Organization	Safety management system	Reference No.

Pre-work risk assessment table (Reference No.)

Specific t : Rough weather navigation countermeasure (Deck • Engine • Catering)

Date and time of assessment : 1 April 2021 to MM DD

Work category : : Routine work

Participar :

Place and name of work :

: Non-routine work

	① Possible hazards and risk assessment						② Prevention/mitigation measures and post-measure risk assessment							③ Company assessment						
	Possible hazard (because of~, by doing~, (causing specific trouble))	Frequency of occurrence (a)	Severity (b) Accident involving people	Severity (b) Other	Risk (a×b)	Risk level	Prevention/mitigation measures	Frequency of occurrence (a)	Severity (b) Accident involving people	Severity (b) Other	Risk (a×b)	Risk level		Frequency of occurrence (a)	Severity (b) Accident involving people	Severity (b) Other	Risk (a×b)	Risk level	Measures adopted
5	Fuel consumption increases due to increased navigation distance caused by give-way manoeuvres, resulting in fuel shortages. (Hazard) Fuel Oil	3		4	12	H	(a. Essential measures) (b. Physical countermeasures) (c. Administrative countermeasures) ROB is to be constantly monitored. (d. Use of personal protective equipment)	3		1	3	L		3		1	3	L	○
6	Failure to inform crew not to use the lifts, following the triggering of safety devices caused by hull agitation led to crew being confined. (Hazard) Lifts	1		2	2	LL	(a. Essential measures) Switch off the power supply so that the lift cannot be used. (b. Physical countermeasures) (c. Administrative countermeasures) (d. Use of personal protective equipment)	1		1	1	LL		1		1	1	LL	○
7	Overload operation of the main engine, surging and lacing of the supercharger (turbocharger) were not considered, so the main engine tripped. (Hazard) Supercharger (turbocharger)	3		3	9	M	(a. Essential measures) (b. Physical countermeasures) Exchange information with the Master, check the load on the main engine and slow down if necessary. (c. Administrative countermeasures) (d. Use of personal protective equipment)	3		2	6	M		3		2	6	M	○
8	Clogging of the fuel system strainers due to hull agitation caused by rough weather, resulting in tripping of the main engine or generator. (Hazard) Fuel system strainers	4		5	20	HH	(a. Essential measures) (b. Physical countermeasures) (c. Administrative countermeasures) Frequent strainer switching and cleaning before being being exposed to rough weather and manoeuvring in rough weather. (d. Use of personal protective equipment)	4		2	8	M		4		2	8	M	○
	Total (1~8)	23	7	23	82		Total (1~8)	25	4	10	34			25	4	10	34		
	Risk level prior to countermeasure (Avg.) No.	8	2	8	8		Risk level prior to countermeasure (Avg.) No.	9	3	7	9			9	3	7	9		
	Risk level prior to countermeasure (Avg.) Avg.	2.9	3.5	2.9	10.3		Risk level prior to countermeasure (Avg.) Avg.	2.8	1.3	1.4	3.8			2.8	1.3	1.4	3.8		
	Level (See the criteria)	3	4	3	12	H	Level (See the criteria)	3	2	2	6	M		3	2	2	6	M	

Final assessment: Risk level change H ⇒ M (Work possible?) Yes • No

The risk after implementing countermeasures must be less than or equal to "9".

The risk assessment was carried out as described above.

Signature of the person responsible for the operation:

As a result of the risk assessment, we herewith confirm that safe work is possible.

Master's signature :

As assessed as above, it is our hope that countermeasures be implemented.

