

SAFETY CHALLENGES IN CHINA'S COAL MINING INDUSTRY

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Coal extraction, by no means a safe endeavor, has had a particularly disastrous record in China. According to official statistics, more than 250,000 Chinese coal miners have died in mining accidents since the inception of the People's Republic of China in 1949 [1]. In comparison, industrial nations and most of the developing world have dramatically reduced mining risks over the past decades by implementing advanced technologies and strict regulations. Therefore, while the official fatality rate per million tonnes (mt) of coal produced in China was 2.73 in 2005, it was a mere 0.04 in the United States [2]. Even India, a sizable developing country with a notoriously poor past safety record was able to reduce this rate to less than 9% of China's current rate [3]. With such high fatality rates, China alone accounts for approximately 80% of the total deaths in coal mine accidents worldwide (China Daily, November 13, 2004). Much like its coal production statistics, the safety record of China's coal industry is full of controversy (China Brief, October 25, 2004) [4.6()5.1(t)8.2(h) higher, as mine owners routinely falsify death counts in order to avoid mine closures or fines [4].

The lack of legal protection for private investments has been one of the primary factors behind China's mounting coal mine accidents. After Deng Xiaoping spurred the communist country to open up its economy in 1979, China's state coal mines became encumbered by heavy welfare obligations to their bloated workforces and millions of retired workers. Unable to meet the burgeoning demand for domestic coal, Beijing was forced to allow private investment into the coal industry. In less than two decades, the share of coal production by township and village enterprises (TVE) grew from 17% in 1979 to 46% in 1997. Yet, the central government was unwilling to establish any transparent entry mechanisms or legal frameworks to protect private investment in this sector, as evidenced by Beijing's 1998 decision to close small TVE mines due to the temporary over-supply of coal caused by the Asian Financial Crisis. Without any long-term legal guarantees of ownership rights, private mine owners are generally unwilling to invest in the necessary safety requirements, resulting in terrible working conditions for the miners in the TVE coal mines. Unsurprisingly, TVE coal mines alone accounted for 74% of the coal mine-related fatalities in 2005, though their share of national coal production decreased to 36% [5].

Of the thousands of coal miners who die annually, the overwhelming majority of them are migrant peasants from rural areas, who are among the most vulnerable of the social

groups in China. Unable to unionize due to the ban on independent worker unions, their monthly payments are often as low as several hundred yuan. In the 11th Five-Year Plan, Beijing stated that it intends to reduce the rate of coal mine fatalities by 5.5% annually, reaching 2.2 per mt of coal produced in 2010 [6]. According to the recently revised statistics, however, China's coal production increased by 13.5% annually during the 10th Five-Year Plan (2001-2005). If the current production trend persists during the 11th Five-Year Plan, Beijing's goal of reducing coal mine fatalities would actually imply an absolute increase of fatalities between 2006 and 2010.

The reliance upon underground operations as the primary method of coal mining has had a significant impact upon the productivity as well as safety conditions of China's coal mines. In most countries throughout the world, underground mining has increasingly given way to surface operations due to the significant advantage that the latter confers upon labor productivity. For instance, the share of coal derived from surface mines in the United States has increased steadily from 25% in 1949 to 67% in 2005 [7]. As an added benefit, this structural change in the coal mining industry has led to an improved safety record. Slope failure, the principle hazard of surface mines, is much easier to control than underground mining dangers, such as roof collapses and gas explosions. Yet, both the demand and the reserves of the lower quality sub-bituminous coal and lignite, more likely to be located in shallow coal seams, remain low in China. Higher quality bituminous coal and anthracite continue to be the industry preferences, and the private sector is unwilling to invest in the capital-intensive surface mines, leaving underground operations to dominate China's coal industry. China's reliance on labor-intensive underground operations, however, results in very low productivity—about 590 tonnes of coal per employee per year, as opposed to Australia, which posted an average of 13,297 tonnes per employee in 2005 [8]. As a result, more than 3.7 million workers are necessary for China's coal mining industry to meet the growing demand. This in and of itself contributes to the crowding of underground mines and explains why mine accidents often result in a tremendously high number of fatalities; the single gas explosion at the Sunjiawan Mine in Liaoning province on February 14, 2005 claimed the lives of 214 miners (Xinhua, February 18, 2005).

While the central government imposes increasingly stringent regulations to counter the widespread corruption in the coal mining industry, there remain places in China where “the mountains are high, and the emperor is out of sight.” Mine owners commonly falsify fatality figures in mine accidents—often with substantial help from corrupt local officials—in order to avoid heavy fines and other punitive measures. For instance, when 81 miners died in Nandang County on July 17, 2001, local officials quickly teamed up with the coal mine owner to cover-up the accident. After the catastrophe was disclosed to the public, it was revealed that the head of Nandang County had received 3.21 million yuan (\$410,000) in bribes during the prior two years (Xinhua, August 30, 2002). Similarly, in the first nine months of 2006, seven director-level officials at various Coal Mine Safety Administrations in Shanxi, China's largest coal producing province, were prosecuted for coal mine-related corruption (Xinhua, September 14, 2006). Given the degree of collusion between local officials and coal mine owners, the central government requires that its own State Administration of Work Safety (SAWS) directly investigate

deadly coal mine accidents. The heavy work load for SAWS officials, however, inevitably limits their ability to operate at strategic and managerial levels.

