ANTON 安東

Replicability Technology Case Sharing —— Smart Station

—— Beijing Anvision Technology Co.LTD

2023/8/23

东方智慧　全球分享
Oriental wisdom，Global sharing

Catalogue

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1. Solve customer pain points

☐ Pain point mining

- Traditional stations are faced with the problem of various maintenance costs and service life difficult to quantify
- Faced with the problem that the operation ticket can not be unified intelligent billing
- Faced with the problem of not achieving real-time monitoring and remote management
- **A set of intelligent management system is needed to integrate data and optimize resources to make the station production management more convenient, more accurate, safer and more timely**

☐ Market opportunity transformation

- The wisdom station has been operated in the pressurized hydrocarbon removal station of Rock Point 70 in Yanting, Mianyang, and it is feasible to implement it to other stations
- Through the investigation, it is found that the production data of most stations is not interconnected and there are data islands. Report forms cannot be exported automatically, and data cannot be presented in real time
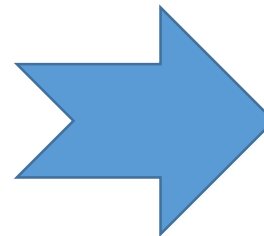
- To build an intelligent management system for the station, improve the quality of operation, reduce the cost of production and operation, maximize the benefit, and realize the data-driven transformation of the station
- It has been implemented in the pressurized hydrocarbon removal station of Rock Point 70, Mianyang

Catalogue

1. Solve Customer Pain Points

2. Implementation of Technology (Scheme) and Customer Evaluation

3. Introduction of Technology and Innovation Points

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1. Digital construction and delivery: The station adopts 3D digital delivery tools for design, and the construction process adopts design + procurement to improve the 3D model, and the model guides the construction process;

2. Integrated centralized control system: the station adopts DCS + SIS + FGS and other automatic control systems to ensure the production, safety and fire fighting process of the station, and the daily on-duty personnel is reduced to two;

3. Intelligent security system: the security of the station and the safety supervision of the production area adopt AI intelligent identification, and actively find and push problems to managers;

4. Intelligent metering and handover: intelligent water and hydrocarbon dew point and chromatographic analysis, combined with the intelligent flow metering system, to ensure the automatic handover and confirmation of the whole process of raw materials and sales.

5. Intelligent production management: the completion of the station construction, that is, intelligent management, including production, equipment, inspection, security, operation process are remote management;

6.3D digital twin system: combine the digital delivery design results with the construction results to realize the 3D digital twin system, and realize the production, inspection, video monitoring and other functions in 3D digital display;

7. Mobile APP management: the management platform of site delivery, in addition to the PC version of online management, almost all management functions can realize mobile APP display;

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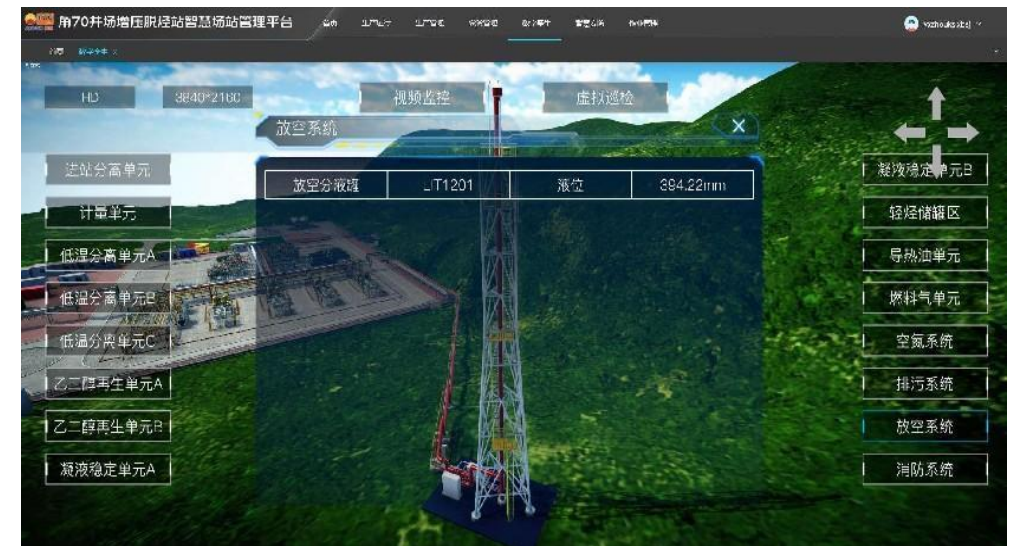
1. Implementation introduction of the technology (scheme)
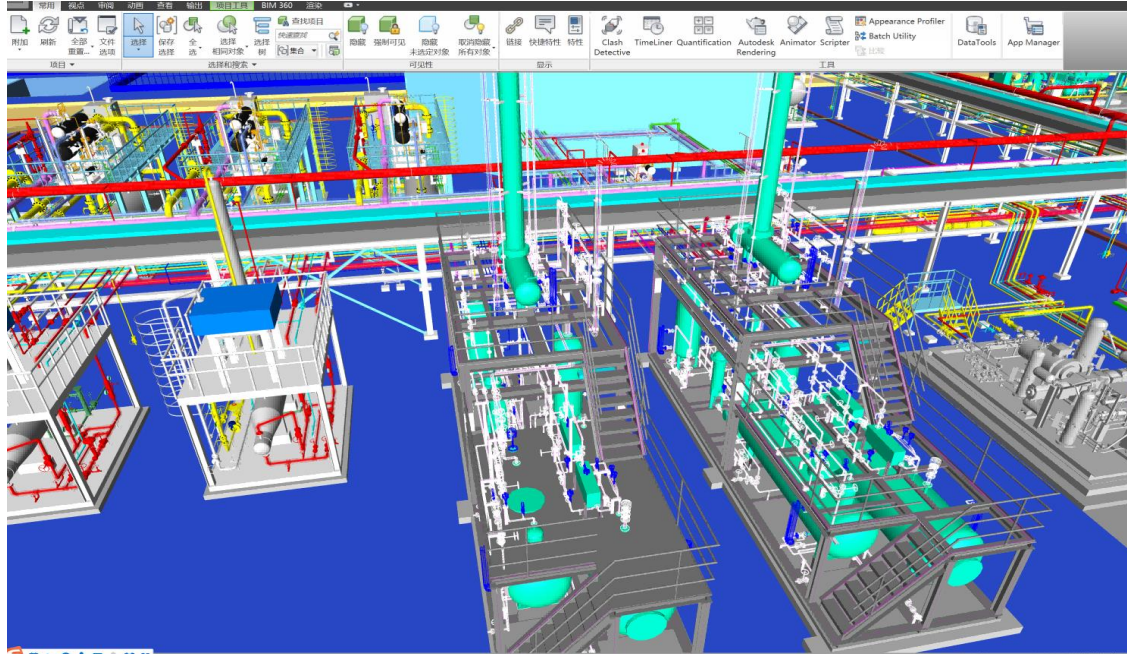
☐ **project context**

