Autumn 2014 issue

BMT Surveys

Surveillance

VERWEIJ & HOEBEE
EXPERTISE- EN TAXATIEBUREAU

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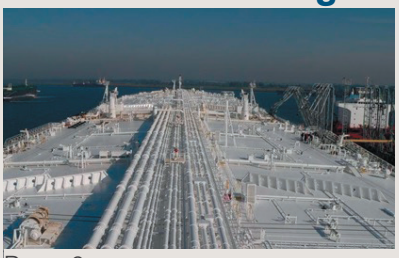

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Welcome to BMT's autumn 2014 survey bulletin "Surveillance" with some recent experiences in the survey field and news items on loss prevention.

Were you aware that **fuel saving measures can have a negative effect on the lashing forces** on the containers? Olivier van der Kruijs shares his experiences from the audits on more than one hundred container vessels last year.

In another article it is also described how ship **condition surveys** could be conducted more efficiently and how the assessment can be done in a more transparent and uniform way to deliver useful datasets. Theory? Not at all. The new system has already been tested during more than five hundred surveys and proven its value to the customer.

Carlos Maenhout explains the issues when investigating incidents involving the **breakage of inland barges.** Is it a trend or just coincidence that a number of these incidents occurred last year? The answer can be found on page three.

Surveyors are usually engaged to investigate the cause, nature and extent of a claim, damage or incident. Their role in **managing projects to salvage cargo** is less known. Peer van Oosterhout and Ad de Klerk share their experiences in salvaging a cargo worth several million Euros from the seabed in the Mediterranean.

Dennis de Bruin describes what a surveyor can do to turn an apparent **total loss of high quality fuel around into the acceptance of a sound product.** He also elaborates on the current issues and new regulations concerning the on-board blending of fuels.

Jaco Osseweijer of Verweij & Hoebee Group, which company joined the BMT Group of companies last year, is an expert on inland navigation vessels. As chairman of the technical committee of the **Netherlands Bureau for Inspections of inland navigation vessels (NBKB)** he is involved in the mandatory inspection regime for these vessels and explains how the system works.

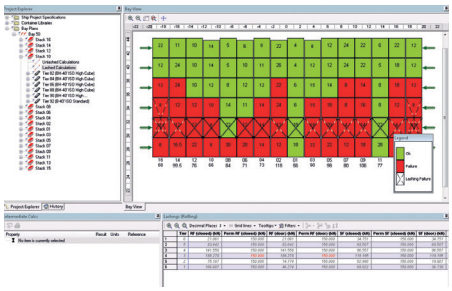
Just a few examples of the many interesting stories surveyors have to tell, which we hope will be of interest to you and your business.

The management of BMT Surveys and Verweij Hoebee Group.

Container ships: Possible effect of fuel efficiency on lashing forces

The latest generation of container ships have been designed not only to increase capacity but also to improve energy efficiency and environmental performance. The rise in fuel prices in combination with an continuing pressure on freight rates has forced ship owners and operators to look closely at the amount of fuel being used. This has resulted in economical steaming and other fuel efficiency measures. Fuel efficiency monitoring can be achieved by a number of ways; for example, by using computer and communication software which monitors and analyses the ship's performance and operational parameters in real time. The results of these analyses may then suggest, for example, to change speed, trim and draft. The optimal trim, varies with speed, displacement, weather and underwater hull shape and can be a significant factor in saving fuel. One study suggested that fuel consumption could be reduced by as much as 5% using this technology. However, as an unwanted side effect, this fuel saving method may increase the calculated dynamic forces to the containers and lashings, possibly exceeding maximum permissible levels.

As part of its extensive range of services to the shipping industry, BMT also carries out regular inspections of container ships. A point of attention during these surveys is the requirement to review the lashing computer data and establish if there is a situation on board whereby container lashing forces are exceeded.



As regards maximum permissible forces, there are limitations resulting from the strength of the container itself. Those limitations are stipulated in ISO standards (ISO 1496). It is important to appreciate that there is no safety margin on these limits. Theoretically, a container may thus distort as soon as these force limits are exceeded. This is different for the safe working loads on the lashings, which do have a safety margin.

