



**EC-DG VII-E/3 - Transport R&D 4th F.P.  
Task 38 - WATERBORNE TRANSPORT**

# **HANDIAMI**

**An investigation into the problems of disabled passengers in access and  
emergency situations when using marine transport and the employment  
of disabled persons in the maritime industry**

## **Final Report for Publication**

**Authors: Malek Pourzanjani, Glynis Young, M. Aziz**

**(PROJECT NR – WA-97-SC.2109)**

**PROJECT FUNDED BY THE EUROPEAN COMMISSION UNDER THE  
TRANSPORT RTD PROGRAMME OF THE 4<sup>th</sup> FRAMEWORK PROGRAMME**



# HANDIAMI

## FINAL REPORT FOR PUBLICATION

### PARTNERSHIP

- |   |   |  |
|---|---|--|
| 1 | Southampton Institute<br>East Park Terrace<br>Southampton<br>SO14 0YN<br>England  | Contact: Prof M Pourzanjani (Maritime)<br>Email: malek.pourzanjani@solent.ac.uk<br>Tel: 01703 319740<br><br>Contact: Prof J Cooper (Law)<br>Email: jeremy.cooper@solent.ac.uk<br>Tel: 01703 319394 |
| 2 | Warsash Maritime Centre<br>Newtown Road<br>Warsash<br>Southampton, SO31 9ZL   | Contact: Dr M Barnett<br>Email: mike.barnett@solent.ac.uk<br>Tel: 00 44 (0) 1489 556221  |
| 3 | Seafarers Int Research Centre<br>University of Wales  | Contact: Torel Patel<br>Email: PatelT@cardiff.ac.uk  |
| 4 | Cork Institute of Technology<br>7 Sheares Street<br>Cork, Eire  | Contact: Dr Mark Duffy<br>Email: mduffy@cit.ie<br>Tel: +353 21 906 206   |
| 5 | VTT Manufacturing Tech<br>Marine and Mechanical Engineering<br>P O Box 17053<br>Tietotie 1 C<br>FIN-02044 VTT<br>Espoo, Finland | Contact: Juhani Sukselainen<br>Research Professor<br>Email: Juhani.Sukselainen@vtt.fi<br>Tel: +358 9 456 5320  |
| 6 | Marine Safety Agency<br>Port of Rotterdam<br>Rotterdam<br>The Netherlands   | Contact: Rene Butter<br>Email: rbutter@marinesafety.nl   |
| 7 | Nat Institute for Research on<br>Transports and Safety<br>Laboratory of Ergonomics and<br>Health Comfort                        | Contact: Dr Jean-Luc Minguy<br>and Dr Claude Marin-Lamellet<br>Email: minguy@inrets.fr<br>and marinlam@inrets.fr   |

- 25 avenue Francois Mitterran  
69675 BRON Cedex  
France
- 8 Scandlines Danmark A/S  
Dampfaergevej 10, 3. Sal  
dk-2100 Copenhagen OE  
Denmark
- 9 Aristotle Uni of Thessaloniki  
Transport Systems Research Group  
Ermou 61  
Tessaloniki 54 623  
Greece
- Tel: +3 4 72 14 2451 or 2428
- Contact: Jorgen Thomsen  
Contact: H Ditlev Jorgensen  
Email: jorgen.thomsen@scandlines.dk  
Email: ditlev.jorgensen@scandlines.dk  
Tel: +45 33 29 02 00
- Contact: Dr Aristotelis Naniopoulos  
Email: telis@hermes.civil.auth.gr  
Tel: +30 31 256033

### **Observer**

- 10 *Representative for Styrsobolaget (operator)*  
Vasttrafik GO  
Box 405  
S-401 26 Goteborg  
Sweden
- Contact: Ragnar Domstad  
Email: ragnar.domstad@vasttrafik.se  
Tel: +46 31 62 92 09

### **Consultant**

- 11 NHR  
Box 3284  
s-103 65 Stockholm  
Sweden
- Contact: Per-Olof Bengtsson  
Email: pob@nhr.se  
Tel: +46 8 677 70 10

## **EXECUTIVE SUMMARY**

### **Disability and Partnership Issues**

The active integration of the views of disabled people into the research design at the outset of the project helped to define and set aims and objectives. Indeed this helped to redefine the paradigm so that the needs of disabled people were seen as ‘standard’ rather than ‘special’. Special requirements implies burdensome separate and additional provision which somewhat contradicts the transition toward ‘inclusion’.

The project adopted the social model of disability rather than allowing itself to be sidetracked by medical taxonomies or the bio-medical, economic or charity/tragedy models.

The many pragmatic views and suggestions for change that disabled people are making imply that the aim should be to work consistently toward accessible vessels. It is noted that many ships have been in operation far longer than awareness of the needs of elderly and disabled passengers and that operators have finite resources available for improving accessibility. However, there remains a great deal that can, and should be achieved now with minimal cost or disruption. Many of these changes relate to simple and inexpensive equipment that would aid, for example, people with sensory impairments whose needs are often overshadowed by the focus on wheelchair users, to the detriment of other disabled people, as once it is judged to be too difficult to improve access for wheelchair users, it is assumed that other access needs are also impossible to meet.

It is essential that partnerships involving disabled people, disability organisations, naval architects, designers, lawyers, academics and so on should continue to pool their knowledge and experience in helping to improve access and evacuation for elderly and disabled passengers.

## **Ageing**

The percentage of elderly people is increasing. In 1995 approximately 20% of the European population was aged 60 or above and forecasts show that this will grow to 26% by the 2020. The passenger ship industry has traditionally earned a significant proportion of its income from this group.

With the increase in age comes the increase in disabilities. Approximately, two-thirds of disabled people are elderly and approximately one-third of the elderly population is disabled. Although many older people do not consider themselves disabled, they have similar limitations, so the effective proportion probably will be higher.

Therefore, it makes sound commercial sense to consider and incorporate the needs of this group into the design and operation of passenger ships by offering accessible vessels with a high level of customer care.

## **Training**

Training, in its many guises, emerged throughout the project as the most prevalent theme.

Current practices regarding crew's training relating to elderly and disabled passengers was found to be inadequate and ineffective.

In addition to specialist training regarding such areas as design, customer care, and safety and evacuation procedures, the need for disability awareness training recurred throughout the project. Findings called for it to be included in training for masters, officers, ratings and other personnel serving passenger ships, as recommended by Resolution 6 of the final attachment of the STCW 1995 Conference.

The STCW 1995 Code is clear with regard to meeting the needs of elderly and disabled passengers, however not all operators comply with this and thus the industry fails these passengers.

## **Design**

Design issues cover a wide spectrum from vessel design, lifesaving equipment and alarm systems through to general information. Although varied, the key concept of ‘design for all’ appeared to address all design issues as it encapsulates the notion of ‘inclusive’ attitudes promoted by the ethos of the social model of disability. However, as the project progressed it became clear that, notwithstanding the design for all concept, what might be an improvement for one type of impairment might not improve the environment for all impairments or all users. An example is floor surfaces which have to remain non-slip when wet hinders some wheelchair users due to friction between the floor and wheel surfaces. Although total solutions have not yet been found for these problems, until they are, effective compromises will have to be agreed.

With regard to cost the project found that designing and building accessible vessels would not have a significant cost implication but recognised that this may not apply to retrofits.

The International Maritime Organization (IMO) MSC/Circ 735 “Recommendation of the Design and Operation of Passenger Ships to Respond to Elderly and Disabled Persons’ Needs” was found to be effective. The project concluded that these should be enhanced and obligatory on vessels in the EU and that new build vessels should comply. In line with the project’s findings above, relating to costs, exceptions could be made to certain parts of retrofit cases where unreasonable costs are involved.

Information, signage and alarm systems should be designed and available in a number of formats which would cater for people with sensory as well as mobility impairments, for example, in accessible visual, oral and tactile mediums.

## **Evacuation**

The maritime industry has not yet specifically or sufficiently, addressed the safe evacuation of elderly and disabled passengers. The combination and co-ordination of design, deployments and training is required to successfully address evacuation.

Design should include means of evacuation at the concept design stage, deployments should include representative sample populations including elderly and disabled passengers and, dedicated staff should be trained to specifically meet the needs of these passengers including procedures for safe evacuation.

## **Employment**

Land-based disability issues have been prominent in recent years and equality of opportunity has become legally incorporated into employment policies. However, disability issues, in the context of sea employment, have largely been ignored or neglected.

Over 6000 European seafarers a year could find themselves sufficiently physically or mentally impaired and unable to continue working at sea in their existing capacity or, indeed, at all. There are few existing shipboard opportunities for disabled seafarers due to safety, economic and legal considerations. The demand placed upon even the most able-bodied seafarer means they must contend with the violent motion of a vessel, movement in restricted spaces, evacuation of passengers and the execution of physically demanding tasks.

There is greater implied risk in recruiting a disabled seafarer, and as such the chances of re-employment of a disabled seafarer to a shipboard position is greatly diminished. However, there is a shortfall in the supply of seafarers and if it continues, disabled seafarers may have some opportunities if able-bodied seafarers are not available.

It is suggested that a comprehensive reassessment of the levels of fitness and mobility required, are still consistent with a functional ability to do a job on board ship that does not compromise the safety of the seafarer, their colleagues or the ship.

Opportunities exist in shore-based occupations and there are frequently vacancies in, among other jobs: commercial and general management positions, purchasing, legal work, cargo surveying and ship design.



