



**International Safety Panel
RESEARCH PROJECT NO. 8**

**SAFE WALKWAYS IN PORTS
& TERMINAL AREAS**

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SHORT PERSONAL HISTORY OF THE AUTHOR

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- No. 2** Ships Lifting Plant
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Safe Walkways in Ports and Terminal Areas

1 Introduction

- 1.1 It has long been recognised that safe means of access and egress for persons working in, or passing through, ports and terminals are essential. Following the introduction of modern, mechanised methods of cargo handling and many fatal and serious accidents, it became obvious that there was a need to separate persons from vehicles. The provision of suitably designated and signed walkways is one way of achieving this separation.
- 1.2 Persons using walkways include stevedores and other port and terminal employees, passengers, other visitors and ships' crew. Many of those who use walkways are likely to be unfamiliar with the layout of the premises and, particularly in the case of passengers and ships' crew, may be unfamiliar with, or not speak, the language of the country. There is, therefore, a clear need for unambiguous instructions to users of walkways. This may involve both the layout and signing of walkways.
- 1.3 In the autumn of 1998 a seaman in the United Kingdom was injured while he was walking in a terminal on an area marked by yellow side and hatched lines. If these markings had been intended to designate a safe walkway, he would have been in an area considered to be safe and would have been expected to remain within the area. Unfortunately although it may have looked like a safe walkway, it was not. The markings identified the running area of the offside wheels of a mobile cargo handling machine. As such, the markings indicated an area to be kept clear and not obstructed, especially as the driver of the machine was on its opposite side and could not see the ground in the marked area. The seaman was taken to hospital but was not seriously injured. During the investigation of the accident it was realised that there was a possibility that the seaman had mistaken the marked area for a safe walkway.
- 1.4 Following a discussion of the accident by UK Accident Prevention Officers, a survey of the standards of provision and marking of walkways at UK ports and terminals was carried out and published by the Ports' Safety Organisation as RIS 4, "Safe Walkways in Port Areas". This showed that there was a high level of provision of walkways but a wide variation in the means by which they were signed and otherwise marked.
- 1.5 The results of the UK survey were discussed at an ICHCA International Safety Panel meeting. The Panel considered that the matter was clearly one of international interest. Consequently, it decided to carry out a further international survey, in conjunction with the International Association of Ports and Harbours (IAPH) and the TT Club, to find out whether the situation elsewhere was similar to that found in the UK.
- 1.6 The international survey was carried out during 1999 and 2000. The results are summarised in Section 2 of this paper.

2 The survey

- 2.1 A copy of the survey questionnaire is at Appendix 1.
- 2.2 100 responses from 30 countries were received. These included 93 completed questionnaires from 28 countries. The questionnaires were analysed and the numerical results are summarised below. The narrative responses are listed in Appendix 2.
- 2.3 In all the tables below the percentages are of the answers to the question. They have been rounded to the nearest whole percent. In some cases this results in totals close to, but not equal to, 100%. Multiple answers were given to some questions leading to totals of more than 100%.

2.4 Does your company provide marked walkways within its premises?

	Number	%
Yes	49	53
No	44	47

- 2.4.1 The number of negative responses was surprising in view of the hazards to pedestrians. Owing to the limited nature of the survey and the number of other possibly relevant factors, no valid comments can be made on the geographical location of ports and terminals without walkways.
- 2.4.2 The 'yes' returns were further analysed as set out in paragraphs 2.5 to 2.28 below.

2.5 What are the walkway widths?

Width (mm)	%
200, 300	6
900 – 1300	43
1500 – 1968	30
2000	11
2700	2
3000, 3300	4
Unspecified	4

- 2.5.1 20% of the responses reported that the widths varied. One of these was reported as 'over 914 mm' and the rest as ranges from '1000 to 3000 mm' to '3300 to 10600mm'. The widths reported as ranges are included in the table in 2.5 as their minimum width.
- 2.5.2 The replies showed a wide variation in the width of walkways. 200 and 300mm wide walkways are surprising. It may be that these widths relate to the width of lines delineating walkways. The width of walkways should be wide enough for the number of persons expected to use them at one time. Wider walkways will be necessary in passenger terminals or other places where large groups of people are expected to use the walkways at the same time.

