

**The Chinese Battery Industry:
The Truth behind the Charge**

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Executive Summary

Section I and II of this paper will provide a comprehensive overview of the battery industry. Firstly, background information will be provided on the major Chinese brands, as well as a synopsis of production methods and locations, for the various models of batteries in mainstream circulation. Secondly, industry standards of safety, including but not limited to, occupational disease, labor conditions, and workers' rights will be critiqued, highlighting previous failures to protect workers in the industry, while introducing proposals to safe guard employees in the future. Thirdly, the environmental implications for the creation and disposal of batteries will be assessed, along with current regulations that have been proscribed by certain governments to combat potential threats that the battery industry poses to their respective populations. Fourthly, the future of the industry, specifically in lithium battery production, will be analyzed through different facets. Fifthly, the evolution of the manufacturers' role in the increasingly global economy, will lend insight as to how companies can increasingly recognize workers' rights and freedom of expression.

Section III presents findings concerning the labor conditions of ten battery factories in Guangdong province. In nearly all of them, some forms of non-compliance with labor laws stipulations or outright infringement of the legitimate rights of employees were found.

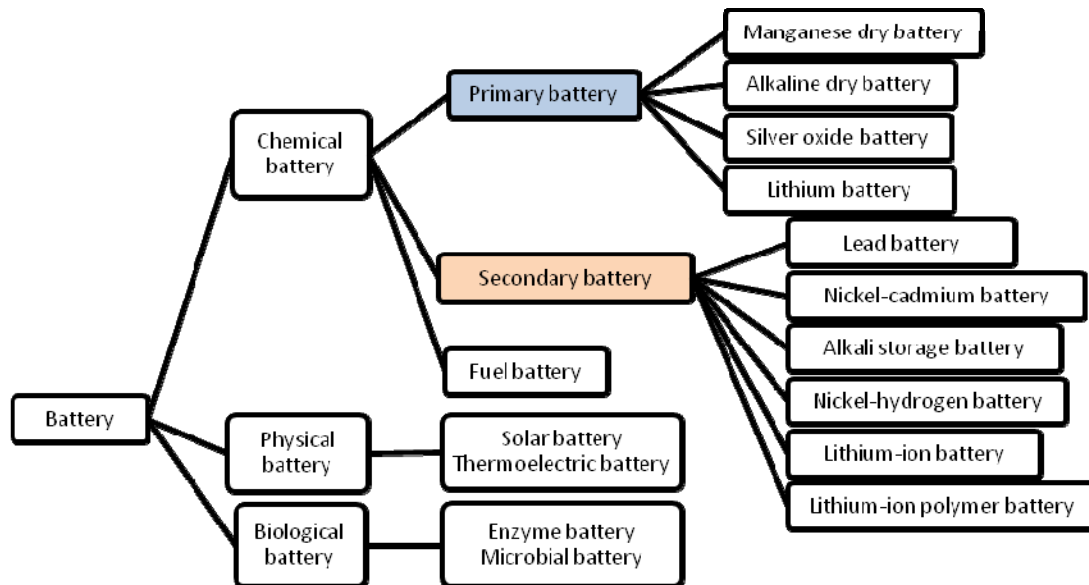
The conclusion will summarize the paper's main findings while outlining proactive measures that are beneficial for workers and companies alike.

Section I. The Chinese Battery Industry's Impact on the World Market

Batteries are an integral part of our everyday lives, powering the simplest to the most complex machines. The concept behind the battery, the conversion of chemical energy, through a controlled chemical reaction, into electrical energy, was pioneered by Alessandro Volta in 1792.¹ This seemingly simplistic invention set the stage for a revolution that transformed electrical energy through mobility and convenience.

“Batteries can be defined into two categories: primary and secondary.”² Primary batteries are sometimes called "throw-away" batteries because they will be discarded when they are flat, as they cannot be recharged for reuse. Common types of primary batteries include alkaline, zinc carbon, lithium, silver oxide and zinc air batteries. Secondary batteries can be recharged and reused for up to 1000 times depending on usage conditions. Common types of rechargeable batteries include Nickel Metal Hydride (NiMH), Nickel Cadmium (NiCd) and Lithium Ion (Li-ion) batteries.³

Figure 1: Type of battery



Source: Deutsche Securities Inc.⁴

Due to the growing popularity of electronics and information and communications products, both the

¹Bellis, Mary. Alessandro Volta - Biography of Alessandro Volta - Stored Electricity and the First Battery. *About.com*. Retrieved 7 August 2008.

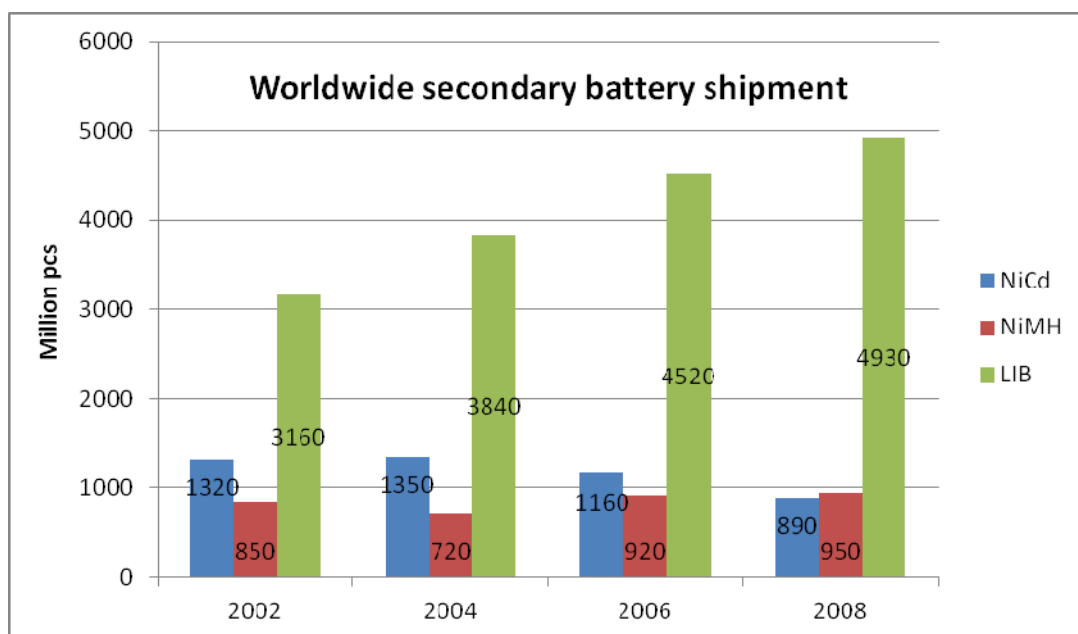
²<http://www.batterypoweronline.com/images/BatteryPowerResourceGuide2010.pdf>

³<http://www.gpbatteries.com/html/faq/index.html>

⁴Deutsche Securities Inc.,LiB materials industry, Jan-26-2011, <http://gold-estate.com/content/Lithium/LiB12611.pdf>

demand for and output of the secondary battery now far exceed those of the primary battery. As a kind of secondary battery, the nickel-cadmium battery has the longest history, and the annual demand for it once surpassed a billion units. However, due to the memory effect of nickel-cadmium batteries and their hazardous effect on the environment and the human body⁵, its production was gradually replaced by nickel-metal hydride batteries. The nickel-metal hydride battery, while having a smaller memory effect and the same operating voltage as a nickel-cadmium battery, has a higher capacitance than the latter. Manufacturers of products of mobile communications and portable electronic goods had to shift to using nickel-metal hydride batteries. In recent years, however, secondary lithium-ion batteries in turn came to replace nickel-metal hydride batteries because of the demand for ever lighter and thinner electronic products.

Figure 2: Shipment of three different kinds of secondary battery worldwide



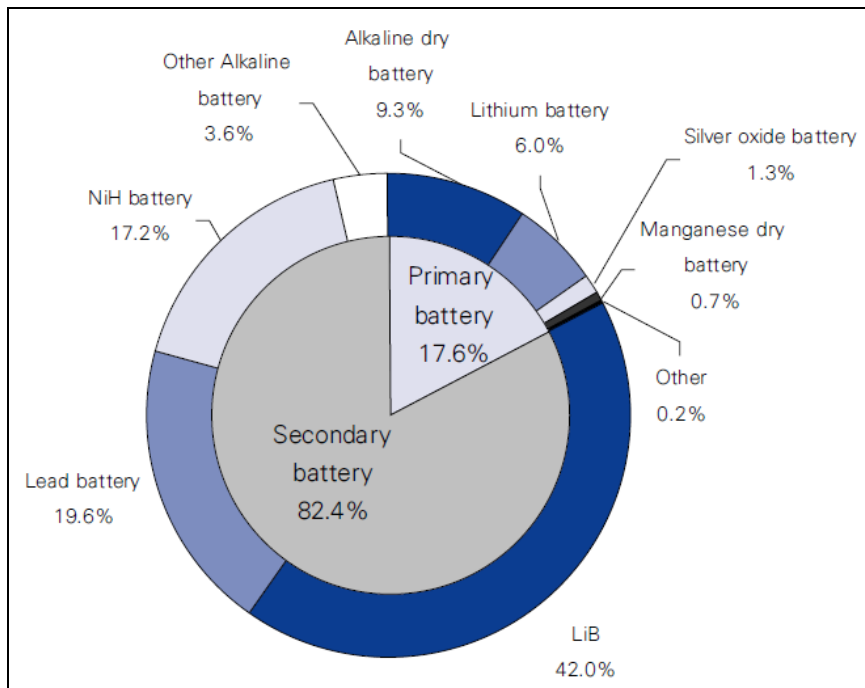
Source: Energy Trend⁶

Lithium batteries have benefits in that they produce a high operating voltage, have large reserves, and are lightweight, rechargeable, long life, amongst other advantages. Hence they have been increasingly used in electronic products. Figure 3 shows that in 2009 secondary battery production worldwide greatly surpassed primary battery production and that lithium batteries accounted for 42% of secondary batteries.

⁵ The EU has prohibited the sale of nickel-cadmium batteries since 2008. China (the major producer of nickel-cadmium batteries) decided in 2011 to restrict the production of nickel-cadmium batteries due to serious cadmium pollution on agricultural land and water. It also planned to gradually reduce the consumption of cadmium within battery industry.

