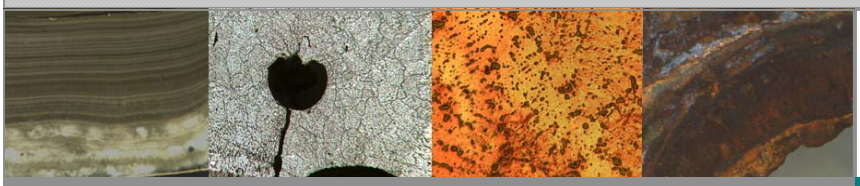
NUTS & BOLTS



New Hampshire MATERIALS LABORATORY, INC.
Your Problem Solving Partner

MECHANICAL TESTING: BENEFITS OF LOAD TESTING ANALYSIS

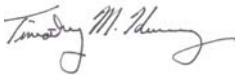
MAY 2011 / SUPPLEMENT ISSUE

Welcome to New Hampshire Materials Laboratory

In 2010 New Hampshire Materials Laboratory purchased and upgraded many pieces of our equipment. We tried to keep you informed of these purchases with brief announcements.

Much to our surprise, some of our long standing customers wanted to know more about our instrumentation, capabilities, and what other testing we could provide for them.

NHML has always considered ourselves “Your Problem Solving Partner”. It is our hope that this supplement of our Nuts & Bolts will give you , our customers, a better idea of our capabilities and how we can further assist you.



Tim Kenney
Laboratory Director

New Hampshire Materials Laboratory Analytical Equipment And Their Capabilities

Glow Discharge Spectrometer a.k.a. GDS
New Spring 2010

Glow Discharge Spectrometer (GDS) is a state of the art technology used to measure elemental variations and depth profiling of ferrous and nonferrous materials such as Stainless Steel, Aluminum, Brass, Unalloyed Copper to name a few. Some of the advantages of the GDS verses other types of analyses are minimal sample preparation, separation of sampling sputtering from excitation resulting in freedom from metallurgical history, quick matrix changes, overall improved precision. It allows us the opportunity to provide rapid response and essentially non-destructive testing of fabricated parts. Click here to find out what methods and standards New Hampshire Materials Laboratory has to offer. **GDS methods and standards**

In This Issue

Join Our Mailing List

Industry Terms & Definitions

Creep: Time dependent deformation of material which occurs over a period of time. The material is subjected to constant stress and constant temperature. Creep of a material can be divided into 3 stages. 1)Primary Stage occurs at a rapid rate and slow with time. 2) Secondary State occurs at a steady rate. 3) Third State occurs at an accelerated rate and ends in a failure of material.

Creep Test: Method used to determine creep or stress behavior. Standard creep testing procedures are detailed in ASTM # 139, ASTM D-2990 and D-2991(plastics) and ASTM D-2294 (adhesives).

Creep Strength: Maximum stress required to cause a specified amount of creep in a specified time

New Hampshire Materials Analytical Equipment And Their Capabilities cont…

Scanning Electron Microscope with Energy Dispersive Spectroscopy feature a.k.a. SEM/EDS
upgraded Fall 2010

The SEM portion of the machine allows detailed surface analysis at a much higher magnification than an optical microscope thus allowing the lab tech to view very small features of the questionable portion of the sample. The Energy Dispersive Spectroscopy (EDS) feature allows the additional advantage of being able to obtain the elemental composition of small objects or surfaces.

What might be accomplished using the SEM/EDS machine? The SEM features can be used to help determine the mode of failure and clues to the cause of a failure for our customers using images. The EDS in conjunction with Micro-FTIR can help determine the characterization of trace contaminants and unknowns.

Inductively Coupled Plasma a.k.a. ICP
Upgraded Fall 2010

In ICP Spectroscopy samples are acid digested and diluted in water and aspirated into a plasma torch. The emitted light is then measured and quantified relative to known standards. ICP is a very versatile spectroscopic technique, capable of analyzing a full spectrum of samples from water samples to dissolved alloys of Steel, Aluminum, Brass, Titanium, and Nickel based alloys. ICP Spectroscopy is used to accurately determine the chemical composition of ferrous and nonferrous alloys as well as a variety of other samples and extracts. Our lab currently uses a SpectroFlame M 120E spectrometer. The standards used for analyses are traceable to NIST.

One machine that needs to be included but did not need any upgrades is our **Fourier Transfer Infrared Spectroscopy a.k.a. FTIR machine**.

