



# NATIONAL REPORT ON **LEAD IN ENAMEL** HOUSEHOLD PAINTS IN BANGLADESH - 2015

*A follow-up study of lead levels in paints analyzed in 2013*



Environment and Social  
Development Organization-ESDO

National Report

On

## Lead in Enamel Household Paints in Bangladesh-2015

### Editorial Team:

Valerie Denney, Dr. Sara Brosche, Dr. Scott Clark

Dr. Shahriar Hossain, Siddika Sultana

### Research Team:

Siddika Sultana, Pratitee Kamal

Mahbub Alam, Md. Kawser Uddin Maruf

### Support Team:

Md. Mamun ul Hasan, Md. Ali Hossain, Amena Begum Ruma

Produced as part of the Asian Lead Paint Elimination Project

Supported by the European Union's SWITCH Asia Programme

Copyright© ESDO & IPEN, 2015, all rights reserved.

### Disclaimer

"While this publication has been produced with the assistance of the European Union, the contents of the publication are the sole responsibility of Environment and Social Development Organization- ESDO together with IPEN, and can in no way be taken to reflect the views of the European Union. In addition, this report was produced with financial contributions from the Swedish Environment Protection Agency and Swedish public development co-operation aid through the Swedish Society for Nature Conservation, SSNC. The views herein shall not necessarily be taken to reflect the official opinion of any of these donors, including SSNC or its donors."

Printed on unbleached paper with vegetable based ink

**Layout:** Valerie Denney, Dr. Sara Brosche, Dr. Shahriar Hossain

**Photo:** Dr. Shahriar Hossain

**Printed by:** S.A Printers Limited, 1/1 Sheikh Shaheb Bazar, Azimpur, Dhaka.

### Contact Address

House# 8/1, Level# 5, Block #C, Lalmatia, Dhaka-1207, Bangladesh

Phone: 880-2-912-2729 Fax: 880-2-913-0017, E-mail: info@esdo.org

Web: www.esdo.org



Environmental and Social Development Organization (ESDO) is a partner organization of the Asia Lead Paint Elimination Project, a project of IPEN.



IPEN is an international organization promoting safe chemical policies and practices that protect human health and the environment.



This project is funded by the European Union. Delegation of the European Union. The European Commission is the EU's executive body.

**NATIONAL REPORT  
ON  
LEAD IN ENAMEL  
HOUSEHOLD PAINTS  
IN BANGLADESH - 2015**

*A follow-up study of lead levels in paints analyzed in 2013*

## ACKNOWLEDGMENT

We take this opportunity to thank all those who were instrumental in compiling and shaping this paint study.

Sincere thanks go to the European Union for providing funding support. We express our gratitude to IPEN for its counsel and guidance in the writing and review of this document. We also acknowledge the great efforts of all of our IPEN NGO partners in Asia and around the world working for lead paint elimination.

This report was produced as part of the Asian Lead Paint Elimination Project. The Asian Lead Paint Elimination Project was established to eliminate lead in paint and raise wide spread awareness among business entrepreneurs and consumers about the adverse human health impacts of lead-based household enamel paints, particularly on the health of children under six years old.

The Asian Lead Paint Elimination Project is being implemented by IPEN over a period of three years in seven countries (Bangladesh, India, Indonesia, Nepal, Philippines, Sri Lanka, and Thailand) with funding from the European Union (EU) totaling 1.4 million Euros.

We also acknowledge the Swedish Environment Protection Agency and Swedish public development co-operation aid through the Swedish Society for Nature Conservation, SSNC for providing financial contribution for conducting this study.

Finally, ESDO is grateful to Bangladesh Paint Manufacturers Association (BPMA), Department of Environment (DoE) and to other stakeholders for their continuous support and effective participation.



Environmental and Social Development Organization-ESDO is a partner organization of the Switch Asia Lead Paint Elimination Project, a project of IPEN

House # 8/1, Level # 5, Block # C, Lalmatia, Dhaka-1207, Bangladesh.  
Phone: 880-2-912-2729, Fax: 880-2-913-0017, E-mail: [info@esdo.org](mailto:info@esdo.org)  
URL: [www.esdo.org](http://www.esdo.org) [www.facebook.com/esdobd](https://www.facebook.com/esdobd)

# TABLE OF CONTENTS

Preface	1
Executive Summary	2
Findings	3
Recommendation	4
1. Background	5
1.1 Health and Economic impact of lead exposure	5
1.2 The Use of Lead in Paint	7
1.3 Paint Market & Regulatory Framework in Bangladesh	8
1.4 Lead Paint Regulatory Framework in Bangladesh	9
1.5 Initiatives to Establish a Lead Paint Standard	9
1.6 Initiatives taken by ESDO	10
2. Materials and Methods	12
3. Results	14
4. Discussion & Conclusions	17
Abbreviations	18
Appendix-A	19
Appendix-B	33

# LIST OF FIGURES AND TABLES

## Figures

Figure 1: Major paint brands in Bangladesh (by market share)	8
Figure 2: Photos of the sampling process	12
Figure-3: Photos of different activities of paint sampling procedure	33
Figure-4: Photos of slide preparation	34
Figure-5: Photos Signature campaign and public awareness on lead paint	35
Figure-6: Photos of the consultation with paint manufacturers	36

## Tables

Table 1: Comparison of lead concentrations in 49 paints between 2013 and 2015	15
Table 2: Lead concentrations in 2013 and 2015 by color	15
Table 3: Results of Lab Analysis of the Solvent-based Enamel Paints Not Previously Studied	16
Table A1: Solvent-based, enamel paints Included in the study	19
Table A2: Results of the analysis of the solvent-based, enamel paints Included in the study	22
Table A3: Paint Brands that contained lead less than 90 ppm in 2012-2013	24
Table A4: Comparison of lead levels in paints analyzed both in 2015 and 2013	25
Table A5: Consumer Information about Lead on Paint Cans	32

## PREFACE

Leaded paints for home use continue to be widely produced, sold, and used in developing countries despite the fact that most highly industrial countries banned leaded house paints more than 40 years ago.

In 2007 and 2008, NGOs in the IPEN network collected and analyzed decorative (home use) paints on the market in 11 developing countries, and in countries with economies in transition. The results were startling. In every one of these countries, many of the paints had dangerously high lead content. In response, IPEN launched a worldwide lead paint elimination campaign. Since then, IPEN-affiliated NGOs and others have sampled and analyzed paints on the market in approximately 40 low- and middle-income countries.<sup>1</sup> In every country where there was no law or regulation prohibiting it, the paints had high, and often dangerously high, lead contents.

This 2015 National Report on Lead Paint presents new data on the lead content of decorative enamel paints that are offered for sale in the Bangladeshi market. This is the second time that ESDO has analyzed paints sold in Bangladesh for their lead content. The previous study was conducted in 2012-2013 (90 enamel paints from 34 brands), where it was found that a majority of solvent-based, enamel decorative paint brands sold in Bangladesh (almost two-thirds of the paints sampled, or 64% contained high levels of lead above 600 ppm). This study also found that 26 paints (29%) contained low levels of lead less than 90 ppm.

The 2015 National Report on Lead Paint was conducted in 2014-2015 and analyzed 56 enamel paints from 24 brands that had high lead levels in the 2012-13 studies. Paints that contained less than 90-ppm lead in the previous study were not included. This analysis found that 43 of 56 solvent-based enamel decorative paints (77%) contained lead above 90 ppm. Thirteen analyzed paints (23%) had levels below 90 ppm. Thirty-two of 38 bright colored paints (84%), such as red and yellow, contained lead levels greater than 90 ppm. Nineteen of these (or 34 % of all paints analyzed) had dangerously high lead content greater than 10,000 ppm.

In addition to new data on lead in paint, the report also presents background information on why the present and former use of decorative enamel paints with high lead content is a source of serious concern, especially to children's health. It also proposes action steps by different stakeholders to protect children and others from lead paint and lead dust.

---

<sup>1</sup> Information about the indicated countries and studies can be found at [ipen.org](http://ipen.org)

## EXECUTIVE SUMMARY

While lead exposure is also harmful to adults, lead exposure harms children at much lower levels, and the health effects are generally irreversible and can have a lifelong impact. The younger the child, the more harmful lead can be, and children with nutritional deficiencies absorb ingested lead at an increased rate. The human fetus is the most vulnerable, and a pregnant woman can transfer lead that has accumulated in her body to her developing child. Lead is also transferred through breast milk when lead is present in a nursing mother.

Evidence of reduced intelligence caused by childhood exposure to lead has led the World Health Organization (WHO) to list “lead-caused mental retardation” as a recognized disease. WHO also lists it as one of the top ten diseases whose health burden among children is due to modifiable environmental factors.

Most highly industrial countries adopted laws or regulations to control the lead content of decorative paints—the paints used on the interiors and exteriors of homes, schools, and other child-occupied facilities—beginning in the 1970s and 1980s. In Bangladesh, lead paint regulation was enacted in 1995 under Sec. 6A of the Environment Conservation Act, 1995, “Restrictions on manufacture, sale etc. of articles injurious to environment.” Based on this regulation, ESDO is discussing with the appropriate government agencies how to enact a specific regulation and standard for lead paint production and marketing.