Affiliation and full name :

Level assessed : LL 1~2 (Very low) L 3 (Low) M 4~9 (Meduim) H 10~15 (High) HH 16~20 (Very high)

Date revised : DD/MM/20YY	Rev. No. XX	No. of years to be filed for: X years

Attachment 11　Risk assessment examples　Risk assessment form: Preparation of Engine for rough weather

XXX	Safety management system	SMS-1301

Risk assessment form （Ref. No.）

Date and time of assessment:

Vessel name:

Master:

Scenario	Title:
	Study of countermeasures for rough weather
Risk assessment regarding countermeasures for rough weather affect on the engine	

Participants
C/E, 1/E, 2/E and 3/E
FTR, OLRs x 3 and a WPR
9 personnel in total

① Assessment of initial frequency and severity of occurrence prior to implementation of countermeasures

Initial frequency of occurrence	Select A to E with reference to the frequency of risk in Table 1 of the risk management procedure.	
	Selected frequency of occurrence	3

Initial severity	Select 1 to 4 with reference to the level of severity in Table 2 of the risk management procedure.	
	① Impact on health and safety	4
	② Environmental impact	–
	③ Media impact	–
	④ Financial impact	4
	⑤ Impact on the Safety Management System	
	Assessment average of ①～⑤	4

② Study of countermeasures
Consideration of alternative methods, preventive/mitigation measures with reference to the procedure manual

Alternative means	Fixing of moving objects
	Reinforce lubricants management
Prevention countermeasures	Fixing of moving objects
	Strengthening of communication between the charterer and the ship management company
Mitigation measures	

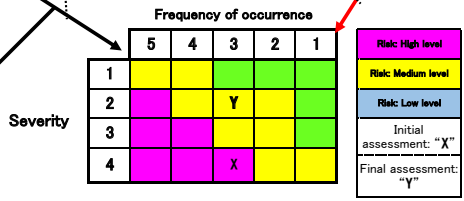
③ Assessment of frequency and severity of occurrence after implementation of measures and actions

Last recorded frequency of occurrence	Select A to E with reference to the frequency of risk in Table 1 of the risk management procedure.	
	Selected frequency of occurrence	3

Last recorded level of severity	Select 1 to 4 with reference to the level of severity in Table 2 of the risk management procedure.	
	① Impact on health and safety	2
	② Environmental impact	–
	③ Media impact	–
	④ Financial impact	1
	⑤ Impact on the Safety Management System	–
	Assessment average of ①～⑤	2

Initial risk assessment
Based on the results of ③, input "X" for the initial risk.

Final risk assessment
Based on the results of ③, input "Y" for the final risk.



④ Verification of final assessment
Are the countermeasures and actions taken appropriate and has the level of risk been reduced?

YES Implementation of the proposed countermeasures will reduce the level of risk to a low level.

Revised date: YYYY/MM/DD	Rev. XX	No. of years to be filed for: XX years

Organization	Safety management system	Reference No.

Pre-work risk assessment table (Reference No.)

Specific 1 : Rough weather navigation countermeasures (Deck・Engine・Catering)

Participar :

Date and time of assessment : 1 April 2021 to MM DD

Place and name of work :

