**ECONOMICS**

**CRISIS – IMPACT ON RUBBER INDUSTRY**

Anon.
US economic crisis and impact on rubber industry
The Rubb. Int. Mag. 2011 13(9) p. 28-34

In August, the US was under so much pressure attempting to pass the new debt ceiling deal as well as being downgraded by a rating agency. Both were the crisis confronting the US one by one in less than one week in the early of August. This partly reflects the US’s economic uncertainty over the past 3-4 year also. How will the US’s present economic crisis have an impact on the rubber industry? It is very interesting to look at.

**GLOVE INDUSTRY**

Anon.
Tough time for Malaysia’s rubber glove industry
The Rubb. Int. Mag. 13(7) p. 22-23

Malaysia is undoubtedly the world’s biggest supplier of rubber gloves, exporting about 100 billion pieces of the rubber gloves to meet two-thirds of global demand. However, Malaysia’s glove maker are now facing the most difficult time in their business, being hit by many problems at the same time.

**INDUSTRIAL OUTLOOK – SYNTHETIC RUBBER**

Loh, L.
Global synthetic rubber industrial outlook
Rubb. India LXIII(6) p. 42-52

This paper is to compile and analyze the statistical data of synthetic rubber capacity and consumption to understand the impact of supply/demand on the global synthetic rubber market. Some forecasted consumption data were generated and published by the joint efforts of both IISRP (International Institute of Synthetic Rubber Producers) emerging issues in the synthetic rubber industry.

**INDEX OF NATURAL RUBBER**

Anon.
Platts launches daily natural rubber index
PR Newswire US 2011

Platts, a leading global provider of energy, petrochemicals and metals information and foremost source of benchmark price assessments, today launched the Platts Natural
Rubber Index (RBX), which is comprised of daily physical spot price assessments for two grades of natural rubber that are key to manufacturing tires and rubber products.

**MALAYSIAN CORRIDOR – INVESTMENT**

Nur Athira Syakira.
More investments in the Northern and Southern corridors
**Malaysian Corridor 2010 4 p. 66-69**
Total investments in the five development corridors reached RM248 billion up to May 2010, a sign of strong commitment from local and foreign investors. The Sarawak Corridor of Renewable Energy (SCORE) attracted the highest amount of investments, amounting to RM87.6 billion. This is followed by Iskandar Malaysia (RM60.2 billion), Northern Corridor Economic Region (RM40 billion), Sabah Development Corridor (RM32 billion) and the East Cost Economic Region (RM28.3 billion). Some 200 development projects and programmes were currently being implemented in the five development corridors since their inception in 2006. They included all 18 projects in Iskandar Malaysia, 54 programmes in SDC and 9 projects in SCORE. In NCER, 27 projects or 90 per cent are being implemented while in NCER, some 80 projects or 93 per cent are in full running.

**MARKET GROWTH – NATURAL RUBBER**

Hoffman, U
Natural rubber in a changing market : Launching a dialogue on key sustainability issues and opportunities
**The Rubb. Int. 13(11) p. 20-26**
In affirming that “states should reduce and eliminate unsustainable patterns of production and consumption,” the Rio Declaration sets a foundation for not only governmental action, but for all stakeholders to integrate sustainable development considerations and goals into their consumption and production decisions. One of the immediate outcomes of the Rio process was a growth in the development of voluntary national eco-labelling and private Corporate Social Responsibility strategies. Over the course of the past decade, these approaches have been complemented by a growth in the use of global and sector-wide voluntary standards and sustainability initiatives (VSIs) (such as fair trade, forest stewardship council, rainforest alliance, roundtable on sustainable palm oil etc).

**NR DEMAND**

Anon.
ANRPC foresact natural rubber demand will slow
**Rubb. & Plastics News 41(6)**
A bleak outlook for the global economy means a downward turn for the world natural rubber market, according to the Association of Natural Rubber Producing Countries.

**NR INDUSTRY – CHINA**

Anon.
China’s natural rubber industry research report in 2011
**PR Newswire US 2011**
On the basis of analyzing global natural rubber development status, the report makes deep research on policy environment, supply & demand status, regional market, major down-stream products and key enterprises, forecasts the development trend in the future, also analyzes the whole industry chain from a macroscopic view and provides investment suggestion.

