

## DERELICT LAND RECLAMATION IN THE UNITED KINGDOM<sup>1</sup>

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Abstract.--In 1966 there was a total of 52,000 ha of derelict land in the United Kingdom, of which approximately two-thirds was either capable of or required treatment. This fact, coupled with the Aberfan disaster in 1967 led to public demand that this land be reclaimed to recreate new land for the regeneration of the country's industry and to improve the welfare of the areas where dereliction was most prevalent. Most local authorities in the coalfield areas, which was where the most dereliction was concentrated, set up special teams to deal with the problem. Their work was assisted by the formation of the Standing Panel of Local Authority Officers on Land Reclamation, which meets to disseminate information, to organise research, and to advise the government on reclamation matters. Seven completed reclamation schemes are described, three from County Durham, and two each from Derbyshire and Mid Glamorgan, showing the aims of the design and the methods used to achieve it. By reshaping the spoil heaps, recontouring, constructing new watercourses and drainage systems, providing flood control measures, covering with topsoil, and planting or seeding, these areas have been restored to such land uses as industry, housing, agriculture, woodland, and recreation.

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### INTRODUCTION

In the United Kingdom 1967 is generally seen as a watershed in derelict land reclamation. On October 21st of that year a coal tip at Aberfan in South Wales slipped and caused the deaths of 116 children and 21 adults. This tragedy generated an anger directed at the many spoil heaps littering not only the South Wales Valleys, but all the coalfields throughout the country. This soon resulted in action by all local authorities in the coalfields to set up reclamation teams to deal with and remove the problems.

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## EVALUATION AND TREATMENT OF DERELICT LAND

Prior to this date reclamation work had been done on an ad-hoc basis. Records exist of tree planting carried out in 1908 on spoil tips in the Midlands by the Midland Re-forestation Association. Other work was done after World War I to reclaim small spoil heaps with hand labour as unemployment relief. After World War II the Distribution of Industry Act 1947 allowed grants to be paid towards reclamation costs where the work would enhance the long-term employment prospects of the area. Some local authorities made use of these grants to plant some derelict tips, but it was not until the 1960 Local Employment Act giving grants of 50%, later raised to 85% in certain areas, that local authorities were able to make inroads into the problem of dereliction. The grants covered not only the cost of the works, but also the cost of land acquisition, where necessary, and design and supervision costs, less any increase in the value of the land after reclamation. These grants were later increased to 100% for local authority schemes and 80% for private ones.

The Aberfan disaster raised the consciousness of the nation towards dereliction. What had been seen as signs of prosperity, or former prosperity, were now seen as a blight on the neighbourhood and could no longer be tolerated. Apart from this aspect, the country could not afford to allow so much land to remain derelict. Dereliction, defined as "land so damaged by industrial or other development that is incapable of further beneficial use without treatment" accounted, in 1966, for 0.29% of the total area of England. However in coalfield areas this proportion was a lot higher; for instance, in the Urban District of Ince-in-Makerfield, 37% of the area was derelict. At that time there was approximately 38,000 ha of derelict land in England, 8,000 ha in Wales, and 6,000 ha in Scotland of which approximately two-thirds was capable of, or required treatment. For a country the size of Great Britain these figures were too high. (Barr 1969).

One other principal reason why land needed to be reclaimed was the desire to improve the self-respect of communities afflicted by dereliction, and the need to improve the appearance of rundown areas trying to attract new investment. Communities which had tolerated gross dereliction for so long had also tolerated shabby housing standards, poor civic amenities, and a general untidiness and scruffiness of the area. The clearance of dereliction can give an impetus to local improvement campaigns and help to restore some civic dignity to a community.

The nature and extent of derelict land in Britain is extremely varied. The various coalfields in Britain all have their own character, either in terms of the coal and spoil produced or in the topography of the land in which they exist. For example, some of the Midland coalfields produce spoil which has a high fine fraction so that washeries tailing lagoons cover large areas and are difficult to treat. In South Wales the spoil is coarser, but problems still exist because the collieries are situated in the bottom of very narrow, steep-sided valleys with spoil heaps perched halfway up the valley side.