⁶ http://www.eettaiwan.com/ART_8800609983_675763_NT_642f810f.HTM

Figure 3: 2009 primary and secondary battery production worldwide

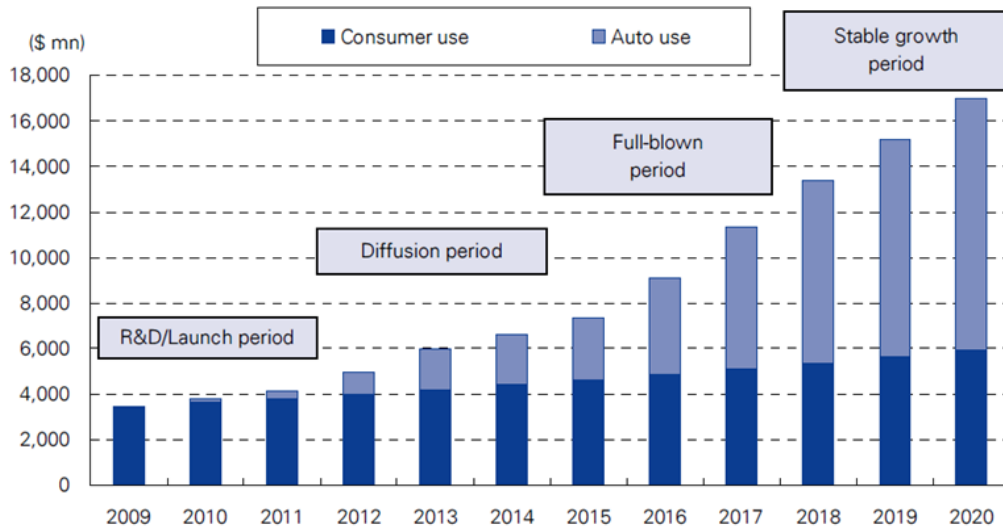


Source: Deutsche Securities Inc.⁷

Manufacturers rushed into the field of lithium electronic products, causing overproduction and hence a gradual decline in the profit margin. A major change in recent years saves them from cut throat competition however. The need to reduce dependence on oil has promoted the development of electric vehicles with low (zero) fuel consumption, and which has created a growing demand for lithium batteries (figure 4). According to estimates, a pure electric vehicle requires 40 to 50 kg of cathode materials and electrolyte, which is about 10,000 times that of single mobile phone battery consumption. To produce 1 million electric cars driven by lithium-ion batteries will require a total amount of related raw materials several times the current world's aggregate demand.

⁷ Deutsche Securities Inc., LiB materials industry, p.9, Jan-26-2011, <http://gold-estate.com/content/Lithium/LiB12611.pdf>

Figure 4: LiB main materials market trend



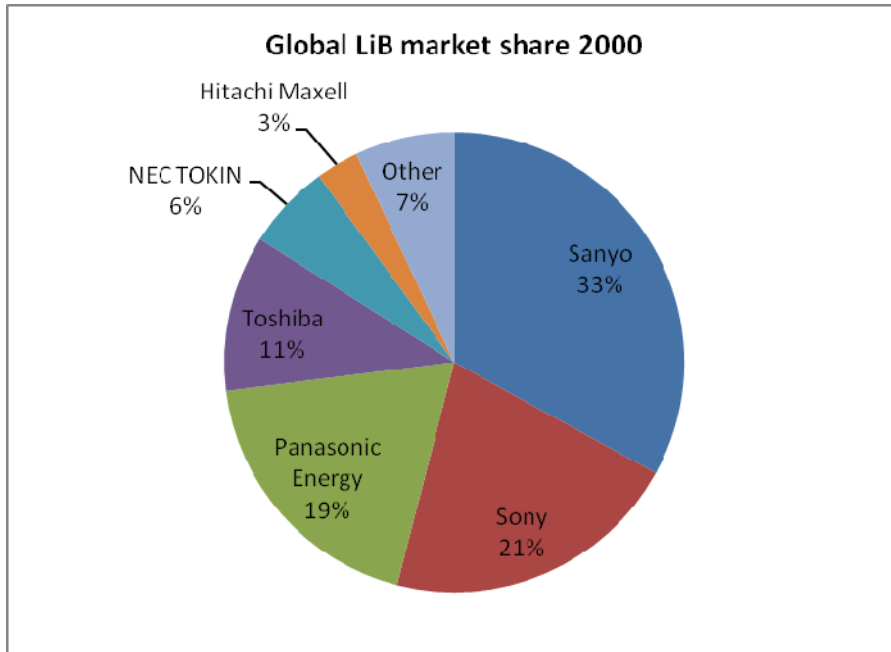
Source: Deutsche Securities Inc.⁸

Japanese makers dominated the lithium ion secondary batteries (LiB) market for decades since Sony produced and sold the first LiB in the world in 1990s. Japan has controlled over 90% of the global LiB market in 2000, however, the growing competition from Korea and China is underestimated. By 2008, the share of Japan companies have reduced to 48%, while the Korean maker had secured 22% of the US\$8.03bn global market and the China companies such as BYD, BAK and Lishen had grabbed 19%. Japanese share had further fallen to 41% in 2010 and the market share of Korean vendors Samsung SDI and LG Chem had increased to 35% (see figure 5 and 6).

⁸ Deutsche Securities Inc., LiB materials industry, Jan-26-2011, <http://gold-estate.com/content/Lithium/LiB12611.pdf>

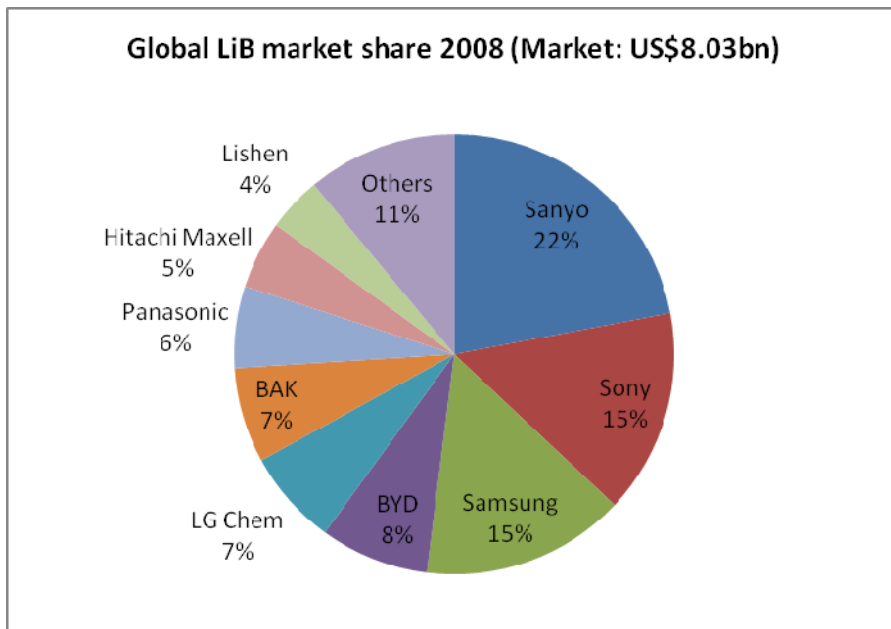
Figure 5: Global LiB market share 2000-2010 (value basis)

Figure 5A



Source: Deutsche Securities Inc.⁹

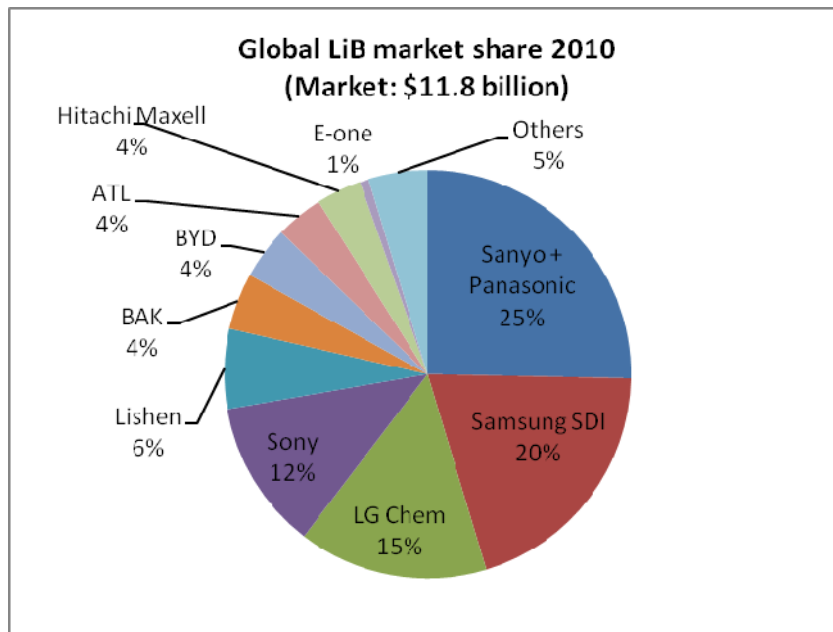
Figure 5B



Source: Deutsche Securities Inc.¹⁰

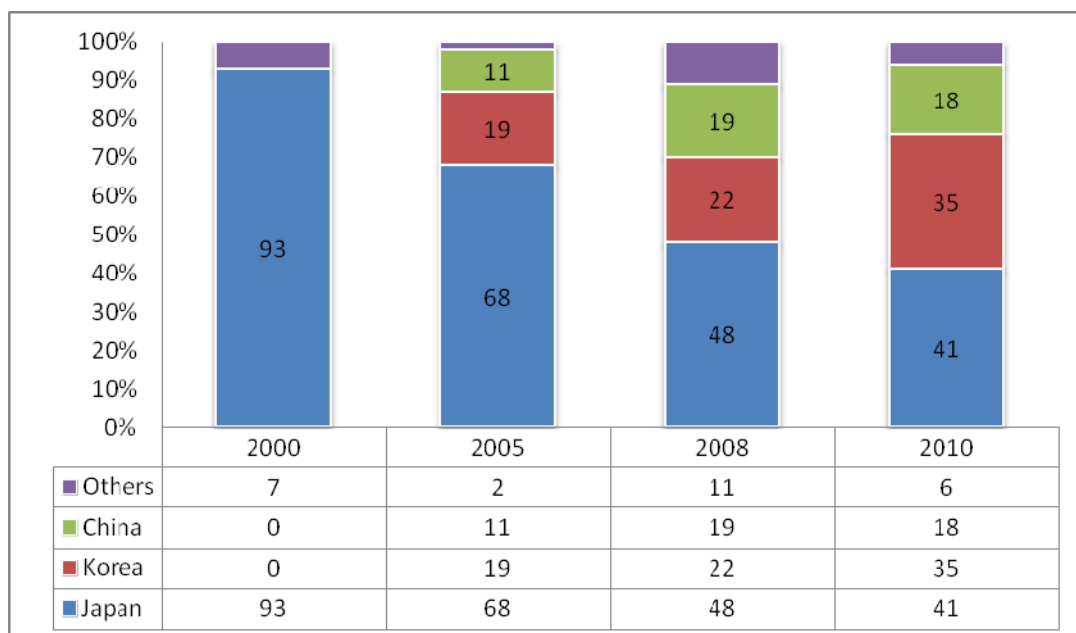
⁹ Deutsche Securities Inc., LiB materials industry, Jan-26-2011, <http://gold-estate.com/content/Lithium/LiB12611.pdf>

Figure 5C



Source: http://www.mem.com.tw/article_content.asp?sn=1104130003

Figure 6: LiB battery share of each country



Note: the 'Others' in the year of 2000 includes Korea and China.

