Maintenance in China 2017 Survey Report

Does maintenance play a role in the China Dream?

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Executive summary

The "Maintenance in China" 2017 survey gives a snapshot of the evolving maintenance management practices of industrial companies in the era of the "China Dream".

Responses show **great awareness of maintenance**, more particularly **among Chinese infrastructures and utilities,** with **risk prevention as a key driver**.

Execution however is still lagging: **decision support is a weak area**, making it difficult to close the "feedback loop" as per the ISO 55000 (or GB/T 33172) Asset Management standard.

Most companies are considering improvement actions that could help address those concerns.

The survey shows that **best performers**:

- Have a maintenance strategy
- See maintenance as risk prevention
- Have a CMMS (81% of local respondents do not)
- Hold regular meetings…
- … during which historical records are analyzed

Table of Content

The 2017 survey

The 2017 Maintenance in China survey

Launched in 2008 and now in its 5th edition, the "Maintenance in China" survey is a joint project between the Sino-European School of Technology of Shanghai University (UTSEUS) and Siveco China, the country's largest maintenance consultancy. It is by far the most comprehensive survey of its kind.

www.utseus.com www.sivecochina.com

A benchmarking opportunity for companies operating industrial assets in China, this year's survey also offers interesting insights in the changing role of maintenance, long underestimated, as the country enters a new phase of its industrial development, moving up in the value chain, with increasing automation, robotization and focus on sustainable development, embodied in such concepts as the China Dream and Made in China 2025.

Respondents

493

Respondents

Representing

453

Companies

Located all over China

The previous edition of this survey, in 2013, had 834 respondents but ran for a much longer period of time (8 months vs. 2 months this year). The well–established Business Confidence Survey of the EUCCC (European Chamber of Commerce in China) offers a good point of comparison, with 506 respondents in 2016.

Responses were well-distributed across all provincial-level divisions of China, with the exception of Tibet. Less than 10 responses in total came from Hongkong, Macau and Taiwan. A few responses from outside of China were excluded from this analysis.

The questionnaire

The questionnaire was aligned with the

ISO 55000:2014

family of Asset Management standards,

now also available as Chinese standard*

GB/T33172-2016

Questions covered:

- **Maintenance strategy & business impact**
- **Execution and supporting tools** (staffing, training, preventive maintenance, relations with production, spare parts, subcontracting, documentation, IT tools)
- **Decision support & improvement**

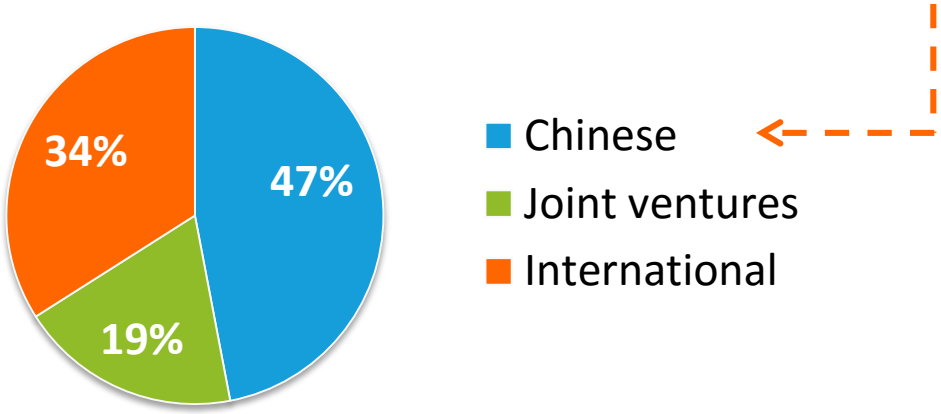
* Approved by the Standard Administration of the People's Republic of China (SAC) on October 13, 2016, effective from May 1, 2017 under the names:
GB/T 33172-2016资产管理, 综述、原则和术语
GB/T 33173-2016资产管理, 管理体系 要求
GB/T 33174-2016资产管理, 管理体系 GB/T 33173应用指南

Survey responses

Respondents profile

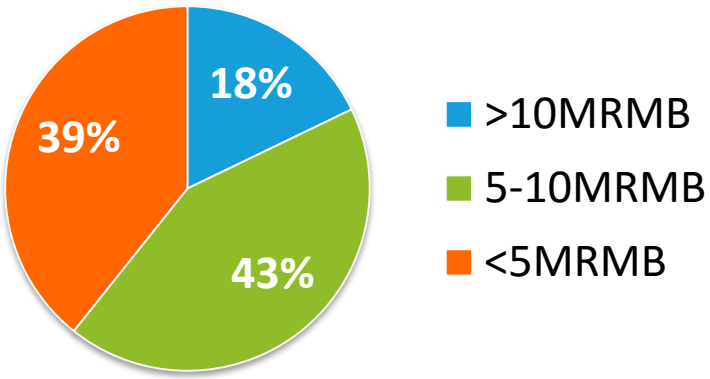
Industry

Nationality

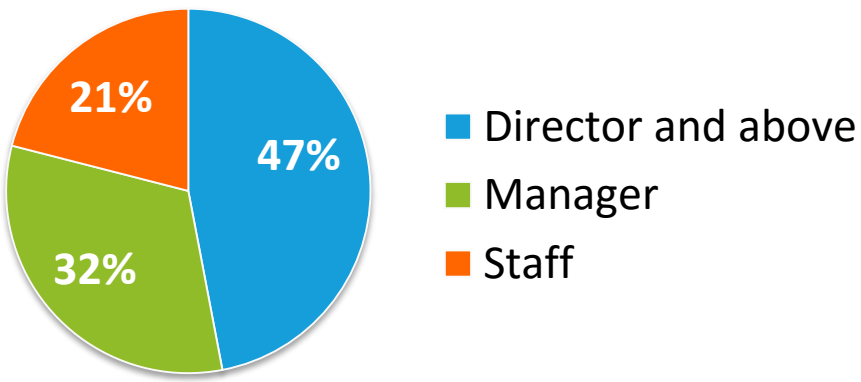


The survey was dominated by Chinese companies and joint-ventures, unlike previous editions (84% multinationals in 2013). Most local respondents are infrastructures & utilities, most international companies are manufacturers. Comparison of response rates (vs. mailing lists) shows a relative lack of interest from multinationals (international chambers were also less interested in the survey compared to 2013).

