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电 气		2011-8-18	1	ISSUED FOR CONSTRUCTION								
		2010-5-8	0	ISSUED FOR CONSTRUCTION								
		2010-3-18	A	ISSUED FOR APPROVAL								
	日期	版本	说明				设计	校对	批准			
	Date	Version	Description				Design	Check	Approve			
	承建者	船务工程有限公司			工程号	ZS07007						
	Builder	SHIPYARD CO., LTD			Proj. No							
	业 主		MARINE ACCURATE WELL ASA			船 级	DNV	详细设计				
	Owner					Class		Detail Design				
	工程名	半潜式钻井平台			图 号	TCN119-CP-H007						
	P. Name	SEMI—SUBMERSIBLE HULL UNIT			Draw. No							
	COMMISSIONING PROCEDUR FOR ELEVATOR 电梯调试程序				设 计		批 准					
Design						Approve						
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SHIPYARD GROUP CO., LTD							比 例	N				
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1.0 GENERAL

- 1.1 All commissioning activities shall be in accordance with COSCO Permit to Work System.
- 1.2 The Permit to Work shall specify the conditions of work and precautions to be taken during the execution of the commissioning work to protect personnel, plant and the environment.
- 1.3 All commissioning personnel shall receive training to the level of their individual responsibilities on the Permit to Work system prior to its commencement.
- 1.4 All activities shall be carried out in accordance with the COSCO Safety Procedures, Project Standards and Statutory Regulations.

2.0 DOCUMENTATION REFERENCE

No.	Description
Mechanical Completion and Commissioning Documents	
2.1	Commissioning Permit to Work System ZS07007-NT-PM-CM-0002
2.2	Commissioning Manual ZS07007-NT-PM-CM-0006
Engineering Documents	
2.3	ELEVATOR LAYOUT PLAN HD-7657
2.4	Vendor document about the elevator

3.0 PURPOSE

- 3.1 The purpose of this document is to provide a procedure for commissioning the elevator and demonstrate to the client and certifying authorities that the system and components are fit for intended duty and meet the requirements of regulatory bodies whilst operating within the parameters of the system specifications.
- 3.2 It also provides a record of operating data that can be used as a basis of acceptance of machinery and system, prior to vessel handover.

4.0 EQUIPMENT REQUIRED

No.	Description	Make	Model	Calibration date
4.1	Sand bag			
4.2	Clock meter			

5.0 PRINCIPAL SPECIFICATION

Item	Design
Location	Living Quarter
Drive	VVVF
Control	2BC(Selective collective control system)
Capacity	1500kg(18 Persons)
Speed	60 m/min
Travelling height	12,700 m
Stopping floor	5 Stops

	(lower, mezzanine , main, A,B, DK)
Power supply	MAIN 3PH 690V 60HZ LIGHT 1PH 230V 60HZ
Traction motor	15 kw
Rated current	A

TYPE OF ELEVATOR	CREW ELEVATOR (2SETS) COLUMN 2&3	
CAPACITY	600KG (6 PERSONS)	
SPEED	60 M/MIN	
DRIVE	VVVF	
TYPE OF CONTROL	2 BC (SELECTIVE COLLECTIVE CONTROL SYSTEM)	
TRAVELLING HEIGHT	21400	
CAR INTERNAL SIZE	1020(W) X 1150(D) X 2100(H)	
NO. OF SERVICE	2 STOPS (LOWEST DK., TOP DK.)	
CLEARANCE OF DOOR	800(W) X 2000(H)	
DOOR OPERATION	2 SPEED SIDE OPENING DOOR (2SSO)	
LANDING DOOR	GAS TIGHT SWING DOOR WITH A-60 & A-0 INSULATION	
TRACTION MACHINE	TM403	
DIA. OF MAIN SHEAVE	Φ550	
MAIN ROPE	Φ 12 X 4 (1:1 ROPING)	
CAR RAIL	18K RAIL	
CWT RAIL	13K RAIL	
MOTOR CAPACITY	7.5 KW	
POWER SUPPLY	MAIN	3 PH 690V 60 HZ
	LIGHT	1 PH 230V 60 HZ
PAINTING COLOR	CAR INSIDE & DOOR	STAINLESS STEEL HAIRLINE FINISHED
	CAR CEILING	STAINLESS STEEL HAIRLINE FINISHED
	LANDING DOOR	MUNSELL NO. 2.5 Y 9/2
	ELECTRIC EQUIPMENT	MUNSELL NO. 7.5 BG 7/2
FLOORING	LUCSTRONG (G-S72406)	
RULES AND REGULATIONS	DNV	
GOVERNOR TRIP SPEED	CAR:84M/MIN(MAX), CWT:88M/MIN(MAX)	