Korean makers can successfully lower the production costs due to the use of in-house production of LiB materials and the Chinese materials, and the cheap labor force in China. In 2011, South Korea surpassed

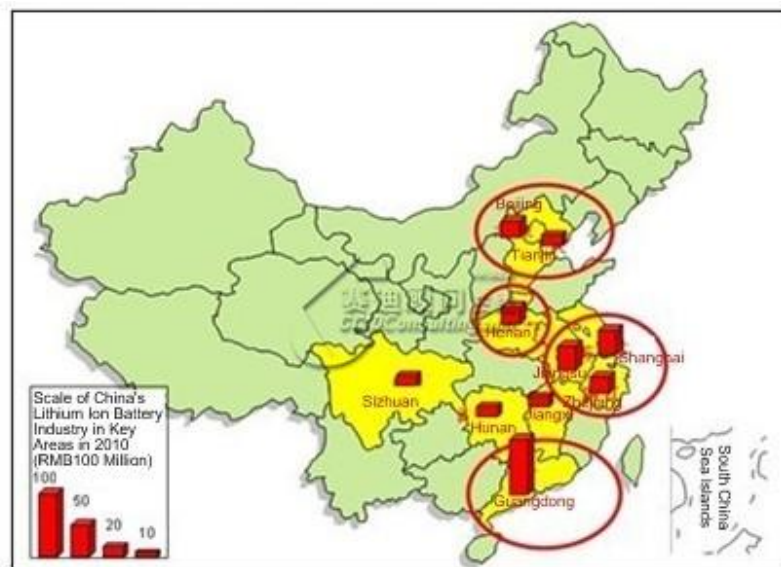
¹⁰ Ibid.

Japan to become the world largest exporter of lithium batteries. The sharp depreciation of the won and the 311 Japanese earthquake enabled two major South Korean manufacturers to capture 39% of the market share, whereas Panasonic and Sony got 24% and 8% respectively.

China has become the world's battery manufacturing power (including chemical and physical battery); its current battery production and exports are highest in the world. In 2009 China's production of chemical batteries reached 33.5 billion units, which exceeded half of the world's production. In the same year China's battery industry (including chemical and physical batteries) totaled more than 4,000 companies with a workforce of more than a million.

The lithium-ion battery industry in China is mainly concentrated in the Pearl River Delta, Yangtze River Delta and the Bohai Bay area (figure 7). Lithium ore resources are mainly distributed between Sichuan and Jiangxi, Xinjiang and other places. The Pearl River Delta region is an important lithium-ion battery materials and assembly production base, with an annual output value of more than 9.67 billion Yuan in 2010, accounting for about 35% of the industry nation-wide. This is followed by the Yangtze River Delta (including Shanghai, Jiangsu and Zhejiang) with an output value of 74.8 billion Yuan, accounting for about 27% of the country's output. The Bohai Bay area, including Beijing, Tianjin, Hebei, Liaoning and Shandong etc, comes third, reaching 4.56 billion Yuan in annual output value.

Figure 7: China LiB Industry Map¹¹



Source: National Bureau of Statistics of China, Ministry of Industry and Information Technology; compiled by Beijing CCID Capital Consulting Co., Ltd, September 2011

¹¹ CCID Consulting is directly affiliate to China Center for Information Industry Development (hereinafter known as CCID Group), it headquartered in Beijing, <http://www.ccidconsulting.com/en/io/mr/mr/ei/webinfo/2011/11/1320629261264637.htm>

Over 40% of global lithium-ion secondary battery production is now in China, while another half is produced by Japanese and Korean domestic manufacturers. Panasonic, for example, until before the 311 Great East Japan Earthquake of 2011, had eight lithium battery factories in Japan, with production of lithium batteries ranging from 80% to 90% of its total output. After the earthquake, Panasonic announced the closure of four of its Japanese plants in 2012 and that it would invest US\$ 720 million to found a new lithium battery factory in Suzhou, China, so as to increase the output share in China from the current 10-20% to about 50% in three to four years time. Sony also announced that it would move its domestic production line to China and Singapore before the end of March 2014. China's fiercely business friendly environment and cheap and high quality labor determines that the global lithium-ion battery manufacturing continuously shifts to China. Table one below shows the trend. It also shows a declining export ratio of lithium-ion batteries, indicating that China is not only becoming a major battery producing country, it is also emerging as a major consuming country.

Table 1: China's lithium-ion battery production by output and by share, 2005-2010

	2005	2006	2007	2008	2009	2010
World output of lithium-ion battery (in billion units)	1.84	2.37	2.82	3.15	3.63	3.90
China's lithium-ion battery output (in billion units)	0.85	1	1.2	1.45	1.5	2
China's production share (%)	46.2%	42.2%	42.5%	46.0%	49.0%	51.3%
China's export (in billion units)	-	-	-	1.25	1.08	1.2
China's export as a share of total production in China	-	-	-	86%	72%	59.75%

China's competitive edge as a production base of batteries can be illustrated by the example of BYD. It turned the expensive Japanese automatic production line of lithium batteries into a human assembly line packed with tens of thousands of workers (called 'human-based automation'), drastically reducing costs. The chairman of BK Battery, Fu Qiyuan, once told reporters that while the Japanese assembly line cost 83 million Yuan, its Chinese counterpart only cost 3 million. According to the study by Peregrine, for BYD, each unit of lithium batteries only costs it US\$ 1.3, while for Sanyo it costs US\$ 4.9.¹²

¹² *Panshi Battery – A Mysterious Purchase from Taiwanese Company*, <http://big5.huaxia.com/sw/qyfc/00244574.html>

Section II. The Human and Social Costs of the Battery Industry

Despite technological advances in the battery industry, worker's safety has not been the foremost priority of most major battery manufacturers, especially in China, where corporate profits have routinely been placed above worker's welfare.

“Labor cost also plays a significant role in manufacturing...batteries. Currently, China has between 275,000 and 325,000 workers in the battery industry. Labor costs in China are very low compared with labor costs in the west and Japan. Approximately 435 batteries companies in China produce batteries. The total output in 2006 was 78.7 billion Yuan (\$1.06 billion).”¹³ Due to decreased labor costs, Chinese battery manufacturers have engaged in worker exploitation. Due to the fierce competition, production quotas take precedence over worker's rights and safety.

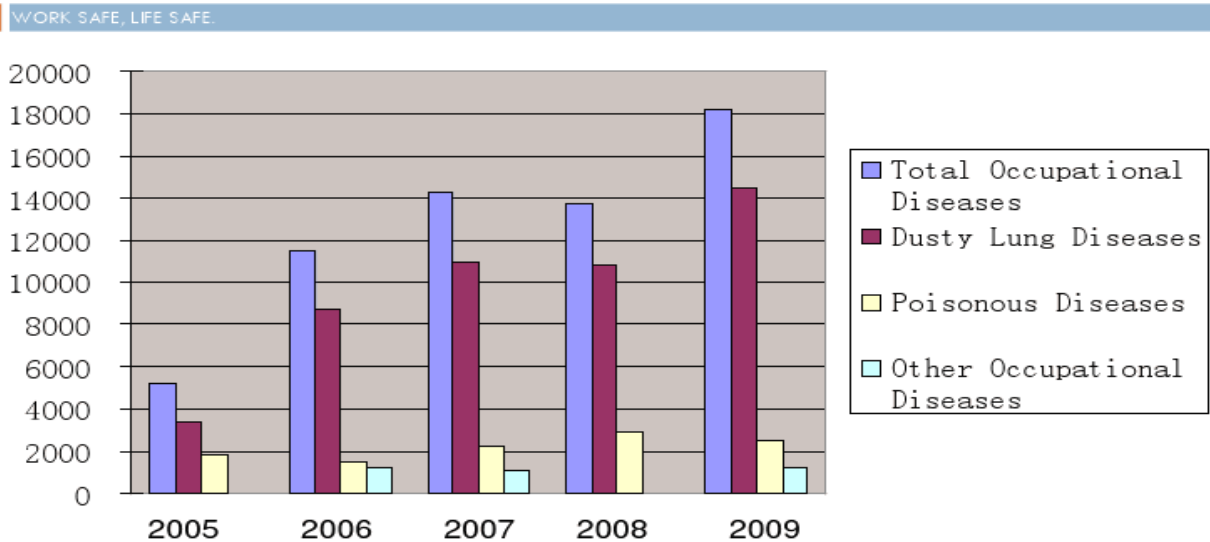
“Media reports on occupational disease have increased in mainland China in recent years. But the term occupational disease is still mistaken by most as unusual habits as a result of doing particular types of jobs over a long period. The misunderstanding of workers is chiefly a result of the failure of government authorities in promoting awareness on the issue.”¹⁴

¹³*Developments in lithium-ion battery technology in the Peoples Republic of China.* (n.d.). Retrieved from <http://www.ipd.anl.gov/anlpubs/2008/02/60978.pdf>

¹⁴Globalization Monitor,. (2009). *No choice but to fight*. Hong Kong: Globalization Monitor

Figure 8¹⁵

Occupational Disease Trends in China



The migration of battery production, from Hong Kong to the mainland, was driven primarily by a ready source of cheap labor and a tendency from provincial governments to usher in foreign investments and corporate interests, while disregarding the safety of the local population. The occupational safety, within this industry, continues to be compromised by government corruption and a lack of sensitivity to “ordinary” people.

The Chinese government has taken a proactive approach towards occupational hazards, by implementing progressive labor laws.

“Two new laws pertaining to safety at work in the early years of this century---ten years after the flourishing of export processing zones and the huge waves of migration from the rural areas Law on Treatment and Safe Production Law became effective in November 2002. Local governments are obliged to draw up implementation regulations, usually at provincial level, to render national laws appropriate to specific conditions in their respective provinces. China's State Administration for Work Safety was created in February 2001, but this body has generally failed to promote the new laws via accessible channels such as the television, free publications or newspapers.”¹⁶

As previously mentioned, the legal infrastructure for workers exists to a certain degree. However,

¹⁵Wang, Haiqing. (n.d.). *Shanghai's workplace health and safety scheme: a brief introduction*. Unpublished manuscript, Griffith, Australia. Retrieved from http://www.griffith.edu.au/__data/assets/pdf_file/0003/245694/Heidi.pdf

¹⁶Globalization Monitor,. (2009). *No choice but to fight*. Hong Kong: Globalization Monitor Limited.

a lack of enforcement of the rule of law, along with a culture of government unaccountability, contributes to an environment where the degradation of humanity occurs routinely. Studies around the world, on the effects of toxic metals, notably cadmium, have yielded shocking results.

Taken as a whole there have been more regulations from the government to impose more public control over the battery industry. A consolidation of the industry is underway in China. Corporations that refuse to comply with these new regulations have been promptly put out of business. Furthermore, if employers cannot meet the increasingly stringent safety regulations, outlined by the Chinese government at various levels, their right to do business may be revoked. These initiatives undertaken by the Chinese government are definitely proactive, but is too little too late for many communities that have already been destroyed by cadmium, nickel, lead or mercury.

“China has detained 74 people and suspended production at hundreds of battery factories in a widening crackdown on heavy metals pollution after dozens of people were sickened by lead and cadmium poisoning. Local authorities are belatedly moving to curb pollution after Beijing announced plans for tighter oversight of the industry in response to reports of widespread contamination from heavy metals.”¹⁷ “In late May, the Chinese government shut down lead battery and lead recycling plants over concerns of lead poisoning.”¹⁸ Despite this beneficial progress, cadmium, lead, nickel and mercury have been known to be toxic to the body ever since the 1960s.

