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NATURAL AND SYNTHETIC RUBBER USAGE - THE EMERGING TRENDS

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Abstract
Rubber is one of the most important commercial agricultural commodities traded both through the spot market and the security exchange market in India. The two sources of 'rubber', namely, natural and synthetic, attempts to satisfy the raw material requirements of the various rubber based industries in India. The economy offered by synthetic rubber is now becoming a new trend in many such industries like automobile and footwear in India. The continuous increase in the price of natural rubber also contributed much towards this trend. So this study tries to make an attempt to analyze the inevitable shift from the part of the rubber based industries to depend more on synthetic rubber to meet their raw material requirements.

Key words: Natural Rubber, Synthetic Rubber, Derivatives, Futures, MCX, NMCE.

Introduction

Rubber as an industrial input has got a significant commercial relevance in the Indian industry. The rubber requirements of Indian industry are met both from the domestic as well as external sources. Both the spot market and the exchange based market are very active in supplying the raw material requirements of the industry. However, on account of the shortage of natural rubber and its high price level, the total rubber requirements of the industry cannot be met from the internal production.

There are basically two broad categories of rubber used by the industry, namely 'Natural Rubber' and 'Synthetic Rubber'. The rubber trees provide natural rubber. In this area, India has got a prominent position among the countries of the world. The synthetic rubbers are made in the artificial laboratories. Both the natural and the artificial rubbers are of different grades or sub categories. The price levels of these are different in the spot market as well as in exchange markets. In exchange based transactions, only the 'futures' mechanism is available in India.

Even though India tops in position in the production of natural rubber, the industry does not effectively use it for consumption. The latest trends show that consumption of synthetic rubber exceeds the use of natural rubber for the past few years. The figures for the past three years indicate that, when there is only a nominal 3.5 per cent average annual rate of growth in the consumption of natural rubber the average annual rate of growth in the consumption of artificial rubber is a significant 13.3 per cent

Natural Rubber (NR)

In India, commercial cultivation of natural rubber was introduced by the British Planters, althoughtheexperimental efforts to grow rubber on a commercial scale in India were initiated as early as 1873 at the Botanical Gardens, Calcutta. The first commercial Hevea plantations in India were established at Thattekadu in Kerala in 1902. The natural rubber is collected by the farmers from the rubber trees on a regular basis and processed into rubber sheet, dried and sold on a large scale. Though synthetic rubber produced in India satisfies the needs of the industry significantly, the major portion of the industrial requirement has been satisfied by the natural rubber and the same is widely exported also. India holds the sixth position among the group of countries of the world, such as, Thailand, Indonesia, China, Malaysia, and Vietnam in the production of natural rubber. The states of Kerala, Assam and Karnataka are the major contributors of natural rubber in India. The commodity exchanges like MCX and NMCE are major commodity exchanges dealing online rubber trading in India.

Recent statistics indicates that production of natural rubber in India crossed 9 lakh tons. Of this the state of Kerala accounts almost 75%-80% of the production. The hallmark of the Indian natural rubber sector is the predominance of small and marginal growers. Currently 90% of the area and 93%of the production of rubber are contributed by the small farm sector comprising 1.19 million units. The average size of the rubber holding in the country is around 0.54 hectare.

Synthetic Rubber (SR)

Synthetic rubber is industrially produced and used in large volume as input by the rubber based industries. Synthetic rubber is any type of artificial elastomer, invariably a polymer. Elastomer simply means a material having the property that it can have much more elastic deformation under stress than most material and still return to its previous position without a permanent deformation. Synthetic rubber serves as a substitute for natural rubber in many cases, especially when improved material properties are required.

In 1879, Bouchardat created one from of synthetic rubber, producing a polymer of isoprene in a laboratory. The expanded use of motor vehicles, and particularly motor vehicle tires, starting in the 1890s, created increased demand for rubber. In 1909, a team headed by Fritz Hofmann, working at the Bayer laboratory in Elberfeld, Germany, also succeeded in polymerizing methyl isoprene, the first synthetic rubber. Scientists in England and Germany developed alternative methods for creating isoprene polymers from 1910-1912.