6.0 COMMISSIONING PROCEDURE

Note: The HYUNDAI service engineer be present during commissioning

PART I: This part used for the elevator of the living quarter

6.1 Load Test (Including Confirmation)

Load test to be carried out on six (6) steps progressively i.e., 0 %, 20%, 50 %, 75%, 100 %, 125% of the rated capacity 1500kg

Voltage, current and speed to be recorded in each steps. Test result to be satisfied with the following items.

6.2 Brake Test (Holding Test)

Test of traction machine brake with maximum load weight plus 25 % of rated load.

6.3 Gear Test

6.4 Insulation Test

6.5 Temperature Rise Test.

Temperature rise on motor, machine, controller and machine room to be measured.

- 6.6 Installation at hoist way component parts test
- 6.7 Test of travel limit switch
- 6.8 Test of automatic operation
- 6.9 Test of alarm device
- 6.10 Manual hoisting device operating test (FLY WHEEL)
- 6.11 Test of normal lighting and emergency lighting
- 6.12 Motor run time limit test
- 6.13 Home landing function test
- 6.14 Safety switches
- 6.15 Protection during operation of doors
- 6.16 Opening the car door
- 6.17 Rope traction
- 6.18 Precautions against creep

Table 6.1 Load Test

LOADS		UP WARD			SIGNATURE		
%	WEIGHT	VOLTAGE	CURRENT	SPEED	VOLTAGE	CURRENT	SPEED
	(kg)	(V)	(A)	(m/min)	(V)	(A)	(m/min)
0	0						
25	375						
50	750						
75	1125						
100	1500						
125	1875						

Accepted car speed range : $54 \leq \text{measured speed} \leq 63$

Table 6.2 Brake Test (Holding Test)

125% of rated load	RESURT
1875kg	
Move the car to the lower floor in auto mode. Check the elevator keeps the stopping condition at a floor	

Table 6.3 Safety Gear Test

Step	Procedure	Expected	Result
	For car	The car stops within 0.3MR	
1	Run the car by pushing the manual down button at the car top		
2	Pull governor rope for car up by hand on the cage top		
3	Check the car stops within 0.3 m		

Step	Procedure	Expected	Result
	For CWT	Equal activation marks are to be shown each guide rail	
1	Run the car by pushing the manual down button at the car top		
2	Pull governor rope for CWT up by hand on the cage top		
3	Check the CWT stops immediately		
4	Check the visible indents of each guide rail		

Note:

1. The base of the pit shall be designed for an imposed load of at least 5000 N/m². The counterweight shall be equipped with safety gear.
2. The car shall be provided with a safety gear capable of operating only in the downward direction and capable of stopping a fully laden car, at the tripping speed of the overspeed governor, even if the suspension devices break, by gripping the guides, and of holding the car there.

