

# TCC

Focus on Best Crushing Solutions

Since 1994

泰伯克

TOP CRUSHER

Focus on One Thing, Do it Best

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# Key Advantages of TCC Sizing Crusher

# Key advantages of TCC Sizer

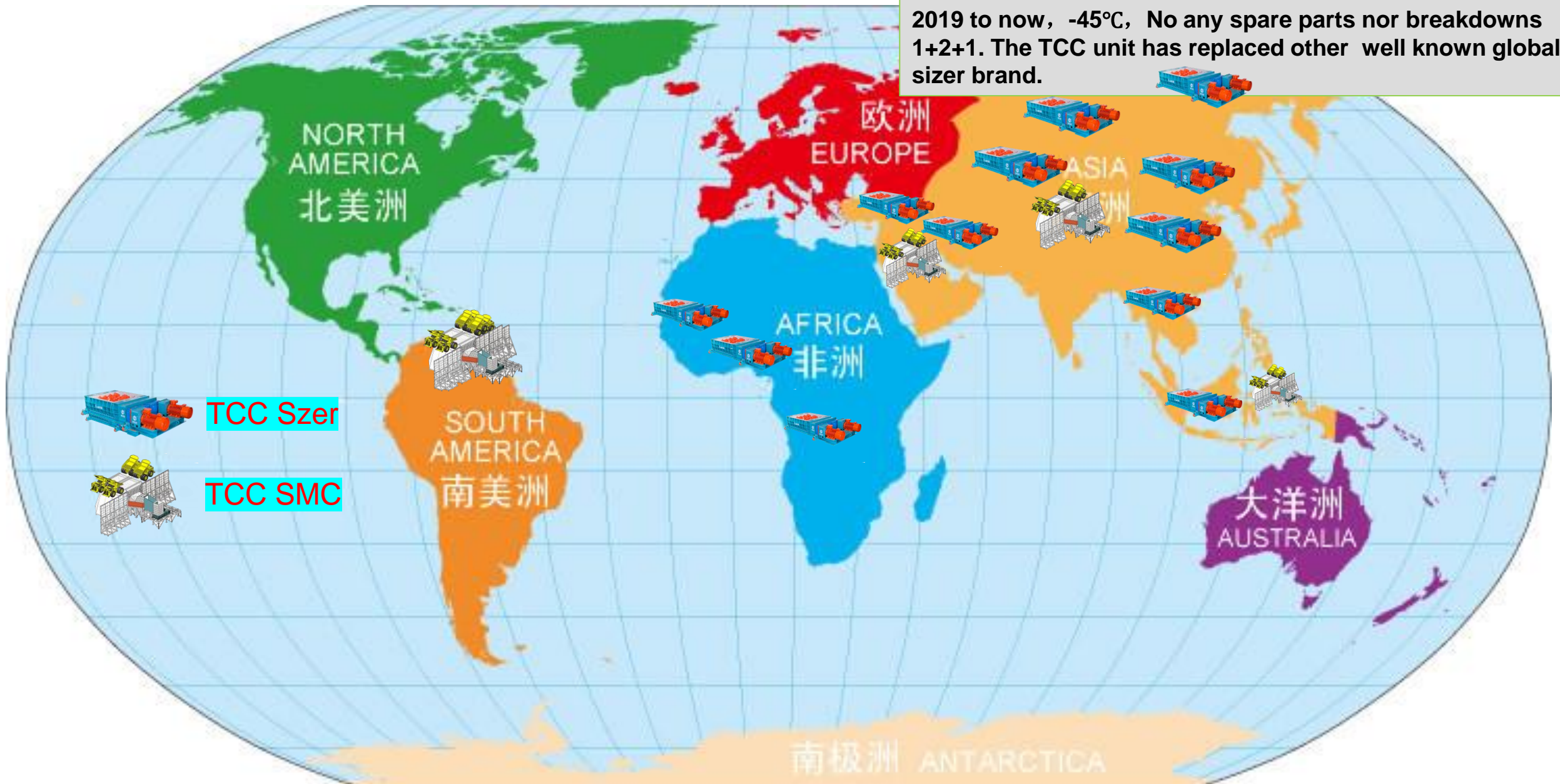
- **Professional – Research and design with 30 years and 1000 units of industrial experience**
- **Tailored design from extensive materials testing**
- **High Reliability – Machine running**
- **High Resistance – Long life Tooth reliability**
- **Intuitive – Protects from scrape iron and online ore size monitoring**

