

A dark, wireframe-style image of a car, showing the front and side profile, serving as a background for the title text.

Advanced Battery Manufacturing Technologies



www.owensdesign.com

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COMPANY OVERVIEW

INTRODUCTION

Since 1983, Owens has worked with OEMs and manufacturers from startups to fortune 500 companies, to design and build over 2,500 tools with 100% delivery. This is achieved through a proven product development process, a team of engineers that average 45 successful development projects each, the discipline to focus on projects in our area of expertise, 75,000 square feet of facilities, and the commitment of our clients to succeed.

We built our reputation as the safe solution provider that always gets the job done. Owens Design clients enjoy minimized risk, accelerated time-to-market, and scaled high-tech production with our custom design, engineering, build and turnkey manufacturing services.

For OEMs with new product development, Owens Design extends your engineering team to transform your IP into FAB-ready prototypes in record time.

For manufacturers needing factory automation, Owens Design enables new processes with production-ready equipment and rapidly scaling production.

Startups use Owens Design to Bridge the valley of death by working with our experienced design and manufacturing team to accelerate time to market. Established brands use Owens Design to quickly capture new product opportunities using our team as an extension of your team.

Owens Design focuses on high tech industries, offers special expertise in semiconductors, renewable energy, emerging technologies, data storage, and medical devices. Our wide range of application experience includes robotics, laser processes, handling lyophilized beads, and much more.

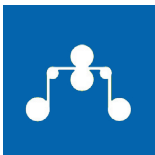
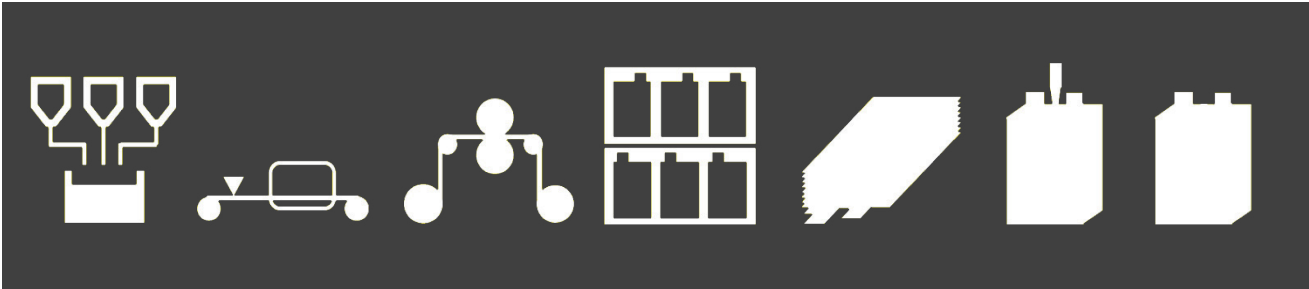


TECHNOLOGY FOCUS

BATTERY MANUFACTURING

Owens design is focused on helping battery OEM's and their respective suppliers to scale for development and production in the US. New technologies require advanced tool technologies that are not available through traditional battery equipment suppliers.

Owens Design partners with our customers to discover the gaps or problems and develop the technology needed to execute the best solution. To date our design, build and deployments cover a wide range of battery production disciplines.



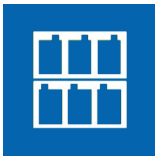
CALENDARING

Web Merge, Align and Stack, Furnce Tooling, Inspection, Testing



CELL ASSEMBLY

Aligning, Stacking, Cleaning, Welding, Marking, Inspection, Metrology



ELECTRODE

Electrode Processing, Cleaning, Cutting, Slitting, Trimming, and Patterning, Marking



