

# **Research of fireworks and firecrackers industry in China**

## **Research background**

Firework and firecrackers industry in China has been confronted with a number challenges in recent years such as tighter regulations in production and consumption, industrial upgrading, and economic transformation. This paper will investigate impact of these recent changes on the economic and employment aspects of the industry.

## **Introduction**

Fireworks and firecrackers were invented 1000 years ago. Let off fireworks is a popular festive activity in China such as during the Lunar New Year. Due to the extensive experiences in producing fireworks and firecrackers, China exported the highest dollar value worth of fireworks (US\$719.7 million) in 2017, which is equivalent to 85% of the global fireworks exports<sup>1</sup>. According to the data released by Chinese Government in 2016, there are more than 3000 fireworks and firecrackers companies in China and most of them are located in the province of Hunan and Jiangxi. For instance, the city of Liuyang in Hunan is often coined as the ‘Origin of fireworks’ since it is famously known for its fireworks and firecrackers manufacturing industry. In fact, the total output value of fireworks and firecrackers from Hunan in 2016 was RMB 34.5 billion<sup>2</sup>, which was equivalent to more than half of the national production the fireworks and firecrackers, illustrating that that Hunan and Jiangxi are two of the production hubs of fireworks and firecrackers in China.

As a leading industry in the area, many people are employed by fireworks factories or related businesses such as the retailer of fireworks in Hunan and Jiangxi. For instance, nearly 500,000 people worked in fireworks and firecrackers industry in Hunan. While among the total population of 1.3 million in Liuyang and 200,000 of them are employed by fireworks and firecrackers industry. However, the wages of those employee remains relatively low<sup>3</sup>. The median wage of a junior firecracker worker was RMB2436 per month in 2014, which was on par with the median wage of junior welder (RMB2328 per month), although the risk is not comparable. Meaning that workers in the industry are still facing the exploitation of low wages and occupational hazards at the meantime.

Although, fireworks and firecrackers production is a high risk industry that caused many accidents in the past, various local economies are still heavily relying on its economic contribution. Since various townships in Hunan and Jiangxi rely heavily on fireworks and firecrackers industry to create income and stimulate economic growth. For example, 85 % of

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<sup>1</sup> DANIEL WORKMAN. (2018, June 8). Top Fireworks Exporters, retrieved from <http://www.worldstopexports.com/fireworks-exporters/>

<sup>2</sup> 奉永成. (2017, August 2). 湖南烟花，期待更美丽的绽放. *Hunan daily*, Retrieved from <http://news.sina.com.cn/o/2017-08-02/doc-ifyinryq7611030.shtml>

<sup>3</sup> 2014 年湖南省娄底市部分职业（工种）工资指导价位(十七). (2015, February 26). Retrieved from [http://www.chinajob.gov.cn/LabourRelations/content/2015-02/26/content\\_1004650.htm](http://www.chinajob.gov.cn/LabourRelations/content/2015-02/26/content_1004650.htm)

fireworks products consumed during 2016 Summer Olympics in Rio de Janeiro were produced by a fireworks manufacturer, Dancing Fireworks, in Liuyang<sup>4</sup>, showing that fireworks and firecrackers manufacturing industry still possesses considerable economic and political influences.

### **Government Regulations**

The Chinese Central Government had implemented a variety of ordinances on the fireworks and firecrackers industry in order to enhance safety production and consumption. For instance, “Regulation on the Safety Administration of Fireworks and Firecrackers”, which was put into effect by State Council since 2006, is one of the more important laws to regulate production, where fireworks and firecrackers production licenses are to be renewed on an annual basis basing on the safety assessments of enterprises<sup>5</sup>. Meanwhile, “Measures for the Inspection and Administration of Exported Fireworks and Firecrackers” controls the qualities of exported firework and firecracker products. Under the measures, manufacturers must adhere to the official procedures to produce fireworks and firecrackers. Moreover, they are required to present with a complete set of production documents when necessary, especially the chemical ingredients table, in order to ensure the quality of exported goods. Hence, manufacturers would be subjected to assessment by the Customs to obtain export permission basing upon their production, safety, and product quality standards. If any manufacturer fails the assessment two times in a row, it must wait for six months before it can apply for another assessment<sup>6</sup>.

One of the main objectives of the abovementioned regulations and legislations is to enhance safety production. In response, many manufacturers adapted to the changes by introducing automation in production. But at the meantime, a growing number of manufacturers are also forced to close down due to the high cost of automation, which instigated a decrease in labour demand. For instance, only 20% of manufacturers in Beihai, Guangxi, recorded profits, while 40% recorded losses. Thus, many businesses owners who are unwilling nor possess the capital for further technological investment quitted, forcing workers they employed into unemployment.

