

WHY CALIBRATE IN RENEWABLE ENERGY?

AUTHORED: TOM SMITH, CEO | ALLTITE



BACKGROUND

Wind turbine structural and electronic failure can lead to loss of uptime, and, in extreme conditions, catastrophic collapse. Reliability is therefore critical to the assembly equipment utilized. With the energy demands of industrial electronic systems increasing, OEMs and suppliers are faced with the challenge of providing data that supports system and instrument reliability.

A calibration program is defined as a standard practice calibration performed at repeatable intervals with the data and certifications kept for a stated period of time. ALLTITE typically sees companies calibrate on an annual and semi-annual interval and retain their records for 10 years.

Pressure, torque and electrical instruments properly calibrated are associated with an ISO-17025 quality management program.

OBJECTIVE

Deliver an evidence-based study for the justification of ISO-17025 calibration program specific to renewable industries.

METHODS

Analytics pulled from internal calibration software of instruments most often used in the top failure applications (gearbox, blades, hub, see Figure 1). Included:

- 104,184 calibrations, over 3 years (2016-2018)
- Included Torque tools, Pressure gauges and Electronic equipment
- Mapped data points to detect trends based on “as found” instrument tolerances
- Analyzed companies following an ISO-17025 Calibration program

RESULTS

A calibration program is justified based on the percentage of tools rejected as unsafe, instruments found out of tolerance (OOT or out of calibration) and the likelihood of a catastrophic incident due to tools that were out of calibration. Total number of tooling out of the 104,184 that was found OOT was 5.47% (Figure 2). However, the total number tools that were rejected as unsafe that could lead to catastrophic failure was 2% (Figure 3). ALLTITE specifically analyzed companies that utilized the ISO 17025 compliant calibration program

