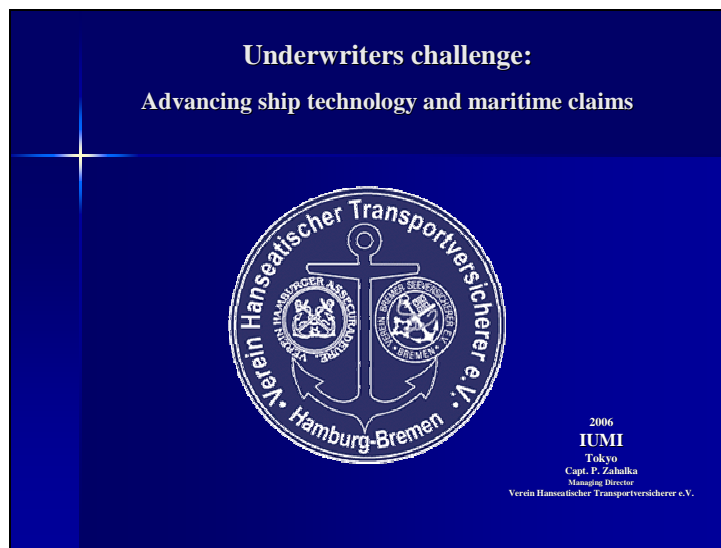


Folie 1



Mr. Chairman, Ladies and Gentlemen,

First of all I would like to thank you Mr. Chairman and the IUMI for inviting me to participate in this conference. I am very pleased and honoured and I wish the IUMI conference a very successful and fruitful progression.

Folie 2



Verein Hanseatischer Transportversicherer e.V. or Association of Hanseatic Marine Underwriter in English, is a merger of two earlier German Claimhandling Associations which dated back to the late 18th and early 19th century. The members of the Association are national and international insurance companies and our customers are the ship owners. Today two offices are maintained, one in Hamburg and one in Bremen, from where nautical and technical support is given to underwriters and shipowners.

Besides the general office staff we employ a total of 7 nautical and technical experts, all of which are either Master Mariners, Chief Engineers or Naval Architects and 5 Master Mariners for claim handling in the office. With the assistance of Average Agents we cover the whole world.

For more details please visit our web-site: **www.vht-online.de**.



VHT services

- Risk analysis and loss prevention as required,
- Giving advise to insurer and owners regarding steps and preventive measures to be taken in case of damages,
- Damage surveys to all types of vessels and machinery, construction parts, piers and other harbour constructional fittings,
- When required by the circumstances of the case; Immediate dispatch of VHT-experts to the site of the accident,
- Preparation of independent valuation - certificates, survey and/or expert reports and tenders,
- Negotiations with shipyards, workshops, manufacturers of machinery and other interested parties,



Folie 4



VHT services (continued)

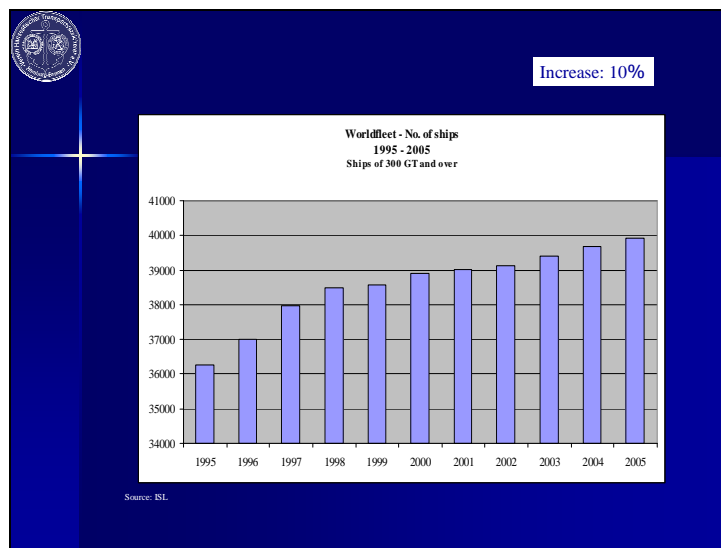
- Supervising repairs and respective costs,
- Nautical and technical preparation and approval of all types of ocean going tows,
- Early advise and supervision for special transports,
- Assistance in marine emergencies and salvage cases and negotiations with salvage and towing companies,
- Recoveries on behalf of clients,
- Qualified claims adjustment for and on behalf of underwriters,
- Maintaining the global network of international average agents for **underwriters and owners benefit alike**,

The slide features a dark blue background with a white list of services. It includes a circular logo in the top left corner and several inset images: a ship at sea, a nautical chart, a close-up of a ship's hull, and a ship's mast.

As you can see our services plenty and include risk analysis , damage surveying, and claims handling and adjusting.

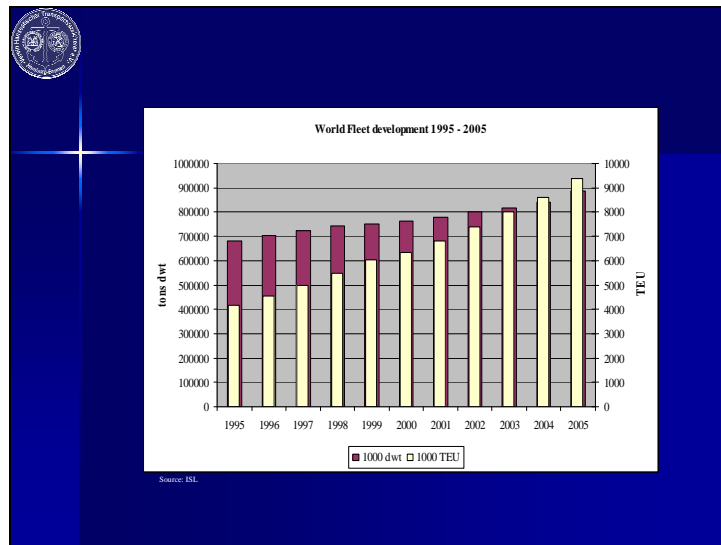
Again - for details visit our website.