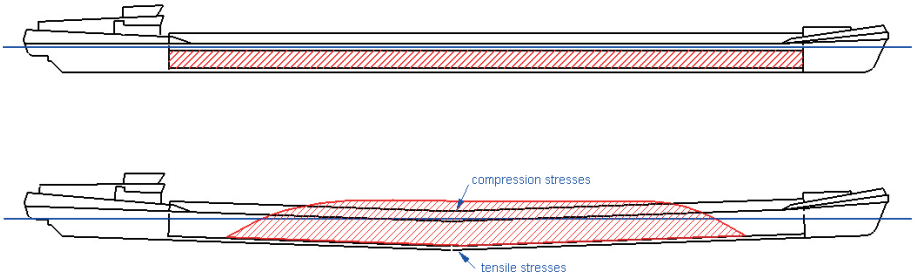
Usually, for the preparation of a stowage plan, stability and lashing forces are calculated. These calculations take into account the usual changes to stability as a consequence of expected fuel consumption or changes to the ballast water quantity, whilst sailing.
It has become apparent that during the voyage, the ship is sometimes instructed by the owners (or the charterers) to make adjustments to improve fuel efficiency. These (unplanned) adjustments of draught and trim often increased the GM (metacentric height) and, as a result, also the dynamic forces acting on the containers and lashings. This could lead to a situation whereby the ship left port with the calculated lashing forces being within design limits, but exceeding the limits at a later stage when the trim adjustments were made. For vessels enjoying a voyage with good weather, exceeding the designated maximum lashing forces is unlikely to result in any damaged cargo. However, if the ship was to encounter its "design motions criteria", damage to the container stacks and cargo could occur, thus as an indirect result of saving fuel.

Loss Prevention contributions

BMT Surveys and Verweij & Hoebee contribute to loss prevention initiatives regularly. Below a snap-shot of some recent contributions:

- New products were added to the world largest's commodity database www.cargohandbook.com, which now results in more than 900 commodities being available free of charge. The website is consulted approximately 200 times a day, on average.
- Andy Morris (London office) wrote an article on "Preparing holds for the carriage of solid bulk cargoes" for Skuld P&I.
- Jeroen de Haas and Nico van Duijvenbode contributed to the Transport Guidance for Bagged Rice of the American Club. http://www.american-club.com/page/bagged-rice-cargoes.
- Dennis de Bruin held a presentation on "on board blending" for the Traders Society in Geneva.
- Olivier van der Kruijs participates in a working group for developing new regulations for reefer container audits under the 360 Quality code.
- The International Association of the Rhine Ships Register (IVR) installed a New Loss Prevention Committee of which Carlos Maenhout, Managing Director of BMT Surveys (Antwerp) N.V., will be the president.
- BMT Surveys has been assigned to write a complete cargo manual for a top-25 container carrier.

Inland navigation: note on strength and loading issues

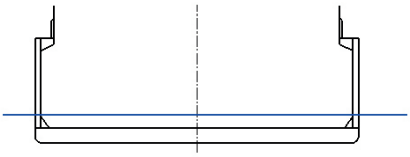


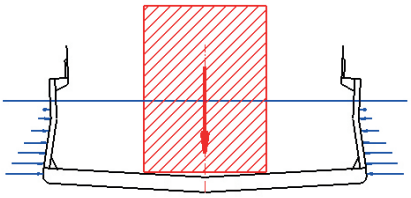
Recently, BMT was consulted in a number of cases/casualties involving the breaking and subsequent salvage of inland navigation barges. The incidents all occurred during loading operations. Since old barges are concerned, immediately questions arose about the cause of the incident. Did the barge give way due to poor construction, or was the collapse caused by faulty loading or something else?
Some older barges may indeed suffer from degraded sections in their construction. At the same time, investigation has shown that this may not necessarily be the cause but that a wrong loading procedure was to blame.

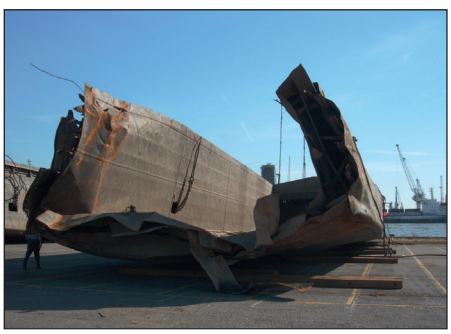
The construction design of an inland navigation barge cannot be compared to that of a sea-going vessel. While sea-going vessels are designed to withstand heavy weather, rough seas, waves, etc., an inland navigation barge is designed to sail in sheltered waters. Moreover, historically, barges are designed to carry cargo in bulk or in bags which should be equally spread over the entire tank top of the cargo hold. When this principle of equal spreading is not respected, the barge tends to bend in the middle, a condition which is also known as “sagging”. This condition generates high compression stresses in the hatch coaming, and high tensile stresses in the bottom plating. Once these stresses exceed the buckling resistance of the hatch coaming construction or the yielding strength of the bottom steel plates, the vessel folds in the middle.