Paint analysis conducted in Bangladesh in 2010 revealed that samples from 24 of the 29 decorative paints analyzed contained concentrations from 800 parts per million (ppm, dry weight of paint) to 14,200 ppm lead. A study conducted by ESDO in 2012-13, found a somewhat different situation. In 2012-13, all paints analyzed from five paint brands, including market leaders Berger and Asian paints, contained less than 90ppm lead.

Nevertheless, nearly two-thirds of the paints sampled in 2012-13 had lead concentrations above 600 ppm and would not be permitted for sale or use in most highly industrialized countries.

In 2014-15, ESDO purchased a total of 56 cans of solvent-based enamel decorative paint from stores in Dhaka and Chittagong in Bangladesh. The paints were from 24 paint brands. Most of the brands (22 of 24 brands) selected for analysis were chosen because they were shown to contain lead above 90 ppm in the 2012-13 studies. The objective was to determine whether lead levels in paint sold in Bangladeshi markets had changed since the initial study in 2012-13. An accredited laboratory in Europe for their total lead content analyzed all paints, based on dry weight of the paint.

Both the 2012-13 and the 2014-15 paint studies were undertaken as part of the Asian Lead Paint Elimination Project. The Asian Lead Paint Elimination Project carries out focused activities to eliminate lead paint from the market in seven project countries – Bangladesh, India, Indonesia, Nepal, Philippines, Sri Lanka, and Thailand.

## FINDINGS

### The paint market has shifted significantly in Bangladesh

- 5 brands of paints now sell paint with lead content levels below 90 ppm; 7 brands – 85% of the paint market – sell paint with lead content levels below 600 ppm and could be sold in most countries where there are regulations limiting lead in paint. This demonstrates that paint with low lead content can be produced cost-effectively in Bangladesh and that companies are willing and able to make the shift.
- The number of paints with lead levels below 90 ppm has increased since the last paint study in 2012-13.
- 2 paint brands (Elite and Roxy) with high lead levels in 2012-2013 showed significantly reduced lead levels (below 600 ppm) in all paints analyzed.

### But paints with high levels of lead are still widely available

- The number of paints with lead levels above 10,000 ppm was about the same in both the 2012-13 and the current study. Lead levels remained dangerously high in 15 brands, with one or more paints with levels above 10,000 ppm (Pailac, Romana, Good Luck, Mayna, Moon Moon, Al Hossain, Eurolac, Monilac, Moon Star, Ujala, Paramex, Raaz, Paintex, Rangs, Anchor).
- While there were fewer analyzed samples above 90 and 600 ppm in the current study when compared to the 2012-2013 study, 19 out of 22 brands still sold paints with a lead content above 600 ppm.
- Lead reductions were the greatest in red paints with 9 of 17 paints with lead levels below 600 ppm in the current study, compared to 2 red paints at this level in the 2012-13. Lead levels in yellow paints showed the least change with only 2 paints of the 17 paints with high lead levels in the 2012-13 studies now below 600 ppm.

## RECOMMENDATION

Government should establish a national regulatory framework to control the manufacture, import, export, sale, and use of lead paints and products coated with lead paint immediately. In the design of the regulatory framework, consideration should be given to the inclusion of provisions for compliance, monitoring, and enforcement. Special attention should be given to the elimination of lead decorative paints and lead paints for other applications most likely to contribute to childhood lead exposure.

### For the government and relevant agencies

- The Government of Bangladesh should enact a standard for limiting of maximum lead content in paints, imported and produced, in Bangladesh to fifty (50) parts per million (ppm, dry weight of paint) in the period of 2015-2017 under Sec. 6A of the Environment Conservation Act 1995 and the Sec. 7, 7A, 7B, 8 and 12 of Environment Conservation Rule 1997.
- Develop training programs for painters and others on work practices that minimize lead dust hazards.
- Introduce regulations to stop the import and supply of lead pigment.
- Conduct a mass awareness campaign on the hazard of lead in paint.

### For paint manufacturers

- Stop importing lead pigment and lead-oxide or red- lead primer in Bangladesh. Take possible initiatives to reduce duty fee on importing toxic-free raw materials (e.g., zirconium drier, lead free pigments) easily so that all manufacturers can be beneficial to produce lead free and eco-friendly paints. If possible consultation and meeting with minister of finance, minister of industries.
- Cooperate in establishing a reliable third-party certification system to ensure the paints sold in the market meets the acceptable standard of 50 ppm or less.
- Adopt third-party certification ensuring low lead levels for their paint brands.
- Review workplace health and safety protocols and enforcement to prevent occupational exposure to lead.
- Develop awareness and lead safe work practice guidance directed towards customers.
- Investigate effluent treatment practices and the release of lead pigment into the environment.
- Organize a training session for SME's on the issue for their practical learning.
- Public awareness.
- Choose lead free paints where available. Focus on identifying the manufacturing date, and look for information about lead content.
- Identify surfaces at places such as schools and childcare centers where children are likely to have high exposure to the paint and ensure lead free paint is used in these areas.
- Be aware of hazards of lead paint when renovating or re-painting and methods to avoid lead exposure.

# 1. BACKGROUND

## 1.1 Health and Economic Impact of Lead Exposure

Children are exposed to lead from paint when deteriorating paint on walls, windows, doors, or other painted surfaces begins to chip or deteriorate and lead is released to dust and soil. When a surface previously painted with lead paint is sanded or scraped in preparation for repainting, very large amounts of lead-contaminated dusts also are produced and spread and can constitute a severe health hazard.<sup>2</sup>

Children playing indoors or outdoors get house dust or soil on their hands, and then ingest it through normal hand-to-mouth behavior. If the house dust or the soil is contaminated with lead, the children ingest lead. Hand-to-mouth behavior is especially prevalent in children aged six years and under, the age group most easily harmed by exposure to lead. A typical one- to six-year-old child ingests between 100 and 400 milligrams of house dust and soil each day.<sup>3</sup>

In some cases, children pick up paint chips and put them directly into their mouths. This can be especially harmful because the lead content of chips is typically much higher than what is found in dust and soils. When toys, household furniture, or other articles are painted with lead paint, children may chew on them and directly ingest the lead-contaminated, dried paint. Nonetheless, the most common way that children ingest lead is through lead-contaminated dust and soil that gets onto their hands.<sup>4</sup>

While lead exposure is also harmful to adults, lead exposure harms children at much lower levels, and the health effects are generally irreversible and can have a lifelong impact.<sup>5</sup> The younger the child, the more harmful lead can be, and children with nutritional deficiencies absorb ingested lead at an increased rate.<sup>6</sup> The human fetus is the most vulnerable, and a pregnant woman can transfer lead that has accumulated in her body to her developing child.<sup>7</sup> Lead is also transferred through breast milk when lead is present in a nursing mother.<sup>8</sup>

Once lead enters a child's body through ingestion, inhalation, or across the placenta, it has the potential to damage a number of biological systems and pathways. The primary target is the central nervous system and the brain, but lead can also affect the blood system, the kidneys, and the skeleton.<sup>9</sup>

---

<sup>2</sup> Clark, S., Grote, J., Wilson, J., Succop, P., Chen, M., Galke, W. and McLaine, P. (2004) Occurrence and determinants of increases in blood lead levels in children shortly after lead hazard control activities, *Environmental Research*. 96, 196-205.

<sup>3</sup> World Health Organization, *Childhood Lead Poisoning*, page 18. <http://www.who.int/ceh/publications/leadguidance.pdf> (2010)

<sup>4</sup> Lanphear, B. P., Matte, T. D., Rogers, J., Clickner, R. P., Dietz, B., Bornschein, R. L., Succop, P., Mahaffey, K. R., Dixon, S., Galke, W., Rabinowitz, M., Farfel, M., Rohde, C., Schwartz, J., Ashley, P. and Jacobs, D. E. (1998) The contribution of lead-contaminated house dust and residential soil to children's blood lead levels, *Environmental Research*. 79, 51-68.

<sup>5</sup> World Health Organization, *Childhood Lead Poisoning*, page 12 <http://www.who.int/ceh/publications/leadguidance.pdf> (2010)

<sup>6</sup> World Health Organization, *Childhood Lead Poisoning*, page 48 <http://www.who.int/ceh/publications/leadguidance.pdf> (2010)

<sup>7</sup> Bellinger D, Leviton A, Waternaux C, et al. 1987. Longitudinal analyses of prenatal and postnatal lead exposure and early cognitive development. *N. Engl. J. Med.* 316:1037-43.

<sup>8</sup> Bjorklund, K. L., Vahter, M., Palm, B., Grander, M., Lignell, S. and Berglund, M. (2012) Metals and trace element concentrations in breast milk of first time healthy mothers: a biological monitoring study, *Environmental Health*. 11.

