Key Performance Indicators in Shipping

Evaluating a Company's Port State Control Performance

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Abstract

The aim of this paper is to perform an overview of the denotation and the use of the Key Performance Indicators (KPI) method in shipping industry and to analyze the performance of a specific company in Port State Control (PSC) KPI. This is accomplished by describing Key Performance indicators, their necessity, their structure, and the requirements during the design and the field of application. A brief historical reference in KPIs is also carried out and furthermore, it is also described reason and method this model was introduced in shipping industry.

The established Shipping KPI model is presented in detail, as supported and developed by BIMCO, which is the world largest international shipping association. The model is a global tool for defining, measuring and reporting information on a ship's operational performance in order to boost performance improvements with companies engaged in ship operation activities and to provide an efficient communication platform on ship operation performance to internal and external stakeholders.

In addition to the above, this paper reviews and analyzes the performance of a specific shipping Company in port state control inspections carried out on board managed vessels for the period of 2012-2016. The company has a fleet of containers and bulk carriers of variable size, age, type, classification society and flag. Through the examination of port state control inspections, results are scrutinized with regards to specific characteristics of the ships, in an effort to establish trends affecting port state control inspections of the company. The results are further analyzed in order to connect detentions with average deficiencies and those with specific vessels' characteristics, such as age, vessel type, flag and classification societies and the connection of those.

Further examination is performed trying to benchmark company's performance in Tokyo and Paris MOU and US Coast Guard, and evaluate all necessary actions needed in order same to be improved. The analysis is also carried out against industry standards and requirements in order to further identify weaknesses, which need to be addressed through strategic planning and additional actions from the company's side.

Περίληψη

Ο στόχος της παρούσας διπλωματικής εργασίας είναι να κάνει μια επισκόπηση στη σημασία και τη χρήση της μεθόδου των Καίριων Δεικτών Απόδοσης (KPIs) στην ναυτιλιακή βιομηχανία και να αναλύσει την απόδοση μιας συγκεκριμένης εταιρείας στους ελέγχους κράτους λιμένος. Αυτό επιτυγχάνεται περιγράφοντας αναλυτικά τους Δείκτες, την αναγκαιότητά τους, τη δομή τους και τις απαιτήσεις κατά τη διάρκεια του σχεδιασμού τους καθώς και το πεδίο εφαρμογής τους. Επίσης εκπονείται σύντομη ιστορική αναφορά στους Δείκτες και επιπλέον περιγράφεται ο λόγος όπως και η μέθοδος που αυτό το μοντέλο εισήχθη στη ναυτιλιακή βιομηχανία.

Παρουσιάζεται στη συνέχεια το μοντέλο δεικτών Shipping KPI, όπως αυτό αναπτύχθηκε από τη BIMCO, η οποία είναι η μεγαλύτερη διεθνής Ένωση σε σχέση με τη ναυτιλία στον κόσμο. Το μοντέλο είναι ένα παγκόσμιο εργαλείο για τον καθορισμό, μέτρηση και αναφορά πληροφοριών σχετικά με τη λειτουργική απόδοση του πλοίου, με σκοπό να να ενισχύσει και να βελτιώσει τις επιδόσεις των ναυτιλιακών εταιρειών και να παράσχει μια πλατφόρμα αποτελεσματικής επικοινωνίας σχετικά με τους δείκτες απόδοσης των πλοίων στα ενδιαφερόμενα μέρη.

Εκτός από τα παραπάνω, η διπλωματική εργασία αναλύει την απόδοση μιας συγκεκριμένης ναυτιλιακής εταιρείας σε επιθεωρήσεις ελέγχου κράτους λιμένα στα υπό διαχείριση πλοία για την περίοδο 2012-2016. Η εταιρεία έχει ένα στόλο πλοίων μεταφοράς εμπορευματοκιβωτίων και χύδην φορτίου, διαφόρων μεγεθών, ηλικίας, τύπου, νηογνώμονα και σημαίας. Μέσω της εξέτασης των επιθεωρήσεις ελέγχου του κράτους λιμένα, τα αποτελέσματα ελέγχονται σε σχέση με τα ειδικά χαρακτηριστικά των πλοίων, σε μια προσπάθεια να εντοπιστούν τάσεις που να επηρεάζουν τα αποτελέσματα των επιθεωρήσεων των πλοίων της εταιρείας. Τα αποτελέσματα αναλύονται περαιτέρω προκειμένου να συνδεθούν απαγορεύσεις απόπλου με μέσο όρο ελλείψεων και αυτών με συγκεκριμένα χαρακτηριστικά των πλοίων, όπως ηλικία, ο τύπος του πλοίου, η σημαία, ο νηογνώμονας καθώς και η σύνδεση των χαρακτηριστικών αυτών.

Περαιτέρω εξέταση γίνεται προσπαθώντας να αξιολογήθει η απόδοση της εταιρείας στα μνημόνια των Παρισίων και του Τόκιο καθώς και στην Αμερικανική Ακτοφυλακή, και αξιολογεί όλες τις απαραίτητες ενέργειες, προκειμένου να βελτιωθεί αυτή. Τα αποτελέσματα αναλύονται επίσης κατά τα πρότυπα του κλάδου προκειμένου να εντοπίστούν οι αδυναμίες, οι οποίες πρέπει να αντιμετωπιστούν από την εταιρία μέσω στρατηγικού σχεδιασμού και να αποφασιστούν πρόσθετες ενέργειες για βελτίωση.

Abbreviations

KPIs: Key Performance Indicators

MOU: Memorandum of Understanding

BIMCO: Baltic and International Maritime Council

ISM Code: International Safety Management Code

TMSA: Tanker Management and Self-Assessment

ISO: International Organization for Standardization

PSC: Port State Control

USCG: United States Coast Guard

SBU: Strategic Business Unit

SPI: Shipping Performance Index

PI: Performance Indicator

DOC: Document of Compliance

IACS: International Association of Classification Societies

MARPOL: Marine Pollution (International Convention for the Prevention of Pollution from Ships)

NOx: Nitrogen Oxides

SOx: Sulphur Oxides

ICT: Information and Communication Technology

IWS: In water Survey

ITF: International Transport Workers Federation

SIRE: Ship Inspection Report Programme

CDI: Chemical Distribution Institute

OHSAS: Occupational Health and Safety Assessment Series

STCW: Standards of Training, Certification and Watchkeeping

MLC: Maritime Labor Convention

NCR: Non Conformity

TEU: Twenty-foot Equivalent Unit

Chapter 1 Introduction to Key Performance Indicators

1.1 Key Performance Indicators definition

A performance indicator or key performance indicator (KPI) is a type of performance measurement. An organization may use KPIs to evaluate its success, or to evaluate the success of a particular activity in which it is engaged. Sometimes success is defined in terms of making progress toward strategic goals, but often success is simply the repeated, periodic achievement of some levels of operational goal (e.g. zero defects, 10/10 customer satisfaction, etc.). Accordingly, choosing the right KPIs relies upon a good understanding of what is important to the organization. 'What is important' often depends on the department measuring the performance – e.g. the KPIs useful to finance will be quite different from the KPIs assigned to sales. Since there is a need to understand well what is important (to an organization), various techniques to assess the present state of the business, and its key activities, are associated with the selection of performance indicators. These assessments often lead to the identification of potential improvements, so performance indicators are routinely associated with 'performance improvement' initiatives.

Key performance indicators define a set of values against which to measure. These raw sets of values, which are fed to systems in charge of summarizing the information, are called indicators. Indicators identifiable and marked as possible candidates for KPIs can be summarized into the following sub–categories:

- Quantitative indicators that can be presented with a number.
- Qualitative indicators that can't be presented as a number.
- Leading indicators that can predict the outcome of a process
- Lagging indicators that present the success or failure post hoc
- Input indicators that measure the amount of resources consumed during the generation of the outcome
- Process indicators that represent the efficiency or the productivity of the process
- Output indicators that reflect the outcome or results of the process activities
- Practical indicators that interface with existing company processes.
- Directional indicators specifying whether or not an organization is getting better.
- Actionable indicators are sufficiently in an organization's control to effect change.
- Financial indicators used in performance measurement and when looking at an operating index.

Each Organization needs to define its own targets and goals. One of the methods to quantify these targets and to set custom made, easy to monitor, measure and try to improve goals, is the use of Key Performance indicators.

The main target of an organization is success, which can be achieved by designing and following the appropriate strategy. A shipping company should make effort to define success and the senior management should ensure that targets are properly set and fulfilled.

Companies set targets in order to reach their goals. Consequently they develop and follow procedures to realize plans through the achievement of goals, which is a never-ending cycle. Proper established procedures set the foundations of success. Procedures are followed in order to achieve targets according to established company objectives. The procedures contribute towards the achievement of targets.

For the past 20 years, companies aim not only at profit but sustainability, not just attracting but keeping customers as well. The way to achieve that, they must perform satisfactory, making the product or service available on the proper place, proper time, and proper quantity for the specific customer.

In order for companies to be able to quantify their performance and measure their improvement they have introduced the use of Key Performance indicators.

1.2 History and Development of Key Performance Indicators

With reference to companies' performance, only the last two decades Performance management has been established as an idea, and is still in its beginning. (Sharif, 2002). In order to evaluate how companies perform, the performance should be measurable, and by measuring it would be able to improve. This concept highlights the importance of the proper measurements of the results of the critical functions of a company, while the not critical can be omitted in the measurement process.

Literature review showed that traditional systems, based on transparent financial measures couldn't integrate all factors that are affecting performance of enterprises and organizations (Freeman and Beale, 1992).

Monitoring and measuring performance of a company is only a fraction of the process of business improvement. The most efficient system of performance measurement is companies to establish a balanced set of performance indicators.

There are seven reasons why performance measurement is used in the management world: the changing nature of work; increasing competition; specific improvement initiatives; national and international quality awards; changing organizational roles; changing external demands; and the power of information technology (Neely, 1998). Other reasons –under the umbrella of aligning business activities to the strategy of the organization performance against strategic goals, are: increase focus on strategy and results, measure what matters and improve performance, align strategy with what human resource can do, improve communication, and put in priority projects.

Maskell, suggests that performance measurement systems must have the following characteristics (Maskel, 1991; University of Warwick, 2006):

1. They are directly linked to overall business strategy and the company's critical success factors
2. They combine both financial and non financial measures
3. They use different measurements for different areas of the company
4. They are changed over time to reflect changes in strategy and operation
5. They are simple and easy to use
6. They give fast feedback to operators and managers
7. They are intended to teach rather than monitor & control
8. They use benchmarking to set target characteristics of performance measurement systems found in world class companies.

From Study in manufacturing has been identified that the outlines in performance measurement systems mainly take into consideration following:

- Quality of services offered
- customer satisfaction
- delivery time

- process time
- Reliability,
- Promptness,
- Expenses
- Versatility and
- resources management.

It is in the company's management decision which and how many alternative measurements are considered necessary.

Within the past twenty years there had been developed various efficient models to monitor the performance of companies, but the most widespread on organization is KPI method. (Plomaritou & Konsta, 2013)

Following the choice of the most suitable performance model to the company, the identification of the appropriate performance indicators is also critical for establishing a proper performance monitoring and improvement tool.

1.3 Key stages in identifying KPIs

The Key Performance Indicators that each company selects for monitoring its scope of application should be meaningful.

Any performance measure is required to give a transparent indication about what is good or bad on its own or combined with another.

The identification of the set of performance indicators, is one of the methods used in order the top Management of the company to make clear to the employees what is considered critical measured data, and which processes should be paid extreme attention. This is a very important factor on determining the KPIs of a company.

Performance indicators differ from business drives and aims. A construction company can consider the failure of delivery of materials for their process a key performance indicator, which assist on understanding the timeline of the company's works, while a wholesales store might consider the percentage of income from new customers as a KPI.

The key stages in identifying KPIs are (Plomaritou & Konsta, 2013):

- Having a pre−defined business process.
- Having requirements for the Business Process.
- Having a quantitative and qualitative measurement of the results and comparison with set goals.
- Investigating variances and tweaking processes or resources to achieve short−term goals.

A KPI must follow the SMART criteria, so it should be Specific, Measurable, Achievable, Realistic and Time-bound. This means the measure has a Specific purpose for the business, it is Measurable to really get a value of the KPI, the defined norms have to be Achievable, the improvement of a KPI has to be Relevant to the success of the organization, and finally it must be Time phased, which means the value or outcomes are shown for a predefined and relevant period. (Plomaritou & Konsta, 2013):

1.4 KPIs in Shipping

The use of performance indicators in shipping is very important. Since shipping is very aggressive industry, the emphasis that is given to measuring performance is great. The reasons for the increased weight on the strategy–performance relationship in shipping include intense competition, the need to attain competitiveness, maximize shareholder wealth, and the requirement to address stakeholder. Consequently it is very important to closely monitor of the performance implications of the adopted competitive strategies (Panayides, 2003)

The need of developing key performance indicators lies with the requirement of the top management to identify the company's needs and the managers to quantify those needs into measurable or calculated data. Therefore it is necessary to establish performance indicators to measure, evaluate, compare the company's performance against the set targets and benchmark it against industry standards and competition.

The operation and the drive of each company is greatly affected by the proper selection of the essential indicators to be monitored. The identification of the company's objectives, which are in line with established policies and procedures, are required before choosing performance indicators.

There should only be financial indicators. Although every company's target is to increase profit, which is the outmost challenge of every management, same should not be the only goal per se, but should be combined with quality of offered services and strive for continuous improvement.

Profitability as a measure is not capable of discriminating excellence (Panayides, 2003). Performance measurement is multi–dimensional (Chakravarthy, 1986). The best value performance indicators can be used for five-dimension performance (Isoraitea, 2010):

1. Strategic objectives: why the service exists and what it seeks to achieve
2. Costs and efficiency – the resources committed to a service: the efficiency with which they are turned into inputs
3. Service delivery outcomes – how well the service is being operated in order to achieve the strategic objectives
4. Quality – explicitly reflecting user's experience of services
5. Fair access – relating to case and equality of access to service

Key performance indicators should be clearly defined, easy to measure, realistic, applicable to the field of application. Financial performance indicators are not enough for picturing the whole performance of a company, and such reports even might be faulty and not easy to compare across companies.(Panayides, 2003).

The introduction of International Safety Management code in Shipping requires that "The Company should periodically evaluate the effectiveness of the safety management system in accordance with procedures established by the Company." One of the methods that shipping companies have developed and used for covering such a requirement of the code, are Key performance indicators. KPIs are a measurable way to evaluate the effectiveness of the management system. By introducing various KPIs related to ISM code requirements, such as

training, safety, companies can quantify the effectiveness of various parameters of safety management system of the company.

Furthermore, more and more shipping companies decide to be verified under International Organization of Standardization (ISO) standards, especially 9001. ISO 9001 requires evaluating performance, by measuring, analyzing and achieving improvement. This can and is required to be carried out by the use of KPIs.

Last but not least the introduction of Tanker Management and Self Assessment (TMSA) program, as a requirement for tanker companies, encourages companies to assess their safety management systems (SMS) against key performance indicators (KPIs) and provides a minimum expectation (level 1) plus three levels of increasing best practice guidance. Self assessment results can be used to develop phased improvement plans that support continuous improvement of their ship management systems. Companies are encouraged to regularly review their self assessment results against the TMSA KPIs and to create achievable plans for improvement.

Aligning their own policies and procedures with industry best practice helps companies to improve their performance and attain high standards of safety and pollution prevention.

Chapter 2 The Shipping KPI Standard

The Shipping KPI System is a global shipping industry instrument for defining, measuring and reporting data on shipping companies' operational performance. It uses a unique standard of 64 different performance indicators to allow the most specific and accurate comparison of ships - across different types and sectors - that is currently available. The data collected is anonymous and aggregated, so it does not compromise commercially sensitive information.

The Shipping Key Performance Indicator (KPI) System can be used by shipping companies to:

- Internally enhance performance improvement in Shipping companies by comparing their business performance against the industry average and identify where improvements can be made and
- Provide a platform for communicating operational ship performance to internal and external stakeholders.

The system was originally developed by a cross-industry group and was supported by InterManager following its launch in 2011. Since June 2015, ownership of the system was taken on by the world's largest international shipping association, BIMCO, and is developed and managed by SOFTImpact.

BIMCO is the world's largest international shipping association, with 2,100 members in around 130 countries.

BIMCO vision is to be the chosen partner trusted to provide leadership to the global industry and its mission is to provide expert knowledge and practical advice to safeguard and add value to members' businesses.

BIMCO's four core service areas provide value and trusted support to our members:

- Products, which include BIMCO's world leading standard contracts and clauses for the shipping industry. Part of this is also the BIMCO Shipping KPI System, which can be used to benchmark ships' operational performance.
- Regulation: BIMCO takes an active role on behalf of shipowners during discussions and decisions with global and regional regulators.
- Information and advice: BIMCO is dealing with 10,000 member queries every year on many issues , by sharing expert knowledge with members, giving practical advice to safeguard and add value to their businesses.
- Training activities to include face-to-face courses, eLearning, webinars and tailor-made courses for companies.

The vision for BIMCO Shipping KPI System is to be the chosen and trusted tool of all ship owners, operators and managers allowing them to benchmark and monitor their company, fleet and ship performance. The system will add value to the users' businesses by highlighting opportunities to drive sustainable improvements.

The mission of BIMCO Shipping KPI System is to be a tool run by the industry for the industry, and therefore a trusted tool and source of information for all. Data collected will only be accessible by the data provider and will be used anonymously to avoid sensitive information being compromised. BIMCO will continuously take into account the broader needs of all potential users in the development and maintenance of the BIMCO Shipping KPI standard. The BIMCO Shipping KPI Steering group will oversee the project and ensure that its associated Expert Group fulfills current and future users' needs.

The Shipping KPI Standard has been established in order to suggest a global shipping industry system for determining, calculating and reporting information on Shipping Companies' operational functions.

By cooperating with more than 20 shipping companies and other bodies related to shipping industry, it had been developed the Shipping KPI tool, which contains Shipping Performance Indexes (SPI), Key Performance Indicators (KPI) and Performance Indicators (PI).

The core idea is described in Figure 1, where the way of calculation of SPIs and their connection with KPIs and PIs is summarized and in detailed will be described further.

SPI	KPI	KPI Value Formula*	KPI_{MinReq}	KPI_{Target}	PI
Health and Safety Performance	Flawless Port state control performance	$\frac{A}{B}$	0.33	1	A: Number of PSC inspections resulting in zero deficiencies B: Number of PSC inspections
	Lost Time Injury Frequency	$\frac{A+B+C+D}{E*10^{-6}}$	2.5	0.5	A: Number of fatalities due to work injuries B: Number of lost workday cases C: Number of permanent total disabilities (PTD) D: Number of permanent partial disabilities (PPD) E: Total exposure hours
	Health and Safety deficiencies	$\frac{A}{B}$	5	0	A: Number of health and safety related deficiencies B: Number of recorded external inspections
	Lost Time Sickness Frequency	$\frac{A+B}{C*10^{-6}}$	2.5	0.5	A: Number of cases where a crew member is sick for more than 24 hours B: Number of fatalities due to sickness C: Total exposure hours
	Passenger Injury Ratio	$\frac{A}{B*10^{-6}}$	2	0.2	A: Number of passengers injured B: Passenger exposure hours
HR Management Performance	Crew disciplinary frequency	$\frac{A+B+C+D+E}{F}*24*365$	0.02	0	A: Number of absconded crew B: Number of charges of criminal offences C: Number of cases where drugs or alcohol is abused D: Number of dismissed crew E: Number of logged warnings F: Total exposure hours
	Crew planning	$A+B$	15	0	A: Number of seafarers not relieved on time B: Number of violation of rest hours
	HR deficiencies	$\frac{A}{B}$	5	0	A: Number of HR related deficiencies B: Number of recorded external inspections
	Cadets per ship	$\frac{A}{B}$	0	3	A: Number of cadets under training with the ship manager B: Number of ships operated under DOC holder
	Officer retention rate	$100\% - \frac{A-(B+C)}{D}*100\%$	70	95	A: Number of officer terminations from whatever cause B: Number of unavoidable officer terminations C: Number of beneficial officer terminations D: Average number of officers employed
	Officers experience rate	$\frac{A}{4*B}$	0.6	0.9	A: Number of officer experience points B: Number of officers onboard
	Training days per officer	$\frac{A}{B}$	0	0.03	A: Number of officer trainee man days B: Number of officer days onboard all ships under technical management (DOC)
Environmental Performance	Releases of substances as def by MARPOL Annex 1-6	$A+B$	1	0	A: Number of releases of solid substances to the environment B: Number of oil spills
	Ballast water management violations	A	1	0	A: Number of ballast water management violations
	Contained spills	A	3	0	A: Number of contained spills of liquid
	Environmental deficiencies	$\frac{A}{B}$	5	0	A: Number of environmental related deficiencies B: Number of recorded external inspections
Navigational Safety Performance	Navigational deficiencies	$\frac{A}{B}$	5	0	A: Number of navigational related deficiencies B: Number of recorded external inspections
	Navigational incidents	$2A+B+2C$	1	0	A: Number of collisions B: Number of allisions C: Number of groundings
Operational Performance	Budget performance	$\frac{A-(B-C)}{A}*100\%$	10	2	A: Last year's running cost budget B: Last year's actual running costs and accruals C: Last year's AAE (Additional Authorized Expenses)
	Drydocking planning performance**	$\left(\left\lvert\frac{B-A}{A}\right\rvert+\left\lvert\frac{D-C}{C}\right\rvert\right)*100$	10	2	A: Agreed drydocking duration B: Actual drydocking duration C: Agreed drydocking budget D: Actual drydocking costs
	Cargo related incidents	A	2	0	A: Number of cargo related incidents
	Operational deficiencies	$\frac{A}{B}$	5	0	A: Number of operational related deficiencies B: Number of recorded external inspections
	Passenger injury ratio	$\frac{A}{B}$	2	0.2	A: Number of passengers injured B: Passenger exposure hours
	Port state control detention	A (if B > 0)	1	0	A: Number of PSC detentions B: Number of PSC inspections
	Ship availability	$\frac{(24*365-B)-A}{24*365-B}*100\%$	97	100	A: Actual unavailability B: Planned unavailability
	Vetting deficiencies	$\frac{A}{B}$	5	0	A: Number of observations during commercial inspections B: Number of commercial inspections
Security Performance	Port State Control performance	$\frac{A}{B}$	0.33	1	A: Number of PSC inspections resulting in zero deficiencies B: Number of PSC inspections
	Security deficiencies	$\frac{A}{B}$	5	0	A: Number of security related deficiencies B: Number of recorded external inspections
Technical Performance	Condition of class	A	1	0	A: Number of conditions of class
	Failure of critical equipment and systems	A	1	0	A: Number of failures of critical equipment and systems

SPI	KPI	KPI Value Formula	$KPI_{Min\ Req}$	KPI_{Target}	PI
These KPIs has no association to an SPI	CO2 efficiency [g/tonmile]	$\frac{A}{B*10^{-6}}$	84	36	A: Emitted mass of CO2[ton] B: Transport work
	Fire and Explosions	$A+B$	1	0	A: Number of fire incidents B: Number of explosion incidents
	NOx efficiency [g/Cargo Unit] mile	$\frac{A}{B*10^{-3}}$	2.2	0.9	A: Emitted mass of NOx[kg] B: Transport work
	Port state control deficiency ratio	$\frac{A}{B}$	8	0	A: Number of PSC deficiencies B: Number of PSC inspections
	SOx efficiency [g/Cargo Unit] mile	$\frac{A}{B*10^{-3}}$	1.5	0.6	A: Emitted mass of SOx[kg] B: Transport work

Figure 1: Summary of SPI, KPI and PI connection

2.1 Hierarchy of indicators

The hierarchy of the indicators consisting the Shipping KPI Standard is pictured in Figure 2. The Standard is based on 64 Performance Indicators (PIs), which are the lower level and are used for the mathematical Calculation of the 34 Key Performance indicators (KPIs), which by their turn are used for the mathematic calculation of the 7 Shipping Performance Indexes (SPIs), which are the higher level indices.

The Performance Indicators of the lowest level are based on direct data measurement straight from a ship or from the shipping management. Figures are collected once and recycled within the Shipping KPI Standard in order to decrease the quantity of data. On KPI level a form of regularization is taking place. While measuring KPIs and in order to associate ships with different particulars, with different occasions and of different nature, KPIs are calculated from 0-100, where zero indicates intolerable and 100 indicates exceptional performance. Finally, on the highest level the KPIs are combining into Shipping Performance Indexes in order to express performance within specific main areas of major concern.

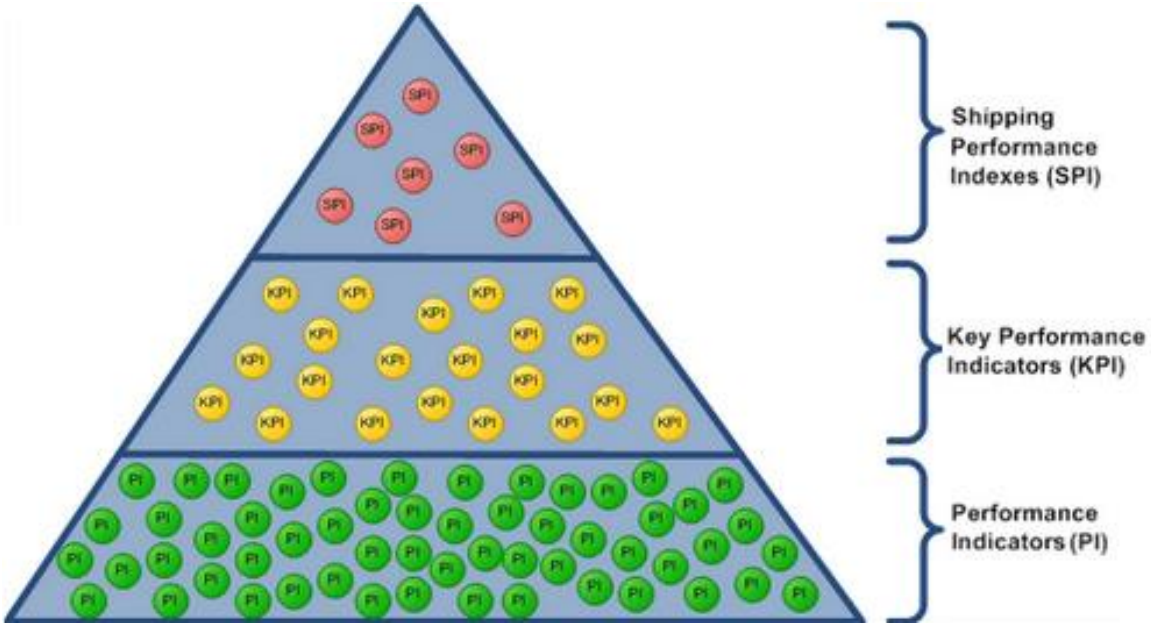


Figure 2: SPI Pyramid, Source: shipping-kpi.org

2.2 Shipping Performance Indexes (SPI)

The Shipping Performance Indexes (SPIs) are combined expressions of measurable performance within a specifically established area. The SPIs are expressed as a weighted average of relevant KPI Ratings on a scale between 0 and 100. Some of the Key Performance Indicators (KPI) can be used for the calculation of various SPIs. As an example can be used the KPI of port state control performance, which contributes to calculation of Health and Safety Performance SPI and Security SPI.

The target of the SPIs is to give internal and external stakeholders information about the overall performance of an organization in one of the following areas:

a. Environmental Performance
b. Health and Safety Performance
c. HR Management Performance
d. Navigational Safety Performance
e. Operational Performance
f. Security Performance
g. Technical Performance
h. Other

Environmental Performance Shipping Indicator is an expression of the company's ability to avoid spills and other forms of pollution that impact the environment, caused by the ship's daily operation. Environmental performance is recorded for each single ship.

KPIs for emissions (such as CO2-, SOx- and NOx- efficiency) would be highly relevant for this SPI. Until commercial decisions and market situations are taken into account, these KPIs (CO2-, SOx- and NOx- efficiency) remain inconsistent as an expression of the ship managers' performance. The KPIs are still recorded but not expressed on a SPI level.

Health and Safety Management and Performance Index is an expression of the company's ability to effectively manage the health and safety of the personnel onboard. Environmental damage and safety of assets and cargo are covered by different SPIs. Near Misses are not included in subject SPI since there is still in question the accuracy and transparency of reporting such.

HR Management Performance is an expression of the Company's ability to employ, retain and develop personnel with the required competences in order to ensure safe and efficient operations of the ships.

Navigational Safety Performance is an expression of safe navigation and absence of navigational deficiencies.

Operational Performance is an expression of the operational efficiency of the ship including passenger care, safe and efficient cargo handling, ship availability and budget management.

Security Performance is an expression of the Company's ability to manage ship security. A new KPI is under consideration and if accepted will be included in this SPI. The KPI is called Security

incidents and deals with actual security incidents while the existing KPI called Security deficiencies deals with breaches of security procedures.

Technical Performance is an expression based on maintenance and reliability. Two new KPIs are under consideration and if accepted will be included in this SPI, which are Planned maintenance and Technical deficiencies.

2.3 Key Performance Indicators (KPI)

The Key Performance Indicators (KPIs) are expressions of performance within a specific area. The KPIs ratings will form basis for the Shipping Performance Index (SPI) score. The KPIs can be expressed in two ways; a KPI Value which is a mathematical combination of relevant Performance Indicators Values and a KPI Rating which is an expression of the KPI Value on scale between 0 and 100 where a high rating (100) is a result of high/excellent performance. Some PI Values can be included in the calculation of more than one KPI Value.

A KPI is:

- a numerical, objective measure of performance
- key to the strategic business objective
- actionable and influenced by the relevant stakeholder/manager
- accountable to stakeholder/manager
- output oriented, not focused on input or activity
- possible to calculate with limited efforts and within limited time

The objectives of KPIs are to:

- measure for continuous improvement
- measure for internal and external benchmarking
- measure to set incentives

The KPIs of the BIMCO Project, which are included in the calculation of the SPIs are included in Figure 1 are described in detail below:

ID	Name	Scope	Period	Description
KPI001	Ballast water management violations	Ship	Quarter	It expresses the company's ability to obey to applicable rules and regulations related to management of ballast water, and records the number of times where regulations in force about ballast water management have been violated and recorded by an external party. Target is 100% compliance.
KPI002	Budget performance	Ship	Year	The company's ability to accurately plan the ship's operating costs (e.g. predictable costs, good budgeting). Basically the overall costs deviation (management, purchasing, operation, M&R, crewing) vs. budgets. The cost deviation is adjusted for agreed additional expenditure. The KPI expresses last years' performance. As the KPI expresses deviations both positive and negative, the KPI Value is always converted to a positive value.

				As the result from the complete fiscal year expenses is required to compare them to the budget costs, the concept of expressing KPI Values on basis of the previous fiscal year is introduced..
KPI003	Cadets per ship	SBU*	Quarter	This KPI expresses the company's efforts to take on new cadets. The KPI shows the ratio between the total number of cadets under training with the Ship Management company over the total number of ships under technical management (ships for which the Ship Manager holds the DOC). Basically the average number of cadets per ship under technical management.
KPI004	Cargo related incidents	Ship	Quarter	This KPI expresses the company's ability to contribute to incidents-free cargo operations and carriage. The KPI counts the number of incidents as recorded in the company's internal incidents reports. The KPI includes but is not limited to the following incidents: • Rejection of ship or holds/tank prior to loading • Inability to load full agreed capacity • Failures/underperformance of ship's cargo equipment • Negligence by ship's crew resulting in a cargo incident • Inadequate company and ship board procedures and practices • Short outturn beyond acceptable level The KPI excludes the following incidents due to: • Stevedore/shore staff • inherent vice (nature of cargo) • Shore equipment • Causes not attributable to the ship • False declarations by the shipper, etc. • Force majeure As this KPI should express the ship management organisation's performance, any accidents where the stevedores accept responsibility are excluded from the calculation
KPI005	CO2 efficiency	Ship	Quarter	This KPI expresses the energy efficiency of the ship by comparing emitted mass of CO2 to the ship's total transport work. The expression gives the emitted mass of CO2 per ton cargo transported one mile. As the PI Value

				’Emitted Mass CO2’ is to be given in tons, the figure is multiplied by 1 million to get the KPI value in g/transport work (tonmile, passengermile, TEUmile, etc).
KPI006	Condition of class	Ship	Quarter	This KPI expresses the company’s ability to avoid conditions of class. The KPI counts the total number of conditions of class issued by class (ref. IACS). All categories of conditions of class are weighted equally. Condition of class is an indication/confirmation that the ship is no longer 100% adherent to the class requirement. Even though far from being in danger of losing its class any condition of class is something to be taken serious and to be avoided where possible. Condition of class is not measured as a ratio because the potential denominator (total no of inspections where CoCs can be stated) is said to be relatively low for all ships. Counting the total number of condition instead of calculating the ratio allows the indicator to express accumulated performance or severity. Simply measuring the frequency loses this information, and was therefore not pursued.
KPI007	Contained spills	Ship	Quarter	This KPI expresses the company’s ability to avoid spills, not the ability to contain them. The KPI counts the total number of contained spills. Contained spills should cover liquid spills including (but not limited to) cargo and bunkers contained on the ship. Contained spills in secure areas as engine rooms are not counted, only spills that could have a potential environmental impact if not contained. Total number of spills on deck where nothing goes overboard of bulk liquids, which could have had an environmental impact.
KPI008	Crew disciplinary frequency	Ship	Quarter	KPI Definition This KPI expresses the ability of the management to maintain discipline. The KPI counts the total number of breaches of code of conduct made by the ship's crew such as substance abuse, criminal offences and AWOLs. As the number of crew on different ships varies significantly, total exposure hours onboard the ship is used as a denominator to enable benchmarking. If one incident caused by the same crew breaches several categories, each breach should be counted individually. The term ’Crew’ refers to any person being part of the ship’s complement. (E.g. officers, ratings, cadets,

				superintendents)..
KPI009	Crew planning	Ship	Quarter	This KPI expresses the company's ability to relieve crew on time as well as avoiding violations of rest hour's regulations. The KPI counts the number of breaches to prevailing regulations or agreements.
KPI010	Drydocking planning performance	Ship	Quarter	This KPI expresses the company's ability to plan the drydocking operation (e.g. predictable costs, good budgeting and scheduling). Basically it expresses the percentile deviation from planned costs and duration. To avoid penalization of ship managers striving towards minimizing time and cost at drydock, any cost or time deviation between 0 and minus 10% is disregarded (to be interpreted as 'according to plan'). As the KPI expresses deviations both positive and negative, the KPI Value is always converted to a positive value.
KPI011	Environmental deficiencies	Ship	Quarter	This KPI expresses the company's environmental performance by measuring environmental related deficiencies recorded during external inspections and audits. The KPI counts the number of environment related deficiencies including any substandard act, practice or condition of an environmental consequence (local regulations and MARPOL) such as failure in the Oily Water Separator, recorded during external inspections and audits. The number of deficiencies is expressed relative to the total number of external inspections and audits. This KPI is part of a range of KPIs related to deficiencies that are identified during external inspections. The deficiencies are categorized depending on their nature. The total number of recorded external inspection is used as a denominator in all these KPIs (related to deficiencies) to enable benchmarking between ships that are subject to an uneven number of external inspection.
KPI012	Failure of critical equipment and systems	Ship	Quarter	This KPI expresses the company's ability to maintain critical equipment and systems. The KPI counts the number of failures of equipment and systems in the critical list defined in the company's Safety and Environmental Management System.
KPI013	Fire and	Ship	Quarter	This KPI expresses the company's ability to avoid fire and explosions on-board the ship. The KPI counts the number

	Explosions			of fire and explosion incidents as reported in the company's internal incident reports.
KPI014	Port State Control performance	Ship	Quarter	Definition This KPI expresses the company's Port State Control Performance. The KPI counts the number of times where Port State Control Inspections are conducted without any deficiency being reported and divides this number by the total number of Port State Control Inspections conducted during the same period This KPI is one of three KPIs related to Port State Control Inspections. The three areas covered are; 'Port state control deficiency ratio' which measures the ratio of the total number of issued deficiencies during port state control inspection against the total number of port state control inspections conducted, 'Port state control detention' which measures the total number of port state control inspections resulting in a detention and this specific KPI, 'Port state control performance' which measures the percentage of port state control inspections resulting in zero deficiencies.
KPI015	Health and Safety deficiencies	Ship	Quarter	This KPI expresses the company's ability to avoid health and safety related deficiencies recorded during external inspections and audits. The KPI counts the number of health and safety related deficiencies including any substandard act, practice or condition (such as misplaced life buoys or fire hoses) recorded during external inspections and audits. The number of deficiencies is then made relative to the total number of external inspections.
KPI016	HR deficiencies	Ship	Quarter	This KPI expresses the company's HR related performance measured by number of deficiencies recorded during external inspections and audits. The KPI counts the number of HR related deficiencies including any substandard act, practice or condition (such as lack of compliance to rest hours), recorded during external inspections and audits. The number of deficiencies is then made relative to the total number of external inspections and audits
KPI017	Lost Time Injury Frequency	Ship	Quarter	This KPI expresses the company's ability to safeguard crew against injuries and fatalities. The KPI counts the number of Lost Time Injuries (LTI) among the crew per

				million exposure hours. Exposure hours are 24 hours per day while serving on-board. Note that injuries during spare-time on board are also included. LTI is the sum of Fatalities, Permanent Total Disabilities, Permanent Partial Disabilities and Lost Workday Cases. The term 'crew' refers to any person being part of the ship's complement. (E.g. officers, ratings, cadets, superintendents). The same complement is also used as basis for calculating the Total Exposure Hours.
KPI018	Lost Time Sickness Frequency	Ship	Quarter	This KPI expresses the company's ability to safeguard crew sickness and fatalities while serving on-board. The KPI counts the cases of sick crew and any fatality due to sickness. Exposure hours are 24 hours per day while serving on-board. The term 'crew' refers to any person being part of the ship's complement. (E.g. officers, ratings, cadets, superintendents). The same complement is also used as basis for calculating the Total Exposure Hours. Lost Time Sickness Frequency (LTSF) expresses the number of Lost time Sickness cases per million exposure hours, and is an expression of the likelihood for sickness on-board the ship. The LTSF do not distinguish on severity of sickness and do not measure the level of severity of sickness, it only expresses the likelihood for becoming ill and do not give any categorization of the disease most likely to occur. LTSF expresses the number of lost time Sickness cases per million exposure hours, and is an expression of the frequency of sickness on-board the ship. The LTSF does not reflect the severities of the sickness.
KPI019	Navigational deficiencies	Ship	Quarter	This KPI expresses the company's ability to avoid navigational related deficiencies recorded during external inspections and audits. The KPI counts the number of navigational related deficiencies including any substandard act, practice or condition (such as a mal functioning radar), recorded during external inspections and audits. The number of deficiencies is then made relative to the total number of external inspections..
KPI020	Navigational incidents	Ship	Quarter	KPI Definition This KPI expresses the company's navigational performance. The KPI counts any navigational incident resulting in a collision, allision or grounding. All incidents are counted regardless of the

				cause of the incident. Value parameters are used to weight collisions and groundings twice that of allisions.
KPI021	NOx efficiency	Ship	Quarter	This KPI expresses the amount of NOx emitted relative to the transport work performed. As the PI Value 'Emitted Mass NOx' is to be given in tons, the figure is multiplied by 1 million to get the KPI value in g/transport work (tonmile, passengermile, TEUmile, etc.).
KPI022	Officer retention rate	SBU	Quarter	This KPI expresses the company's ability to retain officers within the organization. Data is captured by analyzing the employment database four years back in time (to identify officers who have been under contract ('employed'), two years back in time (to identify the number of officers who are no longer 'employed') and finding the average number of officers having been under contract during the last two years (average number of officers 'employed'). mean.
KPI023	Officers experience rate	Ship	Quarter	This alternative expresses the percentile experience of the officers currently onboard the ship on basis of 12 months of experience as 100%. Each officer currently onboard is assigned experience points according to a predefined scale. The maximum number of experience points per officer is 4 (equals 12 months sailing time with the same ship manager). Any experience above 12 months sailing time is disregarded.
KPI024	Operational deficiencies	Ship	Quarter	This KPI expresses the company's ability to avoid operational related deficiencies recorded during external inspections and audits. The KPI counts the number of operational related deficiencies including any substandard act, practice or condition (not including HR, security, health and safety and environmental deficiencies) recorded during external inspections and audits. The number of deficiencies is then made relative to the total number of external inspections.
KPI025	Passenger injury ratio	Ship	Quarter	Definition This KPI expresses the company's ability to safeguard all passengers while onboard. The KPI represents a ratio between the numbers of injured (including fatalities) passengers reported during embarkation, disembarkation and voyage relative to the passenger exposure hours in the reporting period. By

				defining the KPI as a ratio, benchmarking is feasible even between different ship sizes. Only ships certified to carry passengers should use this KPI. Note that supernumeraries (family members, riding crew, superintendents and stowaways) are not considered as passengers.
KPI026	Port state control deficiency ratio	Ship	Quarter	This KPI expresses the company's ability to avoid deficiencies issued during Port State Control Inspections. The KPI represents a ratio between the numbers of reported deficiencies relative to the number of Port State Control Inspections, as such the average number of deficiencies per inspection. By defining the KPI as a ratio, benchmarking is feasible even between ships being subject to an uneven number of Port State Control Inspections.
KPI027	Port state control detention	Ship	Quarter	This KPI expresses the ability to complete PSC inspections without incurring a detention (code 30). The KPI is a simple counter of the number of PSC inspections resulting in a detention.
KPI028	Releases of substances	Ship	Quarter	This KPI expresses the company's ability to avoid releases of substances as defined by MARPOL (Annex 1-6). This is done by counting (and aggregating) the number of (severe) spills of liquid and releases of substances. A severe spill is a spill above one barrel (42 US gallons or 159 liters).
KPI029	Security deficiencies	Ship	Quarter	This KPI expresses the ship manager's security performance measured by the number of deficiencies recorded during external inspections and audits. The KPI counts the number of security related deficiencies including any substandard act, practice or condition (such as lack of compliance to the ISPS code) recorded during external inspections and audits. The number of deficiencies is then made relative to the total number of external inspections and audits.
KPI030	SOx efficiency		Quarter	This KPI expresses the mass of SOx emitted relative to the transport work performed. As the PI Value 'Emitted Mass SOx is to be given in kg, the figure is multiplied by 1 thousand to get the KPI value in g/transport work (tonmile, passengermile, TEUmile, etc.).

