

# The Paris MOU on PSC, propulsion and auxiliary machinery deficiencies and the maritime safety

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**ABSTRACT:** This article tries to show the relationship between one important set of deficiencies included in the Paris Memorandum of Understanding on Port State Control procedures, propulsion and auxiliary machinery, the importance of this set of deficiencies for the PSC inspection and also its importance for the Maritime Safety.

The maintenance of the propulsion and auxiliary machinery systems has become less important that it deserves, that means while the ship sails everything is supposed to be properly maintained, this is the most extended policy in the Companies and accepted and supported by the Owners.

This article studies the deficiencies included in the category propulsion and auxiliary machinery detected by the Port State Control Officers (PSCO) of the Paris MOU area, and tries to demonstrate how important they are in these inspections. At the same time can be seen the professional profile of the PSCO's as well as the assessment made by them of those areas included in this set of deficiencies.

## 1 OBJECTIVES

This article tries to show the relationship between one important set of deficiencies included in the Paris Memorandum of Understanding on Port State Control procedures, propulsion and auxiliary machinery, the importance of this set of deficiencies for the PSC inspection and also its importance for the Maritime Safety.

It is also an objective of the article to know how important this set of the deficiencies is in the PSC inspections. At the same time can be ascertained the professional profile of the PSCO's as well as the assessment made by them of those areas included in this set of deficiencies.

## 2 USED DATA

In this article have been used the SIRENAC database (this is the informatics application used by MOU-PSC for consulting and reporting the data related with ships inspected under their provisions), the 2005 Blue Book and different annual reports published by the Paris MOU.

## 3 METHODOLOGY

Different ships registered in black list, grey list and white list flags have been selected. To establish the list in which a Flag State must be included, its performance is calculated using a standard formula

for statistical calculations in which certain values have been fixed in accordance with agreed Paris MOU policy. Two limits have been included in the system, the "black to grey" and "the grey to white" limit, each with its own specific formula.

Two of the next ship types have been selected per Flag list:

- General cargo multipurpose
- Bulk carrier
- Container ship
- Ro-Ro Cargo Ship

Why these ship types have been selected? The main reason is that the three lists are analysed and must be considered that certain types of ships are unusually registered in Flags included in the Black List, so we have had to select ship types easily found in all Flag Lists.

In those ships the deficiencies regarding propulsion and auxiliary machinery have been studied and they become the basis of the article.

## 4 PROPULSION & AUXILIARY MACHINERY DEFICIENCIES

### – Propulsion main engine

General

Astern power

Protection main engine against:

Overspeeding

Excessive pressure

Lub. oil supply failure

Max. working stresses  
Explosion S74-1/CII-1/R27.4, .5

- **Cleanliness of engine room**
- **Auxiliary engine**
  - General
  - Protection
  - Overspeeding
  - Excessive pressure
  - Lub. Oil supply failure
  - Max. working stresses
  - Explosion
- **Gauges, thermometers, etc**
- **Bilge pumping arrangements**
  - Passenger ship
  - Cargo ship
- **UMS**
  - General
  - Control of propulsion
- **Guards/fencing around dangerous machinery parts**
- **Insulation wetted through (oil)**
  - General
  - UMS – Ship
- **Other (machinery)**

## 5 RESULTS

Different ships registered in black list, grey list and white list flags have been selected for being studied.

Two of the next ship types have been selected per Flag list:

- General cargo multipurpose
- Bulk carrier
- Container ship
- Ro-Ro Cargo Ship

The results of analyzing the “PROPULSION & AUXILIARY MACHINERY” deficiencies found in the last inspection made in the selected ships by the Paris MOU are as follows (tab. 1, 2, 3, 4).

## 6 CONCLUSIONS

Explanation of the deficiencies included in the table of the ships analyzed:

- The deficiency cleanliness of Engine Room – Insufficient. This is a very subjective deficiency. This description does not define the scope and the risks that it implies (maritime safety, safety at work); what is being affected because of it? Which is the origin of the cleanliness? Which are the instructions to define the criterion to be applied by the officers? Furthermore the ignorance

image given if it is considered that that is the most common deficiency detected in the major category propulsion & auxiliary machinery.