## **High Reliability**

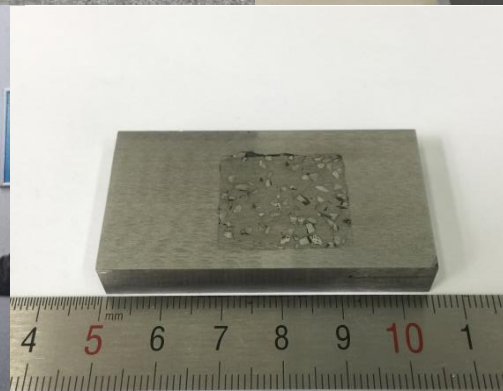
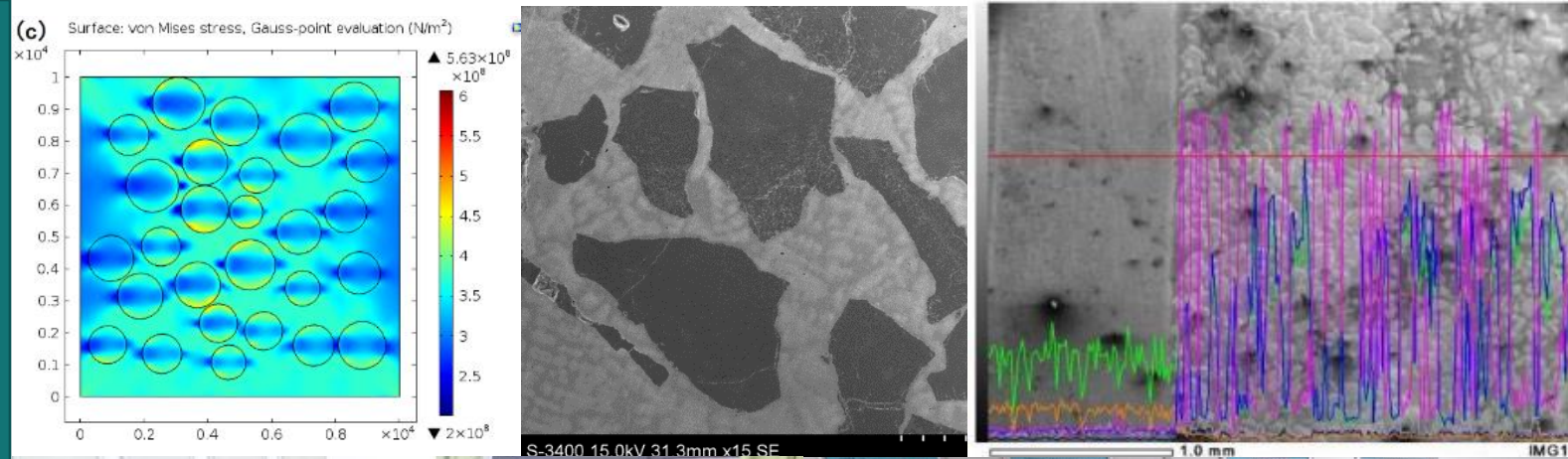
- **+1000 units of sizers application**
- **Units have crushed 2 billion tons coal with gangue and stone with throughput of 40 billion tonnes.**
- **Used in coal, limestone, bauxite, gold ore, iron ore, igneous rock, mines.**
- **Long wear life running under harsh condition with single line production**

# TCC Sizer Distribution

2019 to now, -45°C, No any spare parts nor breakdowns 1+2+1. The TCC unit has replaced other well known global sizer brand.



# High wear resistance technology



# Excellent wearability of Teeth



# Teeth once Long service life

One set of teeth is expected to crush:

- **2.5Mt-3.5Mt** for a primary sizer
- **2.2Mt-2.5Mt** for a secondary sizer

Data determined according to the feeding material for a tertiary sizer.

