



REPLACEMENT OF DAMAGED EXPANSION JOINTS SAS AL NAKHL BRIDGE

Sas Al Nakhl Bridge is a strategic bridge that used by the traffic to enter Abu Dhabi Island (via Maqta Bridge) or used by trucks on their way to Mussafah.

As part of their routine maintenance to enhance the life of the assets of the Emirate of Abu Dhabi, the Infrastructure & Maintenance Department – Abu Dhabi City Municipality issued a Work Order to replace the damaged expansion joints installed in Sas Al Nakhl Bridge.



INTRODUCTION

Due to the sensitivity of the bridge, and the heavy traffic volume in this section of the road, Abu Dhabi City Municipality agreed with Integrated Transportation Center (ITC) to use Maurer Modular Bridging System (MMBS) during the maintenance work of the expansion joints.

The usage of the MMBS will allow the replacement of the expansion joints (along any repair to the structure that may be required) without affecting the traffic movement during the work involved the replacement of the full section of expansion joints (2 lanes & 2 hard shoulders with total length of 13.5m) by new elastomeric expansion joints without disturbing the traffic.

The plan was to install MMBS units to cover the travelling lanes and allow the work on one lane during night-time (from 10:30pm to 5:30am) while the traffic is using the second lane. The full width of the road was opened to traffic during daytime (from 5:30am to 10:30pm).

The site activities during each night are described and documented with photos.

Work started on the 09th of September 2022 (01st night) by installing the MMBS, and the MMBS were removed on the 14th night. Out of these 14 nights, there was 2 nights without work (due to non-availability of closure permit), and there was another 3 nights used to repair the concrete of the deck slab (as there was damage to the concrete).

WORKING IN THE SLOW LANE

During the allowed road closure time (10:30pm to 5:30am), traffic is diverted to the fast lane and the MMBS units are opened, allowing the staff to carry out the work of the expansion joint replacement on the section located in the slow lane and the right shoulder as well.



WORKING IN THE FAST LANE

During the allowed road closure time (10:30pm to 5:30am), traffic is diverted to the slow lane and the MMBS units are opened, allowing the staff to carry out the work of the expansion joint replacement on the section located in the fast lane and the left shoulder as well.



WORKING SEQUENCE

NIGHTS

01

**INSTALLING MMBS ON THE
TRAVELLING LANES** (*fast & slow
lanes*)

02

**WORKING ON THE FAST
LANE** (*removing existing joint*)

03

**WORKING ON THE SLOW
LANE** (*removing existing joint*)

04

**WORKING ON THE FAST
LANE** (*Bedding mortar*)

05

**WORKING ON THE FAST
LANE** (*placing joint units and anchor
bolts*)

NIGHTS

06

**WORKING ON THE SLOW
LANE** (*removing damaged concrete &
cleaning*)

07

**WORKING ON THE SLOW
LANE** (*removing damaged concrete,
cleaning & adding U bars*)

08

**WORKING ON THE SLOW
LANE** (*shuttering & applying concrete
repair material*)

09

**WORKING ON THE SLOW
LANE** (*shuttering & applying bedding
mortar*)

10

NO WORK

NIGHTS

11

NO WORK

12

WORKING ON THE SLOW LANE (*placing joint units and anchor bolts*)

13

WORKING ON THE SLOW LANE & FAST LANE (*Transition strip & anchor bolts sealant*)

14

WORKING ON THE SLOW LANE & FAST LANE (*Removing MMBS Units - Work completed*)

NIGHT 1

Installing MMBS on the travelling lanes (fast & slow lanes)

- Close the slow lane to traffic and divert all the traffic to the fast lane.
- Install MMBS on the slow lane.
- Open the slow lane to traffic (traffic is moving on the newly installed MMBS) and close the fast lane.
- Install MMBS on the fast lane.
- Full width of the road is covered by MMBS units.
- Open the traffic on both lanes





NIGHT ONE

NIGHT 2

Removing expansion joint units (Fast Lane)

- Close the fast lane to traffic and divert all the traffic to the slow lane.
- Open the MMBS on the fast lane.
- Asphalt marking & cutting
- Remove existing joint.
- Remove existing bedding mortar and bolts.
- Cleaning
- Close MMBS on the fast lane.
- Open road to traffic.