Our (Anton) customer rock oil (Chengdu) co. LTD. Plan in the corner of the project of 70 Wells beside a new gas hydrocarbon and pressurized transport facilities, and laid a connection north outer ring pipeline network gas pipeline, in order to solve the problem of the star field gas hydrocarbon dew point standard, at the same time break the existing gas pipeline capacity, further release the production potential of star field blocks. However, the limitations of traditional stations will have a negative impact on the construction goal of releasing production potential. In order to overcome these limitations, it is necessary to introduce an intelligent station management system, which can integrate data, optimize resources, and make the production management of the station more convenient, accurate, safe and timely. It helps to optimize the process management, improve the efficiency of equipment maintenance, realize the intelligent operation, and achieve the goals of real-time monitoring and remote management.

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1. Implementation introduction of the technology (scheme)

☐ **Project implementation process- -Digital construction and delivery**

    1) During the design period of the station, 3D BIM software is used for layout design and demonstration. During the procurement period, the 3D model is constantly updated according to the actual situation of supply. During the construction period, the 3D design drawing is used to guide the whole process of installation and construction, and the 3D model is finally improved.

    2) In the construction process, 4K panoramic video monitoring + UAV remote monitoring are used, and the project progress and construction safety are controlled through AI identification technology.

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1. Implementation introduction of the technology (scheme)

☐ **Project implementation process- -an integrated centralized control system**

Through the construction of DCS system, the production of controllability, reliability and operability is realized, combined with automatic logic control (PID) and remote monitoring equipment (IPTV). Realize the comprehensive data collection and the remote control of the production process, form the operation mode of "centralized duty in the central control room + online production control + on-site verification", and provide a reliable guarantee for the efficient operation of the system.

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1. Implementation introduction of the technology (scheme)

❑   **Project implementation process- -Parameter over-limit alarm, safety chain protection (SIS)**

Parameter over-limit alarm function: the alarm time is accurate to the second level. The value bar displays the alarm data, the level bar can view the alarm level divided into one and two levels, and the description column can view the specific alarm position. Click Low and high settings to modify the lowest and highest value of the alarm value and select the alarm level.

Stop protection function: the system can realize automatic shutdown protection (ESD) under abnormal conditions, effectively avoiding the occurrence of safety accidents.

Fire control and fire system linkage: in fire, leakage and other emergency cases, the fire control system can be automatically started to prevent the spread of disaster.
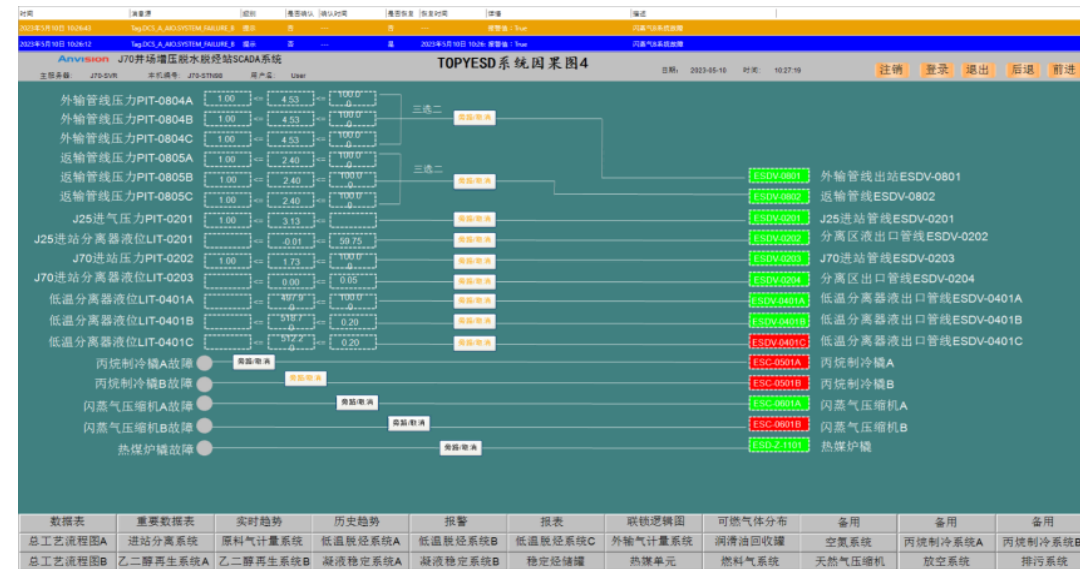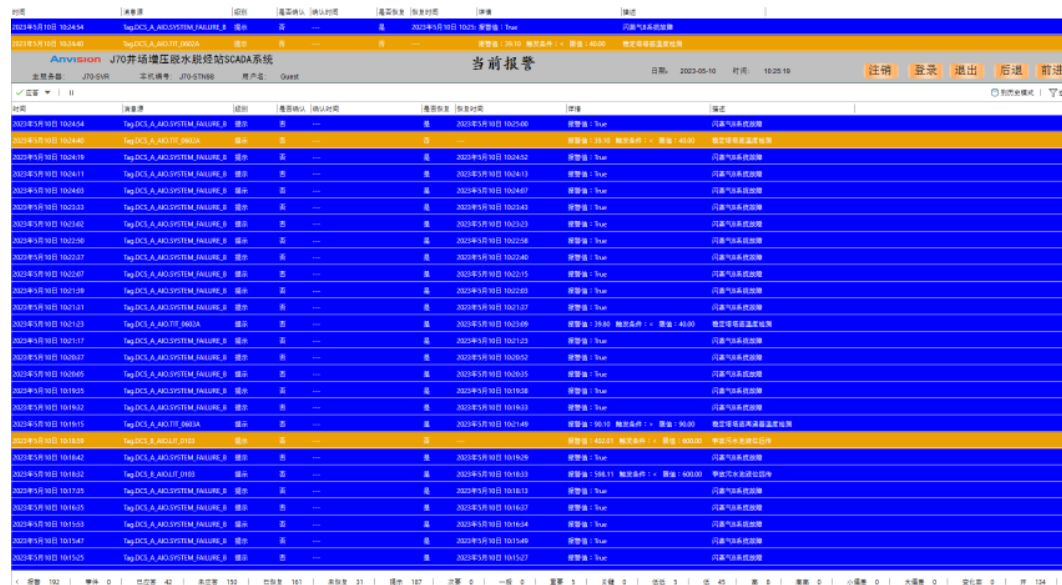
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1. Implementation introduction of the technology (scheme)