2.6 What colours are used?

Colour	%
'Concrete'	2
Green	4
White	20
Yellow	55
White, green	2
White, orange	2
White, yellow	12
'No particular'	2

2.6.1 In terms of single colours only

Colour	%
'Concrete'	2
Green	6
Orange	2
White	37
Yellow	67
White / yellow	92

2.6.2 It can be seen that white and yellow, or a combination of both, are by far the most common colours used.

2.6.3 The colour, or colours, used should be clearly visible during both day and night and whether the walkway is wet or dry. The effects of artificial light on the visibility of the markings should be considered. When walkways are covered by natural elements such as snow, suitable cleaning procedures should automatically be put into practice as part of the normal terminal operations.

2.7 Is the walkway marked with?

Marking	%
Hatches	12
Diagonal lines	39
Side lines only	39
Footprints	12
Walking man symbols	27
Other	16

2.7.1 The responses showed a wide variation in the types of markings used. Several respondents used more than one type of marking. One respondent used hatches only at pedestrian crossings. 'Walking man' symbols included a person with a child. 'Other' markings included zebra crossings, cross stripes, boxes, cycle symbols, yellow Braille bricks and the use of a different level for walkways.

2.7.2 It is essential that markings do not give rise to scope for confusion. This may be by use of markings to indicate different matters in different places or by leading to doubt whether a marked area is a road or a walkway. A conventional raised pavement alongside a roadway is one method of clear marking.

2.7.3 Wherever appropriate, standard international or national symbols should be used in order to assist people unfamiliar with the country and / or premises.

2.8 **Are any words shown on the surface?**

	%
Yes	18
No	82

2.9 **If words are shown, what are they?**

Words	%
Walkway	56
Keep clear	11
Personnel walkway	11
Taxi. Phone	11
Not specified	11

2.10 **Are any directional arrows shown on the surface?**

	%
Yes	16
No	82
Some	2

2.11 **What type of paint is used?**

Paint	%
Fluorescent	7
Ordinary	24
Road	68

2.11.1 One respondent reported using unpainted interlocking blocks.

2.11.2 'Road' paint included acrylic traffic, white balantine, line, paving, thermoplastic and thick paints.

2.12 **How often is the paint renewed?**

Period	%
< annually	9
annually	31
> annually	13
As required	56

2.12.2 A number of respondents quoted ranges. Both ends of the ranges are included in the table in 2.12. The shortest period was 3 - 6 months and the longest 5 - 10 years. As would be expected, the shortest periods were associated with the use of ordinary paint. 7% of respondents reported both periodic repainting and repainting 'as required'.

2.12.3 The maintenance of surface markings so as to be clearly visible is essential. As wear is likely to vary with location, repainting as required, rather than at set intervals, may well be appropriate. In such circumstances regular checks of the markings should be made to determine whether repainting is needed.

2.13 **Is there a design specification for the walkways?**

	%
Yes	17
No	83

2.13.1 Only three respondents provided copies of their walkway specifications. One was a full specification, one a diagram of markings and the third appeared to be a copy of the national requirements for road markings.

2.14 **Are the walkways signposted?**

	%
Yes	45
No	51
Some	4

2.14.1 The attention of pedestrians needs to be drawn to the location of safe walkways. Unless the walkways are very obvious and short, signs are likely to be necessary for this purpose, particularly at the ends of the walkways.

2.15 **If so, what signs are used?**

Sign	%
Walking man alone	48
Walking man + words	40
Various	4
Other	16

2.15.1 The use of clear pictorial signs avoids potential language problems. In a number of countries a walking man symbol is a mandatory sign to indicate that pedestrians must use a specific walkway.

2.16 **What is the size of the signs used?**

Sign	Size	%
	200 mm	4
Circular	600 mm	9
Diamond	600 mm	9
Rectangular	400 - 300 to 300 - 800 mm	57
	Varies	22

2.16.1 Signs should be big enough to be clearly visible and readable against the varied backgrounds to be found in ports and terminals. If there is any doubt the size of signs should be increased rather than decreased. A formula, used in one country, to determine the minimum size of a sign to be read at distances of up to 50 m is A

= $L^2 \div 2000$; where A is the area of the sign in square metres and L is the greatest distance in metres from which the sign must be understood.

