



The 23rd International Asset Facility and Maintenance Management Conference

A 2025 Survey and Trend Analysis of Equipment Management in Chinese Enterprises

Li Baowen, Yue Huaxin, Xu Baoqiang



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01

introduction

Overview of the Research and Questionnaire



Research Background

After approval from the superior authorities, the "2025 China Equipment Management New Trends Survey Questionnaire" activity was launched by institutions such as the "China Equipment Engineering" magazine. The aim is to comprehensively understand and promote the innovative experiences and achievements of enterprises in the equipment management field.

questionnaire design

The survey questionnaire covers multiple aspects including the basic situation of the enterprise, equipment procurement and spare parts management, lubrication management and intelligence, as well as maintenance and repair strategies. There are a total of six aspects, and the number of questions is yet to be determined. The aim is to comprehensively understand the current status of equipment management.

Research objective

Conduct in-depth research on the challenges faced by equipment in various industries throughout their entire life cycle, analyze the trends and patterns of equipment management technologies, and provide practical countermeasures and suggestions for improving equipment management levels and promoting high-quality economic development.

sample selection

In order to ensure the comprehensiveness and representativeness of the research results, we carefully selected enterprises from different industries and of various sizes in first-tier cities, central cities, coastal areas, as well as western and eastern provinces to conduct questionnaire surveys.

data processing

These data will undergo strict data cleaning and organization to ensure the accuracy and reliability of the data. Subsequently, statistical analysis methods will be employed to conduct in-depth analysis of the data, in order to reveal the current situation and problems of equipment management.

02

**Basic Information
of the Enterprise**

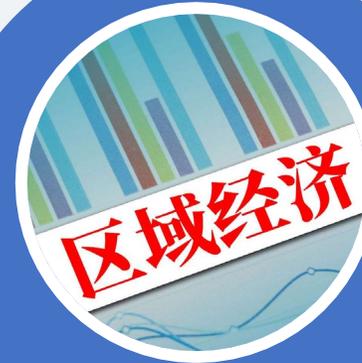
Industry and regional distribution of enterprises



The enterprise industry and regional industry coverage is comprehensive.



Balanced regional distribution



There are significant differences in regional competitiveness.



The competitiveness of the region is of certain representativeness.

03

**Equipment
procurement
situation**

Brand preference in equipment procurement



Rise of domestic brands

Domestic enterprises are now more inclined towards domestic brands rather than foreign ones, This shift reflects the significant improvement in the quality of domestic equipment manufacturing and enhances the competitiveness of the domestic market.

Performance of the world famous brand

Imported brand products still have a place there, relying on their outstanding quality and high reputation,



04

**Intelligent
management
level of
equipment**

Construction of an intelligent equipment asset management information system



Construction of intelligent equipment asset system

The survey data on intelligent equipment shows that **48.57%** of Chinese enterprises have mature and comprehensive equipment asset management information systems, while 31.43% of the enterprises only have partial and scattered information management.



The application of AI technology in equipment fields

01

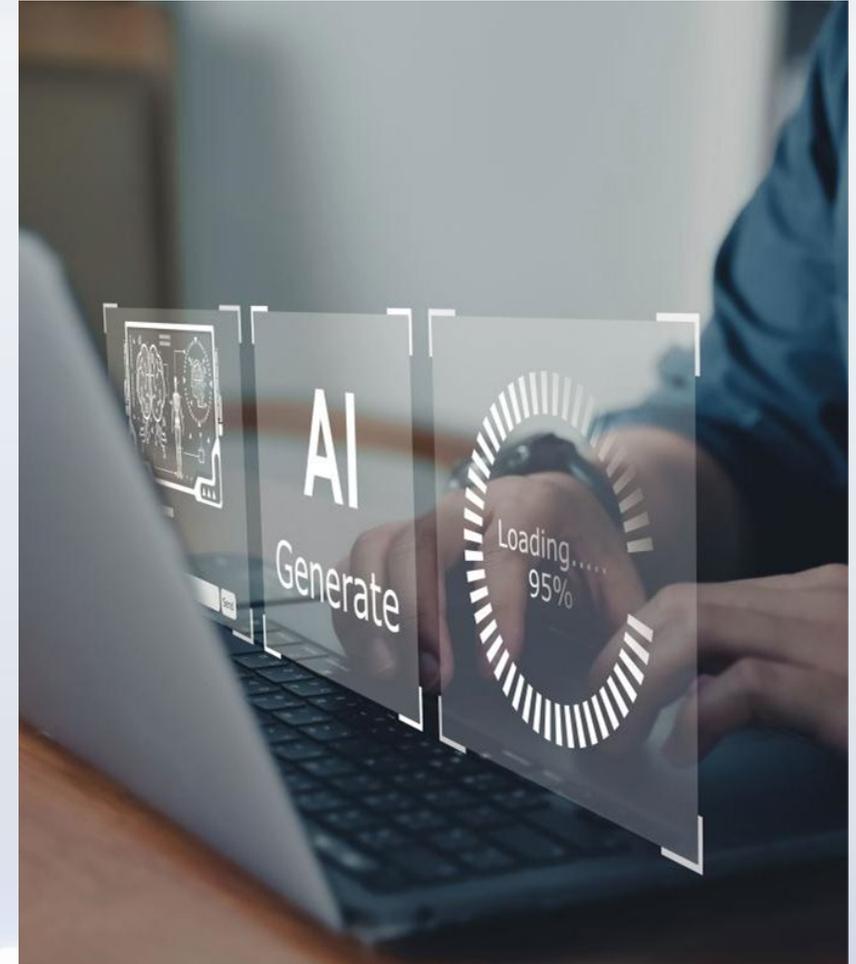
The extent of AI application

The application of AI technology in equipment still remains unimplemented by 40% of enterprises, indicating an uneven distribution of AI technology's application in enterprise equipment management. .