**PLASTICS INDUSTRY**

Anon.
How to develop plastics industry in sustainable way?
**The Rubb. Int. 13(10) p. 18-22**
At present, plastics industry is one of the key engines in boosting economy for many countries. However, the industry has been heavily criticized for ruining environmental and the civil society around the globe urges their governments to control plastic use, as well as informing the public about the negative image for plastics. Due to the heavy criticism in which the plastics players have gone through, how will those players in this industry be able to push forward their business in a sustainable manner under a considerable criticism, or even make their business become much more prosperous in the future? That would be the key issue where the plastics industry players are looking at.

**RUBBER CONSUMPTION**

Anon.
Over a million tonnes of rubber shortage by 2010 : Impact of global rubber trends on consumption and price
**Rubb. Asia 25(5) p. 42-43**
The current global rubber trends are indicative of a few more years of demand overtaking supply making commodity dearer. Though statistics and analyses by experts differ in specifics, all of them agree that most part of the current decade will witness rubber price, especially that of natural rubber, ruling high. Following are condensed version of the presentations of three leading analysts, namely, Dr Stephen V Evans, Secretary General, International Rubber Study Group (IRSG), Dr Hidde P Smit, noted rubber economist and former Secretary General IRSG, and Jom Jacob, Senior Economist.
Association of Natural Rubber Producing Countries (ANRPC), on the issue at the recent India Rubber Summit and Dinner 2011.

**RUBBER INDUSTRY**

Samejaidee, T.
Rubber industry under flying dragon
*The Rubb. Int. 13(10) p. 28-34*

No one can deny that “Dragon” China has increasing role as the world’s super power in all aspects. With the enormous influence in the economy, politics and international relations, China’s movement is now triggering the strong wave throughout the world, including the impact on the global rubber industry in which the dragon is playing a key part.

**RUBBER INDUSTRY – CENTRE OF EXCELLENCE**

Mathews, A.S.
Malaysia will be global centre of excellence for rubber : Datuk Dr. Salmiah Ahmad
*Rubb. Asia 25(5) p. 34-41*

The hundred –year history of Malaysian rubber is marked by a lot of ups and downs. Two major developments during the period have been the country’s slide from the top slot in global natural rubber production to the third place and the shift into oil palm cultivation, mainly due to the un-remunerative prices of rubber. At the same time, the country’s rubber goods manufacturing industry grew by leaps and bounds over the years. Malaysia today is the world’s third largest producer and exporter of natural rubber (NR), the fifth largest consumer and the largest global consumer of latex concentrate. In the product manufacturing sector, Malaysia is the leader in the production and supply of medical rubber gloves, catheters, latex threads and cords.

**RUBBER INDUSTRY – MALAYSIA**

M Nooraini.
An interview : Datuk Dr. Salmiah Ahmad, Director General, Malaysian Rubber Board
*Indian/Int. Rubb. J. 2011 141 p. 10-13*

After more than one year as a Director General of Malaysian Rubber Board, the custodian for the Malaysian rubber industry, I have observed that the industry has undergone considerable changes, in line with the developments in the world economy in general and national policies in particular. Nevertheless, Natural Rubber (NR) remains a major industry sector in the Malaysian economy in terms of its contribution to the Gross Domestic Product (GDP), export earnings, employment and income, involving large numbers of smallholders. In 2010, the industry contributed about RM34 billion in export revenue, increased more than 2 fold increase from RM13.27 billion in 2000 and accounted for about 6% of Malaysia’s total export earnings. NR exports accounted for
Rm9.13 billion, while rubber products contributed to RM12.96 billion, other rubber which includes synthetic rubber, reclaimed, recycled and compounded rubber contributed RM27 billion and rubberwood products made up the rest at around RM7.63 billion.

**RUBBER MARKET**

Tiyo.
Market will stay upbeat strong demand
*Rubb. Asia* 25(5) p. 93-96

The rubber market was ruling remunerative all through July and August 2011 despite the turmoil in Kerala, India’s rubber State, caused by the Union Government’s reduction of duty to 7.5% on import of 40,000 tonnes of natural rubber. There was no valid reason for such turmoil. Even the probability of an erosion in rubber grower’s earnings through imports flooding the market and hitting down the price did not happen thanks to the tight supply situation at home and abroad.

**RUBBER PRICES**

Anon.
After 2012, NR prices are likely to slide : Dr Hidde P. Smit
*Rubb. Asia* 25(5) p. 44-45

The latest trends and available statistics point towards a continuing tight market during 2011 and 2012, with prices in the range of $4.50 to 5.00 and lower prices afterwards, says Dr Hiddle P Smit, noted Rubber Economist and former Secretary General of the International Rubber Study Group (IRSG). According to him, the two pillars determining prices and market shares for NR and SR are total rubber consumption growth will exceed total rubber consumption growth.

