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MMHE DRY DOCK 3

UNDERWATER INSPECTION REPORT




Utilizing ROV GM ST01

Prepared for

Client : MALAYSIA MARINE HEAVY ENGINEERING SDN BHD



Contractor : SOLARIS INFINITI SDN BHD

Final Report: ST-SI-MMHE-DD3-01

Prepared By	Checked By	Approved By	Date
			25/09/2020



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1. EXECUTIVE SUMMARY

The bearing on port and starboard side was inspected with ROV GM ST01 by means of General Visual Inspection (GVI). The obtained video recording data is of HD quality despite the water visibility is less than 1m.

The inspection of the submerged bearings, pins, guide plates and wall revealed that it is in good condition. The marine growth on the submerged areas are less than 2%. The water depth of the bearing location is at approximately -9.25m and the seabed is at approximately -14.2m during high tide.

2. INSPECTION EXECUTION

2.1 TASK

Supreme Technics Resources has been asked by Client, Solaris Infiniti Sdn Bhd to conduct a General Visual Inspection on Port and Starboard Side Bearings. Besides that, we were also asked to monitor the installation of the dry dock gate once installation is complete. The location of the said job is in the location of MMHE Dry Dock 3, Pasir Gudang, Johor, Malaysia. We deployed our ROV GM ST01 to site and performed the GVI.

2.2 INSPECTION OBJECT

The inspected submerged bearings from Port Side has been closely looked at for any anomalies, damaged or defect on the bearings and bearing house. Attached is the drawing that was given to us for guideline. (Please refer attachment Item No. 1)



We did a sweep fly on the stopper wall to look for anomalies, damages or defects on the wall. Our GM ST01 flew along the stopper wall at a distance of 80m.

We also inspected the connector for the dry dock wall to the bearing. We were told to look for gaps between the wall and the concrete wall. Besides that, we were asked to check on the condition of the concrete wall and its attachments.

2.3 EQUIPMENT

The ROV was tested at our facility in Kuala Lumpur before departing to Pasir Gudang, Johor. Suitable tool and consumables were also deployed with GM ST01. The ROV is designed to execute GVI with ease and to capture quality pictures in 4K resolution.

Specification of the ROV will be attached together with the report. Please refer to attachment Item No. 2.

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2.4 MOBILIZATION & PREPARATION

The ROV and its manpower mobilize from STR's facility on 13th September 2020. The manpower involved are:-



- | | |
|--------------------------|----------------------|
| 1) Sham Khaidzir | ROV Supervisor/Pilot |
| 2) Isharuddin Ibrahim | ROV Pilot/Tech 1 |
| 3) Taib Azamuddin Rashid | ROV Pilot/Tech 2 |

ROV is ready in suitcase for easy mobilization. All umbilicals, ROV, controller and charger are packed inside the suitcase.

Consumables were obtained before mobilization and was stowed in the vehicle of transport.

Both manpower, equipment and consumables mobilized to Pasir Gudang on 13th September 2020 and arrived at MMHE Gate 1 on the 14th September 2020.



