



Forward

with Castrol Intelligent Lubrication Solutions

Discover how Castrol's advanced lubricants, smart technologies and proven expertise interconnect to help accelerate your success.



Contents overview

Introduction

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A brief introduction to the Castrol brand, our history, our strategies, the sectors we serve, and how we deliver value to your business.

Intelligent Lubrication Solutions

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Advanced lubricants

Fighting friction, corrosion and wear as the application demands, to optimise performance and efficiency, while helping extend asset and tool life.



Smart technologies

By automating the collection of data, we can offer actionable insights that aid decision-making linked to lubrication maintenance. Helping cut downtime, boost productivity and unlock value.



Expert services

Sharing knowledge through expert technical advice, training and dedicated onsite support to help your operations run smoothly and efficiently.

Offers and case studies

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Success stories from Castrol customers around the world, that demonstrate the real value we deliver to customers like you.

Sustainability goals

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How Castrol is doing more and using less, and how we can help you achieve your sustainability goals.

The primary cause of friction and mechanical wear is **poor lubrication**.

Improper lubrication can lead to...

43%

of mechanical failures



50%

of bearing damage



54%

of bearing failures



70%

of equipment failures



Industrial internet of things (IIoT)

Industrial IoT is an ecosystem of devices, sensors, applications, and associated networking equipment that work together to collect, monitor, and analyse data from industrial operations.

The benefits of IIoT solutions and can range from:

- Solving issues sooner and cheaper
- Help enhances maintenance capabilities
- Increase efficiencies, reduce costs, and improve safety and security

Traditional industrial systems require a team of workers to track and record data, while 'smart machines' are capable of doing this autonomously.

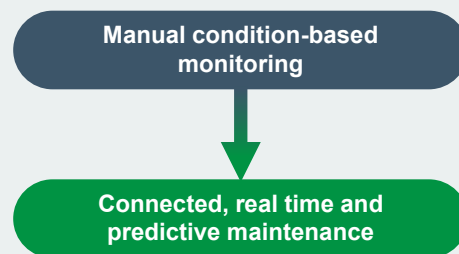
This level of automation not only allows employees to focus on business goals but also reduces human error.



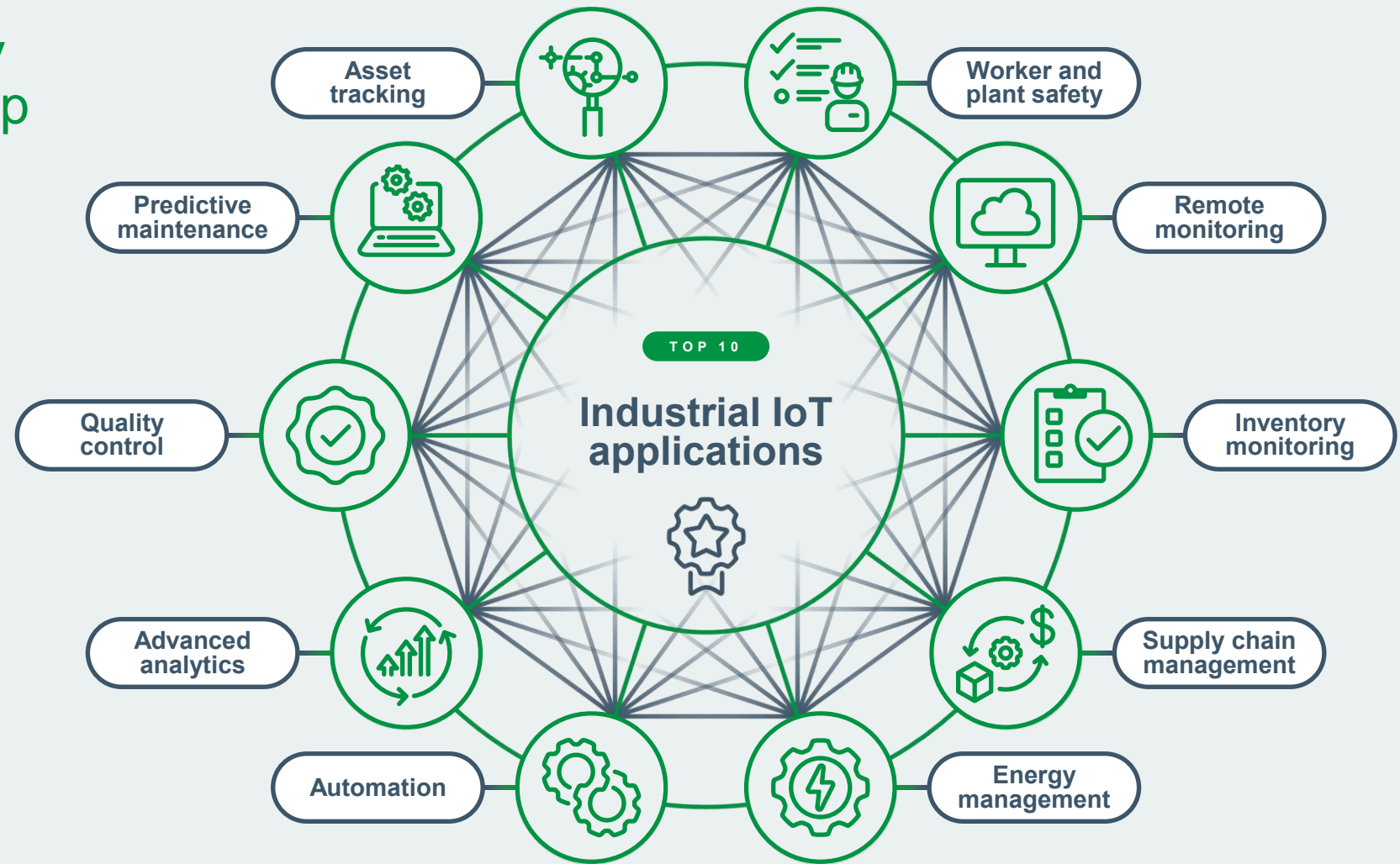
IIoT presents many opportunities to help improve lubrication management

