Current Situation and Prediction of Noise Barrier Market in Korea

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ABSTRACT

The effort to reduce the noise from the roads has continued. These days, efforts to control the noise such as quiet pavement or car noise control continue. In order to reduce noise between the road and the surrounding area, noise barriers are mainly used. Therefore, the study is intended to identify the current situation of noise barriers market in Korea. Based on the current situation on recently installed noise barriers, market prediction is made in this study. Based on assumption that the service life of noise barrier is 10 years, the market is evaluated in terms of maintenance. According to the forecast till 2050, noise barrier market in Korea is expected to enter the steady-growth stage, indicating the great market potential should be supported by developing technology of the alternative noise barrier in the near future.

Keywords: Noise Barrier, Soundproof, Noise Barrier Market, Maintenance, Prediction, Korea Market

INTRODUCTION

Noise barriers have been installed to reduce the road traffic-generated noise and these have been developed in a way of changing soundproof materials. Noise barrier of which length was 2km till 1988 has reached 1,317km as of 2011. The height and length of noise barriers has been getting higher and longer in a bid to improve the noise reduction effect.

Furthermore, the effort to reduce the traffic noise has still been continued because of enhanced living standard. Included in various technologies developed to reduce noise are quiet pavement and noise control of the vehicle. But, other technology development than noise barrier has yet to be sufficient.

Hence, the study is aimed at predicting the domestic noise barrier market in Korea, thereby identifying the market potential. Such prediction effort is expected to help activate the domestic market in noise barrier industry.

CURRENT SITUATION OF KOREA’S NOISE BARRIER MARKET

2.1 Year-on-year Status of Noise Barrier Market

Noise barrier wall in Korea has been built at the district where the noise level is legally regulated such as school zone or residential area as part of the effort to reduce the traffic noise. (Table 1)

In 2011 alone, 43.3km-long noise barrier wall was provided to 107 locations for which U$59.18 mil was spent. Noise barrier wall built till 2011 totaled 4,904 in number or 1,316km in length. Thought it’s been slow down recently, the cost for noise barrier wall would rather increase, should the need for repairing and rebuilding be considered.

Table 1: Year-on-year Status of Noise Barrier Market [1]

<table>
<thead>
<tr>
<th>Category</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>Average Annual Growth Rate</th>
<th>Total Accumulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site</td>
<td>278</td>
<td>235</td>
<td>151</td>
<td>208</td>
<td>92</td>
<td>107</td>
<td>-17.4%</td>
<td>4,904</td>
</tr>
<tr>
<td>Length(km)</td>
<td>78.6</td>
<td>67.2</td>
<td>54.6</td>
<td>66.0</td>
<td>51.7</td>
<td>43.3</td>
<td>-11.2%</td>
<td>1,315.8</td>
</tr>
<tr>
<td>Install Cost (10,000$)</td>
<td>6,919</td>
<td>4,174</td>
<td>4,848</td>
<td>9,647</td>
<td>6,674</td>
<td>5,918</td>
<td>-3.1%</td>
<td>105,414</td>
</tr>
</tbody>
</table>
Table 2: Noise Barrier Wall by Height in 2011 [1]

<table>
<thead>
<tr>
<th>Category</th>
<th>&lt; 2m</th>
<th>2m~3m</th>
<th>4m~5m</th>
<th>6m</th>
<th>&gt;7m</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rate</td>
<td>2.0%</td>
<td>20.5%</td>
<td>25.6%</td>
<td>42.6%</td>
<td>9.3%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Install Length(km)</td>
<td>0.8725</td>
<td>8.8610</td>
<td>11.080</td>
<td>18.4310</td>
<td>4.0410</td>
<td>43.2855</td>
</tr>
</tbody>
</table>

Fig 2: Noise Barrier Wall by Height in 2011

3. ANALYSIS METHOD

Analysis method adopted in this study is as follows.

Survey of Noise Barrier Market Trends in Korea

Pattern Analysis (Average Annual Growth Rate, etc.)

Prediction of Noise Barrier Market

Prediction of New Install Noise Barrier

Prediction of Maintenance Noise Barrier

Conclusion

Fig 3: Analysis Process
4. MARKET PREDICTION

Korea’s noise barrier wall market is forecast into two categories, new installation and repair & maintenance.

4.1 Estimate of the Cost for New Installation

The figures till 2011 was based on actual measurement and the forecast after 2011 was made based on Geomean annual growth rate.

For the walls to be newly built, annual average growth rate, –3.1% from Table 1 was applied.

The walls are expected to be built at 60 locations in 2014 and the cost is estimated at US$53.88 million.

When applying the assumed rate till 2040, total US$998.05 million is estimated to be required for new installation. (Table 3.)

Table 3: Prediction of New Installation of Noise Barrier Wall

<table>
<thead>
<tr>
<th>Category</th>
<th>Average Annual Growth Rate</th>
<th>2011</th>
<th>2014</th>
<th>2017</th>
<th>2020</th>
<th>2023</th>
<th>2026</th>
<th>2029</th>
<th>2032</th>
<th>2035</th>
<th>2038</th>
<th>2040</th>
<th>Total Accumulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site</td>
<td>-17.4%</td>
<td>107</td>
<td>60</td>
<td>34</td>
<td>19</td>
<td>11</td>
<td>6</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>345</td>
</tr>
<tr>
<td>Length (km)</td>
<td>-11.2%</td>
<td>43.3</td>
<td>30.3</td>
<td>21.2</td>
<td>14.8</td>
<td>10.4</td>
<td>7.2</td>
<td>5.1</td>
<td>3.5</td>
<td>2.5</td>
<td>1.7</td>
<td>1.4</td>
<td>258.6</td>
</tr>
<tr>
<td>Cost (10,000$)</td>
<td>-3.1%</td>
<td>5,918</td>
<td>5,388</td>
<td>4,906</td>
<td>4,467</td>
<td>4,067</td>
<td>3,703</td>
<td>3,372</td>
<td>3,070</td>
<td>2,795</td>
<td>2,545</td>
<td>2,391</td>
<td>99,805</td>
</tr>
</tbody>
</table>

Notice: An average annual growth rate used to Geomean ratio

4.2 Estimate of Maintenance Cost

Based on total length of noise barrier wall which has been built since 2006 as indicated in Table 4, prediction of noise barrier wall market was performed with the assumption of 10-year endurance period. Assumptions used in estimating the maintenance cost include the followings.

