

## **Use of recycled macadam for road improvement work**

“With regard to road improvement construction, the Board demanded that improvement measures be taken to save construction costs by promoting wider use of recycled crushed stone and by adopting environment-friendly and economical construction design, resulting in the measures taken by the auditee”

### (1) Summary of road improvement construction works

The State and local authorities carry out a number of road paving and construction works every fiscal year as part of road maintenance and improvement projects. In these works, crushed stone is used as aggregate for road bases in road paving and as foundation material for construction. Cobblestone is also used as a foundation material in construction. There are two types of crushed stone: that produced by crushing natural stone (“new crushed stone” hereinafter), and that produced by recycling concrete blocks from building demolition (“recycled crushed stone” hereinafter). Cobblestone is produced from natural stone, as is the case with new crushed stone, and there are no recycled cobbles.

The Ministry of Land, Infrastructure, Transport and Tourism (“MLIT” herein after) has published guidelines on recycling promotion, providing that, in principle, recycled crushed stone of satisfactory quality should be used when there is a recycling center that produces recycled crush stone within 40 kilometers of the construction site.

In fact, the number of recycling centers has substantially increased in recent years, as has the number of construction sites using recycled crushed stone. Recycled crushed stone is, generally, cheaper than new crushed stone or cobblestone. Furthermore, crushed stone for use in public works construction is produced in accordance with established quality standards equivalent to those for new crushed stone.

### (2) Results of audit

Of all road paving works conducted during the period from Fiscal 2006 to 2008, a total 341 works were audited, the breakdown being: 53 works conducted by three national road offices as government projects; and 288 works carried out by 19 project-implementing bodies in two prefectures as subsidized projects. In 297 works, the cost was calculated on the basis that new crushed stone would be used as aggregate for the road bases. Similarly, in 44 works conducted by two project-implementing bodies as government projects, the costs were

calculated on the basis that cobblestone would be used as foundation material for construction.

In response to an inquiry as to the reason for the use of new crushed stone and cobblestone in these works, the project-implementing bodies involved expressed concerns about the supply and the quality of recycled crushed stone.

However, given that supply of crushed stone to any construction site has become possible in recent years, and that no structural problem has been reported with regard to the work done by other project-implementing bodies using recycled crushed stone as aggregate for road bases and as foundation material for construction, it was acknowledged that recycled crushed stone should have been used, so as to ensure that these works could be carried out in accordance with environment-friendly and economical design principles.

From the modified calculation of the material cost for crushed stone, assuming that recycled crushed stone had been used instead of new crushed stone, it was acknowledged that it should have been possible to decrease the costs of the government projects by about JPY1.7 million and the cost of subsidized projects by about JPY158.20 million (inclusive of about JPY90.4 million in state subsidies). From the modified calculation of the foundation cost, assuming that crushed stone had been used instead of cobblestone, it was estimated that about JPY7.5 million in costs could have been saved.

### (3) Improvement measures taken by MLIT

In response to the audit findings, MLIT issued a notice to the Regional Development Bureaus in September 2009, instructing that, with regard to the use of crushed stone and other materials in road construction work, from both environmental and economic perspectives, priority should be given to the use of recycled crushed stone. MLIT also sent a similar instruction to prefectural governments through Regional Development Bureaus.