"PILOTAGGIO RACCOMANDATO NELLE BOCCHE DI BONIFACIO"

AUDIZIONE INFORMALE VIII e IX Commissione Camera dei Deputati

15 aprile 2021

Il progetto del **Servizio di Pilotaggio** nello Stretto delle Bocche di Bonifacio nasce a seguito di una specifica risoluzione dell'IMO (organo tecnico delle Nazioni Unite – *Iternational Maritime Organization*) quale condizione ***sinequa non*** per la determinazione in via definitiva dell'unica Area Marina Particolarmente Sensibile (*PSSA – Particulary Sensitive Sea Area*) del Mediterraneo. La seconda al mondo (dopo Torres Strait in Australia/Papa Nuova Guinea) per caratteristiche ambientali, sociali, politiche ed economiche.

Il Pilotaggio nello Stretto di Bonifacio è un pilotaggio di alto mare che si discosta completamente, da un punto di vista tecnico e concettuale, dal pilotaggio normalmente detto "di Porto".

L'IMO ha inserito il pilotaggio ad integrazione di quelle che definisce **Misure Associate di Protezione Ambientale** (APM – *Associated Protective Measure*), ovvero un "pacchetto" di misure intese a raggiungere il massimo livello di prevenzione, protezione e sicurezza marittima e ambientale possibili, dai pericoli del traffico marittimo internazionale, che sono:

- schema di rotte raccomandate
- servizio VTS (Vessel Traffic Service) con rapportazione via radio
- Servizio di Pilotaggio raccomandato

1 - ATTIVITÀ' SVOLTA

Fin dall'inizio l'Amministrazione centrale (MIMS) ha richiesto, per tramite della Federazione, la disponibilità dei piloti di Olbia e Porto Torres ad organizzare un servizio raccomandato[1] nello Stretto, ricevendo sempre pieno supporto.

Con risorse personali proprie, perché il progetto della PSSA potesse produrre i suoi

[1] Nella P.S.S.A dello Stretto di Bonifacio l'I.M.O. esorta gli Stati rivieraschi a scoraggiare il transito delle navi, ovvero, nel caso non possano farne a meno, raccomanda che le stesse utilizzino un pilota esperto della zona, quale Misura Associata di Protezione a tutela dell'Area particolarmente Sensibile.

effetti, i piloti hanno predisposto, quanto segue:

- ✓ il sito internet per l'informazione alle navi e le eventuali prenotazioni del servizio di pilotaggio.
- ✓ l'adeguato dei mezzi nautici per la navigazione d'altura.
- ✓ l'acquisto e la ristrutturazione di una pilotina di 16 mt per potere avere margini di sicurezza maggiori rispetto alle imbarcazioni utilizzate nei porti.

È giusto dare merito che se non fosse stato per parte italiana, il progetto della PSSA non avrebbe trovato attuazione, vanificando il lavoro e le risorse di anni spesi in sede internazionale. Prova ne è che il decreto di nomina dei piloti dello Stretto di Bonifacio dell'Autorità Marittima Italiana è del 30 giugno 2014. Appena 24h prima del termine entro il quale l'IMO ne aveva disposto l'adempimento. Attuazione che ha consentito anche alla Francia, ancorché in ritardo, di provvedere allo stesso inter il 7 di novembre dello stesso anno.

Da allora dal punto di vista sostanziale e formale poco o niente si è mosso, se non la costante attenzione posta dal Comando Generale delle Capitanerie di Porto Guardia Costiera che ha sempre mantenuto l'attenzione sull'argomento.

Il "neonato gruppo" di pilotaggio internazionale invece, **istituito e coordinato su base volontaria**, ha sempre dovuto far fronte alle non poche difficoltà logistiche ed operative in solitudine, consentendo così, di fatto, l'applicazione delle misure disposte dall'IMO.

E' bene evidenziare che, sempre nell'ottica di contribuire attivamente alla tutela delle Bocche, dal 1° luglio 2014, i piloti garantiscono un turno di guardia regolare di prontezza operativa ed invio di informazioni di servizio su richiesta dei comandanti delle navi, senza alcun costo riconosciuto.

Tutto ciò avviene da ormai quasi sette anni di una prima fase di sperimentazione, che ci auguriamo oggi conosca un suo "*upgrade*", durante i quali solamente 36 navi hanno rispettato la raccomandazione del pilota a bordo, a fronte delle oltre 20.000 unità transitate. Un dato che non ha bisogno di commenti.

2 - STATO DELL'ARTE

Oltre alle 36 navi pilotate, altre 40 navi circa, una volta saputo del pilotaggio, hanno rinunciato a passare, scegliendo rotte alternative. Oppure, in qualche altro caso, pur avendo confermato il transito con il pilota a bordo, sono stati proprio i piloti a sconsigliare il passaggio per condizioni meteo particolarmente avverse che avrebbero inutilmente messo a rischio la nave

e la PSSA.

Per quanto detto, oggi possiamo affermare con certezza che la sperimentazione così come è stata impostata, è fallita.

È doveroso informare che a causa della pandemia i piloti francesi, momentaneamente, non possono dare il loro contributo nella turnazione. Questo, unitamente ad alcuni infortuni e pensionamenti, ha ridotto la squadra da 14 a 5 piloti.

Paradossalmente il tutto avviene in un momento in cui alcune compagnie (due) stanno utilizzando il servizio con una certa regolarità e vorrebbero usufruirne sempre. Infatti, dopo una media di 4,6 pilotaggi all'anno (All.1), siamo passati agli 8 pilotaggi nel primo trimestre 2021.

Dal punto di vista economico le tariffe sperimentali attualmente in vigore a volte non arrivano a coprire i costi vivi dell'operazione. Questo non perché siano troppo basse le tariffe, ma perché i costi di trasferimento ed i tempi così lunghi sono assolutamente esagerati.

3 - CAUSE DEL FALLIMENTO

Non avere una postazione operativa avanzata, ad alcune miglia dall'intervento, pone la misura del pilotaggio nella condizione di NON poter essere raccomandata alle navi, perché non immediatamente fruibile. Criticità dovuta unicamente alla mancanza di risorse economiche.

Per dare un'idea, il transito a bordo della nave dura in media 1h e 40'. L'operazione impegna tre persone (1 pilota + 2 membri di equipaggio) degli organici attivi nei porti di Olbia e Porto Torres, per 12 ore circa. Mentre se ci fosse la postazione avanzata (La Maddalena/Santa Teresa) i tempi si ridurrebbero a 4 ore circa.