Annual maintenance budget



Seniority level

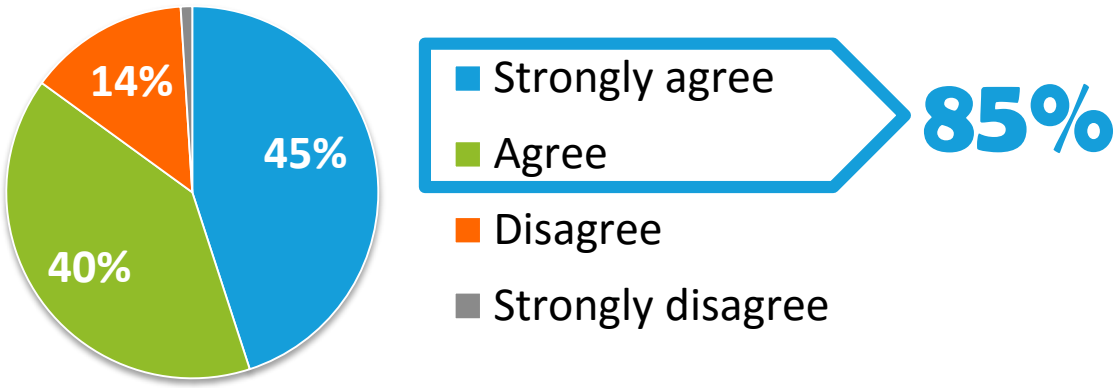


Size comparison shows most respondents were mid-size or large companies (more than 5 RMB annual maintenance budget).

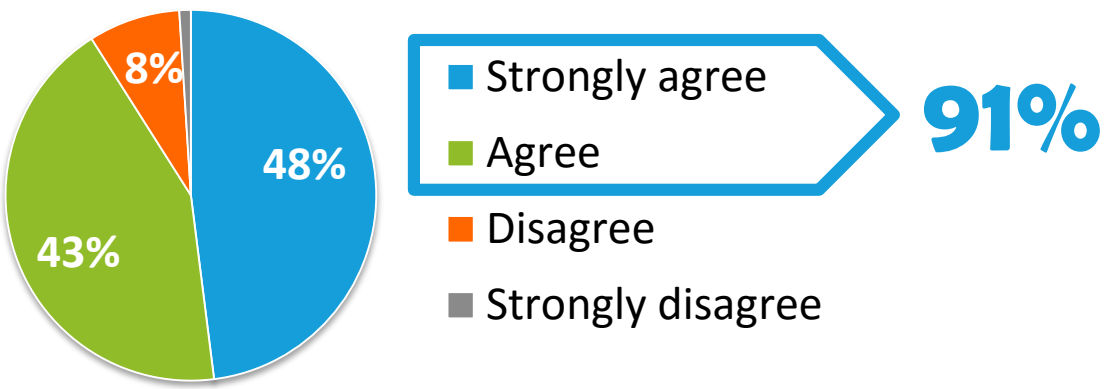
The survey attracted a senior management audience, reflecting interest on the topic of maintenance at management level.

Maintenance strategy

The maintenance strategy is established, documented and known to all stakeholders



The maintenance strategy is aligned with the company's overall strategy



The surprisingly positive responses on strategy-related questions show great awareness of the importance of maintenance, which was far from being the case in previous surveys. Wishful thinking or reflection of a changing reality?

Business impact

A significant[1] share of our equipment is in poor condition that could result in disruptions

(1) More than 5%

44%

A significant[2] share of our production losses are due to breakdowns

(2) More than 10%

21%

26% Do Not Know

A significant[3] share of failures results in production losses

(3) More than 5%

23%

Responses show that maintenance has a significant business impact, which perhaps partly explains the higher awareness at top management levels.

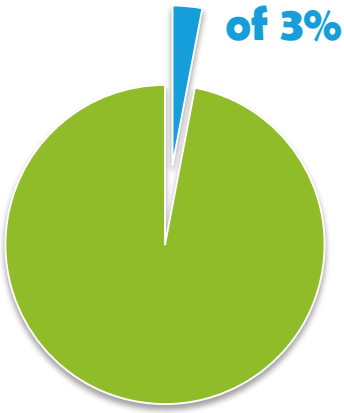
Staffing

Process industry, infrastructures & utilities

10-25% with an average of 13%

Discrete manufacturing

1-5% with an average of 3%



Maintenance
Others

Nobody is in charge of maintenance planning **5%**

Staffing figures are in line with international standards (in 2013 companies surveyed were considered slightly understaffed in maintenance).

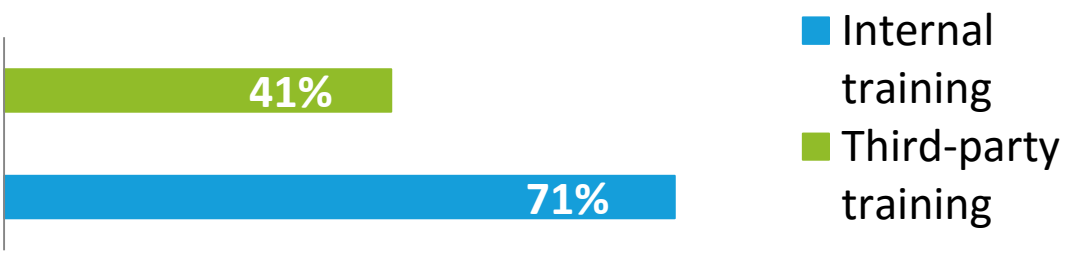
Training

Has your team been trained on maintenance management and methodologies?