In fact, the IIoT for asset monitoring is expected to produce \$200-\$500 billion in economic value by 2025.

The transformation required:



Transformation requires collaboration and trust, both synonymous with the Castrol brand.



Frequent readings of oil can change detection from months to minutes

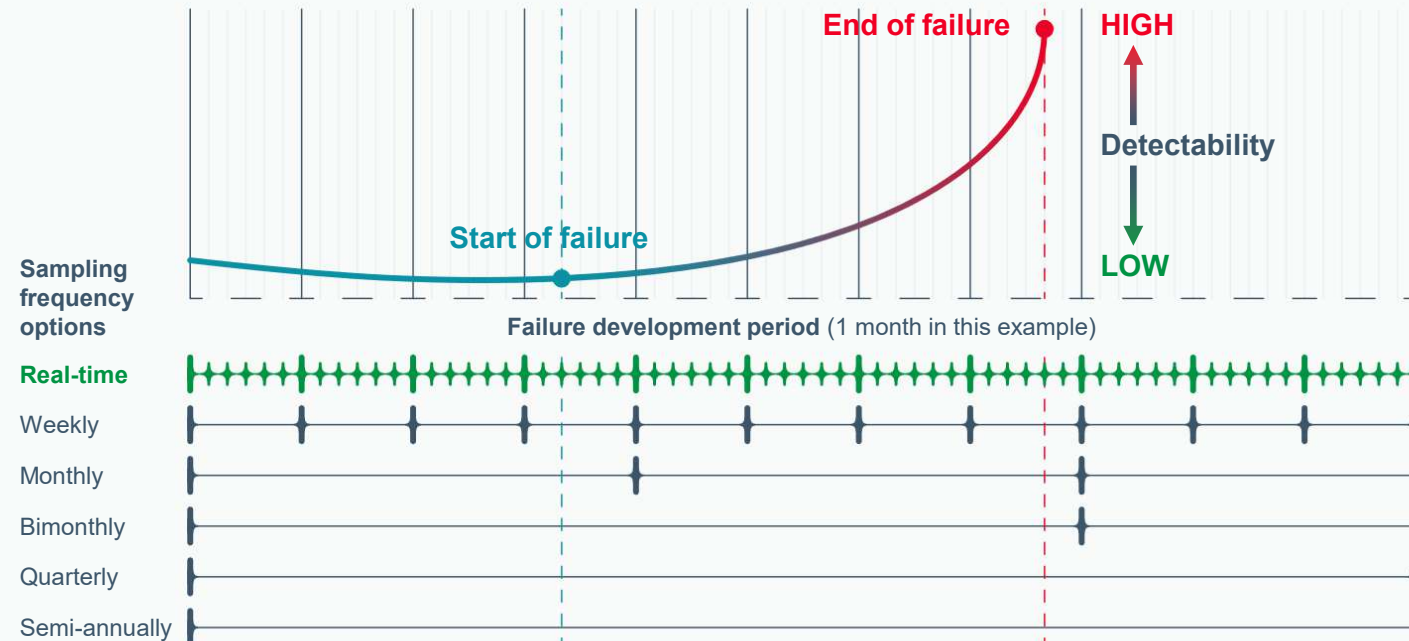
Traditionally oil sampling is manual and takes time, making data relating to the oil in equipment infrequent.

