

Protecting Against Component Failure

Metal Surface Treatments • Engineered Coatings • Fatigue Testing

MANY OF OUR READERS are familiar with the shot peening, laser peening and peen forming services of the Metal Improvement Company (MIC). The company has been in business since 1945 and has 40 job shops around the world.

A lesser known fact is that MIC is a business unit of Curtiss-Wright (CW), falling under their Surface Technologies division. This business unit has several offerings related to enhancing performance and preventing/analyzing failures. In addition to shot peening, CW also provides different types of coatings and analytical testing in 30 well-established facilities throughout the world.

Engineered Coatings

CW provides two general types of coatings. They are solid film lubricants (SFL) and thermal spray (TS) and both have subcategories. SFLs (also called dry film lubricants) can be described as “lubricating paints” or “soft coatings”. There are many applications in almost all industries where lubrication is required and oils and greases are not practical. Lubrication is a broad category and can consist of reducing “rattles and squeaks” in automobiles to proving proper torque-tension feedback when installing specialized fasteners. SFLs operate

over broad temperature ranges (-200°F to over 1400 °F) and can withstand very high surface contact pressures.

When corrosion is a concern, zinc-flake based coatings can be utilized. They have a sacrificial-based nature—the zinc ‘sacrifices’ itself in order to protect the underlying metal—that makes them effective for outdoor conditions. They are commonly used on automotive and off-highway vehicles on exposed surfaces like brake rotors. SFLs can also have corrosion inhibitors added so they provide multiple solutions. An example of the widespread use of SFLs is aircraft fasteners. A large commercial aircraft can utilize six-million fasteners and about half require a SFL for either lubricating or corrosion inhibiting properties.

CW has business units in the USA and UK that apply thermal spray coatings. Their proven surface treatments meet industry demands for lighter materials, improved performance and life extension. The three most common industries are Aerospace, Power Generation and Oil and Gas. The Aerospace and Power Generation industry frequently utilizes thermal spray coatings to provide thermal barrier and corrosion protection of components in the hot section of the Jet and Industrial Gas Turbine (IGT) engines.



Lubricity treatments are just one of the many engineered coatings available at the Lombard, Illinois plant.



Robot for applying thermal spray coating.

The Oil and Gas industry uses thermal spray coatings for hard, erosion/abrasion resistant surfaces in harsh environments. Other industries serviced are automotive, medical mining, steel mill and other demanding industrial markets. We can prevent premature failures due to fatigue, corrosion, wear, galling and fretting. Across the various divisions, these thermal spray processes are available:

- HP/HVOF and HVOF
- ID HVOF (down to 4" ID)
- Plasma OD and ID
- Combustion and Arc Wire
- Solution Plasma Spray
- Spray and Fuse
- Kinetic/Cold Spray
- HVOF (M3) OD and ID down to 7"
- Rokide, all in fully automated booths

The FW Gartner Division also provides laser cladding services—essentially a welding process utilizing an infinitely controllable laser beam as its heat source—and PTA Cladding/Hardfacing.

Materials Testing Services: Fatigue Testing

IMR Test Labs, a CW subsidiary, is an international firm offering a complete scope of materials testing services, including chemical analysis, cleanliness testing, corrosion testing, mechanical testing, metallurgical analysis, failure analysis, fatigue testing and much more.

Fatigue testing in a lab environment is especially valuable to the shot peening industry. Testing an optimized shot peening process in this way is the closest simulation to real-world conditions. Since these components will be assembled into critical applications, most engineers want to know whether destructive testing in a laboratory correlates with their calculations on part life.

Most commonly, the laboratory performs fatigue testing at slightly elevated stress levels. This allows test engineers to complete the testing in a reasonable amount of time yet preserve the high-cycle fatigue nature of the application. Examples of industries that use laboratory fatigue testing are Automotive, Aerospace, Medical, Oil and Gas, and Offroad industries.

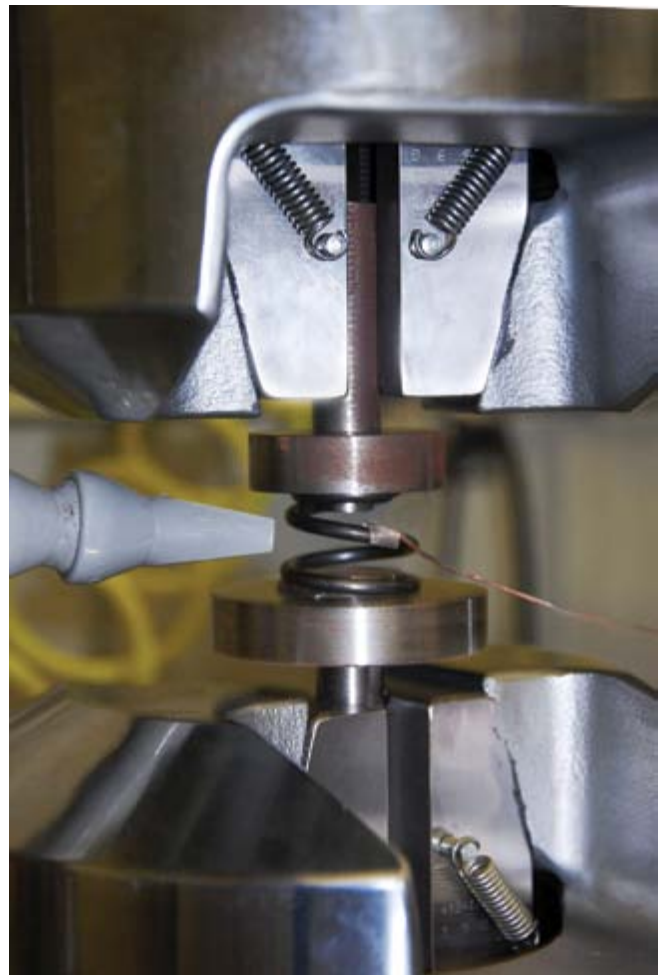
IMR Test Labs offers a variety of services for the evaluation of materials. They have various frames designed to handle a wide range of loads and samples. They can perform testing on:

- Metals
- Coatings (coating shear)
- Polymers

- Composites (fiber-reinforced, ceramic-matrix)
- Nonmetallic/Metallic hybrid materials
- Finished products

Not only does IMR Test Labs offer accredited fatigue testing, but their staff can also provide insightful, informative analysis and reporting after testing. The metallurgical engineering group is well-versed in fractography and failure modes. They have a full microscopy lab (light, optical, SEM) and the support of chemistry, mechanical and other groups. ●

For more information on any of these services, please email Dave Breuer at dave.breuer@cwst.com or call him at (262) 893-3875.



Fatigue testing a spring in the IMR Test Labs, a subsidiary of Curtiss-Wright.