				The issue of SOx efficiency is complicated by the fact that there are several influencing factors. The commercial operator is responsible for utilization of the ship's capacity hereby affecting the transport work. The other main factor regarding transport work is the market itself. Ship's attributes such as hull design, engine type (and to some extent age) as well as the load factor for each voyage are all influencing the quantity of emitted mass of SOx through the amount of fuel burned.
KPI031	Training days per officer	SBU	Quarter	Definition This KPI expresses the company's commitment to maintain and enhance the officers' competence. The KPI represents the ratio between the ship manager's efforts in training over the total number of officer working days. Basically the average number of training days per officer day at sea.
KPI032	Ship availability	Ship	Quarter	This KPI expresses the company's ability to minimize the unplanned unavailability. The KPI calculates the ship utilization as a percentage of the total utilization time available. Keeping the ship available to the client is among the most important responsibilities of the ship manager. The KPI calculates the ship utilization as a percentage of the 100% availability which is found by subtracting hours of planned unavailability from 365x24
KPI033	Vetting deficiencies	Ship	Quarter	This KPI expresses the ship manager's ability to avoid deficiencies and negative observations from vetting inspections. The KPI counts the number of deficiencies (including any substandard act, practice or condition) and negative observations, recorded during vetting inspections. The number of deficiencies and negative observations is then made relative to the total number of vetting inspections.
KPI034	Flawless Port State control inspections	Ship	Quarter	This KPI expresses the ship manager's ability to maintain the vessel in excellent condition and avoid any deficiencies from Port State Controls. This KPI counts the number of the Port State Control inspections without deficiencies as a percentage of total PSC inspections.

Table 1:Key Performance indicators description

*SBU (strategic business unit) is a legal entity directly under the main company. Some companies may not have SBUs then the company itself is the SBU. All ships under technical management by an SBU or by companies directly under the SBU (holding the DOC for the ship) should be given the same PI Values, hence the same KPI Value and KPI Rating on this KPI.

2.4 Performance Indicators (PI)

The Performance Indicators (PIs) are the building blocks giving the basis for KPI Value calculations. PIs are directly observable parameters (measurements) for each ship under management, e.g. Number of dismissed crew, Number of collisions and Number of fire incidents. The Performance Indicators are the only elements that must be reported manually or by means of implemented Information and Communication Technology (ICT) solutions. Focus has been to provide the hierarchy with unambiguous definitions of measurable low level parameters based on existing measurements in the industry. Each PI may be used in the calculation of several Key Performance Indicators (KPIs). An example is the PI Number of recorded external inspections which is used as a denominator in the calculation of several KPI Values.

Detailed description of all Performance Indicators used in Shipping KPI project is given in below table.

ID	Name	Unit	Scope	Period	Description
PI001	Actual drydocking costs	US$	Ship	Quarter	The total actual costs associated with the drydocking. This shall include in-water survey (IWS), modifications and repairs, not included in routine running costs. It also includes costs for any additional work not planned for before the drydocking.
PI002	Actual drydocking duration	Days	Ship	Quarter	The Actual Drydocking Duration. This shall include in-water Survey (IWS), modifications and repairs.
PI003	Actual unavailability	Hours	Ship	1 Rolling year	The number of hours actually lost to ship-owner due to interruption of service in the given quarter. It is further defined as the time lost due to interruption of service (level) caused among others by: deficiency, default, strike, accident or illness of the crew, deficiency of stores, explosion, fire, damages, breakdown, repairs, modification, overhaul, maintenance of hull, machinery or equipment, grounding, requisition, detention, quarantine, arrest of the Ship, drydocking for the purpose of examination, cleaning and/or painting bottom of underwater parts and/or repair

					including steaming time to shipyard, losses of time due to hot or cold lay-up, war, acts of piracy, smuggling, stowaways, industrial actions against the ship or her crew, reduction of ship's performance regarding speed or cargo handling, or by any other similar cause preventing the full working of the Ship.
PI004	Agreed drydocking budget	US$	Ship	Quarter	The total budget amount associated with the drydocking as agreed between the ship manager and owner BEFORE the drydocking. This shall include in-water survey (IWS), modifications and repairs, not included in routine running costs. Any additional work which is approved AFTER the drydocking has started shall not be taken into account.
PI005	Agreed drydocking duration	Days	Ship	Quarter	The Agreed Drydocking Duration as agreed between ship manager/owner and shipyard BEFORE the drydocking. This shall include in-water survey (IWS), modifications and repairs. Any extension of the duration which is approved (agreed) AFTER the drydocking has commenced shall NOT be taken into account.
PI006	Average number of officers employed	Officers	SBU	Average over 2 Rolling Years	This is the average number of officers having been under contract with the ship manager (DOC) during the last two years. Average number of officers employed in the period is found by adding the highest number of officers under contract at any time during the last two years to the lowest number of officers under contract at any time during the last two years and divide by 2.
PI007	Emitted mass of CO2	Metric Tons	Ship	Quarter	The mass of CO2 emitted by the vessel is calculated by multiplying given fuel type consumption expressed in metric tons by a respective non-dimensional conversion

					factor provided below. The total mass of CO2 emitted by the vessel is calculated by adding masses of CO2 emitted by the vessel burning all, different types of fuel. Respective fuel consumptions shall be calculated only for voyages completed during given quarter in order to be compared to the Transport Work (PI064). This means that an inaccuracy is acceptable with respect to the definition of the quarter. The emitted mass of CO2 must be calculated per fuel type used during the quarter and then be aggregated to report the total mass of emitted CO2 per ship.
PI008	Emitted mass of NOx	Kilograms (Kg)	Ship	Quarter	The mass of NOx emitted by the vessel is calculated by multiplying given engine type consumption expressed in metric tons (depending on its load) by a respective conversion factor provided below. The total mass of NOx emitted by the vessel is calculated by adding masses of NOx emitted by all different vessel engine types. Respective fuel consumptions shall be calculated only for voyages completed during given quarter in order to be compared to the Transport Work (PI064). This means that an inaccuracy is acceptable with respect to the definition of the quarter.
PI009	Emitted mass of SOx	Kilograms (Kg)	Ship	Quarter	The mass of SOx emitted by the vessel is calculated by multiplying given fuel type consumption expressed in metric tons and sulphur content factor expressed in kg/metric ton. Sulphur content factor is calculated by multiplying fixed parameter of 20kg/mt and given fuel type sulphur content percentage expressed as absolute value. The total mass of SOx emitted by the vessel is calculated by

					adding masses of SOx emitted by the vessel burning all, different types of fuel. Respective fuel consumptions shall be calculated only for voyages completed during given quarter in order to be compared to the Transport Work (PI064). This means that an inaccuracy is acceptable with respect to the definition of the quarter.
PI010	Last year's AAE (Additional Authorized Expenses)	US$	Ship	Previous Fiscal year	The additional expenses agreed relating to running cost budget referred to in PI012 for previous fiscal year. This includes maintenance, repair, crewing, spares /stores, management cost and /or fee and lubricants. Insurance and capital expenses, such as modifications and drydocking expenses shall be excluded.
PI011	Last year's actual running costs and accruals	US$	Ship	Previous Fiscal year	The total last (fiscal) year actual running costs and accruals per ship. This includes maintenance, repair, crewing, spares /stores, management cost and /or fee and lubricants. Insurance and capital expenses, such as modifications and drydocking expenses shall be excluded.
PI012	Last year's running cost budget	US$	Ship	Previous Fiscal year	The total last (fiscal) year running cost budget per ship as approved by ship owner prior to the beginning of the fiscal year. This includes maintenance, repair, crewing, spares /stores, management cost and /or fee and lubricants. Insurance and capital expenses, such as modifications and drydocking expenses shall be excluded.
PI013	Number of absconded crew	Absconded	Ship	1 Rolling year	The number of crew absent without leave (AWOL). Crew in this case refers to any person being signed on as part of the ship's complement (e.g. officers, ratings, and cadets). It represents the number of

					crew who are not present and without prior notice at the time of the ship's departure from any given port while written on the Crew List.
PI014	Number of allisions	Allisions	Ship	Quarter	The allision incidents when the ship strikes a fixed object. Fixed objects include floating buoys, fixed mooring installations, moored ships and off-shore installations. Data shall be captured from internal reporting as well as any official incident reports to give a good and valid expression of ship's navigational performance.
PI015	Number of ballast water management violations	Violations	Ship	Quarter	The number of times where prevailing regulations regarding ballast water management have been violated and recorded by an external party (maritime authorities). Prevailing regulations include international, regional, national and local regulations.
PI016	Number of beneficial officer terminations	Terminations	SBU	2 Rolling years	Termination is the event where an officer, who has been employed with the ship owner or ship manager within the period of the last TWO (2) years (before the Termination), leaves the company. Beneficial officer termination represents Terminations that provide benefits to the company by Officers leaving the company (for example underperformers or made redundant).
PI017	Number of cadets under training with the ship manager	Cadets	SBU	Quarter	The number of cadets under training with the ship owner or ship manager during the reporting quarter. The data is captured by counting the number of Cadets training on board of all ships in the fleet on the last day of the given quarter.
PI018	Number of cargo related incidents	Incidents	Ship	Quarter	The number of incidents during cargo operations attributable to the ship, her equipment, her crew and/or failures of

					Owners and/or ship board procedures and/or practices
PI019	Number of cases where a crew member is sick for more than 24 hours	Sick cases	Ship	1 Rolling year	The number of recorded cases where an individual among the crew or any person being part of the ship's complement (e.g. officers, ratings, cadets, superintendents) is sick for more than 24 hours. The individual must have been onboard the ship for a minimum of four days. Defining what is meant by sick "is an individual being unable to carry out his duties or to return to work, or to a scheduled work shift on the next day following the sickness".
PI020	Number of cases where drugs or alcohol is abused	Abuses	Ship	1 Rolling year	The number of cases where any person being part of the ship's complement (e.g. officers, ratings and cadets) violates company's drugs and alcohol abuse prevention policy. This includes also violation of local procedures and/ or regulations. The number of cases is based on a documented record of violation. This indicates that people with alcohol and drug addictions are counted each time they have a logged warning or any other written record of their abuse.
PI021	Number of charges of criminal offences	Offenses	Ship	1 Rolling year	Number of cases where any person being part of the ship's complement. (e.g. officers and ratings) is charged with a criminal offence. In cases where the charge is later withdrawn, the relevant Value should not be updated.
PI022	Number of collisions	Collisions	Ship	Quarter	The number of collision incidents between the ship and another moving object. Data shall be captured from internal reporting as well as any official incident reports to give a good and valid expression of ship's navigational performance.

PI023	Number of conditions of class	Conditions of class	Ship	Quarter	Number of Conditions of Class issued during the reporting period. Condition of Class (CoC) is a written statement from class. The "Condition of Class" definition might differ between class societies, as some use term "Condition of Class", others use term "recommendation". Data concerning this PI can be taken from class records and/or inspection reports, and should be aggregated from the inspections held during the reporting period.
PI024	Number of contained spills of liquid	Spills	Ship	Quarter	Total number of spills contained on deck (where nothing went overboard) of liquids as covered by MARPOL. Data for this PI shall be based on internal reporting. The procedure and process for such reporting should be included in the Safety Management System so that the process can be audited.
PI025	Number of seafarers not relieved on time	Seafarers	Ship	Quarter	Number of seafarers not relieved within the agreed tenure of contract including extensions imposed by the ship owner or ship manager, but excluding mutually agreed extensions and extensions initiated by the seafarer. Dismissals and Terminations should not count in this PI.
PI026	Number of dismissed crew	Dismissals	Ship	1 Rolling year	The number of cases where any person being part of the ship's complement. (e.g. officers, ratings and cadets) has been dismissed due to breach of internal/external procedure or regulation and as a consequence his contract is being terminated prior to completion. The number of cases are based a documented record of the breach and dismissal. Such a dismissal may also count as Beneficial Termination if the crew member is an officer and the incident leading to the dismissal also leaves the

					officer as "not for reemployment".
PI027	Number of environmental related deficiencies	Deficiencies	Ship	Quarter	Number of environmental related deficiencies and/or non-conformities (excluding operational-, navigational-, HR-, security-, health and safety deficiencies) including any substandard act, practice or condition of an environmental consequence (local regulations and MARPOL) recorded during external inspections and audits by external bodies (class, port state, flag state, underwriters, ITF) including statutory audits, but excluding other voluntary inspections made for the purpose of quality improvement or for commercial reasons, such as SIRE, CDI or other charterer inspections.
PI028	Number of explosion incidents	Incidents	Ship	Quarter	The number of explosion incidents on board a ship. This includes explosion that occurred on board in repair facilities. Include explosions of equipment such as turbo chargers, compressors, economisers, etc.
PI029	Number of failures of critical equipment and systems	Failures	Ship	Quarter	The number of failures to equipment and systems in the critical list as defined in the company's Safety Management System. If multiple faults result in the same unavailability they should all be counted, as this PI measures the state of the system, not the consequence of the failure.
PI030	Number of fatalities due to work injuries	Fatalities	Ship	1 Rolling year	Number of deaths on board among the crew or any person being part of the ship's complement (e.g. officers, ratings and cadets) resulting from a work injury (not illness or other conditions) regardless of the length of time between the injury and death.
PI031	Number of	Fatalities	Ship	1Rolling	Number of confirmed deaths on board

	fatalities due to sickness			year	the vessel among the crew or any person being part of the ship's complement (e.g. officers, ratings and cadets) resulting from confirmed cases of sickness, also including suicide (mental illness).
PI032	Number of fire incidents	Incidents	Ship	Quarter	The number of fire incidents on board the ship. This includes fires that occurred on board in repair facilities.
PI033	Number of groundings	Groundings	Ship	Quarter	The groundings including incidents of stranding, ie. when the ship makes any contact with the sea bed and/ or sea shore, including reefs or sea mounts. Data shall be captured from internal reporting as well as any official incident reports to give a good and valid expression of ship's navigational performance.
PI034	Number of health and safety related deficiencies	Deficiencies	Ship	Quarter	Number of health and safety related deficiencies and/or non-conformities (excluding operational-, navigational-, HR-, security- and environmental deficiencies) including any substandard act, practice or condition recorded during external inspections and audits by external bodies (class, port state, flag state, underwriters, ITF) including statutory audits, but excluding other voluntary inspections made for the purpose of quality improvement or for commercial reasons, such as SIRE, CDI or other charterer inspections.
PI035	Number of HR related deficiencies	Deficiencies	Ship	Quarter	Number of HR related deficiencies and/or non-conformities (excluding operational-, navigational, environmental, security- and health and safety deficiencies) including any substandard act, practice, or condition recorded during external inspections and audits by external bodies (class, port state, flag state, underwriters, ITF) including statutory

					audits, but excluding other voluntary inspections made for the purpose of quality improvement or for commercial reasons, such as SIRE, CDI or other charterer inspections.
PI036	Number of logged warnings	Warnings	Ship	1 Rolling year	Any logged warning given by superior to any person being part of the ship's complement (e.g. officers, ratings and cadets).
PI037	Number of lost workday cases	Cases	Ship	1 Rolling year	Number of injuries among the crew or any person being part of the ship's complement (e.g. officers, ratings, cadets, superintendents) which results in the individual being unable to carry out his duties or to return to work, or to a scheduled work shift on the next day following the injury.
PI038	Number of navigational related deficiencies	Deficiencies	Ship	Quarter	Number of navigational related deficiencies and/or non-conformities (excluding operational-, environmental-, HR-, security-, health and safety deficiencies) including any substandard act, practice, or condition recorded during external inspections and audits by external bodies (class, port state, flag state, underwriters, ITF) including statutory audits, but excluding other voluntary inspections made for the purpose of quality improvement or for commercial reasons, such as SIRE, CDI or other charterer inspections.
PI039	Number of officer days onboard all ships under technical management (DOC)	Days	SBU	Quarter	Number of officer days onboard all ships within the same ship owner or ship manager. This PI can be calculated by adding number of officers of officers onboard each ship (PI043) with the same ship owner or ship manager and multiplying such figure by the number of days in the reporting quarter.

PI040	Number of officer experience points	Experience points	Ship	Quarter	Officer experience points are defined as aggregated experience points assigned to each officer onboard the ship on the last day of the quarter.
PI041	Number of officer terminations from whatever cause	Terminations	SBU	2 Rolling year	Termination is the event where an officer, who has been employed with the ship owner or ship manager within the period of the last TWO(2) years (before the Termination), leaves the company. The total number of officers Terminations for whatever reason (including Beneficial and Unavoidable terminations).
PI042	Number of officer trainee man days	Days	SBU	Quarter	This PI counts all days where an officer has attended and completed training as defined below. The number is then aggregated for all officers having attended and completed training. As trainings are counted all trainings including statutory requirements performed by formal trainer ashore (in addition to forums & seminars) and all trainings provided onboard by Onboard Trainer or Superintendent onboard and Certified Computer Based Training. Trainings with successful completion are documented by issuance of certificate, in order for the training to be counted. For forums & seminars the attendance must be on record.
PI043	Number of officers onboard	Officers	Ship	Quarter	The number of officers onboard a ship on the last day of the quarter. Cadets are not included under officers and are captured separately under PI017.
PI044	Number of operational related deficiencies	Deficiencies	Ship	Quarter	Number of operational related deficiencies and/or non-conformities (excluding navigational-, HR-, security-, health and safety- and environmental deficiencies) including any substandard act, practice or condition recorded during external inspections and audits by

					external bodies (class, port state, flag state, underwriters, ITF) including statutory audits, but excluding other voluntary inspections made for the purpose of quality improvement or for commercial reasons, such as SIRE, CDI or other charterer inspections.
PI045	Number of passengers injured	Passengers	Ship	Quarter	The number of passengers injured during embarkation, disembarkation and time spent on board the vessel. Number is taken from received and recorded claims. If the claim is later withdrawn, the relevant PI should not be updated. Passenger is defined as person that paid for the passage or is shown as passenger in ship's documents.
PI046	Number of permanent partial disabilities (PPD)	Cases	Ship	1 Rolling Year	The number of recorded cases where a crew member or any person being part of the ship's complement (e.g. officers, ratings, cadets, superintendents) suffers a work injury resulting in complete loss, or permanent loss of use, of any member or part of the body, or any impairment of functions of parts of the body, regardless of any pre-existing disability of the injured member or impaired body function, that restricts an employee's ability to work on a permanent basis at sea. Permanent Partial or Total Disability resulting in person's inability to work at sea should be based on medical judgment and be obtained from a medical statement for the established % of disability.
PI047	Number of permanent total disabilities (PTD)	Cases	Ship	1 Rolling Year	The number of recorded cases where a crew member or any person being part of the ship's complement (e.g. officers, ratings, cadets, superintendents) has work injury which incapacitates the individual permanently resulting in

					termination of employment on medical grounds (e.g. loss of limb(s) permanent brain damage, loss of sight) and precludes the individual from working either at sea or shore.
PI048	Number of PSC deficiencies	Deficiencies	Ship	Quarter	The number of recorded deficiencies, excluding observations (code 99), found during port state control inspections. In case of several PSC inspections in the same quarter then deficiencies are aggregated for that specific quarter.
PI049	Number of PSC inspections	Inspections	Ship	Quarter	Data concerning this PI is captured by counting the number of recorded port state control inspections. In the case a ship is under inspection at the period end, only completed PSC inspections should be reported for the PI.
PI050	Number of PSC detentions	Detentions	Ship	Quarter	The number of Port State Control detentions as per PSC Action Code 30. A re-inspection resulting in a detention not being lifted is NOT a new detention.
PI051	Number of PSC inspections resulting in zero deficiencies	Inspections	Ship	Quarter	The number of Port State Control inspections resulting in zero deficiencies (not counting observations – code 99).
PI052	Number of recorded external inspections	Inspections	Ship	Quarter	The total number of recorded inspections and audits by external bodies (e.g Class, port state control, flag state, underwriters and ITF) excluding commercial and voluntary inspections (e.g charterers inspections such as CDI and SIRE) made for the purpose of quality improvement.
PI053	Number of releases of solid substances to the environment	Releases	Ship	Quarter	The number of releases of substances to the environment, in violation of MARPOL Annex II through V and/ or any other local regulations. Oil spills covered by MARPOL Annex I shall be reported in PI055. Data for this PI shall be based on

					discovered releases reported to authorities and recorded in relevant vessel's record books.
PI054	Number of security related deficiencies	Deficiencies	Ship	Quarter	Number of security related deficiencies (excluding operational-, navigational-, environmental, HR- and health and safety deficiencies) including any substandard act, practice or condition recorded during external inspections and audits by external bodies (class, port state, flag state, underwriters, ITF) including statutory audits, but excluding other voluntary inspections made for the purpose of quality improvement or for commercial reasons such as SIRE, CDI or other charterer inspection. Security deficiencies including any sub-standard act, practice or condition recorded during external inspections and audits by external bodies (class, port state, flag state, underwriters, charterers, ITF) including ISO/ISM/OHSAS audits, excluding other voluntary inspections made for the purpose of quality improvement.
PI055	Number of oil spills	Spills	Ship	Quarter	The total number of oil spills to the environment (overboard), excluding contained spills. Data for this PI shall be based on oil spills reported to authorities and recorded in oil record book.
PI056	Number of unavoidable officer terminations	Terminations	SBU	2 Rolling Years	Termination is the event where an officer, who has been employed with the ship owner or ship manager within the period of the last TWO (2) years (before the Termination), leaves the company. Unavoidable officer terminations are outside of the control of the company (i.e. retirements, death, long-term illness, officers following a ship which is no longer under technical management,

					leaving seagoing career).
PI057	Number of ships operated under DOC holder	Ships	SBU	Quarter	The number of ships operated as under one DOC holder. All ships for which the company holds the DOC should be counted, not only the number of ships which are currently part of the Shipping KPI reporting regime.
PI058	Number of observations during commercial inspections	Observations	Ship	Quarter	The number of observations recorded during voluntary inspections made for the purpose of quality improvement or commercial reasons, such as to SIRE, CDI or any kind of charterers' inspections. In case of several voluntary and/ or commercial inspections in the same quarter then observations are aggregated for that specific quarter. External statutory inspections and audits by external bodies such as Class, Port State, flag state, underwriters, ITF are excluded (see PI052).
PI059	Number of commercial inspections	Inspections	Ship	Quarter	The number of recorded voluntary inspections made for the purpose of quality improvement or for commercial reasons, such as SIRE, CDI or any kind of charterers' inspections. Data concerning this PI can be taken from summing up all voluntary and/ or commercial inspections the ship had during the reporting period. External statutory inspections and audits by external bodies such as Class, Port State, flag state, underwriters, ITF, ISO, are excluded (see PI052).
PI060	Number of violations of rest hours	Violations	Ship	Quarter	The number of cases with violation of STCW or MLC conventions regarding rest or work hours. Even if a crew member agrees to the breach of rest hour conventions the breach shall be counted. This PI counts internal and external reporting of Violations.

PI061	Passenger exposure hours	Hours	Ship	Quarter	The passenger exposure hours are the aggregated total number of hours all passengers have spent on board the ship during given quarter counted from time of embarkation till time of disembarkation
PI062	Planned unavailability	Hours	Ship	1 Rolling Year	The number of hours planned for repairs and maintenance, including drydocking, in-water survey (IWS), modifications, hot / cold layup that are agreed between the ship manager and ship owner for the given quarter.
PI063	Total exposure hours	Hours	Ship	1 Rolling Year	Total exposure hours is the aggregated total number of hours all crew or any person being part of the ship's complement (e.g. officers, ratings and cadets) have spent onboard the ship during the reporting period.
PI064	Transport work	[Cargo unit] Mile	Ship	Quarter	Transport work is a product of the quantity of cargo unit/ number of people and the transport distance (laden leg) sailed by a vessel during specific quarter.

Table 2: Performance Indicators description

Chapter 3 Specific Company Port State Control KPI analysis

As described in previous chapters most shipping Companies establish Performance Indicators, which contribute to the calculation of Key Performance Indicators, according its specific needs, identified goals and targets. It is the company's Top Management responsibility to identify the exact field that is required to be measured, monitored and improved.

All shipping companies can follow the BIMCO project but is also very common to establish own KPIs which are evolving in the process of time, taking into consideration BIMCO project, in order to be more specific to their needs and targets.

Example Company had established various KPIs which are described below, either by following the exact calculation method of BIMCO, or by introducing custom measurement methods.

	PERFORMANCE INDICATORS	
HSEQ	Training courses attended by office personnel	
	Average training time per number of employees (hours)	
	Total no of employees trained	
	No. of individual employees trained / % of total employees	
	No. of internal audits (vessels)/avg per fleet vsl	
	Internal NCR's/avg per fleet vsl	
	No. of internal security audits/avg per fleet vsl	
	PSC visits/avg per fleet vsl	
	PSC defects/avg per visit	
	PSC detentions/avg per fleet vsl	
	Other 3rd party individual visits excl. PSC/avg per fleet vsl	
	No. of external auditors visits / audits carried out (incl. MLC, ISPS & ISO)	
	External NCR's raised/avg per audit	
	No. of interactive drills/avg per fleet vsl (incl. ISPS & PCSOPEP drill)	
	No. of HSEQ manual amendments	
	HSEQ Manual revisions	
	HSEQ attendances / avg per vessel	
	No. of reported dangerous occurrences / avg per vsl (reported near misses)	
	Navigational deficiencies / (% of total PSC def)	
	Lifesaving Appliances & Fire Safety Deficiencies / (% of total PSC def)	
	Actual vs Budget (total) us$/%	
CREW	Crew recycling rate %	Total
		Officers
		Ratings
		Officers non-Philippine
		Ratings non-Philippine
	Average service time onboard (months)	Total
		Philippine
		non-Philippines

	Manning agents audits	
	Promotions within/avg per vsl	Total
		Officers
		Ratings
		Officers non-Philippine
		Ratings non-Philippine
	No. of officers left with other company	Total
		Officers
		Officers non-Philippine
	No. of serious illness claims	
	Avg. crew performance	No. dismisses/avg per vsl
		No. non rehirable officers/avg per vsl
		No./ % graded A+B 31/12
	Actual vs Budget (us$/%)	Salaries
		Crew expenses
OPERATION	No. of customer complaints/avg per vsl (justifiable)	
	No. of crew accidents -injuries/avg per vsl	
	No. of deaths/avg per vsl	
	No. of cargo damage incidents/avg per vsl	
	No. of hull/property damage incidents/avg per vsl	
	Off hire days/avg per vsl	Commercial *(excl. laid up)*
		Commercial *(laid up)*
		drydocking
		Technical *(excl. laid up)*
	Speed Claims	
	Actual vs Budget (General expenses)-us$/%	
TECHNICAL	Machinery Breakdowns	Number/avg per vsl
		time lost (days)/avg per vsl
	Money lost due to vessel's poor performance ($)/avg per fleet vsl	
	Loss of speed kn/avg per vsl (kn)	
	Daily FO over consumption mt/avg per vsl (mt)	
	Supt. Engineers Training onboard/days	
	Supt Engineers Visits (excl. dd)	Number/avg per vsl
		time spent / avg per vsl (days)
	Port Capt./IT visits	Number / avg per vsl
		Time spent/avg per vsl (days)
	Supt. Electricians visits	Number / avg per vsl
		Time spent/avg per vsl (days)
	Drydockings (excl. iws)	Number / avg per vsl
		time spent/avg per dd (days)
	Actual vs Budget (Spares-repairs) - us$ / %	

PURCHASING	Number of scheduled spares orders delivered / avg per fleet vsl (REQUISITION)	
	Number of urgent spares orders delivered / avg per fleet vsl (REQUISITION)	
	Number of scheduled stores orders delivered / avg per fleet vsl (REQUISITION)	
	Number of urgent stores orders delivered / avg per fleet vsl (REQUISITION)	
	Number of scheduled forwardings/avg per fleet vsl	
	Number of urgent forwardings/avg per fleet vsl	
	Unsuitable / wrong spare deliveries	No./avg per vsl
		Percentage
	Actual vs budget (Stores) - us$/ %	
INSURANCE	P&I loss record	Last period (%)
		7-year period (%)
	H&M loss record	Last period (%)
		5-year period (%)
	Actual vs Budget -us$/%	
ENVIRONMENTAL	Contained spills	
	Environmental deficiencies / % of total PSC def	
	CO2 efficiency (Vessels/Tech) (containers/bulk carriers) (gr CO2/t or TEU x nautical miles)	
	Discharge of sludge ashore m3 / vessel	
	Number of Water Ballast Management Violations	
	Disposal of used batteries onboard	
	Release of solid waste garbage onboard	
	Recycling of printer tonners and ink cartridges ashore	
	Consumption of paper ashore	
	Paper recycling ashore	
	Disposal of fluorescent lamps /electric bulbs	
	Disposal of used batteries ashore	
	Power and water consumption per person / month	
	Legal and other requirements compliance review	

Table 3: Company Key Performance Indicators Matrix

From Table 3 it is clear that Company is monitoring more than one KPI related to port state control performance, as highlighted. Analysis will be carried out on KPIs related to port state control performance of the company. This choice is made since data used for the calculation of subject indicators is public and available to all members of shipping community. Data used is transparent, and there can be no intervention of the shipping company to the given results. Furthermore, due to nature of the indicators, can be benchmarked against the Company's competitors and industry standards are considered a significant Commercial characteristic of the organization. Due to the commercial significance of the indicators, results can lead company to important strategic planning decisions.

3.1 Specific to the Company PSC performance

In more detail, there will be an analytical presentation of a Company's approach to Port State Control Deficiencies measured KPIs and possible identification of needs that might arise from subject analysis. The analysis goes beyond the strict frame of KPIs calculation and benchmarking, and goes deeper into qualitative analysis of trends, of nature of defects and of results that could help company to take actions and establish plans related to strategic business decisions.

Company is managing a fleet of 30 vessels, both Containers and Bulk Carriers, of various sizes, of various trades, both local and worldwide, flying various flags and monitored by various Classification societies.

In this Chapter will be analyzed results from 401 Port State control inspections worldwide, for the period of 2012-2016 for all company's vessels.

3.1.1 Port State Control Detention Analysis

One of the most important measurable items during a Port State Control analysis is the number of detentions.

Detention of the ship is the last and most important and drastic course of action that a Port State Control Officer would take upon finding significant deficiencies breaching the safety of the vessel and the crew aboard the vessel.

Estimates by DNV GL indicate that the cost for a PSC detention may be as high as USD 80,000 to USD 100,000.

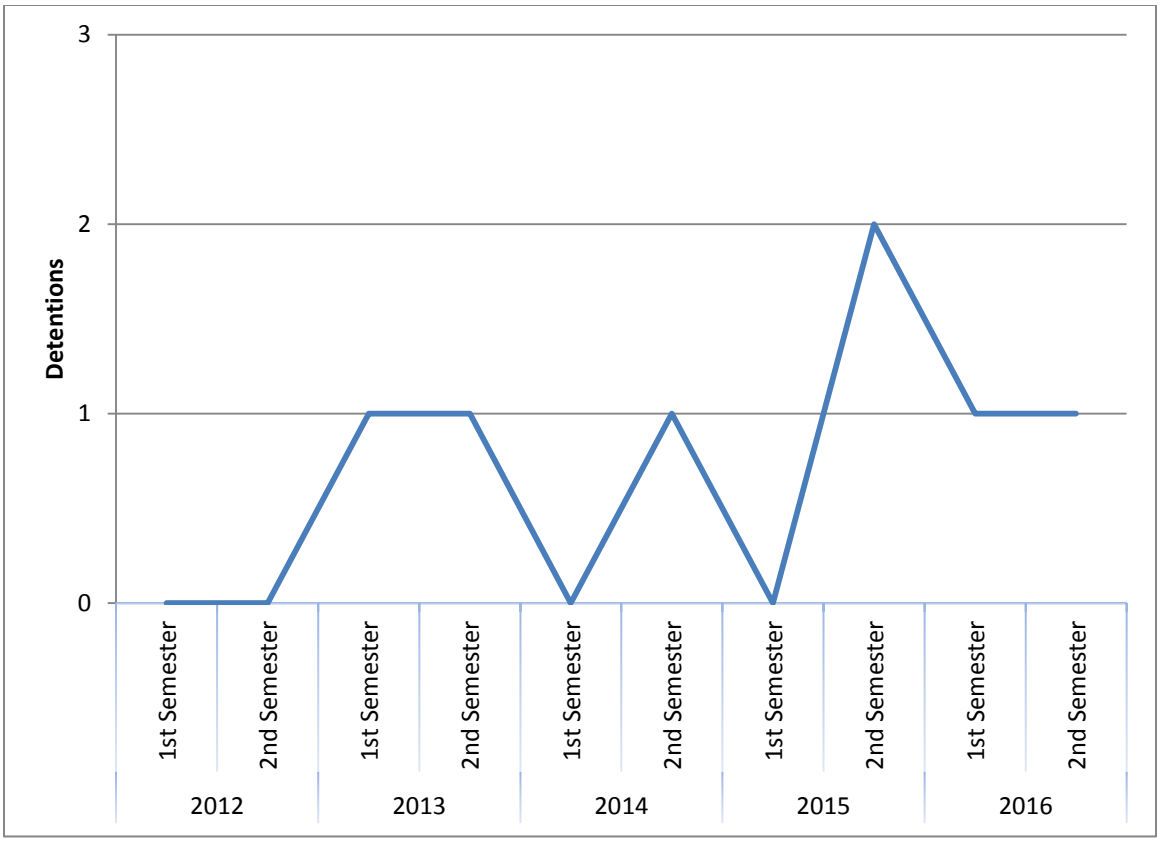


Chart 1: Number of detentions

In Chart 1 it is reflected the number of detentions for the Company per semester for the 5 Year Period analyzed. Although the number of detentions is a critical Indicator, does not provide any significant value if standing alone, and cannot be comparable or further analyzed. Thus can be considered a PI, and in order to be calculated in a KPI, should be used as average per Port State Control in conjunction with the Port State Control Inspections (PI) which are charted below for the same period.

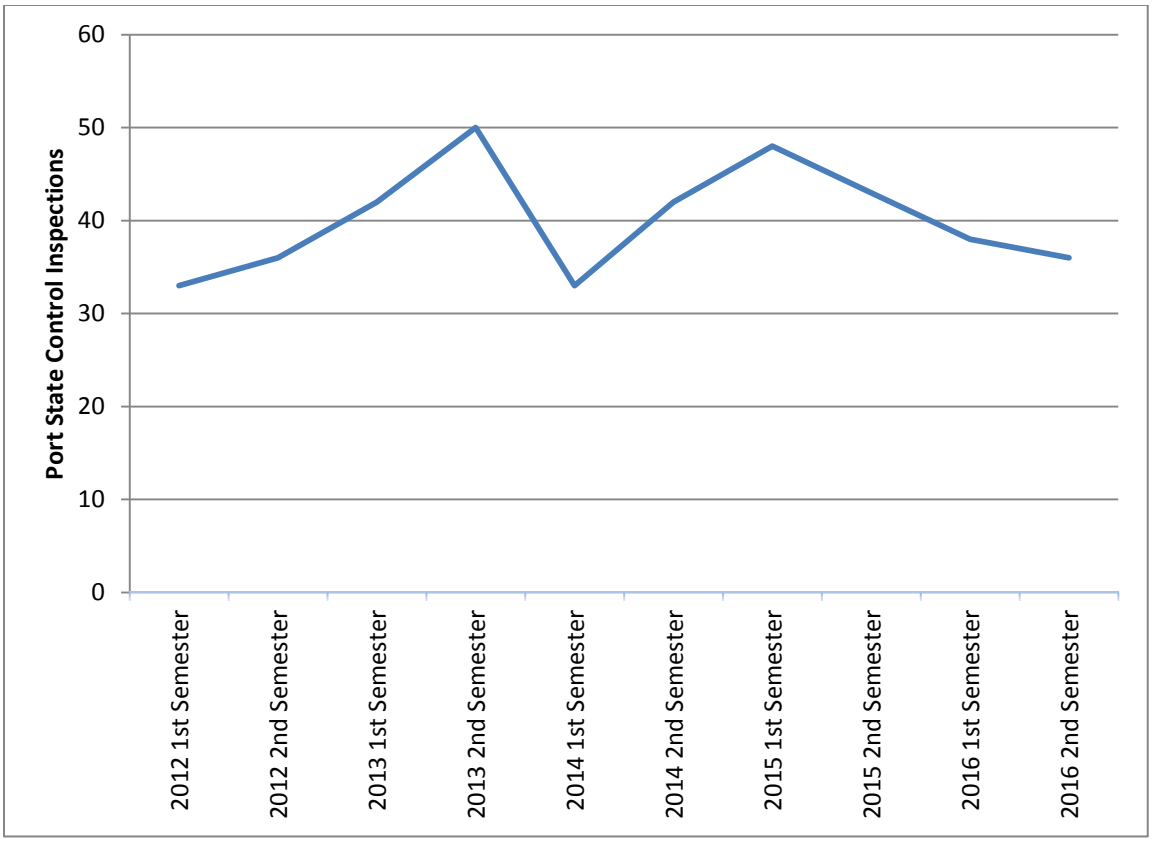


Chart 2: Number of Port State Control Inspections

Company is also monitoring how often Port State control inspections are carried out on board Company's vessels, which might be an indicator in case Company is targeted or not.

