Attachments

Attachment 1 Quantified risk assessment index guidelines (criteria): Severity

【Frequency of occurrence evaluation criteria】 Attachment 1

Frequency of occurrence	Nominal frequency of occurrence	Probability of occurrence
5	Level of repeated encounters in a lifetime (occurring in less than 3 to 6 months)	3/10
4	A level that has more than one encounter in a lifetime (occurring about once every six months to a year)	3/100
3	A level that has several encounters in a lifetime (occurring in less than 3 to 5 years)	3/1,000
2	A level that has very few encounters in a lifetime (occurring about once every 5-20 years)	3/10,000
1	A level that is close to zero encounters in a lifetime (occurring once in more than 20 years)	3/100,000

Attachment 2 Quantified risk assessment index guidelines (criteria): Frequency of occurrence

【Severity evaluation criteria】 Attachment 2

Level	Health and safety	Public concern	Environment impact	Economic loss	Management system
4	Death/public impact	Worldwide media coverage	Large-scale and long-term pollution	100 mm yen above	Complete shutdown
3	Serious injury or illness, limited public impact	National press coverage	Serious pollution	10 - 100 mm yen	Possible shutdown
2	Minor injury, small impact on public	Reported in local press	Medium-sized pollution of medium duration in a limited area	5 mm - 10 mm yen	Affected
1	Minor injury/no public impact	Rarely broadcasted	Minor pollution or no pollution	Less than 5 mm yen	No impact

Attachment 3　Risk assessment index guidelines (criteria):
Risk severity assessment and classification

【Risk severity assessment classification】

Attachment 3

<table>
<tr><th colspan="2">Risk severity assessment</th><th>Level</th><th>Region</th><th>Assessment as to whether or not work can be carried out</th></tr>
<tr><td>1</td><td rowspan="3">LL</td><td rowspan="3">Very low risk</td><td rowspan="4">[Region of safety]</td><td rowspan="9">[Work possible]
Ensure that risk mitigation measures are implemented and that work is carried out in line with this</td></tr>
<tr><td>2</td></tr>
<tr><td>3</td></tr>
<tr><td>4</td><td>L</td><td>Low risk</td></tr>
<tr><td>5</td><td rowspan="5">M</td><td rowspan="5">Medium risk</td><td rowspan="5">[Region of uncertainty]
(Permissible and ALARP region)</td></tr>
<tr><td>6</td></tr>
<tr><td>7</td></tr>
<tr><td>8</td></tr>
<tr><td>9</td></tr>
<tr><td>10</td><td rowspan="6">H</td><td rowspan="6">High risk</td><td rowspan="10">[Hazardous region]
(Region whereby permission is not allowed)</td><td rowspan="10">[Work not possible]
Where it is necessary to carry out work in order to respond to an emergency or for other reasons, the work must not be carried out without the permission of the manager, notwithstanding the safety management regulations.</td></tr>
<tr><td>11</td></tr>
<tr><td>12</td></tr>
<tr><td>13</td></tr>
<tr><td>14</td></tr>
<tr><td>15</td></tr>
<tr><td>16</td><td rowspan="5">HH</td><td rowspan="5">Extremely high risk</td></tr>
<tr><td>17</td></tr>
<tr><td>18</td></tr>
<tr><td>19</td></tr>
<tr><td>20</td></tr>
</table>

ALARP AREA　: As low as Reasonably Practicable

Organization	Safety management system	Reference No.

Pre-work risk assessment table (Reference No.)

Specific work to be carried out : (Deck・Engine・Catering)

Participants :

Date and time of as DDMMYY～DDMMYY

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	Frequency of occurrence (a)	Severity (b) Accident involving people	Severity (b) Other	Risk (a×b)	Risk level	Measures adopted
1						(a. Essential measures) (b. Physical countermeasures) (c. Administrative countermeasures) (d. Use of personal protective equipment)											
2 (Hazard)						(a. Essential measures) (b. Physical countermeasures) (c. Administrative countermeasures) (d. Use of personal protective equipment)												
3 (Hazard)						(a. Essential measures) (b. Physical countermeasures) (c. Administrative countermeasures) (d. Use of personal protective equipment)												
4 (Hazard)						(a. Essential measures) (b. Physical countermeasures) (c. Administrative countermeasures) (d. Use of personal protective equipment)												
Total (1～4 only)	0	0	0	0		Total (1～4 only)	0	0	0	0		0	0	0	0		
Risk level prior to countermeasure (Avg.)						Risk level prior to countermeasure (Avg.)											
Level (See the criteria)						Level (See the criteria)											

Describe possible risks and hazards

Fill in the frequency and severity of occurrence with reference to the criteria and multiply

Decide on level

Assess the level of risk by describing the frequency and severity of the occurrence after having implemented the countermeasures

Fill in the appropriate boxes with measures to be taken

Companies are to assess the report from the vessel

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.