Chances of catching early faults or damage in equipment are slow and remote. It creates longer failure development periods (FDP). It's during this time that operational costs could rise due to equipment downtime, maintenance, and an increase in resources such as water, lubricant etc.

Smart technologies, can help:

- Speed up detection
- Reduce the FDP
- Allow operators to make timely interventions
- Reduce overall operating costs

Real-time readings via Smart technologies can reduce the FDP even further



Helping your Industrial business to achieve your goals:

Increase productivity
Create new efficiencies
Make smarter, more confident decisions
Extend equipment & tool life
Improve health and safety
Improve inventory management
Achieve your circularity goals



Lower total cost of operations
Minimise lubricant consumption
Cut rejected components
Eliminate inefficiencies
Reduce manual processes
Reduce waste and water use
Reduce unplanned maintenance costs

The goals of an industrial customer, varies according to their role...

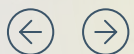


NEW



Castrol Intelligent Lubrication Solutions

Available for trial today



Move forward with Castrol Intelligent Lubrication Solutions

Whenever you have a challenge or a goal, we are here to help accelerate your success through our advanced lubricants, smart technologies and proven expert services.



Advanced lubricants

Fighting friction, corrosion and wear as the application demands, to optimize performance and efficiency, while helping extend asset and tool life

Smart technologies

By automating the collection of data, we can offer actionable insights that aid decision-making linked to lubrication maintenance. Helping cut downtime, boost productivity and unlock value



Expert services

Sharing knowledge through expert technical advice, training and dedicated onsite support to help your operations run smoothly, safely and efficiently