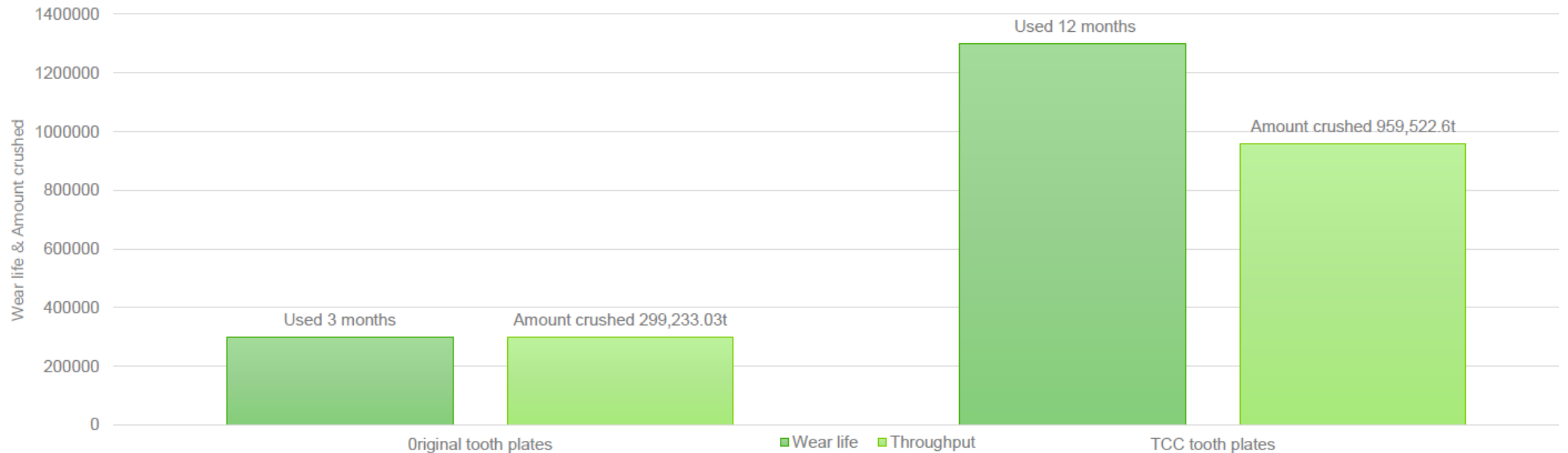
TCC has launched its very hard mineral sizer tooth for crushing medium and hard ores. Constant improvements are being made to challenge the crushing of harder ores.