# TABLE OF CONTENTS

<b>OBJECTIVES</b>	<b>1</b>
<b>1 METHODOLOGY</b>	<b>2</b>
<b>2 SCIENTIFIC AND TECHNICAL DESCRIPTION OF THE PROJECT</b>	<b>4</b>
2.1 <i>Disability and Partnership Issues</i>	4
2.2 <i>Ageing Population</i>	6
2.3 <i>Training</i>	8
2.4 <i>Design</i>	11
2.5 <i>Evacuation</i>	17
2.6 <i>Employment</i>	21
2.6.1 Re-employment of Disabled Seafarers	21
2.6.2 Shore-based opportunities for re-employment of disabled seafarers:	23
2.6.3 Additional skills and training needed for shipboard and shore-based jobs	23
2.6.4 Shipboard	23
2.6.5 Related Maritime Shore-Based	24
2.6.6 Other Shore-based Employment	24
2.6.7 Availability of retraining and rehabilitation	25
2.7 <i>Legislation or rehabilitation and its implications</i>	25
<b>3 CONCLUSIONS AND RECOMMENDATIONS</b>	<b>30</b>

<b>4</b>	<b>Annex One: Executive Summaries from all work packages</b>	<b>32</b>
	Executive Summary for WP3	36
	Executive Summary for Work Pack 7	43
	Executive Summary for Work Pack 8	46
	Sub-task 10.1	<b>Error! Bookmark not defined.</b>
	Sub-task 10.2	<b>Error! Bookmark not defined.</b>
<b>5</b>	<b>Annex Two: List of publications, conferences, presentations from the project</b>	
	<b>52</b>	

## **OBJECTIVES**

- 1 To assess the state of the art in maritime and other transport sectors. This will be realised by carrying out an in depth survey of all transport modes and identify the strengths and shortcomings.
- 2 To develop a taxonomy of the nature of disability. This will be done using the existing knowledge and assessment of the industrial need. The classification will include but not limited to:
  - Visual impairments
  - Mobility impairments
  - Hearing impairments
  - Language impairments
  - Impairment due to ageing
- 3 To examine the reintegration of disabled people into the maritime workforce
- 4 To examine specific requirements of disabled people in emergencies in order to have an impact on ship design, operation and training

# 1 METHODOLOGY

The very nature of the Handiami project intrinsically lent itself to a ‘research study’ as defined by the Commission. An important aspect of the methodology was to ensure that samples from which the ideas and examples were gathered was comprehensive and included viewpoints of the disabled community, both individuals and organisations with an interest in disability issues. In addition views were sought of experts in design, emergency response and shipping operators.

The research team conducted original research involving, visits to and voyages on high-speed and ro-ro ferries, participation in abandon ship deployments using evacuation chutes, attendance at conferences on cruise liners and ageing, surveys using questionnaires, interviews, focus groups comprising disabled people and industry experts and, workshops. Following are the generic methods used, which were subsequently subdivided and tailored to the demands of each workpackage:

- 1 To review the current situation including current practices and technologies available in all transport modes and, plans and policies for implementation in the near future. Analysis and identify their strengths and weaknesses.
- 2 To develop conceptual models (eg organisational, systemic, design methods, cabin layout and location) including case studies
- 3 To propose mechanisms for cost-effective measures to facilitate and enhance job redeployment in the marine and maritime sector. This included issues such as minimum user requirements for work stations for applications such as VTS
- 4 To apply project results relating to impaired passengers in emergency situations on current ferry designs and propose feasible modifications which can be utilised on existing ferries and proposed new buildings

- 5 To develop cost-effectiveness and policy impact assessment of the proposed measures

## **2 SCIENTIFIC AND TECHNICAL DESCRIPTION OF THE PROJECT**

The project was divided into workpackages which covered specific sections of the research. Common overriding themes emerged from the workpackages which provided a logical structure for this section of the report. The themes which emerged are: Disability and partnership issues, Ageing, Training, Design, Evacuation and Employment.

### **2.1 Disability and Partnership Issues**

To our knowledge, this study of the maritime industry is the first to actively seek the views of disabled people and to integrate those views into the research design. In terms of the research paradigm an immediate outcome of Workpackage 2, authored by Richard Light and Claire Pekcan, was to redefine the paradigm so that the needs of disabled people were seen as 'standard' rather than 'special'. To describe the requirements of disabled passengers as 'special' implied separate and additional provision and stood in stark contrast to the contemporary transition toward 'inclusion'. With particular regard to design, inclusive attitudes are exemplified by the 'design for all' ethos, which is gaining increasing prominence and acceptance throughout much of Europe.

Furthering this approach brought the project to the conclusion that to contrive a medical taxonomy would be unproductive in solving the issues of accessibility and evacuation. In consequence the social model of disability was adopted which rejected the application of the bio-medical, economic and charity/tragedy models. Instead the following descriptors were identified as being of practical help in addressing the needs of elderly and disabled passengers: learning difficulties, mental health, hearing impairments, visual impairments and mobility impairments.

Results from this richly informed resource will, undoubtedly, surprise many people with an interest and involvement in the maritime industry, not least because of the relatively cheap and eminently pragmatic suggestions for change that disabled people are seeking. It is

recognised that it would be unreasonable to criticise the maritime industry for any failure in addressing the needs of elderly and disabled passengers. Many ships have been in operation for a period that far exceeds the increased awareness of the situation of disabled people and commercial pressures ensure that operators have finite resources available for improving accessibility. So, although there is a firm resolve to increase accessibility, there is a manifest understanding that demanding perfect accessibility on old vessels would involve unrealistic expense. The changes that are sought are primarily viewed as ‘generational’, thus, the promotion of accessible design now will only come to fruition 20 to 30 years in the future, thus, substantial improvement is sought for the next generation of disabled people. However, there remains a great deal that can, and should, be achieved for disabled passengers now, with minimal cost or disruption. The challenge is to work consistently toward accessible vessels, rather than repeatedly postponing such effort by citing unproven financial burden.

If access is to be improved for elderly and disabled passengers, then pan-European and international agencies have a vital role to play in providing the maritime industry with relevant information. It is unrealistic to expect individual operators to underwrite the costs necessarily flowing from the advancement of innovative maritime safety policies for elderly and disabled passengers.

Furthermore, without knowledge of disability issues, there is a tendency to focus on wheelchair users, to the detriment of other disabled people. Conversations with those in the maritime industry suggest that the demographics of disability are misunderstood, which impedes the provision of simple and inexpensive equipment that would aid, for example, people with sensory impairments.

One issue which emerged from workpackage 3 was that “partnership” between various groups with interest in disability as suggested here, is much stronger and more visible in other modes of transport and building design scenarios.

It appears appropriate, therefore, that the EU, working in conjunction with existing regulatory authorities, could expeditiously provide a framework of technical guidance. From this a policy initiative could derive a single, enforceable standard that would work to the significant advantage of disabled people, the elderly and the maritime industry.

## **2.2 Ageing Population**

The percentage of elderly people is increasing and we are living longer than ever before. This demographic trend poses important marketing challenges to passenger ship operators if they wish to maintain their share of the travel and tourism market.

A look at population statistics shows the size of this market. In 1995 approximately 20% of the European population was aged 60 or above (around 76m) and European forecasts show that this will grow to 26% by the year 2020 (approximately 110m). It is important to the passenger ship industry to retain and indeed increase this group from which the industry has traditionally earned a significant proportion of its income.

The importance of ageing manifests itself in both the increased volume of elderly people and also in the increase in disabilities, which accompany old age. With the increase in age comes the increase in disabilities. Approximately two-thirds of disabled people are elderly and approximately one-third of the elderly population is disabled. When combining the numbers of disabled and elderly people the figure is currently 25% of the European population (approximately 100m) and by the year 2020 this will grow to approximately 31% (130m).

The challenge for the industry, therefore, is to provide maritime tourism opportunities that will meet the needs and encourage the expectations of this market. To establish what these needs and expectations are, the Handiami project team conducted focus groups comprising (elderly and) disabled people, to discuss these issues. Findings showed that participants perceived problems with maritime tourism to involve difficulties in access, including embarkation and disembarkation, freedom on board to enjoy the ship's facilities and safety.



Clearly, ship design should take these concerns into consideration in order to cater to the needs of this important market. (This report's section on 'design' examines these issues.)

A report "Maritime Tourism to the Year 2004" (G P Wild Ltd, 1999) reinforces the seriousness of this established market. It shows that in the US cruise market the largest number of passengers were aged between 40 and 59 and that this group had risen dramatically from 30% in 1990 to 45% in 1998 (CLIA Biennial Market Profile Studies). A further 28% of passengers were aged 60+ and the balance, 27%, aged 25-39.

In the UK, age analysis of the cruise market (PSA) shows that in 1992 the largest groups of cruisers, 40%, were aged 65+. Since then this figure dropped to 20% in 1997 and rose again to 32% in 1998. However, the fastest growing segment is the 45-54 group, which rose from 18% - 29% between 1992 and 1997 before dropping to 23% in 1998. From these figures it can be seen that whilst the age profile of passengers fluctuates, the 60+ age group continues to make a significant contribution to the income of the cruise ship industry.

Consequently, it would appear to make sound commercial sense to consider and incorporate the needs of this group into the design and operation of passenger ships by offering accessible vessels with a high level of customer care.

### **2.3 Training**

Training emerged throughout the Handiami project as, arguably, the most prevalent theme. As the research of the project evolved, training, in a number of different guises, was identified as playing an essential role in solving or improving access and emergency situations.

The type of training recommended covered a wide range of personnel including naval architects and designers and, ship officers and crew.

Part of the recommendations for the training of ships' officers, ratings and other personnel is already covered in the Standards of Training, Certification and Watchkeeping for Seafarers Convention, (STCW 95 Convention). Regulation V/2 of the convention deals with the mandatory minimum requirements for the training and qualifications of masters, officers, ratings and other personnel on ro-ro passenger ships. It refers to training in crowd management, familiarization training, safety training, passenger safety, crisis management and human behaviour.

Section V/2 of the STCW Code covers details of crowd management training and includes a clear directive on the evacuation of disabled people and those needing special assistance. This section also describes key issues regarding safety training for personnel looking after passengers and their need to be able to communicate during emergencies by a variety of means, such as demonstration or hand signals when oral communication is impracticable.

Resolutions 5 of attachment of the Final Act of the STCW 95 Conference invites the IMO to develop, as a matter of urgency, detailed provisions on the training of personnel on ro-ro passenger ships in crisis management and human behaviour for possible inclusion in the STCW Code. Resolution 6 of the same attachment invites IMO to consider developing appropriate provisions covering the training of masters, officers, ratings and other personnel serving on passenger ships for inclusion in the STCW Convention.