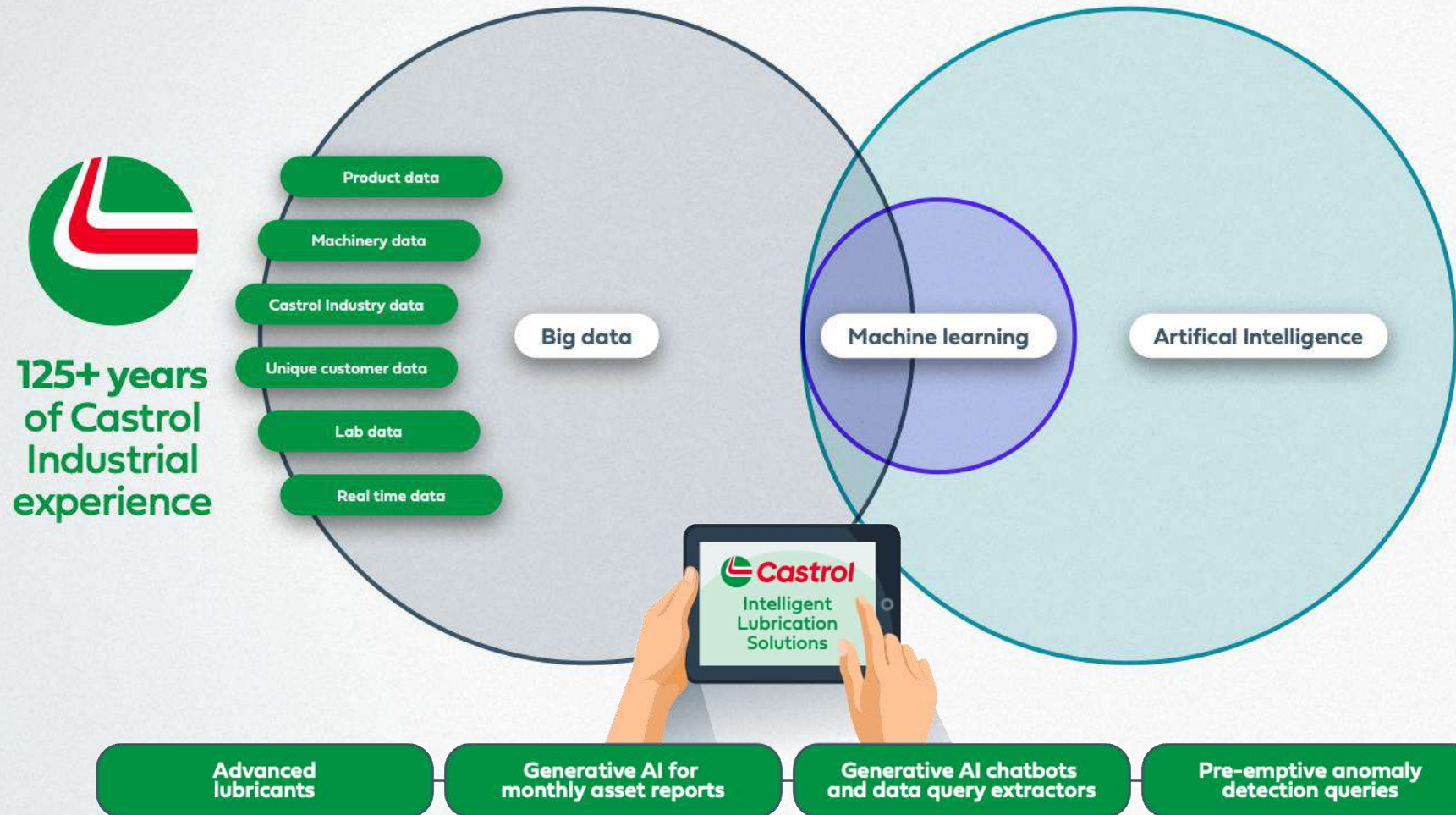
Offers and case studies

- Castrol SmartMonitor platform
- Castrol SmartControl EXO
- Castrol Virtual Engineer
- Digital Security

These pages will evolve as we progress through the ODIMs process to expand our Castrol Intelligent Solutions portfolio and experience.



What big data offers Castrol Industrial customers





Bespoke, data driven insights

Our new platform, Castrol SmartMonitor, brings digital transformation to used oil analysis.

When connected to a sensor, SmartMonitor, provides near real time access to key parameters of your oil. SmartMonitor sends immediate alerts if an issue is detected, reducing the failure development periods (FDP) typical with traditional oil monitoring protocols.

Castrol Intelligent solutions, such as SmartMonitor and SmartOil, bring software, hardware and analytics together to help:

- Reduce operating costs by maximising fluid use
- Minimise waste
- Extending tool life



125 years of lubrication experience has been built into this platform

Key features

- SmartMonitor is hardware agnostic
- Provides access to data anywhere at any time
- View results within 15 minutes of readings being taken
- Intelligent lubricant limits are set by our team of Castrol experts and built into our platform's logic
- Sends alerts via SMS and email as your fluids fall outside your pre-determined limits
- Compare performance across assets via integrated dashboards
- Access can be provisioned at different levels across your organisation



Neat Oil condition monitoring hardware

Castrol SmartOil is a sensor solution designed to measure standard parameters of a neat oil.

Castrol Intelligent Lubrication Solutions, such as SmartMonitor and SmartOil, bring software, hardware and analytics together to help:

- Reduce operating costs by maximising fluid use.
- Minimise waste.
- Extend tool life.