02

direction of application

The application of AI tools is AI assist in decision-making, fault diagnosis, and maintenance plan etc..



The difficulties that enterprises encounter in the field of intelligent manufacturing



01

The challenge of insufficient talent

The primary challenge that enterprises encounter during the transformation to intelligent manufacturing is the shortage of talents.

02

The clarity of the roadmap

In addition, the ambiguity of the intelligent manufacturing roadmap has caused many enterprises to feel confused and made it difficult for them to clearly plan their future development paths.

03

The degree of attention given by the leader

The leadership's insufficient attention to intelligent manufacturing has significantly hindered enterprises' investment and progress in this field.

04

Other potential obstacles

During the process of intelligent manufacturing transformation, enterprises may also encounter various potential obstacles in terms of **technology, market, and capital.**

05

**The status of equipment
maintenance and repair in
the enterprise**

The current situation of enterprise maintenance resource allocation



Outsourcing and in-house development coexist

Approximately 20% of the enterprises do not have their own professional maintenance teams and rely on external cooperation; 60% of the enterprises have maintenance teams ; large state-owned enterprises such as those in the oil, chemical, and steel industries mainly rely on external forces.

Balanced maintenance capabilities is Necessary!

06

**Management of
comprehensive
innovation
capabilities**

The comprehensive goal of equipment management



Integrated management objectives

The comprehensive goal of equipment management is "**safety, stability, long-term operation, intelligence, low carbon footprint, environmental protection, and high efficiency, with high quality**". This consists of 8 aspects: safety, stability, long-term operation, intelligence, low carbon footprint, environmental protection, high efficiency, and high quality. **More than half of the enterprises can meet 6 to 7 of these aspects.**



The situation of enterprises participating in overseas cooperation



01 State of Cooperation

The situation of domestic enterprises participating in overseas cooperation is that **27.14%** of the enterprises have more cooperation, **20%** have less cooperation, and more than half have no cooperation.



02 Global Expansion

Expanding overseas market is the only way to become a world-class enterprise. Although the current environment is full of challenges and opportunities.

Investment in garden-style factories and green development initiatives



01

Green development investment

Regarding the "garden-style factory" and green development construction, **54.29%** of enterprises invested more than **500,000 yuan**, while the rest invested less than 500,000 yuan.

02

Green investment

The enterprises not only pursue economic benefit, but also attach importance to green development and garden factory construction, but the current investment level is still **insufficient.**

Pay attention to corporate training and re-education



More and more enterprises pay attention and recognize that:

Specialized training and conference participation



Experience sharing from attending meetings

Deep learning and the pursuit of knowledge



Enterprise welfare and employee growth

The Role of External Consulting Institution and Enterprise Development



External consulting

Only **20%** of the enterprises believe and rely on external consultants, but most do not recognize their value, especially in complex problem-solving and strategic planning.

07

**Conclusions of the
survey**

New Trends in Technological Innovation of Equipment



01

Intelligent transformation and upgrading

The intelligent transformation of China enterprises has moved from pilot to systematic and ecological, driven by policies and market, especially in the manufacturing, energy and communication fields.

02

Building an industrial ecosystem

China is ramping up smart computing infrastructure development, an industrial ecosystem is forming.

03

Future Trends and Challenges

Future challenges focus on talent cultivation and security governance.

The Status of Composite Application of Sensor and Virtual Sensor

01

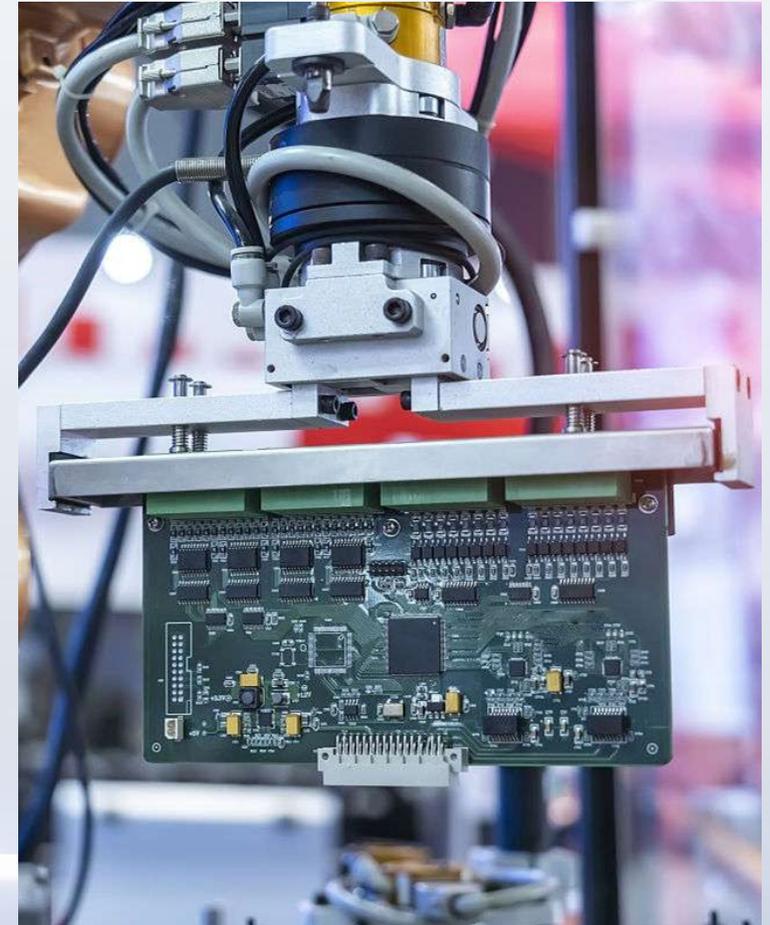
Sensor composite applications

The company has achieved breakthroughs in the integrated application of sensors and virtual sensors, particularly applied in industrial automation and predictive maintenance.

