

# 9th International Symposium on Maritime Health

3-6 June 2007

Esbjerg - Denmark

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## Sponsors and support

The Organising Committee is very grateful to the following who have generously supported this symposium:

Claus Sørens Fond

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Dansk Selskab for Maritim Medicin

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International Maritime Health Association

International Maritime Organization

The City of Esbjerg

The Danish Maritime Occupational health Service  
Søfartens Arbejdsmiljøråd

The Danish Medical Research Council  
Forskningsrådet for Sundhed og Sygdom

The ITF Seafarers' Trust

The Occupational Health Service for Danish Fishermen  
Fiskeriets Arbejdsmiljøråd

Viking Life-Saving Equipment

World Health Organization

# Programme

ISMH9, Esbjerg 3-6 June 2007  
Equity in maritime health and safety  
- development through research, cooperation and education

SUNDAY 3 JUNE 2007  
Welcome reception

Venue:	Esbjerg Academy of Music, 61 Kirkegade, Esbjerg
14.00-16.00	Registration
16.00-18.05	Opening
16.00-16.45	Esbjerg Ensemble  Per Sabro Nielsen, Chairman 9th International Symposium on Maritime Health  Johnny Søtrup, Mayor of Esbjerg  Jørgen Hammer Hansen, Director, Danish Maritime Authority  Tim Carter, President, International Maritime Health Association
Opening Keynote:	Equity in Maritime Health and Safety - Development through Research, Cooperation and Education
16.45-17.25	Anthony Lane, Professor Emeritus, The University of Cardiff, United Kingdom. <i>Seafarers' Physical, Mental &amp; Social Well-being &amp; Regulatory Deficits in the ILO Maritime Convention of 2006.</i>
17.25-18.05	George Conway, NIOSH Agriculture, Forestry, and Fishing Program and Alaska Field Station. <i>Towards Reducing the International Gradient in Sea Safety for Fishermen and other Mariners.</i>
18.10-20.00	Get together. Standing buffet



## Tuesday 5 JUNE 2007

Venue: Musikhuset Esbjerg, Havnegade 18, Esbjerg

09.00-10.00	<b>Keynote Session 2: Education &amp; Health Promotion</b>		
Room: Store Sal	Chair: Dr. Nikolic Nebojsa, Chairman Dr. Suresh Idnani, Co-chair		
09.00 - 09.30	Tim Carter, President, IMHA <i>Who wants Equity in maritime health? Who needs it?</i>		
09.30-10.00	Rob Verbist, Mediport Antwerp <i>Maritime fitness examinations - a challenge to equity?</i>		
10.00-10.30	Coffee break		
10.30-11.30	Poster Session 2		
11.30-13.00	Lunch		
13.00-14.30	<b>Parallel Session 2</b> Health Promotion  Chair: ML Canals MM Rodriguez OC Jensen  <u>Room:</u> Store Sal	<b>Parallel Session 3</b> Fitness for Duty  Chair: B Schepers P de Guzman T Carter  <u>Room:</u> Lille Sal	<b>Work shop 3:</b> Maritime Health Education  Chair: R Rygaard  <u>Location:</u> Centre of Maritime Health Service, Isle of Fanoe
14.30-15.00	Coffee break		
15.00-17.15	<b>Work Shop 4:</b> Health Promotion  Chair: OC Jensen ML Canals MM Rodriguez  <u>Room:</u> Store Sal	<b>Parallel Session 4</b> Occupational Exposures/Risks  Chair: HL Hansen Suresh Idnani  <u>Room:</u> Lille Sal	<b>Workshop 3 - continued</b>  <u>Location:</u> Centre of Maritime Health Service, Isle of Fanoe
17.15-19.00	<b>General Assembly, IMHA</b> <u>Room:</u> Store Sal		

## Wednesday 6 June 2007

Venue: Musikhuset Esbjerg, Havnegade 18, Esbjerg

09.00-10.10 Keynote Session 3: Occupational Injury at Sea

Room: Store Sal Chairs: Dr. Heikki Saarni, Chairman  
Dr. Henrik L. Hansen, Co-chair

09.00-09.40 George Conway, NIOSH Agriculture, Forestry, and Fishing Program and Alaska Field Station.

*New approaches for sea safety and deck injury prevention*

09.40-10.10 Finn P. Brodersen, A.P. Møller - Mærsk

*Safety management – a line responsibility*

10.10-10.40 Coffee break

10.40-12.30

**Workshop 5:**  
The Sustainable Vessel

Chair: K D Nedergaard

Room: Store Sal

**Workshop 6**  
Ethics in Maritime Medicine

Chair: F Knudsen  
A Ergle

Room: Lille Sal

**Parallel session 5**  
Infectious Diseases

Chair: R Verbist

Room: Foredragssal

12.30-13.30 Lunch

13.30-16.00

**Parallel session 6**  
Telemedicine

Chair: A Schreiner  
M Hamming

Room: Store Sal

**Parallel session 7**  
Occupational Accidents

Chair: G Conway  
LH Laursen

Room: Lille Sal

**Parallel session 8**  
Psycho Social Factors/Welfare

Chair: H Saarni  
E Dahl

Room: Foredragssal

14.30-15.00 Coffee break

16.00

**Closing Session including handover of the IMHA flag:**

Room: Store Sal Per Sabro Nielsen, Chairman, 9th International Symposium on Maritime Medicine  
President, IMHA

19.00

Conference dinner, Musikhuset



# DETAILED PROGRAMME

International Symposium on Maritime Health

3-6 June 2007

Esbjerg, Denmark

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Sunday 3 June 2007

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Venue: Esbjerg Academy of Music  
61 Kirkegade, Esbjerg

From  
14.00 Registration

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Opening 16.00-18.00

Welcome to 9th ISMH 2007

Per Sabro Nielsen, Chairman of ISMH9,  
Research Unit of Maritime Medicine

Johnny Søtrup, Mayor of Esbjerg

Jørgen Hammer Hansen, Director,  
Danish Maritime Authority

Tim Carter, President, International Mari-  
time Health Association

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Opening Keynote Session 16.45-18.05

Equite in Maritime Health and Safety - Development  
through Research, Cooperation and Education.

16.45-17.25 Anthony Lane, United Kingdom  
Seafarers' physical, mental & social well-  
being & regulatory deficits in the ILO  
Maritime Contention of 2006.

17.25-18.05 George Conway, USA  
Towards reducing the international gradi-  
ent in sea safety for fishermen and other  
mariners.

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18.10-20.00 Get together - standing buffet

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Venue: **Musikhuset Esbjerg**  
18 Havnegade, Esbjerg  
From  
08.00 Registration

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**Keynote Session 1** 09.00-10.40  
**Health of Seafarers - Social and Economic Aspects**

Chair: Tim Carter, United Kingdom  
Per Sabro, Denmark  
Room: Store Sal

09.00 Andrew Smith, United Kingdom  
Seafarers' Fatigue

09.40 Rimsky Sucre, Panama  
Social Security Access for Seafarers

10.10 Tom Holmer, United Kingdom  
Health of Seafarers - Social and Economic Aspects; the ITF Perspective

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Coffee break 10.40-11.10

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Poster Session 1, Foyer 11.10-12.15

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Lunch in the Foyer 12.15-14.00

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Parallel Sessions/Workshops 14.00-17.00

Coffee break 15.00-15.30

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**Parallel Session 1** 14.00-17.00

**Health Effects/Surveillance**

Room: Store Sal

Chair: D Jegaden, France  
R Nilsson, Sweden

**Paper 1-1**

Risk of cardiac events in seamen sailing on vessels under the German flag

M Oldenburg, HJ Jensen, X Baur

**Paper 1-2**

Decreased mortality among fishermen and their wives

A Turunen, PK Verkasalo, H Kiviranta, E Pukkala, A Jula, S Männistö & T Vartiainen

**Paper 1-3**

A survey of occupational health in the Royal Norwegian Navy

B.E. Moen

**Paper 1-4**

Hospital contacts for chronic diseases among Danish seafarers and fishermen - a population-based cohort study

L Kaerlev, S Dahl, PS Nielsen, J Olsen, H Hannerz, A Jensen, F Tüchsen

**Paper 1-5**

Use of fluorescein angiography to detect diabetic eye disease among Filipino seafarers with diabetes mellitus  
Pile G, Oca C, Nepomuceno E

**Paper 1-9**

Fatal accidents at sea in Norwegian and Icelandic fisheries 1980 – 2006

G Pétursdóttir, HL Aasjord, H Snorrason

**Paper 1-10**

IMHA and ICSW initiatives. Bridging health and seafarers' welfare

Suresh N Idnani

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**Workshop 1**

14.00-17.00

**Social Security for Seafarers**

Room: Lille Sal

Chair: R Sucre, Panama  
C A Yhap

**Workshop 1 Introduction**

Social security for seafarers

R Sucre

**Workshop paper 1-1**

Historical perspectives on life as a seafarer in comparison to that of a shore-worker

C A Yhap

**Workshop paper 1-2**

Exploring social protection and welfare issues among aging Filipino seafarers

Cruz, Gichelle A

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**Workshop 2**

14.00-17.00

**Maritime Health Care Systems**

Room:

Foredragssal

Chair: HL Hansen, Denmark  
B Rikken, Netherlands

**Workshop 2 Introduction**

How to organize maritime healthcare systems?

HL Hansen

B Rikken

**Workshop Paper 2-1:**

HL Hansen

**Workshop Paper 2-2:**

S Idnani

**Workshop Paper 2-3:**

M Meikart

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Get together, Esbjerg Fisheries and Maritime Museum.  
Departure by bus from Musikhuset **from 17.15**

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**Poster Session 1**                      **11.10-12.15**

**Poster 1-1**

Norwegian Centre for Maritime Medicine (NCMM)  
established 2006.  
AM Horneland

**Poster 1-2**

Lung cancer and mesothelioma among engine room  
crew. Risk assessment of previous and on-going exposure  
to carcinogens.  
K Forsell, S Hagberg, R Nilsson

**Poster 1-3**

Morbidity pattern and time trends at a regional maritime  
health centre  
R Nilsson

**Poster 1-4**

The changes on electroencephalogram of seafarers By test  
a sea wave withstanding capacity.  
Trieu Thi Thuy Huong, Tran Thi Quynh Chi, Nguyen  
Truong Son

**Poster 1-5**

Work-related stress at sea. Self estimation by maritime  
students and officers.  
M Jezewska, I Leszczynska, B Jaremin

**Poster 1-6**

Sense of coherence and mental health among seafarers in  
relation to physical activity.  
V Malinauskiene, I Jonutyte, V Obelenis

**Poster 1-7**

Psycho-Physiological examination of seafarers: visual  
memory.  
S Nezavitina, NI Yfremenko

**Poster 1-9**

(Moved to Tuesday, Poster Session 2, according to re-  
quest of presenter)  
A project for improving telemedicine service at sea.  
F. Amenta, A. Tveito, D. Terning

**Poster 1-10**

(Moved to Tuesday, Poster Session 2, according to re-  
quest of presenter)  
Skin diseases treated by Centro Internazionale Radio  
Medico (C.I.R.M.): Improved diagnosis by lesion obser-  
vation.  
A Di Donna, S Pillon, F Amenta

**Poster 1-11**

HIV/AIDS in seafaring population of Montenegro and  
prevention suggestions.  
LJ Jovicevic, M Vranes-Grujicic

**Poster 1-12**

Medics' risk of exposure to infection with hepatitis B.  
S Nilaus

**Poster 1-14**

A review of the use of Medico Cork by fishing vessels and  
trawlers  
N McCarthy, S Cusack  
Presented by P Allan

**Poster 1-15**

What is the safe distance from fumigated containers in  
ports?  
W Veldman, X Baur  
Presented by M Oldenburg

Venue: **Musikhuset Esbjerg**  
18 Havnegade, Esbjerg

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**Keynote Session 2** 09.00-10.00  
**Education and Health Promotion**

Room: Store Sal

Chair: Nicolic Nebojsa, Croatia  
Suresh Idnani, India

09.00 Tim Carter, United Kingdom  
Who wants equity in maritime health? Who needs it?

09.30 Rob Verbist  
Maritime Fitness examinations - a challenge to equity?

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Coffee break 10.00-10.30

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**Poster Session 2, Foyer** 10.30-11.30

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**Lunch** 11.30-13.00

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**Parallel Sessions/Workshops** 13.00-17.00

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**Coffee break** 14.30-15.00

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**Parallel Session 2** 13.00-14.30  
**Health Promotion**

Room: Store Sal

Chair: ML Canals  
MM Rodriguez  
OC Jensen

**Paper 2-1**  
Training of leaders in maritime health promotion  
Bogdan Jaremin, Maria Jezewska, Irena Leszczynska

**Paper 2-2**  
Health promotion among Finnish seafarers - trimmare project  
H Saarni, L Niemi

**Paper 2-3**  
Follow up and intervention studies on tetanus-diphtheria vaccinations in seafarers  
ML Canals, S Pombo

**Paper 2-4**  
Assessment of cardiovascular death risk as prognostic indicator of fitness for work in periodic examinations of seafarers  
Elzbieta Rosik Bogdan Jaremin, Kinga Szymanska

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**Paper 2-5**  
Comparison of stress level between seamen and non seaman professionals inside the same company  
D. Jegaden, B Loddé, D Lucas, JD Dewitte

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**Parallel Session 3:** 13.00-14.30

**Fitness for Duty**

Room: Lille Sal

Chairs: B Schepers  
P de Guzman  
T Carter

**Paper 3-1**  
Situation in regard of health issues of professionals embarked aboard ships and who are excluded from the ILO/IMO N° 73 convention  
D. Jegaden, B Loddé, D Lucas, JD Dewitte

**Paper 3-2**  
Quality assurance for maritime health providers and revised international seafarer medical fitness standards  
Suresh N Idnani, Tim Carter

**Paper 3-3**  
Facing the revised international health regulations: Consequences for port health authorities  
C Schlaich, T Riemer, U-P Hüsing, M Oldenburg

**Paper 3-4**  
Defining a duty of care in the seafarers pre-employment medical examination  
N P Griffiths  
Presenter: Allison Hutchings

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**Parallel Session 4:** 15.00-17.15

**Occupational Exposures/Risks**

Room: Lille Sal

Chairs: HL Hansen  
S Idnani

**Paper 4-1**  
Does air conditioning impact on hygienic quality of indoor air on sea going vessels?  
G Meyer, B-F Schepers

**Paper 4-2**  
Drug abuse on board ship  
G. Tchkonia

**Paper 4-3**

Piracy – still a risk on board ships

N. Nikolic

**Paper 4-4**

Assessment of manual materials handling practices in motion-rich environments

SN MacKinnon, WJ Albert, J Matthews, M Holmes, C Duncan

**Paper 4-5**

Navigator workload and performance in simulated high-speed ship operation

KS Gould, VF Koefoed, BE Moen

**Paper 4-6**

An example of ergonomic exposure assessment on an oil drilling rig

CJ Jensen and C Jensen

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**Paper 5-1**

(Moved from Wednesday, Parallel Session 5, according to request of presenter)

Prevalence of hepatitis C virus (HCV) infection in Croatian seamen

Rosanda Mulic, Ana Muslim, Andro Loncar

**Paper 5-3**

(Moved from Wednesday, Parallel Session 5, according to request of presenter)

Types of gastrointestinal illnesses and their prevention on cruise ships

JA Bronstein, MR Richecoeur, B Lotte, JD Dewitte, D Jegaden

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**Workshop 3**

13.00-17.00

**Maritime Health Education**

Location: Center of Maritime Health Service,  
Fanoe  
Note! Departure from Musikhuset at  
12.45 at entrance (5 min walk, health  
promotion!) - to ferry.

Chair: R Rygaard

**Workshop 3 Introduction**

How to implement stcw regulations, section a vi/4, of mandatory minimum requirements relating to medical first aid and medical care, in teaching

R Rygaard

**Workshop paper 3-1**

“Førstehjelp til sjøs – First aid at sea – Erste hilfe zur see”

A Schreiner, L Aanderud

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**Workshop 4**

15.00-17.00

**Health Promotion**

Room:

Store Sal

Chair:

OC Jensen

ML Canals

MM Rodriguez

**Workshop 4 Introduction**

Internacional maritime health promotion programme 2007-12. Prevention of non-communicable diseases (NCD) and un-fitness at sea.

Arranged by: OC Jensen, Rodriguez, MM, Canals ML.

**Workshop paper 4-1**

The seafarers' health information programme - current status.

RC Verbist

**Workshop paper 4-2**

Diabetes and Obesity

Spain, follow up & retrospective data

Preparing EC-7FP

Jensen OC, Canals ML, Rodriguez MM

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**General Assembly IMHA 17.15-19.00**

Room

Store Sal

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**Poster Session 2**                      **10.30-11.30**

**Poster 2-1**

Food poisoning at offshore field: A case study.  
Xijiang Song, Binhui Li

**Poster 2-2**

“Førstehjelp til sjøs – First aid at sea – Erste hilfe zur see”.  
A Schreiner, L Aanderud

**Poster 2-3**

Analysis on ship's accidents caused by dozing watch-keepers in Japan.  
S Urushidani, Y Sano, S Muramatsu, M Ehara

**Poster 2-4**

Researching the changes of some norms of cardiovascular functions of seafarers by test a sea wave withstanding capacity.  
Tran Thi Quynh Chi, Nguyen Truong Son

**Poster 2-5**

Persistent neurological and respiratory symptoms caused by a single accidental exposure to phosphine. A case report on the health risks posed to maritime workers.  
C Schlaich, AM Preisser, M Oldenburg, Riemer T, X Baur

**Poster 2-6**

Influence of conditions on vessels to women's menstrual cycle.  
M.Vranes-Grujicic, Lj. Jovicevic, D.Kljakic

**Poster 2-7**

Urinary syndrome and diagnosis of renal pathology in seafarers  
AI Gozhenko  
TS Nezaviina

**Poster 2-8**

Measurement of fumigants and other toxic gases in 2100 import containers.  
X Baur, P Poschadel, M Oldenburg, T Ollesch

**Poster 2-9**

Seamen's health risk affected by shipboard cockroaches.  
M Oldenburg, U Latza, X Baur

**Poster 2-10**

Chemical contamination of drinking water in ships.  
M Oldenburg, C Schlaich, X Baur

**Poster 2-11**

What would we do if the Bohai 2 sank today?  
Binhui Li, Xijiang Song

**Poster 2-12**

Changes of immune function in rats after 60-meter air simulated dives.  
Xu Weigang, Tao Hengyi, Li Runping, Sun Xuejun

**Poster 2-13**

Dental practice during a world cruise: characterisation of oral health at sea.  
BAJ Sobotta, MT John, I Nitschke

**Poster 2-14**

The importance of medical evaluations to apply to the nautical institution of Venezuela  
MM Rodriguez da Silva

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**Poster 1-9**

(Moved from Monday, Poster Session 1, according to request presenter)  
A project for improving telemedicine service at sea.  
F. Amenta, A. Tveito, D. Terning

**Poster 1-10**

(Moved from Monday, Poster Session 1, according to request presenter)  
Skin diseases treated by Centro Internazionale Radio Medico (C.I.R.M.): Improved diagnosis by lesion observation.  
A Di Donna, S Pillon, F Amenta

Venue: Musikhuset Esbjerg  
18 Havnegade, Esbjerg

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**Keynote Session 3** 09.00-10.10  
**Occupational Injuries at Sea**

Room: Store Sal  
Chair: H Saarni, Finland  
HL Hansen, Denmark

09.00-09.40 George Conway, USA  
New Approaches for Sea Safety and  
Deck Injury Prevention

09.40-10.10 Finn P. Brodersen, Denmark  
Safety Management - A line Responsibility

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**Coffee break** 10.10-10.40

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**Parallel Session/Workshops** 10.40-12.30

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**Workshop 5** 10.40-12.30

**The Sustainable Vessel**

Room: Foredragssal  
Chair: KD Nedergaard

**Workshop 5 Introduction**

The sustainable vessel  
KD Nedergaard

**Workshop paper 5-1**

Corporate social responsibility  
O Tonby

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**Workshop 6** 10.40-12.30

**Ethics in Maritime Medicine**

Room: Lille Sal  
Chair: F Knudsen  
A Ergle

**Workshop 6 Introduction**

Ethics and equity: Ethical dilemmas for professional  
practitioners and researchers in maritime health.  
F Knudsen and A Ergle

**Workshop paper 6-1**

Theories of normative and applied ethics – an overview  
Fabienne Knudsen

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**Parallel Session 5** 10.40-12.30

**Infectious diseases**

Room: Store Sal  
Chair: R Verbist

*Papers 5-1 and 5-3 moved to Tuesday, Parallel Session 4,  
according to request of the presenters.*

**Paper 5-2**

HBV spreading among seafarers and humoral immunity  
indexes of HBsAg carriers  
G. Tchkonia, L. Akhvlediani

**Paper 5-4**

Suspected methicillin-resistant *Staphylococcus aureus*  
infections at sea  
Ray Lucas, Keith Boniface, Karen Roberts, Elisabeth  
Kane

**Paper 5-5**

Passenger and crew referrals to dentists in local ports  
from three cruise ships: A one-year study  
E Dahl

**Paper 5-6**

The spread of HCV among the seafarers  
L. Akhvlediani, N. Inaishvili

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**Lunch** 12.30-13.30

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**Parallel Session 6** 13.30-16.00

**Coffee break** 14.30-15.00

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**Parallel Session 6** 13.30-16.00

**Telemedicine**

Room: Store Sal  
Chair: A Schreiner  
M Hamming

**Paper 6-1**

Centro Internazionale Radio Medico (C.I.R.M.): Recent  
data of medical assistance to seafarers  
F Amenta, A Di Donna, S Pillon

**Paper 6-2**

A new information and communication system for  
port health authorities  
JM Rückleben, DO Stichtenoth, M Oldenburg, B  
Poschadel, J Fischer, UP Hüsing, C Schlaich, Riemer T,  
X Baur

**Paper 6-3**

Radio medical assistance to "Galathea 3" expedition:  
A virtual telemedical project  
S Kristensen, HL Hansen, A Biehl, O Winding

**Paper 6-4**

From radio medical advice to telemedical assistance of seafarers: Which perspectives?

F. Amenta

**Paper 6-5**

Study of the quality of the telemedical communication for the Danish seafarers worldwide.

M B Hamming, OC Jensen, T Leth

**Paper 6-6**

Does telemedicine equipment improve health care service for seafarers in the Norwegian international fleet?

-A study about intersectoral co-operation in Maritime Medicine-

M. Puskeppeleit

**Paper 6-7**

Telemedical advice to long distance passenger ferries.