Furthermore, a proper athwartships distribution of the cargo load should be respected. Once cargo is loaded any other way, the bottom tends to bend in transverse direction, the effect of which is increased by the hydrostatic water pressure in the ships’ sides.

The photographs show an example of such faulty loading. The heavy steel plate stacks do not cover the entire length of the cargo hold; moreover, the cargo weight is concentrated near the barge’s centre line rather than having been spread sideways. Ten minutes after leaving its berth, this barge suddenly collapsed and sank. After salvage of the wreck, the typical failure mechanism as described above could be clearly noted: the barge’s bottom was bent downwards in transverse direction, its sides were pushed inward and its hatch coaming was heavily buckled.







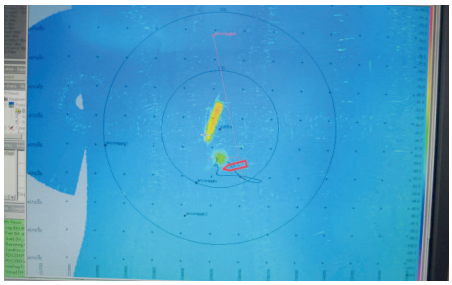
In such type of incidents, reconstruction of the loading procedures is important as these represent the last actions prior to the barge’s collapse. Reconstruction can be based on witness statements, possible available photographs, videos from security cams, diving inspections before salvage, etc.

Subsequently, strength calculations of the still water bending moments and the section modulus may be conducted by BMT to find out whether or not the barge collapsed as a consequence of its loading condition.

Retrieving valuable cargo from the sea bed - a success story

Recently, BMT Surveys in Rotterdam was approached by a major European-based underwriter, to investigate the possibility of salvaging a high value cargo from a vessel that had sank in about 100 metres depth of water in the Mediterranean. Even though the cargo value was significant, the location and other operational considerations made the salvage venture potentially marginal if it was not carefully managed with time and costs controlled.

The initial appointment was to arrange and carry out a feasibility study to assess how much cargo could potentially be recovered and to gauge whether it was commercially and operationally viable. In co-ordination with the insurer, a diving survey and salvage company was appointed with an appropriate survey vessel to conduct a sonar side beam survey of the site which was 35 nautical miles from the shore. With BMT in attendance, a sonar side scan survey was carried out. This was then followed up by the use of an ROV (Remotely Operated Vehicle) equipped with underwater video equipment.



Once these operations were completed, the collected data were analysed. The analysis confirmed that the majority of the cargo lay scattered on the sea bed close to the ship. This allowed the cargo to be accessed without having to disturb the ship, which would have resulted in a larger and more costly operation. Insurers were provided with a report, including video footage of the wreck site. The report supported the opinion that, with the correct equipment, about 75% of the cargo could be salvaged. Subsequently, insurers decided to salvage the cargo and BMT was appointed to assist and manage this recovery process. This included; liaison and negotiations with authorities and interested parties, finding a safe and secure port to land and store the recovered cargo and on-the-spot monitoring of the operational activity. BMT also assisted insurers with the sale of the recovered cargo.

The operation took nearly four weeks and eventually 80% of the cargo was recovered. The proceeds of the salvage sale were significant and concluded a successful operation.

Petroleum products: Resolving a contamination claim in West Africa

Shipping is a global business and the obstacles and challenges faced are often demanding. Hence knowledge, experience and personal contacts are essential to resolve problems. These challenges can be due to geography, e.g. the remoteness of places, the complexity of cargo, local politics and lack of equipment or, misunderstandings that arise from different languages, jurisdictions and cultures.

Last year, BMT Surveys' tanker department was requested by an oil trader to assist with an apparent insurmountable problem involving a 'high spec' oil product cargo that was significantly contaminated. At the time of the instruction, the parties involved in the shipment had considered a possible total loss of the cargo. BMT was requested to investigate whether there were others solutions than declaring a total loss.