NIGHT TWO

NIGHT 3

Removing expansion joint units (Slow Lane)

- Close the slow lane to traffic and divert all the traffic to the fast lane.
- Open the MMBS on the slow lane.
- Asphalt marking & cutting
- Remove existing joint.
- Remove existing bedding mortar and bolts.
- Cleaning
- Close MMBS on the slow lane.
- Open road to traffic.

Observations:

- Damaged concrete
- Structural gap filled with debris.





NIGHT THREE

NIGHT 4

Completing Bedding Mortar (Fast Lane)

- Close the fast lane to traffic and divert all the traffic to the slow lane.
- Open the MMBS on the fast lane.
- Cleaning the concrete surface.
- Fixing the shutter.
- Laying bedding mortar.
- Close MMBS on the fast lane.
- Open road to traffic.



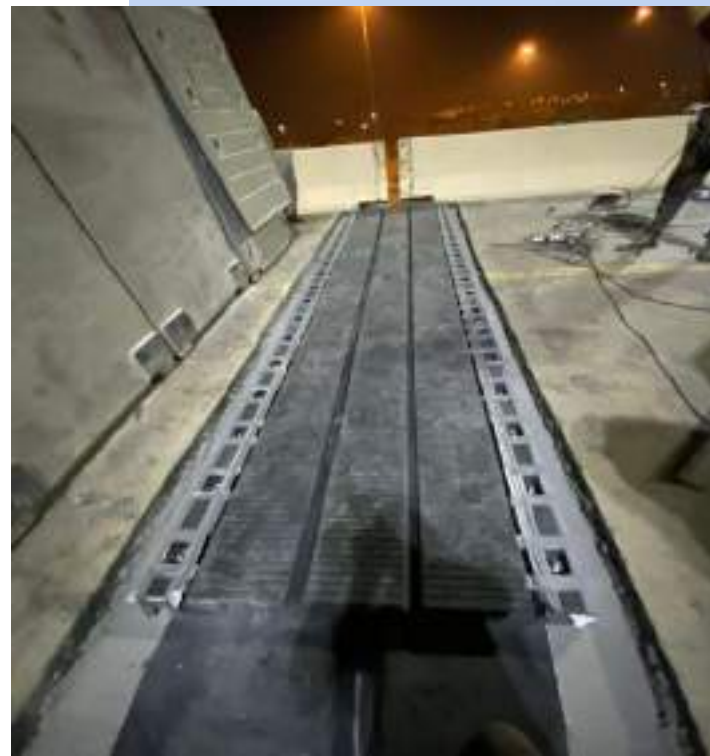


NIGHT FOUR

NIGHT 5

Placing expansion joint & fixing anchor bolts (Fast Lane)

- Close the fast lane to traffic and divert all the traffic to the slow lane.
- Open the MMBS on the fast lane.
- Remove shutter & cleaning.
- Fixing EPDM membrane.
- Placing new expansion joints (3 units).
- Marking for anchor bolts & drilling.
- Applying anchor adhesive and install bolts.
- Close MMBS on the fast lane.
- Open road to traffic.





NIGHT FIVE

NIGHT 6

Removing damaged concrete & cleaning (Slow Lane)

- Close the slow lane to traffic and divert all the traffic to the fast lane.
- Open the MMBS on the slow lane.
- Remove damaged & loose concrete.
- Clean the structural gap and remove all debris.
- Close MMBS on the slow lane.
- Open road to traffic.





NIGHT SIX

NIGHT 7

Cleaning & adding U bars (Slow Lane)

- Close the slow lane to traffic and divert all the traffic to the fast lane.
- Open the MMBS on the slow lane.
- Continue removing damaged concrete & cleaning.
- Drilling to add U bars with chemicals.
- Close MMBS on the slow lane.
- Open road to traffic.