4 - MISURA ASSOCIATA DI PROTEZIONE - PILOTA A BORDO

In passato in Italia si è pensato, in più di un'occasione, di proporre la soluzione di un pilotaggio in VHF (via radio), nella convinzione che questo potesse adempiere comunque a quanto indicato dall'IMO nella risoluzione che istituì la PSSA. Nella fattispecie, ciò non risponderebbe al vero. Ci sia consentito in questa sede, per la rilevanza internazionale del progetto, evidenziare alcuni aspetti forse poco noti circa il regime di pilotaggio VHF, che è un istituto esistente solo in Italia. A riguardo alleghiamo una scheda di approfondimento (ALL. 2).

5 - SUGGERIMENTI E PROPOSTE

Gli anni di esperienza sul campo suggeriscono che la soluzione migliore, più veloce e meno dispendiosa, sia quella di sostenere uno start-up operativo nell'immediato, meglio attraverso un soggetto pubblico, volto ad essere pronti ad intervenire, pubblicizzando maggiormente la misura, tanto via radio alle navi in avvicinamento, quanto alle agenzie marittime di tutto il mondo ed alle

compagnie di navigazione. Questo creerebbe coscienza collettiva sulla fragilità e delicatezza, oltre che pericolosità di questo tratto di mare e raggiungerebbe l'obiettivo di avere un certo numero di navi che utilizzerebbe tutte le misure associate, ivi il pilotaggio, dando la possibilità al progetto di start-up di staccarsi dal sostegno pubblico il prima possibile per autofinanziarsi come già notoriamente avviene nel sistema di pilotaggio nazionale (All.3).

6 - STUDIO DEL TRAFFICO

Segue una tabella riepilogativa estrapolata dall'analisi allegata alla presente relazione (All. 4), sulla base dei dati di traffico rilevati dalla Stazione VTS negli anni 2011-2020. Le navi sono state suddivise tra Italiane/Francesi, ed Estere per poi essere classificate secondo la **tabella di "rischio Ambientale"** dell'IMO che prende come riferimento la stazza e che riassumiamo qui sotto:

1. BASSO RISCHIO < **3.500** TSL/Gross Tonnage
2. ALTO RISCHIO > **3.500 - < 25.000** TSL/Gross Tonnage
3. ALTISSIMO RISCHIO> **25.000** TSL/Gross Tonnage

La tabella mostra come lo Stretto di Bonifacio venga utilizzato in prevalenza da navi iscritte a registri stranieri.

Per quanto concerne le navi che per dimensione l'IMO classifica ad alto/altissimo rischio per l'ambiente per la grossa capacità di stoccaggio di combustibile destinato alla sola propulsione ed idrocarburi vari presenti a bordo, la percentuale è aumentata considerevolmente dagli ultimi dati disponibili, **fenomeno riconducibile al noto "gigantismo navale" e non scende mai al di sotto del 80% negli ultimi cinque anni.**

CONCLUSIONE

Accogliamo favorevolmente la volontà politica di intraprendere, parallelamente, un percorso verso l'obbligatorietà a livello internazionale, ma sappiamo questa essere una strada lunga e dagli esiti incerti, mentre l'unica certezza statistica è che prima o poi potrebbe accadere ciò che nessuno vuole. Un progetto di pilotaggio raccomandato serio però necessita di risorse immediate. Auspichiamo pertanto che si possa dare inizio a quella che può essere definita la "fase 2" della sperimentazione, con l'obiettivo di verificarne l'efficacia entro 24/36 mesi.

La Federazione Italiana Piloti dei Porti si dichiara disponibile a partecipare ad eventuali iniziative e tavoli corrispondenti sul tema, per i quali manterrà sempre un atteggiamento propositivo nel pieno rispetto dei ruoli, a tutela del pilotaggio italiano.

All. 1

Monthly pilotage service report in the Bonifacio Strait

	N. Passage	month	Passage Date	P.O.B.	Ship Name	N° IMO	GT	IMO Risk level		Weather Condition	Vassel type	Last port / Next port	Passage Direction		pilotage	Pilot	Band
2015	1 - 1	Giugno	14/06/2015		CASTOR LEADER	9713894	70.048	Very Hight Risk	(1)	SW/NW 4/5	Vehicles Carrier	Napoli (I) / Barcellona(E)	East Bound	(1)	Italy (1)	Bandiera	(1)
	2 - 2	Luglio	07/07/2015		GRACEFUL LEADER	9357303	57.692	Very Hight Risk	(2)		Vehicles Carrier	Southampton / Ciivtavecchia	East Bound	(2)	French (1)	/////	
	3 - 3	Settembre	16/09/2015	02.15	E.R. PUSAN	9211169	66.289	Very Hight Risk	(3)	calm	Container Ship	Napoli / Valencia	West bound	(1)	Italy (2)	Fois	(1)
	4 - 4	Ottobre	15/10/2015	14.52	MS NIEUW AMSTERDAM	9378450	86.278	Very Hight Risk	(4)		Passengers Ship	Cartagena / Civitavecchia	West bound	(2)	Italy (3)	Bandiera	(2)
	5 - 5	Ottobre	25/10/2015	17.00	MS NIEUW AMSTERDAM	9378450	86.278	Very Hight Risk	(5)		Passengers Ship	Barcellona / Napoli	West bound	(3)	French (2)	/////	
	6 - 6	Novembre	23/11/2015	18.42	AURIGA LEADER	9402718	60.213	Very Hight Risk	(6)		Vehicles Carrier	Setubal / Civitavecchia	East Bound	(3)	Italy (4)	Sanna	(1)
2016	1 - 7	Gennaio	20/01/2016	17.52	HTC CHARLIE	9670846	32.987	Very Hight Risk	(7)		Bulk Carrier	Salerno / Barcellona	West bound	(4)	Italy (5)	Fois	(2)
2017	1 - 8	Gennaio	27/01/2017	12:30	TAMARA	9600889	81.670	Very Hight Risk	(8)		Crude Oil Tanker	Southampton / Civitavecchia	East Bound	(4)	French (3)	/////	
	2 - 9	Aprile	18/04/2017	14:55	CAPRICORNUS L.	9283863	61.854	Very Hight Risk	(9)	W25	Car Carrier	Southampton / Civitavecchia	East Bound	(5)	Italy (6)	Sanna	(2)
	3 - 10	Settembre	24/09/2017	11:35	M/V LIVADI	9522946	21.934	Hight Risk	(1)	W4	Bulk Carrier		East Bound	(6)	French (4)	/////	
	4 - 11	Dicembre	20/12/2017	08.18	RICKMERS SHANGHAI	9244544	23.119	Hight Risk	(2)	NE4	General Cargo	Fos/Mer / Rijeka (Messina)	East Bound	(7)	Italy (7)	Fois	(3)
2018	1 - 12	Gennaio	14/01/2018	12.57	MEDITERRANEAN SEA	9451006	46.800	Very Hight Risk	(10)	NE3	Vehicles Carrier	Civitavecchia / Sagunto (Valencia)	West bound	(5)	Italy (8)	Bandiera	(3)
	2 - 13	Febbraio	23/02/2018	10.04	R/V MARIA S. MERIAN	9274197	5.573	Hight Risk	(3)	W4	Research Vessel		East Bound	(8)	Italy (9)	Sanna	(3)
	3 - 14	Marzo	10/03/2018	09.50	EPIC ST. THOMAS	9697492	4.292	Hight Risk	(4)	SE/NE 4	LPG Tanker	Durres / Lavera	West bound	(6)	Italy (10)	Bandiera	(4)
	4 - 15	Settembre	06/09/2018	20.45	SAGA BEIJA FLOR	9160798	29.729	Very Hight Risk	(11)	W4/5	General Cargo	Sete / Monfalcone	East Bound	(9)	Italy (11)	Sanna	(4)
	5 - 16	Ottobre	25/10/2018		SAINT DIMITRIOS	9401518	23.322	Hight Risk	(5)		General Cargo	Sete / Canakkale/kavkal	East Bound	(10)	French (5)	/////	
	6 - 17	Dicembre	13/12/2018	22.42	BW MERLIN	9682239	29.768	Very Hight Risk	(12)		Oil tanker	Koper / Lavera	West bound	(7)	Italy (12)	Fois	(4)
2019	1 - 18	Febbraio	16/02/2019	21.10	SAGA ODYSSEY	9401788	29.758	Very Hight Risk	(13)		General Cargo		West bound	(8)	French (6)	/////	
	2 - 19	Marzo	02/03/2019	13.00	SAGA FRIGG	9613850	37.499	Very Hight Risk	(14)		General Cargo		West bound	(9)	French (7)	/////	
	3 - 20	Giugno	10/06/2019	23.42	SAGAVIKING	9233466	29.867	Very Hight Risk	(15)		General Cargo	Sete / Napoli	East Bound	(11)	Italy (13)	Fois	(5)
	4 - 21	Novembre	13/11/2019	09.15	YM WARMTH	9704647	144.651	Very Hight Risk	(16)	NW8	Container Ship	Suez / New York	West bound	(10)	Italy (14)	Fois	(6)