However, despite the above code and recommendations, results of the Handiami project found that in the majority of cases operators were not paying sufficient attention to training. Findings revealed that officers, ratings and other personnel were given only rudimentary training and, that emergency drills and deployments of safety and evacuation procedures did not use representative samples of passenger populations which would necessarily include elderly and disabled people. In many cases ships' crew were not given any special training for dealing with elderly and disabled passengers in emergency situations.

The need for disability awareness training was highlighted and referred to in seven of the eleven workpackages. Indeed it can be argued that it would be easier and more effective to develop training for masters, officers, ratings and other personnel serving on passenger ships as recommended by Resolution 6 of the attachment of the Final Act of the STCW 95 Conference, if it included disability awareness training.

The aim of this training is to afford participants the opportunity of examining the validity of their perceptions and beliefs regarding disabled people. It seeks to equip people with a working knowledge of disability issues and enable them to recognise discriminatory practices. In so doing it helps to redress myths and assumptions, remove barriers (environmental, attitudinal and institutional) and reduce fear regarding communicating with disabled passengers. It helps personnel to perceive disabled passengers as customers who deserve the same quality of service as the rest of the passengers and not as a potential burden to the crew in case additional assistance is required.

Indeed so strong was the project's view that this type of training was needed that two pilot disability awareness training programmes were run, one with a group of naval architects and the other with ships' crew. The results were rewarding in that both groups felt they had learned a lot from the training that could benefit them in their work. However, the groups differed in their opinion of what they would actually be able to apply in their work.

The naval architects were of the opinion that they designed to client's specifications. They felt it was not within their remit to make or suggest changes regarding the needs of disabled

passengers. They believed that their client's specifications would change only when legislation deemed it so. In contrast the crew believed that there were changes they could make immediately, which were relatively easy and inexpensive to implement. One area was signage and the other crew training in disability awareness.

In summary, all training targeted at meeting the needs of elderly and disabled passengers should form part of the operator's standard customer care policy. Research found that:

- crew's training with regard to these passengers was inadequate and, therefore, ineffective
- disability awareness training should be included in training for naval architects and designers, masters, officers, ratings and other personnel serving on passenger ships, as recommended by Resolution 6 of the attachment of the Final Act of the STCW 95 Conference
- currently the application of the Code is complied with to varying degrees, the majority of which is insufficient to meet the needs of elderly and disabled passengers

## 2.4 Design

Design, in its many guises, plays a major role in providing accessible, safe and comfortable passenger vessels.

Design issues that emerged from the Handiami project included a number of disparate elements such as vessel design, lifesaving equipment, general information and alarm systems. Although varied, one key concept surfaced that could be applied to all these elements, and makes a significant improvement to their effectiveness, the concept of “Design for All”.

Design for all, is described by The Center for Universal Design as the design of different products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialised design. The intent of the design for all concept is to simplify life for everyone by making products, communications and the built environment more usable by more people at little or no extra cost.

The project found this to apply to passenger ships and that the design for all concept would benefit not only elderly and disabled passengers, but all passengers who could temporarily be considered disabled such as children, adults with small children and prams, pregnant women, injured passengers and passengers with heavy luggage.

One major outcome from workpackage 3 was that there is much to be learnt by “maritime designers and architects” from designers and architects involved in other modes of transport and public places. These include more regular updates to design codes, update of curriculum for designers, transfer of technology, and closer relationship with disability groups. Examples of these could be found, for example in the Rail transport, where the Office of the Rail Regulator produced a Code of Practice, “Meeting the needs of Disabled Passengers”. For this to come about a consultation took place with the Disabled Persons Transport Advisory Committee, in accordance with the provisions of the Railways Act 1993. The Code offers practical advice and guidance, on the special needs of disabled people, for all engaged in the delivery of railway passenger services and station services.

It covers;

- Information prior to travel
- Advanced booking
- Disability awareness training
- Station design and
- Rolling stock design

In terms of safety, a new general safety plan based on this concept, taking into account all types of passengers, could prove beneficial to a greater population of potential passengers and more efficient by taking into account safety issues that have been overlooked or underestimated.

Access requirements are fundamental in evaluating safety issues for disabled passengers in maritime transport because they form a prerequisite for travel in the first place. Secondly, as observed above, enhanced accessibility through design improvements improves the mobility of all passengers and crew and thus facilitates an efficient response to emergency situations eg obstacle-free passageways during an evacuation process.

With regard to cost, Handiami research found that designing and building (new build) accessible vessels would not have a significant cost implication. Workpackage 10 found that "Taken into consideration in the early design stages, these measures should not have too much impact on building costs, although it might not be possible to find ideal solutions in all cases." The project recognised, however, that where retrofits are concerned costs involving complete access solutions might be prohibitive.

For Work Pack 10, two case studies were carried out on car and passenger ferries in Denmark. The first ro-ro vessel was already in service; the second existed as a preliminary design for a double ended car ferry. Many of the design problems were associated with access issues for those with mobility impairments and wheelchair users, especially in emergency situations.

Researchers found that in order to achieve full access for all to either ship the following design features had to be addressed: barrier free passage; access to gangways, corridors and passageways; multi-access decks, steps and stair lifts; handrails; doors; deck and floor surfaces. Moreover it was pointed out that for very practical reasons ferries by necessity have to be built with several deck; for cars, passengers, accommodation etc. Vertical access to decks is therefore by steps or by lift. It is axiomatic that steps present an obstacle to passengers with mobility impairments.

Whilst this is not a perhaps such a problem for larger vessels, Ferry 1 had lift access to all decks, Ferry 2, a smaller ship, did not offer lift access to the upper passenger deck and sun deck area. The lift shaft and machinery would obstruct the view from the bridge.

A further and greater problem with lifts on-board ships is that they are not available for use during emergency situations. This leaves a crucial question of how to ensure barrier free access to muster stations, safe areas and emergency equipment in case of an incident. This is further compounded by the method of evacuation that is being used. Evacuation by liferaft or life boat is conducted from the sides of the ship from decks nearer to the water, whilst an evacuation by helicopter is from the highest deck of all.

Although researchers found that by installing new doors and widening adjacent area to give easier access to lifeboats from a given deck (Ferry 1), and by installing extra evacuation slides on certain decks (Ferry 2) it meant that people with mobility impairments who are unable to use steps would be restricted to one deck of the ship only. It was also pointed out that these escape routes would have a limited capacity and the crew would have to identify passengers that needed to use that route and lead the others to another. Evacuation via the upper decks by helicopter would mean that mobility impaired passengers would have to be carried up steps.

In the case of Ferry 2, it is concluded that the vessel would need to be radically redesigned in order to solve the barrier issue and that at present, the solution does not seem to be available.

Although design for emergency situations seemed more problematic, especially for the smaller vessel, some minor design changes have been recommended for these ships in order to improve accessibility as far as possible. These recommendation for both of the ferries studies are contained in the tables below.

<b>2.4.1.1 Ferry 1</b>			
<b>Cost/benefit rating</b>	<b>Conversion specification text</b>	<b>Estimated costs</b>	<b>Comments</b>
<b>1. High</b>	Deck area adjacent to life-boats to be extended app. 11 sqm. to provide space for an assembly station for e/d pass. 1 fire door to be installed.	EUR 15.000	Will ensure barrier free access to life-boat from primary passenger deck
	Locker with stretcher to be installed on deck 2, 4, 5 and 6	EUR 3.000	Simple and efficient low cost improvement .
	Ramp at doors to sun deck (11 pcs.) to be added	EUR 5.000	Simple and efficient low cost improvement .
<b>2. Medium</b>	Exterior doors (10 pcs.) on sun deck to be converted for automatic (push button) operation.	EUR 35.000	Vulnerable and rather unreliable installation.
<b>3. Low</b>	Ad. A: Inclination of stairs to be reduced from 37 to 30 dgr.: Existing stairs including handrails in 6 staircases to be removed. Holes in deck to be extended app. 1.4 m. New stairs/handrails to be installed. Details to comply with WP 10.1 requirements 6.4.IV.2-3.	EUR 800.000	Very expensive operation. Will hardly make much difference in an emergency situation compared to existing arrangement.



<b>2.4.1.2 Ferry 2</b>			
<b>Cost/benefit rating</b>	<b>Conversion specification text</b>	<b>Estimated costs</b>	<b>Comments</b>
<b>1. High</b>	30 m additional handrail	EUR 2.500	
	Locker with stretcher to be installed on deck 1,3 and 4.	EUR 2.500	
<b>2. Medium</b>	4 exterior and 2 interior manually operated doors to be replaced by automatic doors	EUR 20.000	

Information, signage and alarm systems should be designed and available in a number of formats which would cater for people with visual, hearing and mobility impairments as well as to the elderly eg in visual, oral and tactile mediums.

There already exist recommendations on passenger vessel design. The International Maritime Organization (IMO) MSC/Circ 735 “Recommendation on the Design and Operation of Passenger Ships to Respond to Elderly and Disabled Persons’ Needs” was analysed in Workpackage 2. It concluded that these recommendations are effective and should be obligatory on vessels in the EU and those new build vessels should comply. In line with the project’s findings, above, relating to costs, exceptions could be made in parts of retrofit cases where unreasonable costs are involved.

These recommendations also include advice on general information about the services and assistance available to elderly and disabled persons. It provides guidance on what information should be made available before boarding and during the voyage. In addition, Workpackage 5 recommended that a Passenger Access Information System (PAIS) be designed containing all relevant information on the special needs of individual passengers in order that appropriate assistance can be planned for and provided by the operator. This information is required at the time of booking. However, there is always the risk that, because of the problems associated with self-identification, necessary information will not be

given to operators and, passengers needs will not be met. Therefore, self-identification should be seen as a temporary measure pending an acceptable longer term solution. Further it is recommended that prior to boarding information be supplied to these passengers detailing all assistance devices and procedures during boarding, voyage and disembarkation which would enable them to maximise their independence, knowledge of support systems and, their ability to use them when necessary.

## 2.5 Evacuation

Throughout the Handiami project evidence emerged that gave rise to the conclusion that the maritime industry has not yet specifically or sufficiently, addressed the safe evacuation of elderly and disabled passengers. Critical issues culminating in this outcome were rooted in a combination of design, deployments and training issues.

