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PRESENT STATUS AND FUTURE DEVELOPMENT  
OF SYNTHETIC RUBBER INDUSTRY IN INDIA <sup>1/</sup>

by

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Present status and future development of Synthetic Rubber Industry in India.

I. INTRODUCTION

1. The Rubber Goods Mfg. Industry in India is well developed with a wide range of products meeting practically the entire domestic demand and is making rapid strides to increase export sales. The product range includes automobile tyres and tubes for various categories of vehicles, bicycle tyres and tubes, rubber and canvas footwear, industrial rubber products such as conveyor, transmission, V and Fan belts, automobile rubber components, industrial and agricultural hoses, other moulded and extruded goods, latex products such as foam, contraceptives, gloves, etc. The estimated value of annual production for all these products was about Rs. 4,000 million during 1972-73 and the estimated value of export sales during 1972-73 was about Rs. 100 million. The total consumption of new polymer during the same period was about 135,000 M. tonnes. The consumption of new polymer which is indicative of the growth of the industry during the past 10 years has been as under:-

Year	Table-I		(M. Tonnes)
	Natural Rubber	Synthetic Rubber	Total
1961-62	48,410	10,186	58,596
1962-63	53,553	10,223	64,276
1963-64	61,155	11,959	73,114
1964-65	61,057	15,285	76,342
1965-66	63,765	21,553	85,318
1966-67	68,685	23,592	92,277
1967-68	74,518	23,324	97,842
1968-69	86,615	27,238	113,853

1969-70	34,213	30,626	116,849
1970-71	87,237	33,150	120,397
1971-72	36,454	37,09	133,665
1972-73 (Apr-Feb.)	34,119	31,190	125,277

2. The average annual increase in the consumption of new polymer has been about 12.8%. The estimated demand of the total new polymer has been assessed as 200,000 M. Tonnes by 1978 and as per the growth rate during the last 10 years, the same may reach a level of 330,000 M. Tonnes by 1980. Production capacity for all the major raw materials required by the Tyre and other Rubber Goods Mfg. industry has already been set up in the country to enable its unhindered growth.

3. India is one of the few countries where there is production of both Natural and Synthetic rubber and also a well developed consuming industry viz. Rubber Goods Manufacturing Industry. The production of Natural rubber in India has increased from a modest level of 25,700 M. Tonnes in 1960 to about 142,000 M. tonnes during 1972-73. This has been achieved by replanting the older plantations with high yielding species and also to a limited extent by bringing in newer areas under rubber cultivation. In order to augment the supply position of rubber to meet the growing needs of the Rubber Goods Mfg. Industry, steps were taken to develop capacity for the production of General Purpose Synthetic rubber.

II. Present status of Synthetic Rubber Industry in India

4. The first Synthetic rubber plant was set up by M/s. Synthetics & Chemicals Ltd. at Bareilly in Uttar Pradesh with a plant capacity of 50,000 M. tonnes per year and the unit commenced commercial production from 1963. The unit has been producing 3 major grades of Styrene-Butadiene Synthetic rubber; these grades are (a) Synaprene 1500, 1502 which are Styrene

Butadiene Copolymers made by the cold emulsion polymerisation system ( ) Synprene 1712 and 1714 which are copolymers of Butadiene and Styrene made by the cold emulsion polymerisation process and extended with aromatic oils and (c) Synprene 1958 which is a high Styrene Butadiene resin. The plant has facilities to produce both the principal monomers Butadiene as well as Styrene. The technologies and know-how have been obtained from Chemische Werke Huls, West Germany, for Styrene; Union Carbide, USA for Butadiene and Firestone Synthetic Rubber & Latex Co., USA for the rubber plant.

5. The production of Butadiene and Ethylene for the Styrene plant by M/s. Synthetics & Chemicals is based on the utilisation of alcohol which in turn is produced from sugar cane molasses in several distilleries situated near the Synthetic Rubber plant. Fifteen years ago, the development of the Organic Chemical Industry in the country was limited and with the enforcement of prohibition virtually in all parts of the country, the off-take of Ethyl alcohol was limited and disposal of molasses by the sugar industry was proving a difficult problem. It was in this context M/s. Synthetics & Chemicals undertook to set up the Synthetic rubber plant in the sugarcane producing area of Uttar Pradesh based on alcohol, whereas the plants that have been set up elsewhere, world over, for this type of Synthetic rubber are based on petro-chemicals.