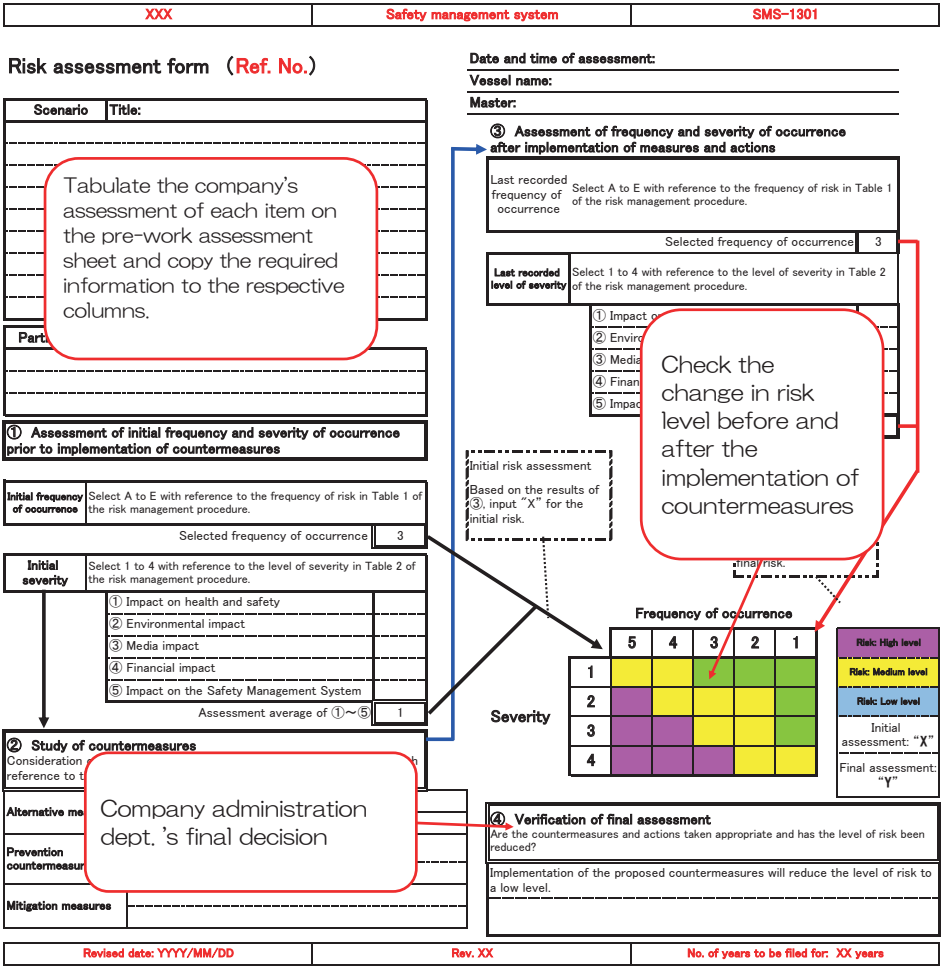
Master's signature :

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


XXX
Safety management system
SMS-1301
Risk assessment form （Ref. No.）
Date and time of assessment:
Vessel name:
Master:
Scenario
Title:
Tabulate the company's assessment of each item on the pre-work assessment sheet and copy the required information to the respective columns.
Part
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
② Environmental impact
③ Media impact
④ Financial impact
⑤ Impact on the Safety Management System
Assessment average of ①～⑤
1
② Study of countermeasures
Consideration
reference to t
Alternative me
Prevention countermeasur
Mitigation measures
Company administration dept.'s final decision
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
② Enviro
③ Media
④ Finan
⑤ Impac
Check the change in risk level before and after the implementation of countermeasures
Initial risk assessment
Based on the results of ③, input "X" for the initial risk.
final risk.
Frequency of occurrence
5 4 3 2 1
Severity
1
2
3
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?
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 : Rough weather navigation countermeasures (Deck • Engine • Catering)