No
54%

Yes
46%

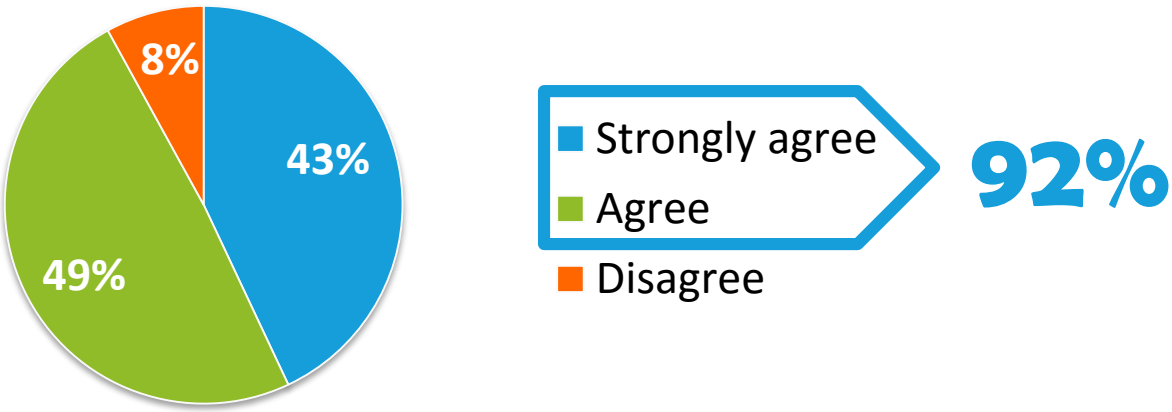
Maintenance training received



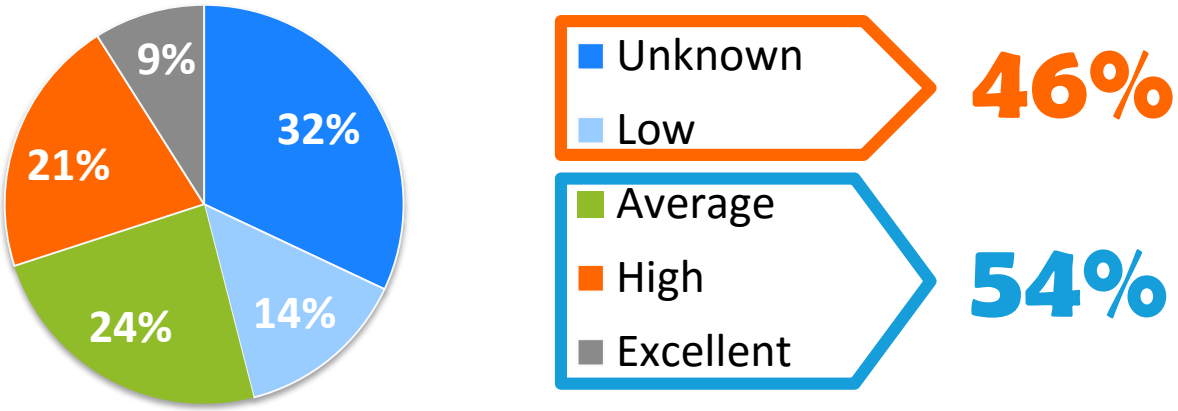
In contrast with extremely positive responses on maintenance strategy, 54% of maintenance teams have not received training on maintenance management and methodologies: who, then, develops and implements the strategy?

Preventive maintenance

Preventive maintenance plans are in place for all critical assets



Share of preventive actions in overall maintenance



Low <25%, average 25-50%, high < 85%, excellent >85%

Responses on the existence of preventive maintenance plans are again overwhelmingly positive. The preventive maintenance ratio is reversed (improved) compared to 2013, but for 46% of respondents preventive maintenance remains insufficient.

Relations with production

Preventive maintenance stops are coordinated with production

80%

6% No Plan

The production department is satisfied with maintenance stoppages

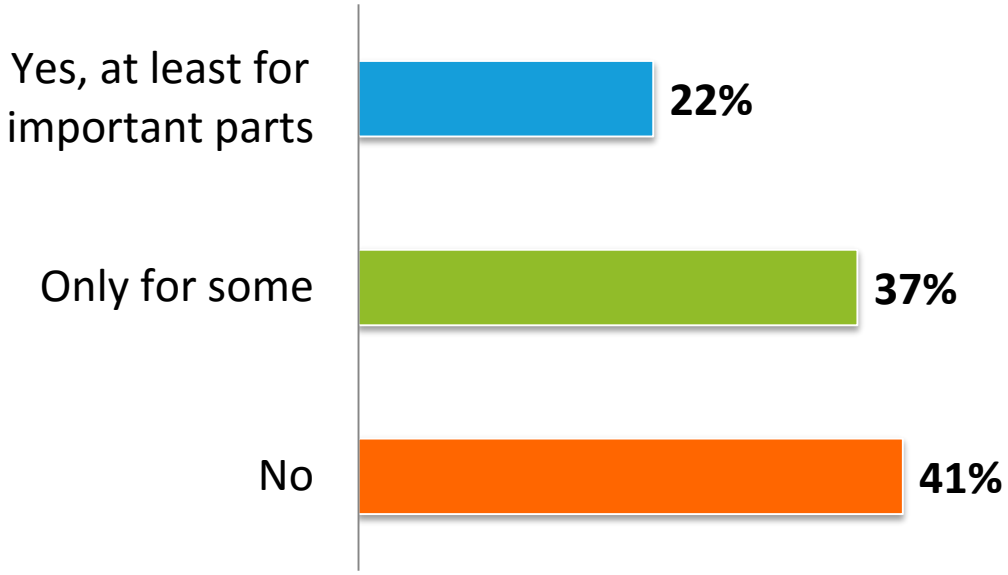
66%

34% Not Satisfied

Overall relationship between maintenance and production (operation) departments is good.

Spare parts

Do you know the turnover rate of your spare parts stock?



