Symposium

SECURING OF FREIGHT CONTAINERS ON THE DECKS OF CONTAINER SHIPS

Rotterdam - February 16th 2000

Proceedings

National Ports Council in the Netherlands
The Hague, March 1st 2000

Contents

Annexes

1. Summary of the discussion

Discussion

The discussion following the lectures is summarized below.

1. Awareness of risks is a "conditio sine qua non" to ensure safety. The risks to crew, vessel, cargo and environment related to the transportation of containers on the decks of ships as well as the risks to dockworkers unloading containers from and loading containers on the decks of ships are recognized.

2. Existing EU legislation on occupational health and safety generally favours an approach that aims at taking away the cause of a risk. If such an approach is not feasible, collective safety measures are to be taken. Individual safety measures are only temporarily admitted.

3. It is felt that this EU legislation on occupational health and safety is adequate to create safe working conditions in ports in general and also in container stevedoring. Additional legislation does not seem to be required.

4. The EU legislation on occupational health and safety ought to be enforced in the ports of all EU member states. The EU Senior Labour Inspectors Committee (SLIC) could play an important role in this respect.

5. Considering paragraph 4, stevedores, dockworkers and local enforcement agencies by co-operation could devise the best way to comply with EU legislation on occupational health and safety, taking into account specific conditions.

6.There are many different types of twistlocks, with different characteristics like endurance, reliability, appearance and way of operation. Some vessels are equiped with different types of twistlocks. Further standardisation of twistlocks will contribute to the reduction of risks during unloading and loading.

7. There are no simple general solutions. It could be assumed that open hatch container vessels with overhead cellguides offer the best conditions for safe unloading and loading as well as safe carriage across the seas. However, today only a limited number of this type of vessels is employed. It will take tens of years to change this situation substantially. Meanwhile semi automatic twistlocks could in a number of situations solve a part of the problem. By using SATL's coning and deconing may take place on the quay thus eliminating the risk of falling from a height. But the use of SATL's brings about a number of operational problems and other risks.

8. In a number of ports throughout the world vessels flying the Green Award flag enjoy certain benefits. These encourage the owners to comply with the Green Award requirements. The Green Award is not compulsory. A Green Award exists for tankers and is being developed for bulk carriers. It was proposed to verify wether a Green Award for container ships could contribute to safe unloading and loading as well as safe carriage across the seas.

9. The NPC-working group that prepared the symposium "Securing of freight containers on the decks of container ships" will continue to monitor relevant developments and stimulate the international dialog on this matter.

2. Programme

Symposium "Securing of freight containers on the decks of container ships"; programme

Date: February 16th 2000. Location: MarineSafety Rotterdam BV, Wilhelminakade 701, Rotterdam. Organized by: Nationale Havenraad.

Lecture	By	Time
• Welcome	Mr B.M.J. Hennekam, Secretary-General of the Benelux Economic Union	10.00 - 10.10
• Introduction by the symposium chairman	Mr A. van der Hek, President of the National Ports Council in the Netherlands (NPC)	10.10 - 10.20
• The dockworkers' point of view (risk of falling from a height; safe coning and deconing procedures; labour conditions and occupational health; effective regulations on health and safety at work).	Capt. A. Steinhoff, Amt für Arbeitsschutz, Hamburg	10.20 - 10.40
• The insurers' point of view (minimizing the risk to dockworkers and the risk to cargo; costs involved; insurance-premium and claims)	Mr J. Nicholls, Director of Loss Prevention of the Through Transport Mutual Servives (UK) Ltd (TT Club)	10.40 - 11.00
• Coffeebreak	-	11.00 - 11.20
• The stevedores point of view (coning and deconing and crane productivity; operational problems related to coning and deconing on the quay).	Mr E. van Aerschot, Hessenatie NV, Antwerp	11.20 - 11.40
• The shipowners' point of view (safe and efficient securing of containers on deck; turnaround time; operational problems related to the use of SATL's on small vessels; safe coning and deconing in Japan and the USA).	Mr E.J.N. Brookes, European Community Shipowners' Association (ECSA)[1]	11.40 - 12.00
• Lunchbreak	-	12.00 - 14.00
• USA (six months of experience after the ban of working on top of containers)	Mr B. Baron, Director of Safety and Security of the Steamship Trade Association of Baltimore[2]	14.00 - 14.20
• National authorities/EU (national and EU legislation and maintenance of national and EU legislation).	Mr P.J. Huijzendveld, Director-General of the Labour Inspectorate in the Netherlands, Ministry of Social Affairs and Employment	14.20 - 14.40
• Teabreak	-	14.40 - 15.00
• Discussion, summary, conclusions	Mr A. van der Hek, NPC President	15.00 - 16.00
• Reception	-	16.00 - 17.00

[1] Director (Technical) of the British Chamber of Shipping and Vice Chairman of the ECSA Technical Committee.
[2] Deputy chairmain of the ICHCA Safety Panel.

Extra lecture

An extra lecture was added to the programme after the teabreak:

• Safety in defence	A personal contribution by mr E. Vossnack, Former Head Newbuilding Nedlloyd

Discussion

To prepare for the discussion the lecturers presented their views on the risks involved, on how to deal with those risks, practical solutions and legislation supporting those solutions. After each lecture questions to clarify the presented information were to be answered. During the discussion views were exchanged between the audience and the lecturers together with a representative of the Green Award Foundation (mr J.A.A.J. Fransen) and a representative of the Federation of European Private Port Operators (mr P. Verhoeven, Secretary-General of Feport).

3. Participants

February 18th 2000

Symposium "Securing freight containers on the decks of container ships"; participants

PRESIDENT:

Name	Organisation	Country
1. Hek, mr A. van der	National Ports Council (President)	NL

LECTURERS:

Name	Organisation	Country
2. Aerschot, mr E. van	Hessenatie NV (Manager Container Operations)	B
3. Baron, mr B.	Steamship Trade Association of Baltimore (Director of Safety and Security)	USA
4. Brookes, mr E.J.N.	European Community Shipowners' Association (Vice-chairman Technical Committee)	GB
5. Huijzendveld, mr P.J.	Labour Inspectorate in the Netherlands (General Director)	NL
6. Nicholls, mr J.	Through Transport Mutual Services (UK) Ltd/TT Club (Director of Loss Prevention)	GB
7. Steinhoff, mr A.	Amt für Arbeitsschutz, Hamburg (Captain)	D

PANEL (the lecturers and):

Name	Organisation	Country
8. Verhoeven, mr P.	Federation of European Private Port Operators (Secretary General)	B
9. Fransen, mr J.A.A.J.	Green Award Foundation (Certification Manager)	NL

ATTENDANTS:

Name	Organisation	Country
10.Alexander, mr J.	PSO (Technical Services) Ltd	GB
11.Altschüler, mr O.	Arhus Stevedore Kompagni A/S (Operations Manager)	DK
12.Andren, mr K.	Port of Göteborg AB (Manager Banana Terminal)	SW
13.Arnold, mr F.A.	Hamburg Süd (Marine Superintendent)	D

14.Baete, mr B.	Belgische Transportarbeidersbond (National Secretary "Ports")	B
15.Bakker, mr A.	Rotterdams Dagblad (Press)	NL
16.Banicevic, mr	Port of Bar, Montenegro (Interpreter)	YU
17.Becker, mr T.	Eurogate Container Terminal Bremerhaven GmbH (Manager Operations)	D
18.Berg, mr L. van den	Benelux Economic Union	B
19.Biggs, mr S.	Southampton Container Terminals Ltd (Safety Representative)	GB
20.Boels, mr D.	Amt für Arbeitsschutz, Hamburg	D
21.Boerboom, mr J.	Ministry of Transport and Public Works	NL
22.Boevé, mr W.P.G.H.	Europe Combined Terminals (Director Home Container Division)	NL
23.Borg, mr C.	Specialarbejderforbundet i Danmark (Health and Safety Officer)	DK
24.Börjesson, mrs Y.	Port of Göteborg AB (Industrial Relations and Human Resources)	SW
25.Breukelen, mr V. van	Nieuwsblad Transport (Press - Photographer)	NL
26.Calado Correia, mrs M.M.	Inst. de Desenvolv. E Inspecção das Condições de Trabalho (Tecnica Superior Principal)	P
27.Carrera Vega, mr E.	Federación Estatal de Transportes, Comunicaciones y Mar	ESP
28.Chaffart, mrs M.	Christelijke Vervoerarbeiders en Diamantbewerkers (General Sector Co-ordinator Water)	B
29.Chielens, mr K.	Ocean Container Terminal Hessenatie Zeebrugge (Technical Manager)	B
30.Compton, mr M.	PSO (Technical Services) Ltd	GB
31.Dekkers, mr J.M.	Europe Combined Terminals (Director Corporate Communications)	NL
32.Denkelaar, mr W.	Rotterdam Short Sea Terminals BV (Safety Co-ordinator)	NL
33.Desbuquoit, mr G.	Noord Natie Terminals NV (Manager Containerterminal)	B
34.Edkins, mr S.	Tilbury Container Services Ltd (Head of Operations)	GB
35.Eklund, mr B.	Port of Göteborg AB (Production Manager)	SW
36.Ellens, mr H.	Schip & Werf de Zee Magazine (Press)	NL
37.Gaag, mrs M.E. van der	National Ports Council (Symposium Administrator)	NL
38.Goebel, mr N.-V.	Alpha Ship GmbH (Marine Superintendent)	D
39.Goller, mr H.	Hamburger Hafen- und Lagerhaus AG (Terminal Manager)	D
40.Goey, mrs M.B.C.I. de	Labour Inspectorate in the Netherlands - district South-West (Chief Inspector)	NL
41.Halworson, mr H.	Port of Göteborg AB (Foreman)	SW
42.Hardarson, mr S.	Administration of Occupational Safety and Health (Technical Inspector)	ICE

43.Hazejager, mr J.	Algemeen Dagblad (Press)	NL
44.Heirstraten, mr T.	Seaport Terminals NV (Terminal Manager)	B
45.Henderson, mr G.P.	Health and Safety Executive (Head of Construction & Marine Section)	GB
46.Hennekam, mr B.M.J.	Benelux Economic Union (Secretary General)	B
47.Hoek, mr P.J. op de	Labour Inspectorate in the Netherlands - Central Office	NL
48.Hoeven, mr T. van der	Labour Inspectorate in the Netherlands - district South-West (Chief Inspector)	NL
49.Hornsby, mr T.	Tilbury Container Services Ltd (Supervisor)	GB
50.Jacobs, mr F.	Christelijke Vervoerarbeiders en Diamantbewerkers (Nat. Sector Co-ordinator Water)	B
51.Jacobs, mr J.	Ministry of Labour (Industrial Engineer)	B
52.Jong, mr J. de	Schip & Werf de Zee Magazine (Press)	NL
53.Keilen, mr C. van der	Joint Service for Prevention and Protection at the Port of Antwerp (Engineer P&B)	B
54.Keiman, mr H.S.	Matrans Marine Services BV, Rotterdam	NL
55.Keyzer, mrs H. de	Transport Echo (Press)	B
56.Kleinjan, mr J.	Europe Combined Terminals/CNV Bedrijvenbond (Crane driver)	NL
57.Kluit, mr P.C. van der	International Association of Ports and Harbours (IAPH Representative Europe)	NL
58.Kok, mrs J.	Press Release	NL
59.Krabbendam, mr M.	Europe Combined Terminals/FNV Bondgenoten (Radioman Deck)	NL
60.Kromhout, mrs K.	Student M.Sc. Maintenance & Safety Management	NL
61.Kruisdijk, mr P.	Ministry of Social Affairs and Employment	NL
62.Leenaerts, mr L.	Antwerp Combined Terminals (Terminal Manager)	B
63.Leeuw, mr P.W.	Labour Inspectorate in the Netherlands - district North Sea Canal (Inspector)	NL
64.Lindeijer-Schoof, mrs H.	Ministry of Transport and Public Works (Team Manager Seaborne Shipping)	NL
65.Löpmeier, mr P.	Grosshandels- und Lagerei-Berufsgenossenschaft. Bezirksverw. Bremen	D
66.Loridan, mr M.	Belgische Transportarbeidersbond (Secretary "Port of Antwerp")	B
67.Lovet, mr D.	Tilbury Container Services Ltd (Compliance Manager)	GB
68.Lubben, mr H.	Belgische Transportarbeidersbond (Permanent Representative)	B
69.Luitwieler, mr M.	Mac Gregor Conver (Sales Manager)	NL
70.Luth, mr H.R.	Marin - Wageningen (Consultant)	NL
71.Maat, mr J.	Port of Dordrecht (Harbour Master)	NL
72.Madrid, mr M.R.	Estibarna (Assistant Director Marketing)	ESP

73.Marzaroli, mr G.	La Spezia Container Terminal/Contship Italia Group (Risk Manager)	I
74.Mastenbroek, mr J.	Rotterdam Short Sea Terminals BV (Manager Operations South Side)	NL
75.Meenke, mr D.	German Shipowners' Association	D
76.Meijer, mr W.F.	Ministry of Transport and Public Works	NL
77.Meldrum, mr R.W.	Health and Safety Executive (H.M. Principal Inspector of Health and Safety)	GB
78.Merkx, mr J.P.	Flemish Ports Committee (Attaché)	B
79.Metzlar, J.K.	Shipping Inspectorate in the Netherlands (Senior Expert)	NL
80.Meulders, mr W.	Christelijke Vervoerarbeiders en Diamantbewerkers (Delegate)	B
81.Munneke, mr H.	Corus (British Steel/Hoogovens) (Safety Expert)	NL
82.Nesse, mr B.	Labour Inspectorate in the Netherlands - district South-West (Project Manager)	NL
83.Niemand, mr W.A.	Carriers Container Council. Inc (Director - Gulf Region)	USA
84.Nooyer, mr O. de	Chiquita Int. Service Group, Antwerp	B
85.Olaizola Azaldeguï, mr J.A.	Federación Estatal de Transportes, Comunicaciones y Mar	ESP
86.Ostosic, mr Z.	Port of Bar, Montenegro	YU
87.Oudgenoeg, mrs E.	Nieuwsblad Transport (Press)	NL
88.Pajer, mr W.	Grosshandels- und Lagerei-Berufsgenossenschaft. Bezirksverw. Bremen	D
89.Penon, mr T.	German Lashing	D
90.Qamar, mr N.	Associated British Ports (Senior Safety Manager)	GB
91.Quetina Pargana, mrs T.I.	Instituto de Desenvolvimento e Inspecção das Condições de Trabalho (Labour Inspector)	P
92.Reijniers, mr J.	Ocean Container terminal Hessenatie Zeebrugge (Terminal Manager)	B
93.Ripke, mr J.J.	P&O Nedlloyd BV (Nautical Marine Superintendent)	NL
94.Rosier, mr O.C.	National Ports Council (Secretary/Symposium Manager)	NL
95.Schie, mr C.H.M. van	Shipping Inspectorate in the Netherlands (Inspector of Shipping)	NL
96.Scholtens, mr M.	P&O Nedlloyd (Naval Architect)	NL
97.Smith, mr L.	Southampton Container Terminals Ltd (Foreman Safety Representative)	GB
98.Staaf, mr K.S.	Swedish National Board of Occupational Safety and Health (Senior Adm. Officer)	SW
99.Stam, mr N.	FNV Bondgenoten (Manager)	NL
100.Struis, mr M. van der	Uniport Multipurpose Terminals BV (Terminal Manager)	NL

101.Struijs, mr P.	Port of Rotterdam (Executive Director Shipping)	NL
102.Sybesma, mr S.	P&O Nedlloyd (Master Mariner - retired)	NL
103.Terry, mr P.F.	Southampton Container Terminals Ltd (Safety Manager)	GB
104.Vandenvoorde, mr J.L.	De Lloyd (Press)	B
105.Vark, mr Th.E. van	National Ports Council (Secretary General)	NL
106.Vervat, mr J.M.	Matrans Marine Services BV (Director)	NL
107.Vossnack, mr E.	P&O Nedlloyd (Former Chief New Building - retired)	NL
108.Westra, mr T.W.A.	Royal Association of Netherlands' Shipowners (Advisor Operational Affairs)	NL
109.Woninck, mrs J.	Green Award Foundation	NL
110.Wouden, mr A. van der	Retired	NL
111.Wubbeling, mr J.	Europe Combined Terminals (Safety Manager)	NL
112.Wijdeveld, mr E.	Rotterdam Port Industries' Association	NL
113.Ziethen, mr M.	Grosshandels- und Lagerei-Berufsgenossenschaft. Bezirksverw. Hamburg (Engineer)	D
114.Zurstrassen, mr H.	Grosshandels- und Lagerei-Berufsgenossenschaft (Managing Director)	D

4. Welcome

Mr B.M.J. Hennekam
Secretary-General of the Benelux Economic Union

Brussels, 10 februari 2000
SG/REG (2000) 34b

Secretariaat-Generaal
Afdeling REG

Symposium "Securing of freight containers on the decks of container ships"

Welcome by mr Hennekam, secretary-general of the Benelux Economic Union

Ladies, and gentlemen,

Growing world trade resulting in growing seaborne shipping, rationalization resulting in increasing containerisation, growing congestion on the European motorway network boosting short sea shipping. These are the seeds that make the container-crop in the seaports grow. Today about 190 mln containers annualy are transported by sea going vessels. This number is expected to grow (sheet 1).