On the other hand, in order to enhance consumption safety and improve air quality, total bans are put on using fireworks and firecrackers products in 103 cities while restricted bans are put on further 402 cities including major cities such as Beijing, Shanghai, Guangzhou, and Shenzhen<sup>7</sup>. According to the rules, citizens are not allowed to let off fireworks without the permission of municipal government. Also, the illegal selling and storing are not allowed in some cities, for examples, Shenzhen. Eventually, consumers’ demand of fireworks and

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<sup>4</sup> 赵觉理. (2018, February 3). 中国烟花网上对接国际买家 正走上一条别样的转型之路. *Global Times*, Retrieved from <http://world.huanqiu.com/exclusive/2018-02/11580176.html>

<sup>5</sup> Regulation on the Safety Administration of Fireworks and Firecrackers (2016 Revision), Retrieved from <http://en.pkulaw.cn/display.aspx?cgid=268553&lib=law>

<sup>6</sup> 出口烟花爆竹检验管理办法, Retrieved from [http://www.gov.cn/govweb/ztlz/content\\_165457.htm](http://www.gov.cn/govweb/ztlz/content_165457.htm)

<sup>7</sup> 公安部:全国 138 城市禁放烟花 春节将严查隐患, Retrieved from [http://district.ce.cn/newarea/roll/201502/06/t20150206\\_4533989.shtml](http://district.ce.cn/newarea/roll/201502/06/t20150206_4533989.shtml)

firecrackers decreases substantially in recent years, especially during the peak season of Lunar New Year.

In short, the fireworks and firecrackers industry is facing grave challenge because of the above regulations. On the one hand, enterprises are receiving lower profit due to the decline in domestic sales and tighter control on exports. While production costs continue to rise due to investment in automation and assessment on the other hand, some municipal administrations, such as Guangxi government, realized the harm and the limited contribution from fireworks and firecrackers industry eventually took measures to shut down those enterprises who sell fireworks.

## **Economic Aspects**

Fireworks and firecrackers industry is facing an adverse operating environment in recent years. The total sales volume of fireworks and firecrackers continue to decrease. For instance the overall sales of fireworks and firecrackers in Beijing decreased 30.3 % from 175,000 boxes in 2016 to 122,000 boxes in 2017<sup>8</sup> and the drop has started since 2011. The data showed that the business environment becomes worse in recent years.

In terms of production, many factories which produce fireworks and firecrackers closed down. The total number of fireworks and firecrackers enterprises reached 8000 in 2006 but the figure dropped 60% to 3200 enterprises after 10 years<sup>9</sup>. Also, the first enterprise from the fireworks and firecrackers industry in China to be publically listed, Panda Fireworks (600599.SH), changed their company's name in 2017 to become Panda Financial since they have transformed their business from fireworks to finance<sup>10</sup>.

Not only is the fireworks and firecrackers industry facing challenges from domestic regulations and shrinking market, the demand from the international market is also experiencing decline in recent years. According to worldstopexports.com, the value of fireworks export dropped by 5.9% from 2013 to 2017. And this can be further substantiated by the declined export of fireworks and firecrackers form China. When compared to that of 2013, the overall trend of fireworks and firecrackers export volume and value from China continued to decrease (see Figure 1 & 2).

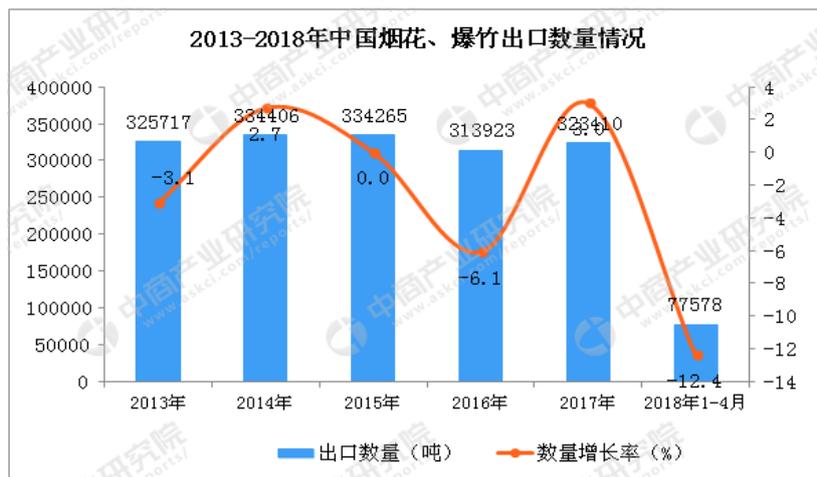
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<sup>8</sup>薛涛. (2017 February 2). 北京：烟花爆竹销量、伤人数下降. *Xinhua News Agency*, Retrieved from [http://www.xinhuanet.com/2017-02/02/c\\_1120399824.htm](http://www.xinhuanet.com/2017-02/02/c_1120399824.htm)