Table 6.4 Insulation Test

NO.	ITEMS	ACTUAL	REF.VALUE	
1	Motor	M Ω	$\geq 4M \Omega$	
2	Brake circuit	M Ω	$\geq 4M \Omega$	
3	Control and signal	M Ω	$\geq 0.1M \Omega$	
4	Door motor circuit	M Ω	$\geq 4M \Omega$	

✘ The circuit board is to be removed before the test to avoid possible damage due to transient

Table 6.5 Temperature Rise Test

NO.	ITEMS	FINAL TEMPERATURES		SUCCESS	LIMIT OF TEMP. RISE
		COOL	HOT		
1	T/M Gear Housing				MAX 60°C
2	Motor frame				MAX 60°C
3	Control Panel(inside)				MAX 50°C
4	Machine room				MAX 45°C

Table 6.6 Installation at hoist way component parts test

Step	Procedure	Expected	Result
1	Check that landing push button and illuminated lamp are operated correctly	Operate correctly	
2	Check that the electric landing position indicator lit correctly in compliance with landing deck and running direction	Operate correctly	
3	Check that the interlock switches for landing door are operated correctly	Operate correctly	
4	Check the landing deviation It shall be less than $\pm 10\text{mm}$ regardless of the load in the car	Operate correctly	

Table6.7 Test of travel limit switch

Check the car stops immediately by activating the each travel limit switch FOR UP & DOWN during the HAND OPEARTION

Note: DO NOT TEST THIS" LIMIT SWITCH TEST "IN AUTO MODE

Step	Procedure	Expected	Result
1	Travel limit switch test Check the limit witch for upward/downward is operated at +50mm point(in case of upward) or -50mm point (in case of down ward) from the top/bottom floor level	The switches shall be operated at $\pm 50\text{mm}$ point and the car stops within $\pm 180\text{mm}$ from the top/bottom floor level	
2	Final limit switch test Check the final limit switch for upward /downward is operated at +250mm point (in case of upward) or -250mm point (in case of sown ward) from the top/bottom floor level.	T he switches shall be operated at $\pm 250\text{mm}$ point and the car stops within $\pm 450\text{mm}$ from the top/bottom floor level	

Make short circuit the travel limit switch before testing final limit switch operation

Table 6.8 Test of automatic operation

Step	Procedure	Expected	Result
1	Check the system is operated as SELECTIVE-COLLECTIVE control	Operate correctly	
2	Check the Alarm buzzer with lamp is operated by pressing alarm button on car operating panel (IF PROVIDED)	Operate correctly	
3	Check the communication system is well operated (IF PROVIDED)	Operate correctly	
4	Check the speaker is operated normally (if provided)	Operate correctly	

Table 6. 9 Test of alarm device

Step	Procedure	Expected	Result
1	The overload device shall be operated when the load in the car exceeds 10% or more of the rated one. Upon operating, it shall prevent the car doors from closing and also prevent any movement of the elevator, and signal audible and visual alarms inside the car	Operate correctly	
2	When the ship rolls by $\pm 10^\circ$ or pitch by $\pm 7.5^\circ$,the elevator shall goes to the nearest deck during the running and shall be standby there with door open. The car shall keeps its standby condition until after 1 min of the rolling or pitching signal is disappeared	Operate correctly	
3	When the stopping device on car and /or in pit are active, the car shall be stopped immediately	Operate correctly	

Table 6.10.Manual hoisting device operating test(FLY WHEEL)

Step	Procedure	Expected	Result
1	Fit the fly wheel to the motor and release the mechanical brake on the machine	The manual operation is smooth	
2	Rotate the fly wheel by hand		
3	Check the rotation of the fly wheel is smooth. (Max 400N is necessary for raising loaded car or lowering empty car)		

Table 6.11.Test of normal lighting and emergency lighting

Step	Procedure	Expected	Result
1	Check the emergency lighting comes on automatically upon failure of the normal lighting supply	Emergency light turns on when the normal light is turned off	

Table 6.12.Motor run time limit test

Step	Procedure	Expected	Result
1	Operate the car safety gear	Operate correctly	
2	Give a car call	Operate correctly	
3	Check the system give off an error and stops with in below run time	Operate correctly	
4	Reset the system and release the car safety gear. Operated the counter-weight safety gear		
5	Give a car call		
6	Check the system give off and error and stops with in below run time		

Table 6.13. Home landing function test

Step	Procedure	Expected	Result
1	Set the home landing floor to 2 nd floor		
2	Set the home landing time to 5 min		
3	Check the elevator moves to 2 nd floor after 5 min. of rest		

Table 6.14. Safety switches

Step	Procedure	Expected	Result
1	Open the Hoist way escape switch. Check the main contact is de-energized.		
2	Open the car escape switch. Check the main contact is de-energized.		
3	Press down the operating plate of slack rope switch. The switch shall be operated and main contact is de-energized.		