The cargo in question was a high quality fuel, which had already been loaded on a tanker. The cargo was worth approximately $3.0 million USD. The ship had been chartered, to load at a West African port and to be discharged at another West African port. After loading had been completed, the master was advised that the analysis of the cargo showed high amounts of a metallic type contaminant, resulting in the cargo being considered 'off spec'. Following this discovery, the receivers refused to accept the cargo and the ship remained at the load port whilst all parties debated how to resolve the situation. BMT was contacted to assist.

A plan was devised using a modified filtration unit to fit in-line at the ship's discharge manifold in order to remove the contaminants. The unit, with a technician, was dispatched to the load port and, once on board, a "test-quantity" of cargo was recirculated through the filtration unit with the receiver's representatives attending. A sample of the recirculated cargo was analysed and found to be within specification. After lengthy discussions, the receivers agreed that the filtration unit could be used at the discharge port. Subject to successful cargo sample analysis, the cargo would be accepted by the receivers. The technician and the filtration unit sailed with the ship to the port where the ship discharged the contaminated cargo through the filtration unit, thus removing all the contaminants. After final sampling and testing, the receivers eventually accepted the cargo without any further claim. Quite interestingly, so successful was the filtration unit that the terminal bought one for permanent availability.

Condition surveys: new insights

For many years BMT Surveys has carried out various types of condition surveys for the diverse interests of the marine industry; these include insurers, banks, cargo interests, charterers and owners. The scope of the 'condition survey' is often the same for all of these interests, though the survey needs are often very different. Most condition surveys follow a format that documents long lists of questions covering every inch of a ship, its crew, safety equipment, certification, management, etc.

Over recent years BMT Surveys have seen changes in the requirements of these surveys and inspections. It has been observed that more and more parties want to develop their own particular survey content, tailoring the survey to cover the particular information they need for their business. BMT Surveys has participated in the development of different survey formats, which has provided new insights and opinions on how a condition survey could be structured more efficiently and effectively.

Traditionally, a condition survey is all encompassing and comprehensive, but this is not necessarily the most effective way to assess the condition for each and every customer. Is it necessary, for example, for a Hull Insurer to know everything about crew safety on board in minute detail when there is minimal liability exposure? Does an investor need to have a surveyor spend excessive time on ship's operational procedures, when it is the asset value, the condition of the ship's structure and planned maintenance records that are of particular importance of him?

In order to make the survey more comprehensible there is a need to make the survey specific to the customer and devise a 'scoring system' to the key survey points. Not only will a 'score' enable vessels to be benchmarked (e.g. ship type, owner or manager etc), but also, if consistently applied, it enables changes in the condition of a vessel to be monitored over time, (for example over a long term charter). By formulating a score system this also provides the reader of the report to see quite clearly where the problem areas lie.

The whole concept relies on a proper and equitable way of translating the survey findings into a reliable numerical score. This requires a few simple rules to be followed:

- Each survey finding is to be pre-defined and given a weighing factor. For example, when considering a leaking hatch cover, the risk has to be defined and provided with a 'weighting' on that risk, i.e. give the defect a figure so that the level of risk can be easily understood by the reader – high risk – high number. This can be easily transposed to a traffic light (red / amber /green) format.
- Each surveyor requires specific training to conduct the survey, understanding the risk philosophy and providing a consistent interpretation. This requires continuous evaluation, so that different surveyors all provide consistent interpretations.
- Achieve uniformity in assessing the survey results by having all reports evaluated and authorized by specially trained reviewers.

BMT Surveys have participated in developing tailor made inspection systems for, a large variety of interests in the maritime sector. The new survey system has proven its value in many instances and provided a significant contribution to preventing losses, damages and incidents.

ScoreCard

Section	Description	Score
1.1	Inspection history	80,0%
1.2	Chief Officer	77,6%
1.3	Chief Engineer	54,9%
2	General items	58,5%
3	Accommodation and bridge	100,0%
4	Hull, deck and holds	79,8%
5	Engine room and steering gear	94,5%
	Total	77,9%

Risk Areas

Follow-up actions	80,0%
Cargo Care	79,2%
Cargo Gear	100,0%
Maintenance	97,4%
Pollution Prevention	66,7%
Housekeeping	75,0%
Structural condition	53,4%
Visitor / stevedore safety	85,0%
Navigation	100,0%
Various	100,0%

Tankers: On board blending

Fuel oils are mainly a blend of oils and other components, for example; aromatic hydrocarbons such as benzene, toluene and xylene. Gasoline, for instance, is a refined product of petroleum, consisting of a mixture of hydrocarbons, additives and blending agents. Its composition varies widely depending on the crude oils used, the refinery processes, the type of product demanded and its specifications.