Olaf C. Jensen, Niels Bo Bøggild and Søren Kristensen

**Parallel Session 7**

13.30-16.00

**Occupational Accidents**

Room:

Lille Sal

Chairs:

G Conway

LH Laursen

**Paper 7-1**

Safety training for fishermen – results from 25 years of basic training of Norwegian fishermen

HL Aasjord, T Zachariassen

**Paper 7-2**

Safety aspects in the Norwegian coastal fishing fleet

HL Aasjord, B Enerhaug, Tord Hanssen

**Paper 7-3**

Major differences in rates of occupational accidents between different nationalities of seafarers

HL Hansen, LH Laursen, M Frydenberg and S Kristensen

**Paper 7-4**

Lethal levels of carbon monoxide found in cargo holds with wood pellets

U Svedberg, J Samuelsson

**Parallel Session 8**

13.30-16.00

**Psycho Social Factors/Welfare**

Room:

Foredragssal

Chair:

H Saarni

E Dahl

**Paper 8-1**

Workplace bullying among seafarers

V Malinauskiene, I Jonutyte, S Einarsen

**Paper 8-2**

Coping with separation: Chinese seafarer-partners in cyberspace

L Tang

**Paper 8-4**

The collaborative blue

– equity in communication

L.L. Froholdt

**Paper 8-5**

The associated marine officers' and seamen's union of the Philippines PTGWO-ITF: Welfare programs

CF Oca

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**Closing Session**

16.00

**Room:**

Store Sal

**KEYNOTE  
ABSTRACTS**

**Opening Keynotes: Equity in maritime health and safety - development through research, cooperation and education**

**Opening Keynote 1**

**SEAFARERS' PHYSICAL, MENTAL & SOCIAL WELL-BEING & REGULATORY DEFICITS  
IN THE ILO MARITIME CONVENTION OF 2006**

Anthony Lane, Professor Emeritus  
The University of Cardiff, United Kingdom

The World Health Organisation defines health as consisting in a '... state of complete physical, mental and social well-being and not merely the absence of disease or infirmity'. This definition offers no exclusions or variations of applicability on the grounds of occupation, class, status, race, religion, nationality etc. Equity as between individuals on matters of health is a *sine qua non*. Equity is elemental.

Unhappily, the practices of human affairs ensure that equity, far from being established, is something that has constantly to be vigorously strived for, while simultaneously recognising that little in the way of social policy objectives is ever fully-realised. It was to promote understanding of the difficulties of changing the world that a famous author coined the aphorism, 'pessimism of the intellect, optimism of the will'. When hopes and ambitions are carefully shaped into positive intentions and then pursued through policies and strategies to a final concrete expression in law, in regulations, in conventions, in codes of guidance and practice, a series of adjustments to the original policy ambitions are inevitable. Interested parties with often conflicting aims (not to mention parties' internal divisions) must find ways of settling on agreed objectives while makers and enforcers of regulations and conventions etcetera, must themselves be sensitive to the limitations of their own law-making and regulatory institutions. Hopes and ambitions have to be negotiated to a point of viable approximation. The inevitable result of negotiations are regulatory deficits. Laws, conventions, regulations do sometimes come close to their ambitions. But not always and perhaps not even very often. Sometimes there are gaps and sometimes chasms and, as I intend to show, many gaps and a few chasms are apparent in the provisions of the ILO Maritime Labour Convention, 2006 as they apply to the 'physical, mental and social well-being' of seafarers.

All of the above comments and cautions on the pursuit of equity will be evident and probably clichéd to anyone who was involved in the creation of the ILO Maritime Labour Convention of 2006. Between 2001 and 2003, together with a colleague, I regularly attended ILO meetings of employers, trade unions and government delegations. There as observers at open and closed sessions, we watched, listened and took notes. In casual conversations and in private meetings we actively engaged leading participants in discussions. And in doing so could appreciate and often share in the frustrations experienced by those in leading roles who were determined on reform and progress, yet obliged to compromise for fear of losing the consolidating convention which put all previous conventions into one big ark. Unsurprisingly, the ark leaks. The purpose of this paper is to show where the leaks are and, but much more tentatively, suggest how they might be plugged.

## Opening Keynote 2

### TOWARD REDUCING THE INTERNATIONAL GRADIENT IN SEA SAFETY FOR FISHERMEN AND OTHER MARINERS

George A. Conway, MD, MPH. CDC/NIOSH, Anchorage, Alaska, USA

While ancient texts describe hazards still inherent in fishing (weather, waves, risk of capsizing and drowning), even artisanal or “country” craft are now often equipped with motors to reach grounds far offshore. Modern vessels’ decks still pitch and are often slippery, but with winches, lines, booms, and pulleys affording hazards of injury<sup>1</sup>. Worldwide, mitigating these hazards is gaining momentum via science, technology, social organization, and regulation. Unfortunately, diffusion and adoption of such measures have not been universal: up to 25,000 fishermen (of the world’s ~36 million<sup>2</sup>) still drown each year after vessel loss or capsizing, most in developing nations.

Technologies including PFDs, immersion suits, life rafts, and EPIRBs are now commonplace in developed nations, commercially available to fishing and merchant vessels. Many developed nations<sup>3</sup> have effective search and rescue operations and marine casualty surveillance. International agencies – ILO, and particularly FAO with the recent joint “Safety at Sea for Small-Scale Fisheries in Developing Countries” initiative partnership with IMO and NGOs, are organizing progress for developing nations.<sup>4, 5</sup> Vessels > 24 meters were codified for safety by the Torremolinos Protocol (1993), but these measures have only been partially or sporadically adopted. More vigorous safety regulations have already prevented many deaths, as documented in Alaska<sup>6</sup>, as have rigorous training programs by NGOs<sup>7</sup>. However, even in developed nations, while vessel stability is well-understood and measurable, many fishing vessels still sink after retrofitting and/or overloading, and long hours and fatigue still play their role<sup>8</sup>.

Organization and regulation of vessel use, equipment, and training continue to yield progress in reducing mortality of fishermen and other seafarers. The adoption last year of the Marine Labor Convention by the ILC consolidates many of ILO’s separate maritime instruments. These measures, when/if adopted, hold tremendous hope for all maritime workers to have safe work and workplaces. Such progress might be augmented in developing nations by measures such as improved casualty surveillance, analysis, and response, the local fabrication of PFDs, and simple Internet interfaces in villages providing weather, health, and safe fishing tips.

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**Keynote Session 1: Health of Seafarers - Social and Economic Aspects**

**Keynote 1-1**

**SEAFARERS' FATIGUE**

Professor Andrew Smith  
Director, Centre for Occupational and Health Psychology,  
School of Psychology, Cardiff University

This paper will provide an update of our current knowledge of seafarers' fatigue. Results from our major research programme will be described in detail and recommendations about the best way forward will be presented. The main points of the talk are summarised below:

- Prior to this research programme there was very little evidence based research concerning fatigue at sea.
- The potential for fatigue at sea is high due to a range of factors, many unique to the marine environment.
- To understand fatigue at sea negative risk factors must be considered in combination rather than alone. This reflects the reality of the seafarers' working experience.
- Fatigue increases most significantly during the first week of tour, perhaps reflecting adaptation, a ceiling effect, or a combination of these possibilities.
- Recovery from fatigue after a tour of duty on average does not occur until the second week of leave.
- Fatigue can be addressed at three levels: legislation, company policy and personal awareness/management. Success will only be achieved if all three are co-operatively involved.
- Present reporting systems are inadequately designed to record factors relevant to fatigue.
- Excessive working hours are a problem in the seafaring industry, hidden by the fact that a concerning number of crew falsify audited records. Those who at least occasionally under-record their working hours were found to report higher fatigue.
- Fatigue was consistently associated with poor quality sleep, negative environmental factors, high job demands and high stress. Other important factors included frequent port turn-arounds, physical work hazards, working more than 12 hours a day, low job support and finding the switch to port work fatiguing.
- In the diary study more frequent port calls were associated with greater fatigue among those on shorter tours, and with lower fatigue among those on longer tours. This difference would appear to reflect ship type.
- Mini-bulkers arguably represent a worst case scenario in terms of a ship environment conducive to fatigue, as evidenced by subjective and objective testing. The combination of negative factors on this ship type include: frequent port turn-arounds, short port stays, changing cargos, only two watchkeepers (in many cases) and long periods of pilotage.

Consequences of fatigue have been shown not only in terms of accident contribution but self-reported physical and mental health outcomes.

Keynote 1-2

**SOCIAL SECURITY ACCESS FOR SEAFARERS**

Rimsky Sucre  
Clinica Einstein, Panama

The inequities in Social Security Access for seafarers were discussed and analyzed last November in IMHA-Latina's seminar and workshop in Panama. In the context of ISMH 9 in Esbjerg, 2007, these inequities of working at sea are considered with special regard to seafarers from developing countries. This lack of social security access adversely affects the health of seafarers (as defined by the WHO) and has negative consequences on the wider maritime industry. However, the international community is not unaware of the peculiar situation of seafarers, nor of the importance of social security provision.

Social security is discussed as a human right which is repeatedly recognized in international documents, declarations, charters, covenants and conventions. Social Security is also discussed as a fundamental right of workers, and in particular of seafarers, as enumerated in numerous ILO conventions starting in 1920. The ILO's new Maritime Labor Convention 2006 is discussed with a focus on social security. The convention treats it as something to preserve where systems already exist (usually in advanced economies, but only for their own nationals), and merely viewed as an aspiration where there are no or few social protections. Currently, the social security of shore workers in many countries is jeopardized due to the decreasing number of system contributors, relative to the number of beneficiaries. In this light, it would be unfair to ask seafarers to begin participation in these turbulent social security systems. The most relevant maritime organizations ought to abandon old and rigid positions and take interest in the formation of a focus group that will research the social security issue regarding seafarers with a view to evaluating and perhaps realizing the innovative solution outlined here.

**Keynote 1-3**

**HEALTH OF SEAFARERS - SOCIAL AND ECONOMIC ASPECTS; THE ITF PERSPECTIVE**

Tom Holmer  
Administrative Officer, ITF Seafarers Trust

The ITF and their affiliated unions have been supporting seafarers working and living conditions for over a century, and recently in the negotiations for the consolidated maritime labour convention at the ILO.

The ITF Seafarers Trust has been active in support of assisting both with welfare and reducing the high risk lifestyle of seafarers. Tom Holmer will cover some of the current issues facing seafarers which are the focus of activity within the ITF and the Trust.

## **Keynote Session 2: Education & Health Promotion**

### **Keynote 2-1**

#### **WHO WANTS EQUITY IN MARITIME HEALTH? WHO NEEDS IT?**

Tim Carter

President, International Maritime Health Association  
Chief Medical Adviser, Maritime and Coastguard Agency. UK

No one wants unhealthy seafarers, but who bears the costs and consequences of ensuring that the whole seafaring population has their health safeguarded and cared for? This dilemma must be at the heart of any symposium concerned with equity in maritime health.

Decisions about the health care needs for seafarers should start with the available data on their ill-health and its implications for safety, vessel operations, the ill seafarer and treatment facilities. In a rational world such information would be used to set priorities for action and then implement effective preventative and treatment programmes. The balance between prevention and treatment has to be set by the features of each health condition, aided by an ethical approach that will always seek to avoid harm by preventative action wherever this is reasonably practicable.

The approach of seafarers and their trade unions, maritime employers, governments and health professionals to:

- fitness standards for work,
- working/living conditions at sea,
- the provision of medical care for seafarers

will be reviewed to show how the various interest groups structure and present their thinking on the actions needed to secure safety, prevent illness at sea and minimise early termination of careers by illness. This analysis will look at the role of understanding of disease processes, the economics of health and the ethical concepts that underpin decisions on action.

The value systems and actions that relate to avoidance of risk to others, both in terms of vessel safety and adverse effects of transmissible disease are common ground for all groups – at least all say they are! Where they diverge is on topics such as whether to employ a willing seafarer because of potential costs of treatments during a tour of duty and the time horizon for minimising health risks – is it the duration of a single contract or the full period of seafaring life?

It should be possible to build a more explicitly equitable framework for seafarer health if the common core is consolidated and better mechanisms for resolving the scientific and political/economic aspects of the areas where there are differing views are developed. An evidence-based rather than a profit-maximising approach by maritime health professionals is a precondition for this.

## Keynote 2-2

### MARITIME FITNESS EXAMINATIONS – A CHALLENGE TO EQUITY?

RC Verbist

Mediport, Antwerp, Belgium; Maritime Academy, Antwerp, Belgium; International Committee on Seafarers' Welfare, Watford, UK.

**Introduction:** Maritime medical fitness examinations are compared to find challenges to equity. The conclusions of examinations in various systems are analyzed.

**Method:** 2910 conclusions were analyzed; those different from FIT were analyzed on assessment(s) that caused the "NOT FIT" conclusion.

**Results:** 7.10 % of the examinations end with a decision other than FIT. 50 – 60 year old represent 15% of the sample, but 29% of the NON FIT. 30% of the NOT FIT do not return for follow-up. 30% of the NOT FIT are found FIT later. Having a NOT FIT advice puts a candidate at risk of that advice again. Candidates who undergo a drug and alcohol test are more likely to be found NOT FIT. Candidates to the Maritime Academy are more likely to get a NOT FIT decision. 28% of the NOT FIT decisions relate to cardiovascular problems. In 22% vision rendered candidates NOT FIT. 17% fail drug and alcohol tests, 6% because of surgery, 6% because of hearing problems, 4% spine problems, 3% diabetes, 3% psychiatric problems, 2% teeth that needed care. 1% asthma problems, 1% epilepsy or seizures, 1% joint problems, 1% skin problems and 1% thyroid problems, 3% other conditions.

Candidates, failed because of vision, 57% would be found FIT under Dutch regulations, under German conditions none would have been accepted, under Panama requirements 60% and for Norwegian criteria 30% would conclude differently. Candidates who got a decision NOT FIT because of hearing problems, apparently in many the hearing problem was not the only problem. Older seafarers combine health problems that make the risk of getting a NOT FIT decision bigger.

**Conclusions:** Challenging to equity is the tendency from government driven examinations, to packages with conditions of insurances, companies or charter parties. Elder seamen present several diagnoses, making decisions complicated, but various systems show congruence. Most at risk for differences in decision are young people at their first examination.

### Keynote 3-1

#### "NEW APPROACHES FOR SEA SAFETY AND DECK INJURY PREVENTION"

GA Conway, JM Lincoln, BJ Husberg, RW McKibbin, and DL Lucas  
NIOSH Alaska Field Station, Anchorage, Alaska, USA

**Introduction:** Commercial fishing in Alaska has been historically very dangerous. Since the late 1980s, there has been a concerted effort to improve safety of Alaska's fishermen, via regulations, equipment, training, and efforts by many different organizations.

**Methods:** Surveillance data were examined for frequency, type, and trend of fatal and non-fatal injuries in Alaska. Technological approaches to prevent entanglement deck injuries were designed and tested. A suite of other innovations are in the design or evaluation phase.

**Results:** During 1990-2006, the fatality rate among Alaska commercial fishermen has declined significantly by 51% ( $p < 0.001$ ). The greatest progress was made in preventing deaths due to the loss of fishing vessels, however deaths due to falls overboard have not significantly decreased ( $p = 0.61$ ). For 1991-2002, 798 severe injuries occurred in this workforce, about one-quarter each from falls and entanglements or other machinery incidents. Successful trials of an emergency stop device for winch capstans have been completed.

**Conclusions:** There has been tremendous progress made in preventing drowning and hypothermia deaths in Alaska, due to new regulations, equipment, training, and efforts by many different organizations. These approaches are now being applied elsewhere in the US and some international locales. While less progress has been made in preventing fall overboard events and the many serious injuries which can occur on deck, new technological approaches hold much promise for preventing those in the near future.

**Keynote 3-2**

**SAFETY MANAGEMENT – A LINE RESPONSIBILITY**

Finn P. Brodersen, A.P. Møller - Mærsk

With the aim to eradicate all personal injuries at the work place, it is important to understand how to carry out effective safety management. During the recent decades a great effort has been carried out by government bodies, employer associations, unions and private companies striving towards a safe work place for the employees. These initiatives have caused a significant fall in the personal accidents statistic to a degree that a number of companies throughout the world now are resting at a low steady level from where it seems difficult to make further progress. This presentation describes ways and means in order to drive the effort of an accident free workplace further considering the concept of people-based safety, management commitment and line responsibility as implemented in the A.P.Moller-Maersk vessel operation.

**PARALLEL SESSIONS  
ABSTRACTS**

Parallel Session 1: Health Effects/Surveillance

Paper 1-1

**RISK OF CARDIAC EVENTS IN SEAMEN SAILING ON VESSELS UNDER THE GERMAN FLAG**

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**Introduction:** Cardiovascular diseases belong to the major causes of maritime service disablement. The aim of this study was to assess the risk of coronary heart diseases (CHD) in seamen on vessels sailing under the German flag in comparison with the general population and the CHD risk depending on shipboard job duration.

**Methods:** A total of 161 male seafarers who had participated in a medical surveillance programme were examined (response 84.9%). Interviews and blood sampling were conducted and the heart rate variability (HRV) was measured. The CHD risk of the German seafarers (N= 45) were compared to the three risk groups (10-year risk of CHD <10%, 10% - 20%, and >20%) of the Prospective Cardiovascular Munster Study (PROCAM, Assmann et al. 2002). According to the number of independent CHD risk factors (RF) of PROCAM, the seamen were further assigned to lower (<3 RF) and higher ( $\geq 3$  RF) risk classes.

**Results:** In the low 10-year CHD risk group, seafarers were less frequently found than PROCAM's subjects ashore (71.1% vs. 77.5%). The subjects we examined had more often moderate risks (26.7% vs. 15.0%) but less frequently high risks (2.2% vs. 7.5%). The latter finding was likely due to the seamen's medical surveillance examination every two years. Two seafarers (1.2%) had suffered from angina pectoris in the past. 55 seamen (34.2%) showed more than three coronary risk factors (49.7% had hypertension, 41.6% showed high triglycerides, 39.8% were older than 45 years, 37.3% were active smokers, 18.0% had high LDL cholesterol, 11.8% low HDL cholesterol, 8.7% had a positive family history of premature myocardial infarction, 5.0% suffered from diabetes mellitus). The CHD risk was significantly correlated with HRV (Chi-Square of Pearson;  $P= 0.001$ ). The average shipboard job duration was 16.7 years (SD 12.2 years). After adjusting for age, the CHD risk was to a minor extent associated with job duration (OR 1.08 (95% CI 1.02-1.19)).

**Conclusions:** In spite of the seafarers' regular medical surveillance examination, the risk of coronary diseases in seamen was slightly elevated. Therefore, our results indicate that the circumstances on vessels may be a risk factor of CHD development. (23b)

Paper 1-2

**DECREASED MORTALITY AMONG FISHERMEN AND THEIR WIVES**

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**Introduction:** Fish is nutritionally important due to its long-chain polyunsaturated fatty acids and other beneficial compounds, but it may, especially in the Baltic Sea area, contain high levels of environmental contaminants. Our aim was to determine whether the health effects of high fish consumption are reflected in the mortality of fishermen and their wives.

**Methods:** The mortality of 6,410 Finnish fishermen registered since 1980, and of 4,260 fishermen's wives was examined. The fishermen were identified from the professional fishermen register of the Ministry of Agriculture and Forestry, and the wives from the national population register. The cohort was linked with cause-of-death data from the Statistics Finland. The standardised mortality ratios (SMRs) and their 95% confidence intervals (CIs) were calculated for the period 1980–2005 using the national mortality rates as the basis for expected numbers. Blood samples and food frequency questionnaire data were collected from a volunteer sample to assess dietary habits and to measure serum biomarkers.

**Results:** The average fish consumption and the serum concentrations of fish-derived fatty acid and environmental contaminants were higher among the study population than the general population in the same region. The fishermen and their wives had lower mortality from all causes (SMRs, respectively, 0.78, 95% CI 0.73–0.82, and 0.84, 0.76–0.93), and ischaemic heart diseases (0.73, 0.65–0.81, and 0.65, 0.50–0.83) than the general male and female populations. Mortality from cerebrovascular diseases was decreased among the fishermen (0.67, 0.52–0.85), but not among the wives (0.95, 0.70–1.27). The SMRs for malignant neoplasms were close to unity (0.90, 0.80–1.01, and 0.97, 0.85–1.15).

**Conclusions:** Life-long high intakes of environmental contaminants from fish were not seen as excess mortality. The health benefits of fish consumption appear to outweigh the health hazards. (073b)

**Paper 1-3**

**A SURVEY OF OCCUPATIONAL HEALTH IN THE ROYAL NORWEGIAN NAVY**

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**Introduction:** The past years, workers in the Royal Norwegian Navy have suspected that factors in their working environment have been the cause of several adverse health effects. The administration of the Royal Norwegian Navy decided to start a project of surveillance of the work environment in the whole Navy. The project has been performed by The University of Bergen in 2001-2006, and will be described here. The aim of this project was to find possible problems in the work environment. The information should be used to make a plan for improvement in the Navy.

**Methods:** The project included a surveillance of all types of marine ships and land based marine work places, such as fortresses, marine schools, workshops, dockyards and stores, as well as office buildings, altogether 42 work place visits. In addition, questionnaire studies among present workers in 2002 (n=3878) and previous workers in the period 1950-2002 (n=9 962). Also, special studies of smoke divers, radiation, noise and vibration and organization of work have been performed.

**Results:** The researchers pointed at the following problems: Work with Health and Safety in the Navy lacks organization. There is no systematic work to improve the work environment. Factors like noise, hand eczema, radiation on ships and stress must be further examined. Psychosocial work environmental factors must be discussed more. The Navy has no statistics over occupational accidents, occupational diseases and sick leave. Reorganizations in the Navy are not always performed with the affected workers involved. Analyses of accidents are not properly performed. Life-style factors among the workers ought to be discussed. Nineteen reports were produced in the project.

**Conclusion:** There are high potentials for improvement of the work environment in The Royal Norwegian Navy. The organization is strong and motivated, and should be able to improve the work environment. (079)

**Paper 1-4**

**HOSPITAL CONTACTS FOR CHRONIC DISEASES AMONG DANISH SEAFARERS AND FISHERMEN - A POPULATION-BASED COHORT STUDY**

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**Introduction:** Seafarers' and fishermen's working condition may impact their lifestyle and health. We compared standardized hospital contact ratios (SHCRs) in two time periods and estimated the relative risks of hospital contact as a function of employment time.

**Methods:** Cohorts of all Danish seafarers (officers and non-officers) registered by the Danish Maritime Authority (DMA) 1986-1998 and fishermen retrieved from a pension registry 1964-1998 were linked to the nationwide Occupational Hospitalisation Registry (OHR) and followed up for incident diseases from 1 January 1994 and 1 January 1999 using rates specific for age and calendar time for the entire Danish workforce as a reference.

**Results:** The SHCRs for lung and cardiovascular diseases were high for non-officers. Among officers, the SHCR for chronic heart diseases was statistically significantly higher in the 1999 than in the 1994 cohort. For both time periods high SHCR values were found for bronchitis, emphysema, cancer of the lung, alcohol-related liver diseases and diabetes among non-officers, and lung cancer among officers. Among fishermen high SHCRs for bronchitis, emphysema, lung cancer and Raynaud's syndrome were found in both cohorts. No duration-response pattern was observed in any of the analyses, which may reflect a healthy worker selection over time.

**Conclusions:** Danish seafarers, especially non-officers, had an elevated risk of hospitalisation for diseases that may be related to social conditions and lifestyle factors. (069)

**Paper 1-5**

**USE OF FLUORESCIN ANGIOGRAPHY TO DETECT DIABETIC EYE DISEASE  
AMONG FILIPINO SEAFARERS WITH DIABETES MELLITUS**

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**BACKGROUND:** Although most diabetic seafarers present with visual acuity within minimum standard, some of them might have diabetic eye disease that may cause repatriation if left unchecked.

**OBJECTIVE:** To illustrate the use of fluorescein angiography to detect diabetic retinopathy among Filipino seafarers with diabetes mellitus

**METHODS:** 30 Filipino seafarers diagnosed to be diabetics underwent fluorescein angiography to determine the degree of diabetic retinopathy. The degree of diabetic retinopathy was graded to be mild, moderate or severe non-proliferative diabetic retinopathy; and proliferative diabetic retinopathy.