<sup>9</sup>贾国强. (2017, February). 禁燃令下：烟花爆竹生产企业迷茫 烟花第一股转做金融. *China Economic weekly*, Retrieved from <http://finance.sina.com.cn/roll/2017-02-13/doc-ifyamkzq1286008.shtml>

<sup>10</sup>贾国强. (2017, February). 禁燃令下：烟花爆竹生产企业迷茫 烟花第一股转做金融. *China Economic weekly*, Retrieved from <http://finance.sina.com.cn/roll/2017-02-13/doc-ifyamkzq1286008.shtml>

Figure 1: Export volume of fireworks and firecrackers exported from China (in tons) from 2013 to 2018<sup>11</sup>



Blue bar: Export volume (in Tons)

Orange line: Growth rate (in %)

Figure 2: Export value of fireworks and firecrackers exported from China (in thousands US\$) from 2013 to 2018



Blue bar: Export value (in thousands US\$)

Orange line: Growth rate (in %)

Moreover, the Chinese manufacturer are also facing tough competitions from international competitors are well. As the largest exporter of fireworks and firecrackers in the world, fireworks and firecrackers importation, which was non-existent before 2015, recorded a sudden surge in recent years (see Figure 3 & 4).

Figure 3: Volume of fireworks and firecrackers imported to China (in tons) from 2014 to 2018<sup>12</sup>

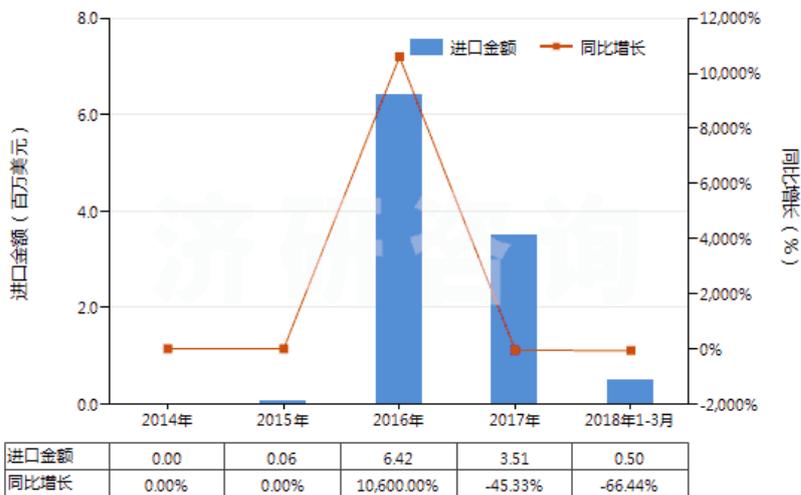
<sup>11</sup> 2018年1-4月中国烟花、爆竹出口数据统计：出口量下降12.4% (附图)。 (2018 June 1). Retrieved from <http://s.askci.com/news/maoyi/20180601/1500451124141.shtml>



Blue bar: Import volume (in tons)

Orange line: Growth rate (in %)

Figure 4: Value of fireworks and firecrackers imported to China (in tons) from 2014 to 2018:



Blue bar: Import value (in millions US\$)

Orange line: Growth rate

The regulations and laws implemented by the government may have a contributing factor to such change. According to the import data of fireworks and firecrackers, the volume of import fireworks suddenly surged in 2016. Coincidentally, the State Council of China release the revised version regulation on the safety administration of fireworks and firecrackers in February 2016. The regulation requires enterprises to ensure safety during production, selling, and transportation of fireworks and firecrackers. If those enterprise and factories cannot meet the requirements updated by state council, they are not allowed to produce or sell fireworks. Thus, many products were not allow to launch due to the strict requirements implemented by