Matade, S.
High NR prices hit stock prices
*Polym. & Tyres Asia* 2(5) p. 24-25

Rising input costs, mainly of natural rubber, have hurt Indian tyre companies’ margins undermining their stock performance on the bourses. A study to evaluate performance on the bourses. A study to evaluate performance on tyre company stocks between Sept 1, 2010 and Aug 30 2011, indicates that their shares have plunged 15%-75% compared with a 9% fall of the Bombay Stock Exchange’s 30-share Sensex. However, the Auto Index has fallen only by around 5% during the same period.

Mathews, A.S.
Prices may stay high on tight supply
*Rubb. Asia* 25(4) p. 40-44
The crossing of $5 milestone by natural rubber (NR) has, of course, added to the excitement of growers while the consumers, mainly tyre companies that account for a major share of the global NR consumption, are stricken with panic. The consuming industry is seized of the issue and is exploring ways and means to somehow keep their margins intact in the face of the growing demand supply gap in NR.

Smit, H.P.
NR supply response to prices: High prices can hardly boost production
Rubb. Asia 2011 25(4) p. 34-39

Natural rubber (NR) prices reached all-time highs in the recent past with TSR 20 at SICOM trading at levels over $5 per kg. In contrast, 10 years ago, prices were at lows of around $0.50 per kg. How has this affected natural rubber supply? This article tries to assess how producer behaviour has evolved in the past in order to draw lessons for forecasting the future. The focus will be on the major producing countries Thailand, Indonesia, Malaysia, India, Vietnam and China. For all countries, national aggregates will be used, except for Indonesia and Malaysia where smallholdings and estates will be distinguished. Annual data will be used. Supply response can be split into short-term response and long-term response. Long-term response is implemented along lines of discarding and replanting. The focus of this article is on short-term supply response.

**RUBBER PRICES – THAILAND**

Moore, M.
NR prices fall despite Thailand floods
Rubb. & Plastics News 41(7)

Widespread flooding has closed auto factories in Thailand, but the country’s natural rubber production has been relatively unaffected, according to sources close to the rubber trade. Most of the flooding has taken place in the northern part of Thailand, whereas 85 percent of NR-growing regions are in the south, they say.

**RUBBER SUPPLY**

Anon.
We are only at the beginning of a decade of tight NR supply: Jom Jacob
Rubb. Asia 25(5) p. 46-47

Global supply of natural rubber will remain “tight” at least during the next seven years as output gains among key growers fail to match rising demand from rubber goods manufacturing industry, mainly tyre and glove makers, says Jom Jacob, Senior Economist, Association of Natural Rubber Producing Countries (ANRPC).
HEVEA

ALTERNATIVES

Anon.
Intense research on alternatives
Polym. & Tyre Asia 2011 2(25) p. 56-57

International renowned researcher on alternative natural rubber Dr Katrina Cornish says global NR shortfall is driving scientist to discover sustainable alternatives. *Guayule* and *Russian dandelion* are in their focus, but they will not replace *Hevea brasiliensis* rubber. But the two plant species will certainly supplement the global rubber supply and make up for the deficit that is currently predicted.

Munt, O., et al.
Fertiliser and planting strategies to increase biomass and improve root morphology in the natural rubber producer *taraxacum brevicorniculatum*
Industrial Crops and Products 36 p. 289-293

*Taraxacum brevicorniculatum* produces high-quality natural rubber in its roots and could be developed as an alternative commercial source of this valuable raw material. However, current wild type accessions have a low biomass and branched roots that make them difficult to harvest.

BRANDING – COMMODITY ACCEPTANCE

Thomas, S.
Branding of NR : An assurance of quality
Rubb. Asia 25 (4) p. 134-135

Branding is a modern management technique to improve the domestic as well as international acceptability of a commodity. In the case of NR, it is an assurance of quality and a promise by the exporter, with the endorsement of the Rubber Board, India.

CLONES

Daud, R. D.; Feres, R. J.; Hernandes, F.A.
Seasonal suitability of three rubber tree clones to *Calacarus hevea* (Acari, Eriophydae)

The suitability of rubber tree clones to *Calacarus heveae* was inferred from the life cycle, reproduction and survivorship of this mite. The assays were performed under controlled conditions with leaflets detached from 6-year-old plants. The development of 20C. *heveae* individuals on each of the clones GT 1, PB 235 and RRIM 600 was analysed.
Majumdar, S.
Plasticizer in elastomer

Any elastomer cannot be used as such because it is plastic state (soft) and does not show its usual ‘elastic’ behaviour unless it is cured or ‘vulcanized’. Vulcanization of polyolefinic rubbers can be defined as the process by which the reaction between the polyolefin and sulphur, that greatly increases in elastic properties of the polyolefin and can maintain certain properties of the polyolefin and can be defined as the process by which the reaction between the polyolefin and can maintain certain properties over a comparatively wide range of temperature. In sulphur vulcanization, therefore, sulphur helps in the formation of plastics rubber to three dimensional elastic state (Fig. 1).

