

Datapoint

Reporting on developments in material properties for engineering design

NEW CAPABILITIES

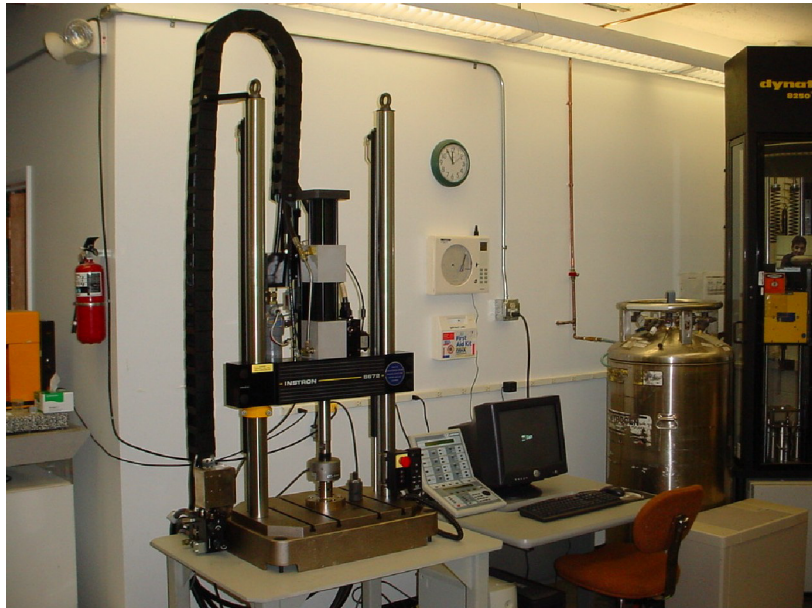
High-Speed Testing

In response to persistent customer demand for high-speed properties of materials, DatapointLabs has acquired an Instron Servo-Hydraulic system.

The new instrument is configured for high speed testing to strain rates in excess of 25/s, permitting the development of consistent rate-dependent stress-strain data into the impact regime. Outfitted with the latest Dynacell load cell technology which incorporates an in-built accelerometer, the instrument automatically compensates for inertial effects, dramatically improving measurement accuracy. This eliminates a major source of error associated with high-speed measurements.

The instrument is also capable of per-

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The new high-speed servo-hydraulic system

DATA DELIVERY

DatapointLabs Approves Matereality DDS

DatapointLabs has transitioned to using Matereality's secure web-based Data Delivery Service (DDS) to send test results to its clients. Starting March 2004, data generated at the laboratory will be converted to True Digital format, ready to be delivered electronically into clients' Matereality accounts. Data is typically available one business day after the completion of testing. There is no data delivery fee but clients must have a Matereality account. By requesting data in electronic format only, clients can save on shipping fees and take advantage of powerful next-generation benefits (see box).

Customers can still choose to have hard copy reports shipped to them by overnight courier at normal shipping charges. Due to increasing concerns about viruses in e-mail attachments, DatapointLabs is discouraging the use

of e-mails to deliver PDFs and data files. These will henceforth be provided only upon specific client request.

Many DatapointLabs clients have already signed on. Says one regular DatapointLabs client from a major resin supplier company: "It's pretty cool. The data is separated and presented clearly. I like how you don't have to go through fifty levels of confusion to find what you're looking for."

DatapointLabs offers Matereality accounts to its clients at a discounted price of \$300/year (\$25/month). In addition to receiving data through DDS, users get full access to the Matereality material data management (MDM) system. Clients who spend more than \$5,000/year are eligible for a free account. To set up a Matereality account, please contact us at rader@datapointlabs.com or call toll-free at 1-888-DATA-4-CAE.

- Data is always accessible, never lost
- True Digital, non-PDF format
- Powerful data visualization tools to examine dependencies, zoom in, zoom out
- Unmatched data cataloging and search capabilities
- Easy export to Excel and other applications
- Data is authenticated with Data Certificates
- Data is secure: client controls who sees their data
- Data can be shared easily in keeping with the business needs of the client
- Eliminates the need for email attachments
- All transactions are tracked using Access Logs

PERSONNEL

New Arrivals

This past fall DatapointLabs added three new members to its team.

