</td>
</tr>
</tbody>
</table>

*Source: Fozia Johor (2004)*

7. NOISE EFFECT ON HUMAN HEALTH

The identification of the noise has been becoming sever health problems such as physically and psychologically which considers a significant human health problem. Presently noise is an urban environmental problem and is taking seriously matter in urban society due to growth of transportation. Noise is an indication of an irritation, which effects to the human performance and actions. It brings human character change [13].

In many researchers has found road traffic noise has a close health relationship on human such as; noise annoyance, hypertension, heart problems, and weak effects on health problems tiredness, headache and sore throat respectively [14].

Noise annoyance is a major public health problem in urban areas. Noise annoyance is a form
of psychological stress. Noise, an unwanted sound, causes serious psychological, physiological and social effects: feelings of disturbance, stress reactions and sleep disorders, some hormonal changes, increased blood pressure, increased risk of myocardial infarction, and impairment of well-being and general quality of life [15].

8. MITIGATION OF ROAD TRAFFIC NOISE POLLUTION

On the basis of the study carried out for the problem of road traffic noise pollution in the Larkana city and developing countries cities, it can be stated that there is a need of the sustainable national development control approach for noise control. Planning policy guidance and control should be integrated different type transport with land use planning and with policies for accessing job opportunities for the people. Land use planning has important role in integrated public transport and by shaping the pattern of development and influencing the locations. Planning may reduce the need to travel and it may help to promote walk able cities.

9. RESULTS

On the basis of methodology mentioned in this paper couples of figures (9.1 and 9.2) have been into account. Figure 9.1 depicts maximum traffic noise levels recorded in dB (A) at Sheikh Zaid Woman Hospital road was 96 dB (A) and minimum 73 dB (A), which has been highly exceeding from National Environmental Quality Standards Noise of Pakistan.

Similarly, figure 9.2 shows that the traffic noise levels recorded in dB (A) at Lahori Mohalla road was between 90 to 100 dB (A) and minimum 73 dB (A) that presents severe condition of road traffic in terms of noise pollution.

10. CONCLUSIONS

In conclusion, land use planning control helps the better environment in the city, which provides convenience, accessibility and optimal public facilities planning. Study indicates that local authority can play important role to control land use development and sustainable transport. It is also concluded that traffic noise level as recorded at nine various locations. The lowest value of noise level ranges from 70 to 80 dB (A) and the highest value were recorded mostly 100 to 101 dB (A), which reflects the level of traffic noise people are facing.

Measurements of traffic noise levels in Larkana city were higher than maximum limit from 85 dB (A) National Environmental Quality standards of Noise in Pakistan.

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REFERENCES