<sup>9</sup> Needleman, H. (2004) Lead Poisoning, *Annual Review of Medicine*. 55, 209-222.

It is generally agreed that one key element in lead toxicity is its capacity to replace calcium in neurotransmitter systems, proteins, and bone structure, altering function and structure and thereby leading to severe health impacts. Lead is also known to affect and damage cell structure.<sup>10</sup>

According to the World Health Organization (WHO), “Lead has no essential role in the human body, and lead poisoning accounts for about 0.6% of the global burden of disease.”<sup>11</sup> Evidence of reduced intelligence caused by childhood exposure to lead has led WHO to list “lead-caused mental retardation” as a recognized disease. WHO also lists it as one of the top ten diseases whose health burden among children is due to modifiable environmental factors.<sup>12</sup>

In recent years, medical researchers have been documenting significant health impacts in children from lower and lower levels of lead exposure.<sup>13, 14</sup> According to WHO, “There is no known safe level of exposure to lead.”<sup>15</sup>

When a young child is exposed to lead, the harm to her or his nervous system makes it more likely that the child will have difficulties in school and engage in impulsive and violent behavior.<sup>16</sup> Lead exposure in young children is also linked to increased rates of hyperactivity, inattentiveness, failure to graduate from high school, conduct disorder, juvenile delinquency, drug use, and incarceration.<sup>17</sup> Lead exposure’s impacts on children continue throughout life and have a long-term impact on a child’s work performance, and—on average—are related to decreased economic success.

---

<sup>10</sup> Verstraeten, S.V., et al, Aluminium and lead: molecular mechanisms of brain toxicity, (Archives of Toxicology 82:789–802. DOI 10.1007/s00204-008-0345-3, 2008)

<sup>11</sup> World Health Organization, Childhood Lead Poisoning, 2010, page 11: <http://www.who.int/ceh/publications/leadguidance.pdf>

<sup>12</sup> A. Prüss-Üstün and C. Corvalán, World Health Organization, Preventing Disease Through Healthy Environments: Towards an estimate of the environmental burden of disease, 2006, page 12: [http://www.who.int/quantifying\\_ehimpacts/publications/preventingdisease.pdf](http://www.who.int/quantifying_ehimpacts/publications/preventingdisease.pdf)

<sup>13</sup> Herbert Needleman, Lead Poisoning, (Annual Review of Medicine 2004, [http://www.rachel.org/files/document/Lead\\_Poisoning.pdf](http://www.rachel.org/files/document/Lead_Poisoning.pdf))

<sup>14</sup> World Health Organization, Childhood Lead Poisoning, page 26 (citing the work of Lanphear et al., 2000): <http://www.who.int/ceh/publications/leadguidance.pdf>, 2010

<sup>15</sup> World Health Organization, Frequently Asked Questions, International Lead Poisoning Awareness Campaign, Week of Action, 19-25 October, 2014, page 1: [http://www.who.int/ipcs/lead\\_campaign/faq\\_lead\\_poisoning\\_prevention\\_campaign\\_en.pdf?ua=1](http://www.who.int/ipcs/lead_campaign/faq_lead_poisoning_prevention_campaign_en.pdf?ua=1)

<sup>16</sup> Mielke, H.W. and Zahran, S., The urban rise and fall of air lead (Pb) and the latent surge and retreat of societal violence (Environment International. 43 (2012) 48-55)

<sup>17</sup> World Health Organization, Childhood Lead Poisoning, page 28: <http://www.who.int/ceh/publications/leadguidance.pdf>, 2010

A recent study investigating the economic impact of childhood lead exposure on national economies in all low- and middle-income countries estimated a total cumulative cost burden of \$977 billion international dollars<sup>18</sup> per year.<sup>19</sup> The study considered the neuro developmental effects on lead-exposed children, as measured by reduced IQ points, and it correlated lead exposure-related reductions in children's IQ scores to reductions in lifetime economic productivity, as expressed in lifelong earning power. The study identified many different sources of lead exposure in children, with lead paint as one major source. Broken down by region, the economic burden of childhood lead exposure as estimated by this study was:

Africa: \$134.7 billion of economic loss, or 4.03% of Gross Domestic Product (GDP)

Latin America and the Caribbean: \$142.3 billion of economic loss, or 2.04% of GDP

Asia: \$699.9 billion of economic loss, or 1.88% of GDP

## 1.2 The Use of Lead in Paint

Lead is a toxic metal that is found in some paints.

Paints contain lead when the paint manufacturer intentionally adds one or more leaded compounds to the paint for some purpose. A paint product may also contain some amount of lead when paint ingredients contaminated with lead are used, or when there is cross-contamination from other product lines in the same factory. Water-based paints are rarely contaminated with lead, but solvent-based enamel paints have been found to have high lead content in many countries.<sup>20</sup>

The leaded compounds most commonly added to paints are pigments. Pigments are used to give the paint its color, make the paint opaque (so it covers well), and protect the paint and the underlying surface from degradation caused by exposure to sunlight. Lead-based pigments are sometimes used alone, and sometimes used in combination with other pigments.

Leaded compounds also may be added to enamel paints for use as driers (sometimes called drying agents or catalysts). Leaded compounds are also sometimes added to paints used on metal surfaces to inhibit rust or corrosion. The most common of these is lead peroxide, sometimes called red lead or minimum.

---

<sup>18</sup> An International dollar is a currency unit used by economists and international organizations to compare the values of different currencies. It adjusts the value of the U.S. dollar to reflect currency exchange rates, purchasing power parity (PPP), and average commodity prices within each country. According to the World Bank, "An international dollar has the same purchasing power over GDP as the U.S. dollar has in the United States." The international dollar values in this report were calculated from a World Bank table that lists GDP per capita by country based on purchasing power parity and expressed in international dollars. The data from the table (at: <http://data.worldbank.org/indicator/NY.GDP.PCAP.PP.CD>) was accessed by the report's authors in February 2012.

<sup>19</sup> Teresa M. Attina and Leonardo Trasande, Economic Costs of Childhood Lead Exposure in Low- and Middle-Income Countries, (Environmental Health Perspectives; DOI:10.1289/ehp.1206424; <http://ehp.niehs.nih.gov/1206424/>).

<sup>20</sup> See e.g. Brosché, S., Denney, V., Weinberg, J., Calonzo, M. C., Withanage, H. and Clark, C. S. (2014) Asia Regional Paint Report Clark, C. S., Rampal, K. G., Thuppil, V., Chen, C. K., Clark, R. and Roda, S. (2006) The lead content of currently available new residential paint in several Asian countries, Environmental Research. 102, 9-12.

Non-lead pigments, driers, and anti-corrosive agents have been widely available for decades, and are used by manufacturers producing the highest quality paints. When a paint manufacturer does not intentionally add lead compounds in the formulation of its paints, and takes care to avoid the use of paint ingredients that are contaminated with lead, the lead content of the paint will be very low—less than 90 parts per million (ppm) total lead by dry weight and frequently down to 10 ppm or less.

Most highly industrial countries adopted laws or regulations to control the lead content of decorative paints—the paints used on the interiors and exteriors of homes, schools, and other child-occupied facilities—beginning in the 1970s and 1980s. Many also imposed controls on the lead content of paints used on toys and for other applications likely to contribute to lead exposure in children. These regulatory actions were taken based on scientific and medical findings that lead paint is a major source of lead exposure in children, and that lead exposure in children causes serious harm, especially to children aged six years and under.

The use of lead in production of decorative paint is prohibited in the European Union through regulations related to safety of consumer products and specific prohibitions for most leaded raw materials. In the U.S., Canada, Australia and other countries with regulations restricting the use of leaded ingredients in decorative paint, standards specifying a maximum lead limit are in place. The current standard for household paints in the U.S. and Canada is 90 ppm, and adherence to this ensures that a manufacturer can sell its paint anywhere in the world. Some other countries have established standards of 600 ppm.