**RESULTS:** Most of the patients, 12 out of the 30, showed no signs of diabetic retinopathy. Eight had mild, five had moderate, and two had severe non-proliferative diabetic retinopathy. Three patients however had proliferative diabetic retinopathy which needed appropriate laser treatment in the form of pan retinal photocoagulation.

**CONCLUSION:** Fluorescein Angiography is an effective way to detect diabetic eye disease among diabetic seafarers and will help decrease repatriation due to these potentially debilitating eye problems. (101)

**Paper 1-9**

**FATAL ACCIDENTS AT SEA IN NORWEGIAN AND ICELANDIC FISHERIES 1980 – 2006**

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**Introduction:** Norway and Iceland hold reliable data on fatal accidents among fishermen as well as data on serious injuries onboard fishing vessels. Fisheries in Norway and Iceland are comparable in many respects, which make it worth while to compare the mortality statistics and reasons for fatalities at sea in the two countries.

**Conclusions:** The paper presents the causes of the 214 fatal accidents that have occurred in the Icelandic fleet, and the 485 fatalities among Norwegian fishermen in the period of 1980-2006.

The yearly incidence of fatal accidents is discussed and related to changes in the composition of the fishing fleets and fishing methods during that time, as well as the introduction and development of safety and survival training and more effective safety measures in the fishing fleets of the two countries. (053)

**Paper 1-10**

**IMHA AND ICSW INITIATIVES. BRIDGING HEALTH AND SEAFARERS' WELFARE**

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**INTRODUCTION:**

The International Committee on Seafarers' Welfare (ICSW) and the International Maritime Health Association (IMHA) have come together to bridge the gap between seafarers' welfare and seafarers' health. Some of the planned initiatives are to ensure that the health and welfare of seafarers are safeguarded and improved and that there is effective dissemination of good practice and high quality information on health aspects of seafarers' welfare. Other areas of work include the availability of the expertise and communication networks of both organisations to help out with the ongoing projects and programmes concerning and related to the health aspects of seafarers' welfare. Another area of joint action is to foster the investigation of solutions to practical problems concerning seafarers' health and welfare. Efforts are on to ensure that the members of both organisations and those they represent understand and work effectively together to improve the life of seafarers whether at sea or on shore. It is the necessity here to provide the framework for joint project work where this is beneficial and cost-effective.

**CONCLUSIONS:**

In accordance with the above, some of the decisions and discussions would entail working together to further the ideals and achieve the end results for seafarers' health in relation to seafarers' welfare. The South Asia programme has made good progress in reaching out to seafarers' welfare in the various ports in India and also in Sri Lanka and Bangladesh. Ship visiting and the ship visitors' training course is in motion. Much more needs to be done to motivate and activate the cooperation of welfare workers and stakeholders at port level. Everybody is doing something and everyone wants to do their own thing and the problem posed here is how duplication of efforts can be avoided. It will be of prime importance to work towards trying to synchronize efforts with welfare schemes already in place: governments, ports, ship owners and seafarers' organizations. A working model is already in place for ready implementation in the various port welfare committees set up where the government and all concerned work towards a common goal of seafarers welfare incorporating health and wellness too. (061)

**Parallel Session 2: Health Promotion**

**Paper 2-1**

**TRAINING OF LEADERS IN MARITIME HEALTH PROMOTION**

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**Background:** In spite of modernization, technological progress in fleet and better professional qualifications of workers, the health risk at sea is still bigger than in majority of land jobs. The main causes of high fatality rate among seamen and fishermen are: accidents and cardiovascular diseases.

The possibility of medical intervention is limited due to marine circumstances; it may only reduce the health risk/emergency effects in insignificant way. The aim is: improving safety and health risk in maritime work-site.

**Methods:** Primary prevention by developing health – promoting behaviour during job formation was chosen. Forth-year students of the Maritime Academy in Gdynia – future officers of merchant fleet and fishery were trained as the promotion leaders directly before their training cruise and graduation. The programme consisted of 30 hours of training, workshop and practice during one term in small groups of 15-20 students.

Knowledge and practical skills applied to two areas:

- medical issues: (preventing atherosclerosis, obesity, addictions, sexually transmitting diseases, promoting healthy diet and physical activity)
- psychological issues (developing one's personality, improving; interpersonal relations, conflicts solving, group management, stress sources identification, dealing with stress).

**Results:** The progress in knowledge and practical skills were measured by control tests. The questionnaires, individual interviews and feed – back programme of evaluation indicated that the aim was obtained. In majority of students the methods were efficient, accepted by the participants and the Maritime Academy authorities. Programme was conducted thanks to the grant from Ministry of Health no. 48/MP/2006. It is planned to be continued.

**Conclusions:** Maritime health promotion leaders training is accepted, educationally and economically justified. It may have measurable medical effects and reduce health and life risk among seafarers. (021b)

Paper 2-2

**HEALTH PROMOTION AMONG FINNISH SEAFARERS - TRIMMARE PROJECT**

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**Introduction:** Seafarers are often overweight, suffer from high blood pressure and blood glucose levels and their physical performance is poor. High salt and calorie intake, smoking, and lack of physical exercise are health risks. Work on board a ship and poor safety behaviour may also have adverse health effects.

**Methods:** In 2003, the Finnish Seaman's Pension Fund started a 3-year-project called "TrimMare". Its goal was to activate seafarers and shipping to promote health and safety behaviour on board ships. The target group of the project was all Finnish ships and seafarers. The needs and wishes of both industry and clients were clarified by interviewing trade unions, shipping companies and their occupational health organizations, and by carrying out a questionnaire among the seafarers. Some were trained as coaches to support health activation on board. Information material on ways to promote health on board ships was sent monthly to be put out on information panels and in mess-rooms. Cookery courses focusing on appetizing, low-calorie and low-salt meals were arranged for stewards. Forms for evaluating working conditions and safety behaviour on board ships were developed. Training days in health promotion were held for shipping companies, occupational health and safety organizations, coaches and seafarers. In 2006, the effects of the project were evaluated by interviews and a questionnaire.

**Results:** During the project, food on board ships became lower in salt and calories, and more vegetables were available. Seafarers begun and continued various physical activities. Shipping companies supported the health of seafarers more actively and realised that this was financially advantageous. Work and safety behaviour forms were taken into everyday use by shipping companies and their occupational health services.

**Conclusions:** Health and safety promotion on all levels, from company to individual seafarer, is necessary in the maritime industry, and has proved to be successful. Occupational health services for planning and steering health promotion and evaluating its effectiveness have a key role. (022)

Paper 2-3

**FOLLOW UP AND INTERVENTION STUDIES ON TETANUS-DIPHTERIA  
VACCINATIONS IN SEAFARERS**

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**Introduction:** Vaccination is an important tool for prevention. Its control in seafarers should be monitored. The objective of this study is to evaluate their state of tetanus and diphtheria vaccination, describe the accomplishment of the doses and booster, the efficiency of intervention tools and determine facilitating and preventive factors in our maritime health centre in Tarragona (Spain).

**Methods:** We have carried out a prospective follow up study in 505 seafarers (most of them fishermen) that visit us for their medical examination, from 1988 to 2006, with intervention points like a telephone call and determination of antibodies to probe the vaccines efficiency. A questionnaire with related variables was used to check facilitating factors to build a multiple regression equation for prediction of the fulfilment.

**Results:** Only 6,1 % of the seamen studied had been properly vaccinated before our campaign in 1988. The percentage of participation achieved 98 % in 1994, when the intervention telephone calls (1<sup>st</sup> to 2<sup>nd</sup> dose of tetanus vaccination) rose 64. 8 % in the sub sample response and McNemar's test showed statistically significant differences of improvement (76 %). We obtain a logistic regression model (96 % of good classification) which showed us facilitating and predictive factors of vaccination fulfilment like the number of fitness medical examinations to embark (OR=1.57, CI 95 % 1.1-2.3) and a stable couple (OR= 4.17, CI 95 % 1.5-11.5). Logit=5.65-5.92 (starts) + 4.44 (no. of doses) + 0.45 (no. of fitness exams) + 1.43 (stable couple). Booster doses and the correlation with sufficient level of antibodies were high.

**Conclusions:** Educational efforts and active intervention programmes with cohort studies are basic to implement and follow up vaccinations in seafarers. (086)

Paper 2-4

**ASSESSMENT OF CARDIOVASCULAR DEATH RISK AS PROGNOSTIC INDICATOR OF FITNESS FOR WORK IN PERIODIC EXAMINATIONS OF SEAFARERS**

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**Background:** The sudden circulatory diseases are responsible for the majority deaths at sea attributed to internal causes. Evaluation of individual risk and prognostication of seafarer' fitness for work on sea-going ship need more precise tools.

**Methods:** 500 men applying for health certificate for work on sea-going ships, was examined at preliminary or periodic prophylactic examinations in the years 2006-2007. Assessment of ten-year risk of fatal cardiovascular disease was based on 6 classic risk factors, according to criteria adopted by the European Society of Cardiology: positive family history of the disease, arterial hypertension (> 140/90), obesity (BMI >30), hyperglycemia on fasting (> 110 mg/dl), active smoking, lack of physical activity ( 3 h/week <).The results were subjected to a multifactorial analysis according to the SCORE project. Age and period of service were analyzed; Kaplan-Meier curves were evaluated for the prognostication of survival.

**Results:** The assessment based on the Score risk estimation was compared to to the existing model of qualification, according to the list of diseases and pathological states contraindicating the work on sea-going ships. Advantages and weak points of the Score assessment of cardiovascular risk were indicated. The benefits take into account the possibility of better prevention by modifications to individual and collective life styles in maritime work-site.

The counseling pose impact on: programming individual diets, pharmacotherapy of hypertension, formation of motivation support groups on ships to reduce: obesity, lack of physical activity, nicotine/alcohol addiction.

**Conclusions:** The assessment of cardiovascular death risk in persons employed in marine occupational environment may be a useful method to prevent cardiovascular diseases. It indicates the trends in activities reducing the modifiable risk factors at the workplace. (028)

**Paper 2-5**

**COMPARISON OF STRESS LEVEL BETWEEN SEAMEN AND NON SEAMAN PROFESSIONALS INSIDE THE SAME COMPANY**

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**Objects**

The aim of the survey is to compare the level of professional strain between seamen aboard French oceanographic vessels to that of technicians and engineers of the oceanographic institute that owns the ships and who are meant to board the ships not bearing the seaman status.

**Method**

We used two tests validated on an international basis:

- Langner's total health test (22 items) that investigates the level of psychic sufferance,
- Karasek's question list (38 items) that considers strain at work, discretion to decide and

social support.

Data were processed by a statistical software : Sphinx®.

**Results**

74 seamen and 74 non seaman professionals were questioned. Both population are male. There is no significant difference between ages and seniority.

Results show that there is no significant difference of strains at work and social support between seamen and non seaman professionals although the seamen's scores remain below the other's. On the contrary there is a very significant difference about discretion to decide, the latter being at a much lower level for seamen compared to non seaman. 16,6% of the seamen are ranked in the heavy strain/low discretion to decide category regarded by Karasek as a high risk of stress (compared to 0% of non seaman professionals). 33% of seamen in this group reached a score that discloses a psychic sufferance according to Langner's total health test.

**Conclusion**

Our survey shows that the occupation of seamen includes specifically elements regarded by Karasek as leading to a risk of stress. (010b)

**Parallel Session 3: Fitness for duty**

**Paper 3-1**

**SITUATION IN REGARD OF HEALTH ISSUES OF PROFESSIONALS EMBARKED  
ABOARD SHIPS AND WHO ARE EXCLUDED FROM THE ILO/IMO N°73 CONVEN-  
TION**

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**Objects**

Seamen are not the only professionals to board ships. Numerous other professionals work aboard and remain excluded from the ILO/IMO N° 73 Convention about medical screening for seafarers. As a fact the N° 73 Convention does not apply to persons employed by an employer else than the ship-owner and to harbour personnel that usually do not work at sea. Nevertheless measures have to be taken so that these persons remain in good health and that their presence on board draws no hazard to others.

Our goal is to investigate the existing means of supervision for these professionals and to propose solutions.

**Method**

We search the different situations in which non seaman professionals are embarked and the new occupations recently arisen they care about.

We investigate the different medical managements of these professionals.

We propose a guideline to occupational physicians who look after this personnel and state on their seagoing fitness.

**Results**

Many occupations are involved in this situation : researchers and technicians in the field of oceanography, engineers and technicians operating submarine cables, fisheries observers, safety agents, representatives of commercial companies, embarked health professionals, catering and hotel personnel...

In France these professionals do not have the seaman status and are not looked after by the Seamen Health Service, their medical aptitude being checked by an occupational medicine service whose physicians usually have no experience of the maritime field.

We insist upon shipping companies who embark these professionals on board their ships so that they set up a medical screening prior to embarkment.

We propose to occupational physicians a specific training in maritime medicine at the Université de Bretagne Occidentale (Brest) and a guide allowing them to state on the seagoing medical fitness of this personnel.

**Conclusion**

A real health watch of non seaman professionals who embark is being put up in France, next to the Seamen Health Service that takes care exclusively of professional seamen. (11b)

Paper 3-2

**QUALITY ASSURANCE FOR MARITIME HEALTH PROVIDERS AND REVISED INTERNATIONAL SEAFARER MEDICAL FITNESS STANDARDS**

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**Introduction:** Fitness to work at sea and the best ways to assess it are continuing concerns of the maritime industry, seafarers and maritime regulators. The current methods have several shortcomings and included among them are the lack of international recognition of fitness certificates, different fitness criteria in different countries, variable levels of competence and ethical standards among those who issue certificates. A rejected seafarer ends up working for employers who are least organised in terms of responding to the safety consequences of ill health or handling medical emergencies at sea. This system breeds bad practices and a lack of concern for the long term health of seafarers. Improvements in the criteria for fitness to work at sea and their application by quality assured maritime health providers will have the potential to reduce these risks. If adopted internationally they will ensure wider acceptance of certificates issued anywhere in the world and reduce the need for supplementary assessment procedures. The incremental costs of such measures will be small as a proportion of the sums currently spent on fitness assessment and could be expected to reduce the costs of ill-health at sea in a way which is genuinely acting in the interests of the seafarer and of the whole maritime sector.

**Conclusions:** IMHA is currently reviewing medical fitness standards for seafarers and is examining proposals in quality assurance and accreditation for maritime health providers. Two groups are working simultaneously on these objectives. The first is a group working on evidence based medical fitness standards for seafarers. Concepts underlying fitness standards, their purposes, the limitations of available evidence, the ethical dimensions and the variations in use of fitness standards in different national and commercial settings are all under review. The second group on quality assurance is working on an internationally valid set of quality measures for all aspects of maritime health advice covering fitness for work, advice on working and living conditions aboard, surveillance for adverse effects, recommendations on skills, equipment and support arrangements for medical emergencies at sea, telemedical advice, repatriation and medical treatment of landed seafarers, and health promotion and lifestyle advice. The Quality Assurance framework will be suitable for use within an accreditation programme such that centres that have demonstrated that they are fully in compliance with the quality standards could then become accredited. Both initiatives are timely because of the perceived limitations in the current arrangements for seafarer fitness internationally. (039b)

Paper 3-3

**FACING THE REVISED INTERNATIONAL HEALTH REGULATIONS:  
CONSEQUENCES FOR PORT HEALTH AUTHORITIES**

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**Introduction:** The revised International Health Regulations (IHR) will be adopted to national law in summer 2007. They require that public health risks from shipping other than just rodents be identified and controlled by the designates ports. Thus, Port Authorities will have to develop extended protocols which are harmonized nationally and internationally to issue a *Ship Sanitation Certificate* instead of a *Deratting (Exemption) Certificate*.

**Methods:** To comply with these requirements, the Hamburg Port Health Centre (HPHC) in cooperation with other German ports currently develops a draft certificate and protocol. This will be tested during the first half of the year 2007 with the aim to gain experiences and identify critical areas even before adoption of the law. The following areas of concern are identified:

- 1) An increase in capacities needed to meet the new requirements is anticipated. Specifically: The increase in work-time by port health officers is critical for further planning as well as defining additional technical skills.
- 2) Adaptation of our existing electronic documentation system (a web-based databank developed by our institution) according to the new IHR.
- 3) Rethinking the level of communication and cooperation with local, national and international bodies. Identifying further needs of regulation on State or National level. Putting enhanced local and/or national standardization and harmonization procedures (e.g. checking-lists) in place in addition to the Standard Operational Procedures currently developed by the WHO.
- 4) Ascertainment of compliance while a ship is in port. Developing communicating strategies to be used by Port Authorities.

**Conclusion:** The extended requirements by the revised IHR pose a challenge to the Port Authorities in terms of capacity building, communication, cooperation and regulation. Timely identification of critical areas as well as planning and testing of procedures is essential to be well prepared for the adoption of the new IHR in 2007. (055)

Paper 3-4

**DEFINING A DUTY OF CARE IN THE SEAFARERS PRE-EMPLOYMENT MEDICAL EXAMINATION**

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**Background:** Merchant seafarers all undergo a mandatory pre-employment medical examination. During the duration of their contract aboard ship, seafarers may be seen by physicians at shore medical facilities. Each time a physician examines a patient a duty of care is evoked. The extent to which that duty of care extends, is in many cases unclear to doctors. The aim of this study is to define the duty of care and consider its application in specialised areas of medicine applied to seafaring.

**Methods:** The Supreme Court of New Jersey in the case of *Reed v Bojarski* sets clearly defined expectations of medical examiners. It has become the benchmark of disclosure in pre employment medical examinations. We explore the case, and look at the significance it has had on subsequent judgments and its application to the shipping industry. It explores legal concepts such as duty of care, foreseeability, reasonableness, negligence and remedy.

**Results:** A duty of care is evoked every time a physician sees a patient regardless of the referrer. The 'prudent patient' test, and not the 'prudent doctor' test should be applied. The requirement of a physician's examination as a condition of employment, often paid for by the prospective employer, is not uncommon. The findings focus on the responsibility of a physician in such circumstances. More particularly, we are confronted with the question whether a physician, performing a pre-employment screening, who determines that the patient has a potentially serious medical condition, can omit informing the patient and delegate by contract to the referring agency the responsibility of notification. The answer is no.

**Conclusions:** When a person is referred to a physician for a pre-employment physical, included within the notion of a reasonable and competent examination is the need to take reasonable steps to make information available timely to the examinee of any findings that pose an imminent danger to the examinee's physical or mental well being. There is a duty of disclosure in keeping with the prudent patients' expectation. (096)

Paper 3-5

**INSURANCE IN MARITIME MEDICINE**

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**Background.** International maritime insurers aim to reduce the costs of medical claims and to do so they have tried to introduce their own procedures and criteria for medical fitness assessments. This is in part because of the limitations of current international arrangements where assessment is limited to sight, hearing and an medical opinion are insufficient to achieve consistent standards. What is needed is co-ordinated action led by WHO to create a single harmonised system.

**The aim** of the work presented is to analyze the problem.

**The method** is a review of WHO, ILO, medical insurance company reports and legal documents, supplemented by Ukrainian experience of medical assessment and care of seafarers, including professional medical selection.

**The results obtained.** We have identified three aspects relevant to the problem under discussion: (1)

The need for all preventative, curative and insurance related aspects to be carried out only by specialists with special training on maritime medicine; (2) That the state system of medical – and - sanitary aid to seafarers should be headed by a single institute for co-ordination of standards, procedures and research. This needs to provide clear communication and leadership for all those involved in maritime health including sanitary–and-epidemiologic supervision, prophylaxis and insurance medicine; (3) medical help to seafarers should be carried out on the basis of obligatory state medical insurance financed from [different] sources.

**Conclusion.** These goals can only be successfully realized on the basis of legal instruments agreed by international organizations (WHO, ILO, IMO, ITF) with all maritime countries assisting with their composition and ratifying the conventions and agreements. Public opinion on these problems must be formulated by international public, scientific and practitioner organizations. International symposia or maritime health are an important way of developing rational and evidence based views on what is needed. (035c)

Paper 3-6

**THE IMPORTANCE OF MEDICAL EVALUATIONS TO APPLY TO THE NAUTICAL INSTITUTION OF VENEZUELA**

MM Rodriguez da Silva

Médico Cirujano- Instructor OMI, Universidad Marítima del Caribe, Venezuela

**Introduction:** This study helps to determine the importance of medical exams for an aspirant to be accepted in the Nautical Institution of Venezuela. Studies of case: Nautical School of the Maritime University of the Caribbean.

**Method:** The methodology, according to its unique characteristics, is a field of investigation with an exploratory – descriptive procedure; at that point a well documented investigation will be made. This work has not been carry out by a sample and probability procedure, but with the total population, since has been easy to access to 452 people of both sexes and ages between 16 to 22 years old in 2004 and 458 in 2005, that participated in the procedure to apply for the career of maritime engineer of the Nautical School of the Maritime University of the Caribbean. To gather the data, medical evaluations were applied, as laboratory exams and psychological.

The investigation procedure was developed in three stages: a) By comparing the international directrix of worlds recognized organization like: International Labour Organization ILO, International Maritime Organization IMO, International Health Organization IHO; of profiles for “People of Sea” versus profiles requested by the Venezuelan Nautical Institution; b) Analysing the evaluations applied of candidates to be admitted in the Venezuelan Institute; c) Promote medical, physical and psychology exams to all the aspirants that applied to the Venezuelan Institute, considering parameters of international organizations.

**Results:** The psychological results evidence that in 2004 there was a 51% of people with psychological disorders (drugs, homosexuality, hidden phobia, and others) comparing with the year 2005 that there was a 50.6%. Regarding the medical exams, the most common were the infections (urinal, parasitic) with 31.5% in 2004 and 21% in 2005 and the haematological disorders with 10.5% in 2004 and 15.2% in 2005. With respect to sex and age, the results show that there were more male participants than female and the ages were between 16 to 18 years old. The most evident is that though the female participants are less, they have the highest percentage in psychological disorders.

**Conclusion:** In conclusion with this study it was demonstrated the obligation to follow and carry out all medical – psychological evaluations in order to receive individuals capable to develop a career of Maritime Engineering. (042)

**Parallel Session: Occupational Exposures/Risks**

**Paper 4-1**

**DOES AIR CONDITIONING IMPACT ON HYGIENIC QUALITY OF INDOOR AIR ON SEA GOING VESSELS ?**

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**Introduction:** Occupational physicians observed that nearly the moiety of the seamen will come down with diseases of the upper respiratory tract. Hence, a research project was initiated to examine the hygienic quality of indoor air on sea going vessels. A potential relationship between the content of microorganisms in the air of work and living places and their distribution by air-conditioning systems (AC) should be determined.

**Methods:** Air samples were taken on-site on five ferries, four bulk carriers, three container vessels, three freighters, a research vessel and a tanker. Wheelhouses, mess rooms, crew cabins and engine control rooms were determined regarding the contents of bacteria, fungi and endotoxins. Outside air was used as reference. Investigations were realized under different climatic conditions. Parallel to air sampling filter layers of AC were analyzed for the occurrence of bacteria and fungi. **Results:** Compared to fungi and endotoxins, bacteria showed highest contents and highest distribution in indoor air on vessels. During heating and cooling, cell numbers of bacteria increased. Thereby the maximum was found in the air of crew cabins. However the type of vessel has to be taken into account. For example freighters and bulk carriers demonstrated the strongest intake of bacteria, fungi and endotoxins during (un-) loading of grain. Analysis of filter layers of AC showed that bacteria dominated microbial flora. Consequently distribution of bacteria by air flow can be supposed.