Same can be reviewed in Chart 3:

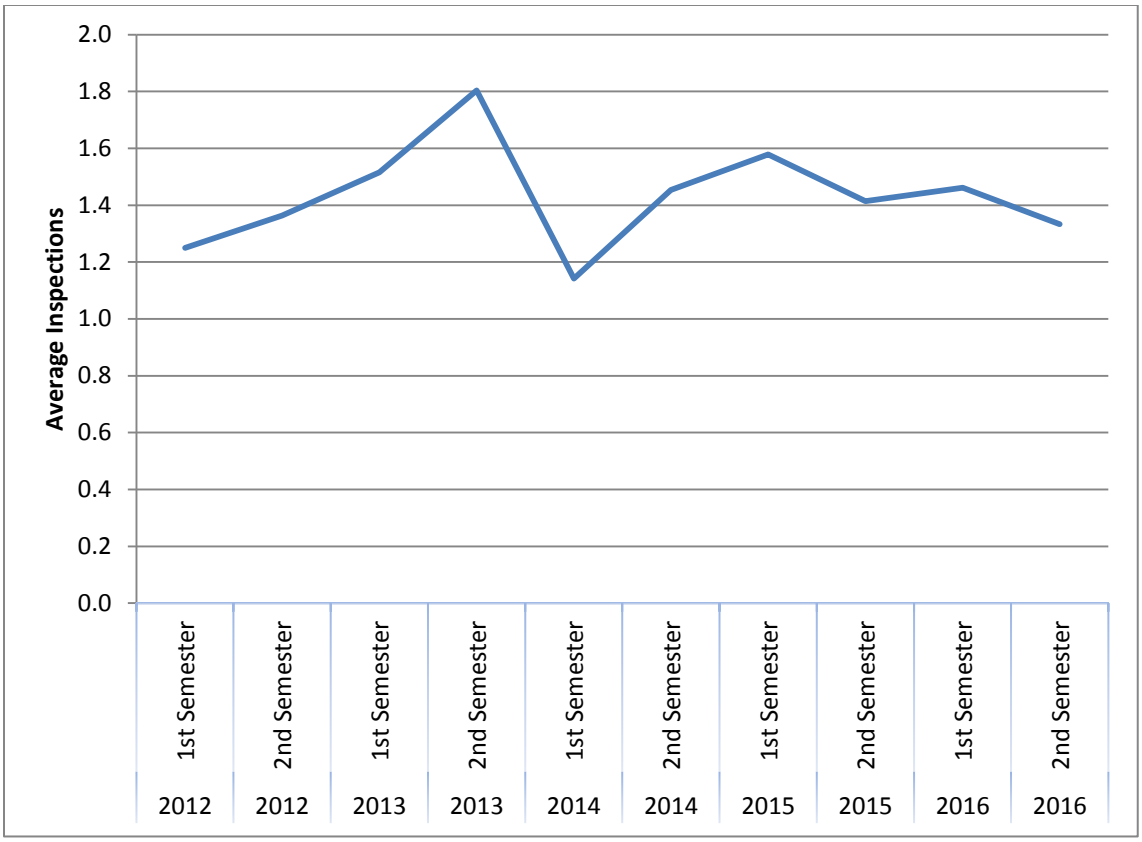


Chart 3: Port State Control Inspections Per vessel

Since the fluctuation of the fleet is not significant for the 5Year period, the trends of the total inspections and the average inspections per vessel are similar.

Combining data from Chart 1 and Chart 2 are given in Chart 4, where is pictured the average number of Detentions per Port State Control Inspection in Company's fleet.

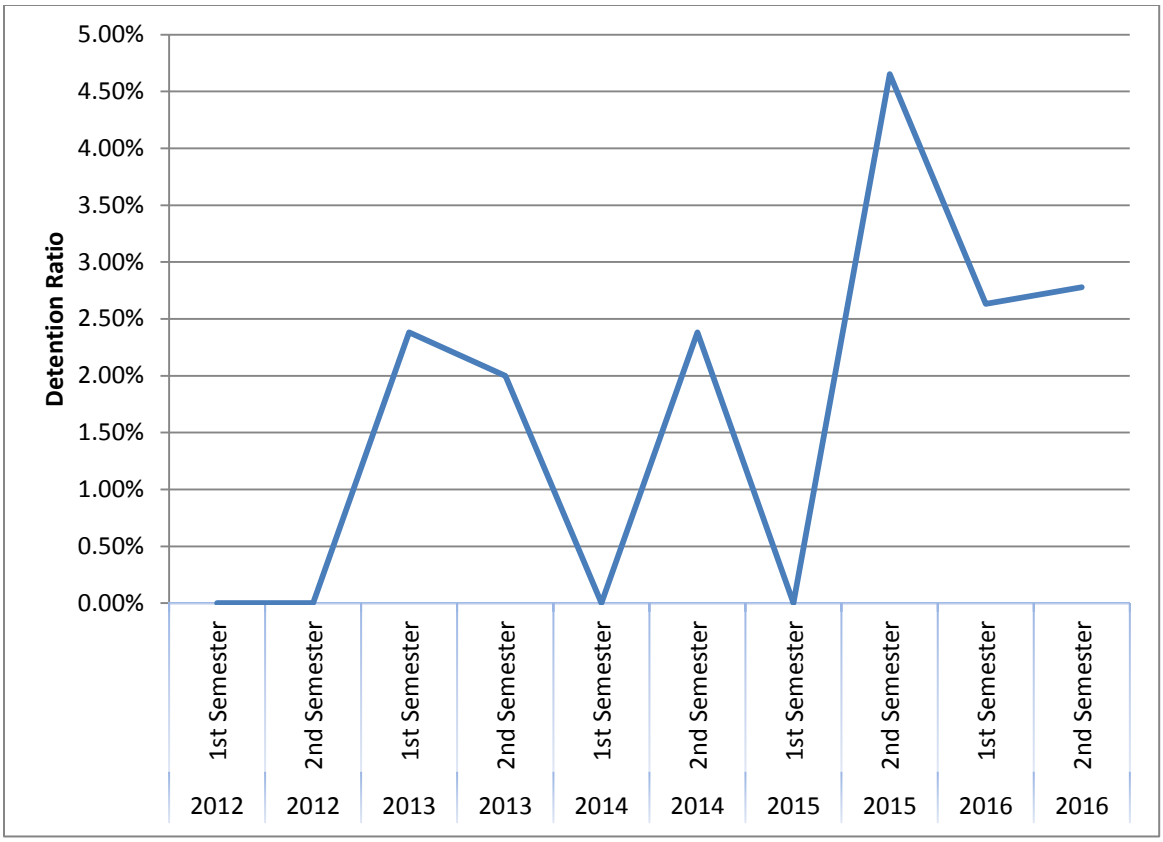


Chart 4: Detentions Ratio per Inspection

The average number of detentions per Port State control Inspections is a KPI which has significant value for every Company.

As described in 3.1.1, the effect of a detention for the reputation, the income and operational costs of a vessel and consequently of the Company is severe. The above trend will be reviewed and benchmarked against market standards in a later stage.

Further review in case detentions can be combined with the number of inspections can be carried out:

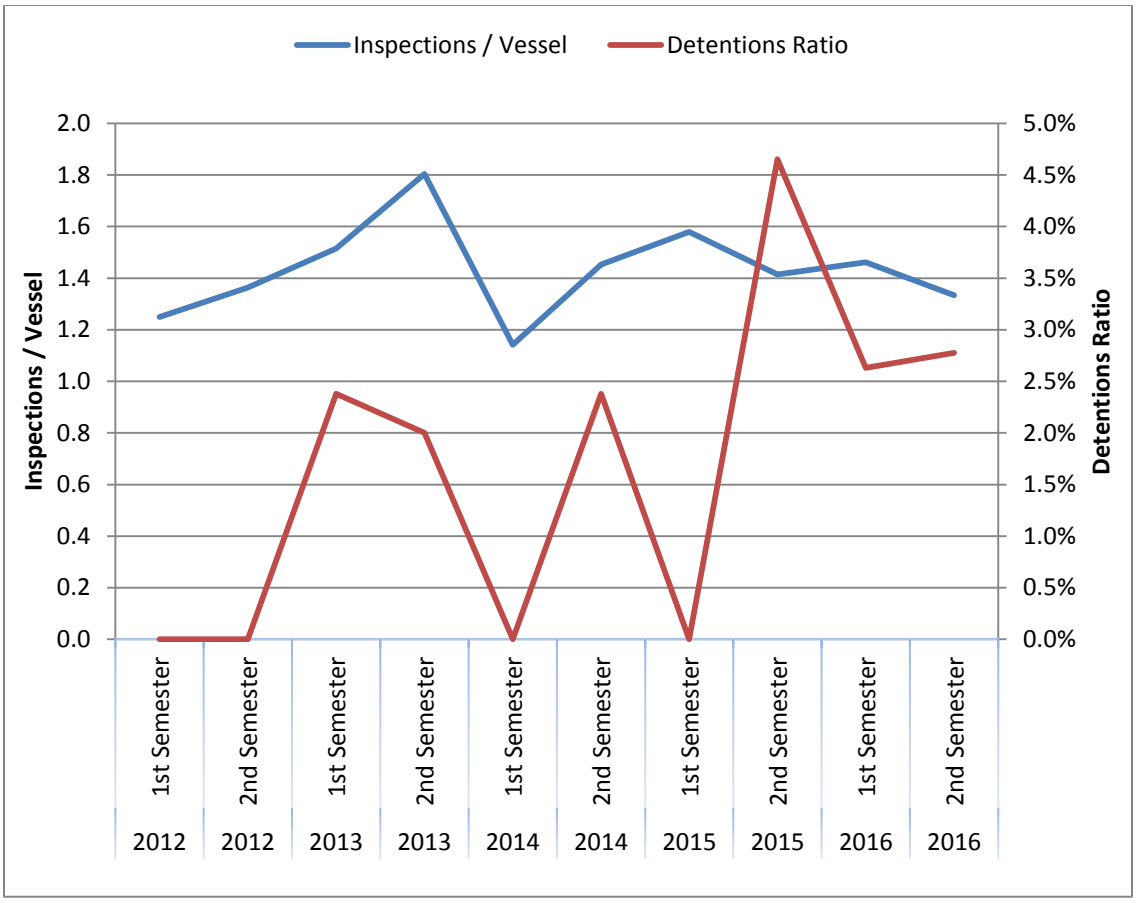


Chart 5: Comparison between detentions ratio and inspections per vessel

As a result of Chart 5 there cannot be any connection for subject company, between detentions and inspections frequency. Although until 1st semester of 2014 detentions and inspections are following a common trend, since then and the end of 2016 detentions are not proportional to inspections per vessel. This might be caused due to limited range of the sample but cannot be ruled out the possibility that there is no actual connection between detentions and inspections frequency on board.

3.1.2 Port State Control Deficiencies Analysis

Except from the detentions, Companies measure and analyze the deficiencies imposed during Port State controls as well.

Company's performance is also calculated basis the number of the deficiencies imposed during Port State Control inspections, which also has significant commercial value. All data is public and easy accessible to any party concerned. The performance of Company's vessels to Port State Control inspection is the mirror of the quality of the Company and of the offered services. Customers of the Companies are deeply interested in Port State Control Performance and there are various tools to measure and benchmark each Company and each vessel.

In more detail, the Company measures the total number of deficiencies imposed during any Port State control Inspection as a PI. (Chart 6)

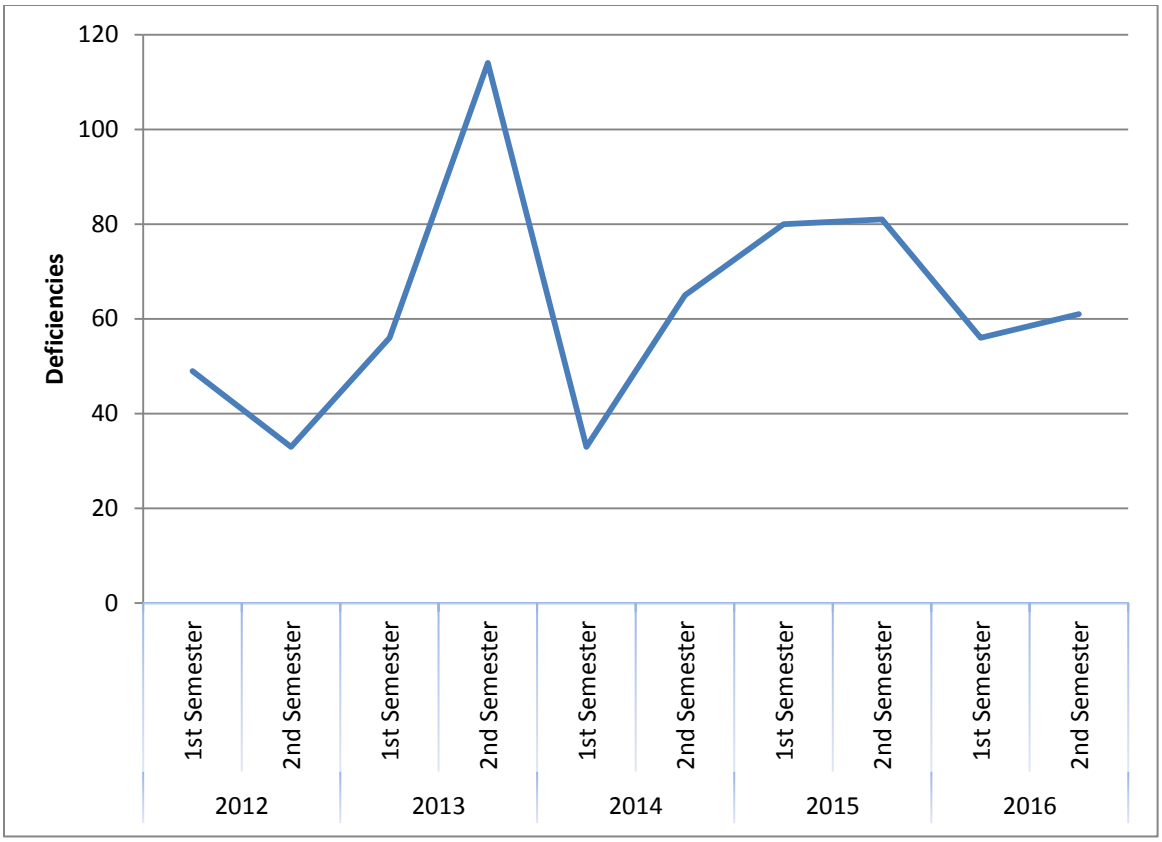


Chart 6: Number of Port State Control Deficiencies for 5 Year Period

Subject PI can be combined with the number of vessels in order to get a more clear view of the average Port State Control deficiencies per Vessel as described in Chart 7.

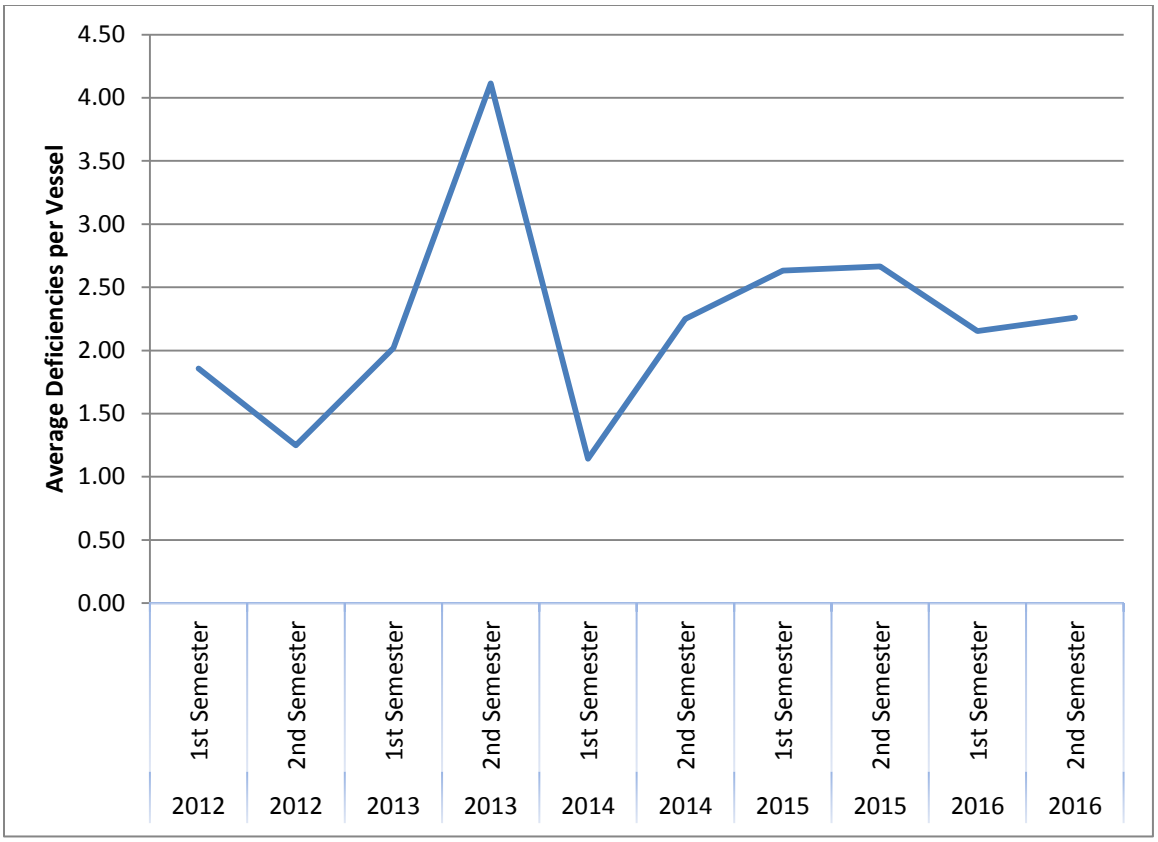


Chart 7: Average Port State Control Deficiencies per Vessel

By reviewing Chart 7, the average deficiencies per vessel are following the trend of the total deficiencies of the fleet, mainly due to the limited fluctuation of vessels fleet size. Since company is managing almost the same number of vessels throughout the period analyzed, it is expected that average deficiencies per vessel are in accordance with the total number of deficiencies imposed.

Nevertheless, Chart 8 can provide a clearer picture for the deficiencies trend, where the Average Port State Controls per Inspection (KPI) are analyzed.

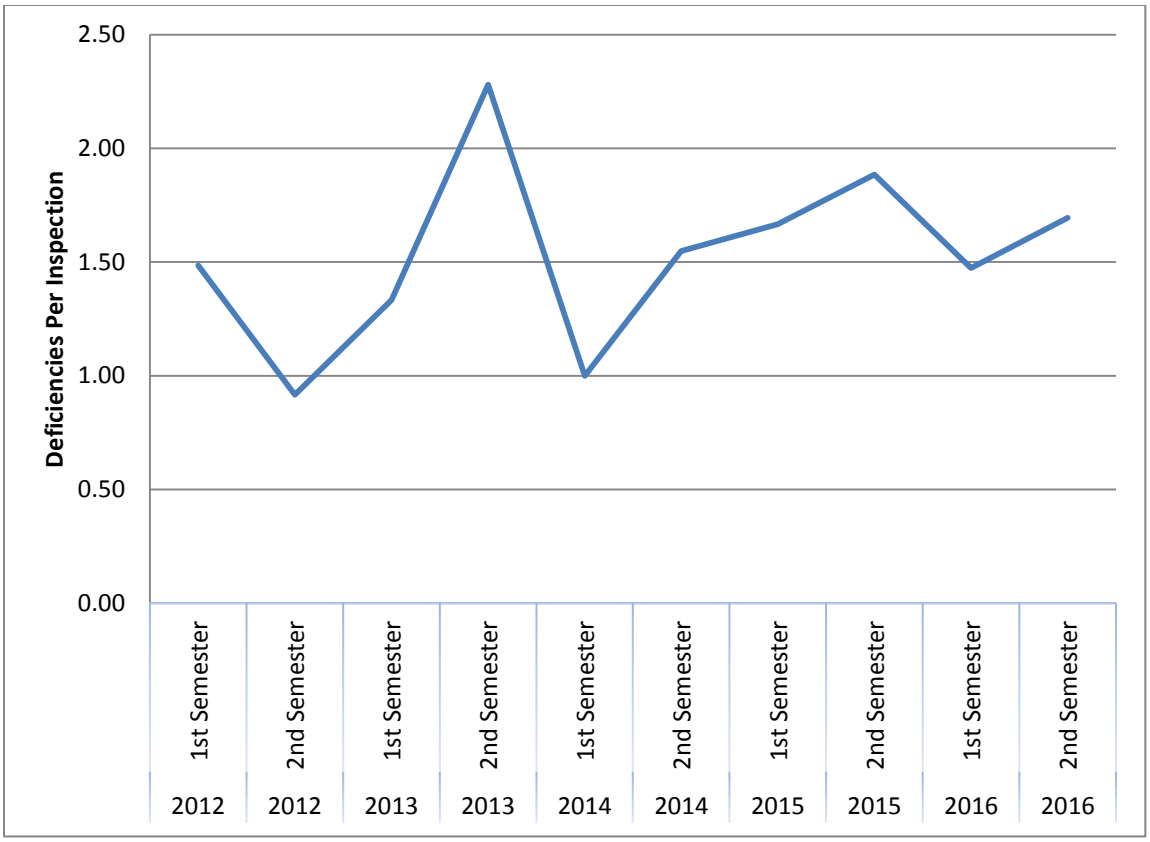


Chart 8: Average Port State Control Deficiencies per Inspection

The results from Chart 8 have the outmost value for the Company, since are easily compared and benchmarked against the market and the competitors. In Chart 9 it is pictured the comparison between the results of Chart 7 and Chart 8.

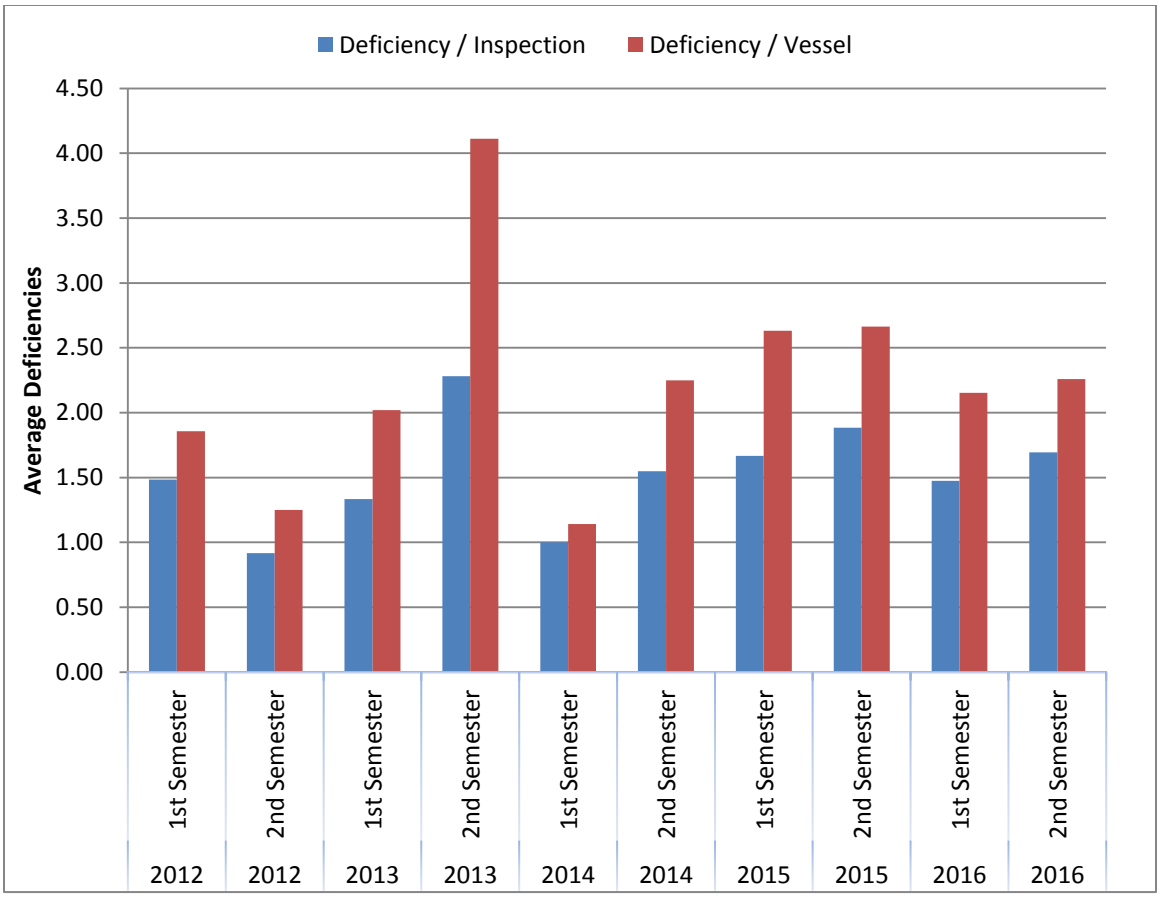


Chart 9: Comparison of Port State Control Defects per Vessel and per Inspection

It is clear why the critical performance indicator is average deficiency per inspection. By reviewing only data from Chart 7: Average Port State Control Deficiencies per Vessel, Company could have been led to the conclusion that 2nd Semester of 2013 had a deviation from the average of about 100%, instead of about 60% which is the actual, value almost double.

Furthermore, and more important, from Chart 7 Company could have identified that the 2nd semester of 2015 the performance was stable, although it was actually declining significantly.

In addition to the above, all MOUs and industry researches are calculating the performance from deficiencies per inspection.

A further checking from the Company can be an effort to link average deficiencies to number of inspections per vessels as per next Chart:

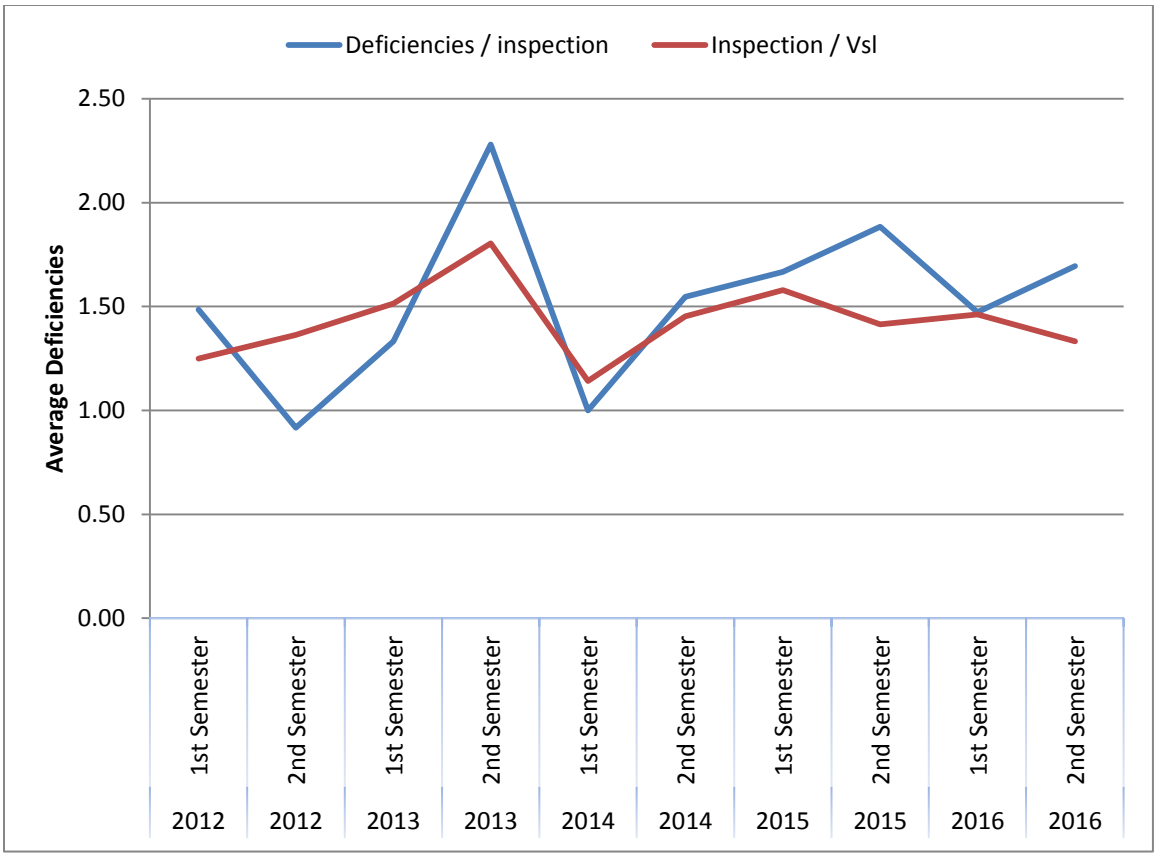


Chart 10: Comparison between Deficiencies per inspection and inspections per vessel

From Chart 10 there can be concluded that there is a direct connection between the average deficiencies per inspection and the number of inspections per vessel. From that fact, there should be made all efforts in order Company's vessels not to have many Port State Control Inspections. Evaluation and review of target methods for Port State controls will be carried out in next paragraph: Company's Performance per MOU standards.

Additionally, one more Performance indicator that company can monitor, in case company wish to follow the KPI suggestion from BIMCO project, is the flawless Port State Control Inspections percentage, i.e. the percentage of inspections without deficiencies of the total PSC inspections on board vessels.

Results of subject KPI are presented in next chart:

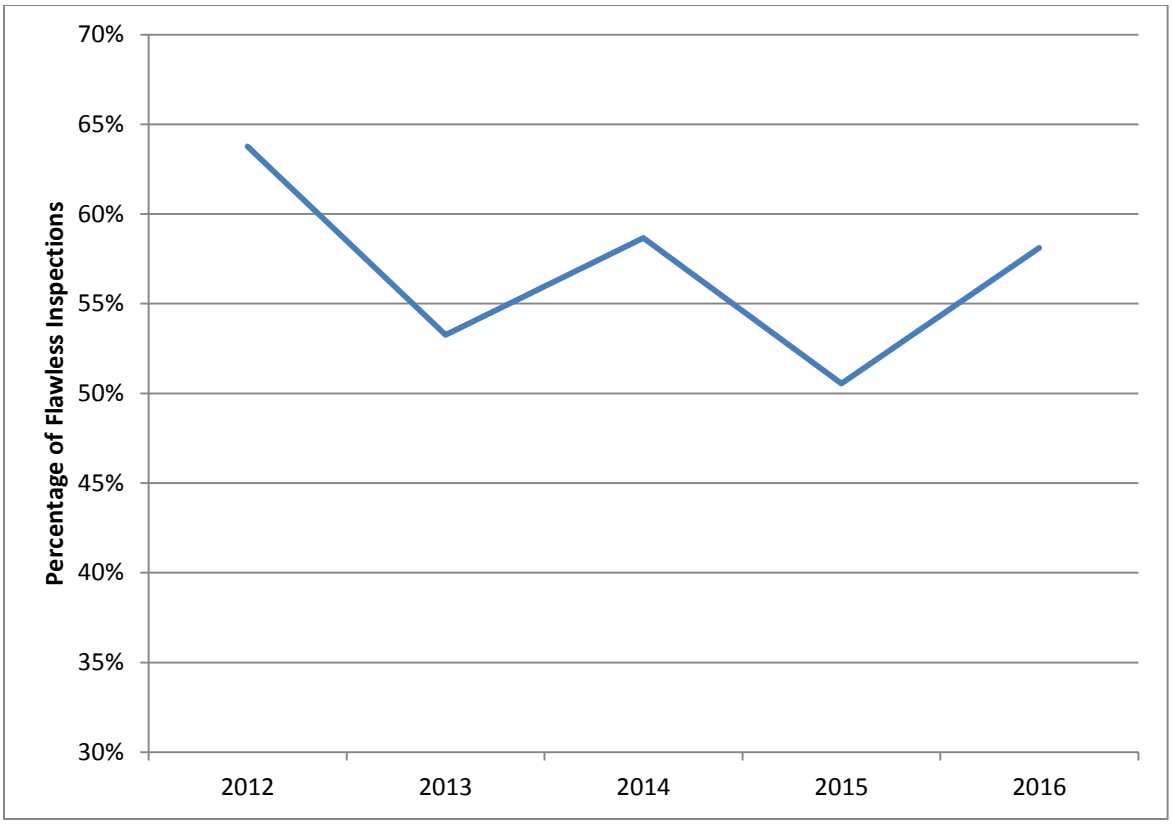


Chart 11: Percentage of Flawless Port State Control Inspections on Company's Fleet

There can be no specific conclusion from subject chart but results will be used for further evaluations and comparisons.

3.2 Analysis of Port State Control Results per Various Parameters

Company can analyze all the results as per various parameters in order to make efforts to gather results and to conclude to reliable findings the status of the vessels.

Company's vessels performance will be analyzed per:

- Vessels type,
- Age at the moment of the inspection,
- Classification Society,
- Flag Administration,
- Office Personnel attendance during the inspections,

as well as possible combinations of the above.

3.2.1.1 Analysis per Vessels' Type

The analysis per vessel type, as pictured in Chart 12 can guide the Company to the conclusion that Bulk Carriers are generally more targeted by PSC than Containers, but further analysis will be carried out at next Chapter.

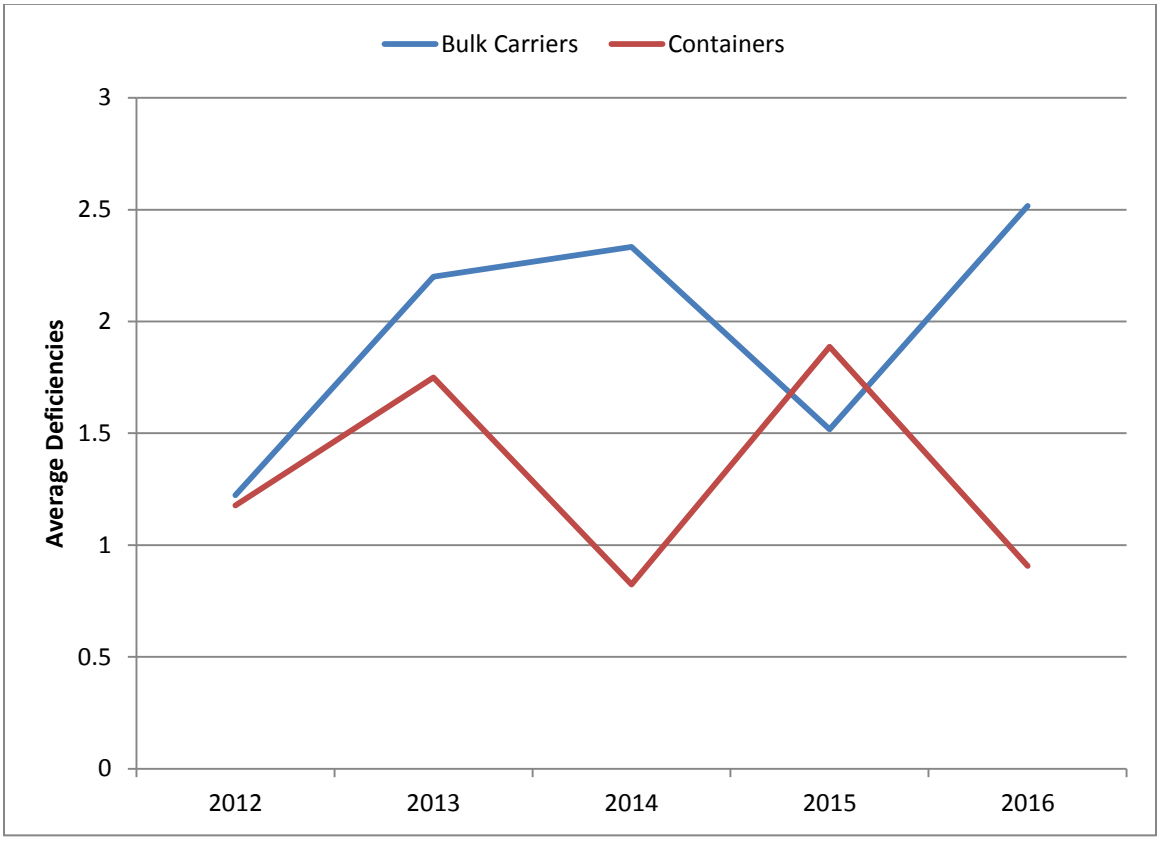


Chart 12: Average Port State Control deficiencies per Inspection per Vessels' type

There is a fluctuation of the trend in 2015, but there is no reason to believe that this was not a random, not normalized due to limited and variable sample of the company.

3.2.1.2 Analysis per Vessels' Age

In Chart 13 there is the analysis of the Port State Control deficiencies compared to vessels' age, for the entire fleet.

