



EXTRUSION

SPE EXTRUSION NEWSLETTER | WINTER 2019

CHAIRMAN'S MESSAGE

For 2019, ANTEC in Detroit, Michigan has been reformatted into two programs, INSPIRE and INSIGHT, to best represent the ideas and trends shaping our plastics industry:

ANTEC 2019 INSPIRE

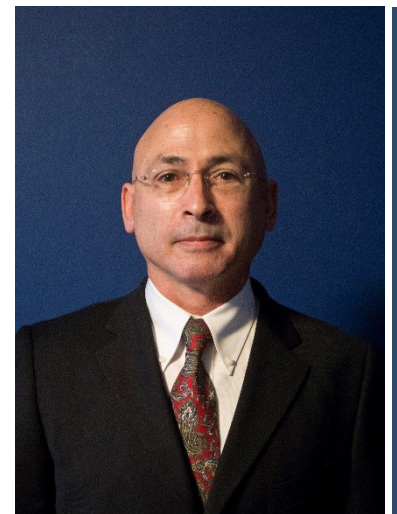
550+ technical and business papers and 60+ marketing presentations, spanning Monday thru midday Wednesday, you will be able to enjoy the traditional ANTEC that you know and love— complete with networking, student events and exhibitor receptions.

ANTEC 2019 INSIGHT

Running from Wednesday midday and all-day Thursday with megatrend sessions on Packaging, Building & Construction, Sustainability and Transportation you will get face-to-face interaction with expert representatives from the largest industry segments. INSIGHT will focus on the big picture –and the biggest questions being asked in the plastics community today.

We are currently in the process of developing the Technical Program, so please keep checking the ANTEC website.

I would also like to take this opportunity to announce the 2018 Extrusion Division Scholarship Award winners (these scholarships will be presented during the Extrusion Division Annual Meeting at ANTEC). Given the \$25,290 average annual cost of an undergraduate education in the United States, the Extrusion Division Scholarship program provides immediate and impactful support for young, talented students seeking careers in plastics.



2018 Scholarship Recipients

Recipient	Scholarship	University	Program of Study	Scholarship Amount
Thomas Ellingham	Lew Erwin Scholar	University of Wisconsin - Madison	Mechanical Engineering	\$5,000
Nicholas Moore	Russell Gould Scholar	Pennsylvania College of Technology	Plastics & Polymer Engineering Technologies	\$2,500
Lexington Peterson	Ed Steward Scholar	Pittsburg State University	Plastics Engineering Technologies & Polymer Science	\$2,500

Total: \$10,000

Please join me in congratulating our future extrusion superstars!

Adam Dreiblatt

SPE Extrusion Division Chair 2018-2019

dreiblatta@centuryextrusion.com

SPALDING AWARDED SPE RESEARCH AND TECHNOLOGY

SPE is awarding the 2019 Research and Technology Award to Mark Spalding of The Dow Chemical Company. This is one of the four major industry awards SPE bestows each year at ANTEC. In addition to receiving the award at the SPE Banquet, Mark will deliver one of the keynote talks at ANTEC on his work for the Extrusion Division. Spalding is a long-time member of SPE and the Extrusion Board of Directors.

The Research/Engineering Technology award recognizes an individual who has made significant contributions in the fields of polymeric material development, processing, design, the innovative application of polymer engineering principles, and/or the fundamental understanding of the science of polymeric materials and their behavior (creation of new polymer structures, characterization and understanding of polymer structures, properties, performance and processing).

ANTEC 2011 BEST PAPER: An Engineering Approach to the Correction of Rotational Flow Calculations for Single-Screw Extruders—Equation Correction

By Mark A. Spalding, The Dow Chemical Company, Midland, Michigan; and Gregory A. Campbell, Castle Research Associates, Jonesport, Maine

Simulation of single-screw extruder screws using the standard generalized Newtonian method is known to deviate from measured performance. Part of this deviation is caused by the calculation of the drag flow rate.

Previous research has shown that the calculation of the drag flow rate using this method is higher than that in the actual channel, causing the pressure



gradient to be incorrectly adjusted to compensate for the error in the drag flow term. The research here provides the correction factors for rotational flow (historically known as drag flow) such that axial pressure gradients can be quickly and accurately calculated.

The original research did not include the number of flight starts in the correction factors, creating an unnatural curve in the data. This paper includes the flight starts and eliminates the problem.

To download the paper in its entirety [CLICK HERE](#) ■

MARK YOUR CALENDARS FOR EXTRUSION DIVISION MINITECPLUS

SPE Extrusion Division will be holding a two-day technical program May 1-2 at the Polymers Center of Excellence (PCE) in Charlotte, N.C.

