Management of lead in paint in selected Asian and Pacific Countries

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Outline

1. **Background on lead in paint**
2. **Standards, regulations, and legislations in selected Asian and Pacific Countries**
3. **A case study -Sri Lanka**
4. **Challenges**
5. **Recommendations**

Background

Lead is a toxic metal harmful to humans and other life forms. Leaded ingredients have been used in gasoline and in paint industry over several decades around the world.

- **Exposure to lead is much more harmful to children than adults, and the health effects are generally irreversible and can have a lifelong impact.**
- **Evidence of reduced intelligence caused by childhood exposure to lead has led the WHO to list "lead caused mental retardation" as a recognized disease.**
- **Lead from paint is recognized as one of the major sources of childhood lead exposure.**

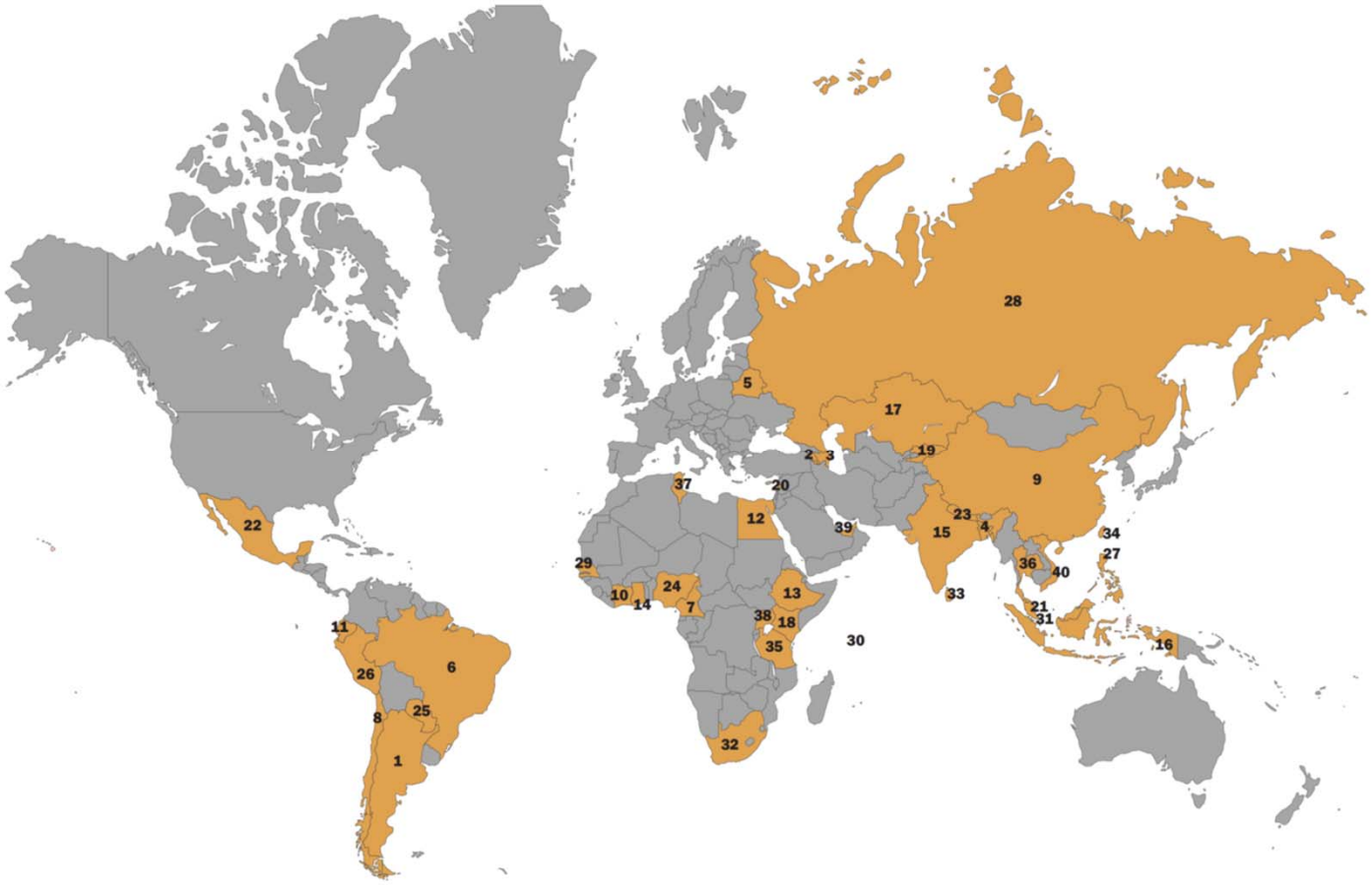
UNEP, IPEN. LEAD IN ENAMEL DECORATIVE PAINTS-NATIONAL PAINT TESTING RESULTS: A NINE COUNTRY STUDY. 2013