Work category : : Routine work / : Non-routine work

	① Possible hazards and risk assessment						② Prevention/mitigation measures and post-measure risk assessment							③ Company assessment						
	Possible hazard (because of~, by doing~, (causing specific trouble))	Frequency of occurrence (a)	Severity (b) Accident involving people	Severity (b) Other	Risk (a×b)	Risk level	Prevention/mitigation measures	Frequency of occurrence (a)	Severity (b) Accident involving people	Severity (b) Other	Risk (a×b)	Risk level	Measures adopted	Frequency of occurrence (a)	Severity (b) Accident involving people	Severity (b) Other	Risk (a×b)	Risk level	Measures adopted
1	By forgetting to turn off the cooking apparatus, a fire was caused by moving objects falling.	5		4	20	HH	(a. Essential measures)												
							(b. Physical countermeasures) Fixing of moving objects	5		1	5	M	O	5		1	5	M	O
							(c. Administrative countermeasures) Always turn off cooking apparatus after use, not just in rough weather.	2		1	2	L	O	2		1	2	L	O
	(Hazard) Cooking apparatus and moving objects						(d. Use of personal protective equipment)												
2	Doors of lockers installed in common areas (e.g. mess room) in the accommodation space are left ajar, causing the door to open by hull agitation, pinching fingers and causing injury.	4	4		16	HH	(a. Essential measures)												
							(b. Physical countermeasures)												
							(c. Administrative countermeasures) Locker doors are to be closed, not just in rough weather. Doors that are left open, such as in the mess room, are to always heave a door stop applied and be lashed.	4	1		4	M	O	4	1		4	M	O
	(Hazard) Doors						(d. Use of personal protective equipment)												
3	Carelessly holding plate in each hand while serving, and falling over due to hull agitation, resulting in burns or injury.	4	3		12	H	(a. Essential measures)												
							(b. Physical countermeasures)												
							(c. Administrative countermeasures) Make it a habit to keep one hand free at all times.	4	1		4	M	O	4	1		4	M	O
	(Hazard) Hot plates						(d. Use of personal protective equipment)												
4	The floor in the mess room was wet and a crew member slipped and fell. Injured sustained	4	3		12	H	(a. Essential measures)												
							(b. Physical countermeasures)												
							(c. Administrative countermeasures) Keep floor surfaces dry, not just in rough weather.	4	1		4	M	O	4	1		4	M	O
	(Hazard) Wet floors						(d. Use of personal protective equipment)												
	Total (1~4 only)	17	10	4	60		Total (1~4 only)	19	3	2	19			19	3	2	19		
	Risk level prior to countermeasure (Avg.) No.	4	3	1	4		Risk level after countermeasure (Avg.) No.	5	3	2	5			5	3	2	5		
	Risk level prior to countermeasure (Avg.) Avg.	4.3	3.3	4.0	15.0		Risk level after countermeasure (Avg.) Avg.	3.8	1.0	1.0	3.8			3.8	1.0	1.0	3.8		
	Level (See the criteria)	5	4	4	20	HH	Level (See the criteria)	4	1	1	4			4	1	1	4		

Final assessment: Risk level change ⇒ [Work possible?] Yes・No

The risk after implementing countermeasures must be less than or equal to "9".

The risk assessment was carried out as described above.

Signature of the person responsible for the operation:

As a result of the risk assessment, we herewith confirm that safe work is possible.

Master's signature :

As assessed as above, it is our hope that countermeasures be implemented.

Affiliation and full name :

Level assessed : LL 1~2 (Very low) L 3 (Low) M 4~9 (Meduim) H 10~15 (High) HH 16~20 (Very high)

Date revised : DD/MM/20YY	Rev. No. XX	No. of years to be filed for: X years

Organization	Safety management system	Reference No.

Pre-work risk assessment table (Reference No.)

Specific work to be carried out: Rough weather navigation countermeasures (Deck • Engine • Catering)

Date and time of assessment : 1 April 2021 to MM DD

Work category : (Routine work)

Participar :

Place and name of work :