Folie 5



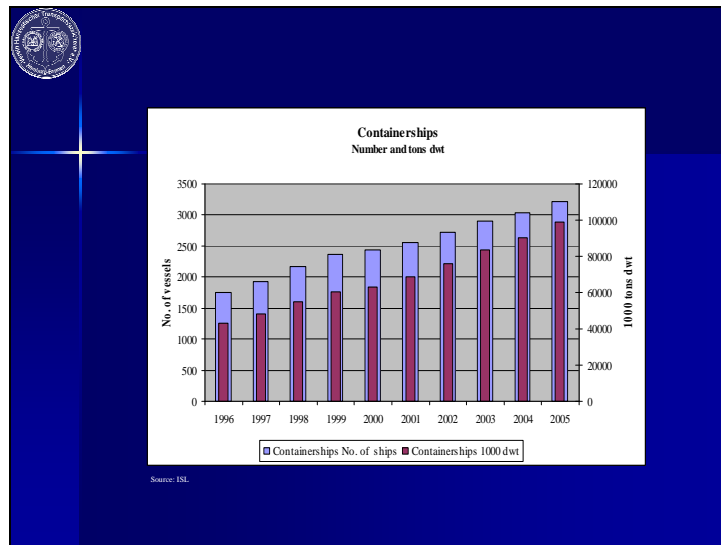
My task for today will be to highlight the technological advance of shipping in general and the likely claim related consequences for the insurance industry in particular. As a starter I would like to give you an idea of what actually has happened in the shipping world over the last 10 years. In respect of the number of vessels, the world fleet has grown by 10%. By the end of 2005 the count was 39.932 vessels of different types.

Folie 6



The rise in tons dwt over the same period however was 30%, from close to 700 million to 888 million tons dwt by the end of 2005, indicating that the cargo carrying capacity of the new built vessels was increasing even faster than the number of vessels. Looking at the growth-rate in TEU's however shows of what type most of the newly built vessels were: Undoubtedly Container carrying vessels with increasing TEU capacity with an remarkable increase of 125% from about 4 million TEU in 1995 to 9,4 million TEU in 2005.

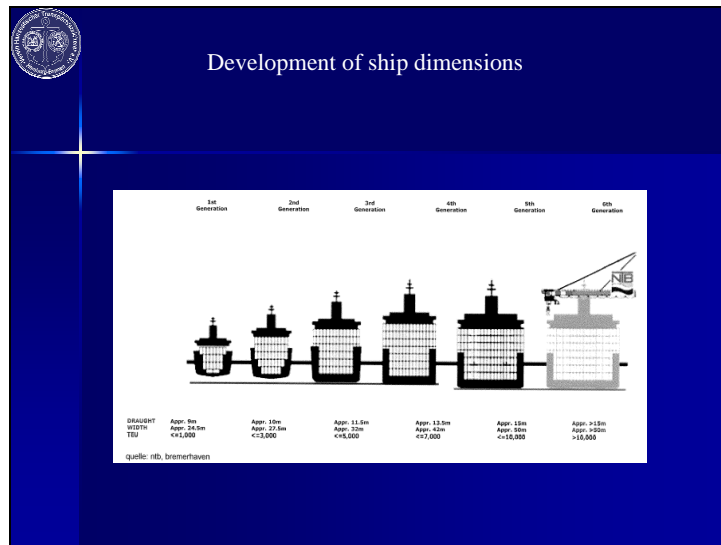
Folie 7



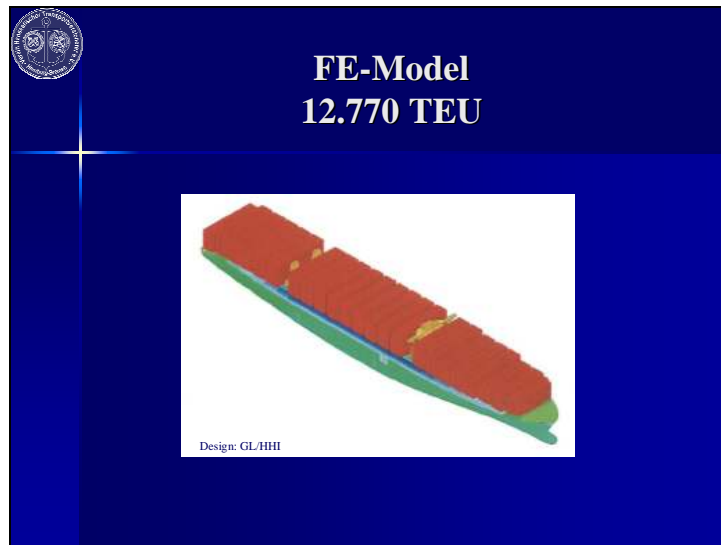
As we have learned from the previous slide, Containervessels are the type of vessels that has increased in number and dwt over time the most. On this slide we see that the actual increase in the number of Containervessels is remarkable 84% from 1.800 to 3.220 ships, and the increase in tons dwt even more distinct 129% from 45 to 99 million tons dwt in a 10 year period. None of the other categories of vessels went through a comparable development.

For the purpose of this paper I will stick to the Containervessels as the technological progress we have seen to date in this class of vessels is outstanding and has not taken place to such an extent with any other type of vessel.

Folie 8




This slide gives you a good indication of what has happened over the recent years from the 1st to the 6th generation of containerships. We see that an increase in draft and width has led to vessels with cargo carrying capacities from 1000 to bigger than 10000 TEU's. What the industry is telling us is that this is not the end to it. 13000 TEU and even bigger vessels are under consideration nowadays.