<sup>12</sup> 济研：2014-2018年3月烟花、爆竹进出口贸易总额及发展趋势。(2018 May 31). Retrieved from

[http://www.cir.cn/R\\_ShiYouHuaGong/2018-05/JiYan2014-](http://www.cir.cn/R_ShiYouHuaGong/2018-05/JiYan2014-)

2018Nian3YueYanHuaBaoZhuJinChuKouMaoYiZo.html

government. To a certain extent, this may be able to explain the reason behind in the sudden surge of import and decline in export during that year as the industry has yet to adapt to the new regulations. Thus, it is believed that the government policies play a large part in the development of fireworks and firecrackers industry in recent years as the fireworks and firecrackers industry strived to take different measures to adapt to the new regulations and policies. And more than often, it is usually the largest and well-resources enterprises who are able to make the adaptation successfully.

As mentioned in previous sections, there are already 505 cities in China enacting various forms of ban on using and trading fireworks and firecrackers products. Air pollution issues caused by fireworks and firecrackers were a major concern behind such bans. In order to meet the demand for cleaner fireworks and firecrackers, many manufacturers developed new types of fireworks such as eco-friendly fireworks that does not contain Sulphur in the explosive, so as to reduce the Sulphur Dioxide, which is the major air pollutant, released during explosions<sup>13</sup>.

In terms of production, many factories introduced automation and mechanization. They adopted new technologies during manufacturing fireworks so that workers and explosives can be separated, whereas all the risky procedures during production will no longer involve human intervention. They were replaced by automatic machines and the safety of workers can be ensure. Besides, the efficiency of production improves. For example, a firework company in Liuyang, Zhongzhou Fireworks, introduced the first automatic firework production line in the world in 2016. The length of production line is 200 metres and significantly reduced manpower from 300 to 11<sup>14</sup>. Furthermore, some enterprises apply artificial intelligence in supervision since the monitoring system controlled by A.I. is much more stable than human. The application of technology on fireworks and firecrackers industry improve the safety of labour and more importantly, meet the safety requirements as stipulated by the Chinese Government. However, the technologies in product and production innovations do not come cheap, many companies just cannot afford it.

Although a transformation in production model can help various fireworks and firecrackers manufacturers to survive, the vast investment it requires is also forcing many enterprises to close down since they do not have enough capital to make or adapt the transformation. For instance, 394 fireworks companies in Jiangxi had close down<sup>15</sup> since 2015, Besides, the Chinese Government provide little support to small to medium-size firework enterprises in

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<sup>13</sup> 环保意识渐入人心狗年烟花爆竹销售同比减少 71.1%。(2018 March 2). Retrieved from <http://www.bjdx.gov.cn/jrdx/dxxw/dxxx/2018n/2435654.html>

<sup>14</sup> 丁怡婷.(2017, November 31). 关键涉药环节人机分离,“人脸识别”严防超员烟花生产提升安全系数(行业广角). *People's Daily*, Retrieved from [http://paper.people.com.cn/rmrb/html/2017-11/13/nw.D110000renmrb\\_20171113\\_4-19.htm](http://paper.people.com.cn/rmrb/html/2017-11/13/nw.D110000renmrb_20171113_4-19.htm)

<sup>15</sup> 重環保、保安全 擴大“禁放”區域 煙花爆竹企業需轉型升級。(2017 August 16). Retrieved from <https://hk.saowen.com/a/448e5b16ba1016bf75c5de66470332ac0500cb37fc2d3692837cadfd6c090b48>

adapting to the new policies and regulations, forcing many small to medium size enterprises withdrawing from the business.

## **Labour Aspects**

Despite tougher measures and regulations on production and consumption, industrial accidents are still often within the fireworks and firecrackers industry. According to the information collected from media exposures of reliable sources, the study records 19 cases of fireworks and firecrackers related fatal industrial accidents from 2015 to 2017, with a total of 92 recorded fatalities and 141 injuries. As a matter of fact, most of these accidents occurred in small to medium sized factories with less than 100 workers, indicating that many small scale productions have yet to catch up with the safety standards laid down by the officials in recent years, as they still lack the resources to upgrade their production technologies and safety measures. Moreover, 31.6% (6 incidents) of such accidents and 53.3% (49 fatalities) fatalities were caused by illegal productions. The disproportionately high fatality rate in illegal production accidents demonstrates that the potential risks and hazards in these factories are much higher due to the absence of any safety and health precautions. Thus, regardless of the efforts of government officials to improve productions safety, illegal productions are still posting serious threats to the safety of the workers. Furthermore, it is noteworthy that as many of the recorded accidents (52.6%) occurred in the three months before February, a common month where Lunar New Year took place, it is not unreasonable to presume that the peak season leading up to the Lunar New Year may undermine the safety awareness of the workers and management alike. While the other 36.8% of the accidents occurred between June to September, illustrating hot temperature during the hot summer months also increase the risk factors in fireworks and firecrackers production and storage (see Figure 5).