Throughout the case studies implemented during the course of the project, the following outcome was realised regarding the vessel emergencies:

- In many cases wheelchair users would have to be embarked or disembarked by being carried.
- No specific areas onboard ferries and high-speed crafts are devoted to wheelchair users.
- In rough weather wheelchair users have to sit in a seat, while the wheelchairs stowed in luggage racks.
- In some ships there is no area wheelchair users could remain in their wheelchairs without restricting access along the aisle.
- The threshold at emergency exits are high enough to be difficult for elderly or persons with restricted mobility to climb out of this exit.
- Most of the ships' crews and officers have no specific emergency evacuation training relating to disabled and elderly passengers.
- The accessibility to disabled and impaired people is advertised in some cases, but the number of disabled passengers to be carried onboard ships are not limited,. The continued increase in the number of elderly and disabled passengers could become a major problem as there would not be sufficient amount of crewmembers to help these passengers in emergency situations.
- Where there are two levels in passenger deck, a small lift or a ramp is required to facilitate the move of the disabled passengers in between the two levels.
- Members of the crew will instruct and explain safety procedures to any unaccompanied visually or hearing impaired passenger.
- Able-bodied passengers are asked to help disabled persons in emergencies (to don life jackets, to go down the marine evacuation system, to be carried if required).

- Access to life rafts, passengers must exit via few steps and climb into the life raft.
- Awareness of disabled and elderly passengers must be part of the crew training.
- Disabled passengers should be kept close to emergency exits to facilitate evacuation of disabled passengers.

Operators have argued that to design accessible passenger vessels which include specific evacuation arrangements tailored to the needs of the injured, ill, elderly and disabled would incur costs that would render their businesses unviable. However, the project's findings show this not to be the case, especially when such requirements were considered at the outset of the design process.

When the situation in other modes of transport was considered in work package 3, it was found that the procedures and solutions developed in other modes are not automatically and immediately transferable between these situations. For example emergency situations on a rail carrier, in most circumstances will require the passengers to be taken off and as far away from the train as possible, whereas a similar situation on a marine craft may require passengers to stay within the vessel. There are also common issues where the Marine industry can and have done in the past, work closely with other transport domains, examples include crisis management, crowd control, fire fighting.

At a road accident, the accessibility is usually good or fairly good. It is therefore the easiest area for rescue. The basic principle in the rescue task is to stabilise the condition of the surviving victims in situ before they are transported to hospital for further treatment. Both ambulance and fire units are equipped for medical aid in the field. To gain access to victims in badly damaged vehicles some special equipment is needed to cut the structures.

In Rail accidents accessibility to the place of the accident/fire may be an issue. Rail transport usually requires heavier constructed vehicles than for road accidents. Therefore, additional rescue methods are required, for example, cutting up walls and beams of a rail vehicle. The

Finnish Railways (VR Ltd.) has special crane units capable of doing this and, if available, local private mobile cranes can be hired. The local rescue department is responsible for the actual rescue operation.

In most countries, whenever there is an air accident, the national authorities are responsible for finding the aircraft. Then the local municipal rescue service takes over. Evacuation of an aircraft is usually easier than from a ship. Usually, the rescue teams try to keep the fire away from the place where they evacuate the passengers. If an aircraft falls into the sea, the Coast Guard is responsible for the rescue after it has been found.

Research found that many potential evacuation problems can be resolved with careful planning but a few unsolved challenges remain. For example, how to move disabled passengers between decks when elevators are not available. Clearly they will require assistance to move but the lifting and carrying of passengers by crew contravenes EU health and safety regulations as it might cause serious injuries to both parties. To date, no effective assistance equipment has come to light, which is universally accepted as being appropriate for disabled people and those assisting them. In addition, the exterior of vessels appears a hostile environment to all except the youngest and fittest. Ships' ladders appear to remain hazardous with little or no tactile or visual information at the top and bottom of the ladders, and inappropriate handrails and surfaces. Exterior fittings are crucial in an emergency evacuation and the development of less hazardous designs is urged.

Evacuation equipment such as chutes and slides, whilst of undeniable advantage to able-bodied passengers present problems for some disabled passengers, particularly those with spinal injuries or passengers who cannot maintain a stable position. In such cases a securement mechanism should be installed to hold the passenger in an upright position or s/he should be accompanied by a crewmember.

Evacuation deployments play a vital role in preparing crew for the exacting demands of emergency situations. In order to gain appropriate certification, evacuation drills have to be performed within strict time constraints. However, these tests were not found to reflect

realistic situations, as they do not include representative samples of the ship's passengers. In addition, tests are usually carried out using the ship's own crew or young, fit people whilst moored alongside a quay and not at sea. Furthermore, these tests do not take into account the mustering stage and tests occur in a trouble free situation. Consequently ships can gain certification even though it is highly questionable whether these drills properly prepare crew for emergency situations or could perform them at sea within the prescribed time limits for traditional ferries and high-speed craft (HSC). It can be argued that the timings are unrealistic when compared with, say, the St Malo grounding which took 1hr 17mins to evacuate.

Notwithstanding EU regulations on physical lifting and carrying of people, if, under certain circumstances, such action offers the only feasible solution to evacuation, then specialised training on the physical handling of elderly and disabled passengers, as well as dealing with disability issues, must take place in conjunction with relevant institutes and possibly lead to the acquisition of a specialised training diploma.

The project also suggests that dedicated staff should be allocated to each crew who is trained specifically to look after elderly and disabled passengers in emergency situations. This would involve them in the identification and location of such passengers, assisting them to assembly stations and on to safe waiting areas prior to evacuation.

As part of the ship's overall safety procedures, elderly and disabled passengers must be informed, as a matter of routine, what action they should take if an emergency should occur. They should be familiarised by way of instructions (produced in a format which addresses their disability ie visual, audible or tactile), together with, where appropriate, an assisted tour of the vessel to show them assembly stations, how to don lifejackets and what action, if any, to take. This procedure should be included in the specialist training of dedicated personnel.

To summarise, it will be through the co-ordination of design, deployments and training that the safe evacuation of elderly and disabled passengers can be achieved. Design should include means of evacuation at the concept design stage, deployments should include

representative sample populations including elderly and disabled passengers and, dedicated staff should be trained to specifically meet the needs of these passengers including procedures for safe evacuation.

## **2.6 Employment**

Over 6000 European seafarers a year could find themselves sufficiently physically or mentally impaired and unable to continue working at sea in their existing capacity or, indeed, at all. Consequently, they may have to adapt their seafaring and general skills to new situations and particularly to shore-based occupations, which they may never previously have considered.

Rehabilitation and re-employment prospects of disabled seafarers have to be tempered by the reality of modern shipping practices. The demands placed upon even the most able-bodied seafarer has to deal with, among other things, the violent motion of a vessel, movement in restricted spaces, evacuation of passengers and the execution of physically demanding tasks.

### *2.6.1 Re-employment of Disabled Seafarers*

- Significant number of shipboard positions are highly impact so that it is impractical or impossible to redesign ship which permits crew members with disabilities to safely and effectively execute their designated tasks.
- Duties of most officers and crew members require a very high level of physical fitness with respect to mobility. High levels of sensory and cognitive capabilities are essential for these jobs.
- Some seafarers with disabilities may be able to perform a few of administrative duties.
- The primary reason of the bleak prospects for seafarers with various impairments, who wish to attain shipboard employment after failing their medical examination, is attributed

to the fact that in case of emergency crew- members must be fit in all senses to assist either passengers or other crew- members to evacuate promptly and safely.

- A study in the UK in 1996 revealed that the types of shore-based maritime related jobs according to business category are rated in the following order: Ports, Classification Societies, Consultants, Marine Equipment Suppliers, Maritime education and training, and shipping companies.
- Various shore-based maritime related businesses employ seafarers on the basis of their qualifications, skills and experience.
- Skills of disabled seafarers are just as advantageous as those of ex-seafarers and are transferred to land based occupations, providing that their impairment has not diminished their skills or rendered them obsolete.
- Employment prospects are greater for officers and extremely limited for ratings as most of the shore-based occupations are suitable for officers and not for ratings.
- Generally speaking, disabled seafarers only fill a certain proportion of vacancies demanded by shore-based sectors.
- Under certain circumstances, disabled seafarers and specially ratings may not have any opportunities for re-employment.

In conclusion shipboard opportunities for re-employment of disabled seafarers areas follows:

- Disabled seafarers experience great difficulties in gaining re-employment to other shipboard positions, primarily due to safety constraints.
- Crew-members are required to be fit in all senses.
- There is greater implied risk in recruiting disabled seafarers, which interested parties are not willing to undertake.
- Chances for re-employment of disabled seafarers to shipboard positions greatly diminish.



### 2.6.2 *Shore-based opportunities for re-employment of disabled seafarers:*

- Disabled seafarers can be employed in the shore based maritime sectors into general or commercial management, purchasing and shore-based shipping companies.
- Future jobs for disabled seafarers are dependent on the demand of seafarers.
- Future prospects illustrate that if the shortfall in supply of seafarers continues disabled seafarers may have some opportunities if non-disabled seafarers are not available.

### 2.6.3 *Additional skills and training needed for shipboard and shore-based jobs*

In general, seafarers who find themselves compelled to transfer to radically different shipboard or shore-based employment will require retraining.

### 2.6.4 *Shipboard*

- Generally, seafarers who wish to transfer to other seafaring jobs, there are limited obstacles to gaining re-employment in a different position on a vessel.
- The transition will be more complex if a deck rating wished to be re-employed as a deck officer, in which case he/she would have to undergo retraining for the requisite period and acquire some additional skills and qualifications.
- It seems very unlikely that a seafarer who has been declared permanently unfit to remain working at sea will attain shipboard re-employment to another position at sea.
- The only present available opportunities for disabled seafarers in shipboard employment are on coastal vessels and tugs as pilots. This is dependent entirely upon the impairment or disability. For such positions a limited amount of retraining and re-skilling is necessary.