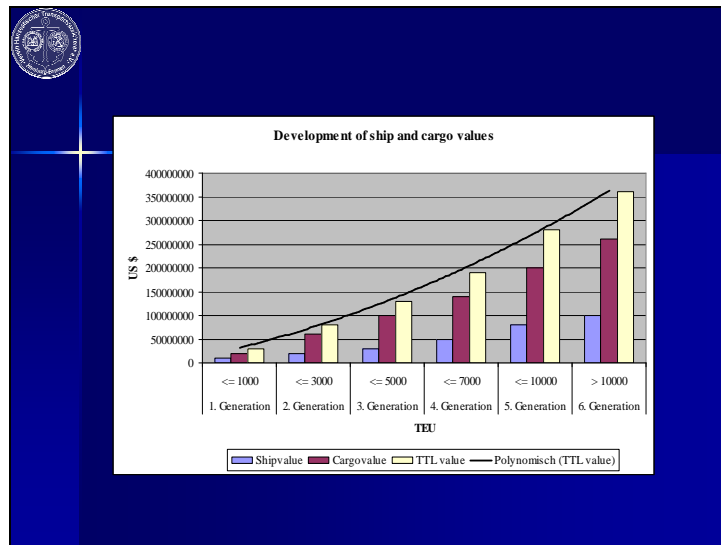
Here we have a study of an innovative design for a vessel carrying more than 12.000 TEU. We see that the wheelhouse and accommodation has moved forward and the reason for that is not to loose TEU capacity, as it would happen if the wheelhouse would remain aft

Folie 10



The further aft you locate the wheelhouse the more TEU's you will loose, as the minimum range of vision in front of the bow has to meet the safety requirements.





Ladies and Gentlemen, a similar dramatic development took place in respect of values. Ship values boosted inter alia because of growing ship size and consequential cargo carrying capacity. The cargo values shown on this slide have been calculated by using conservative 25000 US\$ as an average value for a 20 feet container. Nowadays a total value for ship and cargo in the range of 300 – 400.000.000 US\$ and even more would not be out of the question.


Now that we have had a look at the basics we can return to the topic of this paper:

Underwriters challenge:

Advancing ship technology and maritime claims

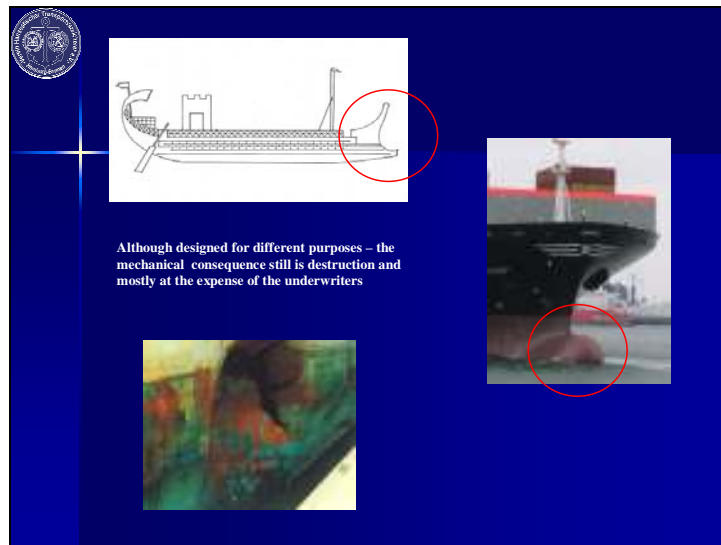
Where is the link between advancing technology and claims, where are the potential risks underwriters have to look at carefully ?

If one looks at these ships which have been designed by utilising finite element calculation methods to evaluate the possible stresses a vessel will encounter, the following areas of concern spring to mind:



Areas to look at

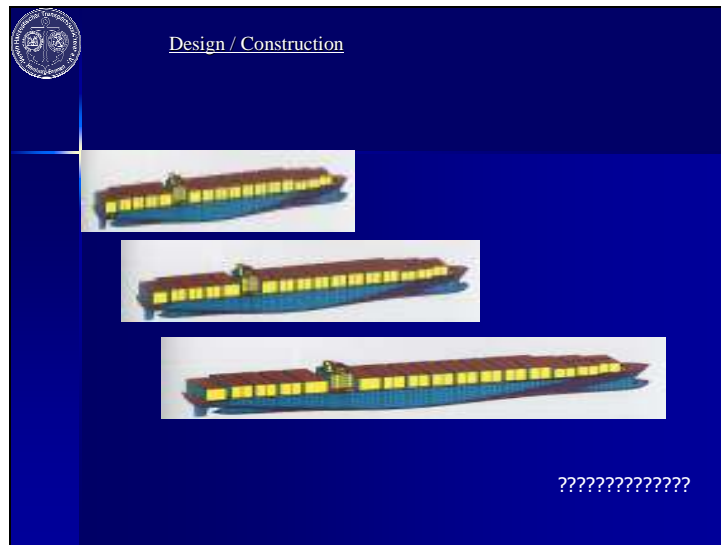
- Design / Construction
 - Small tip clearance of propeller
 - Cracks in flat stern
 - Cracks in longitudinals, etc.
 - Double Hull / Coating
- Propulsion
 - Main engine configuration
 - Failure of essential machinery parts
 - Propeller / Azipods
- Operation
 - Parametric rolling
 - Loss of cargo
 - Speed / Slamming
 - Safe speed / Squat / Interaction
 - Repair and Salvage
- Port Facilities



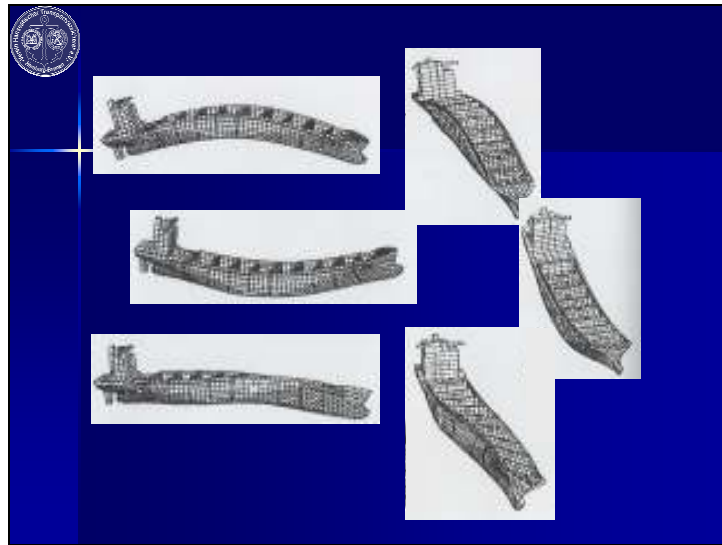
Although designed for different purposes – the consequence still is mechanical destruction and mostly at the expense of the underwriters

This is not to say that all new development we have seen in the past is always to the detriment of the underwriters but there can be no doubt that underwriters have to bear a part of the burden and share into the respective financial consequences.