The incidence of occupational disease, and the quality of labor conditions, has not been addressed by the Chinese government until recently. Ignorance, insensitivity and multifaceted corruption, have allowed China to become the “sweatshop of the world”, where companies can relocate cheaply and not to have worry about anyone interfering in their internal affairs.

However, the government is now seeking to diversify the Chinese economy, by closing the loopholes for so called “low tech” industries, while advocating Research and Development funding and an increase in subsidies for university education.

“The Chinese government aggressively supports the development of new types of batteries, such as lithium batteries, fuel batteries (fuel cell), and solar batteries. China’s 10th five year plan and 863 Program listed the lithium battery and related key materials as an important research project in the new

¹⁷Kurtenbach, Elaine. (2011, May 30). China detains 74 in lead poisoning crackdown. *The Boston Globe*. Retrieved from: http://www.boston.com/business/articles/2011/05/30/china_detains_74_in_lead_poisoning_crackdown/

¹⁸Montgomery, Michael. (2011, June 15). *Chinese battery plant shutdowns affect lead market*. Retrieved from <http://leadinvestingnews.com/1116-chinese-battery-plant-shutdowns-affect-lead-market.html>

material field.”¹⁹ “A grant of \$3.1 million, initially, from the federal government and more from local governments....will be used to fund R&D and commercialization efforts on China BAK's lithium phosphate battery technology. The hope is to get manufacturing of high-power batteries for electric and hybrid vehicles going as soon as possible.”²⁰

But the advancement in technology in the industry does not automatically upgrade the occupational safety there. Despite talk about ‘harmonious society’, China continues to perform badly in its protection of labor’s health:

China has more deaths per capita from work-related illnesses each year than any other country, according to the ILO. In 2005, the most recent year for which data are available, 386,645 Chinese workers died of occupational illnesses, according to Chinese government data compiled by the ILO and cited in the July 14, 2006, *Journal of Epidemiology*. Millions more live with fatal diseases caused by factory work, other epidemiologists estimated in the article. The number of workers living with fatal diseases does not include those who suffer amputations. Primitive, unsafe machines with blades that lack safety guards have caused millions of limb amputations since 1995, according to lawyers for Chinese workers.²¹

These statistics confirm the assertions made above. With China's rapid and unrestrained economic growth, terrible consequences have arisen for workers. Workers' rights have not increased or been protected, as threats of physical violence abound for individuals attempting to assemble publicly through trade unions or express their ideas freely. Even the relatively few cases, that reach the judicial stage, have a minute chance of actually achieving tangible reform.

Occupational Hazards of Battery Production

Cadmium

Cadmium, a common metal used in conjunction with other elements in the battery industry, is potentially lethal to humans who are exposed to it for a prolonged period of time.²² Beginning in 1961, a study was conducted in Britain to determine if there was a correlation between enhanced levels of cadmium and nickel in relation to a higher incidence of anosmia. Anosmia is defined as “a complete or

¹⁹ *Developments in lithium-ion battery technology in the Peoples Republic of China*. (n.d.). Retrieved from <http://www.ipd.anl.gov/anlpubs/2008/02/60978.pdf>

²⁰ Abuelsamaid, Sam. (2008, December 30). *China bak battery selected to receive government grants for r&d, manufacturing*. Retrieved from <http://green.autoblog.com/2008/12/30/china-bak-battery-selected-to-receive-government-grants-for-randd/>

²¹ Tofani, Loretta. Chinese workers lose their lives producing goods for America. *Salt Lake Tribune*. Retrieved from: <http://extras.sltrib.com/china/>.

²² Wisconsin Department of Health Services, (2010). *Cadmium* Retrieved from <http://www.dhs.wisconsin.gov/eh/chemfs/fs/cadmium.htm>

partial loss of the sense of smell.”²³ This may sound inconsequential, especially due to the date of this study, but the precedent established in this case warns of the dangers of poisonous metals, exactly 50 years ago. The study recorded the habits of alkaline battery workers, a co-op endeavor by *Alkaline Battery Company Limited* with *The United Birmingham Hospitals*.

The sense of smell of 106 alkaline battery workmen exposed at their work to cadmium and nickel dust has been compared with a control group of 84 men matched for age. The battery workers reported significantly more anosmia than the controls (15% to zero). The noses of 85 battery workers and 75 controls were examined. It is concluded that the anosmia is due to exposure to cadmium or nickel dust or a mixture of the two.²⁴

Unfortunately, the dangers of cadmium and nickel extend far beyond a loss of smell. The results from this study clearly demonstrate that cadmium is harmful to the human body. Kidney failure and an increased risk of contracting diabetes can stem from cadmium poisoning. “The kidneys lose their function to remove acids from the blood. The kidney damage inflicted by cadmium poisoning is irreversible. The *proximal renal tubular dysfunction* creates low phosphate levels in the blood (*hypophosphatemia*), causing muscle weakness and sometimes coma.”²⁵

Subsequent studies were conducted. Another example focuses on the incidence of lung cancer mortality among nickel - cadmium battery workers.

“In 1993, a Working Group of the International Agency for Research on Cancer (IARC) concluded that there was sufficient evidence in humans for the carcinogenicity of cadmium and cadmium compounds. Twenty reports relating to seven cohort studies of cadmium workers were available for this evaluation. Since the IARC report, an analysis incorporating newly abstracted detailed work histories indicated that the lung cancer excess in the cohort was consistent with...cadmium compounds or arsenic compounds being the carcinogenic agents.”²⁶

This study proves that cadmium's ill effects are wide ranging. Despite of this, the demand for cadmium in China continues to rise, because cadmium is both effective and relatively cheap as a kind of raw material for battery. As outlined in the figure below, the use of cadmium has steadily decreased in Western countries, whereas the opposite is true for China.

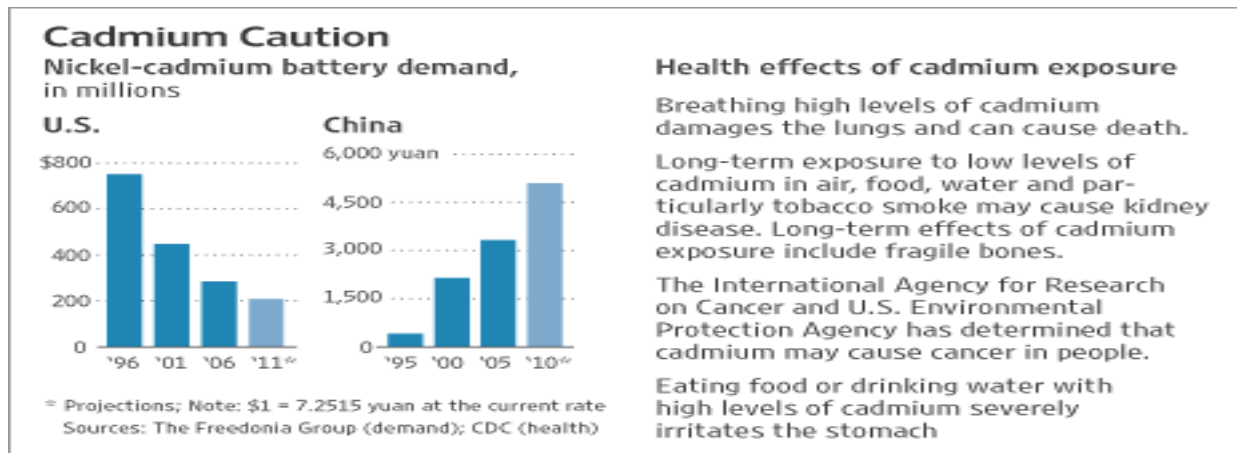
²³ Mayo Clinic Staff, (2011, February 08). *Loss of smell (anosmia)*. Retrieved from <http://www.mayoclinic.com/health/loss-of-smell/MY00408>

²⁴ Adams, R.G., & Crabtree, Norman. (1961). Anosmia in alkaline battery workers. *British Journal of Industrial Medicine*, 18(3), Retrieved from <http://www.jstor.org/pss/27721658?searchUrl=%2Faction%2FdoBasicSearch%3FQuery%3Dbattery%2Bproduction%26acc%3Doff%26wc%3Don&Search=yes>

²⁵ *Cadmium poisoning*. (n.d.). Retrieved from http://en.wikipedia.org/wiki/Cadmium_poisoning

²⁶ Sorahan, T., & Esmen, NA. (2004). Lung cancer mortality in U nickel-cadmium battery workers, 1947-2000. *Occupational and Environmental Medicine*, 61(2), Retrieved from <http://www.jstor.org/pss/27732175>

Figure 9²⁷



Although China has introduced stricter regulations to combat cadmium health concerns, the prices for cadmium based batteries remain lower than that of other batteries. Chinese manufacturers, including subcontractors that make batteries for the US market, have attempted to subvert international laws and trade conventions, in order to sell their products.

A well known case of cadmium poisoning in China is the GP case. GP group is a Hong Kong based corporations which once had 20 battery plants in China. Between the end of 2004 and early 2005 more than 400 workers in two GP factories found out that they were either poisoned by cadmium or having excessive level of the chemical due to management negligence. The workers fought for six years to fight for compensation. In September 2010, they finally won their lawsuit against Gold Peak Ltd. The total compensation won by the GP workers amounts to more than RMB 50 million.²⁸

Lead

Exposure, without adequate protection, is at best employer negligence and at worst an accessory to murder. Other metals have had similar effects on the human body, namely lead, as highlighted in a study conducted in Senegal.

There was a case of lead poisoning in the suburb outside of Dakar, Senegal. In just five months, 18 children died from an unknown illness that attacked their central nervous system. Following some

²⁷ Spencer, Jane, & Ye, Juliet. (2008, January 15). Toxic factories take toll on china's labor force. *The Wall Street Journal*, Retrieved from: <http://online.wsj.com/article/SB119972343587572351.html>

²⁸ Globalization Monitor, Ex-GP workers win new compensation deal after six years of struggle <http://www.globalmon.org.hk/en/01news/021gp-batteries-cadmium/new-publicationgold-peak-workers-campaign-update/>

preliminary investigations, it was determined that illegal dumping and improper disposal of refuse, caused the contamination. The primary item that was later identified as the main cause of this catastrophe was used – lead acid batteries (ULAB). Merely breathing the air, in an area contaminated with lead, can disable some of the body's primary functions. Unfortunately, 18 children died and 81 individuals in total were poisoned before any information became available about this issue.²⁹

China experienced similar tragedies with lead and its harmful effects, but has recently taken proactive measures to combat the potential for contamination, namely in batteries. However, not everyone is complying with these new measures to eradicate lead. “China is the world's largest producer of lead..., and it currently accounts for 45% of worldwide lead demand. Chinese lead demand is fed overwhelmingly by the lead-acid battery sector, and this industry accounted for 84% of total consumption in 2010.”³⁰

According to a report by The Telegraph (September 27, 2009), at least 121 children living around a battery factory in eastern China are suffering from lead poisoning, according to officials. “The children lived close to the Huaqiang Battery Plant, which was shut ten days ago after villagers approached the authorities with test results showing that some residents had been poisoned,” it said. Similar incidents continue to fill the pages of the press, which have prompted the government to introduce more regulation of the industry.

