

## UNDERPINNING AND EROSION PROTECTION AT THE UNIVERSITY ROAD BRIDGE, DAR ES SALAAM

By: F. Bucher\*

Late in 1976 the Civil Engineering Department decided to take action for the University Road Bridge in Dar es Salaam which had been seriously underscoured, mainly

- to save the bridge from a possible failure during the rainy season of April - June 1977,
- to demonstrate the Department's awareness, willingness and ability to solve acute and practical problems,
- to give staff and students opportunity to relate theory and practice.

In a first step the conditions of the bridge with regard to the foundation and super-structure, abutments and the approach and tailwater sections of the river were investigated. In the report on the assessment of the bridge condition (submitted in December 1976 to the Chief Administrative Officer of the University) it was concluded that the foundation of the bridge was in a very critical state. The figures on page give the details of our findings. The undermined area of the foundation was estimated to be 40 - 50% of the total area and in some regions the soil was eroded to a depth of 70 cm below the concrete slab. A local or even a total failure of the bridge could not be excluded and immediate action was found necessary. The Department offered assistance in the design and supervision of the repair measures and recommended a work schedule. The proposal was well received by the University Administration.

In a second report of January 1977 the repair measures were outlined in detail and a cost estimate and other requirements were included. It was proposed to underpin the two abutments and the three piers of the bridge and then to protect the underpinning piers from further erosion as being most urgent.

The proposed measures are shown in the figures on page . The designed as masonry walls founded on plain concrete strip footings in a depth of 1 m below the slab.

The repair measures were based on the assumption that the Estate Department of the University could provide about twenty workers and an experienced foreman throughout the time of construction.

Early in February 1977 the work was started and carried out according to the proposals under the supervision of the Civil Engineering Department. As anticipated the groundwater level was close to the ground surface and had to be lowered which was achieved by installing ditches and sumps. On 12th March, 1977, two weeks earlier than estimated, the underpinning was completed and the bridge could be reopened for all traffic after a closure of six weeks. Erosion protection work was continuing and could essentially be finished before the rains started. The inspections so far revealed that the measures have been successful.

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\*Senior Lecturer, Head of Laboratory for Soil Mechanics and Foundation Engineering, Department of Civil Engineering, University of Dar es Salaam.