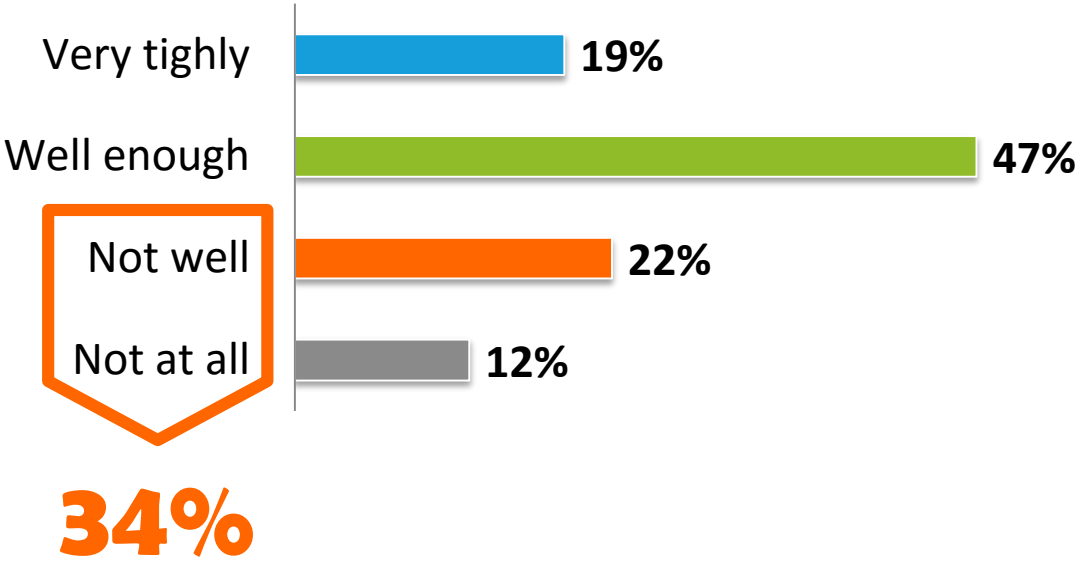
Are the parts needed available in stock?

33% Do Not Know

25% say less than 1/10th are in stock

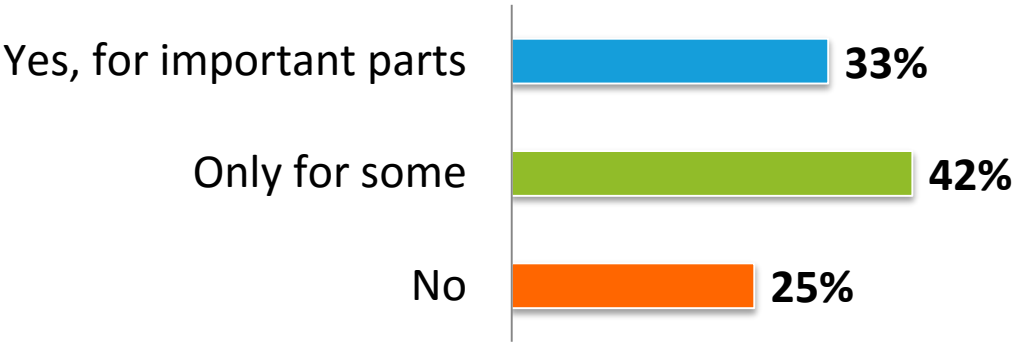
Spare parts-related questions show major improvement opportunities. Less than one fourth of respondents know the turnover rate of important spare parts. One third do not know if the parts they need are in stock.

How do you control the origin and quality of spare parts?



34%

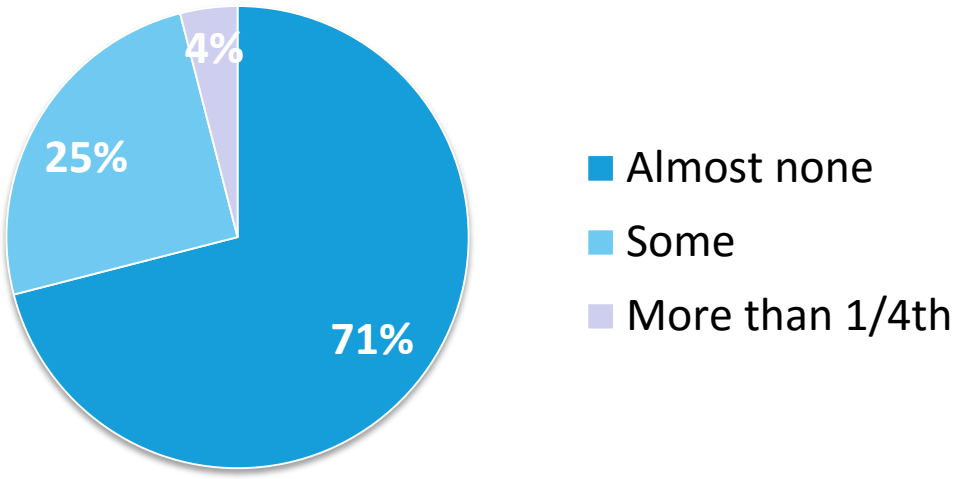
Have you already performed an optimization of your stock?



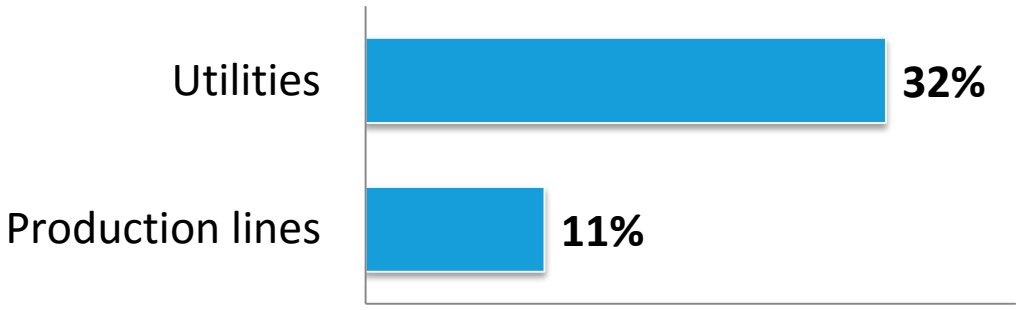
Similarly, responses show the origin and quality of parts are not under control. Only one third of respondents have optimized their stock for important parts.

Subcontracting

How much maintenance do you subcontract?