- Aux. Engine – Inadequate: Cooling syst. not appropriate. Spray of water over electric systems. “An inadequate or not appropriate” cooling system means that the whole system is not adequate for that ship, and it is supposed that it was approved by a Classification Society or an Administration before being installed. Furthermore, with reference to the spray of water over electric systems, we can not know which the affected systems are and if the spray comes from a hole, a flange...
- Aux. Engine – Not as required: Fuel purifier leakage. With this description, the importance, the product leaking (H<sub>2</sub>O, F.O), the risk and the scope can not be known.
- Propulsion main engine – Not as required: On STBD main engine fuel leakage. It does not define where the leakage is, is a pipe leaking? Or is a pump?... The scope and the risks can not be known.
- Auxiliary engine – Not as required: On boiler safety valves disconnected. Deficiency badly classified, the safety valves of a boiler are not elements of the auxiliary engine.
- Other (machinery) – Other: Emerg. Generator not properly maintained. What does it mean?
- Aux. Engine – Not as required: Rubber lines to be removed from diesel engines. Replaced by fire proof ones. Which are the lines to be removed, water, F.O? Which is the deficiency detected?
- Propulsion main engine – Not as required: Available some of fuel oil and lubricating oil leakages on main engine. Deficiency badly expressed, lack of precision, lack of scope and risks not defined.
- Aux. Engine – Not as required: Some leakages from diesel generators. Lack of precision, with this description it is impossible to know where the leakages are, the scope and the risks.
- Propulsion main engine – Not as required: Some leakages from the main engine. Lack of precision, with this description it is impossible to know where the leakages are, the scope and the risks.

To conclude we can emphasize the lack of precision in the definitions of all the deficiencies, some incorrect expressions, and the lack of the scope and the risks that the deficiencies represent.

We understand that the port state control officers must detect deficiencies which mainly affect the maritime safety and the pollution prevention without excluding others that can also be important and it can be emphasized that the deficiencies most commonly found are cleanliness of the Engine Room and leakages.

Because of the above mentioned reason, it can be understood that an element as important as the propulsion and the auxiliary machinery, of which the ship depends, has the correspondent major category of deficiencies in the 5<sup>th</sup> place of the ranking of the summary of deficiencies (see table 2).

## REFERENCES

1. IMO, STCW-78/95 Convention.
2. IMO, SOLAS 2004.
3. SIRENAC Database of MOU of Paris.
4. Results CIC-STCW-78/95 Campaign 2002.
5. Blue book of 2004 of MOU of Paris.

Table 1. Propulsion and Auxiliary Machinery deficiencies detected by the Paris MOU on PSC