Sources of Lead in Paint-Pigments

- Pigments are used to give the paint its color; make the paint opaque so that it covers well; and protect the paint and the underlying surface from degradation caused by exposure to sunlight.

- Lead compounds commonly used as paint pigments include: lead chromates, lead oxides, lead molybdates, lead sulfates and others.

Where are lead paints still sold?



- **The use of lead in paints is not regulated in some of the developing countries;**
- **In many countries in Asia and the Pacific, the standards are either voluntary or there is no legal framework for restricting lead level in paints.**

Lead-Based Decorative Paints Where Are They Still Sold—and Why? Environmental Health Perspective. 2014, 122(4).

Why are stricter standards needed in the region?

There is a need for formulating stricter and mandatory standards for lead in paints for the following good reasons:

- There is an ever increasing market for decorative household paints in the region;
- The impact of lead poisoning has been well established, especially in children and unborn fetuses; and,
- Since the voluntary standards have been blatantly ignored by most in the industry, there is a need for legal and regulatory deterrents

Global actions on lead in paint

Global Alliance to Eliminate Lead Paint

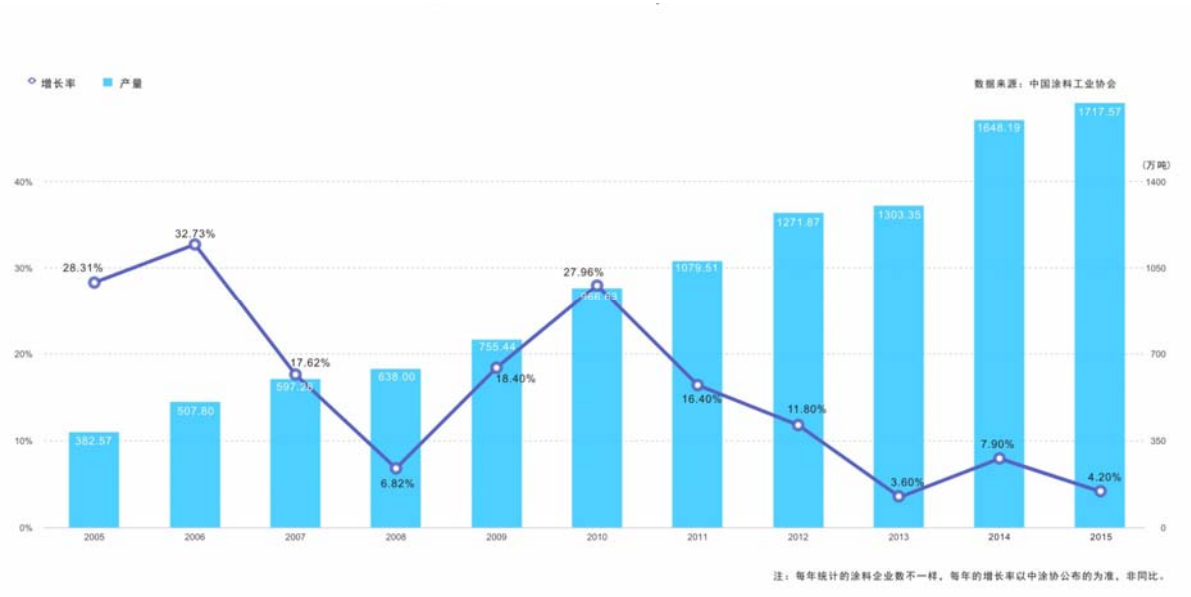
- Many highly industrialized countries enacted laws, regulations or mandatory standards to protect the health of their people in the **1970s** and **1980s**. These laws generally prohibit the manufacture, import, sale or use of lead paint for interiors or exteriors of homes, schools and commercial buildings.
- The standard adopted by the United States imposes an upper limit of **90 ppm** on total lead (dry weight) for house paints and many other paint categories. Other countries have adopted mandatory limits in the range of **90 to 600 ppm** total lead (dry weight).