QUALITY

Inspection, Metrology EOL Testing, Burnin

CASE STUDY 1

LASER PROCESS

SITUATION

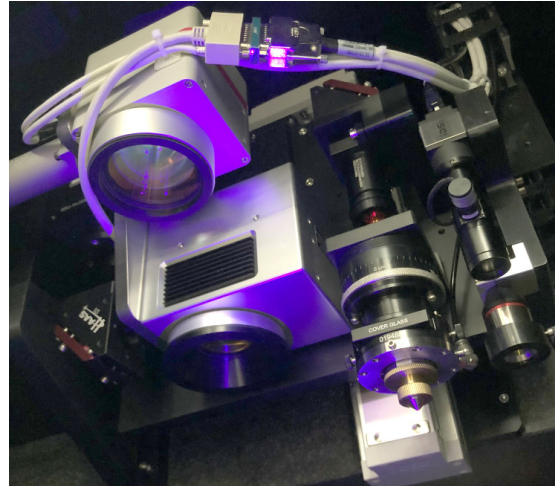
A process for cleanly cutting and ablating a key layer in the battery stack via laser was developed in the lab and had to be integrated into factory automation while maximizing throughput and laser utilization.

PROBLEM

Not losing the process when implementing a high throughput tool. In addition, the thin, fragile layers had to be moved quickly and reliably throughout the tool.

SOLUTION

Owens partnered with Turner Laser Systems (TLS) to develop and incorporate a manufacturing-ready process into a production ready laser system. This semi-custom laser platform was integrated quickly into a custom, fully automated system to handle and clean the delicate parts. The laser expertise of TLS and the manufacturing equipment experience of Owens Design delivered a complete solution to guarantee the process and the automation will work out of the box.



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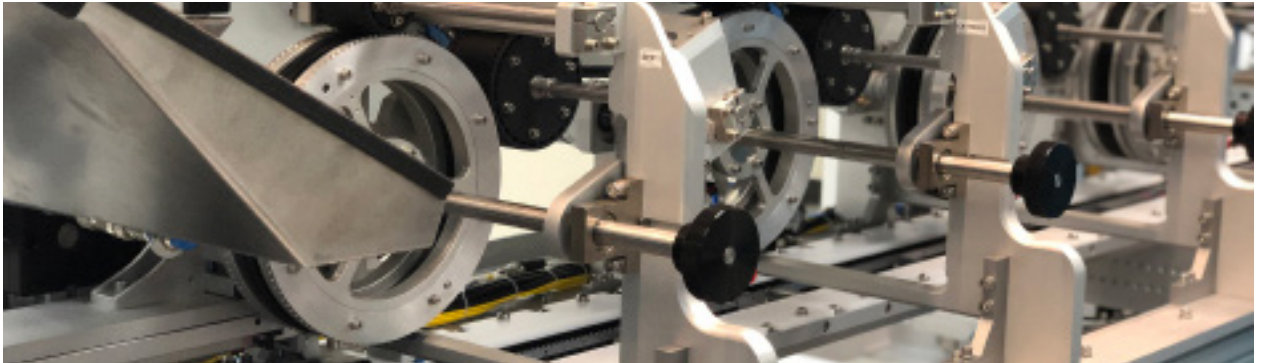
NEW TECHNOLOGY
REQUIRES ADVANCED
TECHNOLOGY
EQUIPMENT

ADVANCED TECHNOLOGY

When new technology is developed in a product or process, often times a new and advanced design must be invented and developed to support the manufacturing and mass production. New technology requires advanced technology equipment.

CASE STUDY 2

WEB MERGE-STACK



SITUATION

An electric vehicle battery startup required development of an automated, web-based anode/cathode/separator merge and stack system.