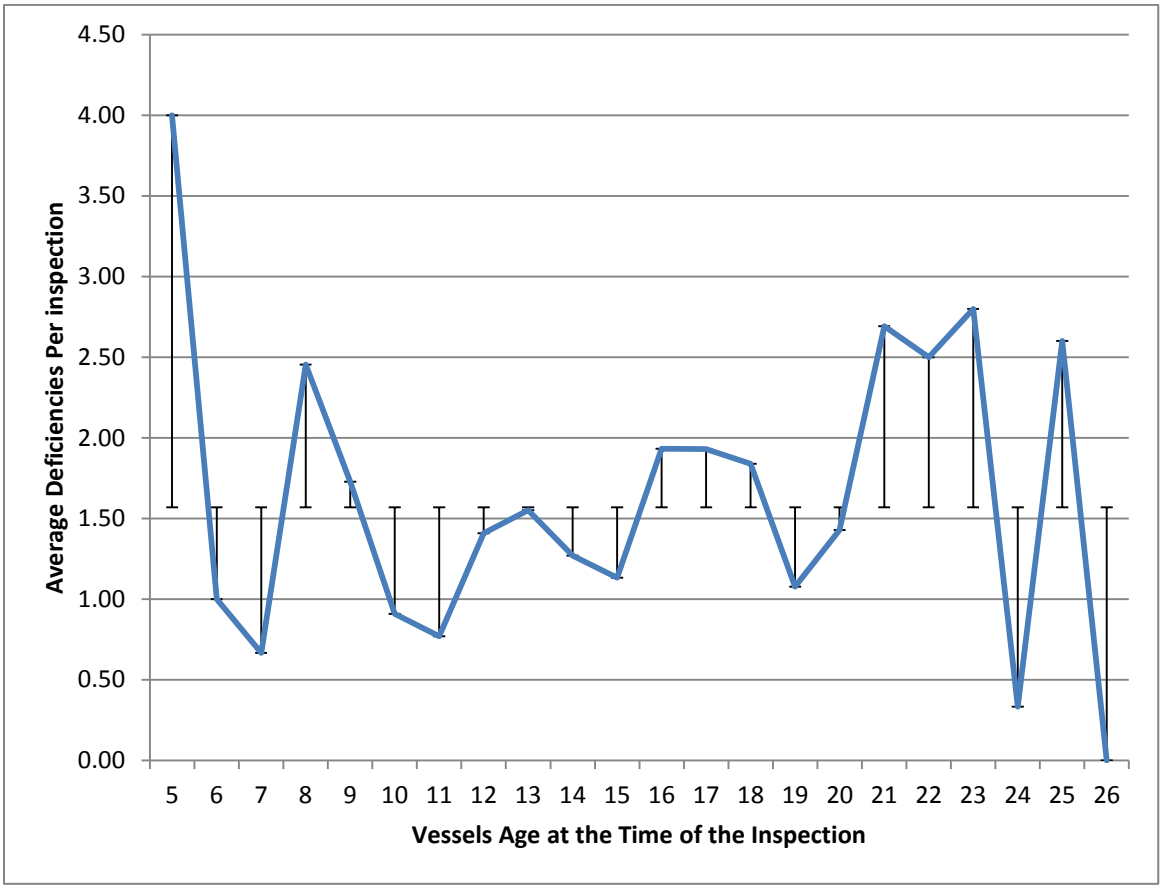


Chart 13: Average Port State Control deficiencies per Inspection per vessels' age

The result is not as expected and cannot guide to any conclusions, since cannot be identified any pattern and there is no relation to industry studies, as seen in Figure 3, in which it is pictured a DNVGL study that implies that average detention rate is higher, the older the vessels are

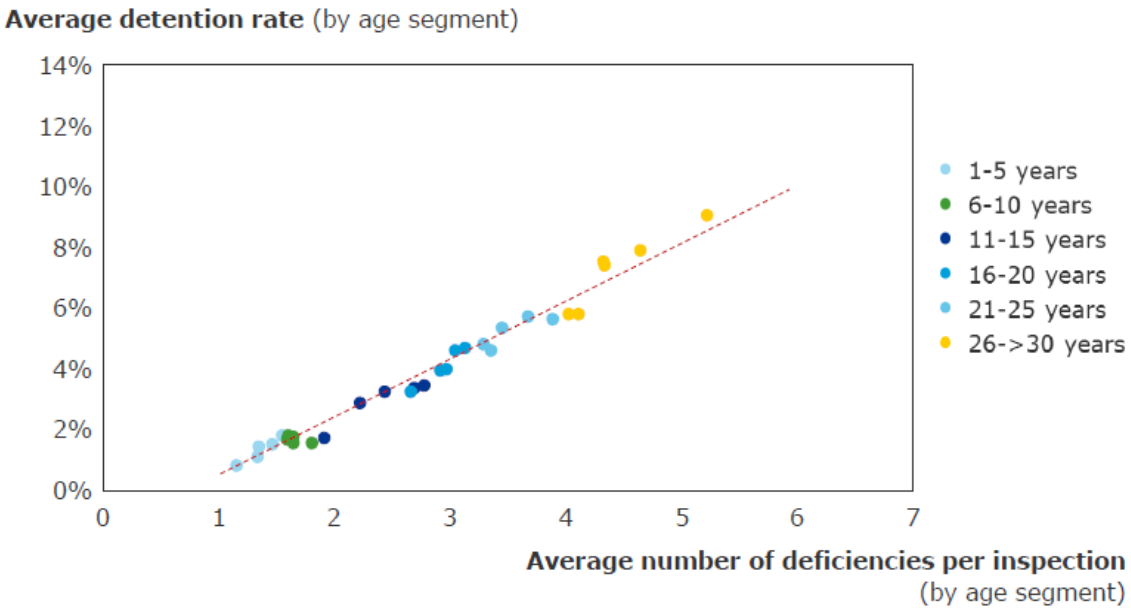


Figure 3: Correlation of PSC performance and age, Source: DNVGL

Further analysis of the relation of the imposed deficiencies and vessels age can be carried out as average deficiencies per inspection per vessel, as pictured in Chart 14.

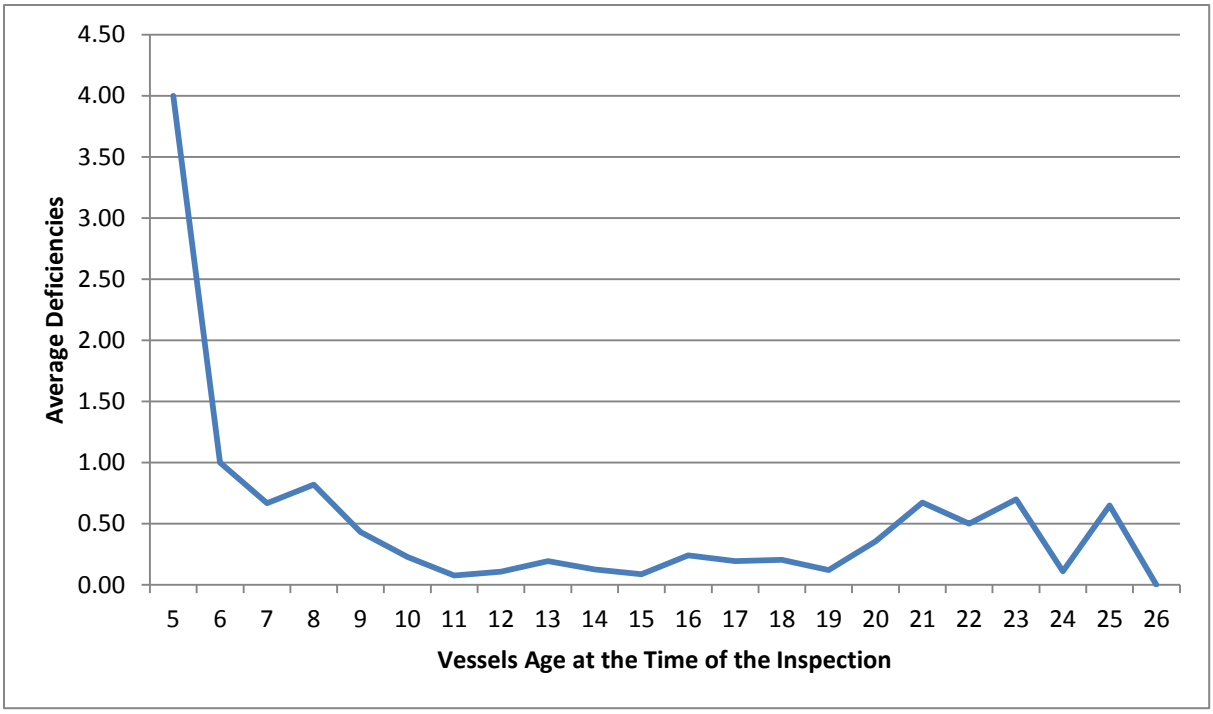


Chart 14: Average deficiencies per inspection per vessel per vessel's age

From Chart 14 company cannot take any results of any value.

Additional check can be carried out by normalizing the data used for Chart 13, in order to crosscheck if company's results have any connection to industry studies.

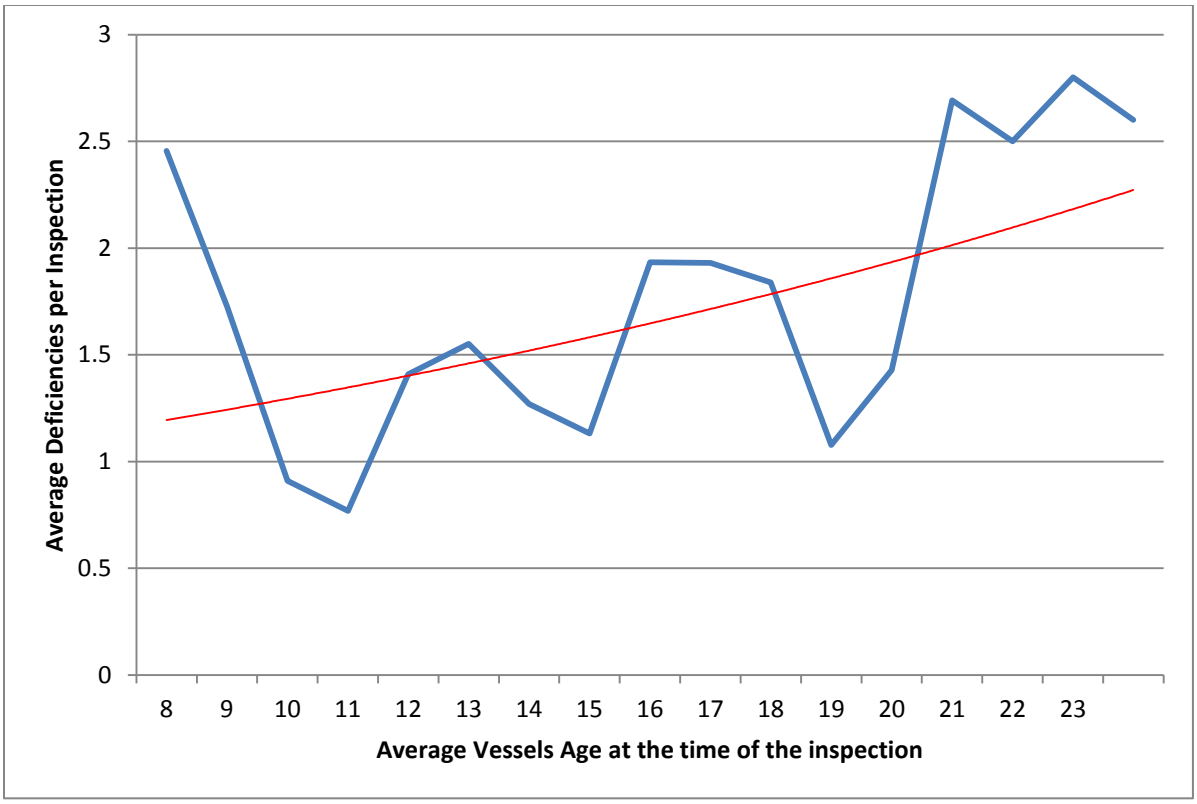


Chart 15: Normalized Results for Average Deficiencies per inspection and Age

Normalization has been carried out by removing all the extreme values by using the method of outlier analysis. By calculating the standard deviation of the company's data and removing all data that have difference more than half of the value of the standard deviation.

Still there is no evidence that there is a direct connection between vessel's age and average imposed deficiencies per inspection for Company's vessels. Nevertheless, by adding the trendline, there is an increasing value of deficiencies with vessels age, which is a standard consideration of the industry, as shown in Figure 3.

3.2.1.3 Analysis per Vessels Classification Society

Vessels' performance can be reviewed basis the Classification society of each vessel, as given in Chart 16. There is no significant value at the results of subject chart, but can be used as a future reference value. Although there are significant values for RINA in 2013 and 2016, same cannot be considered as a trend but a random result, by crosschecking the rest of the years, where average deficiencies are almost same.

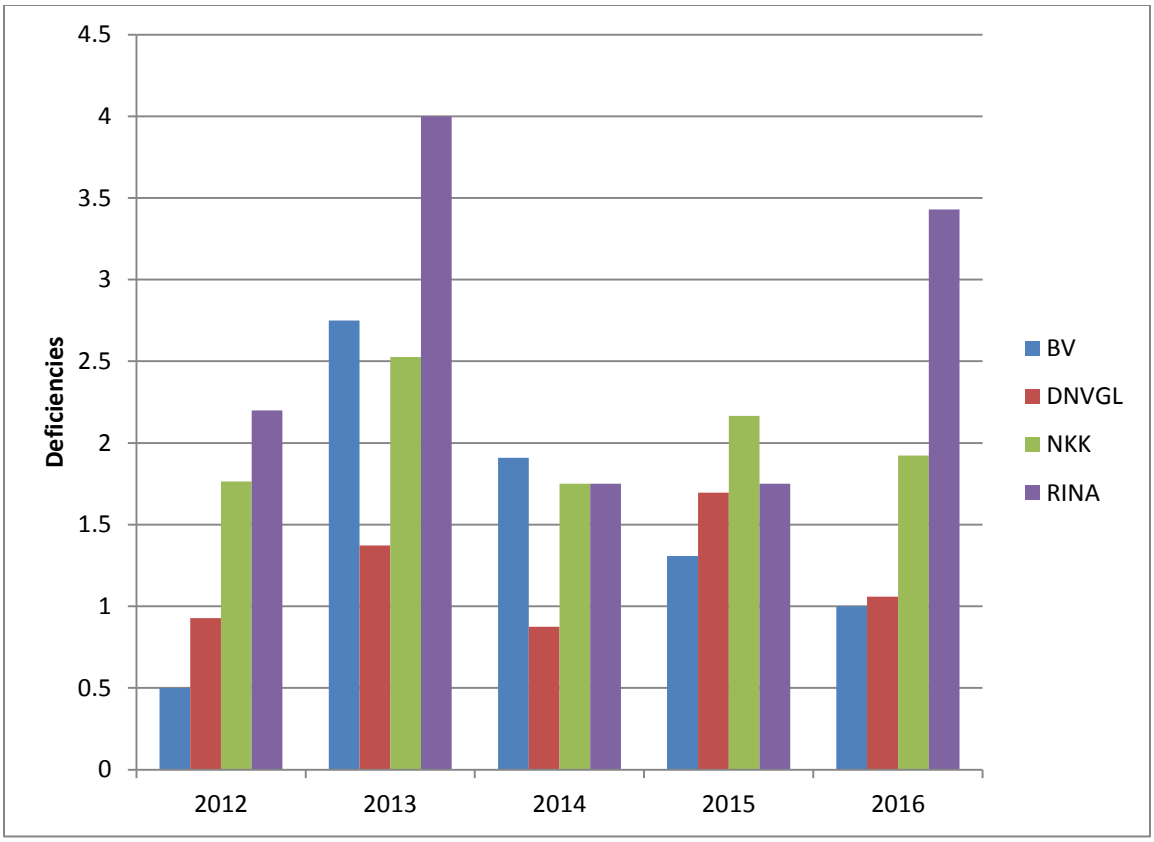


Chart 16: Average Deficiencies Per inspection per Classification Society

3.2.1.4 Analysis per Vessels' Flag

Similar to previous analysis, results can be viewed per vessels' Flag, as given in Chart 17:

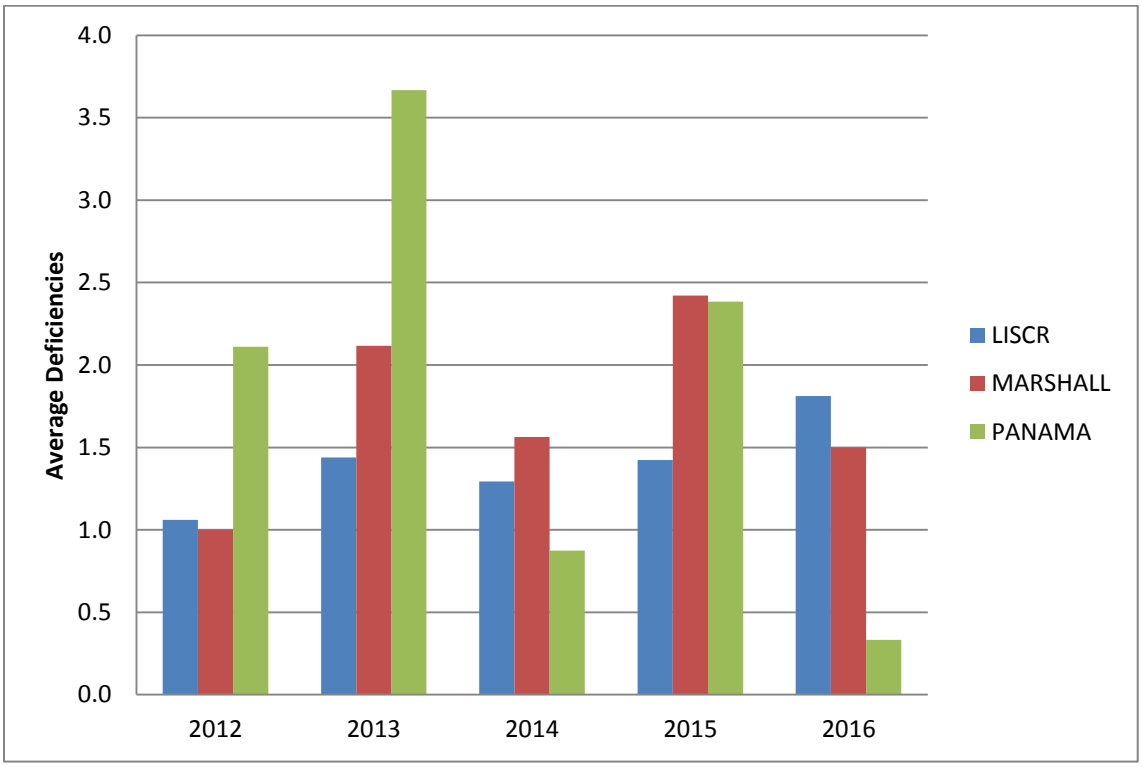


Chart 17: Average Deficiencies per Inspection per Flag

Also Chart 17 can be used mainly as reference, and in comparison to industry standards, since although there is a fluctuation in performance per flag, by crosschecking all the years, this looks rather random, instead part of a defined trend.

3.2.1.5 Analysis per office personnel attendance

One of the most important preventive actions that companies are considering to take in order to improve performance in Port State Control Inspections, is to deploy office personnel to attend on board vessels before or even only during the inspections. It is a general industry's belief that the presence of office personnel on board during the inspection results to better performance during the inspection, i.e. less deficiencies and decreased detention probability.

The effect of company's representative presence, on board during an inspection on detentions is pictured in following chart.

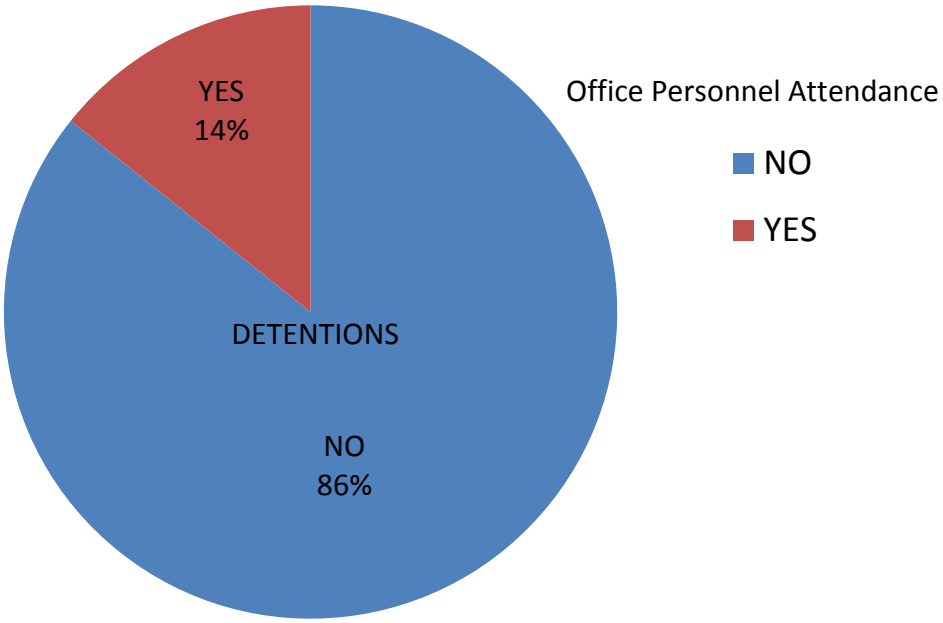


Chart 18: Office Personnel Attendances during detentions

In Chart 18 it is clear that during the 86% of the detentions imposed to the company's vessels, no office personnel were attending on board. Same should be definitely taken into consideration, when company is making its planning on improving Port State Control Performance.

Further analysis can be carried out in order to crosscheck if company's personnel attendance has any effect on the average deficiencies imposed during the inspection.

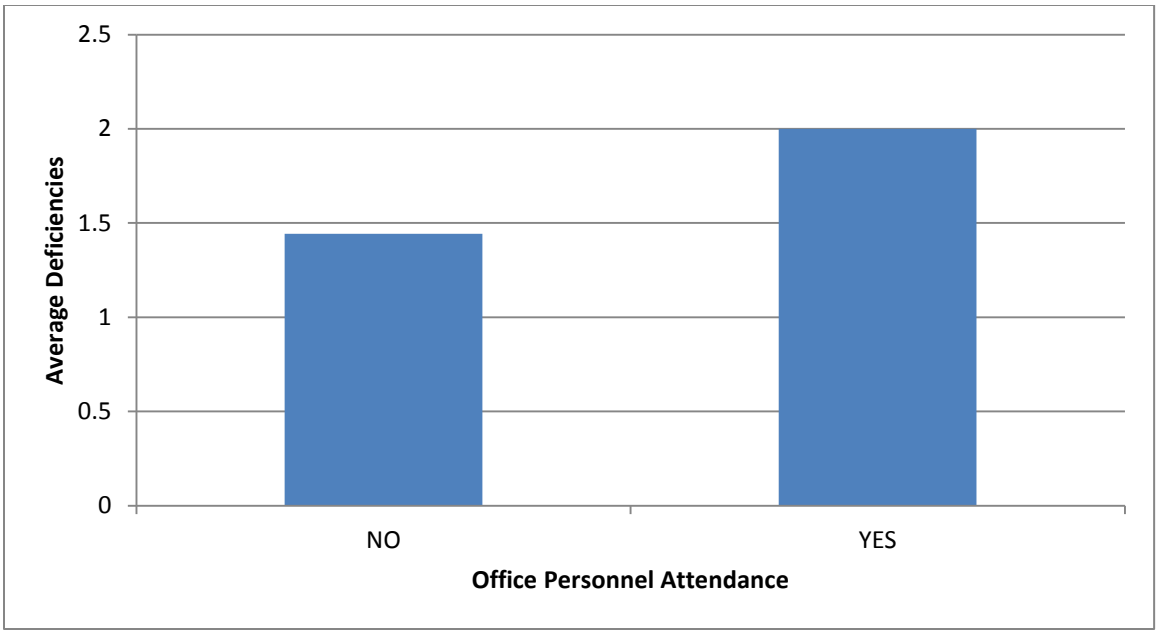


Chart 19: Office Personnel Attendance and Average imposed deficiencies per Inspection

Although the effect of the presence of office personnel on board during the inspections is critical for the detentions, there is no significant value for the average deficiencies.

This might be due to various factors. Most important is that the attendances are focused and not random. Company is choosing where the personnel to attend, usually taking into consideration the vessel's condition, known preexisting defects, "difficult" Port State Controls and known trends for defects and detentions in the trading area. That means that Company's strategy does not include office personnel attendances for Port State controls in MOUs which are known to be more relaxed or are in remote and difficult to reach ports.

3.3 PSC nature of deficiencies analysis

In order the Company to have a more clear view of the imposed defects, there can be a further analysis on the nature of the deficiencies, which will be carried out in accordance with the PARIS Memorandum of Understanding (MOU) list and categories of deficiencies, which are also used from most of the Major MOUs, which are described in paragraph 4.2.

In more detail following groups had been identified under which all the imposed deficiencies are categorized.

1. Certificates & Documentation
2. Structural condition
3. Water/Weathertight condition
4. Emergency Systems
5. Radio communication
6. Cargo operations including equipment
7. Fire safety
8. Alarms
9. Working and Living Conditions
10. Safety of Navigation
11. Lifesaving appliances
12. Dangerous Goods
13. Propulsion and auxiliary machinery
14. Pollution Prevention
15. ISM
16. ISPS
17. Other
18. MLC, 2006

For 2016 Company's performance per category is presented in Chart 20 below.

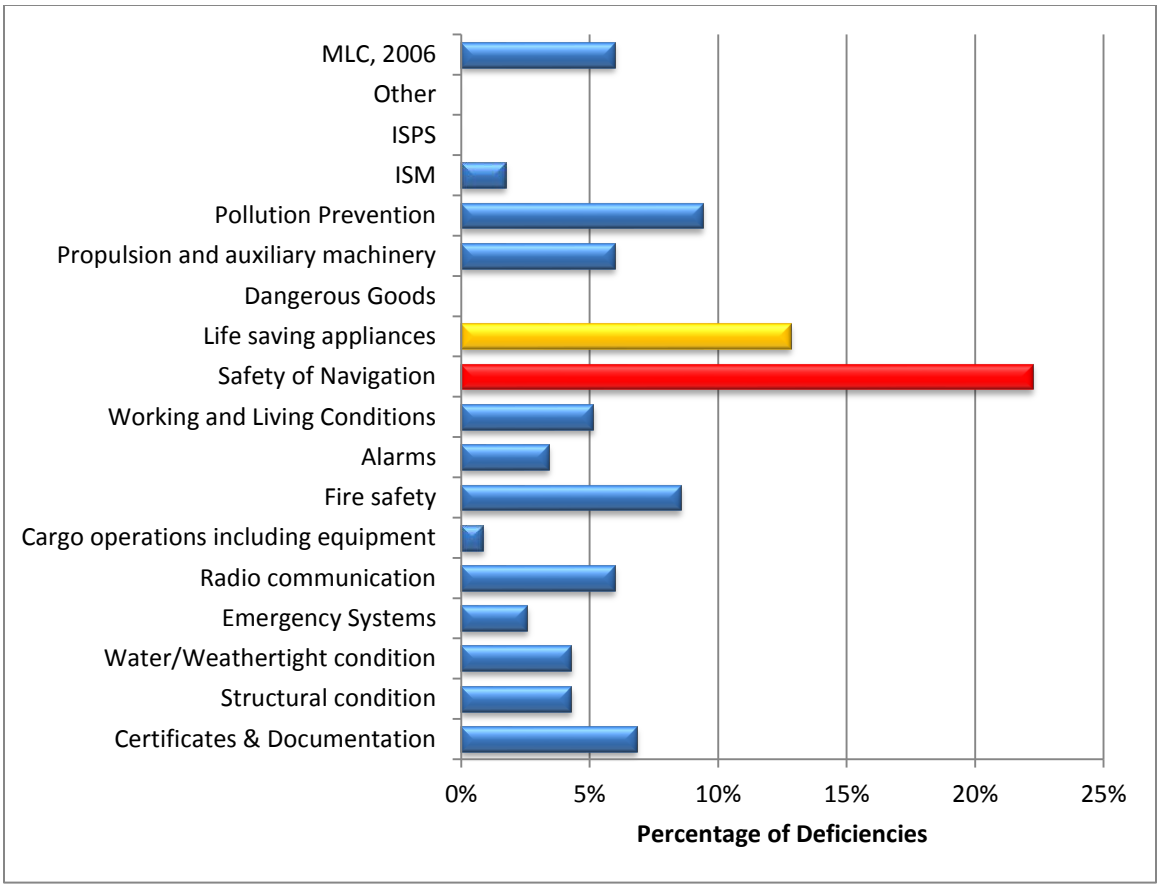


Chart 20: Categories of Imposed deficiencies for 2016

From the above chart crucial decisions could be taken regarding Company's strategy planning, focus and resources needed to improve certain areas of concern.

On the specific occasion, for subject Company for 2016, following had been identified:

a. Deficiencies related to Safety of Navigation are MUCH higher than any other defect
b. Deficiencies related to Life Saving Appliances are also higher than the average of the rest of the categories

In order to view a trend same can be crosschecked for the period of 5 Years.

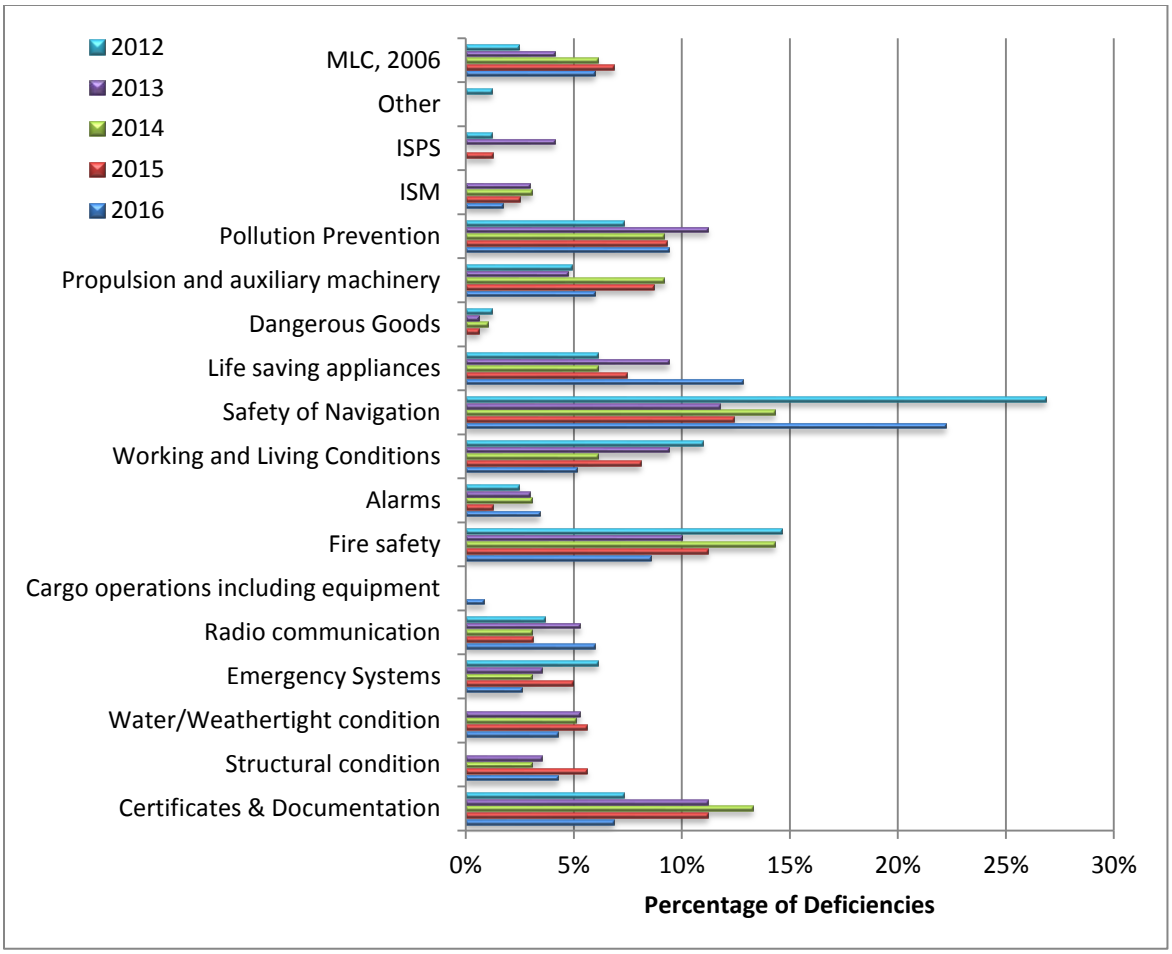


Chart 21: Nature of Imposed PSC deficiencies last 5 years (2012-2016)

Above Conclusions can be confirmed from this chart, and in more detail:

a. There is a definite need to address deficiencies imposed on safety of navigation, since it is throughout the 5 year period significantly increased, with a peak in 2012
b. Lifesaving appliances defect is history high for 2016

In order to provide a more comprehensive analysis regarding the nature of the deficiencies imposed, could be further analyzed per vessel type, for the 5 year period.

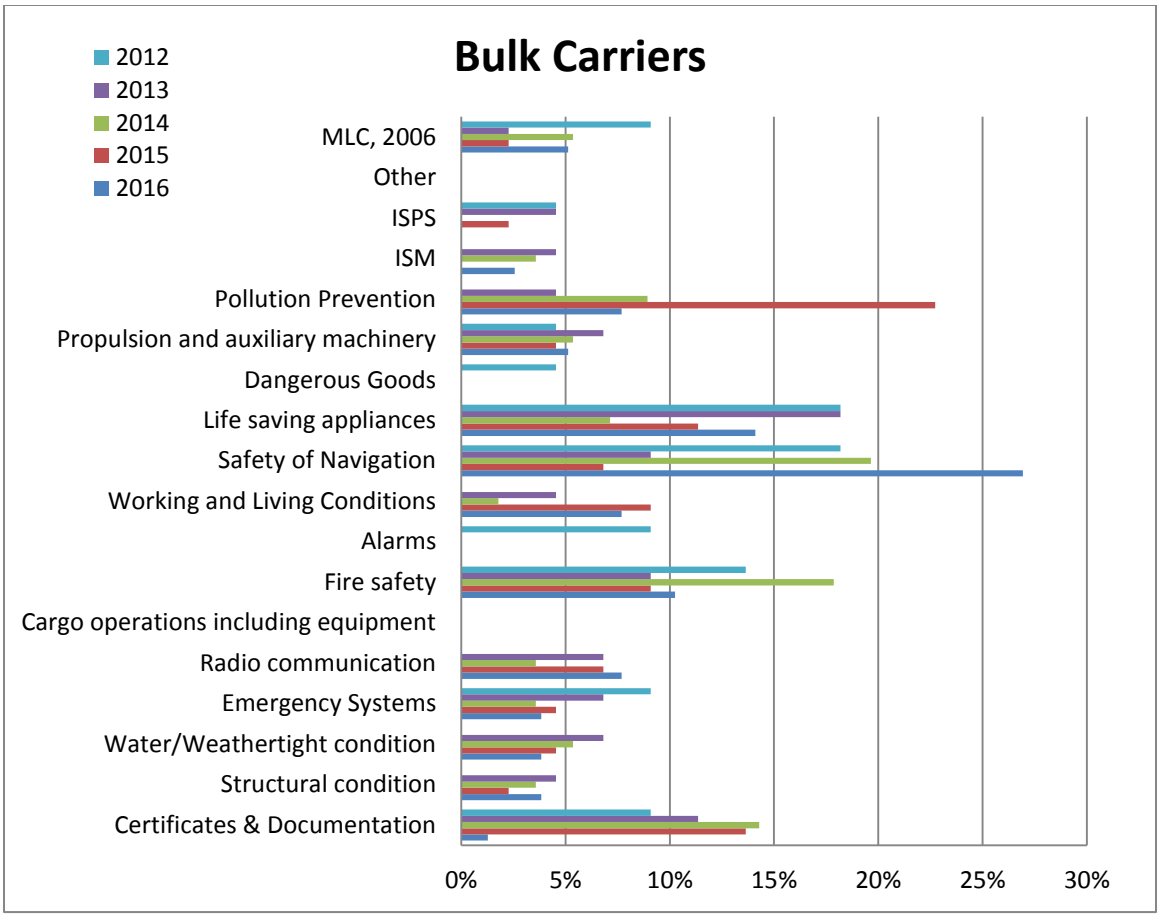


Chart 22: Nature of Imposed Deficiencies Bulk Carriers (2012-2016)

It is clear from Chart 22 that:

- there is an improvement of lifesaving appliances deficiencies of Bulk Carriers
- Safety of navigation category result for 2016 should be immediately addressed, since it is almost double than any other category

Equivalent Comparison can also be carried out for container vessels.

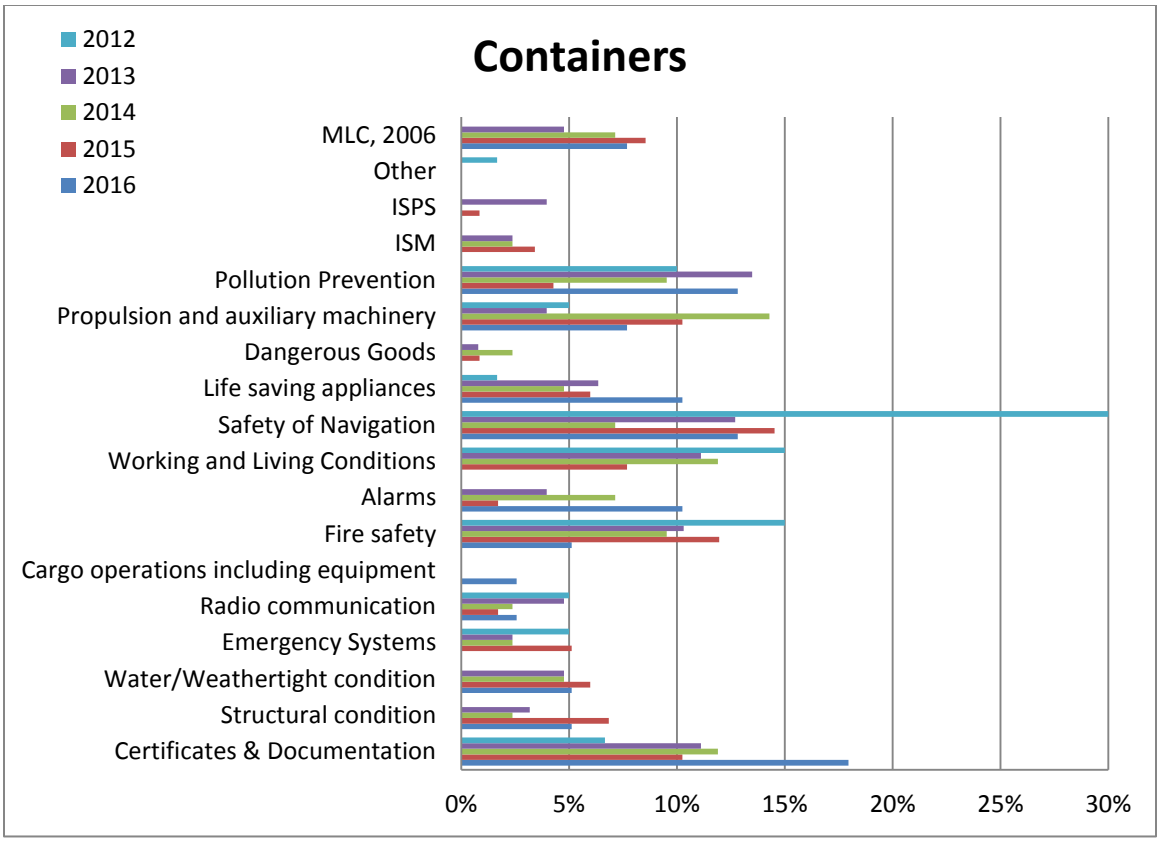


Chart 23: Nature of Imposed Deficiencies Container Vessels (2012-2016)

From Chart 23 following conclusions can be reached:

- There is big fluctuation in the Safety of navigation deficiencies, which is high.
- Working and living conditions category percentage is high
- Certificates and documentation category is very high for 2016

By combining the 5 Year average of both vessel types very important results can be identified, as seen in following Chart.