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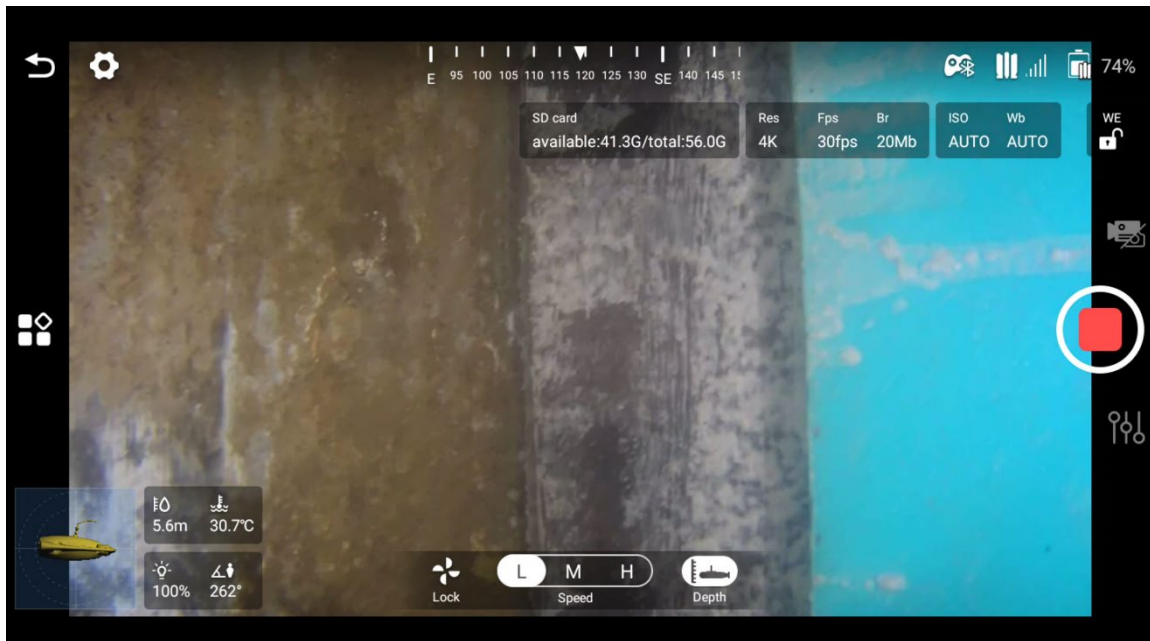
2.5 EXECUTION

ROV Operation

Our observation class ROV type Gladius Mini ST01 is used for this inspection. Once deployed, ROV located the said object of inspection and monitor of any damages and defects. The inspection is done via video recording to determine depth and accurate location of the inspected objects. The length of the inspection depended on the water conditions, currents and visibility.



Video Recording

The ROV are equipped with 4K resolution Sony camera. The video footages of the complete operation were saved and reviewed for data analysis. The video yields information and smoothness of recording motion.



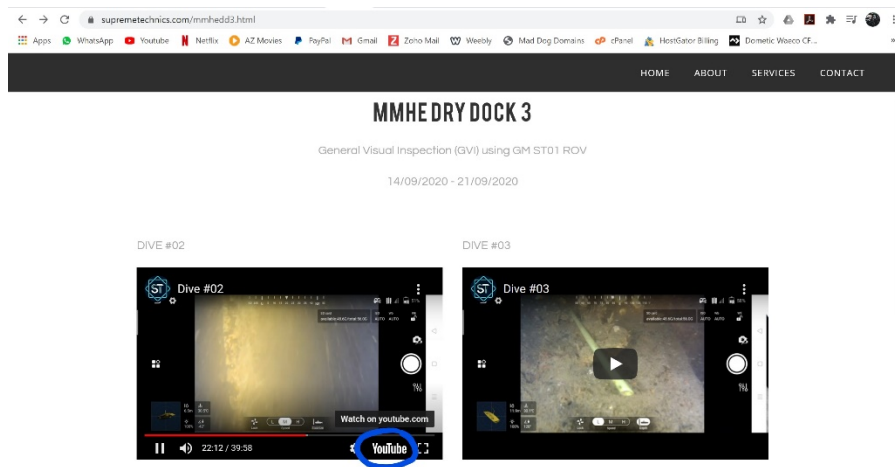
Data Quality

The data quality is good and showed on our video recordings. Visibility is less than 1m but managed to get quality videos for inspection.

