

Executive Summary

Manhole covers for the public sewerage and drainage system are made of metal products such as cast iron (CI) and ductile iron (DI). These covers are susceptible to theft due to the high resale value. As material technology advances, manhole covers made of compound material (CM) are now being used in Mainland China. These covers are marketed to have the following advantages over the metal covers: 1) low resale value, 2) environmentally friendly, 3) lighter and 4) less susceptible to rusting.

This study comprised desktop review and site trial. The existing requirements on manhole covers and the research findings of the Highways Department (HyD) on compound material were reviewed. Draft specification for the 675x675 CM cover was prepared following the requirements of BS EN124:1994, which was previously adopted by DSD for the DI cover. Based on HyD's experience, a double triangular design would be adopted to see if the rocking problem could be reduced.

14 nos. of CM manhole covers, including 6 nos. of 570x570 and 8 nos. of 675x675 covers, were purchased. 10 nos. were installed in the sewer and stormwater drain manholes inside the Stonecutters Island Sewerage Treatment Works (SCISTW) on 18.12.2014. 2 nos. of 675x675 covers were used for laboratory testing. 1 no. of 570x570 cover and 1 no. of 675x675 cover were sent to HyD for their on-going study and were later on returned to DSD for further lab testing.

For the 570x570 covers, 4 out of 5 were found to experience wear and tear after 6 months and rocking was experienced on all of them. It could be due to the gap between the CM cover and the existing CI frame. The 570x570 cover was weighed to be 35% lighter than the CI cover. It was tested to be complied with the heavy duty grade of the GS. For the 675x675 covers, only minor wear and tear was observed and no rocking was experienced. They perfectly fitted with existing DI frame. The 675x675 cover was weighed to be 14% heavier than the DI cover and it failed to comply with Class D400 of BS EN124:1994. Although the cost of the CM cover was higher than the existing CI/DI cover, it could be expected that the cost would reduce significantly if it became popular with more suppliers available in the market.

For the 675x675 cover, it weighs heavier than the DI cover but it is unable to achieve the required strength. More R&D resource is required to resolve this problem and the weight of cover is expected to be further increased. It is therefore recommended not to further proceed with the 675x675 CM covers.