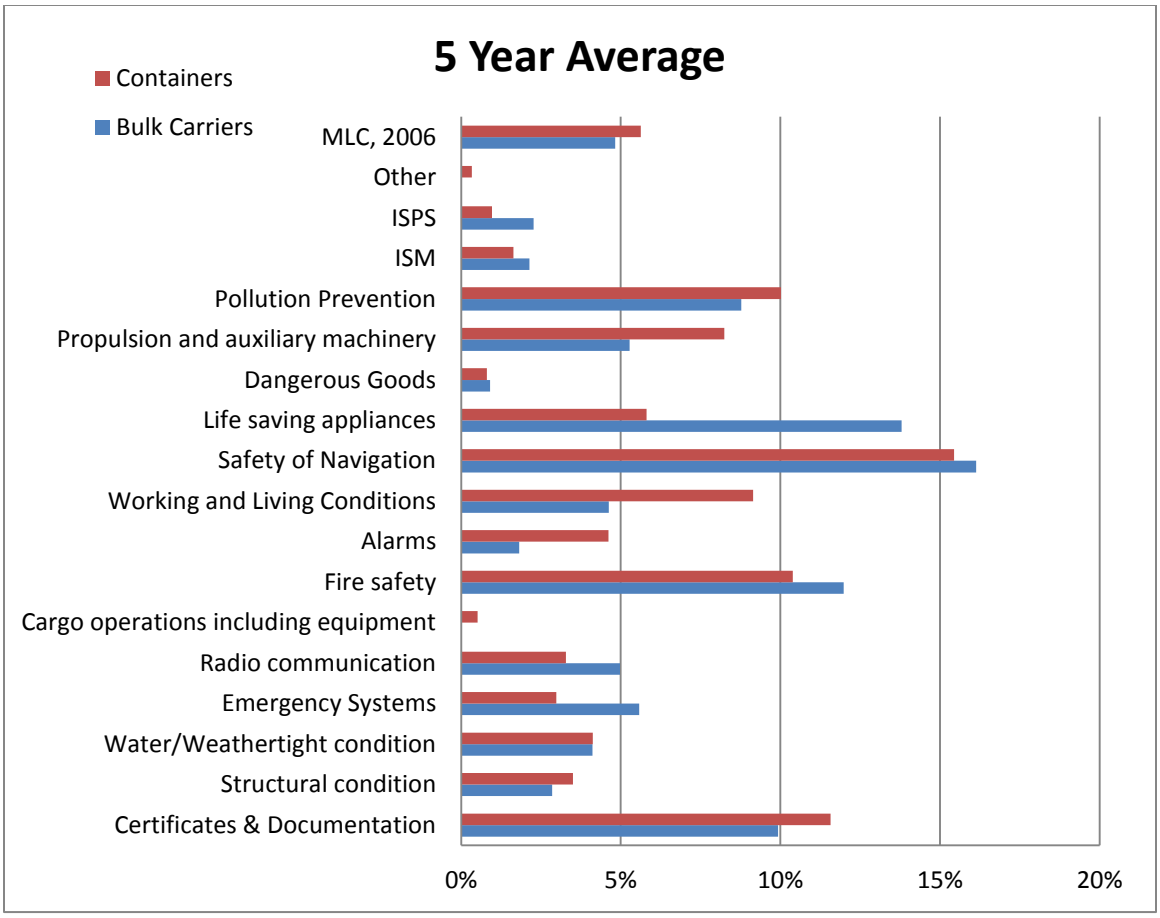


Chart 24: 5 Year Average Comparison between Bulk Carriers and Containers

It is evident from Chart 24 that, although most of the categories have similar appearances in both vessels types following facts should be further reviewed:

a. Lifesaving appliances deficiencies in Bulk Carriers have almost 3 times the value of containers.
b. Propulsion and auxiliary machinery category is significantly higher in Containers than in Bulk Carriers
c. Safety of Navigation is a common problem for both Bulk Carriers and Containers

Chapter 4 Comparisons and Benchmarking

All the results of Chapter 3.1 will be compared between each other, as well as to industry standards and historical data, in order the company to evaluate properly its actual port state control performance.

Comparison can be carried out between average deficiencies, detentions and inspections, and combination of those.

Benchmarking can be achieved by following methods:

a. By comparing Company's results with those of Major MOUS
b. By comparing Company's results with Industry studies and results
c. By using any 3rd party benchmarking institution such as BIMCO Shipping KPI project
d. By using Vetting Companies (Rightship, Major Oil Companies etc.)

At this stage benchmarking of Company's results will be carried out in comparison with Major Mous and with Industry studies.

4.1 Comparison between Detentions/Deficiencies

One of the initial checks that company can carry out is to cross check if the average deficiencies are directly related to the detentions. Same is presented in following Chart:

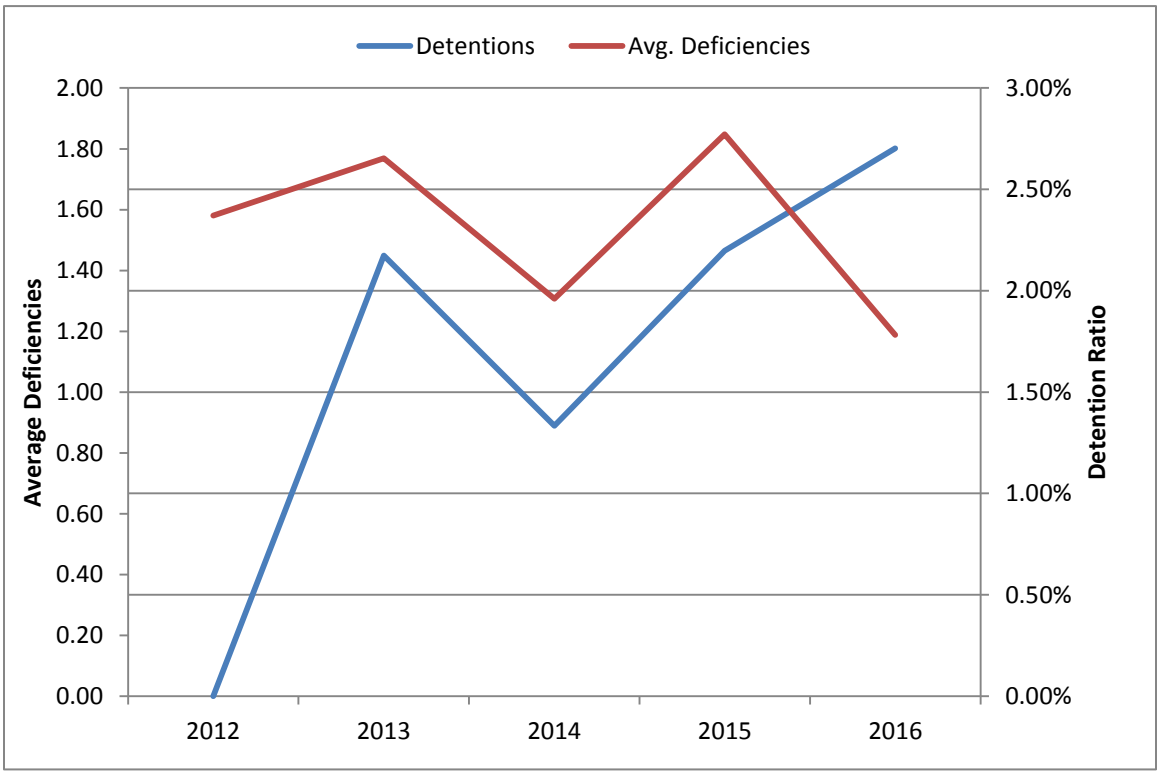


Chart 25: Comparison between Detentions Percentage per inspection and Average Deficiencies per Inspection

It is clear from Chart 25 that there is a direct relation between detentions and average deficiencies per inspection, which is absolutely normal, since both indicators are closely related to overall Company's performance and Standards. There is a deviation of the trend in 2016, since the average deficiencies per inspection had decreased, while the average detentions per inspection increased. There is no reason to believe that this is not random, since the trend is following also industry studies, given in Figure 4, from which it is clear that by the increase of the average deficiencies per inspection the likelihood of a detention is also increasing.

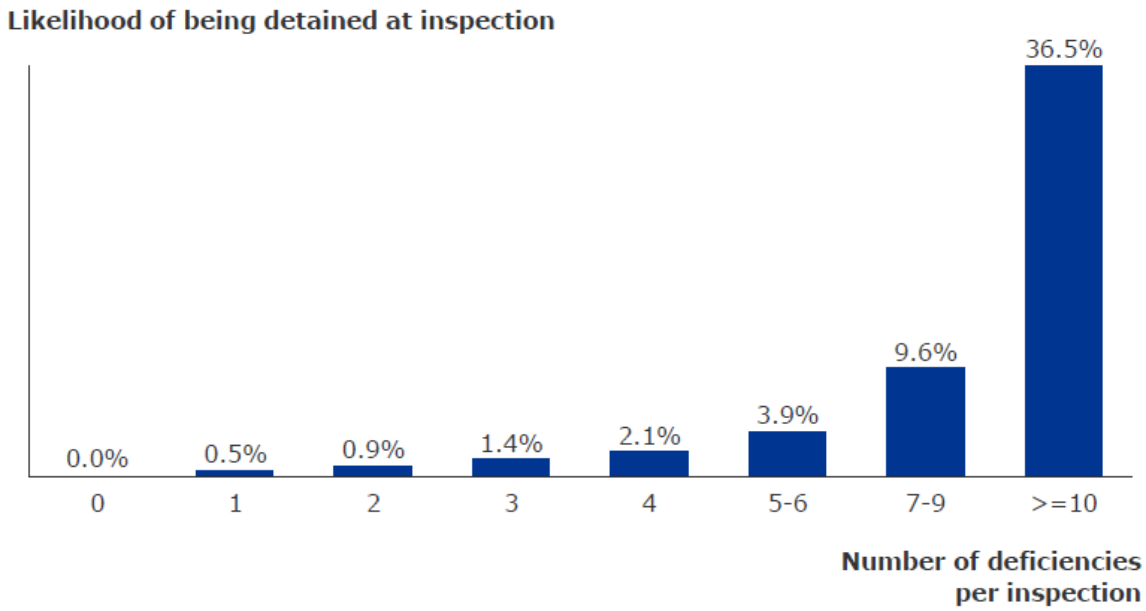


Figure 4: Correlation between likelihood of detention and number of deficiencies, Source: DNVGL

Further review can be made by comparing the flawless inspections to the average detention Ratio, which is carried out in next Chart.

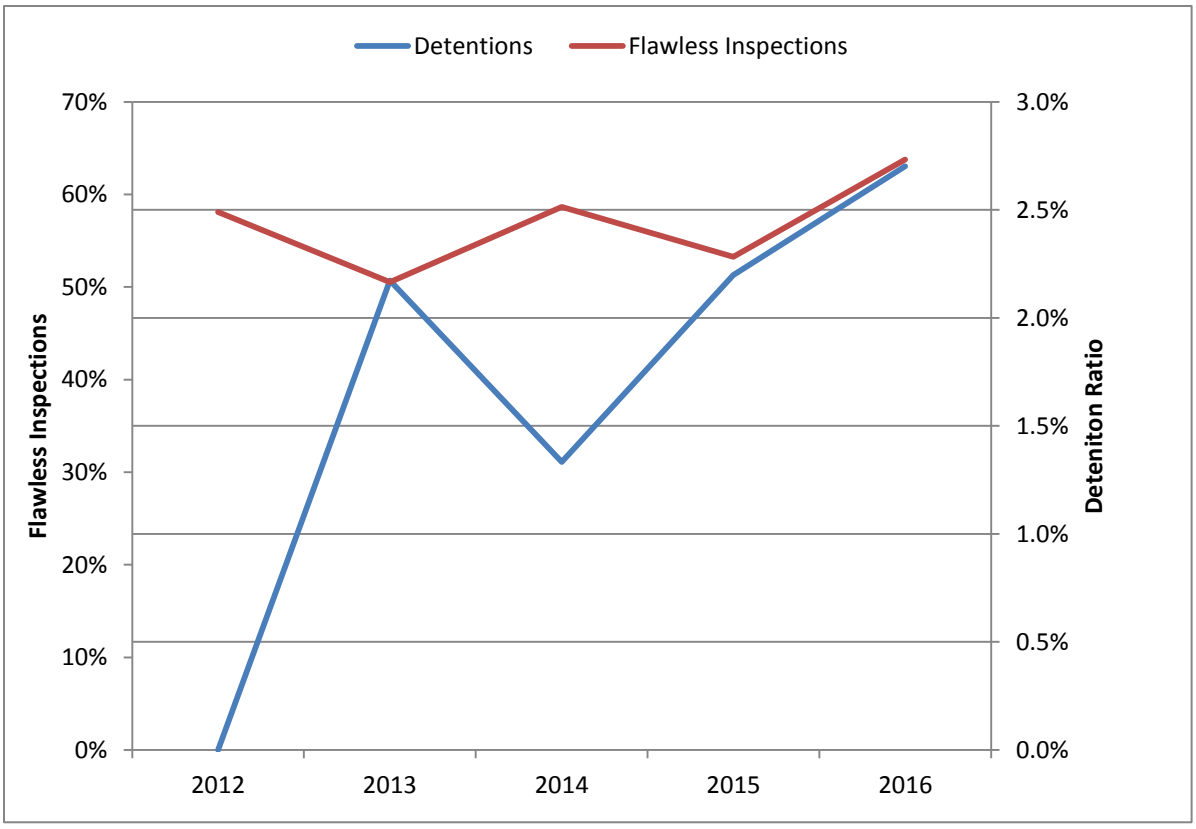


Chart 26: Comparison between Flawless inspections percentage and detention Ratio

From Chart 26 can be concluded that when the percentage of flawless inspections is increases, the percentage of detentions is decreased. Only for 2016 this is not true, same as it had been identified in Chart 25, which had also been explained.

In order to make an effort to further connect flawless inspections and company's port state control performance, a comparison with the average deficiencies can also be carried out.

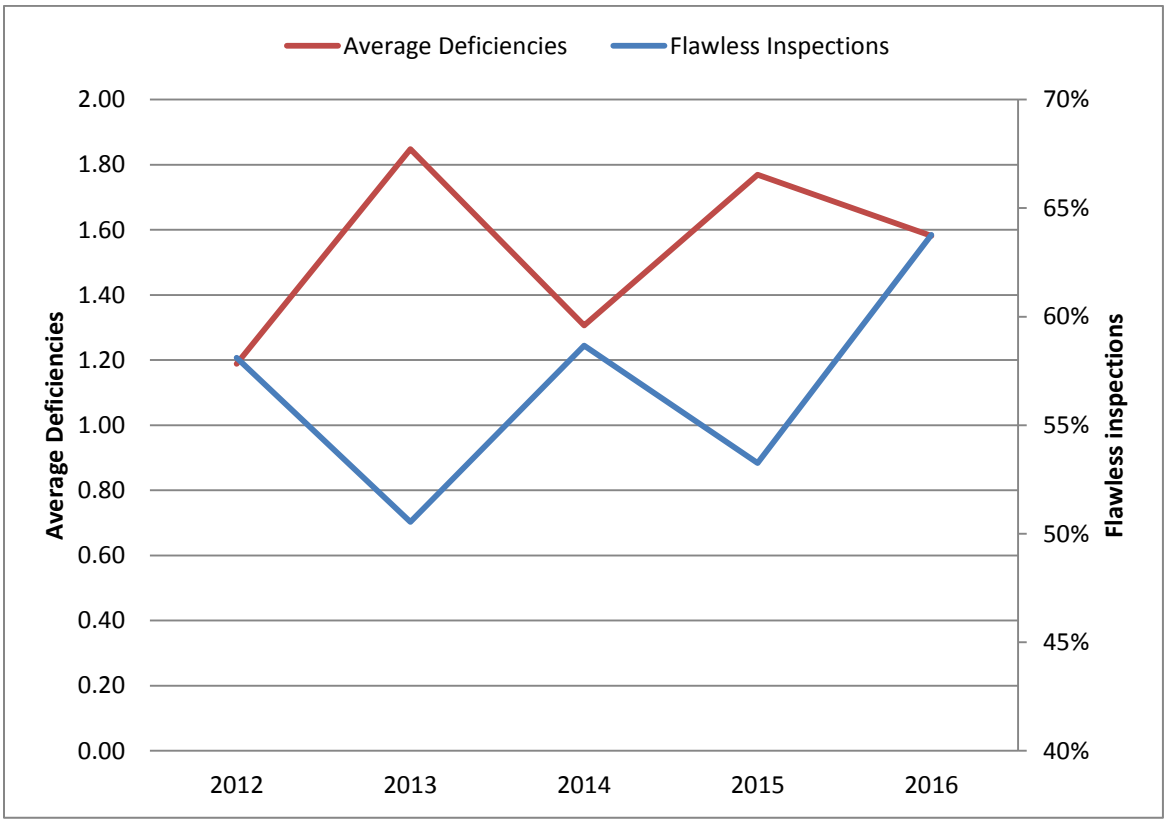


Chart 27: Comparison between Average deficiencies and Flawless inspections

In Chart 27 the results were anticipated. The more the flawless inspections are, the better the company's performance of average deficiencies are. Although the trends are contradicting, this is normal, since the perfect for flawless inspections is 100% while for average deficiencies is 0.

4.2 Comparing Company's Results to Major MOUs results

There are following 9 regional MoUs and USCG with different schemes, systems, focus areas and cultures. The main mission of Port State Control MOUs is to eliminate the operation of sub-standard ships through a harmonized system of port State control inspections.

a. Paris MoU with members: Belgium, Bulgaria, Canada, Croatia, Cyprus, Denmark, Estonia, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Latvia, Lithuania, Malta, the Netherlands, Norway, Poland, Portugal, Romania, the Russian Federation, Slovenia, Spain, Sweden and the United Kingdom
b. Tokyo MoU with members: Australia, New Zealand, Canada, Papua New Guinea, Chile, Peru, China, Philippines, Fiji, Russian Federation, Hong Kong, Singapore, Indonesia, Solomon Islands, Japan, Thailand, Republic of Korea, Vanuatu, Malaysia, Viet Nam, Marshall Islands
c. Acuerdo Latino (Viña del Mar MoU) with members: Argentina, Brazil, Chile, Colombia, Cuba, Ecuador, Guatemala, Honduras, Mexico, Panama, Peru, Dominican Republic, Uruguay And Venezuela.
d. Caribbean MoU with members: Anguilla, Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, Cuba, Curaçao, Bermuda, British Virgin Islands, Cayman Islands, Dominica, Grenada, Guyana, Jamaica, Montserrat, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Suriname, Trinidad and Tobago, Turks and Caicos Islands
e. Mediterranean MoU with members: Algeria, Cyprus, Egypt, Israel, Jordan, Lebanon, Malta, Morocco, Tunisia, Turkey
f. Indian Ocean MoU with members: Australia, Mauritius, Bangladesh, Mozambique, Comoros, Myanmar, Djibouti, Oman, Eritrea, Seychelles, Ethiopia, South Africa, La Reunion, Sri Lanka, India, Sudan, Iran, Tanzania, Kenya, Yemen, Maldives
g. Abuja MoU with members: Benin, Nigeria, Senegal, Gabon, Sierra Leone, Ghana, South Africa, Guinea Conakry, The Gambia, Cote D'ivoire, Togo, Angola, Sao Tome and Principe
h. Black Sea MoU with members: Bulgaria, Georgia, Romania, Russian Federation, Turkey and Ukraine
i. Riyadh MoU with members: United Arab Emirates, Bahrain, Oman, Saudi Arabia, Qatar and Kuwait.
j. US Coast Guard
k. Other

Company had various Port State Control Inspections for the period of 2012-2016, as per below breakdown:

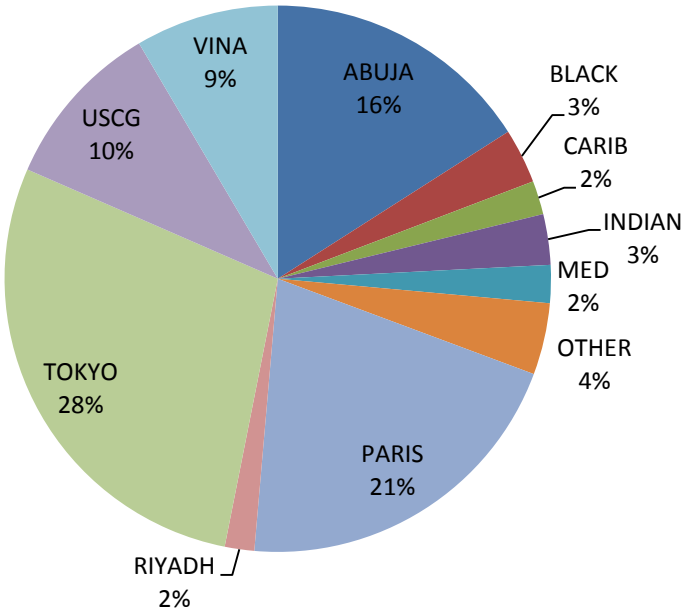


Chart 28: Distribution of Company's Port State Control Inspections (2012-2016)

With reference to comparison and benchmarking comparing to Paris Mou, Tokyo Mou and USCG results makes the most sense, since these are the most transparent and standardized, with reference to inspection procedures and publishing results. Furthermore, Tokyo MOU and Paris MOU have the most members as given in the list above, while USCG is the most strict and prestigious Port State control in the industry. Furthermore, as seen from Chart 28, 60% of company's inspections had been carried out in Paris, Tokyo and USCG. Results in Abuja MOU and Vina Del Mar will not be analyzed due to the non-transparent nature of the inspections, to the non-availability of comparison data and to the lower commercial value that they have.

All MOUs have standards in order to classify vessels according their risk profile. Usually the categorization as per Risk profile of the vessels is Low Risk, Medium or Standard Risk and High Risk Vessel. According to the calculated risk profile of each individual vessel, is also calculated by the MOUs, the periodicity of the inspections on board, the detail of the inspection, and as it is easily understood the approach of the vessel from the inspectors. It is clear that is to the managers benefit the vessels to be of the best possible risk profile, i.e. each manager to have only Low Risk vessels in its fleet.

Each MOU has its own ship risk calculator, but all of them are taking into account not only the individual vessel performance while calculating its risk profile, but also the Management Company's performance in the specific MOU. Thus, even if a vessel has flawless performance in a specific region, same will not be considered as high standard vessel, in case Management Company's performance is not high as well. Therefore, it is clear that Company's performance should be monitored and analyzed in depth. Evidence of such can be seen also in Figure 1, where the effect of targeting system on inspection frequency is described.

In calculating Company's performance, Major MOUs are taking into consideration average detentions and average deficiencies. In this respect such a review will be carried out in this chapter.

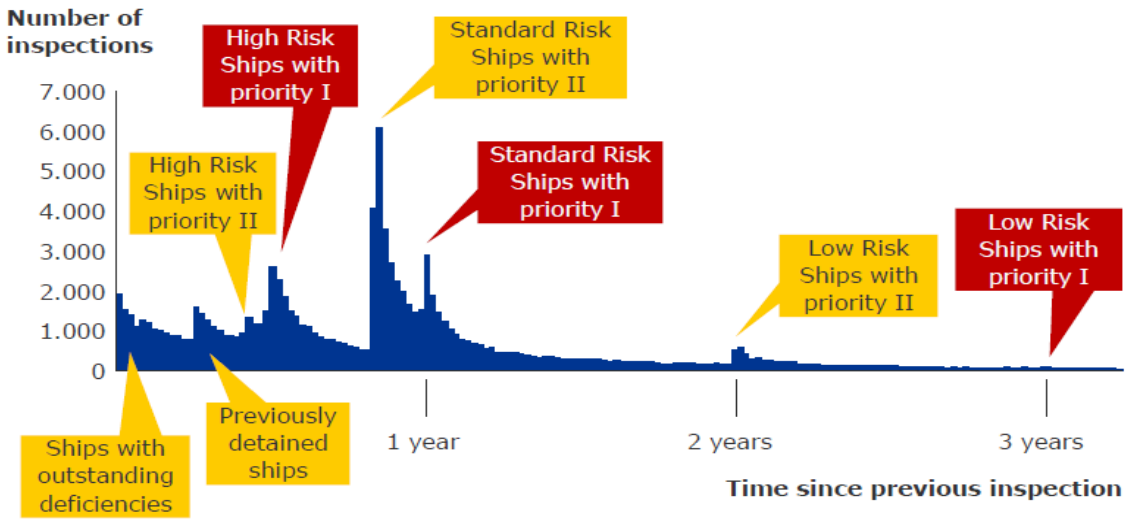


Figure 5: Effect of targeting systems on inspection frequency, Source DNVGL: Improving PSC performance and fleet Safety with big data

As it is also shown in Figure 5, the frequency of the inspections is much higher and condensed for High and Standard Risk Ships, while Low Risk ships are inspected less often.

4.2.1 Comparison Company's Detention Performance to Major MOUs

In Chart 29 there is the comparison between the average detention ratio of major Mous, as published in their annual reports and Company's performance.

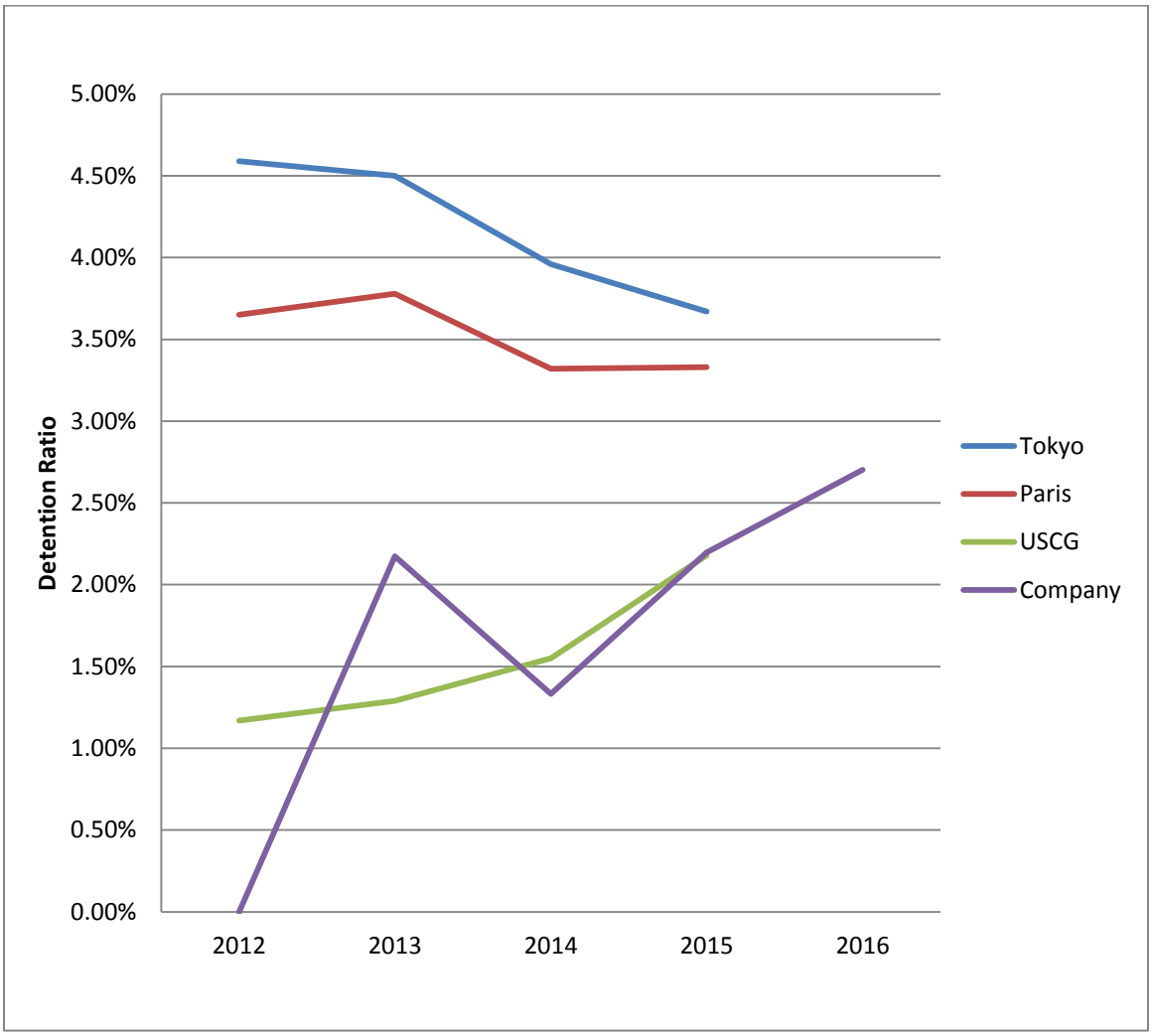


Chart 29: Company's Average detention Rate compared to MOU

Company's detention ratio is less than the average of each of the major MOUS, but it is clear that Company's detention performance in Major MOUs the last 2 years is deteriorating significantly, matter which should be taken under consideration and initiate preventive actions.

More important information can be given in case there is a comparison between the performances in each MOU individually.

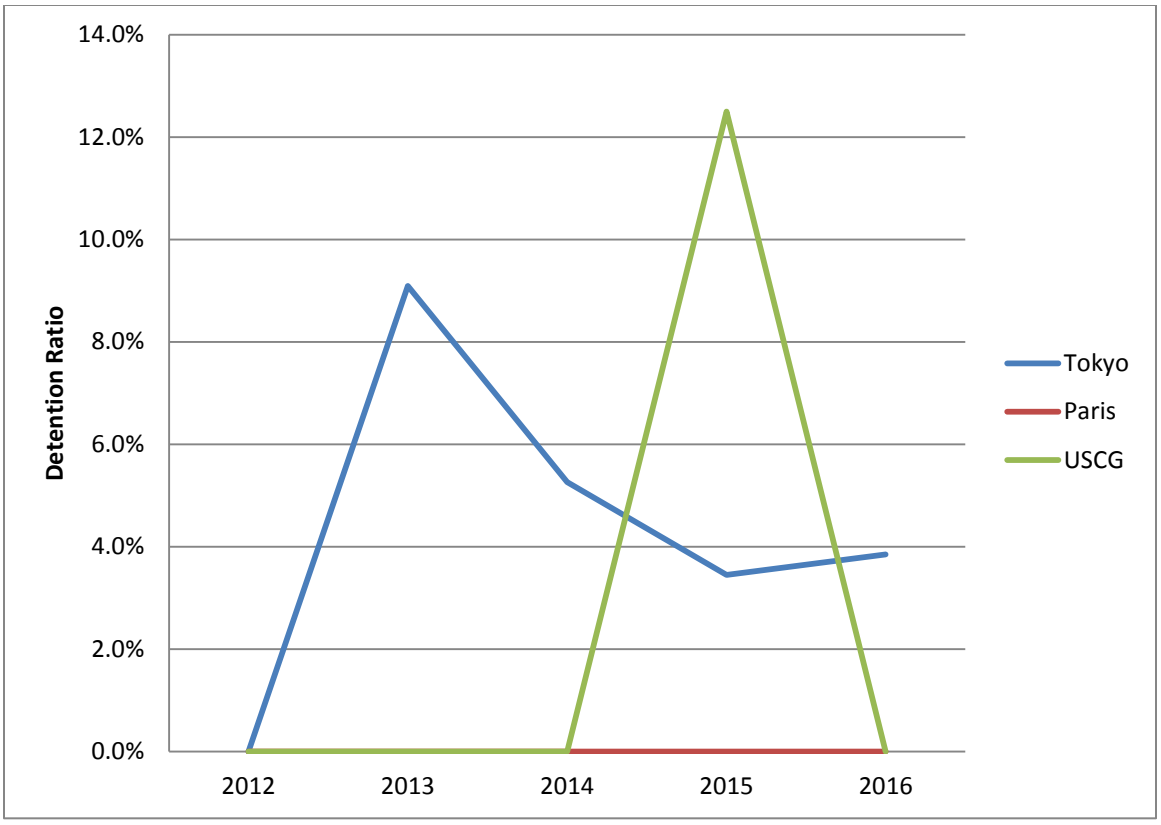


Chart 30: Company's Detention Performance per MOU

From comparison in Chart 30, following conclusions can be reached:

1. Company's performance in Paris MOU is perfect
2. Company's performance in USCG had a bad year in 2015, but the average for the period of 5years is 2.38%, which is marginally above the average of USCG for 2015. This cannot be considered though representative, since is only 1 detention for the period of 5 years, which deteriorates the performance. Further review will be required in case the deficiencies average is also near the average.
3. Performance in Tokyo MOU is alarming and needs further investigation, and is the main contributing factor on the medium general performance of the Company

In order to further investigate Company's performance in Tokyo MOU reference to detentions, comparison between Tokyo MOU average and Company average can be carried out.

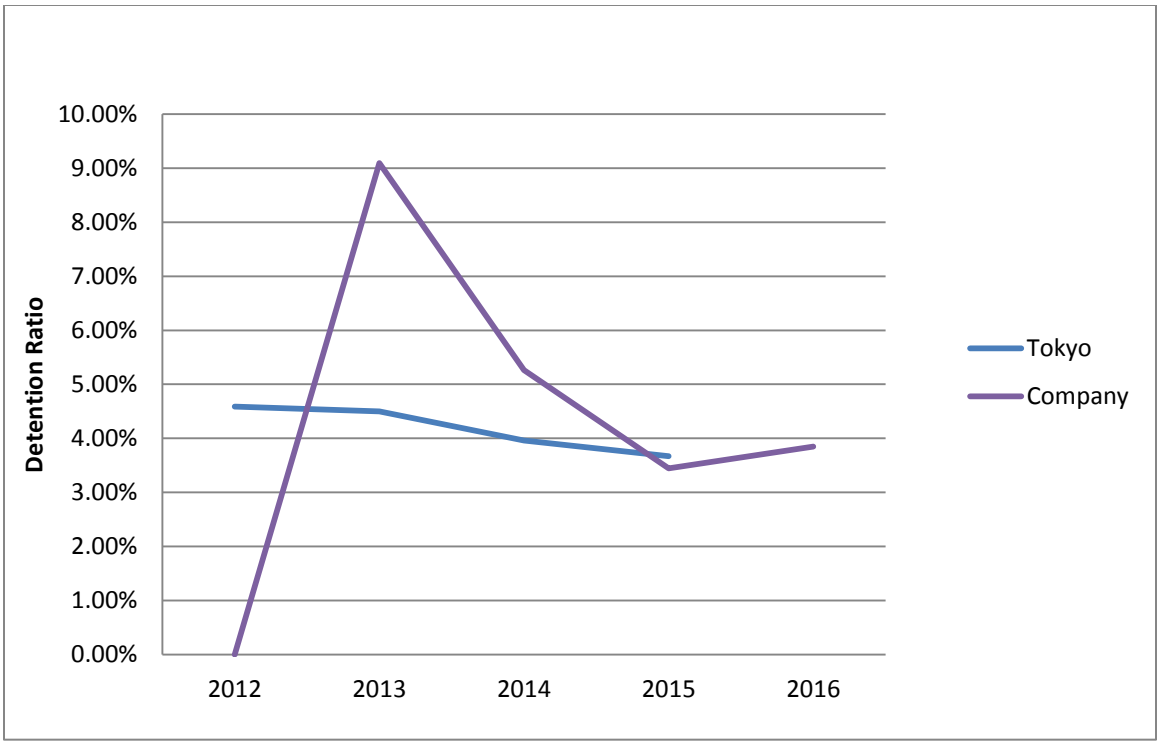


Chart 31: Average Detention comparison between Company and Tokyo MOU

As it was expected, Company's performance is below average in Tokyo MOU.

In order to go into more detail, further analysis for the Company's deficiencies performance and comparison to Major MOUs can be carried out.

4.2.2 Comparison Company's Deficiencies Performance to Major MOUs

Company's average deficiencies per inspection can be compared to the average of each major MOU in order to able to benchmark company's performance in general.

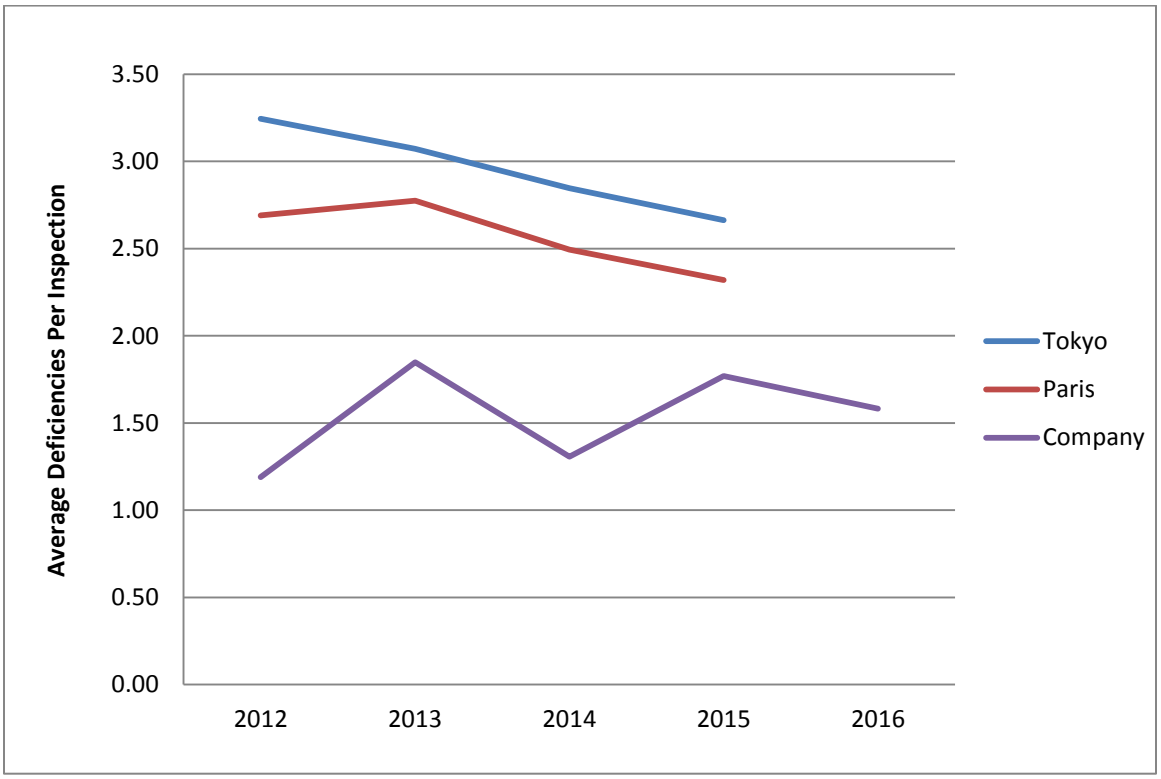


Chart 32: Company's Average Deficiencies per Inspection compared to Paris and Tokyo MOU average

From Chart 32 company's performance is compared to major MOUs, Paris and Tokyo. No reference is made towards USCG, since the data is not disclosed in the Annual Reports. It is clear that although company's average is well below (better) than in both MOUs, does not follow the trend of declining that the MOUs are following. That means that company's performance is steady while the average performance of world fleet is improving, case which should be taken into consideration from the company.

