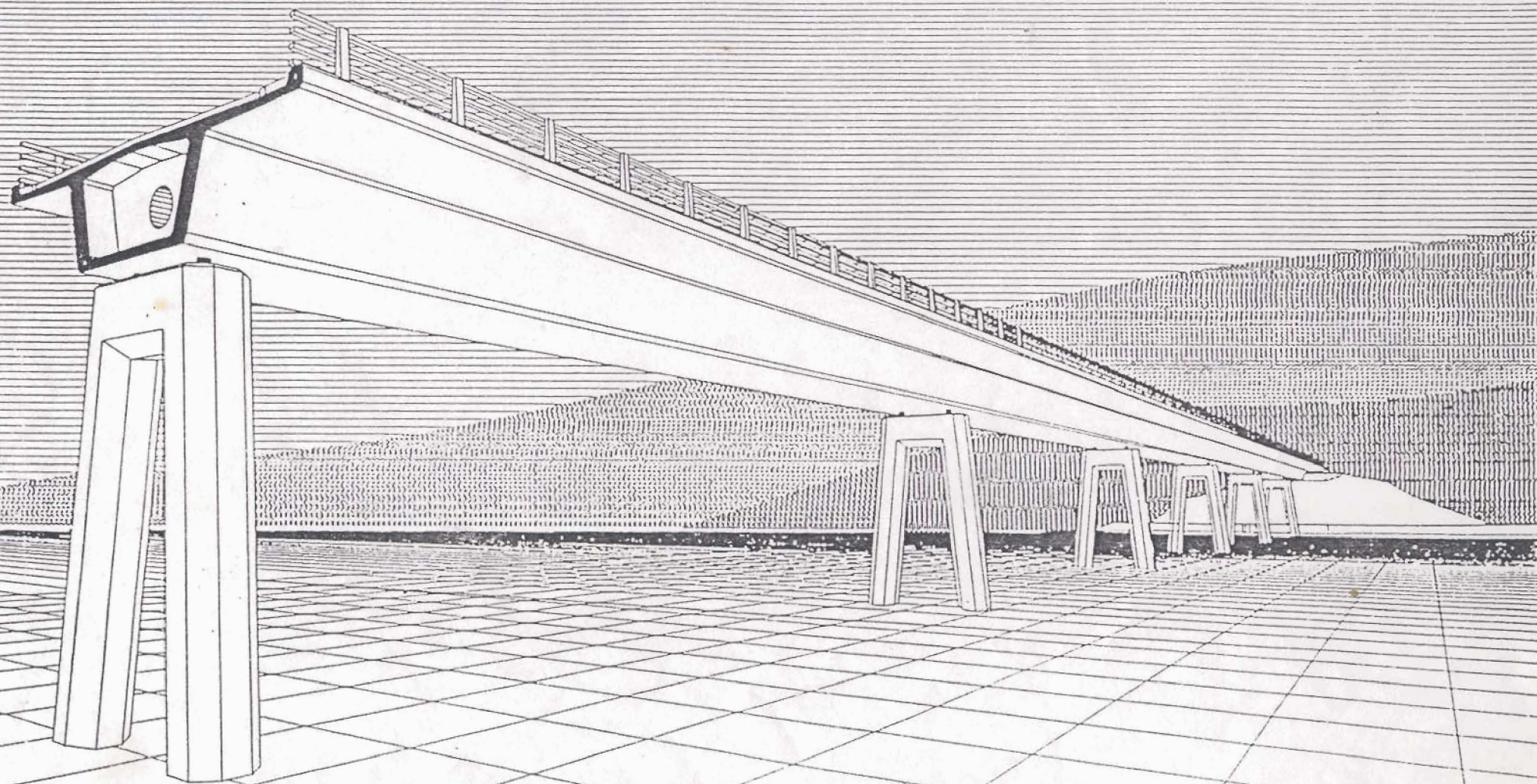


DORNOCH BRIDGE

DESIGN & CONSTRUCT COMPETITION



CHRISTIANI - MORRISON JOINT VENTURE



A9 DORNOCH FIRTH BRIDGE

METHOD OF CONSTRUCTION

The purpose of these notes are to provide a broad summary of the design principles and construction techniques used in the construction of the bridge.

Design

The bridge is designed to be supported on 20 piers and each pier is founded on 2 No. 2100mm diameter reinforced concrete piles driven up to a depth of approximately 24m below the sea bed.

The bridge deck is a prestressed concrete base constructed in half span lengths and incrementally launched from the South End.

Construction

Piers

The piers are constructed using two different pieces of floating plant.

The piles are driven from a 400 T 18m x 15m Jack-up platform which is positioned accurately at each pier location.

On the Jack-up is a 120 T capacity crane used for lifting the 30m long steel pile tubes and for handling the piling hammer which weighs 38T.