6. Production of sugar cane which is an agricultural commodity is subject to uncertainties of annual rain fall in the area. During the last 10 years of operation, the alcohol based SBR plant had gone through hardships due to shortfall in production of alcohol arising out of drought conditions faced by the sugar cane/molasses based alcohol industry. The unit was permitted to import alcohol on few occasions to augment local supplies. The cost of production of synthetic rubber based even on locally available alcohol relative to the petro based product

is higher. Since the cost of imported alcohol is higher than locally available alcohol, whenever the unit was obliged to import alcohol, their cost of production increased further leading to significant resistance by the consumers of synthetic rubber.

7. Along with the setting up of SBR plant based on alcohol, steps were also taken for the production of various organic chemicals based on alcohol. With the growth of organic chemical industry, the demand for alcohol steeply increased leading to uncertain availability of alcohol to the synthetic rubber unit. Fortunately, Petro Chemical industry also made some headway during the last few years with the setting up of M/s. NOCIL at Bombay with plant facilities for the production of various organic chemicals. M/s. Synthetics & Chemicals have been successful in arranging supplies of Butadiene from M/s. NOCIL to the extent of about 7,000 tonnes per year. This has eased the difficult supply position of alcohol required by M/s. Synthetics & Chemicals. With the locally available alcohol to a large extent and with petro based Butadiene from M/s. NOCIL and also occasionally importing alcohol, M/s. Synthetics & Chemicals have been able to utilise their plant capacity for the production of SBR synthetic rubber during only the last 3 to 4 years. Any increase in the capacity of SBR will, therefore, have to be based entirely on petro-based Butadiene.

8. The total production of various grades of synthetic rubber in India by M/s. Synthetics & Chemicals during the last 9 years has been as under:-

Table-II

<u>Year</u>	<u>Production (M. Tonnes)</u>
1963-64	8,075
1964-65	11,633
1965-66	14,741
1966-67	22,358



1967-68	19,942
1968-69	22,806
1969-70	26,689
1970-71	33,791
1971-72	52,911

Along with the grades of SBR rubber mentioned earlier, the unit has also been producing successfully limited quantities of polybutadiene by the emulsion process (LBR-08) and synthetic latex for blending with VP latex for tyre cord dipping, based on the know-how developed in their Company; they have also plans to produce Butadiene-Acrylonitrile rubber.

### III. Demand Pattern of General Purpose Synthetic Rubber

9. The demand for General Purpose rubber such as SBR depends upon the product pattern of rubber goods. In India nearly 65% of the total rubber consumption is accounted for by automobile and bicycle tyres and tubes and tyre retreading material. Another important aspect which has a significant bearing on the demand for SBR Synthetic rubber is the pattern of production in the automobile tyre sector itself in terms of tyres for various categories of vehicles. In India Bus and Truck tyres constitute nearly 50% of the total tyre demand (this used to be substantially higher 5 years ago) whereas in other advanced countries the proportion of Bus/Truck tyres is only a fraction of the demand for car tyres. While the tyre industry has been able to utilise large proportion of SBR rubber in various categories of tyres and tyre retreading material, its usage has been only limited in Bus/Truck tyres. The high proportion of Bus/Truck tyres in the overall tyre production is expected to continue in the next 10 years also and this would in turn significantly effect the increased off-take of SBR rubber.

10. A break-up of the production of Bus/Truck tyres during

the last 5 years vis-a-vis the total production for all categories of automobile tyres is given below:-

Table-III

Year	Production of Bus/Truck Tyres (Nos.)	Total production of automobile tyres (Nos.)
1968	1,851,284	3,438,551
1969	2,077,653	4,015,014
1970	2,092,631	4,040,946
1971	2,362,783	4,659,129
1972	2,391,758	4,978,218

IV. Future development of Synthetic rubber

11. Apart from indigenously produced Natural and SBR Synthetic rubber, the Rubber Goods Manufacturers are also permitted to import limited quantities of other types of Synthetic rubber for which there is no indigenous production. In the past, imports of limited quantities of Natural rubber also were being permitted whenever the indigenous production was considered not adequate to meet the total demand for New Polymer. Type-wise consumption of Natural and Synthetic rubber during the last 5 years is given below:-

Table IV. (K. Tonnes)

Type	1967-68	1968-69	1969-70	1970-71	1971-72
1. Natural Rubber	74,518	86,615	86,213	87,237	96,454
2. S.B.R.	20,266	24,198	26,969	28,118	31,565
3. Butyl	1,688	1,516	1,812	2,702	3,227
4. Neoprene	314	340	384	460	549
5. Nitrile	254	329	435	530	499
6. Polybutadiene	114	5	58	577	375
7. Synthetic latex	432	597	636	673	788
8. Others	256	257	342	100	206
9. Total for items above	27,324	27,238	30,636	33,160	37,209

It may be seen from the above that apart from Natural and SBR Synthetic rubber, the consumption of other types of Synthetic rubber has been only limited. As stated earlier, SBR has been the only General Purpose synthetic rubber that is being produced at present.

