

COMPARISON OF IHM FOR CLEMENCEAU AND SAO PAULO

To gain a better understanding of the hazardous materials on board the São Paulo, the Grieg Green IHM survey is directly compared to the Bureau Veritas IHM report created for the Clemenceau, Sao Paulo's sister-ship, in 2007.

There are approximately 1622 individual rooms and 587 individual tanks on each of the vessels.

GRIEG GREEN IHM

Grieg Green rooms inspected = 201

Percentage of rooms inspected = *12%

*Note – There was no explanation within the Grieg Green IHM survey to explain why only 12% access was gained.

The following is the brief summary taken from the Grieg Green survey:

Executive Summary	Quantities	Positive
Total number of checkpoints	201	21
Total number of samples taken	111	19
Total number of visual checks	75	2
Total number of Lab tests	130	20
Lab testing for Asbestos	97	13
Lab testing for PCB	6	0
Lab testing for ODS	5	1
Lab testing for Chromium 6	6	0
Lab testing for Mercury	6	0
Lab testing for PFOS	3	0
Lab testing PCN	2	0
Lab testing for SCCP	1	0
Lab testing for PBB	1	0
Lab testing for PBDE	1	0
Lab testing for HBCDD	7	0
Lab testing for Cadmium	6	1
Lab testing for Lead	7	5

Asbestos: Asbestos and visual checks were done for asbestos and asbestos was found.

PCB's: Sampling was done for PCB's analysis and no PCB's were detected.

ODS's: Sampling was done for ODS's analysis and ODS's were detected.

Organotin Compounds: Sampling was not carried out based on information supplied (due to new paints applied).

Heavy Metals – Paint: Sampling was done for heavy metals in paint (Lead, Cadmium, Mercury, Hexavalent chromium) and was detected.

Heavy Metals – Lead: Sampling was done for lead in other materials analysis and lead was not detected.

Mercury: Visual checks were done for fluorescent tubes on board the vessel and mercury was found.

Polybrominated Biphenyl (PBB's): Sampling was done for PBBs analysis and no PBBs were detected.

Polybrominated Diphenyl Ethers (PBDE's): Sampling was done for PBDEs analysis and no PBDEs were detected.

Polychlorinated Naphthalene (PCN's): Sampling was done for PCNs analysis and no PCNs were detected.

Short Chain Chlorinated Paraffins (SCCP's): Sampling was done for SCCPs analysis and no SCCPs were detected.

Perfluorooctane Sulfonic Acids (PFOS's): Sampling was done for PFOSs analysis and no PFOSs were detected.

Hexabromocyclododecane (HBCDD): Samples were taken for HBCDD analysis and no HBCDD was detected.

Radioactive Substances): Smoke / Heat detectors were visually checked and no radioactive substances were found.

BUREAU VERITAS IHM

Bureau Veritas rooms inspected = 1325

Percentage of rooms inspected = *82%

*Note – The reason 100% of the rooms were not accessible was that several lower decks over multiple bulkheads had flooded with sea water.

Asbestos: Asbestos and visual checks were done for asbestos and asbestos was found.

PCB's: Sampling was done for PCB's analysis and PCB's were detected.

ODS's: Sampling was not done for ODS's.

Organotin Compounds: Sampling was done for organotin compounds analysis and organotin compounds were detected.

Heavy Metals – Paint: Sampling was done for heavy metals in paint (Lead, Cadmium, Mercury, Hexavalent chromium) and was detected.

Heavy Metals – Lead: Sampling was done for lead in other materials analysis and lead was detected.

Mercury: Sampling was not done for mercury within light bulbs.

Polybrominated Biphenyl (PBB's): Sampling was done for PBBs analysis and PBBs were detected.

Polybrominated Diphenyl Ethers (PBDE's): Sampling was not done for PBDEs.

Polychlorinated Naphthalene (PCN's): Sampling was not done for PCNs.

Short Chain Chlorinated Paraffins (SCCP's): Sampling was not done for SCCPs.