#### 2.6.5 *Related Maritime Shore-Based*

- A seafarer wishing to gain a maritime shore-based employment will usually have to obtain some further training, qualifications and skills in order to have a competitive edge over others with shore-based experience applying for the same position.
- Some additional skills and training are essential in some cases according to business category.
- Very few categories require zero additional skills such as classification societies.
- Generally, the additional skills which seafarers are required to develop include managerial, financial administrative and commercial skills.
- Opportunities for disabled seafarers for related maritime shore-based employment are greater than those for shipboard employment.
- The additional skills required by disabled seafarers are the same as for non-impaired seafarers.
- The level and extent of seafarers impairment is a limiting factor in that context.
- Some impairments will constitute a disability. Such actually disabled seafarers may be more likely to encounter discrimination in finding shore-based employment in competition with technically disabled seafarers as able-bodied persons.

#### 2.6.6 *Other Shore-based Employment*

- It is difficult to identify specific additional training and skills which seafarers would need to acquire if they were seeking other shore based employment.
- Seafarers are required to be fully retrained in order to gain employment in other sectors such as commercial management or retailing.
- Ratings may be employed in construction and labouring sectors and therefore transfer their physical skills with relative ease, but this may have to be augmented with other skills.
- Additional skills and training necessary for disabled seafarers who wish to gain employment in other shore-based sectors is similar to all seafarers.

- Disabled seafarer would have to re-skill and retrain, but the nature of that re-skilling and retraining will be dependent exclusively upon the nature of the job and the level and severity of the seafarer's impairment.

#### *2.6.7 Availability of retraining and rehabilitation*

- Retraining and rehabilitation is the key to re-employment of ex-seafarers.
- There is no specifically designed re-training schemes for seafarers.
- In UK, no charity or government agency help seafarers requiring counselling on post redundancy retraining and rehabilitation opportunities.
- A European wide strategy based upon the retention of skilled workers and the protection of an organisation's initial training investment in those workers, is now necessary if the finite European pool of skilled seafarers is to remain available to the European shipping industry.

### **2.7 Legislation or rehabilitation and its implications**

It is surprising that land-based disability issues have been prominent in recent years and, that equality of opportunity has become legally incorporated into employment policies while disability issues, in the context of sea employment, have largely been ignored or neglected.

There is a general lack of awareness of disability issues within the industry and among seafarers themselves. A person's competence and suitability to live and work at sea, to become or remain a 'seafarer', is judged according to internationally harmonised laws. These describe, among other things, the medical and eyesight standards that seafarers must be able to satisfy as well as the frequency of medical examinations.

There is a greater implied risk in recruiting a disabled seafarer, which interested parties are not willing to take and, as such, the chances of re-employment of a disabled seafarer to a shipboard position is greatly diminished.

Shipowner's potential liability for harm caused directly to passengers or crew by an impaired crew-member, for which the shipowner would be vicariously liable as the crew-member's employer. This form of liability, however, **is probably less** of a disincentive to the employment of impaired seafarers than the consequences that their employment will have on the seaworthiness of a vessel and the extremely poor likelihood of an impaired seafarer fulfilling the regulations that govern the qualification, certification and competency of merchant seamen.

There are significant legal consequences for shipowners and managers who knowingly employ seafarers that are not competent or fit enough to carry out their jobs that, combined with the stringent requirements of the official medical examinations, make it almost impossible to continue seagoing employment after impairment.

There are comprehensive provisions for the financial support of disabled seafarers who are discharged from service but no similar provisions exist for their rehabilitation and re-employment within Europe. For the time being, however, disabled seafarers are reliant upon a small number of maritime charities who themselves have legal limitations placed upon the nature and extent of the assistance they are able to provide. A better co-ordination of the assistance available from these charities would greatly benefit seafarers.

It has only been possible to outline a framework for a precise quantitative analysis of the overall impact of policies designed to deal with the rehabilitation of seafarers who become disabled. Significant practical problems exist in conducting a proper Cost Benefit Analysis and hence a cost-effectiveness analysis was more practicable. This analysis compared the costs of alternative policies to deal with seafarer disablement while holding the benefits constant.

In many cases, the retraining schemes for disabled seafarers that best utilised their acquired skills and knowledge carried significant costs, often because of the necessity of acquiring a University degree.

The results of the questionnaire survey of seafarers and the shipping industry revealed, somewhat surprisingly, a general lack of awareness of disability issues within the industry and among the seafarers themselves.

A number of key action points necessary to raise awareness of disability issues within the industry were identified to improve the post-redundancy support available to seafarers and to contribute to the formulation of a more coherent and thoughtful policy towards seafarer disablement that is consistent with the general need to address the European-wide shortfall in seafaring skills which threatens to wipe out this vital industry.

There is a pressing need for further empirical research in other European countries to establish the nature and extent of seafarer disablement and shortages there; to establish and address the social and employment problems facing redundant and disabled seafarers and to consider the lessons that can be learnt from successful schemes that are in operation in other industries.

The evolution of shipboard opportunities for disabled seafarers will depend on the realisation by the shipping industry, that the demand for skilled and experienced seafarers far outstrips supply. If the shortfall in the supply of seafarers continues, disabled seafarers may have some opportunities if able-bodied seafarers are not available.

There are significant financial and liability barriers to adapting the shipboard environment so that a vessel can be safely operated and navigated by impaired seafarers.

It is suggested that a comprehensive assessment of levels of fitness and mobility required, are still consistent with a function ability to do a job on board ship that does not compromise the safety of the seafarer, their colleagues or the ship.

A rapid and substantial action to avert the forecasted serious shortage of skilled officers is advised. Part of this action has to be a comprehensive re-evaluation of the way in which the

assessment of a seafarer's fitness to work is conducted. Many of these may still be able to do their jobs safely and efficiently with some limited adaptations on the part of shipowners and managers that will not compromise safety.

Opportunities exist in shore-based occupations and there are frequently vacancies in, among other jobs: commercial and general management positions, purchasing, legal work, cargo surveying and ship design. The additional skills required by disabled seafarers to pursue alternative shore-base employment are mostly in the commercial, management, financial and administrative fields rather than in the technical or mechanical side.

Retraining can and often is provided by shipping companies through an advisory body or through national schemes that are not specific to seafarers. Greater co-ordination, however, is required between union and welfare organisations, employers and national retraining and rehabilitation groups.

A rapid and substantial action to avert the forecasted serious shortage of skilled officers is advised. Part of this action has to be a comprehensive re-evaluation of the way in which the assessment of a seafarer's fitness to work is conducted. Many of these may still be able to do their jobs safely and efficiently with some limited adaptations on the part of shipowners and managers that will not compromise safety.

There are significant legal consequences for shipowners and managers who knowingly employ seafarers that are not competent or fit enough to carry out their jobs. This combined with the stringent requirements of the official medical examinations, make it almost impossible to continue seagoing employment after impairment.

There are comprehensive provisions for the financial support of disabled seafarers who are discharged from service but no similar provisions exist for their rehabilitation and re-employment within Europe. The Australian SEACARE scheme provides one possible model that could be adopted by the EU.

Disabled seafarers are reliant upon a small number of maritime charities who themselves have legal limitations placed upon the nature and extent of the assistance they are able to provide. A better co-ordination of the assistance available from these charities would greatly benefit seafarers.

In many cases, the retraining schemes for disabled seafarers that best utilised their acquired skills and knowledge carried significant costs, often because of the necessity of acquiring a University degree.

Further empirical research is required to establish the nature and extent of seafarer disablement and shortages; to establish and address the 'pull' factors which lead seafarers to voluntarily quit sea-going employment, as well as the 'push' factors that lead to involuntary redundancy.

An analysis of successes achieved by quality shipping companies such as BP and Shell, who do operate an ongoing programme of retraining and re-integration of disabled e-seafarers into shore-based jobs, should be conducted in order to protect their investment in these human resources.

### **3 CONCLUSIONS AND RECOMMENDATIONS**

1. It is essential that partnerships involving disabled people, disability organisations, naval architects, designers, lawyers, academics and so on should continue to pool their knowledge and experience in order to improve access and evacuation for elderly and disabled passengers. To facilitate this the EU or an appointed organisation should hold regular, say six monthly, meetings or workshops at which interested parties can meet and share information and experiences.
2. The elderly and disabled population represents a significant market share. Consequently the needs of this market segment should be incorporated into the design and operation of passenger ships. Passenger vessels should be accessible and offer a high level of customer care.
3. Current training practices, with regard to elderly and disabled passengers, are inadequate. Disability awareness training should be obligatory for all personnel, including naval architects and designers, masters, officers, ratings and other personnel serving on passenger ships. In addition specialist training courses in design, customer care, and safety and evacuation procedures should be obligatory for personnel with duties in those areas.
4. The IMO MSC/Circ 735 “Recommendation of the Design and Operation of Passenger Ships to Respond to Elderly and Disabled Persons’ Needs” was found to be effective. These should be enhanced and obligatory on vessels in the EU and new build vessels should comply.



5. The design of information, signage and alarm systems should be developed in a number of formats which cater for people with sensory as well as mobility impairments, for example, in accessible visual, oral and tactile mediums. All vessels in the EU should comply with this recommendation.
  
6. It will be through the co-ordination of design, deployments and training that the safe evacuation of elderly and disabled passengers can be achieved. Design should include means of evacuation at the concept design stage, deployments should include representative sample populations including elderly and disabled passengers and, dedicated staff should be trained to specifically meet the needs of these passengers including procedures for safe evacuation. Compliance to these recommendations is required.
  
7. There is a shortfall in the supply of seafarers. A rapid and substantial action to avert the forecasted serious shortage of skilled officers is necessary. Part of this action necessitates a comprehensive re-evaluation of the way in which the assessment of a seafarer's fitness to work is conducted. Many of these may still be able to do their jobs safely and efficiently with some limited adaptations on the part of shipowners and managers that will not compromise safety. Therefore, a realistic assessment of levels of fitness and mobility is required which is consistent with functional ability to do a job on board ship. This should be devised and applied. To facilitate this greater coordination is required between union and welfare organisations, employers and national retraining and rehabilitation groups. To facilitate this the EU or an appointed organisation should establish a forum comprising members of the above organisations to examine ways of implementing these recommendations.

**4 ANNEX ONE: EXECUTIVE SUMMARIES FROM ALL  
WORK PACKAGES**

## **Executive Summary for WP2**

This package is to review the state of the art in dedicated measures to support disabled people in emergency situations while using in maritime transport.