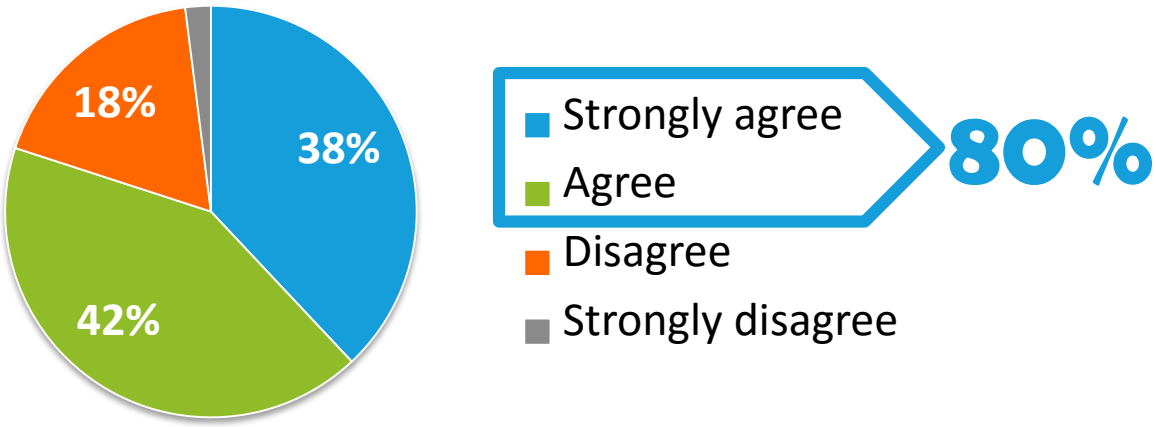
What maintenance is outsourced?



Outsourcing is still uncommon. There are no good or bad answers to outsourcing questions. Outsourcing of utility maintenance (non-core for manufacturers) is an example of strategic approach to maintenance.

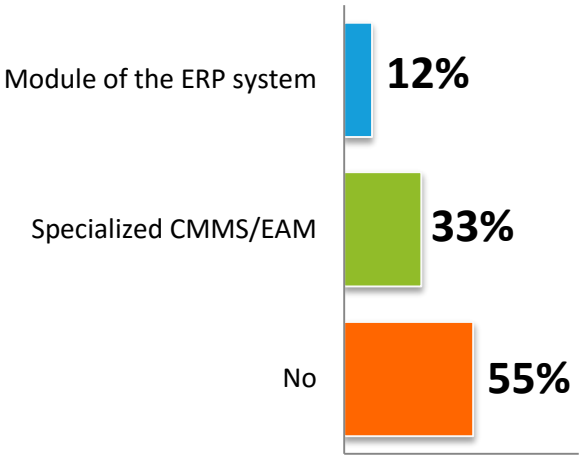
Documentation

Technical documentation is complete and up-to-date for all critical assets

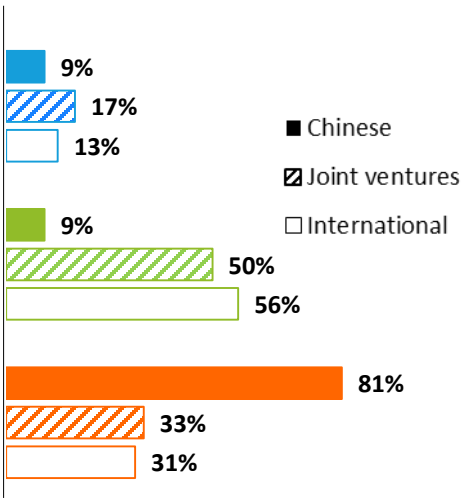


IT tools

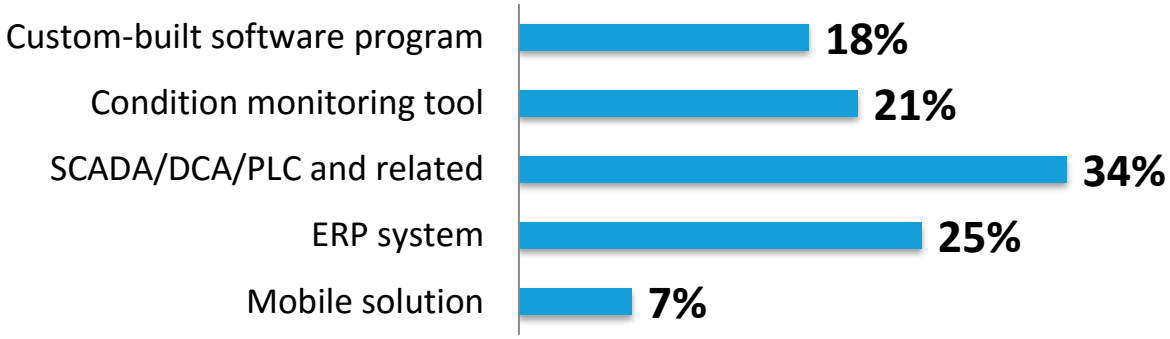
Is your company using a computerized maintenance management system?



Major differences between nationality / industry



What other IT tools are you using for maintenance ?



Over half of respondents (and over 80% of local firms, most of them infrastructures or utilities) do not use a CMMS. For multinationals, comparison with 2013 results show that CMMS adoption rate has increased (from 60 to 70%).

Decision support

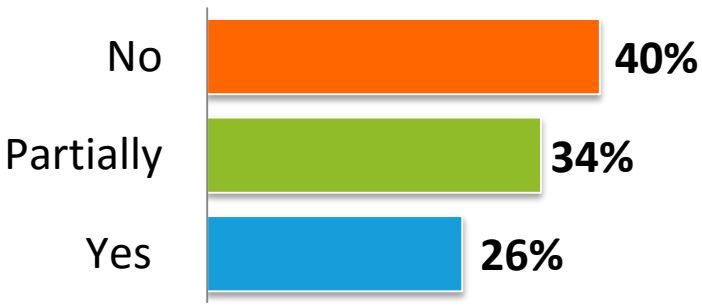
Maintenance improvement meetings are held regularly

85%

… during which historical records are analyzed

23% always
31% sometimes
46% no

Are records useful for management decisions?



Clearly defined maintenance KPIs

74%

… but KPIs not useful

66%

Responses show that when maintenance management controls and tools have been put in place, they seldom produce the expected effects in terms of decision support.