12. High Cis-polybutadiene rubbers:

50% of the automobile tyre production in India is for Bus/ Trucks; this is the expected pattern during the next five years also; as such consumption of SBR may not show substantial increase at least during the next five years. In order to increase the new polymer availability and to augment the supply of Natural rubber and in order to reduce dependence on imports, it was felt that there was scope for setting up a second Synthetic rubber plant. The matter regarding the selection of the specific type of synthetic rubber for which production facilities are to be set up was taken up with the consuming industry. It was also discussed in Technical Seminars. Finally M/s. Polymer Corporation Ltd., Canada, was commissioned by Government of India to undertake a study of the needs of the new polymer over a 15 year period. Based on the findings of this report, Government of India took a decision to set up the second synthetic rubber plant forming part of the down stream unit of M/s. Indian Petro Chemical Corporation near Baroda in the State of Gujarat. The scheme is for the production of 20,000 M. tonnes per year of high Cis-polybutadiene in the Public Sector in collaboration with M/s. Polymer Corporation of Canada. The raw material required for the project viz. Butadiene would be obtained from the C<sub>4</sub> stream of the Naptha cracker of the Petro Chemical Complex. Preliminary work on the project is in progress and the plant is expected to go into production during the next 3 years. After five years, with further increase in the production of automobile tyres beyond the envisaged demand of 11.5 million nos. (1978-79) and with further growth in the other sectors of the

rubber goods manufacturing industry the need for the setting up of a second unit synthetic rubber plant based on petro-chemical raw materials would be there.

#### 13. Butyl Rubber

A substantial part of the automobile tube production and practically all the bicycle tube production in India is based on Natural rubber. To a large extent this is due to the fact that production capacity for Butyl rubber is yet to be set up in the country; this accounts for the limited consumption of Butyl rubber as shown above.

Once the production facilities of Butyl rubber are set up in the country, its demand is likely to increase steeply as Butyl rubber has inherent advantages over Natural rubber in the production of automobile and bicycle tubes. The demand for automobile tubes and bicycle tubes has been tentatively assessed to go up to a level of 11.5 million nos. and 50 million nos. each by 1978-79. The requirement of the total polymer for the production of automobile tubes has been estimated at 19,000 M. tonnes. Keeping in view this as well as the use of Butyl rubber to a limited extent in bicycle tube production and also its usage in other fields such as rubber lining etc., the overall demand for Butyl rubber may reach a level of 20,000 M. tonnes during the next 5 to 7 years; setting up of plant facilities with a capacity of 2,000 M. tonnes/year is considered economically viable. The raw material required for the manufacture viz. isobutylene is expected to become available from the Petrochemical complex and the refineries. This will be the third synthetic rubber unit and a decision on the same is yet to be taken by the Government of India.

#### 14. Nitrile Rubber

The present consumption of Nitrile rubber, due to restricted imports, has been limited. The existing SBR synthetic rubber unit

has been permitted to undertake the manufacture of 2,000 M. tonnes per year of Nitrile rubber based on its own know-how and indigenous raw materials and the same may come on stream towards the end of 1975. A production of this order is considered adequate during the next 5 years.

15. Other Special Purpose Synthetic rubbers

The consumption of other Special Purpose Synthetic rubbers such as Poly-chloroprene, Poly-sulphide rubber and other miscellaneous Special Purpose Synthetic rubbers has been very limited totalling to about 800 M. tonnes. The demand for all these types of rubbers may not exceed 1500 M. tonnes during the next 5 to 7 years; as such it may not prove viable to set up manufacturing facilities for these types of rubbers at present.