Key features

- Uses advanced technologies such as mid-infrared spectroscopy to deliver high-quality data across a variety of parameters
- Configured with either a pump or a valve to support a wide variety of applications
- Built in a modular manner to support integration with additional sensors depending upon the application & requirement

Measures

Standard Parameters of a neat oil/hydraulic oil/gear oil/circulating oil/engine oil:

- Oil Temperature
- Oxidation
- Total acid number (TAN)
- Water content
- Viscosity

Optional Extras:

(incur additional cost)

- Wear Debris
Ferrous / Ferrous & Non-Ferrous





Measurable parameters

PARAMETER	UNIT	INFERENCE OF THE PARAMETER
Relative humidity percentage	%	The relative humidity percentage indicates the concentration of water dissolved in the oil. Depending on the temperature, the oil cannot "carry" any more water if the concentration is above 100% relative humidity or if the water saturation point is reached. At a relative humidity of over 100 %, abrasive wear can occur at moving friction points. Where water is deposited instead of oil, the extremities of the surfaces are no longer lubricated. Water can cause massive corrosion and rust formation.
Temperature	°C	Sensor temperature
Oil temperature	°C	Temperature measured by wear debris sensor
Viscosity	cP	The change in viscosity enables conclusions to be drawn on mixture with other oils, impurities such as soot, VI improver shear or oil thickening due to factors such as oxidation.
Oxidation	abs/cm	Oils oxidize under the influence of heat and oxygen. Acids and oil-insoluble components are formed. These in turn are often the cause of varnish-like resin formation or sludge-like deposits.
OccupancyRateChunk	%	The OccupancyRateChunk is used to detect all magnetisable wear particles, especially with a bigger size. Rust is barely magnetisable so produces a low OccupancyRateChunk. A high OccupancyRateChunk indicates acute wear e.g. scuffing.
OccupancyRateFine	%	The OccupancyRateFine is used to detect all magnetisable wear particles, especially with a lower size. Rust is barely magnetisable so produces a low OccupancyRateFine. A high OccupancyRateFine indicates acute wear e.g. scuffing.
OccupancyRateSum	%	A sum parameter of OccupancyRateFine and QccupancyRateChunk.
TAN / TBN & ipH	mgKOH/g	By comparison with the fresh oil values, the TAN allows conclusions to be drawn regarding the oxidation of the oil and the breakdown of oil additives. It provides essential supplementary information for the extension of oil change intervals.
Water	ppm	The water content in a lubricant should not exceed certain permissible values, depending on oil type and use. Too much water in the oil can cause problems such as corrosion, cavitation or oil oxidation.



The next best thing to a Castrol expert on site

Wherever you're based in the world, whatever your industry*, when you have a challenge or simply need some technical advice, our Castrol experts want to help.

Through Castrol Virtual Engineer, we can now virtually visit your site, from anywhere in the world, without the travel.

Key benefits include:

- Rapid access to our experts
- Multi-device computability
- Hands free operations
- Safe, secure and compliant
- Flexible connectivity



We can see what you want us to see, Virtual Engineer allows us to effortlessly interact with you, even allowing us to make notations on screen or pointing out things we may need to take a closer look at. All with no travel.

Key features

- Accessed on mobiles, tablets, laptops or desktop PCs, or on our Castrol mobile app (developed for Apple and Android)
- Confidential data is protected. Any information shared is stored on an encrypted, cloud-based server
- Complies with the EU General Data Protection Regulation (GDPR)
- Annotations, sharing documents, sharing video, recordings and adding more members to the session



*Where service is offered by Castrol and subject to connectivity and compatibility of your device.

Digital security

- 1 Certificate authentication**
We employ X.509 certificates to authenticate devices, ensuring that only trusted devices can communicate with our network, providing a secure and reliable connection for our customers
- 2 Data encryption**
Our commitment to data security includes robust encryption standards. We encrypt data at rest using bp encryption standards and in transit with TLS 1.2, ensuring that customer data is protected at all times
- 3 IAM rules for authentication**
Access to our systems is governed by strict IAM rules, which define who can access what within our environment. This ensures that only authorised personnel have access to sensitive areas, maintaining the integrity and security of customer data
- 4 Regular vulnerability checks**
We conduct continuous vulnerability scanning to identify and address potential security threats. This proactive approach ensures that we are always one step ahead in protecting our customers' data from emerging cyber threats



Customer success story

Steel Manufacturer

Situation

- There was a history of water leakage into a 2000-gallon (approx. 9,000l) finishing mill gearbox central system
- Steel manufacturer challenged Castrol to mitigate the risks of water ingress to the system.