All. 1

Monthly pilotage service report in the Bonifacio Strait

	N. Passage	month	Passage Date	P.O.B.	Ship Name	N° IMO	GT	IMO Risk level		Weather Condition	Vassel type	Last port / Next port	Passage Direction		pilotage	Pilot	Band
2020	1 - 22	Gennaio	19/01/2020	13.30	SAGA PIONEER	9380764	29.758	Very Hight Risk	(17)	NE3	General Cargo	Set (F) / Monfalcone (I)	East Bound	(12)	French (8)	/////	
	2 - 23	Aprile	08/04/2020	15.00	UHL FUSION	9785380	16.732	Hight Risk	(6)		General Cargo	Fos (F) / Zadar (HR)	East Bound	(13)	French (9)	/////	
	3 - 24	Aprile	10/04/2020	12:30	OSHIMANA	9249295	36.324	Very Hight Risk	(18)		General Cargo	Sete(F) / Monfalcone(I)	East Bound	(14)	French (10)	/////	
	4 - 25	Giugno	21/06/2020	17.00	MSC LORENA	9320403	50.963	Very Hight Risk	(19)		Container Ship	Gioia Tauro (I) / Fos(F)	West bound	(11)	French (11)	/////	
	5 - 26	Settembre	06/09/2020	19:54 / 21:30	SAGA FRONTIER	9343510	29.158	Very Hight Risk	(20)		Bulk Carrier	set (F) / Napoli (I)	East Bound	(15)	Italy (15)	Fois	(7)
	6 - 27	Settembre	14/09/2020	11:54 / 13:25	BBC OPAL	9506758	12.810	Hight Risk	(7)	NE3	Container Ship	Malta(MT) / Fos (F)	West bound	(12)	Italy (16)	Bandiera	(5)
	7 - 28	dicembre	23/12/2020	12:00 / 13:30	APL PHOENIX	9597501	109.712	Very Hight Risk	(21)		Container Ship	Fos (F) / Gioia Tauro	East Bound	(16)	Italy (17)	Sanna	(5)
2021	1 - 29	Gennaio	04/01/2021	23:10 / 00:30	R.HOURD EL FARES	9537044	23.059	Hight Risk	(8)	Sw3/4	LPG Tanker	Porto Torres (IT) / Ardea(IT)	East Bound	(17)	Italy (18)	Marras	(1)
	2 - 30	Marzo	07/03/2021	04:25 / 06:20	BERGA II	9537032	23.059	Hight Risk	(9)	NE7	LPG Tanker	Porto Torres (IT) / Napoli (IT)	East Bound	(18)	Italy (19)	Sanna	(6)
	3 - 31	Marzo	09/03/2021	03:50 / 05:35	APL SAVANNAH	9597513	109.721	Very Hight Risk	(22)	NE7	Container Ship	Fos (F) / Gioia Tauro (IT)	East Bound	(19)	Italy (20)	Bandiera	(6)
	4 - 32	Marzo	29/03/2021	14:05 / 15:30	R.HOURD EL FARES	9537044	23.059	Hight Risk	(10)	E2	LPG Tanker	Ardea(IT) / Porto Torres (IT)	West bound	(13)	Italy (21)	Bandiera	(7)
	5 - 33	Marzo	29/03/2021	19:30 / 21:00	OPTIMANA	9253856	38.910	Very Hight Risk	(23)	E2	General Cargo	Monfalcone (IT) / Sete (FR)	West bound	(14)	Italy (22)	Bandiera	(8)
	6 - 34	Marzo	31/03/2021	23:30 / 01:15	R.HOURD EL FARES	9537044	23.059	Hight Risk	(11)	calm	LPG Tanker	Porto Torres (IT) / Ardea(IT)	East Bound	(20)	Italy (23)	Sanna	(7)
	7 - 35	Aprile	05/04/2021	10:36/13:00	MAERSK KATE	9431276	24.481	Hight Risk	(12)	calm	Oil tanker	Barcellona / Fiumicino	East Bound	(21)	Italy (24)	Fois	(8)
	8 - 36	Aprile	15/04/2021	14:05 / 15:30	ECO ARCTIC	9746683	19.554	Hight Risk	(13)	calm	LPG Tanker	Napoli (I) / Porto Torres (I)	West bound	(15)	Italy (25)	Sanna	(8)

ALLEGATO 2

SCHEDA DI APPROFONDIMENTO PILOTAGGIO VHF (assistenza via radio)

L'assistenza alla manovra via radio da parte del pilota nel porto è nata fondamentalmente in sostituzione di un altro istituto in uso in alcuni paesi, quale è il "Pilot exemption Certificate", conosciuto con l'acronimo di PEC. Questa soluzione in Italia non trova un riscontro oggettivo sulle modalità di attuazione così come previste all'estero. L'Autorità Marittima Italiana ha invece dato delle specifiche linee giuda per regolamentare l'istituto dell'assistenza via radio dei piloti, c.d. VHF che varia porto per porto.

