



South Wales RIGS Group Site Record

RIGS Description

SECTION A

General	South Wales
Site Name: Darren Ddu tramway quarries	File Number: Site_RAW_JRD_28 but includes 232_297, 232_298, and 232_299
RIGS Number: 608	Surveyed by: R A Waters and J R Davies
Grid Reference: SO 2177 1274 – 2278 1295	Date of Visit: 14 th October 2010
RIGS Category: Scientific, educational	Date Registered: Owner: Unknown Planning Authority: Monmouthshire County Council
Earth Science Category: Stratigraphical, sedimentological	
Site Nature: Quarry complex	Documentation prepared by: R A Waters
Unitary Authority: Monmouthshire County Council	Documentation last revised: DIS 31 st January 2011
OS 1:50,000 Sheet: 161	Photographic Record: Attached
OS 1:25,000 Explorer Sheet: OS13	
BGS 1:50,000 Sheet: E232	
<p>RIGS Statement of Interest: The Darren Ddu tramway quarries form part of a network of sites that demonstrate the stratigraphy and geological history of the Carboniferous Limestone on the north crop of the South Wales Coalfield. They have been proposed as a RIGS as they expose an excellent section through the lower part of the Carboniferous Limestone succession on the eastern part of the north crop.</p> <p>They show a very accessible, continuous section through the oolites and dolomites of the Clydach Valley Subgroup and the lower part of the overlying Llanelly Formation. Furthermore, the site provides an alternative to the Llanelly Quarry GCR site [SO 221 123 – 225 123] (Adams et al., 2004), situated on the other side of the Clydach valley. Llanelly Quarry contains a spectacular fossil soil at the top of the Gilwern Oolite, which is replicated in the Darren Ddu tramway quarries.</p> <p>The site provides an important locality for scientific research on the stratigraphy and sedimentology of the Clydach Valley Subgroup. The dolomites in the subgroup are poorly understood and key to the understanding of early Dinantian geological history in South Wales. One of the tramway quarries is the type locality for the Darren Ddu Limestone Member of one of the dolomite formations. The tramway quarries also provide an excellent locality for students to study shallow water limestones, dolomites, fossil soils and karst.</p>	

Geological setting/context:

The Darren Ddu tramway quarry complex comprises a series of disused quarries alongside the old tramway leading to Graig y Gaer from the Council road at Blackrock in the Clydach valley. The quarries expose a semi-continuous and accessible section in the lower part of the Carboniferous Limestone in the eastern part of the north crop of the South Wales Coalfield (Barclay, 1989). The section comprises the lower part of the Pembroke Limestone Group; the Clydach Valley Subgroup of Courceyan age. The Subgroup is made up of fine grained dolomites punctuated by three oolitic limestones. The quarries expose the following formations within the subgroup:

Gilwern Oolite c. 10 m

Coed Ffyddlwn Formation c. 18 m

Blaen Onnen Oolite c. 5 m

Pantydarren Formation c. 10 m

Pwll-y-Cwm Oolite c. 7 m seen

Most of the Pwll-y-Cwm Oolite is exposed in the lowest quarry. It comprises pale grey oolitic grainstone, locally affected by late stage secondary dolomitisation. Crinoid and shell debris is scattered throughout and some of the ooids exhibit reddened cores. The oolite is flat bedded with no obvious sign of cross bedding or lamination. The top of the oolite is sharp and locally undulatory, but not obviously karstic and does not show any sign of pedogenesis as might be anticipated.

The Pantydarren Formation comprises a thickening and coarsening upwards succession of dolomites. The lower 3.8 m consists of thin bedded dolomite mudstones and argillaceous fine-grained dolomites. Above is 3.5 m of unfossiliferous, thicker-bedded fine-grained dolomites with scattered shaley partings; planar and low angle lamination, cross-lamination and burrows are widespread. The upper 2 m comprises thick bedded dolomites with lamination, cross-lamination and hummocky cross-stratification. Scattered oolitic laminae are present. The formation grades up into the Blaen Onnen Oolite.

The Blaen Onnen Oolite is a pale grey cross-bedded ooid grainstone with scattered crinoid debris and patchy secondary dolomitisation. The top of the formation is seen in the middle quarry [SO 2195 1291] adjacent to the tramway, where a 0.5 m-thick intraclast conglomerate is seen.

The junction with the overlying Coed Ffyddlwn Formation is sharp. The latter predominantly comprises medium bedded fine-grained dolomite, with scattered lamination and cross-lamination, intraclast horizons and a little shell debris. A 1.8m thick peritidal unit in the middle of the formation comprises cryptalgal and fenestral dolomite and calcite mudstones, peloidal grainstones and packstones, and ostracod and bivalve coquinoid wackestones. The Darren Ddu Limestone Member occurs at the top of the formation in the middle quarry, which is the type locality for the member. Some 1.4 m thick, it comprises a thin bedded, peritidal unit of fenestral and cryptalgal calcite mudstones with green clay interbeds.