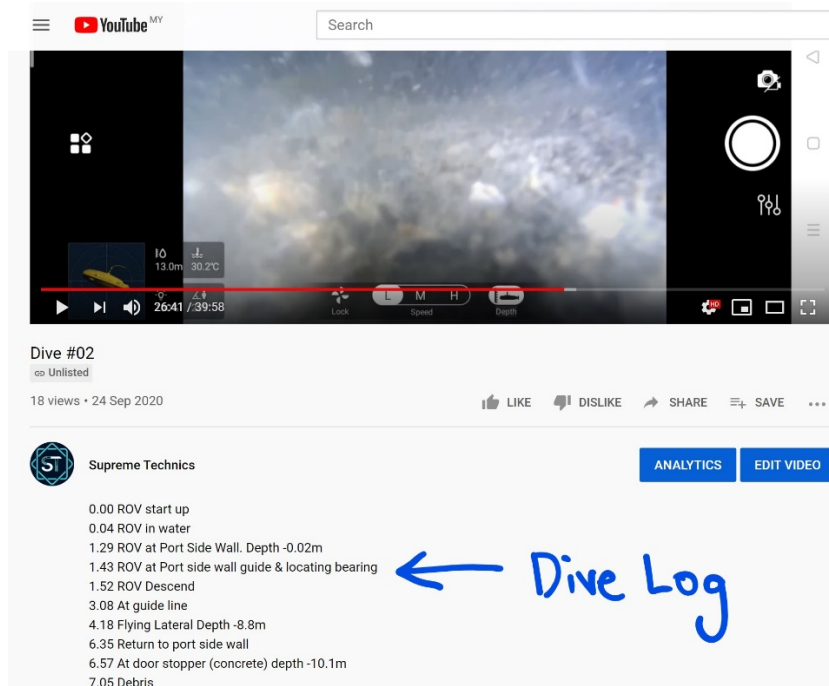
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3. RESULTS



Please refer to attachment Item No. 3 for the ROV Dive Log. The video recordings can be found in <https://www.supremetechnics.com/mmhedd3.html>. For better viewing, click on the Youtube icon of each video.



YouTube icon circled in blue



ROV Dive Log is present in the video description of each video

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4. CONCLUSION

From the findings of the General Visual Inspection, we found out that the condition of the bearings and bearing house (port and stbd side) is in great health. Minimal marine growth detected (less than 2% marine growth) and no anomalies detected at the inspected site. The stopper wall is in great health and condition. Very minimal to no marine growth detected when the ROV flew at the outer wall (now facing steel dry dock wall). Sadly the video was corrupted but the condition was confirmed by MMHE's Person in Charge Hafizul.

The dry dock wall has been slotted in as confirmed by our video recording and sits at where it is supposed to. The condition of the slotted area is visibly seen in the video recordings.

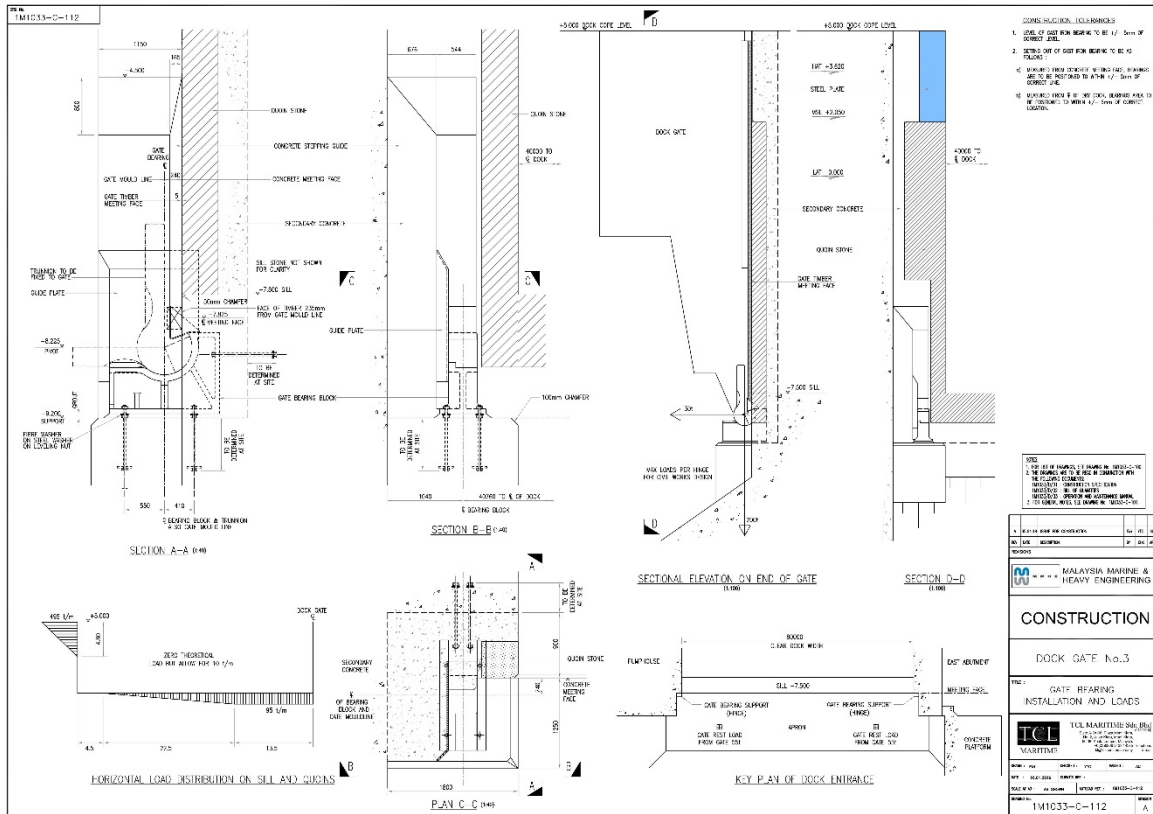
We would suggest a periodic inspection is to be done on the DD3's drydock wall.