Già questo potrebbe suggerire che in Francia, probabilmente, non potrebbe essere riconosciuto come strumento valido.

Entrando nel merito invece, l'IMO chiede esplicitamente che la nave che non possa fare a meno di transitare lo Stretto, debba avvalersi di un pilota esperto dell'area per un passaggio sicuro.

Differentemente dal pilotaggio portuale, questo è un pilotaggio di alto mare e non riguarda la manovra in spazi ristretti, ma la necessità di avere una persona esperta della zona che collabori direttamente con gli Stati rivieraschi, in assoluta sinergia e comunione d'intenti con le stazioni radio/radar a terra. La bontà di tale concetto tecnico-operativo è ampiamente descritto nel dettaglio in uno studio commissionato dalla Comunità Europea "Efficient, Safe and Sustainable Traffic at Sea" nel 2012 (che alleghiamo per pronta visione), dove viene approfondito proprio il risultato, in termini di sicurezza in mare, dell'interazione VTS - Pilota a bordo e dove il primo è definito misura passiva (perché da remoto), ed il secondo misura attiva (perché sul posto).

Nelle Bocche di Bonifacio un eventuale servizio in VHF, oltre a non trovare supporto normativo a livello internazionale, si ridurrebbe ad un accavallamento di competenze e/o di comunicazioni rispetto a quanto già egregiamente svolto dal VTS nazionale, così come dal semaforo francese. Inoltre, non risponderebbe alle indicazioni dell'IMO e questo potrebbe esporre l'Amministrazione a future censure circa le azioni intraprese a seguito di una risoluzione chiara e definitiva.

Se volessimo poi analizzare anche il profilo dei costi, questi non sarebbero inferiori. Infatti, mentre le necessità attuali sono di un intervento a supporto della logistica con un importante, ma tutto sommato, moderato investimento iniziale, per poi proseguire con un mantenimento delle spese di gestione limitate nel tempo, in caso di VHF dovremmo strutturare l'impiego di un gruppo di piloti che dovrebbe sostenere una turnistica regolare di guardia in una specificata sede.

Uno sforzo davvero notevole per un'operazione complessa e normativamente discutibile, per offrire un servizio che dal punto di vista operativo e di sicurezza ambientale non aggiungerebbe niente a ciò che è già in essere, perché, lo ripetiamo, creerebbe semplicemente un doppione e rimarrebbe una soluzione che non potrebbe comunque essere imposta. Risulterebbe pertanto una misura a carico del pubblico in via permanente e non risolverebbe comunque il problema di avere ulteriori risorse per un imbarcazione ed equipaggio disponibili ad intervenire.

Allegato 3

1 - SOLUZIONE IMMEDIATA

(Pilotaggio RACCOMANDATO)

Base a La Maddalena titolare Amministrazione/Ente Pubblico

COSTO MATERIALI

- N° 1 Pilotina tipo "NELSON 52'" mt 16,00 – (ACQUISTO)*	€	300.000,00
	Totale €	**300.000,00**

COSTO GESTIONE ANNUO PER MANTENIMENTO SERVIZIO

- N° 1 Conduttore + 1 meccanico/marinaio	€	120.000,00
- Manutenzione ordinaria mezzi nautici	€	20.000,00
- Assicurazione per n° 1 pilotina e P&I	€	15.000,00
	Totale €	**175.000,00**

* N.B: Soluzione possibile sino ad un massimo e non oltre le 50 prestazioni di pilotaggio all'anno.

2 - SOLUZIONE MEDIO TERMINE

(Pilotaggio RACCOMANDATO)

Base a La Maddalena e Santa Teresa titolare Amministrazione/Ente Pubblico

COSTO MATERIALI

- N° 1 Pilotine "ORC 155" mt 18,00 **"HART MARINE"**	€ 1.500.000,00
- implementazione tecnologica (ponte radio, strumentazione varia, dotazioni sicurezza e recupero uomo a mare)	€ 150.000,00
- Arredamenti per N° 2 sedi (La Maddalena e Santa Teresa)	€ 20.000,00
Totale	€ **1.670.000,00**

COSTO GESTIONE ANNUO PER MANTENIMENTO SERVIZIO

- N° 2 Conduttori + N° 2 meccanici/marinai	€ 240.000,00
- Costi di gestione n° 2 sedi (fitto, luce, acqua, pulizie)	€ 40.000,00
- Manutenzione ordinaria mezzi nautici	€ 40.000,00
- Assicurazione per n° 2 pilotine e P&I	€ 30.000,00
Totale	€ **350.000,00**

SINTESI GENERALE DEI COSTI

Totale costi SOLUZIONE <u>IMMEDIATA</u>	
• **Materiali**	€ **300.000,00**
• **Gestione Servizio annuo**	€ **175.000,00**
Totale costi SOLUZIONE <u>MEDIO TERMINE</u>	
• **Materiali**	**<u>€ 1.670.000,00</u>**
Totale generale	**€ 2.145.000,000**
A regime Gestione Servizio annuo	€ **350.000,00**

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N.B.: Il prospetto prevede un impiego di fondi pubblici come "start-up" della seconda fase di sperimentazione del pilotaggio raccomandato nelle Bocche di Bonifacio. Raggiunta la soglia minima di 300 prestazioni è verosimile pensare che il progetto si autofinanzi. Si tratterebbe del 10% circa del traffico in transito.

ALL. 4

ANALISI GENERALE DEL TRAFFICO – PERIODO 2011/2020

L'analisi del traffico è stata fatta estrapolando i dati forniti dalla Stazione VTS di La Maddalena per gli anni dal 2011 a tutto il 2020.
Per facilità di comprensione sono state raggruppate le **oltre 30.000 navi prese in esame** in sei gruppi principali, considerando le navi di bandiera Italiana e Francese in una unica soluzione in quanto le sole alle quali possono essere imposte alcune restrizioni (IMO resolution A766 – Divieto di transito delle navi cisterna se cariche).