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

Work category : ×Routine work : Non-routine work

Participar : △△△、XXX、□□□

Place and name of 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
1	Failure to plan for evacuation in a rough sea area, and failure to inform relevant parties of estimated arrival delays, resulting in confusion in rescheduling (Hazard) No review of the voyage plan	2		4	8	M	(a. Essential measures) (b. Physical countermeasures) (c. Administrative countermeasures) If there is a significant change in estimated time of arrival, this is to be reported immediately (d. Use of personal protective equipment)	2		1	2	LL		2		1	2	LL	○
2	Failure to secure or stow moving objects in the bridge, resulting in bruising or fractures when the moving object hits a person. Further, this can damage nautical instruments. (Hazard) Moving objects in bridge	3	3		9	M	(a. Essential measures) (b. Physical countermeasures) Securing or storing of moving objects in lockers etc. (c. Administrative countermeasures) (d. Use of personal protective equipment)	1	1		1	LL		1	1		1	LL	○
3	Failure to secure moving objects on the deck or in the store will damage the hull or other parts of the ship, or lead to injury. (Hazard) Moving objects on deck or in the store	3		4	12	H	(a. Essential measures) Anchor lashing must be used throughout the voyage (b. Physical countermeasures) (c. Administrative countermeasures) (d. Use of personal protective equipment)	2		1	2	LL		2		2	4	M	○
4	Failure to close watertight doors, through which water can enter and cause wet damage, or, fractures caused from being caught in a watertight door. (Hazard) Watertight doors	4	5	4	20	HH	(a. Essential measures) (b. Physical countermeasures) Watertight doors are always to be securely closed and, if necessary, locked (c. Administrative countermeasures) (d. Use of personal protective equipment)	2	1	1	2	LL		2	1	1	2	LL	○
	Total (1~4 only)	12	8	12	49		Total (1~4 only)	7	2	3	7			7	2	4	9		
	Risk level prior to countermeasure (Avg.) No.	4	2	3	4		Risk level after countermeasure (Avg.) No.	4	2	3	4			4	2	3	4		
	Risk level prior to countermeasure (Avg.) Avg.	3.0	4.0	4.0	12.0		Risk level after countermeasure (Avg.) Avg.	1.8	1.0	1.0	1.8			1.8	1.0	1.3	2.3		
	Level (See the criteria)	3	4	4	12	H	Level (See the criteria)	2	1	1	2	LL		2	1	2	4	M	

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 (Moduim) 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 ↓ : Rough weather navigation countermeasures (Deck • Engine • Catering)

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

Work category : : Routine work

Participan : △△△、xxx、□□□

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	When a navigation light bulb went out, and was replaced with a spare bulb, the spare bulb was also out of order. There were no lights on. (Hazard) Navigation lanterns	2		2	4	M	(a. Essential measures) (b. Physical countermeasures) (c. Administrative countermeasures) Always check the navigation lanterns. (d. Use of personal protective equipment)	2		1	2	LL	2		1	2	LL	O
6	The handrail was damaged. When trying to hold oneself up due to swaying, this caused a fall which led to bruising and broken bones. (Hazard) Handrails	3	3		9	M	(a. Essential measures) (b. Physical countermeasures) Immediately repair any damage, not just the handrails. (c. Administrative countermeasures) (d. Use of personal protective equipment)	3	1		3	L	3	1		3	L	O
7	The lifelines on deck were not in place. As there is no means of support in the event of a ship's motion, this may cause the crew to fall over or overboard. (Hazard) No installation of lifelines	4	5		20	HH	(a. Essential measures) (b. Physical countermeasures) Lifelines are to be set in place in rough weather. (c. Administrative countermeasures) If not described it in the procedures for dealing with rough weather, this is to be added. (d. Use of personal protective equipment) If work must be carried out, a life belt connected to a lifeline is to be worn.	4 4 4	2 2 2		8 8 8	M M M	4 4 4	2 2 2		8 8 8	M M M	O O O
8	(Shared information) Failure to prepare a cabin for rough weather may result in injury from falls or dropping objects. (Hazard) Moving objects in each room	3	2		6	M	(a. Essential measures) (b. Physical countermeasures) Securing of moving objects in the accommodation areas and rooms. (c. Administrative countermeasures) The room is always tidy. (d. Use of personal protective equipment)	3 3	1 1		3 3	L L	3 3	1 1		3 3	L L	O O
	Total (1~8)	24	18	14	88		Total (1~8)	30	11	4	42		30	11	5	44		
	Risk level prior to countermeasure (Avg.) No.	8	5	4	8		Risk level after countermeasure (Avg.) No.	11	8	4	11		11	8	4	11		
	Risk level prior to countermeasure (Avg.) Avg.	3.0	3.6	3.5	11.0		Risk level after countermeasure (Avg.) Avg.	2.7	1.4	1.0	3.8		11.0	1.4	1.3	4.0		
	Level (See the criteria)	3	4	4	12	H	Level (See the criteria)	3	2	1	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.