02

Virtual Sensor Challenge

The virtual sensor has not applied comprehensively because of the recognition and understanding.



New Trends in Equipment Management Innovation



Blockchain technology for product traceability

The entire process, from design to component procurement, is fully digitized on the blockchain, a blockchain-based traceability is established in some enterprises..



AR/VR Debugging

AR glasses were used to instruct equipment installation and torque parameters in real time, while VR simulation enabled virtual debugging of high-risk equipment.

New Trends in Equipment Management Innovation



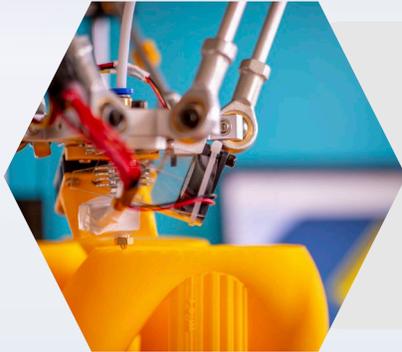
Innovation in the management of equipment spare parts and materials

More and more enterprises are transitioning from reactive to proactive approaches in spare parts management, leveraging IoT, AI, and big data technologies to optimize inventory, control costs, and ensure sustainable operations.

Digital twin inventory management

Enterprises build 3D digital twin libraries for spare parts to map physical inventory status in real time; predict spare part wear cycles through equipment operation data and automatically generate procurement suggestions..

New Trends in Equipment Management Innovation



AI-powered prediction

Typical predictive model structure (equipment operating data + historical replacement records); for example, Ningbo Heli uses intelligent operation and maintenance and large language models to improve prediction accuracy.

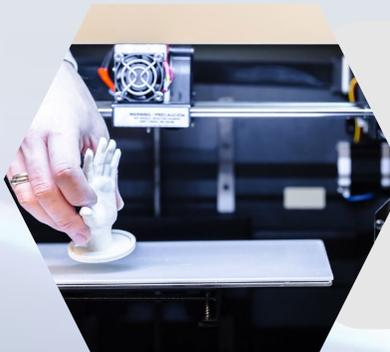
Shared warehouse and alliance

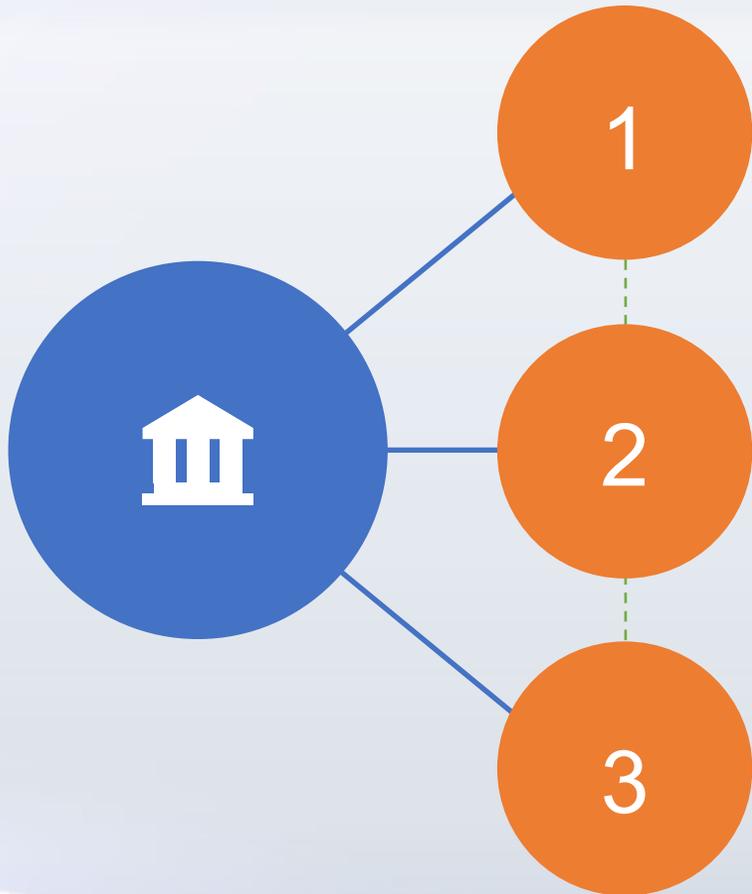
Sany Heavy Industry's Yangtze River Delta Shared Spare Parts Center has tripled its turnover rate. The mutual support agreement for spare parts among five major airlines has saved 120 million yuan in annual warehousing costs.



3D printing on demand

Metal powder bed fusion technology for on-site 3D printing spare parts production; digital inventory storage CAD model; Schneider Electric Wuhan Branch introduced domestic 3D printers, reducing processing time to 3 hours and cutting costs by 80%.