### 1.3 Paint Market and Regulatory Framework in Bangladesh

Paint Market in Bangladesh

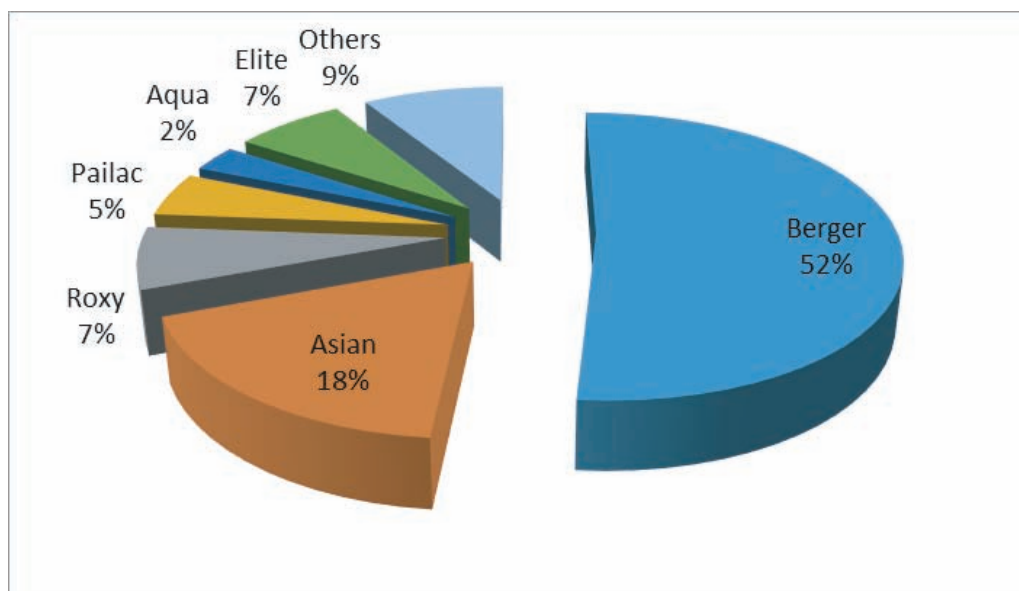


Figure 1: Major paint brands in Bangladesh (by market share)

The size of the Bangladesh Paint industry is more than BDT 20 billion, (approx. 0.26 billion USD). Forty-one formal/structured and 20+ non-structured paint manufacturers sell paints in Bangladesh. Berger, Asian, Roxy, Pailac, Aqua, and Elite are the major players and command an almost 90% market share (Figure 1). Three enamel decorative paint brands (Alfa, FMC, Jotun) are newly engaged in paint production in Bangladesh. Berger Paints alone holds 52% market share, followed by Asian Paints with 18% market share, Roxy 7%, Pailac 5%, Aqua 2%, and Elite Paints 7%. Other, small and medium-sized enterprises (SMEs) altogether occupy 9% of market share. Together, all these companies produce 77,000 MT of paints annually, although the demand of the country is nearly 98,000 MT. The per capita paint consumption of the country is approximately 260 grams.<sup>21</sup>

## 1.4 Lead Paint Regulatory Framework in Bangladesh

In Bangladesh, though a regulation was enacted in 1995 under Sec. 6A of the Environment Conservation Act 1995, which placed “Restrictions on manufacture, sale etc. of articles injurious to environment,” there is no specific regulation limiting the lead content in paint. In addition to this, Sec. 7, 7A, 7B, 8 and 12 of Environment Conservation Rule 1997 can give the governmental departments the power to implement a standard for limiting maximum lead content in paints.

ESDO has developed a draft guideline consistent with these regulations, which includes a ban on the import of lead containing raw materials, pigments, driers and finished paints. It also includes a complete ban on lead content in paint production, sale, import and illegal trade of household, decorative and industrial paints.

## 1.5 Initiatives to Establish a Lead Paint Standard

ESDO’s goal is to eliminate lead paint in Bangladesh by 2017 by promoting the establishment of a standard for lead content in paint of 50 ppm by the end of 2015. To achieve these goals, ESDO held a number of productive consultations, meetings with paint manufacturers, the paint manufacturers association and policy makers in Bangladesh on the issue of lead in paint throughout 2014. Government departments showed a positive response in support of the formulation of legislation under the law of Bangladesh, including the Ministry of Environment and Forest (MoEF), Ministry of Health & Family Welfare (MoH & FW), Ministry of Commerce (MoC), BCSIR (Bangladesh Council of Scientific and Industrial Research) and DPHE (Department of Public Health Engineering).

---

<sup>21</sup> Information taken from the annual report of Bangladesh Paint Manufacturers Association, 2014, written up by "Problem in Paint Industry in Bangladesh " by B.B. Saha Roy

## 1.6 Initiatives taken by ESDO

### High level consultation to formulate regulation in near future with government departments

- ESDO successfully organized a high level consultation with the Ministry of Environment and Forests (MoEF) to submit a petition and to urge a professional commitment in favor of lead paint regulation. ESDO also build up strong communication with MoH & FW, MoC, DoE and NIPSOM to adopt third party certification and take protective precautionary steps to prevent occupational exposure.

### Consultations and regular meetings with manufacturers, secretary general and other persons to build support for a national policy to ban the use of lead in paint

- ESDO organized a consultation program on “Certification and Eco-labeling of Lead free Paints in Bangladesh” with Bangladesh Paint Manufacturers Association (BPMA). Representatives from different Bangladesh paint manufacturers agreed to the necessity of lead free paint manufacturing for the sake of health and environmental safety. In addition, every participant confidently said that they need to establish lead free paint industries to ensure eco-friendly products. The recommendations made by the consultation program were mainly to produce and use lead free paint to secure public health & safe environment and work so that Bangladesh can fly the first flag as a lead free paint country in South Asia.
- ESDO organized another consultation program on “Certification and Eco-labeling of Lead free Paints in Bangladesh” with Bangladesh Paint Manufacturers Association (BPMA) and Mr. Perry Gottesfeld, executive director of Occupational Knowledge International, expert advisor to the Asian Lead Paint Elimination Project on third-party certification, and an international expert on product certification programs. The objectives of this consultation program were to encourage paint manufacturers to adopt lead free paint production; to raise widespread awareness among all paint industries about the hazardous effects of lead-based paints on the health and environment; and to encourage manufacturers to adopt a third party certification scheme for lead safe paints. Representatives from different paint manufacturers of Bangladesh once again agreed to the necessity of lead free paint manufacturing for the sake of health and environmental safety. BPMA’s President said that Bangladesh is now producing water based paints which are 100% lead free and has been maintaining contact and communication with respective government ministries in order to reach the goal of lead free paints, according to the methods recommended by ESDO. All thanked ESDO for taking this important initiative in Bangladesh. Every participant also willingly said that they need to establish lead free paint industries to ensure eco-friendly products, though they were not yet ready to commit to third party certification.
- ESDO organized a meeting with General Secretary of BPMA and the Executive Director of Roxy Paints to discuss on the upcoming joint activities for promoting lead free paint among SMEs, and limiting the use of lead in paint by the end of 2015.

- Most recently, ESDO met with the “Ministry of Finance Department” to discuss with Finance Minister banning the importation, sale, manufacture and use of lead-based paint and pigments in favor of superior and safe, duty free lead dryers and alternatives. ESDO also proposed that the president of BPMA consult with Minister of Finance and Minister of industries on the issue of the high cost of imported paint ingredients and possible duty free lead dryers.
- In summary, the manufacturers association as a whole supports complete elimination of lead use in paint manufacturing. And the manufactures are agreed to working for a lead paint standard of 50 ppm.

### Awareness campaigns

- ESDO also conducted a signature and public awareness campaign in 2014 in order to submit a petition to Government in support of legislation and a standard for lead in household paints. Approximately 3000 signatures were collected in just three days from six different locations of Dhaka city of Gulshan, Banani, University of Dhaka, New market, Dhanmondi, Kawran Bazar.
- The ESDO team involved Green Club (an initiative of Green Youth Citizen Program of ESDO) in organizing a media campaign on Lead Free Paint in 2014. Children and youth formed a human chain in front the National Press Club demanding an immediate ban on lead-based household decorative paints and shared flyers about the dangers of lead in paint with the public.
- ESDO, in association with GAELP, organized different activities to observe the ‘International Lead Poisoning Prevention Week of Action in both 2013 and 2014 along with hundreds of countries around the world and with support of the World Health Organization (WHO) and United Nations Environment Programme (UNEP). ESDO activities included:
  - Human chain
  - Children’s art competition
  - Launching of IEC materials (highlighting the impact of leaded paint to human health & environment)
- ESDO campaigned through its web site, social, electronic and print media by posting the latest updates, news, pictures and IEC materials.
- Most recently, ESDO produced a short documentary that focuses on banning the importation, manufacture, and use of lead based paint and pigments in Bangladesh and promotes superior and safe alternatives.

## 2. MATERIALS AND METHODS

From November 2014 and January 2015, the Bangladeshi NGO, ESDO, purchased 56 cans of enamel decorative paints from various stores in Dhaka and Chittagong. 24 manufacturers produced these paints from 24 different brands. In most cases, ESDO selected one white paint and one or more bright-colored paints such as yellow and red. The availability of these paints in retail establishments suggested that, they were intended to use within home environment. Excluded were automotive and industrial paints that are not typically used for domestic housing applications or for painting toys.

Figure 2: Photos of the sampling process



Materials for paint sampling



Each sample was stirred before sampling



Staffs used a new paint brush and avoided cross contamination of the samples during the sample slide preparation



Samples were left to dry before being sent to lab for testing

During the paint sample preparation, information such as color, brand, countries where manufactured, purchase details, and the date manufactured as provided on the label of the paint can was recorded. The formats used for date of manufacturer varied with some companies providing day, month and year and others providing only month and year. In addition, some paint companies used only a single word to describe some colors, such as “red,” while others used “bright red.” Colors were recorded as provided on the can. For the red and yellow paints the protocol called for obtaining “bright” or “strong” red and yellow paints when available. Dates of purchase were recorded in the day/ month/year format in most cases.