PROBLEM

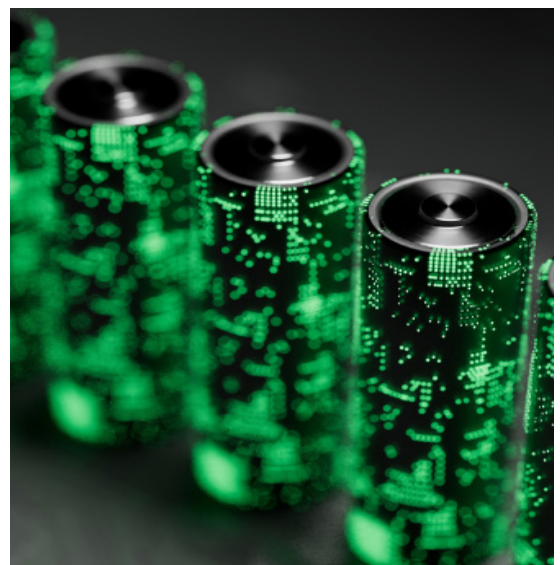
To accurately merge four different delicate patterned layers and punch them into a stack at rate of 40 ms per stack.

SOLUTION

A new merging process was created by Owens Design along with a proof-of-process (PoP) system to validate and optimize the process. Owens Design then designed and built a fully automated system to support the customer's pilot production line, implementing the learning from the PoP, which included web handling, web merge, die punch, and machine Software.

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NEW PROCESSES
REQUIRES CREATIVE
ENGINEERING



CASE STUDY 3

METROLOGY

SITUATION

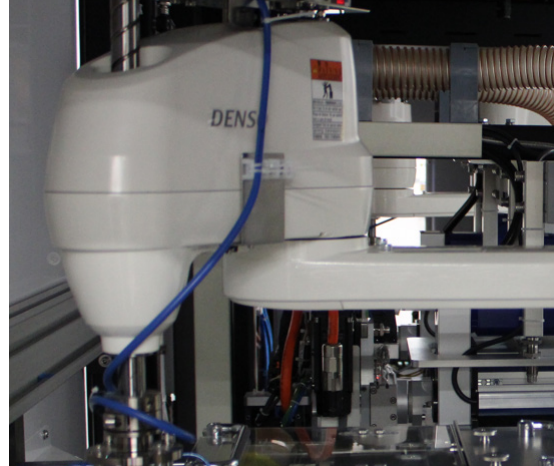
A solid-state EV Battery company needed to test single parts & trays of parts on a common platform. A primary metrology method was specified with the caveat other metrology platforms might be used in the future.

PROBLEM

Creating a high throughput machine requiring minimal dry room space that was flexible enough to accommodate unknown metrology unit

SOLUTION

Owens created a flexible robotic architecture to maximize units under test by either using two differing metrology systems or using two of the same in a parallel configuration. In addition, a custom tray handling solution was created that was extendable across the factory which allowed for quick tray exchanges while queueing a number of stacks to minimize operator interventions



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HIGH THROUGHPUT
COMMON PLATFORM
FLEXIBLE ARCHITECTURE

DESIGN FOR X

When considering an engineered-solution, design for performance, safety, cost, less components help our team to develop machine tools that are flexible, reliable and with quality.

BUSINESS MODEL

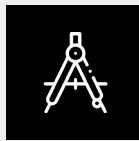
PROTECT INVESTMENT

Our business model is to protect your investment. We have strict safeguards to protect IP and we can be trusted with highly confidential programs. Our customers own 100% of the design documentation unless specifically communicated in writing.



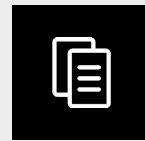
PHASE 1

CONCEPT AND FEASIBILITY



PHASE 2

DESIGN, BUILD AND TEST



PHASE 3

COPIES LOW TO MED TO
HIGH VOLUME

Phase 1

Concept and Feasibility: We collaborate with the customer to understand the application, flush out the unknowns and develop the concept. A PM and system architect drive the efforts at this phase.

Phase 2

Design, Build and Test: We create full designs based off the concepts in phase 1. Once the designs are locked down, we will order parts and build the first article.

Phase 3

Repeat Builds: With solid documentation, we can build out to volume.

EXPERIENCED **TEAM LEADERS**

The Owens Design Team

Over 40 years of high tech product development and build experience.
We bring your concepts to life.



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