☐ **Project implementation process- -Intelligent AI security system**

Perimeter security system: nearly 20 perimeter security 2K starlight intelligent gun machines are built around the whole station to realize the uninterrupted monitoring and alarm function of security day and night;
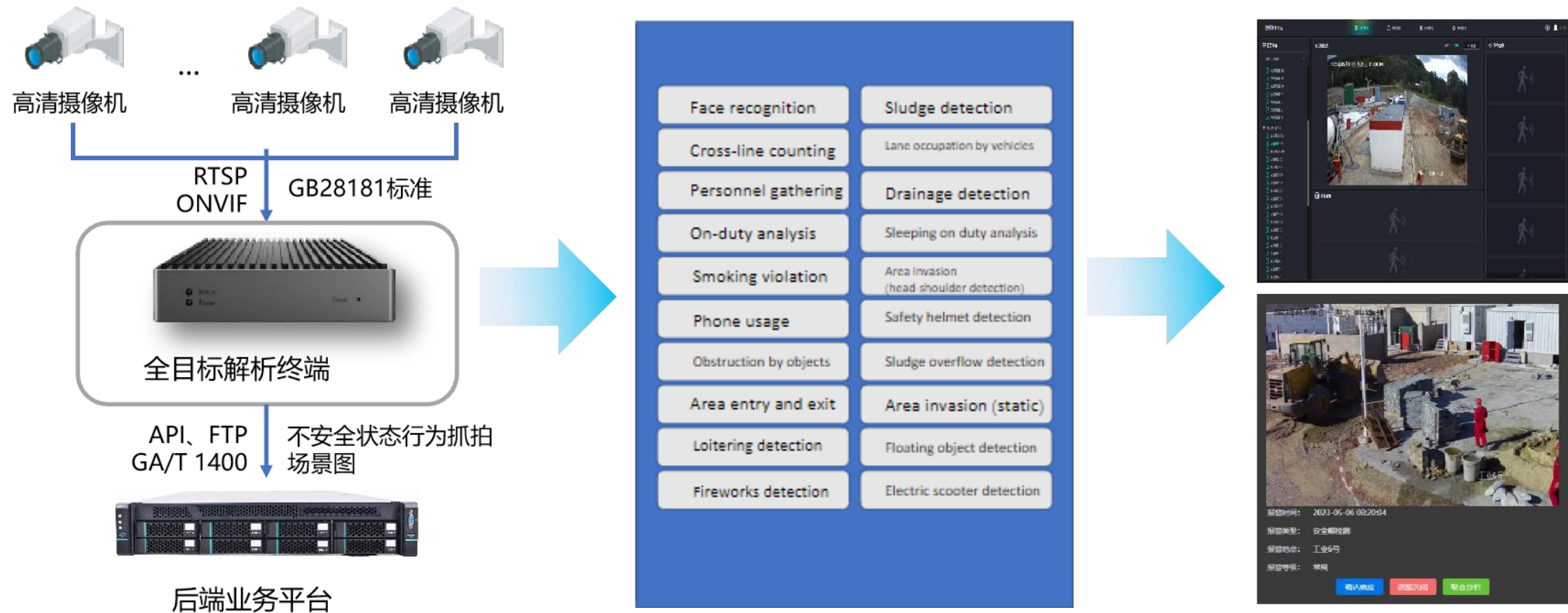
Intelligent monitoring of equipment area: nearly 502K starlight intelligent ball machines will be built in each area of the station to realize equipment monitoring, remote inspection, monitoring and recording of the whole operation process;

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1. Implementation introduction of the technology (scheme)

☐ **Project implementation process- -Intelligent AI security system**

Intelligent AI security realizes all-weather intelligent monitoring and improves the on-site security control ability

高清摄像机 ... 高清摄像机 高清摄像机

RTSP
ONVIF GB28181标准

全目标解析终端

API、FTP 不安全状态行为抓拍
GA/T 1400 场景图

后端业务平台

Face recognition	Sludge detection
Cross-line counting	Lane occupation by vehicles
Personnel gathering	Drainage detection
On-duty analysis	Sleeping on duty analysis
Smoking violation	Area invasion (head shoulder detection)
Phone usage	Safety helmet detection
Obstruction by objects	Sludge overflow detection
Area entry and exit	Area invasion (static)
Loitering detection	Floating object detection
Fireworks detection	Electric scooter detection

