

# A Comparative Analysis of Regional Agreements on Port State Control

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## Abstract

Regional agreements on Port State Controls (PSC) are established to improve more effective inspection system to reduce the risks arising from maritime transportation. Currently there are nine regional PSC agreements in operations; Paris MOU (Memorandum of Understanding on Port State Control), Acuerdo de Vina del Mar Agreement, Tokyo MOU, Caribbean MOU, Mediterranean MOU, Indian Ocean MOU, Abuja MOU, Black Sea MOU and Riyadh MOU. In addition to, USA conduct inspections in its waters adding its regulations.

In this study, it is aimed to analyze all regional MOUs performances. For this, inspections, detention and deficiency rates from 2010 to 2014 as well as type of deficiencies, detentions by ship types, flag states and Recognized Organizations (RO) for the period of 2012-2014 are compared and consequently, the importance of effective inspection system on marine safety is discussed.

**Keywords:** Maritime transport; port state control; regional MOU; safety.

## 1. Introduction

Maritime transport is an important constituent of the transportation system. It carries about 90 % of international cargo. It is more advantageous compared to other modes of transport. Maritime transport allows to carry a large amount of cargo at once and makes transport costs cheaper. Especially, with the development of container transport, the importance of maritime transport has increased once again. Besides these advantages, maritime transport poses significant risks on the marine environment. Ship source pollutions, such as exhaust gases and ballast water, have a significant impact on marine environment. On the other hand, risks arising from accidents and port operations effects marine environment as well.

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In this direction, in order to minimize the risks posed by maritime transportation on the environment and human health, the need of various international and national regulations has emerged. International Maritime Organization (IMO) regulated international rules and several conventions such as International Convention for the Prevention of Pollution from Ships (MARPOL), International Convention for the Safety of Life at Sea (SOLAS), International Convention on Load Lines, and Convention of the International Regulations for Preventing Collisions at Sea (COLREG). Each country was responsible for ensuring compliance with the standards of the vessels flying its flag and making necessary adjustments. However, experiences showed that applied actions were not sufficient and control mechanism was not fulfilled accordingly by Flag States and Classification Societies in the existence of open registries. Especially, serious tanker accidents that occurred in the 1970s, reinforced this idea more [1].

Therefore, Port State Control (PSC) has been emerged. PSC is described as “the inspection of foreign ships in national ports for the purpose of confirming that condition of the ship and its equipment comply with the requirements of international conventions and that the ship is manned and operated in compliance with applicable international laws” by IMO [2]. In order to develop effective and sustainable control mechanism, Regional Agreements on PSC (Memorandum of understanding on PSC- MOU) have been established. The first created regional MOU is the Paris MOU and later the other regional MOUs are established. Currently, there are nine regional PSC agreements in operations.

In this study, it is aimed to analyze all regional MOUs performances by comparing each other's and the importance of effective inspection system on marine safety is discussed.

## **2. Regional agreements on PSC (MOUs)**

The establishment aims of regional MOUs are to balance the demand for ports in the same region making PSC inspection strictly, exchange information on ships inspected and to unify the standards for inspection, ship detention and training of officers conducting inspections under Port State Control [3].

Existent regional MOUs are respectively; Paris MOU, Vina del Mar Agreement, Tokyo MOU, Caribbean MOU, Mediterranean MOU, Indian Ocean MOU, Abuja MOU, Black Sea MOU and Riyadh MOU, and United States.

### ***2.1. Paris MOU***

Created the first regional agreement is the Paris MOU that includes Europe and North Atlantic region. It was signed in 1982. The Paris MOU generates a black/grey/white list of flags based on the statistics of inspections/detentions conducted during previous 3 years. This list aims to identify flags that pose a very high risk. Ship risk profile determined by using ship's generic and historic parameters. Based on a ship's risk profile the inspection and selection scheme determines the scope, frequency and priority of inspections. The Paris MOU also determines the performances of class companies which are called Recognized Organizations (RO) in the annual reports. It's calculated as such in flag performance. Performance of ROs are grouped as high, medium, low, very low. There must be at least 60 inspections per RO to be taken into account for performance calculation in the last three years [4].

## **2.2. Vina del Mar Agreement**

Established the second regional MOU is Acuerdo de Vina del Mar Agreement. It includes Latin American region and was established in 1992. Information of deficiencies by ship type, deficiency and detention by flags, deficiencies by categories, detention and deficiencies by recognized organization are given in annual reports [5].