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 8　Risk assessment examples　Pre-work assessment table:
Preparation of Deck for rough weather

Attachment 8(Deck)

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 on the Deck	

Participants
Capt., C/O, 2/O and 3/O
Bsn. AB x 3, OS x 2
10 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	1

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

Alternative means	Fixing of moving objects Strengthening of communication between the charterer and the ship management company
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.

Frequency of occurrence

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

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 9(Eng . 1)

Organization	Safety management system	Reference No.

Pre-work risk assessment table (Reference No.)

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

Participer : △△△, xxx, □□□

Date and time of assesment : 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		Frequency of occurrence (a)	Severity (b) Accident involving people	Severity (b) Other	Risk (a×b)	Risk level	Measures adopted	
1	The C/E and 1/O do not consult with the deck personnel (Master and 1/O) and the engine department's measures against rough weather are inadequate or implemented too late.	2		1	2	LL	(a. Essential measures)													
							(b. Physical countermeasures)													
							(c. Administrative countermeasures) Not only should meetings be regular, but items	2		1	2	LL		2		1	2	LL	O	
	(Hazard) None						(d. Use of personal protective equipment)													
2	Inadequate lubrication of main engine, generator and other equipment, and hull agitation causing low level alarm and tripping (emergency stop).	4		4	16	HH	(a. Essential measures)													
							(b. Physical countermeasures) Check lubricant level and top up if necessary. Cleaning of strainer (including that of fuel system)	4		1	4	M		4		1	4	M	O	
							(c. Administrative countermeasures)													
	(Hazard) Lack of lubricant						(d. Use of personal protective equipment)													
3	Failure to secure moving objects in the engine room and engine control room, causing damage to the console and other parts, and injury to crew members who are hit by those moving objects.	3	4	4	12	H	(a. Essential measures)													
							(b. Physical countermeasures) Fixing of moving objects	2	2	2	4	M		2	2	2	4	M	O	
							(c. Administrative countermeasures)													
	(Hazard) Moving objects						(d. Use of personal protective equipment)													
4	Inadequate cleaning of the floor in the engine room, causing oil and water on the floor to accumulate leading to crew slipping and being injured.	3	3	–	9	M	(a. Essential measures) Floor cleaning in advance. Dry each time afterwards.	3	1		3	L		3	1		3	L	O	
							(b. Physical countermeasures) If necessary, apply slip resistant material.	3	1		3	L		3	1		3	L	O	
							(c. Administrative countermeasures)													
	(Hazard) Oil and water on the floor						(d. Use of personal protective equipment)													
	Total (1~4 only)	12	7	9	39		Total (1~4 only)	14	4	4	16			14	4	4	16			
	Risk level prior to countermeasure (Avg.) No.	4	2	4	4		Risk level after countermeasure (Avg.) No.	5	3	3	5			5	3	3	5			
	Avg.	3.0	3.5	2.3	9.8		Avg.	2.8	1.3	1.3	3.2			2.8	1.3	1.3	3.2			
	Level (See the criteria)	3	4	3	12	H	Level (See the criteria)	3	2	2	6	M		3	2	2	6			

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

Attachment 10 (Eng. 2)

Organization	Safety management system	Reference No.

Pre-work risk assessment table (Reference No.)

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

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

Work category : : Routine work

Participat : : Non-routine work

Place and name of 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

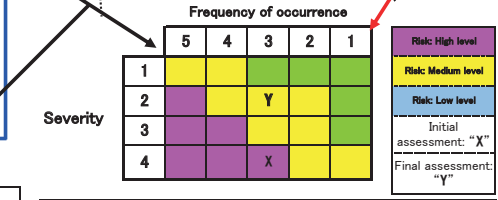
Last recorded level of severity	Select 1 to 4 with reference to the level of severity in Table 2 of the risk management procedure.	
	① Impact on health and safety	2
	② Environmental impact	–
	③ Media impact	–
	④ Financial impact	1
	⑤ Impact on the Safety Management System	–
	Assessment average of ①～⑤	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 ｔ : Rough weather navigation countermeasures (Deck • Engine • Catering)

Participer :

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		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		5		1	5	M	O
							(c. Administrative countermeasures) Always turn off cooking apparatus after use, not just in rough weather.	2		1	2	L		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 have a door stop applied and be lashed.	4	1		4	M		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		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		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		
		Avg. 4.3	3.3	4.0	15.0			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) / Non-routine work

Participar :

Place and name of 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	○	
	(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	○	
	(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	○	
	(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.