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1. Implementation introduction of the technology (scheme)

☐ **Project implementation process- -intelligent metering and handover**

- Process management based on intelligent measurement and handover realizes the real-time statistics of process parameters and device operation records

水烃露点分析仪

DCS系统

智慧场站

在线色谱分析仪

DCS系统

智慧场站

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1. Implementation introduction of the technology (scheme)

❑ **Project implementation process- -intelligent, production management**

• Realize intelligent management, including production, equipment, inspection, security, operation process to realize remote management
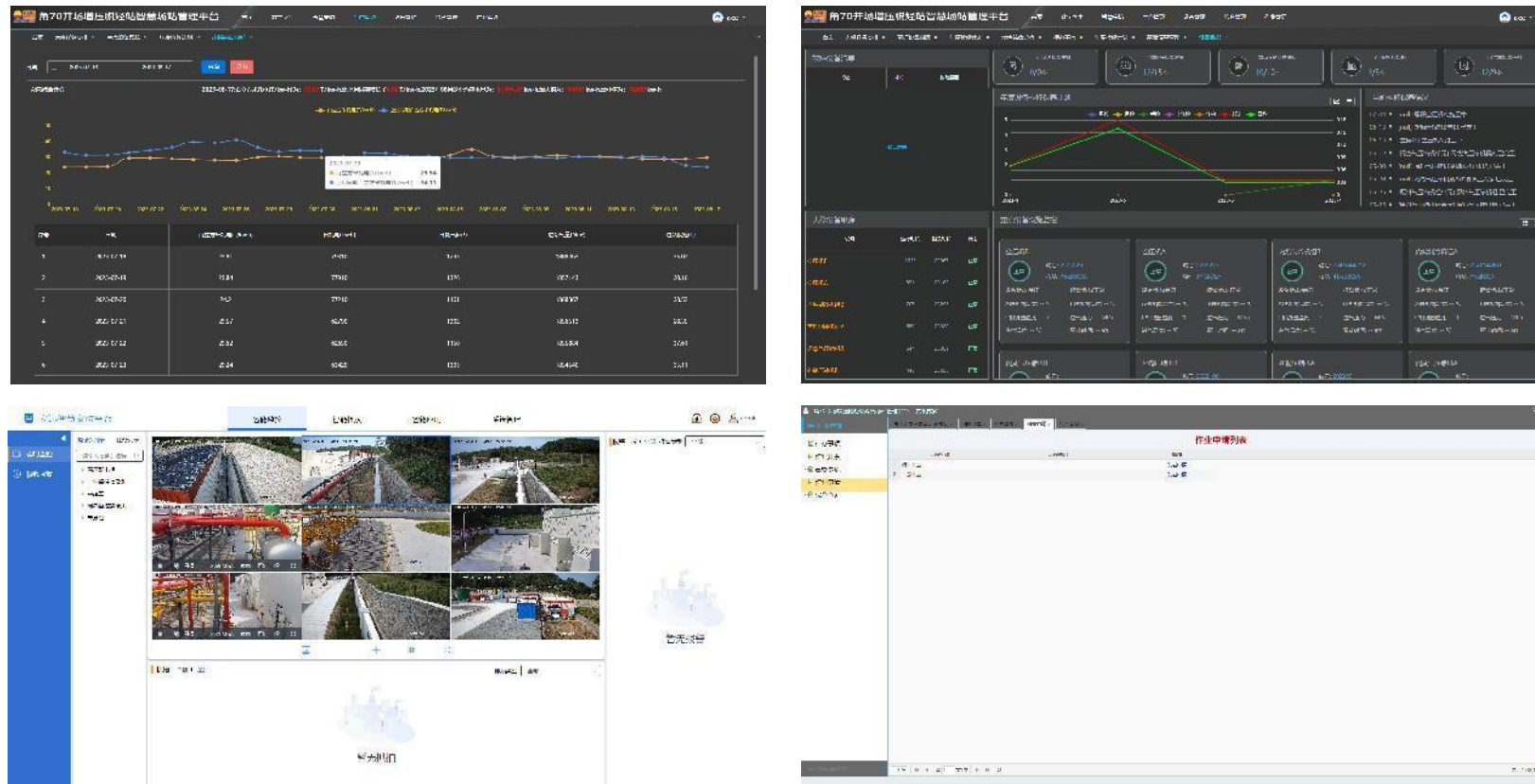
1. Implementation introduction of the technology (scheme)