6.15. Protection during operation of doors

A protective device shall automatically initiate re-opening of the door in the event of passenger being struck (or about to be struck) by the door in crossing the entrance during the closing movement:

- a) The effect of the device may be neutralized during the last 50 mm of travel of each door panel
- b) In the case of a system which makes the sensitive protection device inoperative after a fixed period of time, to counteract persistent obstructions when closing the door, the kinetic energy defined above shall not exceed 4 J during movement of the door with the protective device inoperative.

6.16. Opening the car door

In order to permit passengers to leave the lift car, if the lift stops for any reason close to a landing, it shall be possible with the car stopped and the supply to the door operator (if any) disconnected:

- a) to open or partly open the car door by hand from the landing
- b) to open or partly open the car door together with the landing door linked to it if they are coupled, by hand from within the car.

6.17. Rope traction

Rope traction shall be such that the following two conditions are fulfilled:

- a) It shall not be possible to raise the car when the counterweight is resting on the buffers, and the lift machine is rotated in the «up» direction.
- b) The formula in note 1 at the end of clause 9 shall be satisfied.

6.18. Precautions against creep

The car shall be prevented from creeping from a landing level by more than 0.12 m by one of the following measures:

- a) When the precautions against free fall of the car or descent with excessive speed include a car safety gear, this safety gear may also be used as precaution against creeping provided it is tripped by lever (9.19.5). This tripping by lever can be part of the precautions against free fall of the car or descent with overspeed, or be additional.
- b) When the precautions against free fall of the car or descent with overspeed include a pawl device this pawl device can also be used as precaution against creeping.

Note: AFTER TEST, CHECK OUT THE FOLLOWING

- 1. Restore all bridge cable and short circuits, if there is any.**
- 2. set the mode switches, control switches and circuit protector to normal position.**
- 3. check the MPU data, if there is any changes during the test.**

PART II: This part used for the elevator of the COLUMN2&3

7.1 Load Test (Including Confirmation)

Load test to be carried out on six (6) steps progressively i.e., 0 %, 20%, 50 %, 75%, 100 %, 125% of the rated capacity 600kg

Voltage, current and speed to be recorded in each steps. Test result to be satisfied with the following items.

7.2 Brake Test (Holding Test)

Test of traction machine brake with maximum load weight plus 25 % of rated load.

7.3 Safety Gear Test

7.4 Insulation Test

7.5 Temperature Rise Test.

Temperature rise on motor, machine, controller and machine room to be measured.

7.6 Installation at hoistway component parts test

7.7 Test of travel limit switch

7.8 Test of automatic operation

7.9 Test of alarm device

7.10 Manual hoisting device operating test (FLY WHEEL)

7.11 Test of normal lighting and emergency lighting

7.12 Motor run time limit test

7.13 Home landing function test

7.14 Safety switches

7.15 Protection during operation of doors

7.16 Opening the car door

7.17 Rope traction

7.18 Precautions against creep

Table 7.1 Load Test

LOADS		UP WARD			SIGNATURE		
%	WEIGHT (kg)	VOLTAGE (V)	CURRENT (A)	SPEED (m/min)	VOLTAGE (V)	CURRENT (A)	SPEED (m/min)
0	0						
25	150						
50	300						
75	450						
100	600						
125	750						

Accepted car speed range : $41 \text{ m/min} \leq \text{measured speed} \leq 47 \text{ m/min}$

Table 7.2 Brake Test (Holding Test)