The low price of compensation for the death of a miner gives mine owners little incentive to employ safety practices and mechanisms. Prior to 2004, the amount of compensation for the death of a miner in China was generally between 10,000 to 50,000 yuan (\$1,300 to \$6,400). The low price tag placed on human life also made it easy for owners to reach private deals with the families of the deceased miners to remain quiet, allowing for the under- and non-reporting of deaths. A significant step was taken by the Shanxi provincial government on November 30, 2005, when it became the first to increase the amount of compensation to 200,000 yuan (\$25,000) per coal mine fatality, a move that in turn was adopted by other major coal producing provinces [9]. Still, the compensation remained only a small percentage of the gross annual profit—50 million yuan (\$6.4 million)—for mine owners [10]. Given that the 2005 fatality rate in China was 2.73 miners per mt of coal, the penalty imposed by the new regulation represented only 1% of the gross profit collected by mine owners. Shanxi province soon realized that the new regulation was insufficient, but rather than increase the amount of compensation required, officials instead imposed an additional fine of one million yuan (\$130,000) per coal mine fatality, payable to the local government itself (People's Daily, November 1, 2005). The incremental penalty was counterintuitive, however, because it not only turned the widespread coal mine accidents into a lucrative source of revenue for the authorities who collected the fines but also offered significant incentives for mine owners to reach private deals with miners' families so as to avoid fines, further distorting death tolls.

Since 2000, China's coal consumption has increased at an astonishing rate of more than 10% annually. The unwillingness to invest in proper safety mechanisms, however, and the lack of regulation enforcement have created a coal mining industry that constantly operates far beyond its safe threshold. Moreover, the miscalculation of a coal surplus in late 1990s convinced Beijing to compete aggressively with other major coal exporting countries in the international market. As a result, China's coal exports grew from 17 mt in 1990 to 94 mt in 2003, further aggravating the supply and demand balance. Unsurprisingly, the combination of forcing coal output beyond the capacity of the mine, worker fatigue, safety violations and equipment failure has become a catalyst for deadly accidents. According to Zhou Xinquan, a professor at China University of Mining and Technology, China's coal mining industry under invests at least 50 billion yuan (\$6.4

can be implemented appropriately: (1) establish transparent legal & institutional frameworks to protect the interests of all stakeholders; (2) set an aggressive quantity-based safety target; (3) hold local officials accountable; (4) allow for additional media and grassroots monitoring; and (5) eliminate incentives that seriously distort safety statistics.

Notes:

1. Statistics before 1991 are from Coal Enterprises Management, Issue 2, 2003, p. 27-28. Statistics after 1991 are from China Coal Statistical Industry Yearbook (CCSIY).
2. 5,602 was the death toll of 1996, CCSIY 1998, p. 80; 6,995 was the death toll of 2002, CCSIY 2003 p. 229; Mine Safety and Healthy Administration, U.S. Department of Labor, available at <http://www.msha.gov/ACCINJ/BOTHCL.HTM>.
3. India's coal mine fatality count and coal production in 2004 were 99 deaths (India Ministry of Coal, available at <http://coal.nic.in/point18.html>) and 407.7 million tonnes (BP Statistical Review of World Energy, 2006)
4. In table 2-4 of Huang Shengchu & et al., The Environmental Impacts Analysis of Coal Development and Utilization in China (2003), the estimated coal mine fatality in 1997 by independent experts was 9,512, in comparison, the official statistics cited only 6,141. Moreover, according to Guo Guozheng & et al., Coal Mine Safety Technology and Management (2006), p. iii-iv, China's annual coal mine fatality statistics during the early 1950s, 1980s and 1990s were approximately 70,000, 40,000 and 10,000 deaths, respectively. The aforementioned independent sources suggest that China's cumulative coal mine fatalities since 1949 should be significantly higher than the official statistics available at footnote 1.
5. Energy Bureau of NDRC (2006) Analysis of National Work Safety Trend in 2005, available at http://www.chinasafety.gov.cn/zhuantibaodao/2006-02/13/content_172502.htm.
6. State Council (2006) Notes regarding National Work Safety Control Indicators in 2006. available at http://www.gov.cn/gzdt/2006-01/25/content_171305.htm.
7. Mine Safety and Healthy Administration, U.S. Department of Labor, available at <http://www.msha.gov/ACCINJ/BOTHCL.HTM>.
8. Around 30,000 people were employed at Australian black coal mines at the end of