



“8.12” Tianjin Explosion and Industrial NC

Presented by:
From:

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At 11:30PM, August 12th 2015, there was a huge explosion happened in dangerous products warehouse of Ruihai Company, Xinhai District, Tianjin City, China, which 165 person died, 8 missed, 798 hurt, cause the lost of 6.866 billion RMB.



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INTRODUCTION OF 8.12 EXPLOSION



Immediately after the accident, the **State Council set up a special investigation team to conduct a thorough investigation of the accident.**

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INTRODUCTION OF 8.12 EXPLOSION

■ Explosion equivalent

23:34:06 1st explosion

15 tons of TNT equivalent

23:34:37 2nd explosion

430 tons of TNT equivalent



Beijing



Explosion location in Tianjing



■ RUIHAI WAREHOUSE

**Total area of
46,226 m²
7 classes of
dangerous goods,
111 kinds, 11384
tons**

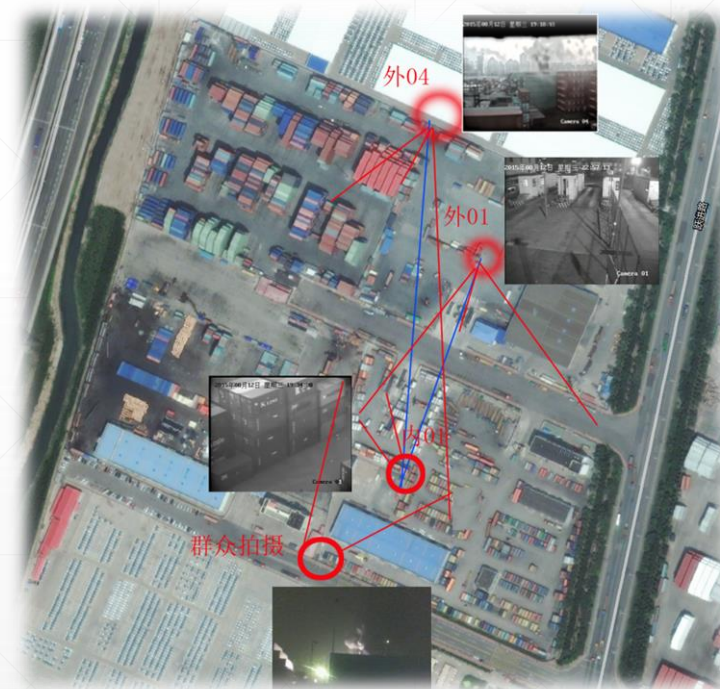
**800 tons of
 NH_4NO_3 , 680 tons
of NaCN, NC(EA),
NC solution and
chips 229 tons**



The Nitrocellulose was identified as the initial ignition material .

Why & How?

- **Eliminate man-made destruction, lightning strikes and external sources of ignition.**
- **The fire position is determined by monitoring the video**



How did Nitrocellulose Identify as the initial ignition material

CLASS 4 eight Flammable solids. Except nitrocellulose, no spontaneous combustion or self-heating

Comparison of flame characteristics



So, Nitrocellulose Identified as the initial ignition material

Causes of Spontaneous Combustion of Nitrocellulose

- ◆ Hebei Sanmu Cellulose Co., Ltd., & Hengshui New Oriental Chemical Co., Ltd. own these products
- ◆ The loss of wetting agents lead partly drying
- ◆ Under the effect of days of high temperature , accelerating decomposition exothermic heat to spontaneous combustion

In fact, we all believe that the real cause is unstablility of the product itself

The unstable products caused a serious accident at the wrong place at the wrong time.



In 2016, WONIPA Executive Committee proposed Bergman-Junk stability test method taken by all the WONIPA member companies, taking place of Abel test to do industrial NC stability analysis.

Bergman-Junk stability test

◇ for energetic NC testing

Abel test

◇ for industrial NC testing

- **test content**
- **We Use Bergman & Junk test for different grades of industrial NC and NC chips to do stability test, then compare with Abel test results**
 - ◇ sample preparation (acidity)
 - ◇ sample pre-drying
 - ◇ The influence of B&J test sample loading height
 - ◇ B&J test ----Comparison of titration methods

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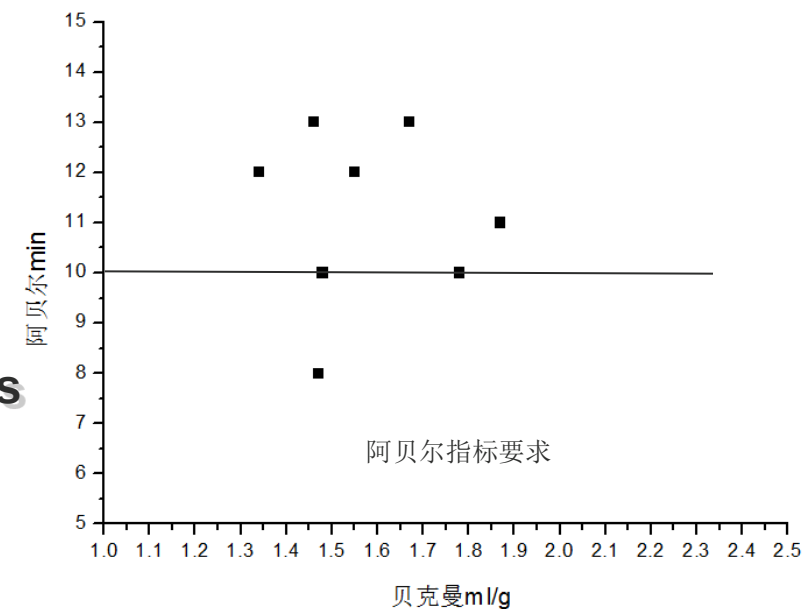
- **Results**
- **We Use Bergman & Junk test for different grades of industrial NC and NC chips to do stability test, then compare with Abel test results**

Bergman-Junk stability test

- ◇ quantitative
- ◇ NOx large amount
- ◇ relatively stable

Abel test

- ◇ qualitative
- ◇ NOx small amount
- ◇ plenty influencing factors



◇ **Energetic NC products**

the composition is relatively simple.

**the military have strict requirement for the storage and transportation of energetic NC.
the product storage cycle is short.**

◇ **Industrial NC products**

most of them are alcohol products. alcohol (ethanol or alcohol or other alcohols), trace moisture and impurities caused by alcohol, thus the composition is more complex than the aqueous products.

◇ **To improve the characterization of the Abel test----Qualitative→quantitative
Judgment by the human eye→Judgment by Instrument**

◇ **Gas detection tube / resistance change**



◇ The sample for all the current stability detection standard should be **pre treated**.

◇ The safe storage life of the **original product** is a reflection of the real stability of the product. It is very important to establish a standard test method to determine the safe storage life of the original product at different temperatures.

谢谢
Thanks.