Given the industrial history of Great Britain, it is not surprising that there are a multitude of different types of dereliction sometimes crammed alongside one other. Abandoned collieries with steel works and gas plants are common partners in many old industrial areas, complemented by old chemical works in Cheshire and Lancashire, limestone quarries with mounds of lime waste in Derbyshire, china clay workings in Cornwall, and lead mining in various parts of the country to name but a few. Each county has its own range of dereliction and of course its own range of particular needs giving rise to a variety of afteruses.

By the early 1970s most local authorities, either County or District Councils, had established multidisciplinary teams to tackle the derelict land problem. Early reclamation schemes were often carried out with the sole purpose of removing the visible scars of dereliction and returning the sites to agriculture or public open space. Over the years however, both the public and reclamation authorities have become aware of the potential that reclamation can open up. If large amounts of spoil are to be moved and money spent, it is worthwhile preparing a scheme that can best suit the needs of the community and make the best use of the land available. Modern reclamation schemes can therefore be complex in their scope and integrated with proposals for transportation, housing, industry, waste disposal, energy production, and leisure and reclamation facilities. It is often worthwhile to include other nonderelict land in the scheme so that whole areas are regenerated using the reclamation scheme as the catalyst.

## PREPARATION OF SCHEMES

The more complex schemes mean that much more time has to be spent on preliminary studies, ground investigations and consultations. Preliminary studies of old editions of Ordnance Survey maps, mining and geological plans and other old records are followed by investigations onsite. From the information obtained, preliminary comments can be made on the range of afteruses proposed by local community leaders, other local authorities and user groups.

From their knowledge of the area, the reclamation team members themselves can influence the choice of afteruses for the scheme or suggest better ways of using the land available. Public meetings are often held to give the public the chance to see plans of proposals before they are put into their final form. Detailed planning applications can then be made, and drawings and contract documents finalised. This process can take some time and must be complemented by the process of land assembly.

Local authorities in Great Britain, both at District and County level, have the powers to compulsorily acquire derelict land for the purposes of reclamation plus such other land as may be required for the scheme. This is only used when negotiations for the purchase have broken down and only then as a last resort after a public enquiry and with the approval of the Secretary of State for the Environment. Private owners are encouraged to

carry out their own reclamation, and government grants are available assist them, but it is often the case that owners will not or do not want to involve themselves in this work. Occasionally the local authority may wish to have an area covering several ownerships reclaimed together. This makes a lot of sense when an overall objective can be achieved by, for example, transferring spoil from one site to another, or unifying the landscape when two tips are adjacent plots separately owned.

The basic design of the reclamation scheme produced by the reclamation engineer is made after constant interchange of ideas with other team members. After problems of stability, the next problem is usually that of drainage, especially on areas of high rainfall or on steep slopes. The reclaimed site is most vulnerable when the site has just been completed, with no grass cover and therefore subject to maximum run-off, and so drainage channels have to be designed to allow for these worst conditions. As most dereliction occurs in areas that were first developed over 100 years ago, the land drainage of the area often uses drains and culverts constructed at that time and may have been affected by mining subsidence. This presents an opportunity to replace or update the old drainage system.

Many schemes are still designed for an agricultural afteruse, but modern, heavy, earth-moving plant is not generally conducive to good landscaping as it compacts the spoil too much. Even when topsoil and subsoil are available to spread over the spoil, great care has to be taken not to compact this precious commodity; at the same time measures have to be taken to relieve the compaction in the spoil. The choice of species, grass or trees, that will grow on reclaimed sites has been the subject of a great deal of research, not only in Britain. New species have been produced which will grow on unhospitable spoil, such as lead waste, as well as species being identified as being the best to suit the various types of spoil and the vagaries of the British weather.

Another aspect of reclamation that must be taken into account is coal recovery. All spoil heaps have to be checked for recoverable coal content before reclamation starts. Apart from the fact that the value of the coal recovered can help offset the cost of reclamation, it is worthwhile to reduce the amount of combustibles in the spoil to prevent future spontaneous combustion, especially if the site is to be developed. Not all tips have a coal content that is economic to recover, but the proportion that have has led to a substantial coal recovery industry being developed with highly sophisticated plant to recover the coal down to 0.25mm and to dewater the fine material to allow it to be disposed of with the rest of the discarded spoil.

Coal recovery schemes are not universally popular with local residents and council representatives. Coal recovery schemes take longer to complete and also bring more noise and dust to sites which may have been idle for a number of years. Generally though, communities are happy to accept coal recovery as part of a reclamation scheme where they can see some benefit to the area.

