Tunnels

Development of Road Tunnel Maintenance and Management Plans

Building on its long track record and rich experience in asset management, CTI Engineering can help you establish a systematic method of maintenance and management of road tunnels that allows you to efficiently utilize these facilities.

What is Maintaining and Managing Road Tunnels?

[Purpose of the development of a maintenance and management plan]
- Ensure the safety and reliability of local road networks.
- Develop a maintenance cycle based on maintenance and management plans for each tunnel.
- Reduce the inspection and repair cost of individual tunnels.

What our technologies have to offer

- Our staff with professional expertise in various fields develop workable plans.
- Having developed individual facility (long-term repair) plans for various kinds of social infrastructure as a general consultant, we are fully aware of the current status and issues of each kind of infrastructure.
- We create easy-to-understand materials for you to use in presenting your plans to financial authorities and taxpayers on how you will work in developing mid- and long-term cost forecasts and necessary measures.
- We propose how you can establish systems and train personnel to carry out and improve your plans on an ongoing basis.
Development of Road Tunnel Maintenance and Management Plans (cont.)

[Defining repairing priority] ✅ Systematic maintenance and management

- We determine the priority of individual tunnels concerned according to their type, size, and in-service period, as well as onsite characteristics, road type, traffic volume, importance of the road, etc.
- The repair priority is determined by combining the above order of priority with the results of periodic inspections.

[Defining repairing priority] ✅ By building a database and developing a servicing cycle by employees

(i) Tunnel database

(ii) Calculation of LCC of individual tunnels

- Evolution of soundness
- LCC

(iii) Calculation of future cost of tunnel groups

- Future cost by different scenarios, such as preventive maintenance and corrective maintenance

(iv) Output of a list of maintenance and management plans

- Tunnel database
- Calculation of LCC
- Calculation of future cost
- Output of maintenance and management plans

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Development of Road Tunnel Maintenance and Management Plans (cont.)

[Defining repairing priority]

Defining repairing priority

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- Systematic maintenance and management

- By building a database and developing a servicing cycle by employees

- Tunnel database
- Calculation of LCC
- Calculation of future cost
- Output of maintenance and management plans

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Development of Road Tunnel Maintenance and Management Plans (cont.)

(iv) Output of a list of maintenance and management plans

- Tunnel Route Length(m) Const. year in service Last inspected in

<table>
<thead>
<tr>
<th>Tunnel</th>
<th>Route</th>
<th>Length</th>
<th>Const. year</th>
<th>in service</th>
<th>Last inspected</th>
<th>Measure and period</th>
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<td>34</td>
<td>2014</td>
<td>Patch plate work</td>
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Future maintenance cost (100 million yen/year)

- Determine the order of priority among maintenance, management, and repair works