Jerry Lindsley was hired as a lab technician. He brings almost twenty years of experience as a service technician in the airline industry and the military. In his spare time Jerry enjoys hunting and fishing.

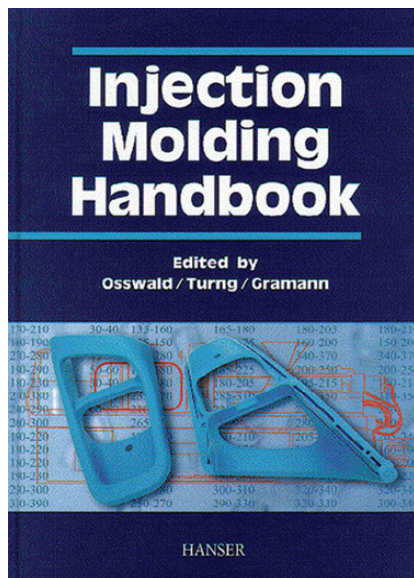
Will Liguori was hired as a lab technician and quality assurance specialist. Will brings over fifteen years of experience in quality management, primarily in the aerospace industry, and moonlights as a rock guitarist.

Mark Rader is the company's new administrative assistant. He has been assisting in the editing and delivery of test reports and the production of company publications. In his spare time Mark writes fiction and journalism.

Welcome!

BOOK REVIEW

Injection Molding Handbook



ISBN: 1-56990-318-2

Publisher: Hanser Gardner

6915 Valley Ave., Cincinnati, OH

45244-3029

Phone: 513-527-8977

CORNELL CONNECTIONS

CIMP Founder Turns 80

Cornell University Professor Emeritus of Mechanical and Aerospace Engineering, K.K. Wang, widely regarded as one of the fathers of modern injection molding simulation turned 80 in October of 2003. At a surprise birthday party held for him in Ithaca, New York, more than 50 of his former students, staff and collaborators gathered to celebrate his contributions to the field. Attendees came from as far away as Japan, Korea, Taiwan and China. The research and software code developed by the Cornell Injection Molding Program (CIMP) forms the basis for most of the injection molding CAE programs in use today. Former CIMP members now continue his legacy in universities, institutes and companies all over the world.

CIMP Proceedings Available On-Line

Plastemart.com is pleased to announce its exclusive alliance with Cornell Injection Molding Program (CIMP) for worldwide distribution of all its technical papers. These are now available at <http://www.plastemart.com/cimp/>. The web-site provides historical details about CIMP and its activities. A directory of former CIMP members is maintained as well as links to websites relevant to injection molding and CAE. It is now possible to purchase specific documents and technical reports created by CIMP during its 25 year history.

Lalit Shah, former CIMP member and student of K.K. Wang is the founder of Plastemart, an India-based on-line plastics materials and equipment trading company.

This book, edited by the Wisconsin-based team of Osswald, Turng and Gramann, represents a compilation of work by several well-known authors and brings together a body of knowledge that will be appreciated by injection molding professionals and students of plastics processing.

The book does well to cover all the important aspects of this complex materials processing technology and goes into as much detail as needed to provide the reader with a clear understanding of the underlying science without resorting to complicated mathematical analysis.

Osswald's coverage of injection molding materials and processing pays particular attention to the relationship between molecular weight and resulting material behavior. Of particular interest is the section on anisotropy development during processing, which gives the reader critical insight into residual stress development and warpage.

Chris Rauwendaal brings his enormous experience in screw behavior to help the reader understand this important but often neglected aspect of the injection molding process. Details include mechanisms of mixing in the screw and nozzle design.

Bob Farrell's treatment of the molding machine is complete, with extensive treatment of clamp design including design calculations and a special discussion on tie-rod design.

John Beaumont's chapter on mold design and part design provides guidelines and insight to aid the practitioner in this art.