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 (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 Catering department 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

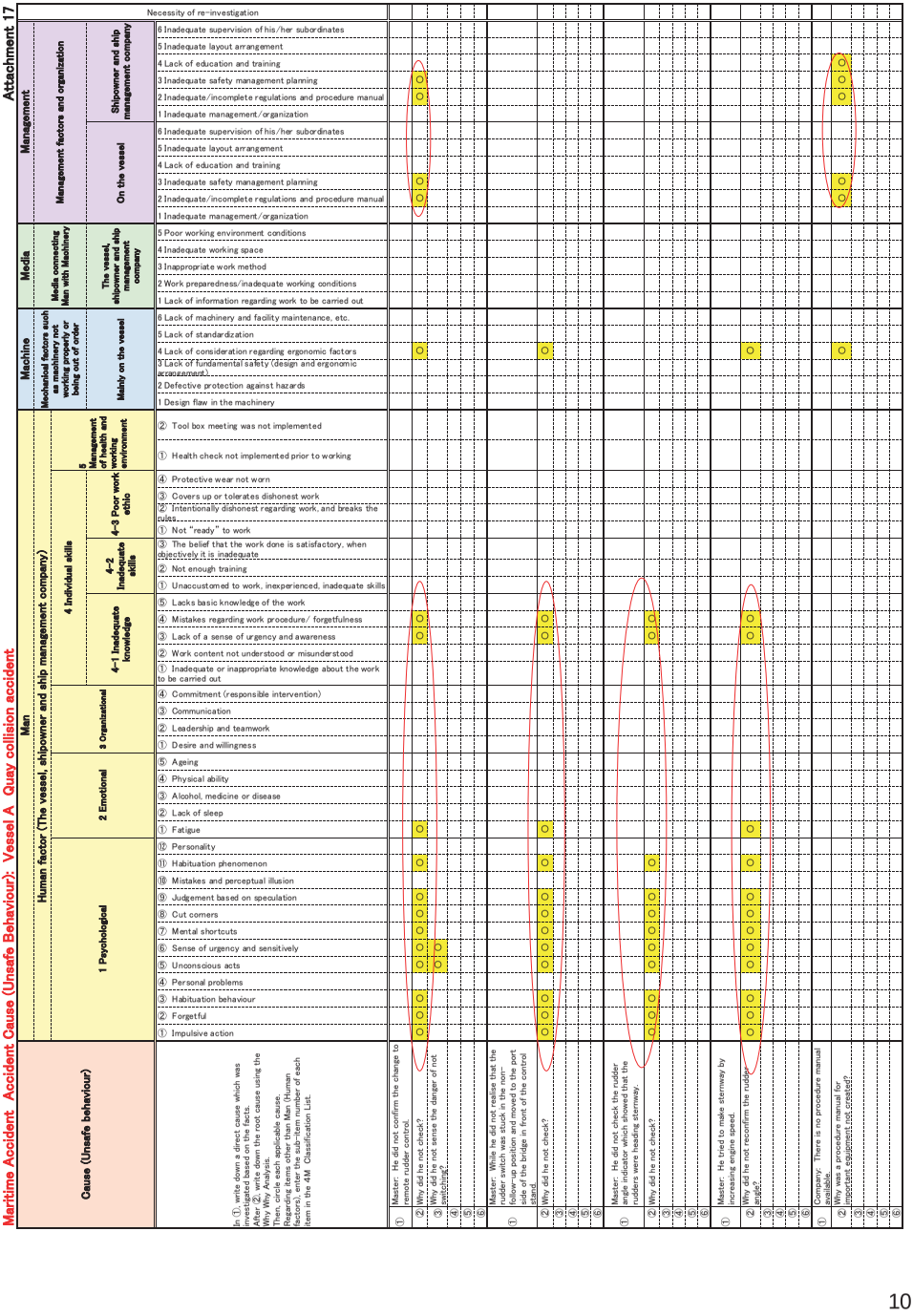
Crew arrangement	Standard docking procedures	Time	Speed	Distance from the quay (Ship length ratio)	Actual actions taken	Who
Bridge Master • C/E Fore C/Off • Bsn • Sailer Aft 2/AE • 3/Off Eng. Room 1/AE	Engine in neutral position	11:55	9.4 kts	2,350 m (30 L)	At 2,350m before the quay (30L), engine half speed to neutral operation. Speed of 9.4 knots and switched from automatic to manual rudder	Master
	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
					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
		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