- ☐ **Project implementation process- -accurate and real-time equipment detection**
- • According to the intelligent target requirements, supporting efficient new technology and new products, through the on-site integrated application, all-weather real-time monitoring of equipment operation
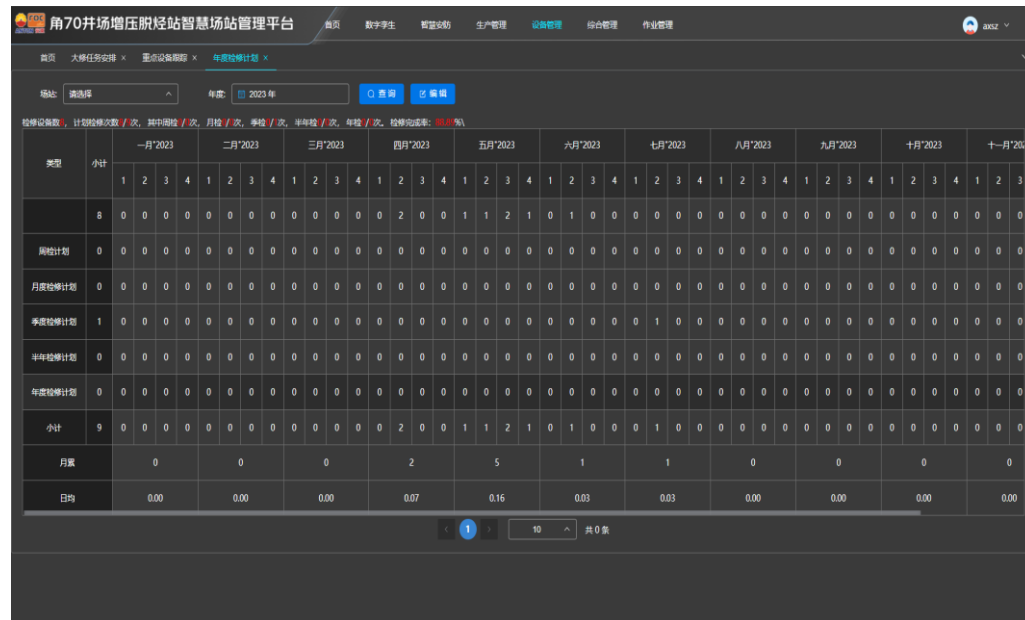
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1. Implementation introduction of the technology (scheme)

☐ **Project implementation process- -Special operation control**

• Special operation control shall realize orderly operation in accordance with the regulations, reduce risks, reduce hidden dangers, prevent accidents, and improve the safety management level of operation links
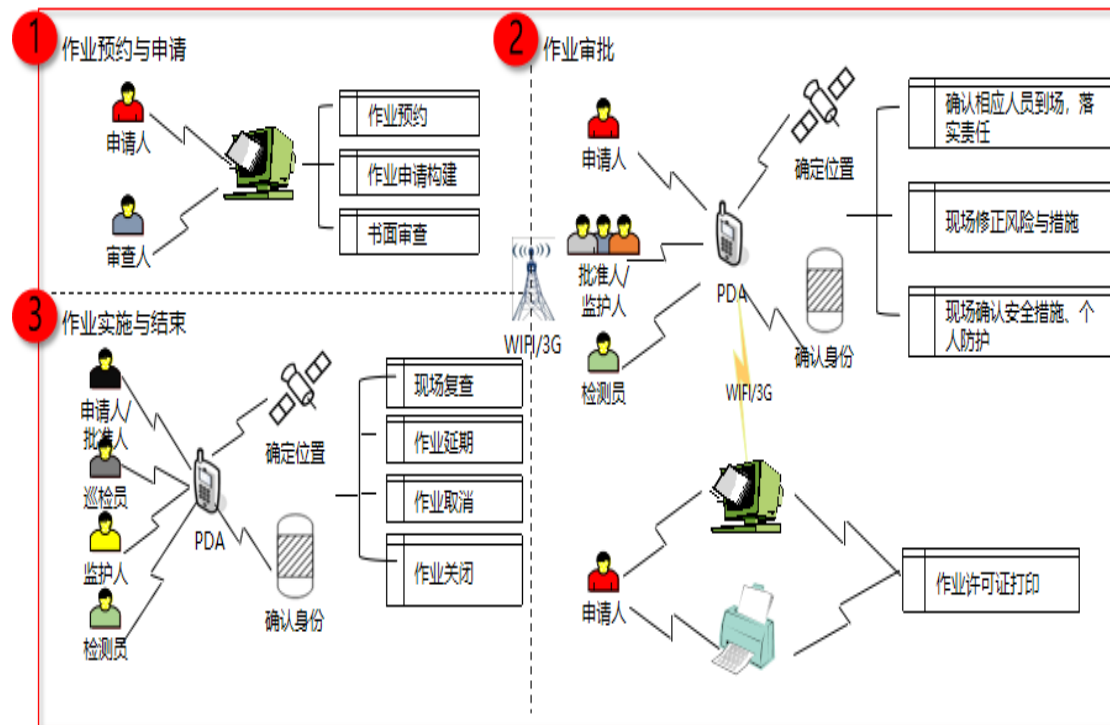
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1. Implementation introduction of the technology (scheme)

☐ **Project implementation process- -digital twin video surveillance**

- In accordance with the trend of unmanned construction of the station, the digital intelligent twin system of the pipeline station is constructed to ensure the production safety, improve the control efficiency and operation quality, and establish the lean production and operation of the station. Video surveillance realizes full coverage of real-time surveillance, and remote warning can quickly and accurately locate and solve problems.

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1. Implementation introduction of the technology (scheme)

❑   **Project implementation process- -digital twin virtual patrol inspection**

• Apply complete mapping in the three-dimensional virtual space can reflect the production process of the corresponding physical station in real time, realize the three-dimensional virtual inspection, and understand the whole process of inspection.

1. Implementation introduction of the technology (scheme)

☐ **Project implementation process- -Mobile terminal APP makes the office fast and efficient**

• Implement lean operation, on-site standardized operation, fine management, strengthen material quality control, technical experts whole process site support, improve construction management and decision-making time

• Mobile terminal integrates production rates	• Mobile terminal integrates production rates	• Integrate intelligent security data	• Integrate equipment management	• Integrate online monitoring
1. Production process management	2. Intelligent production and operation	3. Intelligent security monitoring	4. Equipment management	5. Online monitoring of the equipment

Mobile terminal support Android, IOS, Hongmeng, data push is timely and reliable

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1. Implementation introduction of the technology (scheme)

☐ **Project implementation process- -Mobile terminal APP makes the office fast and efficient**

• Functional construction is carried out around different levels, mainly focusing on decision-making management, supervision management, and operation and maintenance operators

Decision management

Site management

Operation and maintenance operator

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☐ Digital twin

technical feature:

- Technical principle: Adopt 3D digital delivery tools for design, the construction process combines design and procurement to improve the 3D model, and the model guides the construction process to realize the 3D digital twin system, and realize the production, inspection, video monitoring and other functions in the 3D digital display