Figure 5: Fatal industrial accidents from 2015 to 2018

	<b>Incidents</b>	<b>No of Fatalities</b>	<b>No of Injuries</b>	<b>Illegal Productions</b>
2015	6	32	49	1
2016	8	40	90	4
2017	5	20	2	1
Total:	19	92	141	6

On the other hand, low wages in the industry do not favour the promotion of occupational safety awareness among workers. According to the salary guidance levels in Loudi released by the Hunan Ministry of Resources and Social Security, the media wage of junior firework manufacturing workers was RMB2436 per month in 2014, which was considerably lower than other high risk jobs such as crane driver (RMB2960 per month)<sup>16</sup>. Thus, the poor

<sup>16</sup> 2014 年湖南省娄底市部分职业（工种）工资指导价位（十七），*China's Employment*. Retrieved from [http://www.chinajob.gov.cn/LabourRelations/content/2015-02/26/content\\_1004650.htm](http://www.chinajob.gov.cn/LabourRelations/content/2015-02/26/content_1004650.htm)

working conditions discourage the workers to stay in the industry for long term, prompting problems in experience and safety awareness accumulation and succession. Even the China Fireworks and Firecrackers Association admitted that the industry failed to appeal skillful workers to stay on a permanent basis. Moreover, since businesses are heavily seasonal pronged, the bulk of the workforce are mainly short-term workers such as women and elderly peasants who only received primary education level, as a result, safety awareness is particular low among the seasonal workers<sup>17</sup>.

Thus, workers in the industry continues to be plagued by low wages and poor occupational health and safety conditions. Especially during the peak season leading to Lunar New Year, short-term workers with low safety trainings and awareness are particularly vulnerable to accidents and fatalities. As the statistics illustrate, the most impending occupation hazards in the industry are still existing in small to medium scale, sometimes illegal productions, in less developed areas.

## **Conclusion**

When evaluating some of the statistics displayed in previous sections, it is no doubt that the fireworks and firecracker industry is facing tough challenges both from declining market demands and tightening government regulations. As a matter of fact, it is also evident that some of the bigger enterprises with abundant resources are better prepared to cope with such challenges. But on the other hand, small to medium scale productions during the peak season becomes a hotbed of fatal industrial accidents. Thus, it is imperative for the government to turn their focus on not only regulating and monitoring, but also assisting those small to medium size enterprises to enhance their products and production technologies in order to improve the competitiveness of the businesses, as well as the working condition of the workers. Moreover the Government should take the initiative in stamping out illegal productions and factories, especially those in the rural areas to ensure the occupational safety of the workers. In the long term, higher wages and more occupational health and safety trainings will be required to maintain a more stable and experienced workforce in the industry.

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<sup>17</sup> 梁元超. (2014, July 30). 关于烟花爆竹产业安全发展的几点思考. *China Fireworks and Firecrackers Association*. Retrieved from [http://www.chinafireworks.org.cn/Article/Detail\\_5925\\_36\\_39\\_8\\_50.html](http://www.chinafireworks.org.cn/Article/Detail_5925_36_39_8_50.html)