Failures are reported and analyzed **87%**

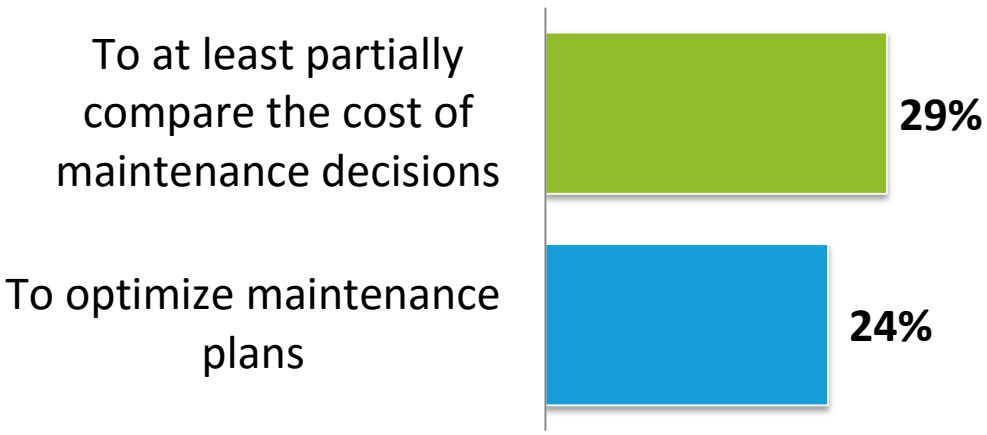
Do you know your equipment failure rate?

19% for all

35% for important ones

54% no

Analysis of records allows



The same discrepancy is seen for failure analysis: experience shows that companies perform individual failure analysis but do not aggregate data over time.

Improvement

A significant[1] number of breakdowns could be prevented

81%

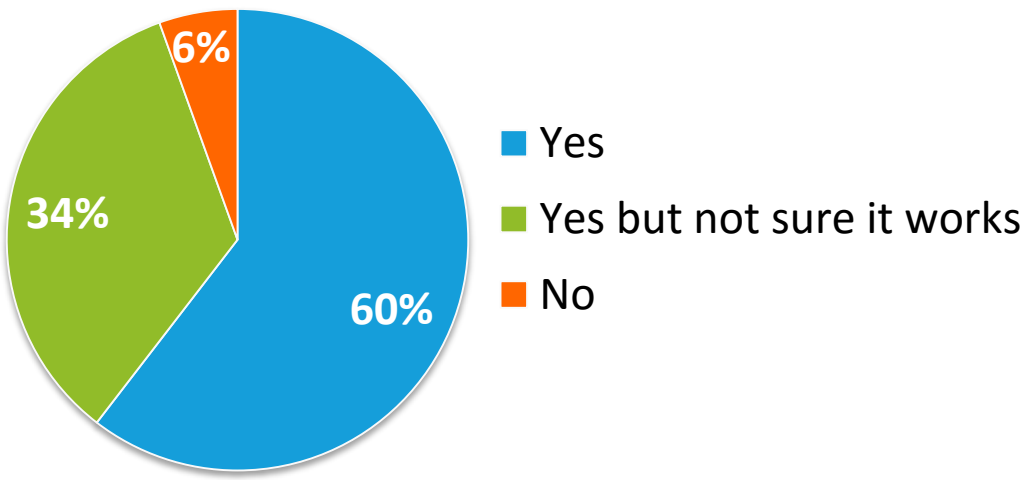
(1) More than 5%

Major[2] productivity gains could be achieved through preventive maintenance

55%

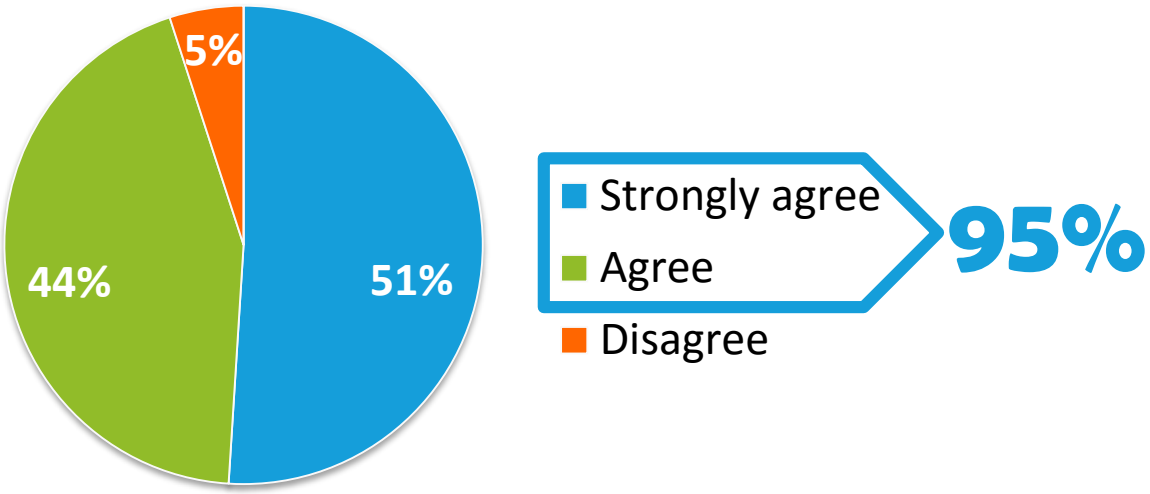
(2) More than 10%

Plan to reduce operation cost through maintenance



Significant improvement potential exists in terms of breakdowns prevention and productivity gains. 94% of respondents plan to reduce operation cost through maintenance.