Standards, regulations, and legislations in selected Asian and Pacific Countries

Lead in paints in China

- Since 1994, Pb and Cr paint has begun to be restricted in Europe, USA and other developed countries;
- Some international paint manufactures transfered their production to mainland China, and the production of Pb and Cr paint in China has greatly increased since then；
- In 2011, the production and sales of Pb and Cr paint in China were 52699.9 tonnes and 49779.3 tonnes, respectively.

The production and rate of paint in China (2005-2015)



In 2015, the total production of paint in China was about 17.2 million tonnes, accounting for 28% of the global production.

http://www.tushi366.com/news/industry/2016/0328/1448.shtml

Management of lead in paint in China

- **In many developing countries, lead paint is a main source of endangering the environment and human health. China is one of these countries, which are still producing and selling lead paint.**

- **At the end of the 12th Five-Year Plan, Chinese Ministry of Industry and Information Technology (MIIT) is actively preparing a program of phasing out the lead paint.**

China National Coatings Industry Association, China Coatings Industry Technology Innovation Alliance. The 13th Five-year Plan in Coatings Industry in China (I). CHINA COATINGS, 2016,31(3):1-12.

Management of lead in paint in China

Preliminary and basic research on management of lead in paint was conducted in China.

- "The 12th five-year plan for the prevention and control of heavy metal pollution" included " Phasing down the production and use of lead paints, coating and solder".
- Many lead compounds (such as PbO, Pb_3O_4, PbAc, basic lead carbonate, lead stearate, lead naphthenate, lead isocaprylate, lead octoate, et al.) were listed in "Product catalog of "High pollution and high environmental risk"" ;
- Encourage industry to develop better and safer substitutes, prevent children contacting lead paint and reduce occupational exposure.

Management of lead in paint in China

- **Related standards on lead in paints of highly related to public have been issued, such as Indoor decorating and refurbishing materials, building interior and exterior wall coatings, automobile coatings and toy coatings et al. However,**

- Standards for industrial coating, such as bridge and engineering machine coatings are still lacked;
- Standard system of lead in paint is slowly updated and disordered. The national standards, industrial standards and provincial standards are usually overlapped and repeated;
- Although related standards are issued by Chinese government, lead paint are still being produced and used, because of various manufactures and monitoring difficulty.

Standards for lead in paints in China

At present, main enforced national standards for paint and coating industry are GB 18581-2009 and GB 18582-2008.

GB 18582-2008: Indoor decorating and refurbishing materials-limits of harmful substances of interior architectural coatings

项　　目		限量值	
		水性墙面涂料[a]	水性墙面腻子[b]
可溶性重金属/(mg/kg) ≤	铅 Pb	90	
	镉 Cd	75	
	铬 Cr	60	
	汞 Hg	60	

[a] 涂料产品所有项目均不考虑稀释配比。

[b] 膏状腻子所有项目均不考虑稀释配比；粉状腻子除可溶性重金属项目直接测试粉体外，其余3项按产品规定的配比将粉体与水或胶黏剂等其他液体混合后测试。如配比为某一范围时，应按照水用量最小、胶黏剂等其他液体用量最大的配比混合后测试。

ICS 87.040
G 51

中华人民共和国国家标准

GB 18582—2008
代替 GB 18582—2001

室内装饰装修材料
内墙涂料中有害物质限量

Indoor decorating and refurbishing materials—
Limit of harmful substances of interior architectural coatings

2008-04-01 发布　　2008-10-01 实施

中华人民共和国国家质量监督检验检疫总局
中国国家标准化管理委员会　发布

Standards for lead in paints in China

GB18581-2009: Indoor decorating and refurbishing materials-Limit of harmful substance of solvent based for woodware.