2.16.2 In a number of countries the shape of a signboard indicates its status. These include the use of circular signboards for prohibitory signs, such as a 'No entry' sign, and mandatory signs, such as the mandatory use of a walkway, and the use of triangular signboards for warning signs.

2.17 What background colour is used for the signs?

Colour	%
Blue	33
Green	4
Red	4
Turquoise	4
White	29
Yellow	21
Varies	4

2.17.1 In a number of countries the background colour of a sign indicates its status. These include the use of red for prohibitory signs, blue for mandatory signs and yellow for warning signs.

2.18 Where are the signs placed on the walkways?

Location	%
Both ends	50
Both ends and middle	8
Regular intervals	46
Elsewhere	13

2.18.1 'Elsewhere' included portable signs at the bottom of gangways, at exits and on light towers and buildings.

2.18.2 The number of signs will depend on the length of a walkway, its route and the adjacent layout of buildings, stored cargo or other materials. In many cases it will not be sufficient to have signs only at the beginning and end.

2.19 Does any part of the walkway cross an operating area or roadway?

	%
Yes	86
No	14

2.19.1 Two respondents reported providing elevated walkways, so avoiding any conflict between pedestrians and vehicles.

2.20 If so, are signs used to warn the walkway user of the roadway?

	%
Yes	34
No	64
Usually	2

2.20.1 It is essential that users of walkways be given clear warning of the possible crossing of the walkway by vehicular traffic. Similarly, there needs to be clear indications to drivers of vehicles of the location of pedestrian walkways that cross terminal roads or operating areas.

2.21 If so, what signs are used?

2.21.1 Only a third of respondents replied to this question. The responses varied widely. Over half of them referred to pedestrian crossing signs or the need to use pedestrian crossings. Other signs included arrows, 'caution look left', 'foreman', 'signal truck' and stop signs. At passenger terminals the provision of full pedestrian crossings or traffic lights may be appropriate at some crossings.

2.22 Are walkways leading to / from quayside areas provided?

	%
Yes	63
No	35
Some	2

2.23 If so, does the company have any posters, leaflets or other information that is placed on board ship when it arrives, or is used in some other way to identify the walkways provided?

	%
Yes	53
No	47

2.23.1 Information provided included maps, billboards, notices with the ship's papers and brochures. Some included information in a number of languages.

2.23.2 The inclusion of such information in a leaflet or brochure giving other information that is likely to be of use or interest to seamen makes it more likely that it will be read and kept. Such other information may include information on nearby towns, local transport, the nearby Seamen's Mission and how to get there.

2.24 Are portable signs indicating the safe walkway routes placed at the foot of the ship's gangway?

	%
Yes	15
No	85

2.24.1 Whilst the crew of some ships, that are regular visitors, may be familiar with the layout and requirements of a terminal, many others will not. Such portable signs are one way of informing them how to get to safe walkways and of the need to keep to them.

2.25 **Is there any reference at the entrance to the dock, port or terminal to the provision of walkways and where to find them?**

	%
Yes	64
No	34
Some	2

2.25.1 It might have been expected that the proportion of answers to this and the previous question would be the same as they deal with the two ends of the same problem. Two respondents made reference to security personnel at all entrances and exits.

2.26 **Does the company provide any other means for seamen to get from the ship to the road, for example by terminal bus?**

	%
Yes - all	44
- by bus	25
- by taxi	8
No	56

2.26.1 Such transport may be an alternative to walkways in areas where pedestrians are prohibited. In such circumstances the transport needs to be appropriately controlled. It may be necessary to require it to follow clearly designated routes within the terminal. Appropriate facilities should be provided to enable the transport to be summoned when required.

2.27 **Is it considered that other aspects of terminal surface marking should be clearly indicated, for example traffic free areas?**

	%
Yes	64
No	34
'Depends'	2

2.27.1 The aspects suggested are listed in Appendix 2. They vary widely. Many comments, including speed limits, refer to roadways rather than to walkways.

2.28 **Please provide further comments as appropriate.**

2.28.1 The additional comments made by respondents are also listed in Appendix 2. Four respondents, including two with no walkways, do not allow pedestrians on the terminal. Three of them provide transport.

