

## PAVEMENT DESIGN & REHABILITATION OF PORT CONTAINER STACKING DEPOT CAPE TOWN HARBOUR

Existing stacking pavement structures were constructed using concrete panels about 30 years ago. These panels measured around 5m by 5m and included key construction joints, dowel joints and a host of other joints types. These concrete panels exhibited ongoing distress due to the phenomenon of alkali aggregate reaction (AAR/ASR) which presented ongoing problems in the concrete with expansion due to chemical reactions in the presence of water. Little maintenance and repair has been carried out over the pavement life period including that to the joints.

In order to expand the container harbour's overall capacity, the existing stacking arrangement of 3 containers high needed to be upgraded to a 5 container high stack with resultant increases in both contact stress and overall load on the concrete pavements.

Rehabilitation was investigated with mainly non-destructive methods being used to evaluate the ability of the existing pavement to accommodate different arrangements of container stacking.

General findings:

- ◆ ***Existing distressed stack accommodates 2 to 3 container stacking in limited formation over the future required design period.***
- ◆ ***Upper concrete pavement thickness of around 360mm with poor flexural strength due to the ASR.***
- ◆ ***Pavement supporting layers consisting of thin stabilised subbase on sandy materials were found to be generally adequate.***

Rehabilitation design was carried out which necessitated the removal of existing concrete in the planned stack areas and replacement with 400mm thick concrete with a 4,5 MPa flexural strength whilst leaving the supporting layers intact. The remaining existing concrete would be generally left intact where vehicle trafficking and rubber tyred gantry trafficking would be the loading. Over these zones, local areas and slabs showing severe distress would be replaced.

Complex jointing design was necessary to mesh the new concrete with new service structures and tie into the existing concrete pavements.

New stack areas are to be constructed using a similar concrete pavement structure to the zones of rehabilitation, except with stabilised subbase of 200mm cement treated material and crushed material upper selected layers and sandy lower selected layers.

Material obtained from the break-up of existing concrete is cost-effectively utilised as crushed material for both the stabilised subbase and the selected layers.

Client : Transnet Capital Projects /  
National Ports Authority



Cape Town Port Container Depot