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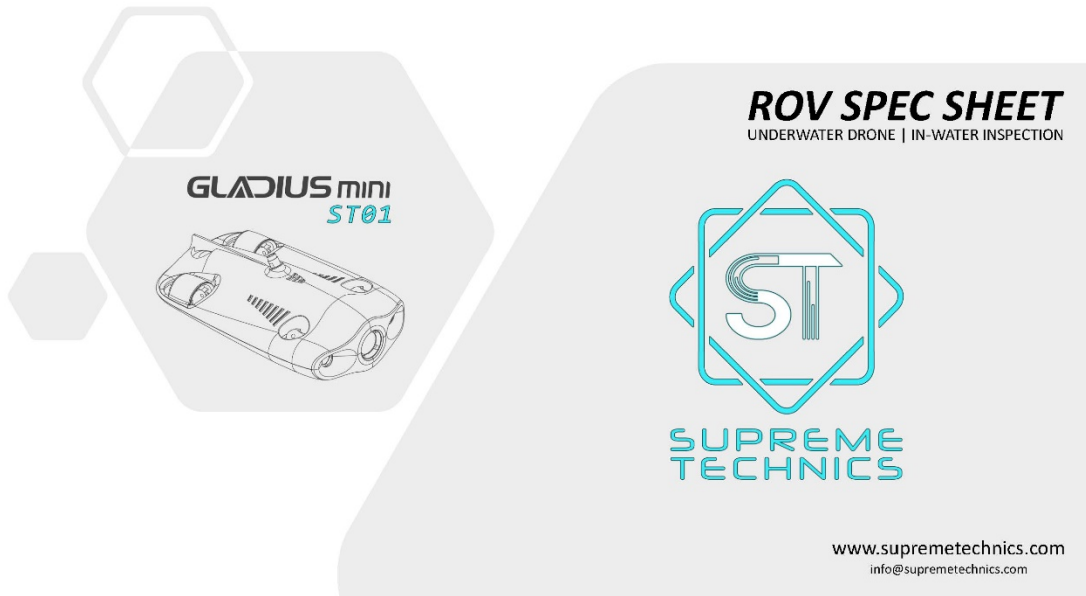
5. ATTACHMENTS



Item No. 1 - Drawing of Dry Dock 3



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Item No. 2 - ROV Specifications Sheet



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SPECIFICATIONS

ROV	
Size	385x226x138mm
Battery Capacity	55.5Wh (5000mAh)
Weight	<2.5kg
Buoyancy	-10g ~ 10g
Operating Temperature	-10°C ~ 40°C
Maximum Depth	100m
Maximum Speed	>4Kn (2m/s)
Maximum Rise/Fall Speed	2Kn (1m/s)
Maximum Flow Resistance	4Kn (2m/s)
Battery Life	2h (Forward at L speed in a fixed depth mode)
Battery Cycle	>300 times

Camera	
CMOS	1/2.3inches
Aperture	F3.0
Focal Length	4.0mm
ISO Range	100-3200
Field of View	95°
Maximum Resolution of the Image	12M (4000*3000)
Picture Type	JPEG/DNG
Video Resolution	FH D: 1920x1080 30fps FH D: 1920x1080 60fps FH D: 1920x1080 120fps UHD: 3840x2160 (4K) 30fps
Video Maximum Stream	60M
Video Type	MP4
SD Card Memory	64GB

Adapter	
Adapter	2.4GHz-2.485GHz
ROV Charging Time	<10m
Base Station Charging Time	1h

Note: ROV and base station are used the same adapter.