## **2.3. Tokyo MOU**

The Tokyo MOU that includes Asia-Pacific region was established in 1993. There are 19 members of the Tokyo MOU and due to the geographical conditions some countries, such as Australia and Russian Federation, are the members of both MOUs. Australia is also a member of Indian MOU and Russian Federation is a member of Black Sea MOU. The Tokyo MOU generates a black/grey/white list of flags like the Paris MOU. Similar to the Paris MOU, a ship risk profile is determined using the flag, recognized organization and company performance, the number of deficiencies and detentions recorded for the ship, past inspection records of the ship, as well as the ship's age and ship type. As the Paris MOU, Tokyo MOU also determines performances of Recognized Organizations [6].

## **2.4. Caribbean MOU**

The Caribbean MOU includes Caribbean region. It was established in 1996. Target inspection rate in the Caribbean MOU is at least 15 % per country. For ranking of flag state performance, the Caribbean MOU used a methodology in the 2013 annual report which examines the average detention rate for the last three years. According to this method "Flags with a detention rate that is two times higher than the average are given a poor performance, those who are on average are given a neutral rating and those who are below the average rate are ranked as high performance, flags that have no detentions for the three year period are also given a high performance." This evaluation method is not performed in the 2014 annual report [7].

## **2.5. Mediterranean MOU**

The Mediterranean MOU includes Mediterranean region. It was established in 1997. There are 10 members in this MOU that Turkey is also a member of the Black Sea MOU. Standard statistics are given in the annual reports as the Vina del Mar Agreement [8].

## **2.6. Indian Ocean MOU**

The Indian Ocean MOU includes Indian Ocean region. It was established in 1998. As it was mentioned above, the member country Australia is also a member of the Tokyo MOU. In addition to standard statistics, comparisons are carried out using last three years' period in the annual reports [9].

## **2.7. Abuja MOU**

The Abuja MOU includes West and Central African region. It was established in 1999. Target inspection rate is

15% of ship calls at port of each member state [10].

### **2.8. Black Sea MOU**

The Black Sea MOU includes Black Sea region. The Black Sea MOU was signed in 2000. Two of the member countries, Russian Federation and Turkey, are also members of the Tokyo MOU and the Mediterranean MOU respectively. Standard information about inspections are given in the annual reports. Flag states whose number of detention exceeds the average detention rate, exceeding 10 numbers of inspections, are listed in the annual reports. The Black Sea MOU decided to introduce a New Inspection Regime for selection of ships from 2016 to harmonize further its risk based targeting and inspection system with the Paris MOU and Tokyo MOU [11].

### **2.9. Riyadh MOU**

The Riyadh Memorandum of Understanding on Port State Control, the last regional MOUs, in the Gulf Region was established in 2004 [12].

### **2.10. USA**

United States is not a member of any regional agreement. They conduct port state control inspections adding to their own rules by USCG (United States Coast Guard). Performances are evaluated as safety and security compliance performances. United States use The Port State Control Safety and Environmental Protection Compliance Targeting Matrix to better target ships that pose the most risk to their ports. ISPS/MTSA Security Compliance Targeting Matrix is also used additionally [13].

## **3. Comparison of regional MOUs**

In this section, in order to determine performances of all regional MOUs, inspections and detention rates, deficiency rates from 2010 to 2014 and type of deficiencies, detentions by ship types, flag states and Recognized Organizations (RO) for the period of 2012-2014 are compared.

### **3.1. Inspection numbers, detention and deficiency rates**

Regional MOU inspections data are shown in Table 1. This table gives number of inspections for each MOU between 2010 and 2014. The data are obtained from the annual reports which are found in the MOU's website [4-13]. The Tokyo MOU, Paris MOU and USCG have the highest number of inspections according to data which is shown in Table 1.