AR glasses empower warehouse management

State Grid Corporation of China has achieved a 60% increase in spare parts picking efficiency and a 70% reduction in new employee training time after adopting smart glasses.

Innovations in carbon footprint management

The carbon label of spare parts calculates the full cycle emissions; the green procurement algorithm gives priority to low-carbon suppliers;

AI-driven predictive maintenance

Frequency Exploration Company utilizes AI and mechanical failure mechanism libraries to predict failures 1-2 months in advance, achieving a diagnostic accuracy rate exceeding 95%. This helps chemical enterprises save over 10 million yuan in annual maintenance costs.

New Trends in Equipment Management Innovation



Dynamic scheduling of maintenance resources

The Shanghai Metro Operation and Maintenance Center has implemented a digital twin system for maintenance resources, utilizing AI algorithms to optimize multi-objective resource allocation. This initiative not only enhances emergency response efficiency but also reduces unnecessary driving,

Cloud-based sharing of maintenance resources

The electric vehicle aftermarket has boosted maintenance efficiency by 50% through its cloud platform model integrating online apps with offline certified technicians, achieving 95% customer satisfaction.



AR Remote Expert Network

Shaanxi Blower Group uses AR glasses to achieve remote guidance; China Southern Airlines provides remote technical support through AR glasses; China Guangdong Nuclear Power Group's nuclear island maintenance robot cluster reduces radiation exposure for personnel by 90%; the widespread application in manufacturing highlights technical support.

New Trends in Equipment Management Innovation



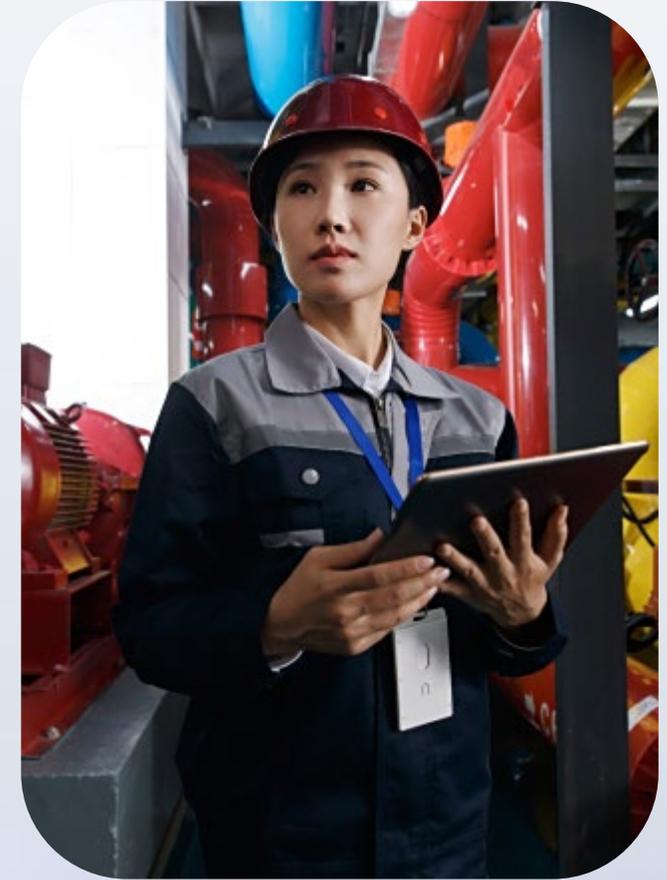
Sustainable green maintenance

Remanufacturing technology reduces costs while being environmentally friendly.

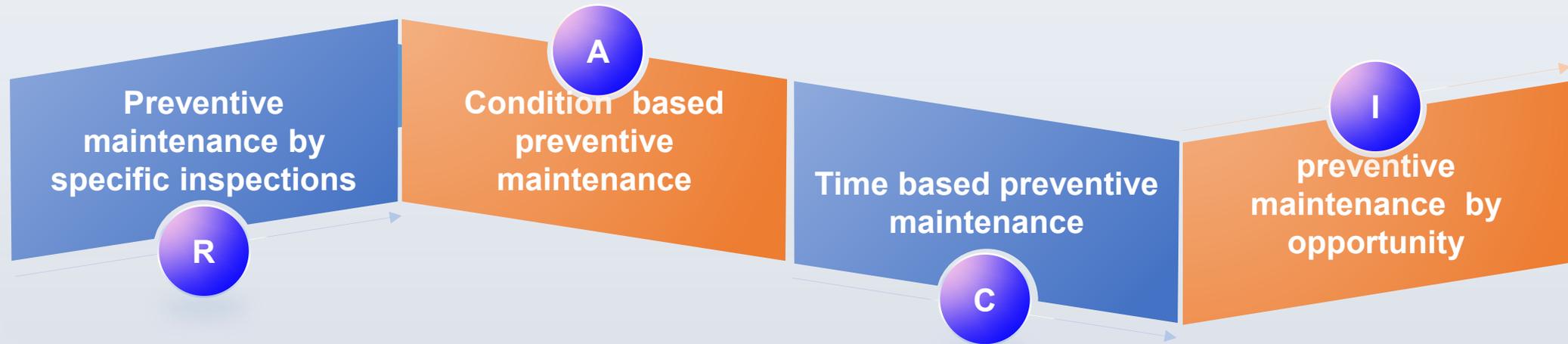
Companies like Wanbang Heavy Industry and Tuhu Auto Maintenance have set benchmarks for green maintenance.