- Day 1 will focus on general extrusion (standard Minitex format)
- Day 2 will focus on specific tips & techniques for processing PET & PLA

Cost to attend: Day 1 \$300, Day 2 \$300, Both days: \$500 (deduct \$50 each if registered before April 10, 2019)

For a detailed agenda, see this link: <https://www.4spe.org/i4a/pages/index.cfm?pageID=4205>

Interested in attending, receiving a detailed agenda or sponsoring? Contact Charlie Martin of Leistritz, who is serving as the event's technical program chair, at cmartin@leistritz-extrusion.com or call 908/685-2333 x616. ■

EXTRUSION PRESENTATION OF THE MONTH

The Importance of Extruder Barrel Alignment

J. Scott Glover
President
The ADVANCED Team, Inc.

What is Extruder Barrel Alignment?

- Extruder Barrel Alignment is the intentional effort to make the rotational centers of the feedscrew and the output shaft of the gearbox co-linear.
- The feedscrew is carried, supported, and in effect held in place by the barrel. Therefore it is imperative that the bore of the barrel is

properly centered so that the screw will indeed be co-linear to the gearbox.

- Co-linear is defined as "corresponding parts arranged in the same linear order."

Proper alignment of extruders can extend the life of extruder barrels and feedscrews by precisely positioning the extruder barrel to coincide with the gearbox output center of rotation. The feedscrew should accurately mate to the thrust shaft of the gearbox (quill) while being properly centered within the barrel.

To download this presentation, [CLICK HERE](#) ■



SPE MOURNS LOSS OF WALT SCHRENK

Long-time SPE member Walt Schrenk passed away in late October at the age 85. Walt was a Fellow of The Dow Chemical Company and one of the early pioneers of coextrusion. He was considered as one of the great mentors for Dow. Walt was a Fellow of SPE (1992) from the Extrusion Division.

Walt received a bachelor's degree from University of Michigan and was a member of the National Academy of Engineering, American Society for Mechanical Engineers, and a lifetime member of SPE. ■

EXTRUSION FORMULA OF THE MONTH: SHAFT TORQUE AS IT RELATES TO SCREW RPMs IN A CO-ROTATING TWIN SCREW

By Charlie Martin, Leistritz

Co-rotating twin screw extruders (TSEs) are available with top screw rpm's of 1200+. Generally speaking, the TSE should not be geared substantially higher than the required screws rpm. Due to the shear sensitive nature of many formulations, the motor/gearbox are often specified for top screw rpms of 600 or lower.

The cross-sectional area of the screw shafts, the shaft design/metallurgy, and the manufacturing method determines the torque that can be imparted into a process and dictates the best motor/gearbox ratio for the application. This formula helps determine the proper motor and gearbox configuration for a co-rotating TSE:

Torque= 9550 x KW/top rpm

Units:

9550 = constant

Torque = Total torque for both screw shafts, typically denoted in N-M (Newton-Meters)

KW= Motor rating on the co-rotating twin screw extruder

For example:

If a co-rotating twin screw extruder with a 60 mm screw diameter has a torque rating of 3200 NM and uses a 200 KW motor if geared for 600 rpm at full torque, then a 400 KW motor would be specified at 1200 rpm as indicated below:

Geared for 600 rpms:

$3200 \text{ NM} = (9550 \times 200\text{KW})/600 \text{ rpms}$

Geared for 1200 rpms:

$3200 \text{ NM} = (9550 \times 400\text{KW})/1200 \text{ rpms}$

Since the torque is the constant, a 60 mm twin screw extruder can either be geared at 600 rpm with a 200 kW motor, or at 1200 rpm with a 400 kW motor (or with another motor/gearbox combination). If the process will never operate above 600 rpm, then it should not be geared for 1200. At 600 rpm and below the performance will be exactly the same, since the applied torque and free volume are unchanged.

Sometimes the choice is between a co-rotating twin screw extruder with a larger screw diameter operating at lower RPM or a smaller machine at higher RPM. The cost differential for both should be compared before a final selection is made, particularly for larger machines. ■



SPE WEBSITE LINK OF THE MONTH

Plastics Research Online allows you to view and download technical articles for free. Browse the latest articles by category including: Applied Rheology, Bioplastics, Composites, Conductive Polymers, Engineering Properties, Extrusion, Failure Analysis, Injection Molding, Plastics Nanotechnology, Polymer Modifiers, and Thermoplastics.

To access these article [CLICK HERE](#). ■

BOOK RECOMMENDATION: DIAGNOSTICS OF EXTRUSION PROCESSES, NATTI S. RAO

The widespread use of large scale units for manufacturing blown film, blow-molded articles, flat film, and extruded pipes necessitates troubleshooting on site. This book provides practical computational tools which can be applied easily on the shop floor to obtain quick solutions in these and many other areas of polymer extrusion.

To order this book [CLICK HERE](#) ■

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EXTRUSION

SPE Upcoming Calendar of Events:
[CLICK HERE](#) for all upcoming SPE events.

For the latest on the SPE Extrusion Division
and for contact information [CLICK HERE](#).

Newsletter Editor:

Jim Callari, Plastics Technology Magazine