

Ban Benzene Campaign

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1. What is benzene?
 - An aromatic organic compound
 - A proven carcinogen¹
 - A common solvent, found in paint, glue, fuels and cleaning agents
 - Commonly used in various industries including electronic, toys and shoes
 - Linked to various bone marrow anomalies including leukemia and anemia
 - Can also cause birth defects

2. Why ban benzene?

Benzene is the most common cause of industrial poisoning in China. According to official statistics, over 60% of all occupational cancers are caused by benzene². In the industrial city of Dongguan, 30% of all diagnosed occupational diseases are caused by benzene poisoning³. Those who have suffered chronic benzene poisoning often requires life-long treatment; many dies. Acute benzene poisoning has a fatality rate of 21.7%.⁴

¹ Benzene is a group 1 carcinogen as classified by International Agency for Research on Cancer (IARC)

² 卫生部通报 2010 年职业病防治工作情况和 2011 年重点工作 (<http://www.moh.gov.cn/mohwsjdj/s5854/201105/51676.shtml>). Although the total number of cases looks small (only 80 cases of occupational cancer in 2010), this is mainly a result of the immense difficulties in obtaining an official occupational disease diagnosis.

³ 东莞常见 4 种职业病 三成源自苯中毒 (<http://news.qq.com/a/20090611/000446.htm>)

⁴ 卫生部：急性苯中毒死亡率高达 21.7% (<http://www.people.com.cn/GB/shehui/47/20020402/700372.html>)

In 1996, the media uncovered a series of benzene poisoning cases in the shoe-making town of Putian, Fujian, some dating back to the 80s. A collective case in 1993 was of particular note; a group of workers got violently sick after working for a few months in Jinjiang factory; two pregnant workers subsequently died from leukemia together with their unborn child. Atmospheric benzene content in the town was also revealed to be 30% above maximum permissible level, and local residents expressed fear of its health effect on them and their next generation.⁵

In 2000, another collective case was revealed in a shoe factory in Nanhai, Guangdong. Among its 200 workers, 44 show signs of benzene poisoning. In response the authorities carried out health check for workers in 17 other shoe factories, uncovering another 67 cases.⁶

In 2002, 31 workers from luggage factories in Gaobeidian, Hebei were diagnosed with benzene poisoning; 9 died.⁷ The average age of the workers poisoned was only 17 years old, which has worked there for an average of 10.8 months⁸. Their employers were later found guilty of causing major industrial incident and sentenced to 6 months to 4 years imprisonment⁹.

In 2004, 11 workers in the painting department of a forestry plant in Fujian was sent to hospital because of acute benzene poisoning. The hospitalized workers were foaming at the mouth and suffering from convulsion.

In 2010, 35 workers at a hair products factory in Xuchang, Henan were found to be benzene poisoned. Half of them suffered from aplastic anemia, a debilitating blood cancer¹⁰.

The above shows only the tip of the iceberg, consisting of cases that managed to gain media attention and/or state recognition. Yet they are still sufficient to

⁵ 妈祖有泪（苯毒危害女工报告之一）<http://old.chinacourt.org/public/detail.php?id=7593>

⁶ 毒胶水害鞋厂工人 中毒打工仔入院治疗 <http://news.sina.com.cn/s/159341.html>

⁷ 紧急追查“苯中毒”事件 <http://www.people.com.cn/GB/shehui/212/7792/>

⁸ 2002 年高碑店市箱包业苯中毒事件调查分析
<http://file.lw23.com/9/94/94c/94c572c7-7ee7-418c-8206-231b7c64a21a.pdf>

⁹ 河北高碑店“苯中毒”事件八名厂主被判有罪
<http://www.unn.com.cn/GB/channel19/49/117/200207/26/198963.html>

¹⁰ 许昌一家企业密封严 十多天发现 30 名员工苯中毒
http://www.dahe.cn/xwzx/sz/t20100330_1772565.htm

show that benzene poses a substantial and life-threatening threat to workers across the country and across industries, working with paint, glue and other common solvents.

