

AUTOMATED DISTRIBUTION CENTRE

CORUS, SCUNTHORPE (2004)



The ADC structure 159m long, 25.7m wide and 30m high

The Automated Distribution Centre (ADC) at Corus' Scunthorpe site is an immense racking system designed to hold bundles of steel weighing up to 6t on 24 levels of supports until an automated crane system picks them off and loads them onto trucks or rail.

The ADC measures 159m in length, has a width of 25.7m and is just over 30m high and is able to store up to 17,000t of steel sections completely protected from the elements. The building has four aisles running the length of the structure and each of these lanes provides 24 different levels for storing stock. Stackers, which operate along these aisles are 28m long and 29m high and capable of moving at 3m per second to place or retrieve the bundles. The clever part about the storage system is that the central computer stores the exact location of bundles of steel ranging from 6 to 24m in length, not in pigeon

holes suitable for the longest item, but on racks with minimal clearance between the bundles.

As positional control is key to the operation of this facility, the structure needed to be stiff enough to limit movements under the infinite array of possible load combinations resulting from the storage of stock in bundles of different length and weight and at any location in any of the aisles. This meant that a foundation solution had to be found which could ultimately guarantee the required rigidity of the structure above ground.

The building was completed by the installation of more than 9,500 1m-long steel prongs - which form the racking on which the steel is stored. These needed to be positioned to extremely tight tolerances as any inaccuracy would impair performance of the stacking system and a stiff foundation solution enabled the necessary tolerances to be achieved.

BOREHOLE LOG

MADE GROUND: Black/grey gravelly ash. Gravel size fragments are subangular to subrounded fine to coarse of slag.

1.80

MADE GROUND: Dark grey slightly sandy slightly gravelly clay, with occasional sand lenses and rare shell fragments. Gravel size fragments are subangular to subrounded fine to coarse of mudstone and clinker.

...at 3.25m rare rootlets

4.50

MADE GROUND: Grey locally mottled light grey slightly sandy slightly gravelly clay. Gravel size fragments are subangular to subrounded fine to coarse of mudstone, sandstone and coal.

...from 8.00m gravelly

...at 12.00m with rare shell fragments and occasional cobble sized fragments of mudstone

14.00

MADE GROUND: Grey slightly sandy slightly gravelly clay, with occasional sand inclusions. Gravel size fragments are angular to subangular fine to coarse of mudstone.

...at 18.00m with occasional cobble size fragments of mudstone and rare shell fragments

21.60

Grey mottled yellow crystalline LIMESTONE, With rare shell fragments.

21.60

Cable Percussion boring complete at 22.00m

Splice welding the piles together



Pile caps and holding down bolts



There is nearly as much steel under the structure as in the building's main frame and the entire piling operation – including splicing the piles - was completed in just 14-weeks with two piling rigs. The 316 piles were Corus Advance 305 x 305 x 186 UKBPs manufactured at Corus' Teesside Beam Mill and installed on a 3m by 6m grid to match the column spacing of the ADC. The section was selected for its 'driveability' and high load capacity.

Once the piles had been installed each one had a steel plate welded to the top before being incorporated into a concrete pile cap with holding down bolts cast in to accept the steel columns. An unusual feature of the installation method was that the holding down bolts were accurately positioned and grouted before the steel columns were erected.

Once the bolts were set the steelwork contractor began erecting the 4,350t of structural steelwork for the ADC's main frame. The five lines of columns were formed from Corus Advance 914 UKB sections and erected in two spliced 15m-long sections.



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