At the beginning of 2011, nine ministries and commissions of China including the Ministry of Environmental Protection and the Ministry of Industry and Information Technology jointly carried out an environmental protection campaign listing lead-acid battery as a primary object of regulation. The “Planning of Integrated Control of Heavy Metal Pollution during 12th Five-Year Plan Period” pointed out that comprehensive prevention and control would be conducted over 141 lead-acid storage battery enterprises and 7 key regions in China in 2011. As a result, the lead-acid battery industry will enter into a new phase of adjustment in 2011, during which nonstandard enterprises will be eliminated and enterprises under sustainable development will embrace new development opportunities in the future.³¹

Nickel and Mercury

²⁹Haefliger, Pascal, *et al.* (2009). Mass lead intoxication from informal used lead-acid battery recycling in Dakar, Senegal. *Environmental Health Perspectives*, 117(10), Retrieved from <http://www.jstor.org.mutex.gmu.edu/stable/40382926?seq=3&Search=yes&searchText=battery&searchText=industry&list=hide&searchUri=%2Faction%2FdoBasicSearch%3FQuery%3Dbattery%2Bindustry%26gw%3Djtx%26acc%3Don%26prq%3Dbatteries%26hp%3D25%26wc%3Don&prevSearch=&item=1&t1=12875&returnArticleService=showFullText&resultsServiceName=null>

³⁰Spotlight: china the denominator in lead market outlook. (2011, April08). *MetalBulletin*, Retrieved from <http://www.metalbulletin.com/Article/2804381/SPOTLIGHT-China-the-denominator-in-lead-market-outlook.html>

³¹*China lead-acid storage battery industry report, 2010.* (2011, April). Retrieved from http://www.reportlinker.com/p073428/China-Lead-Acid-Storage-Battery-Industry-Report.html?utm_source=prnewswire&utm_medium=pr&utm_campaign=prnewswire

Other dangerous metals, which are commonly used in battery production, include mercury, nickel and lithium. Despite the apparent benefits of nickel based batteries, there are serious side effects as well. “Nickel is a naturally occurring silvery metal found in the earth's crust in the form of nickel-containing minerals...Nickel is used in nickel-cadmium batteries. Manufacture of pure nickel is particularly hazardous because of the potential exposure to the gaseous intermediate nickel carbonyl, the most toxic form of nickel. Studies of workers in nickel refineries have shown increased rates of lung and nasal cancer.”³²

To corroborate these assertions, a study conducted on Swedish battery workers, highlights that “battery workers exposed to nickel were at an increased overall risk for lung cancer...and cancer of the nose and nasal sinuses.”³³ Despite nickel typically being associated with cadmium, and its potential to transform the energy industry, as highlighted above with the Chinese example, nickel is still a metal where precautions must be used to safeguard workers. As this study highlights, production of nickel based batteries can yield deadly effects for workers that may be long term, debilitating illnesses.

Another poisonous metal, mercury, has received significant publicity. “Exposure to environmental Hg (mercury) is believed to have a number of potential negative effects on human health, including: i) cognitive deficits (e.g., reduced IQ) in children due to fetal exposure and in adults exposed to high concentrations of Hg vapors, ii) possible increases in fatal and nonfatal heart attacks, and iii) increases in premature death (i.e., some studies link Hg exposures to increased risk of premature mortality regardless of cause).”³⁴

These side effects of mercury are quite consistent with the other poisonous metals listed above. Mercury's ill effects were highlighted in a study in 1963 by the British Journal of Industrial Medicine. “In a factory in which old airplane batteries containing zinc mercury amalgam were substituted, it was not realized that mercury vapor was being produced. Of 25 workers exposed, seven developed serious

³²<http://www.mdguidelines.com/toxic-effects-nickel-and-inorganic-compounds>. (n.d.). Retrieved from <http://www.mdguidelines.com/toxic-effects-nickel-and-inorganic-compounds>

³³Jarup, Lars, Bellander, Tom, Hogstedt, Christer, & Spang, Gunnar. (1998, November). *Mortality and cancer incidence in swedish battery workers exposed to cadmium and nickel*. Retrieved from <http://www.jstor.org.mutex.gmu.edu/stable/27731026?&Search=yes&searchText=battery&searchText=poisoning&searchText=nickel&searchText=workers&list=hide&searchUri=%2Faction%2FdoBasicSearch%3FQuery%3Dnickel%2Bpoisoning%2Bbattery%2Bworkers%26gw%3Djtx%26acc%3Don%26prq%3Dbattery%2Bpoisoning%2Bnickel%26hp%3D25%26wc%3Don&prevSearch=&item=1&tll=165&returnArticleService=showFullText>

³⁴Swain, Edward, *et. al.* (2007). Socioeconomic consequences of mercury use and pollution. *Ambio*, 36(1), Retrieved from <http://www.jstor.org.mutex.gmu.edu/stable/4315783?seq=5&Search=yes&searchText=poisoning&searchText=China&searchText=mercury&list=hide&searchUri=%2Faction%2FdoBasicSearch%3FQuery%3Dmercury%2Bpoisoning%2BChina%26gw%3Djtx%26acc%3Don%26prq%3Dmercury%2Bpoisoning%26hp%3D25%26wc%3Don&prevSearch=&item=5&tll=1017&returnArticleService=showFullText&resultsServiceName=null>

chronic mercury poisoning and were admitted to hospital.”³⁵ As with other dangerous metals previously listed, studies had been conducted, in various industries and working conditions, on mercury.

However, as previously mentioned, governments did not take proactive measures until workers reported symptoms consistent with poisoning. The European Commission took the first step towards banning batteries containing mercury in 1991, with the US following suit in 1996 with a comprehensive ban.³⁶ However, China had not followed this course, and if the use of mercury in the battery industry declines in recent years it was more a market respond to the Western countries’ move to ban mercury than a conscious governmental intervention in China:

“Battery manufacturing is the second-largest legal use of mercury in China, at approximately 150 tons of demand annually. Fortunately, unlike the trend in PVC, mercury use in the battery sector has been declining precipitously. This is in response to market forces. Declines are projected to continue, as many multinational corporations have recently pledged to voluntarily eliminate all remaining mercury in batteries in the next several years.”³⁷

Lithium hexafluorophosphate (LiPF₆)

Every battery consists of three major components: electrodes, separator, and electrolyte. An electrolyte is a substance which acts as a medium to conduct electricity and may be classified into solid and liquid electrolytes. Liquid electrolytes include molten salts and electrolyte solutions. With reference to the type of solvent used they are called aqueous (water), mixed aqueous (water and cosolvent), and nonaqueous (organic or inorganic solvent) electrolyte solutions³⁸.

Li-ion batteries use a nonaqueous organic electrolyte which is the solutions of LiPF₆ salt in a solvent blend of ethylene carbonate (EC) and various linear carbonates such as dimethyl carbonate (DMC), diethyl carbonate (DEC) and ethylmethyl carbonate (EMC).³⁹

According to the data of the MSDS, LiPF₆ is a dangerous material can corrode skin, cause severe skin

³⁵Tamir, M., *et al.* (1963). Mercury poisoning from an unsuspected source. *British Journal of Industrial Medicine*, 21(4), Retrieved from <http://www.jstor.org.mutex.gmu.edu/stable/pdfplus/27721978.pdf?acceptTC=true>

1. ³⁶Rod Hunter, Koen J. Muylle (ed.) *European Community deskbook* Environmental Law Institute , 1999 ISBN 091193782X, page 75.

Frank Kreith, George Tchobanoglous *Handbook of solid waste management*, McGraw-Hill Professional, 2002 ISBN 0071356231, page 6-34

³⁷NRDC, (2007, April). *Nrdc fights to stop mercury pollution in china*. Retrieved from <http://www.nrdc.org/international/china/mercury.pdf>

³⁸ Nonaqueous electrolyte solutions: New materials for devices and processes based on recent applied research, <http://media.iupac.org/publications/pac/1995/pdf/6706x0919.pdf>

³⁹[http://www.covalentassociates.com/Li-](http://www.covalentassociates.com/Li-ion%20Battery%20Electrolytes%20Designed%20For%20a%20Wide%20Temperature%20Range.pdf)

[ion%20Battery%20Electrolytes%20Designed%20For%20a%20Wide%20Temperature%20Range.pdf](http://www.covalentassociates.com/Li-ion%20Battery%20Electrolytes%20Designed%20For%20a%20Wide%20Temperature%20Range.pdf), P1

burns and eye damage. In case of eye or skin contact, the effects would be: "burning sensation, Cough, wheezing, laryngitis, Shortness of breath, spasm, inflammation and edema of the larynx, spasm, inflammation and edema of the bronchi, pneumonitis, and pulmonary edema. The material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin."⁴⁰

⁴⁰ Lithium hexafluorophosphate, SAFETY DATA SHEET of SIGMA-ALDRICH, <http://www.sigmaaldrich.com/MSDS/MSDS/DisplayMSDSPage.do?country=TW&language=en&productNumber=450227&brand=ALDRICH&PageToGoToURL=http%3A%2F%2Fwww.sigmaaldrich.com%2Fcatalog%2Fsearch%3Finterface%3DAll%26term%3DLiPF6%26lang%3Den%26region%3DTW%26focus%3Dproduct%26N%3D0%2B220003048%2B219853264%2B219853286%26mode%3Dmatch%2520partialmax>

International Trend in Reducing Hazardous Effects of Battery

European Union (EU) directives have begun to tighten some of the loopholes against environmentally destructive battery disposal practices. In the EU, a directive is a binding piece of legislation that has been approved by the legislative and executive branches. It states a common objective for regulation, which must be implemented, through the discretion of each member state.

Although these initiatives largely focus on waste removal, rather than the production stage, at least the EU member governments recognize the seriousness of cadmium and lead poisoning, which, as noted in the Senegal case study (see pg. 4), can have deadly ramifications. The EU Battery Directive calls for the implementation of a recycling scheme, to reduce the release of potentially toxic chemicals into the environment, while promoting conservation of resources through reuse.

Deposit systems and refund schemes, which will most likely be established by corporations, will provide customers with an incentive to recycle their used batteries. Upon return of a battery, an individual could be reimbursed with a percentage of the original price. This system would likely promote conservation and provide an incentive for people to return their used batteries to designated collection points, instead of disposing them improperly.⁴¹ This scheme is mutually beneficial for recycling contractors as well as manufacturers, due to the fact that fewer new raw materials will be needed to construct more batteries. In addition to these measures, the EU is considering a further reduction in the permissible levels of cadmium in imported batteries.

This legislation is progressive, but “without a significant change by the manufacturers and other countries, the battery-waste will continue to grow with all its health and environmental consequences.”⁴²

In the case of nickel cadmium battery, the poisonous cadmium travels around the world in the form of consumer goods, especially toys. In the United States this has resulted in recalls of a number of metallic toy jewelry items by the Consumer Product Safety Commission. In 2006 high level of nickel, cadmium, copper and zinc was found in a bracelet exported by China which was hazardous to children’s health.⁴³ It led to more consumer campaign against cadmium and which pressurizes importers and brand companies to act.