- Performance advantages: high reduction degree, real scene, strong page resolution adaptation, high fluency, high operation efficiency

Customer pain points:

- The station warning cannot be located accurately located; the inspection route and content are not unified; the equipment information cannot be monitored in real time

application scenarios:

- Oil and gas station

application case:

- The management platform of the intelligent station of the well site of Cape 70 has been put into operation, and the video monitoring of the station. The remote warning can quickly and accurately locate and solve problems

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☐ AI intelligent security

technical feature:

- Technical principle: The ordinary camera meets the resolution of 1080P, is connected to the AI video intelligent analysis box, and automatically detects and identifies more than 20 unsafe states and behaviors for people entering and leaving the station, wearing, falling, smoking, answering and making phone calls, so as to realize all-weather intelligent monitoring and improve the on-site safety control ability

- Performance advantage: high profit advantage, strong applicability, many types of algorithms, accurate identification

Customer pain points:

- Many camera models cannot be configured and replaced, and the existing algorithm does not meet the current situation, which requires system access with strong compatibility and unified management

application scenarios:

- Oil and gas station

application case:

- The operation of the intelligent station management platform of Well Jiao 70 has been launched, the accident rate has been reduced in the construction process, and unsafe behaviors have been detected in the production process to prevent accidents

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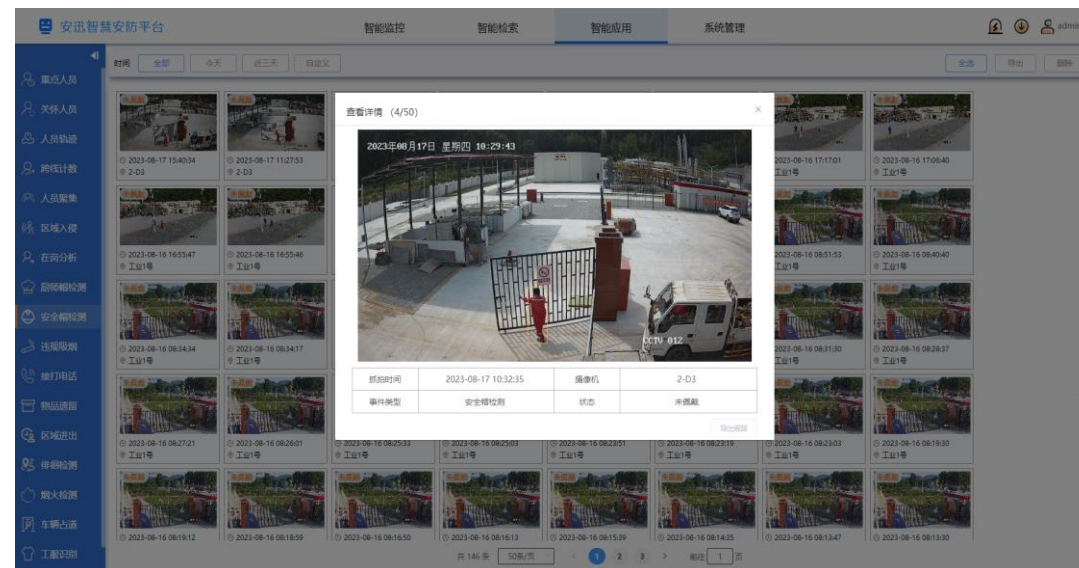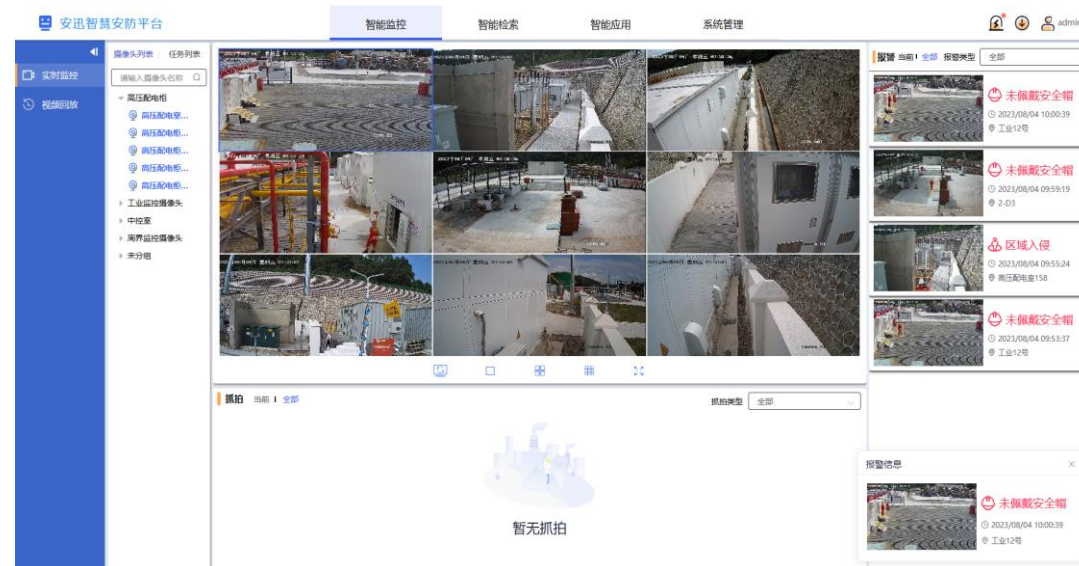
☐ Mobile inspection

technical feature:

- Technical principle: the data is written to NFC, scanned through the mobile device, and then filled in the relevant production number.