IMO	FLAG	FLAG LIST	TYPE OF SHIP	Ner OF DEFIC.	DETENTION	PROP & AUX MACH DEFIC.
8117835	GEORGIA	Black	Gen Cargo Multip	8	N	Cleanliness of ER – Insufficient
7531591	EGYPT	Black	Gen Cargo Multip	23	N	–
8103822	ALGERIA	Black	Bulk Carrier	5	N	–
7701691	UKRAINE	Black	Bulk Carrier	35	Y	–
9322877	TURKEY	Black	Container Ship	0	N	–
8322210	TURKEY	Black	Container Ship	5	Y	–
8206533	LEBANON	Black	Ro-Ro Cargo Ship	5	N	- Cleanliness of ER – Insufficient: Area close to Main Engine - Cleanliness of ER – Insufficient: Purifiers area - Aux. Engine – Inadequate: Cooling syst. not appropriate. Spray of water over electric systems - Aux. Engine – Not as required: Fuel purifier leakage
8318116	EGYPT	Black	Ro-Ro Cargo Ship	5	Y	- Fire safety measures – Jacketed high pressure lines – Not as required: All three DG's leaking alarms connected with rubber pipe to open fuel tank No21 - Fire safety measures – Jacketed high pressure lines – Not as required: On both main engines collecting pipes to fuel leakage alarms disconnected - Fire safety measures – Jacketed high pressure lines – Inoperative: PS main engine fuel leaking alarm inoperative - Propulsion main engine – Not as required: On STBD main engine fuel leakage - Auxiliary engine – Not as required: On boiler safety valves disconnected
8866929	RUSSIAN FEDERATION	Grey	Gen Cargo Multip	2	N	–
7434729	PANAMA	Grey	Gen Cargo Multip	21	Y	–
7721316	BULGARIA	Grey	Bulk Carrier	10	N	- Cleanliness of ER – Insufficient - Other (machinery) – Other: Emerg. Generator not properly maintained
7806908	PANAMA	Grey	Bulk Carrier	21	Y	- Alarm signals – UMS alarms – Inoperative: DG No2 fuel leakage alarm inoperative
9002726	PANAMA	Grey	Container Ship	0	N	–
8419726	PANAMA	Grey	Container Ship	4	N	–
7816094	MOROCCO	Grey	Ro-Ro Cargo Ship	14	N	- Aux. Engine – Not as required: Rubber lines to be removed from diesel engines. Replaced by fire proof ones - Cleanliness of ER – Insufficient
8125844	VANUATU	Grey	Ro-Ro Cargo Ship	2	N	–
8209638	LIBERIA	White	Gen Cargo Multip	1	N	–
9113226	ANTIGUA & BARBUDA	White	Gen Cargo Multip	11	N	- Propulsion main engine – Not as required: Available some of fuel oil and lubricating oil leakages on main engine
9044700	MALTA	White	Bulk Carrier	15	N	- Aux. Engine – Not as required: Some leakages from diesel generators - Propulsion main engine – Not as required: Some leakages from the main engine
9018751	BAHAMAS	White	Bulk Carrier	1	N	–
7907477	LIBERIA	White	Container Ship	0	N	–
9110535	ANTIGUA & BARBUDA	White	Container Ship	4	N	–
7707853	GREECE	White	Ro-Ro Cargo Ship	4	Y	- Cleanliness of ER – Insufficient
8521218	ITALY	White	Ro-Ro Cargo Ship	1	N	–

### Notes:

In yellow deficiencies not classified as propulsion and auxiliary machinery major category, but related with it.

In red deficiencies bad classified

Table 2. Summary of deficiencies and action taken

MAJOR CATEGORIES OF DEFICIENCIES	NUMBER	%	ACTION TAKEN	NUMBER	%
Ship's certificates and documents	3583	5,74	As in the agreed class condition	1946	3,12
Crew certificates	2529	4,05	At an agreed repair port	543	0,87
Accommodation	1720	2,75	At the next port	4645	7,45
Accident prevention (ILO147)	1048	1,68	Before departure	15090	24,19
Food and catering	1634	2,62	Master instructed to ...	790	1,27
Working spaces and accident prevention	2562	4,10	Rectified	20670	33,14
Mooring arrangements (ILO 147)	930	1,49	Within 14 days	16938	27,16
Structural safety	5165	8,27	Within 3 months	1753	2,81
Safety of navigation	6681	10,70	Detainable def, class related	697	1,12
Fire safety measures	8631	13,82	Ground for detention	4970	7,96
Life saving appliances	6147	9,85	Not detainable	56768	90,92
Alarm signals	425	0,68	Agreed repair port informed to redetain	8	0,28
Radiocommunications	3027	4,85	Classification society informed	1185	40,96
Bulks carriers	111	0,18	Flag state informed	899	31,08
Gas and chemical carriers	214	0,34	Inspection suspended	63	2,18
Cargoes	588	0,94	MARPOL investigation	43	1,49
Load lines	3197	5,12	Next port informed	143	4,94
Propulsion & aux.	4287	6,87	Overriding priority inspection	552	19,08
Operational deficiencies	2099	3,36	Ship expelled on security grounds	-	0,00
ISM related deficiencies	2940	4,71	Competent security authority informed	164	25,79
MARPOL annex I	3270	5,24	Flag consulted	245	38,52
MARPOL annex II	40	0,06	LOW issued	4	0,63
MARPOL annex III	6	0,01	LOW withdrawn	-	0,00
MARPOL annex IV	24	0,04	Prohibition to continue an operation	11	1,73
MARPOL annex V	608	0,97	Temporary repair	157	24,69
MARPOL annex VI	17	0,03	Temporary substitution	55	8,65
MARPOL related operational deficiencies	134	0,21			
Maritime security	817	1,32			
	58851	100,00			