## STANDING LOCAL AUTHORITIES PANEL ON LAND RECLAMATION

Different problems encountered in different areas lead to a variety of solutions. In order that these experiences could be brought together for the benefit of all reclamation authorities and the government, who oversee the reclamation programme, a Standing Panel of Local Authority Officers was formed in 1973. The Panel, whose membership is open to all Reclamation Authorities, meets twice a year to discuss all aspects of reclamation, from details of construction contracts to the administration of Derelict Land Grants, and is aided by several specialist subcommittees that meet more frequently.

The Engineering Sub-Group covers items such as treatment of toxic waste and washery tailings, new materials available for land drainage work, preparation of contract documents where coal recovery is included in the works, compaction of spoil and the relief of compaction when necessary, difficult demolitions, and all engineering aspects of reclamation.

The Vegetation and After-Management Sub-Group is concerned with the design of schemes alongside the engineer and the specialist skills needed once the engineer work has been completed. Through their endeavors over the years civil engineers now take more notice of the vegetation and afforestation needs in the preliminary design stage than they used to. The Sub-Group has concerned itself in grass and tree growth, use of fertilisers, methods of planting, and different aspects of land management.

Other Sub-Groups have been responsible for conducting surveys on design costs, preparing advice for the government on various aspects of derelict land reclamation, and collecting and disseminating information pertinent to land reclamation. The government has sponsored several research projects that have been suggested by the Panel and its Sub-Groups, who have been represented on the research project management panel. These projects have included the treatment of colliery tailings, location and treatment of shafts and adits, management of colliery tailing, location and treatment of shafts and adits, management of reclaimed agricultural land, and the growth of trees on colliery shale.

## DESCRIPTIONS OF SCHEMES

The following descriptions of seven reclamation schemes are typical of many carried out during the last few years in coalfield areas and show the different emphasis that the three counties, Durham, Derbyshire and Mid Glamorgan, put on the afteruse for the sites.

### Mainsforth Colliery Reclamation Scheme, County Durham

This site, situated approximately 8 miles southeast of Durham City, was one of the largest pit heaps in the county. It is bounded to the east by the main railway line and on the west by the River Stell. Directly to the north is an

industrial area and on the south is an area of agricultural land. Further east is more agricultural and woodland and the village of Mainsforth.

The area of land to be reclaimed was 44 ha, completely covered by colliery waste heaps and slurry lagoons. To assist in spreading the spoil to more appropriate contours, a further 24 ha of agricultural land and 1 ha of woodland were "borrowed" to accommodate the surplus spoil. The afteruses for the site included 26 ha of woodland, 18 ha of new agricultural land and the 24 ha of land returned to agriculture. The remaining land was designated as an extension to the Mainsforth recreation ground and an extension of the industrial estate if that was ever needed.

During the works a total volume of 2.1 million m<sup>3</sup> of spoil were moved to lower the tip by a maximum of 28 m, in addition 70,000 m<sup>3</sup> of slurry was removed from the slurry lagoons. Due to the acid nature of the spoil, a total of 45,000 m<sup>3</sup> of topsoil were imported to provide an adequate cover to establish good grass growth.

Alma Pit Reclamation Scheme,  
West Pelton, County Durham

The former Alma Colliery lies south of the settlement of Grange Villa and straddles country road. To allow the tipping of spoil, the National Coal Board had diverted the Twizell Burn through a large culvert which had subsequently become a source of concern. Substantial depths of material had subsequently become a source of concern. Substantial depths of material had been tipped over the culvert, thus destroying the effect of the pleasantly wooded valley and creating an area of dereliction visible from much of the surrounding area. Burnt shale workings, abandoned mineral railways, and a substantial refuse tip completed the general effect of squalor.

Insufficient council-owned land was available to dispose of all the spoil material, but 6 ha of adjacent farmland was acquired under a license agreement to dispose of some of the fill. This allowed the formation of a shallower valley at a higher level than the original, removing the need for the culvert and the restoration of the farmland to an improved standard.

It was necessary to rejoin the original watercourse by means of a cascade and stilling basins with a total drop of 20 m. Alternative methods of construction were considered, but gabions was the method adopted. The road was crossed by a 1.9-m-diameter culvert, the old railway bridge and pithead buildings were demolished, and the shafts were capped before the 460,000 m<sup>3</sup> main earthworks were carried out. Construction of a new footbridge has allowed the reopening of a public footpath across the site, and the extended system of paths and tracks has given the public access to a pleasantly wooded area.