V. R & D facilities in the country

16. M/s. Synthetics & Chemicals who have been manufacturing SBR type synthetic rubber have set up a service, testing and research laboratory. Arising out of the work already carried out by them from this laboratory, M/s. Synthetics & Chemicals have already diversified their production to manufacture emulsion Poly-butadiene rubber, special grades of SBR rubber and synthetic latices. M/s. Indian Petrochemicals Corporation Ltd. who are implementing a scheme for the manufacture of High Cis-Poly Butadiene are now setting up a well equipped Research and Development Laboratory to enable them for carrying out developmental work and advance research on polymers. Shri Ram Institute for Industrial Research, Delhi and National Chemical Laboratory, Poona, have also been carrying out research work on Polymers. Based on the work carried out in the National Chemical Laboratory, M/s. Synthetics & Chemicals are now poised to commercialise the manufacture of Nitrile rubber. Pilot plant work on the manufacture of Poly-chloroprene is under way in these Institutes. The Indian Rubber Board have

set up the Indian Rubber Research Institute at Kattayan in Kerala for carrying out fundamental as well as process research on Natural rubber. The rubber chemical manufacturers in the country have also good research laboratories for carrying out work on rubber chemicals for use in the Rubber Goods Mfg. Industry. It would thus be seen that steps have already been taken to set up requisite infra-structure for the Research and Development work in this field.

#### VI. Conclusion

17. As stated earlier, the production of Natural rubber in the country is rapidly increasing; the production which was of the order of 25,700 M. tonnes in 1960 is expected to exceed 200,000 M. tonnes by 1978-79; it is planned to increase the production even further. The Synthetic rubber plants set up/to be set up would only be supplementing the supply of Natural rubber. While planning for the setting up of Synthetic rubber capacity, emphasis is laid on procuring the monomers from local sources. Utilisation of alcohol for this purpose is no longer considered feasible; the shift inevitably would have to be towards petro chemical sources. The limitation in the yield of the required monomers from Naptha crackers vis-a-vis the overall investment required for the purpose has been recognised. In view of this implementation of Synthetic rubber production if carried out even based on limited quantities of imported raw materials to supplement the locally available raw materials for shorter intervals of time before adequate facilities for the manufacture of monomers are established, should prove beneficial to the National economies of the developing countries.

#### VII. SUMMARY

18. India is one of the few countries in the world where there is production of both Natural and Synthetic rubber and also a

well developed Rubber Goods Manufacturing Industry to consume the rubber. The consumption of new Polymer during 1972-73 was about 135,000 M. tonnes and the same is expected to reach a level of 265,000 M. tonnes by 1978-79. The production of Natural rubber which was only about 25,700 M. tonnes during 1960-61 has gone up to about 112,000 M. tonnes during 1972-73 and the same is expected to exceed 200,000 M. tonnes level by 1978-79.

19. There is at present one Synthetic rubber unit producing three major grades of SBR Synthetic rubber with a capacity of 30,000 M. tonnes per year; the production is based on alcohol manufactured from sugar cane molasses; the demand also is of the same order. Automobile tyre and tube production which is currently at the level of 5 million nos. each per year is expected to increase to 11.5 million nos. each per year by 1978-79. Out of this a little over 50% is for Bus/Truck tyres. In view of this there may not be a rapid rise in the demand for SBR type synthetic rubber during the next 5 years. However, the need for another suitable type of General Purpose Synthetic rubber has been recognised to meet the growing demand of the industry. The second Synthetic rubber unit for production of 20,000 M. tonnes/year of high Cis-Polybutadiene based on Petro-chemical Butadiene in the Public Sector and involving collaboration with M/s. Polymer Corporation Ltd., Canada, has been approved by the Government of India and the same is expected to come on stream in another 3 years.

20. The present consumption of Butyl rubber which is about 4,000 M. tonnes per year and which is totally imported may reach a level of 20,000 M. tonnes per year to meet the demand by the Automobile tube and other rubber goods industry during the next 5 to 7 years necessitating the setting up of manufacturing facilities for the same in the third synthetic rubber unit; the main raw material viz. Iso-butylene is expected to become available

in adequate quantities from the expanding indigenous petrochemical industry; a decision in this regard is yet to be taken by the Government.

21. The existing SER Synthetic rubber unit is already producing limited quantities of emulsion poly-butadiene and some of the grades of synthetic latices required for tyre cord treatment. This unit has also been permitted to manufacture 2,000 M. tonnes per year of Nitrile rubber and the same may be implemented in another two years.

22. Individual demand for all the other types of Synthetic rubber is relatively small as to warrant setting up of manufacturing facilities during the next 5 years; they are all currently being imported; the overall consumption of such miscellaneous types of Synthetic rubber at present is only about 800 M. tonnes per year.