Table 3. Major categories of deficiencies per ship's gross tonnage and age

Categories of deficiencies	TOTAL	TOTAL-%	GT < 500	>= 500 and < 1600	GT >= 1600	< 5 years	>= 5 and < 15	>= 15 years
Accident prevention (ILO147)	1046	1,68		123	902	23	131	892
Accommodation	1709	2,74	41	157	1511	30	127	1552
Alarm signals	424	0,68	6	43	375	15	57	352
Bulks carriers	109	0,18	0	0	109	14	17	78
Cargoes	588	0,94	8	50	530	30	99	459
Crew certificates	2526	4,06	151	408	1967	219	427	1880
Fire safety measures	8611	13,83	179	857	7575	337	1432	6842
Food and catering	1626	2,61	14	167	1445	61	222	1343
Gas and chemical carriers	213	0,34	0	4	209	12	44	157
ISM related deficiencies	2931	4,71	11	349	2571	131	442	2358
Life saving appliances	6133	9,85	197	697	5239	248	1010	4875
Load lines	3186	5,12	115	375	2696	47	262	2877
Maritime security	815	1,31	5	106	704	45	167	603
MARPOL annex I	3266	5,24	56	420	2790	182	602	2482
MARPOL annex II	38	0,06	0	8	30	1	6	31
MARPOL annex III	6	0,01	0	1	5	0	3	3
MARPOL annex IV	24	0,04	0	3	21	0	7	17
MARPOL annex V	607	0,97	13	80	514	41	102	464
MARPOL annex VI	17	0,03	0	3	14	1	3	13
MARPOL related operational deficiencies	134	0,22	2	15	117	10	21	103
Mooring arrangements (ILO 147)	929	1,49	31	103	795	16	111	802
Operational deficiencies	2096	3,37	61	240	1795	121	364	1611
Propulsion & aux.	4267	6,85	69	370	3828	91	523	3653
Radiocommunications	3023	4,85	101	442	2480	143	640	2240
Safety of navigation	6669	10,71	260	1040	5369	366	1184	5119
Ship's certificates and documents	3571	5,73	132	520	2919	265	666	2640
Structural safety	5155	8,28	120	580	4455	173	642	4340
Working spaces and accident prevention	2554	4,10	51	262	2241	81	346	2127
	62273		1623	7423	53206	2703	9657	49913

Table 4. Number of deficiencies per ship's gross tonnage and age

Year-3c	Total	GT < 500	≥ 500 and < 1600	GT ≥ 1600	< 5 years	≥ 5 and < 15	≥ 15 years
<b>NATURE OF DEFICIENCIES</b>							
<b>Propulsion &amp; aux.</b>							
Auxiliary engine	946	15	102	829	17	104	825
Bilge pumping arrangements	164	1	7	156	7	19	138
Cleanliness of engine room	990	14	90	886	5	97	888
Gauges,thermometers, etc	206	3	18	185	3	25	178
Guards - fencing around dangerous machinery parts	75	5	14	56	1	8	66
Insulation wetted through (oil)	139	2	11	126	6	15	118
Other (machinery)	1171	17	94	1060	36	165	970
Propulsion main engine	527	11	33	483	14	77	436
UMS - ship	49	1	1	47	2	13	34
	4267	69	370	3828	91	523	3653