**Conclusions:** Air-conditioning seems to influence the quality of indoor air on sea going vessels. The results of the study indicate that a regular maintenance of AC is essential. (020)

Paper 4-2

**DRUG ABUSE ON BOARD SHIP**

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**Background:** Drug abuse in maritime industry is an acute problem, which involves economic losses due to accidents, health problems, injuries and so on. The aim of this study was to estimate the effectiveness of conventional drug testing methods (pre-employment, random, periodic, post-accident, reasonable cause) for seafarers.

**Methods:** The study was carried among Georgian seafarers. Special methods of revealing metabolite antibodies of psychoactive drugs were applied along with conventional testing methods of drug use. 746 seafarers were examined during pre and post employment medical examinations.

**Results:** About 3% of examined seafarers were determined as carriers of metabolite antibodies of psychoactive drugs whereas all seafarers were tested with conventional methods during pre employment and on board drug testing and passed clear all examinations.

**Conclusion:** Conventional drug testing methods of seafarers which are the essential tools of shipping companies' anti drug policies are not so effective. It is necessary to advise companies also to pay attention to other approaches to their anti-drug policies. (048)

Paper 4-3

**PIRACY – STILL A RISK ON BOARD SHIPS**

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**Introduction:** Piracy is not only a part of maritime history it is still present on the seas all over the world. The problem is largely confined to West Africa, South America and South East Asia. Although recent study conducted by the ICC International Maritime Bureau (IMB), notes that reported piracy attacks world-wide are on the decline they still present a treat to the travellers by sea. Statistics documented in the latest edition of the Kuala Lumpur-based organization's report "Piracy and Armed Robbery Against Ships" found that the number of attacks through to the end of the 3rd quarter 2006 was 174. These are serious and violent attacks, done by organized crime groups and targets are merchant ships, passenger ships and cruising yachts.

**Methods:** Typical pattern of attacks is described.

**Results:** Recent data from International Maritime Bureau presented.

**Conclusion:** In the wake of the late tragic events and the reality of terrorist attacks, piracy is threatening the security of passengers and crews all over the world. (064)

Paper 4-4

**ASSESSMENT OF MANUAL MATERIALS HANDLING PRACTICES IN MOTION-RICH ENVIRONMENTS**

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**Background:** Commercial fishing, cargo and passenger shipping are industries that require workers to perform regularly manual materials handling (MMH) activities. Traditionally, risk of motion induced interruptions (MII) has been assessed using models that represent the human operator as a static element or at the very best, a quasi-dynamic linked segment system. However, humans have the innate capacity to react to sudden external perturbations. These reactions may not only serve to correct for lost stability, but put the operator at increased risk for injury. The purpose of this study was to examine the increased biomechanical demands associated with MMH tasks performed in moving environments.

**Methods:** Healthy male participants performed several MMH tasks, all considered to be within acceptable and safe limits, while exposed to a 6 degree of freedom ship's motion simulator. Dependent measures included electromyographic (EMG) signals from several trunk muscles, foot pressure time histories and thoracolumbar motions collected via a Lumbar Motion Monitor (LMM). Video records were used to determine the time-histories of the MMH events, identifying those during which a MII event occurred. These data were collected over a series of related studies.

**Results:** In general, the EMG signals were greater during MII events compared to successful lifts. Most notable were bilateral increases for the erector spinae and external obliques muscles. There were increases in the LMM velocities in the lateral bending and twisting planes for lifts incurring a MII across all lifting conditions when compared to successful lifts. Foot pressure measurements clearly identified periods of instability and describe which deck motions will likely cause the operator to stumble.

**Conclusions:** Large muscle activations and thoracolumbar velocities were observed in this study, for both the successful lifts and those during which an MII was identified. It has been suggested that these LMM magnitudes would put the operator at risk for low back pain. Lifts during which operators experience a MII could be potentially very harmful, depending upon the magnitudes of the floor motions and the cumulative fatigue effects likely present during sustained work in motion-rich environments. Those responsible for the development of safe work practices and seakeeping criteria should be cautioned about transferring MMH guidelines developed under stable conditions for tasks performed in moving environments. (076)

Paper 4-5

**NAVIGATOR WORKLOAD AND PERFORMANCE IN  
SIMULATED HIGH-SPEED SHIP OPERATION**

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**Background:** Naval fast patrol boat (FPB) navigation in the RNoN involves high operator performance demands, with operations often taking place in difficult coastal areas and under poor weather conditions. The RNoN is currently in the process of replacing their Hauk-class FPBs with the new Skjold-class FPBs. Due to the introduction of electronic navigation systems and reduced crew sizes, this will dramatically change performance demands and task characteristics for FPB navigators. There is reason to believe that these changes may have a negative impact on navigation safety.

**Methods:** A balanced, matched-pair study was carried out with 20 navigator cadets from the Royal Norwegian Navy. The study was carried out using high-fidelity navigation simulators, with measurements being made over a period of one day for each participant. The simulators were used to model the current Hauk-class and new Skjold-class fast patrol boat used in the RNoN, with navigators using conventional paper-chart navigation and electronic-based navigation methods respectively. Workload was measured using a combination of subjective ratings (with the NASA Task load index) and ambulatory psychophysiological measures (heart rate variability and skin conductance). Performance was measured by calculating course deviation (cross-track error) from the simulator position data, and expert ratings by RNoN navigation instructors. Analyses were performed using linear mixed-model statistical methods.

**Results:** No significant differences were found in subjective or psychophysiological workload between the two navigation methods, although skin conductance measurements indicated lower workload in the navigators using electronic-based navigation. Performance results showed significantly better course keeping in the electronic-based navigation group, while the expert ratings showed some aspects of communication performance to be significantly lower in this group.

**Conclusion:** Naval high-speed ship navigation using electronic-based navigation systems improves course-keeping performance and may possibly reduce navigator workload. However, our results showed that some communication tasks are significantly reduced compared to the conventional navigation system. (104)

Paper 4-6

**AN EXAMPLE OF ERGONOMIC EXPOSURE ASSESSMENT ON AN OIL DRILLING RIG**

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**Introduction:** Ergonomic exposure assessments on a drilling rig are described. Established scientific methods in combination with company data on work task organization are used. To demonstrate the method used, results from one job position, the derrick man, are shown.

**Methods:** One method, the PATH-method, is a work sampling-based approach (ref.). Workers are observed for extended periods of time (1-3 hrs.) and digital photos are taken at predetermined intervals, usually every 30 or 60 sec. For each worker, the fraction of photos where e.g. a specific posture is observed corresponds to the fraction of the work time spent in this posture.

Another method is an analysis of specific lifting tasks based on the revised NIOSH equation. Specific lifting activities are videotaped to identify the moments, where the highest loads on the lower back occur and the corresponding lifting index (LI) is calculated.

**Results:** Derrick men spent 60-80% of their working time in an upright posture during 3 out of 4 work tasks performed. However, during maintenance in the pump room less than 40% of the time is spent in an upright trunk posture. Squatting was observed for 10% of the time in the pump room, but not during other work tasks.

Handling of 25 kg sacks with chemicals for mixing mud was analysed with the revised NIOSH equation. The lifting tasks performed pose a medium risk of LBP as LI values are within 1-2.

**Conclusions:** Most operations to maintain pumping activity are performed in awkward postures. The peak loads on the lower back when handling sacks impose a medium elevated risk of low back pain, which could be reduced by having the chemicals delivered in containers, from which the chemicals can be transferred to the mixer by automated systems. (030)

Paper 4-7

**MECHANISM OF SPINAL CORD INJURY INDUCED BY DECOMPRESSION SICKNESS AND THERAPEUTIC EFFECTS OF EXTRINSIC NGF**

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**Background:** NGF (nerve growth factor) is the most important biological active elements of the central nervous system, and it has been considered as the most typical nerve nutritional factors for its dual roles in nerve nutrition and the promotion of the growth of nerve. The objective of this paper is to explore the mechanism of nerve injury induced by decompression sickness (DCS) through observing the course of nerve injury of spinal cord, and to study therapeutic effects of extrinsic NGF on the nerve injury induced by DCS.

**Methods:** 92 male SD rats were randomly divided into control group, safe decompression group, spinal cord DCS group, NS group, NGF therapy group, HBO therapy group, NGF combined with HBO therapy group. Rat models of spinal cord injury were made by exposing the rats to 1.0MPa for 5.5min and then decompressing to the surface in 55s. The rats with spinal cord injury were administrated with extrinsic reorganizaed NGF through subarachnoid cavity injection. The distributions of NGF, TrkA and tumour necrosis factor- $\alpha$  (TNF- $\alpha$ ) were detected and semi-quantified analysis was made by immunohistochemistry at 0h, 6h, 24h, 48h and 72h after decompression treatment. Neuron apoptosis was manifested by TdT-mediated dUTP nick end labeling (TUNEL) reaction. The content of TNF- $\alpha$  in tissue was measured with sandwich enzyme-linked immunosorbent assay (ELISA).

**Results:** The immuno-positive cells of NGF and its receptor TrkA reached the peak in 24h after fast decompression, while apoptosis index, TNF- Immuno-positive ratio and its concentration in spinal cord tissue reached the peak in 48h. NGF Immuno-positive cells were mainly neurons and glia cells, while TNF- $\alpha$  immuno-positive cells mainly glia cells in gray matter, apoptosis cells mainly neurons in gray matter. The distribution and density of TNF- $\alpha$  immuno-positive cells and apoptosis cells had the same trend. The concentration of TNF- $\alpha$  and apoptosis index of NGF therapy group were much lower than that of NS group at 24h, 48h, and 72h, but the concentration of TNF- $\alpha$  and apoptosis index of NGF in the group of combining with HBO therapy group is lower than that of single NGF therapy group or HBO therapy group.

**Conclusions:** Expression of NGF, TrkA, and TNF- $\alpha$  and neuron apoptosis occurred in spinal cord injury induced by DCS. Autogenous NGF may have protective effects on the autologous neurons, while TNF- $\alpha$ , maybe produced by glia cells might play a role in inducing neuron apoptosis. Having neuron protective effects, extrinsic recombined NGF has cooperative effects with HBO exposure in meliorating the spinal cord nerve injury induced by DCS. (006b)

**Parallel Session 5: Infectious diseases**

**Paper 5-1**

**PREVALENCE OF HEPATITIS C VIRUS (HCV) INFECTION IN CROATIAN SEAMEN**

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**Background:** Estimated prevalence of HCV infection in the Croatian general population is around 1.7%. The highest incidence is found in the 20-40 age groups at a high risk of infection by the use of drug injection. The aim of this study was to determine the prevalence of HCV infection among Croatian seamen. The hypothesis was that seamen are a high risk group for acquisition and transmission of HCV infection because of their profession, which is connected to various health risks. In available biomedical bibliography (MEDLINE), no information of research of the kind in Croatia has been found, nor is there any official data on the prevalence of HCV infection in Croatian seamen.

**Methods:** The study, conducted during the period between June and September 2006, was performed by examining medical record cards found in one general practice surgery in the area of Split, which has some 1400 patients registered. 270 medical record cards of seamen were singled out and, out of these, we singled out another set of records of seamen who were tested for HCV or were HCV infected.

**Results:** Data on laboratory tests for HCV infection was found in 37 of the total number of medical records examined (270). No data on possible HCV infection could be found for 233 seamen (86.3%) because their medical records contained no data on whether they had ever been tested for HCV. The test results of 25 seamen (67.6%) were found to be negative for HCV. HCV infection markers were found in 12 seamen (4.4% of the total number). Most of the diseased seamen (8; 67%) were between 35 and 39 years of age. The time when seamen contracted the HCV infection could not be determined. HCV genotype 3a was found in eight (67%) infected seamen, which indicates possible contamination via intravenous drug-taking. In three of the infected seamen, HCV genotype could not be determined based on information provided by available medical records. Only one seaman (8%) had genotype 1b, suggesting contamination by blood transfusion. The prevalence of HCV infection in Croatian seamen is 2.5 times greater than in the rest of the population. **Conclusions:** Since the sample contained only a small part of the entire population of Croatian seamen (0.8%; 270 of 32,000 seamen), there is a need for additional research which would confirm or reject the hypothesis that seamen are a high-risk group for HCV infection. (051)

**Paper 5-2**

**HBV SPREADING AMONG SEAFARERS AND HUMORAL IMMUNITY INDEXES OF HBsAg CARRIERS**

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**Background:** Hepatitis B is an important healthcare problem worldwide. Approximately 30 % of the world population is carriers of HBV serological markers. The aim of our study was to determine the rate of HBV spreading among seafarers and to do research on the humoral immunity index of HBsAg positive (HBs antigen carriers) seafarers.

**Methods:** HBsAg blood testing was performed with ELISA method. We used "HUMAREADER SINGLE" - (Human, Germany) spectrophotometer and the reagents produced by Human (Germany) and Vector - Best (Russia).

The determination of total immunoglobulin concentration was performed on HUMALYZER 2000 biochemical analyzer.

**Results:** We tested the total number of 1165 seafarers. About 6.5% of them (all male adults) were found HBsAg positives (HBs antigen carriers). We have an absolute evidence of the total blood immunoglobulin (IgA and IgG) decrease in HBs antigen carriers as compared with healthy donors ( $P < 0.01$ ). Practically all HBs antigen carriers denied their previous history of Hepatitis B.

**Conclusions:** Practically all HBsAg positive (HBs antigen carriers) seafarers showed immunodeficiency some indexes of humoral immunity. People with depressed humoral immunity are known to have Hepatitis B without symptoms and they become innate. Thus we can assume that such a high HBs antigen carriers percentage among seafarers results from the depressing effect of maritime labour on the humoral immunity. It should be also noted that HBs antigen carriers have increasing epidemiological consequence in enclosed working spaces. In our opinion there should be a more detailed case study of Hepatitis B among seafarers. Seafarers should be also vaccinated to prevent Hepatitis B. (047)

**Paper 5-3**

**TYPES OF GASTROINTESTINAL ILLNESSES AND THEIR PREVENTION ON CRUISE SHIPS**

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**Introduction:** Each year millions of people enjoy cruise vacations. Travelling on cruise ships exposes people to new environments and high volumes of people, including other travellers. Although an infrequent occurrence, this exposure creates the risk for illness, either from contaminated food, water or more commonly through person to person contact. The incidence of diarrheal disease among cruise ship passengers is estimated at 16.3 per 100.000 passenger days in 2000.

Noroviruses (NOVS), are the most common cause of infectious acute gastroenteritis and are transmitted feco-orally through food and water, directly from person to person and by environmental contamination. These viruses are often responsible for protracted outbreaks in closed settings. Common symptoms caused by NOVS are vomiting, diarrhea, and some stomach cramping. Less common symptoms are low-grade fever, chills, headache, muscle aches, nausea, and tiredness. NOVS are found in the stool or vomit of infected people and on infected surfaces that have been touched by ill people. This illness often begins suddenly, and the infected person may feel very sick. Most people recover within 1 or 2 days and have no long-term adverse health effects. People may becoming dehydrated if lost liquids are not replaced. Normally, Children often vomit more than adults. NOVS are highly contagious, but infections are not usually serious. Less frequently, other enteroviruses (Rotavirus, callicivirus) are responsible of acute gastroenteritis.

Among enterobacteries, the two most frequent species are Salmonella. Most persons infected with Salmonella develop diarrhoea, fever, and abdominal cramps 12 to 72 hours after infection. The illness usually lasts 4 to 7 days, and most persons recover without treatment. *Escherichia coli* is categorized into four major groups according to virulence mechanisms like enterotoxigenic (ETEC). Sea travellers are at greatest risk for ETEC infection.

**Conclusion:** Persons can reduce their chance of getting infected by frequent handwashing, prompt disinfection of contaminated surfaces with household chlorine bleach-based cleaners, and prompt washing of soiled articles of clothing. If food or water is thought to be contaminated, it should be avoided. (077)

**Paper 5-4**

**SUSPECTED METHICILLIN-RESISTENT *STAPHYLOCOCCUS AUREUS*  
INFECTIONS AT SEA**

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**Background:** Methicillin-resistant *staphylococcus aureus* (MRSA) has been increasingly reported as the cause of community-acquired skin infections in the US in individuals without established risk factors. MRSA infections tend to be more purulent than cellulitis caused by other pathogens such as group A *streptococcus*. In a recent large US multi-center study, MRSA was the most common cause of purulent skin infections. Patients diagnosed with MRSA also are likely to report a suspected spider bite as the cause, or to have been exposed to someone else with a similar skin infection.

**Objective:** To evaluate the incidence of skin and soft tissue infections at sea over the past 5 years, and to see if there are trends in reported clinical features that suggest MRSA as the pathogen.

**Methods:** A retrospective chart review was undertaken of all cases reported to Maritime Medical Access, a tele-medical advice service to US-flagged ships at sea run by the George Washington University Department of Emergency Medicine. The service covers a combination of cargo, tug, fishing, and pleasure cruise vessels. All cases of skin and soft tissue infections from 2002 until 2006 were reviewed. Since microbiologic diagnosis is not feasible at sea, cases were evaluated for the following features which may suggest MRSA: the presence of pus, abscess or furuncle, possible "spider bite", or performance of incision and drainage (I&D) by the medical officer. The number of skin infections, and the proportion of suspected MRSA infections between 2002 and 2006 were compared with the Fisher's exact test.

**Results:** In 2002 5.5% (n=11) of all medical advice cases were skin infections, which rose steadily with each passing year to 8.8% (n=46) in 2006 (ns). Of all skin infections, 36%(n=4) had features consistent with MRSA infection and 74 % (n=34) had them in 2006 ( p <.05). Across all years 15 – 30% of cases required an I&D procedure at sea or upon arrival in port. There was a non-significant increasing trend for the medical advice physician to prescribe antibiotics covering MRSA such as trimethoprim-sulfa, clindamycin, or doxycycline.

**Conclusions:** The number of skin and soft tissue infections reported to a single tele-medical advice service has increased in the past five years. Furthermore, the proportion of cases with features common to MRSA infections doubled. Planners for health care at sea should consider stocking appropriate antibiotics and ensure medical officers are trained to perform I&D in order to treat this increasingly common skin infection. (085)

**Paper 5-5**

**PASSENGER AND CREW REFERRALS TO DENTISTS IN LOCAL PORTS FROM THREE  
CRUISE SHIPS: A ONE-YEAR STUDY**

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**Introduction:** Ship's doctors are neither trained nor equipped to do elective dentistry aboard. The aim of the study was to evaluate passenger and crew referrals to out-patient port services from 3 cruise ships during 12 months (2004), with focus on dentist appointments.

**Methods:** Passengers and crew referrals were registered continuously and after each cruise recorded in the ship's doctor's medical cruise report, from which the data were retrieved and reviewed.

**Results:** During 2004 the median number of passengers/crew per cruise was 659/561 on Ship A, 498/534 on Ship B, and 604/614 on Ship C. The doctors of the 3 sister ships had a total of 17,474 consultations (49% passengers; 51% crew). Twenty-eight (35%) of 81 passenger referrals and 130 (60%) of 216 crew referrals to out-patient port services were to dentists. Among the specified dental referrals concerning crew, 18% were extraction requests.

**Conclusions:** The ship's doctors had a busy practice, but sent relatively few patients to specialist medical service in local ports. The low number of passenger referrals to dentists in port reflects the fact that most passengers, as opposed to seafarers, will be able to see their own dentist shortly. More than half the crew referrals in port concerned dentistry. Inadequate health insurance may cause low-wage crew to request free extractions instead of expensive dental repair in high-cost ports. Since dentistry in local ports is a poor substitute for the person's own dentist, doctors performing seafarer examinations should ensure that dental problems are solved before sign-on. (026)

**Paper 5-6**

**THE SPREAD OF HCV AMONG THE SEAFARERS**

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**Aim:** Hepatitis C is a global health problem, as estimated 170 million people are chronically infected with the hepatitis C virus (HCV) worldwide. At least 70% of patients who contract HCV develop chronic hepatitis C, with 20-50% of these patients eventually progressing to cirrhosis and 1-2% developing hepatocellular carcinoma in 10-20 years.

The aim of this study was to investigate the spread of HCV infection among the seafarers.

**Methods:** Detection of anti-HCV was made with enzyme immunoassay (EIA) in spectrophotometer, "HUMAREADER SINGLE". The positive results have been verified by Polymerase Chain Reaction (PCR) for detection of HCV RNA.

**Results:** 1400 seafarers have been examined, of which 11,5 per cent (162 seafarers) were found anti-HCV positive. All of them were examined by gastroenterologist and additional testings (LFTs, Bilirubin, albumin, PCR (Polymerase Chain Reaction)) were made. Of 162 above mentioned seafarers 157 were with active disease and only 5 with inactive disease. About 9 per cent of the seafarers with active disease needed antiviral therapy according to the gastroenterologist, the rest of them were given preventive recommendations.

**Conclusion:** The research showed that spreading of HCV infection among seafarers is higher than among the general Georgian population. Timely revealing, treatment and preventive measures can prevent the disease progressing and prolong the active work age. (080)

## Parallel Session 6: Telemedicine

### Paper 6-1

#### **CENTRO INTERNAZIONALE RADIO MEDICO (C.I.R.M.): RECENT DATA OF MEDICAL ASSISTANCE TO SEAFARERS**

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**Introduction:** The majority of people on board merchant ships are in a disadvantaged situation in comparison with ashore-living people which may have medical services available within a short time. Only a few ships carry a doctor or adequately trained paramedic personnel on board and the majority of vessels are at sea for days or weeks before they can reach a port. Hence, the most reliable possibility of treating diseases or accidents on board is to provide medical advice via telecommunication systems. Centro Internazionale Radio Medico (C.I.R.M., International Radio Medical Centre) is a non-profit organization founded in 1935, to provide free medical assistance via radio to ships with no doctor on board. From its foundation, C.I.R.M. has assisted more than 50,000 patients on board ships, being one of the organizations with the largest experience of medical care of seafarers in the world.

**Methods:** This study has analyzed files of C.I.R.M. medical assistance from 1 January 2003 to 31 December 2006. Diseases affecting seafarers, age and rank of patients and the outcome of single cases were assessed and analyzed statistically.

**Results:** In the period examined, the Centre has assisted 6,239 patients. 6,026 patients were assisted on board ships, 139 on fishing vessels and the remaining on board airplanes. Accidents represented the first-most treated pathology. Over the years, the trend of accidents showed a slight decrease. Illnesses of the digestive system were the second disease most frequently treated by C.I.R.M. and their frequency is constant over the years. Renal and urinary tract diseases represent the third disorder most often assisted by C.I.R.M. Other pathologies occurring were in the order, cardiovascular, nervous system, and dermatological diseases. Cargos and tankers were the ship types asking more often for medical advice to C.I.R.M. Italian seafarers represented approximately the 30% of patients assisted in the four years considered. In terms of telecommunication systems used, e-mail is becoming the way through which ships enter in contact most often with C.I.R.M. Medical advice requests to the Centre by e-mail represented the 41% of total cases in 2003, the 46% in 2004, the 57% in 2005 and the 61% in 2006.