2.28.2 At terminals where no pedestrians are allowed there will still be occasions when access on foot may be necessary. Such occasions may include access to or from ships by their crew and others, checking location of containers, connecting or disconnecting refrigerated containers and emergency repairs to vehicles or other plant or equipment in the area. Appropriate arrangements for safe access in such circumstances should be made. These may be by the provision of safe walkways, by controlled vehicular access or otherwise.

3 International requirement

3.1 The 1979 International Labour Organization Convention No. 152 relates to occupational safety and health in dock work. Although it is primarily concerned with the safety and health of dock workers, its requirements are equally applicable to the safety and health of others who may be at docks, including passengers. The matters for which the Convention requires national laws or regulations to be made include the provision of safe means of access and egress.

3.2 Article 11 of the Convention requires separate passageways for pedestrian use to be provided where necessary and practicable. Such passageways shall be of adequate width and, as far as is practicable, separated from passageways used by vehicles.

3.3 The ILO Code of Practice that complements the Convention advises:

- In areas of danger, a pedestrian route should be provided for persons requiring to make their way about the dock or to/from any vessels that may be there. The route should be clearly marked.
- Where possible, the route should avoid any part regularly used by dock vehicles, such as the neighbourhood of stacks of goods and entrances to warehouses.
- Where the route has to cross an area used by vehicles, warning signs should be installed in a conspicuous position. Whenever possible the signs should be permanent.
- Any corner where visibility is permanently obstructed by buildings or other structures should be provided with warning mirrors in order that pedestrians and drivers of vehicles can see each other approaching.

3.4 The Code of practice was first published in 1958 with a second edition being published in 1977. Since then there have been many changes in the methods of cargo handling, including great increases in containerised and ro-ro traffic, both of which involve vehicular traffic. These are among the factors that have led to ILO's recent decision to revise and update the Code of Practice.

3.5 International road traffic signs are used in many countries. These incorporate standard symbols that are now familiar to most people. Although they were developed for road traffic purposes, a number of the signs are also appropriate for walkways.

3.6 In a number of countries the shapes and colours of signboards have been standardised to give a clear indication whether the sign is a mandatory instruction or a warning of a hazard. International standardisation of such signs is particularly helpful to persons in countries other than their own. Examples of such signs can be found on the website www.travlang.com/signs.

4 Conclusions

- 4.1 Despite the known hazards of vehicles to persons on foot in dock areas, the steps taken to protect such persons vary widely. Almost half of the respondents did not provide marked walkways within their premises.
- 4.2 The most common colours used for marking walkways are yellow and / or white.
- 4.3 In view of the international nature of shipping and of crews and passengers, the use of words alone on signs may not be sufficient. It is doubtful whether words alone would be understood by all those for whom the signs are intended.
- 4.4 The use of pictorial signs, international road signs and other warning signs, where appropriate, minimises problems of language.
- 4.5 Consideration needs to be given to the provision of information to ships' crew about the location of safe walkways through the port or terminal to or from their ship. The information should include the need to use such routes or any alternative transport that is available.

5 Recommendations

- 5.1 Arrangements for the necessary safe pedestrian access to all areas of ports and terminals should be reviewed periodically. In addition to access by stevedores, this should also cover access by other dock workers for operational and maintenance purposes, passengers, ships' crew and other persons as appropriate.
- 5.2 Wherever practicable pedestrian walkways should be separated from vehicular traffic.
- 5.3 The width of walkways should be wide enough for the number of persons who are expected to use them at one time.
- 5.4 Markings to identify safe walkways should be consistent and unambiguous. In particular, there should be no doubt whether a route is a walkway or a vehicular route or whether markings indicate a walkway or the track of mechanical plant or other hazard.
- 5.5 The markings should be clearly visible both in daylight and by artificial light. Yellow and /or white markings are most frequently used. Obstructions or constrictions in a walkway should be clearly marked or signed.
- 5.6 Appropriate road paint should be used for markings on, or identifying the boundaries of, permanent walkways to obtain maximum durability.
- 5.7 Walkway markings should be reviewed at appropriate intervals and renewed as required.
- 5.8 Where necessary, pictorial symbols, rather than words, should be used both on signs and on the surface of walkways.
- 5.9 Wherever appropriate international symbols and warning signs should be used.