A *Wall Street Journal* reported that

⁴¹Kierkegaard, Sylvia. (2007). Charging up the batteries: squeezing more capacity and power into the new EU battery directive. *Computer Law & Security Report*, 23(4), Retrieved from <http://www.sciencedirect.com/mutex.gmu.edu/science/article/pii/S0267364907000489#sec3>

⁴²Ibid.

⁴³<http://www.albany.edu/ihe/Cadmium.htm>

TOYS 'R' US Inc. said it will begin phasing out nickel-cadmium batteries, the making of which has caused widespread environmental contamination in China and poisoned hundreds of factory workers.

Most of the new safety initiatives aim to protect the health of the consumers. The cadmium-battery phase-out is a sign that toy retailers are also under pressure to consider the health of the workers and citizens of China, where the majority of the world's toys are made.

Some toy makers, including Hasbro Inc., have already launched their own bans on cadmium batteries.⁴⁴

⁴⁴ <http://chinese.wsj.com/gb/20080218/bus132814.asp?source=channel>, February 18, 2008.

Section III. Report on Ten Battery Plants in China

Method

In this report we are going to summarize our investigation of occupational safety problems and violations of relevant laws, and outline a quest for best practices in ten battery factories.

To examine the working conditions in the battery industry in China, we conducted surveys from January to August 2010 in 10 factories. Fieldwork and interviews with workers have been supplemented with archival research. In each factory five to eight workers were interviewed. During the interviews we asked open-ended questions in order to build up an interviewee-friendly atmosphere and encourage interviewees to provide more precise descriptions of their working conditions. Thus the findings of this report are based on information provided by interviewees and by researchers' observations. Name, age, hometown and other personal information of workers interviewed are not disclosed so that there can be no retaliation from management or any other adverse consequences. The benchmarks for examining working conditions in these factories are national labour laws and ILO conventions.

Findings

A. Sunwonda Electronic Co. Ltd

1. Background

This company is a supplier to Lenova, Philips, Panasonic, Sandisk, Apple, Samsung, Sony, and Sanyo. It produces batteries for mobile phones, notebooks and additional devices. It employs over 1400 workers; eight workers were interviewed.

2. Pay and overtime premium

Sunwonda pays the minimum wage, which was 900 yuan at the time of the interview. Workers earn about 1800 yuan a month, including overtime wages. However, the company attempts to minimize overtime labour costs by taking advantage of a legal loophole. Article 44 of the Labour Law stipulates that employers must pay workers no less than 1.5 times the regular wage for overtime accrued on regular work days; no less than two times workers' regular wage on rest days; and no less than three times their regular wage on statutory holidays.

However, there is no explicit prescription for overtime compensation based on piece rates. At Sunwonda, while normal wages are calculated by time, overtime wages during the weekend or on a statutory holiday are based on piece rates. Since this piece rate is no different the regular

weekday rate, workers do not receive extra compensation for overtime.

Each worker is given a monthly wage slip that does not itemize the different components but only shows the sum of time-based wages and piece-based wages. Therefore, most workers interviewed are unsure if they are paid correctly.

3. Working hours

Article 41 of the Labour Law requires that only under special circumstances may employers extend work hours due to production requirements or other special reasons. The total overtime per employee may not exceed three hours a day and 36 hours in a month. However, the practice of Sunwonda Electronic Co. Ltd. does not meet the legal standards. Workers work 12 hours a day at least six days a week, which means their weekly overtime is 32 hours (4 hours x 5 days + 12 hours) and a monthly overtime of roughly 128 hours (32 hours x 4). An interviewed worker said “I have about only two rest days a month. The working hours are too long; it’s so exhausting. That’s why workers won’t stay long in the factory.” Another worker shared that “my work is really exhausting; sometimes I don’t even have time to go to washroom.”

Workers noted that if they refuse to work overtime, 100 yuan will be deducted from their wages each day.

4. Occupational health and safety

Article 32 of the Law on the Prevention and Treatment of Occupational Diseases spells out that for those “laborers whose work comes into contact with occupational hazards, their employers shall organize occupational health examination for their employees before and during their employment or when their employment terminates. The employers shall inform the laborers of their examination results.” Sunwonda Electronic Co. Ltd. asks workers to bear the cost of health examination (50 yuan); this is not in line with the legal standard. [IS THIS ANOTHER LOOPHOLE OR IS IT EXPLICITLY STATED THAT THE EMPLOYER MUST PAY?]

Moreover, Article 31 of the Law on the Prevention and Treatment of Occupational Diseases spells out that employers should conduct occupational health training for workers before the latter take up their posts and continue to provide workers with regular trainings. However, Sunwonda Electronic Co. Ltd provides only one or two days of pre-employment training.

Workers have not been informed of the health risks associated with their work, nor have their contracts provided any information about occupational hazards. “I don’t know if the chemicals I

use in work are harmful or not and I don't know what they are" one worker reported.

5. Social insurance

Article 72 of the Labour Law stipulates that employers and employees must take part in the social insurance program and contribute to the fund. Article 73 states that the fund must cover illness, occupational injury or disease, unemployment, retirement and reproduction. Workers at Sunwonda said the factory contributed to the social insurance fund, but they suspect only it only covers retirement funds. The factory has never properly informed them about the scope of the coverage.

6. Training on Trade Unions

Article 7 of the Labour Law spells out the right to organize trade unions, which are to be independent, representing and safeguarding the rights of workers. Article 9 of the Trade Union Law requires that trade union should be formed through democratic election. However when we asked workers about the factory trade union, most were unsure whether it exists. An engineer claimed that there is one.

Furthermore, workers do not recall any labour rights training provided by the factory before or after they took up their positions. But without proper training, workers would not know what legal rights they are entitled to or how to defend their own interests. It is common for factories to avoid providing training as this means there is greater room to manipulate workers.

7. Punitive fines

Workers said they are fined at least 20 yuan for trivial reasons such as talking while working, not wearing anti-static clothing that is too thick for summer time, or not being able to recite standard answers to questions put forward by clients. A worker complained that "the factory never spends money on workers' welfare. Anyway, I will be happy if it does not deduct my wages for different excuses."

B. Yaoan Battery

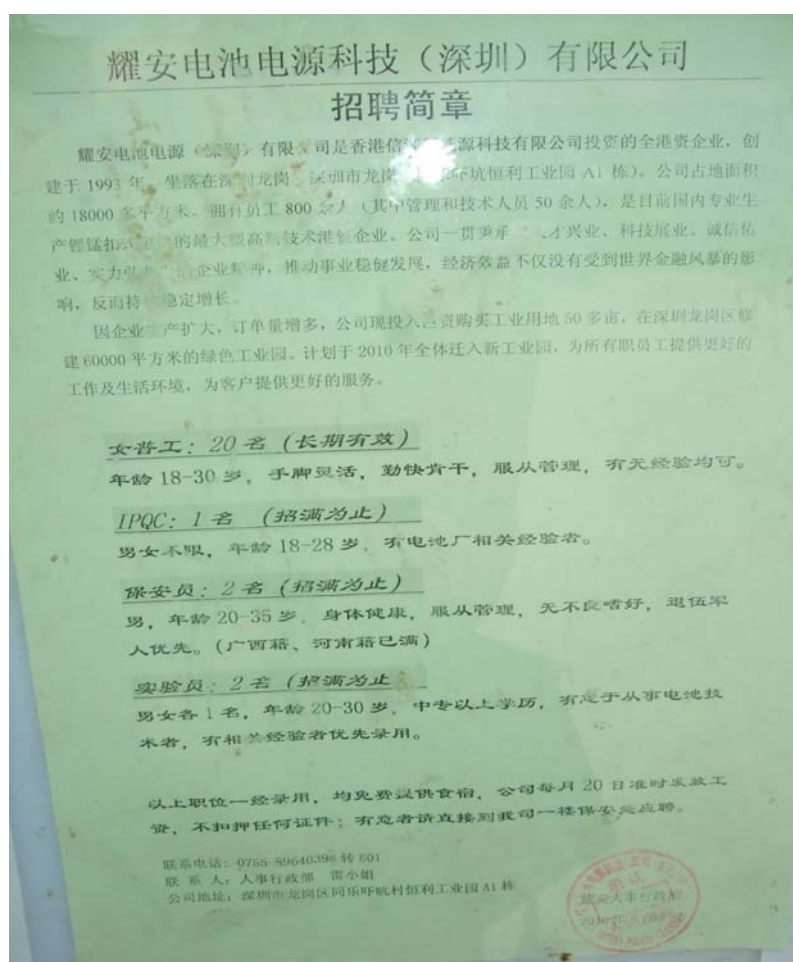
1. Background

This company produces batteries for remote controls, digital cameras, notebooks, etc. It employs 800 workers; six were interviewed.

2. Pay and overtime premium

Yaoan Battery pays the minimum wage, which was 900 yuan at the time of interview. Including overtime payment, a worker's monthly income is roughly 1200-1500 yuan. Workers who work in the milling shops have higher wages, around 2000 yuan.

As in the case of Sunwonda Electronic Co. Ltd., Yaoan Battery takes advantage of the legal loophole regarding overtime premium by paying piece-rate wages.



Yaoan Battery employment advertisement: It boasts for being able to pay wages timely and for not withholding the identity cards of their employers.

3. Working hours

In Yaoan Battery, workers usually work six days a week. They work overtime weekdays for about three hours. In other words, the monthly overtime is about 92 hours (3 hours x 5 days + 8

hours} x 4 weeks). This is not in line with the Article 41 of the Labour Law.

4. Occupational health and safety

Health examinations are essential to the protection of workers for two reasons: first, for the early diagnosis of diseases and, second, in order to assign responsibility when the occupational disease is diagnosed. However Yaoan Battery does not arrange pre-employment health examinations. This is not in conformity with Article 32 of the Law on the Prevention and Treatment of Occupational Diseases. It does not arrange the prescribed annual health examination either.

Yaoan Battery has no pre-employment or on-the-job health and safety training, thus violating Article 31 of the Law on the Prevention and Treatment of Occupational Diseases.

Workers at Yanon Battery are not well informed of the health risks associated with their work. A worker noted that “in the liquid injection workshop workers have to work with certain chemicals, but workers don’t know what harm they may cause.”

5. Social insurance

Yaoan Battery does not contribute to any workers social insurance fund. It is therefore in violation of Article 72 and 73 of the Labour Law and Article 74 of the Labour Contract Law.

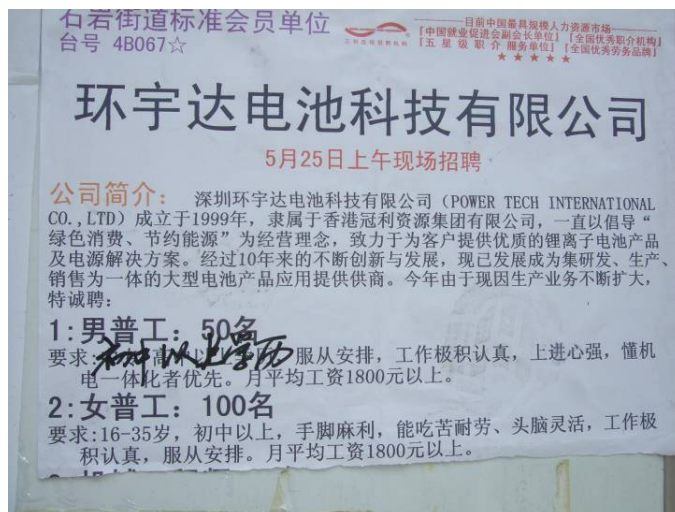
6. Training on Trade Unions

In Yaoan Battery there is no trade union. A worker in Yaoan Battery said “I don’t know what a trade union is and what its functions are.” Needless to say there is no labour rights training.