Paint sampling preparation kits containing individually numbered, untreated wood pieces, single-use paintbrushes and stirring utensils made from untreated wood sticks were assembled and shipped to the ESDO by the staff of the IPEN partner NGO, Arnika, in the Czech Republic.

Each can of paint was thoroughly stirred and paint was subsequently applied onto individually numbered triplicates of untreated wood pieces using different, unused, single-use paintbrushes by the staff of ESDO.

Each stirring utensil and paintbrush was used only once, and extra caution was taken to avoid cross contamination. All samples were then allowed to dry at room temperature for five to six days. After drying, the painted wood pieces were placed in individual resalable plastic bags and shipped to an ELPAT (Environmental Lead Proficiency Analytical Testing program) accredited lab in Europe for analysis of total lead content of dry weight of the paint. The paint samples were analyzed using method CPSC-CH-E1003-09 (Inductively Coupled Plasma (ICP) spectroscopy, as recognized both by WHO and the United States Consumer Product Safety Commission as appropriate for the purpose.<sup>22, 23</sup>

---

<sup>22</sup> WHO Library Cataloguing-in-Publication Data (2011). Brief guide to analytical methods for measuring lead in paint. [http://www.who.int/ipcs/assessment/public\\_health/lead\\_paint.pdf](http://www.who.int/ipcs/assessment/public_health/lead_paint.pdf)

<sup>23</sup> United States Consumer Product Safety Commission, Directorate for Laboratory Sciences, Division of Chemistry (2009). Test Method: CPSC-CH-E1003-09 Standard Operating Procedure for Determining Lead (Pb) in Paint and Other Similar Surface Coatings <https://www.cpsc.gov/PageFiles/128129/CPSC-CH-E1003-09.pdf>

### 3. RESULTS

A total of 56 cans of new enamel decorative paint from 24 paint manufacturers were purchased in Dhaka and Chittagong in Bangladesh and analyzed for their lead content. Of these, 49 paints from 22 manufacturers had been previously analyzed for their lead content in 2012-13 in the first round of sampling in the Asian Lead Paint Elimination Project.

Since ESDO began studying the lead content of paints and raising awareness of the hazards of lead paint, in 2009, most paint brands with the largest market share have shown significant reduction in the amount of lead to less than 90 ppm and so most of these paint brands were not included in this study (Please see Table A4 in Appendix A for these brands). Key findings from this latest lead paint analysis include:

#### The paint market has shifted significantly in Bangladesh

- 5 brands of paints now sell paint with lead content levels below 90 ppm; 7 brands – 85% of the paint market – sell paint with lead content levels below 600 ppm and could be sold in most countries where there are regulations limiting lead in paint. This demonstrates that paint with low lead content can be produced cost-effectively in Bangladesh and that companies are willing and able to make the shift.
- The number of paints with lead levels below 90 ppm has increased since the last paint study in 2012-13.
- 2 paint brands (Elite and Roxy) with high lead levels in the 2012-13 study showed significantly reduced lead levels (below 600 ppm) in all paints analyzed.

#### But paints with high levels of lead are still widely available

- The number of paints with lead levels above 10,000 ppm was about the same in the 2012-13 studies and the current study. Lead levels remained dangerously high in 15 brands, with one or more paints with levels above 10,000 ppm (Pailac, Romana, Good Luck, Mayna, Moon Moon, Al Hossain, Eurolac, Monilac, Moon Star, Ujala, Paramex, Raaz, Paintex, Rangs, Anchor).
- While there were fewer analyzed samples above 90 and 600 ppm in the current study when compared to the 2012-13 studies, 19 out of 22 brands still sold paints with a lead content above 600 ppm.
- Lead reductions were the greatest in red paints with 9 of 17 paints with lead levels below 600 ppm in the current study, compared to 2 red paints at this level in the 2012-13 study. Lead levels in yellow paints showed the least change with only 2 paints of the 17 paints with high lead levels in 2012-13 now below 600 ppm.

**Table 1. Comparison of lead concentrations in 49 paints between 2013 and 2015**

Year	Number of paints with lead content below 90 ppm	Number of paints with lead content above 90 ppm	Number of paints with lead content above 600 ppm	Number of paints with lead content above 10,000 ppm
2013	0	49	46	18
2015	9	40	33	17

Yellow paints had the highest lead concentration in both the 2012-13 and 2014-15 studies. Of the paints analyzed both in 2012-13 and 2014-15, 17 were yellow, 17 were red and 15 were white. Two yellow paints, 9 red paint and 5 white paints had a lead content of less than 600 ppm in 2014-15. All white paints analyzed in both studies now contained lead below 10,000 ppm, while 14 yellow paints and 3 red paints contained lead levels that exceeded 10,000 ppm.

**Table 2: Lead concentrations in 2013 and 2015 by color**

Color	Number of Samples	Average lead content (ppm)		% Paints above 90 ppm		% Paints above 600 ppm		% Paints above 10,000 ppm		Min lead content (ppm)		Max lead content (ppm)	
		2013	2015	2013	2015	2013	2015	2013	2015	2013	2015	2013	2015
Yellow	17	43,400	35,700	100%	100%	100%	88%	100%	82%	5,400	169	1,23,000	73,000
Red	17	5,030	3,930	100%	76%	100%	47%	100%	18%	44 <sup>0</sup>	<5	27,000	27,000
White	15	4,450	3,050	100%	67%	100%	67%	100%	0%	148	<5	11,900	9,600

\* Overall results for all paints analyzed in 2014-15

- 43 of 56 solvent-based enamel decorative paints analyzed (77%) contained lead above 90 ppm. Nineteen of these (or 34 % of all paints analyzed) had dangerously high lead content greater than 10,000 ppm.
- 13 of analyzed paints (23%) contained lead levels below 90 ppm.
- 32 of 38 bright colored paints (84%), such as red and yellow, contained lead levels greater than 90 ppm.

However some companies did produce red and yellow paints with lead levels below 90 ppm, suggesting that technology exists in Bangladesh among small and medium-sized companies to reduce lead paint in bright colored paints.

## Results for solvent-based enamel paints not previously analyzed

Seven solvent-based enamel paints that had never previously been analyzed were included in this study, representing four brands. All the colors (yellow, red and white) of Jotun and the white paint from Raaz had a lead content below 90 ppm. Lead concentration levels in paints from Alfa (white, yellow and red paint) and FMC (white paint) ranged from 4,000 ppm to 85,000 ppm. The highest concentration (85,000 ppm) was found in yellow color paint of Alfa brand.

**Table 3: Results of Lab Analysis of the Solvent-based Enamel Paints Not Previously Studied**

Sample Number	Brand Name	Color of Paint	Lead content (ppm)	Country of Brand Head-quarters	Country Where Manufactured	Is there information on can about lead content of paint?
BGD-238	Raaz	White	12	Bangladesh	Bangladesh	No
BGD-239	Alfa	Yellow	85,000	Bangladesh	Bangladesh	No
BGD-240	Alfa	Red	10,100	Bangladesh	Bangladesh	No
BGD-242	FMC	White	5,590	Bangladesh	Bangladesh	No
BGD-250	Jotun	White	15	Bangladesh	Bangladesh	No
BGD-251	Jotun	Yellow	12	Bangladesh	Bangladesh	No
BGD-252	Jotun	Red	12	Bangladesh	Bangladesh	No

*\*\* Yellow and Red paints of Raaz and FMC and White paint of Alfa are out of production*

## 4. DISCUSSION & CONCLUSIONS

In Bangladesh, lead paint regulation was enacted in 1995 under Sec. 6A of the Environment Conservation Act, 1995, “Restrictions on manufacture, sale etc. of articles injurious to environment.” Based on this regulation, ESDO is discussing with the appropriate government agencies how to enact a specific regulation and standard for lead paint production and marketing.

ESDO began studying the lead content of paints sold in Bangladesh in 2010. By 2013, the paint brands with the largest market share reduced lead in most paints sold to 90- 600 ppm. Brands representing 84% of total market share now sell paint that would meet the most stringent regulation anywhere in the world.

Nevertheless, this study demonstrates that paint with lead levels exceeding 600 ppm continue to be sold by small and medium-sized manufacturers representing 16% of the paint market. These producers often face special barriers in shifting to low lead products and may require additional technical information, better access to suppliers of non-lead paint ingredients and other types of help in re-formulating their products.

The World Health Organization (WHO) calls lead paint “a major flashpoint” for children’s potential lead poisoning and says that “since the phase-out of leaded petrol, lead paint is one of the largest sources of exposure to lead in children.” Children are exposed to lead, when painted surfaces deteriorate over time and contaminate household dust and soils. Children, ages 0-6, engaging in normal hand-to-mouth behaviors are most at risk of damage to their intelligence and mental development from exposure to lead dust and soil.

We should be aware of the hazards of lead paint when renovating or re-painting activities and methods to avoid lead exposure; ESDO team believes, by making awareness and proper guidelines of lead in paint, banning of the import and use of lead in Bangladesh is an emerging demand; so the paint industries should come forward and stop using lead in paint production. They can encourage and aware the consumers on the lead free paint thus can make a better and sustainable environment for our future generation.