# Wear-Resistance Comparison for Taixi Anthracite Hard Coal

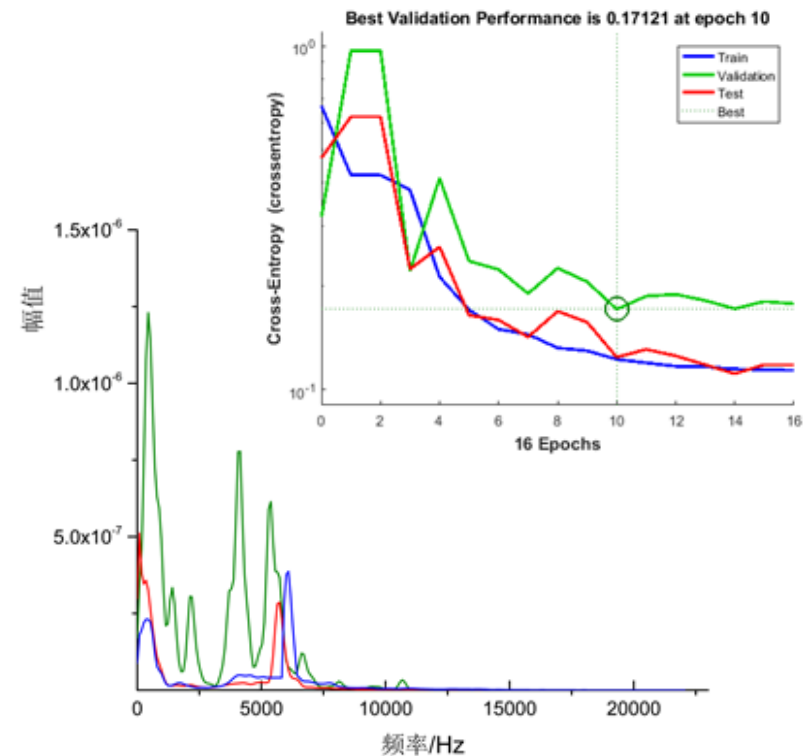
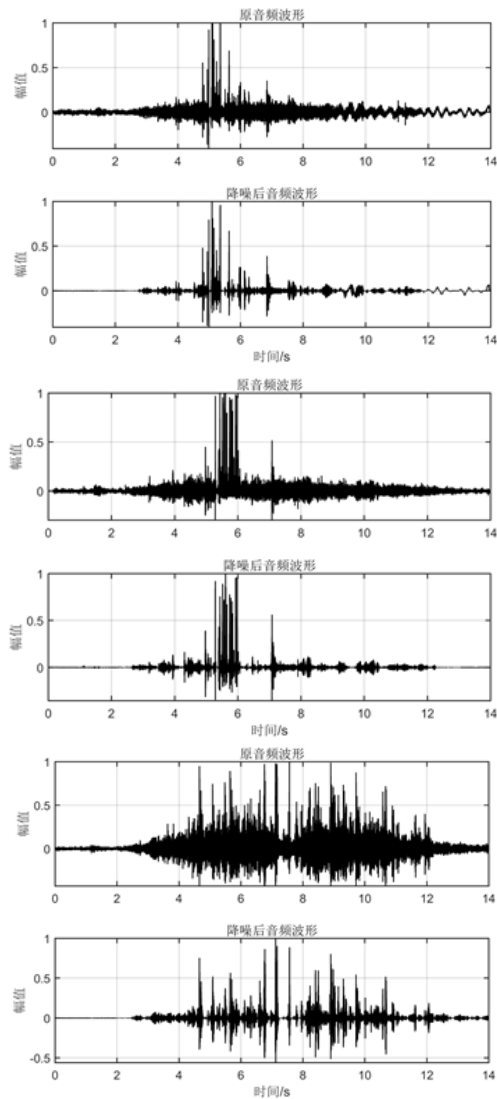


Sizer model	Time	Total amount crushed (t)	Wear life (Month)
Well-known brand 625	Jan 2018-Sept 2019	299233.03	3
TCCH900SMV	Oct 2019-Sept 2020	959522.60	12

### Teeth wear life comparison



# Artificial Intelligence Improves Crushing Systems Health diagnosis and Maintenance



**Training Confusion Matrix**

Output Class	1	2	3	4
1	7 35.0%	0 0.0%	0 0.0%	100% 0.0%
2	0 0.0%	4 20.0%	4 20.0%	50.0% 50.0%
3	0 0.0%	1 5.0%	4 20.0%	80.0% 20.0%
	100.0% 0.0%	80.0% 20.0%	50.0% 50.0%	75.0% 25.0%
Target Class	1	2	3	

**Validation Confusion Matrix**

Output Class	1	2	3	4
1	1 20.0%	0 0.0%	0 0.0%	100% 0.0%
2	0 0.0%	2 40.0%	1 20.0%	66.7% 33.3%
3	0 0.0%	1 20.0%	0 0.0%	100% 0.0%
	100.0% 0.0%	66.7% 33.3%	100% 0.0%	60.0% 40.0%
Target Class	1	2	3	

**Test Confusion Matrix**

Output Class	1	2	3	4
1	2 40.0%	0 0.0%	0 0.0%	100% 0.0%
2	0 0.0%	1 20.0%	0 0.0%	100% 0.0%
3	0 0.0%	1 20.0%	1 20.0%	50.0% 50.0%
	100.0% 0.0%	50.0% 50.0%	100% 0.0%	80.0% 20.0%
Target Class	1	2	3	

**All Confusion Matrix**

Output Class	1	2	3	4
1	10 33.3%	0 0.0%	0 0.0%	100% 0.0%
2	0 0.0%	7 23.3%	5 16.7%	58.3% 41.7%
3	0 0.0%	3 10.0%	5 16.7%	62.5% 37.5%
	100.0% 0.0%	70.0% 30.0%	50.0% 50.0%	73.3% 26.7%
Target Class	1	2	3	

# AI Industrial Application

- ❑ To further verify the industrial application for our methods, the MMD 625 crusher in the Taixi coal processing plant was used.
- ❑ The table shows that the end-to-end method achieved an overall identification accuracy of 74.70% for the three materials, and for iron, the identification accuracy is up to 99.10%, which is enough to satisfy the production requirements.