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	Company	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



Maritime Accident Accident Cause (Unsafe Conditions): Vessel A Quay collision accident

Attachment 18

Cause (Unsafe behaviour)

In ①, write down a direct cause which was investigated based on the facts. After ②, write down the root cause using the Why Why Analysis. Then, circle each applicable cause. Regarding items other than Man (Human factors), enter the sub-item number of each item in the 4M Classification List.

Man – Human factor (The vessel, shipowner and ship management company): 1 Psychological, 2 Emotional

No.	Cause (Unsafe behaviour)	1 Psychological ① Impulsive action	② Forgetful	③ Habituation behaviour	④ Personal problems	⑤ Unconscious acts	⑥ Sense of urgency and sensitively	⑦ Mental shortcuts	⑧ Cut corners	⑨ Judgement based on speculation	⑩ Mistakes and perceptual illusion	⑪ Habituation phenomenon	⑫ Personality	2 Emotional ① Fatigue	② Lack of sleep	③ Alcohol, medicine or disease	④ Physical ability	⑤ Ageing
①	Master: The Master intended to turn the rudder control switch to remote control but did not verify that this had indeed been done.																	
②	Why could he not check?																	
③	Why was there no warning sound?																	
④																		
⑤																		
⑥																		
①	Company: Operating procedures for important equipment had not been incorporated into Safety Management Code (SMS).																	
②	Why was this not incorporated into the safety management regulations?						○											
③																		
④																		
⑤																		
⑥																		
①																		
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④																		
⑤																		
⑥																		

Man – Human factor: 3 Organizational, 4 Individual skills, 5 Management of health and working environment

No.	Cause (Unsafe behaviour)	3 Organizational ① Desire and willingness	② Leadership and teamwork	③ Communication	④ Commitment (responsible intervention)	4–1 Inadequate knowledge ① Inadequate or inappropriate knowledge about the work to be carried out	② Work content not understood or misunderstood	③ Lack of a sense of urgency and awareness	④ Mistakes regarding work procedure/ forgetfulness	⑤ Lacks basic knowledge of the work	4–2 Inadequate skills ① Unaccustomed to work, inexperienced, inadequate skills	② Not enough training	③ The belief that the work done is satisfactory, when objectively it is inadequate	4–3 Poor work ethic ① Not "ready" to work	② Intentionally dishonest regarding work, and breaks the rules	③ Covers up or tolerates dishonest work	④ Protective wear not worn	5 Management of health and working environment ① Health check not implemented prior to working	② Tool box meeting was not implemented
①	Master: The Master intended to turn the rudder control switch to remote control but did not verify that this had indeed been done.																		
②	Why could he not check?							○	○										
③	Why was there no warning sound?																		
④																			
⑤																			
⑥																			
①	Company: Operating procedures for important equipment had not been incorporated into Safety Management Code (SMS).																		
②	Why was this not incorporated into the safety management regulations?													○					
③																			
④																			
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Machine – Mechanical factors such as machinery not working properly or being out of order (Mainly on the vessel); Media – Media connecting Man with Machinery (The vessel, shipowner and ship management company)

No.	Cause (Unsafe behaviour)	Machine 1 Design flaw in the machinery	2 Defective protection against hazards	3 Lack of fundamental safety (design and ergonomic arrangement)	4 Lack of consideration regarding ergonomic factors	5 Lack of standardization	6 Lack of machinery and facility maintenance, etc.	Media 1 Lack of information regarding work to be carried out	2 Work preparedness/inadequate working conditions	3 Inappropriate work method	4 Inadequate working space	5 Poor working environment conditions
①	Master: The Master intended to turn the rudder control switch to remote control but did not verify that this had indeed been done.											
②	Why could he not check?		○		○							
③	Why was there no warning sound?				○							
④												
⑤												
⑥												
①	Company: Operating procedures for important equipment had not been incorporated into Safety Management Code (SMS).											
②	Why was this not incorporated into the safety management regulations?		○		○							
③					○							
④												
⑤												
⑥												
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②												
③												
④												
⑤												
⑥												