The objectives of this task is to identify the extent to which attention has been given to the special needs of disabled passengers in emergency situations both at embarkation points and on board ships.

The review undertaken in this workpackage was intended to establish and document innovative solutions to problems for disabled people, in emergencies, that are design and operationally related.

### **Findings**

*It must be emphasised that additional enquiries are ongoing and that the conclusions described are both tentative and incomplete.*

#### *Physical access*

Increasing accessibility for disabled people creates opportunities not just cost.

Motor cars remain the preferred mode of transport for disabled people.

It would be disingenuous to suggest that ideal standards can be achieved without significant cost and inconvenience. However, the time has come where modifications that can be made, should be made.

There is an identifiable trend that suggests where access is addressed at the design stage, there are few, if any, additional costs in production accessible vessels.

It is recommended that IMO Recommendation on the design and operation of passenger ships to respond to elderly and disabled persons' needs to be made obligatory on vessels in European Union, with an exception when compliance would impose unreasonable cost or difficulty on the operator.

It is also recommended that new build vessels should comply with IMO recommendations.

It is recommended that IMO recommendations are to be supplemented with detailed technical guidance papers.

Operators are encouraged to address the needs of the often ignored passengers with sensory impairments, a great deal of which can be done to increase accessibility of passengers with sensory impairments, often with minimal cost.

It is recommended that for the safety of deaf and hearing impaired passengers to:

- Convert audible emergency alarms to include visual warning, or
- Issuing such passengers with vibrating personal alarms for the duration of the passage.

Exterior of the vessels appears a hostile environment to all but youngest and fittest passengers. Ships' ladders appear to remain hazardous (little or no tactile or visual information at the top and bottom of the ladder, inappropriate handrails and surfaces). Exterior fittings are crucial in an emergency evacuation. The development of less hazardous designs are encouraged.

It has been noticed that areas adjacent to lifeboats and/or evacuation slides are often narrow, with little room for disabled passengers to wait safely and comfortably to evacuate.

Lack of appropriate method to train the crew to deal with disabled passengers at evacuation areas

### *Training*

Much can be done to improve travelling experience for disabled passengers. It is recommended that staff and crew to undertake disability awareness training.

Safety of disabled passengers has not been included in any exercise or training programme. It is believed that there may be compelling reasons to adopt fundamentally different emergency procedures for disabled passengers.

It would be appropriate to ensure that appropriate crew members are properly trained in lifting and carrying techniques to reduce the risk of injury to the carried passengers and themselves.

### *Provision of information to disabled and elderly passengers*

Research into the most effective design for safety and evacuation signage is encouraged as a matter of some urgency.

*Provision of information to the maritime industry*

It is firmly believed that national and/or supra-national agencies could and should seek to provide operators with detailed guidance on increasing accessibility and safety for disabled passengers.

*Emergency services*

It was unable to identify any part of the maritime industry that has specifically addressed the safe evacuation of disabled passengers.

There is a clear need to ensure that the emergency services are adequately trained to assist disabled passengers.

### **Executive Summary for WP3**

This report aims to identify the factors that affect the evacuation of disabled people from buildings, air and surface transport vehicles. It also aims to identify how the methods and equipment used by fire and rescue services on the land could to analogies for passenger ships, in particular ferries.

The report found that the provisions for the evacuation of people with mobility impairments from land and air transport is catered for through national and European legislation.

Although on a national level, there are recommended practices for passenger ship operators to facilitate access to disabled people on their ships; provision for evacuations and emergency situations is more vague. Research carried out on a sample of passenger ships showed that carriers make provisions for access and also for evacuations. Although the provisions for evacuation relied upon the assistance of a designated member of the crew to help those with mobility impairment to evacuate via an appropriate system.

Many of the methods that are applied to access and emergency situations on other transport modes are applicable to passenger ships. For example, accessibility criteria, crowd management and evacuation processes. Although it is thought that some of these methods are far more difficult to action in a maritime setting.

## **Executive Summary WP 4**

The original concept for this work package was to develop a taxonomy of disabilities for use in consequent research. The research that was carried out for this work package brought to light contemporary issues concerning the way that people with impairments are viewed and treated, and above all the semantics of disability. It was argued that a taxonomy of disabilities is un-realistic and that people, if they should be labelled at all should be classified by their needs, rather than by their impairments. It is argued that an analysis of people's 'problems' are irrelevant, inefficient and offensive.

This report argues further that in order for the project to earn support and have weight, a true understanding of the language of disability is essential. Disability is seen by different groups in different ways, or models. There are four models of disability.

The bio-medical model views disabled people as 'ill' or sick' and in need of treatment. It is argued that as disabilities are seen as defective or deficient, it absolves the rest of society from removing disabling barriers.

The economic model underpins government treatment of disabled people. It sees disabled people as being unable to participate in 'normal' social and economic life because of their 'problem'. It views disabled people therefore as being unable to contribute economically and being viewed as 'in need'.

The charity / tragedy model stems from the attitudes of non-disabled people and in particular the press. It views disabled people as victims, sufferers, as being limited and afflicted. It also encourages people to believe that disabled people should be grateful for anything that is bestowed upon them.

Last of all is the social model. This model that has been developed through the views of disabled people sees disability in a different way. It sees impairment as the functional limitation caused by physical, mental or sensory impairment. It sees disability as the loss or limitation of opportunities to take part in normal life of the community on equal terms due to physical and social barriers. Finally it sees the economic and social exclusion of disabled people as being caused by the views and attitudes of others, rather than by a person's particular impairment. It is the central tenet of the 'design for all' concept.

This report however does see that some sort of classification is necessary in the case of transport by sea, but it is important that the project makes clear the difference between assumption and reality. It is also important that operators do not insist on a declaration of disability for passengers as there is often a general reluctance to declare. Furthermore there are some legal considerations that should be taken into account, especially that of employer's liability to ship's crews.

For the purpose of this project and for use in maritime transport some broad categorisation of passenger is helpful. These are: those with learning difficulties, mental impairment, hearing impairment, visual impairment, mobility impairment and wheelchair users.

Therefore, it is submitted that the development of taxonomy, in addition to flying in the face of contemporary disability research methodology, would be in direct contravention of the principles advanced by the European Commission and described by the *Communication on Equality of Opportunities for People with Disabilities*.



## **Executive Summary for WP 5**

This work package examines disabilities with particular regard to age. It is essentially split into two parts:

An examination of elderly passengers' requirements with regard to marine transport.

The difficulties that affect seafarers that acquire disabilities through ageing

### **Elderly Passengers**

After preliminary research it was concluded that the elderly should be placed into the same general category as that of people with disabilities for the purpose of this work-package. Elderly people need the special assistance like that required by people with disabilities. Nearly half of elderly people are disabled. Even though the elderly would not see themselves as being disabled but for practical purposes of this research project, they will be treated as such.

Research has shown that the elderly population in Europe is growing and consequently there is an increasing passenger market potential.

The objectives of this section:

Inspection of two passenger ships, one in port and one at sea. For the sea voyage one of the research team was a wheelchair user.

To ensure passenger safety and comfort, there are a number of equipment redesigns and technology application initiatives that should be incorporated into existing, as well as new, ferries and cruise ships.

Review the current practise of handling elderly passengers and staff training.

### **Findings:**

Ship personnel need *advance* information concerning the numbers of travellers with disabilities expected on a specific voyage. They also need to know the nature and extent of the disabilities to ensure that appropriate assistance will be provided.

The ticketing process should provide specialised assistance to passengers with disabilities and the elderly in defining their special needs, and determining how those needs could best be accommodated.

Prior to boarding, a package of information should be provided to passengers with disabilities and the elderly; this package would provide detailed information on all assistance devices and procedures during boarding, voyage and disembarkation. Known as the Passenger Freedom Package (PFP), this should enable potential passengers with disabilities

to maximize their independence, their knowledge of support systems aboard, and their ability to use such systems when necessary.

Shipboard facilities such as cabins, toilets, and specialized areas need to be designed specifically for the limitations of passengers with disabilities and the frail elderly.

A safe haven needs to be provided for passengers, especially the elderly and those with disabilities, to be kept smoke-free in emergency conditions. The safe haven must be easily accessible and should provide protection to the elderly and passengers with disabilities on a priority basis.

Shipboard structures (ramps, passageways, rails, and flooring) need to be designed in respect of the interfacing requirements of the elderly and passengers with disabilities.

A ship wide signage concept must be implemented that will provide immediate and clear information on routes, destinations, emergencies, and precautions for all passengers, but especially for the elderly and passengers with disabilities.

Handling of passenger baggage on and off the ship, including carry-on types of baggage (handbags, camera bags, personal computer bags, etc.) should accommodate the special needs of the elderly and passengers with disabilities who may not have a free hand to carry such baggage. Hand-luggage should be carried onboard and off-board by ship staff to enhance security of the luggage in that it is always within view of the embarking or disembarking passenger.

Mobility aids and sensory aids need to be provided to enhance the safety and satisfaction of impaired passengers. New ships should be designed, and existing ships retrofitted, to include elevator services to assist mobility impaired passengers in moving between decks.

It is regularly stated in this report that ship personnel must be available to provide assistance as necessary to the elderly and passengers with disabilities. This assistance can be assured when dealing with small numbers of such passenger. However, in the coming era of full accessibility to all modes of travel by this category of passenger, it is becoming increasingly possible that large will be travelling on a ferry or cruise ship at any one time. This may require the availability of on-call (full-time) ship personnel to provide additional assistance.

The major threat to the safety and survivability of ferry and cruise ship passengers, especially the elderly and passengers with disabilities, is smoke resulting from shipboard fires that may or may not have been contained. The elderly and passengers with disabilities will require more time to evacuate from a ship space filled with smoke. A need exists to provide such passengers (and to some extent all passengers) with an oxygen supply and breathing mask. The oxygen canister and mask must be readily accessible, easily donned and activated, and easily used even without assistance. An approach of co-locating the oxygen supply with lifejackets should be investigated.

## **Seafarers and Ageing**

This examination only examined the Deck Officers and Engineering Officers of the Merchant Navy.