C. Power Tech International Co., LTD

1. Background

This company produces batteries for notebooks, DVD players, automobiles, electronic bicycles, electronic vehicles, etc. It employs over 800 workers; eight were interviewed.



Employment advertisement of Power Tech

2. Pay and overtime premium

Power Tech pays the minimum wage, which was 900 yuan at the time of interview. Including overtime payment, a worker earns about 1200 yuan a month. As in the case of Sunwonda Electronic Co. Ltd. and Yaoan Battery, Power Tech International Co., LTD has taken advantage of the legal loophole regarding overtime pay.

The factory does sign a labour contract with workers, but has not given them a copy. This is in violation of Article 16 of the Labour Contract law.

3. Working hours

In Power Tech International Co., LTD, workers usually work six days a week with weekday overtime of three to four hours. This means their monthly overtime ranges between 92 to 112 hours and is thus in violation of Article 41 of the Labour Law.

4. Occupational health and safety

Power Tech does not arrange pre-job health examinations or an annual health examination; this is not in conformity with Article 32 of the Law on the Prevention and Treatment of Occupational Diseases. It provides no pre-employment or on-the-job training on occupational health and safety, thus violating Article 31 of the same law.

5. Social insurance

Power Tech International Co., LTD does not contribute to the social insurance fund and therefore violates Article 72 and 73 of the Labour Law and Article 74 of the Labour Contract Law.

6. Training on Trade Unions

At Power Tech International Co., LTD, there is no labour rights training nor a trade union.

D. Shenzhen Bak Battery Co., LTD

1. Background

Shenzhen Bak produces batteries for mobile phones, notebooks, digital cameras, etc. Over 8000 workers are employed; seven were interviewed.



The Shenzhen Bak Battery building

2. Pay and overtime premium

The company pays the minimum wage, which was 900 yuan at the time of interview. Including overtime payment, a worker's total monthly income is between 1600-1800 yuan. Compared with previous three factories, Shenzhen Bak Battery Co., LTD. seems to have better overtime policies. Some of the wages are based on piece rate while others are based on time. Workers are entitled to an overtime premium as stipulated by laws if they work on rest days or statutory holidays.

3. Working hours

In Shenzhen Bak Battery Co., LTD., the daily normal working day is seven hours, but the daily overtime is three hours. Thus the monthly overtime is roughly 66 hours and is not in conformity with Article 41 of the Labour Law.

4. Occupational health and safety

Like Sunwonda Electronic Co. Ltd., this company asks workers to bear the cost of health examination, which in this case is 25 yuan. This is not in line with the legal standard. However it has arranged annual health examinations for workers as the law prescribes and provides four to five days of pre-employment training, which includes some aspects on occupational health and safety.

Some workers suspect that at Shenzhen Bak Battery Co., LTD, they have to work with hazardous chemicals, but they have not been well informed. A worker told us that “workers have to work with chemicals in the liquid injection workshops; many workers don’t want to work there even though wages in that workshop is higher. Usually workers won’t stay long in that workshop as they know that it will harm their health.”

5. Social insurance

Shenzhen Bak Battery Co., LTD only contributes to the medical insurance portion of the social security law. This is in violation of Article 72 and 73 of the Labour Law and Article 74 of the Labour Contract Law.

6. Training on Trade Unions

In Shenzhen Bak Battery Co., LTD, there is trade union, but workers seldom seek help from it. A worker noted that “I only know that every year the trade union would organize activities, such as basketball competition and cultural and entertainment night. However, when we need help, we seldom think of seeking assistance from the trade union. Even if I do so, it will not be of great help, it cannot help solve the problem.”

7. Punitive fines

Workers told us that according to the staff handbook, they will be fined for 10 yuan if they receive a warning from management, 20 yuan for a small demerit, 50 yuan for middle demerits and 100 yuan for a big demerit. For example, if they tell their wages to others, they will receive a warning and be fined 10 yuan.

E. HYB Battery

1. Background

The company produces batteries for notebooks; it is a supplier to Samsung, Foxconn and Tyco.

Over 1000 are employed; eight were interviewed



2. Pay and overtime premium

HYB Battery pays the minimum wage rate, which was 900 yuan at the time of interview. Including overtime payment, a worker's total monthly income ranges between 1500-2000 yuan. The company has a better overtime policies with some wages piece-rate based while others are time-rate based. Workers are entitled to an overtime premium as stipulated by laws if they work on rest days or statutory holidays.



3. Working hours

At HYB Battery, workers work six days a week and have four rest days a month. They usually work 12 hours a day, which means the monthly overtime is about 176 hours. This is not in conformity with the Article 41 of the Labour Law.

4. Occupational health and safety

HYB Battery arranges annual health examinations but charges workers 50-60 yuan. This is not in conformity with Article 32 of the Law on the Prevention and Treatment of Occupational Diseases. Moreover, it provides no pre-employment or on-the-job training on occupational health and safety, violating Article 31 of the Law on the Prevention and Treatment of Occupational Diseases.

Workers have not been informed of on-the-job health risks nor have their contracts provided information on any occupational hazards. Workers in HYB Battery work with chemicals, such as acetone, but are unaware of its harmful effects.

5. Social insurance

HYB Battery only contributes to medical and retirement insurance, thus violating Article 72 and 73 of the Labour Law and Article 74 of the Labour Contract Law.

6. Training on Trade Unions

In HYB Battery, there is a trade union and workers have to pay a monthly membership fee of one yuan. However workers told us that they don't know what the trade union is supposed to do; they only notice that from time to time it will organize entertainment. They have never heard about workers seeking help from the trade union.

7. Punitive fines

There is a wage deduction system in the factory. For example, workers will be fined 20 yuan for not wearing mouth masks.

F. Lexel Battery (Shenzhen) Co. Ltd

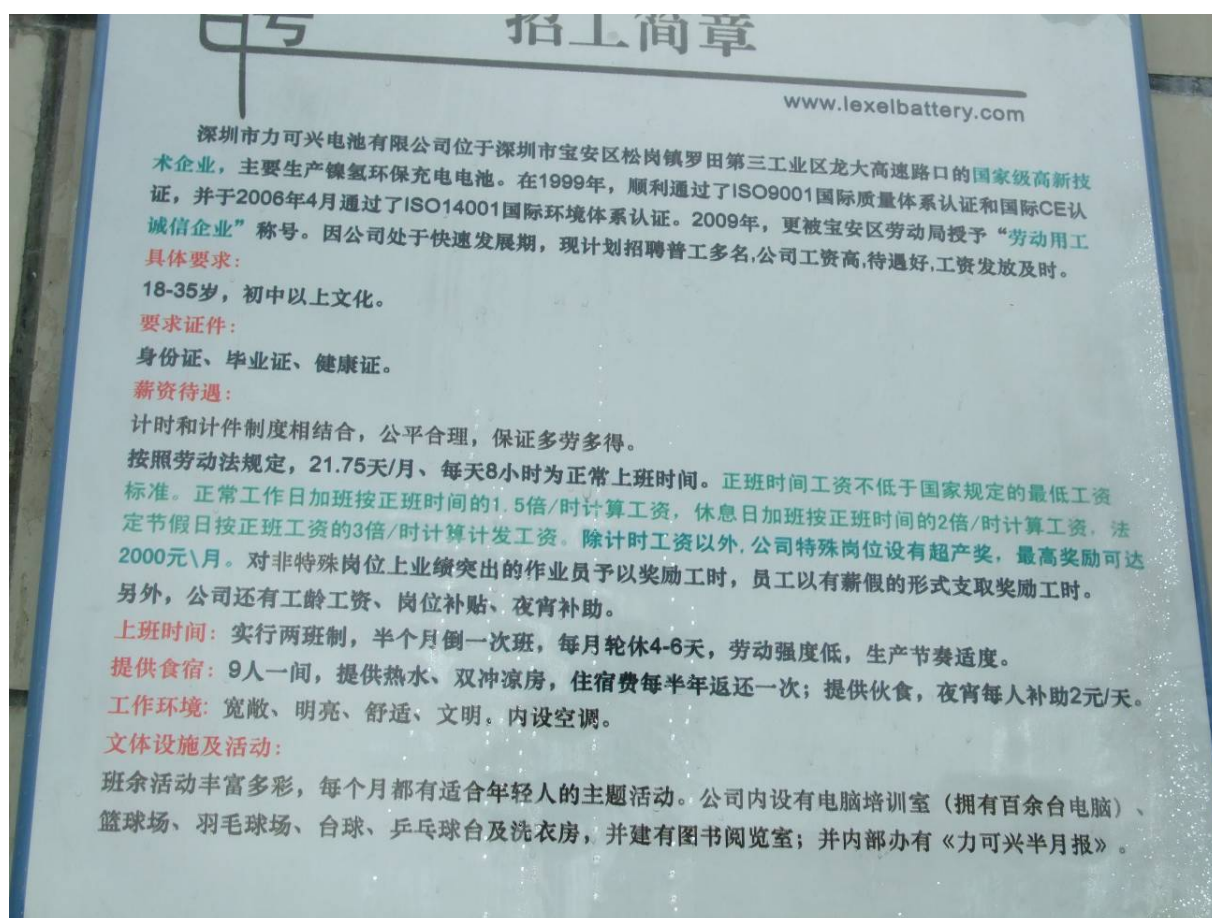
1. Background

Lexel employs 2000 workers; five were interviewed.



2. Pay, working hours and overtime premium

Lexel pays the minimum wage rate, which was 900 yuan at the time of interview. Including overtime payment, the total monthly income of workers is about 1600 yuan. In Lexel, Some wages are piece-rate based while others are time-rate based. The wage calculation is not in accordance with legal regulations. Lexel assumes that the monthly wage is based on 176 hours of work. Only when this total is exceeded will the factory pay an overtime premium. This means even when a worker puts in a 16-hours day but does not work more than 176 hours in a given month, he/she is not entitled to an overtime premium. This is a violation of Article 44 of the Labour Law.



Employment advertisement from the Lexel Battery.

3. Occupational health and safety

Lexel has arranged annual health examinations for workers as the laws prescribe. However, it provides no pre-employment or on-the-job training on occupational health and safety; this is a violation of Article 31 of the Law on the Prevention and Treatment of Occupational Diseases.

Management never informs workers what kind of hazardous materials they might come across. Workers in Lexel said the working environment does not seem to be safe. Every day after work their uniform has become black and dirty. One woman told us that she has some skin problems with her face and pimples appeared; this only happened after she started working in this factory.

