Asia Rubber Industry Training Week 2019
1-4 July 2019, Pullman Bangsar Hotel, Kuala Lumpur, Malaysia
Training Courses for Chemists, Engineers and Managers in Rubber Industries

Course List
1 July 2019  Rubber Vulcanization: Science & Practice
2 July 2019  Rubber Reinforcement with Carbon Black & Silica
3 July 2019  Rubber Testing and Quality Control for Process Improvement
4 July 2019  Strategic Compounding with Rubber Blends

Rubber Vulcanization: Science & Practice
The training is designed to provide a better understanding of the cure process in general and the efficacy of curing systems in particular. The science of crosslinking, even not fully understood yet, provides reliable principles that should be used to improve the performance of rubber parts that are submitted to operate in a large range of extreme conditions. (temperature, mechanical load, aggressive media, oil, grease etc) On the base of accepted concepts and mechanisms the course will emphasize why the state of cure, the structure of crosslinks and the chemical nature of the polymer, the presence of fillers allow a particular performance of the vulcanizates. However, the limitations of different curing systems, the influence of compound ingredient on the curing process have to be taken into account. A special point of interest in the seminar is the reversion process, overcure and the consequences of temperature distribution in molds on the performance of rubber vulcanizates. Finally, new curing systems will be presented. They will show the potential for further improvements of elastomers with heat and aging stability. The course contents include:
- Process of curing
- Reactivity of rubbers and curing systems
- Curing systems
- State of cure
- Cure process (kinetics)
- Sulfur curing (accelerators, activators, retarders, synergistic effects)
- Influences on reversion (curing system, rubber matrix, filler, processing)
- Peroxide Cure
- Metal oxide, resins
- Cure packages
- Influence on standard physical properties
- Influence on ultimate properties
- Life time
- New Curing Systems

Rubber Reinforcement with Carbon Black and Silica
The training is designed to provide an overview on filler reinforcement by Carbon Black and Silica/Silane in tire formulations and technical rubber goods. The advantages and disadvantages of both technologies will be presented. With the implementation of silica in the tire technology (green tire) the tread properties have been successfully improved with respect to rolling resistance and wet grip. This leads directly to significant reductions of fuel consumption and safe driving at higher speed. Details about silanization with different silanes (mono- and difunctional) under different mixing conditions and temperature regime, the degree of silanization, the impact on silica dispersion and dynamic mechanical as well as ultimate properties will be presented. However, recent developments demonstrate that optimal dispersion of CB leads to similar performance and in addition a very substantial improvement of abrasion resistance. The key-parameter for this success is a properly designed filler surface activity and filler – polymer interaction. Key parameters to improve the processing parameters of rubber compounds as well as the final material properties are presented. The factors that lead to the required nano-dispersion of the reinforcing fillers will be discussed for the two different filler systems. In addition the problem of filler transfer and phase distribution of CB and polar precipitated silica in non-polar rubber blends (BR/SBR and BR/SBR/NR) will be an important part of the Seminar. This course outline includes:
- Manufacturing of Carbon Black and Silica
- Characterization of Filler Particles
- Surface Specific Area and Structure
- Surface Activity
- Incorporation and Dispersion of CB and Silica
- Flocculation of filled Compounds
- Methods to measure Dispersion
- Technical Mixing Procedures
- Special Features of Silica/Silane Technology
- Properties of uncured filled Compounds
- Properties of cured filled Compounds
- Fracture Mechanical Features
- Functional Polymers for better Dispersion
- New Developments
Rubber Testing and Quality Control for Process Improvement

The training is designed to those individuals who are active in rubber testing and quality control as well as those seeking for a better understanding of the complex interactions in rubber compounds. As it is well known that the sum of physical and chemical properties governs quality and performance of rubber products the most important standard test methods for rheological properties of rubber mixes, static, dynamic and ultimate properties of vulcanizates are presented in detail. The course will give practical guidance with respect to the test procedures, errors and meaning of the results. Practical examples will be used for better understanding. By applying the principles outlined in this training course the participant could be able to take reliable decisions for compounding that lead to improve of the quality of rubber parts produced. The Course content includes:

- Features of rubber mixes and vulcanizates.
- Introduction to rubber testing: Test conditions, Samples and conditioning, Error treatment and interpretation
- Tests on Rubber Compounds: Mooney Viscosity, Mooney Scorch, Capillary Viscosimetry, Dynamic Characterization
- Aging & Oil Resistance

Strategic Compounding with Rubber Blends

The training course is designed to those individuals who are seeking for compounds that combine physical properties of different rubbers in order to fulfill the sophisticated demands of the market. Starting from the basics of polymer compatibility the influence of molecular weight and chemical constitution of rubbers on miscibility will be presented in relation to phase morphology, phase adhesion and interfacial effects that control important physical properties of rubber blends. The use of phase compatibilizers to improve processing and compound properties will be presented. In addition, the advantages of the blend technology will be demonstrated for technological important blend systems. However, the limitations of the technology will be also addressed to avoid adverse effects that can be made in application. The course will provide a platform for reliable decisions in designing recipes to increase factory productivity, reducing costs and manufacturing defects. The course contents include:

- Importance of blend technology
- Principles of polymer miscibility
- Analytical assessment of phase morphology
- Interfaces of rubber blends / phase adhesion
- Influence of chemical constitution on phase morphology
- Influence of process parameters on phase morphology
- Phase compatibilizers
- Filler distribution in rubber blends
- Vulcanization of rubber blends
- Ultimate properties and durability
- Cost reduction with rubber blends
- Future trends

Instructor: Prof. Dr. Robert Schuster

Robert Schuster is a world-renowned rubber scientist and technologist with 40+yrs experience in rubber industry. After his doctorate thesis at the Macromolecular Institute of the University of Freiburg, he took over the management of the German Institute for Rubber Technology (DIK) from 1991 to 2010 and made this institute significantly influential. For his services he has been awarded the "Carl Harries" medal by the German Rubber Society (DKG) in 1998. He also received the Melvin Mooney Distinguished Award from the American Rubber Society (ACS Rubber Division) in 2012. He gives lectures and seminars in rubber technology around the world. He wrote three scientific books and several chapters on rubber and published more than 415 Scientific and technological papers in journals.

Registration Fee

- 650 US$/Course/Person
- 2,000 US$/All Courses/Person

Remarks: Payment is required with registration. Registration fee includes training documents, lunch and refreshments.

Program Registration: 10% discount for group of 3 or more delegates from the same organization.

Program Agenda: 9am to 5pm

Program Language: ENGLISH

Venue: Pullman Kuala Lumpur Bangsar, 1, Jalan Pantai Baharu, Jaya Tower 3, 59200 Kuala Lumpur, Malaysia
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Registration Procedure: Please download registration form at WWW.RUBBER-INDUSTRY.ORG and send the filled registration form to Ms. Sirinthip Boonlom (training@technobiz-asia.com). Performa Invoice will be issued upon receipt of registration form.

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