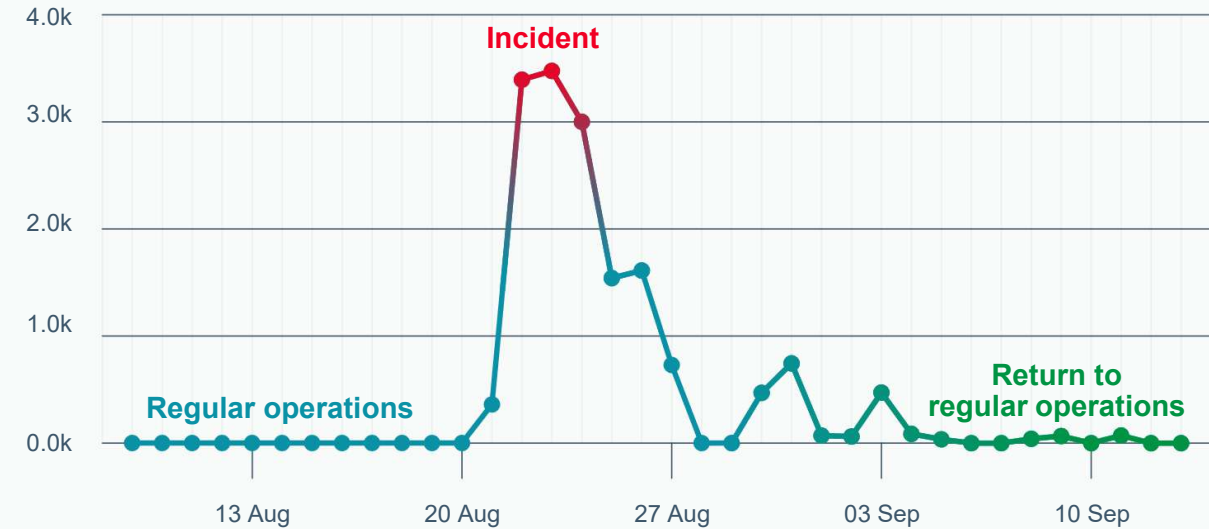
Castrol Intelligent Solution

- Castrol recommended installing Castrol SmartOil neat oil sensors, with readings being visible in the Castrol SmartMonitor platform
- This solution would help monitor water levels in Castrol Alpha CLP 220 (gear oil) in near real time and provide timely alerts.

Outcome

- SmartMonitor platform sent an immediate alert to the Steel Manufacturer of a rapid increase in water content from 0% to 0.3% in just a few hours
- Steel manufacturer identified that a burst hose has caused the water increase and removed the excess water. The detected problem was solved within half a day, with water readings declining in SmartMonitor.

Water (ppm)



Castrol's Intelligent Lubrication Solutions helped prevent potentially critical damage to operations

preventing a potential cost of \$104,200

Customer success story

Paper production factory

Situation

- Water in the oil can lead to significant machine damage, increase maintenance costs, and cause unexpected production downtimes
- A paper production company was facing extreme problems with bearing failures, and they didn't know why
- Castrol were asked to help find a solution to detect water in the oil early and take action before larger issues arose.

Castrol Intelligent Solution

- Castrol recommended installing Castrol SmartOil, a neat oil sensor, and Castrol SmartMonitor platform to access real time data and alerts to any changes in the water levels
- If the water levels of the oil in the bearings increased, an automated alert will get sent to the paper production team, allowing them to make timely interventions to avoid bearing failures.

Outcome

Thanks to the Castrol recommended solution:

- the risk of costly machine damage and production downtime has been significantly reduced
- The customer can now respond instantly to increased water levels in the oil and plan maintenance proactively. This not only saves time and costs but also increases the overall reliability of production.



The risk of costly machine damage
and production downtime has been
significantly reduced

Customer success story

Dredger

Situation

- Castrol SmartOil was installed on a vessel's main engines
- Our customer and TSE received an alert of a water event on the port main engine.