4. Social insurance

Lexel buys medical insurance for workers but contributes to other social insurance programs only when workers make a request. [IS THIS AN INDIVIDUAL REQUEST, OR GROUP REQUEST?] This violates Article 72 and 73 of the Labour Law and Article 74 of the Labour Contract Law.

5. Training on Trade Unions

Workers are not sure if trade union exists in the factory.

6. Punitive fines

There is a wage deduction system in the factory. For example, if workers' uniforms are not neat enough, or if they talk in the workplace, they will be fined 20 yuan.

G. Heng Yu

1. Background

Heng Yu is a supplier to SANYO、Samsung、Panasonic、TI、SII and MAXIM. It employs over 20 workers; four were interviewed.

2. Pay and overtime premium

The company pays the minimum wage, which was 900 yuan at the time of interview. Workers earn about 1500 yuan per month, including overtime payment. Heng Yu system of payment is based on time worked and the company follows the law regarding the overtime premium.

3. Working hours

The daily overtime work on weekdays at Heng Yu is three hours; sometimes Saturday work is required. The monthly overtime is about 96 hours, which is not in conformity with Article 41 of the Labour Law.

4. Occupational health and safety

The company has no pre-job health examination or annual health examination, which is not in conformity with Article 32 of the Law on the Prevention and Treatment of Occupational Diseases. Nor does it provide pre-employment or on-the-job training on occupational health and safety. This is a violation of Article 31 as well.

5. Social insurance

The company contributes to the social insurance fund only on the workers' request. This is a violation of Articles 72 and 73 of the Labour Law and Article 74 of the Labour Contract Law.

6. Training on Trade Unions

There is no trade union at the small factory.

H. Better Power Battery CO., Ltd

1. Background

Better Power Battery's products are exported to the United States, Europe, Japan, Korea and Thailand. There are about 1200 workers; eight were interviewed.

2. Pay and overtime premium

Better Battery pays the minimum wage, which was 900 yuan at the time of interview. Workers earn about 1500-1800 yuan every month, including overtime payment. The company takes advantage of the legal loophole regarding overtime payment and uses piece-rate wages.



Employment advertisement from Better Power Battery

3. Working hours

At Better Power Battery CO., Ltd, workers work a six-day week and usually 12-hour days. The monthly overtime is about 112 hours, which is not in conformity with the Article 41 of the Labour Law.

4. Occupational health and safety

The company follows the law for annual health examinations. However, it has no pre-employment or on-the-job training for workers occupational health and safety training, in violation of Article 31 of the Law on the Prevention and Treatment of Occupational Diseases.

Better Power's work environment seems unsafe; a worker said one of her workmates and a fellow villager quit after working in the factory for 10 days when a rash developed on her face. However since workers have not been informed about what kind of chemicals they have to work with in workplace, they could hardly prove their skin problems are work-related.

5. Social insurance

Better Power contributes to medical insurance, but only contributes to other social insurance programs when workers request that they do so. This is a violation of Articles 72 and 73 of the Labour Law and Article 74 of the Labour Contract Law.

6. Training on Trade Unions

There is no trade union.

I. Zhong Kai xing

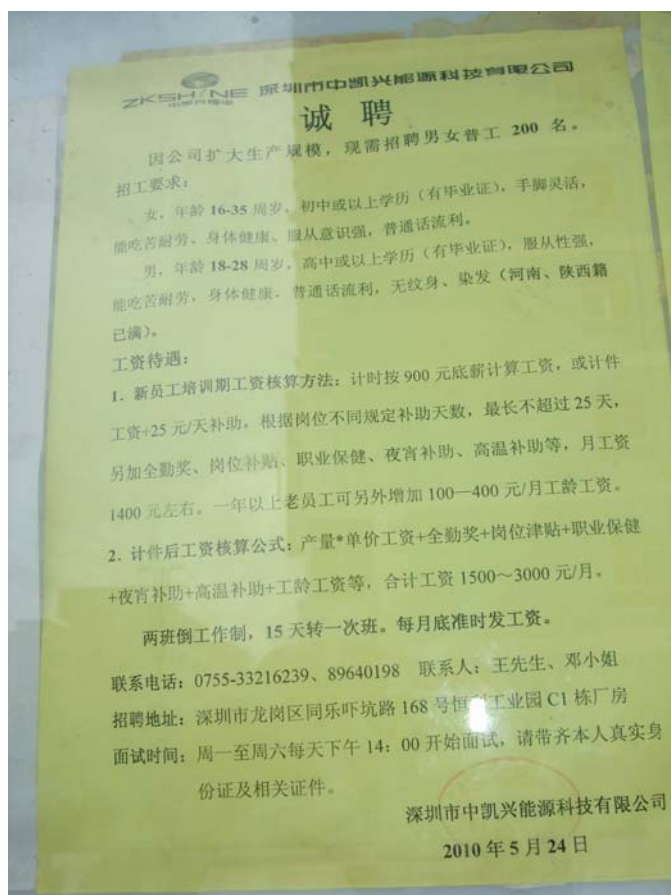
1. Background

The company produces batteries for toys, motorcycles, electronic bicycles, etc. It employs over 2000 workers; eight were interviewed.

2. Pay and overtime premium

Zhong Kai xing pays the minimum wage, which was 900 yuan at the time of interview. Workers earn about 1400 yuan per month, including the overtime payment. Workers' wages are

completely based on piece rate. Once again, a company has taken advantage of the legal loophole regarding overtime payment.



Employment advertisement from Zhong kai xing

3. Working hours

Workers work six days a week, usually putting in a 12 hour-day. With a monthly overtime of about 112 hours, the company is in violation of Article 41 of the Labour Law.



4. Occupational health and safety

The company arranges health examination but charges workers 40 yuan. This is not in conformity with Article 32 of the Law on the Prevention and Treatment of Occupational Diseases. It does not provide pre-employment or occupational health and safety on-the-job training. This is a violation of Article 31 of the Law on the Prevention and Treatment of Occupational Diseases.

At Zhong Kai xing, many workers said they have skin problem (like pimples), which only happened after they worked in this factory. They said the working environment is quite dirty. They have to put on gloves and mouth masks while working. By the end of the day the mouth masks are blackened. But without knowing what kinds of chemicals they work with, they could hardly prove their skin problems are work-related.

5. Social insurance

The company contributes to social insurance fund only on workers' request, thus violating Articles 72 and 73 of the Labour Law and Article 74 of the Labour Contract Law.

6. Training on Trade Unions

There are no trade unions.

J. Bei Te Rui

1. Background

The company exports products to countries including Japan, Korea, the United States, France, Germany, and Canada. It employs about 800 workers; five workers were interviewed.

2. Pay and overtime premium

J.Bei Te Rui pays the minimum wage, which was 900 yuan at the time of interview. Workers earn about 1600 yuan per month, including overtime payment. Wages of workers based on piece rate. They receive no overtime premium for extra work on weekdays or Saturday, but they do for working on statutory holidays. This company also takes advantage of the legal loophole regarding overtime payment.

3. Occupational health and safety

Following the legal requirement, the company provides annual health examinations. However it does not provide pre-employment or occupational health and safety on-the-job training, thus violating Article 31 of the Law on the Prevention and Treatment of Occupational Diseases.

At Bei Te Rui, workers said that by the end of the work day, they usually become very dirty and their mouth mask will be black. The mouth masks are disposable and probably are inadequate protection. Many workers develop sensitive skin after working there. However since workers have not been well informed about the chemicals with which they have to work, they could hardly prove their skin problems are work-related.

4. Social insurance

Bei Te Rui contributes to the social insurance fund only on workers' request. This is a violation of Articles 72 and 73 of the Labour Law and Article 74 of the Labour Contract Law.

5. Training on Trade Unions

In Bei Te Rui, some line management told us that there is trade union in the factory, but workers were unsure of its existence. A worker noted that "I don't know the function of trade unions. I only noticed that the factory from time to time will organize some activities, but I am not sure if they are held by a trade union. When I am in trouble, I probably won't think of the trade union. "

Summary and suggestions

1. Pay and overtime premium

Although all 10 battery factories pay the minimum wage it must be noted that most take advantage of the legal loophole on paying the overtime premium by paying the piecework rate. Thus workers receive no special compensation for working extra hours. We think the overtime wages for piece-rate workers should follow the spirit of the labour law, which stipulates that employers must pay workers no less than 1.5 times of the regular wage for overtime accrued on regular work days; no less than two times the regular wage on rest days; and no less than three times that for statutory holidays. This principle should be applied to the piecework rate as well.

2. Working hours

Article 41 of the Labour Law requires that only under special circumstances may employers extend work hours due to production requirements or other special reasons. The total overtime per employee may not exceed three hours a day and a maximum of 36 hours a month. However, the practice of all the factories investigated is not in line with the legal standards. We strongly suggest that factories should strictly conform to the legal standards. Workers need time for rest. Any factory not in compliance should have to bear the legal costs of violating the laws.

3. Occupational health and safety

Most of the factories under investigation do not conduct pre-employment and on-the-job annual health examinations as the law stipulates. In those cases where examinations are arranged, workers are very often asked to bear the cost. None of the factories have informed workers about the chemicals that they work with; they do not mention the effects these chemicals pose to their health. There should be stricter enforcement of the laws governing occupational injury and disease in workplace; factories not in compliance should be penalized.

4. Social insurance

Many of the factories do not take part in the social insurance programs or contribute to the fund as the law requires. Several pick and choose which they fund. We advocate strict enforcement of the law to make insure that factories will become compliant.

Training on trade union work

Many workers are unaware of the existence of trade unions in their factories; nor do they understand the function of trade unions. When they are in trouble, they usually will not seek help from them. Article 9 of the Trade Union law should be enforced. This would require that factories conduct trade union training and facilitate their democratic election at the workplace. The most effective way to solve issues at workplace and safeguard workers' collective interest is through a democratically elected trade union.

Punitive fines

Some factories have policies that fine workers for trivial matters. This is unreasonable and cuts into the already low income workers earn. This makes it even more difficult to sustain their lives. We advocate that this system of punitive fines be abolished in all factories.

Section IV. Conclusion

The invention of the battery revolutionized the world. A mobile power source allowed people to use devices anywhere. But by putting profits ahead of worker's rights, battery manufacturers, especially in China, created some devastating situations that ruined people's lives.

This report has focused on China, which is now the world's main battery producer. As developed countries outsourced the battery industry, China allowed its unrestricted growth. As a direct result, the battery manufacturing sector has exacerbated occupational diseases. Peoples' lives have been ruined by poisonous metals that few had ever heard of prior to the manufacturers' arrival in this part of the world. Although some health and safety regulations have been introduced, these have not been adequately monitored.

While the government stands idly by, Chinese battery manufacturers continue to refuse their responsibility for workers' lives. Unless the government takes an aggressive stance against corruption at the local level and proactively targets battery manufacturers, this tragic situation will most likely continue with the introduction of lithium and other fuel cell technologies. As the battery industry continues to evolve, it is more crucial than ever that working people can defend themselves and hold their employers accountable for their well being. This goal can only be achieved when workers are empowered with civil rights, particularly the right of freedom of association, so that they can act and bargain collectively with their employers rather than acting alone.



Price: HK\$ 50 / US\$ 12 / EURO 10