**Conclusions:** A detailed analysis of requests of medical advice from ships to ashore centres may contribute to better know pathologies affecting most often sailors and therefore to improve the quality of health care of seafarers. (058)

## Paper 6-2

### A NEW INFORMATION AND COMMUNICATION SYSTEM FOR PORT HEALTH AUTHORITIES

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**Background:** On the basis of the new International Health regulations (IHR) and other laws (national and international), the port health authorities in all countries are obliged to ascertain the protection of people against epidemics, pandemics, disasters and to enhance the protections of seafarers and passengers. An efficient communication between Port Health Authorities using information technology is a prerequisite to meet the requirements given by the national and international laws. Presentation on the web supports the acceptance and utilization of the services offered by the Port Health Authorities by the maritime community and supports networking of interested bodies.

**Methods:** Using open source softwares like PHP, MySQL (database), phpbb (forum), mambo (content management system) and a web provider are used for running our internet community named [www.port-health.org](http://www.port-health.org) and help us to create our web presentation.

**Results:** We have built up an internet community ([www.port-health.org](http://www.port-health.org)) for port health authorities and related authorities and specialists in public health science and its organisation. In the public part we present a collection of laws and guidelines concerning the work of the port health authorities. Registered specialists can join after acceptance of registration to a forum (subdivided in groups), a health concerning ship database and to a specialised fileservers. The ship database is established as a working tool for selection of vessels that needed to be controlled or re-inspected and as a decision tool for further procedures. This information can be exchanged between Port Authorities. Last but not least, we have created a newsletter to publish immediate response and action coordination that seems to be needed in exceptional situation. For example, during the time of severe concerns of avian influenza in Germany we received significant fewer phone calls concerning that matter after we have informed the interested community by our website. The use of internationally accepted open source software proved to be an acceptable solution with low system requirements and costs.

**Conclusion:** Web sites are an appropriate tool to communicate between authorities and related specialists, which aids in meeting control requirements more efficiently and disseminates information to the interested public efficiently. (057)

**Paper 6-3**

**RADIO MEDICAL ASSISTANCE TO “GALATHEA 3” EXPEDITION:**

A virtual telemedical project

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**Background:** Internationally and nationally, telemedical advice to seafarers now and in the future will be given by radio medical organizations. In the past, the telemedical concept mainly was based on the telex and the telefax techniques, but now it is mainly based on direct satellite-born radio-communication. In the future, however, the concept will be based on satellite-born virtual telemedical communication techniques by camera and TV-monitor.

**Aim and method:** In order to elucidate the possibilities for safety and health of seafarers in the future, a pilot study based on these new techniques was conducted and is right now carried out as a joint-venture project between Radio Medical Denmark, South West Jutland Hospital, and the Medical Department of Royal Danish Navy. The technical equipment (Polycom ®) was delivered by Danish Data Display.

When the expedition is finished ultimo March, the study is closed. It is expected that 100 patients will have participated in the virtual telemedical project.

**Results:** The results of this pilot study will be presented and discussed at the 9<sup>th</sup> ISMH in Esbjerg 2007 and the possibilities for future applicability of the concept at sea will be discussed. (052)

## Paper 6-4

### FROM RADIO MEDICAL ADVICE TO TELEMEDICAL ASSISTANCE OF SEAFARERS: WHICH PERSPECTIVES?

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**Introduction:** Applications of communication technologies in medical interventions (telemedicine) is growing world-wide. Telemedicine probably will contribute to improve in the future the quality of health care. At the present, areas of development of telemedicine include the possibility for physicians to assist distant patients through telecommunication, video conferencing between local hospital physicians and specialists in different branches of medicine, or the transmission of data of medical tests to specialised hospital. Providing medical assistance to ships at sea was probably one of the first practical applications of telemedical techniques. However, at the present is the so-called radiomedical advice the way through which medical assistance is usually delivered to ships. Radiomedical advice is based on the simple description of symptoms affecting a seafarer without providing objectively biomedical data.

**Methods:** This study has examined files of C.I.R.M. medical assistance from 1 January 2004 to 31 December 2006. Medical files with biomedical data transmitted were selected and analyzed.

**Results:** In the three years considered, the Centre has assisted 4,684 patients. Except for basic data such as pulse, temperature and blood pressure, objective medical data were transmitted in 4 % of patients assisted in 2004, in 6.5% of cases in 2005 and in 12.3 % of patients in 2006. Dynamic images (ECG or ultrasonography) were transmitted only in a few cases from cruise and passenger ships. Static images were the type of telemedical data most often sent from ships to C.I.R.M. These pictures coming as attached files to e-mail messages included views of traumatized areas (25 % of cases), of skin lesions of dermatological interest (23% of cases), ocular lesions (15 % of cases) and burns (8 % of cases). Sometimes, pictures were used to guide local treatment of lesions.

In spite of the limits of static images such as those generated using a store and forward approach, pictures were very useful for making correct diagnosis and/or for requiring specialist advice. In the years, transmission of pictures of affected areas is becoming more common and diffused. It often accompanies the first request for medical advice.

**Conclusions:** It is generally agreed that medical assistance to seafarers was not improved in parallel with advances of medicine and of telecommunications. The use of telemedicine to transmit medical data ashore will contribute to improve medical assistance to sailors. Our experience indicates that sending biomedical images from ships to ashore medical centres is possible and can successfully done. What we need are just small investments and enlargement of ship's pharmacy including in it basic telemedical devices. (059)

**Paper 6-5**

**STUDY OF THE QUALITY OF THE TELEMEDICAL COMMUNICATION FOR THE DANISH SEAFARERS WORLDWIDE.**

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T Leth, Centre for Maritime Health Service, Fanø, Denmark(CMS)

**Background:** Since 1995 Radio Medical Denmark, Centre for Maritime Health and the Research Unit of Maritime Medicine has been collaborating on improving the medical service to Danish seafarers worldwide. The all over aim is to be able to offer the seafarers medical assistance on same level as other Danish citizens. A retrospect study of the telemedical service has been conducted since 2004. The purpose is to analyse ways of communication, disease pattern and standard of documentation with the aim to point out areas for improvement as well as identification of needs for differentiated education of the “paramedics” on board.

**Method:** 300 medical records from 2004 have been studied to compare way of contact, ship types, content of essential information (allergy, medicine use, blood pressure and pulse) and diagnosis registered. 300 medical records from 2006 are studied now in similar way.

**Results:** In 2004 55 % of contacts came from merchant ships, 25 % from passenger ferries, 11 % from fishing boats and 9 % from supplier ships. In 37 % fax, e-mail or telex was the only way of contact. In 27 % telephone was the only way of communication, and the rest were combinations.

64 % concerned illness, 24 % accidents, 6 % banalities and 6 % advising.

For allergy, previous and actually medicine use information only were present in 20 – 35 % of the cases, no matter which type of ship and communication were used. The used diagnose coding in 2004 was not sufficiently differentiated to support information on differentiated education.

**Conclusion:** From 2004 results are that improvement of documentation is needed, and further analysis is necessary on pattern of diseases and accidents in order to support the differentiated education.

Therefore a follow-up study is conducted now on data from 2006 after change of routines of documentation and diagnosis-coding. Results of both studies will be presented and discussed at the meeting of 9<sup>th</sup> ISMH. (041b)

**Paper 6-6**

**DOES TELEMEDICINE EQUIPMENT IMPROVE HEALTH CARE SERVICE FOR SEAFARERS IN THE NORWEGIAN INTERNATIONAL FLEET?**

**-A study about intersectoral co-operation in Maritime Medicine-**

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**Background:** In Norway there is a great deal of interest in telemedicine. Co-operation via telecommunication represents a special situation in healthcare and may be defined as working together with another for a common goal. Co-operation is in general depending on personal, organisational and situational factors. This project was related to healthcare service for seafarers. The general objective of the study was to give an overview of possibilities and limits for intersectoral co-operation and networking in maritime medicine by using telemedicine equipment. The study includes an assessment of various organisations working with healthcare services for seafarers. All involved organisations (Norwegian National Centre for Maritime Medicine, Radio Medico Norway, iMed Norwegian Telemedicine AS, Medi 3 AS, several ship owners and crew members of 7 Norwegian ships and 3 offshore platforms) have different formal organisation structures, different professional attitudes and behaviours. The study focuses on successful factors and barriers in the inter-organisational process while working with e-health care services on board of Norwegian merchant ships and on platforms.

**Methods:** To investigate these matters, after some explorative interviews, a web organized interactive interview technique with a semi-structured qualitative interview guide for data collection was used.

**Results:** The co-operation process between the involved partners and the complexities of intersectoral co-operation in maritime medicine will be analysed and described. It includes the description of the different operational goals (human, technical, business) of the maritime organisations. The study will try to answer research questions like: are the different maritime organisations ready to establish intersectoral co-operation and networking by using telemedicine equipment and can telemedicine equipment facilitate intersectoral co-operation in maritime medicine?

**Conclusions:** The study will help to better understand the complexities of networking and co-operation within this public health sector. (089)

## Paper 6-7

### TELEMEDICAL ADVICE TO LONG DISTANCE PASSENGER FERRIES

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**Background:** Radio medical (RM) advice for seafarers and travelling passengers is important and can be crucial for the optimal medical treatment on board ships. The aim was to analyse the data from consultations with passenger ferries to identify areas for possible improvements.

**Methods:** Data from the journals for one year from Radio Medical Denmark consultations with the medical responsible officers on passenger ferries was analysed retrospectively.

**Results:** Two hundred and fourteen RM records, 73% among passenger and 27% among crewmember patients were analysed. Passenger patients were generally older and more serious ill than patients among the crew. A high number of potential and life-threatening medical conditions, e.g. angina pectoris was seen among the passengers and nine of these were evacuated by helicopter. Sixty-three percent (n=135) of the calls related to pain complaints and more than half of these were severe or of considerable pain strength. Only paracetamol and opioids were in the medicine chest.

135 (63%) of the calls were caused by pain of which 72 (53 %) was of severe or considerable pain strength. Nociceptive pain was seen in 77 patients; half of these from injuries, the others from infections, otalgia, tooth pain or other complaints. 34 of the nociceptive pain patients had considerable or severe pain strength. Visceral pain from the inner organs occurred in 49 patients and 31 of these had considerable or severe pain. In generally they were very ill and most of them had pain in the heart. The neurogenic pain types were of the central type such as migraine, meningitis pain or other types of headaches. For treatment of pain mainly paracetamol, NSAIDs and opioids was used. Paracetamol was offered to all with pain without any registration. Among the patients with nociceptive pain 4 were treated with NSAIDs and one with morphine. The NSAID drugs were supplied from the other passengers. Among the patients with visceral pain 1 was treated with NSAID and 22 with opioids. Of the 23 patients treated with opioids, 19 had sublingual Buprenorphine, 3 morphine injections and 1 used his personal codeine tablets. No problems were reported from resorption of the Buprenorphine resorbibles, which therefore seemed to work well. At least 77 patients would have benefited from use of non-steroid anti-inflammatory drugs.

**Conclusions:** The paramedical assistance and the medicine chest content were considered insufficient in several cases. Passengers and crewmembers with chronic diseases should be thoroughly prepared and advised before their travels. (002)

## Parallel Session 7: Occupational Accidents

### Paper 7-1

#### **SAFETY TRAINING FOR FISHERMEN – RESULTS FROM 25 YEARS OF BASIC TRAINING OF NORWEGIAN FISHERMEN**

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**Background:** Basic safety training for Norwegian fishermen started around 1980 as a trial arrangement where the course vessel arrived into the fishery harbour and arranged a two-day course for local fishermen. From 1982 the voluntary safety training was extended to a 40-hours course. In the period of 1980 - 1983 Norway experienced losses of 124 fishermen lives. After these fatal happenings the government set up a special Safety Commission for the fishing fleet for active work in the period of August 1984 – January 1986. This commission put forward a number of measures both for new and existing vessels and recommended that Safety Training for fishermen should be made mandatory (realized in 1987) with a basics course of 40 hours and a refresher course of 20 hours 5- 8 years after the basic course. The Norwegian government gives a yearly amount of economical support for this basic training of fishermen. The main organization of this training was located to Tromsø city and there is an organization for this safety training with an advisory board, an administration, a staff of instructors and a course vessel arranging courses in selected harbours.

**Results:** In the 25-year period there have been a lot of fishermen and some other people have taken part in these courses and got the needed course diploma. In the period of 1982 – 2006 about 35.000 fishermen and others have taken the basic course, while 10.000 fishermen have taken the refresher (repetition) course. The presentation will deal with the experience of this type of (mostly) ambulant basic safety training. We will also look upon what are the positive effects of this type of theoretical and practical safety training. The results could be: Reduction of personal (fatal) accidents, number of fishermen that have been saved in foundering (loss of vessels) and other type of accidents. The fishermen attitudes to safety thinking as a result of safety training? The real cost of this training and what will happen with this training in the future? (083)

## Paper 7-2

### SAFETY ASPECTS IN THE NORWEGIAN COASTAL FISHING FLEET

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**Background:** The rate of fatal and serious accidents in the Norwegian fleet of medium size and smaller fishing vessels is still very high. This presentation will present the results from ongoing projects on safety problems and different measures in this fleet.

Focus will be on statistics of:

- Fatal accidents in the Norwegian fishing fleet for the last 10-year period (1997 – 2006)
- Serious accidents in the Norwegian fishing fleet for the period of 1998 - 2003

A presentation of main results from a survey on smaller fishing boats from 6.0 to 10.67 meters, carried out by the Norwegian Maritime Directorate in 2005, will also be given.

Based on results and findings from our contacts with fishermen onboard a selected group of vessels, actual strategies in the efforts of reducing accidents in this fleet will be discussed with reference to:

- Better safety regulations and control routines special for the boats under 10.67 meters
- Sea keeping qualities for the vessel groups between 10 to 34 metres
- Higher safety standards on board smaller vessels, included better rescue and protective equipment.
- More competence on vessel handling
- Economical aspects

(084)

**Paper 7-3**

**MAJOR DIFFERENCES IN RATES OF OCCUPATIONAL ACCIDENTS BETWEEN DIFFERENT NATIONALITIES OF SEAFARERS**

HL Hansen<sup>1</sup>, LH Laursen<sup>2</sup>, M Frydenberg<sup>3</sup> and S Kristensen<sup>4</sup>

<sup>1</sup>Medical Office of Health, Region Southern Denmark;

<sup>2</sup>Research Unit of Maritime Medicine, University of Southern Denmark;

<sup>3</sup>Department of Biostatistics, University of Aarhus, Denmark

<sup>4</sup>Radio Medical Denmark, South West Jutland Hospital, Denmark

**Introduction:** It was noted already several years ago that there were major differences in rates of notified occupational accidents aboard merchant ships between ethnical groups. Merchant seafarers from the South East Asia had considerable lower accident rates when compared with seafarers from Western Europe. The purpose of the study was to investigate whether the earlier observed differences in rates of notified accidents between different nationalities were sustained if other sources on occurrence of accidents were used and to identify specific causes of excess accident rates among certain nationalities.

**Methods:** Occupational accidents aboard Danish merchant ships during one year were identified from four different sources. These included accidents notified to the maritime authorities, accidents notified to a mutual insurance company, files on medical costs reimbursed by the government and finally, accidents in which there has been contact to the radio medical service. Time at risk aboard was obtained from a register on all employment periods aboard merchant ships.

**Results:** A total of 948 accidents causing personal injury to a seafarer directly caused by work aboard were identified. Among these accidents, 499 had taken place aboard cargo ships and only these were used in the analysis of differences in accident rates between nationalities. The accident rate for all identified accidents aboard cargo ships were 84 accidents per 1,000 years aboard. The crude incidence rate ratio (IRR) for East European seafarers was 0.88 and for South East Asians 0.38 using West European seafarers as reference. In a Poisson regression analysis, the IRR for South East Asians was 0.29 (0.22-0.38). In an analysis including only more serious accidents, IRR for South East Asians rose to 0.36 (0.26-0.48).

**Discussion:** This study indicates that seafarers from South East Asia, mainly the Philippines, have a genuine lower risk of occupational accidents in comparison to seafarers from Western and Eastern Europe. Differences in approach to safety and risk taking between South East Asian and European seafarers should be identified and positive attitudes included in accident preventing programmes. (049)

## Paper 7-4

### LETHAL LEVELS OF CARBON MONOXIDE FOUND IN CARGO HOLDS WITH WOOD PELLETS

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<sup>1</sup>Department of Occupational and Environmental Medicine, Sundsvall Hospital, Sweden

<sup>2</sup>Department of Radio and Space Science, Chalmers University of Technology, Gothenburg, Sweden

**Introduction:** Carbon monoxide (CO) is an odor- and colorless gas. The lethal concentration of CO in the air is in the 10-15.000 ppm range and 1-3 minutes exposure. It is known that CO is emitted from wood pellets during storage in warehouses. The biochemical mechanism by which CO is formed is not clear however, during dry wood conditions an autoxidative degradation of fatty acids and other wood components seems likely. The process occurs below room temperature but is enhanced by elevated temperature. The present study was initiated after a fatal accident onboard an ocean vessel in port while unloading wood pellets. The cargo hold had been sealed for almost nine weeks during transport. No air measurements or other precautionary steps were taken prior to entering the sealed staircase adjacent to the cargo hold, although the Shipper Cargo Information Sheet listed such requirement. One crew member was killed and a stevedore was seriously injured after entering the unventilated staircase. Several of the rescue workers were lightly affected. The injured stevedore was removed from the contaminated atmosphere after approximately 10 minutes and the dead crew member after approximately 15 minutes.

**Methods:** The air inside an undisturbed cargo hold on the same ship, two days after the fatal accident, was sampled before opening the hold cover. Two additional ships were sampled similarly. A sample tube was inserted into the cargo hold approximately 1 meter into the headspace air through a narrow opening of an inspection door. Approximately 30 liters of sample air was pumped into two Tedlar<sup>®</sup> bags, and analyzed with Fourier Transform Infrared Spectroscopy (FTIR). The oxygen level was on two occasions simultaneously recorded with a VISA<sup>®</sup> instrument.

**Results:** The following compounds were detected in all samples from the three ships; CO 5400-13700 ppm, CO<sub>2</sub> 3400-8800 ppm, methane 240-600 ppm, butane equivalents 230-830 ppm, ethylene 5-13 ppm, propylene 4-11 ppm. The oxygen level was 15-20.2%. The measured levels are indicative of the levels the injured persons were exposed to. On one ship, the air in the stairway adjacent to the cargo hold was measured. The CO level was found to be close to the same as in the hold, although the staircase was ventilated by opening the doors at sea for a whole day, three days prior to sampling.

**Conclusions:** Storage of wood pellets in closed spaces may produce lethal levels of carbon monoxide. The deceased and injured workers were exposed to a dangerous combination of high levels of CO and reduced oxygen partial pressure. Measurement of carbon monoxide is essential prior to entry in spaces with air connection to cargo of wood pellets. Forced ventilation of staircases prior to entry is necessary. (074)

**Parallel Session 8: Psycho-Social Factors/Welfare**

**Paper 8-1**

**WORKPLACE BULLYING AMONG SEAFARERS**

V Malinauskiene<sup>1</sup>, I Jonutyte<sup>2</sup>, S Einarsen<sup>3</sup>

<sup>1</sup> Institute of Cardiology of Kaunas University of Medicine

<sup>2</sup> Department of Public Health, Kaunas University of Medicine

<sup>3</sup> Department of Psychosocial Science, University of Bergen, Norway

**Introduction:** Recent studies in Lithuania and Latvia demonstrated that seafaring is attributed to the high professional risk group. Physiological (arterial hypertension, elevated blood cholesterol level), life style (smoking, immoderate alcohol consumption, insufficient physical activity, irrational nutrition), as well as psychosocial factors (isolation from friends and family, irregular sexual life, undefined work and rest regime, long working hours) contribute to the risk of possible adverse health outcomes. We were seeking for work organizational factors that would affect the seafarers' health. The aim of our study was to investigate the prevalence of workplace bullying among seafarers and its effect on perceived stress.

**Methods:** We conducted a study among seafarers attending the mandatory health examination in the Maritime Medical Centre in Klaipeda. Totally 370 seafarers answered the questionnaire (response rate 53%). We investigated workplace bullying by the Negative Acts Questionnaire (S.Einaresn & H.Hoel). We measured the overall feeling of victimization and its effect on perceived stress assessed by methods of the Finnish Institute of Occupational Health. We used the statistical software SPSS 13.0 for Windows and performed the logistic regression analysis for the calculations of Odds ratios (OR) of workplace bullying effect on perceived stress, controlling for age, nationality, occupational status.

**Results:** The prevalence of occasional bullying in the workplace among seafarers was 10.1 %, severe bullying 3.8%. Bullying was associated with perceived stress. The OR of severe bullying for perceived stress was 4.54; 95% CI 1.46-14.12. After adjustment for age, nationality, occupational status the OR of severe bullying increased to 7.39; 95% CI 1.97-27.77.

**Conclusions:** Bullying in the workplace among seafarers is a serious work organizational problem, increasing the level of perceived stress. Strategies for the improvement of the psychological climate in the workplace would benefit for health promotion in seafaring. (009)

**Paper 8-2**

**COPING WITH SEPARATION: CHINESE SEAFARER-PARTNERS IN CYBERSPACE**

L Tang

Seafarers International Research Centre, Cardiff University, the UK

**Introduction:** The nature of the seafaring career entails intermittent and long-term separation between Chinese as well as other seafaring couples. The latter can put the well-being of seafarer-partners (SPs thereafter) at stake. They may suffer emotional loneliness, social isolation, and other associated troubles while seafarers are at sea. With the widespread of the Internet use, several websites dedicated for seafaring communities have been constructed in China. This paper examines one such discussion website and focuses on how it helps Chinese SPs to solve their everyday problems.

**Methods:** Over one year's online observation; face-to-face interviewing with 15 SP participants and email interviewing with another 15; randomly sampling of 24 discussion threads for content analysis.

**Results:** In this cyberspace, some SP participants disclose various emotions and feelings associated with absent seafarers, while others provide them with emotional comfort and encouragement. They also offer each other informational support. Besides these, participating in this website is a leisure activity and it helps SPs kill lonely time. Finally, SP participants learn from each other in terms of how they should cope with difficult times.

**Conclusions:** Since Chinese SPs are able acquire mutual emotional and informational support when they are in difficult times, and since they provide each other with companionship in this website, they become more positive in facing everyday life. (015)

**Paper 8-4**

**THE COLLABORATIVE BLUE**

**– Equity in communication**

LL Froholdt

Department of Language and Communication/Department of Maritime Research and Innovation  
University of Southern Denmark

**Introduction.** This paper is part of my doctoral thesis, which in part, focuses on multi-national communication between ship and shore in crisis-situations and my interest is in how communication influences maritime operations. In this paper, I present the findings of my pilot study of a conversation between ship and shore, where a ship calls an emergency line, reporting that the rudder is presumably lost. My tentative study shows that communication plays an active role in both creating employee's social relations and influencing their performance, which jeopardizes the outcome of a crisis-situation.

**Method.** This paper presents the results of a single case analysis. It includes a telephone recording of communication between ship and technical personnel at shore surrounding an emergency situation in a Danish shipping company. The conversation has been transcribed and submitted to language analysis using discursive psychology.