The bulbous bow is a feature everyone is used to nowadays, but it very well fits into the type of technological development (here fuel saving) which has and still is costing underwriters money in more or less each collision case, because the ship's hull is penetrated below the waterline with respective consequences. Technology in shipbuilding is advancing ever since and has achieved tremendous improvement in respect of ship safety and economics, but at the same time new problem areas have been detected and have to be tackled. As the underwriters share into the financial risk of the operation of a ship, they will be directly involved and effected.



The most obvious and dominant feature in the development of Containervessels was and still is size for increasing cargo carrying capacity. This can be achieved only by enlarging the vessel, more precisely by increasing length, width and depth. Material thickness however must not grow at the same ratio but only within limits which still safeguard operational safety. Nowadays this limit is defined by mathematical methods such as finite element calculations. Such calculations allow the shipbuilder to simulate stresses and loads the vessel will encounter under certain operational and environmental conditions and find the answers to engineering challenges. To what extent nowadays shipbuilding theory meets the necessities of practical seafaring in general is tested when the vessel has entered its operating life, experience however tells that theory and practise sometimes differs.



These drawings, although I have to admit, a little bit exaggerated, show the motion of a Containervessel in a seaway and it is not too difficult to imagine, even for a layman, that such a construction needs two features at the same time: sturdiness and elasticity.

Will this always be achieved ??

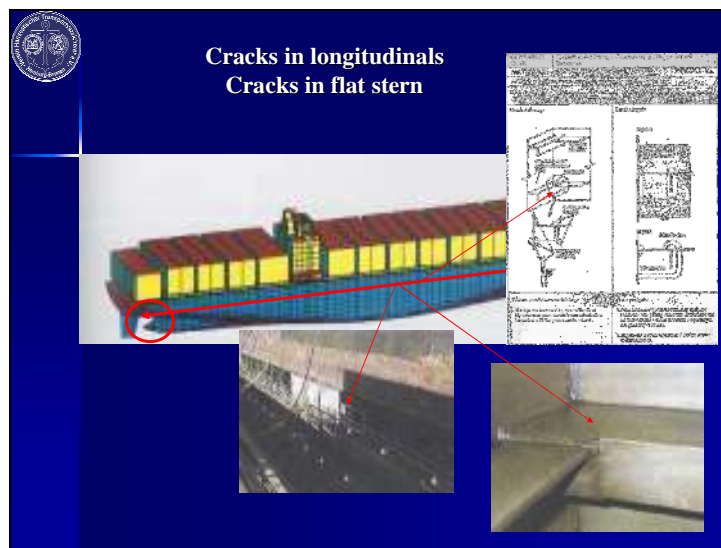
Folie 16



There have been cases where elasticity was in short supply !



But there are other areas of concern.



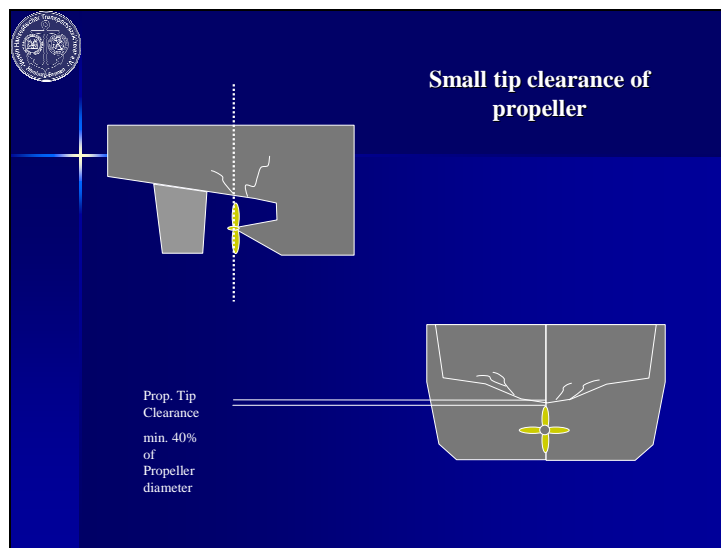
In the recent past structural damage to relatively young Container ships have been reported in increasing number. During inspections several hundreds of fractures in the connection between longitudinal frames and web frames have been found. These fractures indicate that the hulls of these vessels have not been sufficiently dimensioned. It has been detected that such fractures do develop because of peak loads occurring at the interface of longitudinal frames and web frames. These fractures are critical as they may develop not at one location only but at many locations at the same time. In case the local structure is overloaded, then these fractures will propagate through the longitudinal frame into the shell plating. The consequence being that the watertight integrity of the ship will be violated. Now, what is causing these peak loads and fractures ?

A ship moving through a seastate in its operational life will be dynamically loaded at various levels. In a wave-train approaching the vessel either from astern or ahead she will predominantly be exposed to „hogging“ or „sagging“ conditions, subject to where the bow and stern-section or the midship-section is located relative to the wave crests and troughs. If the waves are meeting the vessel at some angle, transverse bending and torsion will also affect the ship's hull. In addition to these so called global loads there are also local dynamical loads such a a pulsating dynamical

load caused by rolling and pitching of the vessel in a seastate. Such a pulsating hydraulic pressure acting on the vessel's shell plating in conjunction with the global loads lead to a complex load collective which in turn will have an influence on the service strength of the vessel.

It is said that a 10% error in calculating loads may lead to a 30% error in calculating the necessary service strength of a vessel. It is quite imaginable that wrongly calculated loads will lead to a weak structure which over time is not able to withstand the forces acting upon it and which eventually will give way. An area to be prone for such weak spots are the interfaces between longitudinal and transverse internals at the vessel's shell plating.