**GENE**

Characterization of a cassinicolin-encoding gene from *corynespora cassiicola*, pathogen of rubber tree (*Hevea brasiliensis*)
Plant Sci. 2011 p. 1-10

*Corynespora* Leaf Fall (CLF) is a major disease of rubber tree (*Hevea brasiliensis*) caused by the Ascomycota *Corynespora cassiicola*. Here we describe the cloning and characterization of a gene encoding cassinicolin (Cas), a glycosylated cystein-rich small secreted protein (SPP) identification as a potential CLF disease effector in rubber tree. Three isolates with contrasted levels of aggressiveness were analyzed comparatively.

**GENE EXPRESSION**

Differential gene expression in different types of *Hevea brasiliensis* roots
Plant Sci. 2011 p. 1-10

Three types of roots (taproots, first order laterals and second order laterals) were functionally characterized on 7-month-old *in vitro* plantlets regenerated by somatic embryogenesis in *Hevea brasiliensis*. A histological analysis revealed different levels of differentiation depending on root diameter.

**LATEX – GLYCOLIPID**

Liengprayoon, S., et al.
Glycolipid composition of *Hevea brasiliensis* latex
Phytochemistry 72 p. 1902-1913

Glycolipid of fresh latex from three clones of *Hevea brasiliensis* were characterized and quantified by HPLC/ESI-MS. Their fatty acyl and sterol components
were further confirmed by GC/MS after saponification. The four detected glycolipid classes were steryl glucosides (SG), esterified steryl glucosides (ESG), monogalactosyl diacylglycerols (MGDG) and digalactosyl diacylglycerols(DGDG). Sterols in SG, ESG and total latex unsaponifiable were stigmasterol, \( \beta \)-sitosterol and \( \Delta^5 \)-avenasterol.

**NATURAL RUBBER INDUSTRY**

Anon.
BC, a visionary leader: Prof. M.S. Swaminathan
*Rubb. Asia* 2011 25(5) p. 62-64

BC was a visionary leader and today the natural rubber industry is thriving because of his great vision, according to Prof. M.S. Swaminathan, the world-renowned agricultural scientist.

**NR INDUSTRY – INDIA**

Venugopal, P.
Challenges before Indian NR industry
*Rubb. Asia* 2011 25(4) p. 141-143

India is well-poised to be a hub of the global rubber industry in view of the vast potential for further development of tyre and other rubber-based industries. However, supply has not kept pace with the rising demand for NR. India needs to explore all avenues for stepping up NR output to tap the emerging opportunities in the rubber industry.

**PRODUCTION**

Mohanan, K.G.
How India made it to No. 1 slot in productivity
*Rubb. Asia* 2011 25(4) p. 61-64

Successive India Governments have been continuously supporting rubber development in India through policies, programmes, projects, campaign and various other educational and extension services. The Rubber Board, the implementing agency for such programmes and projects, has been keen on doing its job with utmost honesty. The rubber farming community, spread over the 16 States in India, has enthusiastically adopted the Board’s directives for their benefit. In the matter of technology adoption, the number of laggards among rubber growers is relatively less when compared to farmers of other crops.

**PRODUCTS**

Skariah, A.
Baby feeding & teething industry: Research can boost NR – made products
Rubb. Asia 2011 25(4) p. 73-75

The market share of the superior natural rubber products in baby feeding &
teething industry can be enhanced considerably through proper research which can
improve their aesthetic properties as well.

**LATEX CHEMISTRY & TECHNOLOGY**

**BIOTECHNOLOGY – BIODEGRADABLE PLASTIC**

Sivan, A.
New perspectives in plastic biodegradation
*Current Opinion in Biotechnology* 2011 22 p. 422-426

During the past 50 years new plastic materials, in various applications, have
gradually replaced the traditional metal, wood, leather materials. Ironically, the most
preferred property of plastics-durability-exerts also the major environmental threat.
Recycling has practically failed to provide a safe solution for disposal of plastic waste
(only 5% out of 1 trillion plastic bags, annually produced in the US alone, are being
recycled). Since the most utilized plastic is polyethylene (PE; ca. 140 million tons/year),
any reduction in the accumulation of PE waste alone would have a major impact on the
overall reduction of the plastic waste in the environment. Since PE is considered to be
practically inert, efforts were made to isolate unique microorganisms capable of utilizing
synthetic polymers. Recent data showed that biodegradation of plastic waste with selected
microbial strains became a viable solution.