## ABBREVIATIONS

BPMA	Bangladesh Paint Manufacturers Association
DoE	Department of Environment
DPHE	Department of Public Health Engineering
ESDO	Environment and Social Development Organization
EU	European Union
GAELP	Global Alliance for Eliminating Lead Paint
IPEN	International POPs Elimination Network
MNCs	Multi-National Corporations
ppm	parts per million
SMEs	Small and Medium Enterprises
UNEP	United Nations Environment Programme
WHO	World Health Organization
ELPAT	Environmental Lead Proficiency Analytical Testing program
ICP	Inductively Coupled Plasma (ICP) spectroscopy

## Appendix-A

Table A1. Solvent-based, enamel paints Included in the study

Sample ID	Brand Name	Color of Paint	Paint Can Size (Liter)	Price of	Date manufactured	Batch no (if given)	Date of Purchase	Is there website on label?
				purchase (local currency) [Enter price of one liter can in brackets]				
<b>BGD-200</b>	Pailac	Yellow	0.45	150	----	4.2.2013	12.11.2014	----
<b>BGD-201</b>	Pailac	Red	0.91	292	----	581/05	12.11.2014	----
<b>BGD-202</b>	Pailac	White	0.91	292	----	663/07	12.11.2014	----
<b>BGD-203</b>	Romana	Yellow	0.455	150	----	663/07	12.11.2014	----
<b>BGD-204</b>	Romana	Red	0.455	150	----	663/07	12.11.2014	----
<b>BGD-205</b>	Romana	White	0.455	150	----		12.11.2014	----
<b>BGD-208</b>	Elite	Yellow	0.455	150	----	K2901171_X	13.11.2014	----
<b>BGD-209</b>	Elite	Red	0.455	128	----	K2901172_X	13.11.2016	----
<b>BGD-210</b>	Elite	White	0.455	128	----	K2901170_X	13.11.2017	----
<b>BGD-211</b>	Al Karim	Yellow	0.45	150	----		20.12.2014	----
<b>BGD-212</b>	Good luck	Red	0.455	125	----		20.12.2014	----
<b>BGD-213</b>	Good luck	White	0.455	125	----		20.12.2014	----
<b>BGD-214</b>	Mayna	Yellow	0.455	130	----		12.12.2014	----
<b>BGD-215</b>	Moon moon	Yellow	0.455	135	----		12.12.2014	----
<b>BGD-216</b>	Moon moon	Red	0.455	135	----		12.12.2014	----
<b>BGD-217</b>	Moon moon	White	0.455	135	----		21.12.2014	----
<b>BGD-218</b>	Rollic	Yellow	0.46	135	----		24.12.2014	----
<b>BGD-219</b>	Rollic	Red	0.46	135	----		24.12.2014	----
<b>BGD-220</b>	Rollic	White	0.46	135	----		24.12.2014	----

Sample ID	Brand Name	Color of Paint	Paint Can Size (Liter)	Price of purchase (local currency) [Enter price of one liter can in brackets]	Date manufactured	Batch no (if given)	Date of Purchase	Is there website on label?
<b>BGD-221</b>	Al Hossain	Yellow	0.45	155	----		09.12.2014	----
<b>BGD-222</b>	Al Hossain	Red	0.45	155	----		09.12.2014	----
<b>BGD-223</b>	Al Hossain	White	0.45	155	----		09.12.2014	----
<b>BGD-224</b>	Eurolac	Yellow	0.91	150	----		04.12.2014	----
<b>BGD-225</b>	Eurolac	Red	0.91	250	----		04.12.2014	----
<b>BGD-226</b>	Eurolac	White	0.455	150	----		04.12.2014	----
<b>BGD-227</b>	Monilac	Yellow	0.45	140	----		08.12.2014	----
<b>BGD-228</b>	Monilac	Red	0.45	140	----		08.12.2014	----
<b>BGD-229</b>	Monilac	White	0.45	140	----		08.12.2014	----
<b>BGD-230</b>	Moon star	Yellow	0.455	160	----		08.12.2014	----
<b>BGD-231</b>	Moon star	Red	0.455	160	----	14.11.13	08.12.2014	----
<b>BGD-232</b>	Moon star	White	0.455	160	----	14.11.35	08.12.2014	----
<b>BGD-233</b>	Ujala	Yellow	0.91	230	----	13-	09.12.2014	----
<b>BGD-234</b>	Paramex	Yellow	0.455	145	----		15.12.2014	----
<b>BGD-235</b>	Paramex	Red	0.455	145	----		15.12.2014	----
<b>BGD-236</b>	Paramex	White	0.455	145	----		15.12.2014	----
<b>BGD-237</b>	Raaz	Yellow	0.455	145	----		24.12.2014	----
<b>BGD-238</b>	Raaz	White	0.455	145	----		24.12.2014	----
<b>BGD-239</b>	Alfa	Yellow	0.45	160	----		13.12.2014	----
<b>BGD-240</b>	Alfa	Red	0.45	160	----		13.12.2014	----
<b>BGD-241</b>	Alfa	White	0.45	160	----		13.12.2014	----

Sample ID	Brand Name	Color of Paint	Paint Can Size (Liter)	Price of purchase (local currency) [Enter price of one liter can in brackets]	Date manufactured	Batch no (if given)	Date of Purchase	Is there website on label?
<b>BGD-242</b>	FMC	White	0.45	127	----	G29D003A	12.12.2014	----
<b>BGD-243</b>	Paintex	White	0.91	250	----		05.01.15	----
<b>BGD-244</b>	Paintex	Yellow	0.91	250	----		05.01.15	----
<b>BGD-245</b>	Paintex	Red	0.91	250	----		05.01.15	----
<b>BGD-246</b>	Rangs	Yellow	0.455	115	----		05.01.15	----
<b>BGD-247</b>	Rangs	Red	0.455	115	----		05.01.15	----
<b>BGD-248</b>	Aqua	White	0.91	245	----	BN 2663	15.01.2015	----
<b>BGD-249</b>	Aqua	Red	0.455	102	----	3.84E+08	15.01.2015	----
<b>BGD-250</b>	Jotun	White	0.91	330	----	DD344002	15.01.2015	----
<b>BGD-251</b>	Jotun	Yellow	0.91	330	----	DD3240007	15.01.2015	----
<b>BGD-252</b>	Jotun	Red	0.91	330	----	DD3840005	15.01.2015	----
<b>BGD-253</b>	German	White	450	145	----		15.01.2015	----
<b>BGD-254</b>	Anchor	Yellow	0.455	122	----		15.01.2015	----
<b>BGD-255</b>	Anchor	Red	0.455	122	----		15.01.2015	----
<b>BGD-256</b>	Anchor	White	0.455	122	----		15.01.2015	----
<b>BGD-257</b>	Deer	Red	0.455	150	----		15.01.2015	----
<b>BGD-258</b>	Roxy	Yellow	0.455	127	----		18.01.2015	----
<b>BGD-259</b>	Roxy	Red	0.455	160	----		18.01.2015	----

**\*\* BGD-206, BGD-207, BGD-211, BGD-248 these samples were discarded during the processing due to overlapping**

Table A2. Results of the analysis of the solvent-based, enamel paints Included in the study

Sample ID	Brand Name	Color of Paint	Lead content (ppm)	Country of Brand Head-quarters	Country Where Manufactured	Is there information on can about lead content of paint?
BGD-200	Pailac	Yellow	60,000	Bangladesh	Bangladesh	-----
BGD-201	Pailac	Red	54	Bangladesh	Bangladesh	-----
BGD-202	Pailac	White	17	Bangladesh	Bangladesh	-----
BGD-203	Romana	Yellow	34,000	Bangladesh	Bangladesh	-----
BGD-204	Romana	Red	27,000	Bangladesh	Bangladesh	-----
BGD-205	Romana	White	636	Bangladesh	Bangladesh	-----
BGD-208	Elite	Yellow	169	Bangladesh	Bangladesh	-----
BGD-209	Elite	Red	45	Bangladesh	Bangladesh	-----
BGD-210	Elite	White	<10	Bangladesh	Bangladesh	-----
BGD-212	Good luck	Red	12,752	Bangladesh	Bangladesh	-----
BGD-213	Good luck	White	6,764	Bangladesh	Bangladesh	-----
BGD-214	Mayna	Yellow	48,000	Bangladesh	Bangladesh	-----
BGD-215	Moon moon	Yellow	33,550	Bangladesh	Bangladesh	-----
BGD-216	Moon moon	Red	551	Bangladesh	Bangladesh	-----
BGD-217	Moon moon	White	953	Bangladesh	Bangladesh	-----
BGD-218	Rollic	Yellow	7,700	Bangladesh	Bangladesh	-----
BGD-219	Rollic	Red	2,508	Bangladesh	Bangladesh	-----
BGD-220	Rollic	White	1,650	Bangladesh	Bangladesh	-----
BGD-221	Al Hossain	Yellow	61,000	Bangladesh	Bangladesh	-----
BGD-222	Al Hossain	Red	559	Bangladesh	Bangladesh	-----
BGD-223	Al Hossain	White	10	Bangladesh	Bangladesh	-----
BGD-224	Eurolac	Yellow	25,000	Bangladesh	Bangladesh	-----
BGD-225	Eurolac	Red	10,560	Bangladesh	Bangladesh	-----
BGD-226	Eurolac	White	8,829	Bangladesh	Bangladesh	-----
BGD-227	Monilac	Yellow	31,556	Bangladesh	Bangladesh	-----
BGD-228	Monilac	Red	1,607	Bangladesh	Bangladesh	-----
BGD-229	Monilac	White	893	Bangladesh	Bangladesh	-----
BGD-230	Moon star	Yellow	73,000	Bangladesh	Bangladesh	-----
BGD-231	Moon star	Red	<5	Bangladesh	Bangladesh	-----
BGD-232	Moon star	White	<5	Bangladesh	Bangladesh	-----