Question: Are these fractures and the consequences insured because they have been caused by a peril insured (heavy weather) or are we faced with fatigue fractures which occurred because the structure of the vessel was too weak for the intended operation ?

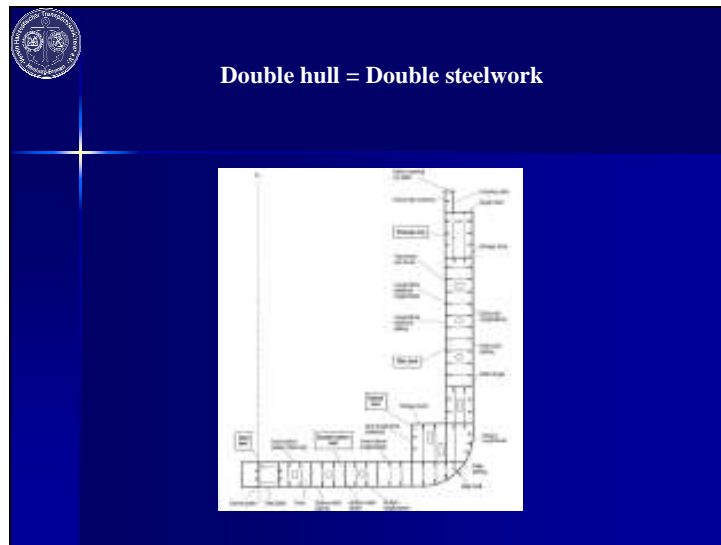


Briefly the diameter of a propeller should be as large as possible so that the maximum amount of wake, caused by the ship's hull, is used. On new Containervessels we see overhanging, wide and flat stern sections. It is important to safeguard that the clearance between the propeller tip in the 12 o'clock position and the hull plating above the propeller is large enough (about 40% of the prop. diameter) to avoid pressure strokes and vibrations which in turn might cause cracking of the shell plating above the propeller. This danger is even further enhanced by „pooping“ of the vessel, i.e. when sailing in a stern sea and when the stern section is slamming into the sea by pitching and rolling. The wide and flat body of the stern section will practically „hammer“ into the sea and it is easy to imagine what kind of forces will be acting on the vessel's hull under such circumstances.

Again - are these damages caused by an insured peril ??

That the structure of a vessel is prone to cracking under certain conditions is nothing new, however with larger Containervessels the problem seems to be more serious. It is not without purpose that IACS the International Association of Classification Societies has published Guidelines for

Surveys, Assessment and Repair of Hull Structures for Container ships.
What we learn from this publication is, that the steelwork of a
Containervessel is a very complex structure which offers plenty
opportunities for structural problems.



Newer type Container ships are built with a double hull of which large sections are used as water ballast tanks. These tanks are nowadays coated with long-lasting and thus expensive coatings. The costs of which will form a considerable part of a claim when the vessel's hull is damaged by collision or otherwise and do not forget the extra steel-work which will then have to be replaced.

Let us now turn to the propulsion of such vessels.

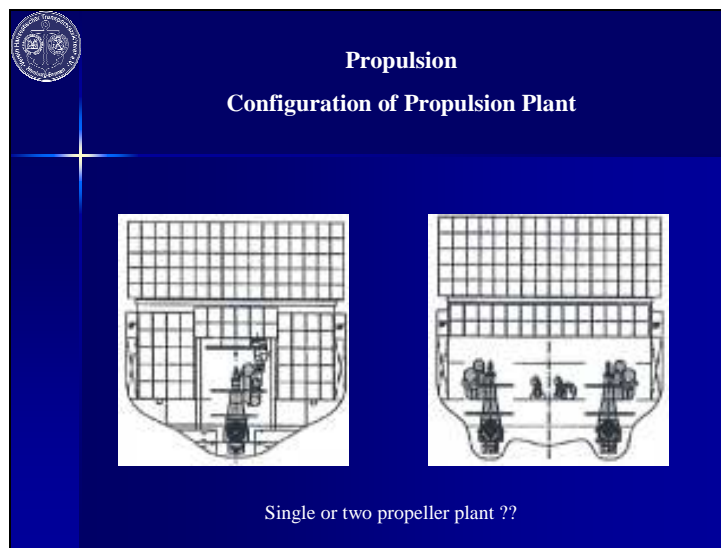


Again, the message seems to be: Big is beautiful.

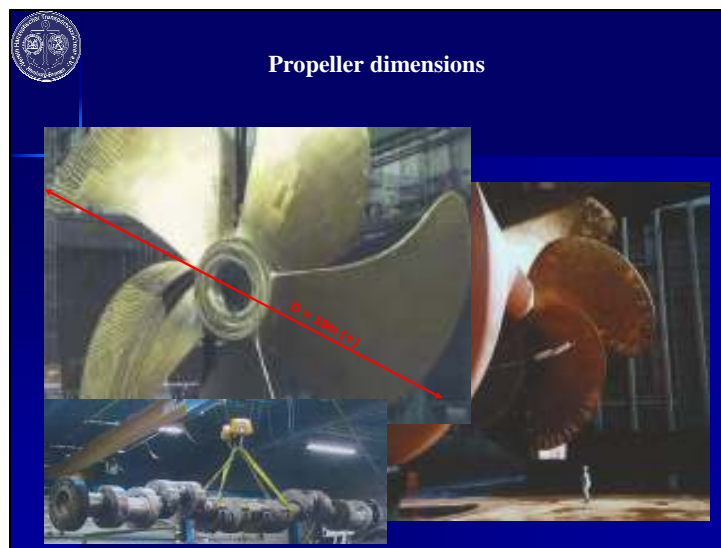
This slide shows the size ratio of a 450 kW to a 100.000 kW two stroke main engine. The weight of such an engine is in the range of 3.000 t and the power/length ratio in 2003 had reached 3.000 kW/m. For comparison purposes, this ratio was slightly above 1.000 kW/m in 1965 for the then available largest engine. This changing power/length ratio is an indicator which is telling us that we are faced with a similar development as we have it with the vessel's hull. There the line of development is size with as little as possible steel weight, with the engine it is maximum output with as little as possible weight. Such a development automatically enters so called „grey areas“, especially when demand is fierce and technology moves ahead with great steps. Under such circumstances there is hardly time for proper testing. A fact the underwriters will learn the hard way later on.