**EXUDE LATEX**

Konno, K.
Plant latex and other exudates as plant defence systems : roles of various defence
chemicals and proteins contained therein
*Phytochemistry* (2011) p. 1-21

Plant latex and other exudates are saps that are exuded from the points of plant
damage caused either mechanically or by insect herbivory. Although many (ca. 10%) of
plant species exude latex or exudates, and although the defensive roles of plant latex
against herbivorous insects have long been suggested by several studies, the detailed
roles and functions of various latex ingredients, proteins and chemicals, in anti-herbivore
plant defenses have not been well documented despite the wide occurrence of latex in the
plant kingdom. Recently, however, substantial progress has been made. Several latex
proteins, including cysteine proteases and chitin-related proteins, have been shown to
play important defensive roles against insect herbivory.
RUBBER CHEMISTRY & TECHNOLOGY

CALCIUM CARBONATE

Poompradub, S., et al.
Improving oxidation stability and mechanical properties of natural rubber vulcanizates filled with calcium carbonate modified by gallic acid
A novel technique to modify the surface of calcium carbonate (CaCO$_3$) nanoparticles, used as an antioxidant and reinforcing filler, by gallic acids is disclosed. The new properties of the modified (CaCO$_3$) could make it more useful and practical for the rubber industry.

CARBON BLACK

Majumdar, S.
Processing of acetylene black
Carbon black is an important industrial chemical which has been used over thousands of years. The extremely black colour and fine particle size have also made it an ideal material for pigment applications. Carbon Black is finely divided carbonaceous pigment, produced by thermal decomposition of hydrocarbons in an oxygen deficiency environment. In excess of oxygen, carbon will be converted into carbon dioxide and therefore, all categories of carbon black will always be produced in controlled conditions. It can be produced in absence of oxygen, called, Thermal decompositions of hydrocarbon.

CARBON NANOTUBES

Zhan, Y. H., et al.
Natural rubber/carbon black/carbon nanotubes composites prepared through ultrasonic assisted latex mixing process
Plastics, Rubb. and Composites 40(1) p. 32-39
Carbon black (CB) and carbon nanotubes (CNTs) filled natural rubber (NR) composites were prepared through an ultrasonic assisted latex mixing process. Carbon nanotubes were dispersed into NR latex by ultrasonic irradiation and then the mixed latex were co-coagulated to obtain the CNTs/NR masterbatch. The structure and properties of the composites were characterised. The results show that the ultrasonic assisted latex mixing methods. The well dispersed CNTs and CB exhibited a synergistic reinforcing effect. When the weight ratio of CB/CNTs was 20 : 5 (parts per hundred of rubber), the mechanical properties reached the maximum loss tangent decreased. Dynamic rheological measurement showed the storage modulus and complex viscosity of rubber composites increased and the shear thinning index decreased with increasing CNT contents.
CHEMICAL INDUSTRY

Venugopal, P.
Rubber chemical industry : India on a high growth trajectory
Rubb. Asia 25(4) 2011 p. 28-30

Indian rubber chemical industry is well-poised to take advantage of the rise in demand caused by steady growth of tyre and rubber industries. To realize the growth potential, the industry and Government have to work hand in hand to address basic issues like creation of high-quality infrastructure, availability of feedstock, modernization of technology and training of talent.

ELASTOMERIC FRICTION

Smith, R.H.
Measuring Rubber Friction forces individually
Rubb. World 2011 p. 20-23

The current de facto standard engineering equation for elastomeric friction calculations – formulated for practical application to sliding tires in 1966 – incorporates three dynamic rubber friction forces: (1) adhesion; (2) a hysteretic force arising from bulk deformation of rubber in contact with a macroscopically rough surface; and (3) physical wear of the rubber, or cohesion loss. The existence of a fourth basic rubber friction force, surface deformation hysteresis, or microhysteresis, generated by adhesive interaction of the elastomer’s surface with the microroughness of the contacted material, had been posited in 1965. Although a number of researchers supported this hypothesis, none was able to verify it through testing.