In 1998 about 33 mln TEU were loaded on and unloaded from seagoing vessels in the major European seaports, of which about 11 mln TEU in my own back yard: the major Benelux seaports (sheet 2).

The Benelux cooperation between Belgium, The Netherlands and Luxembourg began with the introduction of a Customs Union in 1944 resulting in 1958 in an Economic Union. The Benelux served and serves as model for Europe. Benelux cooperation is supported by a general secretariat in Brussels.

Due to their location at the mouths of the main rivers of Western Europe, the Benelux countries have been able to deploy major activities in the field of transport and distribution. Half of the goods leaving or coming into Europe has transhipments in Benelux seaports. In a growing Europe the three countries use their cooperation to defend their common interests. For example: Every six month prior consulatation is organised on items on the agenda of the European Council on Transport. In the field of the Benelux cross-border

cooperation we pay a lot of attention to the development of the port-regions and the cross-border infrastructure problems.

The unmistakable competition between Benelux ports does not exclude cooperation. Many common interests exist. They can be approached jointly. The symposium of today is in my opinion an example of such a common interest.

The introduction in the mid nineteenth sixties of the freight container in the maritime transport chain caused a revolution for all parties concerned. This revolution not only affected shipping companies, who had to build special designed ships, but also the ports who had to adapt their infrastructure. And they still do. For example:

1. In Amsterdam an innovative new containerterminal is constructed.
2. Rotterdam finalises its Delta 2000-8 project and a second Maasvlakte will accomodate more container facilities.
3. Rotterdam and Zeeland Seaports are to construct a new containerterminal along the Western Scheldt estuary in Flushing for Hessenatie of Antwerp.
4. Antwerp is constructing a number of tidal containerterminals on the left bank of the river Scheldt.
5. Ghent and Brugge are modernizing their port-infrastructure for containerships.

Elsewhere in Europe ports are also working on new containerfacilities.

Due to the success of container transport a tremendous scale-up is taking place in merchant shipping and port infrastructure. Faster and bigger ships, with containers sometimes stowed 7 high on deck and the development of vast container terminals with huge container cranes are indications of this process. Terminal operators are continuously urged to improve terminal productivity. To meet the productivity required more and more terminals are now fully operational around the clock and the capacity of the terminal equipment is improved. Electronic data transmission and processing speeds up procedures.

However, in this high tech environment of the seaborne container transport the securing of containers, especially on deck, seems to be a "suppositious child". In an environment where huge partly or fully automated terminal equipment moves about with massive loads, the securing of containers on the decks of container ships still is done manualy.

This situation brings about a number of potential conflicts. Conflicts of scale, conflicts of time, safety and conflicting economic interests.

Safe and proper securing of containers on the decks of container ships first and foremost requires positive securing devices. Reliable devices, easy and safely to manipulate, that ensure solid securing. The ultimate solution of course is the hatchless container vessel equiped with overhead cellguides. But for a number of reasons this type of vessel is not ordered anymore. Other solutions to parts of the problem being:

- The use of lifelines but that negatively effect productivity;
- The use of safetyflats that are rather costly and also negatively effect the productivity.
- The use of semi automatic twistlocks, that allow deconing and coning on the quay outside the crane cycle thus offering in theory effective protection. But semi automatic twistlocks appear to be twice as expensive as conventional twistlocks and particularly on smaller vessels the use of semi automatic twistlocks may cause operational problems.

Safety first, ladies and gentlemen. Whatever our choice, safety should not be second to economic interests. Preferably safety and economic interests should go hand in hand.

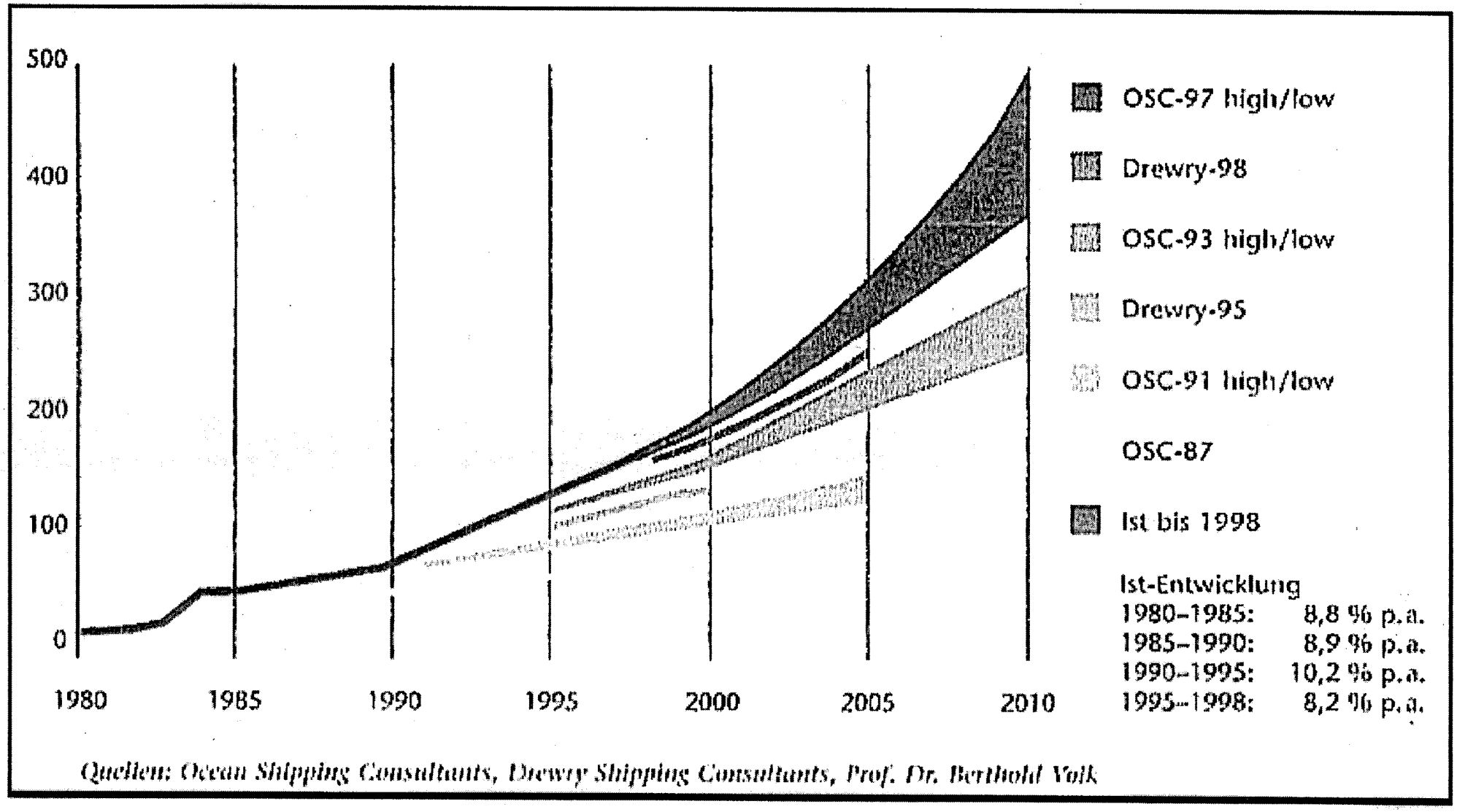
In more and more countries the risks involved in the securing of freight containers to the decks of container ships are recognized. In a number of countries, like the USA and Japan, legislation already has been introduced to eliminate this risk of falling from a height while working on top of containers. This legislation seems to be effective to achieve container top safety. Some Member States of the European Union already consider similar European regulation too. No wonder. The European Union aims at free movement of its inhabitants, free enterprise and free and fair competition. This inevitably calls for equal standards particularly when it comes to safety and health. Unilateral national regulations in Europe may distort competition, particularly in the container transport market.

Therefore I wellcome the initative of the National Ports Council in the Netherlands to organize this symposium. To bring together all those involved: stevedores, shipowners, dockworkers, insurers, national and multinational authorities and port authorities from a considerable number of European countries. To discuss risks, the desired safety level, the appropriate safety measures and the instruments - both financial and legal - to encourage and enforce the use of the appropriate safety measures.

Mr President, ladies and gentlemen,
I now declare the symposium "Securing of freight containers on the decks of container ships" to be open.

I am sure it will be an interesting event. And I hope this symposium will be the first step towards a lasting joint international effort to develop and apply intrinsically safe techniques for securing of freight containers on the decks of container ships; techniques that produce maximum safety of the vessel's crew, the vessel, its cargo and the oceans; techniques that produce intrinsically safe working conditions during loading and unloading; techniques that eliminate the risk of falling from a height while coning and deconing on top of containers.

I wish you a good information-exchange and discussion.



Quellen: Ocean Shipping Consultants, Drewry Shipping Consultants, Prof. Dr. Berthold Volk

Containerthroughput in the European seaports (1991-1999)

	Loaded on and unloaded from seagoing vessels (x 1.000 TEU)								
	1999	1998	1997	1996	1995	1994	1993	1992	1991
Felixstowe	-	2.943	2.251	2.065	1.924	1.747	1.639	1.543	1.434
Southampton	921	858	890	805	680	587	501	422	409
Liverpool	-	487	460	414	379	-	-	-	-
Thamesport	-	500	396	-	-	-	-	-	-
Tilbury	-	-	125	115	-	-	-	-	-
Hamburg	3.700	3.550	3.337	3.054	2.890	2.742	2.495	2.246	2.178
Bremen/Bremerhaven	2.150	1.820	1.700	1.543	1.524	1.503	1.358	1.315	1.277
Rotterdam	6.400	6.032	5.445	4.930	4.787	4.539	4.167	4.125	3.766
Antwerp	3.614	3.177	2.969	2.654	2.329	2.208	1.876	1.836	1.761
Zeebrugge[1]	835	776	648	553	528	609	490	526	304
Le Havre	1.370	1.320	1.185	1.020	970	873	895	746	919
Marseille	664	660	622	547	498	437	432	350	447
Algeciras	-	1.826	1.538	1.307	1.155	1.004	807	780	762
Barcelona	1.250	1.066	965	767	689	605	501	552	489
Valencia	-	1.003	832	709	672	467	385	371	364
Bilbao	-	366	340	301	297	268	222	204	194
Lisbon	-	340	333	309	-	-	-	-	-
Leixoes	-	243	216	202	-	-	-	-	-
Gioia Tauro	2.253	2.126	1.449	572	16	0	0	0	0
Genoa	1.234	1.266	1.180	826	615	507	343	338	344
La Spezia	843	732	616	871	965	816	765	596	464
Livorno	458	522	501	417	424	371	361	334	411
Napels	334	320	304	246	235	-	-	-	-
Salerno	266	251	219	190	174	-	-	-	-
Venece	200	206	212	169	128	-	-	-	-
Triest	189	174	202	177	152	143	150	134	136
Ravenna	173	173	188	191	-	-	-	-	-
Taranto[2]	-	0	0	0	0	0	0	0	0

Source: National Ports Council in the Netherlands.

[1] Both lo-lo and ro-ro containers.

[2] Taranto Container Terminal will be operational by September 1999; expected volume: 500.000 TEU/year.

5. The dockworkers' point of view

Capt. A. Steinhoff
Amt für Arbeitsschutz, Hamburg

Freie und Hansestadt Hamburg
Behörde für Arbeit Gesundheit und Soziales
Amt für Arbeitsschutz

Securing of Freight Containers on Decks of Container Ships

by Capt. Armin Steinhoff

Modern container ships need a lot of lashing gear to secure container deckloads. How the work has to be done is written down in the cargo securing manual and the lashing plan.
It is the task of the stevedores / riggers to establish this securing system before, during and after loading / unloading operations on container ships.

(Pic. 1) ... the risk

Lashing operations can be divided in three major worksteps:

- Coning and deconing operations of twistlocks with the risk of falling from containers;
- Screwing and unscrewing of bridge clamps / bridge fittings also with the risk of falling from containers;
- Setting and taking off of lashing rods with the risk of falling from the hatch covers, over board or in open hatches.

A lot of existing regulations will lead to a safe working practice, but riggers and their companies have to follow them.
Under a high time pressure – and lashing operations will always be done under high time pressure – not everybody will follow the regulations, if there is a chance to save time. "Time is Money"

Coning and deconing operations

There are some possibilities to make the working place safer:

- Use of a speader for climbing up to the top of containers and work with a full fall arrest harness connected to the spreader. This method is not allowed in all countries, so in Germany.
- Use of a lashing cage for the transportation of riggers to the top of the containers and work with a full fall arrest harness connected to the cage.

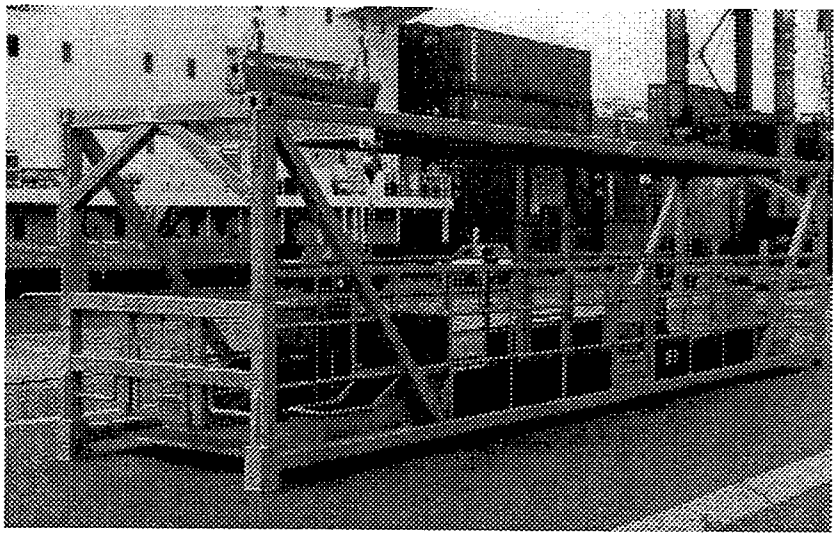
In both above mentioned cases the fall arrest equipment is not in the right use, because

- it is supposed to save somebody from falling vertically and not designed for a horizontal use,
- it will not allow a comfortable working speed and
- it will lead to heavy injuries, if somebody falls from the containers and slides along the walls.

Much better is to...

- Use special lashing cages (see Pic. 3) for the transportation of riggers to the top of containers and work out of the cage with a full fall arrest harness connected to the cage.

(Pic. 2) ... out of the Cage



(Pic. 3) ... special lashing cage / Hamburg

- Use SATL's (Semi Automatic Twistlocks) to reduce the work on containers. But now the work has to be done between Van Carriers / Straddle Carriers, cars, lorries or AGV's (Automated Guided Vehicles) on the shoreside.