If one looks at the dimensions of these large engines one will appreciate that spare part availability will become a problem. Parts like a crank shaft or sections of a crank shaft will not be readily available in case of need but will have to be manufactured on order when needed - a time consuming

procedure during which the vessels will be out of service. This problem does not stop at the crankshaft - turbochargers, drive wheels , gear wheels, propellers etc. have a similar fate.



Up to now we see single engine and single propeller plants fitted into the large Container vessels. There is a school of thought however which would prefer two propeller plants on these ships. The background seems to be, that with such a configuration the propeller efficiency would be better at a lower main engine output level, compared to a single propeller plant. Although the vessels would be fitted with two engines which bear the risk of suffering damage more often than a single engine only, the advantage for the operation of the vessel would be propulsion redundancy in an emergency. A fact which would be welcomed by the underwriters. In addition another problem with a single propeller plant would be solved: A single engine of the size in question will even at „Dead Slow Ahead“ give the vessel a speed which will cause problems when manoeuvring in port approaches or in ports. A two propeller configuration is more flexible in this respect.

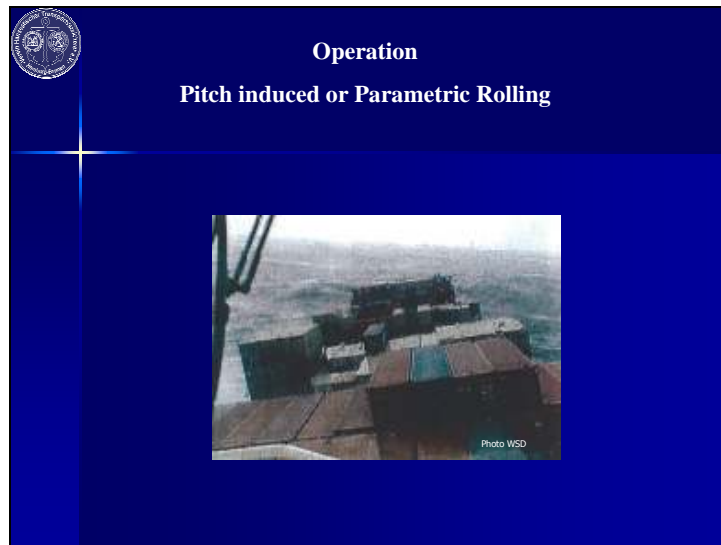


With the size of the vessel naturally the size of the propeller grows. The larger the diameter of a propeller is, the higher is the propulsive efficiency. However the size of a propeller will have to be optimized according to the ship design. For strength and production reasons the diameter will nowadays generally not exceed 10 m and a power output of about 90.000 kW.

The largest propeller diameter manufactured so far however is of 11,0 m diameter, the weight of such a propeller will exceed 100 t and there are not many manufacturers around the world who are able to produce such a propeller. Especially nowadays where all shipyards are brimming with newbuilding activity, the order books of the propeller manufacturer are full and in case such a propeller has been damaged it will take months to get the necessary spare propeller to the ship. Under standard Particular Average considerations time is not the concern of the underwriters, if however a GA situation or a Loss of Hire insurance would apply, the situation will be different.



Technological development of ship propulsion does not stop at the design of propellers – even more sophisticated systems have been developed. The AZIPOD is one of those developments. So far they have to my knowledge not been fitted into Container ships, their market niche seem to be the passenger liners and ferries. From a point of manoeuvrability and saving of space for more commercial aspects such a propulsion system is a very welcome development. But imagine the costs if such an AZIPOD suffers some damage , either internal or by an accident such as grounding.

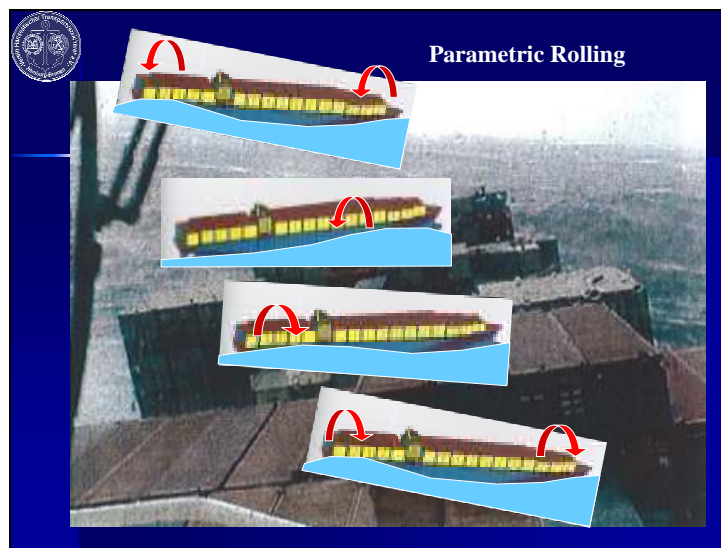


As we all know, the main characteristics of a vessel's motion in a seaway is pitching and rolling and this is nothing new. However since the development of large Container ships we have seen spectacular losses of Containers stowed on deck. These accidents occurred when the vessel was sailing in rough weather and when all of a sudden the vessel started rolling heavily with increasing rolling angles which in turn caused accelerations which caused the Container lashing systems to fail.

What is happening here ??

The answer is „Pitch induced or Parametric Rolling“

As I have explained earlier nowadays Container ships feature wide beams, large bow flares and wide stern sections in order to carry a maximum of Containers on deck. At the same time naval architects are continuing to streamline the underwater hull to minimize resistance for improved economics, this appears to be a dangerous equation.