Edge computing real-time diagnosis

By deploying micro-AI chips on devices to achieve 10ms-level response, TSMC's wafer fabrication plant has successfully enhanced lithography machine fault response speed by 20 times through edge computing technology.



Four Main Preventive Maintenance Strategies applied in China



08

Summary
Outlook and suggestions

Challenges

01

Gap between talent and standards

Statistics indicate that China needs to train 150,000 intelligent manufacturing professionals by 2026, while inconsistent technical standards hinder cross-enterprise collaboration.

02

Lag in the management of cognitive processes

The management is still lagging behind in the concept of equipment management, and still regards it as a cost center, ignoring its value creation potential, which affects the overall strategic layout of the enterprise.

03

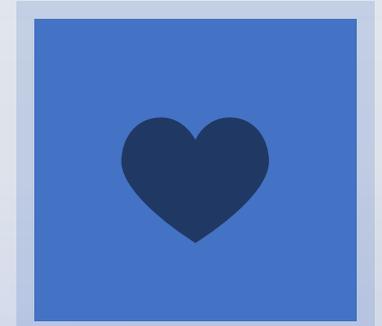
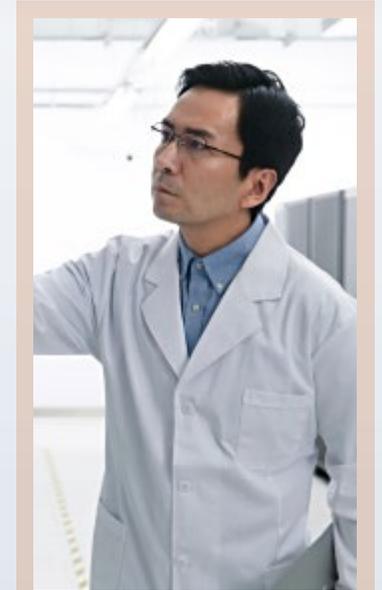
Fragmentation of technical standards

In recent years, although China's equipment maintenance standardization construction has made some progress, it is still very backward, which is not in line with the international status of China's manufacturing industry.

04

internal coordination failure

The production department and the equipment department are serious egoism, lack of effective communication and cooperation, resulting in frequent conflicts between equipment maintenance plan and production plan.



01 Promoting the Value Management of Equipment Life Cycle with 5L as the Guideline

Establishing the Strategic Goal of Equipment Management: Safety, Stability, Long-term, Intelligence, Low carbon, Environmental, High efficiency , and Superior quality



Security is the
cornerstone of survival
and development

01



Stability is the guarantee of
sustainable operation

02

Maximizing the Value of
Long-Term Resources

03

Intelligent is the core of
digital transformation

04

Establishing the Strategic Goal of Equipment Management: Safety, Stability, Long-term, Intelligence, Low carbon, Environmental, High efficiency , and Superior quality



Low-carbon is more than a commitment

05



06

Sustainable environmental protection and maintenance require long-term efforts.