Perfluorooctane Sulfonic Acids (PFOS's): Sampling was not done for PFOSs.

Hexabromocyclododecane (HBCDD): Samples were not taken for HBCDD.

Radioactive Substances: Samples were not taken for radioactive substances.

DIRECT IHM SURVEY COMPARISSON

Q790 - Clemenceau			
Waste Type	Qty	Unit	Notes
Oily Water	400	Ltr	
Asbestos-Con-Water	5000	Ltr	
Rainwater	100	Ltr	
Ballast Water			
Invasive Species			
Asbestos Containing Materials (ACM's)			
Lagging - Pipes	17400	m	<ul style="list-style-type: none"> - Average nominal diameter of 65mm - The initial results of analyses showed that a system could contain asbestos in one room and not contain asbestos in an adjacent room without the external appearance changing.
Lagging - AIB	2740	m ²	<ul style="list-style-type: none"> - Average section of around 0.06 m² (300 x 200 mm) - The on board inspection shows that the insulations were homogeneous in the various rooms inspected. - Areas containing sprayed asbestos or asbestos board are to be treated as specific sites.

São Paulo			
Waste Type	Qty	Unit	Notes
Oily Water	0		
Asbestos-Con-Water	0		
Rainwater	0		
Ballast Water	0		
Invasive Species	0		
Asbestos Containing Materials (ACM's)			
Lagging - Pipes	6000	m	
Lagging - AIB	0		

Q790 - Clemenceau			
Waste Type	Qty	Unit	Notes
Insulation - Sprayed	2380	m ²	- Areas containing sprayed asbestos or asbestos board are to be treated as specific sites.
Insulation - Mattress	3920	m ²	N/A
Floor Tiles	7140	m ²	N/A
Floor insulation (cement)	N/A	/	- Prudence and the usual precautions during dismantling of cement floor slabs remain appropriate.
Floor slab & glue	N/A	/	- It is recommended that all floor slabs and glue be considered to contain asbestos.
Floor - Lino	N/A	/	- Although not a material containing asbestos, linoleum is to be treated in a specific process.
Paint	44000	m ²	N/A
Munitions Door Gaskets	N/A	/	- It is recommended that all munitions lift door gaskets be considered to contain asbestos.
Door Gaskets	N/A	/	- It is recommended that all door gaskets be considered to contain asbestos.
Bunker Deadlight Gaskets	N/A	/	- It is recommended that all bunker deadlight

São Paulo			
Waste Type	Qty	Unit	Notes
Insulation - Sprayed	0		
Insulation - Mattress	0		
Floor Tiles	0		
Floor insulation (cement)	0		
Floor slab & glue	0		
Floor - Lino	20	m ²	
Paint	0		
Munitions Door Gaskets	0		
Door Gaskets	0		
Bunker Deadlight Gaskets	0		

Q790 - Clemenceau			
Waste Type	Qty	Unit	Notes
			gaskets be considered to contain asbestos.
Pyrotechnic Locker Door Gasket	N/A	/	- It is recommended that all pyrotechnic locker door gaskets be considered to contain asbestos.
Hanger Door Gasket	N/A	/	- It is recommended that all hanger door gaskets be considered to contain asbestos.
Pipe Flange Gaskets	N/A	/	- It is recommended that all pipe flange gaskets be considered to contain asbestos.
Asbestos Felt	N/A	/	There is a high risk of presence of asbestos felt in numerous rooms, either stuck under the reinforcement plates or mixed with the original mineral wool. - Identification of those felts is not possible prior to dismantling of the insulations, therefore those felts are not identified. - It is recommended that all mineral wool insulation be considered as potentially polluted by this underlying asbestos felt.