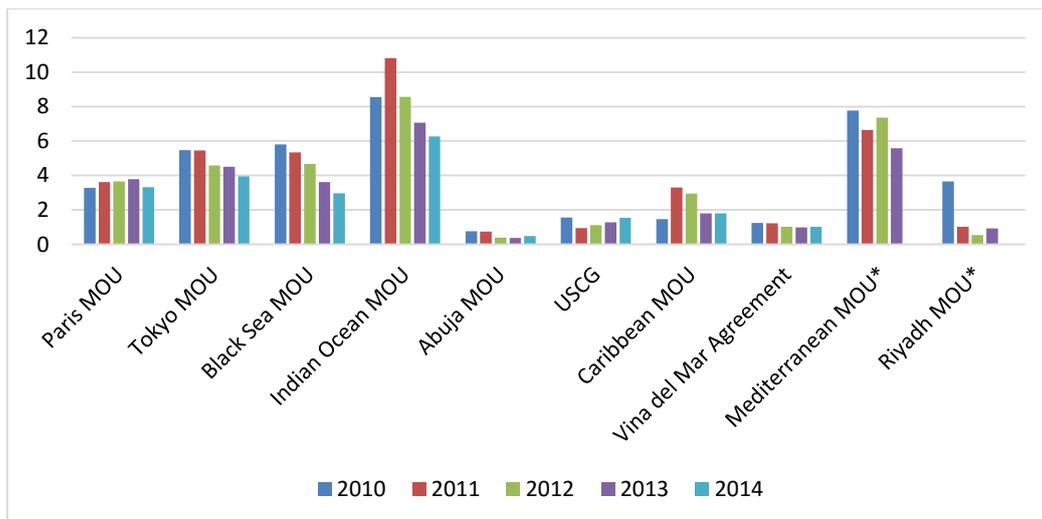
According to the 2014 annual report of each MOU, regional inspection rate in the Black Sea MOU is 69.41 % and Russia and Ukraine have higher inspection rate than other member states of Black Sea MOUs. Regional inspection rate in the Tokyo MOU is 69% and Australia, Philippines, Japan and Chile have the top five inspection rate. Number of inspection in the Indian Ocean MOUs is 6059 and 62 % of these inspections were carried out by Australia. Number of inspections in the Abuja MOU is 2916 and 20 % of these inspections

carried out by Congo, DRC and 22 % of theirs by Nigeria. 18430 inspections were performed by the Paris MOU in the year of 2014 and each individual ship was inspected an average of 1.2 times per year. Most of the inspections are carried by the members Spain and United Kingdom. The USCG conducted 9232 inspections for 79091 port calls in 2014. According to the 2013 annual reports, the Mediterranean MOU regional inspection rate is 21 % and Lebanon, Egypt and Turkey have higher inspections rate than other states. Number of inspections in the Vina del Mar Agreement is 9088 and 31 % of these inspections carried out by Brazil and 18 % of these inspections carried out Argentina [4-13].

**Table 1:** Number of inspections between 2010 and 2014

Regional MOUs	2010	2011	2012	2013	2014
Paris MOU	24058	19058	18308	17687	18430
Tokyo MOU	25762	28627	30929	31018	30405
Black Sea MOU	4929	4657	4607	5080	5092
Indian Ocean MOU	5513	5550	5051	5320	6059
Abuja MOU	1966	1483	2074	3211	2916
USCG	9907	10129	9469	9394	9232
Caribbean MOU	815	605	645	994	836
Vina del Mar Agreement	8584	8841	8946	7409	7440
Mediterranean MOU*	6783	6218	5645	4698	
Riyadh MOU*	2047	3607	3357	3508	

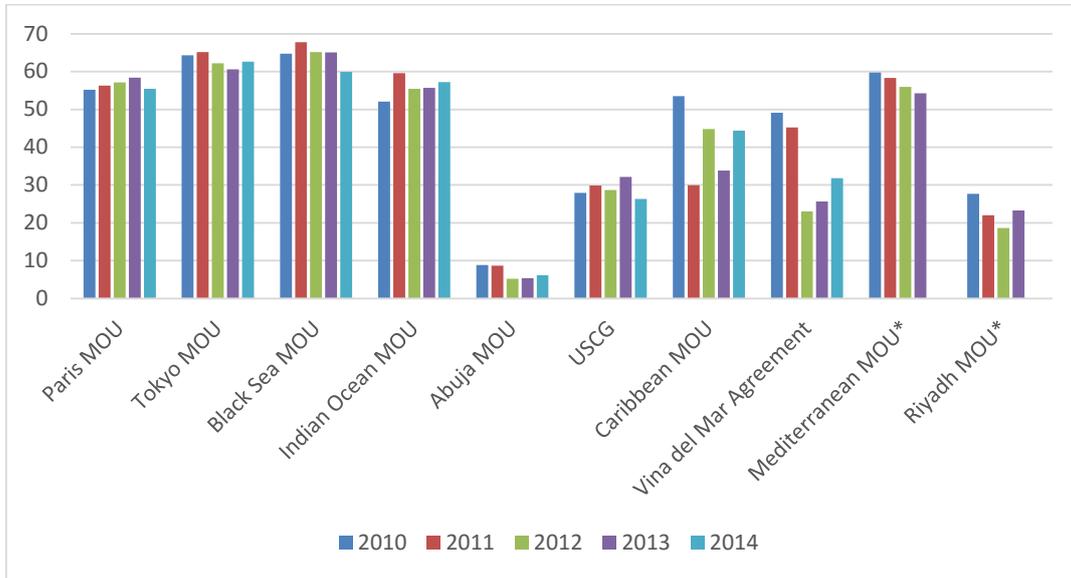
\*Annual report 2014 has not been printed yet.