The piles after driving to the correct level below sea bed are excavated with an Airlift, which is a long 250mm dia tube placed inside the pile. Air is forced into the tube near it's bottom and the effect is to agitate the material in such a way that the material is sucked up the tube like a Hoover. This removes the sands and gravels. The clay material is removed with a large grab.

After the piles have been excavated, they are inspected and then filled with concrete. The piers are then constructed using a 25 ton floating crane barge.

Deck

The deck is constructed in half span lengths in a temporary building erected at the South End of the bridge on the causeway.

After each section of the bridge deck is concreted, it is stressed to the completed section and pushed over the completed piers using 2 No. 600 ton pushing rams. This cycle will be repeated 42 times.

General

The bridge will reduce the journey distance from Tain to Dornoch by about 25 miles and the journey will take about 10 minutes.

The Labour Force engaged on the bridge will be about 60-70 persons at the peak of construction next summer.

DORNOCH FIRTH BRIDGE

SUMMARY OF INFORMATION

CONTRACT:

Client: Scottish Development Department
Contractors: Christiani-Morrison Joint Venture
Contract Completion: 1991

DIMENSIONS

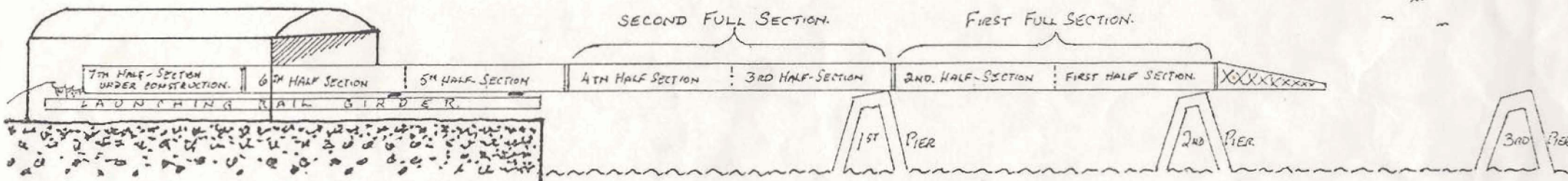
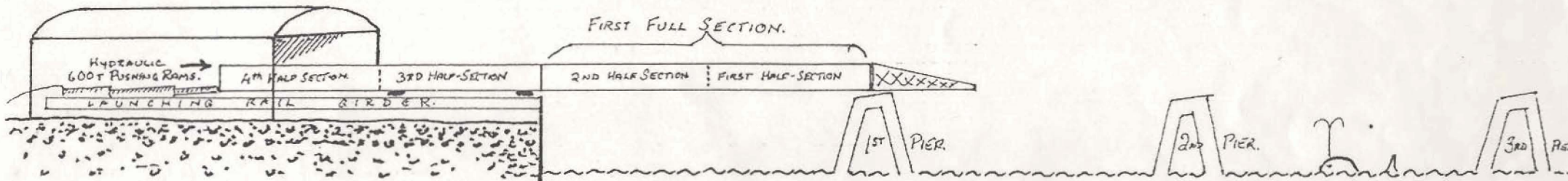
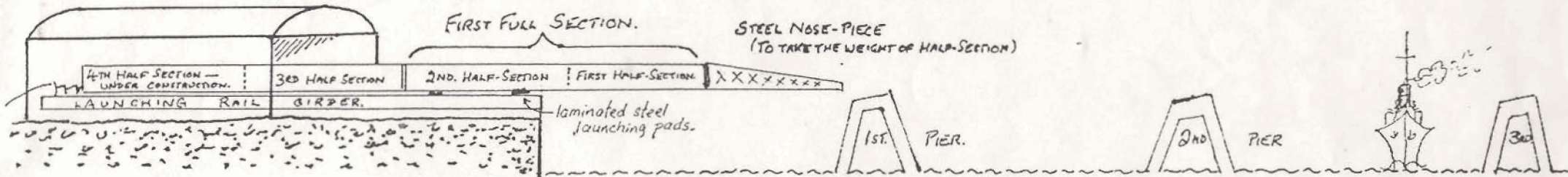
Overall Length: 890m
Number and Length of Spans: 19 Spans of 43.5m
2 End Spans of 31.7m
Overall Width: 13.3m
Overall Depth of Concrete Box: 2.63m
Navigational Clearance: Width 36m
Height 11m at H.W.

QUANTITIES (Approximate)

Volume of Concrete: 10,000m³
Area of Formwork: 22,500m²
Tonnage of Rebar: 1,550te
Tonnage of Prestress: Stage 1 300te
Stage 2 80te
Weight of Concrete Deck: 15,000te
Number of Piles: 40
Length of Piles: Vary between 16m and 24m
Diameter of Piles: 2m
Total Tonnage of Steel Casings: 1100te

THE PRINCIPLE OF INCREMENTAL LAUNCHING IN BRIDGE CONSTRUCTION, AS APPLIED TO THE DORNOCH FIRTH BRIDGE. 1990.

"THE FACTORY"



and so, ultimately the first full span becomes the last span on the North side.