**Conclusion.** The outcome of this call between ship and shore resulted in a wrong decision costing the shipping company an unnecessary amount of money. I will show how the participants i.e. through linguistic structures in their communication, collaborated in constructing (national) identities that became more important to the participants than the current crisis, hereby becoming the main cause of human error in the situation. I believe that if employees receive communication training and tools for how to reduce orientation towards i.e. nationality and optimize concentration on the task at hand, the possibility of human error and eventuality of a dire breach of safety will be minimized considerably. This training would enable all employees in the Danish maritime sector regardless of nationality, equal opportunity to communicate and perform their tasks safely, adequately and without extra cost.

Although this study has a small range of data, it will be the basis for my further research, due to the reason that it points at the possibility that communication is an overseen part of the human element in maritime operations. (082)

**Paper 8-5**

**THE ASSOCIATED MARINE OFFICERS' AND SEAMEN'S UNION OF THE PHILIPPINES  
PTGWO-ITF: WELFARE PROGRAMS**

CF Oca

Associated Marine Officers' and Seamen's Union of the Philippines  
AMOSUP-PTGWO-ITF

The Associated Marine Officers' and Seamen's Union of the Philippines PTGWO-ITF is a registered labor union in the Philippines with approximately 75,000 Filipino seafarers as members. It is one of the largest seafarers' union in the world affiliated with the International Transport Workers Federation (ITF).

The union operates different welfare programs benefiting its members and their families. It operates three tertiary hospitals called the Seamen's Hospital. These hospitals are located in Manila (100 beds), Cebu (60 beds) and Iloilo (40 beds). The hospitals cater to the union's members and their dependents free of charge.

Aside from the hospitals, the union has a provident fund scheme, a shelter program (housing), a grocery, two dormitories and a training center. It also operates the Maritime Academy of Asia and the Pacific (MAAP), considered one of the best in the world by a recent fact finding mission by the EU. (100)

**WORKSHOP  
ABSTRACTS**

## **Workshop 1: Social security for seafarers**

### **Introduction to workshop 1**

**Chairman Rimsky Sucre**

In November of 2006, 115 participants from 13 countries participated in IMHA-Latina's First Regional Seminar on Maritime Health in Panama City, Panama. Its title topic was "Social Security Access: In Search of Integrated Solutions for Seafarers."

It included diverse presentations leading up to the workshop: "Historical Perspectives on Life as a Seafarer in Comparison to that of a Shore-worker," "Globalization and the Maritime Industry: Implications on Labor, Welfare and Social Security," "Social Security of the Seafarers in the Countries in Transition," and others.

The attendees' punctuality and concentration on the various presentations was remarkable as they reviewed historical inequities in the lives and working conditions of seafarers compared to shore workers and even among different seafaring groups. Finally there was a working group with the participation of representatives from various segments of the maritime industry to evaluate a social security solution for seafarers of the merchant marine. During the workshop we analyzed why some populations of seafarers have access to viable social security, but the majority does not, and explored the possibility that this urgent need could be fulfilled by an international, non-profit, non-governmental, specialized organization. The group coincided in the need to continue researching questions related to this theme, spark new lines of research, and most importantly organize a focus group to spearhead this initiative recruiting partners in terms of expertise and economic support. A film documentary of the seminar and workshop is being edited and will be ready for ISMH9 for international distribution.

## Workshop paper 1-1

### HISTORICAL PERSPECTIVES ON LIFE AS A SEAFARER IN COMPARISON TO THAT OF A SHORE-WORKER

C A Yhap

Clinica Einstein, Panama City, Panama

**Introduction:** This presentation explores how seafarers and their families around the world have historically dealt with hazards germane to seafaring, the economic implications of these hazards, what life has been like for them at sea, and how they have dealt with the physical and psychological isolation experienced while at sea. To better understand the peculiarities of seafaring, we first delineate certain facets of working on-shore. Admittedly, life on land has been as varied as there are cultures, societies, people, places, and has also changed with the passage of time and advances in technology (i.e. we can speak of industrial societies, nomadic societies, agrarian societies, etc.). That said, all over the world people have always had more or less the same threats to their economic security: unemployment, illness, disability, old age, and death.

In response to these economic uncertainties people have tried to insulate and protect themselves in similar ways: Assets, Labor, Family, and Charity. By contrast, seafarers have relied almost exclusively on their labor, so if they are hurt or killed while at sea, their families have no economic support.

In spite of these hardships and dangers, people still chose a seafaring life. Reasons for this were tradition, adventure, money, because seafaring may still have been better than life on shore, and some were impressed into service on warships. Once on board life was very difficult. It has always been marked by restriction, isolation, and hard physical labor. Historically representative cases are described highlighting labor at sea and its dangers, psychological stresses born by seafarers due to loneliness at sea as well as that experienced by their loved ones on shore, illustrations of confinement aboard, and abuses of foreign seafarers are also described. Egalitarian, democratic, and hierarchical systems of social organization and decision making are discussed briefly with examples for each. Also examined in detail are examples of economic dangers consequent to these physical hazards and their negative effects on seafarer's families.

**Conclusion:** Working at sea has been a dangerous enterprise since the earliest times. These dangers have historically undermined the economic security of seafarers and their families. (098)

**Workshop paper 1-2**

**EXPLORING SOCIAL PROTECTION AND WELFARE ISSUES  
AMONG AGING FILIPINO SEAFARERS**

Cruz, Gichelle A.<sup>1</sup>

<sup>1</sup>Research and Extension for Development Office, College of Social Work and Community Development, University of the Philippines, Diliman, Quezon City, Philippines

**Introduction:** The Filipino seafarers' remittances almost reached \$2 billion dollars for the year 2006, contributing to the strengthening of the national economy. This amount can be attributed to the 4.9 percent increased growth of seafarers being deployed overseas from 247,983 in 2005. As the Philippine government continues to pursue its goal in increasing a strong foothold in supplying 30% of the world's seafarers, social protection and welfare issues among aging seafarers (retireable age of 50 years old and above) continue to be neglected. Being older, most of these seafarers have devoted more than 30 years of their life in the sea, suffered long periods of absence from their loved ones while being most vulnerable to the occupational stresses of compromised working conditions in an unsteady working area. Though long service in the maritime industry doesn't necessarily make them financially stable, aging seafarers and their families suffered the most when the privilege of returning to work becomes a hindrance due to discontinued medical treatment and limited medical benefits. Several studies have already been documented to relate the health impact of working in the sea. Many seafarers have been diagnosed with injuries and illnesses related to the kind of work and lifestyle they maintained at the ship. This situation, along with their fear of displacement from younger seafarers, made them most vulnerable as seafarers and as older persons.

**Aims of the Study:** The main aims of the study are two folds: (1) explore views on social protection and welfare issues among aging seafarers through participatory video method where seafarers can participate in documenting their own struggles and challenges as they become consciencitized in their issues as aging seafarers; and (2) address social protection and welfare among aging Filipino seafarers not only as a national issue but also as a global concern to the many aging seafarers who have devoted prime of their lives to one of the most dangerous occupations in the world.

**Method:** Participatory Action Research (PAR) using Participatory Video (PV) method as an educational process among the people involved in the production. This method has been used by home-based workers in the Philippines to raise their personal awareness and consciousness in their situations as informal workers and as women. The PV method also provided a venue in making other people understand the issues and struggles of informal workers while generating support from potential consumers to support their products. Given the potential benefits of PV method, this method can be applied in exploring views of aging seafarers in order to gain better understanding of their social protection and welfare issues. (068)

## **Workshop 2: Maritime Health Care Systems**

### **Introduction to Workshop 2**

#### **HOW TO ORGANIZE MARITIME HEALTHCARE SYSTEMS?**

HL Hansen, Denmark

B Rikken, Belgium

Maritime health care systems are build up of several different components. These include, among others, the basic medical training of seafarers, the medical facilities aboard, the access to radio medical advice and the access to shore based medical facilities. The purpose of the workshop is to focus on the possibilities for organising maritime health care systems to ensure the best possible health care for seafarers.

The workshop will include a few presentations on how health care systems are organized in different parts of the world followed by a discussion on the subject. In the workshop, we will define some key elements of maritime health care systems and set up proposals on their optimal interactions.

## Workshop 3: Maritime Health Education

### Introduction to Workshop 3

#### **HOW TO IMPLEMENT STCW REGULATIONS, SECTION A VI/4, OF MANDATORY MINIMUM REQUIREMENTS RELATING TO MEDICAL FIRST AID AND MEDICAL CARE, IN TEACHING**

R Rygaard et al.

Centre of Maritime Health Service, Fanø, Denmark

**Introduction:** The STCW regulations of 1995, section A VI/4 stipulates the mandatory minimum requirements relating to medical first aid and medical care, and describes the minimum standard of competence for seafarers designated to take charge of medical care on board ship. However, these regulations do have some shortcomings: They may describe, in some detail, which subjects to teach, and to some extent methods of assessing the candidates (“required to demonstrate”), but none of the regulations stipulates how the training is done, or which taxonomy should be used when describing the attained level of competence.

**Method:** As a workshop: An introduction to our practical approach to teaching medical subjects and a discussion of how to improve the teaching even further.

**Results:** The Danish Maritime Authority reformed the Radio Medical service and the “medical training” of the seafarer in 1995. At the Centre of Maritime Health Service we have been responsible for the training of the “persons in charge of medical care” for more than 10 years.

**Conclusions:** We witness a high degree of enthusiasm and motivation among our candidates, and we tend to ascribe these indications to the practical approach to the subjects we teach. We would greatly appreciate opinions on this or other approaches to promoting the teaching aspect of health at sea.

**Please note:** We hope to have extended time (1 hour?) and would like the workshop to take place on Fanø on our premises (equipment), possibly combined with social activities on Fanø.

**Workshop paper 3-1**

**“FØRSTEHJELP TIL SJØS – FIRST AID AT SEA – ERSTE HILFE ZUR SEE”**

A Schreiner, L Aanderud

Norwegian Centre for Maritime Medicine, Department of Occupational Medicine, Haukeland Universitets-  
jukehus, 5021 Bergen, Norway

Norwegian Centre for Maritime Medicine has produced a DVD with video of 25 medical procedures that can – and should – be performed on board. The videos are accompanied by commentary in Norwegian, English and German.

We suggest that the DVD should be available on board all vessels in the commercial fleet, and on larger fishing vessels. The DVD is useful for self training, and for training in groups.

The presentations are:

- HLR
- Free airways
- Stable side position
- Examination of the abdomen
- Examination on stiffness of the neck
- Listen to the heart and lungs with a stethoscope
- Measuring the blood pressure with a stethoscope
- Measuring the blood pressure by feeling the pulse
- Putting on sterile gloves
- Local anaesthetising
- Closing a wound with staples
- Closing a wound with needle and suture
- Establishing venous access
- Infusion of fluid
- Removing a foreign body from the eye
- Emptying the urinary bladder by means of a catheter
- Tamponade in nose bleeding
- Treatment of burns
- Preparing patient and stretcher for transport
- Helicopter evacuation
- Splinting a forearm fracture
- Splinting a finger fracture
- Using a pneumatic splint
- Taping a fracture in the middle hand
- Taping an ankle

(095)

## Workshop 4: Health Promotion

### Introduction to Workshop 4

#### **INTERNATIONAL MARITIME HEALTH PROMOTION PROGRAMME 2007-12**

Prevention of Non-Communicable Diseases (NCD) and un-fitness at sea

Arranged by:

Dr. M.Luisa Canals: Instituto Social de la Marina, Tarragona, Universidad Rovira y Virgili in Tarragona and Sociedad Española Medicina Marítima in Spain.

Dr. Maria Manuela Rodriguez, Universidad Marítima del Caribe, Caracas, Venezuela.

Dr. Olaf Jensen, Legekoret for sjømenn Bergen, Norway and Research Unit of Maritime Medicine, University of Southern Denmark, Esbjerg

Background:

Prevention of diabetes-2, cardio-vascular diseases, cancer and overweight is needed in general and in seafaring as well. The diseases are related to three main causal factors: diet, physical activity and smoking. Seafarers have their daily life on board and health promotion is a natural part of the occupational health for seafarers.

WHO use the concept of a high-risk strategy and a population strategy for prevention of Non-Communicable Diseases (NCD). Speaking about intervention studies, related to the population strategy, there are few if any studies with known long-term health effect. Change of the pattern of risk factors in the population strategy, however, have been shown in a Finnish study. In addition, the SHIP project international relates to the population strategy. Though no direct health effect can be measured, the program has been successfully performed.

The effects of the high-risk intervention-strategy, however is more convincing and based on the existing evidence, we propose that an international program should use both strategies.

The idea here is to create an international health promotion program in seafaring. The participating countries should contribute with their specific projects. In Spain, for example, a 20-year long retrospective prevalence study of body mass index will be performed and there are more descriptive and intervention studies in other countries.

The aim is to gather all efforts with identical objectives under one umbrella program. Such an international program can facilitate the initiation of new projects and promote funding. The results of the different studies will be distributed and used in seafaring worldwide.

The objectives of the workshop are to present and systematize some existing project plans and to establish an IMHA scientific working group to take some further initiatives.

Agenda

1. Definition of the areas included in NCD-health promotion
2. Presentations of some projects – short
3. Systematizing projects: Type: descriptive-causal-intervention /country/study population / objectives/expected effect/ time shedule-start-end/budget/financiatiion/contact person
4. Scheme – filling out
5. Application for funding
6. Creation of a scientific group in IMHA for health promotion

Participants in the workshop:

Invited are: All who want to listen and debate – all who are involved in planning or performing projects in this area - all who want to go into such a project - and all who know about someone else involved.

## Workshop paper 4-1

### THE SEAFARERS' HEALTH INFORMATION PROGRAMME - CURRENT STATUS

RC Verbist

Mediport, Antwerp, Belgium; Maritime Academy, Antwerp, Belgium; International Committee on Seafarers' Welfare (ICSW), Watford, UK

**Introduction:** The ICSW SHIP project is a health promotion campaign for seafarers, sponsored by the ITF Seafarers' Trust, focusing on seven health topics that are lifestyle related. SHIP is in its third year and the seven health topics will be completed by September 2007. The programme has evolved: lessons learned from the first phase are important and should be shared with others interested in health promotion for seafarers.

**Lessons:** Maritime companies of all kinds, show a genuine interest in health promotion. Motivations for that are: corporate social responsibility making safety and health a part of a company's philosophy and policy. Shortage of candidates for certain maritime jobs leading to an older workforce and concern about working and living conditions onboard.

SHIP has therefore developed company guidelines to assist setting up a health promotion campaign in seven steps:

1. create support
2. set up a structure
3. investigate the needs
4. make a plan for the campaign
5. implement the campaign
6. evaluate
7. adapt and continue

Health promotion programmes are production focused. Promotion and distribution need more attention.

Budgets have to calculate with marketing efforts and wide distribution. In case of SHIP the original plan to distribute through organizations, members of ICSW, has been changed to free distribution of material in seven ports worldwide with dedicated and trained groups of volunteers. This approach is chosen to get the material onboard of low standard vessels where the need for information is bigger.

**Current Status:** The report on the first phase of SHIP is under preparation and will be ready in September 2007. It will include the lessons learned, compared with the original study and aims. Evaluation will also include analysis of the questionnaires and reports of the ship visitors and companies that participate. Harmonisation of methods and systems may lead to integration of several efforts into larger, integrated maritime health promotion initiatives.

Different target groups like officers, crew and other employees react on the items of each campaign and on the content of the messages. Some find them extremely helpful and feel supported by the information, others see a risk of patronizing a group of workers that is already flooded with information of all kinds. On each of the topics questionnaires have been made trying to evaluate aspects like knowledge and behaviour.

**Conclusions:** SHIP has so far been a success in the organisation of the project and dissemination of knowledge to the seafarers international. However any impact of health improvement in short term cannot be expected. It is assumed that SHIP have been a major contributor to a change of culture with respect to healthy living at sea, international.

## **Workshop 5: The Sustainable vessel**

### **Introduction to Workshop 5**

Kristen D Nedergaard

Department of Maritime Research and Innovation, University of Southern Denmark

The workshop on "The sustainable ship" is a concentrate of discussions unfolded during the first meeting of the Sustainable Shipping Thematic Group under the BlueUniversity. It is an attempt to describe an encompassing concept for sustainable shipping. The concept is basically described as a matrix consisting of (A) the three basic phases of the Ship Life Cycle: Construction (including projection, design and construction), Operation (operation, waste management and maintenance), and decommissioning (scrapping, disposal and recycling); and (B) four dimensions of sustainability: Economics (optimizing, new business opportunities), Environment (external environment, workplace environment, health), HR (knowledge, competencies, behaviour, organization), and framework conditions (public, semi-public and private).

## Workshop 6: Ethics in Maritime Medicine

### Introduction to Workshop 6

#### **Ethics and equity: Ethical dilemmas for professional practitioners and researchers in maritime health**

Fabienne Knudsen, MA, PhD, Research Unit of Maritime Medicine Esbjerg, Denmark  
Dr. Andra Ergle, MD, City Hospital No1 of Riga Maritime Health, Latvia

The workshop will be formed as an occasion to reflect upon the ethical dimensions of our practice as professional in maritime occupational health. The point of departure for this reflection will consist of dilemmas we have encountered - or may encounter - in our daily work. Dilemmas have often their source in ethical deliberations, where contrasting sets of principles may be at stake.

Examples of such dilemmas could be for medical assessment: What are the consequences for the seaman/fisherman of one's decisions? How much and for how long time should one follow up medically, economically, etc when the seaman is declared unfit? More fundamentally: Do equality of treatment at all times lead to equity? Is consideration for the specific case compatible with compliance with universal guidelines?

The workshop will be introduced by three presentations:

- General presentation over main ethical schools (Fabienne Knudsen)
- Codes of Ethics and Practical wisdom (Andra Ergle)
- Ethical dilemmas in the physician's clinic (Emmie Knudtzon)

The main part of the workshop will consist of group discussion on questions/problems originating as far as possible from the participants' own experience.

At last, the answers will be collected, discussed and summed up in plenum.

A written compendium of the presentations and a list over selected relevant writings will be delivered to the participants.

## Workshop paper 6-1

### Theories of normative and applied ethics – an overview

Fabienne Knudsen, Research Unit of Maritime Medicine, University of Southern Denmark

**Introduction:** The presentation is a general introduction to the main schools in applied ethics, their implications and problems, and their relationship to the notion of equity.

**Background:** Dilemmas and tensions between ethical principles and the practices of the maritime industry will be discussed at an empirical level in the workshop Ethics and Equity. This opening theoretical presentation is an attempt to frame and qualify the following discussion.

**Summary:** The interest of normative ethics' is the content of our moral behaviour. Normative ethical theories seek to provide action-guides - procedures for answering practical questions ("What ought I to do?"). That is, in practice, normative ethics cannot be pursued in isolation from applied ethics. Four main theories will be introduced:

Utilitarianism: An action is right if and only if, in the situation, there was no alternative to it which would have resulted in a larger sum of total of welfare in the world

Egoism: We ought always to act so as to maximize the sum total of our own welfare.

Duty ethics: There are universal duties and prohibition we always should follow, irrespective of the consequences of following them.

Virtue ethics: The most basic question is not what we ought to do, but what kind of persons we ought to be.

Besides, the ethics of right, the ethics of care and theories of justice will be mentioned.

The theories' advantages and problems will be actualised by relevant examples.

Conclusion at discretion

# POSTER ABSTRACTS

**Poster Session 1: Foyer 11.10 - 12.15**

**Poster 1-1**

**NORWEGIAN CENTRE FOR MARITIME MEDICINE (NCMM) ESTABLISHED 2006**

AM Horneland

Norwegian Centre for Maritime Medicine, Norway

**Background:** Through many years, medical doctors with common interest in maritime medicine have been determined to establish a national centre for maritime medicine in Norway. Based on a decision in the Norwegian Parliament in 2004, the centre was established in 2006, as a section of the Department of Occupational Health, Haukeland University Hospital.

**Mandate:** The Centre shall mediate knowledge in maritime medicine to shipowners, crew, seafarers, authorities and others. It shall initiate and conduct research. Furthermore, the incidence of illnesses and accidents at sea shall be registered. Support to maritime education will be given. NCMM shall act as the Norwegian point of international contact in maritime medicine. Radio Medico Norway will be incorporated in the centre.

**Current tasks:**

1. A new regulation for medical examination of seafarers, pilots, and offshore workers in the North Sea is proposed. At present, the main focus is on the specification of medical standards. NCMM is leading the work in cooperation with the Norwegian Maritime Directorate, and the Norwegian Directorate for Health and Social Affairs.
2. Establishment of a Norwegian Maritime Health Registry, including health data on seafarers in the NOR and NIS registry, pilots, offshore industrial workers, fishermen and professional divers. The registry will be made pseudonymous, and linked to other Norwegian health registries, i.e. the Cancer registry, the Registry of Causes of Death, Norwegian Labour and Welfare Organization, Medical Prescription Registry and several others.
3. A textbook in maritime medicine will be published.
4. Several research projects are, initiated and results will be presented by the end of 2007 or early 2008.
5. A basic course in Maritime Medicine, developed by the medical services in the Royal Norwegian Navy will be taken over by the Centre, and further developed in accordance with the new regulations.
6. Pilot projects in telemedicine are carried out in cooperation with Radio Medico Norway.
7. A DVD with practical medical emergency procedures for seafarers, was released December 2006

**Cooperation:** NCMM seek international contacts for further development in the field of maritime medicine.

(105)

**Poster 1-2**

**LUNG CANCER AND MESOTHELIOMA AMONG ENGINE ROOM CREW. RISK ASSESSMENT OF PREVIOUS AND ON-GOING EXPOSURE TO CARCINOGENS.**

K Forsell, S Hagberg, R Nilsson

Occupational and Environmental Medicine, Sahlgrenska University, Gothenburg, Sweden.

**Introduction:** Several cases of cancer occurred in a few years among engine room personnel of one ferry in Gothenburg, Sweden. The company's medical advisor contacted our department for medical advice.

**Methods:** The engine room crew during 2001-2006 consisted of 50 men. Sick leave due to cancer was reported by the engine room's staff manager. Four cases of cancer were referred to our department. Medical history, personal risk factors for cancer and diagnosis were confirmed through interview and medical files. Work exposure was evaluated by an experienced hygienist.

**Results:** Nine cases of cancer were reported between 2001-2006. Two engine room officers (age 55 and 62) with lung cancer and one engine room officer (age 61) and one electric engineer (age 63) with mesothelioma were referred to our department. In addition, there were five other cases of cancer (one myeloma, one thyroid cancer, three colon cancers). The patients with lung cancer had been smokers for several years (33 and 45 yrs). All four had worked in the engine room since the 60s (1959-67). Exposure to asbestos had been 2-5 fibers/mL with main exposure during the 60s and 70s. Polycyclic aromatic hydrocarbons (PAH) and nitroarenes had been an everyday exposure throughout their working life.