- 5.10 Appropriate signs should be erected at the ends of walkways and at intervals along them as necessary.
- 5.11 Steps should be taken to ensure that information is given to ships' crew and other visitors about the location of safe walkways or other transport arrangements available and of the need to use them. This could be included in a general port or terminal information document and /or displayed on boards at the foot of gangways and at the entrances to the port or terminal.
- 5.12 Suitable lighting should be provided on walking routes to or from ships. Signs and markings on walkways should remain clearly visible by artificial light. At terminals that do not work at night, such lighting can be controlled by sensors and / or switches that turn it on for predetermined periods.
- 5.13 Additional guidance on the provision, marking and signing of pedestrian walkways in dock premises should be included in the proposed revision of the ILO Code of Practice 'Safety and Health in Dock Work'.

Appendix 1

Survey questionnaire

[Please refer to separate document - Walkways Survey Questionnaire]

Appendix 2

Narrative responses to questionnaire questions

- * Reported no walkways
- Q 1** 2.4 On container terminals use shaded indications in the danger zones.
- Q 2b** 2.6 Not in particular. Interlocking blocks are widely used.
- Q 2c** 2.7 At pedestrian crossings.
Level of surface is differentiated.
Different level.
Adult and child symbols on asphalt, a cycle way is marked with a cycle symbol (both symbols are by attachment).
- Q 2e** 2.9 Taxi. Phone.
Keep Clear.
- Q 2g and 2h** 2.11 Used are differently coloured inter-blocking blocks. So, there is no need for painting or repainting. If broken, just replace these defective blocks with fresh ones.
2.12
- Q 2h** 2.12 Not long life, Can you provide us with a good quality fluorescent paint - about 2 litres for our trial? Thank.
- Q 5a** 2.15 Walking man with child and words.
Crossways: walking man alone, walkways: adult and child (copies attached).
- Q 5b** 2.16 Crosswalk signs: square 600 x 600 mm or 400 x 400 mm (extra signs 450 x 450 mm), walkway signs: round, diameter 600 mm.
- Q 6** 2.19 * *[Yes]* From 6 different ports.
* Passengers are completely separated from cars by means of providing dedicated passage (elevated / bridge).
43500mm x 2000mm elevated walkway painted green.
- Q 7** 2.20 * Warning sign for cars is duly provided.
- Q 8** 2.21 Crosswalk signs (see appendix *[walking man on pedestrian crossing]*) and white stripes on ground.
- Q 9** 2.22 *[No.]* Responsibility of stevedore.
Not in terminal. Some to general cargo berths.
* Pedestrian passage is separated by concrete blocks.
* Passengers are completely separated from cars by means of providing dedicated passage (elevated / bridge).
- Q 10** 2.23 Safer access brochure with crew access PIN.
Crew access own vessels.
The general traffic plan is available but it has not been found necessary to deal it to ships.
Each terminal operator provided to those who go ashore with a guide.
- Q 11** 2.24 *[No.]* Start of gangway. Footpath very apparent.
- Q 12** 2.25 Only the traffic flow.

- Q 13** 2.26 Taxi phone and taxi lane to end of quay line.
Yes - PAX ships have separate walkway direct into passenger terminal
- completely separate to dock traffic.
Taxiways - fenced.
Shuttle bus for cruise passengers. (Not for seamen, only on the
passenger terminals).
* We have a bus service @ 24/24 to bring or pick up anyone anywhere on
the terminals.
A bus is for stevedores only. A taxi cab may drive alongside. Also
seamen's mission bus service available.
* There are bus stops for city bus routes 17 and 109.
Provide bus stop outside the operational area.

- Q 14** 2.27 As required.
The need for traffic signs at all intersections.
1. Storm water drains - waste drains.
2. Terminal area (working area) - no unauthorised access.
* Container areas etc.
Speed limit. Stop signs.
Terminal surface should be marked in accordance with local rules and
customs.
No parking areas around certain operational areas.
Emergency lanes etc. for fire, ambulance.
Roundabouts. Box Junctions.
Stop bars. Slow marking. Speed zone markings.
We deny all traffic access to terminal area except designated roadways
at each side. These end at parking area. Pedestrian access to end of
berth clearly marked.
e.g. speed limits for trucks.
Port parking areas, speed limits.
Signing and fencing could probably be improved. One of our main
problems is that we have open (unfenced) traffic terminals in proximity
to the passenger areas. This can be confusing and people sometimes
get into these areas that have no signs or walkways because pedestrians
are not supposed to be in them in the first place.
No parking areas etc.
If necessary, depends on case by case.
* Traffic free areas.
* Pipelines. Public telephone.
Emergency assembly points.
* Sufficient lighting shall be made to the passages working areas where
night-time work takes place and where cars and walkers cross.
* Pedestrians passages sometimes are mounded up.
Braille block is one of measures for the easy use by the disadvantaged.
* Diagonal lines. "Traffic free areas". "Use helmets boards". "Walking
men" sign boards.