FILLERS – SODIUM SULFATE

Imran Khan; Poh, B.T; Badriah, C.M.
Effect of sodium sulfate on viscosity, tack and adhesion properties of SMR 10-based pressure-sensitive adhesive
J. of Elastomer and Plastics 43(1) p. 85-95

The effect of sodium sulfate as filler on viscosity, tack, and adhesion properties of Standard Malaysian Rubber (SMR 10)-based pressure sensitive adhesive were studied. Coumarone-indene resin and toluene were used as the tackifier and solvent respectively throughout the experiment. The results show that viscosity of adhesive increases with addition of sodium sulfate. For rolling ball tack test, the distance traveled by rolling ball decreases with coating thickness of adhesive. For cross-hatch adhesion test, result shows that maximum of wettability of adhesive. The 60 µm of adhesive coating thickness shows good performance of adhesion property of SMR 10-based pressure sensitive adhesive.
INNOVATION

Anon.
“Goo” – Silence rubber table mats and coasters
The Rubb. Int. Mag. 2011 13(10) p. 60

UK-based design maker Mode Associates Ltd has a large number of designed products coming out into the market. One of its fascinating silicone rubber-based products is “Goo dining set”, consisting of silicone table mats and coasters.

MANUFACTURING – TENNIS BALL

Majumdar, S.
Making of tennis ball
Rubb. India 2011 LXIII(5) p. 42-52

Tennis ball are one of the most widely used commodities in sporting goods industry as pressurized balls can be deemed unfit for play as soon as nine games after opening. Use of pressurized ball are very rare in use in the game today.

PEROXIDE VULCANIZATION

George, B.; Alex, R.
Scorch control in peroxide vulcanization using a stable free radical
Rubb. India LXIII(6) p. 54-56

Peroxide vulcanization of rubbers offers various advantages over sulphur vulcanization like rapid vulcanization without reversion at higher temperatures, good compression set, excellent heat ageing properties, possibility to co-vulcanise saturated and unsaturated rubber blends etc. These are attributed to the C-C cross-links formed during peroxide vulcanization, which have the same bond strength as the C-C bonds in the polymer back bone. As per the generally accepted mechanism, peroxide vulcanization is initiated by the thermal decomposition of organic peroxides to highly reactive free radicals which then abstract hydrogen atoms from the elastomer, yielding rubber macroradicals.

PRESSURE – SENSITIVE ADHESIVES (PSAs)

Imran Khan.; Poh B.T.
Natural rubber-based pressure – sensitives adhesives : A review

The purpose of this review is to describe the various aspects of pressure-sensitive adhesives prepared from natural rubber. Pressure-adhesives (PSAs) adhere instantaneously to a variety of surfaces upon application of slight pressure and can be obtained using different technologies. PSAs are materials that develop tack for low
pressures and short contact times. There are number of factors affecting the adhesion property of natural rubber based pressure adhesives.

**RUBBER APPLICATION – SEISMIC BEARING**

Wei, Z., et al.
Seismic performance of continuous girder bridges using cable-sliding friction aseismic bearing
*Procedia Eng. 2011 14 p. 914-921*

This paper reports on the study of the performance of a new seismic control device named as cable-sliding friction aseismic bearing (CSFAB), which combines a conventional aseismic bearing with restrainer cables to dissipate earthquake energy and at the same time to control the displacement of girder to an acceptable value. A two-dimensional long-span continuous girder bridge model was developed and analyzed in the study. Considering the influence of different site conditions, the model was subjected to three historic ground motion records applied to different (A,B,C,D) site conditions specified in the USGS site classification.

**RUBBER COMPOUND**

Finazzi, E.; Gallo, A.; Lucci, P.
Continuous compounding and recycling using a co-rotating twin screw extruder
*Rubb. World 244(2) p. 21-26*

Nowadays, most rubber compounds are still made with a batch system. However, multiple and notable advantages are shown by a continuous process. The development of extrusion technology with co-rotating twin screw extruders allowed the development of a continuous process based on these machines. The knowledge in this field is continually growing, thanks to research oriented toward process optimization and simplification, and to the extension of the processable materials range.

**SEISMIC BEARING**

Varma, R.
Quake absorber
*Polym. & Tyre Asia 2011 2(25) p. 60-61*

The use of structural protection isolators made of rubber in buildings protect them from collapse during earthquake. In spite of being soft and elastic, the ability of natural rubber to support heavy structures has made its engineering application a key element in large structures, says Toshio Nishi, Emeritus Professor at Tokyo Institute of Technology in this exclusive interview.
Ayman A. Saleemah.; Mohamed Al-Sharkawy
Seismic response of base isolated liquid storage ground tanks
*Ain Shams Eng. J. 2011 7 p. 33-42*
In this paper, the seismic responses of base-isolated broad and slender cylindrical liquid storage ground tanks are investigated. Three types of isolation systems are considered. The seismic responses are compared with the corresponding responses of non-isolated tanks. Moreover, a parametric study was conducted to evaluate the effect of tank aspect ratio, isolation period, and friction coefficient of the FPS system on key responses of the tank.