# BRIDGE AT DARAJANI ON UNIVERSITY ROAD

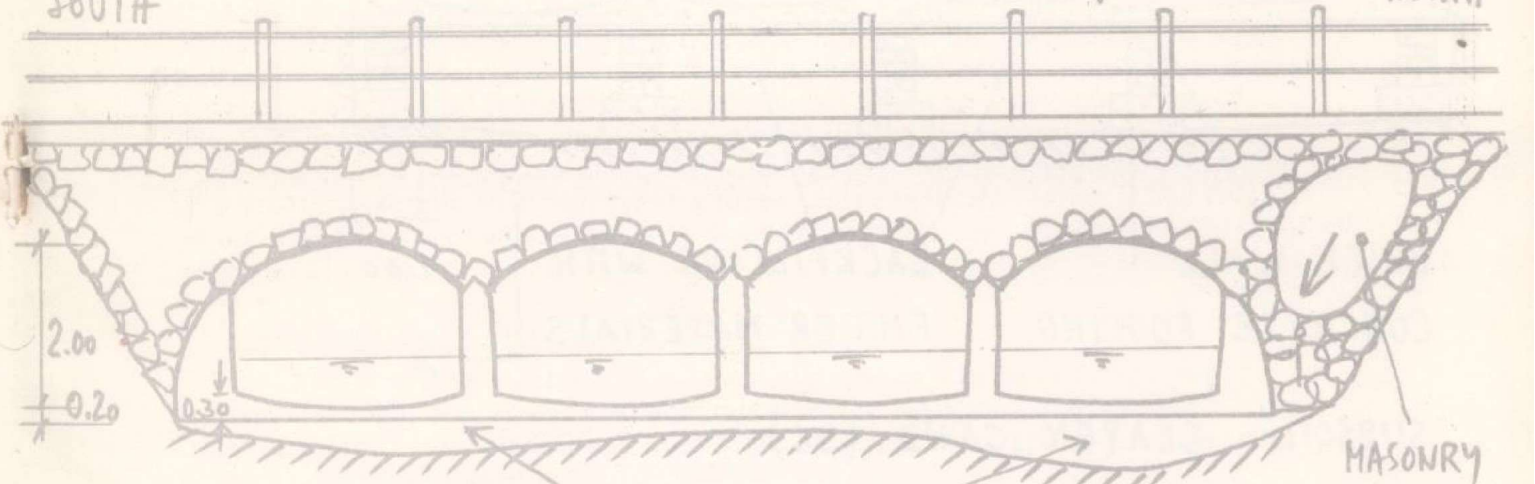
## ELEVATION FROM DOWNSTREAM FACE

1:100

SOUTH

NORTH

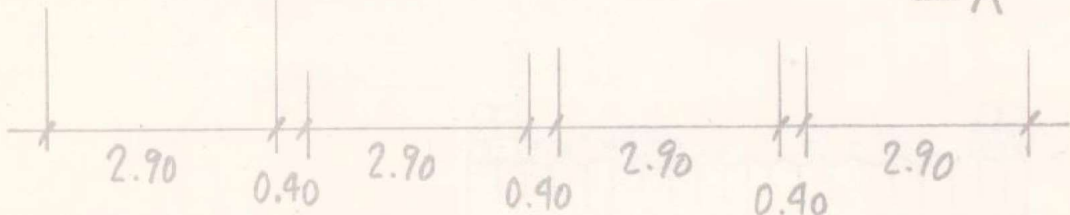
A



40-50% UNDERMINED

A

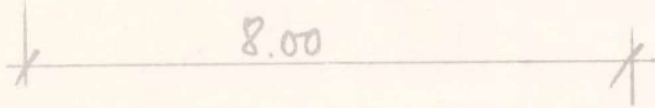
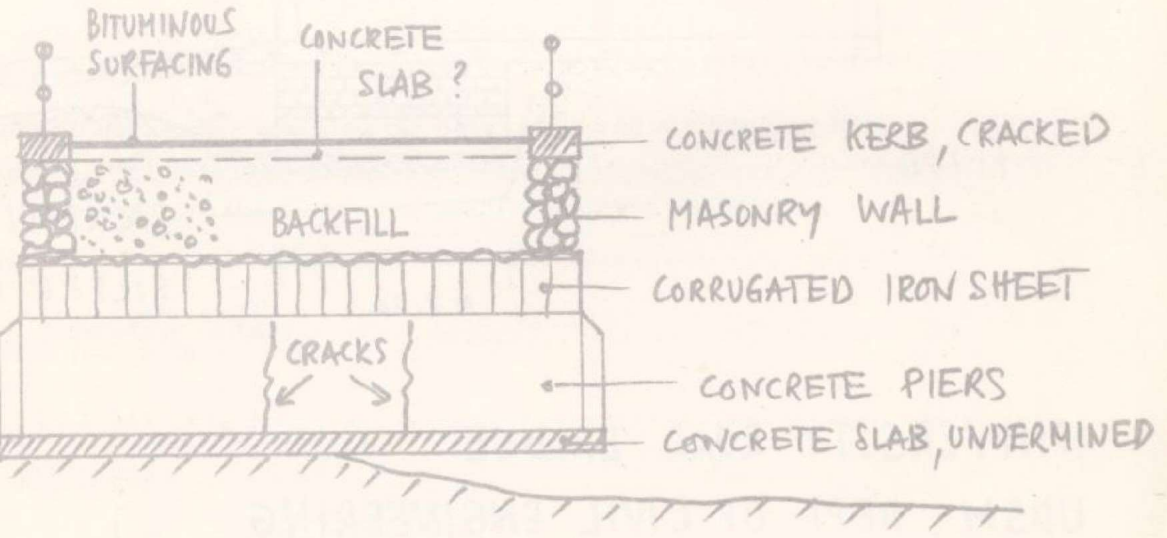
MASONRY BROKEN OUT