: Non-routine work

	① Possible hazards and risk assessment						② Prevention/mitigation measures and post-measure risk assessment							③ Company assessment						
	Possible hazard (because of~, by doing~, (causing specific trouble))	Frequency of occurrence (a)	Severity (b) Accident involving people	Severity (b) Other	Risk (a×b)	Risk level	Prevention/mitigation measures	Frequency of occurrence (a)	Severity (b) Accident involving people	Severity (b) Other	Risk (a×b)	Risk level		Frequency of occurrence (a)	Severity (b) Accident involving people	Severity (b) Other	Risk (a×b)	Risk level	Measures adopted	
5	The mess table was not prepared for rough weather and plates moved during the meal. Hot soup spills and burns the crew.	3	2		6	M	(a. Essential measures) (b. Physical countermeasures) (c. Administrative countermeasures) As a requirement for rough weather, use wet sheets and other materials to prepare tables for rough weather. (d. Use of personal protective equipment)	3	1		3	L		3	1		3	L	O	
	(Hazard) Hot dishes																			
6	Because moving objects (including chairs in the mess) were not fixed, crew members were hit by moving objects and injured.	5	2		10	H	(a. Essential measures) (b. Physical countermeasures) (c. Administrative countermeasures) The securing of all moving objects (d. Use of personal protective equipment)	5	1		5	M		5	1		5	M	O	
	(Hazard) Moving objects																			
7	Pantry was not tidy, provisions are scattered and some unusable.	4		1	4	M	(a. Essential measures) (b. Physical countermeasures) (c. Administrative countermeasures) Regular tidy-up (d. Use of personal protective equipment)	2		1	2	LL		2		1	2	LL	O	
	(Hazard) Provisions																			
8							(a. Essential measures) (b. Physical countermeasures) (c. Administrative countermeasures) (d. Use of personal protective equipment)													
	(Hazard)																			
	Total (1~8)	29	14	5	80		Total (1~8)	29	5	3	29			29	5	3	29			
	Risk level prior to countermeasure (Avg.) No.	7	5	2	7		Risk level after countermeasure (Avg.) No.	8	5	3	8			8	5	3	8			
	Risk level prior to countermeasure (Avg.) Avg.	4.1	2.8	2.5	11.4		Risk level after countermeasure (Avg.) Avg.	3.6	1.0	1.0	3.6			3.6	1.0	1.0	3.6			
	Level (See the criteria)	5	3	3	15	H	Level (See the criteria)	4	1	1	4	M		4	1	1	4	M		

Final assessment	Risk level change	H	⇒	M
	(Work possible?)	(Yes)	•	No

The risk after implementing countermeasures must be less than or equal to "9".

The risk assessment was carried out as described above.

As a result of the risk assessment, we herewith confirm that safe work is possible.

As assessed as above, it is our hope that countermeasures be implemented.

Signature of the person responsible for the operation:

Master's signature :

Affiliation and full name :

Level assessed : LL 1~2 (Very low) L 3 (Low) M 4~9 (Medium) H 10~15 (High) HH 16~20 (Very high)

Date revised : DD/MM/20YY	Rev. No. XX	No. of years to be filed for: X years

Attachment 14　Risk assessment examples Risk assessment form:
Preparation of Office for rough weather

XXX	Safety management system	SMS-1301

Risk assessment form （Ref. No.）

Date and time of assessment

Vessel name

Master

Scenario	**Title:**
Study of countermeasures for rough weather	
Risk assessment regarding countermeasures for rough weather in the house	

Participants

Capt. and C/O

C/S, 2/S and Boy

5 personnel in total

① Assessment of initial frequency and severity of occurrence prior to implementation of countermeasures

Initial frequency of occurrence: Select A to E with reference to the frequency of risk in Table 1 of the risk management procedure.

Selected frequency of occurrence: 5

Initial severity: Select 1 to 4 with reference to the level of severity in Table 2 of the risk management procedure.

① Impact on health and safety	3
② Environmental impact	–
③ Media impact	–
④ Financial impact	–
⑤ Impact on the Safety Management System	–
Assessment average of ①～⑤	3

② Study of countermeasures

Consideration of alternative methods, preventive/mitigation measures with reference to the procedure manual

Alternative means	Fixing of moving objectives
Prevention countermeasures	Fixing of moving objectives Moving objectives to be fixed
Mitigation measures	

③ Assessment of frequency and severity of occurrence after implementation of measures and actions

Last recorded frequency of occurrence: Select A to E with reference to the frequency of risk in Table 1 of the risk management procedure.

Selected frequency of occurrence: 4

Last recorded level of severity: Select 1 to 4 with reference to the level of severity in Table 2 of the risk management procedure.

① Impact on health and safety	1
② Environmental impact	–
③ Media impact	–
④ Financial impact	1
⑤ Impact on the Safety Management System	
Assessment average of ①～⑤	1

Initial risk assessment

Based on the results of ③, input "X" for the initial risk.