High efficiency is always the goal of equipment management

07

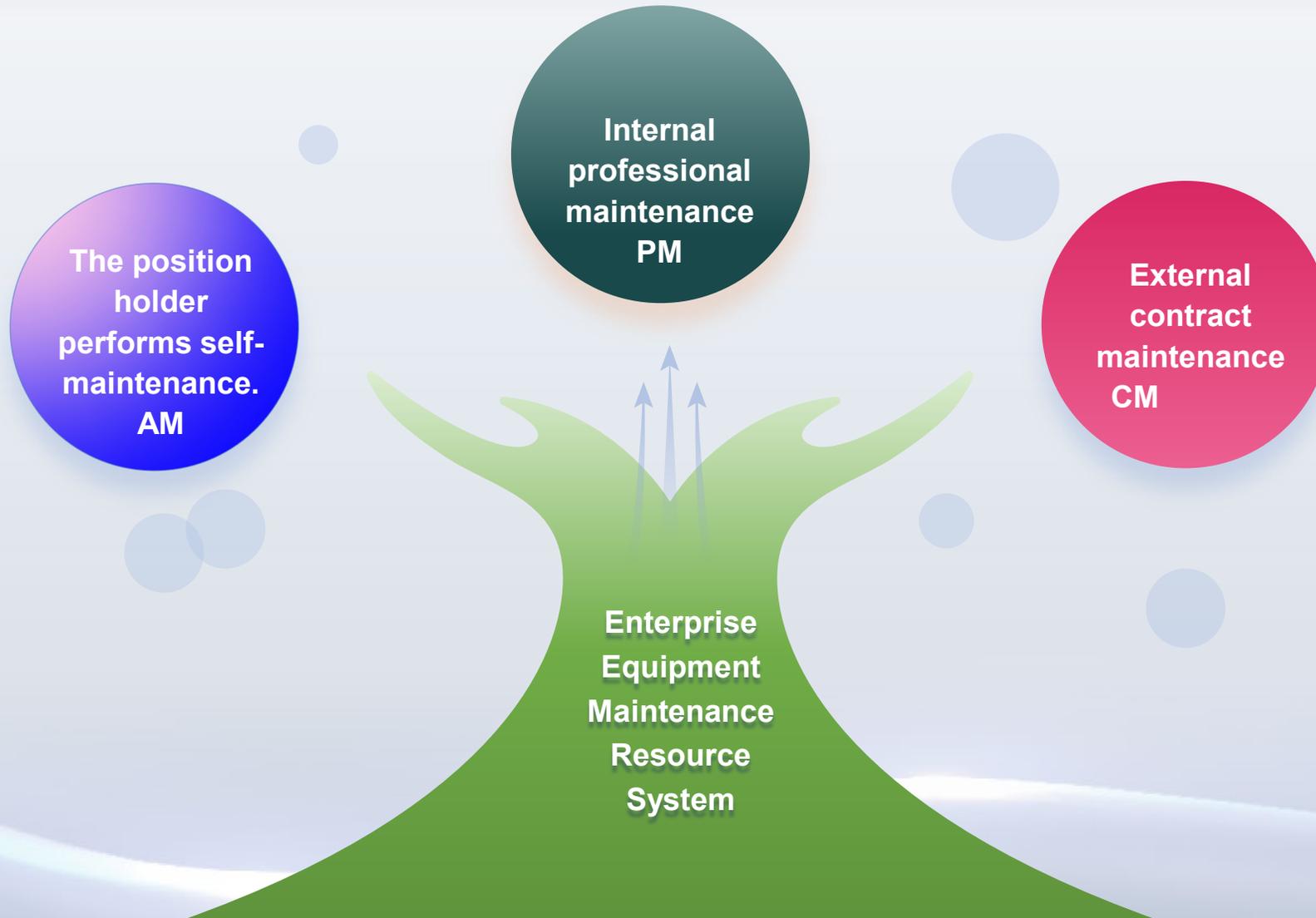
08

The **high quality** operation of the equipment is the guarantee of the high quality products and services

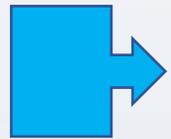
02

**Collaborate internally and externally
to build an excellent equipment
management and maintenance
technical team**

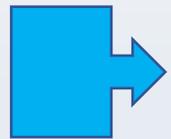
Enterprise resource allocation system maintenance



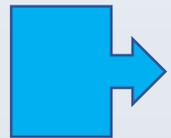
Definition of 5L



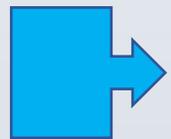
life cycle cost —LCC



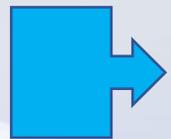
life cycle income—LCI



life cycle value—LCV



life cycle risk—LCR



life cycle ecology—LCE



Excellent equipment management and maintenance team



The interior team is the foundation

The outsourcing team is the support

Collaboration is the key



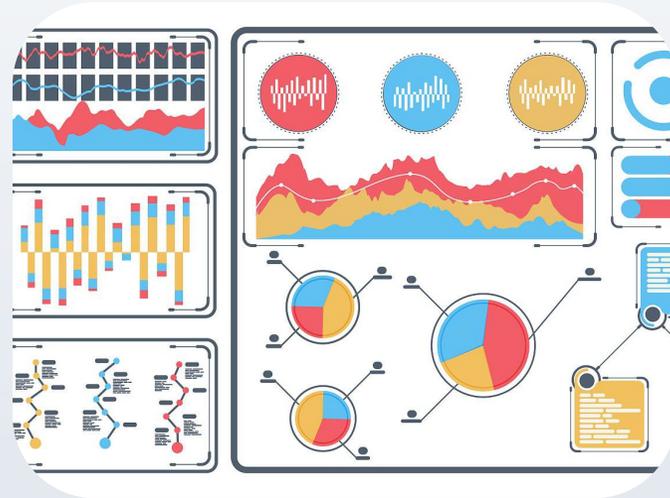
03

Prescriptive Maintenance System Based on Multi- dimensional Dynamic Fault Matrix——P-MDFM

Understanding the Multidimensional Dynamic Fault Matrix

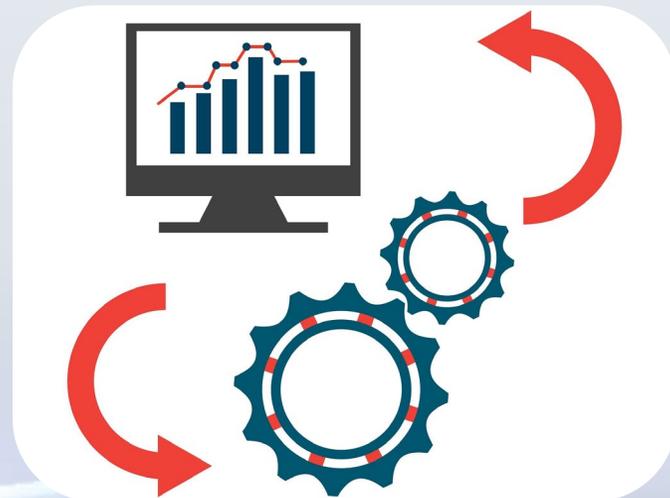
Multi-dimensions

Integrate data dimensions across the entire lifecycle and all virtue sensor information of the equipment, including, operational status, historical failures, environment, monitoring, and external knowledge.



Fault matrix

A knowledge graph of structured storage failure modes and related information, standardized failure phenomena and possible cause chains.