**Figure 1:** annual detention rates of MOUs (%)

Figure 1 shows the annual detention rates per regional MOUs. It seems that the Abuja MOU has the lowest

detention rate. Besides, the Indian Ocean MOU and the Mediterranean MOU have the highest average detention rates. The Paris MOU has the average detention rate of 3.53 % for the mentioned years. It's obviously seen in Figure 1 that the Tokyo MOU and the Black Sea MOU detention rates are decreasing over time.



**Figure 2:** annual deficiency rates of MOUs (%)

Deficiency rates are mentioned in Figure 2 for each regional MOU. The Black Sea MOU and the Tokyo MOU have the highest rates with average 60 %. The Mediterranean MOU, Indian Ocean MOU and Paris MOU have an average between 50-60 %. The Caribbean MOU and Vina del Mar Agreement have a decreasing deficiency rate. The Riyadh MOU and especially the Abuja MOU have the lowest deficiency rate according to Figure 1.

### 3.2. Deficiency categories and detained ship types

Percentage of deficiency categories detected in the MOUs and percentage of detained ships are calculated using inspections data of the period 2012-2014. The Riyadh MOU has only 2013 annual report, therefore it is not evaluated in this section.

Detected deficiencies over the 8 % are ranked in the Table 2. Vina del Mar Agreement is not shown in this Table, because it has deficiency percentage which is lower than 1 %. The categories with the greatest percentage of deficiency are Fire safety, Safety of navigation and Lifesaving appliances in all MOUs generally. While Safety of navigation is the highest deficiency categories in the Black Sea MOU, Indian MOU, Mediterranean MOU, Fire safety is the highest deficiency categories in the Paris MOU, Tokyo MOU, Caribbean MOU and USCG. The top 3 deficiency categories are only similar to the Paris and Tokyo MOU. Only in the Abuja MOU Ship's certificates and documents is the highest deficiency categories.

According to ClassNK PSC Annual Report, noted deficiencies under the category of safety of navigation include charts, nautical publications, lights/shapes/sound signal of navigational, voyage data recorder and voyage and passage plan; noted deficiencies under the category of fire safety majority are related to fire

dampers, pumps and its pipes, detection, prevention, fixed fire extinguishing system, firefighting equipment and appliances; and noted deficiencies under the category of life saving appliances are related to lifeboats, rescue boats, launching arrangements for survival craft [14].

**Table 2:** Deficiency categories detected per MOU for the period 2012-2014

Paris MOU	%	Black Sea MOU	%
Fire safety	14,04	Safety of Navigation	17,28
Safety of Navigation	13,74	Life Saving Appliances	13,64
Life saving appliances	8,94	Living and Working Conditions - Working Conditions	11,31
Working and Living Conditions - Working Con.	8,11	Fire Safety	9,08
Tokyo MOU	%	Indian Ocean MOU	%
Fire safety	19,19	Safety of Navigation	15,71
Safety of Navigation	16,70	Fire safety	14,87
Life saving appliances	11,96	Life saving appliances	10,36
USCG	%	Caribbean MOU	%
Fire Fighting Appliances	21,67	Fire safety measures	16,07
Marine Pollution	19,33	Safety of navigation	11,56
ISM Related Deficiencies	14,67	Lifesaving appliances	10,59
Life Saving Appliances	10,00	Ship's Certificates and Documents	9,11
Safety in General	9,67	ILO	8,75
Mediterranean MOU	%	Abuja MOU	%
Safety of Navigation	21,89	Ship's certificates and documents	15,85
Certificate & Documentation	11,56	Safety of Navigation	8,38
Working and Living Conditions	11,53		
Propulsion and auxiliary machinery	8,68		
Life saving appliances	8,32		

The top five detained ship type by each MOU are given in Table 3. While more than 40 % of detained ships are General cargo/multi-purpose ship in the Paris, Tokyo, Black Sea, Caribbean and Mediterranean MOUs, only it is about 21% in the Abuja MOU. Bulk carrier are the top detained ship types in the Indian MOU, USCG and Vina del Mar Agreement. First two ship types are General cargo/multi-purpose ships and Bulk carriers in most of MOUs. Chemical tankers are at the bottom of lists in the all MOUs generally. This demonstrates that company inspections are more stringent than other ship types. Only in the Abuja MOU they have about percentage of 21%.