Management – Management factors and organization

No.	Cause (Unsafe behaviour)	On the vessel 1 Inadequate management/organization	2 Inadequate/incomplete regulations and procedure manual	3 Inadequate safety management planning	4 Lack of education and training	5 Inadequate layout arrangement	6 Inadequate supervision of his/her subordinates	Shipowner and ship management company 1 Inadequate management/organization	2 Inadequate/incomplete regulations and procedure manual	3 Inadequate safety management planning	4 Lack of education and training	5 Inadequate layout arrangement	6 Inadequate supervision of his/her subordinates	Necessity of re-investigation
①	Master: The Master intended to turn the rudder control switch to remote control but did not verify that this had indeed been done.													
②	Why could he not check?		○	○					○	○				
③	Why was there no warning sound?													
④														
⑤														
⑥														
①	Company: Operating procedures for important equipment had not been incorporated into Safety Management Code (SMS).													
②	Why was this not incorporated into the safety management regulations?		○	○					○	○	○			
③														
④														
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⑥														

Maritime Accident Analysis using 4M5E and Countermeasure List (Unsafe Behaviour): Vessel A Quay collision accident — **Attachment 19**

	Man	Machine	Media	Management	
	The vessel, shipowner and ship management company	Mainly on the vessel	The vessel, shipowner and ship management company	On the vessel	Shipowner and ship management company
Risk factors (Direct cause and indirect/root cause)	All three of the Master's unsafe behaviours have a common direct cause. ① Impulsive action (single-minded focus on the vessel speed and distance to the quay) ② Forgetful (Unable to multi task) ③ Habituation behaviour: bad habit (Human beings have moments of inattention) ⑤ Unconscious acts ⑥ Sense of urgency and sensitively ⑦ Mental shortcuts (Human beings are sometimes in a hurry) ⑧ Cuts corners: breaks the rules due to extra work all of a sudden or fatigue ⑨ Judgement based on speculation: subjective decision and wishful observation (Human beings sometimes make assumptions) ⑪ Habituation phenomenon: false success experience (Human beings have moments of inattention)	No warning for incorrect operation		Inadequate handling instructions for critical equipment	Inadequate handling instructions for critical equipment
Education **Education and training** **Knowledge, skills, consciousness, being given information, etc.**	As an experienced specialist, he is to be well aware of the importance of complying with work procedures. Therefore, he needs to be trained to recognise psychological factors.				
Engineering **Technology and engineering** **Technological countermeasures**		Adjust the device so that a lamp lights up and a warning is sounded if it is operated incorrectly Equipment is installed to assist human characteristics: Human beings sometimes make mistakes and forget			
Enforcement **Thorough guidance and enforcement** **Standardization, proceduralization, alerting, reward and punishment** **KYT, campaigns etc.**				Creation of manuals and procedures in each vessel	Develop written procedures, such as on-site instructions for important equipment, and incorporate them into Safety Management Code (SMS).
Examples **Case studies, countermeasures and rules** **Lead by example, experience of success** **Introduce model cases, "Hiyari-Hatto" (near misses), etc.**	Get involved with creating procedure manual. Also, he will become an instructor for training based on his own experience to teach other Masters and other related audiences.				The carrying out of training on recurrence prevention countermeasures
Environment **Working environment, office internal management, on-board organization, etc.**					

Maritime Accident Analysis using 4M5E and Countermeasure List (Unsafe conditions): Vessel A Quay collision accident

Attachment 20

	Man The vessel, shipowner and ship management company	Machine Mainly on the vessel	Media Work and environment≒ Media connecting Man with Machinery The vessel, shipowner and ship management company	Management	
				On the vessel	Shipowner and ship management company
Risk factors (Direct cause and indirect/root cause)		No warning for incorrect operation		Inadequate handling instructions for critical equipment	Inadequate handling instructions for critical equipment
Education Education and training Knowledge, skills, consciousness, being given information, etc.					
Engineering Technology and engineering Technological countermeasures		Adjust the device so that a lamp lights up and a warning is sounded if it is operated incorrectly. Equipment is installed to assist human characteristics: Human beings sometimes make mistakes and forget.			
Enforcement Thorough guidance and enforcement Standardization, proceduralization, alerting, reward and punishment KYT, campaigns etc.				Creation of manuals and procedures in each vessel	The carrying out of training on recurrence prevention countermeasures Develop written procedures, such as on-site instructions for important equipment, and incorporate them into Safety Management Code (SMS).
Examples Case studies, countermeasures and rules Lead by example, experience of success, Introduce model cases, "Hiyari-Hatto" (near misses), etc.					
Environment Working environment, office internal management, on-board organization, etc.					