表 1　有害物质限量的要求

项　目		限　量　值				
		聚氨酯类涂料		硝基类涂料	醇酸类涂料	腻子
		面漆	底漆			
挥发性有机化合物（VOC）含量[a]/(g/L) ≤		光泽(60°)≥80，580 光泽(60°)<80，670	670	720	500	550
苯含量[a]/% ≤		0.3				
甲苯、二甲苯、乙苯含量总和[a]/% ≤		30		30	5	30
游离二异氰酸酯（TDI、HDI）含量总和[b]/% ≤		0.4		—	—	0.4 （限聚氨酯类腻子）
甲醇含量[a]/% ≤		—		0.3	—	0.3 （限硝基类腻子）
卤代烃含量[a,c]/% ≤		0.1				
可溶性重金属含量（限色漆、腻子和醇酸清漆）/(mg/kg) ≤	铅 Pb	90				
	镉 Cd	75				
	铬 Cr	60				
	汞 Hg	60				

[a] 按产品明示的施工配比混合后测定。如稀释剂的使用量为某一范围时，应按照产品施工配比规定的最大稀释比例混合后进行测定。

[b] 如聚氨酯类涂料和腻子规定了稀释比例或由双组分或多组分组成时，应先测定固化剂（含游离二异氰酸酯预聚物）中的含量，再按产品明示的施工配比计算混合后涂料中的含量。如稀释剂的使用量为某一范围时，应按照产品施工配比规定的最小稀释比例进行计算。

[c] 包括二氯甲烷、1,1-二氯乙烷、1,2-二氯乙烷、三氯甲烷、1,1,1-三氯乙烷、1,1,2-三氯乙烷、四氯化碳。

ICS 87.040
G 51

GB

中华人民共和国国家标准

GB 18581—2009
代替 GB 18581—2001

室内装饰装修材料
溶剂型木器涂料中有害物质限量

Indoor decorating and refurbishing materials—Limit of harmful substances of solvent based coatings for woodenware

2009-09-30 发布　　2010-06-01 实施

中华人民共和国国家质量监督检验检疫总局
中国国家标准化管理委员会　发布

Standards for paint for toys in China

GB6675-2014: Toy safety

玩具材料	元素/(mg/kg 玩具材料)							
	锑 (Sb)	砷 (As)	钡 (Ba)	镉 (Cd)	铬 (Cr)	铅 (Pb)	汞 (Hg)	硒 (Se)
造型黏土	60	25	250	50	25	90	25	500
其他玩具材料(除造型黏土和指画颜料)	60	25	1 000	75	60	90	60	500
注：指画颜料特定元素的迁移见特定要求标准。								

Lead in paint in other Asia and the Pacific Countries

Comparisons of lead levels in new paints by color, brand and country (ppm)

Color	Brand	India	Malaysia	Singapore
Yellow	A	159,200[b]	—	408
Green	A	39,200	—	35
Brown	A	10,980	—	50
Yellow	B	—	149,100	47[c]
Green	B	—	24,200	35
Yellow	C	[d]	<9	<9

C.S. Clarka, K.G. Rampal, V. Thuppil et al. The lead content of currently available new residential paint in several Asian countries. Environmental Research. 2006,102(1): 9-12.