We see maintenance as industrial risk management



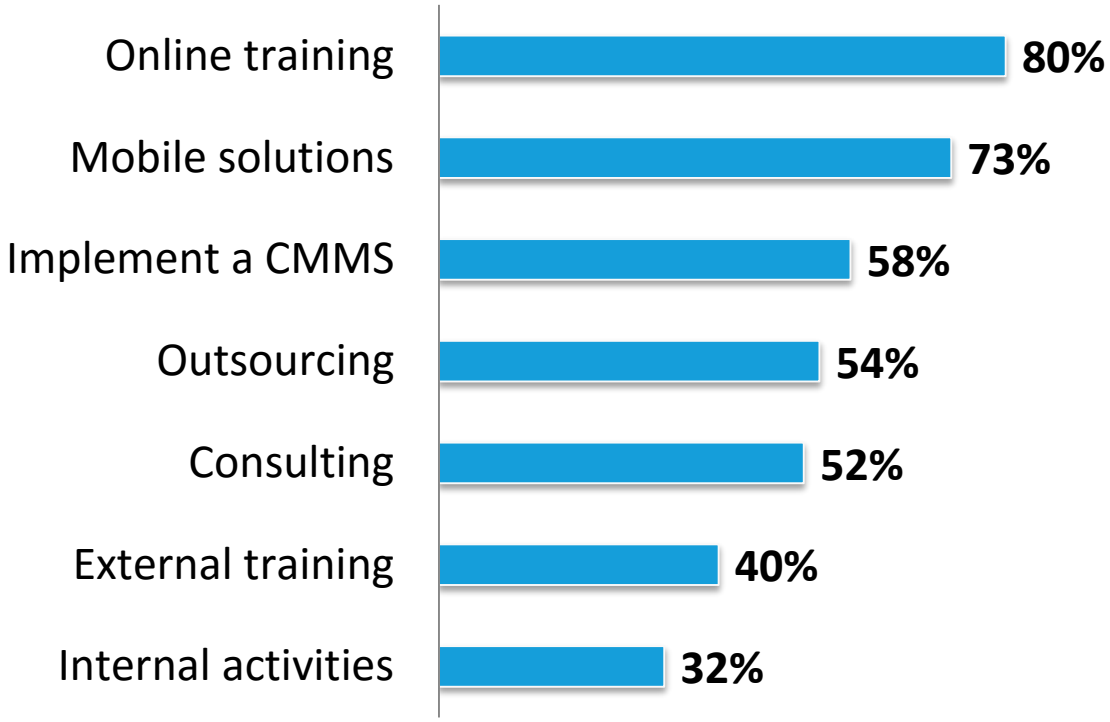
We pay more attention to maintenance than before **94%**

Why? Top 5 keywords in comments:

1. life cycle cost 2. aging equipment,
3. shareholder risks, 4. increase profit,
5. safety requirements

Massively positive responses again about the importance of maintenance. 94% declared paying more attention to maintenance (up from 72% in 2013). 26% of respondents offered comments, the top five keywords are shown above.

How do you plan to improve maintenance?



68% **plan to use CAPEX**

Improvement plans often include a range of simultaneous actions. Using CAPEX (investment) is consistent with the goal of reducing risk (rather that OPEX to reduce cost). In 2013, only 47% planned to use CAPEX (the trend at that time was to run smaller OPEX projects aimed at cost reduction).

Conclusions

Executive summary

We observe much greater awareness of maintenance among respondents, with risk prevention as a key driver.

Execution however is still lagging: decision support is a weak area, making it difficult to close the ISO 55000 (or GB/T 33172) "feedback loop".

Most companies are considering improvement actions that could help address those concerns.

Greater awareness

We observe much greater awareness of maintenance among respondents, with risk prevention as a key driver.

- **High response rate by local firms** (mostly infrastructure and utilities), with 94% of respondents that declare paying more attention than before to maintenance.
- Very high rate (over 85%) of **positive statements about maintenance strategy (an essential part of ISO 55000 or GB/T 33172)**.
- **95% see maintenance as risk prevention**, confirmed by comments. Production improvement is only a secondary driver.

Execution is lagging

Execution however is still lagging.

- **54% of maintenance teams have not been trained on the necessary management concept and methodologies**, making it hard to define and implement the strategy.
- For a comparatively large share of respondents (almost 50%), **preventive maintenance remains insufficient**.
- For one third of respondents, **spare parts management appears weak**, with a lack of knowledge, control and under-optimization.

Weak feedback loop

Decision support is a weak area, making it difficult to close the ISO 55000 (or GB/T 33172) “feedback loop”.

- **If maintenance management controls and tools have been put in place, they seldom produce the expected effects in terms of decision support**: 85% analyze failure records, run regular meetings, 45% already use a CMMS… yet less than 50% know their failure rate, less than 30% are able to compare costs and optimize maintenance plans, only 25% can use records for decisions… Similarly 76% have KPIs, yet 66% do not find them useful.

Most companies are considering improvement actions that could help address those concerns.

- Internal activities
- External training
- Implement a CMMS

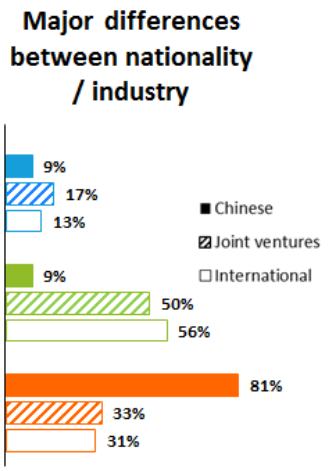
Influence of nationality & industry

In this survey, most local respondents are infrastructure & utilities, while most multinationals are manufacturers, thus differences may reflect industry practices rather than national practices.

The only significant differences found are:

- **Higher response rate from Chinese infrastructure & utility companies, showing stronger interest on the topic of maintenance from local firms**.

- **Lower penetration of CMMS technology among local firms**: 81% of Chinese infrastructure & utility companies are not using a CMMS vs. 31% for international manufacturing companies.



What about the Chinese Dream?

We believe and observe that the increasing awareness of maintenance among Chinese infrastructure & utilities firms comes from:

- Government push for sustainable development
- Strict HSE regulatory enforcement
- Promotion of computerization ("4.0")

bluebee® cloud helps multisite organizations manage their Assets, Facilities, Field Service and Risk Prevention in line with international standards (ISO 55000, ISO 31000).

bluebee® cloud

bluebee® is a unique tool designed "for the worker of tomorrow" to capture information from the field and to enforce systematic recording of failures, non-compliances and work done. bluebee® also integrates with IoT and control systems.

bluebee® mobile and tablet

Coswin 8i is a Computerized Maintenance Management System and Enterprise Asset Management solution designed to help companies increase their profitability while ensuring regulatory compliance.