Final risk assessment

Based on the results of ③, input "Y" for the final risk.

Frequency of occurrence

Severity	5	4	3	2	1
1		Y			
2					
3	X				
4					

Risk: High level

Risk: Medium level

Risk: Low level

Initial assessment: "X"

Final assessment: "Y"

④ Verification of final assessment

Are the countermeasures and actions taken appropriate and has the level of risk been reduced?

YES, Implementation of the proposed countermeasures will reduce the level of risk to a low level.

Revised date: YYYY/MM/DD	Rev. XX	No. of years to be filed for: XX years

Attachment 15

Vessel A Quay collision accident Accident timeline

Crew arrangement	Standard docking procedures	Time	Speed	Distance from the quay (Ship length ratio)	Actual actions taken	Who
Bridge Master • C/E	Engine in neutral position	11:55	9.4 kts	2,350 m (30 L)	At 2,350m before the quay (30L), engine half speed to neutral operation. Speed of 9.4 knots and switched from automatic to manual rudder	Master
Fore C/Off • Bsn • Sailer	D.Slow Ahead Used VecTwin rudders for speed control both sternway and headway	12:00	9.0 kts	1,160 m (15 L)	The Master intended to use the joystick device to control the VecTwin Rudder system to manoeuvre the ship to the shore, and switch the rudder control to remote control. D.Slow Ahead	Master
Aft 2/AE • 3/Off					However, he did not realise that the rudder switch was stuck in the non-follow-up position and moved to the port side of the bridge in front of the remote control stand. He believed that it had switched to remote rudder control by only operating the one lever.	Master
Eng. Room 1/AE		12:06	5.0 kts	317 m (4 L)	Distance to the quay was approximately four times the length of the vessel	Master
	D.Slow Ahead He made a sternway manoeuvre. Turned using bow thruster and joystick	12:08	3.1 kts	100 m (1 L)	At 100m before the quay, he thought he had tipped the joystick backwards and made a sternway manoeuvre, but in fact it was in neutral (hover).	Master
					He was too preoccupied with the distance to the quay that he did not look at the rudder angle indicator on the VecTwin rudders to notice that the rudders were heading sternway.	Master
					As the speed to fetch headway was not decreasing, he tried to make sternway by increasing engine speed (not effective as it was in neutral (hover)) and anchored.	Master
		12:09	4.3 kts	0 m (0 L)	Collided with the quay at almost a right angle, maintaining a speed of 4.3 knots	Master

Attachment 16　Vessel A Quay collision accident Maritime Accident Summary of Related Facts

Vessel A　Quay collision accident
Maritime Accident　Summary of Related Facts

Reference No.	Identified problems from survey findings				Direct cause		Accident cause evaluation	Re-examination necessity
	Date	Time	Caused by	Check facts and problem areas	Unsafe behaviour	Unsafe conditions		
1	XX November	12:00	Master	The Master intended to turn the rudder control switch to remote control but did not verify that this had indeed been done.	○	△	2	
2	XX November	12:00	Master	He did not realise that the rudder switch was stuck in the non-follow-up position (not switching to remote rudder) and moved to the port side of the bridge in front of the control stand.	○		3	
3	XX November	12:08	Master	He was too preoccupied with the distance to the quay that he did not look at the rudder angle indicator on the VecTwin rudders to notice that the rudders were heading sternway.	○		1	
4	XX November	12:08	Master	As the speed to fetch headway was not decreasing, he tried to make sternway by increasing engine speed (not effective as it was in neutral (hover) and anchored.	○		4	
5	XXXX	XXXX	Companies	Operating procedures for important equipment had not been incorporated into Safety Management Code (SMS).		○	5	

Accident cause assessment: Prioritized according to the scale of the cause

Attachment 17 Maritime Accident Accident Cause (Unsafe behaviour): Vessel A Quay collision accident