The Gilwern Oolite rests with an erosive contact on the underlying Coed Ffyddlwn Formation. At the base, the 0.5 m-thick Craig-y-Gaer Coral Bed, is a coarse peloidal

grainstone consisting of micritised bioclasts and intraclasts derived from the underlying peritidal unit. The oolite comprises a thick bedded to massive, pale grey ooid grainstone with scattered bioclasts. The top of the formation is present in the upper quarry (known as Darren Ddu Quarry) [SO 2210 1295] and is defined by a major very irregular palaeokarst. For a couple of metres below the palaeokarstic surface the oolite is reduced to a rubble with yellow clay infilling solution pipes and fissures.

The overlying Llanelly Formation rests disconformably on the rubbly Gilwern Oolite and is Arundian in age. The basal unit, the Clydach Halt Member, comprising fluvial deposits has not been identified. Instead, the lowest unit recognised is the lower part of the Cheltenham Limestone Member. This comprises a range of thin bedded peritidal limestones with green clay interbeds.

Each oolitic unit of the Clydach Valley Subgroup represents a barrier shoal deposit behind which a dolomite unit accumulated. Thus each dolomite/oolite couplet represents a transgressive - progradational (regressive) cycle. Each transgression began with peritidal deposits, followed by deposition of ooid grainstones in a barrier setting. At the high point of the transgression, the barrier began to prograde back south, leaving an emergent land surface behind it. The best example of this is palaeokarst rubble at the top of the Gilwern Oolite, which represents a considerable period of subaerial exposure in a humid climate (Wright, 1982). Although some of the dolomite units are undoubtedly peritidal, others exhibit tractional structures suggesting they were deposited in a deeper shelf lagoon. Considerably more work is needed to understand the sedimentology of the dolomite units. The dating of the Gilwern Oolite also needs further work, dates ranging from Courceyan to Arundian being suggested (Barclay, 1989). Taking into account how the Gilwern Oolite best correlates with events on the south crop of the South Wales Coalfield, a Courceyan age is more likely; this is borne out by the conodont dating.

The Llanelly Formation marks renewed transgression over a land surface that had been emergent through the late ?Courceyan to Chadian. The transgression established a shallow lagoon, fringed by sabhka like coastal flats, behind a major barrier situated across South Wales just north of Cardiff.

References:

ADAMS, A, WRIGHT, V P and COSSEY, P J. 2004. South Wales – Mendip shelf. 393- 476 in British Lower Carboniferous Stratigraphy. COSSEY, P J, ADAMS, A E, PURNELL, M A, WHITELEY, M J, WHYTE, M A and WRIGHT, V P. (editors). *Geological Conservation Review Series*, No 29. (Peterborough: Joint Nature Conservation Committee).

BARCLAY, W J. 1989. *Geology of the South Wales Coalfield, Part II, the country around Abergavenny* (Third edition). Memoir of the British Geological Survey, Sheet 232 (England and Wales). (London: HMSO.).

WRIGHT, V P. 1982. The recognition and interpretation of paleokarsts: two examples from the Lower Carboniferous of South Wales. *Journal of Sedimentary Petrology*, Vol. 52, 83-94

SECTION B

PRACTICAL CONSIDERATIONS:

Please score Accessibility and Safety Red Amber or Green

Accessibility:			X
-----------------------	--	--	---

Comment: Quarry faces adjacent to public footpath

Safety:		X	
----------------	--	---	--

Comment: A landslip in the tramway embankment has affected part of the footpath, which should be traversed with care. A scramble up scree is needed to access some of the faces.

Conservation status:

There are no known conservation designations of this RIGS

OWNERSHIP/PLANNING CONTROL:

Owner/tenant: Unknown

Planning Authority: Monmouthshire

Planning status/constraints/opportunities:

There are no known planning constraints or opportunities

CONDITION, USE & MANAGEMENT:

Present use: Abandoned quarries

Site condition: quarry faces and scree below, locally becoming vegetated by saplings, bushes and ground covering cotoneaster.

Potential threats: Increasing vegetation will cause further problems, especially the ground covering cotoneaster.

Site Management: Selected parts of the quarry complex should be cleared of vegetation.

SITE DEVELOPMENT:

Potential use (general):

Potential use (educational): key site for those undertaking scientific research on the sedimentology and stratigraphy of the Clydach Valley Subgroup. Good site for students to study shallow water limestones, dolomites and fossil solis/karst.

Other comments:

Photographic Record



Lower quarry: Pwll-y-Cwm Oolite at base overlain by thickening upwards sequence of Pantydarren Formation



Middle quarry: Coed Ffyddlwn Formation



Upper quarry: Thick bedded Gilwern Oolite passing up into palaeokarstic rubble and yellow clay. The overlying thinner bedded Llanelly Formation is seen in the uppermost part of the face.