Screwing and unscrewing of bridge clamps

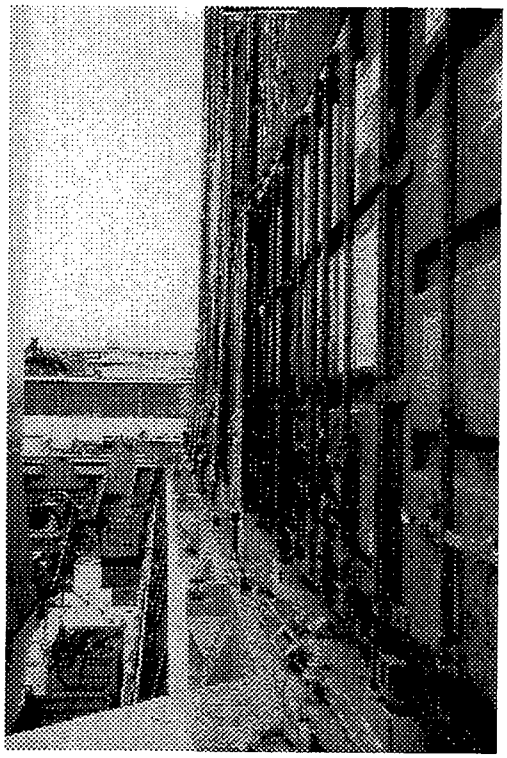
For that operation it is still necessary to work on top of containers, a ban is not possible. Only classification societies are able to renew the calculation of existing lashing plans.

A good solution to work safe on top of containers is the special lashing cage (see Pic. 3)

Setting and taking off of lashing rods

There will be no risk, if the ship design departements did their work well and keep the safety recommendations for riggers and seamen in mind.

Otherwise it is very hard to correct ship design failures during loading and unloading operations (see Pic. 4).



(Pic. 4) ... bad workingplace for ridggers

The Amt für Arbeitsschutz worked on the aboved mentioned matters for more years now.

There are some results:

- A new concept of building container gantry cranes as on the HHLA Containerterminal Burchardkai. They have a lashing plattform above ground level, free of any risks from vehicles.
- Out come from a project "Safe Working Places for Stevedores on Board Vessels". The results are on the Internet Hamburg Homepage **http://www.hamburg.de/bags/arbeitsschutz**
- Coming out soon with an ICHCA Pamphlet: "Ship Design Considerations for Stevedore Safety"

6. An Insurers' point of view

Mr J. Nicholls
Through Transport Mutual Services (UK) Ltd (TT Club)

Securing of freight containers on the decks of container ships

An insurer's point of view

(minimising the risk to dockworkers and the risk to cargo)

by John R Nicholls

Loss Prevention Director

TT Club

All operations, whether they consist of placing or removing containers on or from a ship or simply loading cartons of feathers onto a shelf, involve some sort of risk. No risk is ever likely to be completely eliminated, so there always has to be a considered level of risk that one feels can be taken in order to do a good job.

The stowage of cargo on board ship has changed dramatically since the introduction of the container (some say in 1970, others who have read the history will know that the container dates back to 1935). At first containers were stowed below deck in the fashion known for general cargo, then they started to be loaded on the deck of specialised ships. Eventually these containers started to climb skyward until we now have some ships with seven tiers high on deck.

The art of loading containers in cell guides below deck is complex enough. But the art of loading containers on deck has become a special art, especially when we consider that it is often the hazardous, the "out of gauge" cargoes and those of a non regular shape that are designated as deck cargo. The gantry crane driver will certainly need a high level of skill to stack many differing types of container or flat and the stevedore, or ship gang, will be clambering all over the containers in order to attempt to secure one unit to the next.

The system of securing one container to the one below it has been in existence for many years and it has, to some extent, proven to be a relatively sound system. However, once the stack height on deck started to go above 4 tiers then problems began to occur. It has been common practice to lash the ends of the lower three tiers to the deck using rods and lashing poles in addition to the twistlocks between each vertical container. This leaves the 4^{th} tier to be held in place solely by twistlocks at the bottom and bridge fittings at the top.

With tiers going up seven high there is still an expectation that these practices be applied. The lower three tiers are usually still lashed at the ends, and all tiers above the first three are held in place by twistlocks and the top tier by twistlocks and bridge fittings, but the desire of the stevedores to work at such heights is rapidly diminishing. It takes a brave person to move amongst containers being loaded or discharged at heights of up to 20 metres above the deck of a ship (7 x 2.9 metres) to fit twistlocks and bridge fittings.

It also takes a rather dextrous type of person to fit the rods or handle the lashing poles even to just the first three tiers of containers. These poles are difficult to handle at any time, due to their length,

but working with the poles vertically above ones head makes it even more difficult and consequently more dangerous.

Deck areas often leave a great deal to be desired in respect of space and accessibility and in some cases could be classified as positively dangerous working areas. If anything falls in these working areas, there is little opportunity for the lashers to get out of the way and in consequence the UK Docks Regulations 1988, for example, states that lashing is one operation where safety helmets must be worn.

One should remember, at this point, that the real purpose of insurance is to provide cover for that which is unexpected. One may say that in whatever task we undertake, there is an expectation of certain elements having expected outcomes. One of these elements is that people working at heights such as those just mentioned will, inevitably, lose their balance at some point and fall unless proper precautions are taken.

There is no way that insurers would refuse to cover the risks of stevedores, including fitting rods and handling lashing bars and working on the tops of containers. But as more accidents occur, each having successively larger settlement values, then insurers will be looking for operators to work with safe practices. Those safe practices will be expected to apply to all workers within those operations, irrespective of any previous ways of working.

A fundamental rule for dealing with safety hazards is to deal with them at source. In the case of deck container operations, this option is not available to stevedores or ship's crew, as they have to work each ship as it is. The only people who can deal with this matter at source are those who order, design and build ships. New safety design elements should not be held over awaiting the building of new ships as containers will continue to be moved on existing ships and therefore work on top of containers on the decks of existing ships will still be necessary. Now is the time that new and innovative solutions are needed, not in 5 or 10 years time.

In many cases, the need for stevedores to go on the tops of containers to fit or remove twistlocks or other container-securing devices can be avoided by the use of appropriate securing systems. The need for such access cannot be eliminated completely and access for other reasons may be needed from time to time. In these circumstances it is essential that safe systems of work are devised and put into practice.

It is fairly obvious that there are a number of options that can be used to make working with deck containers as safe as possible, but these are only effective if used at all times and by all persons. As soon as one person decides not to use the safety equipment, then there is every possibility that others will relax their judgement and also not use it. It is the role of management to ensure that all personnel not only have these safety features available to them but also always use them without exception.

Technological advances, such as semi-automatic and automatic twistlocks are slowly coming into their own, especially in services to or from the United States of America. These are undoubtedly an additional safety measure and once they become universally used on all container vessels, irrespective of size, then there is likely to be fewer accidents to stevedores and ship's crew.

These technological advance, in themselves, are not the end of the situation as there have been numerous collapses of stows of deck containers, with losses overboard. These collapses occur whether automatic/semi-automatic or purely manually operated twistlocks have been used. This indicates that the current methods of securing containers on deck are not foolproof.

It may be said that the world weather patterns are changing and that this is the cause of many of these incidents. This is probably true, but if weather patterns are altering and causing additional problems then the industry needs to re-examine how it goes about securing containers on deck to take the additional weather factors into account as well as providing a safe working environment for stevedores and ship's-gangs.

The use of automatic or semi-automatic twistlocks, which require positioning of the twistlocks before loading or after unloading of a container will also bring about some changes in the way that ports and terminals operate. It is likely to be an essential requirement that the quay area is kept clear of all persons not directly involved in the positioning or removing of these twistlocks.

Despite being sensibly built, poor positioning of any type of twistlock could cause them to fall from the container during lifting or lowering by crane, thus jeopardising the safety of any persons in the vicinity of the crane working area.

The possibility of twistlocks dropping from containers and damaging other containers must also be taken into account. Damage caused this way may not be noticed for several days or even weeks, and

if inclement weather is experienced en voyage, then the cargo in those containers that have been damaged could also suffer and end up as a claim.

The whole basis of containerised movement of cargo appears to have been devalued in some way. Shippers look at containers as an alternative method of packing – loading their goods without even a thought for the transit method that will be used. Operators treat containers as yet another piece of ship's equipment and often take little regard of the cargo inside (other than if it is declared as dangerous). Consignees complain that their cargo is received damaged. Everyone ultimately blames the shipping line, because their name is on the box.

If containers are to be given the respect that they deserve as a truly unique way of moving cargo, then they must be treated as unique. The packing and handling of containers, from the positioning at the shipper's premises through the entire transport chain to the return after discharge at the receiver's premises, should be reviewed at regular intervals. This review of the process should include the stuffing of the container as well as the physical handling and appropriate securing of the container during every stage of the journey.

Many years ago I asked a respected terminal safety person how safe something was. His reply has stayed with me now for many years and I believe will continue to be my watchphrase ever into the future – "there is safe and there is not safe, there is nothing in between."

Constant vigilance, moving with the technological advances and ensuring safe operation is what we all should be doing in the future. If this takes a little more time, or costs a little more money then so be it. Property (or wealth) can be replaced - lives cannot.

J R Nicholls
24 January 2000

7. Working safely on top of containers

Mr E. van Aerschot
Hessenatie NV Antwerp

WORKING SAFELY ON TOP OF CONTAINERS

Ladies and Gentlemen,

1. The problem

Working safely on top of containers is part of the total safety regulations that must be implemented in the full cycle of container handling.

It is indeed the case that the employer must devise a global safety system for those in his employ, taking account of all the facets of the global operational process.

This operational process, with its attendant risks, depends greatly on the application of the system. It is therefore no use to emphasise one aspect and lay down regulations whereby people in another part of the operational process are left subject to a greater risk.

We must therefore look for a balance between the regulations and their observance, the ultimate result being to reach the highest safety standards.

In the risk analysis we confirm that the place where the highest risk factor is to be found is where vertical and horizontal traffic meet – that is, the crane buffer zone.

In consequence of this finding, measures have been taken to reduce the number of workers in this area of operations to the minimum.
Systems have been developed for those necessarily employed in this area to reduce the risk as far as possible.
Thus, for example, the straddle carrier may only be given a task via a mobile data system, to remove a container from the buffer zone after the checker has fully examined the container and conveyed the information via a portable data terminal to the host computer.

Transporting containers to and from the crane buffer zone is done by the straddle carrier with a pull-and-push system whereby the straddle carriers never drive under the crane.

This is to illustrate that, with container handling systems – and most certainly in a direct straddle carrier system – the greatest risk is to be found in the crane buffer zone. The more activities that are organised in this zone – in other words, the more workers are employed here – the greater is the risk.

In this context I would therefore like to go over a number of arguments that must demonstrate that depositing and removing SATL-DFTL's at the quayside (in the crane buffer zone) cannot provide a safer solution in all cases and, on the contrary, sometimes creates additional risks.

It is the opinion of the goods handlers that the risk of falling on top of containers should not be replaced by the risk of a crash in the crane buffer zone and/or removing or depositing a twistlock when under a load.

As a matter of fact, the ICHCA mentions the following viewpoint in their booklet entitled "Container Terminal Safety no. 5" by Bob Barnes:

> "The majority of serious accidents on container terminals is due to the mixing of people and heavy machinery, the drivers of which often have restricted visibility. As a general basic principle the aim should be to avoid the exposure of pedestrians to such plant. When this cannot be done, exposure should be minimised."

This statement applies with equal force to those employed in the crane buffer zone.

Arguments

- Depositing and removing twistlocks at the quayside takes place in a risk area under the container crane, within the working reach of straddle carriers or other transport vehicles.
- SATL's are designed with higher technical features and thus vulnerable to rough handling on board. In time, they will quickly cease to function properly.
- When an SATL no longer works properly, additional handling operations will have to be carried out, which in turn will lead to extra risks.
- When more than 4 containers are stacked up one above the other, the operation of SATL's that can't be handled from on deck demands long and heavy operating poles.
- Because of the increasingly narrower bay separations, the working space for operating SATL's from on deck is often too small.

- The lighting from the container cranes provides sufficient light on top of the containers. In the narrow bay separations this is not the case.
- SATL's can fall out of the container when turning round over the quay. This risk will increase as the SATL's become subject to wear and tear.
- When 2 x 20' containers are stacked on a 40' stack position, the intermediate twistlocks can only be operated from above.

2. Where do we go from here?

2.1 At the quayside

Referring to the arguments just presented, the object of using automatic twistlocks cannot be to abolish working on top of containers.
During the month of August 1999, observations and measurements were made on the Hessenatie container terminals in order to gain a clear insight into time lost during operations.

Pick-up time at the quayside (unloading)

1 dock worker (4 twistlocks)	36 sec.
2 dock workers	17 sec.
3 dock workers	15 sec.
4 dock workers	10 sec.

Twinlift container-moves make relatively faster pick-up times possible. Picking up ATL with a twinlift move gains 20% in time compared with the ATL pick-up time with two containers to be unloaded separately.

Installing twistlocks on the quayside

1 dock worker (4 twistlocks)	41 sec.
2 dock workers	17 sec.
3 dock workers	16 sec.
4 dock workers	9 sec.

The crane is always immobilised for a short time, which has a direct influence on efficiency. On average, one dock worker needs 35 seconds to undo automatic twistlocks and 41 seconds to install them. If we count 45 containers per hour when loading (twin-move), then that means that we will spend about 30 minutes per hour fixing automatic twistlocks.

Dock workers who handle automatic twistlocks on the quayside are right next to the load at all times. In some cases they are even partly under the load. Indeed it can happen that their toes are just under the edge of the container.

Conclusions

- Loading and unloading containers with SATL has a considerable impact on the efficiency of the crane.
- The average cycle-time of the crane is 16 to 17 seconds longer when using SATL.
- A quarter to one-half of all SATL shows technical shortcomings that increase this cycle-time.
- Loading and unloading twinlift moves provide a competitive advantage and make it possible to handle twistlocks faster than two containers to be handled separately. The relative gain in time is 10 – 20%.
- Optimally, two dock workers are deployed to pick up or deposit twistlocks. Bringing in more dock workers provides no significant competitive advantage, but only increases the risk of accidents.

2.2 Handling twistlocks on board ship

As already stated, handling twistlocks on board ship cannot be excluded – on condition however that adequate safety equipment is used (safety-flat fitted with a roll-up system and harness).

At both the Hessenatie container terminals, where some 1.6 million containers were handled on the ships in 1999, not a single accident was reported in which the cause was working on top of containers on board ship.

As a matter of fact, if we make a comparison with the building sector, where the seriousness and frequency of accidents at work resulting from working at heights are considerably higher than in the harbour sector, we would have to point out that, here too, working at heights cannot be excluded, provided the use of required safety equipment is made compulsory.

Automatic twistlocks are, seen from a technical viewpoint, more vulnerable to damage than the traditional twistlocks. If they no longer function properly, additional handling will always be necessary and it will never be possible to exclude the fact that, in certain situations, people will still have to work on top of containers. Indeed we must not lose sight of the fact that, on most ships, the topmost layers of containers on deck are held together with bridge fittings. Here too, people have to get on top of the containers to unscrew or fasten them, on condition that the required safety equipment is provided for the dock worker.

On most ships the containers are stacked up 4 to 6-high. This means that very long poles need to be used to undo the twistlocks from the deck. These are difficult to handle. Moreover, the passage between 2 bays on the new generation of container ships is becoming increasingly narrower and sufficient lighting is not always available. After the lashing team have released the lashing bars, these usually remain lying about in the passage between the bays. It therefore becomes dangerous for the people who have to undo the twistlocks from the deck (risk of tripping up, getting feet trapped or missing one's footing on the stairs).

Neither should we exclude the possibility that a badly functioning automatic twistlock will fall out of the corner post when turning over the quayside.

If 20' containers are stacked on a 40' bay, it is not possible to undo the middle twistlocks from on deck. People will then have to get on top of the container anyway in order to unlock them.

Conclusions

1. Bearing in mind the fact that we must always strive towards the safest and most economically achievable solution during operations, we should under no circumstances pin everything on to a single working method as far as handling twistlocks is concerned.

2. Taking into consideration the above mentioned arguments, it will never be possible to exclude the fact that, some time or other, people will still have to work on top of containers. For this reason we should be open to both working methods, on condition that use is made of the required safety equipment in all circumstances.

3. Terminal operators are following the Feport resolution which was approved by the Management Committee on 14-01-2000, stating that a ban on working on top of containers is however undesirable as it would lead to increased risks for the people working on the quay side and to a substantial decrease of production and financial losses.