Nelle tabelle che seguono sono riportate, divise per anno prima, ed in generale poi, il numero di navi registrate in transito, tradotte poi in percentuale, individuate utilizzando i parametri forniti dall'IMO che classifica il rischio a cui le navi sottopongono l'ambiente in una tabella ufficiale:

- BASSO RISCHIO < 3.500 TSL
- ALTO RISCHIO > 3.500 - < 25.000 TSL
- ALTISSIMO RISCHIO > 25.000 TSL

Questo tipo di classificazione è determinata non solo per il tipo di carico commerciale trasportato, ma principalmente per la quantità totale di IDROCARBURI che possono essere "stoccati" a bordo (nafta pesante, olio combustibile, gasolio) che varia a seconda della dimensione della nave, misurata in tonnellate di stazza lorda.

I dati riferiscono che a delle variazioni più o meno significative del traffico, la percentuale di navi riconosciute ad alto/altissimo rischio per l'ambiente, è in costante aumento. La media ponderata negli ultimi cinque anni non è mai al di sotto del 80%.

Un altro dato interessante è che le navi di bandiera estera che transitano lo Stretto di Bonifacio sono costantemente un numero superiore, rispetto alle navi di bandiera Italiana e Francese.

La drastica flessione del 2020 è certamente riconducibile al blocco dei traffici globale delle crociere e comunque ad un generale rallentamento dell'economia mondiale.

ANALISI GENERALE secondo tabella IMO 2011 - 2015

				Considerate dall'IMO				
	nr.	Bandiera Ita/Fra	Bandiera Estera	Alto Rischio		Altissimo Rischio		totali
Transiti 2011	3426	1212	2214	846	25%	1715	50%	**75%**
Transiti 2012	3211	1272	1927	1052	33%	1649	51%	**84%**
Transiti 2013	3157	1225	1932	732	23%	1692	54%	**77%**
Transiti 2014	3039	1232	1807	754	25%	1626	54%	**78%**
Transiti 2015	3076	1220	1856	770	25%	1742	57%	**82%**
GRAN TOTALE	**15909**	**6161**	**9736**	**4154**		**8424**		

ANALISI GENERALE secondo tabella IMO 2016 - 2020

	nr.	Bandiera Ita/Fra	Bandiera Estera	Alto Rischio		Altissimo Rischio		Totali
Transiti 2016	3407	1382	2025	831	24%	1987	58%	**83%**
Transiti 2017	3407	1395	2012	870	26%	1980	58%	**84%**
Transiti 2018	3563	1459	2104	890	25%	2172	61%	**86%**
Transiti 2019	3581	1606	1975	767	21%	2300	64%	**86%**
Transiti 2020	2753	1272	1481	745	27%	1533	56%	**83%**
GRAN TOTALE	**16711**	**7114**	**9597**	**4103**		**9972**		

La comparazione dei due quinquenni presi in esame, evidenzia un sostanziale aumento del numero dei transiti dell'1% circa, prevalentemente verso le navi ad altissimo rischio, ovvero evidenzia l'aumento della stazza in generale.

A fronte invece di questi numeri di assoluta rilevanza, le navi transitate con il pilota dal 1° luglio 2014 ad oggi sono state 35, oltre a circa una quarantina che, dopo avere contattato i piloti per informazioni circa il transito ed i costi, hanno preferito modificare il viaggio passando prevalentemente a sud della Sardegna. Segnaliamo inoltre che, in alcune occasioni, pur avendo confermato il transito con il pilota a bordo, su nostro suggerimento a causa di condizioni meteo-marine molto gravi, le navi hanno accolto di non passare, evitando un inutili rischi.

BONIFACIO STRAIT PILOTS
Capt. francesco Bandiera

Title **Efficient, Safe and Sustainable Traffic at Sea**
Acronym **EfficienSea**

Contract No. 013

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Summary Report on Evaluating VTS and Pilotage as Risk Reduction Measures

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Content

1 Introduction

1.1 Background

Pilotage and Vessel Traffic Services (VTS) are risk reduction measures aimed at improving navigational safety and reducing the risk of collision, grounding, and contact accidents and incidents. Within the EfficienSea project, three studies investigated the risk reduction effects of these measures in specific areas of the Baltic Sea. This report summarises the results of these studies with respect to conclusions on the contributions of these measures to safety.

1.2 Aims of the activity

The main objective of activity 6.5, "Risk reduction of pilotage and Vessel Traffic Service (VTS)", is as follows:

> "*The services provided by VTS centre differ and so do covered areas and required education and experience of VTS operators. It is believed that provided services, area coverage, routines, operator qualifications and operator training etc. can be more risk- oriented than currently the case, and that there is much existing knowledge to be exchanged between different VTS-centres in order to increase maritime safety. Both pilotage and VTS provide information to navigators and their risk-control measures show similarities. Therefore, exchange might be possible. Navigators, pilots and VTS operators are all capable of human error and this is essential to consider. The result of this activity is a decision supporting framework for establishing pilot and VTS services.*"
>
> (From the EfficienSea Project Data Form 04/02/2009)

1.3 Aim of report

This report is part of activity 5 within work package 6 Dynamic Risk Management. The aim of this report is to summarise the three main studies reported within this task, which are focussed on evaluating VTS and pilotage as risk reduction measures, and present their findings with respect to decision support.

1.4 Scope

The study covers the following areas:

- The sea **areas** of the Baltic Sea, primarily Swedish and Finnish territorial waters.
- The risk reduction measures VTS and pilotage.
- The **accident types** groundings, collisions, and contacts.
- **Merchant ships** and **fishing vessels** with a size of at least 100 or 300 GT.

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1.5 Data sources

This report summarises the findings of the following three studies:

- Westerlund, K. 2011. The Risk Reducing Effect of VTS in Finnish Waters. EfficienSea Deliverable D_WP6_5_01.
- Anbring, A., and P. Grundevik. 2012. How Pilotage Contributes to Maritime Safety. EfficienSea Deliverable WP_6_5_02
- Lundkvist, M. 2012. Risk Assessment of VTS in Swedish Waters. EfficienSea Deliverable W_WP6_5_03.

The study by Lundvist was a detailed risk assessment of VTS, with the view to providing a basis for decision making. The other study of VTS, by Westerlund, investigated the types of interventions carried out by VTS operators, and compared the duties in an open water period with those carried out during an ice period. The study on pilotage investigated how pilots contributed to maritime safety through a literature review, interviews, participant observations, accident statistics and accident reports. The interviews, observations, statistics, and accident reports all concerned pilotage in Swedish waters. The study also to some extent investigated whether the pilotage criteria could become more risk-based.

In addition to the three studies mentioned above, recent literature, including some relevant accident reports, was reviewed and discussed.

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2 Risk Reduction from VTS Services

Vessel traffic services (VTS) are defined by the IMO as "shore-side systems which range from the provision of simple information messages to ships, such as position of other traffic or meterological hazard warnings, to extensive management of traffic within a port or waterway." (IMO, 2011).