**SILICA SUSPENSION**

Prasertsri, S.; Rattanasom, N.
Mechanical and damping properties of silica/natural rubber composites prepared from latex
*Polym. Testing 2011 30 p. 515-526*
In this research, a well-dispersed silica suspension was prepared by using a bead mill before adding into natural rubber (NR) latex for preparing silica/NR masterbatches. The coagulated silica/NR masterbatches with 10–30 parts of silica per hundred parts of rubber (phr) were mixed with other rubber chemicals on a two-roll mill. Cure characteristics, mechanical and damping properties of the vulcanizates prepared from the masterbatches were compared with those prepared by a conventional method.

**SILICON RUBBER**

Yin, S.; Ma, L.; Wu, L.Z.
Carbon fiber composite lattice structure filled with silicon rubber
*Procedia Eng. 10 p. 3191-3194*
In the present study, the highly efficient composite lattice structures were filled with silicon rubber in their enormous space, to enhance their mechanical property and energy absorption capacity. Out-of-plane compression tests were carried out to evaluate the enhancement. The initial response and failure mode of the newly developed structure kept the same as that before filling. However, a higher stress level region was appeared which benefited to its energy absorption.

**SPECIALTY NR**

Zairossani Mohd Nor.
Specialty natural rubber : For sustainable & advanced product applications
*Rubb. Asia 25(5) p. 78-80*
The Malaysian Rubber Board (MRB) has developed specialty natural rubbers with properties for sustainable and advanced product applications and for helping NR compete successfully with synthetic rubbers.
**STR20**

Samejaidee, T.
Exclusive interview: Prasat Kesawapitak unveil block rubber STR20 – New AFET product

*The Rubb. Int. Mag. 2011 13(11) p. 27-30*

The Rubber International Magazine revisited Agricultural Futures Exchange of Thailand (AFET) at All Seasons Place, Wireless Rd., and this time is a special visit because AFET has just launched a new product – Block Rubber STR20 – for trading since 28 October. The Rubber has another opportunity to talk with Mr. Prasat Kesawapitak, Chairman of the AFET, about the new product, as well as updating the recent development of AFET.

**SYNTHETIC RUBBER**

Stenmark, N.; Technimet, S.
Conducting failure analysis on a fuel hose

*Rubb. World p. 32-37*

A wire reinforced synthetic rubber fuel hose was submitted for analysis, as it exhibited leaking while in service. It was started that the fuel hose was used in an aircraft auxiliary fuel system as a fuel pressure line. The failed fuel hose had reportedly been in service since 1998, where it was installed inside on aircraft cargo bay. A new fuel hose from current production was also submitted for comparison purposes.

**TYRES**

**GREENHOUSE GAS EMISSIONS**

Anon.
Quiet efficiency

*Polym. & Tyre Asia 2011 2(5) p. 68-69*

There is virgorous research to find new thread compounds and innovative tyre designs in order to reduce rolling resistance and at the same time enhance safety in order to improve fuel efficiency of vehicles. Dr Saikat Das Gupta, Chief Scientist at the Hari Shankar Singhania Elastomer & Tyre Research Institute, an independent research and testing centre promoted by JK Tyre, says reduction could contribute to massive reduction in global greenhouse gas emissions.

**RETREADS**

Anon.
Power your threads
Polym. & Tyres Asia 2(5) p. 36-37
Kraiburg, the Austrian global supplier of retreading materials and industry solutions for over 60 years, has come out with new patterns that are accessible on its revamped website and through iPhone applications. After winning accolades for its K wide technology that offers high safety and mileage, low rolling resistance and low heat build-up, it has earned a reputation as a company whose priorities are safety, value for money and environmental sustainability, says CEO Thorsten Schmidt in an interview.

RETREADING INDUSTRY
Anon.
Auto boom, rise in tyre prices to fuel growth
Rubb. Asia 2011 25(4) p. 89-91
Future prospect appear very bright for the tyre retreading industry in India, thanks to factors like growth in vehicle population, rise in prices of new tyres and enhanced quality of retreaded tyres aided by modern technology. But the rising cost of raw materials is pushing many small retreaders out of business.