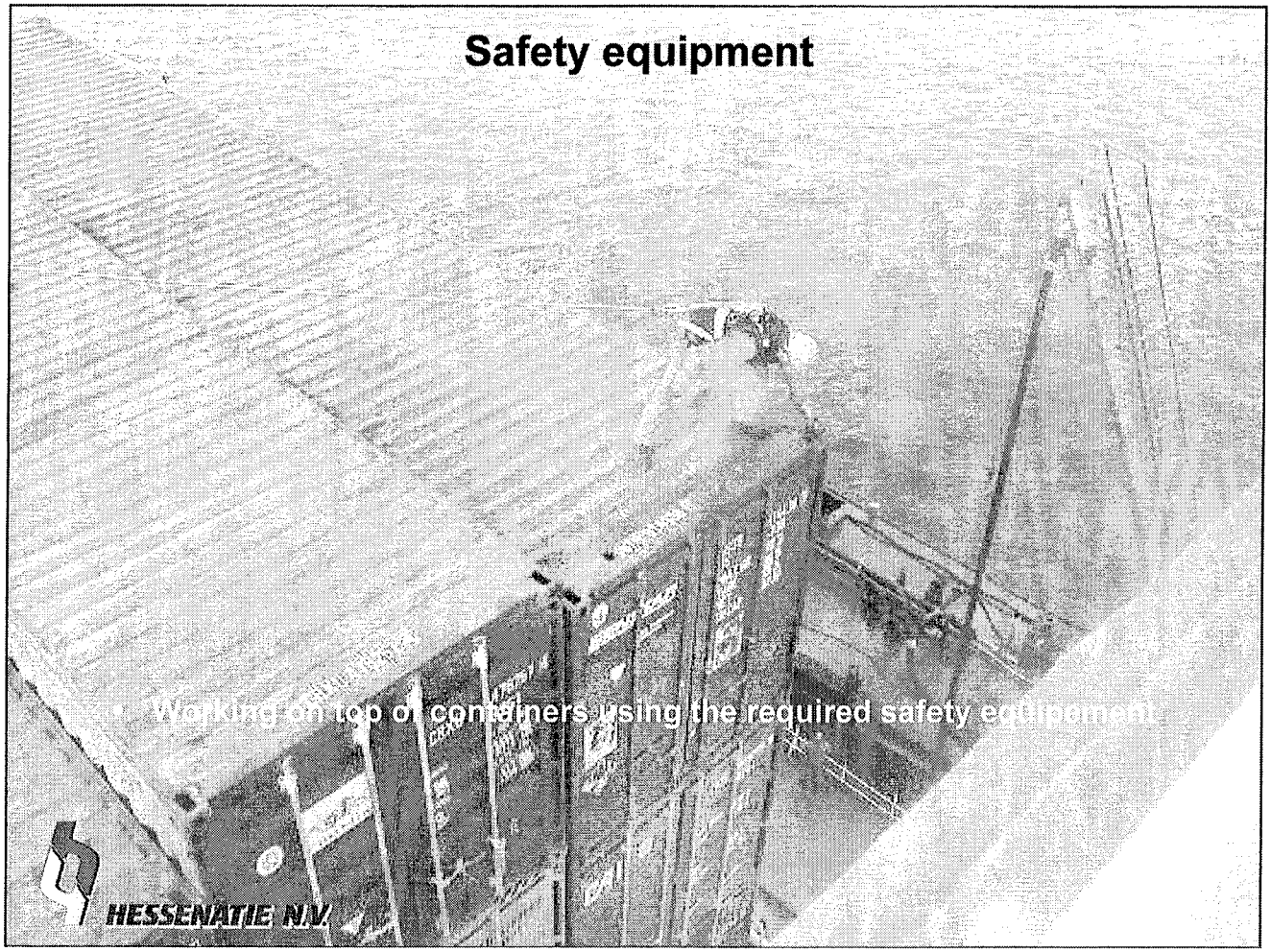
   A lot of container terminals have been conceived to work with a straddle carrier direct system on the quayside. Banning work on top of containers means that the twistlocks have to be manipulated on the quay which implies a great deal of risks and extra manpower.

4. Feport agrees the use of fall arrest measures or fall prevention measures whenever it is necessary for dock workers to go onto the container tops.

5. Feport further endorses the development of alternative methods of securing deck containers.

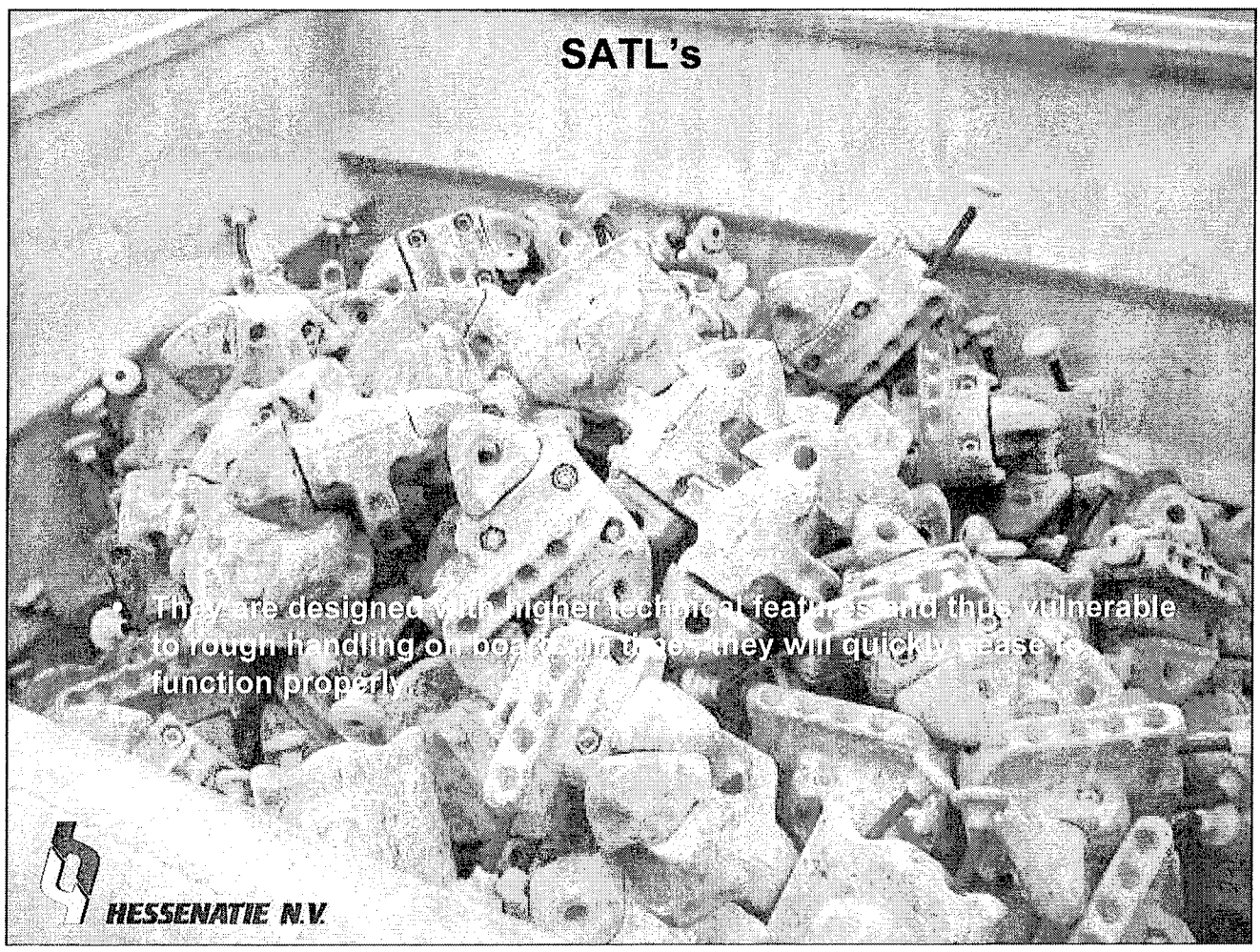
Thus, in the case of the twistlocks that have to be manipulated via the quayside, we must further investigate the possibility of the set-down platform (straddle carrier operation) on the one hand, and on the other hand possibility of providing a single track where the dock workers can handle the twistlocks safely and remain visible to mobile working machines.

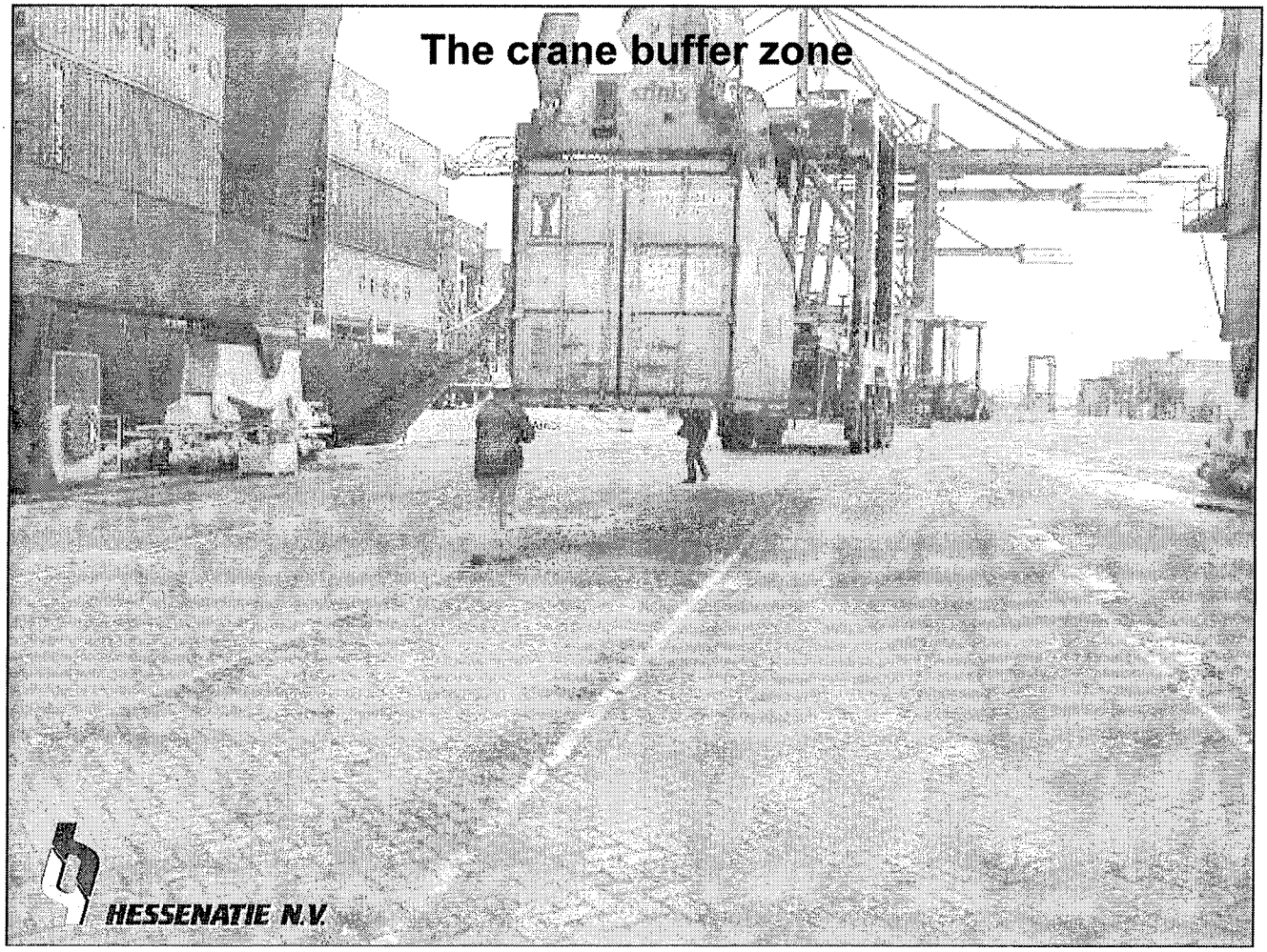

WORKING SAFELY ON TOP
OF CONTAINERS
HESSENATIE N.V.

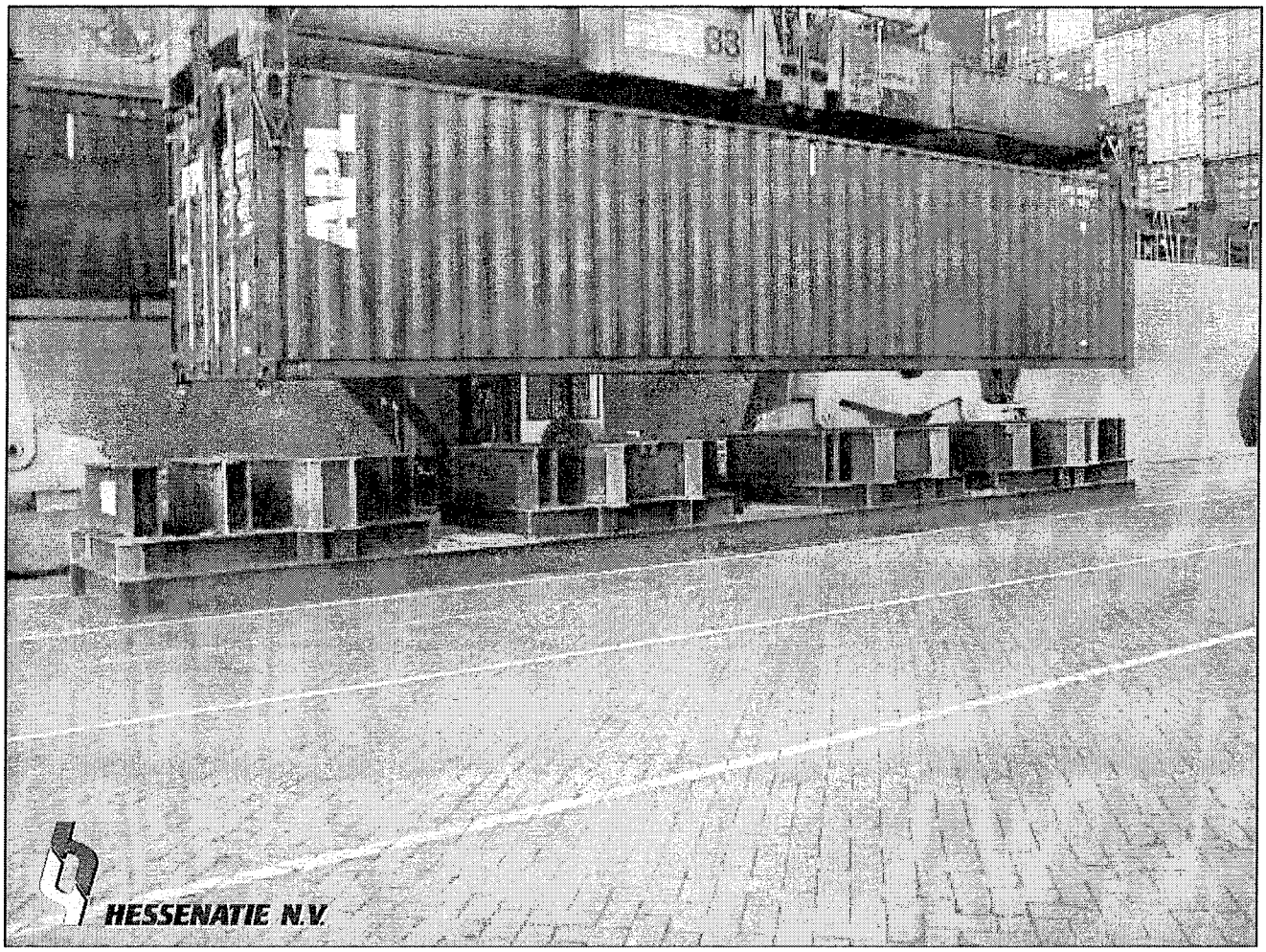

Safety equipment
Working on top of containers using the required safety equipment
HESSENATIE N.V.

Safety equipment: safety flat

SATL's




The crane buffer zone
HESSENATIE N.V.


HESSENATIE N.V.