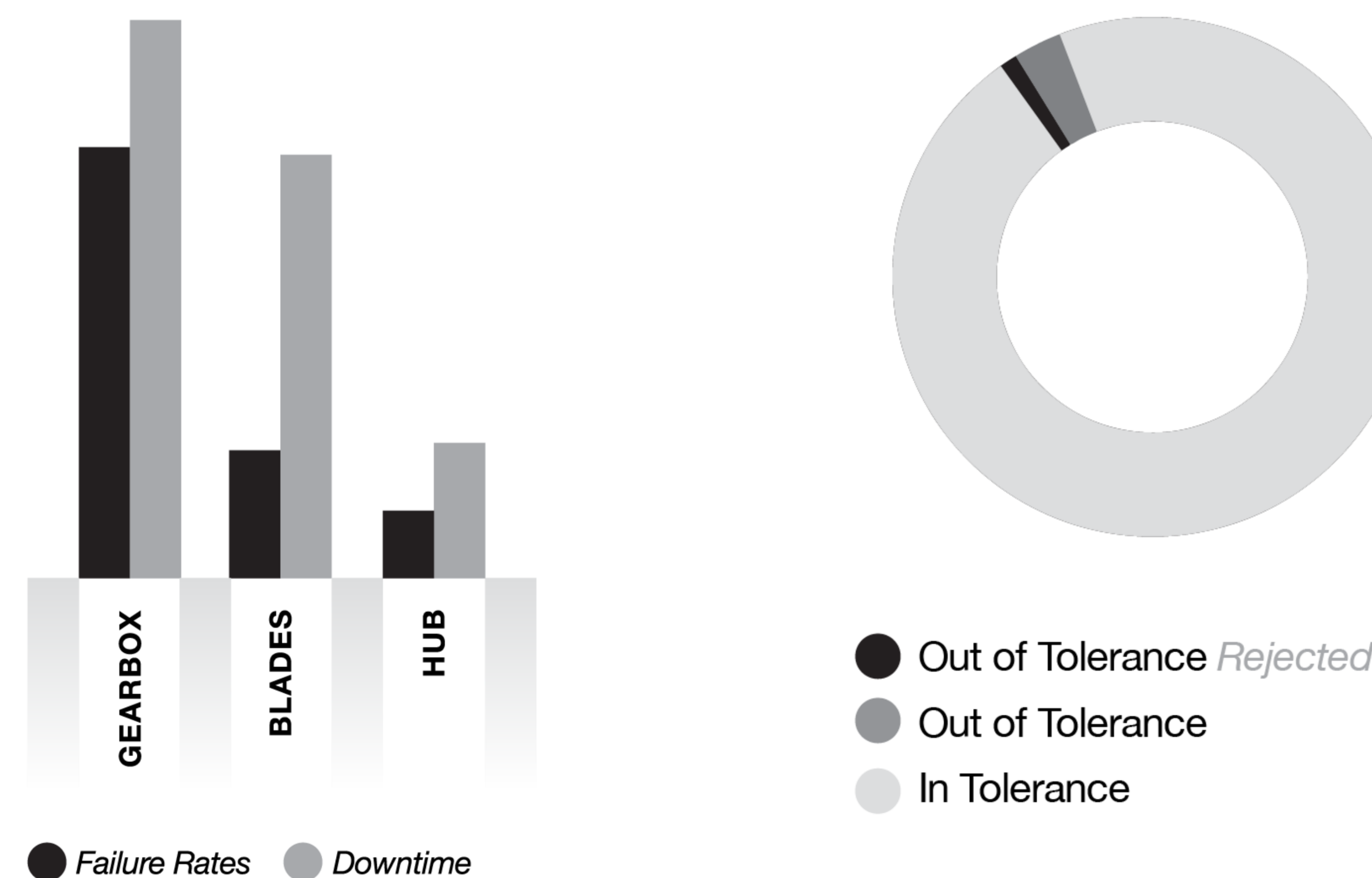


FIGURE 1:

Of the top 41 classifications for wind tower failure rates and downtimes, gearbox downtime ranked highest at 19.1%, according to the study published by IOP Science. Blades and Hubs were among the top 5. Alltite used tooling specific to these most critical areas for study.

FIGURE 2:

Represents a 3 year calibration study for 104,184 calibrations; 5.47% were found OOT, or 5,702 tools or 4,100 torque tools, 849 pressure gauges and 753 electronic measurement tools. 2% were rejected as unsafe (between -83% to +154% tolerance)

over three years. Running a calibration program on consistent time intervals provides an increase in quality year over year. Figure 4 demonstrates the percentage of tooling found OOT year over year dropped by 38% from 2016 to 2018. This drop is due to program consistency and failing tools that are unsafe in previous years. This justifies a regular program by reducing the risk of a large outlier year over year.