Coswin

Find more about Siveco's Maintenance 4.0 solutions at www.sivecochina.com/en/products

Recommendations

What do “best in class” companies do?

Our analysis team could not identify simple correlations between one single factor (CMMS, strategy, etc.) and good performance (high positive response rates related to production impact and spare parts management).

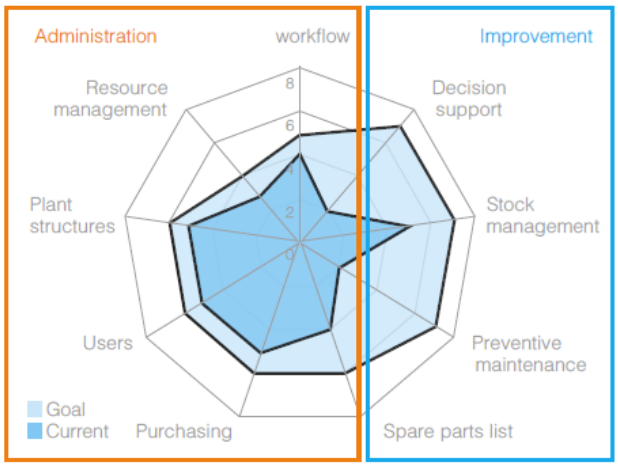
However, companies with the best performance:

- **Have a maintenance strategy**
- **See maintenance as risk prevention**
- **Have a CMMS**
- **Hold regular meetings…**
- **… during which historical records are analyzed**

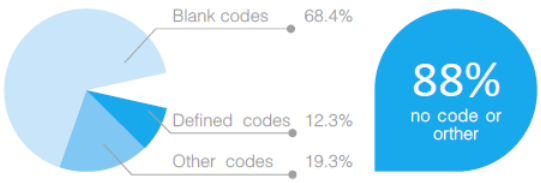
Factors in closing the “feedback loop”

Responses from “best in class” companies show that having a CMMS is a key factor. Indeed, for large companies such as our respondents, the amount and complexity of historical data are such that manual processing is not possible. The CMMS also helps manage the entire project.

However, responses also show that the CMMS alone is not enough. Based on Siveco’s experience, key steps are often missing: implementation not aligned with strategy, no standardization of codes, no actionable KPIs, no coaching of the team, no taking of “Chinese characteristics” into account.



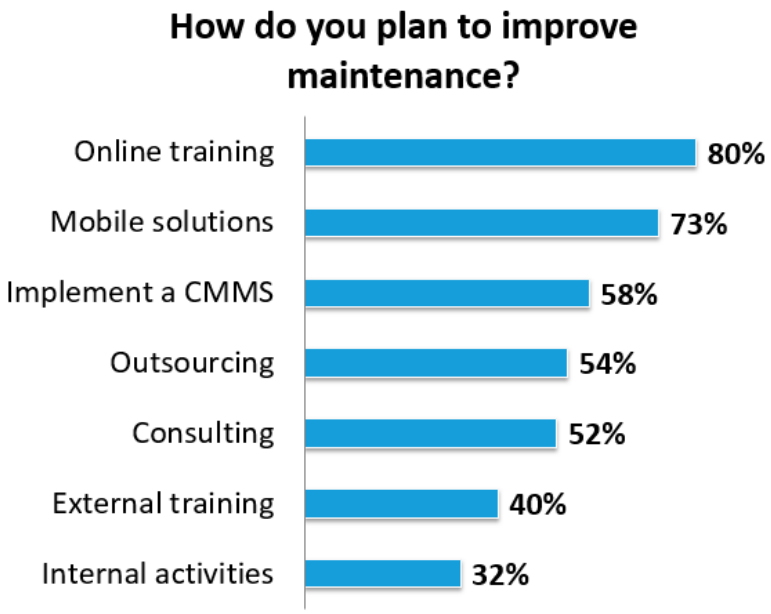
IT focus i.e. focus on what IT people know (typical “EAM”)



Study of Maximo data over a 3 year period

Other studies show that CMMS projects in China tend to be driven by IT, with no positive impact on business.

The CMMS project can then be used as a "catalyst" to incorporate all activities:



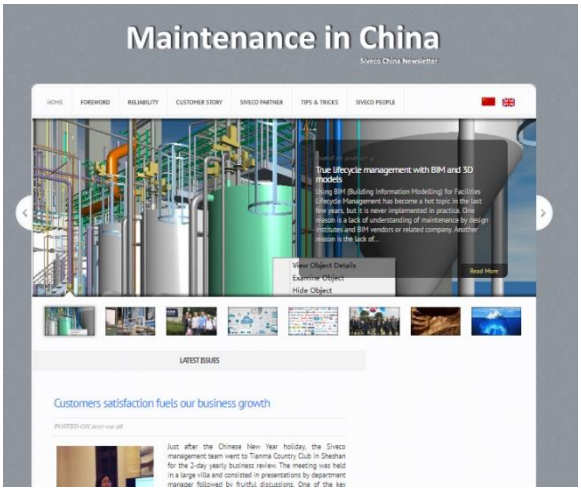
For such a project, ISO 55002:2014 (or GB/T 33174-2016), Section 6.2.2.1 offers useful advice:

There can be benefits in developing the first asset management plan(s) as an interim plan as quickly as possible, using existing information. It helps the organization to understand the strengths and weaknesses of current asset management practices and to identify priorities for the development of future plan(s). It can also help avoid embarking on ambitious data collection exercises before needs are fully understood.

Acknowledgments

The joint UTSEUS & Siveco China survey team would like to thank all respondents. We also thank the French Chamber of Commerce and Industry in China (CCIFC) and all associations that have kindly helped distribute the questionnaire.

Read our bilingual ***Maintenance in China*** newsletter
newsletter.sivecochina.com



Welcome to Maintenance 4.0

Based on a long experience of “maintenance with Chinese characteristics”, Siveco has developed a unique approach combining maintenance consulting and software tools. While the Chinese market has historically been plagued by IT suppliers without understanding of industrial reality, Siveco is run by maintenance people for maintenance people, focusing on obtaining rapid and sustainable improvement.

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