IALA (2008) defines three types of vessel traffic services as follows:

- Information Services (INS): this provides "essential and timely information to assist the on-board decision-making process". The service is not a participant in on-board decision-making.
- Navigational Assistance Service (NAS): This service "provides essential and timely information to assist the on-board decision-making process and may inform, advise and/or instruct vessels accordingly."
- Traffic Organisation Service (TOS): This service "provides essential and timely information to assist the on-board decision-making process and may advise, instruct or exercise the authority to direct movements."

IALA (2009) states that the purpose of VTS is "to improve the safety and efficiency of navigation, safety of life at sea and the protection of the marine environment and/or the adjacent shore area, worksites and offshore installations from possible adverse effects of maritime traffic". IALA (2009) recommends that a formal risk assessment be carried out when implementing a VTS. They state that the navigational risks of the baseline situation should be assessed for the types of accidents that may be managed by VTS – collisions and groundings. They state that one of the main difficulties with respect to conducting an assessment is that "the true financial consequences of recorded casualties are not available". They also state that the future is not necessarily an extension of the past and foreseeable trends should be taken into account.

Within the Baltic Sea area, studies on risk reduction potential of VTS services have been carried out within the framework of FSAs and navigational risk assessment. Some of the more comprehensive studies are as follows:

- Risk Analysis of Navigational Safety in Danish Waters: This study by COWI (2002) was carried out on behalf of the Danish Maritime Authority and the Royal Danish Administration of Navigation and Hydrography. The objective of the study was to estimate present navigational safety in Danish waters and calculate the risk reduction potential of various risk control options. Two of the risk control options considered involved expansion of VTS in the area: one involved incorporating the Hatter area into the VTS Great Belt surveillance area and the other involved introducing a VTS centre for the area around the Drogden channel. A risk reduction factor effect of 0.45 was used in the study for all accident types. It was based on literature studies.

- Implementation of a VTMIS system for the Gulf of Finland: The purpose of this study, carried out by VTT (2002) was to assess the potential effectiveness of two proposed options for a VTMIS system for the Gulf of Finland. The first option included a new routeing system combined with a mandatory reporting system. The second option, consisted of the first option combined with a radar-based traffic monitoring system. These options were compared to the 'Baseline' option which consisted of no additional

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investments to vessel traffic control for the Gulf area. The study concluded that the likelihood of collisions was reduced by 80% with a radar based reporting system. Without radar surveillance the risk reduction would be limited to 3-11%. It should be noted that the study was produced before AIS became mandatory on vessels over 300 GT.

Two studies on risk reduction from VTS services were reported within the EfficienSea project activity 6.5:

- Risk Assessment of VTS in Swedish Waters (Lundkvist, 2012)
- The risk reducing effect of VTS in Finnish Waters (Westerlund, 2011).

The main findings of the studies are summarised in the following sections.

2.1 Risk assessment of VTS in Swedish Waters

The study "Risk Assessment of VTS in Swedish Waters" (Lundkvist, 2012) was a risk assessment carried out on a national level to analyse the costs and benefits of VTS in Sweden. The main aim was to provide a decision making basis regarding whether VTS was cost efficient in specific waterways. The study was limited to Swedish territorial analyses and to vessels over 300 GT. The accident types considered were collision, contact, and grounding. The risk assessment was conducted using the Formal Safety Assessment (FSA) methodology (IMO, 2007) recommended by the International Maritime Organizations (IMO). A summary of the main steps of FSA as carried out within the study are as follows:

- Hazard identification: Accident scenarios were identified based on a review of historical data – specifically the information included in the analysis of data included in the Swedish Sea Accident Database, SOS (Sjöolyckssytemet). This includes accidents and incidents occurring on vessels of all flags in national territorial waters, and Swedish flagged vessels in all waters. Only the data for accidents and incidents occurring in national territorial waters was used.

- Risk analysis: The probability assessment phase of the risk analysis was also based on an analysis of data from the SOS system. Data for two periods was considered, and an accident frequency (number of accidents per year) was estimated. This was then used as the accident probability for the risk assessment study. In terms of accident consequences, literature studies and Swedish national recommended values for socioeconomic analysis of transport (SIKA, 2009) were used as the basis for calculation, along with compensation data obtained from the Swedish Club for the study. Consequence categories included damage to ships, environmental damage, human consequences, delay costs for industries, impact on the ship owner's income, and damage to other property. Risks were quantified for each of the accident types (collision, contact, and grounding) for each waterway considered in the study.

- Risk control options: Risk control options considered in the study included VTS and general call reporting. The main function of VTS addressed in the assessment was the information service function. Navigational assistance and traffic organisation functions of VTS were also discussed. The risk reduction value of VTS was estimated based on literature studies and an assessment of accident investigations. For each accident investigation a number of questions were put to accident investigators and VTS operators on whether the information service could have prevented the accident. Risk

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reduction for information services was estimated at 30% for groundings, 30% of collisions and 20% for contacts. Similar reduction factors were found for a developed port information service as well as for navigational assistance.

- Cost benefit assessment: Costs of information service for each of the waterways considered in the study were based on current costs for information services in two existing VTS areas in Sweden. These costs were estimated based on two basic units – number of vessel calls, and the distance covered by the ships within the VTS area (ship distance monitored by the VTS). The benefit of VTS was considered to be a reduction in accident costs. These were obtained using the estimated accident probability reduction expected from VTS and applying this to the annual expected accident costs for each of the waterways considered. A net present value ratio for each proposed VTS area was estimated using the estimated costs and benefits. As a sensitivity analysis probabilities calculated on the basis of accident frequencies for the periods 2000-2009 and 1985-2009 were compared. The effect of these different frequencies on the overall Net Present Value (NPV) were presented.

- Recommendations for decision making: Uncertainties present in the risk assessment were laid out clearly as background for consideration in the decision-making process. Uncertainties in input data, methodology and assumptions were described, along with possible effects on the outcome of the analysis. The recommendations were specific regarding whether there was a benefit to implementing the information service function of VTS in each of the specific waterways examined.

Further recommendations came out the study with regards to how a better basis for assessing the need for VTS could be developed. Some of these recommendations were directed towards improving available information for carrying out risk assessments, and included the following:

- Within the frame of accident investigation, assess whether collision and grounding accidents could have been prevented with vessel traffic information. This would help to develop a better basis for determining an overall risk reduction factor for each accident type.

- Estimate accident costs in connection with the documentation of accidents in SOS. This would provide a better basis for cost estimates of accidents in Swedish shipping lanes as well as give an indication of local and ship related cost variations.