The objectives of this section:

Examine the medical standards with regard to seafarers.

Carry out an examination to establish the feasibility of re-designing the onboard equipment and technology initiatives to accommodate seafarers with disabilities.

Conduct a questionnaire to seafarers currently working at sea. Sixty-three seafarers completed the questionnaire from the U.K., Ireland and the Netherlands.

Examine in depth a case study of a seafarer that acquired a disability and was forced to change career.

### **Findings:**

The compulsory medical examination for seafarers is of critical importance to older seafarers and a high standard of health is required to pass it. The probability of failing the examination increases with age.

Insurance companies class the profession of Seafaring as a high-risk occupation.

None of the seafarers surveyed had an employment contract that included a long-term ill-health financial provision.

Due to the international nature of shipping, it was concluded that to change the design of the ships to accommodate seafarers with disabilities is impractical.

From the seafarer survey, just over half of those surveyed intended to stay at sea until retirement. These seafarers should make provision in case of a forced termination of their seafarers' career through ill health.

The most preferred alternative career options for those seafarers surveyed are:

Port authority work, Marine Superintendents and education and training.

## **Executive Summary for WP 6**

The objective of the WP6 was the elaboration of a formal safety assessment model, taking into account elderly and disabled passengers. The work presented in this final technical report was conducted by INRETS and involved the participation of Marine Safety Rotterdam and Warsash Maritime Center. The approach developed aimed to create a framework based on three main components : the passengers, the crew and the ship's characteristics. These elements of the model are linked and environment constraints are also integrated.

The first chapter indicates the resources and methods used to collect, analyse and interpret data. Part of the results given in the WP2 are used for the interpretation of other data : the safety questionnaire shows in particular, that there is not sufficient safety information and what do exist is not properly transmitted to disabled people, that ship's characteristics for emergency situations and passengers with disability movements are not well adapted. Results of interviews and literature analysis indicate that crew training has to be improved.

The second part of this work points out the main characteristics of the evacuation stage on board classical ferries and high speed ferries. Such a distinction seems to be accurate particularly concerning the crew per passenger ratio : around 1/35 on board HSF, 1/2 (see results of the WP2) to 1/17 on board classical ferries or cruise ferries. Consequently, if safety equipment and safety information are very similar on board each type of ferry, the main distinction is the evacuation process, due to the respect of a strict time limit for evacuation on board HSF.

The third part presents the framework. The tables of results show a functional classification of disabilities (input from DG XIII TELSCAN Project) as a basis of analysis relevant to the maritime world. The analysis of possible problems and difficulties of passengers with disabilities result from the matching process between ship equipment and characteristics, passengers functional abilities, and crew capabilities, abilities and training. Finally, it is proposed a specific tool used to represent a dynamic interpretation process (DIPTree) of the risks on board a ship during the evacuation process for passengers with disabilities is proposed.

The conclusion points to the possible future use of the results to test the safety process on board ships concerning the specific situation of passengers with disabilities.

### **Keywords:**

Safety, evacuation, elderly, disabled, crew, ships, functional analysis

## Executive Summary for WP 7

### OBJECTIVES

The purpose of WP 7 was to study two basic evacuation cases- a large ro-ro ferry in the Northern Baltic and HSCs in the Channel and in the Irish Sea. The starting point is, as the Estonia disaster has shown, that ultimately only those people in perfect physical conditions are capable to survive really extreme conditions. To move even in a moderately inclined and/or rolling ship also requires all four extremities in reasonable condition, otherwise some assistance is always necessary. As stated above, IMO has drawn attention to the problem of dealing with disabled people under normal voyage circumstances. But what are expected in emergency situations? SOLAS Chapter III Reg 8.2 states: “*Clear instructions to be followed in the event of an emergency shall be provided for every person on board*”. Thus the message has to reach every one if deaf or blind in the first place. Thereafter comes the question how to follow those instructions.

### DESCRIPTION OF THE EVACUATION PROCESS

The evacuation and rescue of persons is always very dependent of the actual circumstances after an accident. No contingency plan can give complete answers to all questions encountered under the evacuation and abandoning the ship process. In WP 6 the principal differences between a traditional ro-ro ferry and a HSC have already been reviewed.

The evacuation process can be divided into three main parts(IMO FP 43/18):

*Awareness time (A)* is the time it takes for passengers to process and to react to the situation. This time begins upon initial notification (e.g. alarm) of an emergency and ends when the passenger has accepted the situation and begins to move towards an assembly station.

*Travel time (T)* is defined as the time it takes for all persons on board to move from where they are upon notification to the assembly stations and then on to the embarkation stations

*Embarkation time and launching time (E+L)* is the sum of embarkation time (E) and launching time (L) is defined as the time required to provide for abandonment by the total number of persons on board.

### EVACUATION ARRANGEMENTS ON A LARGE RO-RO FERRY

Sample vessel was the "Silja Serenade". The 58378 GT ship has a 140m long promenade, which is like a shopping mall with shops and restaurants on both sides on Deck 7 level. The promenade is open on its total length and not divided into 40m long main fire zones. It is 5 decks high and has a glass roof.. The two deckhouses on the sides contain cabins on Decks 1-11 and all these cabins have a window either to the sea side or to the promenade. The

promenade forms a main fire zone with including also spaces like restaurants and shops, which open to the promenade. Those spaces are divided longitudinally with main fire zone bulkheads at places where the hotel part is divided.

The promenade is provided with escape routes at both sides at both ends and in the middle, and they lead to lead to the Rescue Stations and slide stations on Deck 5. The Rescue Stations of Deck 7 are on the same level as the promenade and there is open deck on that level around the ship. The promenade can be used as Muster Station if it is regarded a safe area.

There are twelve special cabins for wheelchair users on starboard side of Deck 8 close to the forward end escape route of the promenade on that side(cabin area 8200). They are adjacent to lifts 1 & 2. As the special cabins are one deck higher than the Rescue Stations on Deck 7, there remains the problem of the descent to that level, if the occupants are in their cabins in case of emergency. One possibility is to switch manually a elevator on in the emergency electricity panel, as there is some spare capacity available in addition to the essential safety systems. If this is not feasible due to circumstances, the remaining possibility is manual handling.

## EVACUATION ARRANGEMENTS ON HIGH SPEED CRAFTS IN THE CHANNEL

The aim of this section was to investigate evacuation cases on High Speed Craft (HSC) in the Channel. The objectives of this task are:

To review the current situation and practices that exist on present day passenger HSC, regarding passenger seating arrangements and evacuation plans and means for elderly and disabled passengers. To examine the ideas provided in work packages 3 and 6 for the development of an enhanced passenger seating arrangement and evacuation system and a related contingency plan for the vessel. To review the justification for improved design features and new equipment for future passenger HSC to further enhance the prospects for a better crashworthiness of the vessel and successful evacuation of elderly and disabled persons.

The current practice on some vessels is that disabled passengers are evacuated after other passengers. This appears to be because the operators prefer to evacuate the majority of passengers as quickly as possible and that once they are evacuated the crew can assist the disabled passengers e.g. crewmembers can travel down evacuation slides with a disabled passenger to control their descent.

## INVESTIGATIONS INTO EVACUATION OF FERRIES IN THE IRISH SEA INVOLVING ELDERLY AND DISABLED PASSENGERS

There are now several high speed craft operating on different routes in the Irish Sea, namely;

Larne - Cairnryan (P&O, “*Jetliner*”, monohull )  
Dun Laoghaire - Holyhead (Stena, “*HSS Stena Explorer*”, catamaran)  
Belfast - Stranraer (Stena, “*HSS Stena Voyager*” , catamaran)  
Dublin - Holyhead (Irish Ferries, “*Jonathan Swift*” catamaran)  
Rosslare - Fishguard (Stena, “*Stena Lynx III*” catamaran)

Determining the procedures adopted by an HSC in carrying out an evacuation following fire was carried out by:

Interviews with a Ship’s Safety Officer and a Ship’s Masters and completion of a questionnaire by these individuals; Visits to vessels; Human factor engineering analysis.

Experts in human factors engineering (Carlow Associates) undertook a detailed analysis of the tasks involved in evacuating passengers from a high speed ferry. This included an examination of the specific requirements of elderly and disabled passengers during emergency situations as well as how this would impact on ship design, operation and training of personnel. Design standards, criteria for shipboard technology and systems to facilitate safe passenger emergency egress were identified.

## CONCLUSIONS

A difficulty stems from the fact that the ferries navigating around Europe are of very different designs, even those run by the same company. Boats are sometimes commissioned by a ship owner, or acquired on second hand market and modified, which leads to many different types of arrangements. Thus the problems encountered differ from boat to boat, even if they fly the same flag and belong to the same company. However, observations of a general nature can be made concerning access to the evacuation stations of traditional ferries and even more so for high-speed boats for which there seem to be fewer variants. We therefore have limited ourselves to the two main categories : traditional ferries and HSC.

In this report the authors have been able to demonstrate several examples how some European ferry operators have solved the problem of developing contingency plans for the evacuation case involving disabled passengers. There are still many ways to enhance the present situation, however. Many less aware companies can certainly learn a lot of the examples presented.

A major beneficiary of this study will be the European tourist industry. Retiree travel is expected to grow across Europe, America, Japan and other non-EU countries. At present a large proportion of the population of the EU is now over 65 representing 20% of the population. This represents a significant target market for the industry and they need to address the present limitations that exist for elderly passengers with disabilities. And with proper safety precautions developed, the travelling of elderly and disabled persons can be as safe as for anybody else.

## **Executive Summary for WP 8**

The general aim of Workpackage 8 is the investigation of evacuation cases for passenger vessels in Greece. The work presented in this report was carried out by the two WP 8 partners, Aristotle University of Thessaloniki (AUTH) and Marine Safety Rotterdam (MSR).

The first three chapters of this Deliverable include the Introduction, Objectives and Methodology to be followed. The fourth chapter deals with the “Identification of disabled passenger needs and problem areas”. The needs and problem areas are classified into two main sections : access requirements; safety requirements. The work carried out in this field involved bibliographic research, input from other HANDIAMI Workpackages (WPs 2, 3, 6) and surveys with experts and disabled people.