8. Safely securing and retaining freight containers (the shipping line perspective)

Mr E.J.N. Brookes
European community Shipowners' Association

SAFELY SECURING AND RETAINING FREIGHT CONTAINERS
(The Shipping Line Perspective)

Eur Ing E J N Brookes - Vice Chairman
Safety & Environment Committee, European Community Shipowners Association
(Director Technical, UK Chamber of Shipping)

SUMMARY

In recent years pictures have shown vividly the effect of weather on container stows. Whatever the reasons for particular failures they show clearly that lashing of all ships must be carried out and maintained to the highest standards without risking the safety of the crew. Hence it is essential that any container securing devices are safe to apply yet properly fulfil their task at sea. Easing one must not compromise the other. New ship designs, equipment and operational procedures mean that this objective can be achieved without undue hindrance to port operations and without consequent time and cost penalties, however the uses of traditional equipment must not be overlooked in the desire to eliminate hazards. The paper considers what to the ship owner is the true issue, looks at related technical developments, associated problems and comments on solutions, concluding that there is a place for all types of equipment, without exclusion, and that they can be installed, used and removed safely.

1 INTRODUCTION

The container ship operator approaches the whole issue of securing freight containers from a slightly different perspective to his land colleagues though with the same objective, namely a "*safe and secure operation*" not to abuse the pun. Hence the title is slightly different from that published and designed to address the real aim. To the container ship operator, it is very much a means to an "end" and "the end" is the safe carriage of his cargo across the oceans on the decks of his ships. However, as such, it is a prerequisite that the securing operation must be carried out safely. We are here today chiefly because there are concerns about the safety of the port operation and the dangers that dock workers may be exposed to when securing containers, and these concerns I seek to address and comment on.

The larger container ships now entering and in service have stacks of containers up to 7 high on deck. Commensurate with this, developments with lashing bridges and lashing equipment, not to mention twistlocks and cell guides have assisted port operations as well as the shipowner. These developments have exercised the minds of many industry players and we have to thank the Swedes for initiating much of the discussion on this project by funding the early research and subsequent studies and tests. They also provided the very professional secretarial support for ISO/TC104/SC1/WG2, which led to the review of ISO 3874 and the development of

standards for what had hitherto been a disparate collection of pieces of ships lashing equipment, though even then they had to be subject to Classification Society survey.

This paper reviews these developments from the ship owners perspective and looks forward to the time when container top working is not such an immediate issue as now.

2 THE PROBLEM

First it is necessary to analyse the problem. I think that it needs stressing that it is not fundamentally a securing problem but one of personnel safety, and ease of work, however many pictures we see of stows which have collapsed. I need to stress this point because unless we do, we may address the wrong issue. Increases in the levels of safety for staff, or perhaps more correctly the reduction in the risk to which humans should be exposed in the place of employment is to be encouraged. This has identified practices such as container top working as supposedly "*ripe for improvement*".

From a shipping line perspective any improvement in safety is welcome if the risk of an accident is perceptibly reduced. However, the whole of the operation of the carriage of cargo needs to be considered and the costs reflect their relative proportion of the safety/risk equation. That is not to say that cost overrides everything. All I am saying is that if one aspect of an operation becomes significantly cheaper then that should be reflected in the costs charged.

As I see it the basic problem is this:

Traditional securing of containers has required stevedores to fit twistlocks on top of a deck stowed container before one is placed on it, then subsequently lock it tightly shut. On discharge the operation is reversed. The key safety issue is that of the safety of the stevedore. The risks are falling over the edge of a stow and being hit by a container being lowered onto the stow or falling equipment. However we must not forget, and I stress this point, that there are other ways of securing traditional twistlocks without risking personal safety - I will discuss this more later in the paper.

Putting that aside for the moment, technology has given us the products to change the way cargo securing on container ships is carried out, or indeed to eliminate the need for it. However each of the solutions may have what the medical world calls "*side effects*". We need to examine those side effects to ensure they do not effect the basic object of the project - safe handling and securing at all times of ISO 668/1496 containers.

I make no apology for spending some time over identifying the problem, as otherwise we risk coming to the wrong conclusions.

3 TECHNICAL DEVELOPMENTS

Against the background of my prognosis of the problem I wish to address 3 issues or developments and review their impact from what I stress is the ship owners perspective. The may seem a very basic premise but one which is to us essential and must not be forgotten.

3.1 Lashing Bridges

They say that "*Necessity is the Mother of Invention*". There are physical limits to the size of lashing rod than can physically and realistically be handled in the limited space between container stows. Lashing bridges in that space effectively permit lashing one tier higher than without them. There are beneficial effects: the vessel can load boxes one tier higher than without them, higher column loadings can be permitted for existing columns before racking stresses reach the maximum permitted, or a higher margin of safety can be designed into a lashing plan.

However the availability of this facility does not mean that one should forget good practice and stow heavy cargo over light. Indeed I feel that more attention should be paid at terminals to working to the CSS Code. The Container loading plan should take account of boxes already loaded. Individual container weights are known (and I don't just mean as light, medium and heavy). The final stow should reflect this knowledge and the loading planned to get all the heavy boxes at the bottom of a column. Please do not forget that lashing systems are based on this premise, they will not work properly if loaded otherwise.

Without doubt Lashing bridges have made possible the carriage of the larger numbers of boxes now carried on deck without excessive lashing and unlashing times in port. They are effectively partial height cell guides. I have two asides to raise:

3.1.1 First, following the recent fire in the "*Ever Decent*" off the River Thames after the collision with the "*Norwegian Dream*" there have been comments that the lashing bridges made it difficult for Fire Fighters from shore with full BA sets to access the top of the platforms and attack the seat of the fire. Some ships make provision for air lines in this area and the problem that I have identified should not be seen to detract from their overall advantages.

3.1.2 Second, some experts have commented that the present racking test for containers of 15kN is insufficient and that it should be raised to 20kN. Bearing in mind that the test value was raised some years ago from 12kN to 15kN what would be the effect? Would it encourage higher and possibly heavier stacking rather than increase the safety margin (I hate the word factor in this respect)?

Without doubt these stacking bridges have made the current loading of the largest ships possible and only *in extremis* have the systems been found wanting. We need to bear this in mind when contemplating further regulation

or limitation on securing methods. However, one accident is one to many - but bear in mind what M.Nichols said!

3.2 Deck Cell Guides and Hatchless Ships

To many deck cell guides are, to use the English saying "*The answer to a maiden's prayer*". A number of ships have been built successfully with them, and their advantages are well known. For the price of about 500/600 tons of steel, container lashing is effectively eliminated and more flexible cargo planning permitted, subject possibly only to column weight and GM/GZ considerations. Port transit times are reduced and staffing requirements drastically cut. There are downsides in that unless all the vessels in an operational string are similar, reduced port times and handling costs are negated by the need to avoid catching the next ship up!

I am repeatedly asked how it is possible to stow 13+ high without the stacks collapsing. The answer is simple in that the ship planner ensures that the total column weight remains within the design limits as laid down in ISO 668/1496. Equally the uninitiated cannot understand how the ship basically stays afloat with no hatch covers. Again the answer is simple, the holds are usually full of boxes and the ships have a very high freeboard, so little green water enters for the extra large bilge pumps to remove, usually these are triplicated.

Perhaps the reason that more hatch-less ships have not been built is that the tantalising dream of not having to lash containers does not bring the financial benefits expected whatever the operational benefits. There is probably also still a conservatism in some quarters at taking a ship to sea without hatches, given some high profile incidents in which hatch failure has led to accidents.

3.3 Semi Automatic Twistlocks

It is not an accident that that I chosen to discuss SATLs last. Their development has probably more than anything else changed the options/method of port operation and reduced lashing activity on ships to fitting/removal of lashing rods. However is it that simple?

I was a member of ISO TC104/SC1/WG2 during the period that it developed the expanded version of ISO 3874 under the guidance of its convenor Mr Gustafson of Sweden. Many is the hour that I have spent at the Swedish National Testing Institute at Boras considering drafts, observing tests and examining the panoply of equipment sent from all over the world. The problem that the WG faced was that SATLs had developed before the standards process got involved, some of which you see here. We faced three basic problems, apart from the key dimensions which were fairly easy to reconcile. The three key points were identifying the correct orientation for the SATL, agreeing the direction of action when a SATL is locked that is visually easy to detect, and finally the strength of the actual twistlock.

I must commend my Swedish colleagues for the investment in facilities, time and money that they have put into the project. There were times when I personally doubted the need to set standards for so many components (apart from SATLs) as we set out to do. I still have my doubts about some of the ancillary components given that IMO through Flag States and Classification Societies is responsible ultimately for ship construction, equipment and safety.

What have we ended up with? We have agreed, provided all the voting members of ISO TC104 support us, that SATLs should have the following key components.

- The identification mark should be at the top (being most probably a hole in the top cone)
- Looking down vertically a SATL locks when the mechanism moves in the clockwise orientation.
- An SATL can withstand a standard agreed stress before deformation commences.

In addition basic dimensional and tolerance criteria have been defined. Given that an SATL has basically 4 operating positions and is formed of 3 pieces of steel connected by sleeves, springs and levers it is hoped that defining these criteria gives manufacturers and operators the ability to design, sell, procure and use with confidence. Those currently manufacturing and using SATLs with a different orientation and identification may not be so happy. However there is one issue that I have deliberately left to the end. I refer to weight. Given that in their normal operation each SATL has to be lifted, fitted under a container and locked into that container, it has to be relatively light. However it has to be strong and strength must not be sacrificed to weight if safety is not to be affected. This is a potential conflict though I do agree that when lifted and fitted at waist height, we have a good working environment.

As I see it there are some problems/issues with SATLs which we must address:

- For their size and ruggedness they are relatively complex pieces of equipment. When being fitted into the bottom corner casting on the quay the docker has to tension the firing mechanism.
- Given that it is the interference between the cone and the corner casting that frees the spring loaded mechanism the design of the cone is quite complex to ensure it *fires* reliably.
- They can be damaged and that damage is not always apparent though if released and properly stowed by dockers there should be no damage.
- In addition when both loading and unloading it is necessary to visually check that the mechanism has "*fired*" into the correct and safe position. I have known a container to be lifted with one SATL below still connected. Not only is a lot of damage caused but there is a serious risk of an accident when the mechanism finally breaks.

- There is then the further hazard when port staff have to disentangle the wreckage and allow the unloading to continue.
- When small ships are being loaded/discharged, a 'list' may develop. This can effect the ability of the SATL to lock correctly.
- If dropped on the quay they will eventually become damaged. Checking systems and unit maintenance are essential, as well as having spares available.

If these issues are not properly controlled the container stack on the ship represents a potential danger area for ship's staff which they have to find a way of correcting in difficult circumstances.

I do not want to denigrate SATLs, but I wish us to use them with our eyes open and recognise that they can have problems which are not immediately apparent to those who may recommend their exclusive use.

4 PROBLEMS

We may conclude from the above that whatever lashing system you use there are potential problems but that for each there is a safe solution. I now wish to address one other issue which so far I have refrained from mentioning and that is vessel size, other than obliquely.

While attention is paid to the very large container ships and their securing systems, we must not forget that their lifeblood is the so called *smaller* vessels and particularly the feeder ships. These are increasingly important as the larger vessels are limited to their ports of call by draught and they rely on the containers brought to them and taken from them by feeder vessels. Also not every country has the facilities that are available here, in Antwerp Felixstowe or dare I say it here, Hamburg. We all want safe operations but we need world-wide regulations that are feasible and realistic wherever vessels call.

The IMO's Flag State Implementation Sub-Committee is trying to ensure that all Flags States apply the SOLAS/LL/MARPOL requirements evenly. In an ideal world that would consign Port State Control to history but that is unlikely. The ISM Code is part of SOLAS (Chapter IX). Why do I mention this? The reason is simple. ISM commits us to continuous improvement. It is a simple fact that whatever we may wish and like, the operational conditions other parts of the world are not the same as here. Similarly the conditions on smaller ships are different than on larger ones. As an example a smaller ship is likely to develop a more pronounced (but safe) list while discharging and loading in port than a larger say 6000 TEU ship. It will then be more difficult in port for SATLs to be properly fitted and removed safely.

Please remember that the USCG regulations (29 CFR) to do not require SATLs to be used. They merely specify a way of operating. Conventional equipment can be used and as I have demonstrated above there are simple ways of carrying out the operation safely.

5 SOLUTIONS

Perhaps the solution to our problem, if indeed it is a problem is in the last paragraph of my comments on "Problems" above. Given thought and application there never has been any reason why any securing equipment cannot be safely applied and removed. The development of SATLs has perhaps focussed our minds away from the obvious in this respect.

It all begs the question "*Do we need more regulation to ensure an adequate standard of safety [if we do not already have one], and if so what form should that regulation take?*"

Let me be unpopular and say, and I say firmly "*NO*". Why is this? Simply every country has its own laws which states how staff may be employed. This includes the risk of being struck by falling items (ie twistlocks which fall out as the container is being lifted), limits on the height of an unprotected edge close to which they may work, and maximum weights that they may lift. In addition appropriate personal protective equipment is specified. Do not forget that many employers already provide and specify conditions in excess of regulation and this I welcome.

So I say, apply these simple rules pragmatically, encourage all to follow the best practice. If necessary adjust laws if some requirements are not blindingly obvious, but do not outlaw current quite safe practices just because a new piece of equipment apparently moves the goalposts - which it does not!

6 CONCLUSIONS & RECOMMENDATIONS

So what is my concluding message? It is simply this:

- Encourage all to follow simple guidelines under existing rules.
- Apply existing laws firmly but fairly.
- Don't forbid practices which are perfectly safe if properly conducted.
- Effectively what I am saying is that SATLs aren't the only acceptable solution though they do provide benefits. There are many ways to safely lash/unlash a container ship in port, some may take longer than others and new innovative equipment will ease the process. However, designers must not be constrained in their approach by unnecessary regulation and however manual and difficult a task, there are ways of doing it safely aided by the proper safety equipment and safety procedures.

Restrictions in container top working are understandable, however at some stage it may be necessary for humans to intervene when the mechanics fail or get stuck. A safe *modus operandi* is then required,

And finally, finally, this is my PLEA, don't forget the purpose of lashing containers is to get a ship to sea and back to port safely without endangering the crew, the ship, its cargo or the environment. Otherwise all the bans on container top working will have failed!

9. The USA experience

Mr B. Baron
Steamship Trade Association of Baltimore

SECURING OF FREIGHT CONTAINERS

ON THE DECKS OF CONTAINER SHIPS

The USA Experience

A Presentation By
Robert D. Baron
Director of Safety & Security
Steamship Trade Association of Baltimore

National Ports Council Symposium
February 16, 2000
Rotterdam

I first want to thank the National Ports Council for inviting me to participate in this symposium. I commend your efforts to address the whole issue of deck stows as I firmly believe the best way to develop answers to problems such as this is to bring together all concerned to work on an acceptable common solution.

The most controversial aspect of working with deck stows is container top safety and that has been a major issue at U.S. ports for over twenty years. It was first addressed by the Occupational Safety and Health Administration (OSHA) in a 1982 directive to field personnel. Although port worker safety rules did not specifically address container work at the time, the agency interpreted existing general cargo regulations covering fall hazards from stowed cargo. Numerous employers were cited which triggered many companies to develop some sort of container top fall protection system. OSHA provided minimal guidance on design specifications for such systems. However, some of the earliest designed systems are still in use today and meet or exceed OSHA's current requirements.

The development of those current requirements began in 1994 when OSHA issued proposed rules to revise and update the longshoring safety standard. OSHA had identified 12 serious injury or fatal accidents resulting

from falls from container tops. So included in the proposal was an entire section that addressed container top safety. After several public hearings and considerable debate, the revised longshoring safety regulations were issued in July of 1997 and came into effect January 21, 1998. However, there was a phase-in approach to container top requirements.

The applicable rules begin by defining a fall hazard. It is considered to be within 3 feet (.9 m) of an unprotected edge which is 8 feet (2.4 m) or higher and 12 inches (.3 m) or greater horizontally. A worker who is within this defined "zone" is considered to be exposed to a fall hazard. Also, weather conditions such as reduced visibility, high winds or icy surfaces can expose a worker to a fall hazard even though he has not yet approached the edge.

The container top safety requirements are separated into two parts: container operations being handled by container gantry cranes and containers being handled by any other devices. When containers are being handled by container gantry cranes, employees are not allowed on top of containers unless they have to perform a function that cannot be eliminated by positive container securing devices such as semi-automatic twistlocks (SATL's) or above deck cell guides. So OSHA recognizes that certain tasks must continue to be done on container tops even when SATL's are in use.