- Performance advantage: unified inspection route, high efficiency, comprehensive content, and more accurate problem handling

Customer pain points:

- There are many inspection points and complex contents and easy to miss items; inspection problems cannot be reported in time and handled slowly.

application scenarios:

- Oil and gas station

application case:

- It has been put into operation in the intelligent station management platform of the jiao 70 well site, which has improved the efficiency of the inspection and greatly improved the solution speed of the inspection problems

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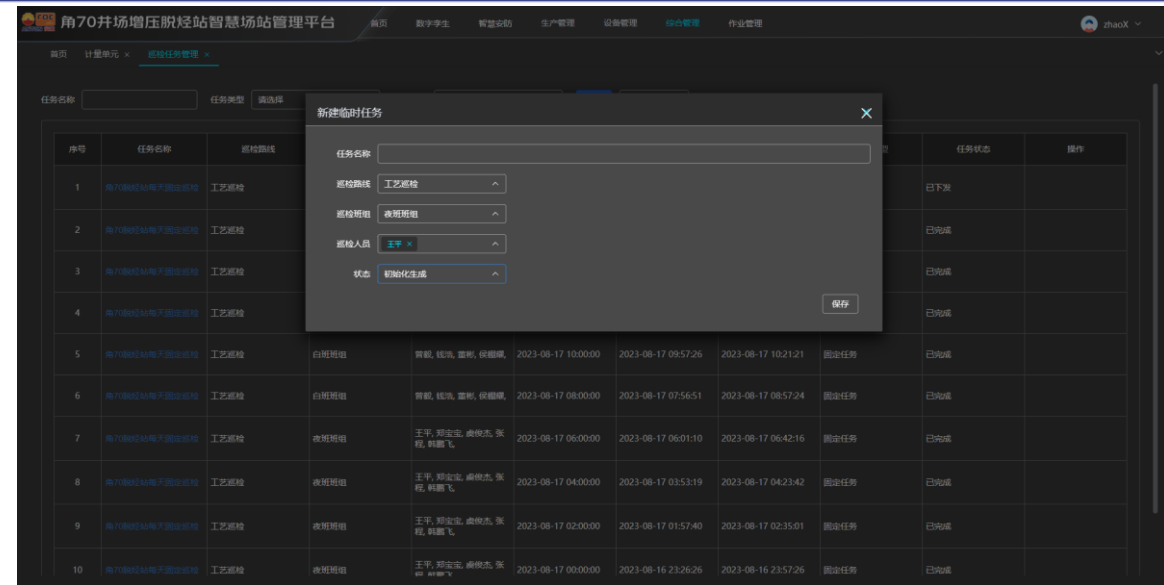
□ **Intelligent management of operation ticket**

technical feature:

- Technical principle: Eight operation tickets of national petroleum and petrochemical standards realize intelligent management through online billing and audit
- Performance advantage: unified standard, unified standard, unified management, convenience and efficient

Customer pain points:

- How to establish a unified operation ticket management and approval process intelligence needs to be solved urgently

application scenarios:

- Oil and gas station

application case:

- It has been running in the intelligent station management platform of jiao 70 well site, and realized the full intelligence of billing, and improved the operation efficiency

作业申请

作业查询

待办审批

许可申请

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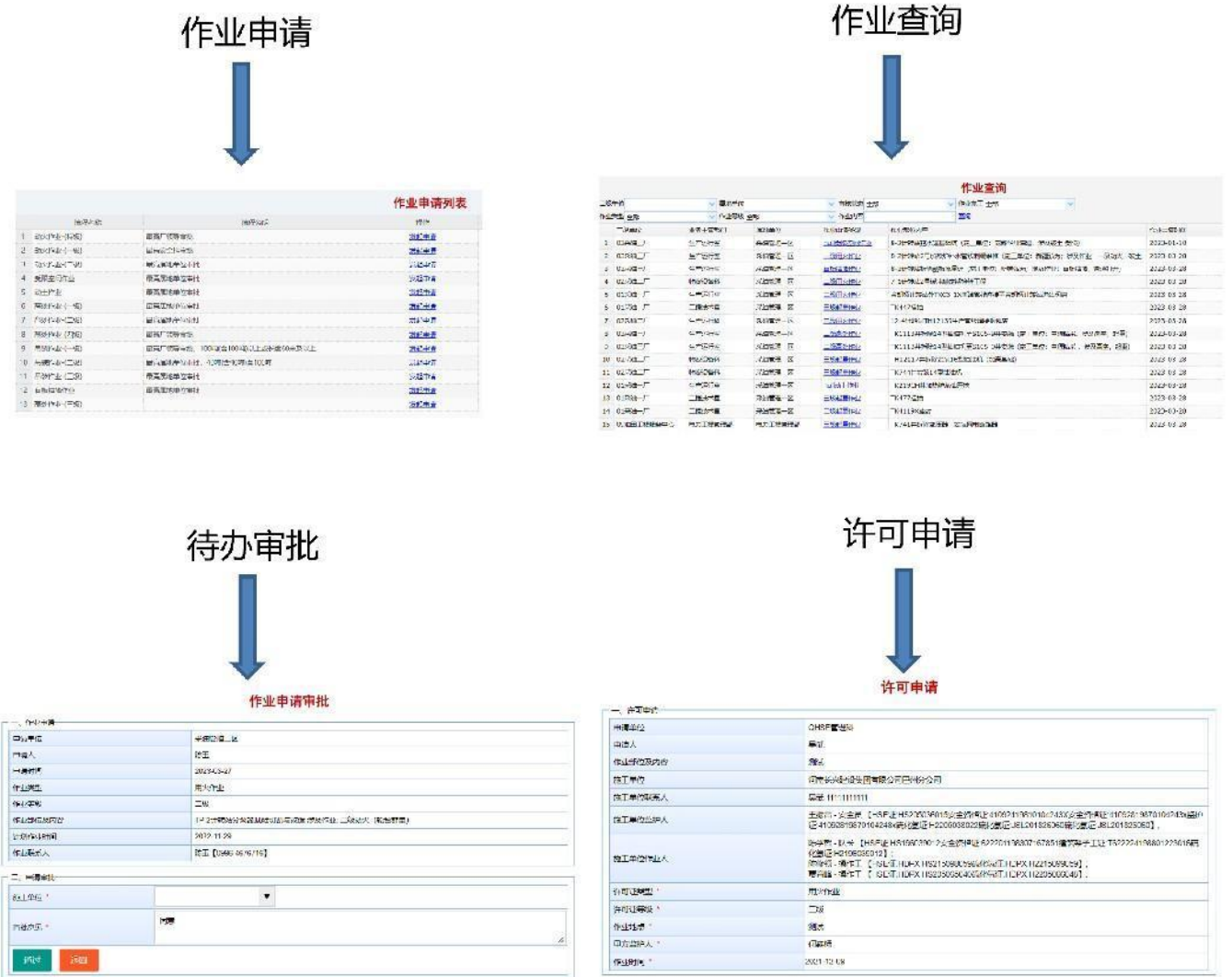
☐ Intelligent device management