**Conclusions:** For lung cancer cases, asbestos exposure was considered a risk factor and PAH and nitroarenes possible risk factors. Smoking contributed to the risk. For mesothelioma, asbestos exposure was considered a causal factor. Today, there is no asbestos present in the machine room of the investigated ferry. Carcinogens to be considered are PAH and nitroarenes. Worldwide, asbestos is still present on ships and in ship-building industry. Measures to eliminate or reduce exposure to asbestos, PAH, nitroarenes and other carcinogenic substances are suggested. (032)

**Poster 1-3**

**MORBIDITY PATTERN AND TIME TRENDS AT A REGIONAL MARITIME HEALTH CENTRE**

R Nilsson

Occupational and Environmental Medicine, Sahlgrenska University Hospital, Göteborg, Sweden

**Introduction:** From 1962 to 1979 the Health Center for Seafarers in Gothenburg was the largest Maritime Health Center in Sweden and had the largest data base of diseases and injuries among Swedish seafarers. About half of all Swedish seafarers got their health certificate there. After 1980 it is almost impossible to get comprehensive statistics of diseases among Swedish seafarers since it was decided that seafarers could get their health certificate from any general practitioner. Before that a large proportion of the seafarers contacted the health center in case of illness or injury since Gothenburg has the largest port in Scandinavia.

**Methods:** The diagnoses from the health center were classified according to the WHO A-list 1962-68, after that ICD codes were used. The morbidity among the seafarers is compared to similar data for the general population. The data have been analyzed using conventional statistical methods.

**Results:** The total number of diseases and injuries treated at the center increased from about 3000 to 3500 per year, despite a reduction in the number of Swedish seafarers from about 20 000 to 15 000 during the period. Acute respiratory tract diseases increased from about 300 to 900 cases per year and accounted for more than 20 % of all cases. Cases of injuries and poisoning slowly decreased from about 700 to 400 cases per year during the period. Musculoskeletal diseases increased from about 300 to 700 per year. All these diagnostic groups were more common among seafarers while circulatory and mental diseases were more common in the general population.

**Conclusions:** Although the data reflect the situation in the 1960s and 1970s and may have limitations, such as selection bias, the pattern of diagnoses and time trends may be similar to the situation in health centers for seafarers in many parts of the world today. (040)

**Poster 1-4**

**THE CHANGES ON ELECTROENCEPHALOGRAM OF SEAFARERS  
BY TEST A SEA WAVE WITHSTANDING CAPACITY**

Trieu Thi Thuy Huong<sup>1</sup>, Tran Thi Quynh Chi<sup>2</sup>, Nguyen Truong Son<sup>3</sup>

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<sup>3</sup> Vietnam National Institute of Maritime Medicine (VINIMAM), Vietnam

**Introduction.** Seasickness cause many changes for bodies' functions. The people with differential ability of wave withstand will have differential changes for bodies' functions as cardio-vascular, digestive system, especially nervous system. How can we diagnose wave withstand ability of every body in order to fit for duty at sea?

**The aim**

- Researching the change of Electroencephalogram (EEG) norms of seafarers before and after were tested a sea wave withstanding capacity.
- Analyzing the change of some characteristics of EEG of researching groups in order to contribute the EEG's characteristic norms to the selection the sea wave withstanding capacity of seafarers in Viet Nam.

**Methods**

- Selecting 99 seafarers with maritime working time over 2 years by interview method and divide them into 3 groups:
  - First group: 36 persons with good ability of wave withstand (never been seasick)
  - Second group: 30 persons with bad ability of wave withstand (regular seasickness)
  - Third group: 33 persons with average ability of wave withstand (light seasickness)
- Evaluating and comparing the EEG's changes of seafarers in 3 groups before and after carrying out the test a sea wave withstanding capacity.

**Results.** The results obtained as follow:

- **In good ability group of wave withstand:** The amplitude and index of Alpha wave was light decrease ( $52.07 \mu\text{v} \pm 9.44$  to  $52.67 \mu\text{v} \pm 8.16$  and  $45.58 \% \pm 11.10$  to  $46.56\% \pm 9.87$ ), Beta was light increase ( $48.33 \pm 11.07$  to  $56.31 \pm 10.73$ ). No slow waves appeared (delta and theta) on EEG either before or after the test time.
- **In the bad ability group of wave withstanding:** The specific nervous reaction of this group was hyper parasympathetic nervous system and in serious inhabitable and stressful state of cerebral cortex such as the amplitude and index of Alpha wave decrease clearly ( $42.93 \mu\text{v} \pm 6.92$  to  $32.61 \mu\text{v} \pm 10.77$  and  $46.89 \% \pm 16.14$  to  $40.36 \% \pm 5.00$ ), Beta wave increased clearly (from  $55.43\% \pm 5.33$  to  $45.50\% \pm 7.06$ ). Especially, after the test, slow wave's rate increased clearly (16.66% to 50%).
- **In the not very well ability group of wave withstanding:** Light decreasing of amplitude and index of Alpha ( $49.39\mu\text{v} \pm 17.66$  to  $48.82\mu\text{v} \pm 14.96$  and  $54.61\% \pm 14.83$  to  $49.45\% \pm 12.54$ ). The slow waves' index was not increased after the test.

**Conclusion.** There are change of the Electro-encephalogram (EEG) norms of seafarers before and after a sea wave withstanding capacity was tested. Especially, after the test, in the bad ability group of wave withstanding with amplitude and index of Alpha wave and beta wave decreased clearly, slow wave's rate increase compared with before the test. It showed that these changes could be used excellently to select the sea wave withstanding capacity of Vietnamese seafarers. (088)

**Poster 1-5**

**WORK-RELATED STRESS AT SEA. SELF ESTIMATION BY MARITIME STUDENTS AND OFFICERS**

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<sup>1</sup>Institute of Maritime and Tropical Medicine, Medical University of Gdansk, Poland

**Background:** People working at sea experience stress connected with their specific work conditions, high job responsibility and psychosocial factors, which generate health and psychological problems. The objective of the study was the comparison of the self-evaluation of the work related stress in students of the Maritime Academy (MA) in Gdynia and in experienced merchant marine officers.

**Methods:** Two study groups were examined: 30 students of the MA, mean age 22,7 years, and 30 seamen, i.e. deck officers and ship's engineers, mean age 47,2 years, with a minimum 15-year period of service at sea. For the self - assessment of work-related stress level „Work-Related Stress – Subjective Work Evaluation Questionnaire” was used in both groups.

**Results:** In all scales of the questionnaire students were in a higher degree burdened, as compared to officers. The total stress reached the level of 8 sten, indicating that students regarded their future occupation as highly stressogenic, already at the beginning of their work at sea. Officers also recognize their work at sea as highly burdening, except in the „lack of control” aspect. In this case they assessed their work as less burdening than other occupations on land. Comparing to the officers with a long period of service at sea, the students were more vulnerable to stress at work, and this was attributed to: social relations, physical onerousness, the lack of control, and the lack of support.

**Conclusions:** MA students preparing themselves for work at sea anticipate it - objectively and subjectively - as a highly stressing job comparing to the group of merchant marine officers.

The programme of psychological training, aimed at supporting the personal competence, was proposed as a preventive intervention. (027)

**Poster 1-6**

**SENSE OF COHERENCE AND MENTAL HEALTH AMONG SEAFARERS  
IN RELATION TO PHYSICAL ACTIVITY**

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**Introduction:** Seafaring is a specific occupation due to long-term isolation from the society and the family. The investigations in the general population indicate that social networks and social support show positive influence on mental health. The aim of the study was to investigate the prevalence of psychological distress (PD), its extreme form posttraumatic stress disorder (PTSD) and sense of coherence (SOC) among seafarers in relation to occupational and leisure time physical activity (PhA).

**Methods:** 248 seafarers, attending the Maritime Medical Centre in Klaipeda for the mandatory health examination answered the General Health Questionnaire (GHQ-12), 169 seafarers answered the questionnaire on PTSD and 335 on SOC. The prevalence of PD, PTSD and SOC among seafarers was evaluated and the correlations with occupational PhA (light, moderate, active, heavy), and leisure time PhA (daily, 1-2 times per week, 3 times per month and less) were calculated. The mean values of the 3 scales were compared to 4 groups of occupational and 3 groups of leisure time PhA. The differences in means were tested by significance level ( $p < .05$ ). The statistical software SPSS 13.0 for Windows was used in the statistical analysis.

**Results:** The prevalence of PD among seafarers was 9.3%, PTSD 5.3%, weak SOC 24.2%. Spearman's correlation between SOC and PD was 0.211 ( $p < .01$ ), between SOC and PTSD 0.211 ( $p < .01$ ). PTSD was negatively correlated with occupational physical activity (Spearman's correlation -0,249 ( $p < .01$ ), showing higher PTSD levels in low occupational physical activity groups. SOC was correlated with occupational (Spearman's correlation 0,108 ( $p < .05$ )) and leisure time (Spearman's correlation 0,114 ( $p < .05$ )) PhA. The mean value of PTSD scale in the light occupational PhA group was 15.50, in the physically active group it was 8.433 ( $p = .034$ ), while in the daily leisure time PhA group it was 3.077, in the low leisure time PhA group it was 11.077. SOC was weaker in the heavy occupational PhA group and showed no difference between leisure time PhA groups. The mean values of the GHQ-12 scale showed no differences in the occupational and leisure time PhA groups.

**Conclusions:** Psychological distress was not more prevalent among seafarers as compared to the investigations among other occupations in Italy, UK, the Netherlands and Sweden. Posttraumatic stress disorder negatively correlated with occupational physical activity. Sense of coherence among the seafarers was weaker in the heavy occupational physical activity group, confirming the findings in the other investigations (weaker SOC in lower socioeconomic status groups). (013)

**Poster 1-7**

**PSYHCO-PHYSIOLOGICAL EXAMINATION OF SEAFARERS: VISUAL MEMORY**

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**Background:** 80 % of accidents on marine transport are the result of human errors and misjudgements. Accidental mistakes include the errors because of lack of attention, and the lapses caused by forgetfulness. Considerable quantity of retention errors are connected with disturbance of the memory function because of its limited capacity, deficient duration of memory retention and its heightened interference sensibility. An impairment of memory often reflects health troubles. The aim of the work present is to study the features of seafarers' visual memory and to prove the possibility of Benton Visual Retention Test (BVRT) application for the revealing of professional fitness for work on board the ship.

**Methods:** 72 males of an average age of 35,9 years old, found fit for the work on board the ship" according to the results of medical examination, have been under study. Memorial functions, attention, personal characteristics and features of the examinees' emotional condition have been investigated by 48 attributes of following tests & methods: BVRT; "working memory"; response on moving object"; compound varied sensomotor reaction"; red-and-black Shulte-Platonov tables; Minnesota Multiphasic Personality Inventory (MMPI); Lusher's test (8-colours). Statistical methods: correlation and factorial analysis.

**Results:** The average meaning of visual memory level in seafarers is decreased comparatively with norm. The average value of final total value (FTV) of seafarers constituted 4,28 points that corresponds to a "border zone" between low norm and pathology. For this group FTV of 4-5 points (23,6% - 22,2% of examinees ) is typical. Good parameter (FTV=1) was marked only at 2,8% of examinees. We have allocated the mistakes most often met among healthy examinees including "organic" ones which are typical for cerebral and vascular pathology. The mean score of organic mistakes in seafarers' reports constitutes 2.6. The results obtained prove close correlation between seafarers' features of visual retention and personality characteristics which may affect their efficiency and reliability concerning issues of safety of navigation.

**Conclusions:** Intensive labour and harmful occupational factors have a considerable negative influence on mental and physical health of seafarers that exhibits in the worsening of their psycho-physiological status. BVRT is an effective method for quality and quantity estimation of visual memory at the performance professional medical & psycho-physiological examination of seafarers. (008)

**Poster 1-8**

**INFLUENCE OF EMOTIONAL STATE OF OPERATORS ON THE SAFETY OF TRANSPORT MEANS.**

TV Demidova

Ukrainian Research Institute for Medicine of Transport, Odessa, Ukraine

**Background.** There is a strong relation between occupational safety and human factors. However, there is a gap of knowledge to what degree the human factors influence as risk factors for safety in maritime- and other types of transport.

**The aim** of the work is to assess the importance of the operator's emotional state (divided in: psychomotor-, receptive- and cognitive characteristic) as risk factors for accidents.

**Methods.** The indexes come from a review of the world statistics of human - factor-related accidents on transport.

**Results:** Based on the review, emotional factors constitute: 90% in aviation, 84% in automobile transport, 71% in railways and 62% in maritime transport.

Increasing speed of transport is strongly correlated with higher risk of accidents related to human factors.

**Conclusions:** Professional requirements related to emotional state should be adjusted to the actual conditions. Presence of good emotional qualities related to: self-control, self-restraint, moral qualities and psychological compatibility are important emotional qualities for navigators for safe navigation. (037c)

**Poster 1-9**

**A PROJECT FOR IMPROVING TELEMEDICINE SERVICE AT SEA**

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<sup>3</sup>Dualog AS, Tromsø, Norway

**Background:** Providing medical advice from land via telecommunication systems is the best way of ensuring medical assistance in case of accidents or diseases on board ships. For more than 80 years, several radio medical services has been operational, starting by using radio signals and Morse code, evolving through telephones and telex to full blown telemedicine solutions. Technological limitations are obvious, but we also have significant medical challenges. At the present, telemedicine is the only means by which expert advice on sea can be get, and there is significant experience in its advantages as well as its limitations. Telemedicine solutions for ships must be able to use satellite communication, with the limits to message size and real time applications that this introduces. Flexible solutions are developed that are able to use several communication carriers depending on what is available at any time. One issue the doctor has to face is that he or she has virtually no knowledge of the patient, save from the description that is received from the ship. Giving medical advice on this background can be difficult. Introducing a maritime medical card will be a great help in this situation.

**The card:** An electronic file will be prepared by medical teams of shipping companies subscribing for the service. This file will include information collected at periodic fitting medical examinations such as Patient's data; Anamnesis (previous pathologies; chronic diseases; allergies; vaccinations/prophylaxis; drugs administered); Clinical examination data. The content of the medical card should be identical for all sailors, and be supported by all the Telemedical Maritime Assistance Services (TMAS) in place in accordance with ILO 164 and IMO 960. These data will be put in a properly protected electronic file available on-line as well as in a smart card given to the sailor. In case of diseases or accidents on board, doctors of the TMAS will consult the patient's file and their prescriptions will be based on the awareness of anamnestic data of each patient. Via internet access medical files can be updated after advice from the telemedical centre and/or after ashore medical consultations and check ups. Periodically new medical data will be transferred to the patient's smart card. This for having an additional system for being used in case of medical check up.

**Conclusions:** Technology available on the communication side and telemedicine applications used today allow a relevant progress in assisting remote patients. The on-line availability of clinical information of patients on board ships may represent a first step for a personalized, efficient and high level medical assistance of sailors. (063b)

**Poster 1-10**

**SKIN DISEASES TREATED BY CENTRO INTERNAZIONALE RADIO MEDICO (C.I.R.M.): IMPROVED DIAGNOSIS BY LESION OBSERVATION**

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**Introduction:** Seamen are affected by several skin diseases which may differ in type and frequency from those occurring in the population ashore. Diagnosis of skin diseases may be difficult based on the simple description of their morphology between a general practitioner and a specialist. This difficulty remarkably increases if lesion description comes from a non expert such as the ship's officer with medical duties on board. Teledermatology by the way of store and forward pictures represents an useful system for providing assistance to remote patients. In this paper we report the experience of Centro Internazionale Radio Medico (C.I.R.M.) in diagnosis and treatment of skin diseases and the positive impact on it of observing lesions by analyzing pictures of affected areas.

**Methods:** This study has examined files of C.I.R.M. medical assistance from 1 January 2004 to 31 December 2006. Medical files of skin diseases were selected and analyzed. The presence or not of pictures, diagnosis at the first request of medical advice, after specialist consultation and in the port of arrival (final diagnosis) were considered.

**Results:** In the three years taken into account, the Centre has assisted 4,684 patients. Dermatological cases were 57 in 2004, 90 in 2005 and 92 in 2006. Different types of dermatitis and fungal infections were dermatological diseases assisted most often. Pictures were provided from 28% of cases in 2004 to 55% of cases in 2006. Pictures consisted always in static images generated and transmitted according to a store and forward approach. In spite of it, pictures were very useful for making correct diagnosis and/or for directing versus specialist advice.

**Conclusions:** Optimal teledermatology practice should include interactive video allowing the examining physician to interact with both the patient and the presenter at the far end. This would allow the physician to establish a better rapport with the patient, ask further historical questions, and request certain images of the patient from the presenter. In spite of the limits of sending static images of skin, the possibility of documenting these lesions with pictures represents an important progress if compared with their vague description from ship officers. Hence, in the presence of skin problems, sending images of lesions should represent an important step in making correct diagnosis of skin diseases affecting seafarers. (060)

**Poster 1-11**

**HIV/AIDS IN SEAFARING POPULATION OF MONTENEGRO  
AND PREVENTION SUGGESTIONS**

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JZU Dom zdravlja Bar, Montenegro

**Introduction:** The HIV/AIDS problem is widely present especially with seafarers due to specific profession, life and work conditions. The aim of this study is to define the level of HIV/AIDS frequency in seafaring population of Montenegro and study sexual behaviour of seafarer and the level of STD protection.

**Methods:** We have interviewed seafarers, contacted maritime agencies and training centres for seafarers and checked data with the central register of HIV/AIDS infections.

**Results:** There are about 6000 professional seafarers in Montenegro.

Most of them work for foreign companies. The first registered cases of HIV infection (in 1989) were with seafarers. 15% of the overall of infected persons in Montenegro (68) are seafarers. If their partners are taken into consideration it amounts to 25%. In our biggest port town Bar, out of the 10 registered HIV infections more than half are seafarers. Only 16% always use condoms, 55% sometimes, while 29% never use condoms.

**Conclusion:** Seafarers are most represented group among HIV infected persons in Montenegro. The extreme susceptibility of seafarers to HIV and other ST infections is triggered by their way of life and specific profession: long absence from family, social isolation, tendency to alcohol and other psychoactive substances use, good financial situation, lack of information on ST infections.

The results of this study point out the necessity of introducing preventive programs and thus improve awareness of HIV/AIDS and slow down spreading of this fatal infection. (016)

**Poster 1-12**

**MEDICS' RISK OF EXPOSURE TO INFECTION WITH HEPATITIS B.**

S Nilaus

Centre of Maritime Health Service, Fanø, Denmark

**Introduction:** Hepatitis B (virus infection of the liver) is common all over the world, but occurrence is especially high in tropical regions. It is estimated, that 2 billion people around the globe, is infected with the hepatitis B virus, and 350 million of these have developed a chronic hepatitis B infection. The medics (=sygdomsbehandlere) on board Danish merchant ships may often have members among the crew originating from these regions with high occurrence of hepatitis B. At the Centre of Maritime Health Service we conducted a survey in 2005 to uncover the medics' risk of being infected.

**Method:** The survey was done as a questionnaire. 103 medics (attending a training course), were asked a few questions by the secretary, who simultaneously entered data. The major part of the interview/entering of data was done by the same person.

The questionnaire was prepared in conjunction with the Research Unit of Maritime Medicine, University of Southern Denmark.

**Results:** The survey revealed an increased risk of exposures to infection for the medic. Over a ten year period, 19 persons have experienced contact with blood and 23 persons have experienced contact with other body fluids.

**Conclusions:** Hence forward it is recommended that medics in the Danish merchant navy are vaccinated against hepatitis B. (050)

**Poster 1-14**

**A REVIEW OF THE USE OF MEDICO CORK BY FISHING VESSELS AND TRAWLERS**

N McCarthy, S Cusack

Medico Cork, Cork University Emergency Department, Cork, Ireland

**Introduction:** Medico Cork, Ireland's national radio medical consultation centre, commenced operations in mid 2001, and we wanted to evaluate its activity during the first 5 years, with focus on the Irish fishing fleet. **Methods:** Retrospective data audit (July 2001 to July 2006).

**Results:** Medico Cork recorded 115 calls from vessels during the period. Fishing vessels and trawlers accounted for approximately 43% (n=50) of the calls, and they were twice as frequent between 10:00 to 12:00 (NB: 2 hours) and 23:00 to 24:00 (NB: 1 hour!) than the rest of the day. The number of calls from the Atlantic was higher than from the Irish Sea (82% vs 14%, unknown=6%), reflecting the Irish fishing fleet distribution. Peak activity was seen in March and July and the lowest number of calls in April and October. Injuries were twice as frequent as other medical events (69% vs 31%). Looking specifically at the injuries, upper limb injuries, in particular the hand (34%), were the most common injuries sustained, followed by lower limb (21%) and head injuries (18%). Abdominal pain was the most common medical condition accounting for 33% of medical-related calls. Use of medicine was recommended in 62% of cases (n=31) with analgesics being advised for use in 95% of these cases. When evacuation from fishing vessels was advised, helicopters were used in 44% (n= 21), while speeding to port was suitable in 46% (n= 22). In 2% (n=1) a lifeboat was used, in 8% (n=4) method is not recorded.

**Conclusions:** Fishing vessels accounted for more than 40% of calls to Medico Cork. Injuries, in particular limb and head injuries, were most commonly reported. Medico Cork gave advice about appropriate care and, when necessary, method of evacuation, and has thus taken its place in the well-established Maritime Search and Rescue response systems. The use of our findings to implement improved training and work practices by BIM (the Irish Sea Fisheries Board), and the Irish Health and Safety agencies may lead to changes in the injury pattern reported; this should be re-analysed in a few years. (014)

**Poster 1-15**

**WHAT IS THE SAFE DISTANCE FROM FUMIGATED CONTAINERS IN PORTS?**

W Veldman<sup>1</sup>, X Baur<sup>2</sup>

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<sup>2</sup>Ordinariat und Zentralinstitut für Arbeitsmedizin/Hamburg Port Health Center (Institute for Occupational Medicine (ZfA), University of Hamburg), Germany

**Introduction:** In most ports, the fumigation of export containers is performed to meet the regulations on pest control. So far, little information is available about the safe distance to be kept from containers fumigated by highly toxic agents. We wanted to determine the safe distance during aeration of such containers.

**Methods:** Six containers were fumigated, three by bromomethane and three by sulfuryl difluoride. Air samples collected during two hours at well defined aeration distances were subjected to gaschromatography/massspectrometry.

**Results:** Fumigant quantities in air samples were as follows: bromomethane at a distance of 5 – 10 m: 10 mg, at a distance of 25 – 30 m: 1 mg; and sulfuryl difluoride at a distance of 5 m: 10 mg; at a distance of 15 m: 4 mg; at a distance of 25 m: 2 mg.

**Conclusions:** Toxic concentrations of bromomethane and sulfuryl difluoride were found at a distance of 20 m from ventilated containers. It can be assumed that the initial concentrations were extremely high. Our results suggest to enlarge the legally binding safe distance during degassing for these two fumigants to 40 m.  
(029)

**Poster Session 2: Foyer 10.30 - 12.30**

**Poster 2-1**

**FOOD POISONING AT OFFSHORE FIELD: A CASE STUDY**

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**Background:** Food poisoning is characterized by gastrointestinal symptoms such as nausea, vomiting, diarrhoea, etc. This report describes food poisoning in 71 seamen on a Bohai rig half an hour after lunch in 2005. The aim of this study is to assess the efficacy of general hospital on dealing with an accident of such magnitude at an offshore field.

**Methods:** The patients have been divided into three groups according to the severeness of their symptoms: severe, moderate, and mild group. Different medical treatment and management were applied to these three groups. Varied intensive treatments were given immediately by the rig first-aid personnel on site, and the severe group was further transferred and managed in Bohai Petroleum Worker's Hospital. The patients recovered from 2 to 48 h after the meal. As a logistics hospital, Bohai Petroleum Worker's Hospital provided their support to complete the rescue procedures by instructing rig first-aid personnel, transferring and treating patients, collecting any suspicious samples on site.