Base Station	
Weight	<400g
Battery Capacity	29.35Wh (2500mAh)
Battery Life	6h (Depending on the environment)
Battery Cycle	>300 times
HDMI Output	Yes
Micro SD (TF) Memory Recording	Yes
Size	151x107x45mm
Wireless Wi-Fi Distance	<10m



Note: The base station is not waterproof and should not be put in water.

Remote Controller	
Working Frequency	2.4GHz-2.485GHz
Wireless Distance (Between smart device and controller)	<10m
Charging Time	1h
Battery Life	5h

Sensor	
IMU	Three-axis gyroscope/acceleration/compass
Depth Sensor	+/- 0.5m
Temperature Sensor	+/- 2°C

Dimmable LED Lights	
Brightness	2x1200LM
Colour Temperature	4000K-5000K
CRI	80
Maximum Power	2x10W
Dimming	Manually adjustable

Winder & Tether	
Weight	1.8kg
Tether	100m



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Item No. 3 - ROV Dive Log

	ROV DIVE LOG	
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Date 17th SEPT 2020	Day THURSDAY	Client MMHE	Location DD3
ROV System GM ST01	Personnel 1 - Supervisor SHAM KHAIDZIR	Personnel 2 - Pilot/Tech ISHARUDDIN IBRAHIM	Personnel 3 - Ins Engineer
Person In Charge 1 HAFIZUL	Person In Charge 2 FAHIZ		

Time/minute	Description	Remarks
	DIVE # 02	
0.00	ROV start up	
0.04	ROV in water	
1.29	ROV at Port Side Wall. Depth -0.02m	
1.43	ROV at Port side wall guide & locating bearing	
1.52	ROV Descend	
3.08	At guide line	
4.18	Flying Lateral Depth -8.8m	
6.35	Return to port side wall	
6.57	At door stopper (concrete) depth -10.1m	
7.05	Debris	Hose and unknown debris
7.43	Bearing house at depth -9.1m	
8.38	Surfaced for reference	
10.22	At guide at depth -2.7m	
11.43	Under Pontoon	
12.53	At guide : corner end wall	
13.25	At stopper wall	
14.04	ROV at bottom	
14.40	ROV at stopper wall	
15.33	At top wall stopper depth -8.3m	
15.41	ROV entangled	
16.40	ROV to surface	
17.24	ROV under pontoon	
18.33	ROV next to water hose	
18.56	At MSL	
19.50	Left surface	
19.54	ROV on deck	
20.07	ROV Dive	
21.36	ROV at guide	
23.11	At corner wall away from guide	
23.25	Continue descend	
23.55	At steel guide depth -9.6m	
24.05	Top Wall stopper	
24.54	At bottom. Depth -12.5m	
26.02	At stopper wall depth -11.7m wall in satisfactory condition	
26.28	ROV at seabed	
26.49	ROV at depth -12.9m	
27.29	At guide. Depth -12.5m	

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	ROV DIVE LOG	
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28.17	At bearing house	
28.42	At bearing house depth -9.9m	
28.55	Debris	Cable
29.39	At bearing house mouth	
30.39	Bearing in good condition and clean	
38.28	Ascend	
29.10	ROV at MSL	
39.45	ROV left surface	
39.50	ROV on deck	
	END	

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	ROV DIVE LOG	
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Date 17th SEPT 2020	Day THURSDAY	Client MMHE	Location DD3
ROV System GM ST01	Personnel 1 - Supervisor SHAM KHAIDZIR	Personnel 2 - Pilot/Tech ISHARUDDIN IBRAHIM	Personnel 3 - Ins Engineer
Person In Charge 1 HAFIZUL	Person In Charge 2 FAHIZ		