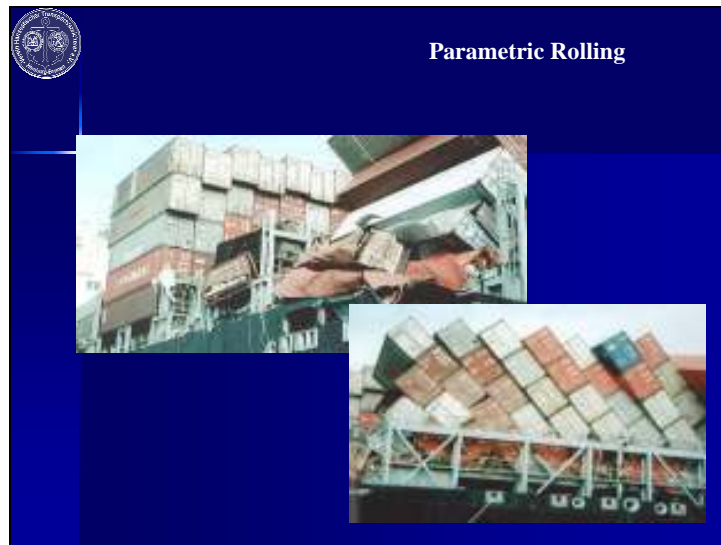
Parametric rolling got its name because it is caused by parameters of the design of the vessel which I have just mentioned: Extreme bow flare, long parallel midship section, wide beam and a wide and flat stern.

In a rough seaway the waves are travelling along the hull. The stability of the vessel will vary with the wave crest travelling along the hull. When the bow is down due to pitching coupled with slight rolling the large bow flare suddenly will immerse in the wave crest. The now restoring buoyancy force plus the wave excitation force will push the ship to the other side. The same will then happen on the other side when the bow again meets another wave crest. Further, a similar action is building up at the stern of the vessel. If the pitching period of the vessel is either equal or half the vessel's rolling period the danger is at its most and can induce a rapid build up of rolling motion. This may result in losing containers from the deck.

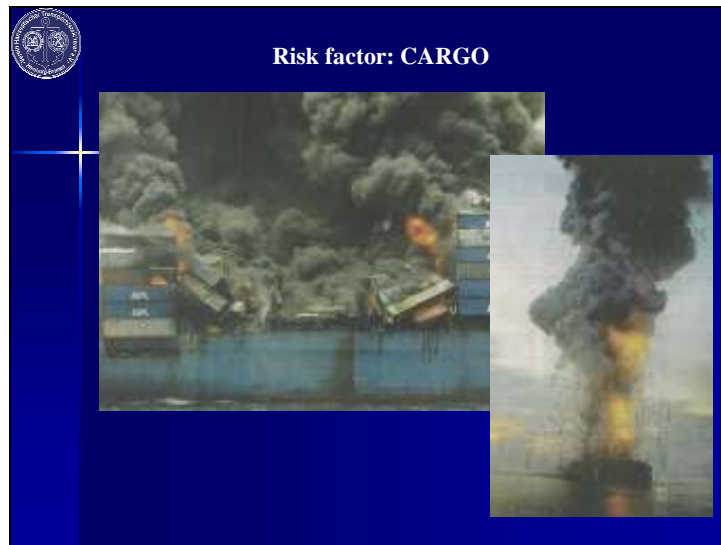
Such rolling motion does not only endanger the cargo on board but under extreme conditions can even lead to the capsize of the vessel.

Ladies and Gentlemen, this certainly is a very shortened and simplified explanation of Parametric Rolling. What we learn is, that Parametric

Rolling to a great extent is a consequence of good, modern and economic ship design.



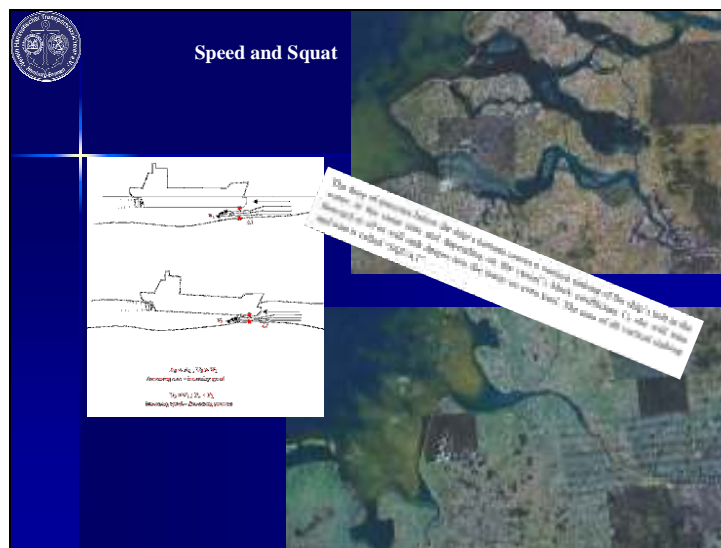
The problem of Parametric Rolling has nowadays been identified by the industry and various counter measures are in progression which will help to avoid damages as shown on this slide. However there are still a number of ships under way where good and careful traditional seamanship will have to help to avoid the encounter with such a situation.



Whilst we are talking about damage to cargo please do not forget the enormous accumulation of values on board of such a vessel. As we all know - some accidents have shown that even with the greatest care in handling the cargo, there remains an area of uncertainty with respect to the truthful specification of the contents of containers.



A speed of 23 to say 25 knots is the owner's requirement for such type of vessel. These vessels run on a tight schedule and delays in arrival are not seen light-heartedly in the industry. This in turn will cause the master of such a vessel to do the utmost to keep his ETA. Even under rough conditions the speed will be maintained. We have seen quite a number of so-called heavy weather damage which most likely could have been avoided by adjusting the vessel's speed accordingly. One has to admit that on these very long vessels the officer of the watch (OOW) does not see nor sense what actually happens at the bow of the vessel.



Squat is a phenomena which occurs when a vessel is sailing in shallow and restricted waters. Squat does reduce the so called keel clearance (The distance between the bottom of a river and the vessel's keel). For these large vessels, at a draft exceeding 13 m plus, many port approaches can be regarded as shallow and restricted (For example see the approaches to Antwerp and Hamburg). To make it for these ports the vessels have to ride on the crest of the tidal wave and thus have to sail at a certain speed. Speed however is the dominant factor in the squat calculation. Very accurate logistic and ship management is necessary to arrive at and to sail from such a port safely.