Regulations for lead in Paint in typical countries of the world

Country	Standard Limit	Regulatory Body
Western world		
USA	**300ppm** for children's products **90ppm** for paints	US Consumers Product Safety Commission, Washington DC, January 2009
European Union	1000ppm, moving gradually to lead-phase out	European Union Restriction of Hazardous Substances Directive, February 2003
Canada	**90ppm**	Consumer Product Safety Bureau, Health Canada, June 2005
Australia and New Zealand	**90ppm** **25ppm** for finger paints	Consumer Product Safety Standard, Standards Australia, January 2009
Asia		
China	**600ppm** Revised to **90ppm**	China National Paints and Pigments Standardization Technical Committee, December 2009
India	No limit exists	Bureau of Indian Standards, IS 15489:2004
	Voluntary **1000ppm** in paints	Bureau of Indian Standards, Eco-Mark (optional) under IS 15489:2004
Sri Lanka	**600ppm** (attempting to revise this to 90ppm)	Sri Lanka Standards Institute
Nepal	**90ppm**	Ministry of Science Technology and Environment (MOSTE)
Bangladesh	No legal provision	Bangladesh Standards and Testing Institution

Investigating Lead (Pb) Content In Leading Enamel Paint Brands In South Asia. 2011. Study by: Toxics Link, New Delhi, Environment and Social Development Organization-ESDO, Bangladesh, Center for Public Health and Enviro

Data from Asia and the Pacific Countries for Lead in New Enamel Decorative Paints

Country	Year of Study/Report	Number of Samples	Average, ppm Lead	Per cent of Samples greater than 90 ppm Lead	Per cent of Samples greater than 600 ppm Lead	Per cent of Samples greater than 10,000 ppm Lead
Bangladesh	2011	6	42,300	100%	100%	83%
China	2006	64	15,100	44%	33%	25%
China	2008	58	/	/	50%	/
India	2009	25	32,700	72%	72%	64%
Indonesia	/	11	14,800	82%	73%	36%
Malaysia	2009	72	24,500	60%	50%	39%
Nepal	2011	12	28,400	67%	33%	33%
Philippines	2009	15	28,400	67%	60%	27%
Thailand	2010	31	13,000	87%	84%	55%
Sri Lanka	2015	56	/	/	46%	21%

UNEP/IPEN (2013). LEAD IN ENAMEL DECORATIVE PAINTS-NATIONAL PAINT TESTING RESULTS: A Nine Country Study.

A case study -Sri Lanka

Lead in paint in Sri Lanka

Lead gasoline was banned in Sri Lanka in 2003. However, there were no mandatory lead standard in Sri Lanka until it was gazetted in 2011.

Paint Test Results in Sri Lanka (2013 and 2015)

Year	Number	Highest concentration	Higher than 600 ppm	Lower than 600 ppm
2013	**97**	**131,000**	**50%**	**50%**
2015	**56**	**44,000**	**46%**	**54%**

Eranda Rathnamalala, Sara Brosché, Valerie Denney. Centre forNational Report-2015 Lead in new household enamel paints in Sri Lanka.2013 and 2015

Management of Lead in paint in Sri Lanka

- Since January 1st, 2013, Sri Lanka has a mandatory standard in force which limits the lead content of household paints to **600 ppm,**while some paints used by children and toys were limited to **90 ppm**.

- Decorative paints with high lead levels are still being sold in Sri Lanka even after the legislation passed by the Consumer Affairs Authority came into force at the beginning of 2013.