Time/minute	Description	Remarks
	DIVE # 03	
0.00	ROV start up	
0.04	ROV left pontoon	
0.09	ROV at MSL	
2.31	Debris depth -10.1m	Cable
2.50	At top gate stopper	
3.52	At guide depth -10.6m	
5.47	At bearing house	
7.02	At guide depth -10.9m	
8.21	Debris depth -11.9m	Hose
9.36	Inside bearing house	
12.24	At bearing house wall depth -11.7m	
13.06	At bearing house	
15.05	At top stopper gate wall	
16.47	Ascending	
17.35	At diver's ladder	
20.20	ROV left surface	
22.13	ROV on deck	
	END	

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	ROV DIVE LOG	
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Date 18th SEPT 2020	Day FRIDAY	Client MMHE	Location DD3
ROV System GM ST01	Personnel 1 - Supervisor SHAM KHAIDZIR	Personnel 2 - Pilot/Tech ISHARUDDIN IBRAHIM	Personnel 3 - Ins Engineer
Person In Charge 1 HAFIZUL	Person In Charge 2 FAHIZ		



Time/minute	Description	Remarks
	DIVE # 04	
0.00	ROV start up	
1.37	ROV at wheel	
2.17	ROV at wall - condition clean	
4.31	Water hose	
5.15	ROV at top wall stopper	
9.08	At corner wall	
10.18	ROV Descend following the guide	
10.40	At guide plate depth -10.2m	
11.01	At end guide plate depth -10.6m	
12.02	At top wall stopper	
12.19	At bearing	
13.00	At wall guide	
13.13	ROV Disconnect	
13.28	Reconnect	
14.43	Ascending	
16.00	At MSL	
19.04	On deck	
	END	

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	ROV DIVE LOG	
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Date 18th SEPT 2020	Day FRIDAY	Client MMHE	Location DD3
ROV System GM ST01	Personnel 1 - Supervisor SHAM KHAIDZIR	Personnel 2 - Pilot/Tech ISHARUDDIN IBRAHIM	Personnel 3 - Ins Engineer
Person In Charge 1 HAFIZUL	Person In Charge 2 FAHIZ		



Time/minute	Description	Remarks
	DIVE # 05	
0.00	ROV start up	
	END	No recordings
	ROV FLYING AT DISTANCE OF 80m AT STOPPER WALL. CONDITION OF STOPPER WALL IS FREE FROM MARINE GROWTH. WITNESSED BY PIC HAFIZUL	

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	ROV DIVE LOG	
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Date 21st SEPT 2020	Day MONDAY	Client MMHE	Location DD3
ROV System GM ST01	Personnel 1 - Supervisor SHAM KHAIDZIR	Personnel 2 - Pilot/Tech TAIB AZIMUDDIN	Personnel 3 - Ins Engineer
Person In Charge 1 HAFIZUL	Person In Charge 2 FAHIZ		



Time/minute	Description	Remarks
	DIVE # 06	
0.00	ROV start up	
0.15	At MSL	
4.58	At marker buoy	
5.09	ROV descend	
8.46	H-Pile located. Top of pile at depth -8.6m	
9.08	ROV ascend	
9.50	At MSL	
12.03	At port side wall	
13.40	ROV left MSL	
13.48	ROV on deck	
	END	

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	ROV DIVE LOG	
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Date 21st SEPT 2020	Day MONDAY	Client MMHE	Location DD3
ROV System GM ST01	Personnel 1 - Supervisor SHAM KHAIDZIR	Personnel 2 - Pilot/Tech TAIB AZAMUDDIN	Personnel 3 - Ins Engineer
Person In Charge 1 HAFIZUL	Person In Charge 2 FAHIZ		

Time/minute	Description	Remarks
	DIVE # 07	
0.00	ROV at MSL	
0.02	At Dry Dock Door depth -8.7m	
2.01	ROV disconnect	
2.54	ROV reconnect	
3.35	At Dry Dock Door & wall depth 0.1m	
4.50	At dry dock door depth -4.5m	
4.53	ROV descending	
6.14	At bearing lock mechanism depth -7.8m	
6.26	Lock mechanism intact & touching wall	
7.05	End lock mechanism at depth -9.6m	
7.21	ROV lost connection	
8.58	ROV recovered & on deck	
	END	