**Results:** All 71 patients recovered fully following the treatments mentioned above. The mortality rate was zero and no sequelae were found within the two days follow-up period. Finally, it is confirmed that the acute poisoning was from bean verdazulene.

**Conclusion:** The rescue process on 71 cases of food poisoning at an offshore field was reported rapidly, managed and analysed in a timely manner. The medical team including the logistics hospital together with offshore rescuing personnel dealt with this abrupt and disastrous accident successfully. (004b)

**Poster 2-2**

**“FØRSTEHJELP TIL SJØS – FIRST AID AT SEA – ERSTE HILFE ZUR SEE”**

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Norwegian Centre for Maritime Medicine has produced a DVD with video of 25 medical procedures that can – and should – be performed on board. The videos are accompanied by commentary in Norwegian, English and German.

We suggest that the DVD should be available on board all vessels in the commercial fleet, and on larger fishing vessels. The DVD is useful for self training, and for training in groups.

The presentations are:

- HLR
- Free airways
- Stable side position
- Examination of the abdomen
- Examination on stiffness of the neck
- Listen to the heart and lungs with a stethoscope
- Measuring the blood pressure with a stethoscope
- Measuring the blood pressure by feeling the pulse
- Putting on sterile gloves
- Local anaesthetising
- Closing a wound with staples
- Closing a wound with needle and suture
- Establishing venous access
- Infusion of fluid
- Removing a foreign body from the eye
- Emptying the urinary bladder by means of a catheter
- Tamponade in nose bleeding
- Treatment of burns
- Preparing patient and stretcher for transport
- Helicopter evacuation
- Splinting a forearm fracture
- Splinting a finger fracture
- Using a pneumatic splint
- Taping a fracture in the middle hand
- Taping an ankle

(095)

**Poster 2-3**

**ANALYSIS ON SHIP'S ACCIDENTS CAUSED BY DOZING WATCH - KEEPERS IN JAPAN**

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<sup>3</sup>Faculty of Marine Science, Tokyo University of Marine Science and Technology  
Japan

**Background:** Every year, numerous marine accidents caused by human errors occur at sea near Japan, resulting in casualties. These accidents have significant social, economic and environmental impacts. The purpose of this study was to investigate a feature extraction for occurrences of dozing among watch-keepers that actually resulted in marine accidents.

**Methods:** Marine accidents (n=870) that had been described to the judgment record of Marine Accidents Inquiry Agency between 1994 and 2003 were analysed. A Quantification Method and Cluster Analysis were used to analyse the data, which included a 30-item categorization procedure. Analysis also included categorization of accidents according to the type of vessel and vessel use (i.e., fishing vessels; cargo ships and tankers).

**Results:** The proportion of dozing in all ship accidents ranged from about 3 to 7%, and a marginal rise in this percentage has occurred since 1991. The following conditions were frequent in shipwrecks associated with dozing: "The weather was fine or cloudy", "watch by one person", and "autopilot was being used". The analysis of fishing vessels revealed there was a significant influence of "the passage of time from the departure port is 12 hours or more" (54.4%). The analysis of cargo ships and tankers demonstrated a significant influence of "generated in the inland sea" (71.3%). Of the 30 items used in the categorization procedure, "Low caution" appeared most prevalent (80.1%). When categories were combined (e.g., "work for a long time" and "lack of sleep"), there was remarkable similarity in the analysis of all types of vessels. The influence of "artificial and environmental factors" characterized the analysis of cargo ships and tankers, whereas the influences of "work tiredness", "lack of sleep", "after supper" and "smell of liquor" characterized the analysis of fishing vessels.

**Conclusions:** These results suggest that a multifactorial consideration of ship type is necessary for developing counter measures to address this problem. (044)

## Poster 2-4

### RESEARCHING THE CHANGES OF SOME NORMS OF CARDIOVASCULAR FUNCTIONS OF SEAFARERS BY TEST A SEA WAVE WITHSTANDING CAPACITY

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**Introduction.** Seasickness cause many changes for bodies' functions, particularly function of cardiovascular system. The people with differential ability of withstand wave will have differential changes for bodies' functions as cardio-vascular, nervous system. How can we diagnose wave withstand ability of every body in order to fit for duty at sea?

#### The aim

- Researching the change of some cardiovascular functional norms of seafarers by testing a sea wave withstanding capacity
- Analyzing the change of some characteristics of the cardiovascular system of researching groups in order to define their sea wave withstanding capacity. Based on these researching results, to apply selecting the sea wave withstanding capacity of seafarers in Vietnam.

#### Methods

- Interview 150 seafarers with maritime working time over 2 years to select 3 groups:
  - First group: 50 persons with good ability of wave withstand (never been seasick)
  - Second group: 50 persons with bad ability of wave withstand (regular seasickness)
  - Third group: 50 persons with average ability of wave withstand (light seasickness)
- Evaluating and comparing the changes of some norms of cardio-vascular functions as: pulse frequency, cardiac frequency, arterial blood pressure, PQ interval (ECG)] of 3 groups before and after tested a sea wave withstanding capacity.

**Results.** The results obtained as follow:

**In good ability group of wave withstand:** The cardiac frequency and arterial blood pressure increased clearly ( $80.94 \pm 8.74$  to  $91.19 \pm 7.68$  and  $119.36 \pm 4.43$  to  $139.45 \pm 5.73$ ). PQ interval is shorter ( $0.16 \pm 0.02$  to  $0.14 \pm 0.05$ ) which showed the upward tendency of hyper sympathetic nervous system.

**In the bad ability group of wave withstand:** The cardiac frequency, blood pressure decreased clearly ( $81.10 \pm 5.61$  to  $64.15 \pm 5.10$  and  $123.73 \pm 5.40$  to  $10.60 \pm 4.45$ ), PQ interval prolongs ( $0.14 \pm 0.05$  to  $0.18 \pm 0.06$ ) which showed the upward tendency of hyper parasympathetic nervous system.

**In the not very well ability group of wave withstand:** The cardiac frequency, artery blood pressure, PQ interval changed not significantly.

**Conclusion.** Having clear changes of cardiovascular functional norms of seafarers by test a sea wave withstanding capacity, which have showed that these norms could be applied excellently to select the sea wave withstanding capacity of Vietnamese seafarers. (087)

**Poster 2-5**

**PERSISTENT NEUROLOGICAL AND RESPIRATORY SYMPTOMS CAUSED BY A SINGLE ACCIDENTAL EXPOSURE TO PHOSPHINE. A CASE REPORT ON THE HEALTH RISKS POSED TO MARITIME WORKERS**

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**Introduction:** The HPHC contributes in the upholding of the regulations for gaseous pesticides in the port area. Remnants of pesticides pose a hazard to maritime workers. To estimate the health risks, a standardized protocol had been developed by the ZfA.

**Methods:** In November 2006 crew members and port workers were accidentally exposed to toxic smoke of phosphine due to an explosion of the substance used as a pesticide in a vessel which carried a load of rape. Crew members were seen by the doctors of our institution 2 h and 24 h after exposure following the protocol which includes a comprehensive questionnaire, physical examination and lung function tests. 2 port workers who were admitted to a hospital were interviewed at 24 h by phone. One person was seen in the outpatient clinic 20 days after exposure.

**Results:** One port workers (37 y, previously healthy) was heavily exposed to the smoke over 30 min without using respiratory protection devices. At 24 h he reported severe headache, coughing and burning sensation of the airways, eye irritation, skin affection, general irritability, and a change to the taste. During follow up at day 20 he showed persistent signs and symptoms of the central (headache, irritability, alteration of taste) and peripheral nervous system (hyp- and dysasthesia and tremor of the left arm) and the airways (burning sensation, cough). Lung function tests indicated an irritant asthma with bronchial hyperresponsiveness and reduced diffusion capacity. A follow up will be done at day 60.

19 out of 26 persons from the crew were exposed to the toxic gases while fighting the fire. Out of the 8 persons who did not wear protective masks, 2 persons experienced a cough and burning sensation of their airways right after exposure. At 24 h all crew members were free of symptoms with normal physical exam, as was the second port worker who was only slightly exposed. Lung function tests were within normal range in 20 out of 23 crew members (1 showed signs of COPD due to smoking, 2 persons did not cooperate according to the needed standard).

**Conclusion** Exposure to gaseous pesticides may cause persistent health problems. Applying a standardized protocol to exposed persons is a useful tool to assess the short and long-term health risk in maritime workers. (056)

**Poster 2-6**

**INFLUENCE OF CONDITIONS ON VESSELS TO WOMEN'S MENSTRUAL CYCLE**

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**INTRODUCTION:** There is no doubt about the role of women in any culture. A healthy woman is a guarantee for healthy offspring, harmonious relation with her husband and warm family atmosphere. For most women bearing a child is a source of unfathomable happiness, she is biologically meant to become a mother. In the modern society women become part of everyday struggle for existence, and thus are being exposed to a variety of stress factors at work. Our aim was to find causes of menstrual cycle dysfunctions with women seafarers.

**METHODS:** We have analysed the data about women employed on merchant vessels gathered by Seafarers' Clinic at JZU Dom zdravlja Bar, hospital on MSC "Opera" and Gynaecological Clinic of General Hospital in Bar. Women who made appointments complained of irregular menstrual cycle. We have made interviews, gynaecological examinations and hormonal tests on a sample group of 36 women in the course of 2 years.

**RESULTS:** Out of 36 examined women amenorrhea was found in 22 cases. We have discovered amenorrhea covers the age group between 18 and 45, more frequently at age below 25, persons with more work experience, no steady partners, especially with groups engaged in duties requiring greater physical activities (dancers, entertainers, and hostesses), with under weighed as well as overweighted.

**CONCLUSIONS:** The amenorrhea cases analysed are caused by joint risk factors at work- a vessel (working overtime, excessive physical activities, stressful situations, wrong diet, irregular rest, disturbed sleep and psycho traumas). Amenorrhea is triggered by hormonal disbalance, via hypothalamus leading to anovulation, galactorrhea and osteoporosis. These very serious disturbances must be treated accordingly. Inadequate therapy leads to complete loss of women's reproductive function.

Montenegro is a small country and there are not too many women seafarers so we are not in position to get bigger sample groups. Our aim was to turn attention to this problem. (045c)

**Poster 2-7**

**URINARY SYNDROME AND DIAGNOSIS OF RENAL PATHOLOGY IN SEAFARERS**

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**Background.** Renal pathology in seafarers is an urgent problem of maritime medicine as a frequent change of water drinking regimes and complex influence of harmful occupational and climatic factors provoke the development of the named organ pathology. At professional medical examinations and at the treatment in the out-patient units the definition of urinary syndrome (proteinuria, leukocyturia and erythrocyturia) presence is an obligatory step. Preciseness of diagnosis at quantitative tests allowing to characterize ratio of leukocytes and erythrocytes usually was expressed with J. Hamburger method.

**The aim** of the investigation presented is to improve the quantitative technique of determination of urinary syndrome.

**The results obtained.** The examination was carried out with an empty stomach. After administration of 0,5% NaCl solution in the volume of 0,5% of an examinee body and the further collection of urine during one hour. In the urine collected they determine the amount of leukocytes, erythrocytes, concentration of protein and creatinine, then calculated relative proteinuria, leukocyturia-- and erythrocyturia in reference to excretion of creatinine. At the increase of indexes calculated for 25-30% as compared to norm they diagnosed pathology of kidneys. Additional investigations allowed to determine that erythrocyturia is typical for renal glomeruli damage and leukocyturia is typical for pyelonephritis. The test described has been run up at 63 healthy seafarers of different national origin who had been under professional medical examination at the Centre for Maritime Medicine of Ukrainian Research Institute for Medicine of Transport in 2005-2006. Control group consisted of 71 volunteers, comparable by age and sex. The use of the test under discussion resulted in revealing of 18 persons with hidden urinary syndrome that served as the basis for further deeper diagnosis of renal pathology. It has been determined in 6 persons.

**Conclusion.** Thus the modiflicated diagnostic test offered has confirmed its efficacy. (038c)

**Poster 2-8**

**MEASUREMENT OF FUMIGANTS AND OTHER TOXIC GASES IN 2100 IMPORT CONTAINERS**

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**Introduction:** We have previously reported on intoxications of dock workers due to exposure to fumigants in import containers. The aim of our present study was to perform air measurements in a large number of import containers for a detailed risk assessment.

**Methods:** Air samples were taken from c. 2100 containers by means of Tedlar bags using a vacuum pump and adsorption tubes. Analyses were done by Thermal Desorption Gas Chromatograph Mass Spectroscopy (TD-GC-MS) and/or Selected Ion Flow Tube Mass Spectrometry (SIFT-MS).

**Results:** National threshold limit values (TLVs) for vapours in air were exceeded mainly by hydrogen phosphide (phosphine; n = 64). This was also true for bromomethane in a few cases (n = 5). Furthermore, two fumigants not allowed to be used in Germany (1,2 di-chloroethane (n = 12), chloropicrin (n = 25)) could also be detected. Surprisingly, TLVs of formaldehyde (n = 120) or benzene (n = 70) were frequently exceeded.

**Conclusion/Discussion:** A total of 225 (11%) of the investigated import containers was found to have airborne concentrations of fumigants and/or other toxic gases above the respective TLVs and 76 (3%) exceeded the threshold control levels of fumigants prescribed after aeration in Germany. These figures indicate a significant health risk for dock workers and other employees unloading imported freight containers. It should be mentioned that none of these import containers displayed the warning sign required according to the IMO Recommendation on the safe use of pesticides in ships. It can also be assumed that due to adsorption of fumigants and other toxic gases on some imported goods may represent a health risk for consumers. (017)

**Poster 2-9**

**SEAMEN'S HEALTH RISK AFFECTED BY SHIPBOARD COCKROACHES**

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**Introduction:** At present, little is known about the cockroach infestation on ships where ideal living conditions for these night-active insects exist. In August 2005, we investigated in Hamburg port cockroach infestation of 59 ships regularly transporting freight to and from tropical/subtropical regions. This examination revealed cockroach infestation of six ships (10.2%). The aim of this study was to assess the prevalence of sensitization to cockroaches in seafarers and the potential of associated health risks.

**Methods:** In July 2005, a total of 145 seamen sailing under the German flag who had participated in a medical surveillance programme were recruited to a cross-sectional study (response 95.4%). A standardized interview and a skin prick test (SPT) with nine common inhalant allergens and a cockroach extract (*Blatella germanica*) were performed. We measured total and cockroach-specific IgE and conducted lung function tests in cockroach-sensitized seafarers.

**Results:** A total of 39 seamen (26.9%) were cockroach-sensitized according to SPT results. The cockroach sensitization in seamen from the tropical zone (37.3%) was significantly higher than in those from the temperate zone (21.3%) (odds ratio 2.20, 95% confidence interval 1.04-4.66). The prevalence of sensitization to any of the other nine tested common allergen mixtures was lower (between 2.1% and 12.4%). Neither current nor past cockroach exposure on board nor the cumulative one and time since latest contact were associated with cockroach sensitization. Cockroach-specific IgE was detected in 52.8% of SPT-positive seamen. Five out of 37 (13.5%) SPT-positive seamen exhibited an obstructive ventilation pattern. The prevalence of work-related atopic symptoms was 9.0% (n=13). These symptoms were not related to cockroach sensitization.

**Conclusions:** The study revealed a high prevalence of sensitization to cockroaches among seamen. As a consequence, further studies and bronchial challenge tests with cockroach allergens are needed to assess in more detail the health risks due to occupational exposure to shipboard cockroaches. (025b)

**Poster 2-10**

**CHEMICAL CONTAMINATION OF DRINKING WATER IN SHIPS**

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**Introduction:** According to the German decree on drinking water, annual investigations of drinking water on ships with regard to bacteriological contamination are performed. In the past two years, several crews of newly built ships complained of unpleasant aromatic drinking water smells.

**Methods:** The available findings of chemical drinking water analyses performed in recent years were summarized and evaluated. Each analysis was induced by aromatic smells. The spectrum of analyses comprised maximally 27 different volatile halogenated hydrocarbons and solvents (among others benzene, ethyl benzene, xylene and vinyl chloride). To evaluate the analyses the corresponding WHO threshold limit value (TLV) were referred to. Multiple measurements were conducted on twelve ships in order to assess exposure progression.

**Results:** Drinking water analyses of a total of 21 container ship tanks with a maximal age of one year are available. The WHO-TLV of chemical substances in drinking water was exceeded on four ships (19.0 %) (Ship 1: xylene 770 µg/l (TLV 500 µg/l), ethyl benzene 590 µg/l (TLV 300 µg/l); ship 2: xylene 510 µg/l, ethyl benzene 400 µg/l; ship 3: xylene 860 µg/l; ship 4: xylene 540 µg/l). After exchanging the complete drinking water, aromatic smells were no longer detected as a consequence of the distinct reduction of the chemical concentrations in control analyses.

**Conclusions:** In the past two years, chemical contaminations in tanks of newly built ships have repeatedly been found. These contaminations are assumed to originate from washed off solvent-including tank coatings taken up by drinking water due to the non-maintenance of required drying periods. Health risks to crews on account of increased solvent concentrations are possible. Therefore, prospective studies with chemical analyses of drinking water from newly built ships including the registration of substantial production data (e.g. chemical composition and drying periods of tank coatings), health state and condition of crews should be initiated. (024)

## Poster 2-11

### WHAT WOULD WE DO IF THE BOHAI 2 SANK TODAY?

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**Background:** The China Petroleum Department's offshore drilling rig "Bohai 2", operated by the Ocean Oil Company, sank when it was transported to another place in Bohai bay on Nov 25, 1979. The disaster resulted in 72 out of 74 crew members' death and financial expenses ran as high as ¥37 millions. The main causes that led to the sinking of the rig weren't related to the medical care. The aim of the report is to study this accident in the context of modern emergency rescue so that potential damages can be minimized in the case of a similar event.

**Methods:** It was reported that the cause of the sinking of 'Bohai 2' was a submersible pump which had fallen on the hold. It had not been removed before the hauling of the rig, and this caused a one-meter gap between the hold and the platform. Because of the gap the water was not properly draining off the rig. This caused 'Bohai 2' to settle deeper in the water creating less stability. The 'Bohai 2' was running counter to the offshore drilling rig operation instructions and the Bohai 2 standard regulations which both require all water should be drained off the rig before any hauling action is allowed to commence. Although there was some offshore rescue equipment on board, there was insufficient training for the crew on how to access and use the equipment. There was no practical rehearsals regarding lifesaving procedures and first aid. When the accident occurred, there was no system for distributing the lifeboats and rafts. The tugboat '282' was not able to provide even basic emergency rescue methods, and many opportunities to save lives were lost. In the terms of modern rescue operations, an overall retrospective study showed the essential concerns were training of offshore staff, transportation of rig doctors and related medicine to the site, identification of personnel duties, detailed diagrams of first-aid equipment location, and response and support from logistic hospitals.

**Results:** From the viewpoint of emergency rescue, it is possible that such a tremendous loss of personal life and resources could be lessened if a series of preventive actions had been adopted.

**Conclusion:** Armed with improved offshore safety instruction and rules, reasonable arrangements of personnel and rescue material, and rapid response and support from logistic hospital, massive damage could be reduced. The financial investment of such an endeavor would be a worthwhile consideration. (003c)

**Poster 2-12**

**CHANGES OF IMMUNE FUNCTION IN RATS AFTER 60-METER AIR SIMULATED DIVES**

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**Background:** Hyperbaric conditions were found to have immunological effects, but the precise action and underlying etiology are still ambiguous. We studied the effects of deep air dives on the immune response in rats and the underlying mechanisms were discussed.

**Methods:** Adult Sprague-Dawley rats were exposed to 700 kPa air for 60 min, twice daily for 3 days. The subsets of lymphocytes in peripheral blood and spleen, interleukin-2 (IL-2) in plasma, the responses of splenic lymphocytes to concanavalin A (ConA) and the state of oxidative stress were determined 1, 3 and 5 days after exposures. Serum concentrations of adrenocorticotrophic hormone (ACTH) and corticosterone were also measured before and during 3 days exposures. Rats exposed to 147 kPa oxygen or 700 kPa normoxic nitrogen (21 kPa oxygen + 679 kPa nitrogen) were taken as control groups.

**Results:** Peripheral lymphocytes and CD3<sup>+</sup> and CD4<sup>+</sup>CD3<sup>+</sup> subsets in peripheral blood and spleen, plasma IL-2 level and the responses of splenic lymphocytes to ConA all decreased, and antioxidant enzymes activities and the concentration of reduced glutathione both decreased while the level of malondialdehyde increased after hyperbaric air exposures. All changes returned to control levels in 3-5 days. Similar changes were observed after exposures to 147 kPa oxygen but not to normoxic nitrogen. Plasma levels of ACTH and corticosterone increased after 1 exposure and recovered to normal levels after 3 exposures in rats treated with either hyperbaric or normobaric air. Pretreatment of the animals with N-acetylcysteine, a potent free radical scavenger and antioxidant, attenuated the effects of hyperbaric air on the immune and antioxidant systems.

**Conclusions:** These results suggest that repetitive, 60 m, simulated air dives had immunosuppressive effects on rats, which was associated with oxidative stress induced by the high partial pressure of oxygen in breathing mixture. (094)

**Poster 2-13**

**DENTAL PRACTICE DURING A WORLD CRUISE: CHARACTERISATION OF ORAL HEALTH AT SEA**

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**Background:** Although more than 100 million passengers, mostly from industrialised nations, have taken a cruise since 1980 on a growing fleet of cruise ships with ever increasing numbers of crew, the majority of whom come from developing nations, little is known about oral health of these two distinctly different populations.

**Methods:** In a retrospective, descriptive epidemiologic study design the routine documentation of all dental treatment provided during two months at sea in 2006 was analysed after the voyage. Subjects were n = 57 passengers (3.5 % of 1619) with a mean age of 71 ( $\pm$  9.8) years and n = 56 crew (5.6 % of 999) with a mean age of 37 ( $\pm$  12.0) years. Age, gender, nationality, number of natural teeth and implants were extracted. The prosthetic status was described by recording the number of teeth replaced by fixed prosthesis and number of teeth replaced by removable prosthesis. Oral health-related quality of life (OHRQoL) was measured using the 14-item Oral Health Impact Profile (OHIP-14) and characterised by the OHIP sum score.

**Results:** Women attended for treatment more often than men. Passengers had a mean number of 20 natural teeth plus substantial fixed and removable prosthodontics. Crew had a mean of 26 teeth. British crew and Australian passengers attended the dental service above average. Crew tended to have a higher average OHIP-14 sum score than passengers indicating an increased rate of perceived problems. Emergency patients from both crew and passengers have a higher sum score than patients attending for routine treatment. Differences seen between the two groups are not exclusively attributable to the age factor but represent differing backgrounds in home countries. Socioeconomic factors serve to explain the high standard of prosthetic care in passengers. Crew in general present with less sophisticated prosthetic devices. This is in line with their different socioeconomic status and origin from developing countries. Salary of the individual crew member together with the level of dental fees aboard in comparison to treatment costs in home countries may explain some of the differences in attendance. The ease of access to quality dental care may explain the relatively low level of perceived problems as characterised by oral health-related quality of life scores.

**Conclusion:** Passengers have enjoyed high standards of prosthetic care in the past and will expect a similarly high standard from ship based facilities. The dental officer aboard has to be prepared to care for very varied diagnostic and treatment needs. (103)

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