



JETI PELURU
TLDM, LUMUT, PERAK, MALAYSIA

REPORT
ON
CONDITION OF
SPLASHPRO M1-80 SYSTEM
BASED ON SITE INSPECTION

Prepared and submitted by:



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JETI PELURU
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REPORT
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March 2015

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JETI PELURU, TLDM, LUMUT, PERAK, MALAYSIA -
(Armory jetty, Royal Malaysian Navy, Lumut, Perak, Malaysia)

REPORT ON CONDITION OF SPLASHPRO M1-80 SYSTEM BASED ON SITE INSPECTION

- Client** : TLDM (Royal Malaysian Navy), Lumut, Perak /
JKR, Cawangan Pangkalan Udara Dan Maritim
- Contractor** : Akid Merah Sdn Bhd /
CLM Construction & Trading Sdn Bhd
- Description** : The jetty comprises 105 steel piles.
There are 30 nos. 480mm diameter and 75 nos. 630mm diameter
The splash zone height is 4000mm. Total protected area is 724 sq.m
- Installation** : February to March 2007
- Material used** : SPLASHpro M1-80 System comprising
STACprime UW, STACfill, STACwrap (150mm & 300mm),
STACguard, SS317L band (12.5mm / 0.76 mm), SS 316 Buckle
- Manufactured by** : Central Products LLC, USA /CP Coatings Sdn Bhd
- Supplied through** : STAC System Sdn Bhd
- Inspection Date** : 6th March 2015



JETI PELURU, TLDM, LUMUT, PERAK, MALAYSIA

(Armory jetty, Royal Malaysian Navy, Lumut, Perak, Malaysia)

REPORT ON CONDITION OF SPLASHPRO M1-80 SYSTEM BASED ON SITE INSPECTION

Background

Subsequent to the report on pictures of the installations, a site inspection was arranged on the installation by the client on the 6th March 2015.

The procedure of the inspection as proposed by CP Coatings Sdn Bhd was accepted by the client.

- a. Visually inspect most, if not all the piles via boat to be provided by the client, and make close examination on selected piles and areas.
- b. Proposed to work on the pile closest to the shore to open up the SPLASHpro jacket for detailed examination.
- c. Remove the barnacles from the HDPE jacket and the straps and make observations.
- d. Cut off a section of the HDPE jacket between 2 straps of around 400mm height. And make observation on the conditions of the jacket as well as the conditions of the STACwrap.
- e. Cut off some area of STACwrap and make observations on the conditions of the metal surface. Remove a portion of the STACwrap for testing purposes.
- f. Upon completion of inspection, new STACwrap will be used to make good the wrap protection. Thereafter, the HDPE jacket shall be installed over the inspected section and secured by new set of straps.
- g. Samples of the removed portion of the jacket and the wrap will taken for future investigation.
- h. Pictures will be taken for report purposes.

Time of Inspection

The inspection was conducted as follows:

- a. Date : 6th March 2015
- b. Time : 10.00 am to 12.30pm (2.5 hours)
- c. Tide : Based on the tide information, the low tide is at 11.00am

Attendance

The Inspection was attended by the following:

- | | |
|-------------------------------|---|
| a. Aini Sauinah Esa | JKR TLDM (Civil Engineer) |
| b. Mohd Dzulkarnain b. Shaari | JKR TLDM (Engineer Assistant) |
| c. Mohamad Rozlan b. M Idris | JKR TLDM (Site Supervisor) |
| d. Bo Soon Leong | STAC System Sdn Bhd |
| e. Sherman Chaw | CP Coatings Sdn Bhd (Representing Central Products LLC) |
| f. Ling Liong Lai | CP Coatings Sdn Bhd (Representing Central Products LLC) |

Observations and Pictures

a. Visual inspection of the piles.

Using the boat arranged by the client, visual inspection of all the piles was carried out.

Photo 1: Boat used for Inspection



Photo 2: View of Platform



Photo 3: View of Platform



Photo 4: View of Trestle



Photo 5: View of Trestle



Photo 6: View of Trestle



Photo 7: View of Jetty



Photo 8: View of Jetty



Photo 9: View of SS 317L Bands



Photo 10: View of SS 317L Bands



Photo 11: View of SS 317L Bands



Photo 12: View of SS 317L Bands



Photo 13: View of Barnacle Growth



Photo 14: View of Barnacle Growth



Observations:

1. All the jackets installed on the piles were intact and are in their original positions with none detected slipping down.
2. There was no detection of jackets missing from the piles.
3. There were no visible signs of injury or damage to the jackets.
4. All the straps were seen to be intact and holding up well. Some were observed with stains and some were still shiny.
5. There were visible signs of staining on the straps.
6. There was extensive growth of barnacles on the jackets and into the gaps of the overlap.

b. Detailed Inspection of a Selected Pile

1. From the discussion with the client, the trestle pile closest to the shoreline was selected for detailed inspection.
2. The pile was selected as it was possible to access to it without the use of a pontoon, which is necessary for work to be carried out around the pile when the tide is at the lowest at 11am on the inspection day.
3. One of SS317L was removed and a height of 350mm height of jacket was cut off to inspect the jacket and the STACwrap.