Some of those permitted functions include the removal/placing of bridge clamps, freeing jammed twistlocks, unlocking SATL's on 5, 6 or 7 high stacks, and attaching or removing overheight gear. Whenever employees must go aloft to perform one of these permitted functions, they must utilize a fall protection system that meets OSHA requirements.

When containers are being handled by hoisting devices other than a container gantry crane, employees are allowed to work on top of containers but must be protected by a fall protection system, if possible. From a technical standpoint, when ship's gear or mobile shoreside cranes are used to hoist containers, it much more difficult to utilize a fall protection system that does not present a greater hazard than no fall protection at all. Practically speaking, fall protection can be very difficult to provide and may not be desired when single-point suspension equipment is used to handle containers. OSHA acknowledged this situation and the regulations include an exception that allows workers on top of containers without fall protection if the employer can show that fall protection would be infeasible or presents a greater hazard due to working conditions.

In those circumstances where fall protection cannot or should not be provided, the employer is required to alert the affected employees about the hazards involved and instruct them on the best way to minimize the hazard.

It is also important to note that these fall protection requirements apply below deck as well as above deck. Some systems that work effectively above deck may not work below deck. Selection of a fall protection system should be made based on all anticipated stow configurations. For example, the valley stow, chimney stow and stair step stow can present significant challenges to many fall protection systems.

The final section of the OSHA container top rules provide the technical and operational requirements of any fall protection system that may be used. Known as a performance standard, it allows any kind of system to be used as long as it meets the established criteria. I am not going to go into detail about these requirements (unless someone has a question) other than to stress the importance of every system meeting these requirements.

This is perhaps the best time to bring your attention to an ICHCA Safety Panel publication that was recently revised and updated. Research Paper #4, "Container Top Safety, Lashing and Other Related Matters" provides an excellent overview of the container top issue including a regulatory summary, container securing systems, and photographs showing various fall protection systems. This is the most comprehensive reference on container top safety available today and it includes references to jib crane

operations and terminal strategies for dealing with container top working generally.

Although most of the new longshoring rules took effect in 1998, a phase-in period was allowed for the prohibition on coning and deconing. It was delayed until July 26, 1999 which was to give employers adequate time to notify container lines of the new restriction. So effectively, vessel operators had 5 years advance notice of the proposal. Since OSHA cannot directly regulate shipping lines, it was left to stevedore companies and terminal operators to notify their customers and explain the implication of the new rules. Although initially this seemed to be a huge and awkward task, many major container carriers had initiated conversion of their ships to SATL's in the mid-90's. Without having access to exact numbers, I think it is safe to say that most pure container ships calling at U.S. ports are now equipped with SATL's or are utilizing some other type of positive container securing device such as above deck cell guides.

However, this is not to say we now have 100% compliance. Recently a small container vessel called at a port on the U.S. West Coast still equipped with manual twistlocks. An OSHA compliance officer happened to visit the terminal and noted the situation. Although he could have cited the employer with a potentially severe penalty, the vessel was able to

provide documentation that SATL's were on order but due to their manufacturer's backlog, delivery and conversion was delayed. This was deemed acceptable to OSHA so no citation was issued. However, the employer was compelled to provide fall protection.

So what has been the U.S. experience – not just in the last six months but since the new rules were introduced: substantial compliance but numerous complications. Although these rules do significantly reduce the exposure to falls from container tops, they do not eliminate the problem. Some people argue that we have transferred the injury exposure by taking workers from container tops and putting them on the quay where they can be struck by moving equipment. While this may be true, we have not seen an alarming increase in serious or fatal injuries as a direct result. Terminal operators need to anticipate this potential consequence by using recognized accident prevention measures such as high visibility clothing, driver training, worker awareness, traffic control and effective supervision.

I can report on one incident that occurred at a U.S. East Coast port. A worker placing cones on a four-high stack lost his balance and fell over the edge. He was tied off to a fall protection system that arrested his fall almost instantly. He dropped about 4 feet (1.2 m). He was able to recover and get himself back up on the container top without assistance. In fact, this all

happened so quickly that his partner, working on the opposite side of the stack, did not have time to come to the man's aid before it was all over. So we have at least one documented "save" we can credit to the fall protection requirement.

Obviously SATL's are not the complete answer because we still have circumstances when personnel have to go aloft. A complete ban on working on top of containers is out of the question given the limitations of today's technology. We still have a significant percentage of containers being worked with single-point suspension equipment that makes it very difficult to provide fall protection. So what is the answer?

In the near term, I submit we need to develop better fall protection systems and find solutions for those situations where we cannot provide it. We should look to container handling and securing equipment suppliers and vessel operators for assistance. We should develop workable regulations that meet the intent of ILO Convention 152 and assure our workers as safety a working environment as we can provide.

Long term, we need to rethink the entire approach and work towards truly and totally eliminating the hazards presented by current container ship design. The problem is one made for us all by the decision as to how deck stows will be secured. Obviously any radical changes cannot be done

without collaboration with vessel owners and designers. Yet we in the container handling business must take the initiative as it is our workers who are at risk. Container carriers do not have responsibility for the safety of dock workers – we, the employers, do.

The first international step in this direction has already been taken. IMO Circular 886, issued in December of 1998, recommends to member governments that all parties involved be asked to consider alternative container securing methods and/or systems. A second step is in the final stages of development: a joint position paper by the National Maritime Safety Association (U.S.) and the International Safety Panel of ICHCA on the securing of deck stowed containers aboard ship. Once finalized, we plan to seek the support of as wide a cross section of international agencies and organizations who have an interest in this matter as possible. We want to make wide circulation of this paper to ship designers, vessel operators, terminal operators and stevedore companies. A third step I hope will be taken in the foreseeable future is the revision of the ILO Code of Practice on Safety and Health in Dock Work. Written in the mid-1970's, the current edition does not give as much practical advice on achieving the goals of the Convention in this subject as it now should. All of these measures will help but I want to stress that we cannot do this in a vacuum. We have to solicit

the active participation of those that design, build and operate container ships if we are to succeed.

May I conclude by saying that although my comments focused on container top safety, the United States shares the growing concern over the hazards of deck working on containers ships and supports the drive to find alternatives.

10. Secure it safely through the social dialogue

Mr P.J. Huijzendveld
Ministry of Social Affairs and Employment in the Netherlands

Symposium

"Securing of freight containers on decks of container ships."

"Secure it safely through the Social Dialogue!"

An approach to the issue from the perspective
of Health and Safety legislation

Approach from the perspective of Dutch health and safety legislation within the European framework

"Container top safety"; in organising this symposium, the National Ports Council has emphasised that this is an issue that goes beyond national borders.
A purely national approach encourages unfair competition and can also lead to certain activities being 'dumped' in regions where both the legislation and its enforcement are less strict.
This is therefore an international problem, not just in the north-west of Europe but throughout Europe as a whole. Which is all the more reason for me to clarify the approach both from a European perspective as well as from a health and safety perspective.

European legislation

Before going into more detail about legislation in the health and safety field, I would like to say something about the European regulatory framework in general.
Based on the founding treaty of the European Community, the Treaty of Rome, and on the revisions introduced in the Single European Act in 1987, European legislation follows two main tracks:

1. Firstly, the Economic Dimension track, based on articles 100 and 100A of the treaty. The Economic Dimension is particularly concerned with removing barriers to trade through the harmonisation of *product* legislation.
2. Secondly, the Social Dimension track, based on articles 118 and 118A of the treaty. The Social Dimension is made up of the following elements:
   - Labour relations
   - Social dialogue
   - Worker participation
   - Employment and labour market policy
   - Social security
   - Policy relating to health and safety at work

We are particularly concerned with the legislation on health and safety at work and with the social dialogue.

The creation of European legislation

The creation of European legislation is a complex process, but this process **is** clearly set out in several different procedures. It would be impossible to deal with them all today, so I intend to present a somewhat simplified model which has general application. I will then go on to say something about the opportunities for the parties directly involved to influence this legislation. Of course, a lot more could be said about differences in the methods of policy making or the opportunities for influencing policy for certain areas.

The legislative process is based on the founding treaty. The European Commission sets outs its legislative intentions in a four-year programme and then develops on these in its annual programme. The Commission is the only body with the power to initiate European Directives. Expert groups are instructed to draw up draft proposals for Directives which the Commission then submits to the Council of Ministers. Prior to any decision being taken by the Council of Ministers, the Advisory Committee, the Economic and Social Committee and the European Parliament are involved respectively in the processes of consultation and advice, and in assent and codecision procedures. Decisions on Directives in the area of health and safety at work are taken by majority vote in the Council of Ministers. Nevertheless, great efforts are made to reach unanimous decisions where possible, in order to ensure maximum support. The European Parliament has the right of codecision in these decisions. However, I will not trouble you with the details of this process. I will indicate where and when the opportunities arise to influence policy shortly. Once the process has been completed, a Directive is drawn up by the Council of Ministers. Social Directives are drawn up by the Social Council, or the council of ministers for Social Affairs of the member states. Once a Directive has been drawn up, it has to be implemented in the national legislation of the member states. This can be done in a number of ways. The customary way is for the Directive to be adapted into the national legislation but there are other ways, for example in the form of a generally binding collective labour agreement. The governments of the member states are responsible for implementation, however this takes place. They are also responsible for enforcement.

Opportunities to influence legislation and the Social Dialogue

I will now move on to the opportunities for influencing legislation and when these arise. Before the Commission puts forward initiatives, there are of course opportunities for lobbying the members of the Commission and their officials. And, of course, all the parties involved make use of these opportunities. However, this process is far from transparent, with each party doing what it can to further its own interests.
Once the Commission has taken an initiative for a Directive, first of all the social partners are invited to make proposals in the form of an agreement, in the framework of the social dialogue (which I will come back to shortly). This agreement may then lead to contractual relationships at community level. If the social partners put forward such a proposal (normally within a period of nine months) the process continues fairly smoothly right through to the decision in the Council of Ministers. The procedure I have outlined is, in fact, largely a formality. During the round of advisory and consultative meetings I have just mentioned few, if any, further changes are made to the agreement which is submitted by the Commission as a proposal for a Directive to the Council of Ministers.
This type of Directive also tends to get through the Council of Ministers quite quickly. All of which demonstrates the importance attached to the role of the social partners. If the social partners do not manage to put forward an agreement, the entire process outlined earlier has

to be gone through, in which case there are opportunities for influencing each body that has a role to play in the process.

It goes without saying that the formal process of social dialogue is subject to certain rules. As a supplement to the founding treaty, in 1987 the Single European Act included a passage in which the importance of the social dialogue, that is consultation between social partners at community level, was emphasised and fleshed out. The main partners are:

ETUC (European Trade Union Congress),
UNICE (Union of Industrial and Employers' Confederation of Europe)
CEEP (Centre Européen des Entreprises à Participation Publique)

During the period between 1985 and 1995, no actual agreements were reached, but a number of joint declarations were issued. In the Maastricht Treaty, and subsequently the Treaty of Amsterdam, the importance of social dialogue was further emphasised by giving it more formal powers. I gave an example of this earlier when I talked about how legislation is created. It was not until 1995 that the first agreements based on social dialogue were made. 1995 saw an agreement on parental leave , 1997 one on part-time work and 1999 one on temporary contracts of employment. Under the terms of the Treaty of Amsterdam, the social partners no longer have to wait for an invitation from the Commission, but are allowed to work independently to reach an agreement and submit this to the Commission.

Health and safety legislation in Europe and the Netherlands

I will now turn to the health and safety legislation in Europe and the Netherlands

In the period from the mid-eighties to around 1994, an important web of legislation in the field of health and safety at work was created at the European level. First of all, a legislative framework was created in the so-called Framework Directive. This framework has been further developed by a series of some 25 special Directives. This means that the entire field of health and safety at work is now largely covered by a harmonised minimum level of regulation which forms the so-called European level playing field. The European Directives indicate a minimum level of protection which, in practice, also tends to be a maximum level. The Framework Directive, which can be seen as a sort of European Health and Safety Act, assigns important roles and responsibilities to employers and employees in creating a good health and safety climate. Although special Directives in certain important areas do, in fact, contain prohibitions – take the asbestos Directive for example – such prohibitions do not really fit in very well with the concept of assigning responsibility which I just mentioned. This is why this Framework Directive includes the so-called prevention principle, which states that dangers to health and safety must be tackled at the source. This means that for the specific problem of Container Top Safety, no American-style prohibition on working on containers can be expected at European level. In this respect, the prevention principle of tackling dangers at the source offers sufficient opportunities for employees and employers to carry out their responsibilities in a responsible manner. The prevention principle has been adopted without any modifications into Dutch legislation.
Around 90% of the current legislation in the Netherlands is based on these European Directives and also on a number of ILO treaties. The remaining 10% has generally developed over time and tends to be limited to specific sectors.

The specific approach to Container Top Safety in the Netherlands - particularly concerning working at heights, the source policy and policy on the temporary use of personal protection equipment as implemented in the Dutch Health and Safety Act and Decrees - is founded entirely on European legislation. There is therefore no need for new European legislation in order to achieve safe handling of containers. Nonetheless, during the discussions on

amendments to the work equipment Directive[1], the Netherlands attempted to have a passage included which would encourage the application of securing equipment such as SATL's, or semi-automatic twistlocks. However, these attempts have not yet been successful. It seems that there is not enough support to achieve this within the framework of this Directive. Furthermore, enforcement in the Netherlands does not go beyond the possibilities already offered by the current European legislation. This does not mean that equal safety levels have now in fact been reached in all European countries. There is still a lot to be done.

Firstly, identical, or at least comparable, implementation of European Directives in the different member states. The Commission monitors this not just by chasing up member states on matters of procedure, but also by analysing the content of the legislation implemented and comparing it to the Directive itself. Nonetheless, there will always be differences, not least because of the different legislative systems of the member states.
Secondly, comparable enforcement of the legislation in the member states. The Commission has now also made it its business to pay more attention to this. This could be achieved, for example, by making it compulsory for the member states to report back not just on the implementation of the Directives (which they already have to do) but also on the enforcement of the Directives and the problems encountered in this enforcement. The Commission also facilitates the SLIC (Senior Labour Inspectors Committee). This committee is made up of the directors of the various Labour Inspectorates and includes representatives of future member states as observers. Mutual agreements and exchanges of experience are recurring themes in the committee meetings, which are held twice a year. The Commission also supports the joint enforcement audits held by the SLIC.
These activities are all designed to promote further harmonisation of the legislation and its enforcement.

I should now like to return to the Dutch situation and the approach of the Dutch Labour Inspectorate, before rounding off with a number of conclusions.
As I said earlier, the policy of the Dutch Labour Inspectorate in respect of Container Top Safety is a source policy. Tackling the dangers at the source. This is why our enforcement activities are concentrated on changing the working methods in container handling. In the first instance, the working methods should be such that there is no danger of falling. In other words, no employees should have to work on the container top with the associated danger of falling. Where this is not possible, collective measures should be taken to eliminate the dangers of the working methods used. Only in those cases where this is not yet possible can personal protection equipment be used as a temporary measure to avert these dangers – and I must emphasise that this 'temporary' aspect stems specifically from the duty to adhere to the prevention principle. This roundabout route to enforcement taken by the Labour Inspectorate has proved necessary because of the decision to assign individual responsibility to employers and employees which I outlined earlier. This decision means that there is no question of the Commission taking an initiative towards prohibition, even though consistent enforcement has this same effect. However, it is the quickest route and it is up to the social partners to reach further agreements in Europe, based to some extent on the responsibility I have mentioned. In this way, the application of SATLs (semi automatic twistlocks) in safe securing could take concrete shape, meaning that working methods requiring workers to go up onto container tops could be avoided.
The fact that this symposium on the subject of "Safe Securing" is taking place demonstrates the sense of responsibility of the social partners and I have every confidence that the route to eliminating the dangers involved in container handling will be followed in the proper manner.

[1] Proposal for a Directive as second revision to Directive 89/655/EEC in respect of minimum health and safety requirements for employees when using work equipment on the work site (2e special Directive in the sense of

Conclusions:

- Current European legislation offers sufficient opportunities to effectively tackle the dangers of falling when working at heights on container tops.

- Given the current European legislative systems which emphasise the individual responsibility of employers and employees for health and safety, a US-style prohibition on certain working methods (in casu working on container tops) cannot be expected.

