

Site Name: Machynlleth Railway Cutting Grid Reference: SH 74550130

RIGS Category: Educational & Scientific

Earth Science Category: Structural Geology

Geology 1:50,000: BGS Sheet 163, Aberystwyth

RIGS Statement of Interest:

The rock cutting adjacent to sidings at the railway station yard in Machynlleth is of regional importance because it displays a fine, readily accessible example of a phenomenon known as cleavage transection. Recognition of this important structural characteristic has been of great significance in the interpretation and understanding of the tectonic evolution of the Welsh Basin during the early Devonian Acadian phase of the Caledonian Orogeny.

The cutting exhibits a sequence of interbedded, turbiditic sandstones and mudstones belonging to the Lower Silurian (Llandovery Series, Telychian Stage) Devil's Bridge Formation. Well-exposed ripple marks on bedding planes reveal that these sedimentary rocks were derived from the east or north-east, and it has been suggested that the deposition of the turbidites, from turbid, sediment-laden submarine currents, reflects an increase in sediment supply rates induced by faulting along the eastern margin of the Welsh Basin. The sedimentary rocks have been deformed into a metre-scale anticlinal fold that is well exposed on the floor of the cutting. Measurements both of the bedding and bedding-cleavage intersections show that the fold plunges north-eastwards at 21° towards 016° . However, additional measurements of the inclination of cleavage planes reveal that the axial plane of the fold is transected by the cleavage, in a clockwise fashion, at an angle of approximately 16° . Transected folds, which have been recorded throughout the Welsh Basin and Lake District, are interpreted to reflect the anticlockwise rotation of folds, prior to cleavage development that accompanied sinistral transpressional (i.e. oblique compression with an element of left-lateral shear) deformation during the late Silurian - early Devonian Acadian phase of the Caledonian Orogeny.

Surveyed by: Dr Bob Mathews