Further comments

- 2.28 Pedestrians not allowed.
Security officers are posted at all entrance/exit.
* Basically no pedestrians are allowed within terminals. Transport within
terminals is conducted by authorised vehicles only.
* Pedestrians not allowed. Bus service ..[?]/.. on 24 hr to bring visitors

and dockers to their location.

24hr transportation to and from vessel or work areas.

There is no walking allowed on terminal Transportation is supplied for everyone.

We do not like directing crew to walk between crane legs. However this procedure is better than having crew walk through the stacks.

For general cargo berths we have accessways marked but encourage agents to have crew ferried by car/taxi whenever possible. All vehicles are given instruction on safest route to berth.

- * No walkways. All movements by minibus / cars.
- * Port terminal is situated close to city centre. Traffic within the terminal is not intense. That is, the need for specific walkways does not exist today.

Good quality fluorescent marking paint in yellow shade about 3 litres will be welcome at the following address. Thanks.

1. Provisions of question 5 will be implemented shortly and according to *[national]* specifications and code.

2. We are in the process of implementing PDP safety module.

- * In some operational areas we have pavements for pedestrians, but in most of cases we haven't pavements in operational areas.

It is difficult to clearly demarcate walkways and signpost in a port where most operational activities are centred in the port.

Would welcome the introduction of an international standard that all seamen would understand and comply with.

- * Pedestrians (workers) are separated by moveable fences. No serious problem is felt.

[Questionnaire] Results of some hearings made to the leasees.

- * Port Corporation is responsible for marking (separation) of vehicle passages. The rest is up to the discretion of the lessees. Therefore, marking for pedestrians does not come into the range of responsibility of the Corporation.
- * Pedestrian roads have been totally separated from car roads.
- * Pedestrian passage is mounded up. So, no marking is necessary.
- * Pedestrian passage is elevated. There is no road sign / marking on the road.
- * Roads are provided with pedestrian passage on both sides.
- *
 - Our railway grade crossings are marked with light blue reflecting stripes on surface on the difficult and dangerous areas. There are also special signs in this kind of places.
 - There are bumps on the roadway before gateways.
 - The edge line of the roadway is wider on the port area than elsewhere (40 cm), also dash line in the middle of the roadway is wider (20 cm). On the passenger terminal area where is in the main car traffic widths are 20 cm / 10 cm.
 - Places of containers and lorries are marked with yellow numbers. There are also special signs in this kind of places (see attachment).
- * Policy is focused to (1) spaces to which the general public is of safe and free access and (2) to the facilities to which the access is entitled to those who are authorised to enter. No container terminal is open to the general public.

ICHCA'S INTERNATIONAL SAFETY PANEL

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ICHCA is an independent, non-political international membership organisation established in 1952, whose membership comprises corporations, individuals, academic institutions and other organisations involved in, or concerned with, the international transport and cargo handling industry.

With an influential membership in some 65 countries, ICHCA's object is the improvement of efficiency in cargo handling by all modes of transport, at all stages of the transport chain and in all regions of the world. This object is achieved inter-alia by the dissemination of information on cargo handling to its membership and their international industry.

ICHCA enjoys consultative status with a number of inter-governmental organisations. ICHCA also maintains a close liaison and association with many non-governmental organisations.

ICHCA has National Sections in various countries, together with an International Secretariat based in the U.K., whose role it is to co-ordinate the activities of the Association and its standing committees, i.e. the International Safety Panel and Bulk Panel. The International Secretariat maintains a unique and comprehensive database of cargo handling information and operates a dedicated technical enquiry service, which is available to members and non-members.

Studies are undertaken and reports are periodically issued on a wide range of subjects of interest and concern to members and their industry.

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