

# Cardox System in the Civil Engineering Field

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# 1. History an Theory

## 歷史 / 原理

**ATD Pressure Gas System 又稱ATD Cardox System. Cardox 英文為Carboniumdioxid. Cardox 原理在1920年為開採地下煤礦坑發展出來.**



# Why liquid CO<sub>2</sub> ?

- 不會自燃助燃
  - 遇熱從液態轉成氣態
    - 瞬間膨脹**500 - 600**倍
      - 壓力可達 **2700 Bar**

## 2. The Advantage of ATD

### Cardox System 系統優點

ATD System 優點: Safety 安全

Cardox action is the **expansion** of  
CO2 and **not an explosion**

不需申請許可 !!!

## ATD System 優點:

- 成本低
- 人員需求低
- 低耗材費用



ATD System 優點:

Fast and Efficiency  
裝填迅速、高效率

# 3. ATD Cardox System in Civil Engineering Field

# Breaking of rock



# Breaking of rock





# Breaking of rock



# Breaking of rock





# Coal Mine



# Development of Shaft





# walk way tunnel





# Excavated 120m<sup>3</sup>



**4. Conclusion : no problem or complain**

**結論：摘自粉體儲槽技術論文**

**From: Bulk on Line Forum 粉體儲槽技術論壇**

**hi**

**what is the best method to clean the clinker silo especially to remove/break the harden clinker?**

**normally what we did before was enter the silo and clean harden clinker inside but very risky? ...so not so many people willing to do it.....**

**need your suggestion/input**

**tq**

## From: Bulk on Line Forum 粉體儲槽技術論壇

- There is only one **safe, fast and effective** way to break/remove/clean the harden clinker in the silo- the Cardox CO2 Blasting System.
- Cardox action is the **expansion** of CO2 and **not an explosion**, it does not affect the steel silo structure.

The system can be used for **breaking concrete, rock, granite etc so breaking harden clinker will not be a problem**. When use for other processes, it will not damage the refractory lining.

- Cardox has been used for silo cleaning for more than 20 years and so far there is **no problem or complain**.