technical feature:

- Technical principle: Make rules according to the annual equipment maintenance plan, combined with the set maintenance rules, the system will automatically remind the expired maintenance equipment information and monitor and manage the whole process of maintenance equipment
- Performance advantage: real-time tracking of the whole process of equipment and automatic reminder of expired equipment

Customer pain points:

- Devices that cannot monitor the status of the equipment in real time, track the whole process of the maintenance equipment, and expire quickly cannot be automatically reminded

application scenarios:

- Equipment management function of each station

application case:

- It has been applied in the intelligent station management platform of Oryx oilfield and Cape 70 well site in Chad, and has been praised by the operation and maintenance personnel

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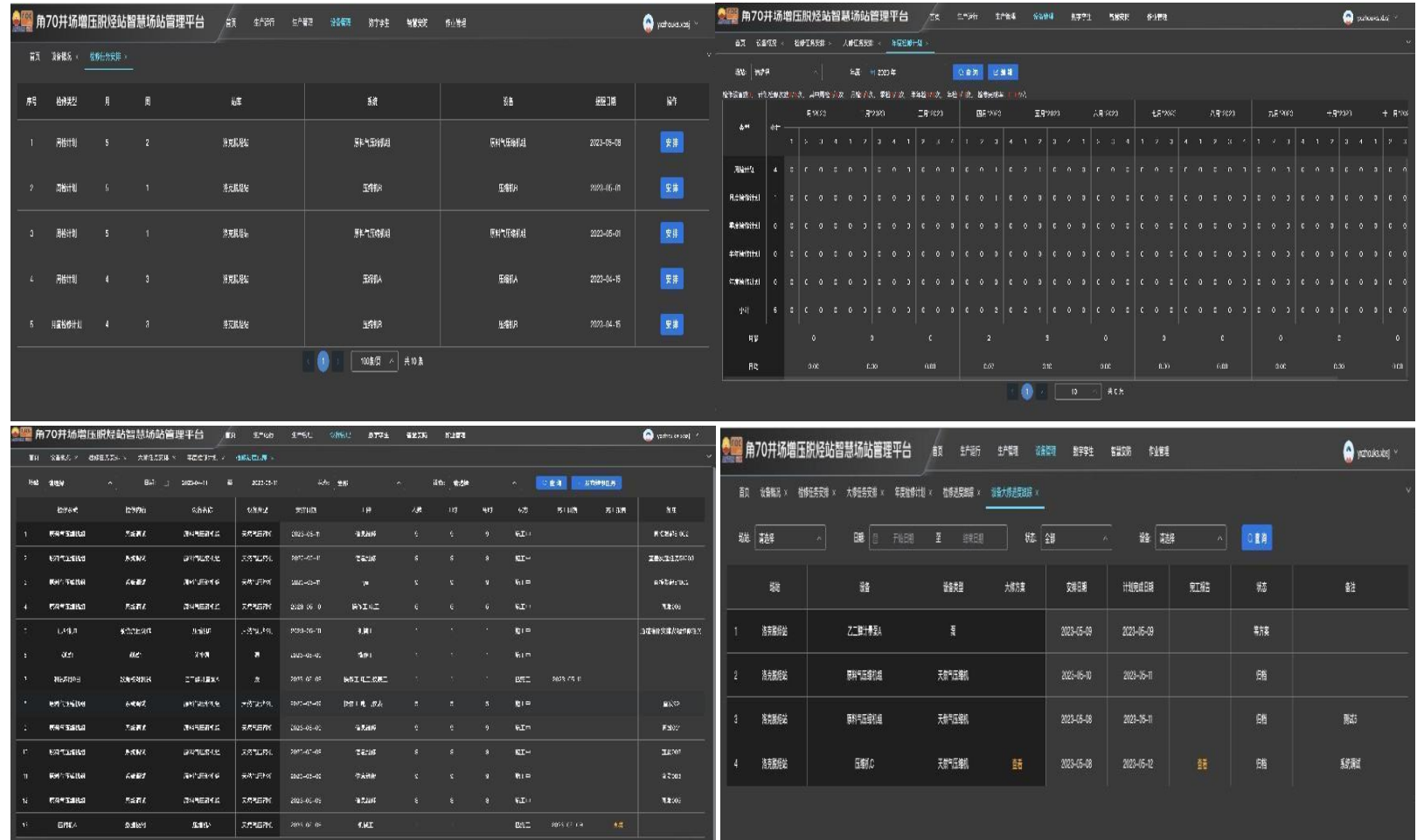
□ **Reproducibility promotion recommendations**

Through the information construction of intelligent station, the "standardization, digitalization, visualization, automation and intelligent" management of the station is realized, the management needs of the station management and the site execution level are met, the ability of hidden danger prediction, risk control and resource optimization is improved, and the station management reaches the advanced level of intelligence.

It can be widely promoted in the station that pursues intelligent management