- Given the fact that enforcement has been taken on board by the European Commission, but that this will lead to harmonisation only at a much later date, the quickest way to eliminate the problem is through the "Social Dialogue". In this, the Social Partners exercise their responsibility at EU level to reach an agreement which, via the Commission, may lead to community-wide contractual obligations.

- Enforcement by the Labour Inspectorate has led to a proactive attitude within the branch, as evidenced by technical developments and innovations in this field, but also by the fact that this symposium is taking place. This should also be introduced in the Social Dialogue at the European level.

Annex 1

Safety in defence
Personal contribution by mr E. Vossnack

Safety in defence

Major disasters with containerships

As yet no fatal accidents occurred to container ships, directly related to the "modern ship's design" (smaller depth than desired). Only under extreme conditions a ship will be tested on her seaworthiness and then the shortcomings in as well design as in exploitation are being disclosed.

Tonnage rules versus L/B/Draft

Based on economical requirements it is esential to carry as much cargo as possible against lowest initial costs. As a result of the GT-rules more and more absurd large deckloads are being shipped by coastal feeder ships, even up to 75% of the total cargo. We however are of the opinion that safer ships can be built, ships with more freeboard and where the depth should not be counted as a base for collecting toll levies. Those ships need not yield economically to the ships of the present generation (fuel consumption per tonmile and handling expenses per TEU).
Concerning the idea that the stability-arms should be measured upon submersion of the hatch seals instead of the immersion of the edge of the freeboard-deck, we must ascertain that this is no conclusive argument, as it highly depends upon the kind of vessel, bulkcarrier, ro-ro, fishingship, etc. The free water surface in the gangboards remains a danger.
The seafarers among us know the dangers of overcoming green water on ships with a small freeboard and we have the greatest respect for the sea as it can change any moment into a disastrous monster.
We understand that a veto on the international GT-measurement rules will not be feasible from one side. However we trust that you also will devote yourself to the cause of eliminating defaults which have lead to the development of wrong and dangerous ship-types. And we hope this will finally result in superb seaworthy vessels. The new international IMO-rules must entirely be dependent on the type of the ship.
An other basis for tariffs will hopefully start from the insurance companies, confronted with the loss of containers, with whom already fruitful dialogues are being held.

Harbour dues

An alternative fundament with a more sound starting-point for the harbour dues would be factor x maximum draught (Plimsoll) x LOA (length over all) x beam. By no means it is the intention that harbour authorities loose money, the rendered services must be paid for. Apart from the so called "wet" dues a harbour can charge for other facilities, such as cranes, storage, conveyerbelts, passenger terminal, favourable geographical position and hinterland.
The ports already charge different tariffs for various types of vessels, so that there can be no objection for a harbour to use a different multiplication factor for a cruise ship or a carcarrier than for a bulkcarrier, tanker or containership with the same length, beam and summerdraught. This method of levy will be experienced as more honest.
Most ports in the world are autonomous and can determine their own tariffs. A harbour director has been heard stating that once a ship has safely entered his port, he has no dealings at all with the safety of the ships at sea. There is not much to encounter that theses, other than that it does not sound very social. Maybe some pressure can be put on the harbour authorities.

Container lashings

The lashing handbooks give instructions based on the dynamics to which the containers are exposed. However we are not aware that any attention has been given to the dynamics of the ship's hull. We may consider the ship's hull as a "living being" whch, even in calm weather, is constantly moving caused by the vibrations of the engines. Only a slight swell does already make the ship's hull reacting in her bending stresses and/or torsional movements.The exposure to these movements are stronger on long-, low- and slender ships. On larger vessels these bending- and torsional movements can easily be observed, especially by heavy swell coming in at 4 points from the bow or under an angle of 4 points from the stern.
During these periods of bad weather or heavy swell the hatchcovers are moving on the hatch coamings. These movements can vary from one to two inches as well in longitudinal as in transverse direction, which can easily be noticed. Cleats used to batten down the hatch covers will certainly break off when tightened too strongly.
Stowing containers on two adjacent hatch covers, making different and even adverse movements, leads to severe damage of the containers and makes lashing impossible. Nowadays the 2nd and 3rd tier on deck are secured by stiff solid rods to lashing-bridges instead to moving hatch covers. It may be clear that the lashing-bridge being a part of the ship does not follow the movements of the hatch covers. It will also be clear that something must break and one can be rather sure that it will be the lashing material in the first place, as the lashing rods must meet the sliding forces of the whole pile of containers on the hatch. But it has also been noted that even the lashing-bridges were torn off the deck.
Lashing of the upper tiers by automatic twistlocks is probably a good solution for the lashing crews in the container loadingports, but certainly not for a ship at sea. Lashing of containers on deck as a block stow by means of bridgefittings is already a long forgotten history. We may now expect when a container vessel leaves port that the containers should be properly lashed. Retightening and checking of the huge amount of turnbuckles and rods cannot be a part of the nowadays minimal crew and certainly not on a dark night in bad weather.
The cause of the loss of containers overside should not be sought in defective or inferior lashing material, but rather in the lashing of containers on moving hatches to the rigid parts of the vessel. Between those parts extreme forces may be developed. Forces which (in our opinion) can hardly be calculated. We know they are there, proof of which on large ships experiencing bad weather time after time piping breaks or starts leaking at beforehand predictable places. That the bending of the ship takes enormous amplitudes can be seen in the movements of the bafflers in the cargo pipelines on deck of a VLCC. Any rigid construction is deemed to break, reason why we can only come to one conclusion: **It is impossible to properly lash a high deck load containers on such a flexible ship's hull.** Ergo the container lashing system must be regularly checked and retightened, an impossible job for a five men crew.
The only solution will be to establish that the container heigts of the deck load should be reduced to an obligatory maximum for ships not having fixed cellguides. Because only the open ships, which have cellguides from the tanktop and extending till above the upper deck, give the necessary support as on those ships the whole stack is harmoniously tied to the ship's construction.

Stabilisers

Stabilisers aim to minimize the heavy rolling, consequently reducing the torsion forces in the hull, but does not reduce the pitching and consequently the bending forces are not being decreased.
Due to the much greater reliability of the modern ships 95% of the duration of the black-outs will not last longer than 30 seconds and resettle automatically. Of course events with a much longer duration can always happen (e.g. blazing fire, automation break-down). A ship should be seaworthy at all times even in an unexpected black-out situation.

P&O Nedlloyd ships

May we consider it to be safe to check on hundreds of container lashings and to manhandle heavy lashing bars on a heavy rolling ship in bad weather? At the merger of P&O and Nedlloyd the new generation (Southampton-class) containerships had already been ordered.
But the open-ship idea is still alive with P&O Nedlloyd. The turn-around time in port with such a ship is 10% to 15% shorter than with a conventional ship. Furthermore these ships have better safety requirements for the crew.

Annex 2

Container top safety, the position of Feport

Federation of European Private Port Operators

CONTAINER TOP SAFETY

Position of FEPORT

(14/1/2000)

- FEPORT is concerned with the safety of dock workers while securing/unsecuring containers stowed on decks of vessels

- A ban on working on top of containers is however undesirable as it would lead to increased risks for people working on the quay side and to substantial production losses. A lot of container terminals have been conceived to work with a straddle-carrier direct system on the quayside. Banning work on top of containers means that the twist locks have to be manipulated on the quay which implies a great deal of risks.

- FEPORT supports the use of fall arrest measures or fall prevention measures whenever it is necessary for dockworkers to go onto the container tops.

- FEPORT further endorses the development of alternative methods of securing deck containers.

The Federation of European Private Port Operators (FEPORT) was established in 1993 to represent the common interests of all private terminal operators and stevedores located in the seaports of the European Union. Its membership consists of national or regional associations of private port operators, representing in total about 800 individual companies.

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Annex 3

The Green Award Foundation

SYMPOSIUM

Securing of Freight Containers on the Decks of Container Ships

On February 16 2000 at MSR Rotterdam a symposium subjecting "Securing of Freight Containers on the Decks of Container Ships" and organized by the Netherlands National Port Council (NPC) was held.
An interesting melange of experts of the industry, representing 11 countries, attended this symposium actively.
The input from the speakers and audience made it quite clear that all parties are concerned about this topic and are eager to find the appropriate solutions to enhance safety in container handling in general and on this subject in particular.

At the end of the day a discussion was held and conclusions were summarized leading to a final statement.
By presenting the final statement a brief discussion started concerning two items of the statement:
In brief, to call:

- For the development of a "Green Award" for containerships and (later) for container terminals.....;
- Upon port authorities, insurers and other actors... ...to provide incentives for... ..... .

The participants were of the opinion that the subject Green Award was not sufficiently attended. Therefore it was decided to revise the final statement and supply additional information about Green Award.

GREEN AWARD

General
The objective of the Green Award Foundation certification scheme is: *"to promote **safe** and **environmental-friendly** behavior of ship and crew/management, mainly by achieving international acceptance, recognition, regulation and coordination of the "Green Award" certification, all in observance of (inter) national conventions, legislation and developments in the area of ship lay-out, equipment, crew, operations and management."*

Green Award aims to make quality perceptible and beneficial to:

Shipowners	:	efficiency in operations
		cost control
Shipping actors	:	efficiency in operations
		reliability
		less risk
		clean seas and port-areas

The Foundation is a non-profit organization consisting of a Committee, Board of Experts, Board of Appeal and the Bureau Green Award,the executive body of the foundation.
At this moment the certification scheme is open for oil tankers with a deadweight over 20.000 tonnes and is expected to be expanded towards bulk carriers at the end of 2000. Numerous ports and other actors are providing incentives for Green Award certificied vessels.

Green Award versus container operation / vessels?

Prior to this symposium a Green Award representative participated in workshops (organized by NPC) concerning the symposium subject. In the course of the workshops it became clear that the Green Award system could play a positive role in enhancing safety on container operations and "fill the gap excisting between ship and terminal". By means of a market mechanism a standard for container vessels will be created. Positive results are to be expected on the long term.

Pre-conditions for developing.

- The Foundation to adopt the policy for development of a system for container vessels.
- Requirements to deal with a range of subjects related to safety, environmental aspects and quality.

- A limited group of industry experts in cooperation with the Green Award Board of Experts should be available to set the requirements for container vessels.
- The certification system operates on its best as a voluntary system.
- Incentive providers to be available prior to the development of the system (instead of incentives a "bonus malus system" can be an option).
- Branch organizations should be able to have a say in the operation of system, by making positions available in the Green Award Committee and Board of Experts, this on a rotational basis.

Requirements at a first thought

- ❑ Use of Semi Automatic Twist Locks (type);
- ❑ Maintenance system for securing devices (Classification society approved);
- ❑ Alternative container securing (open hatch);
- ❑ Ship lay-out (safe access for stevedores);
- ❑ Safety instruction for shipboard personnel;
- ❑ Ship-terminal checklist;
- ❑ Pre-operation safety meeting (ship-terminal);
- ❑ Exhaust emissions;
- ❑ Housekeeping on deck and in cargo holds;
- ❑ Lighting deck and cargo spaces;
- ❑ Dangerous goods;
- ❑ Safe bunkering;
- ❑ Shipboard management.

This is a rough idea of aspects which can be incorporated amongst many others which are already applicable to oil tankers. By auditing the shipowner office and the vessel in question, a rating system will be used to determine if certification is considered.

Annex 4

Osha final rule
Longshoring and marine terminals

Friday
July 25, 1997

Part II

Department of Labor

Occupational Safety and Health Administration

29 CFR Part 1910, et al.
Longshoring and Marine Terminals; Final Rule

handling activities except for the following:

(i) When a substance or cargo is contained within a sealed, intact means of packaging or containment complying with Department of Transportation or International Maritime Organization requirements;[1]

(ii) Bloodborne pathogens, § 1910.1030;

(iii) Carbon monoxide, § 1910.1000 (See § 1918.94(a)); and

(iv) Hydrogen sulfide, § 1910.1000 (See § 1918.94(f)).

§ 1918.2 Definitions.

Barge means an unpowered, flatbottomed, shallow draft vessel including river barges, scows, carfloats, and lighters. It does not include ship shaped or deep draft barges.

Bulling means the horizontal dragging of cargo across a surface with none of the weight of the cargo supported by the fall.

Danger zone means any place in or about a machine or piece of equipment where an employee may be struck by or caught between moving parts, caught between moving and stationary objects or parts of the machine, caught between the material and a moving part of the machine, burned by hot surfaces or exposed to electric shock. Examples of danger zones are nip and shear points, shear lines, drive mechanisms, and areas underneath counterweights.

Designated person means a person who possesses specialized abilities in a specific area and is assigned by the employer to do a specific task in that area.

Dockboards (car and bridge plates) mean devices for spanning short distances between, for example, two barges, that is not higher than four feet (1.2 m) above the water or next lower level.

Employee means any longshore worker or other person engaged in longshoring operations or related employments other than the master, ship's officers, crew of the vessel, or any person engaged by the master to load or unload any vessel of less than 18 net tons.

Employer means a person that employs employees in longshoring operations or related employments, as defined in this section.

Enclosed space means an interior space in or on a vessel that may contain or accumulate a hazardous atmosphere due to inadequate natural ventilation. Examples of enclosed spaces are holds, deep tanks and refrigerated compartments.

Fall hazard means the following situations:

(1) Whenever employees are working within three feet (.9 m) of the unprotected edge of a work surface that is 8 feet or more (2.4 m) above the adjoining surface and twelve inches (.3 m) or more, horizontally, from the adjacent surface; or

(2) Whenever weather conditions may impair the vision or sound footing of employees working on top of containers.

Fumigant is a substance or mixture of substances, used to kill pests or prevent infestation, that is a gas or is rapidly or progressively transformed to the gaseous state, although some nongaseous or particulate matter may remain and be dispersed in the treatment space.

Gangway means any ramp-like or stair-like means of access provided to enable personnel to board or leave a vessel, including accommodation ladders, gangplanks and brows.

Hatch beam or *strongback* mean a portable transverse or longitudinal beam placed across a hatchway that acts as a bearer to support the hatch covers.

Hazardous cargo, materials, substance or atmosphere means:

(1) Any substance listed in 29 CFR part 1910, subpart Z;

(2) Any material in the Hazardous Materials Table and Hazardous Materials Communications Regulations of the Department of Transportation, 49 CFR part 172;

(3) Any article not properly described by a name in the Hazardous Materials Table and Hazardous Materials Communication Regulations of the Department of Transportation, 49 CFR part 172, but which is properly classified under the definitions of those categories of dangerous articles given in 49 CFR part 173; or

(4) Any atmosphere with an oxygen content of less than 19.5 percent or greater than 23 percent.

Intermodal container means a reusable cargo container of a rigid construction and rectangular configuration; fitted with devices permitting its ready handling, particularly its transfer from one mode of transport to another; so designed to be readily filled and emptied; intended to contain one or more articles of cargo or bulk commodities for transportation by water and one or more other transport modes. The term includes completely enclosed units, open top units, fractional height units, units incorporating liquid or gas tanks and other variations fitting into the container system. It does not include cylinders, drums, crates, cases, cartons, packages, sacks, unitized loads or any other form of packaging.

Longshoring operations means the loading, unloading, moving or handling of cargo, ship's stores, gear, or any other materials, into, in, on, or out of any vessel.

Mississippi River System includes the Mississippi River from the head of navigation to its mouth, and navigable tributaries including the Illinois Waterway, Missouri River, Ohio River, Tennessee River, Allegheny River, Cumberland River, Green River, Kanawha River, Monongahela River, and such others to which barge operations extend.

Public vessel means a vessel owned and operated by a government and not regularly employed in merchant service.

Ramp means other flat surface devices for passage between levels and across openings not covered under the term *dockboards.*

Related employments means any employments performed incidental to or in conjunction with longshoring operations, including, but not restricted to, securing cargo, rigging, and employment as a porter, clerk, checker, or security officer.

River towboat means a shallow draft, low freeboard, self-propelled vessel designed to tow river barges by pushing ahead. It does not include other towing vessels.

Small trimming hatch means a small hatch or opening, pierced in the between deck or other intermediate deck of a vessel, and intended for the trimming of dry bulk cargoes. It does not refer to the large hatchways through which cargo is normally handled.

Vessel includes every description of watercraft or other artificial contrivance used or capable of being used for transportation on water, including special purpose floating structures not primarily designed for or used for transportation on water.

