Teaching your equipment to talk and learn:
Custom sensor development for

IIoT and Machine Learning

STRESS ENGINEERING
SERVICES INC.
IoT APPLICATIONS
LABORATORY™

YOUR DATA IS THE HEART AND SOUL OF THE INDUSTRIAL INTERNET OF THINGS (IIoT) AND MACHINE LEARNING (ML).
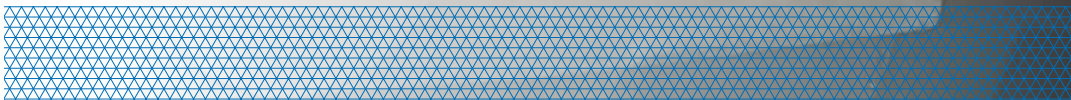
But virtually no manufacturing systems are ready to leverage this transformative technology. Most all manufacturers have significant stockpiles of data available to them from their traditional plant **MRP** and **SCADA** systems. However, **IIoT** and machine learning initiatives contemplate data and data analytics and systems with much greater fidelity than currently available from standard process data feeds. **The environment envisioned includes sensors transmitting data from key locations on equipment or process systems, wherever they may be needed, to enable new actionable insights and decision making while providing a foundation to exploit machine learning opportunities.** The problem is, there are very few off-the-shelf sensors available that can be conveniently adapted to the hardware to provide these new data streams. Stress Engineering can solve this problem!

Our Custom Machine Sensor & Data Analytics Development.

No matter what industry, Stress Engineering likely has experience transforming machine components and mechanical elements into on-line IIoT-capable sensors designed to provide real-time operational data for equipment efficiency and process improvement. **Our industry experience includes high speed automation, pharmaceutical packaging, food and beverage processing and packing systems, heavy construction equipment, floating systems for oil and gas, petrochem and refining process vessels, medical and pharmaceutical device assembly, drug manufacturing processes, theme park rides, automotive and aerospace, to name a few.**

Long before computing power evolved to its current state, enabling the reality of IIoT and ML, we developed the sensor and data acquisition capabilities to help clients solve difficult equipment performance and efficiency problems. Stress Engineering IoT Applications Lab™ uses those same skills and capabilities, leading us to the forefront of these exciting new Industry 4.0 technologies!

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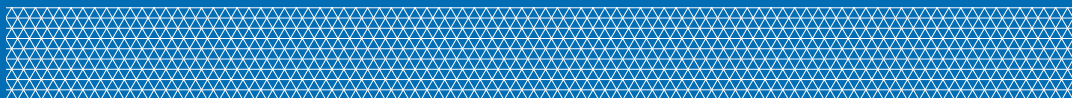
CREATING CUSTOM SENSORS, NEW RAW DATA STREAMS & CUSTOM ANALYTICS:
Large Capacity Commercial Retort Sterilizer

A client engaged Stress Engineering to overcome throughput limiting problems on their fleet of retort vessels used to sterilize millions of products annually. Standard data feeds available from the retort itself were unable to shine a light on any equipment-related attributes that could be correlated to the problem. We were asked to conceive of an approach to create custom sensors that would provide new, relevant dynamic data streams that could be analyzed—and then provide actionable, predictive insights relevant to early problem detection and root cause problem analysis as well as ongoing process insights.

One of the sensors developed for this project involved the **transformation of four discrete support pedestals of the retort into very sensitive sensors capable of detecting changes in time varying loads during production operation of the unit.** The design of the pedestal sensors was optimized to maximize the signal-to-noise ratio by using a 'digital twin'

(a predictive computational model) of the retort system to identify the actual load path through the pedestals into the foundation of the building. Once designed, each pedestal sensor was then calibrated in Stress Engineering's laboratory. The completed pedestal sensors were then shipped to the client's plant and installed on the retort.

COLLECTING DATA IN REAL-TIME
Operational, time-dependent data was collected from the sensors that were developed as part of an overall process where data and physics-based analytics were used to gain totally new insights and data related to behaviors not previously visible to the operators. The data included information about bearing health, alignment changes and 'unique events' that can have a detrimental impact on OEE. We bring this capability to a very broad range of products and industrial processes.
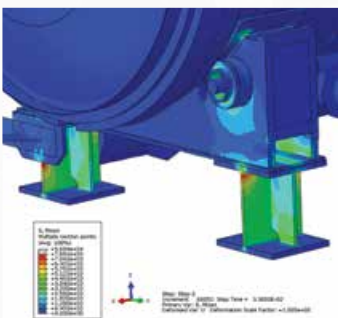
Digital twin of retort system to identify the actual load path through the pedestals into the foundation.

Once designed, each pedestal sensor was then calibrated in a load frame in our laboratory.

Completed pedestal sensors were then safely shipped to the clients plant.

Installed on retort system and collecting data in real-time.

How we help you win:

We've been there. At Stress Engineering, we leverage more than 45 years of experience in solving complex business and engineering challenges across a broad spectrum of categories.

We understand speed to market. You get one of the largest staffs of PhD and advanced degreed specialists to efficiently guide every project from start to success.

We take a physics-based approach. From concept development to product manufacturing and delivery, we focus on delivering solutions that can be proven to work before they have to work.

ISO 9001:2015 & ISO 13485:2016
Certified

ISO 17025:2005
Accredited for Several Test Methods

ISTA Certified
Testing Laboratory Member

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If you need a strategy for generating relevant data from your existing equipment, we can do the heavy lifting!

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