The Ministry of Health has flagged up the issue of benzene poisoning as early as 2002, but has so far been ineffective in curbing the problem. While there are industrial standards in place for permissible exposure level, it is often unenforced. Factory inspections are mostly a sham, and problems are not spotted until people actually get sick.

Given the extreme toxicity of benzene, we consider a complete ban as more appropriate than regulated use. As the American Petroleum Institute stated as early as 1948, "it is generally considered that the only absolutely safe concentration for benzene is zero."¹¹ Benzene is not irreplaceable; human lives are.

3. Case studies

In recent year LAC has come across many cases of benzene poisoning, involving toy, shoe, electronic and container industries, among others. Many of the factories involved are either itself renowned listed companies, or are manufacturers for big brand names such as Disney and Timberland.

Case 1: China International Marine Containers (Group) Ltd. (CIMC)



CIMC is a state-owned listed company found in 1980, and is among Forbes's "Top 2000 World Leading Companies" in 2009. It has over 150 subsidiaries and 63,000 staff across China, North America, Europe, Asia and Australia.

Yi Yeting joined CIMC in 2003, working as a machine operator. He described his working environment as "filled with a mixture of irritating smells, coming from thinners, paints, smoke and dust from welding. You can smell that horrible smell once you walked within 500m of the factory." The authorities have only

¹¹ American Petroleum Institute, API Toxicological Review, Benzene, September 1948, Agency for Toxic Substances and Disease Registry, Department of Health and Human Services (http://web.archive.org/web/20030310145140/http://hobsonlaw.com/benzene_pages/pdffile.pdf)

carried out one inspection during the time Yi's was working in CIMC. "The factory knew about the inspection beforehand and had prepared accordingly. Normally we can produce 140 containers per day; that day we made only 30. All the harmful chemicals like thinners were hidden away."

In early 2005, Yi started showing signs of gum bleeding and bruising. Doctors told him that he had leukemia. He was only 25.

Suspecting that the disease is related to his job, Yi applied for occupational disease diagnosis. Although he did not directly handle paint or other solvents, he did work next to the painting station. The factory has not partitioned off the harmful procedure, nor had it provided adequate ventilation. Yet the hospital told him, "CIMC would never cause any occupational diseases!"

By chance Yi came across evidence of bribing by the factory to the local occupational disease diagnosis institutions. Suspicious, Yi appealed to the provincial diagnosis board and finally received a confirmed diagnosis in 2007. Only then could he be entitled to treatment under the national work injury system.

Since Yi's success was made known, more workers from CIMC have stepped forward to demand recognition and compensation for their occupational diseases. Four more has been diagnosed. At the moment all five of them are still suing CIMC for civil compensation.

Case 2: Early Light International Toy Factory

Early Light is one of the world largest toy manufacturers, and a member of the International Council of Toy Industries (ICTI) CARE process. It is a long-time producer for big brands including Disney, Mattel and Hasbro. Its president, Francis Choi Chee-ming, is known as the "King of Toys".



Its factories in Shenzhen and Shaoguan have a capacity of up to 70,000 workers. Yet such a renowned enterprise has surprisingly appalling OSH practice.

Since 2011 several cases of chronic benzene poisoning have come to light at Early Light's Shenzhen plant, which has a workforce of over 3000. The case has only been exposed thanks to the persistence of six of the affected workers. Their experience revealed how the factory has been systematically covering up the problem of benzene poisoning, showing a serious disregard for the rights and health of the affected workers.

In accordance with the law, Early Light has been conducting annual health check for its workers. However the results are not disclosed to the workers; rather the information thus obtained was utilised by the factory to quietly weed out sick workers.

In early 2011 after the usual annual body check, Luo Yuanxiang and about 100 other workers were requested to undergo repeated examinations. They then received a notice that they are to be transferred to various different departments where they have no expertise. Luo and a few workers protested about the transfer, but most other workers complied. Suspicious of the factory's motive, Luo and her friends demanded to look at the examination reports. The factory refused.