Photo 15: View of Selected Pile



Photo 16: View of Selected Pile



Photo 17: Inspection of Pile



Photo 18: Removal of Barnacle



Photo 19: Barnacles Removed



Photo 20: Removal of SS317L Strap



Photo 21: SS317L Strap Removed



Photo 22: Growth into the Overlap



Photo 23: Ingress of Mud into Overlap



Photo 24: Jacket Serial No in Overlap



Photo 25: Ingress of Mud into STACwrap



Photo 26: Condition of STACwrap



Photo 27: Condition of STACwrap



Photo 28: Condition of STACwrap



Photo 29: Cut off Section of STACwrap



Photo 30: Cut off Section of STACwrap



Photo 31: Condition of Steel Pile Surface



Photo 32: Condition of Steel Pile Surface



Photo 33: Condition of STACwrap



Observations:

1. The barnacles could be removed with hand tools. There was no penetration of the barnacle into the HDPE jacket.
2. The barnacles grew into the overlap of the HDPE sheet, but not beyond the overlap.
3. Mud and water were found into the overlap and onto the STACwrap. Mud was observed on the STACwrap.
4. The STACwrap was seen to be in very original condition and no drying up was evident.

c. Making Good and Reinstallation of the Inspected Area of Pile

1. After completion of the inspection, the STACwrap of the removed section is replaced by a layer of STACwrap.
2. Thereafter, a new 2 layers of STACwrap is applied on over the entire removed jacket area.
3. A section of 500mm height of jacket is installed over the cut section with 2 straps of SS317L installed on the top and bottom edge.

Photo 34: Patch with STACwrap



Photo 35: Patch with STACwrap



Photo 36: Apply 2 layer STACwrap



Photo 37: Apply 2 layer STACwrap



Photo 38: Apply 2 layer STACwrap



Photo 39: Complete 2 layer STACwrap



Photo 40: New Section of Jacket



Photo 41: Install Bottom SS317L band



Photo 42: Install Top SS317L band



Photo 43: Install Top SS317L band



Photo 44: Secure Buckle



Photo 45: Completed Jacket



Photo 46: Completed Reinstallation



d. Inspection of the SS317L Band

1. The SS317L bands were seen to have stains.
2. Hand brush was used to brush of the stains as well as the barnacle growth.
3. It is observed that these were sticking to the surface as the bands were still shining after cleaning.

Photo 47: Stained band



Photo 48: Wiring Brushing



Photo 47: Shining surface of band



Photo 48: Stained Band



Photo 49: Shining surface of band



Photo 50: The removed SS317L bands



e. Sample removed from the site

The following samples were removed from site after inspection for detailed visual observation and any future use.

1. SS317L bands and buckle
2. STACwrap measuring 250mm x 300mm
3. A piece of HDPE jacket

Photo 51: Sample of STACwrap



Photo 52: SS317L band and buckle



Photo 53: Sample of HDPE Jacket



Conclusions :

From the inspection, it was seen that the SPLASHpro M1-80 systems installed 8 years ago have performed according to its intended purposes.

The materials used were still intact and are in excellent conditions as shown in the following considerations:

1. The HDPE Jacket is holding up well. No visible damage to the jackets were observed.
2. The bands and buckles are performing well. No jackets were seen slipping down. The bands and buckle had held the jackets in position firmly against the waves and other elements.
3. The STACwrap is performing well. It was observed that the STACwrap was still greasy and similar to the new STACwrap although made dirty by the mud.
4. The metal surface of the steel pile (from the sample inspected) appeared to be still coating in the petrolatum primer and the surface did not have evidence of further corrosion.

