

Method Statement. Consolidation and Repair of Iron-Stone Worker's cottages and associated workshop building, Rosedale East.



It is proposed to consolidate the ruinous fabric of the ruinous workshops adjacent a terrace of also ruinous iron-stone workers' cottages north of iron calcining kilns to the eastern side of Rosedale. The primary focus will be upon the workshops, but some consolidation and re-plastering within one of the former cottages will also be carried out to assist interpretation in the future.

The original mortars of construction are very similar, if not identical, to those used in the construction of nearby kilns, the nature and composition of which have been analysed by Bill Revie of CMC Ltd, Stirling. These were composed primarily of calcined ironstone aggregate, with associated fuel ash and were hot mixed with a non-hydraulic lime binder at a proportion of 1 part slaked lime: 0.6 calcined ironstone aggregate. As evidenced in photographs below, there is a high density of lime inclusions, most of these having slaked and carbonated in situ. This would indicate prompt, hot use after mixing. The effective binder: sand proportion was 1:1.6.





Interior wall plaster mortars were also analysed by CMC Ltd. Base coat plasters were 1 lime: 0.8 calcined ironstone aggregate with an effective binder: aggregate ration of 1: 1.63. The finish coat over the same was 1 lime: 0.16, with an effective binder: aggregate proportion of 1: 0.56, the aggregate comprising finely sieved calcined ironstone waste. The base-coat plasters were hot mixed, but allowed to cool before knocking up immediately before use; the finish coat plaster was mixed from lime putty.

The effective binder proportions of both bedding and base-coat plaster mortars are consistent with hot mixing of these mortars at a proportion of 1: 3 using powdered quicklime. To exactly match these mortars, it would be necessary to hot mix at a proportion of 1: 2 quicklime: aggregate using lump lime, and this would be the proposed mix for any repairs, repointing and base-coat plastering.

It is intended that the repairs will observe the principle of like-for-like repair – consistent with current guidance of both Historic Environment Scotland and Historic England.

Calcined ironstone, as well as associated coal ash and slag, when of a fine particle size, provide a measure of pozzolanic set to a non-hydraulic lime mortar and belite (di-calcium silicate) was present within these mortars, indicating a feeble pozzolanic set. This would not be reflected in the use of any natural hydraulic lime. The high free lime content of the existing mortars will deliver a high effective porosity, which was confirmed on analysis. NHLs are typically low in free lime and low in the capillarity that is essential to effective porosity and proper performance. The Jurassic sandstone of which the structures are built is itself eminently porous and will readily behave sacrificially when repair mortars are of lesser effective porosity. Repair mortars of lesser effective porosity will be incompatible with existing mortars and will lead to excessive and cumulative dampness, facilitating frost damage.

It is proposed, therefore, that repair mortars will comprise non-hydraulic lime and calcined ironstone waste. These will be processed in similar ways to originally – the bedding mortars and base-coat plasters will be hot mixed in

small batches; the finish coat plasters will be used making freshly slaked lime putty. The calcined ironstone aggregate will be sourced close to the buildings themselves, from spoil-heaps.



*Calcined ironstone waste.*

This will be harvested from across the spoil-heap in order to preserve the topography of the heap itself and will be passed in small buckets to the former road-way to the incline that served the cottages and workshops above and then carried in power-barrows to the work-site. All necessary materials will be similarly transported.

The primary focus of the works will be to the low, standing walls of the workshop building, as well as to the surviving gable wall. The latter will be scaffolded and all loose or precarious stones will be removed by the trainers before access to the wall by others; the opening will be supported with accrow props to facilitate the re-introduction of lintels and the reinstatement of missing stonework above these lintels. No scaffolding will be required for most of the proposed works, which will entail re-pointing and top-of-the-wall flaunchings. The wall-top flaunchings will be of an eminently hydraulic pozzolanic mortar; pointing will be of similar hydraulicity to the original mortars.

As necessary, gazebos will be erected over the wall remnants being worked upon.

The wider objective of the works will be to train and up-skill National Park apprentices, National Park volunteers and local craftspeople. They will mix and deploy pozzolanic lime mortars and all essential PPE and health and safety advice will be provided. The training will take place over a three-week period in March 2020. There will be full risk assessments and on-going tool-box talks throughout the programme of works.

Plastering will be carried out in the north-most cottage, which has been consolidated in the past using cementitious mortars. No access will be allowed to other cottage-remnants, as these are precarious. All potential hazards will be removed by the trainers prior to access to all proposed work areas.



*workshop gable, north side – low, surviving walls of the workshop to the south.*



*surviving plaster within north-most cottage*



*close-up of similar.*