For the past two decades, the global push to reduce greenhouse gasses, coupled with the soaring price of fuel oil and insecurity of fuel supply, has focused governments on the need for alternative resources. The European Community has decreed that sustainable fuel policies should be adopted. They have set targets for road transport to use at least 10% bio-fuel by 2022. The growth of bio-fuel and bio- diesel is therefore expected to grow significantly. Since 2010, the European Community has required fuel companies to mix 5 per cent bioethanol with 95 per cent petrol and 5 per cent biodiesel with 95 per cent conventional diesel. Fuel mixes at these levels will not damage the fuel systems of motor vehicles and some manufacturers are even producing cars that can use 'B30' fuel - a 30 per cent biodiesel / 70 per cent diesel mix. Biodiesel is derived from vegetable oils, such as palm, coconut, rapeseed and animal fats. These are known as Fatty Acid Methyl Esters (FAMEs) and are produced by trans esterification of vegetable oils or animal fat with an alcohol. Raw 'FAME' materials have different chemical compositions and so their blended properties vary, although biodiesel has properties similar to conventional petroleum diesel. Bioethanol is ethanol produced by fermenting products from sugar or starch crops, including sugar cane or beet, corn, wheat or cassava.
The blending of products and components into making fuel oil is a fundamental part of the energy business. Gases such as butane and propane are also blended. Ships are often required to blend different cargoes and this has been a regular activity on many trades. The blending is usually for logistical or commercial reasons; such as creating a cargo with another product specification, reconditioning a cargo or adding dyes and additives for commercial or legislative reasons.

There are a number of problems that can arise from blending a cargo and these can include:

- Final blend product does not meet specification.
- Inadequate mixing of the various products.
- Complications when blend components are incompatible.
- Individual blend components are unstable and result in a precipitation of sediment.
- Not using proper representative samples - thus incorrect test blend results recorded.
- Calculation errors in product quantities resulting in incorrect blends.
- Final non-linear blends produced with inconsistent flash points, colour and viscosity.
- Commercial liabilities, such as the risk of quality / shortage claims, and 'Bills of Lading' problems.
- Tank cleaning difficulties following a blending operation. 'FAME' products can be absorbed into the tank walls or pipelines and then later leech into subsequently carried products.
- Individual components are contaminated.

Objections to blending on ships were first raised by the Netherlands and UK governments in 2008 when concerns came to light particularly over the blending of bio-fuels onboard ships. New regulations were introduced by the IMO through - SOLAS Chapter VI Regulation VI/5-2 - which prohibits the physical blending of bulk liquid cargoes and production process during the sea voyage as from 1st January, 2014.

The regulations states:

1.) The physical blending of bulk liquid cargoes during sea voyages is prohibited. Physical blending refers to the process whereby the ship's cargo pumps and pipelines are used to internally circulate two or more different cargoes with the intent to achieve a cargo with a new product designation. This prohibition does not preclude the master from undertaking cargo transfers for the safety of the ship or protection of the marine environment.

2.) The prohibition stated in paragraph 1 does not apply to the blending of products for use in the search and exploitation of seabed mineral resources on board ships used to facilitate such operations.

3.) Any production process on board a ship during sea voyages is prohibited. Production processes refer to any deliberate operation whereby a chemical reaction between a ship's cargo and any other substance or cargo takes place.

4.) The prohibition stated in paragraph 3 does not apply to the production processes of cargoesn for use in the search and exploitation of seabed mineral resources on board ships used to facilitate such operations.

Reference should also be made to "Guidelines for the transport and handling of limited amounts of hazardous and noxious liquid substances in bulk in offshore support vessels (IMO resolution A.673(16))". Further, the 2011 Guidelines for the Carriage of Blends of Petroleum Oil and Biofuels should be referred to as well.

Therefore blending on board ship is the mixing of two products resulting in one single product and reflects only physical mixing as distinct from any chemical processing. Such mixing operations should only be undertaken whilst the ship is within port limits. The physical blending on board of bulk liquid products during a sea voyage to create new products is prohibited.