As the result of an unprecedented combination of snowmelt and heavy rain shortly after the scheme had been completed, the 1.9-m-diameter culvert under the road was overloaded and failed due to

pipings in a local sand pocket, and the gabion cascade collapsed. A new watercourse was then constructed, consisting of a concrete channel and cascade, and a piled culvert with a concrete stilling basin upstream and downstream.

The site has produced 22 ha of woodlands, 6 ha of new agricultural land and 3 ha of public open space adjacent to the housing. This is in addition to the 6 ha of licensed land restored to agriculture. Steep slopes on much of the land precluded any uses other than woodland.

Handenhold Colliery Reclamation Scheme,  
County Durham

The site of the old Handenhold Colliery is situated near West Pelton in the District of Chester-le-Street and consisted of 36 ha of derelict land. Before handing over the derelict land to the County Council, the National Coal Board indicated that they wished to carry out some opencast mining on the site and in addition work a further 23 ha of adjacent agricultural land. Since opencast mining is a particularly sensitive subject in coal mining areas, where local communities see it as a threat to jobs in the deep mining industry, and in the light of the resolve of the Chester-le-Street District Council and the County Council to enhance the area with an 18-hole golf course, the National Coal Board agreed to restore the opencast land to provide levels and contours suitable for a golf course. The Board also agreed to include in the work, for a negotiated price, pockets of derelict land outside the opencast area, which had been in the County Council's original reclamation proposals.

The new landform was designed by the County Land Reclamation Team and, under their supervision, the site was completed to the new contours in April 1983. Construction of the golf course then proceeded with grants from a number of bodies, including the National Coal Board, Department of the Environment, Sports Council, and the Countryside Commission. The area now contains 1 ha of agricultural land, 8 ha of open space, 2 ha woodland and an impressive 53 ha 18-hole golf course.

Grin Low Reclamation Scheme,  
Buxton, Derbyshire

The 36-m high lime waste heaps of Grin Quarry used to be a dominant eyesore on the western approaches to Buxton, close to the Peak District National Park in Derbyshire. The grey-white tips were too steep to take any vegetation and only extensive reclamation work has allowed the levels to be lowered and slopes reduced in order that grass and trees can grow on them.

The total area of the 63-ha site included the old quarry and its surrounding spoil heaps of reject stone and lime waste which in places was as solid as concrete. The reclamation work included the regrading of the limewaste heaps to partly fill in the quarry floor. A total of 500,000 m<sup>3</sup> of material was moved before imported topsoil from neighbouring quarry soil stripping operations was spread over the site, followed by seeding and planting.

As the original drainage of the site via natural swallow holes in the limestone had been covered over in the reshaping process, a complete new drainage system had to be built to take the runoff down to the River Wye. This consisted of a series of channels lined with concrete slab inverts and natural stone sides, leading to a catchpit with a 1-m-diameter culvert under the road and down to the river.

The drainage of the remaining part of the quarry, which is still in a depression, is still via an existing sinkhole. This part of the site is occupied by a 150-unit touring caravan site, occupying 4 ha, developed by the Caravan Club which has become a popular site from which the town of Buxton and the adjacent Peak District National Park can be explored.

Of the remainder of the site, 40 ha have been restored to sheep grazing land and 18 ha to woodland.

#### Glapwell Colliery Reclamation Scheme, Derbyshire

This scheme covers an area of 126 ha, the major part of which was derelict, comprising the old colliery yard, shafts and spoil heaps, coal treatment plant, and disused railway sidings. The site is close to the residential areas of Glapwell and Doe Lea and is particularly prominent from the M1 motorway and its Heath interchange.

The reclamation of the site included the reshaping of the spoil heaps, involving moving some 2.5 million m<sup>3</sup> of spoil and the demolition of old structures and diversion of overhead power lines. The final afteruse of the majority of the site is agriculture and woodland, however as an intermediate afteruse three voids for refuse disposal have been formed and their combined capacities of over 2 million m<sup>3</sup> will provide tipping facilities for the northeast area of Derbyshire until 2002.

Concurrently with the reclamation scheme, opencast coaling has taken place, in two places, as an integral part of the scheme and in addition, coal recovery by tip washing has been carried out.