**Table 3:** Percentage of top 5 detained ship type (2012-2014)

Paris MOU	%	Tokyo MOU	%	Black sea MOU	%
General cargo/multi-purpose	53,05	General cargo/multi-purpose ship	41,83	General cargo/ multi-purpose ship	49,27
Bulk carrier	15,96	Bulk carrier	29,21	Heavy load carrier	17,09
Container	6,31	Container ship	10,57	Bulk carrier	15,27
Ro-Ro cargo	3,85	Refrigerated cargo carrier	3,66	Ro-Ro passenger ship	2,55
Chemical tanker	3,64	Chemical tanker	3,14	Ro-Ro cargo ship	2,55
Indian Ocean MOU	%	Abuja MOU	%	USCG	%
Bulk carrier	47,64	General cargo/multi-purpose	20,59	Bulk carrier	41,46
General cargo / multipurpose ship	18,18	Oil tanker	20,59	Container	14,91
Container ship	9,60	Offshore supply	14,71	General dry cargo ship	11,92
Oil tanker	5,30	Refrigerated cargo	11,76	Ro-Ro cargo ship	10,30
Chemical tanker	4,63	Bulk carrier	8,82	Chemical tankship	4,88
Mediterranean MOU	%	Caribbean MOU	%	Vina del Mar Agreement	%
General cargo/multi-purpose ship	74,44	General dry cargo	38,6	Bulk carrier	25,61
Bulk carrier	9,25	Oil tanker	14,04	General dry cargo ship	23,78
Containership	2,70	Passenger ships	8,77	Container (fully cellular)	12,8
Ro-ro cargo ship	2,40	Bulk carriers	7,02	Reefer	4,27
Refrigerated cargo carrier	1,11	Chemical tanker	4,00	Chemical tanker	1,00

### 3.3. Flag state and RO performances

Flag states and RO performances are evaluated only the Paris and Tokyo MOUs and USCG for determining of ship risk profile. This evaluation is made using three years inspection data. Table 4 shows the black listed flag states of the Paris and Tokyo MOUs and flags received 7 points and 2 points in Safety Targeting Matrix of USCG for the period 2012-2014 [4,6,13]. According to risk assessment, these Flag states have a risk level. With respect to the Tokyo MOU black list, Papua New Guinea and Tanzania have a very high risk level. Tanzania is also found in the Paris MOU black list as high risk. There is not any very high risk flag in the Paris MOU black list. Belize is found in all three lists. Listed flag states are different from each other in these MOUs. For example, Korea DPR, Mongolia and Papua New Guinea, which are black listed flag in the Tokyo MOU, are not listed in the Paris MOU and USGC, because the number of calling ship is low or inspection number is less than

30. At the same way, Moldova which is black listed flag in the Paris MOU is not listed in the Tokyo MOU and USGC.

Also, the Caribbean MOU ranked flag states performances as high performance and poor performance in the annual report 2013. Flag states having poor performance are respectively Cook Islands, Colombia, Dominica, Sao Tomé and Principe, Sierra Leone, Tanzania, Curacao, Switzerland, Venezuela, St. Vincent and the Grenadines, Barbados and Italy. However, these flags had less than 30 number of inspections in this period except for St. Vincent and the Grenadines and Italy. This evaluation is not performed in the 2014 annual report.

**Table 4:** Flags having a risk in the Paris MOU, Tokyo MOU and USCG (2012-2014)

Tokyo MOU (Black Listed Flags)		Paris MOU (Black Listed Flags)		USCG (Flags Received Points in Safety Targeting Matrix)	
Very High Risk	Papua New Guinea	High Risk	Tanzania	Flags Received 7 Points in Safety Targeting Matrix	Belize
	Tanzania	Medium to High Risk	Moldova		Bolivia
High Risk	Mongolia	Medium Risk	Togo		Honduras
	Sierra Leone		Cook Islands		Egypt
Medium to High Risk	Korea, DPR		Dominica		Taiwan
	Cambodia		Comoros		Samoa
Medium Risk	Indonesia		Belize	St. Vincent and the Grenadines	
	Bangladesh		St. Vincent and the Grenadines	Lithuania	
	Kiribati	Sierra Leone	Mexico		
	Niue	Cambodia	Antigua and Barbuda		
Medium Risk	Belize	Flags Received 2 Points in Safety Targeting Matrix	Cyprus		
	Egypt		Germany		
			Malta		
			Panama		
			Turkey		
			Vanuatu		