NIGHT SEVEN

NIGHT 8

Shuttering & applying concrete repair material (Slow Lane)

- Close the slow lane to traffic and divert all the traffic to the fast lane.
- Open the MMBS on the slow lane.
- Cleaning & surface preparation.
- Shuttering.
- Applying primer followed by concrete repair material.
- Close MMBS on the slow lane.
- Open road to traffic.





NIGHT EIGHT



NIGHT 9

Completing Bedding Mortar (Slow Lane)

- Close the slow lane to traffic and divert all the traffic to the fast lane.
- Open the MMBS on the slow lane.
- Remove the shutter of concrete repair.
- Cleaning the concrete surface.
- Fixing the shutter.
- Apply primer and Lay bedding mortar.
- Close MMBS on the slow lane.
- Open road to traffic.





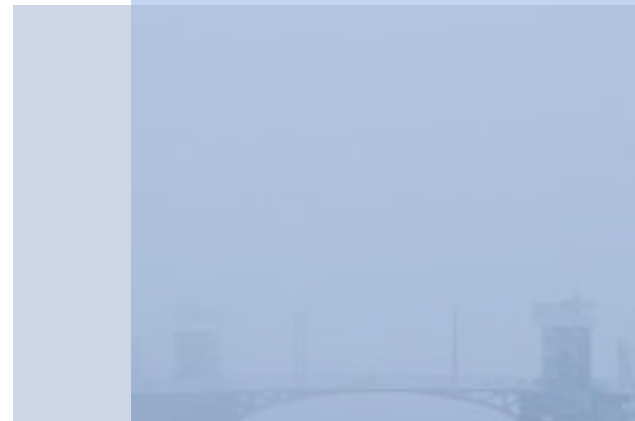
NIGHT NINE



ECO

NIGHT 10

NO WORK

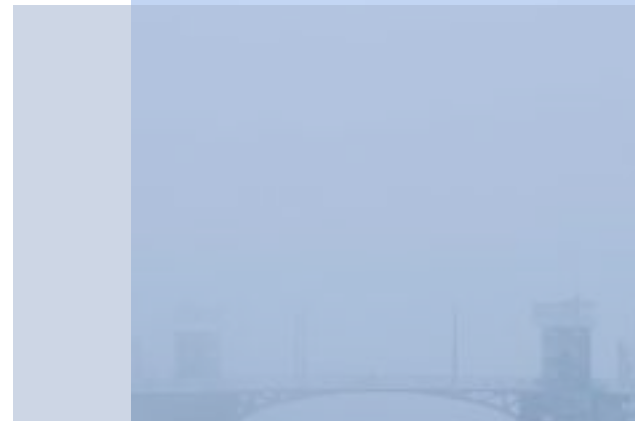




ECO

NIGHT 11

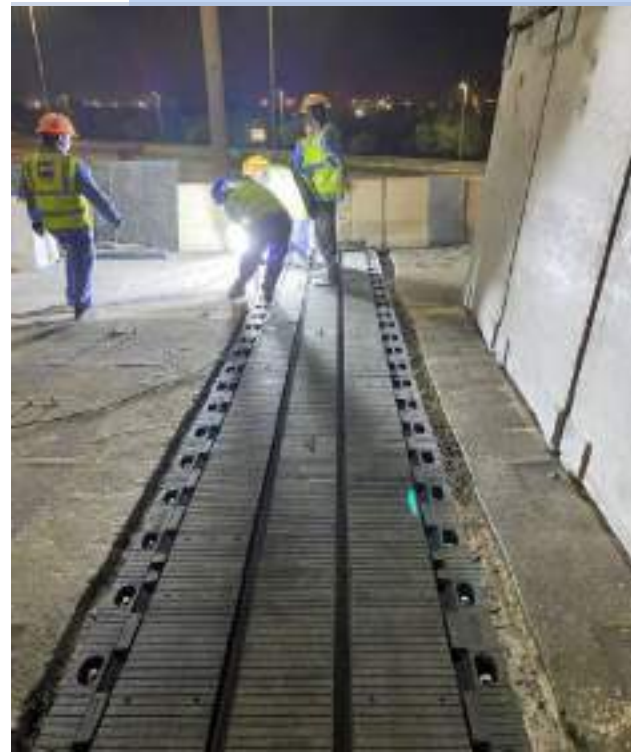
NO WORK



NIGHT 12

Placing expansion joint & fixing anchor bolts (Slow Lane)

- Close the slow lane to traffic and divert all the traffic to the fast lane.
- Open the MMBS on the slow lane.
- Remove shutter & cleaning.
- Fixing EPDM membrane.
- Placing new expansion joints (4 units & special unit of 0.7m).
- Marking for anchor bolts & drilling.
- Applying anchor adhesive and install bolts.
- Close MMBS on the slow lane.
- Open road to traffic.