The next problem in line is hydrodynamic interaction and the so called Bank effect. As said earlier, these large vessel's will have to sail at a certain speed when approaching a tidal port. Overtaking of smaller vessels can thus not be avoided. If such overtaking manoeuvres are not performed with utmost care Hydrodynamics will take over and severe accidents are to be expected. A similar effect can be expected when a vessel sails too close to the edge of a steep bank of a fairway. Similar hydrodynamic effects will occur and will force the vessel away from the bank towards the other side of the fairway and oncoming traffic. Several collision- and grounding-cases have taken place so far.

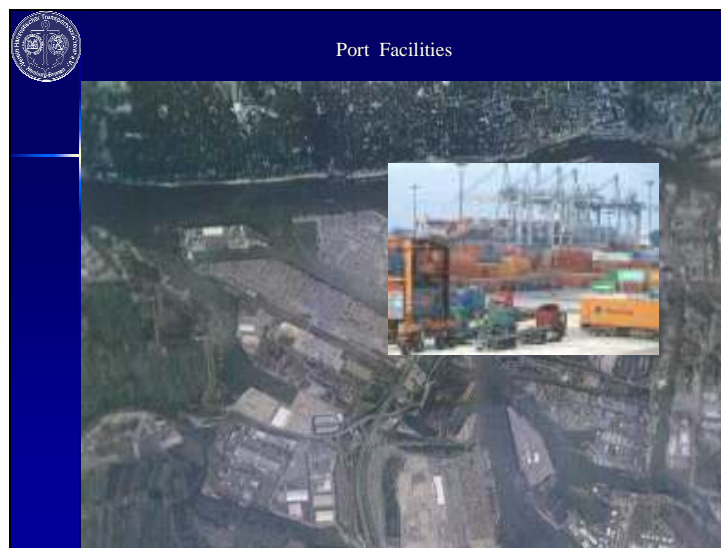
No doubt, these physical effects always has and will continue to influence other type vessels as well, but with these large Container vessels the risk of something going wrong is even greater.



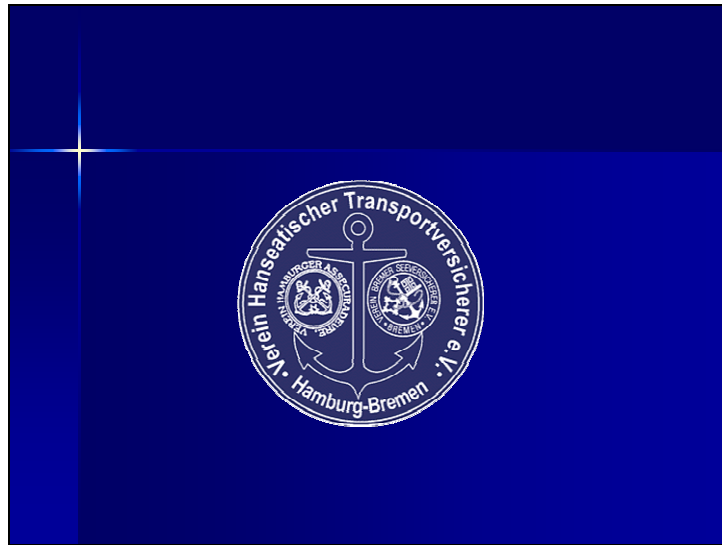
Is the industry really prepared for the salvage of a vessel of these large dimensions ??

We have learned today what efforts it required to refloat the „APL PANAMA“ from the beach in Mexico. Not necessarily it has to be a grounding, an engine failure in mid Pacific when simple towage is required only will cause enough of a problem. Tugs of sufficient bollard pull to maintain a decent towing speed are in short supply and will have to be mobilized over great distances at shocking dayrates or lumpsum.

Imagine a broken rudder-shaft or severe propeller damage after grounding. The vessel will have to be dry-docked for repairs. The next available dry-dock of sufficient dimensions to take such a vessel might unfortunately be located on the other halve of the globe. Moving a vessel to the next available place of repair will fall under the insurance cover of the vessel.



Ladies and Gentlemen, last but not least, a remark on the port facilities. The development of Container vessels in general and of large Container vessels in particular has changed the appearance of the ports of the world. Countries and ports who want to take part in the global transportation chain have and will have to go through huge investments for providing and maintaining the necessary infrastructure to lure the important liner operators. Think alone of the costly container bridges which are placed at the edge of a jetty. A slight misjudgement of the necessary space for a turning manoeuvre or the failure of a tug may result in respectable claims. The same can be said of the other port facilities such as piers, bridges, etc. You can rest assured, where there is a risk, there will be claims.



Ladies and Gentlemen, I will stop here as I have already passed the time limit which was given to me for this presentation. What I have shown and told you does certainly not cover this subject in its totality, it is more like a scratch on the surface, and please note, what has been said in respect of large Container vessels does as well apply to other type vessels of similar dimensions to various extent.

I have not touched upon the tremendous technological advance we see on the bridge of a vessel nowadays, such as VDR (Voyage Data Recorder), AIS (Automatic Identification System), GMDSS (Global Marine Distress and Safety System), ARPA (Automatic Radar Plotting Aid), ECDIS (Electronic Chart Display and Information System). Studies held in the recent past show that humans tend to rely excessively on the accuracy of electronic aids and thereby lower safety margins they would observe if they would have to rely on their own five senses only.

High demanding technology everywhere, there seems to be a never ending rationalizing process in the operation and management of a vessel. In other words, we see crews getting smaller and the workload rising. Are the crews out there still capable of keeping the necessary standards and quality? A question worthwhile to be asked.

Perhaps the answer is:

Seafaring always was and will remain to be a risky and demanding affair for all participants.

I hope that my presentation was of some interest to you and will help you in your daily work to better understand and judge the new operational risks which are deeply interwoven with technological advance in shipping and leads your way to a really risk-adequate premium for the object you have to quote for.

Thank you for your attention.

Capt. P. Zahalka
Managing Director
VHT
Bremen
13.08.2006