This sets the stage for Turng's examination of derivative molding processes such as gas-assisted injection, microcellular injection molding, multi-material molding and powder injection molding processes—less well understood, complex processes that are nonetheless important because of their extensive use in modern molding operations. The book also provides practical guidelines for trouble-shooting processing and material problems.

Hubert Lobo is President of Datapoint-Labs, and a former CIMP member. Lih-Sheng (Tom) Turng was a student of Prof. K.K. Wang and also a member of CIMP. He is now an Associate Professor at the University of Wisconsin-Madison.

CORNELL CONNECTIONS

Cornell University President Tours DatapointLabs

On December 12, 2003, Jeffrey Lehman, the newly appointed president of Cornell University toured DatapointLabs' administrative and testing facilities, as part of an effort to become better acquainted with Cornell-affiliated businesses. Hubert Lobo, President of DatapointLabs and a Cornell alum, showed Lehman various testing equipment, explained the kinds of tests offered by DatapointLabs and introduced him to the DatapointLabs team.



Lehman (left) and Lobo (right) in one of DatapointLabs' testing areas.

NEW CAPABILITIES

New Instron....

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forming cyclic loading tests in multiple modes such as tension, compression and flexure. This capability will be exploited by DatapointLabs to develop new techniques to describe the load deformation characteristics of materials subject to cyclic loading. Fatigue measurements will also be performed.

The higher strength load frame extends the operating range of the laboratory to now include the testing of certain kinds of metals including aluminum and sheet metal. These tests are of importance to engineers working on crash simulations where such materials are used in automotive bodies.

"The new capabilities will greatly enhance the ability of the laboratory to develop rate-dependent models for use in impact and crash simulations using ABAQUS, LS-DYNA, MSC.DYTRAN and PAMCRASH," says Hubert Lobo, President of DatapointLabs. "Because of the participation of the CAE manufacturers in DatapointLabs' *TestPaks*® Alliance program, we have an in-depth understanding of the material modeling requirements of these simulation codes. We will now be better able to support the modeling of plastics, rubber, foam, cardboard and other materials in addition to sheet metal and aluminum."

Goettfert Rheotens Upgraded

Melt tensile strength measurements are of vital importance to plastics processors and material suppliers. The information is relevant in predicting the ability of molten plastic to maintain its form during extrusion, blow molding, film blowing, thermoforming and fiber spinning operations.

The Rheotens test provides a reliable comparative measure of the relative strength of a polymer melt by stretching a molten strand at a constant rate of acceleration, in a manner similar to a tensile test. With newly acquired technology, the Rheotens test now allows clients to receive the actual curve data from each experiment. Additional calculations are also performed, permitting the reporting of results such as stress as a function of draw ratio.

Wagner's work [1] has attempted to extend Rheotens data toward the development of extensional viscosity vs extension rate measurements. His technique presents an attractive means to generate data important for simulation of extrusion, film blowing and fiber spinning operations. However, it must be noted that significant experimental difficulties must still be overcome before such data has value as an absolute measure of extensional viscosity. Chief of these is the fact that the temperature of the strand is an unknown. During the experiment, the strand leaves the die

at the melt temperature and is drawn down toward the drawing wheels which are located about 120 mm away. The strand cools in contact with ambient air along the way. Additionally, the axial temperature profile changes with the progression of the experiment.

The use of high resolution infrared pyrometry presents a means to remove this variable. Alternatively, some experimental improvements seek to maintain the strand in a constant temperature environment. Simulation-based approaches provide an alternate means of addressing the problem.

Reference

1. M.H. Wagner, V. Schulze, A. Goettfert, *Polym. Eng. Sci.*, 36, pp 925 (1996)

Upcoming Events

DatapointLabs will exhibit and/or sponsor at:

2004 International Moldflow User Group Conference, Frankfurt, Germany, May 17-19, 2004.

2004 International ANSYS Conference, Pittsburgh, Pennsylvania, May 24-26, 2004.

2004 ABAQUS Users' Conference, Boston, Massachusetts, May 25-27, 2004.