In order though, to be able to actually compare company's performance, Company's deficiencies average per inspection should be reviewed per MOU in order to be able also to compare it per MOU average.

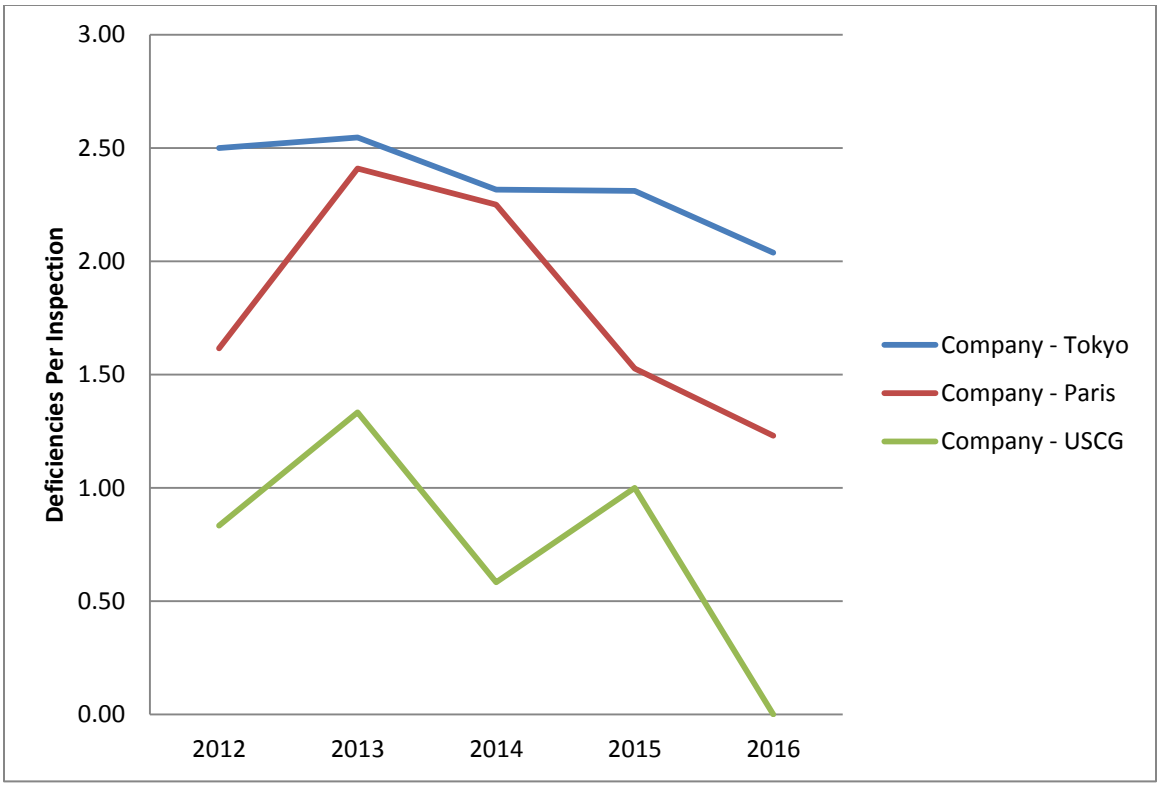


Chart 33: Company's Average Deficiencies Per MOU

From this analysis it is clear that Tokyo MOU and Paris MOU performance should be further investigated, since US Coast performance is good, and within 2016 is perfect. Although it was expected that the performance in USCG would be worse than the other MOUs, since it is widely considered the strictest worldwide, it is not the case. Company is performing well in USCG, although there was a detention in 2015. This can be explained mainly by the fact that USCG is making all efforts only "good" vessels to call US ports, and company is paying extreme attention in this aspect, to vessels calling USCG. Is making sure that only very good vessels with flawless record will make voyages to USA, where always a strict inspection is expected.

By reviewing Company's performance per MOU, further strategic targets can be set, in order to improve performance in each MOU respectively.

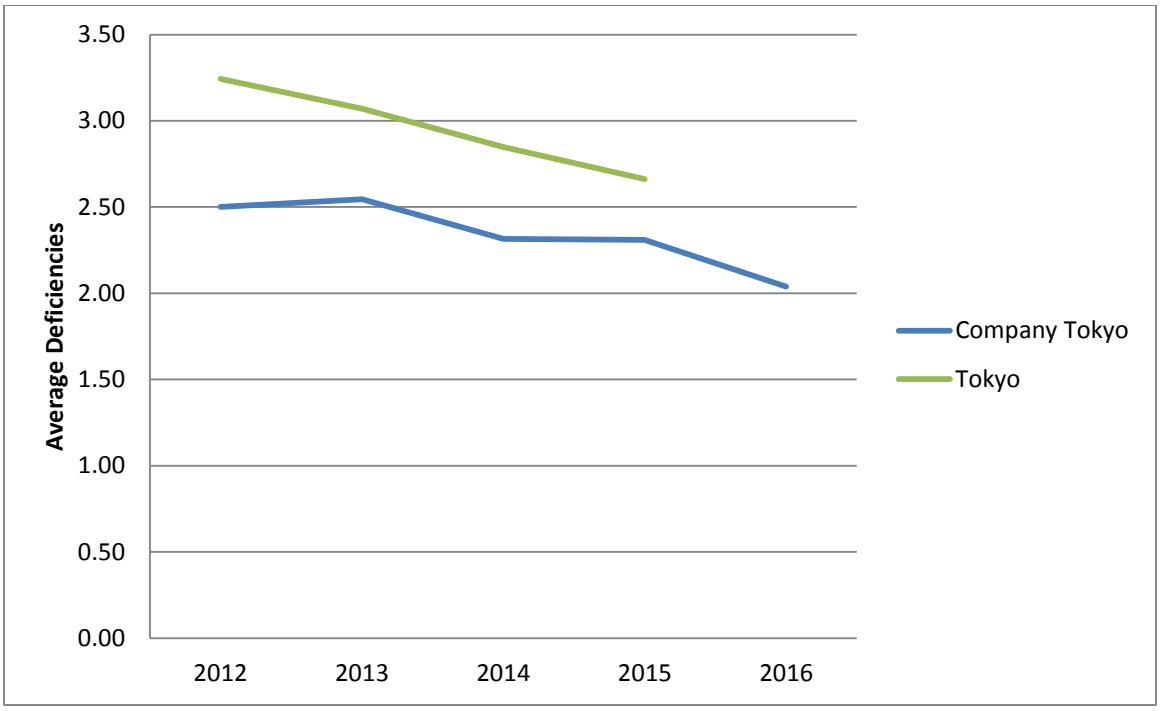


Chart 34: Company's Performance In Tokyo MOU compared to MOU Standards

Although Company's performance in Tokyo MOU is above average, still due to MOUs requirements is still considered as medium.

Comparison is also carried out for Paris MOU.

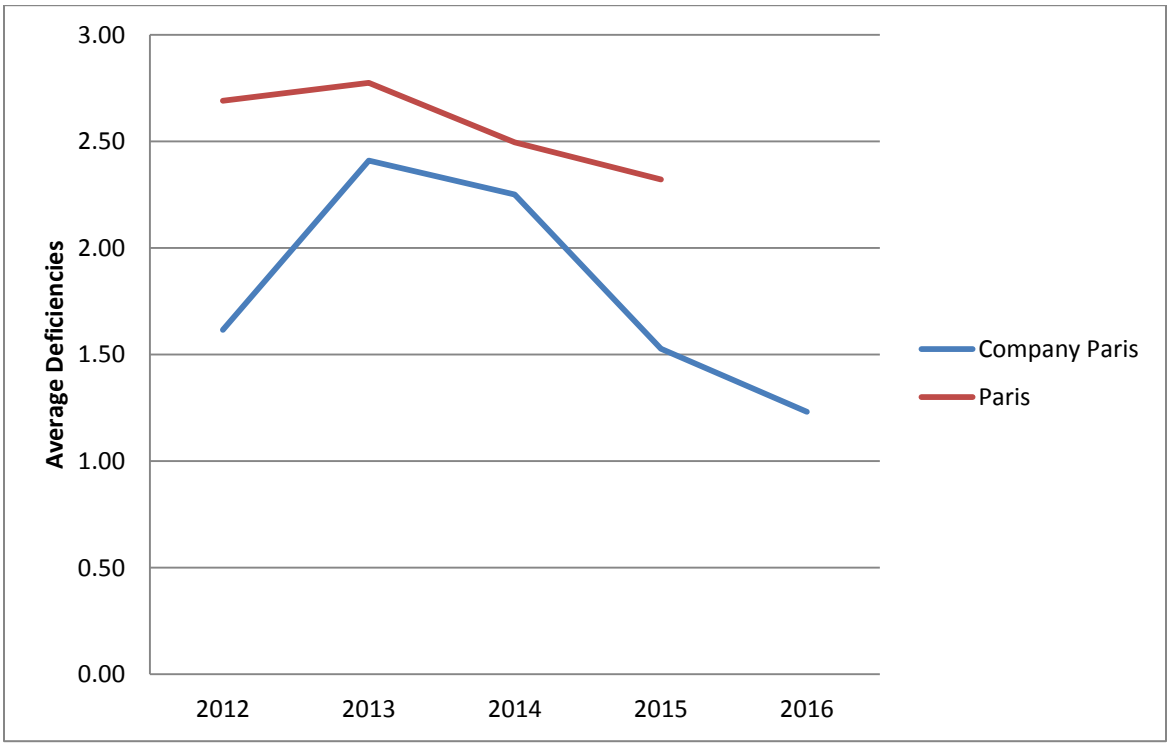


Chart 35: Company's Performance in Paris MOU compared to MOU Standards

From Chart 35 it can also be concluded that although Company's performance is above average for subject MOU, still is considered as medium for PARIS MOU as well, due to MOUs standards and requirements.

Company's performance can be further analyzed by comparing average performance of vessels which are flying white flag, same as company's vessels, in Paris MOU, where subject data is available. There is no benefit in comparing detentions, since company had no detentions in Paris MOU, but deficiencies comparison is presented in following Chart.

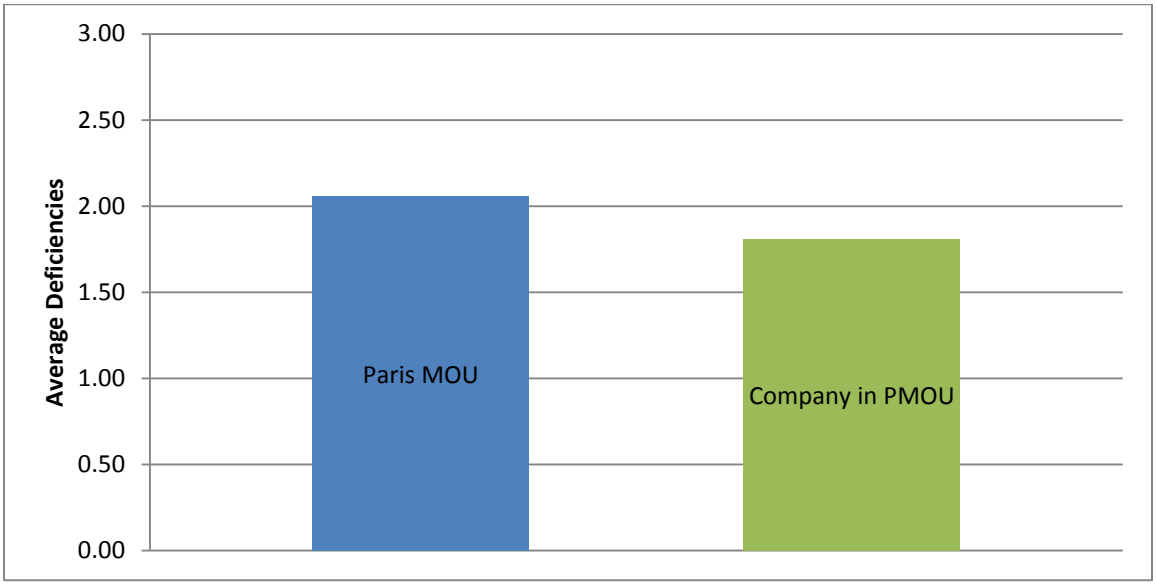


Chart 36: Comparison Company Performance in Paris MOU to White Flag Vessels performance in Paris MOU

The deficiencies in Paris and Tokyo MOU can be further analyzed depending their nature and compared with MOUs average.

4.2.3 Comparison of Nature of Deficiencies of the Company per MOU

Company's performance in each MOU can be further analyzed as per nature of deficiencies and to be compared to each MOU average.

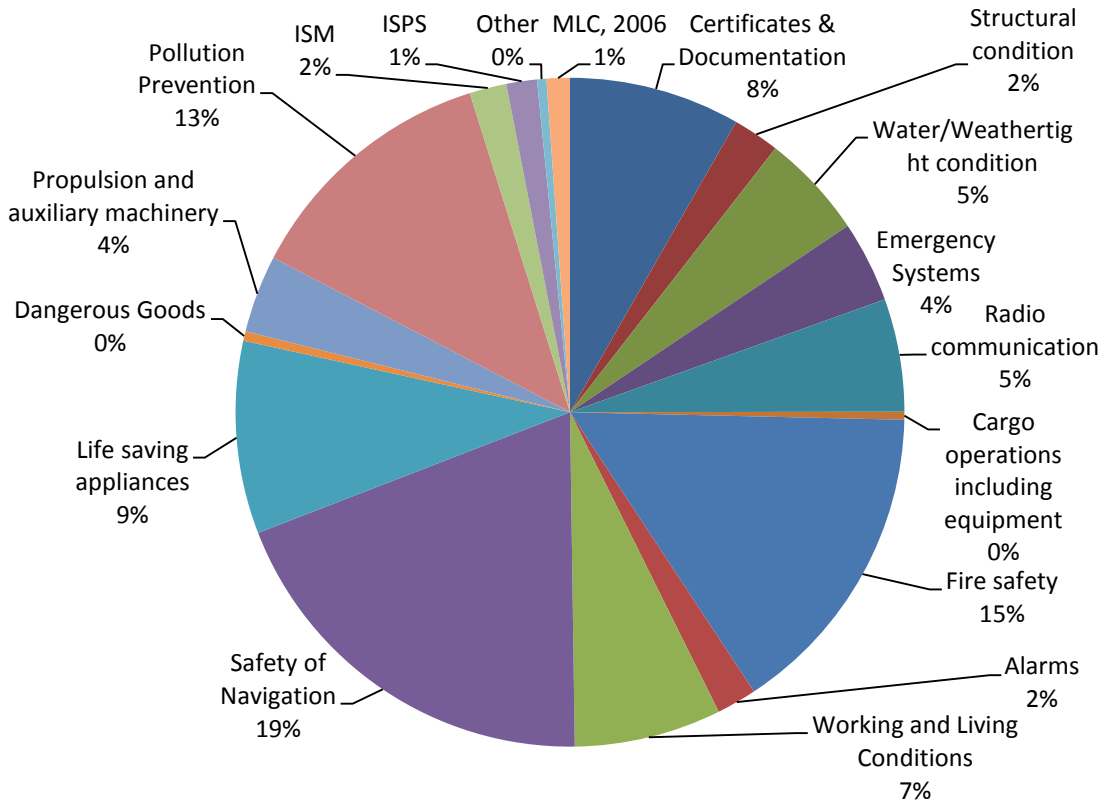


Chart 37: Company's Tokyo MOU nature of deficiencies

Results from Chart 37 can be compared with MOU average in Chart 38.

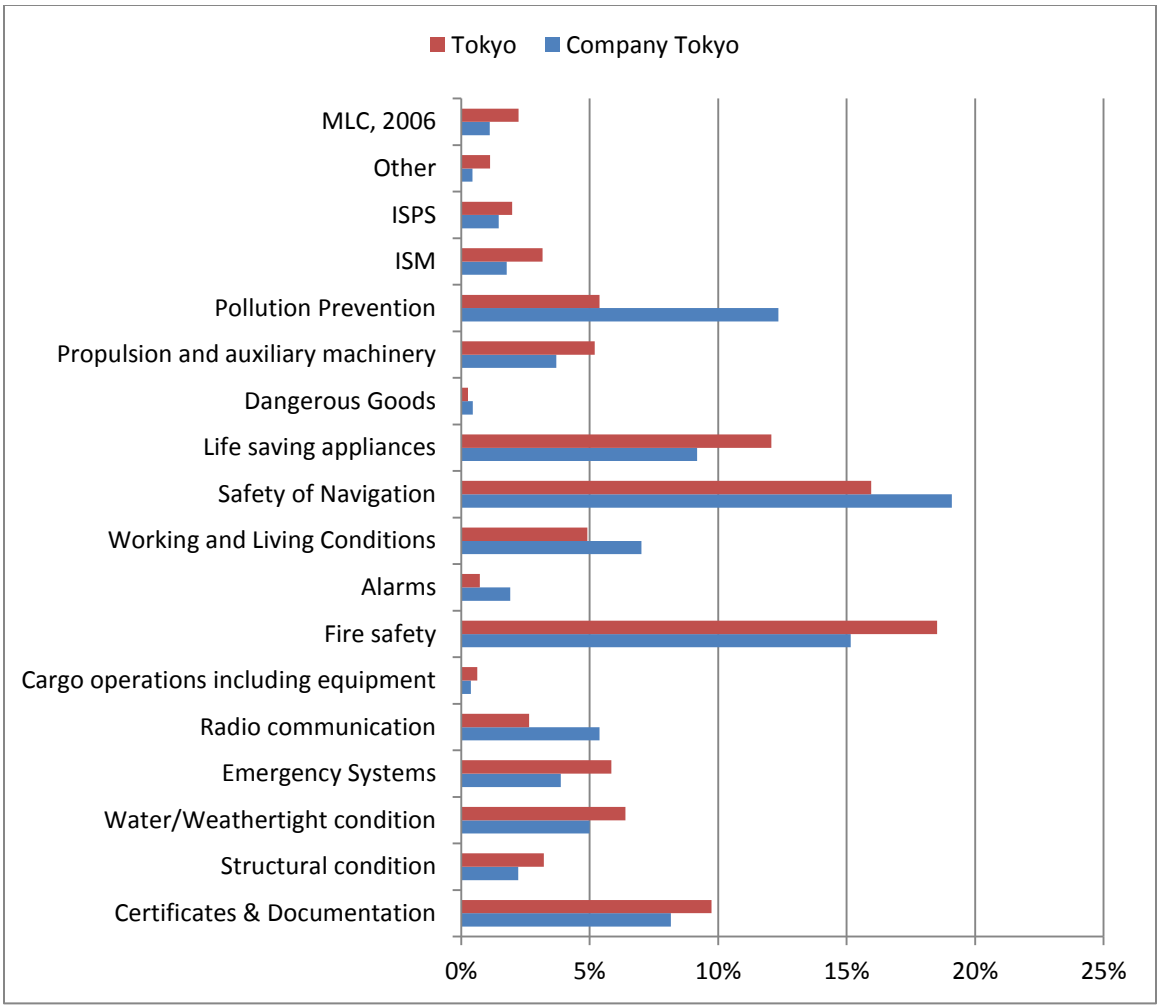


Chart 38: Tokyo MOU Comparison Nature of Deficiencies average

From this chart it is clear that Company should focus on pollution prevention deficiencies in Tokyo MOU and safety of navigation, where it is higher than the average on subject MOU.

Similar review can be carried out for Paris MOU as well.

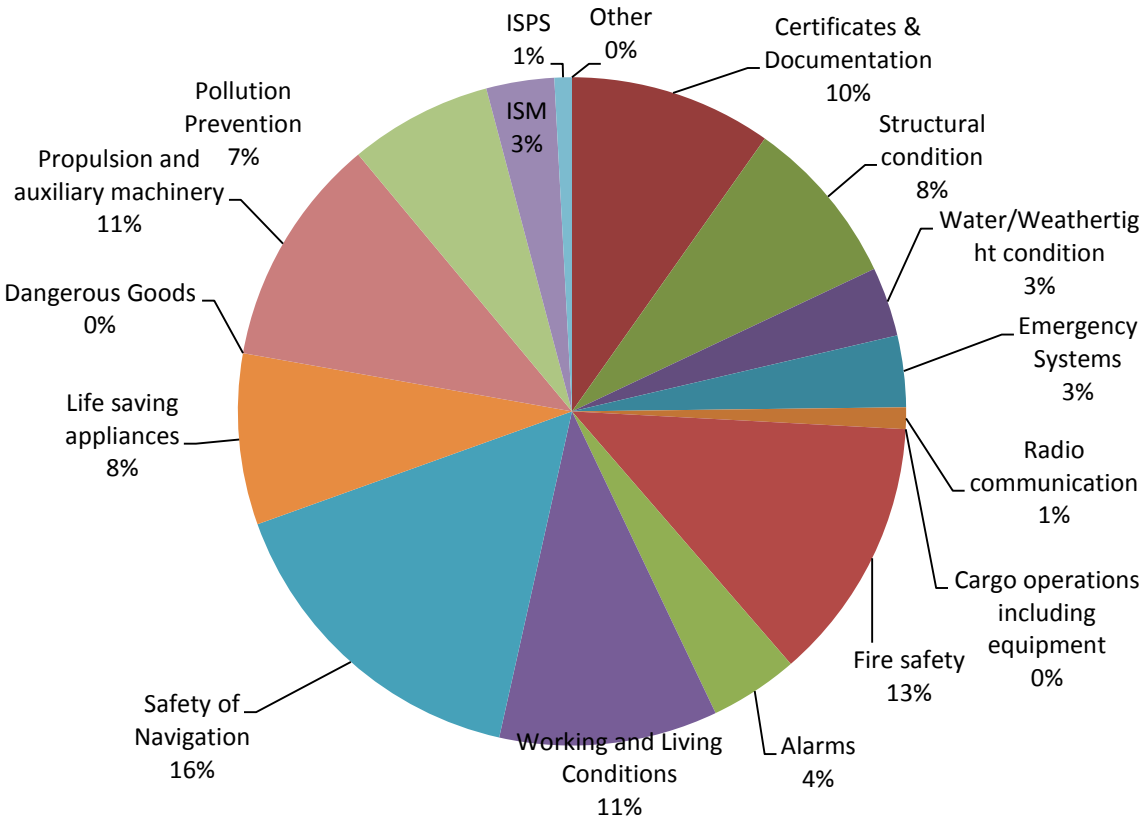


Chart 39: Company's nature of deficiencies in Paris MOU

Again performance should be compared to MOU average in order to have solid conclusions:

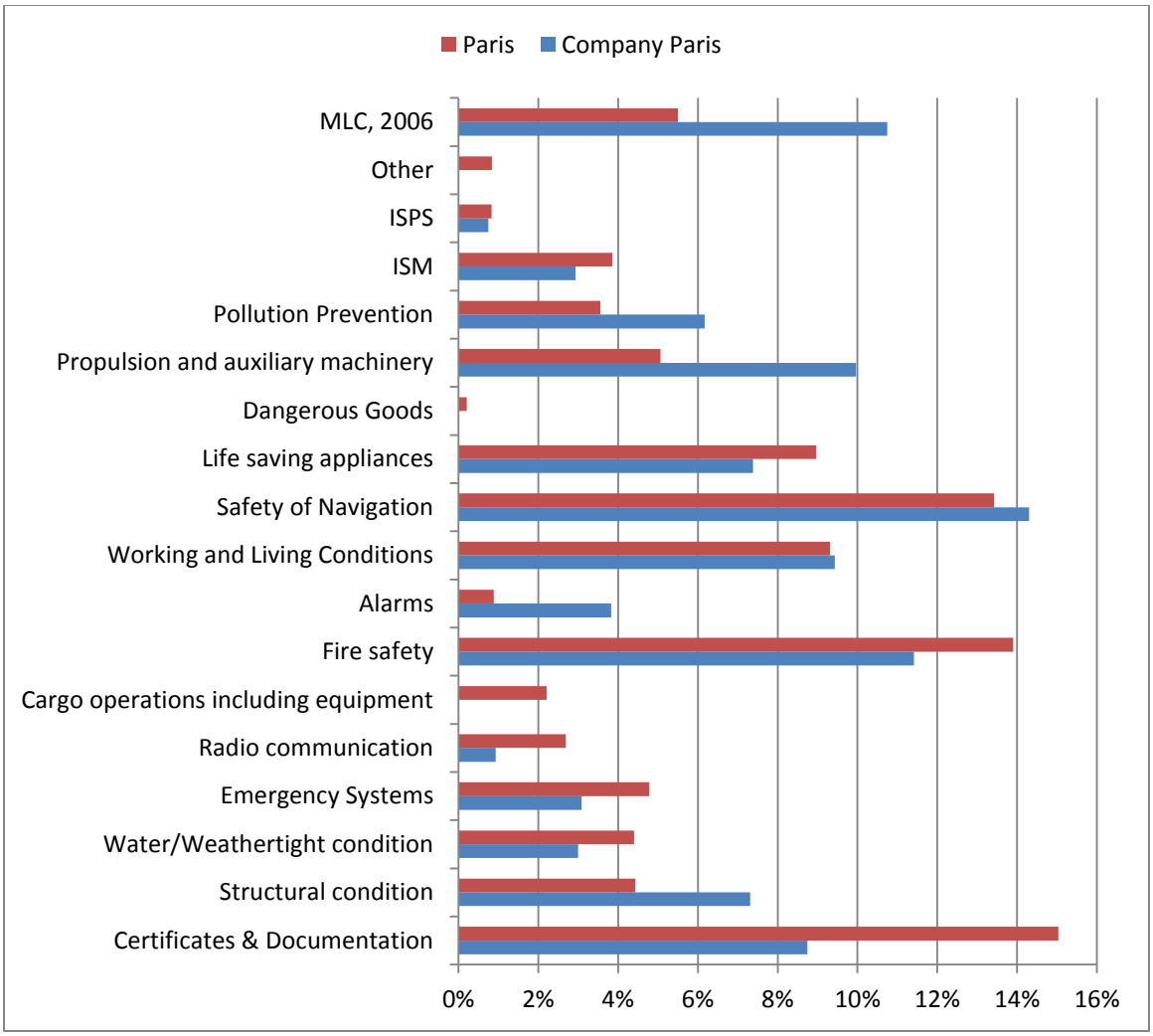


Chart 40: Paris MOU Comparison Nature of Deficiencies average

From this chart Company should focus on following items which are alarming:

- Safety of Navigation, although is marginally above average, is still very high
- MLC 2006, it is clear that Paris MOU focus on MLC items and Company should ensure to focus on rectification of the record
- Pollution Prevention, although it is still low, special attentions should be paid due to category's critical nature
- Propulsion and Auxiliary machinery which is almost double than average

Also deficiencies analysis will be carried out for USCG.

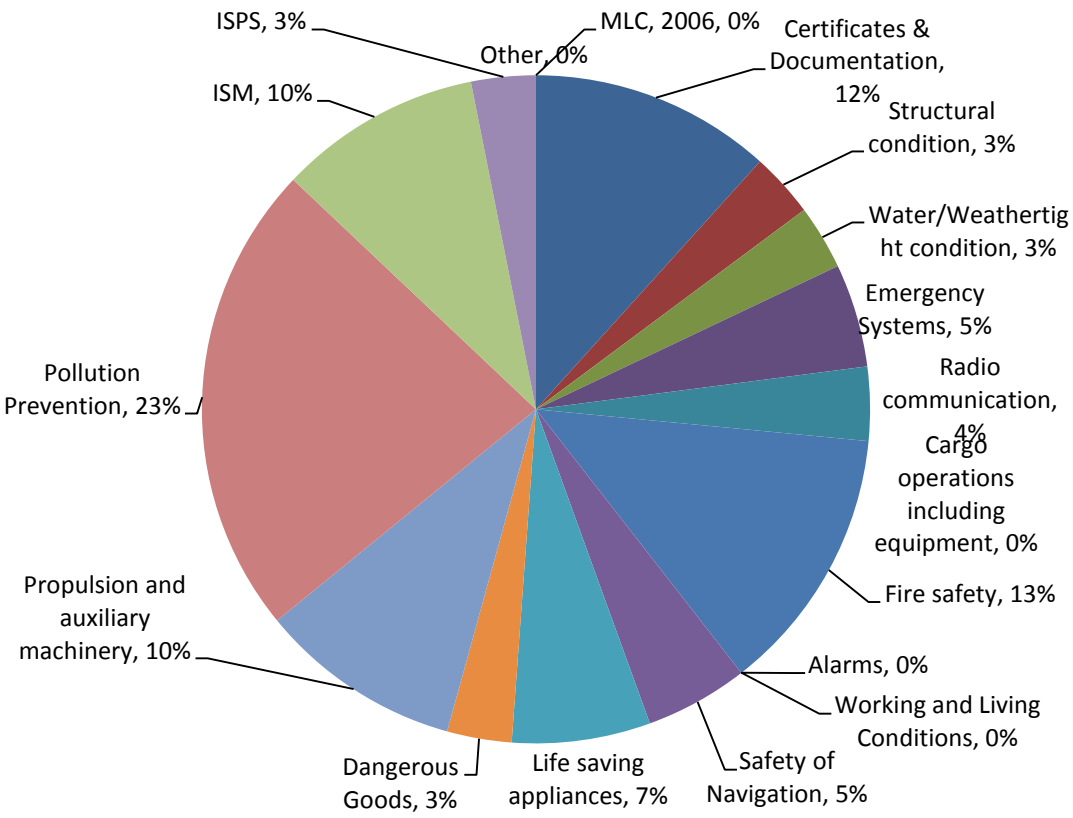


Chart 41: Company's nature of deficiencies in USCG

Performance can be further compared to USCG average. There is no data same as Tokyo and Paris MOU, but comparison can be carried out to the significant categories, as given in USCG annual report.

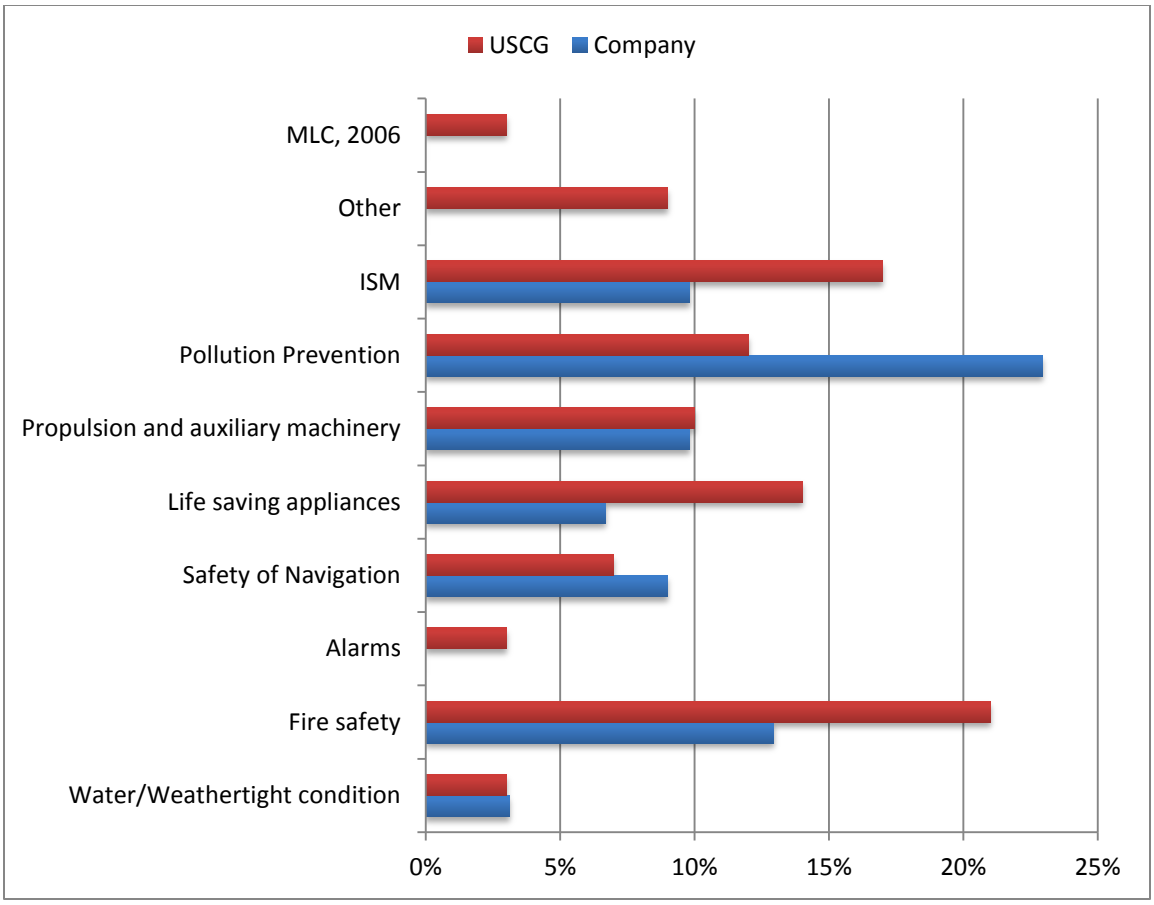


Chart 42: USCG comparison, nature of deficiencies average

Clearly the pollution prevention deficiencies should be taken into serious consideration, since are significantly above the average. USCG is well known for the attention they pay on pollution prevention measures on board the vessels and company should focus on improving the record on subject category.

4.2.4 Company's Performance per MOU standards

Each MOU, as previously mentioned, has different methods of calculation of vessel and Company's standards. More specific:

4.2.4.1 Company's performance Calculation in TOKYO MOU

For TOKYO MOU, ship risk profile is calculated as per the below table.

Parameters		Profile			
		High Risk Ship (HRS) (When sum of weighting points >=4)		Standard Risk Ship (SRS)	Low Risk Ship (LRS)
		Criteria	Weighting points	Criteria	Criteria
Type of Ship		Chemical tanker, Gas Carrier, Oil tanker, Bulk carrier, Passenger ship	2	Neither LRS nor HRS	-
Age of Ship		All types > 12y	1		-
Flag	BGW-list[1)]	Black	1		White
	VIMSAS[2)]	-	-		Yes
Recognized Organization	RO of Tokyo MOU[3)]	-	-		Yes
	Performance[4)]	Low Very Low	1		High
Company performance[5)]		Low Very Low	2		High
Deficiencies	Number of deficiencies recorded in each inspection within previous 36 months	How many inspections were there which recorded over 5 deficiencies?	No. of inspections which recorded over 5 deficiencies		All inspections have 5 or less deficiencies (at least one inspection within previous 36 months)
Detentions	Number of Detention within previous 36 months	3 or more detentions	1		No detention

Figure 6: Tokyo MOU Ship Risk Profile Calculator, Source: TOKYO MOU information sheet of the New Inspection Regime

1) The Black, Grey and White list for flag State performance is established annually taking account of the inspection and detention history over the preceding three calendar years and is adopted by the Tokyo MOU Committee as published in the Annual Report.
2) The status on completion of VIMSAS will be based on updated information obtained by the Tokyo MOU.
3) Recognized Organizations of Tokyo MOU are those recognized by at least one member Authority of the Tokyo MOU, a list of which is provided on the web-site.

4) The performance of all Recognized Organizations is established annually taking account of the inspection and detention history over the preceding three calendar years and is adopted by the Tokyo MOU Committee as published in the Annual Report.
5) Company performance takes account of the detention and deficiency history of all ships in a Company's fleet while that Company was the ISM Company for the ship. Companies are ranked as having a "very low, low, medium or high" performance. The calculation is made daily on the basis of a running 36-month period. There is no lower limit for the number of inspections needed to qualify except a Company with no inspections in the last 36 months will be given a "medium performance".

Based on all the above criteria, following inspection window is determined:

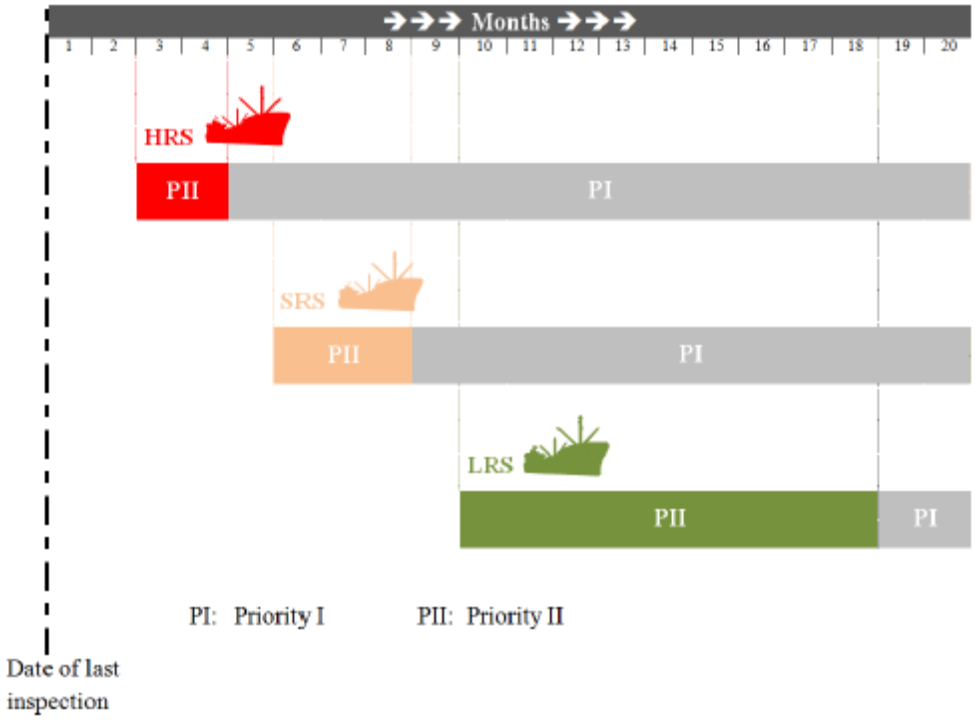


Figure 7: Ship Risk Profile Inspection Window

For which:

Priority I: ships must be inspected because the time window has closed.

Priority II: ships may be inspected because they are within the time window of inspection.

As it is easily understood, Low Risk vessels might be inspected at a periodicity of about 18 months (PII), while Standard Risk vessels periodicity of inspections might be about 8-9 months.

From Figure 6 it is concluded that in order a vessel to be characterized as Low Risk Vessel, Management Company's performance should be high, considering that Company's vessels are all flying White Flags and have high performing Recognized Organizations.