Regulatory limits for different types of paints in Sri Lanka

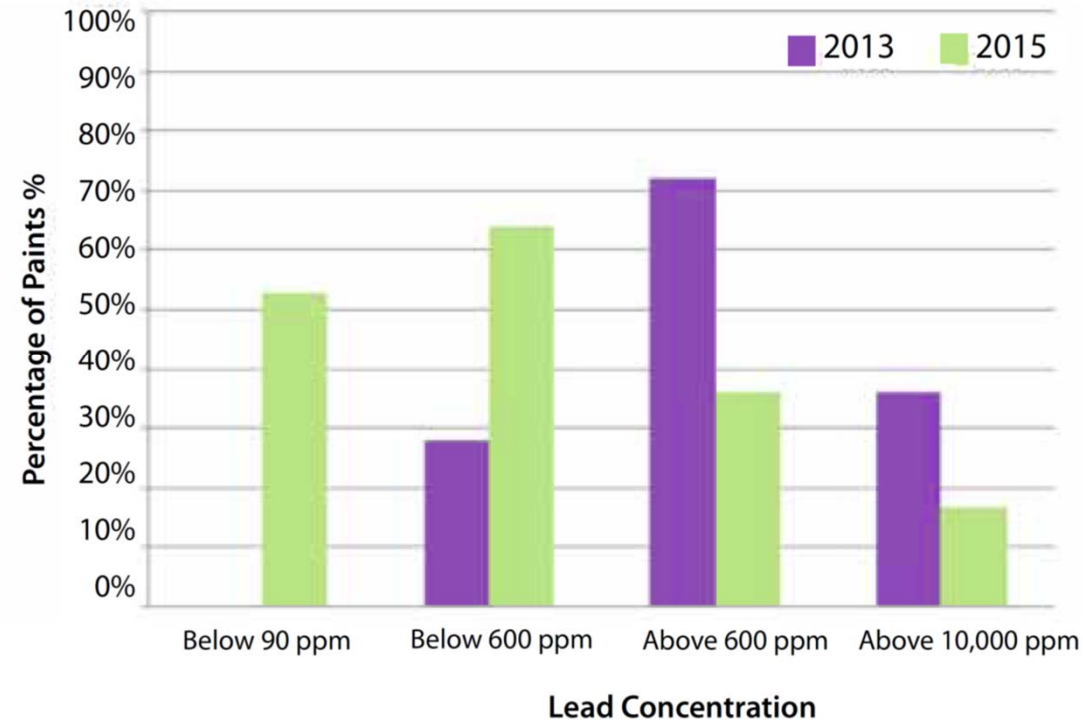
On 15 Aug. 2014, Consumer Affairs Authority (CAA) published new labeling requirements on government gazette, which required decorative paint manufacturers and traders to legibly print the total lead content in each container or pack by September 2014, while specifying regulatory limits for different types of paints.

Paints for Toys and Accessories for Children (Soluble in HCl acid)	- 90 mg/kg
Enamel Paints	- 600 mg/kg
Emulsion Paints for Exterior use	- 90 mg/kg
Emulsion Paints for Interior use	- 90 mg/kg
Floor Paints	- 600 mg/kg

1 mg/kg corresponds to 1 part per million (ppm)

Eranda Rathnamalala, Sara Brosché, Valerie Denney. Centre forNational Report-2015 Lead in new household enamel paints in Sri Lanka. 2015

Lead content of paints included in both the 2013 and the 2015 study grouped into concentration categories



- **The percentage of paints complying with the Sri Lankan legal standard (600 ppm) has increased since 2013;**
- **In addition, the percentage of paints with a lead content below 90 ppm has also increased.**

Eranda Rathnamalala, Sara Brosché, Valerie Denney. Lead in New Household enamel paints in Sri Lanka. 2015

Challenges

- Paints with extremely high levels of lead are still available in many countries (lead concentrations higher than 10,000 ppm);
- The regulation of lead in paints in the region is quite lax with countries like Bangladesh having no legal mechanism to address this issue;
- In most countries with lead paint, equivalent paint with non-lead is available, but lead paint are still being produced and sold;

Challenges

- Paint majors have made tall claims regarding their voluntary move to sell lead-free decorative paints, independent studies suggest that the majority of them still enjoy the regulatory system with its many loopholes;

- Different countries in this region don’t have comparable standards, although they have overlapping business interests and rowing public health concerns.

Recommendations

- Appropriate national legal instruments and regulations should be adopted to phasing-out the manufacture, import, export, sale and use of lead in paint;
- Monitoring programs and strong enforcement measures need to be established;
- Labelling on lead content and lead dust hazards on paint container should be considered as a part of regulations;

Recommendations

- Provide incentives to paint companies to swiftly transition from lead to non- lead paint production;
- Comparable standards in the region need to be established;
- Awareness about the hazards of lead paint needs to inform consumers in the region.

The 11th International Conference on Waste Management and Technology (ICWMT11)

Topics of ICWMT11

- Industrial solid waste comprehensive utilization
- Construction and demolition waste disposal and utilization
- Regional chemicals management and emergency response
- Contaminated site remediation and environmental supervision
- Solid waste management and greenhouse gas reduction
- Final sinks
- Technology transfer

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Thanks for your
attention!