Castrol Intelligent Solution

- The reading was investigated with an onboard test kit, which measured 0.05% water
- The engine was shut down following further investigation and confirmation of water ingress.

Outcome

- Onboard crew discovered that a faulty cooler had caused the issue
- The customer spent £12,600 on repair and parts to replace the cooler
- Castrol SmartMonitor's early detection and proactive alert prevented an estimated £150,000 of damage to the engine.



Customer success story

Maritime Dredger

Castrol Intelligent Solution

- Castrol SmartOil sensors were installed on a vessel's Port Main Engine
- Both Castrol and the dredger company received a RH (Relative Humidity) warning alert from the Castrol SmartMonitor portal
- An onboard water test revealed 0.02% water.

Outcome

- The Chief Engineer confirmed an issue with the Port Main Engine
- Upon investigation, a leak was discovered in one of the cylinder heads. The potential impact could have been more significant, with water entering the sump before signs were visible, potentially causing issues with the bearings while the engine was still running
- Early detection prevented a possible catastrophic failure of the Main Engine bearings, which could have cost over £150k
- The cost for early intervention was £30k, with four people taking two days to rectify the issue
- Since the vessel had already planned downtime, there was no additional loss of earnings during the two days the vessel was out of operation.



The next best thing to a site visit

How Castrol Virtual Engineer helped a major Auto Manufacturer

Situation

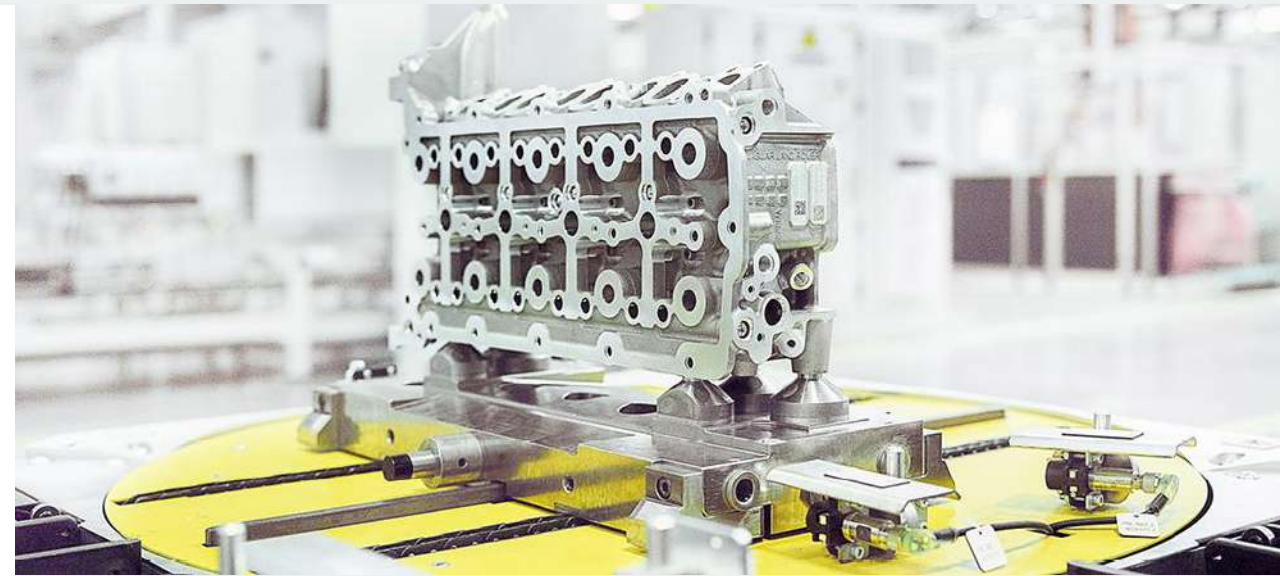
A major automotive manufacturer faced some challenges with new equipment they were trialling.

Solution

The engineering teams joined a Castrol Virtual call within minutes of contacting Castrol, including the equipment manufacturer. The on-site engineer used Virtual Engineer to show those on the call the equipment and exactly what was happening.

Outcome

Through being able to view the equipment and issues on screen, Castrol were able to guide the customer through a series of checks and recommendations. The equipment was operational within an hour.