#### Clydach Vale Reclamation Scheme, Mid Glamorgan.

Clydach Vale is a narrow side valley off the Rhondda Valley approximately 1 1/2 miles long. It contained the remains of two main collieries plus several small mines and drifts and before reclamation started, the valley floor was carpeted from one end to the other with spoil tips, tailings lagoons, and derelict structures. The Nant Clydach was culverted in two places and both culverts were in a bad state of repair. The village of Clydach clings to the northern side of the valley.

Initial consultations showed that the area required land for housing and industry but, in addition, the whole area was rundown and needed an uplift. Parts of the Rhondda nearer to Cardiff were becoming more prosperous, whilst areas, such as Clydach, were being forgotten and neglected by new industry, basically because there was no land for development.

The reclamation of the valley was originally seen as being two schemes, one for each end of the valley, but the investigations had not proceeded very far before it was decided to amalgamate the two schemes into one, covering a total area of 73 ha. The scheme covers the whole length of the valley so it can be appreciated that the maximum width of the site is only some 300 m.

In order to find more space for the spoil, the Nant Clydach was raised and diverted to the north side of the valley and to assist in flood control, two small lakes with surface areas of 0.5 and 1 ha were formed. The new stream course has been made as natural looking as possible with local block stone forming the side walls and the invert on the steeper and cascade sections.

A 6-ha area for industry plus 4 ha for housing have been formed at the lower end of the valley overlooking the larger of the two lakes, whilst the remainder is being laid out for public open space and recreation. A system of footpaths and tracks will encourage not only local residents but, hopefully, tourists to explore the areas beyond the head of the valley and beyond.

#### Gelliwion Valley Reclamation Scheme, Mid Glamorgan

The Maritime Colliery and spoil heaps are situated less than half a mile from the centre of Pontypridd which is one of the major towns in the County of Mid Glamorgan, situated at the confluence of the Rivers Taff and Rhondda. When the colliery closed, a small reclamation scheme was carried out by the District Council to form a small industrial estate on part of the colliery surface. No attempt was made at that stage to deal with the rest of the site, including the very large, dominant spoil heap, or the surrounding area, which even then was looking semi-derelict and rundown.

In 1974 the County Reclamation Team was asked to prepare a scheme for the remainder of the site. The remaining dereliction included the remains of the colliery buildings and coal preparation plant, two large shafts, large retaining walls, a 150-m-long culvert in a poor condition, an abandoned mineral railway line, and the spoil heap that had been badly worked over by a coal recovery contractor, leaving quantities of tailings and tailings lagoons all over the place.

The bulk of the site was acquired from the National Coal Board but additional areas were needed to assist in reshaping the spoil. Identifying the areas needed for the scheme, obtaining the powers to compulsorily acquire the additional plots and convincing the Welsh Development Agency that this was a scheme worth spending over a million pounds on took most of ten years before the scheme was able to start.

The additional land was required to provide sufficient space for spoil so that a significant difference could be made to the shape of the tip. With the additional land, it was possible to move and lift the Nant Celliwion into a new lined channel to provide the required amount of space. This also made it possible to remove the old culvert.

Opportunity was taken to improve the site infrastructure by realigning the old, narrow, twisting access that had been constructed when the colliery first opened, nearly a hundred years ago. With the mineral railway and colliery yard redundant, the old bridges which had provided a straight jacket for the old road, could be demolished and a new alignment, although still of necessity steep, could be achieved.

Even after the scheme it has only been possible to extend the industrial estate by 4 ha, but in Pontypridd, that is a considerable amount of land. The remainder of the site is mostly reshaped spoil heap and its slopes of up to 1:3 are only suitable for woodland or open space.

#### CONCLUSIONS

During the period 1964-82 30,000 ha of derelict land has been reclaimed in England, but during that time the amount of derelict land increased by 44,000 ha (Hartley 1984) The big shake out in industry over the last several years has meant that large numbers of collieries and steelworks, cotton and woollen mills, railways and other old industrial workings have closed. Most of them date back to the time before planning controls on reinstatement of sites existed, so the owners of the sites, factories, mills, or works can not be obliged to carry out any reclamation at their own expense.

Whilst this state of affairs continues, there remains a substantial amount of work for reclamation authorities. It is an opportunity to create new land for the next generation, and a challenge to improve the lives of present communities by improving the appearance of derelict land.

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