### A-A

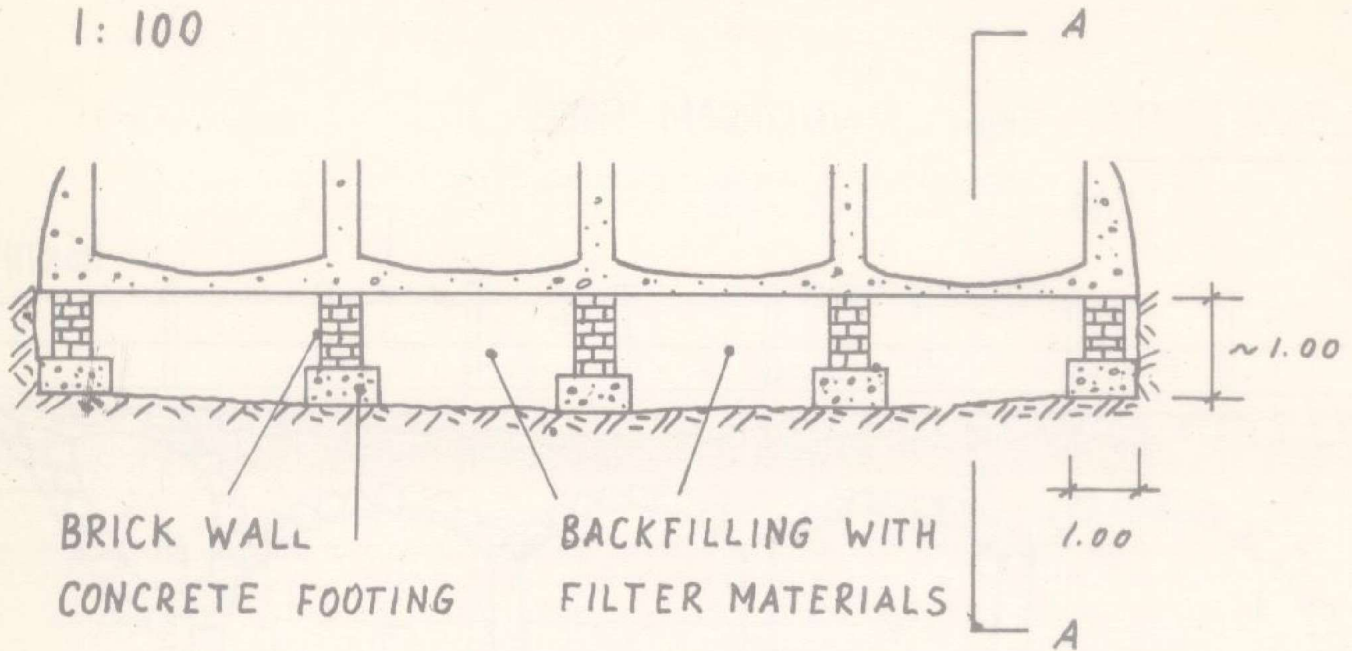
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OPENINGS OBSTRUCTED BY SOIL, WOOD, CONCRETE BLOCKS



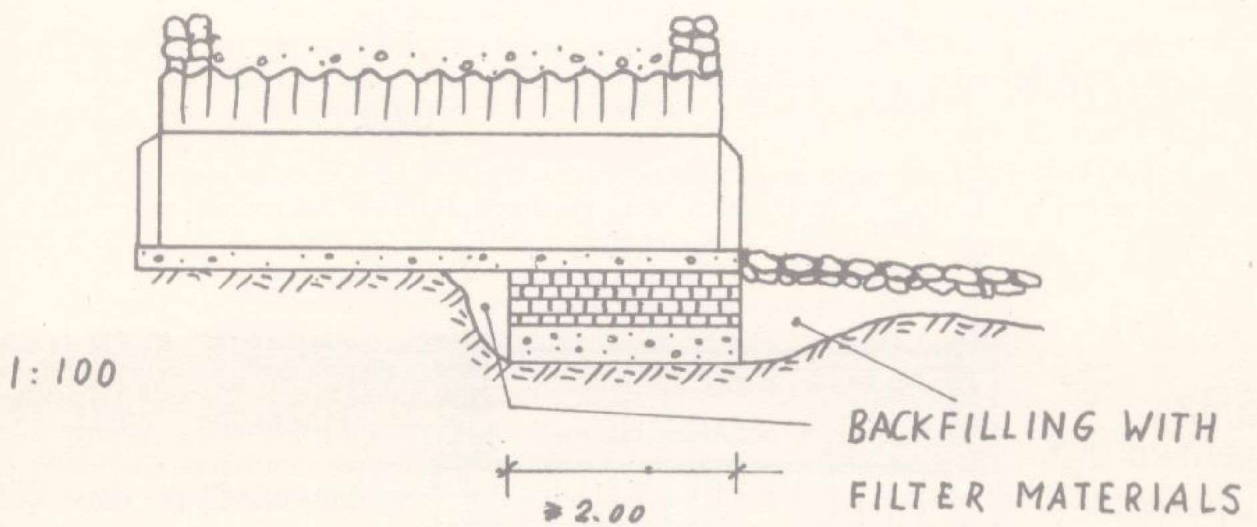
# UNDERPINNING AND EROSION PROTECTION

1: 100



SUBSOIL: CLAYEY SAND (SC)

A-A :



UNIVERSITY ROAD BRIDGE  
UDSM, DEPT. OF CIVIL ENGINEERING