RFID – TYRE TRACKER
Anon.
RFID : Efficient tyre tracker
Polym. & Tyre Asia 2(5) p. 64-65
An internationally-respected authority on Radio Frequency Identification Dr Patrick King is currently serving as leader for Global electronic Strategies for Michelin. An inventor with over 20 patents to his credit, he once commented that the biggest challenge facing RFID’s wider option is removing the myths over its use. RFID is not to displace barcode, it’s to embellish it, he has said.

TYRE CYCLING
Anon.
Recycling innovations
Polym. & Tyre Asia, 2(5) p. 76-77
The Netherlands-based Rumal Rubber Industries has made ground-breaking innovations in tyre recycling that have turned sustainability and quality in a commercial success, CEO Jan Van den Brand says. The company has achieved its reputation as world’s leading tyre recycling company because of its global presence and strong customer confidence in its products and processes, he says.
BIOTECHNOLOGY INDUSTRY

Singh, R.
Facts, growth and opportunities in industrial biotechnology

The revolution in synthetic biology has enabled innovative manufacture of biofuels and development of biological process for the manufacture of bulk and fine chemicals. This short review gives some examples of recent progress.

PREVULCANISED LATEX COMPOUND

John, J.; Pai, V.
Properties of No-Ammonia, ultra lowprotein NR latices and their prevulcanised compounds
The Rubb. Int. Mag. 2011 13(10) p. 23-26

To overcome the disadvantages associated with the usage of Ammonia as NR Latex Preservative, NR Latex is preserved using proprietary preparation, developed at KA Prevulcanised Latex Pvt Ltd (KAPVL), and their properties are evaluated. The Prevulcanised Latex compound is prepared using this No-Ammonia Latex and their properties are compared with the conventional PV Latex compound.

PROCESS CONTROL

Johnson, L.; McNeillly, K.
Result may not vary: how factorial experimentation can reduce variation and improve quality
Quality Progress 44(5) p. 42-48

Controlling manufacturing process so that products meet customer specification is difficult. Understanding and quantifying the impact of process inputs on the outputs is critical to process control. Sometimes we can rely on our knowledge of the process for this understanding, but often the process response defies our predictions. In such situations, factorial experimentation can be the key to understanding the impact of each process input in the process outputs. Experiment results also provide a mathematical model quantifying the effect of each input, allowing you to desired target.
What is renewable energy? This term can sometimes be confusing. The world “renewable” refers to the source of energy and not the type or how it is used. The well known sources of energy include fossil fuel, wind, solar, biomass, hydro, nuclear, geothermal and tidal waves. Going strictly by definition the term “renewable energy” can be rather vague since all sources of energy are renewable, meaning that they can constantly be regenerated or renewed. However the problem arises when we used a particular source of energy faster than it can be regenerated. It is a “simple“ supply-and demand matter.

RISK MANAGEMENT

Reid, R.D.
What have we learned
Quality Progress 44(5) p. 18-23
On March 11, a 9.0-magnitude earthquake tsunami hit the northeast coast of Japan. The damage was extensive and included the Fukushima Daiichi nuclear power plant, a development that renewed fears of nuclear fallout around the globe and left several countries, including the United States, asking questions about their readiness for such a situation. In a more general way, however, the disaster in Japan provides us with a good context to see what lessons can be learned from fundamental quality management science.

R&D MANAGEMENT

Liu, Y.; Keller, R.T.; Shih, H-A.
The impact of team-member exchange, differentiation, team commitment, and knowledge sharing on R & D project team management
R&D Management 41(3) p. 274-287
This paper integrates team-member exchange (TMX), affective commitment, and knowledge sharing to examine how to work unit TMX influences employees’ R&D project team commitment and intention to share knowledge, and how team knowledge-sharing intention and TMX differentiation influences team performance. The results support the relationships between work unit TMX and employees’ intention to share knowledge and team commitment. In addition, the results show that work unit TMX increases intention to share knowledge through increasing group members’ team commitment. At the group level, the results support the relationships between team knowledge-sharing intention and team performance. The results also show at TMX differentiation moderates the relationship between work TMX unit and team
performance. That is, greater work unit TMX is more likely to achieve higher team performance in a team with low TMX differentiation as opposed to a team with high TMX differentiation. Implications for theory building, future research, and R&D management are discussed.

**RUBBER INDUSTRY**

Swaminathan, M.S.
B C Sekhar, a scientists' scientist : Prof M. S. Swaminathan
Rubb. Asia 2011 25(5) p. 27-28

Had we not had a visionary leader like BC, planter would have given up natural rubber in the 70s. Today the natural rubber industry is thriving because of BC’s vision, mission and persistence.