
Elland Bypass Cutting

Highlights

Elland Bypass Cutting provides the best exposure of the Amaliae Marine Band in the Pennine Basin, and confirms its position relative to the *Carbonicola proxima* non-marine bivalve subzone.

Introduction

This cutting by the Elland Bypass [SE 119 203], 5 km SSE of Halifax, West Yorkshire (Figure 10.21), is the remains of a disused claypit that worked refractory fireclays. There is no detailed description of the site in the literature, although the geology of the area is covered by Wray *et al.* (1930).

Description

Lithostratigraphy

The exposed sequence is about 30 m thick. The lowest beds are those immediately overlying the 48 Yard Coal, although the seam itself cannot be seen. The succession is dominated by mudstones with some thin coals and seat earths. There are also a number of sandstone bodies probably representing crevasse-splay deposits. Most of the mudstones are non-marine, and include one lacustrine interval. However, there is also a 5 cm thin band of black mudstone in the lower part of the sequence, which is of marine origin. The top of the succession is marked by 0.75 m of seat earth, which is thought to mark the position of the 80 Yard Band coal, although the seam itself is not normally present in this area.

Biostratigraphy

Marine bands

The thin marine band in the lower part of the succession contains the bivalve *Dunbarella*. From its position relative to the 48 Yard Coal, this is almost certainly the Amaliae Marine Band, also referred to as the Norton or Tonge's Marine Band by Calver (1968). According to Calver (1968), this band rarely contains anything other than this bivalve in the Yorkshire area, and only in a small area near Wigan and in North Devon does it develop into an ammonoid-bearing facies.

Non-marine bivalves

A band of mudstone 5.5 m below the level of the 80 Yard Band coal contains shells of the *Carbonicola Proxima* Subzone. This is further evidence that these beds are in the lower Langsettian (upper *C. lenisulcata* Zone).

Interpretation

This is the best exposure of the Amaliae Marine Band in the Pennine Basin. It is more fully developed in Lancashire, particularly near Wigan (Earp and Magraw, 1955) where it contains ammonoids, but there are no permanent exposures in that area. Throughout the rest of the Pennine Basin, however, it is in the type of pectinoid facies seen here at Elland. While it has been identified at many other places in this facies in the Pennine Basin (Wray and Trueman, 1934; Eden, 1954; Smith *et al.*, 1967), this is the only place where it occurs in a large, surface exposure.

Significantly, the marine band can be seen here overlying a non-marine bivalve band, containing a *C. proxima* Subzone assemblage. In the standard sequence of subzones in the Pennine Basin, the Amaliae Marine Band is normally taken to mark the boundary between the *C. extenuata* and *C. proxima* subzones, and this agrees with the sequence observable at Elland.

Conclusions

Elland Bypass Cutting is the best exposure of shales of the Amaliae Marine Band in the Pennine Basin. The band represents one of the major intervals of flooding of the Coal Measures delta that occurred about 310 million years ago, and is an important marker-horizon that helps established detailed correlations between sequences of this age in different parts of north-western Europe. It is also possible here to relate this band to some fossils of freshwater bivalves, which have also proved important tools for establishing detailed correlations.

[References](#)



(Figure 10.21) Beds associated with the Amaliae Marine Band exposed at Elland Bypass Cutting. (Photo: C.J. Cleal.)