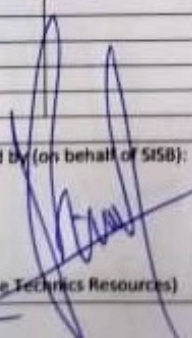




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Item No. 4 – Daily Activity Report (DAR)



 MMHE	DAILY ACTIVITY REPORT	 SOLARIS INFINITI
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Date 14TH SEPT 2020	Day MONDAY	Client MMHE	Location DD3
ROV System GM - ST01	Personnel 1 - Supervisor SHAM KHAIDZIR	Personnel 2 - Pilot/Tech ISHARUDDIN IBRAHIM	Personnel 3 - Pilot/Tech
Person In Charge 1 HAFIZUL	Person In Charge 2 FAHIZ		DAR # DAR/MMHE/001

Time	Description	Remarks
0900	Arrive at MMHE Gate	
1000	Safety Induction at Safety Office	
1040	Meet Hafizul and Fahiz at Block B Building	
1230	Left MMHE	
	END	

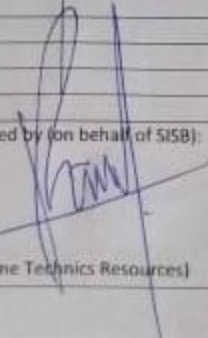

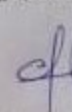


Prepared by (on behalf of SITS):   (Supreme Technics Resources)	Person In Charge (MMHE):    (Please sign and stamp)
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 MMHE	DAILY ACTIVITY REPORT	
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Date 15TH SEPT 2020	Day TUESDAY	Client MMHE	Location DD3
ROV System GM - ST01	Personnel 1 - Supervisor SHAM KHAIDZIR	Personnel 2 - Pilot/Tech ISHARUDDIN IBRAHIM	Personnel 3 - Pilot/Tech
Person In Charge 1 HAFIZUL	Person In Charge 2 FAHIZ		DAR # DAR/MMHE/002

Time	Description	Remarks
0830	Arrive at MMHE Gate 1	
0900	Project Induction Course	
1000	Meet Hafizul and Fahiz at Block B Building	
1530	ROV test dive # 001 at DD3Port Side	
1645	ROV surfaced and system shutdown	
1830	Left MMHE Gate 1	
	Note : Current Visibility is at < 1m Water Current is at < 1 knots	
	END	

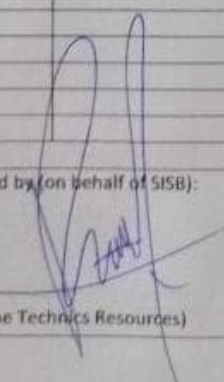

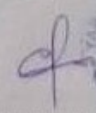

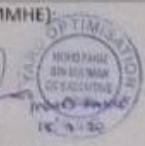
Prepared by (on behalf of SISB):   (Supreme Technics Resources)	Person In Charge (MMHE):    (Please sign and stamp)
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	DAILY ACTIVITY REPORT	
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ROV System GM - ST01	Personnel 1 - Supervisor SHAM KHAIDZIR	Personnel 2 - Pilot/Tech ISHARUDDIN IBRAHIM	Personnel 3 - Pilot/Tech
Person In Charge 1 HAFIZUL	Person In Charge 2 FAHIZ		DAR # DAR/MMHE/004

Time	Description	Remarks
0915	Arrive at MMHE Gate 1	
0930	Preparation for ROV dive at Stbd Side DD3	Please refer video recording
1040	ROV Dive # 004	
1115	Locate Bearing at Stbd Side DD3	
1145	ROV fly 80m to Port Side DD3	Please refer video recording
1215	ROV at surface and prepare to recover	
1230	ROV on deck at Stbd Side DD3	
1300	Exit MMHE Gate 1	
Note : Current visibility is at < 1m Water current is at < 1knots		
END		
		* 2nd Day Charge (1/2 Day)

Prepared by (on behalf of SISB):   (Supreme Technics Resources)	Person in Charge (MMHE):    (Please sign and stamp)
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