The group decided to take the matter to the local authorities. After much protests and haggling, the local occupational diagnosis institution finally agreed to give them further examination and concluded that they are suffering from chronic benzene poisoning. Luo and her friends used to work in the spray painting department, and were in daily contact with thinner and paint. They have worked in Early Light for about 8 to 12 years.

LAC has been conducting four way negotiation with Early Light, ICTI and Disney in order to find a satisfactory solution to the issue. During the negotiation Early Light disclosed that in the annual body check of 2012 a further group of over 100 workers were found to have suspected symptoms of benzene poisoning. When pressed about whether the workers have been given the health check results, the factory maintained that it is necessary to withhold the results in order to prevent the spread of "unwarranted" panic and disturbance. The factory refused to divulge further information and merely assured us that all suspected cases have been properly dealt with. To date three of the six workers with confirmed diagnosis have received private settlements.

Case 3: Chow Tai Fok Jewellery



Chow Tai Fok is the world largest jeweler¹². An 84 year-old listed company from Hong Kong, it is mostly owned by one of the city richest family. It has over 1800 branches over China and Southeast Asia.

Hou Xing was only 18 when she joined Chow Tai Fook in 2004. She worked in the molding department, and has to work with thinners and naphtha. Two years into the job she started feeling unwell, and a lump started to develop in her abdomen. She switched job, hoping that a change of working environment will cure her problem. It did not. Half a year into her new job she got so violently ill that she was forced to quit. Doctor diagnosed her with leukemia, potentially caused by benzene poisoning. She died in 2009, without getting any compensation from either company.

Chow Tai Fook argued that once she left the company it's none of their business, while the new company argued that she had contracted the disease back in Chow Tai Fook. Neither was willing to shoulder the responsibility, and the ball kicking goes on for another three years. Finally in 2012 the court ruled that since Hou's disease was diagnosed while working in the new company, it should bear most of the compensation¹³; however because Hou has work longer in Chow Tai Fook, and that she had developed symptoms while working there, Chow Tai Fook should bear 30% of the compensation.

Case 4: Ka Wai Shoe Factory

Cheng Yi had been working faithfully in Ka Wai Shoe factory, a Hong Kong invested factory, for 17 years together with her husband. Shoes made by her and her colleagues were exported to places as far as Europe and America.



¹² Huge for Its Bling, Unknown in West

(<http://online.wsj.com/article/SB10001424052970204224604577031570735814542.html>)

¹³ This is the default position of Chinese law on occupational diseases compensation

As early as 1996 workers have been found ill due to the unregulated use of solvents, thinner and glue without any protective equipment. Chen Renbing died in 1996 due to poisoning after working there for a decade. Huang Meixian gave birth to a disabled child after working there for seven years. In 2004 Huang Xiaoyou was diagnosed with leukemia. Cheng Yi started feeling unwell since 2009, with bouts of dizziness and chest tightness. A doctor diagnosed her as having Myelodysplastic Syndrome (pre-leukemia) in Oct 2009, and advised that she could only live for 2 more years. Miraculously her situation seems to have stabilised for now, yet she was less lucky on the compensation front.

Since late 2009 she and her husband have embarked on the tortuous road of occupational disease diagnosis. The factory denied that her disease was occupational and refused to cooperate with the diagnosis process. After repeated complaint and petition, the couples finally forced the factory to provide the necessary documents and received a diagnosis result. To their surprise, the hospital concluded that her disease is not occupational. For two long years they have tried going through all the proper procedure to overturn the result, without success. By now they have exhausted all channel of appeal, and the couples are left with no affirmative diagnosis, no compensation, no job, and a broken family. They were forced to send their son to their relatives since they could no longer pay for his study in Guangdong.

