

Use of Foamed Concrete for Trench Reinstatement

In 1991 new laws were introduced by the British Parliament which included new specifications for the reinstatement of openings in highways. It was recognised that the poor state of many British roads was a result of poor road reinstatement.

There were two main reasons for reinstatement failure:

- (i) Use of unsuitable backfill materials, due to composition or incorrect water content.
- (ii) Inadequate compaction of backfill, as existing methods do not give full compaction or restore full lateral support to the trench walls.

Traditionally excavations were filled using granular materials, usually crushed stone. The major problem with such materials is compaction. Not only is it impossible to achieve full compaction during reinstatement, but problems occur at the edges of trenches where the compactor will not fit. It is also impossible to compact around other services without causing damage. After surfacing, settlement of the backfill material occurs due to trafficking, only reaching full compaction after six months, when the road surface has to be re-excavated, and a new surface laid.

In 1991, the New Roads and Street Works Act was passed, which laid down new specifications for the reinstatement of openings in highways, and also included a specification for the use of foamed concrete as a backfill material.

The new specifications demanded that the backfill materials fulfil the following criteria:

- (i) The fill material should require little or no compaction, and should not settle after placing.
- (ii) It should not transmit axle loadings directly to the service in the trench.
- (iii) Final resurfacing should be possible almost immediately, and there should be no need to revisit the site to replace the surface at a later date.
- (iv) The technique should be economic.
- (v) The material should be readily available.
- (vi) The material should permit easy re-excavation.
- (vii) The technique should be easy to perform.
- (viii) The material should be suitable for filling narrow trenches.

Since foamed concrete fulfils all of these criteria, it is a very suitable material for trench reinstatement, and has been successfully used for this purpose by several utilities companies in the UK.

Foamed concrete has many advantages over traditional materials, for trench reinstatement:

- (i) It is very fluid so it will fill any voids, and hence completely restore the lateral stability of the trench, even when the trench walls have been undermined during excavation.
- (ii) Foamed concrete sets quickly, so final re-surfacing is possible in a matter of hours.
- (iii) The use of foamed concrete is highly cost effective in terms of both labour and equipment.
- (iv) There is no danger of causing damage to utilities in the trench during the application of foamed concrete since it does not require any form of compaction. When placing traditional granular backfill materials, there was always a possibility of damaging the pipes with the compactors.
- (v) Test have shown that foamed concrete does not suffer significantly when subjected to a freeze-thaw cycle.
- (vi) Since foamed concrete needs no compaction, there is no need for any of the compactors. This is important, since frequent use of such tools can cause vibration related illnesses among the workers.

There has been increasing awareness in the UK concerning vibration related illnesses. In some cases, workers are taking legal action against their employers to win compensation for the suffering caused by their condition.

From all the work conducted so far, it is clear that not only is foamed concrete a suitable alternative to the traditional granular backfill materials, but it is also significantly better, providing a more stable, longer lasting reinstatement.