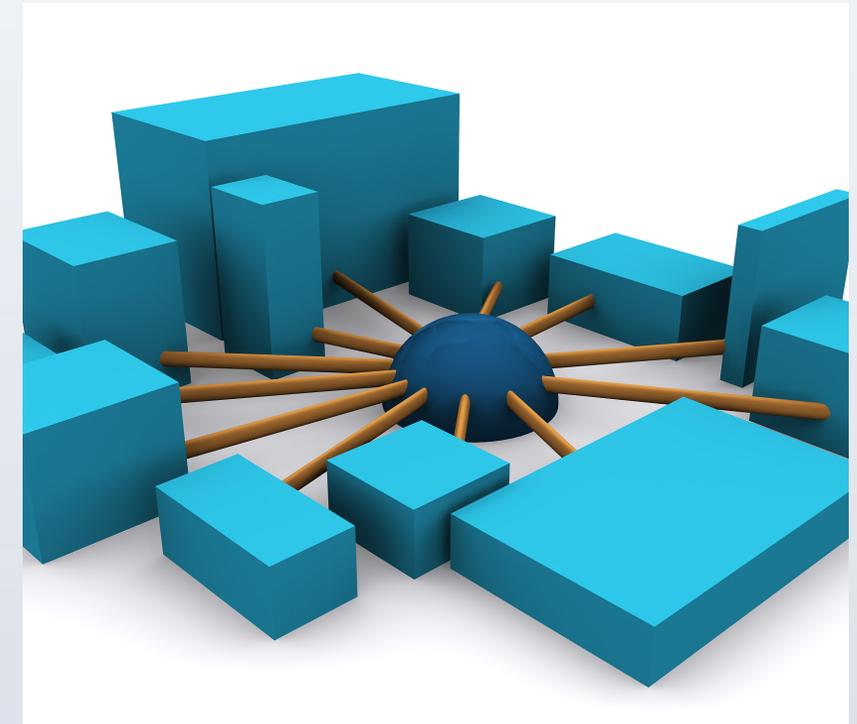
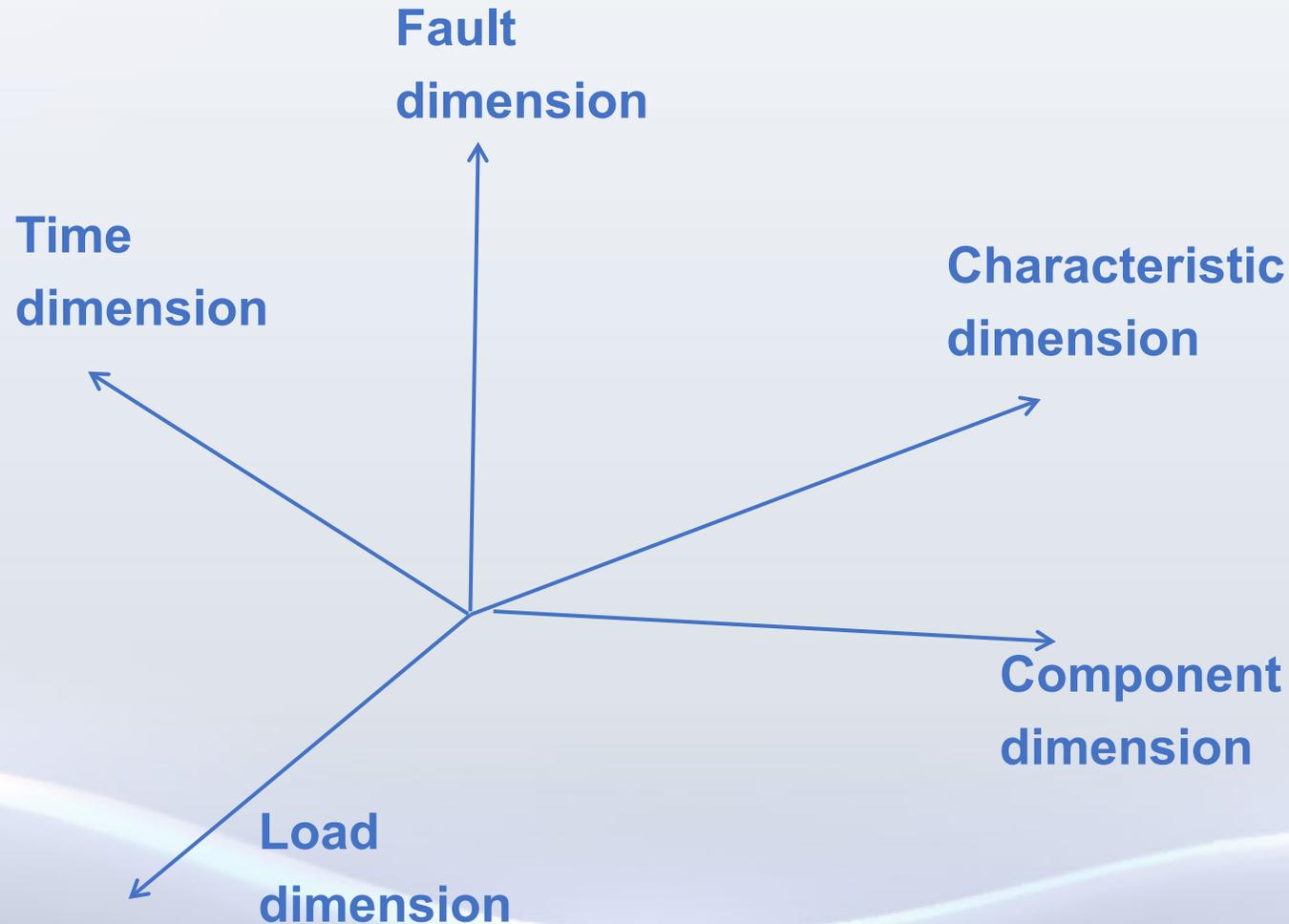
Dynamic

The matrix continuously self-renewes and evolves, featuring dynamic thresholds.