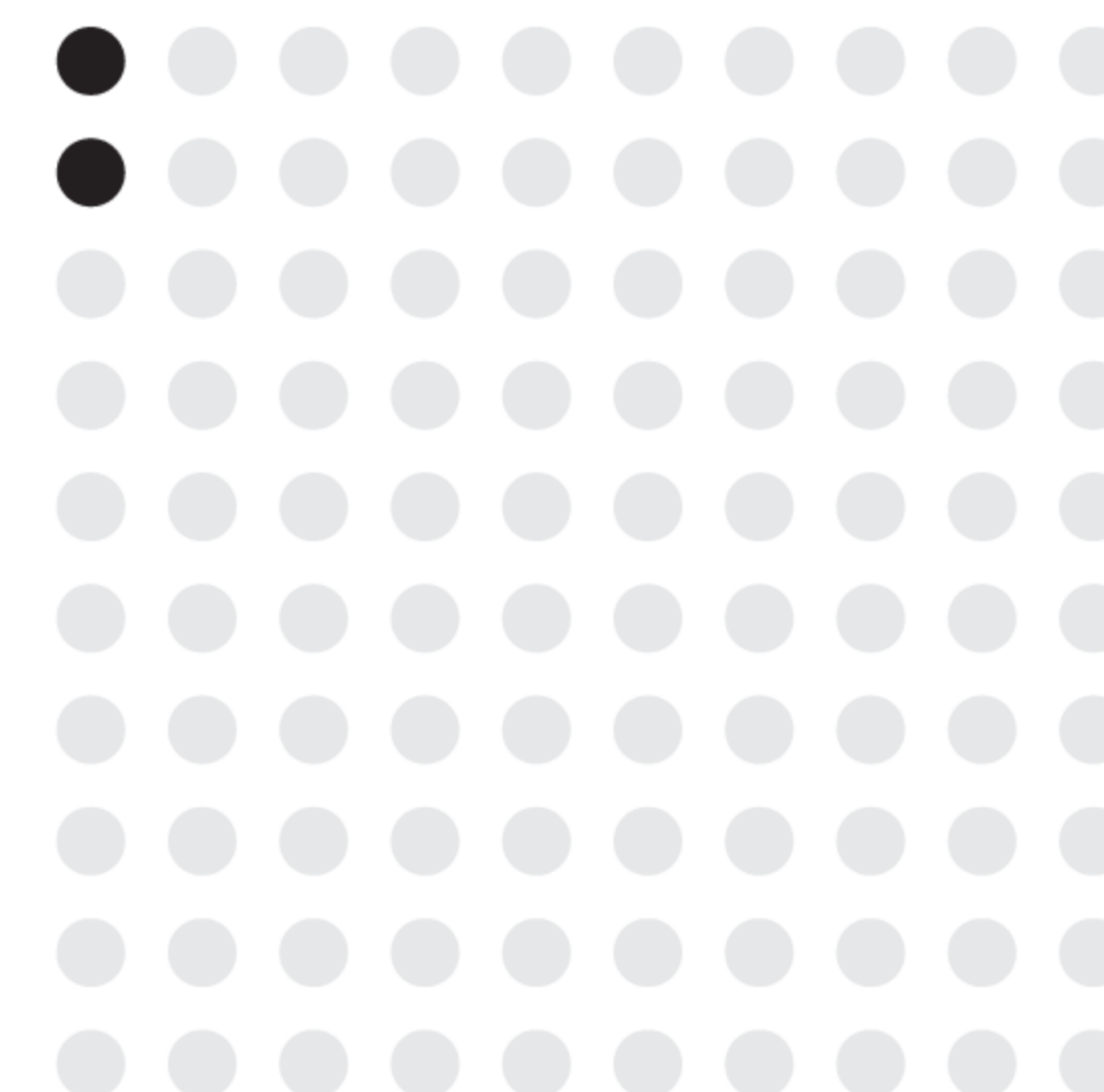


FIGURE 3:

Figure demonstrates the tooling found as unsafe as part of a 3 year study. Total was 2% of all instruments or 2,083, were far outside the tolerance levels. Unsafe manual wrenches were discovered to range from 83%-154% tolerance.