Sample ID	Brand Name	Color of Paint	Lead content (ppm)	Country of Brand Head-quarters	Country Where Manufactured	Is there information on can about lead content of paint?
BGD-233	Ujala	Yellow	37,000	Bangladesh	Bangladesh	-----
BGD-234	Paramex	Yellow	49,248	Bangladesh	Bangladesh	-----
BGD-235	Paramex	Red	3,272	Bangladesh	Bangladesh	-----
BGD-236	Paramex	White	4,261	Bangladesh	Bangladesh	-----
BGD-237	Raaz	Yellow	17,500	Bangladesh	Bangladesh	-----
BGD-238	Raaz	White	12	Bangladesh	Bangladesh	-----
BGD-239	Alfa	Yellow	85,000	Bangladesh	Bangladesh	-----
BGD-240	Alfa	Red	10,100	Bangladesh	Bangladesh	-----
BGD-241	Alfa	White	4,127	Bangladesh	Bangladesh	-----
BGD-242	FMC	White	5,591	Bangladesh	Bangladesh	-----
BGD-243	Paintex	White	7,900	Bangladesh	Bangladesh	-----
BGD-244	Paintex	Yellow	41,000	Bangladesh	Bangladesh	-----
BGD-245	Paintex	Red	6,709	Bangladesh	Bangladesh	-----
BGD-246	Rangs	Yellow	42,000	Bangladesh	Bangladesh	-----
BGD-247	Rangs	Red	17	Bangladesh	Bangladesh	-----
BGD-249	Aqua	Red	115	Bangladesh	Bangladesh	-----
BGD-250	Jotun	White	15	Bangladesh	Bangladesh	-----
BGD-251	Jotun	Yellow	12	Bangladesh	Bangladesh	-----
BGD-252	Jotun	Red	12	Bangladesh	Bangladesh	-----
BGD-253	German	White	9,600	Bangladesh	Bangladesh	-----
BGD-254	Anchor	Yellow	46,000	Bangladesh	Bangladesh	-----
BGD-255	Anchor	Red	120	Bangladesh	Bangladesh	-----
BGD-256	Anchor	White	33	Bangladesh	Bangladesh	-----
BGD-257	Deer	Red	680	Bangladesh	Bangladesh	-----
BGD-258	Roxy	Yellow	340	Bangladesh	Bangladesh	-----
BGD-259	Roxy	Red	245	Bangladesh	Bangladesh	-----

\*\* BGD-206, BGD-207, BGD-211, BGD-248 these samples were discarded during the processing due to overlapping

**Table A3. Paint Brands that contained lead less than 90 ppm in 2012-2013**

Brand Name	Color of Paint	2013 Results
Berger	Yellow	34 ppm
Berger	Red	<8 ppm
Berger	White	<8 ppm
Asian	Yellow	<8 ppm
Asian	Red	36 ppm
Asian	White	9 ppm
RAK	Yellow	23 ppm
RAK	Red	30 ppm
RAK	White	26 ppm
Roxy	White	53 ppm
Al Karim	Yellow	52 ppm
Al Karim	Red	17 ppm
Good luck	Yellow	13 ppm
Mayna	Red	<9 ppm
Mayna	White	23 ppm
Sheezan	Yellow	18 ppm
Sheezan	Red	23 ppm
Sheezan	White	56 ppm
Sunglo	Red	56 ppm
Sunglo	White	14 ppm
Ujala	White	64 ppm
Rangs	White	35 ppm
Aqua	White	19 ppm
Raaz	Red	79 ppm
Rehana	White	51 ppm
Rock	Red	26 ppm

The above paint colors of the mentioned paint brands contained lead below 90 ppm in the 2013 study and were not included in the 2015 study.

**Table A4. Comparison of lead levels in paints analyzed both in 2015 and 2013**

Brand	Number Of Samples	Below 90ppm		≥90 ppm		≥600 ppm		≥10, 000 ppm		Min ppm		Max ppm	
		2013	2015	2013	2015	2013	2015	2013	2015	2013	2015	2013	2015
Al Hossain	3	0	1	3	2	3	1	1	1	910	10	53,000	61,000
Alfa	1 (white)	0	0	1	1	1	1	0	0		4,127	4,127	85,000
Anchor	3	0	1	3	2	3	1	1	1	1,170	33	45,000	46,000
Aqua	1 (red)	0	1	1	1	1	0	1	0	19	25	10,300	115
Deer	1 (red)	0	0	1	1	1	1	0	0	1,120		16,700	680
Elite	3	0	2	3	1	3	0	1	0	2,600	<10	1,17,000	169
Eurolac	3	0	0	3	3	3	3	1	2	7,200	8,829	19,800	25,000
German	1 (white)	0	0	1	1	1	1	1	0	9,100		28,000	9,600
Good luck	2	0	0	2	2	2	2	0	1	13	6,764	8,200	12,752
Mayna	1 (yellow)	0	0	1	1	1	1	1	1	<9		56,000	48,000
Monilac	3	0	0	3	3	1	3	0	1	440	893	9,900	31,556
Moon moon	3	0	0	3	3	3	2	0	1	2,400	551	6,500	33,550
Moon star	3	0	2	3	1	3	1	1	1	1,360	<5	1,23,000	73,000
Pailac	3	0	2	3	1	3	1	1	1	2,600	17	34,000	60,000
Paintex	3	0	0	3	3	3	3	2	1	6,500	6,709	69,000	41,000
Paramex	3	0	0	3	3	2	3	0	1	440	3,272	5,400	49,248
Raaz	1 (yellow)	0	0	1	1	1	1	1	1	79	12	28,000	17,500
Rangs	2	0	1	2	1	2	1	1	1	35	17	33,000	42,000
Rollic	3	0	0	3	3	3	3	1	0	1,220	1,650	13,600	7,700
Romana	3	0	0	3	3	3	3	2	2	7,800	636	47,000	34,000
Roxy	2	0	0	2	2	2	0	1	0	53	245	17,400	340
Ujala	1 (yellow)	0	0	1	1	1	1	1	1	64		60,000	37,000
Total	49	0	10	49	40	46	33	18	17	-----	-----	-----	-----

## Comparison of the paints analyzed both in 2013 and 2015

### For Elite Paint:

Color of the Paint	2013 Results (in ppm)	2015 Results (in ppm)
Yellow	1,17,000	169
Red	4,700	45
White	2,600	<10

In comparison to 2013 and 2015,

- In 2013, Elite paint used leaded pigments and dryers in the yellow paint, and as a result the concentration of lead was very high. However, the vast reduction of the lead content in 2015 suggests that this paint was reformulated to include no intentionally added lead-containing ingredients.
- The reduction in lead levels for the white and red paint between 2013 and 2015 suggest a paint reformulation where lead drier was replaced.

### For Roxy Paint:

Color of the Paint	2013 Results (in ppm)	2015 Results (in ppm)
Yellow	17,400	340
Red	1,720	245
White	53	Not in stock

- The drastic reduction of lead levels between 2013 and 2015 in the yellow and red paints suggest that these were reformulated to include no intentionally added lead-containing ingredients.
- White color paint of Roxy was not found in market in 2015 because of limited stock. But from the previous result it was observed that they contain lead below 90 ppm.

### For the Pailac Paint:

Color of the Paint	2013 Results (in ppm)	2015 Results (in ppm)
Yellow	34,000	60,000
Red	2,600	54
White	2,900	17

In comparison to 2013 and 2015,

- Lead levels in 2013 and 2015 indicate continued use of leaded ingredients in the yellow paint.
- Lead levels in the red and white color paints was reduced to below 90 ppm between 2015 and 2013.

