



# AVOIDING EQUIPMENT FAILURE WITH ENGINEERING DATA ANALYTICS AND AI

Between December 2017 and January 2018, the Creek Fire destroyed at least 60 homes and forced the evacuation of more than 100,000 people from the Sylmar-Santa Clarita area neighboring Los Angeles. In October 2018, the victims of the fire decided to sue the Los Angeles Department of Water and Power (DWP) claiming its failure to maintain the equipment was responsible for starting the blaze. This case is starkly similar to the Thomas Fire of December 2017 where victims won a lawsuit against Southern California Edison that burned more than 280,000 acres in Ventura and Santa Barbara counties due to an equipment failure.

As machines age, the likelihood of such incidents becoming more frequent increases. The need of the hour is to **make machines smarter** with the use of Artificial Intelligence (AI) to help reduce cases like the above, if not eliminate them completely. Organizations vehemently pursuing the vision of **Industry 4.0** must step up their investment and focus on making existing machines smarter. This will not only make machines and operations efficient, reduce risk, and improve overall safety, but also help organizations to collect **real-time data to predict and prevent incidents**.

However, organizations aren't prepared to fully utilize this real-time data to bring in additional efficiencies or even better, improve end user experience. A recent study by Greyhound Research, a leading global analyst firm, found that while 93% of organizations currently capture machine data, only 62% can use this data to improve engineering asset efficiency in terms of operational, maintenance, and energy efficiency. Alarmingly, a majority (82%) struggle to translate machine data into improved end user experiences. This holds true especially for verticals like aerospace, automotive, heavy engineering, manufacturing, and energy, which demand high accuracy for decision-making.

The same study by Greyhound Research highlights the severity of these challenges in the utilities sector, including energy. One of the key things that the respondents in the study call out is how engineering data analytics combined with AI can potentially help overcome complex challenges like non-dimensionalization, which requires combining a group of variables instead of looking at individual variables.

## A CRITICAL EQUIPMENT BREAKDOWN

Using our Engineering Data Analytics service and AI, along with our strong product engineering experience, Infosys is helping clients achieve:

- 20-25% higher operational efficiency
- 20-40% extension in equipment lifetime with 5-10% lower business expenditure
- 30- 40% increase in service margin
- 25% drop in energy consumption

An **oilfield services company**, an Infosys client, was battling unforeseen **failure of mechanical equipment** used to produce a critical component, resulting in high costs on account of **high downtime** and **loss of production**. The client used a rotating machine to mix proponent with water to make a slurry-like matter used to produce shale gas. This rotating machine runs continuously for days together, leading to several issues with the moving parts and frequent breakdowns. The need to find a solution to predict failure of the equipment was dire since it was a critical component for oil and gas exploration.

# PREDICTING FAILURE

Infosys' engineering data analytics solution coupled with strong turbo-machinery domain experience helped the client predict behavior of these machines and forecast outage. We **analyzed the sensor data** of the rotating equipment. The following process of collecting, extracting, and cleaning the data was used to ensure outcomes from the engagement:

Step 1: **Extract the required data** and segregate it into data 'before' and 'after' the failure of the equipment

Step 2: **Cleanse data and divide into clusters** to identify trends occurring in each cluster

Step 3: **Use analytics to predict** the next breakdown and plan for maintenance accordingly bringing together the best of analytics and physics

Utilizing advanced analytics techniques like machine learning and AI, the Infosys team built a **prediction model** that enabled prediction of breakdowns a week ahead. This allowed the client to prepare for the maintenance in advance and bring the machine back online faster. This also helped to **improve the accuracy of the predictions** over a period.

The Infosys approach **matched predictions with actual field failures in more than 90% of the cases**. This helped the client achieve **cost savings** through implementation of the model and condition-based maintenance practices. We were also able to **bring down the equipment's unplanned downtime** through real-time monitoring of the rotating equipment.



# AVOIDING EQUIPMENT FAILURE WITH ENGINEERING DATA ANALYTICS AND AI: THE FIVE TAKEAWAYS

- 1 **Strategize** to capture new forms of data and use historical data
- 2 **Organize** and clean the data in a format that is usable by the business
- 3 **Define** metrics that have a direct business impact
- 4 **Leverage** Engineering Data Analytics and AI to improve operational efficiency
- 5 **Use** machine learning for predictive maintenance by drawing patterns and improving predictive accuracy in the long term

# BIG LEARNING:

Reliability and predictability are critical for asset intensive industries like energy and utilities. A downtime in these industries can lead to losses worth millions of dollars and worse still, loss of life and property. Hence, using engineering data analytics to better plan, predict, and maintain equipment is a necessity. The use of AI and ML along with physics, helps learn from the data more rapidly. Automating basic tasks of maintenance and scheduling is also highly recommended. A pressing need is to overcome existing challenges and mindsets to find newer ways to collect and utilize data in a way that allows organizations to understand the impact on a real-time basis and work towards delivering reliable and predictable services to their end users.

## WE DID THIS FOR THEM. WE CAN DO IT FOR YOU.

To learn more about our engineering data analytics offerings, reach out to us at [askus@infosys.com](mailto:askus@infosys.com)

For more information, contact [askus@infosys.com](mailto:askus@infosys.com)

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