- Assumption of endurance period, 10 years.
- To estimate the annual maintenance cost, the length of wall built for 10 years was calculated and then the cost per km was estimated.
- Noise barrier maintenance cost($10,000/1 year) = Installed length for 10 years × Unit cost
- Unit cost = Installation cost / km (Install cost = Mean value from 2006 to 2011)

Subject to Unit cost = \[(6,919/78.6)+(4,174/67.2)+(4,848/54.6)+(9,647/66.0)+(6,674/51.7)+(5,918/43.3)\]/6 = 1,080,000 $/km

On assumption that the wall built in 2006 will be repaired or rebuilt beginning in 2016, it is estimated to be $84,890,000 (78.6km × $1,080,000).

For the wall to be newly built, total till 2041 was estimated and 10 years of durability period was incorporated to estimate the maintenance cost till 2050.

Table 4: Prediction of Maintenance Cost

<table>
<thead>
<tr>
<th>Noise Barrier Installation Year</th>
<th>Install Length (km)</th>
<th>Durability Period</th>
<th>Maintenance Year</th>
<th>1st Maintenance Reinsta ll Length (km)</th>
<th>Cost (10,000$)</th>
<th>2st Maintenance Reinsta ll Length (km)</th>
<th>Cost (10,000$)</th>
<th>3st Maintenance Reinsta ll Length (km)</th>
<th>Cost (10,000$)</th>
<th>4th Maintenance Reinsta ll Length (km)</th>
<th>Cost (10,000$)</th>
<th>Total Maintenance Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>78.6</td>
<td>10 years</td>
<td>2016</td>
<td>78.6</td>
<td>8,489</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>8,489</td>
</tr>
<tr>
<td>2007</td>
<td>67.2</td>
<td></td>
<td>2017</td>
<td>67.2</td>
<td>7,258</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>7,259</td>
</tr>
<tr>
<td>2008</td>
<td>54.6</td>
<td></td>
<td>2018</td>
<td>54.6</td>
<td>5,897</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>5,897</td>
</tr>
<tr>
<td>2009</td>
<td>66.0</td>
<td></td>
<td>2019</td>
<td>66.0</td>
<td>7,128</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>7,128</td>
</tr>
</tbody>
</table>
4.3 Analysis Result

For the prediction of noise barrier market, new installation cost was added to maintenance cost. According to the forecast of noise barrier wall market from 2016 till 2050, new installation cost was estimated at US$1,094,070,000 while maintenance cost was US$2,446,050,000 which totaled US$3,540,120,000. (Table 5.) Also, according to the analysis result, Korea noise barrier market is expected to maintain a steady growth. (Figure 5.)

Table 5: Prediction of Total Installation Cost
(Unit: $10,000)

<table>
<thead>
<tr>
<th>Category</th>
<th>2016</th>
<th>2020</th>
<th>2024</th>
<th>2028</th>
<th>2032</th>
<th>2036</th>
<th>2040</th>
<th>2044</th>
<th>2048</th>
<th>2050</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Install cost</td>
<td>5,062</td>
<td>4,467</td>
<td>3,942</td>
<td>3,479</td>
<td>3,070</td>
<td>2,709</td>
<td>2,391</td>
<td>2,110</td>
<td>1,749</td>
<td>109,407</td>
<td></td>
</tr>
<tr>
<td>Maintenance cost</td>
<td>8,489</td>
<td>5,584</td>
<td>3,270</td>
<td>7,926</td>
<td>5,410</td>
<td>11,847</td>
<td>7,668</td>
<td>4,564</td>
<td>7,815</td>
<td>244,605</td>
<td></td>
</tr>
<tr>
<td>Total cost</td>
<td>13,551</td>
<td>10,051</td>
<td>7,212</td>
<td>11,405</td>
<td>8,480</td>
<td>14,556</td>
<td>10,059</td>
<td>6,674</td>
<td>9,564</td>
<td>354,012</td>
<td></td>
</tr>
</tbody>
</table>
As shown in Fig 5, noise barrier wall market regained its strength every 10 years which corresponds to endurance period of the wall. Since the prediction was made beginning in 2016, a 10-year cycle was established. (for instance, 2016, 2026, 2036...) Thus when base year and endurance period differ each other, the pattern shown in Fig 5 will remain unchanged, through base year might be changed. Different endurance period would produce different outcome accordingly.

5. CONCLUSION

In this study, domestic noise barrier wall market was predicted from two different aspects which are new installation and maintenance.

For the wall to be newly built, annual average growth rate calculated from the data during 2006 till 2011 was applied to the prediction. For the wall requiring maintenance, the cost was estimated based on assumption that the endurance period is 10 years. Though the growth rate tends to decrease, the number of wall in need of maintenance would maintain a steady growth.

Consequently, domestic noise barrier wall market has shown a similar pattern of a 10-year cycle, indicating a sign of steady growth. New installation would be on the rise while maintenance demand would grow further. Viewing such trend, development of alternative technology is more important, which would pave the foundation to predict the new market in better way.

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REFERENCES


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