São Paulo			
Waste Type	Qty	Unit	Notes
Pyrotechnic Locker Door Gasket	0		
Hanger Door Gasket	0		
Pipe Flange Gaskets	7800	No.	
Asbestos Felt	0		

Q790 - Clemenceau			
Waste Type	Qty	Unit	Notes
Electric Cable Stuffing Box (Grey Putty)	N/A	/	- It is recommended that all stuffing boxes be considered liable to include materials containing asbestos.
Electrical packing seal in electrical cabinet	N/A	/	- It is recommended that all electrical packing seals be considered to contain asbestos.
Materials inside electrical equipment	N/A	/	- It is recommended that all electrical equipment be considered to contain asbestos through some of its components.
Brake pads	N/A	/	- It is recommended that all rotating shaft brakes be considered to contain asbestos.
Electrical equipment insulations	N/A	/	- It is recommended that all baizes and insulations of electrical equipment be considered to contain asbestos.
Chilled water pipes	N/A	/	- It is recommended that all chilled water systems be considered to contain asbestos.
Accessories to lagged system	N/A	/	- It is recommended that all jointing pipes be considered to contain asbestos.

São Paulo			
Waste Type	Qty	Unit	Notes
Electric Cable Stuffing Box (Grey Putty)	0		
Electrical packing seal in electrical cabinet	0		
Materials inside electrical equipment	0		
Brake pads	12	No.	
Electrical equipment insulations	0		
Chilled water pipes	0		
Accessories to lagged system	0		

Q790 - Clemenceau			
Waste Type	Qty	Unit	Notes
Ventilation system felts	N/A	/	- It is recommended that ventilation frame damper felts be considered to contain asbestos regardless of the status of the ventilation system in place.
Flame arrester gasket	N/A	/	- It is recommended that flame-arrester gaskets be considered to contain asbestos regardless of the status of the ventilation system in place.
Paint	N/A	/	- It is recommended that the paintwork in the sea water tanks, oil tanks, front and rear structures and bottoms of the machine and boiler rooms be considered to contain asbestos.
Water	N/A	/	- It is recommended that all water present in the machine / propulsion / auxiliary rooms be considered to contain asbestos.
Electric Cables	N/A	/	- Specific analysis shows that it is not possible to identify visual physical characteristics enabling characterisation of the

São Paulo			
Waste Type	Qty	Unit	Notes
Ventilation system felts	0		
Flame arrester gasket	0		
Paint	0		
Water	0		
Electric Cables	0		

Q790 - Clemenceau			
Waste Type	Qty	Unit	Notes
			presence or absence of asbestos. Markings showing the type of cable are not visible
Paintwork Additives			
Lead	N/A	/	<ul style="list-style-type: none"> - It is recommended that internal paintwork be considered overall to be polluted by lead, as well as paintwork external to the block. - It is proposed that the paintwork of the hull and flight deck be considered as not being polluted by lead.
Zinc	N/A	/	- It is recommended that all paintwork be considered to contain zinc.
Tin	N/A	/	- It is recommended that monitoring of the impact of the hull on the quality of water be maintained.
Arsenic	N/A	/	- It is recommended that aerial discharges (dust) or discharges in solution be limited for all paints.
Cadmium	N/A	/	- It is recommended that aerial discharges (dust) or

São Paulo			
Waste Type	Qty	Unit	Notes
Paintwork Additives			
Lead	644723	kg	
Zinc	0		
Tin	0		
Arsenic	0		
Cadmium	0		

Q790 - Clemenceau			
Waste Type	Qty	Unit	Notes
			discharges in solution be limited for all paints.
Chromium	N/A	/	- It is recommended that aerial discharges (dust) or discharges in solution be limited for all paints.
Nickel	N/A	/	- It is recommended that aerial discharges (dust) or discharges in solution be limited for all paints.
Strontium	N/A	/	- It is recommended that aerial discharges (dust) or discharges in solution be limited for all paints.
Copper	N/A	/	- It is recommended that the evolution of the hull paintwork be monitored. - It is recommended that monitoring of the impact of the hull on the quality of water be maintained. - It is proposed that interior paintwork be considered to be overall not very polluted by copper, as well as the paintwork external to the block.
PCB, PCT, PBB			

São Paulo			
Waste Type	Qty	Unit	Notes
Chromium	0		
Nickel	0		
Strontium	0		
Copper	0		
PCB, PCT, PBB			