- Better documentation and collation of information on incidents observed and experienced at VTS centres.

- Carry out follow-up analysis of accidents and incidents that occur within VTS areas.

- Regarding estimations of cost of VTS services, documentation and quantification of the VTS operators' workload and work time used according to job duties (function) and section of fairways would be helpful for improving estimates of costs of future services.

In summary, the formal safety assessment methodology functioned as an effective framework for the study and for providing recommendations for decision-making.

2.2 Risk reducing effect of VTS in Finnish Waters

The study on the risk reducing effect of VTS in Finnish waters (Westerlund, 2011) considered the effect in open water and the effect in winter navigation. The study collected detailed reports from VTS operators during two periods: a fall period without ice ("open water") and a winter period with heavy ice conditions. The reports were analysed to draw conclusions about the type of interventions carried out by VTS operators, and demonstrate the type of work carried out by the VTS centre.

Both study components involved collected reports from three VTS centres in Finland. These were the Archipelago VTS, the West Coast VTS, and the Gulf of Finland VTS. All three centres provide information, traffic organisation and navigational assistance services in the VTS areas they supervise. The centres reported all events that required their intervention during the two study time periods. Violation reports were also collected and analyzed for the periods.

Open Water:

The open water study covered the period from October 25 to November 8, 2010. A total of 141 reports were gathered from the operators over this time, of which two were not included in the analysis as they were not considered to be safety-related. The ratio of reports to number of port calls in the three VTS areas were estimated. The ratios were all quite close – ranging from 11.5 to 13.3%.

The most common reasons reported for intervening with the ship's navigation were considered to be traffic organisation. These included information sharing, reminding about close quarter situations and making remarks about TSS violations. Examples of traffic organisation included asking ships to use alternative fairways or to slow speed when meeting another ship in narrow or restricted areas. There was also a large range of other types of cases, such as providing information about pilot boarding and disembarking areas, and asking ships about abnormal behaviour.

The study gave examples of the types of cases dealt with by VTS operators and identified specific locations within the VTS areas where interventions were most frequent. It was noted that the study only covered a limited period of time, and that it was not possible to predict whether there would have been an accident or not without VTS intervention. It was recommended that additional data collection during other periods, on an ongoing basis, would be useful.

Winter navigation:

The study on winter navigation covered the time period 28 February to 14 March 2011. February was an exceptionally cold month and ice conditions at the end of the month were considered harsh. The traffic separation schemes could not be used during the period, as the ships were forced to proceed through areas with easier ice conditions. The conditions deviated considerably from the open water situation, and VTS duties of a different nature were required. During ice conditions, icebreakers are responsible for assistance of ships and coordination of traffic in ice fields. The icebreaker coordination sets the order for assisting vessels, based on safety issues. It provides navigational instructions, waypoints, position of the icebreaker, name and VHF working channel, to the VTS, which is then forwarded by the VTS to vessels.

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Very tight restrictions on navigation were in place during the study period, regarding ice class and minimum tonnage. A total of 104 reports were reviewed as part of the analysis, reduced from the previous open water study. Many of the reports from VTS centres were regarding warning ships about harder ice conditions ahead and guiding ships towards easier routes with less ice. Information about where it was safest to wait for icebreaker assistance and/or for a pilot was also provided. Compared to the previous reporting period, i.e. for open water, there were no ship to ship close quarter situations reported. During ice conditions it is normal for ships to navigate in close proximity to each other because otherwise the ice channel starts to close quickly after a ship has passed through. There were a few minor rear-end collisions during the period, but it was not considered the type of collision that VTS could prevent. The role of VTS during the ice period was seen to be very much as a contact point and information exchange – informing icebreakers about vessels requiring assistance and informing vessels about the movements of icebreakers.

The study on risk reducing effect of VTS in Finnish waters provided a good indication of the types of interventions carried out by VTS operators. It also provided very good qualitative descriptions of the work done, and an interesting comparison on duties during open water and ice conditions.

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3 Risk Reduction from Pilotage

Maritime pilots are recognized as playing an important role in promoting maritime safety and protecting the marine environment. The pilot's responsibility is to assist with navigation and manoeuvring. A study on the contribution of pilotage to safety reported within EfficienSea is described below.

3.1 Swedish pilotage study

The study, "How pilotage contributes to maritime safety" (Anbring and Grundevik, 2012), focused on pilotage in Swedish territorial waters, primarily on the pilot's role and work on board the vessel. The study was an investigation based on literature review, interviews, participant observations, accident statistics and accident reports. Interviews, participant observation and accident reports were limited geographically to Malmö and Södertälje. Nine interviews were conducted and the respondents included pilots, VTS operators, and masters with pilot exemption certificates. Accident statistics were obtained from the Swedish Sea Accident Database, SOS (Sjöolyckssytemet) for the period 1985-2009 and were limited to navigation-related accidents in all Swedish waters. They included the accident categories collision, contact, and grounding.

Maritime safety was defined and described in the study as having and maintaining control over a situation, but also to being flexible and adaptive and to adapt the system to a changing world. It was considered that to understand accidents it is important to understand the human behavior in the context it was performed.

Several aspects of how pilots contribute to maritime safety were identified within the literature and empirical studies. The pilots' expertise, experience and local knowledge of the waters and the pilots' ability to make risk assessments based on these were identified as important contributions to maritime safety. Local language skills were mentioned as another contribution. The pilots' advisory role and role as a resource were also identified. These factors were also discussed in the context of Resilience Engineering, which gave another dimension to how pilots contribute to maritime safety. All these factors were considered to represent the contributions that are offered by pilotage and were definitely seen as contributing to increased safety. The opposite, that these factors would decrease safety, was not considered plausible.

Pilots not only increase safety on board the vessel which they are on – they also make conditions safer for other vessels in the fairway compared to the situation of not having a pilot on board any of the vessels. This seemed to be the general opinion among the interview respondents, who claimed that the vessels for which it is mandatory to have a pilot according to the criteria also represent a higher risk and thus it was more likely that these would be involved in accidents.