Savings

- Rapid solution with real time instruction, no travel delays
- Operational disruption kept to an absolute minimum
- Multi-team collaboration

Customer success story

Steel Plant

Situation

- An 'Annual gear inspection' typically requires 4 people in-plant, requiring travel to site, safety clearance and approvals from specific unit.

Castrol Intelligent Solution

- Castrol Virtual Engineer was recommended to help ensure a safe, efficient and productive annual gear inspection
- Through the ability to connect virtually, two teams were brought together to conduct the inspection, three people were at the plant, with two virtual engineers connecting remotely
- A safety harness was used to ensure hands free operations including online annotations.

Outcome

- The inspection was carried out safely with no plant or travel risks
- Timely delivery of the inspection report, as it was produced during the time period typically spent travelling
- A thorough inspection was carried out through the ability to have more subject matter experts join at a timely point,



Faster service support
delivered for the steel plant



Sustainability goals

CONTENT COMING SOON



Castrol Intelligent Lubrication Solutions can help you achieve your sustainability goals

Our Castrol Intelligent Lubrication Solutions and deep expertise will enable us to ensure our advanced products are in the best condition for the task they are scheduled to do.

Through our expert services and smart technologies – such as real-time monitoring and fluid analysis data – we can help customers make informed decisions about the optimum time to top-up, filter, recycle, re-refine or replace the oil, grease or fluid.

While this is vital for performance of a customer's assets, and for cost efficiency of a site – it's also the responsible way to use lubricants, as they are a valuable resource.



Cassandra Higham
Castrol Global Industrial,
Marine and Energy Marketing Director

TALK TO YOUR LOCAL CASTROL REPRESENTATIVE



Let's move
forward
together

Next steps?

Talk to your local
Castrol representative
castrol.com/industrial

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Published January 2025. Results can vary depending upon the type of equipment used, its maintenance, operating conditions, and any prior lubricant used. © 2025 The Castrol name and logo are registered trademarks of Castrol Limited. Subject to availability in region.

Press release

Castrol introduces intelligent lubrication solutions to transform industrial lubrication management

Pangbourne, UK, 19 June 2025 – Castrol, a global leader in lubricants, has introduced 'Castrol Intelligent Lubrication Solutions' to help industrial customers prevent costly downtime, optimise lubricant consumption and extend asset life through predictive maintenance intelligence.

This strategic evolution builds on Castrol's commitment to helping industrial customers and the machines they rely on perform better and improve operational efficiency. The offering combines Castrol's advanced lubricants and expert services with smart technologies, transforming lubrication management into an intelligent system that anticipates issues before they occur.

"Industrial customers need to maximise productivity and optimise costs while navigating challenges such as labour shortages and increasing digitisation," said **Cassandra Higham, Industrial Director, Castrol**. "Our solutions provide near real-time monitoring and actionable insights that transform reactive maintenance into predictive maintenance."

Castrol's initial focus area is providing predictive analysis by leveraging sensor-based technology and IoT platforms for neat oil applications. These capabilities have delivered compelling results in steel and automotive manufacturing and other industrial settings, with the company's innovation roadmap including expanded offerings for metalworking fluids and additional predictive analytics capabilities.

Press release cont.

The real-world impact has been significant. A US steel manufacturer achieved ROI in just 1.5 months, saving USD 104,200 by detecting water ingress early and preventing potential catastrophic equipment failure. Another customer avoided three complete oil changes in a year, substantially reducing waste and maintenance costs.

"The value comes from translating operational data into actionable intelligence," adds Higham. "Combining Castrol's advanced monitoring technology with over 125 years of lubrication expertise delivers context-aware insights that help customers make better maintenance decisions."

This introduction of intelligent lubrication solutions marks Castrol's broader shift toward comprehensive digital solutions. The company is exploring additional innovation areas including oil reconditioning services – building on its [collaboration with SKF RecondOil](#) for advanced filtration technologies and optimising on-site lubrication management.

Proven in industries such as manufacturing, automotive, steel and metals industries, Castrol offers a flexible value assessment approach allowing customers to demonstrate value with minimal disruption.

Castrol will showcase its intelligent lubrication strategies at upcoming European trade shows, where industry professionals can learn more about additional innovations in this evolving field.

ENDS