Human characteristics, Human error and Psychology: Vessel A Quay collision accident

Date and time	Movement	Who?	Human error	Human characteristics	Psychological factors
12:00	Before passing breakwater No. 5	Master	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. However, 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.	① Human beings sometimes make mistakes: A mistake is apparent ④ Human beings sometimes do not notice: Switch position ⑥ Human beings are sometimes only able to see one thing at a time: Moved without checking ⑦ Human beings are sometimes in a hurry: He was distracted by the berthing manoeuvre	④ Confirmation bias: Human beings ignore information that is inconvenient for him or her.
12:08	At approximately 160m from the quay	Master	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). 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.	④ Human beings sometimes do not notice: Rudder indicator ⑥ Human beings are sometimes only able to see one thing at a time: Moved without checking? ⑦ Human beings are sometimes in a hurry: He was distracted by the berthing manoeuvre	③ Confirmation bias: "I' m special, nothing can hurt me!"
				⑤ Human beings sometimes make assumptions: Thought he had tipped the joystick backwards and made a sternway manoeuvre	④ Confirmation bias: Human beings ignore information that is inconvenient for him or her.
			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 Human beings sometimes do not notice: Rudder indicator ⑥ Human beings are sometimes only able to see one thing at a time: Tried to make sternway by increasing engine speed ⑪ Human beings sometimes panic	④ Confirmation bias: Human beings ignore information that is inconvenient for him or her.
12:09	Accident occurs	Master	At a speed of 4.3 knots, the ship hit the quay at almost a right angle.		

Organization	Safety management system	Reference No.

Pre-work risk assessment table (Reference No.)

Specific work to be carried out: Voyage plan (Deck・Engine・Catering Department) Vessel A Quay collision accident

Date and time of assessment:

Work category : Routine work ・ Non-routine work

Participants : △△△、XXX、□□□

Place and name of work: Vessel A

	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×d)	Risk Level	Measures adopted
1	The joystick of the remote control unit moves even when the remote operation unit is switched to non-remote position, causing human characteristic/error such as: Human beings sometimes make assumptions.	5		4	20	HH	(b. Physical countermeasures) Warning sound when switching modes	5		2	10	M		5		1	5	M	Y
							(b. Physical countermeasures) Making the switch to remote mode a 2-stage operation	5		1	5	M							
							(b. Physical countermeasures) Failure to complete both stages will freeze the joystick rendering it immobile.	5		1	5	M							
	(Hazard) Rudder control switch for remote control and joystick						(c. Administrative countermeasures) Repeat training to be carried out	5		1	5	M							
2	Three human errors occurred: incorrect rudder control switch, moving in front of the remote control on the port side of the bridge without checking the steering mode, and not checking the indication on the rudder angle indicator.	5		4	20	HH	(a. Essential measures)												
							(b. Physical countermeasures)												
							(c. Administrative countermeasures) Repeat training and re-education to be carried out, along with the creation of procedures and a manual	5		2	10	H							
	(Hazard) Human characteristics and Psychological factors						(d. Use of personal protective equipment)												
3							(a. Essential measures)												
							(b. Physical countermeasures)												
							(c. Administrative countermeasures)												
	(Hazard)						(d. Use of personal protective equipment)												
4							(a. Essential measures)												
							(b. Physical countermeasures)												
							(c. Administrative countermeasures)												
	(Hazard)						(d. Use of personal protective equipment)												
	Total	10	0	8	40		Total	25	0	7	35									
	Risk level prior to countermeasure (Avg.) No.	1	0	1	2		Risk level after countermeasure (Avg.) No.	5	0	5										
	Risk level prior to countermeasure (Avg.) Avg.	10.0	0.0	8.0	20.0		Risk level after countermeasure (Avg.) Avg.	5.0	0.0	1.4	7.0									
	Level (See the criteria)	5		4	20	HH	Level (See the criteria)	5	0	2	10	H								

Final assessment: Risk level change H ⇒ H

[Work possible or not] 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 are implemented.

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)

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