A regime of impunity

Contrary to common expectation, many of the cases we have come across are not from small scale, unregulated workshops. These poisoning cases occur in well-established, reputable factories, which know about the hazards posed by benzene, which have the resources and know-how to avoid the hazard, but which carry on using this hazardous substance *by choice*. Such choice is often a result of cynical, cold-blooded cost-analysis. Occupational poisoning are hard to prove, and most of the times the workers do not even have the awareness that their sickness might be occupationally caused. While the cost of benzene on human lives is devastating, the cost on the companies is often minimal. Thus it is no wonder that companies do not consider alternatives to benzene even when they have a long history of benzene poisoning.

Such practice of blatantly disregarding workers lives, perpetrated by some of

the biggest players in the industries, must be stopped.

4. Benzene regulations in the world

While benzene has enjoyed wide application early on¹⁴, its use has subsequently been heavily circumscribed due to the discovery of its carcinogenicity.

In 1971, ILO passed the Benzene Convention (C136)¹⁵. Article 2(1) states that, “Whenever harmless or less harmful substitute products are available, they shall be used instead of benzene or products containing benzene.” Article 4 mandates that the use of benzene and of products containing benzene as a solvent or diluent shall be prohibited, except where the process is carried out in an enclosed system or where there are other equally safe methods of work. Regrettably, to date only 38 countries have ratified the Benzene Convention.

In the EU, benzene has been classified as a category I carcinogen as early as 1967¹⁶. Its use is restricted in the Marketing and Use Directive (76/769/EEC)¹⁷. Benzene is not allowed to be placed on the market, or used as a substance, or as a constituent of mixtures in concentration greater than 0.1% by weight. In particular strict restriction is placed on its use in toys. Regulation (EC) 1907/2006, concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), reaffirmed the above rules.

In the US, benzene was withdrawn from consumer products since 1978. The Occupational Safety and Health Administration has set a permissible exposure limit of 1 ppm in the workplace during an 8-hour workday, 40-hour workweek. UK has the same exposure limit¹⁸, and employers are required to eliminate its use or substitute a safer material where possible. In China, the corresponding limit is 1.878 ppm¹⁹.

¹⁴ Disturbing examples of early usage of benzene includes after-shave lotion and decaffeinate coffee.

¹⁵ They are Bolivia, Bosnia and Herzegovina, Brazil, Chile, Colombia, Croatia, Cuba, Czech Republic, Ecuador, Finland, France, Germany, Greece, Guinea, Guyana, Hungary, India, Iraq, Israel, Italy, Kuwait, Lebanon, Luxembourg, Malta, Montenegro, Morocco, Nicaragua, Romania, Serbia, Slovakia, Slovenia, Spain, Switzerland, Syrian Arab Republic, The former Yugoslav Republic of Macedonia, Uruguay and Zambia

¹⁶ Directive 67/548/EEC

¹⁷ As amended by Directives 82/806 and 89/677.

¹⁸ Control of Substances Hazardous to Health (COSHH) Regulations 2002

¹⁹ Or 6 mg/m³

However, even when the stricter 1 ppm limit is complied with, exposure for a working lifetime is estimated to cause 5 excess leukemia deaths per 1000 employees exposed²⁰. Given the prevalent use of benzene in developing countries, that will still translate into millions of *avoidable* deaths²¹. The use of benzene in the workplace should be more strictly circumscribed than that.

5. What are the alternatives to benzene?

The use of benzene as a solvent has been largely phased out in the West, as safer alternatives can often be found. Benzene-free paints are now commercially available, so is benzene-free glue. Cyclohexane is often used as an alternative to benzene in electroplating, rubber manufacturing and varnish solvents. Heptane is another effective replacement for benzene, and is commercially available for use in paints and coating, and as a solvent. Many other non-polar solvents can act as alternative to benzene. Water-based paint and adhesives can also be used in place of organic-based ones. In fact, apart from the limited needs of manufacturing benzene-derived chemicals, the use of benzene is seldom absolutely necessary. It is just cheaper.²²

6. Industry guidelines

Certain brands, mostly in the footwear industry, have laid down guidelines banning the use of benzene, showing that a benzene ban is actually possible. However, most other industries and companies have simply put no thoughts to the matter.

