

Technology Development Award

Development of Tunnel Lining Technology Using Low Cement Content High Fluidity Concrete (Neuro-Crete Neo)

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Reason for the Award

There is a serious shortage of workers in the construction industry, so improvements in productivity are essential. The operation of placing tunnel lining concrete is difficult, requiring placement and compaction in narrow spaces and movement and replacement of the placement pipes. Therefore the work entails risks of faulty work such as filling defects, and labor accidents. To date some aspects of these have been prevented by the skills of experienced workers. To improve productivity and ensure quality of lining work, it is essential to apply high fluidity concrete that does not require compaction. In addition, if it is possible to apply a placement system that does not require the switching of pipes, etc., further improvements in labor-saving and safety can be achieved. Therefore, the low cement high fluidity concrete “Neuro-Crete Neo” was developed in which the cement content was not increased compared with conventional concrete by the use of a special thickening agent, with the aim of applying this versatile high fluidity concrete to lining work. In addition, a hose extension and contraction type continuous placement system has been developed so that switching of pipes is not necessary, thereby enabling automatic control of the placement hoses. By combining both these developments the amount of labor required for the operation can be reduced by half, and by eliminating hazardous work the working environment is improved. Also, by establishing three manufacturing methods of Neuro-Crete Neo, the versatility of manufacture is increased. Neuro-Crete Neo has been applied on more than ten sites since its development more than four years ago, and has demonstrated its versatility for use in lining work. Therefore, this technology has contributed to greatly improving the productivity of lining work and deserves the JSCE Technology Development Award.