Prescriptive

Accurate Maintenance from time dimension and space dimension will be generated.

Understanding the Core Multidimensional Dynamic Fault Matrix by Taking the Five-dimensional Matrix as an Example



04 New Quality Equipment Capability

What is the new quality equipment capability?



Advanced production capabilities
for equipment manufacturing



Advanced equipment
management capabilities

Core Characteristics of New Quality Equipment Capability



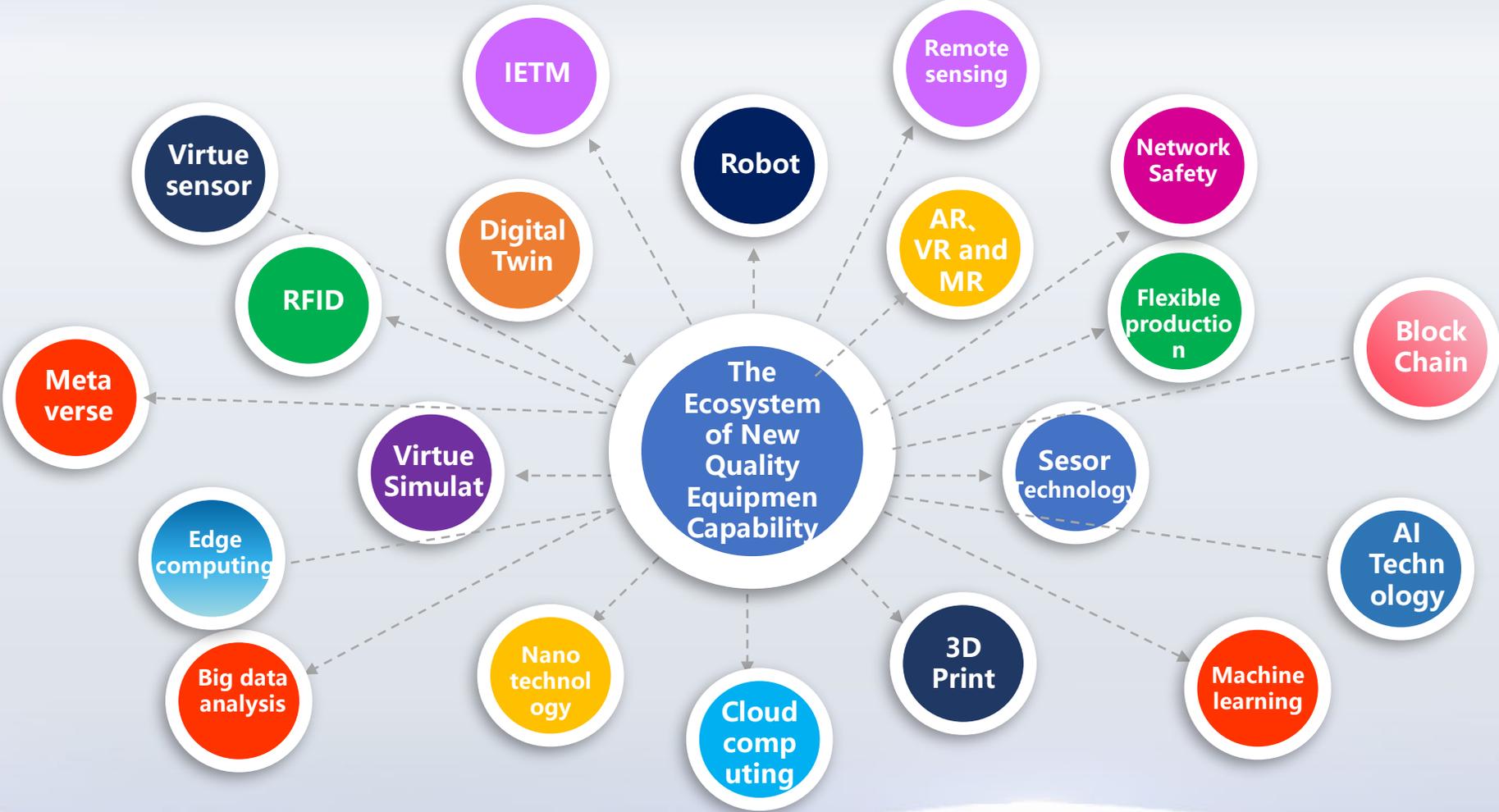
**The generational leap
in technology**

**Advanced
manufacturing
capabilities**

**Closed-loop data
management**



Factors contributing to technological progress in new-generation equipment



Advanced manufacturing capabilities



Domestic production of high-end precision equipment

The localization of high-end product manufacturing and service equipment determines our product quality autonomy. Innovation in design enables first production.



Domestication of advanced experimental testing technologies

Similar to aviation wind tunnel technology, we should achieve domestic production of various experimental and testing instruments, equipment, and tooling accessories.

Localization of High-end Design Simulation Software

Domestic alternatives now exist for design software like CAD, EDA, SketchUP, Rhinoceros, and Figma, as well as simulation tools such as LTspice, Proteus, CAE, and ANSYS Fluent.

The world has never been as full of uncertainties as it is today! Now we are in a VUCA times!

The creatures that survive in this world are not the strongest ones, nor the smartest ones, but those that can react quickly to the changes of this world!

We have to prepare for the VUCA times! So do the maintenance man!



**VUCA—Volatile, Uncertain,
Complex, Ambiguous**



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THANK YOU!



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