Chapter 5 examines the “Identification of problem areas, solutions and priorities”. The main problem areas are defined as : safety, engineering, space requirements, egress and evacuation. The responsible partner for this activity, MSR conducted a case study with a ferry operator from The Netherlands in order to obtain supplementary information on these issues from real practice.

Chapter 6 examines the practices followed in evacuation procedures and makes relevant suggestions for improving current practices. Chapter 7 illustrates the justification basis for introducing improved design and policy features in maritime passenger transport to accommodate for the needs of disabled passengers.

Chapter 8 examines the “Evaluation of safety for disabled passengers in actual situation”. The evaluation of the safety level of a vessel (traditional ferry) was undertaken by three groups of experts (elderly and disabled people; disability/maritime safety experts; crew members) that visited a ferry at the port of Thessaloniki. The expert evaluation exercise was facilitated by using two questionnaires and the results were analysed following the principles of multi-criteria analysis.

The conclusions to this report indicate that there is room for improvement in terms of the safety of elderly and disabled passengers in maritime transport by adopting HANDIAMI recommendations in the design and operation of a passenger vessel. Furthermore, suggestions are also made for future actions following up to the HANDIAMI project and utilising its results.



## **Executive Summary for WP 9**

Defining disability in any employment-related sphere - and particularly in relation to seafarers - presents semantic, contextual and practical problems. No single existing model alone provides an adequate solution to the challenge of defining disability in relation to the seafaring occupation since most models are concerned with how disabled workers can adapt to their working environment. In relation to seafaring, however, context-specific taxonomies that allow impaired seafarers to continue employment following disablement may be impractical, unworkable and dangerous. The most rational basis for any disability criteria for seafarers must always be safety and while a seafarer's disability may not obstruct the safe and efficient operation of a vessel in some circumstances, there are still many common shipboard situations in which disability would compromise the safety of the crew, the passengers, the vessel and other shipping.

A seafarer's status as "disabled" ultimately depends on whether their impairment will lead to failure of a pre-sea or periodic medical examination. The high standards set down in official examinations and in those carried out independently by P&I Clubs are a direct result of the scientifically established link between ill health and human error which gives rise to shipping and other transport accidents. However, an examination of statistics for both European and ASEAN seafarers shows that European seafarers are, by-and-large, suffering from age-related health problems and impairments such as heart disease, obesity, diabetes and vision and hearing defects. This is a trend that will get worse and not better as recruitment of young cadets to the merchant navy continues to decline and the average age of the merchant seamen rises.

Failure or restriction of sea-going service after periodic medical examination in the UK has risen steadily to the level of 10% per annum. Age-related health problems account for the majority of failures. Shipboard accidents are also significant though further research is required to demonstrate the validity of the statistics we obtained on failure due to drug and alcohol abuse which, taken at face value, are worrying. A more comprehensive survey of ill-health and disablement among European seafarers is required to establish more exact numbers but accurate and reliable records are in short supply.

The current training and skills of seafarers are defined by international conventions and so are ubiquitous through the European Union. While seafarer training necessarily concentrates on the knowledge and skills required for the operation and navigation of a vessel certain generic, transferable skills and qualities are present in officers and, to a much lesser extent, ratings. There is, indeed, a wide disparity between the transferable skills of officers and ratings and the important quality of lateral thinking as well as operational, management and leadership skills are more readily found in the former.

There are few if any existing shipboard opportunities for disabled seafarers due to safety, economic and legal considerations. The evolution of shipboard opportunities for disabled seafarers in the future will depend on the realisation by the shipping industry that the demand for skilled and experienced seafarers far outstrips supply. There are significant financial and liability barriers to adapting the shipboard environment so that a vessel can be safely

operated and navigated by impaired seafarers. Greater opportunities exist, in any event, in shore-based occupations and there are frequently vacancies in, among other jobs: commercial and general management positions, purchasing, legal work, cargo surveying and ship design.

The additional skills required by disabled seafarers to pursue alternative shore-based employment are mostly in the commercial, management, financial and administrative fields rather than in the technical or mechanical side. Retraining can and often is provided by shipping companies through an advisory body or through national schemes that are not specific to seafarers. Greater co-ordination, however, is required between union and welfare organisations, employers and national retraining and rehabilitation groups.

There are significant legal consequences for shipowners and managers who knowingly employ seafarers that are not competent or fit enough to carry out their jobs that, combined with the stringent requirements of the official medical examinations, make it almost impossible to continue seagoing employment after impairment. There are comprehensive provisions for the financial support of disabled seafarers who are discharged from service but no similar provisions exist for their rehabilitation and re-employment within Europe. The Australian SEACARE scheme provides one possible model that could be adopted by the EU. For the time being, however, disabled seafarers are reliant upon a small number of maritime charities who themselves have legal limitations placed upon the nature and extent of the assistance they are able to provide. A better co-ordination of the assistance available from these charities would greatly benefit seafarers.

It has only been possible to outline a framework for a precise quantitative analysis of the overall impact of policies designed to deal with the rehabilitation of seafarers who become disabled. Significant practical problems exist in conducting a proper Cost Benefit Analysis and hence a cost-effectiveness analysis was more practicable. This analysis compared the costs of alternative policies to deal with seafarer disablement while holding the benefits constant. In many cases, the retraining schemes for disabled seafarers that best utilised their acquired skills and knowledge carried significant costs, often because of the necessity of acquiring a University degree.

The results of the questionnaire survey of seafarers and the shipping industry revealed, somewhat surprisingly, a general lack of awareness of disability issues within the industry and among the seafarers themselves. The results were not reliable enough to base any accurate analysis upon them. The interviews of representatives from a cross-section of shipping industry sectors were highly productive, however, and have enabled us to identify a number of key action points necessary to raise awareness of disability issues within the industry, to improve the post-redundancy support available to seafarers and to contribute to the formulation of a more coherent and thoughtful policy towards seafarer disablement that is consistent with the general need to address the European-wide shortfall in seafaring skills which threatens to wipe out this vital industry.

There is a pressing need for further empirical research in other European countries to establish the nature and extent of seafarer disablement and shortages there; to establish and

address the social and employment problems facing redundant and disabled seafarers and to consider the lessons that can be learnt from successful schemes that are in operation in other industries.

## **Executive Summary for WP 10**

This work package is to assess the practical implications of the HANDIAMI project results on existing ferries, new buildings and on the associated life saving equipment. The work package is split into two sub-tasks:

Sub-task 10.1: a requirements specification based on previous results

Sub-task 10.2: implementation of the requirements specification

### *Sub-task 10.1*

The requirements specification has been prepared from the suggestions and recommendations made in Work packages 2-6. The requirements specifications can be separated into four areas:

Company Procedures

Access Issues

Infrastructure Design, and

Safety and Evacuation

Most of the design specifications have been taken from the IMO's MSC/Circ. 735 '*Recommendations on the design and operation of passenger ships to respond to elderly and disabled persons' needs*'. Other design specifications have been made using the experience of the Swedish Association of the Neurologically Disabled.

### *Sub-task 10.2*

An impact assessment of the proposed measures for improved emergency handling of elderly and disabled passengers has been carried out in two case studies:

1. An existing 900 passenger car/train ferry for short international voyages.
2. An anticipated new-building 300-400 passenger car ferry for domestic routes.

The assessment deals with both technical and organisational issues, and the necessary modifications including derived costs as well as proposals for further development and general implementation of the requirements are outlined.

#### Conclusions

The implementation of the safety-related issues of the WP 10.1 requirement specification on the two ferries involves both technical and organisational measures.

The necessary technical alterations are limited, due to the fact that both ferries are designed with MSC/Circ. 735 '*Recommendation on the Design and Operation of Passengers Ships*

to Respond to Elderly and Disabled Persons' needs" as an annex to the building specification.

The most important unsolved infrastructure issue is barrier-free access to evacuation stations. This can only partly be solved within the existing concept of the two ferries, but should be incorporated into future ferries in order to improve conditions in emergency situations for both crew and passengers. Taken into consideration in the early design stages, these measures should not have too much impact on building costs, although it might not be possible to find ideal solutions in all cases.

Also the safety information systems need some improvement to cope with the needs of visually and hearing impaired passengers. Improved information systems and operational guidelines must be developed, but the technical and economical implications for the ferry will probably be limited.

The organisational requirements concerning crew resources and training are far more complicated to assess. They could impose considerable responsibility as well as additional operational costs on the ferry operator, but the requirements are not sufficiently detailed in order to make an accurate assessment. Most of the issues involved are regulated by IMO (the International Maritime Organisation) and further development and analysis of the requirements should be done within the relevant IMO bodies in order to ensure uniform standards.

**5 ANNEX TWO: LIST OF PUBLICATIONS, CONFERENCES,  
PRESENTATIONS FROM THE PROJECT**

**Handiami Website:** <http://www.solent.ac.uk/handiami/>

The website will be updated to include highlights of outcomes and sources of information.

**Handiami Leaflet:** see attached, Appendix.

**Media:**

Article: Safety at Sea International, May 1999, 'Access and Evacuation of Elderly and Disabled passengers'

Press releases December/January 1999/2000 to:

Numast Telegraph  
Shipping and Transport Lawyer International  
European Ferry Scene  
Fairplay  
Harbourmaster  
Lloyd's List  
Ports of Europe  
Seaways  
Trade Winds  
Marine Engineers Review  
The Naval Architect  
Lloyd's Cruise International  
Safety at Sea International  
Ships Monthly  
Plus Transport correspondents of:  
The Times  
The Guardian  
The Telegraph  
The Financial Times  
The Independent  
and The Sunday issues  
and BBC national radio

Pending, articles in:

Safety at Sea International, Feb 2000

Nautical Institute, Feb 2000

Press releases of findings to maritime press, Feb 2000

**Conferences:** -EC Transport Conference, Lille, Nov 1999, 'Handiami. Personnes handicapees et systemes maritimes'

**CD ROM:** CD ROM of final report and workpackages, to be distributed in the first instance to the EC, all consortium partners and individuals and organisations who contributed to the project. Copies will be produced for wider distribution to interested parties.