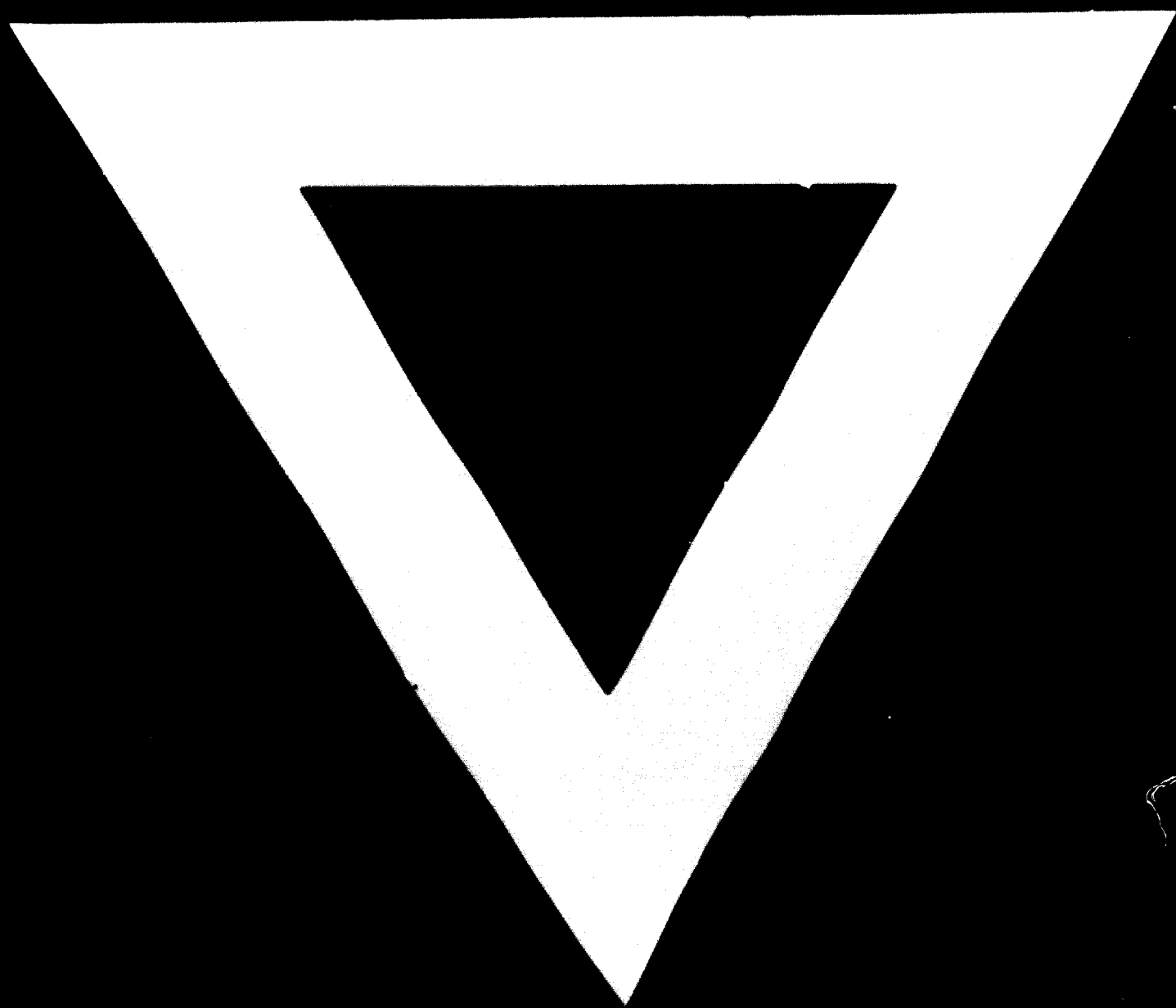
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23. The current import/all types of new polymer is about 6,000 M. tonnes only. As a result of the steps taken so far, availability of Natural and Synthetic rubber should increase to meet the anticipated increased demand of about 265,000 M. tonnes by 1978-79 keeping the imports practically at the same level as at present.

24. Steps have already been taken to set up requisite infrastructure for research and development work in this field. Based on the work carried out in one of the Research Institutes, setting up of production facilities for Nitrile Rubber as referred to in para 21 above are expected to be completed in another two years.







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