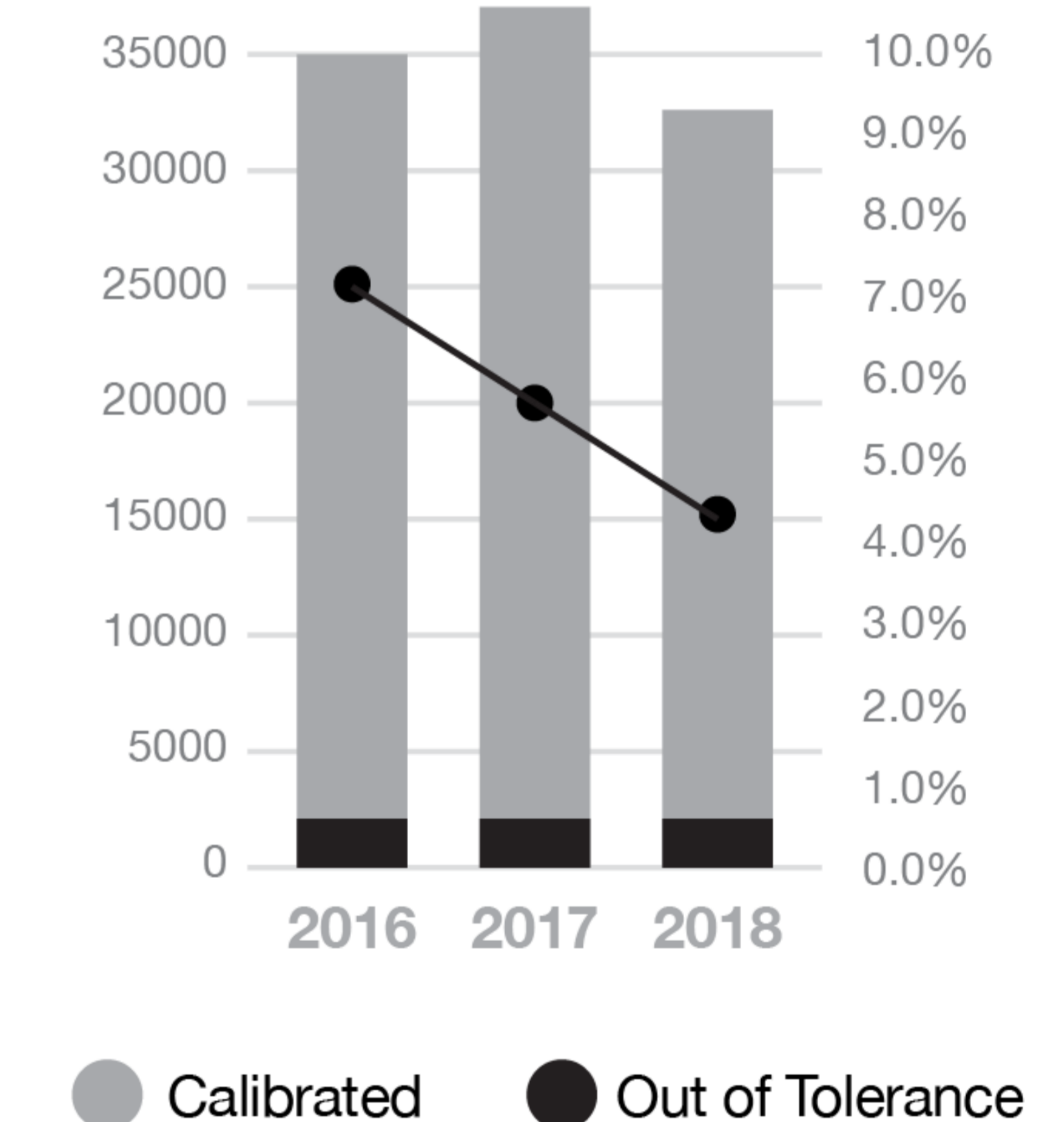


FIGURE 4:

Based on 3 years of ALLTITE Calibration data, the percentage of MTE found OOT year over year dropped by 38% from 2016 to 2018 when using an ISO compliant calibration company.

CONCLUSIONS

It was discovered that a calibration program is justified based on the percentage of tools rejected as unsafe, instruments found out of tolerance and the likelihood of a catastrophic incident due to tools that were out of calibration.

REFERENCES

Reder, M D.; Gonzalez, E., and Mele, JJ. (2016, September 1). Wind Turbine Failures - Tackling current Problems in Failure Data Analysis. Retrieved from <https://iopscience.iop.org/article/10.1088/1742-6596/753/7/072027>

ISO/IEC 17025
<https://www.iso.org/ISO-IEC-17025-testing-and-calibration-laboratories.html>

CONTACT

TOM SMITH | [linkedin.com/in/alltite](https://www.linkedin.com/in/alltite)

ALLTITE | 800.498.6721