**Appendix: Industrial Accident Record in Fireworks and Firecracker Industry from 2015 to 2017**

Year	Month	Date	Province	City	Incident	Fatalities	Injuries	Source
2015	1	16	Guangxi	Beihai	Firework factory explosion	2	N/A	<a href="http://news.ifeng.com/a/20150116/42951141_0.shtml">http://news.ifeng.com/a/20150116/42951141_0.shtml</a>
2015	6	17	Jiangxi	Pingxiang	Firework factory explosion	1	1	<a href="http://www.chinanews.com/m/sh/2015/06-17/7349679.shtml">http://www.chinanews.com/m/sh/2015/06-17/7349679.shtml</a>
2015	7	12	Hebei	Xingtai	Illegal firework factory explosion	22	23	<a href="http://legal.china.com.cn/2017-12/08/content_41975899.htm">http://legal.china.com.cn/2017-12/08/content_41975899.htm</a>
2015	7	22	Hunan	Liuyang	Shengdian Export Fireworks Factory explosion	1	1	<a href="http://news.cnr.cn/native/gd/20150722/t20150722_519281910.shtml">http://news.cnr.cn/native/gd/20150722/t20150722_519281910.shtml</a>
2015	9	1	Gansu	Wudu	Weinan Jiqing Fireworks and Firecrackers Co., Ltd. warehouse explosion	3	23	<a href="http://news.hexun.com/2015-09-03/178827890.html">http://news.hexun.com/2015-09-03/178827890.html</a>
2015	10	30	Jiangxi		Truck transporting firecracker exploded on highway	3	1	<a href="http://www.epochtimes.com/b5/15/10/31/n4562716.htm">http://www.epochtimes.com/b5/15/10/31/n4562716.htm</a>
2016	1	14	Henan	Kaifeng	Illegal production at Tongan Fireworks and Firecrackers Co. caused explosion	10	7	<a href="http://news.cntv.cn/2016/01/17/ARTIUD3Abs6ovWFsJjbi8ZEi160117.shtml">http://news.cntv.cn/2016/01/17/ARTIUD3Abs6ovWFsJjbi8ZEi160117.shtml</a>
2016	1	15	Anhui	Ma'anshan	Illegal firework factory explosion	3	N/A	<a href="http://news.cntv.cn/2016/01/17/ARTIUD3Abs6ovWFsJjbi8ZEi160117.shtml">http://news.cntv.cn/2016/01/17/ARTIUD3Abs6ovWFsJjbi8ZEi160117.shtml</a>
2016	1	20	Jiangxi	Shangrao	Firework	4	48	<a href="https://www.rfa.org">https://www.rfa.org</a>

					factory explosion			<a href="http://g/mandarin/yataibaodao/huanjing/q11-01202016103124.html">g/mandarin/yataibaodao/huanjing/q11-01202016103124.html</a>
2016	1	30	Guangxi	Pubei	Firework factory explosion	1	N/A	<a href="http://news.sohu.com/20160224/n438390828.shtml">http://news.sohu.com/20160224/n438390828.shtml</a>
2016	2	5	Guizhou	Gui'an New District	Explosion broke out when destroying the remaining raw materials of Xingxin Fireworks and Firecracker Factory	8	9	<a href="http://www.xinhuanet.com/2016-02/05/c_1118005422.htm">http://www.xinhuanet.com/2016-02/05/c_1118005422.htm</a>
2016	2	2	Guizhou	Weining	Illegal firework factory explosion	6	10	<a href="http://www.xinhuanet.com/local/2016-02/02/c_1117967373.htm">http://www.xinhuanet.com/local/2016-02/02/c_1117967373.htm</a>
2016	9	20	Hunan	Zhangzhou	Illegal firework factory explosion	6	N/A	<a href="https://box1.global.ssl.fastly.net/news/gb/china/2016/09/201609221608.shtml#_V_2YCJN95Bw">https://box1.global.ssl.fastly.net/news/gb/china/2016/09/201609221608.shtml#_V_2YCJN95Bw</a>
2016	12	24	Hebei	Tangshan	Firework factory explosion	2	16	<a href="http://www.chinanews.com/sh/2016/12-25/8103915.shtml">http://www.chinanews.com/sh/2016/12-25/8103915.shtml</a>
2017	1	24	Hunan	Yueyang	Explosion in a firework shop	6	0	<a href="http://www.chinanews.com/sh/2017/01-26/8135966.shtml">http://www.chinanews.com/sh/2017/01-26/8135966.shtml</a>
2017	4	22	Jiangxi	Manzai	Kangsheng Fireworks Factory explosion	2	1	<a href="http://www.xinhuanet.com/local/2017-04/23/c_1120857545.htm">http://www.xinhuanet.com/local/2017-04/23/c_1120857545.htm</a>
2017	6	24	Shaanxi	Fuping	Firework factory explosion	3	1	<a href="https://www.jiemian.com/article/1422623.html">https://www.jiemian.com/article/1422623.html</a>
2017	9	22	Jiangxi	Pingxiang	Fenglin Export Fireworks	7	N/A	<a href="http://www.xinhuanet.com/politics/20">http://www.xinhuanet.com/politics/20</a>

					Factory explosion			<a href="#">17-09/23/c_1121712358.htm</a>
2017	12	31	Shaanxi	Pucheng	Illegal firework factory explosion	2	N/A	<a href="https://baijiahao.baidu.com/s?id=1588710619713406471&amp;wfr=spider&amp;for=pc">https://baijiahao.baidu.com/s?id=1588710619713406471&amp;wfr=spider&amp;for=pc</a>