Vessel's cargo handling gear includes that gear that is a permanent part of the vessel's equipment and used for the handling of cargo other than bulk liquids. The term covers all stationary or mobile cargo handling appliances used on board ship for suspending, raising or lowering loads or moving them from one position to another while suspended or supported. This includes, but is not limited to, cargo elevators, forklifts, and other powered industrial equipment. It does not include gear used only for handling or holding hoses, handling ship's stores or handling the gangway, or boom conveyor belt systems for the self-unloading of bulk cargo vessels.

[1] The International Maritime Organization publishes the International Maritime Dangerous Goods Code to aid compliance with the international legal requirements of the International Convention for the Safety of Life at Sea, 1960.

(d) *Container inspection.* (1) Prior to hoisting, each container shall be inspected for any visible defects in structural members and fittings that would make the handling of such container unsafe.

(2) Any container found to have such a defect shall either be handled by a special means to ensure safe handling or shall be emptied before handling.

(e) *Suspended containers.* The employer shall prohibit employees from working beneath a suspended container.

(f) *Lifting fittings.* Containers shall be handled using lifting fittings or other arrangements suitable and intended for the purpose as set forth in paragraphs (f)(1) through (f)(3) of this section, unless damage to an intermodal container makes special means of handling necessary.

(1) *Loaded intermodal containers.* Loaded intermodal containers of 20 feet (6.1 m) or more shall be hoisted as follows:

(i) When hoisting containers by the top fittings, the lifting forces shall be applied vertically from at least four such fittings. A less than vertical lift is permitted only under the following conditions:

(A) The container being lifted is an ISO "closed box container";

(B) The condition of the box is sound;

(C) The speed of hoisting and lowering is moderated when heavily ladened containers[5] are encountered;

(D) The lift angle is at 80 to 90 degrees;

(E) The distance between the lifting beam and the load is at least 8 feet, 2.4 inches (2.5 m); and

(F) The length of the spreader beam is at least 16.3 feet (5 m) for a 20-foot container, and at least 36.4 feet (11 m) for a 40-foot container.

(ii) When hoisting containers from bottom fittings, the hoisting connections shall bear on the fittings only, making no other contact with the container. The angles of the four bridle legs shall not be less than 30 degrees to the horizontal for 40-foot (12.2 m) containers; 37 degrees for 30-foot (9.1 m) containers; and 45 degrees for 20-foot (6.1 m) containers.

(iii) Lifting containers by fork liff trucks or grappling arms from above or from one side may be done only if the container is designed for this type of handling.

(iv) Other means of hoisting may be used only if the containers and hoisting means are designed for such use.

(2) *Intermodal container spreaders.* (i) When using intermodal container spreaders that employ lanyards for activation and load disengagement, all possible precautions shall be taken to prevent accidental release of the load.

(ii) Intermodal container spreaders that utilize automatic twist lock systems shall be designed and used so that a suspended load cannot accidentally be released.

(g) *Safe container top access.* A safe means of access shall be provided for each employee required to work on the top of an intermodal container. Unless ladders are used for access, such means shall comply with the requirements of § 1917.45(j) of this chapter.

(h) *Employee hoisting prohibition.* Employees shall not be hoisted on intermodal container spreaders while a load is engaged.

(i) *Portable ladder access.* When other safer means are available, portable ladders shall not be used in gaining access to container stacks more than two containers high.

(j) *Fall protection.* (1) *Containers being handled by container gantry cranes.*

(i) After July 26, 1999, where a container gantry crane is being used to handle containers, the employer shall ensure that no employee is on top of a container. Exception: An employee may be on top of a container only to perform a necessary function that cannot be eliminated by the use of positive container securing devices.[6]

(ii) After July 26, 1999, the employer shall ensure that positive container securing devices, such as semi-automatic twist locks and above deck cell guides, are used wherever container gantry cranes are used to hoist containers.

(iii) The employer shall ensure that each employee on top of a container is protected from fall hazards by a fall protection system meeting the requirements of paragraph (k) of this section.

(2) *Containers being handled by other hoisting devices.* Where containers are being handled by hoisting devices other than container gantry cranes, the employer shall ensure that each employee on top of a container is protected by a fall protection system meeting the requirements of paragraph (k) of this section.

(3) *Other exposure to fall hazards.* The employer shall ensure that each employee exposed to a fall hazard is protected by a fall protection system meeting the requirements of paragraph (k) of this section. Exception: Where the employer can demonstrate that fall protection for an employee would be infeasible or create a greater hazard due to vessel design, container design, container storage, other cargo stowage, container handling equipment, lifting gear, or port conditions, the employer shall alert the affected employee about the fall hazard and instruct the employee in ways to minimize exposure to that hazard.

(k) *Fall protection systems.* When fall protection systems required by paragraph (j) of this section are employed, the following shall apply:

(1) Each fall protection system component, except anchorages, shall have fall arrest/restraint as its only use.

(2) Each fall protection system subjected to impact loading shall be immediately withdrawn from service and not be used again until inspected and determined by a designated person to be undamaged and suitable for use.

(3) Each fall protection system shall be rigged so that a falling employee cannot contact any lower level stowage or vessel structure.

(4) Each fall protection system adopted for use shall have an energy absorbing mechanism that will produce an arresting force on an employee of not greater than 1800 pounds (8 kN).

(5) Each component of a fall protection system shall be designed and used to prevent accidental disengagement.

(6) Each fall protection system's fixed anchorages shall be capable of sustaining a force of 5,000 pounds (22.2 kN) or be certified as capable of sustaining at least twice the potential impact load of an employee's fall. Such certification must be made by a qualified person.[7] When more than one employee is attached to an anchorage, these limits shall be multiplied by the number of employees attached.

(7) When "live" (activated) container gantry crane lifting beams or attached devices are used as anchorage points, the following requirements apply:

(i) The crane shall be placed into a "slow" speed mode;

(ii) The crane shall be equipped with a remote shut-off switch that can stop trolley, gantry, and hoist functions and that is in the control of the employee(s) attached to the beam; and

[5] A heavily laden container is one that is loaded to within 20 percent of its rated capacity.

[6] Examples of work that may not be eliminated by positive container securing devices and that may require employees to work on top of containers include, but are not limited to: installing or removing bridge clamps; hooking up or detaching over-height containers; or freeing a jammed semi-automatic twist lock.

[7] For the purposes of this paragraph, qualified person means one with a recognized degree or professional certificate and extensive knowledge and experience in the subject field who is capable of design, analysis, evaluation and specifications in the subject work, project, or product.

(iii) A visible or audible indicator shall be present to alert the exposed employee(s) when the remote shut-off is operational.

(8) Fall protection system components, other than the anchorages, shall be certified as a unit of being capable of sustaining at least twice the potential impact load of an employee's fall. Such certification shall be made by a qualified person.[8]

(9) Each fall protection system shall incorporate the use of a full body harness.

(10) Each device, such as a safety cage, used to transport an employee(s) by being attached to a container gantry crane spreader, shall have a secondary means to prevent accidental disengagement and the secondary means shall be engaged.

(11) Each fall protection system shall be inspected before each day's use by a designated person. Any defective components shall be removed from service.

(12) Before using any fall protection system, the employee shall be trained in the use and application limits of the equipment, proper hookup, anchoring and tie-off techniques, methods of use, and proper methods of equipment inspection and storage.

(13) The employer shall establish and implement a procedure to retrieve personnel safely in case of a fall.

(l) *Working along unguarded edges.* The employer shall provide, and ensure that the employee use, fall protection meeting the requirements of paragraph (k) of this section whenever the employee works along an unguarded edge where a fall hazard exists (see § 1918.2).

§ 1918.86 Roll-on roll-off (Ro-Ro) operations[9] (See also § 1918.25).

(a) *Traffic control system.* An organized system of vehicular and pedestrian traffic control shall be established and maintained at each entrance/exit ramp and on ramps within the vessel as traffic flow warrants.

(b) *Ramp load limit.* Each ramp shall be plainly marked with its load capacity. The marked capacity shall not be exceeded.

(c) *Pedestrian traffic.* Stern and side port ramps also used for pedestrian access shall meet the requirements of § 1918.25. Such ramps shall provide a physical separation between pedestrian and vehicular routes. When the design of the ramp prevents physical separation, a positive means shall be established to prevent simultaneous use of the ramp by vehicles and pedestrians.

(d) *Ramp maintenance.* Ramps shall be properly maintained and secured.

(e) *Hazardous routes.* Before the start of Ro-Ro operations, the employer shall identify any hazardous routes or areas that could be mistaken for normal drive-on/drive-off routes. Such hazardous routes shall be clearly marked and barricaded.

(f) *Air brake connections.* Each tractor shall have all air lines connected when pulling trailers equipped with air brakes and shall have the brakes tested before commencing operations.

(g) *Trailer load limits.* After July 27, 1998, flat bed and low boy trailers shall be marked with their cargo capacities and shall not be overloaded.

(h) *Cargo weights.* Cargo to be handled via a Ro-Ro ramp shall be plainly marked with its weight in pounds (kilograms). Alternatively, the cargo stow plan or equivalent record containing the actual gross weight of the load may be used to determine the weight of the cargo.

(i) *Tractors.* Tractors used in Ro-Ro operations shall have:

(1) Sufficient power to ascend ramp inclines safely; and

(2) Sufficient braking capacity to descend ramp inclines safely.

(j) *Safe speeds.* Power driven vehicles used in Ro-Ro operations shall be operated at speeds that are safe for prevailing conditions.

(k) *Ventilation.* Internal combustion engine-driven vehicles shall be operated only where adequate ventilation exists or is provided. (Air contaminant requirements are found in § 1918.94 and part 1910, subpart Z, of this chapter.)

(l) *Securing cargo.* Cargo loaded or discharged during Ro-Ro operations shall be secured to prevent sliding loads.

(m) *Authorized personnel.* Only authorized persons shall be permitted on any deck while loading or discharging operations are being conducted. Such authorized persons shall be equipped with high visibility vests (or equivalent protection[10]).

Note to paragraph (m): High visibility vests or equivalent protection means high visibility/retroreflective materials which are intended to provide conspicuity of the user by day through the use of high visibility (fluorescent) material and in the dark by vehicle headlights through the use of retroreflective material. The minimum area of material for a vest or equivalent protection is .5 m^2 (760 $in.^2$) for fluorescent (background) material and .13m^2 (197 $in.^2$) for retroreflective material.

(n) *Vehicle stowage positioning.* Drivers shall not drive vehicles, either forward or backward, while any personnel are in positions where they could be struck.

§ 1918.87 Ship's cargo elevators.

(a) *Safe working load.* The safe working loads of ship's cargo elevators shall be determined and followed.

(b) *Load distribution.* Loads shall be evenly distributed and maintained on the elevator's platform.

(c) *Elevator personnel restrictions.* Personnel shall not be permitted to ride on the elevator's platform if a fall hazard exists. (See § 1918.2.)

(d) *Open deck barricades.* During elevator operation, each open deck that presents a fall hazard to employees shall be effectively barricaded.

§ 1918.88 Log operations.

(a) *Working in holds.* When loading logs into the holds of vessels and using dumper devices to roll logs into the wings, the employer shall ensure that employees remain clear of areas where logs being dumped could strike, roll upon, or pin them.

(b) *Personal flotation devices.* Each employee working on a log boom shall be protected by a personal flotation device meeting the requirements of § 1918.105(b)(2).

(c) *Footwear.* The employer shall provide each employee that is working logs with appropriate footwear, such as spiked shoes or caulked sandals, and shall ensure that each employee wears appropriate footwear to climb or walk on logs.

(d) *Lifelines.* When employees are working on log booms or cribs, lifelines shall be furnished and hung overside to the water's edge.

(e) *Jacob's ladder.* When a log boom is being worked, a Jacob's ladder meeting the requirements of § 1918.23 shall be provided for each gang working alongside unless other safe means of access (such as the vessel's gangway) is provided. However, no more than two Jacob's ladders are required for any single log boom being worked.

(f) *Life-ring.* When working a log boom alongside a ship, a U.S. Coast Guard approved 30-inch (76.2 cm) life-ring, with no less than 90 feet (27.4 m) of line, shall be provided either on the floating unit itself or aboard the ship close to each floating unit being worked.

[8] For the purposes of this paragraph, qualified person means one with a recognized degree or professional certificate and extensive knowledge and experience in the subject field who is capable of design, analysis, evaluation and specifications in the subject work, project, or product.

[9] Ro-Ro operations occur only on Ro-Ro vessels which are vessels whose cargo is driven on or off the vessel by way of ramps and moved within the vessel by way of ramps and/or elevators.

[10] Decals on hard hats will not be considered equivalent protection for the purposes of this paragraph.

Annex 5

IMO recommendation on safety of personnel during container securing operations

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Ref. T1/3.02

MSC/Circ.886
21 December 1998

RECOMMENDATION ON SAFETY OF PERSONNEL DURING CONTAINER SECURING OPERATIONS

1 The Maritime Safety Committee, at its seventieth session (7 to 11 December 1998) expressed serious concern at the dangers to personnel working at the top of containers during container securing operations, which result from container securing arrangements being located in difficult and dangerous locations, and approved the Recommendation on safety of personnel during container securing operations, as set out in the annex.

2 Member Governments are invited to bring this Recommendation to the attention of port authorities, containership owners, designers and all other parties concerned and to consider other positive measures to address this problem in port and when approving cargo securing arrangements, as appropriate.

ANNEX

RECOMMENDATION ON SAFETY OF PERSONNEL DURING CONTAINER SECURING OPERATIONS

1 It has been noted that a number of fatal accidents to crew and dockworkers have involved falls from the top of containers during container securing and unsecuring operations. Although fall protection and fall arrest systems and equipment are available for use whenever container top work is involved, they are cumbersome and reduce the speed of loading and unloading operations of a ship, and thus of limited use and effect.

2 The conventional means of securing containers in non-cellular deck spaces are heavy and difficult to handle, resulting in accidents and non-fatal physical injuries. Newly developed equipment such as semi-automatic and dual function twistlocks are only partially effective in eliminating danger. They depend on the stacking height of containers on deck not exceeding four and require a safe work place on the quayside for their application or removal.

3 A safer environment for personnel involved in the securing of containers can be achieved by shipowners and ship designers focusing on the safety of container securement at the initial stages of the building of a ship, rather than relying on operational methods for this purpose after the ship is built. Such successful current design ideas include:

.1 **Hatchless holds**

These containership designs usually have cell guides to the full height of stowage and do not normally require container top working.

.2 **Flexible boxship arrangements**

These designs are involved on deck cell guides which can be altered in length to accommodate the different lengths of container currently used in the industry, e.g. 20, 30 or 40 feet.

.3 **Deck cell guides**

This usually means either "hatchless holds" or a hatchless ship, but designs exist with cell guides on deck but also with hatch covers. Although deck cell guides have a good safety and securement record, they can create operational inconvenience when loading the varying lengths of container that are commonly in use.

.4 **Lashing frames**

These are mobile personnel carriers by which lashing personnel work on the twistlocks without having to climb upon the container tops. These are often used from container gantries but are operationally more convenient when independent of the shore gantries so that lashing/unlashing can continue without interfering with, and causing delay to, the loading/unloading operation.

.5 **Lashing platforms**

These are permanent or partly mobile platforms, whereby access to deck twistlocks etc., can be achieved without having to climb on the top of the container.

4 In addition to these alternative arrangements, new and equally effective concepts are likely to evolve if increased attention is given to the achievement of safe securing and unsecuring of containers at the ship design stage instead of relying upon operational methods for this purpose. If the process of securing is made safer for the personnel involved and more efficient, a reduction in the loss of containers overboard will provide financial and environmental benefits.

5 Containership owners and designers are therefore reminded of the dangers associated with container securing operations and urged to use and develop container securing systems which are safe by design, with the aim of eliminating the need for container top work, work in other equally hazardous locations, or the handling by crew or dock workers of heavy and unwieldy securing equipment.

Annex 6

Names, addresses, phone- and faxnumbers

Symposium "Securing of freight containers on the decks of container ships"; names, addresses, phone-/faxnumbers

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Annex 7

Recommended literature

Container Top Safety. Lashing and other related matters.
ICHCA Research Paper No. 4.
May 1999
ISBN: 1 853330 022 5

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Safety in Intermodal Transport and Traffic. The Harbour Interface
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1996
ISBN: 3 86108 705 7

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