FTIR is a spectroscopic technique which is useful both for routine material verification/identification of polymers and identification of trace contaminates on manufactured items.

For our full list of our analytical services and techniques click here:
New Hampshire Materials Laboratory Capabilities

Creep Strength Cont: Also used to describe maximum stress that can be generated in a material at constant temperature under which creep rate decreases with time. An alternate term is creep limit.

Costa Rica Sea Turtle Ecology Program and NHML

Endangered Leatherback Turtle

What do Leatherback turtles and New Hampshire Materials Laboratory have in common? The answer is the science and the City of Somersworth. You may be asking yourself how these correlate back to NHML.

A student from Somersworth High School stopped by our laboratory seeking a donation for the Costa Rica Sea Turtle Ecology Program.

New Hampshire Materials Lab
www.nhml.com • lab@nhml.com • info@nhml.com
Tel: 800-334-5432 or 603-692-4110 • Fax: 603-692-4008

Mechanical Testing and Manufacturing Standards

Uniformed Specialized Load Testing:
Left side photo: 3 shelf system as assembled
Right side photo: 3 shelf system as loaded

Manufacturers are surrounded by ASTM, ASME, ISO and other standards. To help RD Engineers, Quality Managers, and other various people in the manufacturing world, New Hampshire Materials Laboratory offers mechanical testing services for the evaluation of metals, polymers, ceramics, and composite materials.

These testing services include routine tension and compression testing as well as shear, tear, and flexural testing. In these tests of materials, a specimen is fabricated from the raw stock and tested in accordance with an appropriate ASTM, ASME, ISO, or other standard.

New Hampshire Materials Laboratory also offers a variety of product testing services. This testing can be performed in accordance with industry specifications or product application driven custom test methods.

Over the years, New Hampshire Materials Laboratory has been asked to perform these type of services for a large supplier of retail displays, and for a firm that designs and manufactures home storage products. A brief synopsis of services provided for these customers are described below.

A large supplier of retail display units asked NHML to perform tests of rail and bracket systems supplied by their traditional domestic and a possible overseas supplier. The comparison was to determine whether the assembled display

continued on next page... ⟶

This program offers the opportunity to high school students to travel Costa Rica to study the largest species of sea turtles, the leatherback.

This enthusiastic student impressed our staff who wanted to learn more about this opportunity being offered at the local high school.

We found out this is the first time Somersworth High School has offered such an opportunity. Each student attending must raise $2500.00 to pay for the trip. This is what brought the student to our doors and our attention to this program.

According to Claire Handy, one of the school advisors for this trip, 8 students (3 seniors, 4 juniors, 1 freshman) plus 2 advisors will be heading to the Pacuare Matina Forest Reserve for 9 days. This reserve is located in a remote area north of the city Limon located on the Caribbean Coast.

During their stay, the students will be working side by side with researchers learning about the endangered leatherback turtle species while helping to restore breeding grounds, and collecting their eggs to be moved to a protected area. They will also have the opportunity to speak with Costa Rican high school reforestation.

New Hampshire Materials Lab
www.nhml.com • lab@nhml.com • info@nhml.com
Tel: 800-334-5432 or 603-692-4110 • Fax: 603-692-4008

System was to meet the requirements of ANSI MHZ 16.2 as specified by MI (Rack Manufacturers Institute). Our testing determined that the systems supplied by both manufacturers met the requirements of ANSI MHZ 16.2, although the domestic supplier's product was approximately 20% stronger.

A company that designs and imports home storage products requested NHML to provide some customized tests to determine how strong their products were so that loading limits could be included with assembly and tested to determine their strength and failure mode when uniformly loaded, as seen in the photographs within this article, as well as non-central point loading.

Uniformed Specialized Load Testing
Left side photo: 2 cubed unit as assembled
Right side photo: 2 cubed unit as loaded

Although, the students are learning outside our materials/ chemistry realm, they are being provided an invaluable experience. That will go way beyond the learning in a traditional classroom. We were impressed by the promotion of science to our local youth so much so we made a small donation.

Click on one of the links provided to read more about their trip and fundraising events to help them meet their goals.

Somersworth High School students to help endangered species on Costa Rica trip

Somersworth High School students work to save turtle on Costa Rica trip

New Hampshire Materials Lab
www.nhml.com • lab@nhml.com • info@nhml.com
Tel: 800-334-5432 or 603-692-4110 • Fax: 603-692-4008