The Russian scientist Sergei Vasiljevich Lebedev created the first rubber polymer synthesized from butadiene in 1910. This form of synthetic rubber provided the basis for the first large scale commercial production , which occurred during world war I as a result of shortages of natural rubber. This early form of synthetic rubber was again replaced with natural rubber after the war ended, but investigations of synthetic rubber continued. Russian American Ivan Ostromislensky did significant research on synthetic rubber and a couple of monomers in the early 20^{th} century. Political problems that resulted from great fluctuations in the cost of natural rubber led to the enactment of the Stevenson Act in 1921. This act essentially created a cartel which supported rubber prices by regulating production (see OPEC), but insufficient supply, especially due to wartime shortages also led to a search for alternative forms of synthetic rubber.

Studies published in 1930 written independently by Lebedev, the American Wallace Carothers and the Germans scientist Hermann Staudinger led in 1931 to one of the first successful synthetic rubbers, known as neoprene, which was developed at DuPont under the direction of E.K.Bolton. Neoprene is highly resistant to heat and chemicals such as oil and gasoline, and is used in fuel hoses and as an insulating material in machinery.

The first rubber plant in Europe SK-1(from Russian "Synthetic Kauchuk", Russian:CK-1) was established (Russia) by Sergei Lebedev in Yaroslavl under Joseph Stalin's First Five-year plan on july7,1932. In 1935, German chemists synthesized the first of a series of synthetic rubbers known as Buna rubbers. These were copolymers, meaning the polymers were made up from two monomers in alternating sequence. Other brands included *Koroseal*, which Waldo Semon developed in 1935, and sovprene, which Russian researchers created in 1940.

The Comparison of NR and SR Consumption in India

Table showing consumption and growth rate of NR and SR

Year	Consumption (NR)	Growth % (NR)	Consumption (SR)	Growth % (SR)
2000-01	631475	0.00	170670	0.00
2001-02	638210	1.07	174530	2.26
2002-03	695425	10.13	194850	14.17
2003-04	719600	13.96	210190	23.16

2004-05	755405	19.63	224650	31.63
2005-06	801110	26.86	237495	39.15
2006-07	820305	29.90	270830	58.69
2007-08	861445	36.42	297155	74.11
2008-09	871720	38.05	292950	71.65
2009-2010	930565	47.36	347710	103.73
2010-11	947715	50.08	411436	141.07
2011-12	964415	52.72	423350	148.05
2012-13	972705	54.04	444160	160.24

(Source: Handbook of Rubber statistics published by Indian Rubber Board)
Note: For growth calculation, 2000-01 is taken as the base year.

The table shows a significant growth in the case of synthetic rubber. From a minor growth rate of 2.26% in 2001-02 it reached a level of 160.24% rate of growth in 2012-13. However during the same period in the case of natural rubber, the growth rate is very slow moving from 1.07% to a comparatively low 54.04%. The comparative figures show a gradual shift from natural rubber to synthetic rubber in meeting the input requirements of rubber based industrial units.

The analysis also reveals that the share of natural rubber in the total raw material market declined from 78.72% to 68.65% during the period 2000 (-01) – 2012 (-13) period. On the other the share of synthetic rubber has grown from 21.27% to 31.34% during the corresponding period. As crude oil prices continue to decline, synthetic rubber (a byproduct of crude oil) has become more attractive to the industry.

To conclude, the shift from the use of natural rubber to that of synthetic rubber is clearly evident in meeting the raw material requirements of rubber based industries. The rise in the price of natural rubber (of course the latest trend shows a decline) coupled with its insufficient production volume steadily and gradually leads the manufacturers to depend more on synthetic rubber moving away from natural rubber. Reduction of the price of crude oil actively supports this trend.

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