Company's performance is determined based on the deficiency index and the detention index.

$$Deficiency\ Ratio = \frac{No\ of\ ISM\ deficiencies * 5 + No\ of\ Non\ ISM\ deficiencies * 1}{No\ of\ Inspections}$$

Equation 1

$$Detention\ Ratio = \frac{No\ of\ Detentions}{No\ of\ Inspections}$$

Equation 2

The Company in TOKYO MOU has performed as follows:

Inspections Count:	78
Deficiencies Count(Non ISM):	175
Detentions Count:	3
ISM Related Deficiencies Count:	4
Deficiency Ratio:	2.5
Detention Ratio:	3.84%

Table 4: Company performance in TOKYO MOU

As per Tokyo MOU New inspection regime deficiency and detention index are calculated as per following table:

Deficiency Index	**Deficiency points per inspection**
Above average	> 1 above Tokyo MOU average
Average	Average Tokyo MOU average +/- 1
Below Average	> 1 below Tokyo MOU average
Detention Index	**Detention Index Detention rate**
Above average	> 1% above Tokyo MOU average
Average	Average Tokyo MOU average +/- 1%
Below average	> 1% below Tokyo MOU average

Table 5: TOKYO MOU deficiency and Detention Index

And Company's performance is calculated as per the below Matrix:

Detention Index	**Deficiency Index**	**Company's Performance**
Above Average	Above Average	Very Low
Above Average	Average	Low
Above Average	Below Average	
Average	Above Average	

Below Average	Above Average	
Average	Average	Medium
Average	Below Average	
Below Average	Average	
Below Average	Below Average	High

Table 6: TOKYO MOU Company's performance Matrix

As published on 04/02/2017 in Tokyo MOU website, Tokyo MOU deficiency Average is 3.28 and detention ratio is 4.04%.

From all the above it is calculated that Company's performance is Average at Detention Index and Deficiency index and general performance is Medium.

Focus should be given especially to Detention index, which is near the average of TOKYO MOU, as also was evident in.

4.2.4.2 Company's performance Calculation in Paris MOU

Each ship in the Paris MOU information system will be attributed a ship risk profile (SRP), according to various criteria. This profile, same as TOKYO MOU, will determine the ships priority for inspection, the interval between its inspections and the scope of the inspection.

Calculation of ships profile is very similar to TOKYO MOU, as per the below table:

				Profile			
				High Risk Ship (HRS)		Standard Risk Ship (SRS)	Low Risk Ship (LRS)
Generic Parameters				Criteria	Weighting points	Criteria	Criteria
1	Type of ship			Chemical tankship Gas Carrier Oil tankship Bulk carrier Passenger ship	2	neither a high risk nor a low risk ship	All types
2	Age of ship[1]			all types > 12 y	1		All ages
3a	Flag	BGW-list[2]		Black - VHR, HR, M to HR	2		White
				Black – MR	1		
3b		IMO-Audit[3]		-	-		Yes
4a	Recognized Organization	Performance[4]	H	-	-		High
			M	-	-		-
			L	Low	1		-
			VL	Very Low			-
4b		Organizations recognized by one or more Paris MoU Member States		-	-		Yes
5	Company	Performance[5]	H	-	-		High
			M	-	-		-
			L	Low	2		-
			VL	Very Low			-
Historic Parameters							
6	Number of def. recorded in each insp. within previous 36 months	Deficiencies		Not eligible	-		≤ 5 (and at least one inspection carried out in previous 36 months)
7	Number of Detention within previous 36 months	Detentions		≥ 2 detentions	1		No Detention

Table 7: PARIS MOU Ship Risk Profile Calculator

Ships become due for periodic inspection in the following time windows:

- For HRS – between 5-6 months after the last inspection in the Paris MoU region.
- For SRS – between 10-12 months after the last inspection in the Paris MoU region.
- For LRS – between 24-36 months after the last inspection in the Paris MoU region.

Considering that all Company's vessels are flying White Flags and have High Performing Recognized Organizations, Company's performance is a critical criterion for the characterization of a vessel calling Paris MOU ports.

Same as Tokyo MOU, in Paris MOU, Company's performance is calculated as per the below Table. The only difference is that Paris MOU is much stricter in criteria set, since it needs 2 units lower than MOU average, in order the Company to be considered as below average in each index. In more detail:

Deficiency Index	**Deficiency points per inspection**
Above average	> 2 above Paris MOU average
Average	Average Paris MOU average +/- 2
Below Average	> 2 below Paris MOU average
Detention Index	**Detention Index Detention rate**
Above average	> 2% above Paris MOU average
Average	Average Paris MOU average +/- 2%
Below average	> 2% below Paris MOU average

Table 8: Paris MOU deficiency and Detention Index

And exactly the same Company's performance calculation Matrix is used:

Detention Index	**Deficiency Index**	**Company's Performance**
Above Average	Above Average	Very Low
Above Average	Average	Low
Above Average	Below Average	
Average	Above Average	
Below Average	Above Average	
Average	Average	Medium
Average	Below Average	
Below Average	Average	
Below Average	Below Average	High

Table 9: Paris MOU Company's performance Matrix

For the calculation of Deficiency ratio and detention Ratio following equations are used:

$$Deficiency\ Ratio = \frac{No\ of\ ISM\ deficiencies * 5 + No\ of\ Non\ ISM\ deficiencies * 1}{No\ of\ Inspections}$$

Equation 3

$$Detention\ Ratio = \frac{No\ of\ Detentions}{No\ of\ Inspections}$$

Equation 4

The company in Paris MOU has performed as follows last 36 months:

Inspections Count:	48
Deficiencies Count(Non ISM):	79
Detentions Count:	0
ISM Related Deficiencies Count:	5
Deficiency Ratio:	2.17
Detention Ratio:	0%

Table 10: Company's performance in Paris MOU

As published on 04/02/2017 in Paris MOU website, Paris MOU deficiency Average is 2.94 and detention ratio is 4.04%.

From all the above it is calculated that Company's performance is Average at Detention Index and Below Average in Deficiency index but still general performance is Medium.

4.2.4.3 Company's Performance in US Coast Guard

United States Coast Guard has a slight different approach towards calculating Risk profiles, as per below matrix:

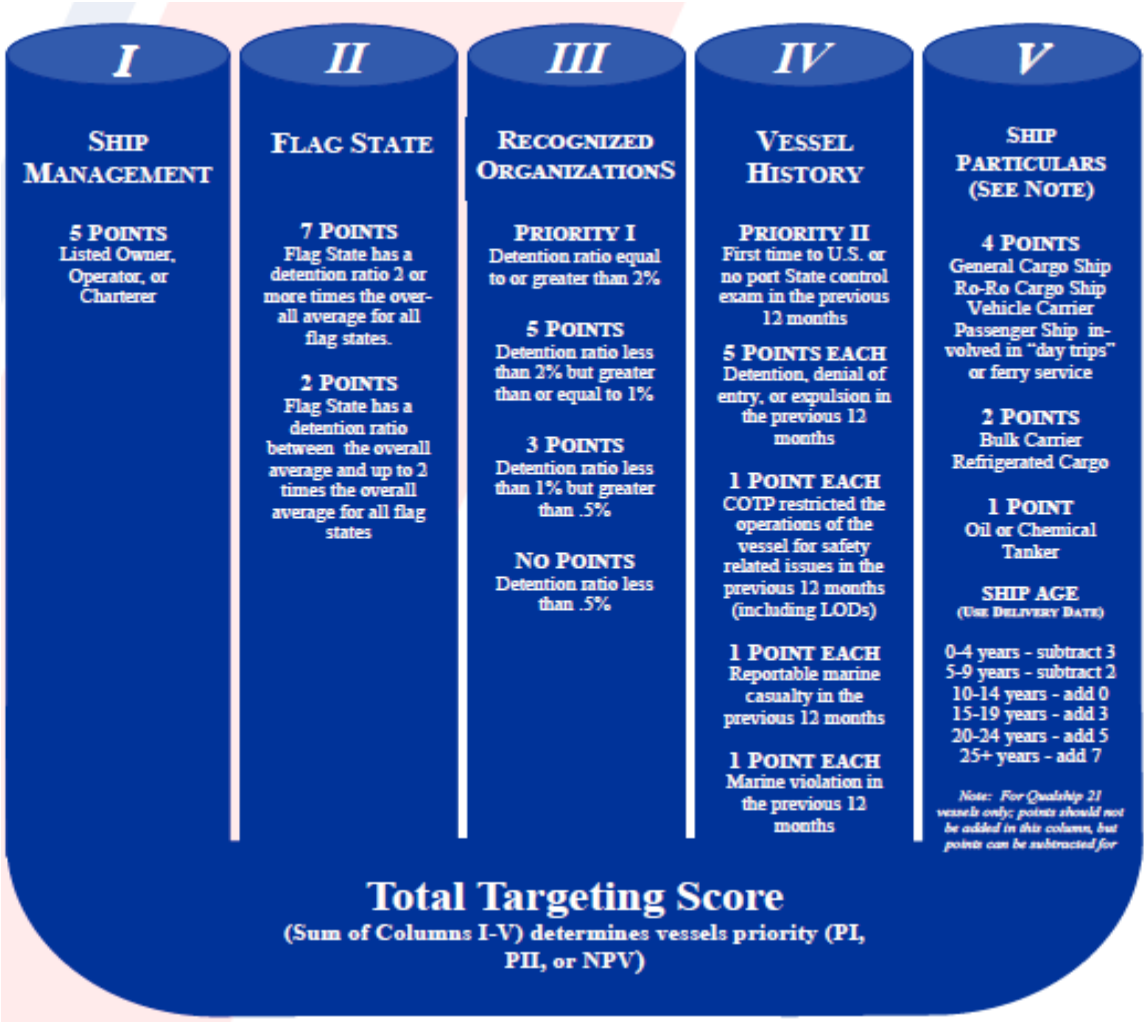


Figure 8: USCG Vessel Targeting Score

US Coast Guard focuses mainly on each Specific Vessel performance, counting negatively only in case Management or Owner Company is listed or targeted. In this case, since Company is not listed in USCG as underperforming, targeting score lays mainly on each vessel's performance. However, regardless of the score that a vessel receives in USCG targeting matrix, all foreign-flagged vessels are examined no less than once each year.

In order to promote responsible vessel's operation, high-quality vessels are recognized and rewarded for their commitment to safety and quality from USCG, by implementing an initiative to identify high-quality ships, and provide incentives to encourage quality operations. This initiative is called QUALSHIP 21, quality shipping for the 21st century. Vessels illegible for QUALSHIP 21 might waive US Coast Guard inspection up to 3 years.

Chapter 5 Conclusions

5.1 Conclusions

From all the data and analysis described in previous Chapters, Company can be driven to very noteworthy conclusions.

During Port State Controls Inspections, all international conventions requirements such as SOLAS, MARPOL, Load Line and MLC are covered.

In case a deficiency is found, this may result in significant consequences:

- Ad hoc costs due to unplanned purchases and repairs
- Possible delays and off-hire times due to detentions
- Negative impact on your company rating
- Increased targeting of your ship and company by MoUs, combined with more detailed PSC inspections and increased risk for PSC detention
- Negative exposure leading to a loss of reputation

Estimates by DNV GL indicate that the cost for a PSC detention may be as high as USD 80,000 to USD 100,000 due to all above reasons.

There are various factors concerning the general performance of Company's vessels in various MOUs, and an effort had been made to analyze trends, parameters and details during Port State Control inspection results for the period 2012-2016.

Part of the results might have a consistency and might need further attention on behalf of the company but other might be random and should not be further reviewed. In more detail, conclusions that Company should definitely be led to are:

a. There is no direct connection between inspection frequency and detention ratio on board vessel.
b. There is direct connection between inspection frequency and deficiencies per inspection.
c. Company's Bulk carriers are generally more targeted than container vessels.
d. There is no clear connection between vessels age and Port State control performance, but there is a trendline indicating that the older the vessel gets, its port State Control Performance deteriorates.
e. There is no connection between Port State Control Performance and Classification Society and Flag Administration of the vessel, although company's vessels are flying only white flags and have IACS members classification societies.
f. Company's representative attendance on board vessels during inspections has no effect on average deficiencies per inspection, but reduces radically the probability of a detention.

g. Category of deficiencies related to safety of navigation is the most critical for the Company, for all types of vessels for the whole period analyzed.
h. Other categories that need attention for the entire period and fleet are:
    - Lifesaving appliances
    - Pollution Prevention
i. Bulk Carriers are targeted on Lifesaving appliances, while Containers on Propulsion and Working and living conditions.
j. There is direct connection between average deficiencies and detention ratio.
k. There is a direct connection between flawless inspections percentage and average deficiencies and detention ratio.
l. Half of the company's Port State Controls are carried out in Paris and Tokyo MOU.
m. Company's performance in all three Major MOUs is better than the average.
n. Company's performance is steady through the years, while worldwide fleet performance is improving in major MOUS.
o. Company should improve detention ratio in Tokyo MOU more than 1% in order to be able to be considered as high performing company.
p. Company should improve in Tokyo MOU performance in Safety of navigation and pollution prevention.
q. Company should improve in Paris MOU in Safety of Navigation, in MLC 2006, in Structural condition and in propulsion and auxiliary machinery.
r. Company should pay attention on pollution prevention deficiencies in USCG.
s. Company's performance in Paris and Tokyo MOU is Medium. Company's vessels cannot be categorized as Low Risk Vessels.

By reviewing all the above conclusions, following items should be addressed by company immediately by taking necessary actions:

a. Deficiencies imposed on safety of navigation should be reduced. Methods for the company to tackle a specific category of deficiencies, is to analyze in more detail each deficiency of this category and carry out a general investigation and analysis, focusing on the root cause of the imposed deficiencies. By identifying Root cause, further corrective and preventive actions can be determined in order to eliminate the root cause. Some Actions might be:
    a. To review the procedures related to safety of navigation onboard and ashore
    b. To focus audits and inspections on navigational procedures on board
    c. To initiate campaigns to increase awareness on safety of navigation on board and ashore
    d. To carry out additional training on crew and office personnel focused on safety of navigation
    e. To employ more experienced navigating officers, by introducing more strict screening of employment

b. Vessels calling Tokyo MOU ports should be better prepared in order to improve inspection results and to reduce detention and deficiency average. Few methods that can be carried out in order company to achieve improvement might be:
    a. Increase awareness in order vessels and crew to be better prepared during a Port State Control Inspection
    b. Pay additional attention to vessels calling regularly Tokyo MOU ports
    c. Increase attendances of office personnel (superintendents, auditors etc.) at vessels calling Tokyo MOU in order to carry PSC preparation and to improve vessels condition
    d. Consider increasing the budget of vessels calling regularly Tokyo MOU ports.
c. Office personnel attendances have severe effect on company's detention record. This very important conclusion should be always taken into serious consideration during strategic planning of the company. Decision on attendances on board should be taken by balancing all available information.
d. Attention should be paid to the trendline of the increase of the deficiencies per company's vessels age. Although the effect of company's aging fleet is not clear yet, all efforts should be made in order situation to remain the same. Additional care should be given to aging vessel in order to keep high performing standards in Port State Control. It is clear that this implies mainly increase of available budget for maintenance, for attendances from office personnel, for upgrading of systems and equipment among others. As per USCG study (Annual Report, 2015), the cost of maintenance and repair for a vessel rises exponentially as it grows older. At the vessel's midlife, maintenance and repair can reach up to 25% of the operating cost.

An overview of the analysis carried out in previous chapters can be pictured in the following infographic as well.

Company should continue monitoring and benchmarking Port State Control inspection results, due to its significance and commercial value.

Furthermore, Port State Control performance is a very accurate, significant and easily measurable performance indicator for companies. By focusing on continuous improvement of subject KPI companies show their Management dedication to constant process of enhancing the management system in order to achieve improvements in overall performance consistent with company's documented policies and procedures for environmental pollution prevention, heath, safety and quality as applicable.

Company's Port State Control Performance Analysis (2012-2016)

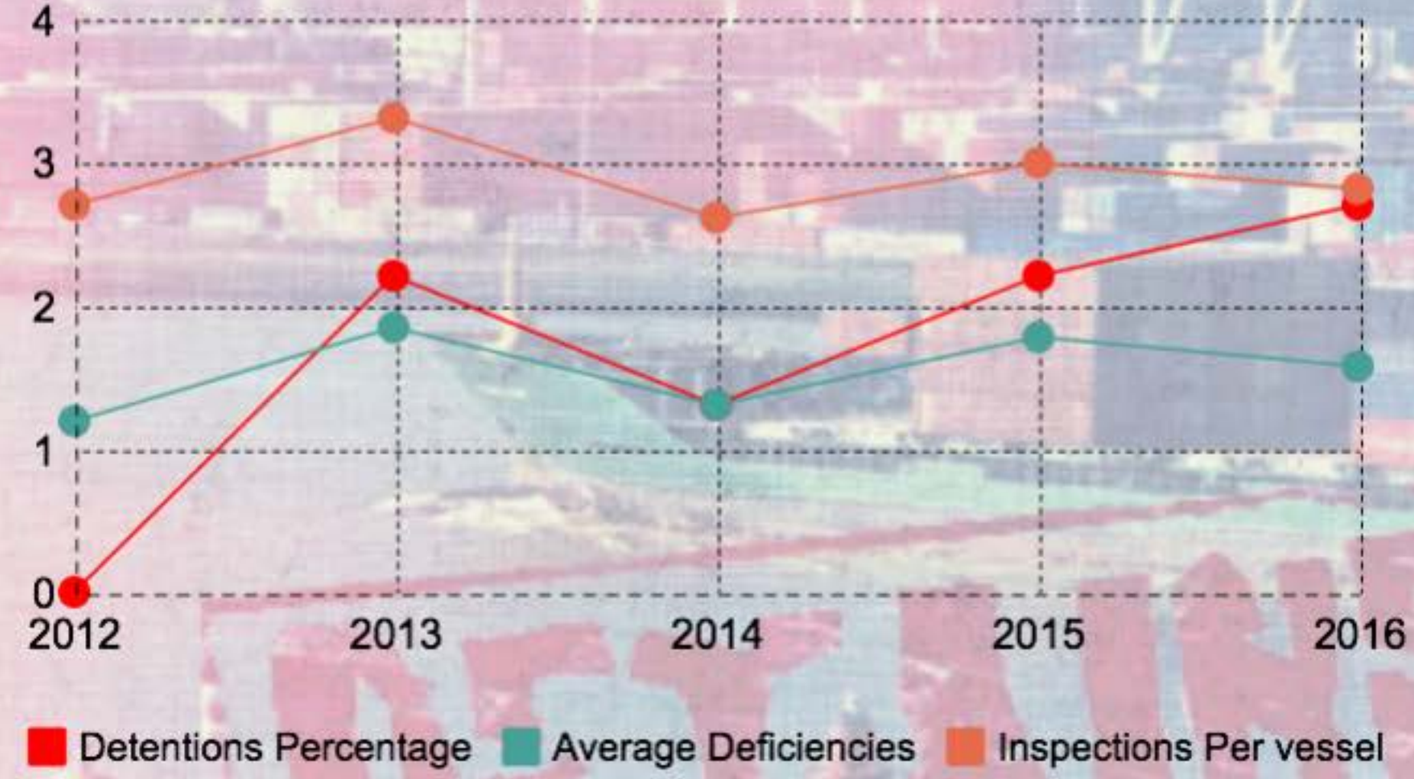
Company's Fleet

Company's Fleet consists of 29 vessels all flying white flags

Port State Control Inspections

401 Port State control Inspections had been carried out on board

Comparison Between Detentions Ratio, Average Deficiencies per Inspection and Inspections Per vessel



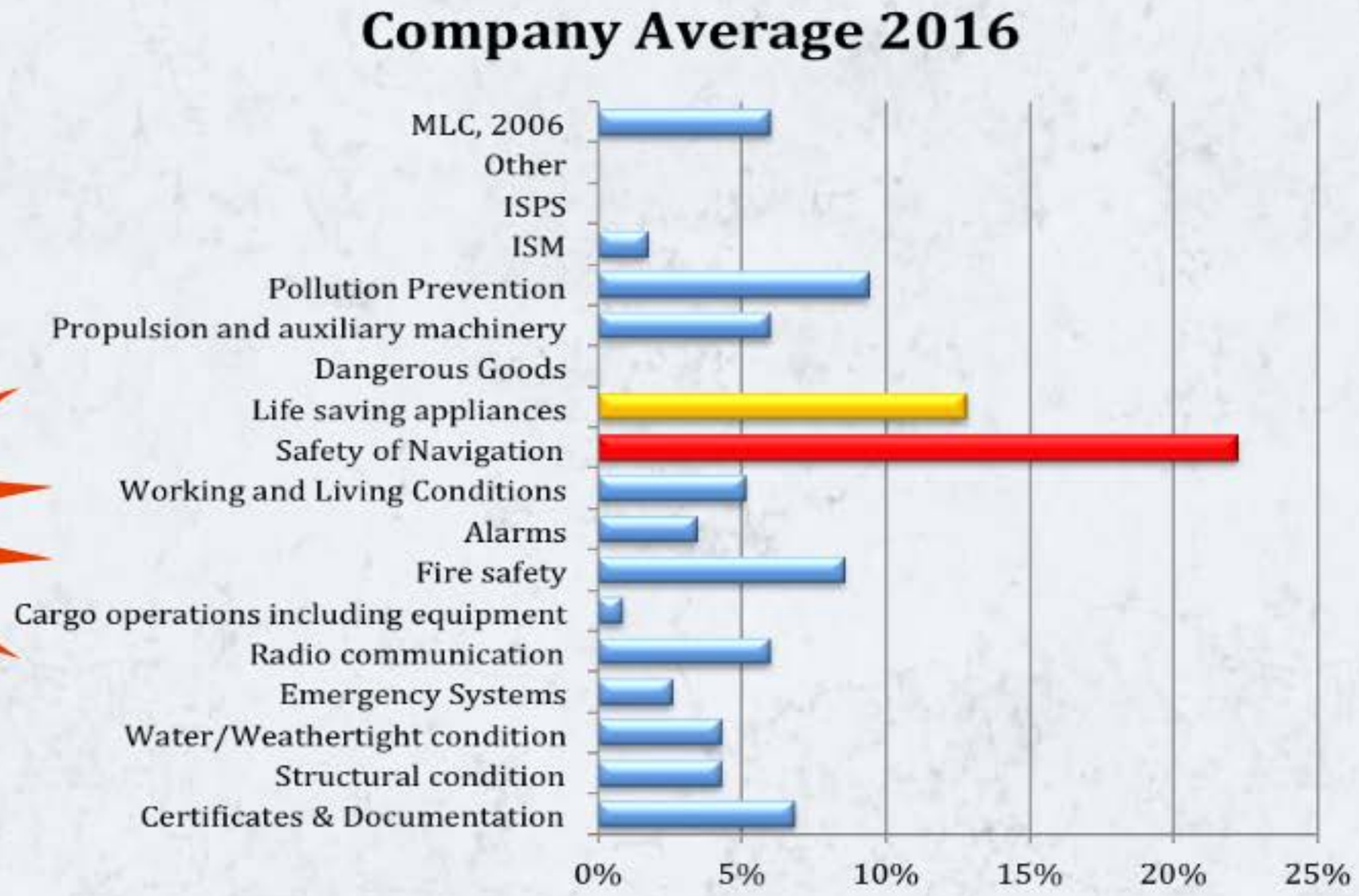
Detention of the ship is the last and most important and drastic course of action that a Port State Control Officer would take upon finding significant deficiencies breaching the safety of the vessel and the crew aboard the vessel. Estimates by DNV GL indicate that the cost for a PSC detention may be as high as USD 80,000 to USD 100,000.

Port State Control Deficiencies are categorized as per their nature by MOUs

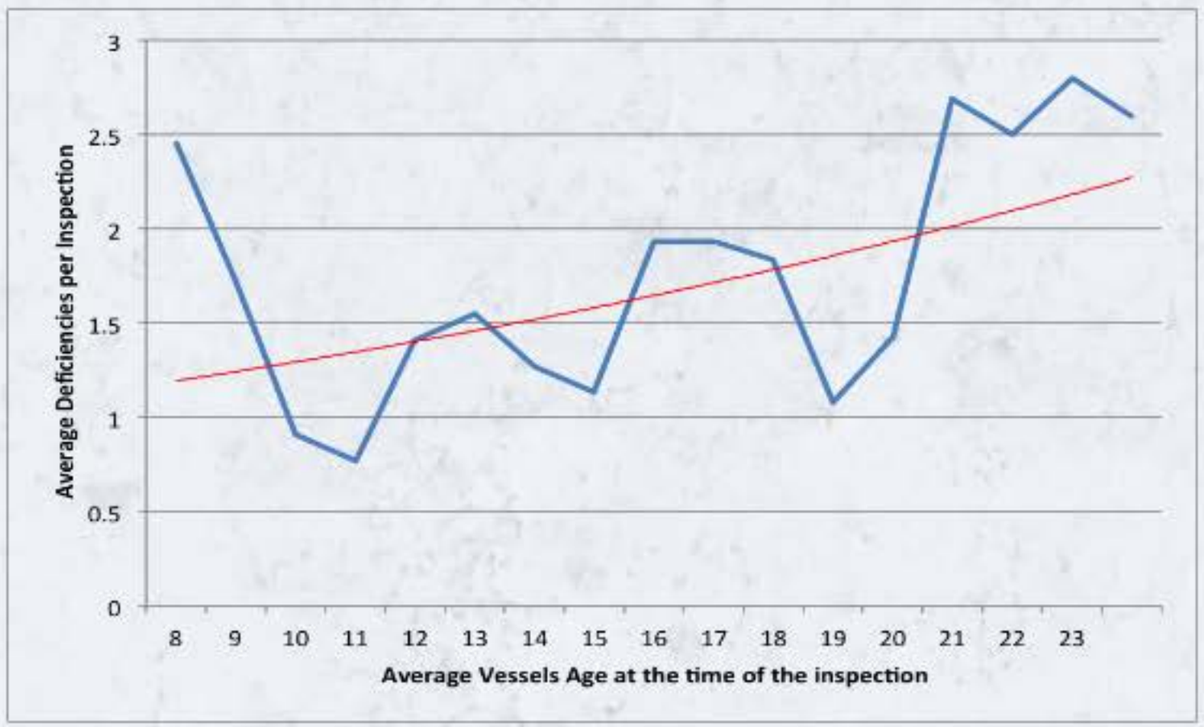
Attention should be paid by Company on deficiencies related to:

-Safety of Navigation

-LifeSaving Appliances

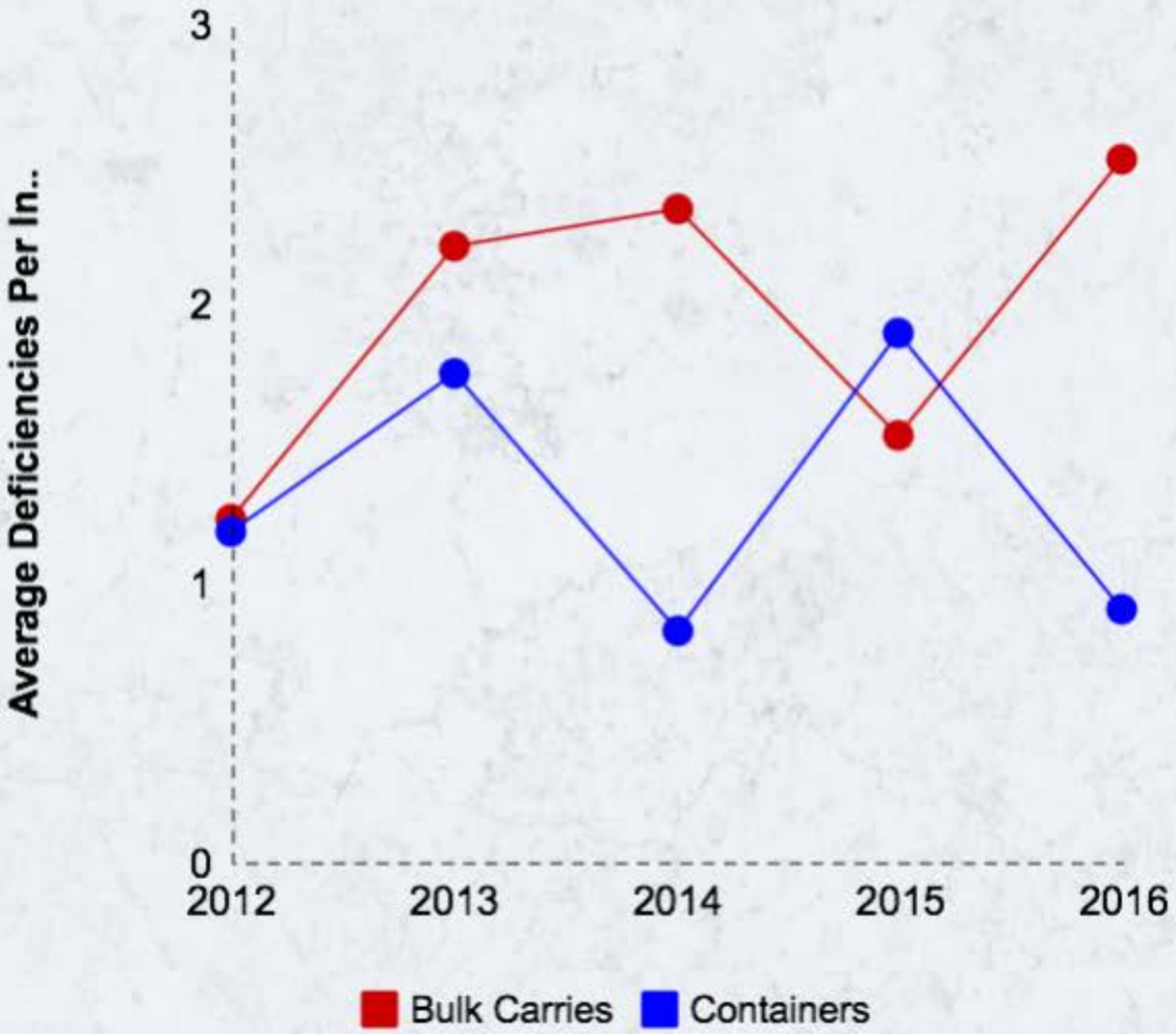


Age Effect on Port State Control Performance

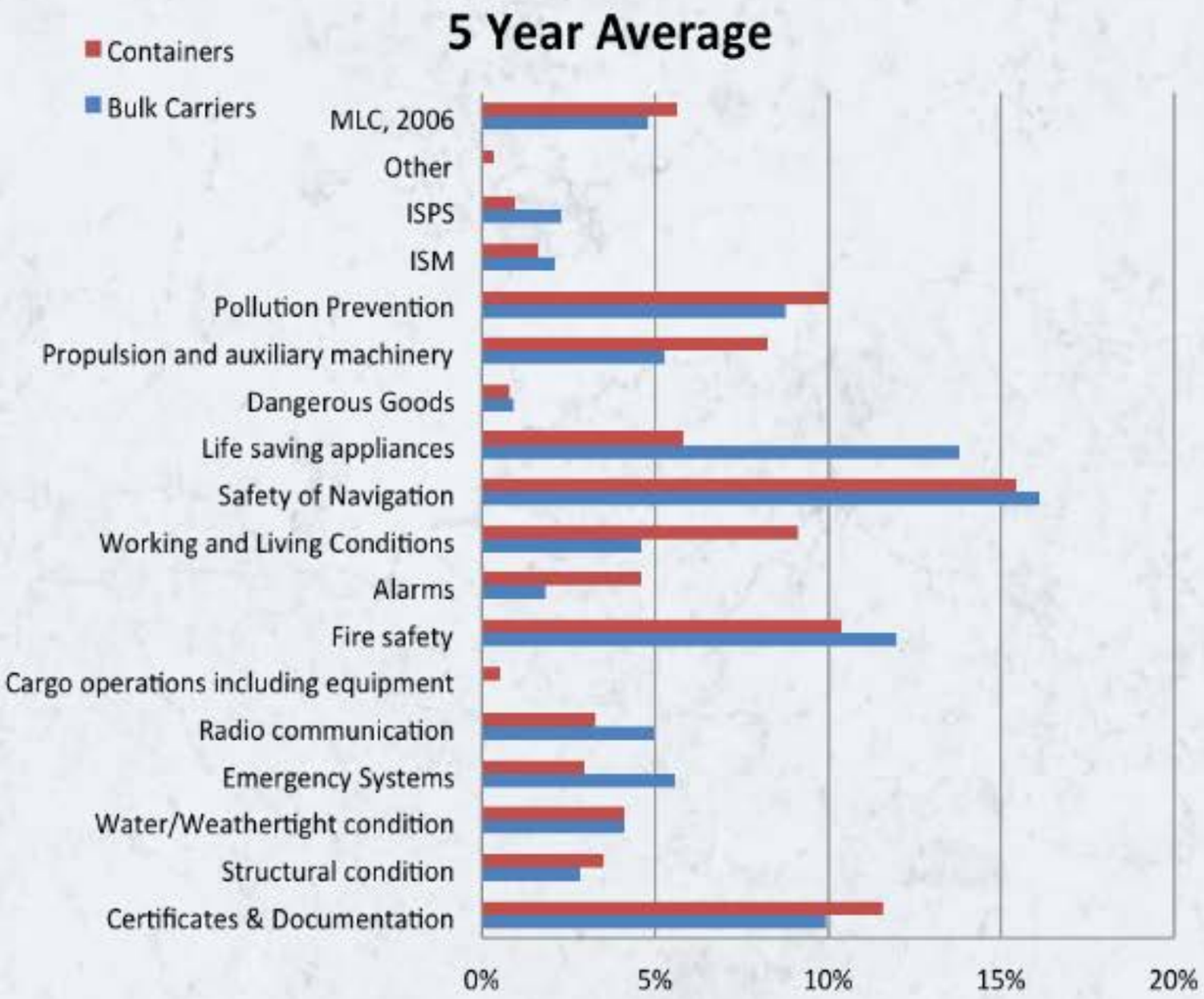


Age of the vessel is not a critical factor but there is a trend that the older the vessel gets the more deficiencies are imposed during a PSC inspection

Bulk Carriers and Containers Deficiencies Comparison



Bulk Carriers are more targeted in Port State Control Inspections than Container vessels.