Table 5 shows the lowest performing recognized organizations in the Paris and Tokyo MOUs and USCG for the

period 2012-2014 [4,6,13]. In this table, the first five ROs that have the highest excess factor values are given in the medium level. ROs having low and very low performances are not found in the Tokyo MOU for this periods. ROs having at least 60 number of inspections are taken into account for performans evaluation in the Paris and Tokyo MOUs while ROs with priorty 1 in the USCG have very low inspection number. Only Panama Maritime Documentation Service has medium performance in both Paris MOU and USCG.

**Table 5:** The lowest performing recognized organizations in the Paris MOU, Tokyo MOU and USCG (2012-2014)

Paris MOU		Tokyo MOU		USCG	
Very Low	Inspeccion y Clasificacion Maritima (INCLAMAR)	Medium*	SingClass International Pte Ltd	Priority 1	Panama Shipping Registrar
Low	International Register of Shipping Bulgarian Register of Shipping		Polski Rejestr Statkow Croatian Register of Shipping		Macosnar Corporation Horizon International Naval Survey and Inspection Bureau Compania Nacional de Registro y Inspecciones de Naves
Medium*	Global Shipping Bureau Inc Universal Shipping Bureau Inc. Phoenix Register of Shipping Overseas Marine Certification Services Panama Maritime Documentation Services		Sing-Lloyd Korea Classification Society (former Josen Classification Society)		5 points National Shipping Adjusters Inc Intermaritime Certification Services
				3 points Panama Maritime Documentation Service	

\* The first five ROs that have the highest excess factor values.

#### 4. Conclusions

According to inspection data of the period 2010-2014, the larger inspections are conducted in the Paris MOU, the Tokyo MOU and USCG. The Tokyo MOU, the Indian Ocean MOU and the Mediterranean MOU have high detention rates, while the Abuja MOU and the Riyadh MOU have low detention rates. A decrease can be seen in the detention rate of MOUs over time in general. This indicates that the vessel standards are getting better in time. According to the 2014 annual report of the each MOU, regional inspection rates of the MOUs are different

from each other. Also, port states belong to same MOU have different inspection rates.

According to the evaluation of the period 2012-2014, the first two ship types detained in the MOUs are general cargo/multi-purpose ships and bulk carriers generally. Chemical tankers are at the bottom of lists in all MOUs except for the Abuja MOU and the Caribbean MOU. The categories with the greatest percentage of deficiency is fire safety, safety of navigation and lifesaving appliances in all MOUs generally. Ship's certificates and documents is the highest deficiency categories only in the Abuja MOU.

According to the performance evaluated by the Paris and Tokyo MOUs and USCG, black listed flag states in the Paris and Tokyo MOU differ from each other except for Tanzania, Cambodia, Sierra Leone and Belize, which these flag states have different risk level except for Belize. Additionally, while Belize and Egypt have medium risk in the Tokyo MOU, they are flags received 7 point in the USGC. At the same way, while Belize and St. Vincent and the Grenadines have medium risk in the Paris MOU, they are flags received 7 point in the USGC.

These indicate that risk level of flags in the black list of the Paris and Tokyo MOU and in targeting list of USCG are different from each other, also, some flags in the Tokyo MOU or Paris MOU or USGC are not listed in the other MOUs, because the number of ships visiting in these regions is very low or number of inspection is less than 30. Due to the same reasons, ROs performances in the MOUs seem to be different from each other in general.

Port state control is an important mechanism to protect the maritime environment. While some MOUs, such as the Paris MOU, the Tokyo MOU, and USCG have more experience about PSC inspections, some MOUs such as the Riyadh MOU and the Abuja MOU appear to be still in the development stage. If PSC inspections carry out stringent and effective, substandard ships may be eliminated over time. By this way, navigation safety is enhanced and the risks arising from maritime transportation will decrease in all seas. Moreover, all MOUs should use risk based ship inspection system such as the Paris MOU and the Tokyo MOU and USCG, in order to inspect effectively and to protect the marine environment in their regions.

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