#### For Rollic Paint:

Color of the Paint	2013 Results (in ppm)	2015 Results (in ppm)
Yellow	13,600	7,700
Red	1,310	2,508
White	1,220	1,650

- In case of Rollic Paint, the lead concentrations do not vary enough to indicate a change in use of lead containing raw materials

#### For Al- Hossain Paint:

Color of the Paint	2013 Results (in ppm)	2015 Results (in ppm)
Yellow	53,000	61,000
Red	1,030	559
White	910	10

- In the case of the yellow paint, the high concentration of lead indicate no change in use of lead containing ingredients between 2013 and 2015 Lead content in the red color paint is below 600 ppm, while in white color paint it is not detectable.

#### For Romana Paint:

Color of the Paint	2013 Results (in ppm)	2015 Results (in ppm)
Yellow	47,000	34,000
Red	27,000	27,000
White	7,800	636

In comparison to 2013 and 2015,

- Yellow and red color paint still have high levels of lead in their paint. They do not decrease the use of lead-containing raw materials in their paints. In case of the white paint, reduced lead levels indicate that they stopped using lead.

### For Moon Moon Paint:

Color of the Paint	2013 Results (in ppm)	2015 Results (in ppm)
Yellow	6,500	33,550
Red	2,600	551
White	2,400	953

- In the case of the yellow paint, the high concentration of lead indicate no change in use of lead containing ingredients between 2013 and 2015
- There is a slight reduction of lead content in the Red and white paint.

### For Eurolac Paint:

Color of the Paint	2013 Results (in ppm)	2015 Results (in ppm)
Yellow	19,800	25,000
Red	7,200	10,560
White	8,000	8,829

- Lead concentration in all these three colors in 2015 is in the same range as compared to the previous study. It seems that they have not stopped using lead-containing raw materials in their paints.

### For Monilac Paint:

Color of the Paint	2013 Results (in ppm)	2015 Results (in ppm)
Yellow	9,900	31,556
Red	440	1,607
White	148	893

- Lead concentration in the yellow paint remains very high, and have increased in comparison to previous study.
- Lead content in the red and white colored paint has also increased in 2015 compared to 2013.

### For Moon Star Paint:

Color of the Paint	2013 Results (in ppm)	2015 Results (in ppm)
Yellow	12,300	73,000
Red	2,700	<5
White	1,360	<5

- Lead concentration in yellow color paint remains very high, and have increased in comparison to previous study.
- The concentration of lead in the red and white colored paints has been reduced to not detectable from the 2013 levels.

### For Paramex Paint:

Color of the Paint	2013 Results (in ppm)	2015 Results (in ppm)
Yellow	5,400	49,248
Red	440	3,272
White	3,400	4,261

- Lead concentration in the yellow paint remains very high, and have increased in comparison to previous study.
- Lead content in the red and white colored paint has also increased in 2015 compared to 2013.

### For Paintex Paint:

Color of the Paint	2013 Results (in ppm)	2015 Results (in ppm)
Yellow	11,300	7,900
Red	69,000	41,000
White	6,500	6,709

\* No significant change is observed as compare to 2013 and 2015 result.

### For Anchor Paint:

Color of the Paint	2013 Results (in ppm)	2015 Results (in ppm)
Yellow	45,000	46,000
Red	5,900	120
White	1,170	33

- No significant change is observed for yellow color paint as compare to 2013 and 2015 result.
- Lead concentration in Red and White color paints decreased to below 600 ppm between 2013 and 2015, possibly indicating the removal of leaded raw materials in the paint formulation.

### For Aqua Paint:

Color of the Paint	2013 Results (in ppm)	2015 Results (in ppm)
Yellow	Not Manufactured	Not Manufactured
Red	10,300	115
White	19	25

- Due to the lack of stock in the market a yellow paint was not included in the study. Lead concentration in the red has been reduced, indicating a removal of leaded raw materials from the paint formulation. Lead content of the white paint remained below 90 ppm low in both studies.

### \*\*For Rangs Paint:

Color of the Paint	2013 Results (in ppm)	2015 Results (in ppm)
Yellow	33,000	42,000
Red	4,400	17
White	35	Not in stock

*\*\*This company has been shut down since end of 2014..*

- Yellow color still have very high amount of lead in their paint, and indicate no change in use of lead-containing ingredients between 2013 and 2015
- Lead concentration in the red paint has been reduced, indicating a removal of leaded raw materials from the paint formulation.
- White color paint of Rangs was not found in market because of limited stock. But from the previous result it was observed it they contained lead below 90 ppm.

### For Good Luck Paint:

Color of the Paint	2013 Results (in ppm)	2015 Results (in ppm)
Red	5,600	12,752
White	8,200	6,764

In comparison to 2013 and 2015,

- Lead concentration in the red paint remains very high, and have increased in comparison to previous study.
- No significant changes can be seen for the white colored paint.

### For Mayna Paint:

Color of the Paint	2013 Results (in ppm)	2015 Results (in ppm)
Yellow	56,000	48,000

- No significant change was observed for Yellow color paint. Lead concentration is still very high because of the use of leaded paint ingredients.

### For the Raaz Paint:

Color of the Paint	2013 Results (in ppm)	2015 Results (in ppm)
Yellow	28,000	17,000
White	-----	12

- In case of Raaz Paint, the concentration of yellow color paint do not vary that much, indicating the continued use of leaded raw materials.
- White color paint was only included in the 2015 study, and shown to contain very low lead levels.

### For Alfa Paint:

Color of the Paint	2013 Results (in ppm)	2015 Results (in ppm)
Yellow	-----	85,000
Red	-----	10,100
White	3,400	4,127

- Because of limited stock of bright color paints the paints were not included in the 2013 study. In 2015, lead levels in all colors indicate the use of leaded raw materials.

### For German Paint:

Color of the Paint	2013 Results (in ppm)	2015 Results (in ppm)
White	1,19,00	9,600

- The white paint continue to contain very high amount of lead, and there are no indications of removal of lead-containing ingredients between 2013 and 2015

### For Deer Paint:

Color of the Paint	2013 Results (in ppm)	2015 Results (in ppm)
Red	1,120	620

There is a slight reduction in the lead content of the red paint from 2013 to 2015.

Table A5. Consumer Information about Lead on Paint Cans

Brand	Number of Samples	Lead content or other lead information on the label	Independent, third party certification of "lead safe" claims?	Information about lead hazard to children	Information about lead hazard when painting or remodeling	Specific language about lead on label
Pailac	3	No	No	No	No	No
Romana	3	No	No	No	No	No
Elite	3	No	No	No	No	No
Al Karim	1	No	No	No	No	No
Good Luck	2	No	No	No	No	No
Mayna	1 (Yellow)	No	No	No	No	No
Moon Moon	3	No	No	No	No	No
Rolic	3	No	No	No	No	No
Al Hossain	3	No	No	No	No	No
Eurolac	3	No	No	No	No	No
Monilac	3	No	No	No	No	No
Moon Star	3	No	No	No	No	No
Ujala	1 (Yellow)	No	No	No	No	No
Paramex	3	No	No	No	No	No
Raaz	2	No	No	No	No	No
Alfa	3	No	No	No	No	No
FMC	1 (White)	No	No	No	No	No
Paintex	3	No	No	No	No	No
Rangs	2	No	No	No	No	No
Aqua	2	No	No	No	No	No
Jotun	3	No	No	No	No	No
German	1	No	No	No	No	No
Anchor	3	No	No	No	No	No
Deer	1	No	No	No	No	No
Roxy	2	No	No	No	No	No

## Appendix B:

Figure-3 Photos of different activities of paint sampling procedure



Paint cans display at the shop



Selection of the paint samples



Purchasing of paint samples



Paint samples for the experiment

Figure-4 Photos of slide preparation



Wood pieces and brushes for sampling



Application of the paints to wood pieces and drying of the painted woods

Figure-5 Photos of Signature campaign and public awareness on lead paint



Mobile Awareness and Signature Campaign



Media Campaign for lead free paint



Global Alliance to Eliminate Lead in Paint- GAELP Week Celebration 2014 (Human Chain, rally, art competition and launching of new IEC materials)

Figure-6 Photos of the consultation with govt. and paint manufacturers



Media Consultation



Consultation with Mr. Perry Gottesfeld on Certification & Eco-Labeling



Consultation with Certification & Eco-Labeling of Lead Free Paints



Meeting with General Secretary, BPMA



With Bangladesh Paints Manufacturers Association- (BPMA)

*Lead paint in older home can  
turn into poisonous lead dust.*  
**Guess where the dust ends up...**



## *Environmental and Social Development Organization-ESDO*

is a non-governmental organization working on environmental and health issues with various stakeholders, to create a toxic free Bangladesh and sustainable living environment.

ESDO is a participating organization of IPEN.

## **IPEN**

is an international organization promoting safe chemical policies and practices that protect human health and the environment.



Published by,



## *Environmental and Social Development Organization-ESDO*

House # 8/1, Level # 5, Block # C, Lalmatia, Dhaka-1207, Bangladesh

Tel: 880-2-912-2729, Fax: 880-2-913-0017

E-mail: [info@esdo.org](mailto:info@esdo.org)

URL: [www.esdo.org](http://www.esdo.org) [www.facebook.com/esdobd](http://www.facebook.com/esdobd)