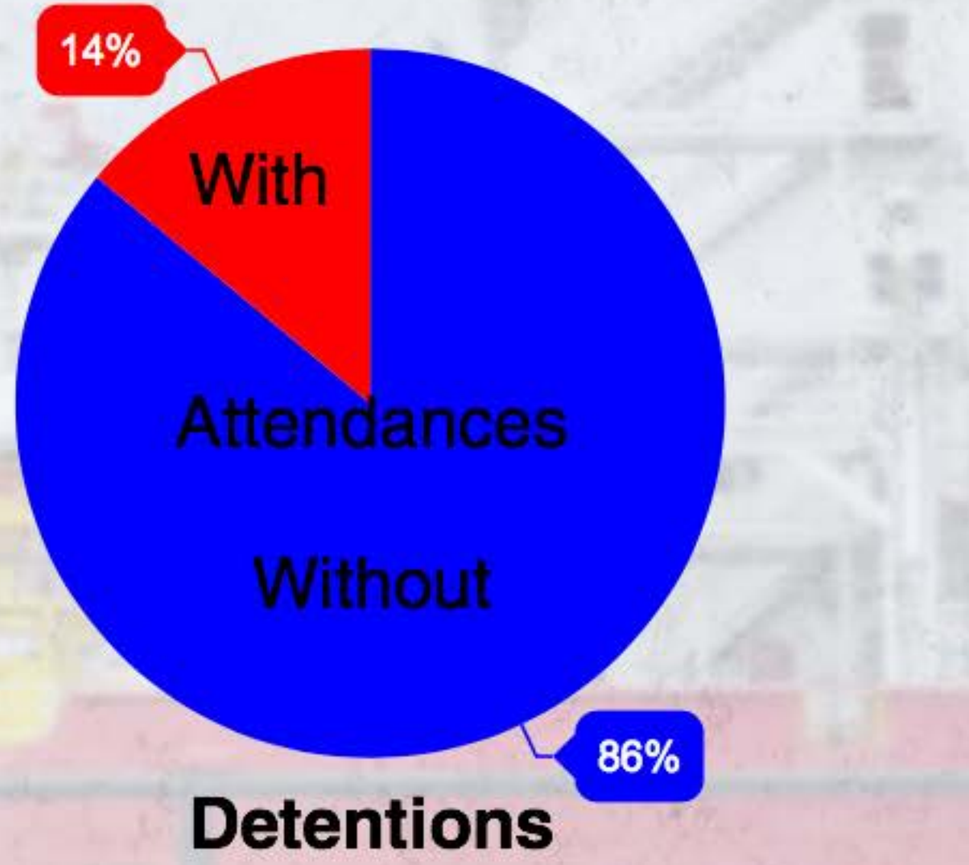
Bulk Carriers

vs

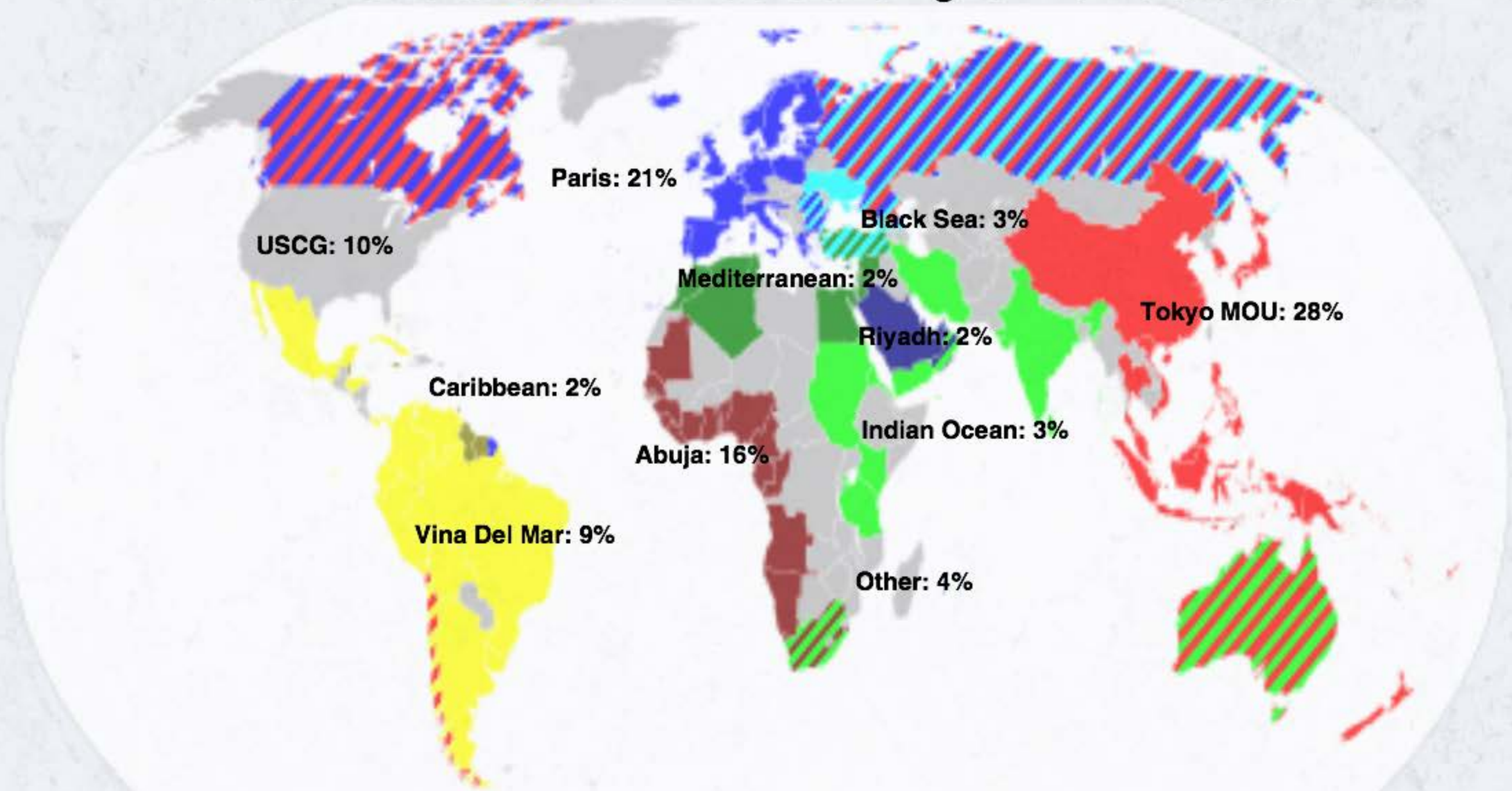
Containers

Office Personnel Attendance Effect

At 86% of the detentions no office personnel had attended the inspection

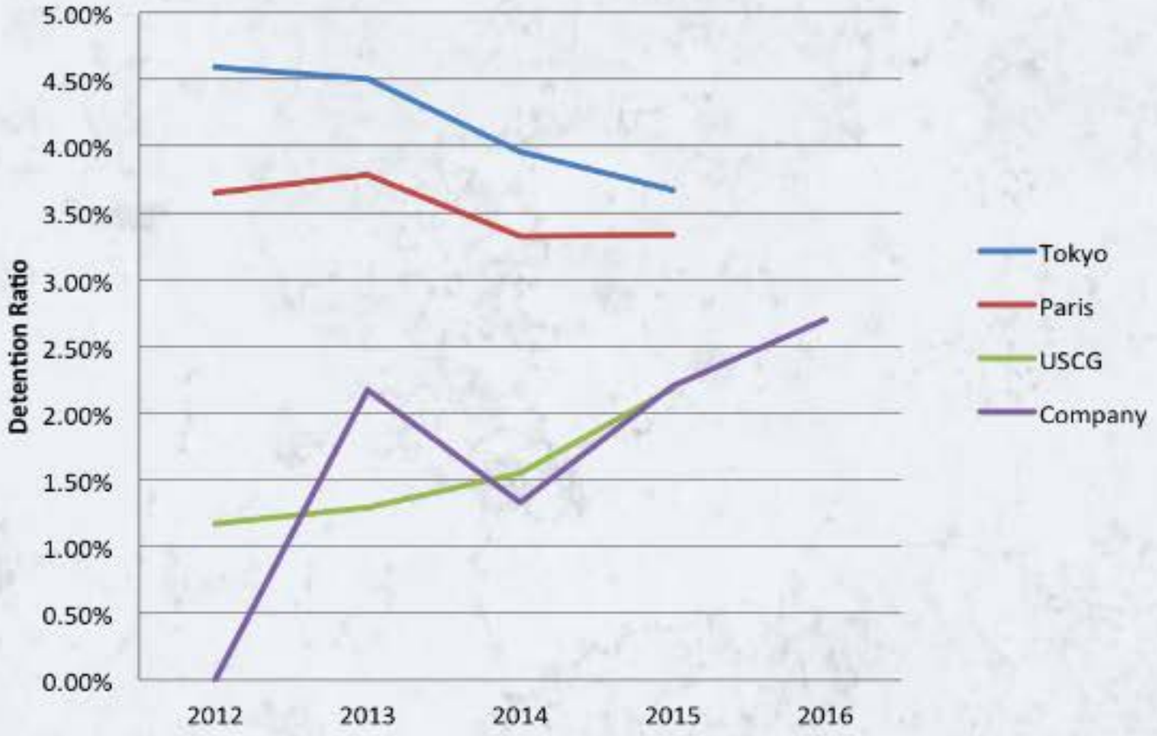


World's Memorandum of Understanding for Port State Controls

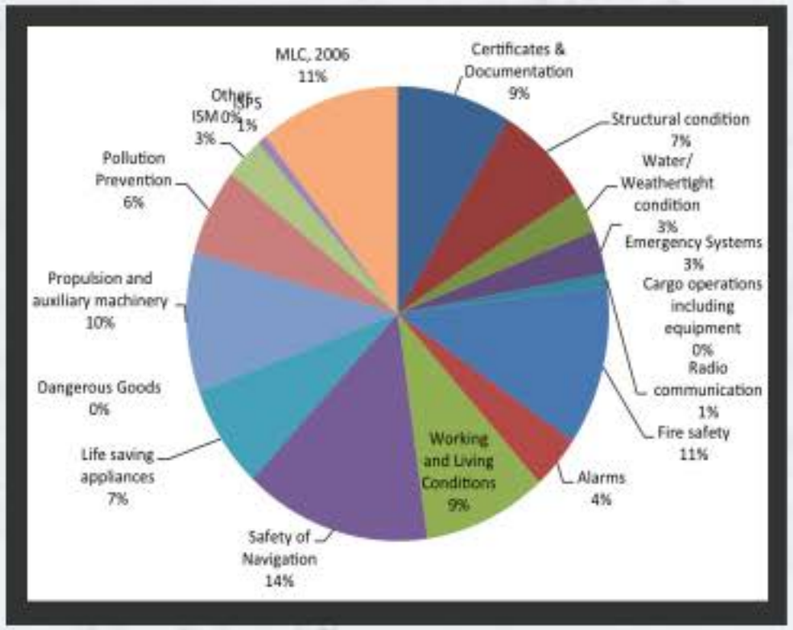


Distribution of Company's Inspections Per MOU for the period 2012-2016

Company's Performance in Major MOUs and USCG



Company's Performance in Majpr MOUs is calculated basis the average deficiencies and detentions imposed on vessels compared to the average of the MOUs

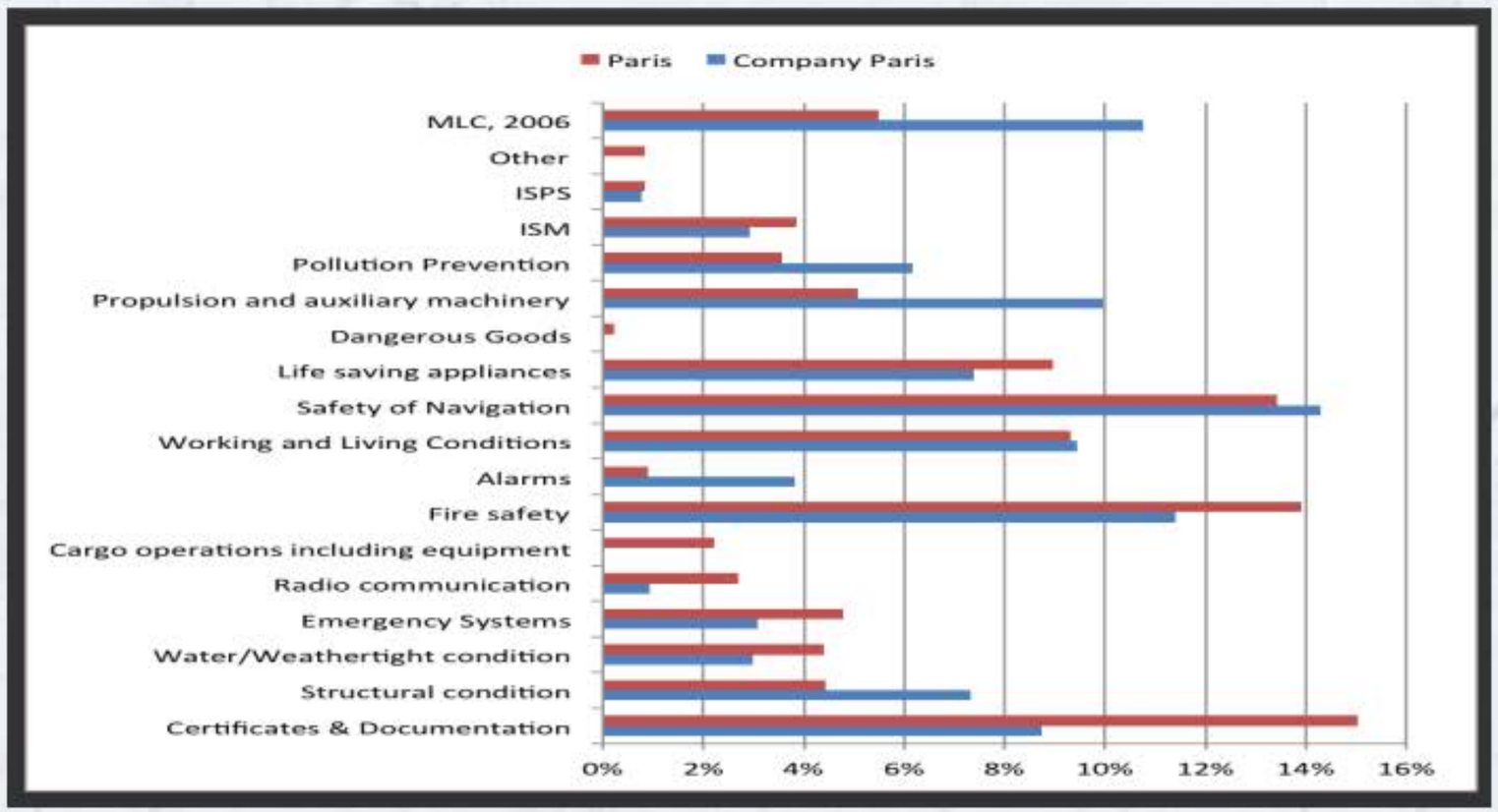


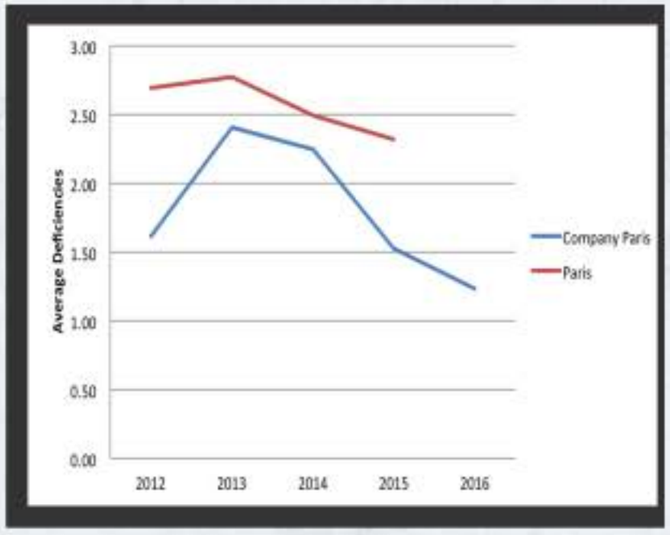
Paris MoU

on Port State Control

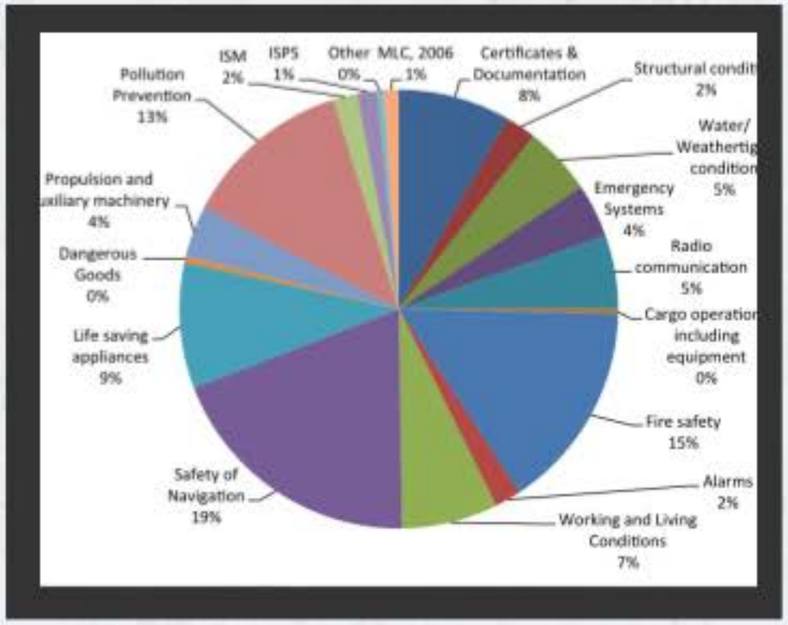
Company's Performance in Paris MOU

Medium





- Average Deficiencies and Detention Ratio should be improved
- Attention should be paid on Safety of navigation, MLC, Propulsion and Auxiliary machinery

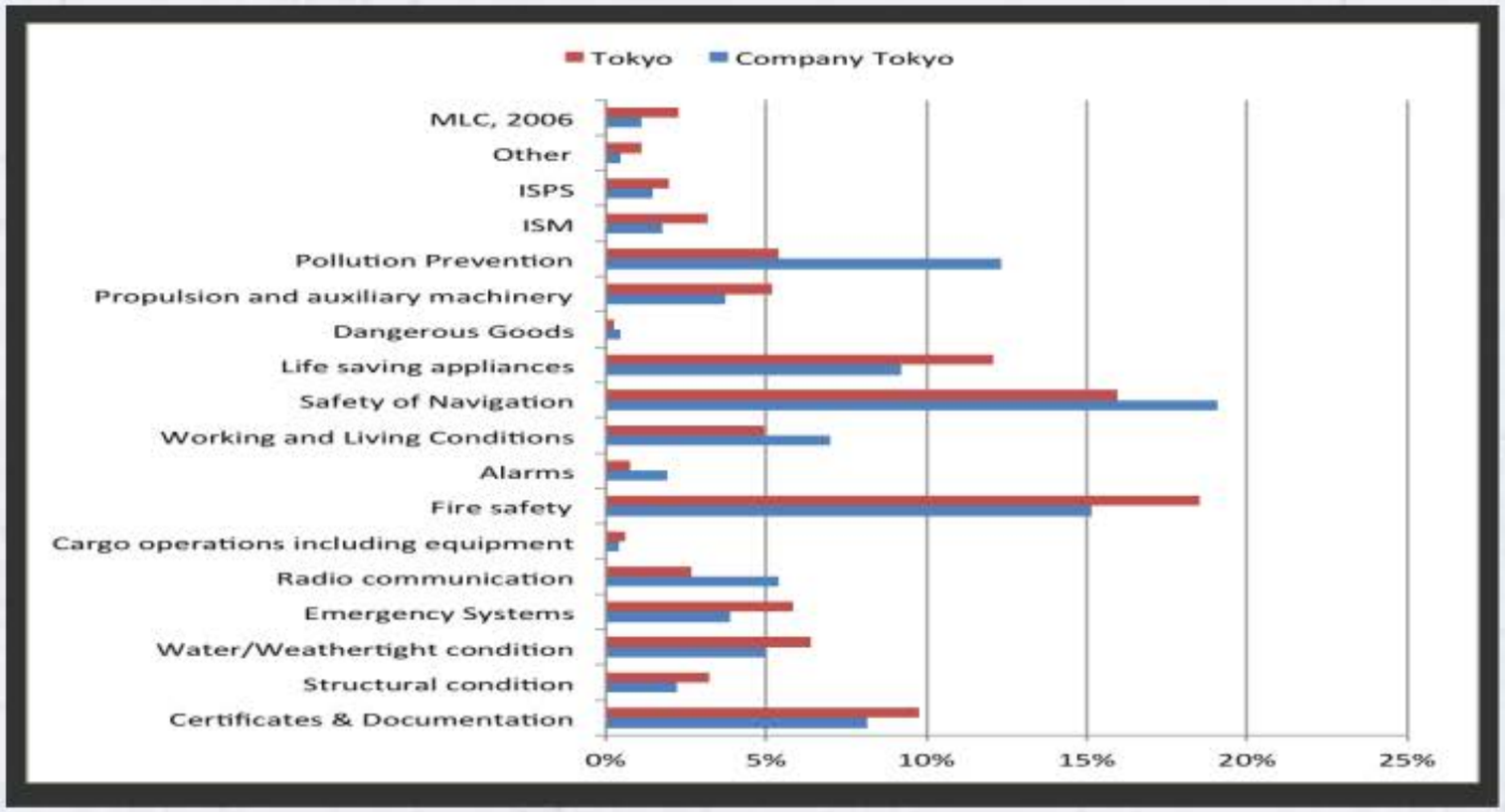


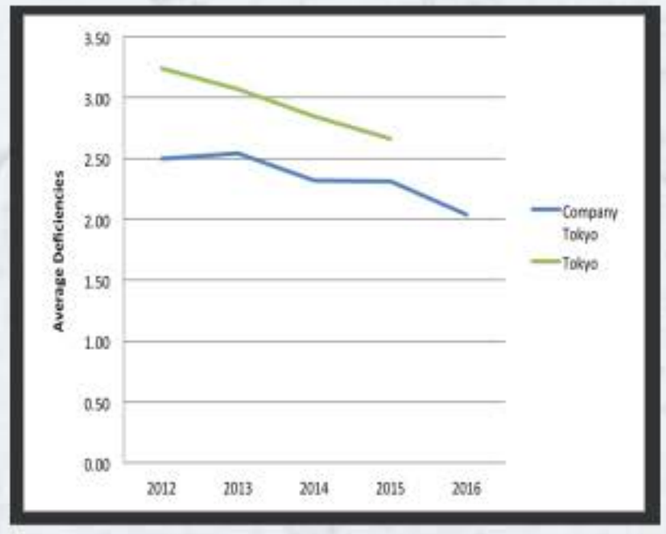
ASIA-PACIFIC PSC

TOKYO MOU

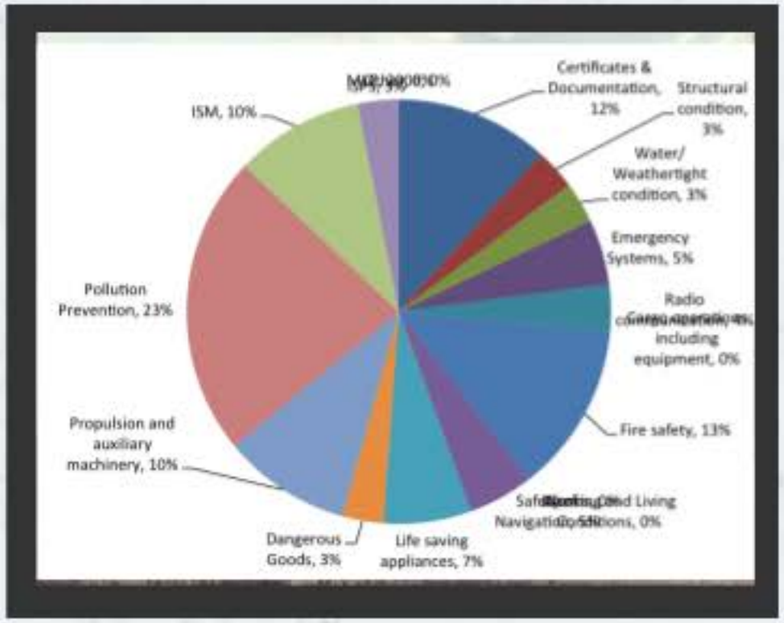
Company's Performance in Tokyo MOU

Medium

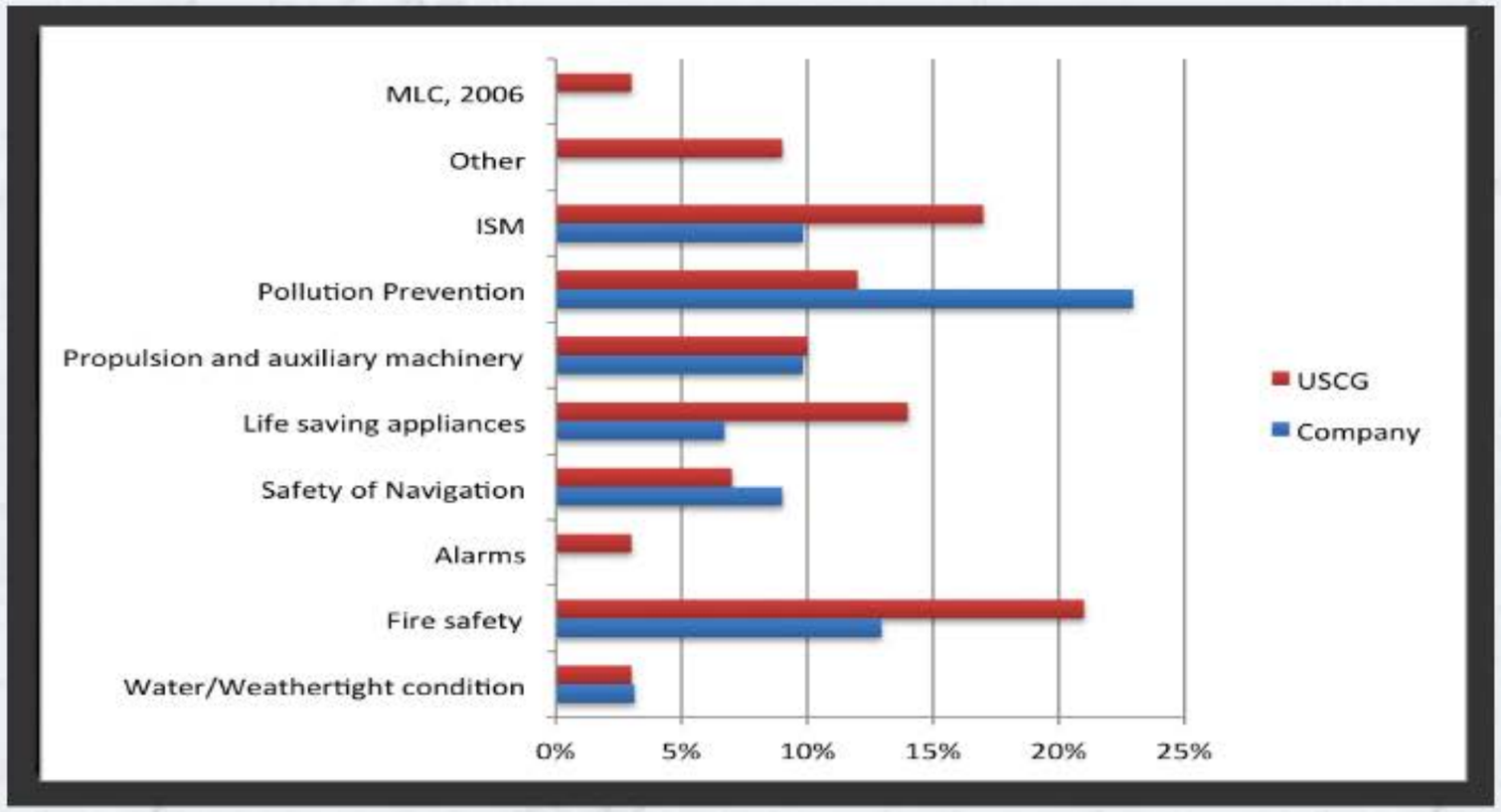


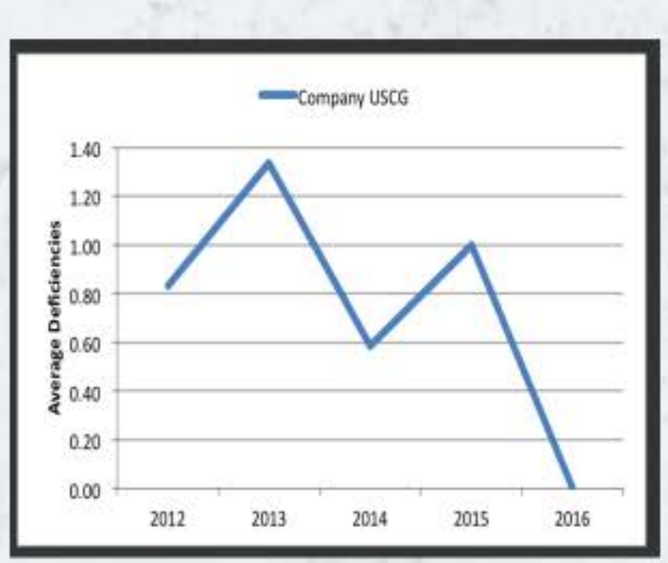


- Average Deficiencies and Detention Ratio should be improved
- Attention should be paid on Safety of navigation and Pollution Prevention



Company's Performance in USCG





Deficiencies related to Pollution Prevention should be improved

Conclusions

Immediate Attention should be paid on deficiencies concerning safety of navigation

Office personnel attendances during inspections reduces probability of detentions

Company's Performance in both Tokyo and Paris MOU needs attention and improvement

There is an established trend that deficiencies per inspection increase with the age of the vessel

5.2 Future Work

As future work on the scope of the analysis of a company's performance, could be considered a deeper analysis of all KPIs of the company, by weighted factors, which could lead to an actual measurable figure. Upon completion of this analysis, further comparison could be carried out with Shipping KPI standard. All the data that the company has in is possession for the calculation of custom KPIs to be used in order Shipping KPI Standard KPIs to be calculated and the results to be compared in order to identify if those are leading to different conclusion.

Financial evaluation of the suggested corrective and preventive actions described in conclusions could be further carried out. It would be interesting an effort to be made in order to calculate the exact cost of each of the solutions suggested, and also a combination of those, in order to be crosschecked with the possible effect on company's Port State control performance. It should also involve further monitoring of company's performance upon implementing those corrective actions, and a final evaluation to be done, if those would be sustainable or company should try to identify more cost effective methods to improve performance.

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Appendix

1. Sample of Data Used for the calculation of company's Port State Control Performance

Vessels	DATE	Place	Authority	Inspection Type	Detention	Deficiency	Code	OFFICE ATTENDANCE
Vessel22	04/01/2012	Cameroun	OTHER	PSC				NO
Vessel29	04/01/2012	Shsnghai	TOKYO	PSC		1	5	NO
Vessel29	04/01/2012	Shsnghai	TOKYO	PSC		2	5	NO
Vessel29	04/01/2012	Shsnghai	TOKYO	PSC		3	14	NO
Vessel18	08/01/2012	Abidjan	ABUJA	PSC				NO
Vessel30	18/01/2012	HODEIDAH	INDIAN	PSC		1	4	NO
Vessel30	18/01/2012	HODEIDAH	INDIAN	PSC		2	9	NO
Vessel16	22/01/2012	Murmansk	OTHER	PSC				NO
Vessel19	29/01/2012	Conakry	ABUJA	PSC				NO
Vessel24	09/02/2012	Malaga	PARIS	PSC		1	9	NO
Vessel24	09/02/2012	Malaga	PARIS	PSC		2	9	NO
Vessel24	09/02/2012	Malaga	PARIS	PSC		3	14	NO
Vessel24	09/02/2012	Malaga	PARIS	PSC		4	1	NO
Vessel32	11/02/2012	Long Beach CA	USCG	PSC		1	10	YES
Vessel22	14/02/2012	Davao	TOKYO	PSC		1	10	YES
Vessel22	14/02/2012	Davao	TOKYO	PSC		2	10	YES
Vessel22	14/02/2012	Davao	TOKYO	PSC		3	7	YES
Vessel22	14/02/2012	Davao	TOKYO	PSC		4	13	YES
Vessel2	19/02/2012	Pointe Noire	ABUJA	PSC				NO
Vessel5	28/02/2012	Tilbury	PARIS	PSC				YES
Vessel2	02/03/2012	Gabon	ABUJA	PSC				NO
Vessel14	09/03/2012	Port Botany	TOKYO	PSC				NO
Vessel2	23/03/2012	Marseilles	PARIS	PSC		1	4	YES
Vessel2	23/03/2012	Marseilles	PARIS	PSC		2	7	YES
Vessel2	23/03/2012	Marseilles	PARIS	PSC		3	13	YES
Vessel2	23/03/2012	Marseilles	PARIS	PSC		4	9	YES
Vessel7	03/04/2012	Murmansk	OTHER	PSC				YES
Vessel29	03/04/2012	Laem Chabang	TOKYO	PSC				NO
Vessel22	07/04/2012	Douala	OTHER	PSC				YES
Vessel22	11/04/2012	Libreville	ABUJA	PSC				YES
Vessel19	18/04/2012	Douala	OTHER	PSC				YES
Vessel32	23/04/2012	Okke	TOKYO	PSC		1	1	YES
Vessel32	23/04/2012	Okke	TOKYO	PSC		2	7	YES
Vessel32	23/04/2012	Okke	TOKYO	PSC		3	7	YES
Vessel32	23/04/2012	Okke	TOKYO	PSC		4	8	YES
Vessel2	25/04/2012	Libreville	ABUJA	PSC				NO
Vessel31	26/04/2012	Singapore	TOKYO	PSC		1	10	NO
Vessel31	26/04/2012	Singapore	TOKYO	PSC		2	17	NO
Vessel31	26/04/2012	Singapore	TOKYO	PSC		3	10	NO
Vessel31	26/04/2012	Singapore	TOKYO	PSC		4	5	NO
Vessel31	26/04/2012	Singapore	TOKYO	PSC		5	9	NO
Vessel33	30/04/2012	Bangkok	TOKYO	PSC				NO
Vessel21	17/05/2012	Cork	PARIS	PSC				NO
Vessel13	18/05/2012	Singapore	TOKYO	PSC		1		NO
Vessel13	18/05/2012	Singapore	TOKYO	PSC		2		NO

Vessels	DATE	Place	Authority	Inspection Type	Detention	Deficiency	Code	OFFICE ATTENDANCE
Vessel13	18/05/2012	Singapore	TOKYO	PSC		3		NO
Vessel32	21/05/2012	Haldia	INDIAN	PSC		1	13	NO
Vessel32	21/05/2012	Haldia	INDIAN	PSC		2	12	NO
Vessel32	21/05/2012	Haldia	INDIAN	PSC		3	18	NO
Vessel27	24/05/2012	Cotonou	ABUJA	PSC				NO
Vessel2	04/06/2012	Abidjan	ABUJA	PSC				NO
Vessel23	10/06/2012	Klaipeda	PARIS	PSC		1	14	YES
Vessel23	10/06/2012	Klaipeda	PARIS	PSC		2	10	YES
Vessel23	10/06/2012	Klaipeda	PARIS	PSC		3	10	YES
Vessel14	14/06/2012	Point Noire	ABUJA	PSC				NO
Vessel11	17/06/2012	Port Botany	INDIAN	PSC		1	10	NO
Vessel11	17/06/2012	Port Botany	INDIAN	PSC		2	10	NO
Vessel11	17/06/2012	Port Botany	INDIAN	PSC		3	10	NO
Vessel11	17/06/2012	Port Botany	INDIAN	PSC		4	4	NO
Vessel2	18/06/2012	Port Bata	ABUJA	PSC				NO
Vessel35	25/06/2012	Nantong	TOKYO	PSC		1	11	YES
Vessel35	25/06/2012	Nantong	TOKYO	PSC		2	11	YES
Vessel35	25/06/2012	Nantong	TOKYO	PSC		3	11	YES
Vessel35	25/06/2012	Nantong	TOKYO	PSC		4	11	YES
Vessel35	25/06/2012	Nantong	TOKYO	PSC		5	16	YES
Vessel35	25/06/2012	Nantong	TOKYO	PSC		6	10	YES
Vessel35	25/06/2012	Nantong	TOKYO	PSC		7	10	YES
Vessel35	25/06/2012	Nantong	TOKYO	PSC		8	10	YES
Vessel35	25/06/2012	Nantong	TOKYO	PSC		9	4	YES
Vessel11	25/07/2012	Oakland	USCG	PSC		1	14	NO
Vessel11	25/07/2012	Oakland	USCG	PSC		2	14	NO
Vessel7	30/07/2012	Murmansk	PARIS	PSC				NO
Vessel18	01/08/2012	Singapore	TOKYO	PSC		1	9	NO
Vessel18	01/08/2012	Singapore	TOKYO	PSC		2	1	NO
Vessel14	06/08/2012	Zeebrugge	PARIS	PSC				YES
Vessel16	13/08/2012	La Pallice	PARIS	PSC		1	7	YES
Vessel32	16/08/2012	Dakar	ABUJA	PSC				NO
Vessel11	17/08/2012	Tauranga	TOKYO	PSC		1	10	NO
Vessel11	17/08/2012	Tauranga	TOKYO	PSC		2	10	NO
Vessel2	22/08/2012	Congo	ABUJA	PSC				YES
Vessel30	25/08/2012	Pireaus	PARIS	PSC		1	9	NO
Vessel30	25/08/2012	Pireaus	PARIS	PSC		2	10	NO
Vessel2	29/08/2012	Gabon	ABUJA	PSC				YES
Vessel32	01/09/2012	Rotterdam	PARIS	PSC		1	8	YES
Vessel18	05/09/2012	Abidjan	ABUJA	PSC				NO
Vessel35	10/09/2012	Kamsar	ABUJA	PSC				NO
Vessel20	11/09/2012	ANTWERP	PARIS	PSC		1	10	YES
Vessel20	11/09/2012	ANTWERP	PARIS	PSC		2	7	YES
Vessel20	11/09/2012	ANTWERP	PARIS	PSC		3	11	YES
Vessel20	11/09/2012	ANTWERP	PARIS	PSC		4	10	YES

Vessels	DATE	Place	Authority	Inspection Type	Detention	Deficiency	Code	OFFICE ATTENDANCE
Vessel20	11/09/2012	ANTWERP	PARIS	PSC		5	7	YES
Vessel29	19/09/2012	Vietnam	TOKYO	PSC				NO
Vessel12	21/09/2012	Mombassa	INDIAN	PSC		1	14	NO
Vessel12	21/09/2012	Mombassa	INDIAN	PSC		2	13	NO
Vessel20	29/09/2012	Abidjan	ABUJA	PSC				NO
Vessel7	01/10/2012	Philadelphia	USCG	PSC			7	NO
Vessel32	04/10/2012	Illichevsk	BLACK	PSC				NO
Vessel35	04/10/2012	Contstanza	PARIS	PSC				NO
Vessel13	06/10/2012	Pasir Gudang	TOKYO	PSC				NO
Vessel2	14/10/2012	Duala	OTHER	PSC				NO
Vessel14	16/10/2012	Port Everglades	USCG	PSC				YES
Vessel33	17/10/2012	Singapore	TOKYO	PSC		1	10	NO
Vessel33	17/10/2012	Singapore	TOKYO	PSC		2	7	NO
Vessel33	17/10/2012	Singapore	TOKYO	PSC		3	7	NO
Vessel33	17/10/2012	Singapore	TOKYO	PSC		4	7	NO
Vessel33	17/10/2012	Singapore	TOKYO	PSC		5	7	NO
Vessel33	17/10/2012	Singapore	TOKYO	PSC		6	10	NO
Vessel33	17/10/2012	Singapore	TOKYO	PSC		7	10	NO
Vessel33	17/10/2012	Singapore	TOKYO	PSC		8	7	NO
Vessel33	17/10/2012	Singapore	TOKYO	PSC		9	1	NO
Vessel33	17/10/2012	Singapore	TOKYO	PSC		10	1	NO
Vessel33	17/10/2012	Singapore	TOKYO	PSC		11	10	NO
Vessel16	22/10/2012	Liverpool	PARIS	PSC		1	18	YES
Vessel31	25/10/2012	Singapore	TOKYO	PSC				NO
Vessel27	27/10/2012	Douala	OTHER	PSC				NO
Vessel33	07/11/2012	Singapore	TOKYO	PSC		1	9	NO
Vessel33	07/11/2012	Singapore	TOKYO	PSC		2	9	NO
Vessel35	21/11/2012	Gunsan	TOKYO	PSC				NO
Vessel18	23/11/2012	Cotonou	ABUJA	PSC				NO
Vessel14	27/11/2012	Port Everglades	USCG	PSC				YES
Vessel2	29/11/2012	Cotonou	ABUJA	PSC				NO
Vessel2	04/12/2012	Abidjan	ABUJA	PSC				NO
Vessel13	06/12/2012	Penang	TOKYO	PSC				NO
Vessel35	14/12/2012	Kalama	USCG	PSC		1	1	YES
Vessel35	14/12/2012	Kalama	USCG	PSC		2	4	YES
Vessel32	31/12/2012	Lome	ABUJA	PSC				YES

Vessels	DATE	Place	Authority	Inspection Type	Detention	Deficiency	Code	OFFICE ATTENDANCE
Vessel33	01/01/2013	Chittagong	OTHER	PSC		1	16	NO
Vessel33	01/01/2013	Chittagong	OTHER	PSC		2	10	NO
Vessel33	01/01/2013	Chittagong	OTHER	PSC		3	7	NO
Vessel33	01/01/2013	Chittagong	OTHER	PSC		4	10	NO
Vessel33	01/01/2013	Chittagong	OTHER	PSC		5	1	NO
Vessel33	01/01/2013	Chittagong	OTHER	PSC		6	9	NO
Vessel33	01/01/2013	Chittagong	OTHER	PSC		7	7	NO
Vessel33	01/01/2013	Chittagong	OTHER	PSC		8	8	NO
Vessel33	01/01/2013	Chittagong	OTHER	PSC		9	3	NO
Vessel33	01/01/2013	Chittagong	OTHER	PSC		10	1	NO
Vessel33	01/01/2013	Chittagong	OTHER	PSC		11	1	NO
Vessel33	01/01/2013	Chittagong	OTHER	PSC		12	9	NO
Vessel14	05/01/2013	Venezouela	VINA	PSC				NO
Vessel24	08/01/2013	Naples	PARIS	PSC				NO
Vessel5	25/01/2013	Antwerp	PARIS	PSC				NO
Vessel22	18/02/2013	San Antonio	VINA	PSC		1	14	NO
Vessel22	18/02/2013	San Antonio	VINA	PSC		2	18	NO
Vessel31	23/02/2013	Penang	TOKYO	PSC				YES
Vessel5	24/02/2013	Abidjan	ABUJA	PSC		1	1	NO
Vessel19	25/02/2013	Algeciras	PARIS	PSC				NO
Vessel20	02/03/2013	Douala	OTHER	PSC				NO
Vessel11	05/03/2013	Oakland	USCG	PSC		1	7	NO
Vessel11	05/03/2013	Oakland	USCG	PSC		2	14	NO
Vessel11	05/03/2013	Oakland	USCG	PSC		3	7	NO
Vessel11	05/03/2013	Oakland	USCG	PSC		4	14	NO
Vessel11	05/03/2013	Oakland	USCG	PSC		5	14	NO