Pilotage was considered a safety-enhancing measure for the shipping industry. According to the Swedish Maritime Safety Inspectorate there would have been more maritime accidents if the vessels that currently fall under mandatory pilotage requirements would not have had a pilot. This was also suggested during the interviews. Although the accident statistics do not fully capture the complexity of accidents, the statistics show that the number of accidents have decreased since mandatory pilotage criteria were introduced. This was also the objective for introducing mandatory pilotage for specific ship categories. The number of accidents decreased

for the first ten years, especially for vessels without a pilot on board. The question is whether this was due to the pilotage criteria which resulted in many more vessels that sailed with a pilot onboard and therefore there were fewer vessels without a pilot onboard. However, the number of accidents increased again in the late 1990s to about the same level as in 1985, and then decreased again. Another explanation could be that there has been a reduced number of vessel port calls and subsequently fewer vessels requiring pilotage. The number of cargo vessels has decreased due to the use of increasingly larger vessels. Improved technology may be another reason for the decline, or it could be a combination of fewer calls and improved technology. The respondents gave AIS as an example of technology that has improved maritime safety. Another explanation could be that the reporting method, or the propensity to report accidents, has changed over this time period, leading to the variation in number of accidents. It is only possible to speculate on the reasons and it is difficult to make causal relationships in complex systems. Furthermore, most accidents were classified as less serious, and only a few were serious accidents. Since accidents are relatively rare events, the statistics are considered a blunt tool.

Nevertheless, the statistics gave no clear indication that pilotage has reduced the number of accidents and thus made the shipping industry more safe. To draw conclusions from the accident numbers it requires more information such as the number of calls with and without a pilot and much more. This information was not available**.** However, safety is more than just the absence of accidents and therefore it is not as simple as stating that shipping has become safer just because the accidents have been reduced. That's because safety can also be manifested in the form of so-called non-events and can then be seen as the sum of events that did not happen. This means that there are several other aspects of how piloting can contribute to maritime safety.

According to this limited study the conclusion is that based on the theory of resilience engineering, the pilot is well placed to contribute to maritime safety as the pilot can adapt the system to new conditions. The pilot must therefore be flexible and adaptive to be able to have and maintain control over the system. The pilot should also be seen as an artifact of the overall maritime safety system and thus the pilot affects the performance of the overall system.

Based on the interview results and the literature study, the current criteria for mandatory pilotage were considered reasonable and there was no apparent need for more risk-based pilotage criteria identified among the respondents. However this issue ought to be investigated further.

The criteria presented can be used as a basis for further discussion of risk-based pilotage criteria and include the following:

- Vessel dimensions, design and maneuverability in relation to the fairway and port
- Ship and especially the bridge equipment
- Ship design in agreement with cargo load
- Crew and watch schedule on the ship
- The bridge team competence/s
- The bridge team experience in the Swedish coastal waters as master and watchkeeping officer
- The bridge team ability to communicate in English or Swedish and English.

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3.2 Other studies and references on the effect of pilotage

Although pilotage is generally considered to contribution to maritime safety, some recent accidents have highlighted some aspects of pilotage that are of concern. The issues relate to pilots boarding and disembarking and to problems with the pilots functioning as a team with other officers on the bridge. Within Finland, there have been three accidents related to pilots disembarking, as follows:

- grounding of the M/S ANNE SIBUM on 2 April 2008 (Finland Accident Investigation Board, 2011)
- grounding of the M/S TALI on 29 January 2008 in Norwegian Waters (Finland Accident Investigation Board, 2009a)
- grounding of the M/S OOCL NEVSKIY on 27 February 2008, south of Helsinki Pilot Station Harmaja (Finland Accident Investigation Board, 2009b).

The Finland Accident Investigation Board (2011) did not consider that weather conditions were so exceptional for the above three accidents that the pilot should have remained on board until the next port. Further, they stated that prevailing winds can often play an important role with regard to a pilot's safe boarding or disembarking, and vessels may turn sideways in the fairway to provide lee to the pilot boat. Recognizing the inherent risks in this, the accident investigators recommended the following:

> *"The State Pilotage Enterprise amend their pilotage instructions so that the pilot, after disembarking, remains at the site and ensures that the vessel assumes the correct heading in time if it has been necessary to turn the vessel into a heading that deviates significantly from the course of the fairway so as to guarantee the pilot's safe landing. If the pilot disembarks well before the designated boarding/disembarking area the pilot boat should escort the vessel to the designated boarding/disembarking area." (Finland Accident Investigation Board, 2011).*

There have also been recent accidents reported by the Norwegian Accident Investigation Board where actions of pilots on board were contributing factors. These were as follows:

- Grounding of the bulk carrier FEDERAL KIVALINA off Årsundøya Island east of Kristiansund on 6 October 2008: The report (Accident Investigation Board Norway, 2010a) stated that the pilot and ship's crew did not work as a team, and this contributed to the accident. It was noted that the manning of the bridge was not functioning during the period before the vessel ran aground, and there had been a gradual loss of control over navigation. One recommendation of the report was that the Norwegian Coastal Administration "*consider changes in the training of pilots and procedures, along with other measures, so that the pilots can more efficiently be part of a well-functioning bridge team."*
- Grounding of the CRETE CEMENT at Aspon Island in the Oslo Fjord on 16 November 2008: The accident report (Joint Accident Investigation Board Norway & Bahamas Maritime Authority Marine Accident Report, 2010) cited the pilot's strenuous duty period the week before the accident as a contributing factor. Limited communication on the bridge was also mentioned. The Norwegian Coastal Administration, was recommended to implement measures to ensure that pilots have sufficient sleep and rest.

Despite that there are some issues associated with some aspects of pilotage, pilots are considered to prevent far more accidents than they cause (Gard News, 2011). Bridge team management operation with a pilot on board, however, is considered an important area to consider.

Huffmeier (2011) states that determining the degree to which safety will improve with a pilot on board is difficult, and can vary depending on the physical characteristics of the waterway and traffic patterns in the area. References to various literature studies include an estimated accident frequency reduction by a factor of 4 for groundings and 5 for collisions at the Bosporus Strait in Turkey, reduction by a factor of 2 for the Great Barrier Reef, and as high as 30 for Danish data (summarised in Huffmeier, 2011). He further reports that the consulting company COWI uses risk reduction factor of 0.5 for groundings if a pilot is on board, and 0.75 for collisions.

4 Summary

Each of the studies contributed new information in the Baltic Sea area that is useful for consideration during decision-making processes. Lundkvist (2012), as part of his risk assessment of VTS in Swedish waters, put forth a number of recommendations for decision making regarding the establishment of new VTS areas. The FSA approach he employed, and rationale behind risk reduction estimates, can serve as a useful framework for similar studies regarding decision-making in other areas of the Baltic Sea. The work by Westerlund (2011) on the risk reducing effect of VTS in Finnish waters provided good background information on the types of duties carried out by VTS operators during both open water and ice conditions. This contributes knowledge useful for estimating manpower requirements for similar areas and also potentially for estimating the distribution of time allocated to various types of duties (information, coordination, etc.). Studies conducted for additional time periods and areas, as recommended by Westerlund are required to ensure a more representative basis. Regarding pilotage, good qualitative information on the benefits of pilotage and views of those involved in pilotage was put forth in the report by Anbring and Grundevik. The need for additional statistical basis for quantifying risk reduction potential was identified.

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