Adidas has a Health and Safety Guidelines which is binding on its suppliers. The Guidelines come with a list of banned chemicals, including benzene²³. Puma has also banned the use of benzene as a solvent²⁴. Nike, however,

²⁰ Agency for Toxic Substances and Disease Registry
(<http://www.atsdr.cdc.gov/csem/csem.asp?csem=19&po=10>)

²¹ According to official statistics, 2 billion workers in China are currently exposed to hazardous substances. Assuming only one tenth handle benzene – probably a conservative estimate – a 1 ppm concentration of benzene in the workplace would have caused the death of 100,000 workers.

²² According to a New York Times report, benzene-free glues in China are 30% more expensive than benzene-containing ones. "For Want of Safer Glue, Chinese Shoemakers Get Sick", 6 June 2000
(<http://www.nytimes.com/2000/06/06/world/for-want-of-safer-glue-chinese-shoemakers-get-sick.html?pagewanted=all&src=pm>)

²³ Adidas Group: Health and Safety Guidelines, p.43
(http://www.adidas-group.com/de/sustainability/assets/Guidelines/2010/Health_and_Safety_Guidelines/Health_Safety_Guidelines_English.pdf)

²⁴ PUMASafe Environment Handbook Volume 2, p.30

allows the use of benzene in their toys products.²⁵

It does seem that the toy industry is lacking behind in its regulation of hazardous chemicals. No guidelines on chemical use can be found in the publicly available codes of conduct of Mattel, Disney or the International Council of Toy Industries.

In the electronic industry, most companies do have chemical guidelines. However those guidelines focus more on the chemicals contained in the final products rather than those employed in the manufacturing process. Most such guidelines make no mention of benzene, including Apple's Regulated Substances Specification²⁶, HP's Substances and Materials Requirements²⁷ and Samsung's Standards for Control of Substances concerning Product Environment²⁸. Nokia does mention benzene in its substance list and mandates a ban, but the restriction applies only to product and not process²⁹. Nor does the Electronic Industry Citizenship Coalition have any policy on chemical use in the workplace.

7. Conclusions

Given what the world have known about the lethality of benzene since early 1900s, its prevalent use today is inexplicable, even shameful. Workers' lives are being sacrificed in the millions while safer alternatives have always been available. This must be stopped. In particular:

- Intentional use of benzene as a solvent must be completely banned. This would eliminate benzene from its most common usage in paint, glues and cleaning agents.
- Use of benzene should be restricted to the manufacturing of benzene

(http://about.puma.com/wp-content/themes/aboutPUMA_theme/media/pdf/PUMASafeEnvironmentHandbook-Vol2_final.pdf)

²⁵ Nike Restricted Substance List, p.41

(<http://www.nikeincchemistry.com/wp-content/uploads/Abbreviated-RSL.pdf>)

²⁶ While Apple makes reference to the Specification on its website, it has not made it publicly available.

²⁷ As laid down in HP's General Specification for the Environment

(<http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/gse.pdf>)

²⁸ Samsung Electronics: Standards for Control of Substances concerning Product Environment

(http://www.samsung.com/us/aboutsamsung/sustainability/environment/chemicalmanagement/download/SEC_Standard_OQA-2049_Rev14_EN.pdf)

²⁹ Nokia Substance List

(<http://i.nokia.com/blob/view/-/2085338/data/1/-/Nokia-Substance-List-2013-xls.xlsx>)

derivatives only.

- ILO should amend the Benzene Convention to effect a complete ban of benzene in solvents, and push for more ratification.
- Countries should adopt legislation banning the use of benzene except where absolutely necessary
- In the absence of local legislation, industries susceptible to benzene poisoning, including toys, shoes, electronic and jewellery among others, should adopt a “zero benzene” policy.
- Companies should laid down detailed restrictions on chemical use in their manufacturing process as part of their CSR program.