BRIDGING THE DORNOCH FIRTH

By Christiani-Morrison Joint Venture for the Scottish Development Department

Christiani-Morrison Joint Venture were awarded the contract to design and build the Dornoch Firth Bridge by the Scottish Development Department. Total cost is expected to be in the order of £11.25m.

The design proposed by the contractor involved the use of the "cast-push" technique of deck construction which allowed the bridge deck to be built in factory conditions behind the south abutment and launched across the firth.

The deck is supported on 20 piers each consisting of a reinforced concrete portal founded on two No. 2.1m diameter piles cast in place on a founding stratum up to 25m below seabed level.

Only a few bridges have been built in Britain using this technique and Dornoch will be by far the biggest and, at 890m, one of the longest in Europe. It will reduce the journey time from Caithness and Sutherland along the A9 by approximately 30 minutes and 35 kilometres (22 miles).

DIMENSIONS

Overall Length	: 890m
Number and Length of Spans	: 19 Spans of 43.5m 2 End Spans of 31.75m
Overall Width	: 13.3m
Overall Depth of Concrete Box	: 2.63m
Navigational Clearance	: Width 36m Height 11m at H.W.

QUANTITIES (Approximate)

Volume of Concrete	: 10,000m³
Area of Formwork	: 22,500m³
Tonnage of Rebar	: 1,550te
Tonnage of Prestress	: Stage 1 300te Stage 2 120te
Weight of Concrete Deck	: 15,000te
Number of Piles	: 40
Length of Piles	: Vary between 16 and 25m
Diameter of Piles	: 2.1m
Total Tonnage of Steel Casings	: 1,100te

The piling is carried out from a 400 tonne jack-up platform using an Eiger C120 crane and driving with a 38 tonne rope-suspended HERA 8800 Diesel Hammer.

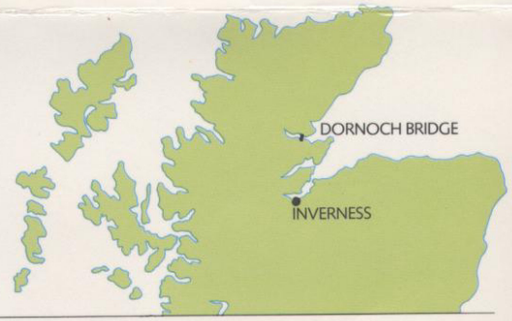
The piles are excavated using Airlift, Hammergrab and B5 Wirth Drill equipment with concrete placed using tremie techniques.

A 25 tonne derrick barge is used to construct the reinforced portals using a purpose-made steel shutter.

The deck is constructed in a 36m x 22m x 12m high temporary building fitted with 5 tonne overhead travelling crane.

The formwork has been specially designed and fabricated for the contract and allows construction of 1 half span (21.75m) at a time.

Once stressed, the deck unit is launched out of the shutter using purpose-made 600 tonne pushing rams mounted on slide beams. The launching process is assisted using stainless steel temporary bearings on each pier over which low friction PTFE-coated bearing plates slide.



CHRISTIANI-MORRISON

Christiani & Nielsen Ltd
21/24 Grosvenor Place
LONDON SW1X 7JE

JOINT VENTURE BETWEEN
and

MORRISON

Morrison Construction Ltd
12 Atholl Crescent
EDINBURGH EH3 8HA

CLIENT

Roads Directorate
Scottish Development Department
New St Andrew's House
St James Centre
EDINBURGH EH1 3SZ

CONSULTANTS TO THE CLIENT

Crouch & Hogg
18 Woodside Crescent
GLASGOW G3 7UU

Ove Arup & Partners
13 Fitzroy Street
LONDON W1P 6BQ

CONSULTANTS TO JOINT VENTURE

Tony Gee & Partners
TGP House, 45 – 47 High Street
COBHAM, Surrey KT11 3DP

Sir Alexander Gibb & Partners
Orchard Brae House
30 Queensferry Road
EDINBURGH EH4 2HS