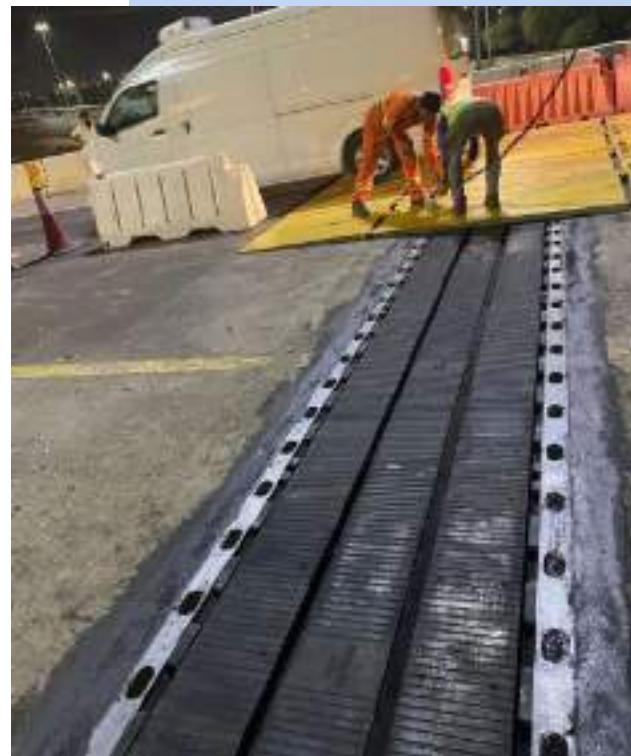


NIGHT TWELVE

NIGHT 13

Transition strip & anchor bolts sealant (Slow Lane & Fast Lane)

- Open MMBS on slow lane and divert the traffic on the fast lane.
- Bolts tightening & torque.
- Complete transition strip and anchor bolts hole sealant.
- Close MMBS.
- Divert the traffic to the slow lane.
- Open MMBS on fast lane.
- Complete transition strip and anchor bolts hole sealant.
- Close MMBS.
- Open road to traffic.



NIGHT THIRTEEN





NIGHT 14

Removal of MMBS (Slow Lane & Fast Lane)

- Divert the traffic to the fast lane
- Remove the MMBS from the slow lane.
- Divert the traffic to the slow lane (traffic is moving on the newly laid expansion joint).
- Remove the MMBS from the fast lane.
- Open the road to traffic.
- Traffic is moving on the newly completed expansion joint units.





NIGHT FOURTEEN

Before Replacement of the Joint

Joint was in bad condition, with damaged units.

Asphalt was laid to replace the damaged expansion joints and close the structural gap



After Replacement of the Joint

The usage of MMBS allowed for concrete repair of the deck slab (on the slow lane).

There was no major disturbance to traffic as the motorist need to make use of the system. The system allowed for proper curing of the materials used in installation of the new expansion joints.

BEFORE & AFTER

CONTACT US