Before undertaking any on-board blending ship owners and charterers should confirm the arrangement with their flag state or the local coastal and port authority. Although there is industry discussion on the full scope of the regulations, it is clear that "bulk cargoes" includes liquefied gas and cargoes which are not MARPOL regulated. Blending operations at an anchorage en route may not be permissible, for example, where there are no facilities for a quick response to a spillage. Blending at an anchorage within port limits may be permissible depending upon the local port regulations. This poses the question whether it is permissible under the regulations to 'blend' during or prior to an offshore STS (ship to ship) operation. Owners should also seek advice from the relevant authorities and their cargo insurers. Any indemnities issued should always be legally checked.

Although the legislation is well intentioned, its scope is not clear for all situations. With the wide range of possible blended products and the problems that can arise from blending, expert advice should be obtained on product compatibility. BMT Surveys has assisted on a number of incidents following blending operations, whereby severe 'waxing' occurred resulting in substantial costs in cleaning cargo tanks and delays to the ship.

NBKB surveys for Inland vessels

To those involved with 'deep sea' or 'blue water' shipping, 'brown water' shipping is a bit of a mystery. The extent and variety of ships using the world's major rivers is vast. For example, the Rhine is Europe's busiest inland waterway, with an estimated 7,000 vessels using the river, representing a capacity of over 10 million tonnes. This includes 4,500 motor cargo vessels, 1,300 tankers, 1,200 pushed barges and tugs and hundreds of passenger ferries. Some 600 vessels cross the Dutch/German border daily, carrying over 200 million tonnes of cargo annually. A significant part of this cargo has originated or has been transhipped from the port of Rotterdam, where 133,000 inland vessels called last year. By using the Rhine-Maine-Danube-Black Sea Canal, cargoes from Central and Northern Europe can be transported directly to the Black Sea.

The Netherlands has a major role in inland transport; with more than 6,000 vessels it has the largest inland fleet of Western Europe. The government department in Holland tasked with regulating vessels is the Dutch Shipping Inspectorate (Inspectie Leefomgeving en Transport). The Inspectorate decided that regulatory inspections and the issuing of inland vessel certificates should be divested to non-governmental organisations. To this end, the 'non-profit' organisation Nederlands Bureau Keuringen Binnenvaartschepen, or NBKB (www.nbkb.nl), based in Rotterdam, was founded in 2004 and it was authorised to inspect inland vessel based on rules and regulations (Rhine, EU and national rules), except for tankers which are obliged to maintain class.

Since the end of 2013, the Netherlands Shipping Inspectorate has also authorised the NBKB to "perform statutory certification services" and issue certificates, including approval of drawings.

Jaco Osseweijer, an engineer surveyor for Verweij & Hoebee (a part of the BMT group), is a founding member of NBKB and is currently Chairman of the technical committee. He is one of the surveyors within Verweij & Hoebee to carry out surveys on inland vessels, i.e. general cargo vessels, push boats, tugs, barges, passenger vessels and ferries.
Every inland vessel has to have a valid Inspection Certificate onboard. A substantial number of the surveyors is qualified to perform these surveys and issue the certificates are attached to NBKB. These surveyors are technically qualified and cognisant of all the complex rules and regulations that govern the vessels permitted to trade on European inland waterways, such as the Rhine. Statutory inspections include (new building) hull surveys (such as steel thickness measurements, alarms, machinery, electrical installations, steering gears and checks on vessel manoeuvrability performance) and safety inspections of fire fighting equipment and life saving appliances.

Also, NBKB surveyors can be called upon to survey damage or approve repairs after incidents, such as a collision, or after certain repair work (including work carried out at the behest of the Inspectorate).

Verweij & Hoebee can service their (inland) relations in damage surveys, condition surveys, valuations etc. and, by performing NBKB inspections, also in certifying. This results in an extended knowledge, which is very useful and can be applied in other kinds of surveys.

Global Surveyors network

We work together with many surveyors in offices around the world. These surveyors have been carefully selected on the basis of their quality standards, their service provided to us in the past or those who have worked with us during our overseas surveys.

All these non-exclusive surveyors around the globe are subject to a strict monitoring and evaluation process in accordance with our ISO 9001 standards. Customers will benefit from passing their global instructions through our offices, both in terms of maximising the result of the survey and obtaining the best price possible.

Availability and competencies of the global survey offices can be obtained by emailing to: network@bmtsurveys.com.

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