125 % of rated load	RESURT
750kg in the car	
Move the car to the lower floor in auto mode. Check the elevator keeps the stopping condition at a floor	

Table 7.3 Safety Gear Test

Step	Procedure	Expected	Result
	For car	The car stops within 0.3MR	
1	Run the car by pushing the manual down button at the car top		
2	Pull governor rope for car up by hand on the cage top		
3	Check the car stops within 0.3 m		

Step	Procedure	Expected	Result
	For CWT	Equal activation marks are to be shown each guide rail	
1	Run the car by pushing the manual down button at the car top		
2	Pull governor rope for CWT up by hand on the cage top		
3	Check the CWT stops immediately		
4	Check the visible indents of each guide rail		

Note:

1. The base of the pit shall be designed for an imposed load of at least 5000 N/m². The counterweight shall be equipped with safety gear.
2. The car shall be provided with a safety gear capable of operating only in the downward direction and capable of stopping a fully laden car, at the tripping speed of the overspeed governor, even if the suspension devices break, by gripping the guides, and of holding the car there.

Table 7.4 Insulation Test

NO.	ITEMS	SOURCE	EARTH-MEGA OHMS	RESULT
1	Motor	M Ω	≥ 4M Ω	
2	Brake circuit	M Ω	≥ 4 M Ω	
3	Control and signal	M Ω	≥ 0.1M Ω	
4	Door motor circuit	M Ω	≥ 4M Ω	

※ DO NOT MEGGER MAIN INVERTER AND PC BOARD

Table 7.5 Temperature Rise Test

NO.	ITEMS	FINAL TEMPERATURES		SUCCESS	LIMIT OF TEMP. RISE
		COOL	HOT		
1	T/M gear housing				MAX 60°C
2	Motor frame				MAX 60°C
3	Control Panel(inside)				MAX 50°C
4	Machine room				MAX 45°C

Table 7.6 Installed at hoist way component parts test

Step	Procedure	Expected	Result
1	Check that landing push button and illuminated lamp are operated correctly	Operate correctly	
2	Check that the electric landing position indicator lit correctly in compliance with landing deck and running direction	Operate correctly	
3	Check that the interlock switches for landing door are operated correctly	Operate correctly	
4	Check the landing deviation It shall be less than $\pm 10\text{mm}$ regardless of the load in the car	Operate correctly	

Table 7.7 Test of travel limit switch

Check the car stops immediately by activating the each travel limit switch FOR UP & DOWN during the HAND OPERATION

Note: DO NOT TEST THIS" LIMIT SWITCH TEST "IN AUTO MODE

Step	Procedure	Expected	Result
1	Travel limit switch test Check the limit switch for upward/downward is operated at +50mm point (in case of upward) or -50mm point (in case of down ward) from the top/bottom floor level	The switches shall be operated at $\pm 50\text{mm}$ point and the car stops within $\pm 180\text{mm}$ from the top/bottom floor level	
2	Final limit switch test Check the final limit switch for upward /downward is operated at +250mm point (in case of upward) or -250mm point (in case of down ward) from the top/bottom floor level.	The switches shall be operated at $\pm 250\text{mm}$ point and the car stops within $\pm 450\text{mm}$ from the top/bottom floor level	

Make short circuit the travel limit switch before testing final limit switch operation

Table 7.8 Test of automatic operation

Step	Procedure	Expected	Result
1	Check the system is operated as SELECTIVE-COLLECTIVE control	Operate correctly	
2	Check the Alarm buzzer with lamp is operated by pressing alarm button on car operating panel	Operate correctly	
3	Check the communication system is well operated	Operate correctly	
4	Check the speaker is operated normally	Operate correctly	

Table 7.9 Test of alarm device

Step	Procedure	Expected	Result
1	The overload device shall be operated when the load in the car exceeds 5% or more of the rated one. Upon operating, it shall prevent the car doors from closing and also prevent any movement of the elevator, and signal audible and visual alarms inside the car	Operate correctly	