Industrial test site

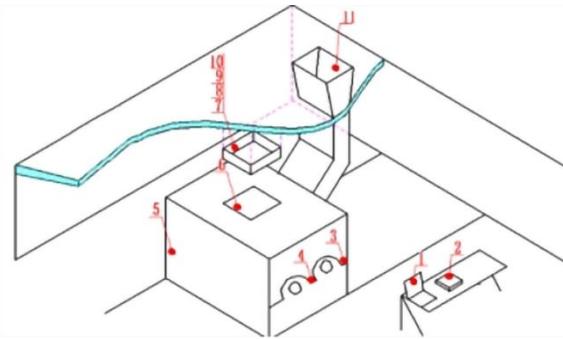


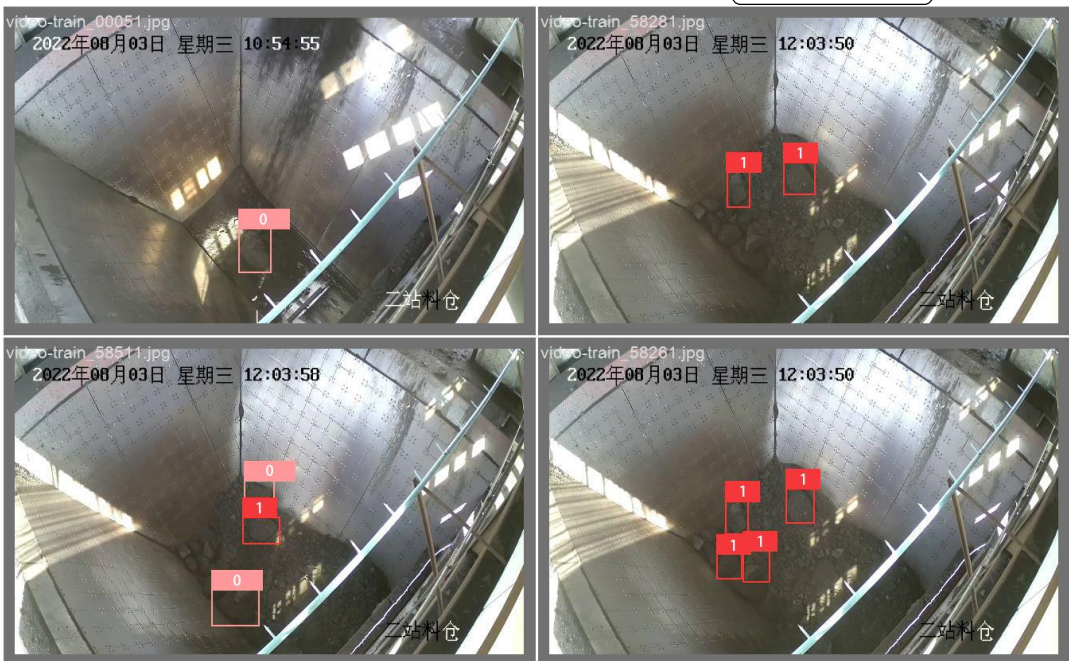
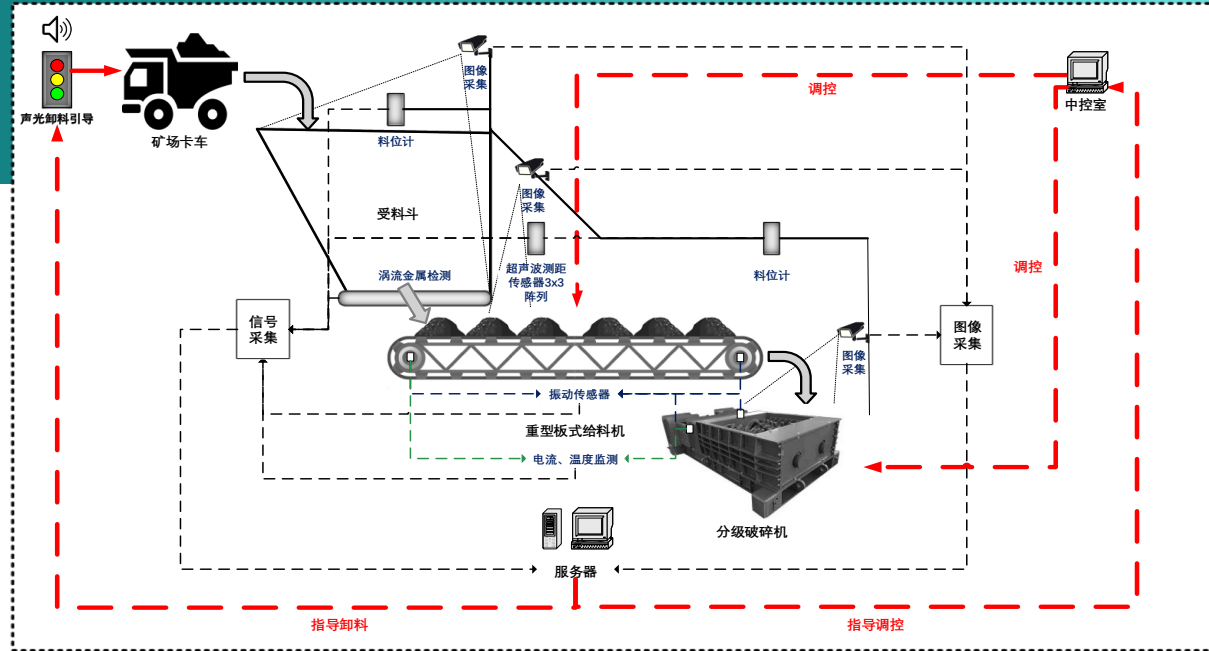
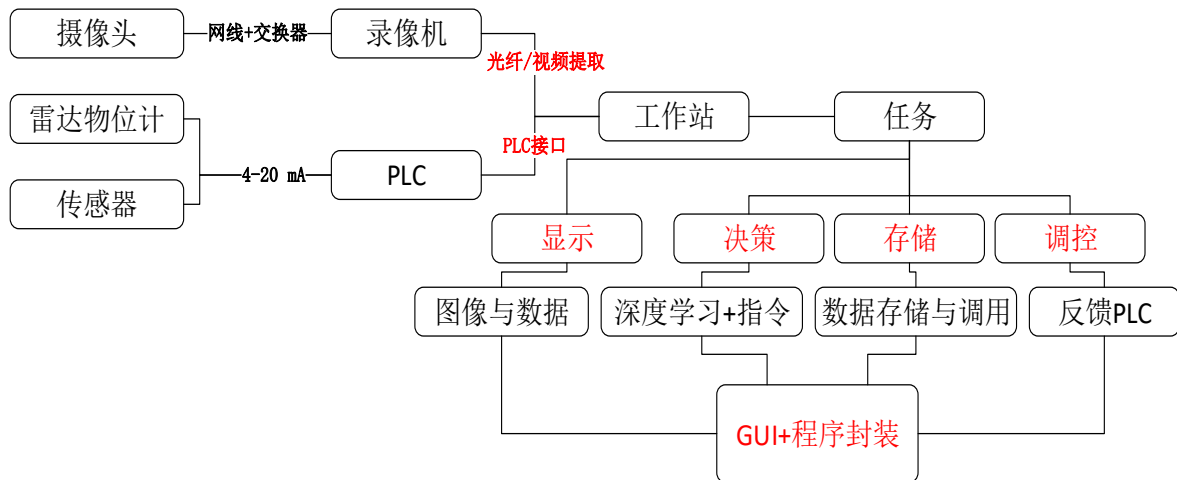
Diagram of the equipment arrangement  
(1-Work Station, 2- Data acquisition instrument, 3-1# vibration sensor, 4-2# vibration sensor, 5-MMD 625 crusher, 6- Material observation window, 7- Infrared camera, 8- General camera, 9-Sound pressure sensor, 10-LED light, 11- Inlet)

Industrial test results of crusher feeding with time series classification

Method	Network	Identification accuracy			
		Tri-classification	Iron	Coal	Wood
End-to-end	FCN-4	74.70%	99.10%	62.07%	64.02%



# Big Size Monitoring



www.top-crusher.com 图9. 大块物料识别模型训练结果 (0为大块物料, 1为较大块物料)

图10. 监测系统GUI界面展示

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**TOP CRUSHER | THANK YOU!**

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