Recommendations:

1. It is recommended to carry out inspections regularly, once a year to assess the conditions of the installations.
2. It is also recommended to inspect the conditions of the components by opening up the installation to assess the performance of the materials and the effectiveness of the corrosion protection.
3. Due to the extensive barnacle growth on the surface and also into the gaps of the overlap, it is recommended that the **SPLASHpro M2-80** bolted system be used in future replacement or projects

Attachment:

1. Report based on site photographs 24 February 2015
2. Installation fact file 2007
3. SPLASHpro M2-80 information

This report is prepared by:

CP Coatings Sdn Bhd, Regional (SEA) distributor in collaboration

with

Central Products LLC, USA/ Central Products (Tianjin) Co. Ltd, manufacturer of SPLASHpro M1-80 system

March 2015

REPORT BASED ON SITE PHOTOGRAPHS
24 FEBRUARY 2015



JETI PELURU
TLDM, LUMUT, PERAK, MALAYSIA

REPORT
ON
CONDITION OF
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BASED ON PHOTOGRAPHS SUBMITTED

February 2015

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Inspection pictures

Picture No.1



Picture No.2



Picture No.3



Picture No.4



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(Armory jetty, Royal Malaysian Navy, Lumut, Perak, Malaysia)

REPORT ON CONDITION OF SPLASHPRO M1-80 SYSTEM BASED ON PHOTOGRAPHS SUBMITTED

Background

A site inspection was conducted on the installation by the client in February 2015. The photographs were passed to us for feedback and comments.

Warranty

The SPLASHpro M1-80 system comes with a limited manufacturing warranty period of 10 years against manufacturing defects.

As the installation was completed in March 2007, the warranty against manufacturing defects is up to March 2017. To date, there were no requests from the contractor/client for the manufacturer to carry out any inspections, assessment and or repairs.

Observations, Comments and Analysis

The following are observations, comments and analysis of the SPLASHpro M1-80 installation made from the 4 photographs provided.

1. The SS316L Straps

- a. The SS316L straps are holding up well.
- b. No straps were detected missing.
- c. Surface corrosion on straps appeared to be normal/minimal, not discolored from surface rust from the silver appearance seen through the barnacles.
- d. If any straps had failed, the jackets would have opened up and eventually pulled off due to wave action.
- e. Jackets did not appear to have "slid" down the piling, indicating a good banding and installation work

2. The HDPE Jacket.

- a. The HDPE jackets appeared deformed. The deformation of the HDPE is normal for M1 jackets which do not have tension or hoop stress on the jacket. The hoop stress is provided through the straps.
- b. With the straps providing the hoop stress in the HDPE jackets, it results in yielding or movement of the HDPE under the banding with the degree of movement according to the wave action experienced at the site
- c. The HDPE jacket appeared to be holding up to some impact issues. There are no visible evidence that something has hit the HDPE and gone through; with no holes detected.

3. The STACwrap
 - a. The condition and the performance of this corrosion protection layer could not be assessed from the pictures.
4. Barnacles growth
 - a. Substantial amount of barnacles have build up on the SPLASHpro system.
 - b. Generally, the barnacles will attach itself to the jackets and not puncture through it.
 - c. From the pictures, it is not visible on the extent or impact the barnacles growth has at the overlap of the HDPE jacket.

Notes and Recommendations

1. The jackets and the straps appeared to be holding up well however with extensive barnacles growth.
2. There is no record of post installation inspection and maintenance works in this project.
3. As the warranty is against manufacturing defects, periodic inspections are usually required to assess the performance and the state of the installations. Damages from third party should be rectified to ensure the system integrity.
4. To assess the complete performance of the SPLASHpro M1-80 system against corrosion, a complete site investigation is necessary.
 - a. Identify one of few piles to represent the whole installation conditions taking into consideration the jackets exposure to sun radiation, wave and flotsam impact and others.
 - b. Clear the barnacles on the surface and assess the jackets from the surface.
 - c. Inspect the vertical overlap of the jackets and determine the migration of barnacles into the corrosion protection layer under the jacket.
 - d. Where possible or allowable, pry open portion of the jacket or the whole jacket to inspect the condition of the STACwrap installation.
 - e. Remove the STACwrap and assess the conditions of the metal surface to determine the effectiveness of the corrosion protection layer.
5. As the installation is already 8 years, it would be timely to do an assessment on the protection system.

This report is prepared by:

CP Coatings Sdn Bhd, Regional (SEA) distributor in collaboration with **Central Products LLC, USA/ Central Products (Tianjin) Co. Ltd**, manufacturer of SPLASHpro M1-80 system.

February 2015

INSTALLATION FACT FILE 2007



JETI PELURU
TLDM, LUMUT, PERAK, MALAYSIA

INSTALLATION

FACT FILE

March 2007

Prepared and submitted by:



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Installation pictures



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Installation pictures (1)



JETI PELURU, TLDM, LUMUT, PERAK, MALAYSIA
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Installation pictures (2)