2	When the ship rolls by $\pm 10^\circ$ or pitch by $\pm 7.5^\circ$, the elevator shall go to the nearest deck during the running and shall be standby there with door open. The car shall keep its standby condition until after 1 min of the rolling or pitching signal is disappeared	Operate correctly	
3	When the stopping device on car and /or in pit are active, the car shall be stopped immediately	Operate correctly	

Table 7.10. Manual hoisting device operating test (FLY WHEEL)

Step	Procedure	Expected	Result
1	Fit the fly wheel to the motor and release the mechanical brake on the machine	The manual operation is smooth	
2	Rotate the fly wheel by hand		
3	Check the rotation of the fly wheel is smooth. (Max 400N is necessary for raising loaded car or lowering empty car)		

Table 7.11. Test of normal lighting and emergency lighting

Step	Procedure	Expected	Result
1	Check the emergency lighting comes on automatically upon failure of the normal lighting supply	Emergency light turns on when the normal light is turned off	

Table 7.12. Motor run time limit test

Step	Procedure	Expected	Result
1	Operate the car safety gear		
2	Give a car call		
3	Check the system give off an error and stops within below run time		
4	Reset the system and release the car safety gear. Operate the counter-weight safety gear		
5	Give a car call		
6	Check the system give off an error and stops within below run time		

Table 7.13. Home landing function test

Step	Procedure	Expected	Result
1	Set the home landing floor to mezzanine DK (2 nd floor)		
2	Set the home landing time to 5 min		
3	Check the elevator moves to mezzanine DK. After 5 min of rest		

Table 7.14.Safety switches

Step	Procedure	Expected	Result
1	Open the hoisway escape switch. Check the main contact is de-energized		
2	Open the car escape switch. Check the main contact is de-energized		
3	Press down the operating plate of the slack rope switch. The switch shall be operated and main contact is de-energized.		

7.15. Protection during operation of doors

A protective device shall automatically initiate re-opening of the door in the event of passenger being struck (or about to be struck) by the door in crossing the entrance during the closing movement:

- c) The effect of the device may be neutralized during the last 50 mm of travel of each door panel
- d) In the case of a system which makes the sensitive protection device inoperative after a fixed period of time, to counteract persistent obstructions when closing the door, the kinetic energy defined above shall not exceed 4 J during movement of the door with the protective device inoperative.

7.16. Opening the car door

In order to permit passengers to leave the lift car, if the lift stops for any reason close to a landing, it shall be possible with the car stopped and the supply to the door operator (if any) disconnected:

- a) to open or partly open the car door by hand from the landing
- b) to open or partly open the car door together with the landing door linked to it if they are coupled, by hand from within the car.

7.17. Rope traction

Rope traction shall be such that the following two conditions are fulfilled:

- a) It shall not be possible to raise the car when the counterweight is resting on the buffers, and the lift machine is rotated in the «up» direction.
- b) The formula in note 1 at the end of clause 9 shall be satisfied.

7.18. Precautions against creep

The car shall be prevented from creeping from a landing level by more than 0.12 m by one of the following measures:

- a) When the precautions against free fall of the car or descent with excessive speed include a car safety gear, this safety gear may also be used as precaution against creeping provided it is tripped by lever (9.19.5). This tripping by lever can be part of the precautions against free fall of the car or descent with overspeed, or be additional.
- b) When the precautions against free fall of the car or descent with overspeed include a pawl device this pawl device can also be used as precaution against creeping.

Note: AFTER TEST, CHECK OUT THE FOLLOWING

- 1. Restore all bridge cable and short circuits, if there is any.
- 2. set the mode switches, control switches and circuit protector to normal position.
- 3. check the MPU data, if there is any changes during the test.

7.0 COMMISSIONING ACCEPTANCE

The units and system covered under this commissioning procedure have been tested accordingly and found to be satisfactory in accordance with commissioning procedures.

REPRESENTATIVES	NAME	SIGNATURE	DATE
DNV			
OWNER			
COSCO			