Q790 - Clemenceau			
Waste Type	Qty	Unit	Notes
Electric Cables	N/A	/	- It is recommended that the electric cables be considered to be polluted by PCBs. Specific precautions are to be taken concerning cutting and handling (possible presence of asbestos, a generic problem with cables of the time).
Paint (General)	N/A	/	<p>- It is recommended that the grey paint of the plant rooms or voids be considered to be polluted by PCBs, as well as the paint burnt under the cuts realised previously.</p> <p>- It is proposed that the exterior paint be considered to be free from PCB. Precautions are, however, to be taken regarding waste during any cutting.</p> <p>- It is proposed that the paint from accommodation areas be considered to be free from PCB. Precautions are, however, to be taken regarding waste during any cutting.</p>

São Paulo			
Waste Type	Qty	Unit	Notes
Electric Cables	0		
Paint (General)	0		

Q790 - Clemenceau			
Waste Type	Qty	Unit	Notes
Paint (Burnt)	N/A	/	- Specific precautions are to be taken for the cutting and handling of plates.
Gaskets	N/A	/	- It is recommended that linoleum coverings and rubber gaskets be considered to be polluted by PCB. - It is recommended that the electronic boards containing condensers and the neon condensers be treated using the specialist procedures.
Foam	N/A	/	- It is recommended that linoleum coverings and rubber gaskets be considered to be polluted by PCB. - It is recommended that the electronic boards containing condensers and the neon condensers be treated using the specialist procedures.
Lino	N/A	/	- It is recommended that linoleum coverings and rubber gaskets be considered to be polluted by PCB. - It is recommended that

São Paulo			
Waste Type	Qty	Unit	Notes
Paint (Burnt)	0		
Gaskets	0		
Foam	0		
Lino	0		

Q790 - Clemenceau			
Waste Type	Qty	Unit	Notes
			the electronic boards containing condensers and the neon condensers be treated using the specialist procedures.
Brake linings	N/A	/	<ul style="list-style-type: none"> - It is recommended that linoleum coverings and rubber gaskets be considered to be polluted by PCB. - It is recommended that the electronic boards containing condensers and the neon condensers be treated using the specialist procedures.
Other Haz Materials			
Plastics	N/A	/	
Sealed Gases	N/A	/	
Mercury	N/A	/	
Lead Batteries	N/A	/	
Cobalt	N/A	/	- The presence of CO in the sonar well of unknown origin must be noted.
Oily Rags	N/A	/	- The oily rags of the propulsion energy compartments are to be treated as products containing asbestos.

São Paulo			
Waste Type	Qty	Unit	Notes
Brake linings	0		
Other Haz Materials			
Plastics	0		
Sealed Gases	0		
Mercury	10000	No.	Light bulbs
Lead Batteries	0		
Cobalt	0		
Oily Rags	0		

Q790 - Clemenceau			
Waste Type	Qty	Unit	Notes
Electric Cable Casings	N/A	/	- It is recommended that waste consisting of piles of electric cables casings be treated as PCB material.
General Rubbish	50	t	- It is recommended that the various waste sacks be treated as material containing asbestos.
Refrigerator Units			
CfC	N/A	/	
ODS (Foam)	N/A	/	
Radioactive Equip			
Luminescent plates	N/A	/	- It is recommended that the various luminescent plates be treated as material containing a radioactive source.
Other			
MMMF	150	t	
Calcium	180	t	
Vernadium Brick	408	t	Within the boilers
Vermin Control	N/A	/	
Micro Organisms	N/A	/	
Marine Growth	N/A	/	

São Paulo			
Waste Type	Qty	Unit	Notes
Electric Cable Casings	0		
General Rubbish	0		
Refrigerator Units			
CfC	0		
ODS (Foam)	3412	kg	
Radioactive Equip			
Luminescent plates	0		
Other			
MMMF	0		
Calcium	0		
Vernadium Brick	0		
Vermin Control	0		
Micro Organisms	0		
Marine Growth	0		